80 U.S.

The Basic Computing Journal for the TRS-80

Vol. VI., No. 4 **$3 per copy** **April, 1983**

0 60959 04
318585

Computers In Government

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.

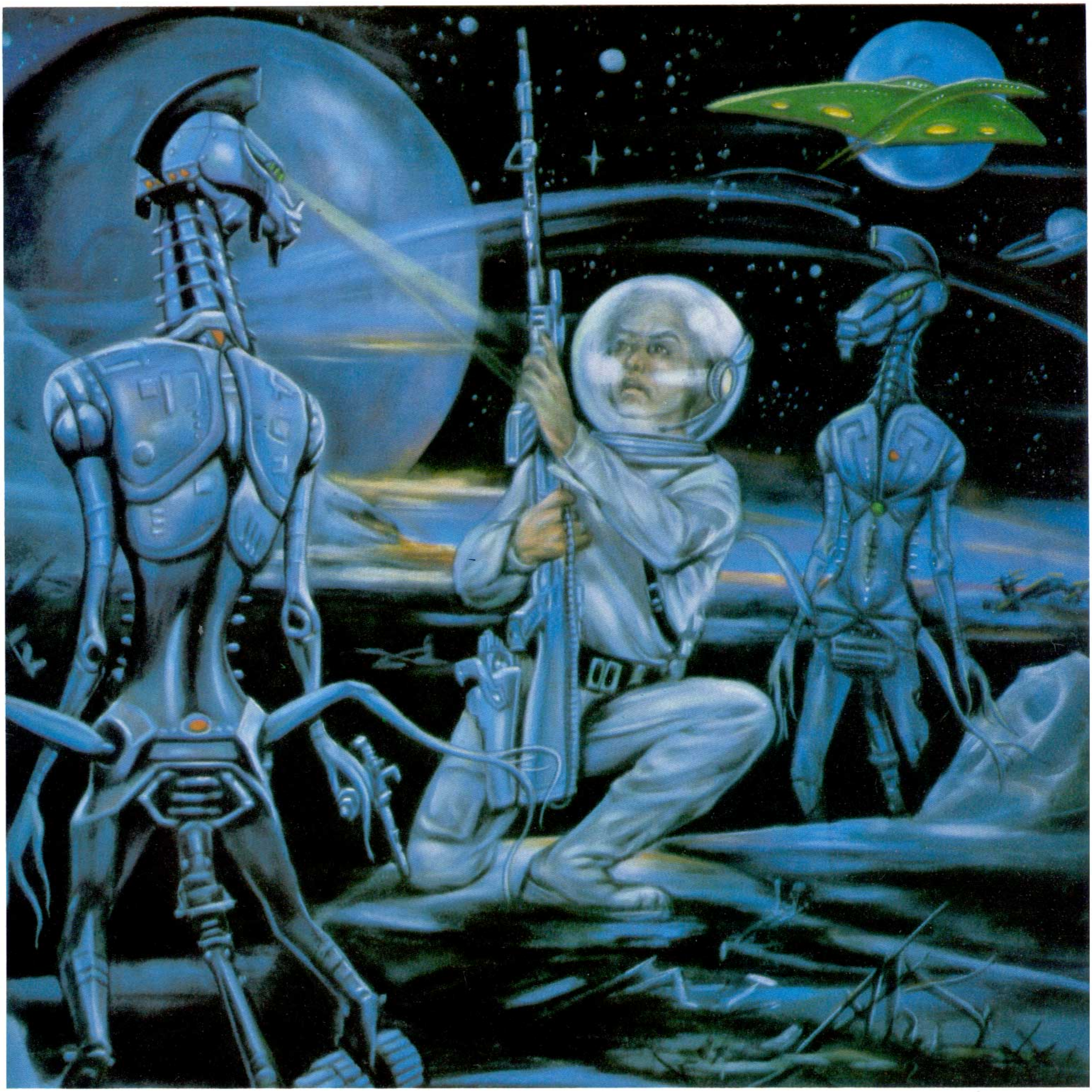
It's the only terminal program enabling you to continue operations in the command mode while receiving additional data through the RS232 cable. And you can adjust video width, turn on the printer, open the buffer and do many other things and then return to the terminal mode without missing a thing.

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

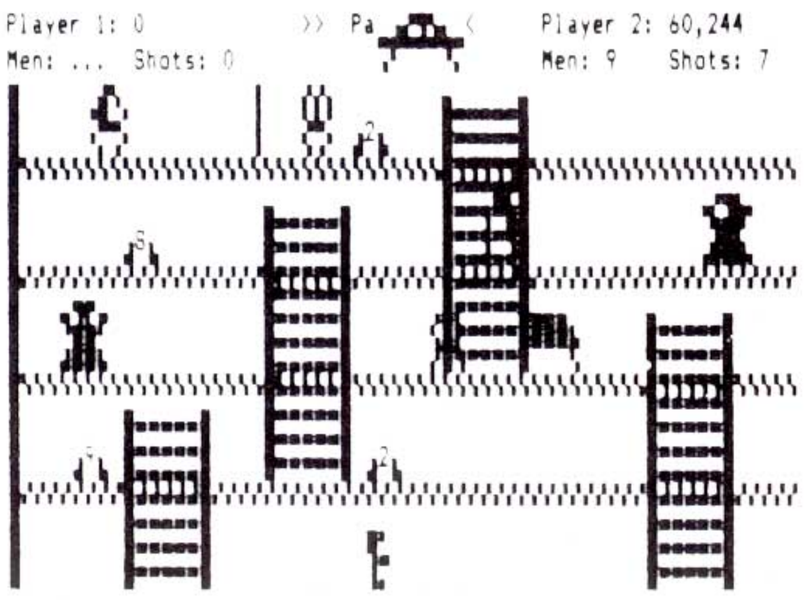
MICRO-SYSTEMS SOFTWARE, INC.

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



PANIK

(BY WILLIAM DEMAS)



- MACHINE LANGUAGE
- JOY STICK COMPATIBLE
- SUPER ENHANCED DISK VERSION
- ARCADE STYLE GAME
- SOUND
- 10 HIGH SCORE SAVE

It has only been 2 weeks since the Mzors have invaded Earth. It took them 3 days to lay waste and conquer Earth and now Earth's inhabitants have been taken to Mzor slave labor sites on distant planets. You alone have managed to escape them, but they have tracked you down and have you trapped at one of their building sites. Your mission is to rid the galaxy of the Mzors forever, but you know that this will not be easy. Mzors are very intelligent because they are half animal and half machine. Their leaders are very difficult to destroy and are capable of creating more Mzor warriors at will. Your only weapons are your energy pistol, your short range transporter pack and your courage. All of mankind is depending on you.

SEE YOUR LOCAL DEALER OR ORDER FROM **FANTASTIC SOFTWARE, P.O. Box 27734, Las Vegas, Nevada 89126, (702) 362-1457**. Price: 16K tape $19.95, 32K disk $24.95, Model I & III. Tape version will not transfer to disk. MasterCharge and Visa.

Advertisers: 80-U.S. Journal will accept relevant commercial advertising which pertains to, or is for use on, the Tandy Corporation microcomputers. Write for a current rate schedule.

Authors: We constantly seek material from contributors. Send your material (double spaced, upper/lower case, please) and allow approximately 4 to 6 weeks for review. Programs must be supplied in machine readable form on diskette or tape, clearly marked as to model and operating system. Text files may be on diskette. Media will be returned if return postage is provided. Cartoons and photographs are welcome. Generous compensation will be made for non-trivial works which are accepted for publication. 80-U.S. Journal pays upon acceptance rather than on publication.

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

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

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

President Ronald Reagan tries out a TRS-80 Model III during a visit to Providence-St. Mel's High School, Chicago, IL, as students keep a watchful eye on his progress. © 1983, Worldwide photo.

80-U.S.

The Basic Computing Journal for the TRS-80

TRS-80 is a trademark of the Tandy Corp.

Vol. VI, No. 4 — April, 1983

ARTICLES

The TRS-80 in small government **18**
Charles P. Knight
Farmersville's municipal billing system.

Electronic politickin' in Old Town **22**
David R. Hughes

Right as rain **28**
TAPE JOURNAL For all models — Larry Krengel
Forecast the weather with your computer and the Farmer's Almanac.

Permatime **30**
TAPE JOURNAL Model I — Ray Bennett
A real-time clock for your Model I.

Moving day for DEBUG **44**
Model I/III tape systems — Don Bazzurro
Relocate it for better results.

A Color Computer spelling bee **46**
TAPE JOURNAL Color Computer — Craig Hunt
. . . with sound.

The creators of DOSPLUS II **54**
Pete Carr
An interview with Kim Watt and Steve Pigliarulo.

Com 80 — 56

Donald L. Stoner

Modems — the sound of music.

Basic bingo — 69

David Busch

TAPE JOURNAL

Models I/III

Let your computer do the work.

A basic data base — 74

Paul Frank

TAPE JOURNAL

For all models

Simple building blocks for a cassette oriented system.

Accessing Profile files from BASIC — 80

Terry R. Dettmann

Models I/II/III

Vehicle maintenance — 86

Jeff Clack

How the City of Lander, WY keeps track on their Model III.

In the chips — 90

Spencer Hall

TAPE JOURNAL

Models I/III

The numbers game.

Files and foibles — 100

Terry R. Dettmann

Models I/II/III

Compacting file information.

lower your UPPERCASE — 102

Ken Hipple

TAPE JOURNAL

Models I/III

Converting your software.

Inside the stringy floppy — 108

Glenn W. Collura

TAPE JOURNAL

Model I

Converting cassette tape I/O to be floppy compatible.

REVIEWS

BASIC Conversion Handbook — 112

Reviewed by Paul Hine

BREVI-T — 114

Reviewed by Albert Niessner, III

Trashman — 114

Reviewed by Jerry L. Latham

Copyart Word Graphics Processor — 116

Reviewed by Jim Klaproth

DEPARTMENTS

Editorial — 6

By Cameron C. Brown

Directions — 8

By I. Mike Schmidt

Notes, etc. — 12

By Cameron C. Brown

Letters to the editor — 15

BASIC bits — 60

By Thomas L. Quindry

Exploring VisiCalc — 66

By Timothy K. Bowman

Basically BASIC — 96

By James A. Conrad

Tandy topics — 98

By Ed Juge

Bulletin board — 119

For immediate release — 120

Advertiser index — 124

80-U.S.

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 Sales
Donald Scarberry

Promotion/Circulation
Robert P. Perez

Production
Catherine D. Doud

Editorial Secretary
Eva R. Jones

Accounting
Helen Dalton

Editorial

Cameron C. Brown, Editor

The microcomputing industry is still a rapidly growing infant. During this year, Radio Shack will be (according to musings in *The Wall Street Journal*) releasing six new models. Combined with their existing (and extant) models (I, II, III, CC, PC-1, PC-2, 12, and 16) and the over 150 other computer manufacturers, you will get probably ten times that number of models and versions of microcomputers.

Almost two years ago, we were getting letters stating "You never run any Model II programs." A year ago, we were getting letters stating "You never run any Color Computer programs." And I am sure that a year from now we will get letters stating "You never run any Model IV programs." All of those well-intentioned readers were wearing blinders.

We publish programs. They happen to be written on a Model XX. That does not make them worthless to you. I believe that well over eighty percent of any program is transferable from one model to another. Too many people just look at the incompatible twenty percent.

BASIC code is our common link. By learning to adapt programs from other models, and yes, even other brands of computers, we can vastly increase our source of worthwhile programs. I still use a program that I adapted from *Interface Age* in 1978. It was written in Northstar BASIC and would not directly run on my Model I. But, by analyzing the output and video formatting, I was able to generate code that worked. Then I proceeded to give the program the enhancements that took advantage of my machine's unique capabilities. That program has since been moved to a Model III and then a Model II. I am sure that it will continue to tag along with me as I change my model to an even newer and more powerful unit.

Computers are tools. Programs are tools. We use programs to solve problems and simplify our tasks. An elegant and unique approach must not be overlooked just because it was written for a Color Computer and can't be typed directly into your Model III.

This is not a call for every reader to become an expert on every model of the TRS-80. That is not possible. It is possible for us to help each other. Code should be written with conversion in mind. PEEKing and POKing is fine, but give a remark as to why. Let the readers of your program in on what is going on. Video formatting is fine, but try to subroutine it so that only one section of code has to be altered for a different video. Use the CHR$s that make your model unique, but do it in a way that can be altered by other programmers.

I encourage you to give it a try. In fact, why not give it a try on the programs we publish? Send us the conversion code for a program and we will see that it gets into print. Drop us a letter that specifies the line changes that had to be made (or operations that were changed). If it catches on, it may signal a direction for the whole industry.

By converting a program from a Model I to a Model II, or a Color Computer to a Model III, we can begin to discover our similarities. The computerist needs as much help as we can give. Let's get together and see what can be done. By writing code that is convertible, everyone can benefit. By reading code from other sources besides your own model, you can benefit. We are just at the start of the revolution; it must not get sidetracked due to tunnel vision. ■

Special: SAVE $15
NEWSCRIPT + Mailing Labels
$139.95

"IF YOUR PRINTER

IS ON THIS LIST, NEWSCRIPT™ SHOULD BE ON YOUR COMPUTER."

NEWSCRIPT'S exclusive print processor gives you total printer control.

NEWSCRIPT's exclusive print processor takes over where formatting leaves off with over 200 print processing and support features. NEWSCRIPT takes you beyond text formatting — beyond just printing text on paper. With NEWSCRIPT's Print processor you take full advantage of your printer's hardware and software features, creating an unsurpassed printed image. Text editing (the part you see), is only part of the job, printing is the other part — the part others will see.

NEWSCRIPT controls over 80 popular printers.

You don't even have to know how your printer works — only what it can do. NEWSCRIPT will do the rest with such major features as underlining, right justified proportional printing, top and bottom titles, top/bottom left-right-center page numbering, chaining and embedded printing of any length file with disk spanning, fully formatted merging of form letters with selective editing, boldface, sub/super scripts, character substitution/translation, table of contents, indexing, hanging indents, paragraph numbering, line numbering, double width characters, italics, hard and soft hyphens, in-memory spooling, and many other features.*

NEWSCRIPT'S text editor has sophistication to match its print processing.

Buffered key entry rates to 450 characters per second — you never drop characters. Windowing to 240 characters, block move and copy within and between files, definable auto save, "HELP" and "WHOOPS" commands, repeat and query last command, search and replace within column and line limits as well as globally, and an automatic interface to the ELECTRIC WEBSTER spelling checker (sold separately).

NEWSCRIPT'S 277 page manual contains an introductory tutorial with explanations of the beginner's most common needs, a "How to Section" to help when you're stuck, a fully alphabetized description of the commands with literally hundreds of examples, a topical index with over 1,300 entries, and a handy quick-reference card (naturally!).

Start getting the printed results only NEWSCRIPT can give you for $124.95. Requires TRS-80 Model I or III with 48K and 1 disk (minimum — 2 recommended)

Newscript T.M.

is available at computer stores, selected B. Dalton Book Sellers, and selected independent book dealers. If your dealer is out of stock order direct. Include $3.00 (domestic), $6.00 (Canada) for shipping and handling. Foreign residents add $15.00 plus purchase price, in U.S. funds.

TO ORDER, CALL NOW, TOLL-FREE:
(800) 824-7888, Operator 422
Calif: (800) 852-7777, Oper. 422
Alaska/Hawaii: (800) 824-7919
For technical information call:
(213) 764-3131, or write us.

PROSOFT®
Dept. C, Box 560, No. Hollywood, CA 91603

NEWSCRIPT companion programs (sold separately): MAILING LABELS $29.95, DAISY WHEEL PROPORTIONAL $49.95 (not required for Daisy Wheel II), PENCIL & SCRIPSIT FILE CONVERSION $24.95, ELECTRIC WEBSTER (spelling checker and automatic correction) $149.50, GEAP (TRS-80 graphics — requires Epson MX-80) $49.95, DOTWRITER (Hi-res graphics — requires Epson MX-80/100 with Graftrax) $69.95, GEAP/DOTWRITER combination (requires Epson MX-80/100 with Graftrax) $99.95

Dealers: NEWSCRIPT is distributed by IJG, Inc. (714) 946-5805

****Some features work only if your printer has the mechanical capability.***

Directions

I. Mike Schmidt, Publisher

It's April once more, and time for all of us in the land of the free and home of the brave to hand over to the great IRS our hard-earned cash. Have you ever wondered what the government does with all that money? Not too many years ago, they financed a rather pointless and stupid war in Vietnam with it. They spent billions on that one, and when there was not enough money, they simply took more from the people.

There seems to be no thought of doing with less, or adjusting the direction and policy so that costs come down instead of up. It would indeed be nice if you were running a business and could follow any whim or fancy and just ask for more money when you need it.

Fortunately for us, there is still something we can do. Our elected government officials are servants of the people. We put them where they are to conduct the business of government for us. They are supposed to represent the wishes of the people who put them into office. We sometimes seem to forget that the power to give is also the power to take away. We also seem to forget that we can get things done through those elected officials.

Here is a case in point and something you can do about it. Recently, Congress passed a tax law that will impose a 10% withholding tax against the interest you earn on savings, beginning July 1, 1983. Under this law, all banks, money market funds, credit unions, savings and loans and other payers of interest or dividends must automatically withhold 10% of the interest or dividends earned by their customers and forward the funds to the Internal Revenue Service. Even modest-income senior citizens will be affected, unless they go through the red tape of filing a Federal application for exemption.

This law will be both unnecessary and unfair. It is unnecessary because you already pay taxes on your savings interest each year when you file your Federal income tax return. It is also unfair because it will lower your interest earnings by reducing your compounded savings growth. You may as well also expect to see the service charge from your bank increase. The IRS can't wait until the end of the year; they seem to want it all up front. How long do you suppose it will be until they want it in advance? Is this responsible government?

The theme of this issue just happens to be Computers in Government. It just seemed to work out that way. This column would have appeared no matter what the theme of the issue. Now, here is what you can do. Fire up your computer and load your text editor or word processor and write a general purpose letter so that you can change the name and address of the addressee. Send the letters to your Congressmen and tell them how you feel about this new law. While you are at it, tell them how you feel about the general financial irresponsibility concerning Social Security, deficits, business taxes that restrict new business and all the rest. Remind them that they are elected to represent you, and to get on the stick.

Your Senators can be reached at the Senate Office Building, Washington, D.C. 20510. Your Congressional Representatives can be reached at House of Representatives, House Office Building, Washington, D.C. 20515.

Good laws, like good days, are made — not had. ■

80-U.S. on tape!

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

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

Model I/III tapes are available monthly for $9.95 (ppd.) or get a full one-year subscription of twelve tapes and over sixty programs for only $99.95 (ppd.).

Color Computer tapes are available quarterly (every three months) for only $9.95 (ppd.) each.

Each tape issue will contain every program recorded twice and a summary sheet of its contents and any special notes on loading the program. Also included with each tape is a postage-paid card for your vote on the best of the bunch.

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

Save hours of typing time!

April, 1983

☐ **SEND ME** this month's Model I/III cassette of the Tape Journal for $9.95 ppd.

☐ **LET ME** save even more. Sign me up for one year of the Tape Journal, beginning with this month's Model I/III cassette. Only $99.95 for 12 tapes ppd.

☐ **SEND ME** color. I want this quarter's (Jan.-Mar. 83) edition of the Color Tape Journal for $9.95 ppd.

☐ VISA ☐ MasterCard ☐ Check/Money Order

Name _____

Address _____

City _____

State _____ Zip _____

Signature _____

Card # _____ Exp. date _____

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

ACCESS UNLIMITED

FREE

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

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

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

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

SPECIALS OF THE MONTH:

NEW "Star Gemini" Printer

Dot Matrix 100 CPS
Model 10 — Reg. $499.00 Sale **$425.00**
Model 15 — Reg. Retail $699.00 Sale **$625.00**

NEW "C-ITOH F-10 Starwriter" Printer

Reg. Retail $2295.00 Sale **$1695.00**

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

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

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

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

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

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

SPECIAL CLOSEOUT:

"Brother" HR1 Daisywheel Printer

Serial— Closeout Sale **$849.00**
Parallel— Closeout Sale **$799.00**

Save $$ on our most popular items!

Percom Data Separator (reg. $29.95)	Now **$23.95**
Screens for Models I*, II*, III Green, Lt. Blue, Dark Blue, and Amber. Bronze for color video (reg. $24.95)	Now **$12.95**
Head Cleaning Kit (reg. $29.95)	Now **$19.95**
Drive Numbering Tabs, pkg. 0-3 (reg. $4.50)	Now **$ 3.95**
NEW Style Smoke Grey File 5¼", Holds 75	Now **$24.95**
Flip-N-File 8" (reg. $54.95)	Now **$28.95**

MEDIA FOR LESS

BASF 5¼" Single Sided Double Density Lifetime Limited Warranty. reg. $44.95 now **$24.90** bx of 10

ATHANA complete with hub rings & one year limited warranty.

Single sided Single density 5¼"	**19.90** bx of 10
Single sided Double density 5¼"	**22.80** bx of 10
Double sided Single density 5¼"	**29.90** bx of 10
Double sided Double density 5¼"	**33.50** bx of 10

VERBATIM Single Sided Double Density **30.90** bx of 10

8" Diskettes from $22.75

LIBRARY CASES—Holds 10 Diskettes Sale **$2.95 ea.**

Bare Drives for "IBM PC"—Internal or External — $269.95 ea.

Beautiful Oak Finish Computer Furniture
50" Split Level Desk $249.00
Matching Printer Stand $89.00

DOS + 3.4 Reg. $159.00. Sale $99.95

Anti-Static Mats—Colors: Russett, Blue & Gold, Natural Brown, & Golden Brown.

3' x 5'—Reg. $75.60	Sale: **$57.00**
4' x 6'—Reg. $120.90	Sale: **$91.00**
4' x 8'—Reg. $161.30	Sale: **$122.00**

"PAGEMATE" Typing Easels—$14.95

SAVE on an Arrick Quick Switch‡

Changes a TRS-80* printer port or a peripheral between computers instantly and easily. Available for RS-232 and Centronics. Plugs included.

Now from $99.95. Cables from $31.95.

• LIMITED TIME OFFER/LIMITED QUANTITIES •
Prices subject to change without notice.

" " Reg. Trademarks

Prices do not include state taxes.

the MICRO SHOPPING CENTER

Percom Quality for your Model III

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

TFD 340N1	one drive single sided double-density	**$449.00**
TFD 340N2	two drive single sided double-density	**$750.00**

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

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

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

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

WE HAVEN'T FORGOTTEN THE MODEL I*!!

Upgrade your Model I to Double Density **All for 159.95!!**

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

Drives for your storage needs

AFD40-1	40 track single sided drive	**$275.00**
AFD42-1	40 track flippy drive	**$329.00**

Percom Hard Disk—Quality for your System

*works with existing floppy drives
*can be daisy-chained up to four hard disks
***DOS Plus 4.0 or LDOS included FREE**
*Now available for immediate delivery in 5 & 10 megabyte configuration
Can be used for Model II*, III*, "Apple II" or "IBM PC" computers.

Reg. from $2495
Now from $1995

Check out the benefits of Access Unlimited Hard Disk Drives For TRS-80*, "IBM-PC", "APPLE II"

- ✓ 5, 10 Megabyte and larger drive units.
- ✓ lets controller handle up to 4 drives.
- ✓ works along with existing floppy disk drives.
- ✓ includes host system support software.

From $1795.00 (5MB) For TRS-80

Your present system too small?

Take advantage of the iBEX company business system and stand alone word processing-systems—overbuild mistake-**model No. 7202**
Regular retail $9070.00
Now for a limited time only—while supply lasts—$3995.00
Look what you get for $3995

- Z80 • CP/M compatible
- 64 kilobyte RAM.
- Dual 8" floppies (total 2.4 Mbytes)
- Switchable to **IBM 3740** format
- 12" green phosphor monitor (80 x 24 characters)
- Centronics compatible printer interface
- Serial interface
- Full function keyboard
- Clock timer and calendar (with battery)
- Over $2000 Worth of **FREE** Software: CP/M Operating System, M/Basic Interpreter, Perfect Writer, Perfect Speller, Perfect Calc, Perfect Filer

HOT OFF THE PRESSES:

Inside Personal Computer Disk Storage Only **$5.95**
THE Necessary Basic Book, **NEW** From "Percom"

Enjoy 1-stop shopping and BIG savings

Order your disks, software, supplies, and accessories from Access Unlimited. We offer low prices on automatic Datamarc*** Sheet and Envelope Feeders for Radio Shack*, QUME, Ricoh, Diablo Daisywheel, and Dot Matrix Printers. And the more you buy at one time, the more you can save.

VISA **1 (800) 527-3475** master charge

Order by phone or by mail. We accept Visa, MasterCard, cashier's checks, certified checks, and money orders. With personal checks, allow additional time for bank clearance. Your bankcard will not be charged until your order is shipped. On orders over $1,000, we pay freight (surface only) and insurance: please add $3.00 shipping and handling under 50 lbs. Over 50 lbs., add $5.00 for orders under $1,000.00. Texas residents add 5% sales tax. Allow 2 to 4 weeks for delivery.

EXPLANATION OF SYMBOLS
* Trademark of Tandy Radio Shack Corp.
†† Trademark of Apparat Corporation
TM Trademark of Access Unlimited
† Trademark of Percom Data Company, Inc.
** Trademark of Micro-Systems Software, Inc.
‡ Trademark of Arrick Products Company
*** Trademark of Datamarc, Inc.
x Trademark of Digital Research

☐ Please send me a FREE catalog. I'm not ready to order at this time.
☐ YES, I'm taking advantage of your Sales prices.

Name _____
Company Name _____
Address _____
City _____ State _____ Zip _____
Phone Number ( ) _____

Quantity	Item	Unit Price	Subtotal
		Subtotal	
		State Sales Tax (Texas residents only)	
		handling charge	
		Total	

Check one:
☐ payment enclosed ☐ Visa ☐ MasterCard*

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

*If MasterCard, numbers above name: ☐☐☐☐

Expiration Date: ☐☐ — ☐☐

Authorized signature, if charged

ACCESS UNLIMITED

DEPT. C4/401 N. Central Expwy. #600/Richardson, Texas 75080
Tel. 1-800/527-3475 214/340-5366
214/690-0207—Sat. and Evenings Only

Notes, etc.

Cameron C. Brown, Editor

There is a poem about best laid plans and it fits us perfectly. As we noted in January, we were sending programs directly to the typesetter from the computers. That was a simple description of a rather involved process. Here is a confession.

Model I programs were put onto a Model III through the CONVERT program. We then saved each program back out on disk as an ASCII file. They were then transmitted to a Model II through a terminal program. Color Computer programs were LLISTed directly into the Model II's RS-232 port. Once the programs were on the Model II, we had to load them in an editor and remove extraneous code that the terminal program may have appended to the file that was sent. We then forwarded a translation table to the typesetter and sent over the program. Well, along the way we ran into bit dropout and it has caused us to step back and take another hard look at it.

After numerous trials in sending files, of text and listings, we noted no errors and went ahead with publishing what was sent. In every trial, we checked each program listing with hard copy from the computer. We even hired people to rekey in many programs out of the January and February pasteups. As Murphy already knew, the program with errors would be the one not checked.

A dropped bit may cause an error in text and our proofreaders would probably catch it. But when a bit is dropped in a listing, the code could still look fine, and yet the program won't work. We won't accept an increased chance for flawed listings.

So, we are going back to photographing direct computer listings. The type is from a daisywheel, not as sharp as typeset copy, but it will be reliable. That is what is most important.

When we can truly get reliable communication from all models to a typesetter, and not have to worry about tabs, spacing, and dropout, we may try it again. By that time, we will probably have typeset quality printers for our computers anyway. We are sorry for the inconveniences, but we have learned an important lesson.

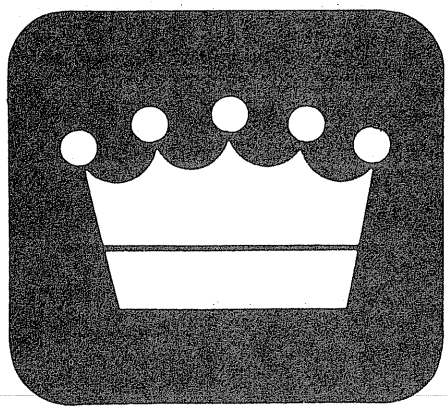
Microstrokes, January '83

These corrections are why we are no longer going to typeset. The program is an excellent one and many readers have taken the time to type it all in. The most important corrections are to lines 10 and 490 (that was where our bits decided to drop), the rest are cosmetic and are not crucial to the operation of the program. We are still trying to find out why lines 48 and 49 were missing completely from the listing. Here are the missing lines or corrected lines:

```
10 CLEAR 1000
48 PRINT"Because the example images used here are
long and complicated, there will be a pause while they
are loaded into memory.
49PRINT:PRINT"Pressing the <U> key will enlarge
the image; pressing the <D>key will decrease the size of
the image. The <arrow>keys will move the image on the
screen. The <F> and <S> will change the rate of
movement.
350 GOSUB 410:'TOGGLE SW TO ACHIEVE SET
RESET EFFECT OF IMAGE
490 DATA 33, 246, 240, 183, 237, 74, 94, 35, 86, 213, 225,
126, 183, 202, 220
642 DATA 1, 1, 1, 1, 1, 1, 9, 9, 10, 10, 2, 2, 2, 2, 2, 2, 10,
10, 10, 4, 4, 5, 5, 4, 4, 6, 6, 4, 4, 9, 9, 9, 8, 2, 8, 8, 1, 2, 4, 2, 2, -
1:'ROCKET
680 DATA 6, 6, 6, 6, 1, 4, 4, 2, 1, 4, 4, 2, 1, 4, 4, 2, 1, 4, 4, 2, 1,
4, 4, 2, 1, 4, 4, 2, 1, 4, 4, 2, 1, 4, 4, 2, 1, 4, 4, 2, 1, 4, 4, 2, 1,4, 4, 2,
1, 4, 4, 2, 1, 4, 4, 2, 1, 4, 4, 2, 1, 4, 4, 2, 1, 4, 4, 2, 1, 4, 4, 2, 1, 4, 5, 5, 5, 5, 1,
8, 1, 8, 1, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8, 8 'TANK
690 DATA 2, 1, 1, 1, 1, 1, 9, 9, 9, 9, 10, 10, 10, 5, 5, 5, 8, 8, 8, 8,
8, 8, 8, 10, 10, 10, 10, 2, 2, 2, 2, 2, 4, 4, 4, 4, 4, 4, 4, 1, 1, 1, 1, 1, -
1:'A SMALL HOUSE
110 TS = &HF0F8 :'-3580 DECIMAL -- THIS ADDRESS
IS THE START WHICH CONTAINS TWO ENTRY
ADDRESSES FOR EACH IMAGE
```

Pocket Adventure, December 1982

Line 700 should really have been line 710. The actual line 700 is worded this way: 700 :PAUSE "YOU HAVE ENTERED A":PAUSE"BOTTOMLESS PIT!!":PAUSE



THE KING OF UTILITIES SUPER UTILITY PLUS

"I believe SUPER UTILITY or SUPER UTILITY PLUS should be present at every TRS-80 disk installation."

We didn't say this; Paul Wiener did in 80 Microcomputing, Jan. '82...but we sure agree with him!

You heard about it! You read about it (80 Microcomputing). Now get the "cadillac" at a special price!

Compatible with MOD I, and MOD III, and all the current operating systems! Copy files from any DOS to any DOS, MOD I or III, without converting!

Zap
Purge
Format
Special Format
Disk Repair
Memory
File Utility
Tape Copy
Format without erase
Disk Copy
Special Disk Copy
Configurable System

MUCH MORE - Mod I & Mod III on Same Disk

For MOD I/III . . . $74.95

NEW

Back up copy **NOW** included.

Also Available:
Super Utility Plus Tech. Manual . . . $14.95
"Inside Super Utility Plus" $19.95

This Special Limited Edition Package will be in high demand as only 500 copies will be made. They will be numbered 1-500 and will be personally signed by the author, Kim Watt. YOUR name will be embedded in the program as the serial number. The following is included with this SPECIAL LIMITED PACKAGE:

1) SUPER UTILITY PLUS S/E in /CMD File Format. Both MOD I and III versions are included, and your NAME will be the serial number. This will NOT be a protected disk, and you may make as many BACKUPS as you wish. The serial number is NOT changeable.

2) TWO attractive SU+/SE binders.
Binder #1 will include:
Three manuals in LARGE format (8 1/2 x 11")
(a) SUPER UTILITY+ Manual
(b) INSIDER SUPER UTILITY by Paul Wiener/ foreward by Kim Watt
(c) SUPER UTILITY TECH Manual by Kim Watt & Pete Carr

3) Binder #2 will include THE SOURCE CODE for SUPER UTILITY PLUS
Yes...the SOURCE CODE to this MAJOR program will be available to 500 programmers. This is FULLY commented by the author, Kim Watt, and is a machine language programmer's dream come true! After reading this, your machine language programming skill should increase tremendously. All of Kim's knowledge in ONE book! All at your disposal and for YOUR use.*

4) The license to USE Kim Watt's sub-routines... will be granted to those 500 registered owners! These 500 ONLY will be able to apply all of Kim's magic to THEIR programs. No royalty fee necessary. In other words, IMPROVE YOUR PROGRAMS! Take Kim's ideas and expand on them! Never has anything EVER been done like this before. These 500 ONLY have the right to use our sub-routines. This information is NOT being put in the public domain. We are allowing these 500 to use our routines by buying our special package. All copyrights and trademarks are retained by Breeze/QSD, Inc.

5) SU+/SE is NOT available from any dealer, but only directly through Breeze/QSD, Inc. Customers will be handled on a one-on-one basis. Confirmed orders will be pre-registered and a matching card must be returned by purchaser for full support from Breeze/QSD, Inc. We will know who each and every owner is, so full support can be given. We DO want you to sign and return our registration card for this support to commence, however. No exceptions will be made.

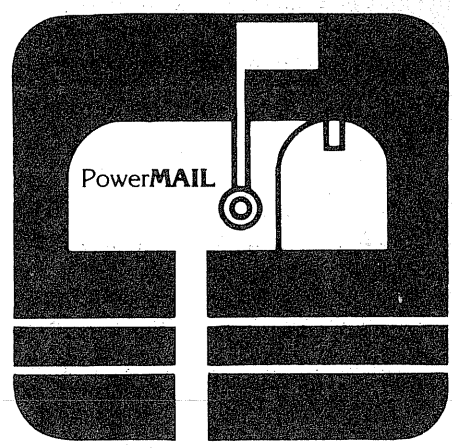
6) This is a very important step that we are taking, and only a select group can appreciate the value in a package like this. This is NOT for the general mass market. It is a college education in machine language written by a recognized expert. It IS SU+ in /CMD file form. It is a license to use Kim Watt's subroutines. It is an opportunity to vastly improve your product. It is a collector's item, also Limited, Indeed. Last, but not least, it is expensive. On the surface only, however, as this product will make you an expert programmer if that is what you want. You can literally write a DOS from studying the code! It will also make you a member of an elite group that has access to Kim's knowledge and can USE that knowledge to YOUR benefit.

Source Code is FULLY Commented.

Price for the Super Utility Plus-Special Edition is
$500

Available later this year
Call or write for more information

*Credit to Kim Watt and Breeze/QSD must be given in the program and in the documentation for sub-routines used. There is NO royalty fee to pay however.



THE MOST POWERFUL, FLEXIBLE DISK MAILING SYSTEM FOR THE TRS80
SUPPORTS 65,000 NAMES

Power**MAIL** is a highly sophisticated mass mailing system designed to run under all of the popular DOS's currently available for the Mod I or III. The program is written entirely in machine language for maximum operation speed, and occupies only 4K of the available RAM in your computer. There are no 'slow' periods when Power**MAIL** is running. New features have been added to the program that others have always lacked. You now have the ability to keep track of mailings using the 24 'flags' that are incorporated into the Power**MAIL** program. The Power**MAIL** system will handle a file up to 8 megabytes, or 65535 names, whichever is smaller. The program will run in as little as 32K and one disk drive, although 48K and 2 drives are desirable. The program will also sort the entire maximum file size and open up to 168 files simultaneously during the process. Author Kim Watt.

For MOD I/III...$99.95

Power Drivers for SuperScripsit (tm)

Printer drivers to enable SuperScripsit (tm) to use non-TRS printers are now available! These drivers interface directly with SuperScripsit and let you use your favorite printer with this fine word-processing program.

PowerDriver S-series for EPSON MX printers equipped with GRAFTRAX-80 or GRAFTRAX-Plus. Take advantage of your MX printer's capabilities! Print italics, underline, superscript, subscript, or double-print in your document! Impress your correspondents!

PowerDriver P-series for the C. Itoh ProWriter and NEC PC-8023A printers. This driver will allow you to use any of 8 pitch sizes on your printer, including proportional and double-wide proportional print! Underline, superscript, subscript, print boldface, print special symbols and GREEK (ΠΘαε€Σ) letters.

PowerDriver F-series for the C-Itoh F10 daisy wheel printer. Use this excellent printer to advantage with SuperScripsit. This driver supports all of SuperScripsit's features on this printer including proportional print, underlining, double-underlining, etc. Word-processing EPROM chip not required!

FOR Mod I/III **$29.95**

POWERSOFT
A Division of Breeze/QSD, Inc.
11500 Stemmons Fwy., Dallas, Texas 75229
To order call toll free 1-800-527-7432
For product information (214) 484-2976

POWERSOFT
A Division of Breeze/QSD, Inc.
11500 Stemmons Fwy., Dallas, Texas 75229
To order call toll free 1-800-527-7432
For product information (214) 484-2976

POWERSOFT
A Division of Breeze/QSD, Inc.
11500 Stemmons Fwy., Dallas, Texas 75229
To order call toll free 1-800-527-7432
For product information (214) 484-2976

"THERE IS THIS GUY".

Color Computer Notes

Mr. Joseph Laronda of Cheshire, CT sent us some very useful facts about the operation of the Color Computer. His letter contained the following tips.

1) It is generally known that the decimal addresses of the last machine language program loaded into the computer are: Start 487, 488; End 126, 127 (-1); Exec 157, 158. (Where the MSB is the first memory location and the LSB is the second memory location.) The LSB for End is one higher than the actual address. A 1600 End address ($640) would show as 6,65 ($6,$41). It is not so well known that the name of the machine language program starts at memory location 474 and runs to 481 ($01DA to $01E1).

2) The ROM chip version in a Color Computer can be determined by typing EXEC 41175. The message COLOR BASIC 1.1, (c) 1980 TANDY, or similar will appear. This is not to be confused with the logo which appears when you first turn on the computer. The start logo will read 1.0 even if you have a 1.1 ROM chip.

3) Newcomers to the Color Computer are always saving programs without erased gaps between programs. The goal is to leave a clear gap of at least four numbers (on the tape recorder wheel) between programs. There are two common ways to create the gap.

First, SKIPF the last program and after the tape has stopped, press record/play. Note the counter wheel number and type MOTOR ON <ENTER>, and watch the counter. When it has recorded the gap you desire, press any key and <ENTER>. You will get an SN? ERROR and the recorder will stop. Now CSAVE the new program while you are still in the record/play mode.

Or, SKIPF to the last program. Type MOTOR ON: FOR T=1 TO 6000: NEXT T: MOTOR OFF <ENTER>. Change the delay loop to anything you want (6000 is close to a gap of four numbers on the recorder).

I use a method unlike either of those. Holding the RESET button in will advance the tape recorder. This works fine and has never disturbed any programs (BASIC or machine language) that are in the computer. SKIPF the last program. Set the recorder to record/play. Note the counter. Press RESET and hold it in until the tape advances. Release the RESET button and the recorder will stop.

After a CSAVE, I note the number that the recorder has ended on. Next to the load number, I write a minus number in parentheses. For example: DATAFIND 47 (-11). The minus number allows me to back up (rewind) to the beginning of the program without re-indexing the tape to zero. This is useful when merging programs, or in loading programs from a different cassette. Using the minus number assumes that you remember which program was loaded last from the cassette. You can even back up through several programs, -11, -20, -12, for example, to reach a program "three programs back". This sounds much more complicated than it really is.

4) According to the Edtasm+ ROMpak manual (pg 65), we can safely use free memory below the first graphic page. The locations are 277-281 (hex 115 to 119) and 285-337 (hex 11D to 151). That is handy for short machine language routines, for storing data to be called by a machine language program, or for using BASIC's POKE and PEEKs.

Puzzler

This month we are looking for a way to default the break key on a Color Computer. The process is well documented for the other Tandy models, but we have yet to see it done on a Color Computer. We have been told that there are two different strobes for the break key and that it is impossible to lock out both at the same time. But, as we all know, impossible is not a valid computer term. We look forward to hearing from you. Send your solution (winning solutions get $10 and a free tour of our facilities!) to Puzzler, *80-U.S. Journal*, 3838 South Warner, Tacoma, WA 98409.

The January Puzzler is still being studied. We can't seem to get reliable results from the Model III submissions. Stay tuned for a winner on that one. A number of people wrote to say that the February puzzler was too easy, so here are eight different ways to do the same thing. The problem was to add 20 to Y when X is positive, but subtract 30 from Y when X is negative, and to do it without an IF statement. We didn't discuss zero, so nothing should be done to Y when X is zero.

Mr. Dennis Kern of Athens, GA, proposes Y=Y+20*(@MAX(X,0))/X - 30*(@MIN(X,0))/X for VisiCalc users. Mr. Carlton Ulbrich of Clemson, SC, sent in Y = Y-5+ 25*SQR(X2)/X and noted the need to cover the case of X=0 by an ON ERROR statement. Many people sent in this tip, but Mr. Spencer Weersing of Montague, MI, was the first. He suggested Y = Y - 20*(X>0) + 30*(X<0). Mr. Gordon Lippey, Los Angeles, CA, would do it this way on his Model II VisiCalc: X - @ABS(X)/@ABS(X) + 1*25 - 5 + Y. Cheryl Whitelaw of Cedar City, UT, used (as did many others) the SGN function. She suggested 200 ON SGN (X) + 2 GOTO 210, 230, 220. Line 210 is Y=Y-30:GOTO 230 and line 220 is Y=Y+20. The "program" continues on in line 230. Even our own staff got in on the problem. Jim "Basically BASIC" Conrad just had to show us that the DEF FN can be useful. He told us to do this: DEF FN A(X)= (X<0)*30 - (X>0)*20 then just say Y = Y + FN A(X). Tim "Exploring VisiCalc" Bowman did it with the @LOOKUP in VisiCalc as did some others. A good @LOOKUP example came from Mr. John H. Campbell of Okemos, MI. He set cells E4 equal to X, E6 equal to Y, A4 equals -10.0E10, B4 equals -30, A5 equals 0, and B5 equals 20. Cell D8 is defined as @LOOKUP(E4,A4...A5)+E6. By entering the value for X in E5, the answer is found in cell D8. It will handle all cases up to a negative ten trillion.

80-U.S. on Tape!

Beginning with this issue, we will be offering our programs on cassette tape. Each program that is available on tape is marked in the Table of Contents, as well as within the article. Be sure to see page 9 for complete details. No longer will long listings be a problem. Let us do the typing for you. Model I/III tapes will be available every month. Model II diskettes will be available twice a year, and Color Computer cassettes will be offered quarterly. ■

Letters to the editor

Cameron C. Brown, Editor

Congratulations on your new format. You have indeed "arrived"!

Please - I have a Model I TRS-80 Level II, 48K, with tape. Where, oh where, are my programs? Color Computer, Model II, disk programs - have you forgotten your old friends?

Robert L. Burr
Johnstown, PA

I recently picked up a copy of your magazine and was very impressed. However, it had extremely little information or software advertising on either the Model II or 16. Will this lack of information continue?

Thomas H. Walker
San Francisco, CA

Many of our old friends have converted to disk but we shall keep both of your requests in mind. —Ed.

I have been using Edtasm+ for the Color Computer to write machine programs but I have found several problems with the Edtasm+ ROMpak.

Upon trying to assemble and write out the program to tape, using the A command, I find the tape is written in a gap format instead of the expected continuous format of machine tapes. The resulting machine tape will not load because it encounters an FF gap byte on the tape when using CLOADM.

There is an error on page 32 of the Color Computer Technical Manual in that it states that the gap byte should be 01 for machine tapes. However, the CLOADM routine in ROM at A6D1 (test 01E4), which is where the gap bytes are stored after reading a tape, tests for a zero byte.

The funny thing is that the routine should continue even though an FF may be found there. It should read it in blocks; however, the CLOADM stops with an FM error. It is the first time I have ever encountered the FM error and I assume it stands for File Mode error.

Another problem is that Edtasm+ will not assemble a program in memory using the A/IM/AO command if the start of the program (ORG) is below the end of the edit buffer. This is contrary to what the manual states on page 15. Of course, this is logical since the edit buffer would be overwritten by the assembled program.

The only way I have been able to get a good tape is to start the Edtasm+ at a very high location (setting BEGTEMP at the 32K border), use Zbug GC006 as stated on page 15, and then assemble the program in memory using the program ORG as the start address with the command: A/IM?/AO instead of the MO switch. After assembly in memory below the edit buffer, I can go to Zbug to punch out the resulting assembled program from memory. The tape written by Zbug has a zero gap byte and does load without errors in a continuous format.

I am wondering if my copy of Edtasm+ is bad, or are there others having the same problem?

Steven R. Abrams
San Francisco, CA

We have not seen these problems. It may be due to your board, or a defective ROMpak. We can't tell, perhaps a reader has had the same problem and can confirm it. —Ed.

One or two reviewers mentioned as a minor fault that LDOS on a Model I cannot be booted in double density.

That is not a minor fault, it is a major failing. It means, in effect, that you must keep a single density disk in drive zero at all times and thus lose half the capacity of that drive. Otherwise a reset, like typing "END" in Scripsit, hangs up your

whole system. That risk is unacceptable.

Logical Systems Inc., has a fix. It's called SOLE. It patches the system disk so that you can reboot a double density disk. It costs $25 extra.

That is like buying a boat and then being told that the rudder is extra. SOLE should be included in the base price.

LDOS has patches for Scripsit. It you've been running a plain vanilla Scripsit, these patches are improvements. But, they are not a patch on SuperScript. Scripsit, patched with SuperScript, runs all features on LDOS, except it will not read the directory and show free space. The system hangs. It will kill and load files, so an appropriate patch should be possible. Does anyone know of one?

Peter J. Brennan
New York, NY

You are correct on the statement that LDOS will not boot on a Model I with the Radio Shack Double Density Board. But, the SOLE program is from MISOSYS and Logical System Inc. is not the owner of it. To include it with every LDOS would require each owner to pay for it, rather than the few who require it.

SuperScript is from Acorn Software and was developed in the early days of the TRS-80 and was made to work on TRSDOS and NEWDOS+. None of the DOS releases such as VTOS, LDOS, NEWDOS/80 are compatible with it. Clearly you have run into a problem that we all have to consider. As we proceed to configure our software and hardware, we risk it becoming unique and incompatible with new releases and upgrades. — Ed.

I especially enjoyed Gary Ludeke's program Deadstik in the February issue. If your readers would like to fly the shuttle with a joystick, I suggest the following modifications:

310 AN = -INT((JOYSTK(1)/2)-21)
320 TR = INT((JOYSTK(0)/10)-3)

and delete lines 315 and 325. For those with Enhanced Color BASIC, line 604 can be changed to:

604 PRINT@ 173, USING"###.#"; INT(10*DM)/10;

this allows the distance, NM, to read out correctly when you are an even number of miles from the landing field.

I have found the joystick version to be a bit more difficult. I have an unfortunate tendency to lower or raise the nose when initiating a turn. I also had this tendency as a student pilot flying T-37s back in 1965. Thanks for publishing Mr. Ludeke's excellent simulation.

Doug McLaughlin
Oxnard, CA

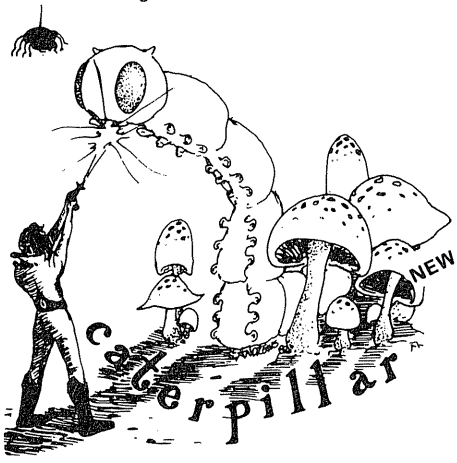
And our thanks to you for the modifications. —Ed.

AARDVARK

TRS-80 COLOR COMMODORE 24 VIC-20 SINCLAIR/TIMEX TI99

QUEST – A NEW IDEA IN ADVENTURE GAMES! Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. 16k TI99, TRS-80 Color, and Sinclair, 13K VIC-20. $14.95 each.

32K TRS 80 COLOR Version $24.95.
Adds a second level with dungeons and more Questing.



CATERPILLAR
O.K., the Caterpillar does look a lot like a Centipede. We have spiders, falling fleas, monsters traipsing across the screen, poison mushrooms, and a lot of other familiar stuff. COLOR 80 requires 16k and Joysticks. This is Edson's best game to date. $19.95 for TRS 80 COLOR.

ADVENTURES!!!
The Adventures below are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are interactive fantasies. It's like reading a book except that you are the main character as you give the computer, commands like "Look in the Coffin" and "Light the torch.")

Adventuring requires 16k on Sinclair, TRS-80, and TRS-80 Color. They require 8k on OSI and 13k on VIC-20. Sinclair requires extended BASIC. Now available for TI99. Any Commodore 64.
$14.95 Tape – $19.95 Disk.

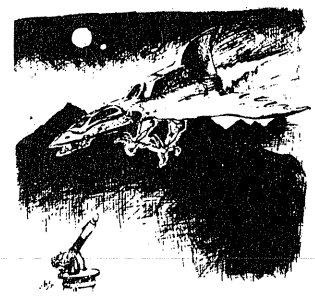
ESCAPE FROM MARS
(by Rodger Olsen)
This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

PYRAMID (by Rodger Olsen)
This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!

DERELICT
(by Rodger Olsen & Bob Anderson)
New winner in the toughest adventure from Aardvark sweepstakes. This one takes place on an alien ship that has been deserted for a thousand years – and is still dangerous!

Dungeons of Death – Just for the 16k TRS-80 COLOR, this is the first D&D type game good enough to qualify at Aardvark. This is serious D&D that allows 1 to 6 players to go on a Dragon Hunting, Monster Killing, Dungeon Exploring Quest. Played on an on-screen map, you get a choice of race and character (Human, Dwarf, Soldier, Wizard, etc.), a chance to grow from game to game, and a 15 page manual. At the normal price for an Adventure ($14.95 tape, $19.95 disk), this is a giveaway.

WIZARDS TOWER – This is very similar to Quest (see above). We added wizards, magic, dragons, and dungeons to come up with a Quest with a D&D flavor. It requires 16k extended color BASIC. $14.95 Tape, $19.95 Disk. VIC 20 Commodore 64.



NEW
PLANET RAIDERS – Not just another defenders copy, this is an original program good in its own right. You pilot a one man ship across a planetary surface dogfighting with alien ships and blasting ground installations while you rescue stranded troopers. Rescue all the troopers and be transported to another harder, faster battle. Joysticks required. ALL MACHINE CODE! EDSONS BEST! 16K Tape TRS80COLOR $19.95 – 32K Disk $21.95.

BASIC THAT ZOOOMMS!!
AT LAST AN AFFORDABLE COMPILER!
The compiler allows you to write your programs in easy BASIC and then automatically generates a machine code equivalent that runs 50 to 150 times faster.

It does have some limitations. It takes at least 8k of RAM to run the compiler and it does only support a subset of BASIC--about 20 commands including FOR, NEXT, END, GOSUB, GOTO, IF, THEN, RETURN, END, PRINT, STOP, USR (X), PEEK, POKE, *, /, +, -, >, <, =, VARIABLE NAMES A-Z, SUBSCRIPTED VARIABLES, and INTEGER NUMBERS FORM 0-64K.

TINY COMPILER is written in BASIC. It generates native, relocatable 6502 or 6809 code. It comes with a 20-page manual and can be modified or augmented by the user. $24.95 on tape or disk for OSI, TRS-80 Color, VIC 20, or Commodore 64.

SEAWOLFE – ALL MACHINE CODE In this high speed arcade game, you lay out patterns of torpedoes ahead of the attacking PT boats. Requires Joysticks, at least 13k RAM, and fast reflexes. Lots of Color and Sound. A fun game. Tape or Disk for Vic20, Commodore 64, and TRS-80 Color.
$14.95 Tape - $19.95 Disk.

Dealers – We have the best deal going for you. Good discounts, exchange programs, and factory support. Send for Dealer Information.

Authors – Aardvark pays the highest commissions in the industry and gives programs the widest possible advertising coverage. Send a Self Addressed Stamped Envelope for our Authors Information Package.

Adventures and Quest now available for TI99

Please specify system on all orders

ALSO FROM AARDVARK – This is only a partial list of what we carry. We have a lot of other games (particularly for the TRS-80 Color and OSI), business programs, blank tapes and disks and hardware. Send $1.00 for our complete catalog.

AARDVARK

2352 S. Commerce, Walled Lake, MI 48088 / (313) 669-3110

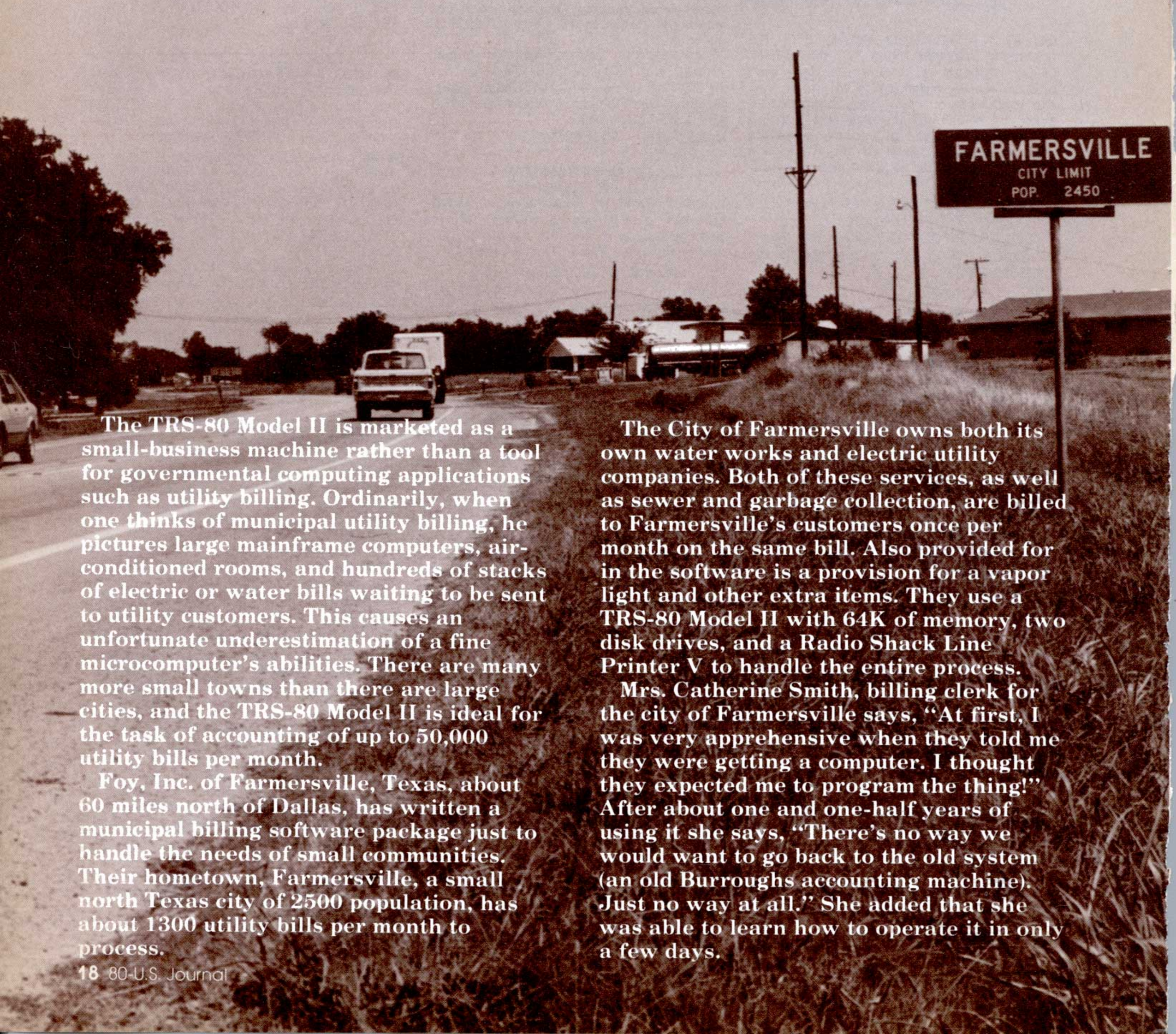
Phone Orders Accepted 8:00 a.m. to 4:00 p.m. EST. Mon.-Fri.

$2.00 shipping on each order

The TRS-80 in small government

Farmersville's municipal billing system

Charles P. Knight, Arlington, TX



The TRS-80 Model II is marketed as a small-business machine rather than a tool for governmental computing applications such as utility billing. Ordinarily, when one thinks of municipal utility billing, he pictures large mainframe computers, air-conditioned rooms, and hundreds of stacks of electric or water bills waiting to be sent to utility customers. This causes an unfortunate underestimation of a fine microcomputer's abilities. There are many more small towns than there are large cities, and the TRS-80 Model II is ideal for the task of accounting of up to 50,000 utility bills per month.

Foy, Inc. of Farmersville, Texas, about 60 miles north of Dallas, has written a municipal billing software package just to handle the needs of small communities. Their hometown, Farmersville, a small north Texas city of 2500 population, has about 1300 utility bills per month to process.

The City of Farmersville owns both its own water works and electric utility companies. Both of these services, as well as sewer and garbage collection, are billed to Farmersville's customers once per month on the same bill. Also provided for in the software is a provision for a vapor light and other extra items. They use a TRS-80 Model II with 64K of memory, two disk drives, and a Radio Shack Line Printer V to handle the entire process.

Mrs. Catherine Smith, billing clerk for the city of Farmersville says, "At first, I was very apprehensive when they told me they were getting a computer. I thought they expected me to program the thing!" After about one and one-half years of using it she says, "There's no way we would want to go back to the old system (an old Burroughs accounting machine). Just no way at all." She added that she was able to learn how to operate it in only a few days.

Prior to the city's obtaining the Model II, Mrs. Smith and her co-workers had to calculate each individual bill by hand. The Burroughs machine would calculate total usage for them, but they had to multiply the result by the rate manually. Since the introduction of GCAs (gas cost adjustments), the workload would almost have doubled. Says Mrs. Smith, "I hate to think how much extra work we would have had to do manually if we didn't have the computer!"

For about three years, they tried purchasing computer time and service from McKinney, Texas, a much larger city which is fifteen miles away. It was necessary for them to make two trips each week transporting data back and forth. This took a lot of extra time and, needless to say, a customer who had a question about his account under these circumstances was in for quite a wait to get the information he needed. Now that they have the Model II, the city administrators are thinking about using it for other accounting such as accounts payable and receivable as well as general accounting needs, saving still more time and effort.

The Model II was chosen because of its low cost but primarily because of the availability of this software package. Foy, Inc., needed to spend only three days training the city employees. Of course there were questions, but the software vendor was only a local phone call away. "We had surprisingly few questions. The training was easier and faster than we expected," said Ann Bridges, also of Farmersville. "We were running on our own in only a couple of weeks."

This easy transition was probably due, in part, to the logical layout of the program. It is menu driven throughout and the screens are very pleasing and uncluttered. Operator error is well trapped, and many different types of reports are available. The master menu allows access to most functions without passing through multiple menus, a definite plus in a system of this type. Search times are short — any record of Farmersville's 1300 may be found in less than seven seconds when searching by account number. If the number is not known, it must be determined by manually looking it up on the alphabetized address listing of customers. The software also flags the account of each of Farmersville's volunteer firemen, killing two birds with one data entry.

In addition to the utility bill which is a 3½ by 6-inch tractor-feed post-card, various reports may be requested. Among these is a high/low audit check. This report flags usage changes as unusual if they fall outside a range which is user definable. This helps find meter reading errors quickly as well as providing the data needed to spot defective meters or those that may have been tampered with. The usage is reported for the previous four months in addition to the current month and the meter readings. An accounts receivable aging report is also provided, and a menu option is provided for automatically adding late payment penalties to those customers who have earned them.

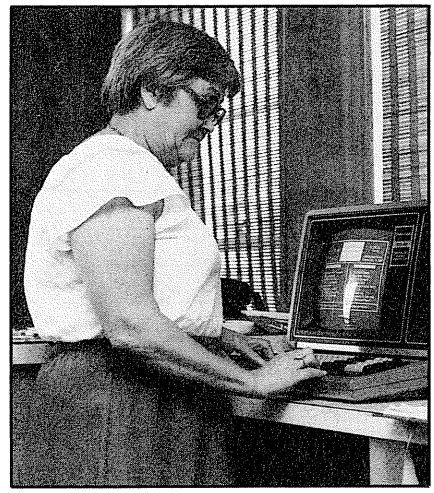
A consumption report is also available. This tells the city the number of users in each category (business or residential) who use amounts of utility service between specified ranges. Thus, it is always known what the "average" customer will need in a given month. No doubt this helps plan future water and energy needs and historical data may be assembled without difficulty for projections.

Route sheets for meter readers are also provided. The route sheet provides space for the meter reader to enter the current reading just to the right of the previous reading. This format greatly simplifies data entry at the end of the month because the written readings are in the same order they are entered by the data-entry personnel.

Some customers pay in cash, others by automatic bank draft and, unfortunately, some try not to pay at all. The software provides a printout of cash receipts and of accounts paid by bank draft. A delinquent account or account status listing is also provided. All of these reports are available as menu selections. Escape prompts are also provided in case of an erroneous menu selection. The menu functions which are normally done daily are arranged on the left side of the screen while those normally done only once per month are arranged on the right.

Both employees and customers who have seen the computer in operation have been impressed by the speed (150 cps) of the Line Printer V, but particularly by the fact that it prints bi-directionally. Merchandisers of hardware and software systems would do well to note that this might be the single most impressive thing about a system to a prospective user or purchaser in today's marketplace. People who are not computer oriented are usually unimpressed by the storage capacity of an eight-inch disk in kilobytes, or the CPU speed in megahertz, but they marvel at a "typewriter" that prints 150 characters per second and types backwards, too.

Murphy, Texas, also uses this software indirectly. They contract with Foy to provide the utility billing service for their 1300 population. Dianne Cooper of Murphy said that their contract is for three years and that the city is considering the purchase of a system from Foy upon the expiration of that contract. They have 475 utility customers for their water department which bills water,



Mrs. Catherine Smith, billing clerk for the City of Farmersville, says, "At first, I was very apprehensive when they told me they were getting a computer. I thought they expected me to program the thing!" After about one and one-half years of using it, she says, "There's no way we would want to go back to the old system. Just no way at all."

sewer, and garbage collection on the same bill. Mrs. Cooper said that they deliver the meter readings and other information to Foy about the 15th of the month and pick up the bills ready for mailing along with the needed reports next to the last day of the month. She says that her husband, who has worked with computers for eleven years, owns a TRS-80 Model III with one disk drive. She says she has used it running VisiCalc to help her with Murphy's proposed budget calculations. Prior to contracting with Foy, she had been calculating all 475 utility bills by hand and with pen and paper. "You just can't believe how much easier it is now," she said.

The City of Van Horn, Texas, also uses a system identical in hardware to that in Farmersville and also uses a version of this program to handle their utility billing. They bill for water, sewer, garbage, and a fire department assessment. This town of 2772 population has about 2000 utility customers and was also, like the others, previously doing the work manually. Crystal, Mississippi, and Avenal, California, are also users of this system. Because the needs of each municipality differ, Foy customizes each software package to the specialized needs of each city.

On a recent trip from Fort Worth, Texas, to Colorado, I must have driven through more than a thousand small communities of less than fifty thousand population who could benefit from microcomputer-assisted billing such as this. I'm sure that no more than five percent of them are on computerized utility billing systems at present. I wonder why more enterprising programmers haven't entered this lucrative and waiting market. ■

The package is available from Foy, Inc., 100 McKinney Street, Farmersville, Texas 75031 for a base price of $2250. It runs on the Model II, 12, 16 (Model II mode) and will be available on the Model 16 when Model 16 BASIC is released from Radio Shack. The package has been recommended by the Radio Shack Software Development program. For further information, write to Jim Foy or call (214) 782-7282.

Consumption Report for Residential Electric Users

```
                CONSUMPTION REPORT
            FOR RESIDENTIAL ELECTRIC USERS
----RANGE OF USAGE----        NUMBER        AVE. USAGE
-----------------------+---------------+---------------+
         0 TO       30 |             0 |             0
        30 TO      300 |             5 |           204
       300 TO    1,000 |             2 |           319
     1,000 TO    1,500 |             6 |          1267
     1,500 TO  999,999 |             0 |             0
```

Master Menu

```
WED, AUG.  5, 1981        CITY OF FARMERSVILLE          (C) 1981 BY
                                                          FOY INC.
   TIME:  11.21          MUNICIPAL BILLING SYSTEM     205 COLLEGE ST.
                                                   FARMERSVILLE, TX 75031
    DAILY ACTIVITIES                    MONTHLY ACTIVITIES

1. DISPLAY OR CHANGE AN ACCOUNT     11. PRINT ROUTE SHEETS
2. ADD A NEW REPORT                 12. INPUT METER READINGS
3. PREPARE A FINAL BILL             13. PRINT HI/LOW REPORTS
4. DELETE AN OLD ACCOUNT            14. CALCULATE BILLS
5. INPUT RECEIPTS                   15. PRINT ACCOUNT STATUS REPORT
6. PRINT TODAY'S RECEIPTS           16. PRINT BILLS
7. PRINT TOTAL OF RECEIVABLES       17. PRINT BANK LIST
8. PRINT LIST OF ADDRESSES          18. PRINT PENALTY TO PAST DUES
                                    19. PRINT DELINQUENT REPORT

0. MOVE PAPER TO TOP OF PAGE        99. FINISHED FOR THE DAY

                        SELECTION
```

PMC SOFTWARE

Proven Software Solutions for the TRS-80, PMC-80 & 81 User At VERY Special Prices

GAMES

Title	List	Our Price
Advanced Operating Systems		
+ VOYAGE OF THE VALKYRIE		
D 32K I & III	39.95	32.00
T 16K I & III	29.95	24.00
Adventure International		
ARMOR PATROL		
D 32K I & III	24.95	19.00
T 16K I & III	19.95	15.00
COMBAT		
D 32K I & III	20.95	16.00
T 16K I & III	19.95	15.00
CONQUEST OF CHESTERWOOD		
D 32K I & III	20.95	16.00
T 16K I & III	19.95	15.00
+ DEMON VENTURE #1— REIGN OF THE RED DRAGON		
D 32K I & III	24.95	19.00
ELIMINATOR		
D 32K I & III	24.95	19.00
T 16K I & III	19.95	15.00
GALACTIC EMPIRE		
T 16K I & III	14.95	12.00
GALACTIC REVOLUTION		
T 16K I & III	14.95	12.00
GALACTIC TRADER		
T 16K I & III	14.95	12.00
+ GALACTIC TRILOGY		
D 32K I & III	39.95	30.00
LUNAR LANDER		
D 32K I & III	20.95	16.00
T 16K I & III	14.95	11.00
MACES & MAGIC #1—BARLOG		
D 32K I	29.95	23.00
MACES & MAGIC #2— STONE OF SISYPHUS		
D 32K I	29.95	23.00
MACES & MAGIC #3— MORTON's FORK		
D 32K I	29.95	23.00
MISSILE ATTACK		
D 32K I & III	20.95	16.00
T 16K I & III	14.95	11.00
OTHER VENTURE #2— CROWLEY MANOR		
D 32K I & III	20.95	16.00
T 16K I & III	19.95	15.00
OTHER VENTURE #3— ESCAPE FROM TRAAM		
D 32K I & III	20.95	16.00
T 16K I & III	19.95	15.00
OTHER VENTURE #4— EARTHQUAKE SF 1906		
D 32K I & III	20.95	16.00
T 16K I & III	19.95	15.00
OTHER VENTURE #5—		
+ DEATH PLANET		
T 16K I & III	19.95	15.00
PLANETOIDS		
D 32K I & III	20.95	16.00
T 16K I & III	19.95	15.00
SCOTT ADAMS' ADV. #1, #2 & #3		
D 32K I & III	39.95	31.00
SCOTT ADAMS' ADV. #4, #5 & #6		
D 32K I & III	39.95	31.00
SCOTT ADAMS' ADV. #7, #8 & #9		
D 32K I & III	39.95	31.00
SCOTT ADAMS' ADV. #10, #11 & #12		
D 32K I & III	39.95	31.00
SEA DRAGON		
D 32K I & III	24.95	19.00
T 16K I & III	19.95	15.00
SHOWDOWN		
D 32K I & III	20.95	16.00
T 16K I & III	14.95	12.00
+ SILVER FLASH-PINBALL 1		
D 32K I & III	19.95	15.00
T 16K I & III	14.95	12.00
SKY WARRIOR		
D 32K I & III	20.95	16.00
T 16K I & III	14.95	11.00
SPACE INTRUDERS		
D 32K I & III	20.95	16.00
T 16K I & III	19.95	15.00
STAR FIGHTER		
D 32K I & III	29.95	23.00
T 16K I & III	24.95	19.00
STAR TREK 3.5		
D 32K I & III	19.95	15.00
T 16K I & III	14.95	11.00
TREASURE QUEST		
D 32K I & III	19.95	15.00
T 16K I & III	14.95	11.00
Automated Simulations (EPYX)		
CRUSH, CRUMBLE & CHOMP		
D 32K I & III	29.95	23.00
T 16K I & III	29.95	23.00
DUNJONQUEST— HELLFIRE WARRIOR		
D 32K I & III	39.95	30.00
T 16K I & III	39.95	30.00
DUNJONQUEST— KEYS OF ACHERON		
D 32K I & III	19.95	15.00
T 16K I & III	19.95	15.00
DUNJONQUEST— SORCERER OF SIVA		
D 32K I & III	29.95	23.00
T 16K I & III	29.95	23.00
DUNJONQUEST— TEMPLE OF APSHAI		
D 32K I & III	39.95	30.00
T 16K I & III	39.95	30.00
DUNJONQUEST— UPPER REACHES OF APSHAI		
D 32K I & III	19.95	15.00
T 16K I & III	19.95	15.00
+ RICHOCHET		
D 32K I & III	19.95	15.00
T 16K I & III	19.95	15.00
Big 5		
ATTACK FORCE		
D 32K I & III	19.95	15.00
T 16K I & III	15.95	12.00
COSMIC FIGHTER		
D 32K I & III	19.95	15.00
T 16K I & III	15.95	12.00
DEFENSE COMMAND		
D 32K I & III	19.95	15.00
T 16K I & III	15.95	12.00
GALAXY INVASION		
D 32K I & III	19.95	15.00
T 16K I & III	15.95	12.00
METEOR MISSION		
D 32K I & III	19.95	15.00
T 16K I & III	15.95	12.00
ROBOT ATTACK		
D 32K I & III	19.95	15.00
T 16K I & III	15.95	12.00
+ STELLAR ESCORT		
D 32K I & III	19.95	15.00
T 16K I & III	15.95	12.00
SUPER NOVA		
D 32K I & III	19.95	15.00
T 16K I & III	15.95	12.00
Cornsoft		
+ BOUNCEOIDS		
D 32K I & III	19.95	15.00
T 16K I & III	15.95	12.00
SCARFMAN		
D 32K I & III	19.95	15.00
T 16K I & III	15.95	12.00
SPACE CASTLE		
D 32K I & III	19.95	15.00
T 16K I & III	15.95	12.00
Med Systems		
ASYLUM		
D 32K I & III	22.95	18.00
T 16K I & III	19.95	15.00
+ ASYLUM II		
D 32K I & III	22.95	18.00
T 16K I & III	19.95	15.00
DEATHMAZE 5000		
D 32K I & III	17.95	14.00
T 16K I & III	14.95	11.00
LABYRINTH		
D 32K I & III	17.95	14.00
T 16K I & III	14.95	11.00
WARRIOR OF RAS— DUNZHIN		
D 48K I & III	29.95	23.00
T 48K I & III	29.95	23.00
WARRIORS OF RAS— KAIV		
D 48K I & III	29.95	23.00
T 48K I & III	29.95	23.00
WARRIORS OF RAS— THE WYLDE		
D 48K I & III	29.95	23.00
T 48K I & III	29.95	23.00
Melbourne House Software		
PENETRATOR		
D 32K I & III	24.95	20.00
T 16K I & III	24.95	20.00

Now Twice As Many Programs!

EDUCATION

Advanced Operating Systems		
MOSTLY BASIC EDUCATIONAL PKG. 7 PRG.		
T 16K I & III	24.95	20.00
MOSTLY BASIC SCIENTIFIC PKG. 7 PRG.		
T 16K I & III	24.95	20.00
TIME DUNGEON— AMERICAN HISTORY		
T 16K I & III	24.95	20.00
TIME DUNGEON—		
+ WORLD HISTORY		
T 16K I & III	24.95	20.00
Automated Simulations (EPYX)		
JABBERTALKY		
D 32K I & III	29.95	23.00
T 16K I & III	29.95	23.00

BUSINESS

Small Business Systems Group		
ACCOUNTS PAYABLE		
D 48K I & III	195.00	155.00
ACCOUNTS RECEIVABLE		
D 48K I & III	195.00	155.00
GENERAL LEDGER		
D 48K I & III	195.00	155.00
INVENTORY CONTROL		
D 48K I & III	195.00	155.00
PAYROLL		
D 48K I & III	195.00	155.00

WORD PROCESSING

Aspen Software		
GRAMMATIK		
D 32K I	59.00	46.00
PROOF EDIT		
D 32K I	30.00	23.00
PROOFREADER		
D 32K I	54.00	42.00
SOFT-SCREEN		
D 48K I	69.00	54.00
SOFT-TEXT		
D 48K I	69.00	54.00
Michael Shrayer Software		
ELECTRIC PENCIL		
T 16K I	100.00	24.00

INFO. PROCESSING

Adventure International		
+ MAXI CRAS		
D 48K I & III	99.95	79.00
MAXI MANAGER		
D 48K I & III	99.95	79.00
+ MAXI MANAGER UTILITY PACK #1		
D 48K I & III	49.95	39.00
+ MAXI STAT		
D 48K I & III	199.95	147.00
Auk's		
+ COMPUTER FILING SYSTEM (CFS)		
D 32K I & III	69.00	55.00
Dan Haney Associates		
ELECTRIC SPREADSHEET		
D 32K I & III	69.95	65.00
T 16K I & III	34.95	30.00

OPERATING SYS.

Micro Systems Software		
DOS PLUS V3.3S		
D 32K I	100.00	80.00

UTILITIES

Adventure International		
+ DIRECTORY INFO MGT II (DIM II)		
D 32K I & III	24.95	19.00
Howe Software		
MON3		
T 16K I	39.95	31.00
MON4		
D 32K I	49.95	39.00
STERM		
T 16K I	69.95	55.00
SYSTEM DIAGNOSTIC		
D 32K I & III	99.95	79.00

MISCELLANEOUS

Adventure International		
HINT SHEET for single Adventure #1 thru #12	1.00	1.00
Software Affair		
ORCHESTRA-85		
T 16K I	99.95	95.00
D 16K I	99.95	95.00

+ NEW

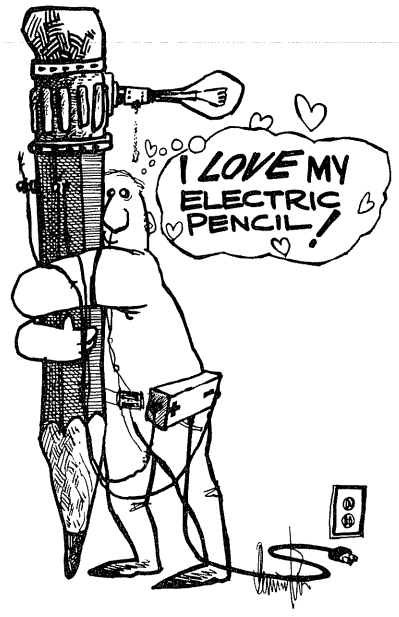
PMC SOFTWARE

475 Ellis St., Mt. View, CA 94043

Orders: (415) 968-1604

Terms: FOR FAST DELIVERY, send certified checks, money orders, VISA or MasterCard number and expiration date. Personal checks require 3 weeks. U S A sales only. PRICES INCLUDE UPS continental delivery (do not use P O Box). CALIFORNIA customers add 6½% tax. Prices subject to change.

Word Processing Software for TRS-80* Model I



World's most popular word processing package. Fully proven Electric Pencil* now enhanced and offered in 16K cassette version only.

- Easiest to learn
- Simple to operate
- Full screen editing
- Global search & replace
- Powerful insert/delete
- Dynamic print formatting
- No control key mod.

Send check or MO for $24.00 plus sales tax for Calif. cust. UPS shipping in USA prepaid.

$24.00

$10.00 for manual only

*Electric Pencil licensed to PMC Software by Michael Shrayer. TRS-80 trademark of Tandy Corp.

PMC SOFTWARE

475 Ellis St. Mtn. View, CA 94043 | Orders (415) 962-0318 | Info (415) 962-0220

Electronic politickin' in Old Town

David R. Hughes, Colorado Springs, CO

It is probably appropriate that the first grass roots electronic politickin' in Colorado took place in Old Colorado City — which was the rip-roaring territorial capitol right after the Pike's Peak or Bust Gold Rush of 1859. It was then that the local toughs took to six guns as readily as old "Jedge" Baldwin took to his soap box to debate the issues.

In 1982, just a block away from where that first Colorado Capitol Log Cabin still stands, the political opponents squared off with microcomputers and telecommunications.

I have run the Old Colorado City Electronic Cottage Bulletin Board for nearly two years. It has served a variety of purposes related to my work as a consultant in information technology, its use in education, and the revitalization of older Colorado commercial districts. The board operated first with Richard Taylor's Message-80 system running on a TRS-80 Model I, then on a TRS-80 Model III with B.T. Enterprises' Connection-80. Now it boasts the super TBBS software written by Phil Becker of Denver.

As one who has been involved with public affairs on the local level, I was asked to support several candidates for election. I had already worked (via the Source) with H. A. "Red" Boucher, who had been Lieutenant Governor of Alaska, in his preliminary work as a Democratic candidate for governor. Red, a gregarious, hail-fellow well-met sourdough, was convinced that the remote reaches of Alaska could be better served with microcomputers and telecommunications than by telephone, bush pilot, or mukluks.

So when local candidates asked for my support, it seemed natural for me to help them by using my bulletin board as a forum for their views. The board serves the 325,000 people in the local dial-up area in the shadow of Pike's Peak.

I had a very active board that, in its Connection-80 days, had over 2,000 calls in three months from local people. Many were middle management, public affairs-oriented people who were 'telecomputing literate.'

The machine was a 48K TRS-80 Model III, with double-headed, double-density, 40-track disk drives, holding over 700K of disk storage. It was running Newdos/80 version 2. This was custom-assembled by WMS of Denver and it served me well as one of my several computers hooked up around the clock to an Epson MX100 and Lynx auto-answer direct-connect modem. It could hold several hundred pages of politically-related text and still have room for my other uses.

Bob Traer was the first candidate whose views were aired on the board. Bob, a Democrat, was candidate for the state senate in a highly conservative Republican town where both newspapers were bound to support any Republican who ran. Part of my decision (as a registered independent) to render this form of support to Bob was because I had been increasingly disillusioned with media image and war chest-based politics on the local, state and national scene. It seemed to me that I could be doing not only a service to Bob, whose public positions I liked, but also to begin to show politicians and voters that there are other ways to conduct politics than via broadcast media performances.

Bob was the owner of an Osborne computer. Using the same word processing files that he had used to express his position in mail-outs, he passed his "electronic position papers" to me.

I simply used my Uniterm Smart Terminal Program to transfer his files directly from his floppy disk via a Microlink Smart Terminal Program into the RS-232 port of my bulletin board Model III. Then, using Electric Pencil (which I like better than Scripsit for telecommunications because it automatically puts the right end-of-file markers on a text file), I organized the 14-issue pieces. Each was one to two pages in length and they were put into separate files that could be accessed from the main menu under the download section. I also had sign-on announcements that said that this board would be involved with the political campaigns in the Colorado Springs area for the remainder of the campaign and invited callers to look over the candidates in the download section — both their self-proclaimed qualifications and the positions that they held. They could then pose direct questions to the candidates on the message board, and expect direct answers. If they had longer pieces than the 16-line, 63-character message format permitted, I accepted uploads which were put in menu-driven files.

Almost immediately, a local bicycle enthusiast came on the board and posed questions to Bob Traer. Didn't he think the state legislature should pass laws restricting drivers from interfering with bicyclists? Mr. Traer thoughtfully responded that while he agreed that it was a problem that should be

dealt with, he felt it more a matter of municipal ordinance than state law. Both the question and answer remained on the board until the end of the campaign. In effect, one voter-caller had established an issue on which the candidate took a position, and all subsequent callers were able to read (or not read) as they chose. No editor decided whether the matter was important enough to publicize.

The ante was raised when a candidate for Congress, Tom Cronin, solicited my support for his campaign. I responded in the same way to Tom. If I had his positions, I would be glad to give them an airing on my board. I had decided that I would not play the even-handed "media person" since I was very clearly partisan for supporting, at this point, both Tom and Bob. I told the candidates that I would not alter or abbreviate in any way, to the maximum capacity of my system, what they said in their positions. I also knew that if push came to shove, I could get the use of a hard disk for mass storage. Since the upper limit of political "information" was more likely to be the capacity of voters to absorb it, rather than my capacity to present it, I wasn't worried about storage. Armed with the positions of Cronin and Traer, the files began to grow.

About this time, some very Republican friends of mine that used the board began to engage in vigorous discussions on the main message board — not just about the candidates themselves, but the whole question of the relevancy of Tip O'Neill democratic values versus Reagan-style conservatism.

There was some strong stuff put on there. Stump politicians would have loved to read the lusty dialogue that took place, with turnaround time in the argument measured in minutes or hours, not in days as in the newspapers.

I expected the political discussions to remain local. How wrong I was! One morning, I noticed in a user log entry that one Richard Adams from Washington, D.C., had called the board. In a message he said, "I am the director of political information of the Republican National Committee." He noted that there didn't seem to be enough Republican activity on the board and offered help (from Washington) to any local Republican candidate.

I later found out that even though he was surrounded by large, batch-job minicomputers, he envied my ability with the TRS-80 and terminal programs to upload and download files so easily. He felt strongly that the use of microcomputers was going to be increasingly important in the political process of the future. Later, to my amusement, he remarked about being a bit worried about the use by "Atari Democrats" of this small computer technology in the upcoming 1984 elections.

As fellow SYSOPs of a sort, we commiserated about how unaware most of the rest of the public, or even campaign staffs, were about the potential of this medium.

About this time, a candidate named Ed Lyell from Boulder, Colorado, who was running for the State Board of Education, had noted all this activity spilling over onto Source commentary. He sent a message through the Source to ask if I would support him in the Colorado Springs area. I said to him, "Send my your positions over The Source," which he did. I downloaded them with ease, studied them, decided to support him (based on what he had to say), put them on the board, and announced the arrival of a new candidate. All I had to do was give them a filename that matched what the bulletin board menu could recognize and they were available to all. Nothing had to be keyed in twice, which is the most powerful argument I know of for buying "smart" rather than "dumb" terminal programs.

Ed Lyell had been on the Joint Budget Committee of the state and was an expert in the economics of education. He had written his master's thesis in the early 1970s on computers in education, and had clear views about the need for technical education in the information age. He placed many pungent, useful messages on the board, educating all as to the significance of computers in education. Some pretty young computerists who regularly called the board were getting a political education I doubted they ever would have seen in either their computer science or government classes. As a matter of fact, young Alex Weinert, whom I have never met in the flesh, chatted late into the night about the connection between politics and his computing. He discussed such

matters as the AT&T settlement, copyright law, and the looming danger that unregulated Mountain Bell would start charging his family for his computer connection as if he were a data processing business.

Alex will take an interest in politics in the future which very few computerists do today although their freedom to compute will, sooner or later, be abridged by lawmakers.

It is the nature of this medium that I never physically met Ed Lyell until long after his position was supported by me on the Old Colorado City Electronic Cottage Bulletin Board.

A businessman named Dick Thompson, who lived west of Colorado Springs in Woodland Park, then became involved. He had become increasingly active on the bulletin board using STERM on a Model III. After watching the activity, he invited Mary Ann Tebedo to put her position on the board as a Republican candidate for the state legislature.

When she saw Richard Adams' offer of help, she asked for detailed information on the administration's plans for New Federalism which he promptly sent to her from Washington to help her with her successful candidacy. It is very unlikely that El Paso County's Mary Ann would ever have contacted Washington's Richard Adams, or have gotten such rapid pinpoint support from the national committee, had they not "met" electronically on the local bulletin board. The cost to Mary Ann was nothing. The cost to the Republican National Committee was, perhaps, $1.00 for the Adams direct-dial phone call to discover her request.

Some of the comments on the board constituted a thoughtful forum about the whole question of the role microcomputers and telecommunications would play in future American political scenes. I had seen enough superficial comment in national media by political "experts" who dismissed this media on the basis that simply "voting by computer" was not really participating in politics, so I started a little discussion on the topic.

The consensus was that political communication via computer is a great deal different (and potentially more effective) than mere vote counting. I decided we had more expertise on the board than the national media. It was clear that the characteristic lack of body language on interactive small telecommunications systems focused attention on the issues, rather than the candidates. Yet, the dynamic nature of the board's give and take gave the discussions the vitality of face-to-face meetings. And, everyone who wanted to make a point was heard.

There was more than a little comment by callers that we were getting close to the nature of the grass roots politics of the future. More than one caller expressed the idea that small computers and telecommunications possessed the inherent opportunity for the little guy to have his voice heard. He (or she) could directly ask the big guy where he stood (at any time they were near a terminal capable of sending and receiving ASCII code) and get direct, written answers which all others could then read at their convenience. This unique potential for sustained, remote, decentralized, asynchronous political debate involving any individual with access to a terminal (and who won't have such access within ten years?) just might help revive a level of direct and two-way political involvement that would go a long way toward correcting the distortions of television, radio, mass mailings and newspapers, all of which are essentially one-way and centralized in the hands of very few editorial czars at any political level.

The word of what was going on at a little bulletin board in Colorado spread as far as the New York Times. Peter Kerr, in an article about bulletin boards, reported the fact that the Old Colorado City Electronic Cottage aired the candidates' views.

I had no illusions about this computer-supported political activity being a significant factor in the 1982 elections of any of the candidates. It reached just too few people. In 1982, I calculated there were only about 10,000 microcomputers owned in Colorado Springs, of which perhaps 1,000 were into telecommunications. But as Videotext, Teletext, local networks, and the sheer number of communicating computers increased, it was clear to me that we were exploring techniques that, in other times and other campaigns, could be very significant.

It also became clear that the next step should be to get such nonpartisan organizations as the League of Women Voters to put up public terminals in places such as libraries and shopping centers, so that individuals who do not own (or have access to) their own computer could walk in and participate.

It was clear that the characteristic lack of "body language" on interactive small telecommunications systems focused attention on the issues, rather than the candidates. Yet, the dynamic nature of the board's give and take gave the discussions the vitality of face-to-face meetings.

Near the end of the campaign, Thom Foulks, a former elected county commissioner, used his TRS-80 Model I to suggest that we conduct some polls on some of the issues before the election. We just didn't have time to implement this. I also found Connection-80 not quite versatile enough for such purposes. The new, incredibly powerful TBBS, with its question and answer utilities and anonymous vote-taking would be a superb medium to run on TRS-80 Model I's or III's for this purpose.

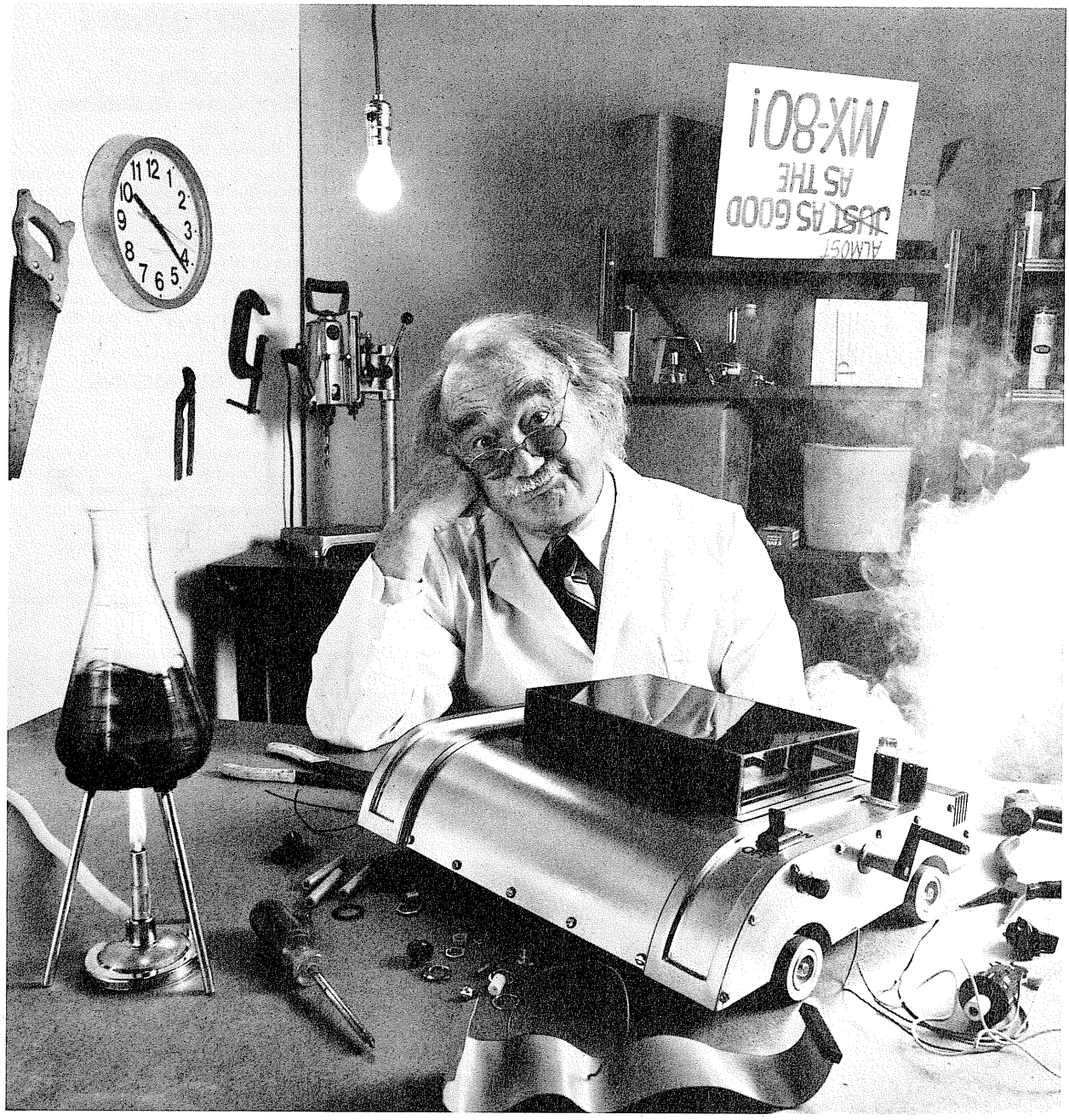
As soon as the election was over, I took all of the campaigns off of the board. To my surprise, politickin', in the form of public affairs, continued on. Richard Adams called again after the election and asked for the phone numbers of some of the local

people interested in continuing the discussion. Ed Lyell, even though defeated as a candidate, called repeatedly, offering his continued support for discussion of the issues of computers in education via the board. What was a partisan politics computer bulletin board has now become a public affairs section of the board. I set aside a section called "Roger's Bar" for "<D>rinkin' and Discussin' Politicks", named after the Old Colorado City Saloon where the politicks are always a subject at the bar.

As I write this, a caller has complained bitterly about Congress raising its own pay. Another caller from Boulder has sarcastically attacked the relief of a Denver police captain from a drunk driving charge on spurious grounds. Another intends to approach elected officials to see if they will keep in contact with their constituents in Colorado Springs from Denver during the legislative session.

When I reflect upon the geographical spread, the quality of the discussions and the value of what went on during those three months (and is continuing as a forum), it has become abundantly clear to me that this technology could breathe new vitality into a political process that has sunk to new lows of popular participation. I am carefully considering how I can help local candidates of my choice in 1984, using my microcomputer expertise. I don't intend to back losing candidates next time, and I will expect any candidate I back to be more than casually aware of this technology. Until politicians begin to use this technology in their own serious endeavors, I don't know how they can be trusted to make laws governing its use.

If any of the readers of this article would like to continue the dialogue, all they have to do is dial (303) 632-3391 with a terminal or computer that can handle 300 baud, ASCII code. Just drop in the "Rogers' Bar" item on the main menu, read the messages, and announce your presence. The drinks are on Old Jedge Baldwin, of Colorado City, who, if he were alive today, would have been the first owner of a microcomputer! ■



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

Epson.

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

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

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

But that hardly scratches the surface.

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

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

Who knows graphics better than Epson?
Nobody, that's who. And if you don't believe it, witness the FX-80.

With a 12K ROM capacity, the FX-80 gives you a few things the others don't. For example, not one, not two, but *seven* different dot addressable graphic modes are program selectable. And can be mixed in the same print line. Everything from 72 DPI (dots-per-inch) Plotter Graphics to the 640 dots per line resolution designed to match the remarkable monitor clarity of the Epson QX-10 personal computer.

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

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

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

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

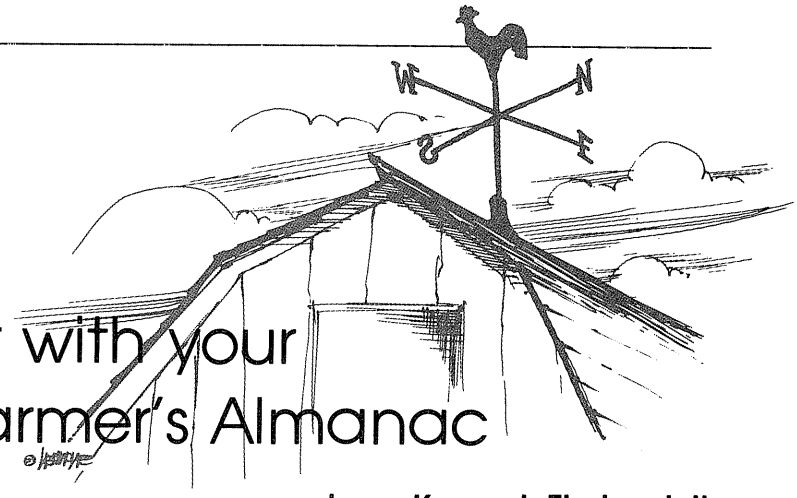
Be the first on your block.
We'd be willing to bet that the FX-80 — like the MX-80 — will have its share of imitators. Don't be fooled. To make sure you get the genuine article, rush down to your local computer store right now and let them show you everything the FX-80 can do.

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

EPSON
EPSON AMERICA, INC.
COMPUTER PRODUCTS DIVISION

3415 Kashiwa Street
Torrance, California 90505
(213) 539-9140.
Outside California, phone
(800) 421-5426 for the
Epson dealer nearest you.

Right as rain



Forecast the weather with your computer and the Farmer's Almanac

For all models

Larry Krengel, Elmhurst, IL

Right now, I keep my TRS-80 in my den where I can find peace and quiet when I want to work on a program. But I envision the day when, by popular demand, it will leave the den. Not only will I use it, but the computer will serve enough useful purposes to be moved to a place of importance in the mainstream of the house. Perhaps it will end up in the family room — the busiest room in the house.

But to earn its way into such a position, the TRS-80 will need to perform numerous important services to many members of the family. Toward this end, I have been collecting ideas and programs that would be placed on file for family use. One of the more recent ones is the program which I have listed here. It incorporates the best of both the old and the new.

The *Old Farmer's Almanac* has long been trusted for its sage advice. Many trust explicitly its weather predictions. In the *Old Farmer's Almanac* there is a table that allows the reader to convert information on wind direction and barometric pressure into a weather forecast. What I have done is to convert this information into a computer program.

Now I only need to stare out at the wind vane on the barn and then tap the barometer gently to get all the information I need to forecast the weather. It is important to realize that the wind is named for the direction from which it is blowing. It is also important to note which direction the needle on the barometer moves when it is tapped. Is it a rising or falling trend?

For the uninitiated, the barometric pressure is measured most often in "inches of mercury" (abbreviated as in. Hg.). Standard barometric pressure is 29.92 in. Hg. The pressure ranges from 28 to 31 inches of mercury usually.

At the present, I am about to begin testing my system against reality. I wonder how I will compare with the TV weathermen or the weather bureau. But before the results are in, here it is for your own experimentation.

Well, this brings my TRS-80 one step closer to that carrel in the family room. One more program for the collection. Let's see now . . . What is it going to be like tomorrow? Wind from the west, 30.05 inches of mercury and steady. Hey! Great day for a picnic.

Program Listing for Right As Rain

To make this program run on the TRS-80 Color Computer with 16K Extended BASIC, make these changes: Change lines 380, 470, 520 and 560 to read

```
380 IF (P<1) OR (P>4) THEN GOTO 360
470 IF (T<1) OR (T>3) THEN GOTO 450
520 PRINT F$(D(W,P,T))
550 IF A$="Y" THEN GOTO 100
560 IF A$="N" THEN CLS:END
```

Note: You might also wish to add some spaces between words in DATA statements 1050 to 1170 to prevent the splitting of words in the video printout during predictions. Conversions by Don Scarberry. Weather predictions by Larry Krengel.

```
Ø GOTO1ØØ
1 ****************************
2 *                          *
3 *   WEATHER PREDICTIONS    *
4 *                          *
5 *    BY LARRY KRENGEL      *
6 *         5/82             *
7 *                          *
8 ****************************
1ØØ CLS
11Ø CLEAR 12ØØ
12Ø DIM D(4,4,3),F$(12)
13Ø FORA=1TO4
14Ø FORB=1TO4
15Ø FORC=1TO3
16Ø READ D(A,B,C)
17Ø NEXT:NEXT:NEXT
18Ø FORX=ØTO12:READF$(X):NEXT
2ØØ PRINT"What is the present wind direc
tion?"
21Ø PRINT"1- north"
22Ø PRINT"2- south"
23Ø PRINT"3- east"
24Ø PRINT"4- west"
25Ø A$="":A$=INKEY$:IFA$=""GOTO25Ø
26Ø W=VAL(A$)
27Ø IFW<1ORW>4:GOTO25Ø
3ØØ CLS
31Ø PRINT"What is the present barometeri
c pressure?"
32Ø PRINT"1- more than 3Ø.2Ø in. hg."
33Ø PRINT"2- 3Ø.ØØ to 3Ø.2Ø in. hg."
```

```
340 PRINT"3- 29.80 to 30.00 in. hg."
350 PRINT"4- less than 29.80 in. hg."
360 A$="":A$=INKEY$:IFA$=""GOTO360
370 P=VAL(A$)
380 IFP<1ORP>4:GOTO360
400 CLS
410 PRINT"Is the barometric pressure ris
ing or falling?"
420 PRINT"1- rising"
430 PRINT"2- remaining steady"
440 PRINT"3- falling"
450 A$="":A$=INKEY$:IFA$=""GOTO450
460 T=VAL(A$)
470 IFT<1ORT>3:GOTO450
500 CLS
510 PRINT:PRINTTAB(22)"THE WEATHER FORCA
ST":PRINT
520 L=64-LEN(F$(D(W,P,T))):PRINTTAB(L/2)
F$(D(W,P,T))
530 PRINT@856,"another entry?"
540 A$="":A$=INKEY$:IFA$=""GOTO540
550 IFA$="y"ORA$="Y"CLS:GOTO100
560 IFA$="n"ORA$="N":END
570 GOTO540
1000 REM ### DATA ###
1010 DATA 0,6,5,0,6,5,0,0,0,0,0,11
1020 DATA 0,6,4,0,6,3,9,0,7,9,0,7
1030 DATA 0,6,4,0,6,3,0,0,8,0,0,10
1040 DATA 2,1,7,2,1,0,9,0,0,12,0,0
1050 DATA AN UNUSUAL SET OF CONDITIONS W
HICH ARE UNPREDICTABLE.
1060 DATA FAIR WITH SLIGHT CHANGE IN TEM
PERATURE FOR ONE TO TWO DAYS.
1070 DATA FAIR - FOLLOWED WITHIN TWO DAY
S BY WARMER AND RAIN.
1080 DATA WARMER - RAIN WITHIN 24 HOURS.
1090 DATA WARMER - RAIN WITHIN 36 HOURS.
1100 DATA COLD AND CLEAR - FOLLOWED SOON
 BY WARMER AND RAIN.
1110 DATA NO EARLY CHANGE.
1120 DATA RAIN WITHIN 18 HOURS THAT WILL
 CONTINUE FOR A DAY OR TWO.
1130 DATA RAIN - HIGH WIND - FOLLOWED BY
 TWO CLEAR AND COOL DAYS.
1140 DATA CLEARING AND COLDER WITHIN 12
HOURS.
1150 DATA SEVERE STORM - WIND - RAIN - C
OLD WAVE WITHIN 24 HOURS.
1160 DATA SEVERE GALE - HEAVY RAIN OR SN
OW - FOLLOWED BY A COLD WAVE.
```

Permatime

A real-time clock for your Model I

Model I

Ray Bennett, Seattle, WA

One of the things I appreciate about Disk BASIC is the clock/calendar. One of the things I don't like about this feature is that it isn't "smart" enough to keep time when my TRS-80 is powered down. Also, it doesn't keep good time if the disk is being accessed, and doesn't keep time at all if interrupts aren't enabled, such as after CMD"T" while loading tape. Of less importance, since Tandy didn't intend that the system crystal be accurate enough to be used as a time-of-day clock, it doesn't keep good time over a longer period. As I say, this one usually isn't very important. All of these shortcomings are rather like working hard to earn a piece of candy, only to find half a worm in it. I decided to take this particular "worm" out of Disk BASIC's clock.

I call the result Perma-Time. It utilizes National Semiconductor's CMOS MM58174A clock/calendar IC, coupled with the necessary logic to make it work. During normal operation, it is powered by the TRS-80 expansion interface, or some other 5V, 125mA source. Some expansion interfaces provide a low current source of 5V on pin 39 of the expansion bus. Radio Shack does not. They tie that pin to ground. If you can get it out without making a federal case out of it, go ahead. Otherwise, you'll have to provide separate power.

Incidentally, when operating from a 5V source, the 8216 will get quite warm, as it uses most of the 100mA. However, when the module is disconnected from the system, or the system is powered down, the power required becomes quite a different story. Ten to 15 microamps will keep it alive very nicely. Two watch batteries should run it for a year or so. Penlights should run it for more than two years. I used a lithium battery on the printed circuit prototype. It should be sufficient to operate it for more than ten years. I hope the TRS-80 is still alive then.

The four 1-Megohm resistors (R6, R7, R8, R9) shown on the schematic are to protect the inputs against static charges when the clock module is disconnected from the system. The other inputs are protected either by internal resistors, or by the other circuitry they are connected to.

The clock IC has a 4-bit address bus, and a separate 4-bit data bus. Data is written into it and read out of it in 4-bit nibbles. As a result, it's a bit laborious to get all of the data out of it, requiring twelve reads to get it all. Available is time, in seven nibbles, from 0.1 second to tens of hours (in 24-hour format). The date requires two nibbles for the day, two for the month, and one nibble for the day of the week (1-7). An interrupt is provided which may be programmed to provide its interrupt every 0.5 seconds, every 5.0 seconds, or every 60 seconds (all ± 16.6ms). This interrupt may be allowed only once, continuously, or not at all — it's your choice under program control. It automatically corrects for different length months, and for leap year. It doesn't actually keep track of the year, but has a 4-bit register to signal the arrival of leap year. The various nibbles of information are addressed via the 4-bit address bus and are strobed in or out with a standard read or write strobe.

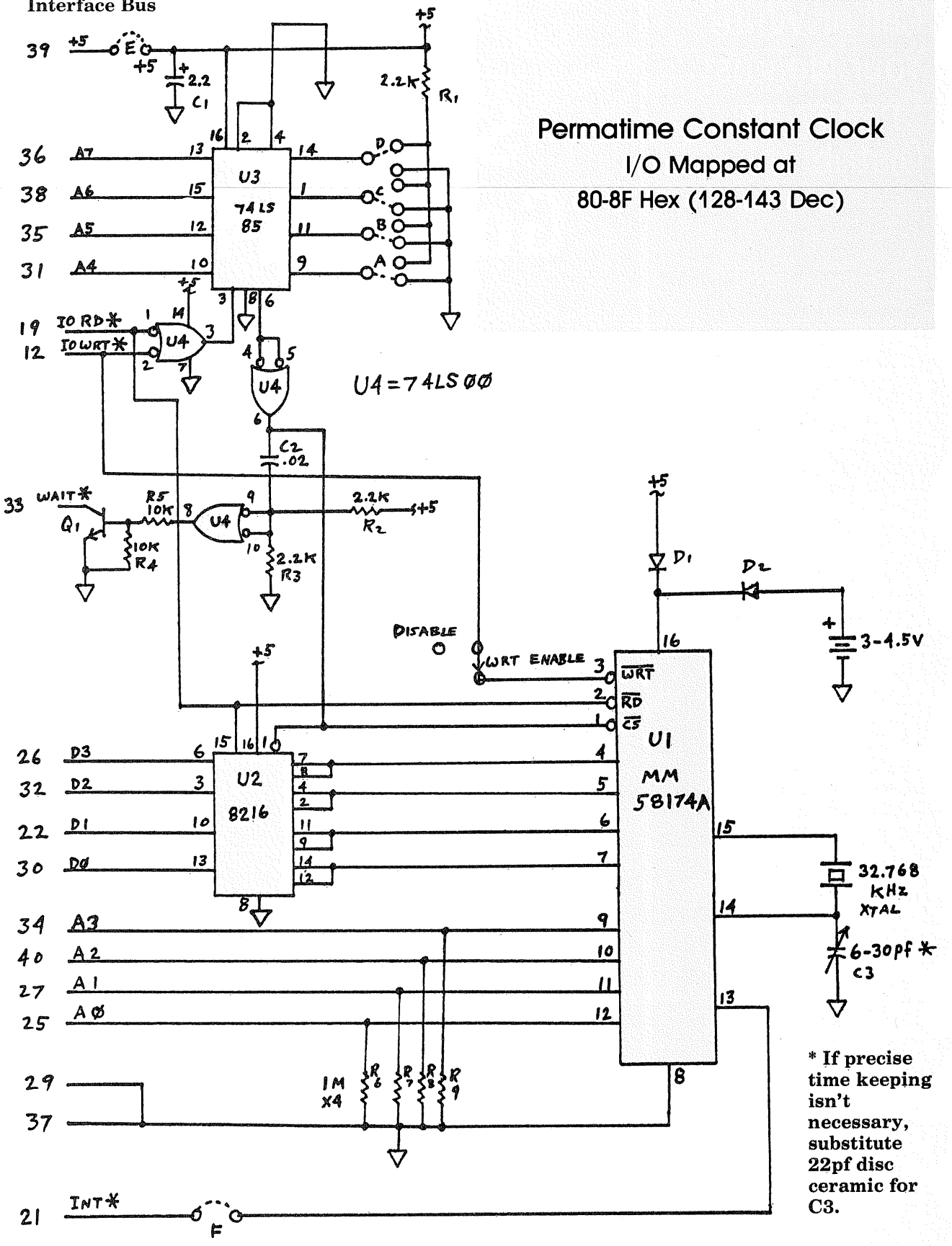
Maximum access time is 500ns, which is too slow for a Model I. Therefore, a wait is caused by U4 and Q1. Before someone gives me an argument that 500ns should be fast enough, let me say that National specifies it a little differently than some might. The time is measured from the leading edge of the IORD strobe, not from address valid/chip select as most manufacturers specify memory. IORD isn't true even close to 500ns, hence the need to cause wait states. A jumper is provided on the clock module to enable or disable the write strobe. It's all too easy to scramble the time otherwise. After setting the time, be sure to disable writing before going any farther.

Included on the PC module is a 4-bit bus transceiver (8216) and a 4-bit comparator (74LS85) for address decoding. The address may be placed anywhere in the I/O space, but the first address of the device must be on a 16-byte boundary. What does that mean? Only the top four bits of the 8-bit I/O address are decoded. The other four bits are used by the clock chip. Therefore, if the decoder is jumpered to match an address of 80 hex, it will match on all addresses from 80 to 8F. The 16-byte boundary mentioned earlier only means, for example, that it isn't possible to place the first address at 82 hex, and have it range up to 91 hex without doing some fancy gymnastics with the addressing. It must start at X0.

The 74LS00 serves the main purpose of forcing the wait state every time the bus has the proper address and either IORD or IOWRT are strobed. The dotted lines on the schematic labeled A, B, C, and D are what select the address. They are shown with 80 hex (128 decimal) selected. Details are in the section on construction.

The jumper labeled "E" is to allow receiving +5V from the system, if available. On most TRS-80 systems, this voltage won't be available, so don't tie +5V to pin 39 of the TRS-80 expansion port. The same is true of the jumper labeled "F." It is to allow the clock module to interrupt the system as mentioned earlier. It would be rather unusual to have this jumper installed, since the

TRS-80 Expansion Interface Bus



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%!

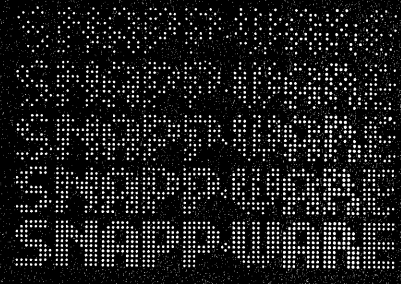
This unprecedented offer allows you to judge for yourself the value of our software using *your* hardware at *your* convenience. Our five best selling products: EXTENDED BASIC, EXTENDED BUILT IN FUNCTIONS, COLLEGE EDUCATED GARBAGE COLLECTOR, AUTOMAP and AUTOFILE, are all available to you on a trial basis 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.

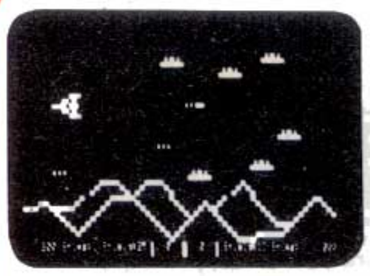
If for any reason you are not satisfied, just return the trial diskette and working copy and we will refund your money, no questions asked. With an unconditional guarantee like this, you can't lose.

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

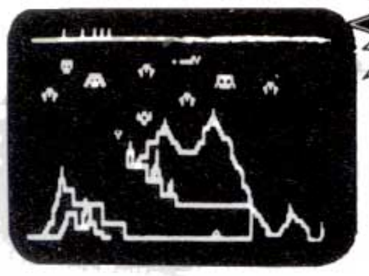


Time saving power at your fingertips.
CALL TOLL FREE:
1-800-543-4628
OHIO RESIDENTS CALL COLLECT: (513) 891-4496
3719 Mantell
Cinti., Ohio 45236



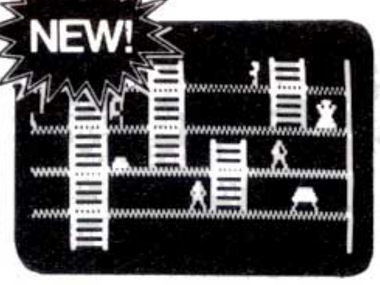
REAR GUARD

Deadly waves of enemy Cyborg craft attack your fleet from the rear. You are the Mothership's sole defender. You have unlimited firepower but the Cyborgs are swift, nimble attackers. Your abilities are tested hard in this game of lightening fast action and lively sound from Adventure International. Price: B



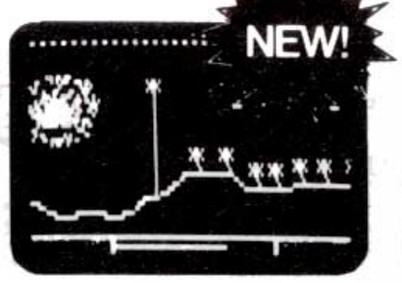
STRIKE FORCE

As the primary defender of a world of cities under deadly alien attack, your weaponry is the latest rapid fire missiles, long range radar and incendiary "star shells". Your force field can absorb only a limited number of impacts. A complex game of strategy, skill and reflexes from Melbourne House. Price: A



PANIK

Trapped at an enemy building site, your fate seems certain. Your laser is empty and evil Mzors are closing in. You'll have to climb ladders and think one step ahead of the various monsters. A challenging game for agile minds. From Fantastic Software with voice (Disk has larger vocabulary). Price: B



SEA DRAGON

Your submarine, the U.S.S. Sea Dragon, penetrates a mined enemy channel. Armed with missiles and torpedos, you engage the enemy while navigating unknown waters. Succeed or come to a salty end in this game. 29 screens of horizontally scrolling sea-scrape and sound from Adventure International. Price: B

SAVE 10, 15, 20%

"If you purchase Alpha's Joystick you get the exquisite pleasure of enjoying (action games) to the limit of arcade-style realism."

–80 Microcomputing 80 Reviews, Jan '82

FEEL THE POWER...

THE ALPHA JOYSTICK

ONLY $39.95

- + Features the famous Atari Joystick
- + Works with all Model I or III systems
- + Compatible with any other accessories
- + Saves your keyboard from abuse
- + Experiment in BASIC. Use A=INP(0)
- + Complete, ready to plug in and use
- + Model I: plugs into KB or E/I
- + Model III: plugs into 50 pin I/O bus

Price includes Joystick + Alpha Interface + Instructions + Demo Program listing. Please specify Model I or III

14 DAY MONEY BACK GUARANTEE

THE BEST FOR LESS

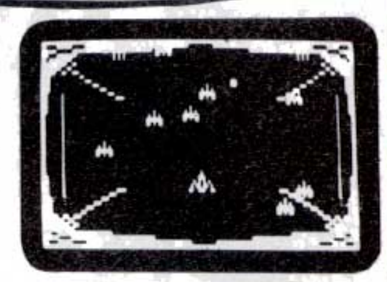
As you can see, all the best games from the top producers are joystick compatible. These games are fun without the joystick but we hope that you are one of the many thousands who enjoy the advantage of real joystick action.

Now you can deduct up to 20% on the price of games: buy any 2 games deduct 10%, buy any 3 games deduct 15%, buy any 4 games deduct 20% from game prices.

TOP TEN

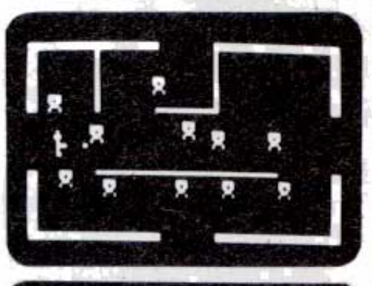
1. SCARFMAN - *All time favorite*
2. PANIK - *Remarkable Voices*
3. PENETRATOR - *Rave reviews*
4. ARMORED PATROL - *Super 3D graphics*
5. CATERPILLAR - *Good rendition*
6. CRAZY PAINTER - *Unique game concept*
7. DEFENSE COMMAND - *Tough struggle*
8. STELLAR ESCORT - *Fast and Challenging*
9. ROBOT ATTACK - *With voice*
10. SEA DRAGON - *Amazing "Seascape"*

STELLAR ESCORT



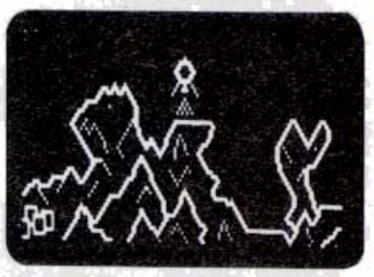
The latest super action game from Big Five. As the Federation's top space fighter you've been chosen to escort what is possibly the most important shipment in Federation history. The enemy will send many squadrons of their best fighters to intercept. With sound. Disk version has voices. Price: A

ROBOT ATTACK

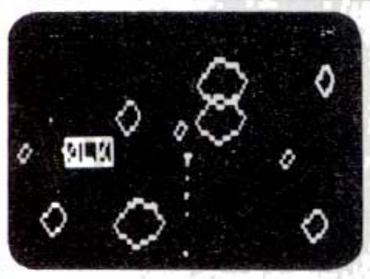


Talks without a voice synthesizer through the cassette port. With just a hand laser in a remote space station you encounter armed robots. Some march towards you, more wait around corners. Careful, the walls are electrified. Zap as many robots as you dare before escaping to a new section. More robots await you. Price: A

LUNAR LANDER



As a vast panoramic moonscape scrolls by, select one of many landing sights. The more perilous the spot, the more points scored -- if you land safely. You control LEM main engines and side thrusters. One of the best uses of TRS-80 graphics we have ever seen. From Adventure International. With sound. Price: A

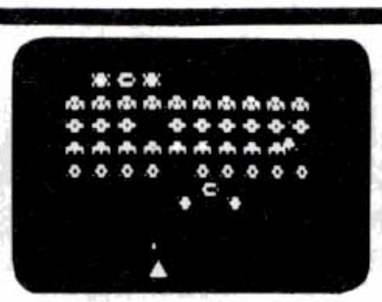


SUPER NOVA

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

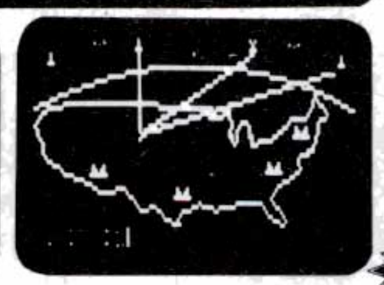
OUTHOUSE

You are the mighty protector of this small (but important) wooden structure. For reasons unknown, a bizarre gang of miscreants wish to vandalize, loot and otherwise destroy the little half moon house. Your patrol craft has lasers and smart bombs to deal with this terror. From SSM with sound. Price: A



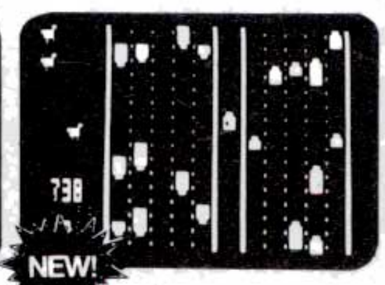
GALAXY INVASION

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



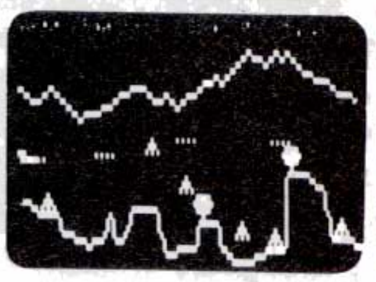
LASER DEFENSE

In this game of ICBM's, high-energy lasers and particle beams, you control the U.S. strategic defense satellite system. From your viewpoint high above the globe, you intercept Soviet nuclear missiles in flight and attempt to destroy their scattered missile silos. With sound from MED Systems. Price: A



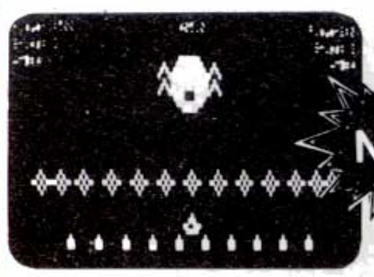
CHICKEN

Will the chicken cross the road? That's up to you. Can you guide these helpless little chicks across the perilous 10 lane super highway to safety? Or will you bumble, littering the blacktop with a storm of chicken feathers? A humourous yet challenging game of nerves from SSM with sound. Price: A



PENETRATOR

Soar swiftly over jagged landscape, swooping high and low to avoid obstacles and enemy missiles attacks. With miles of wild terrain and tunnels to penetrate, you're well armed with bombs and multiple forward missile capability. From Melbourne House. Features sound, trainer mode and customizing program. Price: C



DEFENSE COMMAND

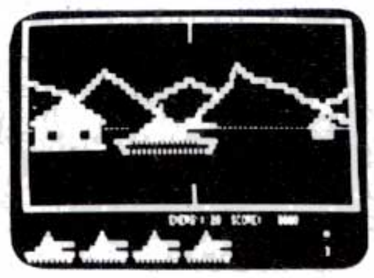
The invaders are back! Alone, you defend the all important nuclear fuel canisters from the repeated attacks of thieving aliens, repeatedly. An alien passes your guard, snatches a canister and flys straight off. Quick! You have one last chance to blast him from the sky! With sound and voice. Price: A

BOUNCEOIDS

Huge boulders careen off the walls. You're in the middle, in danger of being flattened. Keep your wits about you as you blast these "bounceoids" from the screen. Large ones break into many small ones. Clear a screen and enter a fast-paced challenge stage with a chance for big bonus points. From the Cornsoft Group. Price: A

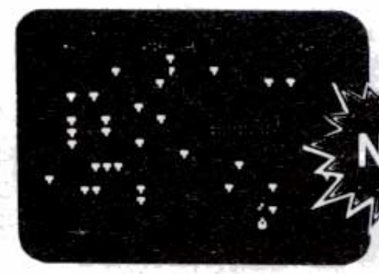
SCARFMAN

This incredibly popular game craze now runs on your TRS-80! It's eat or be eaten. You run Scarfman around the maze, gobbling up everything in your path. Try to eat it all before nasty monsters devour you. Excellent high speed machine language action game from the Cornsoft Group. With sound. Price: A



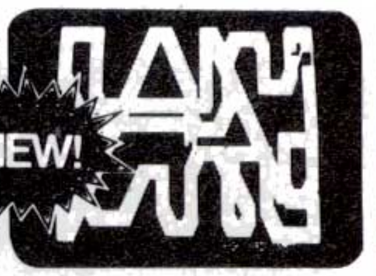
ARMORED PATROL

A realistic tank battle simulation. Your view is a 3-D perspective of an alien landscape. Maneuver your T-36 tank to locate and destroy enemy tanks and robots that lay hidden, ready to assault you. Clever graphics create the illusion of movement and dimension. From Adventure International. With sound. Price: B



CATERPILLAR

An arcade favorite! Stop these multi-sectioned crawlers before they creep down through the mushrooms. Zap one and it splits into two smaller bugs, each with its own sense of direction. There are moths and tumble bugs too. It all adds up to lots of fun for kids and adults alike. From Soft Sector Marketing. With sound. Price code: A



CRAZY PAINTER

You have to paint the floor white. We give you the paint and brush. Sounds easy? Hah! You'll be confounded by stray dogs, snakes, sloshing buckets of turpentine, even a ravenous "paint eater". A crazy, imaginative new game with ten selectable levels of skill for new or seasoned game players. Lot's of laughs. Price: A

LATEST RELEASES:

FROGGER

LICENSED BY SEGA

TAPE: $19.95 DISK: $22.95

WEERD

FROM BIG FIVE

TAPE OR DISK: $19.95

WITH ANY ORDER FROM THIS PAGE
STICK-ON LCD CLOCK-CALENDAR

FREE!

BLACK COLOR. BATTERY INCLUDED
LIMITED: ONE PER CUSTOMER

GAME PRICES

A: TAPE: $15.95 DISK: $19.95
B: TAPE: $19.95 DISK: $24.95
C: TAPE: $24.95 DISK: $24.95

TAPE: Model I&III, 16K Level 2
DISK: Model I&III, 32K, 1 Disk
All games are joystick compatible or may be played using arrow keys.

ALPHA Products
79-04C Jamaica Ave., Woodhaven, NY 11421

Toll Free Order Line
800·221·0916
Orders Only. NY & Info call (212) 296-5916. Hours: 9-5 E.S.T

Add $2.00 per order for shipping/handling.
We accept Visa, Mastercard, Checks, M.O.
C.O.D. - Add $3.00 extra.
N.Y. Residents add sales tax.
Overseas, FPO, APO: Add 10%
Dealer discounts available.

TRS-80 isn't conveniently set up for external interrupts. If you really want to do it, it can be done, but you should know what you are doing.

If it is desired to use NiCads for the backup battery, use three cells and parallel D2 with a 150-ohm resistor, or so. That will give approximately 0.5mA of trickle current into the battery to keep it charged. I don't recommend this procedure, since the NiCads won't last much longer than any other batteries in this application. You won't be able to leave the module disconnected from external power for as long, since the NiCads self-discharge in about a year. D1 is necessary to prevent the battery from powering the rest of the system when it is shut off.

The program listing provided allows for setting the time and date, reading the time and date, setting the system clock, and starting the system clock. The seconds are set to zero when the clock is started, so set the minutes to the next higher minute, then wait for the right time to roll around before pressing the ENTER button. There is also a utility starting at line 600 to allow writing to or reading from any one of the address locations in the clock chip. The address locations are: 0 = test only (the data sheet implies you will wind up in Moorlock's Castle if you mess with this one), 1=tenths of seconds (read only — you can't write to it), 2=units of seconds (read only), 3=tens of seconds (read only), 4=units of minutes, 5=tens of minutes, 6=units of hours, 7=tens of hours, 8=units of days, 9=tens of days, 10=day of week (1-7), 11=units of month, 12=tens of month, 13=leap year flag (8, 4, 2, or 1, write only), 14=start (write 1) or stop (write 0), 15=interrupt and status. That leap year flag is written as a single bit in a 4-bit register. The register is shifted right once each year at January 1. When the bit reaches the "1" position, it's leap year.

To enable interrupt once (non-repetitive), write the following to address 15: 0.5 sec. interval, write "1"; 5.0 sec., write "2"/ 60.0 sec., write "4." For no interrupt, write "0" to address 15. If you want continuous interrupts, add "8" to each of the above. You can test for the interrupt without installing the jumper "F" by reading address 15. Data greater than 8 indicates the interrupt has occurred. It should clear when you read it.

Keep in mind, when you read this device, that it is only the low-order four bits that are significant. Since the unused high-order four data bits will be returned high, or true, they must be masked out. The easiest way is to AND the data with 15. Also, if the device is read when it is updating a register, it will return 15. Since that is never a valid number in this fella, we can simply test for decimal 15, and re-read the same address if it appears. An example of that is on line 130. Incidentally, be sure that if you go looking for a MM58174A for this module, that it has the "A" suffix. Without the A, it will lose time when it is read — quite seriously, too. I wouldn't be surprised to see the older version appear on the surplus market, so be careful when you buy one.

At first glance, line 90 of the program listing appears strange. Its function is to test to see if the module is operational and has had its time set. The premise of the test is that, if 15 is read twice in a row, the device isn't operational. If this test isn't performed, the program will stall, waiting for data other than 15 to be returned. This way, it prints a "get your act together" reminder and returns to DOS.

When the program runs, it sets the system clock and date, starts the system clock, then returns to DOS. After it's done, another program may be run, since it has served its function and is no longer needed. There really isn't any reason why this clock can't be used without Disk BASIC, but you'll have to delete all commands not available in Level II BASIC.

To run the program under TRSDOS, just load and run it as any other BASIC program. It will return control to DOS via the CMD"S" command. Under NEWDOS/80, things may be done with a bit more elegance, if desired. It is a simple matter under NEWDOS/80 to have DOS run the clock program automatically whenever the system is booted up, such as at power up, or with a reset. When in DOS, type AUTO BASIC RUN"TIME". "TIME" is the name I used for the program file, but most any will do as well.

Once the AUTO statement is typed, the program will run automatically whenever the system disk is loaded. It may be prevented from running by holding the ENTER key when pressing system reset. To prevent it running permanently on boot up, type AUTO when in DOS. The program may be rerun any time the system clock needs to be set. A much shortened version could be tacked onto some other program in order to keep the clock correct.

Photo 1 — Perf board

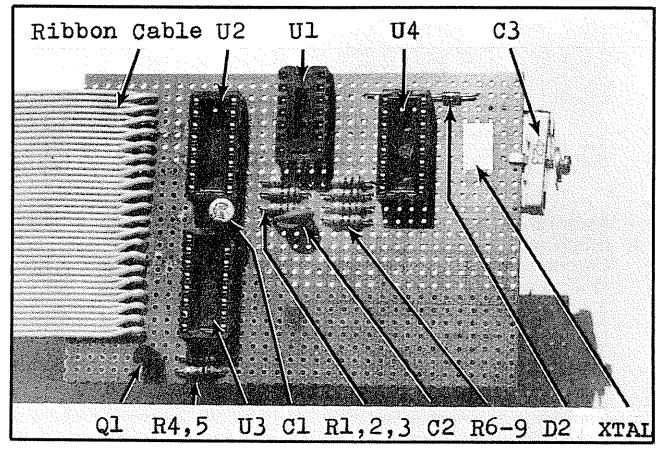
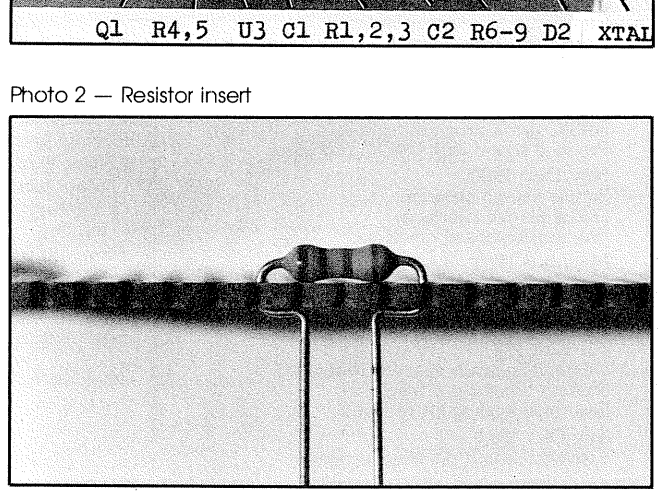


Photo 2 — Resistor insert



For example, if the modified program doesn't need to be able to set the time in the clock module, delete lines 300 to 520. Changes lines 290 and 810 to RETURN. Delete lines 600 to 700. If the system clock will already be running, delete line 280.

It's a simple matter to match the time to a preset value to provide for an alarm function. It would even be possible to make the clock program a machine language routine that would be a part of the interrupt handler. The program would run in the background, without apparent interference, but could stop the system with a selected message. Now, even your computer can nag you. Coupled with Radio Shack's power control module, you can control selected lights and appliances based on the time of day and day of the week, month, etc.

For those readers who wish to build their own, the module may be built any number of ways. However, probably most hackers are comfortable with wire wrap, so I'll pursue that method. Cut a piece of perf board approximately 2½"×3½". You'll need three 16-pin wire wrap sockets, and one 14-pin socket. Lay out the sockets similar to Photo 1. When you're happy with the placement, glue each socket down with 5-minute epoxy. Leave at least one inch of board for the ribbon cable. Choose the battery system you're going to use, and make sure the sockets will fit. I used a 4.5V battery (EverReady #333) in a single AA cell holder with the side clamps spread a bit. Longer battery life will occur if you use two AA cells. If they won't fit side-by-side, you can put one on each side of the perf board. On the end away from the flat cable is the trimmer capacitor, C3, glued to the end of the board. A mica compression-type is shown, but any type with the correct capacity should be fine. Glue the crystal in place and solder (gently) wire from the socket of U1 to the crystal, and to C3. These crystals are usually very small, so be careful with the fragile leads. They aren't polarized, so don't worry about which lead is which.

To prepare the ribbon cable, separate the forty conductors from each other for about one-half inch. Start with the wire closest to you and bend it up 90°. Leave the next one straight, bend up the third, fourth straight, etc. You should end with the last wire straight. Go back and check that the pattern is consistent across all forty conductors, as a mistake here will bite you later. Take the wires that you didn't bend and cut them back about 0.2 inches. Now, one at a time, bend the straight ones down and carefully strip them back about half way to where they're separated. After stripping, bend them back to straight again and tin them, leaving no loose strands. Proceed to strip about 0.15 to 0.20 inches of the bent up wires and tin them as well.

Okay, now bend just the bare portion of each straight wire straight down, opposite the previously-bent wires. On the edge of the perf board away from the trimmer cap, count up five rows of holes. Work the bare wires (the short ones) through this row of holes, one wire to a hole. Stay a hole, or so, away from the transistor. You should be able to get the entire width of the cable on the board. Without disturbing the wires you just stuck through the holes, lift up the ribbon cable, apply some 5-minute epoxy and press it back in place. Time for a lemonade

break while the glue sets.

After the glue hardens, bend the longer wires down and work them through the sixth row of holes. If you have trouble with the wires pulling back out of the holes, crimp them on the back side of the perf board. That is, bend them back, the two rows bent away from each other. To anchor the resistors, diodes, and capacitors, bend the leads as shown in Photo 2. The standup cap (C1, shown in Photo 1 between U2 and U3) will have to have its leads crimped away from each other as they're too close together to be bent toward each other like the resistors. Cut the component's leads to about one-half inch long. Wire the power and ground connections to each of the IC sockets. Don't use normal 30-gauge wire wrap for power. Use at least 28-gauge, with 24- to 26-gauge preferred. It's quite all right to solder these power connections to the wire wrap sockets. Make any solder connections close to the perf board so that you can still put a wrap or two on these IC leads. The ground connection to U1 should still be 24- to 26-gauge, but the +5V to D1 and +battery to D2 may be 30-gauge. You can solder the resistors and caps directly to U4 and U1 (sleeve them where necessary), or you can hook them up with wire wrap.

This brings up the question, "How do you wrap to a round resistor lead effectively?" Easy. Wrap it just as you would a square post. Then, solder it. Solder D1 and D2 directly to U1, pin 16. Now, it's time to identify wire #1 in the ribbon cable. Isn't it the pretty blue one on the edge? If only it were that simple. The problem is the edge connector on the other end of the ribbon cable. Not all of the connector manufacturers were consistent as to which side is 1, 3, 5, etc., and which is 2, 4, and 6. For example, Ansley, who is one of the major manufacturers of ribbon connectors (usually referred to as "mass termination") has their pin out reversed from Radio Shack's. Pity. Don't right it. Go get your ohmmeter or continuity checker.

Looking at the back of the TRS-80 keyboard, pin 1 on the expansion connector is on top, closest to the 3 key. Now, find the mating connection on your connector. Use the ohmmeter to find which wire at the other end of the cable is actually #1. Be sure you're not touching #2 also on either end. Put a dot of fingernail polish on the outside of the connector near pin 1, and on the proper wire. There. Now we can get down to business.

Back at the perf board, of the two rows of twenty wires each, one is all odd numbered, while the other is even. You decide which is which, but be right. A mistake here will cost you much rewiring later. Go ahead and wire the cable to the ICs. Solder at the cable end, keeping the stripped portion short, and wire wrap at the socket. Don't pull these wires tight or they'll break later. When done here, you should have made connection to seventeen of the forty wires, assuming you didn't hook up pin 39, or 21. You won't be using the rest of them, so you may want to lay a strip of vinyl tape across them to keep them from touching anything.

Go ahead and finish up the rest of the wire wrap according to the schematic. If you want it to respond to an I/O address other than 128 decimal, modify the connections to U3, pins 14, 1, 11 and 9. Pin 14

corresponds to bit 7 of the I/O address, pin 1 to bit 6, pin 11 to bit 5, and pin 9 to bit 4. If you want it to recognize the address bit as high, connect it to R1. If you want it low, connect it to ground. Don't set up an address of 240 decimal (F0 hex) as that is the address of your tape recorder.

The write-enable jumper may be plug-on wire that's captive at one end, or it can be a little slide switch glued to the perf board. You can even use a short wire with small alligator clips. If you can tolerate the risk, it can be dispensed with entirely, being permanently enabled. I have inadvertently left mine enabled and have never scrambled the clock's data, but it certainly could happen. The INT enable (jumper F) may be left off if you don't intend to use the interrupt feature, which is the normal way to use this clock. If you're not sure if you want it or not, it can be added later, or you can add another slide switch. Also, you can wire it in permanently, since the clock won't interrupt unless programmed to do so. If you intend to use the interrupt output for some other purpose, be aware that it is an open collector output, so you'll need a pullup resistor of around 10K to +5V. Your TRS-80 already has it, so you don't need the resistor if it goes to the system.

Figure 1 — Perma-Time

PARTS LIST (WIRE WRAP)

Integrated Circuits

Intel: U3—74LS85N, U2—8216
National Semi.: U4—74LS00N, U1—MM58174AN

Capacitors

C1—1.0-10mf Electrolytic
C2—0.02mf Disc Ceramic
C3—Trimmer cap 6-30pf, or 22pf Disc

Diodes

D_1, D_2—IN914, IN4148, etc.

Resistors

$R_{1,2,3}$—2.2K, ¼W, 10%
$R_{4,5}$—10K, ¼W, 10%
$R_{6,7,8,9}$—1 Meg, ¼W, 10%

Transistor

Q_1—Small signal NPN 2N4400, 2N2222, 2N3904, etc.

XTAL

32.768KHz, series mode

Sockets

U4—14-pin wire wrap
U1,2,3—16-pin wire wrap

Perf Board

2½"×3½"

Ribbon Cable

40-conductor with 40-pin female socket on one end to match TRS-80 expansion connector

Check out is straightforward. Leave all of the chips and battery out and apply 5V DC to the unit. Connect a voltmeter, minus to ground. Probe the following points with the positive probe on top of the board, looking for +5: U1, U2, U3 pin 16, and U4 pin 14. U1, pin 16, will be a bit lower because of D1. Once this part checks out, remove power from the unit and plug in the ICs. Be careful with U1, as it is a CMOS IC and is subject to static discharge damage. Just be sure you discharge yourself to ground before taking the MM58174A from its protective foam.

When plugging in the ICs, be sure none of the pins bend under. It's easy to do and can be a bear to diagnose. After all of the chips are in place and checked that they're in the right way, plug the ribbon cable into the TRS-80 keyboard expansion connector, or into the interface adapter expansion connector while the system is powered off. Apply power to the clock module while your voltmeter is connected from ground to +5V. Be sure it comes up to full voltage before proceeding.

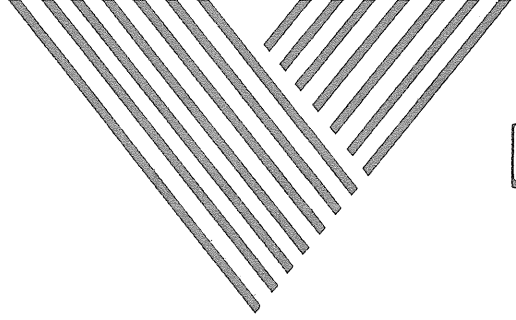
If all is well, turn on the TRS-80 (and expansion interface, if any). It should come up normally. If it comes on with the screen full of strange garbage, and reset has no effect, the clock module ribbon cable is probably plugged in upside down. It doesn't cause any damage except to your nerves. (It's good not to have any witnesses so far.)

When everything powers up okay, enable writing to the module and try the following quick program:

```
10 PO=(Address you choose — 128 per schematic)
20 CLS
30 OUT PO+14,1:REM START CLOCK RUNNING
40 A=INP(PO+2) AND 15:REM READ SECONDS
50 IF A=15 GOTO 40: REM ALLOW FOR INVALID
DATA
60 PRINT @0,A
70 GOTO 40
```

In the upper left corner of the screen should be a single digit that counts up at a one-second rate. If so, give yourself a big cheer. If not, go back and check your wiring, especially the flat cable. Make sure all the flat cable wires that should be wired are, and make sure all that should be blank are blank. If all appears well, but it doesn't work, use a logic probe or an oscilloscope to see if you're getting address match while the above program is running. You should see pulses at U3 pin 3, U3 pin 6, and U4 pin 6, in that order. Pulses at U3 pin 3 indicate the read strobe is present, while U3 pin 6 is the output of the decoder.

If all the listed points are okay, check U1 pins 1 and 2 for pulses. Check U1 pin 3. There should not be a pulse, and it should be high (+). Now, change line 70 to "GOTO 30." Run it and you should have a pulse at U1 pin 3. If not, look at U4 pin 2. If the two points are different, write-enable isn't connected. Incidentally, if the TRS-80 won'r run when the clock is plugged in, check the WAIT line on Q1 collector, or pin 33 on the flat cable. If it's continuously low, your TRS-80 can't operate. Pulses



13 TIMES FASTER THAN dBASE II™

If you bought your computer to save time, then you need SUPER, the most powerful database system you can use. Power is a combination of speed, ease of use and versatility. SUPER has them all.

FAST - To demonstrate SUPER's speed, ISA retained a professional dBASE programmer to benchmark SUPER vs. the acknowledged leader. A simple mailing list application was chosen to minimize dBASE programming cost. The results:

Task	SUPER Time	dBASE II Time
Set up/Program	5:20	12:18:00
Input 100 records	50:29	1:27:50
Sort & Print Labels	6:41	4:18
Totals	1:02:30 hrs.	13:50:08 hrs.

Notice that SUPER was faster at every task where *your time* is involved—and saving your time is probably the whole reason you bought a computer.

EASY TO USE - SUPER won because of its ease of use. Since it is menu-driven, office personnel can easily learn to use SUPER to set up their own applications, speeding and simplifying dozens of tasks without the need of programmer support.

VERSATILE - SUPER, unlike other business programs, doesn't dictate how to run your business. With SUPER the computer does what *you* want, when *you* want, the way *you* want it. *SUPER may* **be the only business program you'll ever need**. It can handle customer files, payables, receivables, depreciation, appointments, cost accounting, time charges, commissions, inventory, manufacturing control, and even matrix accounting systems!

SUPER PERFORMANCE AT A SUPER PRICE - That SUPER beats the $700 dBASE program may surprise you, but in terms of price vs. performance SUPER has no competitors. Among its features are: production input, data compression, multiple databases on line, transaction posting, file reformating, stored arithmetic files, flexible report formats, hierarchical sort and multi-disk files for up to 131, 068 records. It can select by ranges, sub-strings, and field comparisons. It interfaces to word processors such as WordStar™, SuperSCRIPTSIT™, Model II/16 SCRIPTSIT™, and NEWSCRIPT™. In fact SUPER has so many features that it takes a six-page product description to cover them all. Write or call and we'll send you one.

SUPER is available for TRS-80™ Models I & III under NEWDOS™, LDOS™, and DOSPLUS; for TRS-80 Models II, III and 16 under TRSDOS™; and CP/M™ systems.

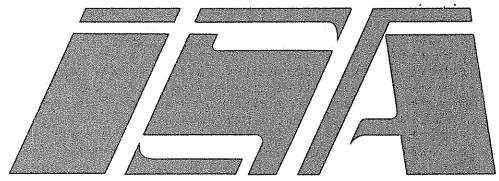
Prices:		
	TRS-80 and Osborne versions	$250.00
	Other CP/M versions	$295.00
	Manual (Price applicable to purchase)	$ 25.00

SPECIAL TILL APRIL 15, 1983 (If you mention this ad):
All TRS-80 Model I/III versions $199.00
MasterCard and VISA accepted.

OTHER SOFTWARE

- ManageMint™: A PERT/CPM project management system compatible with SUPER. It includes scheduling, resource and financial management modules.
- Sales Planning and Data Extraction System: Improves hit rates while cutting costs.
- Small, economical program packages for accounting, business and office applications as well as utilities.

Write for Catalogue



Institute For Scientific Analysis, Inc.

SOFTWARE FOR HARD USE ™

Dept U-1 Institute for Scientific Analysis, Inc.
P.O. Box 7186 Wilmington, DE 19803 (215) 358-3735
West Coast Representative:
CDC 13715 Vanowen St., Van Nuys, CA 91405 (213) 873-6621
Outside of California: (800) 692-5235

there are normal. If you have an oscilloscope, connect a 10K resistor in series with its probe and touch the other end of the resistor to U1 pin 15. You should be able to see the oscillations there. If not, try turning C3 a good bunch (to lower capacitance). If this causes the oscillator to start, you probably should try a different crystal. Also, you should be able to see gated data on U1 pin 7. Pins 4, 5, and 6 will be unpredictable, unless you have a triggered 'scope to see them in proper time perspective.

If all else fails, check all the ICs for zero volts on the pins that should be grounded, including the power grounds. When you locate the problem, change line 70 back to "GOTO 40." When all seems fine, type in the main program.

For those of you wishing to build this circuit, you're more than welcome to do it from scratch, but if you'd rather, I will provide the bare PC board for $15, or the full kit of parts, less the battery, for $50 plus $2.50 postage and handling. Or, if you really want it simple, I'll build it for you and test it for an additional $20. Direct orders to RB Enterprises, 15853 7th S.W., Seattle, WA 98166. ■

Program Listing for Perma-Time Disk Version

```
10 '** CLOCK MODULE (PERMA-TIME)
20 ' BY RB ENTERPRISES - RAY BENNETT
30 '** NOTE: TO CHANGE YEAR, MODIFY LAST
 ENTRY IN LINE 250
40 '                TO CHANGE TIME/DATE, TY
PE 'RUN 300'
                  UTILITY TO PLAY WITH C
LOCK AT 600.
50 CLEAR 200
60 PO=128:'I/O PORT ADDRESS
70 DIM X(15)
80 PRINT@0,STRING$(192," ")
90 A=INP(PO+2)AND15:IF A=0 OR A=15 THEN
A=INP(PO+2)AND15:IF A=0 OR A=15 THEN 800
:'TEST FOR ACTIVE DEVICE
100 'READ IN DATA BUFFERS OF CLOCK
110 FOR I=2TO12
120 X(I)=INP(PO+I) AND 15:'ONLY CARE ABO
UT FIRST NIBBLE
130 IF X(I)=15 THEN GOTO120:'FIX A FUNNY
 IN CLOCK CHIP
140 NEXT I
150 X(7)=X(7)*10+X(6):'CONVERT HOURS FRO
M 2 NIBBLES TO 1 BYTE
160 POKE&H4043,X(7):'SET HRS IN SYSTEM C
LOCK BEFORE IT'S CHANGED
170 IF X(7)>=12 THEN X(7)=X(7)-12:P$="PM
" ELSE P$="AM"
180 IF X(7)=0 THEN X(7)=12
190 CLS
200 PRINT@0,X(7);":";X(5) *10+X(4);":";X
(3)*10+X(2);;P$,
```

```
210 GOSUB 530:'FIGURE DAY OF WEEK
220 PRINT@64,X(12);X(11); "/";X(9);X(8),
DW$,
230 PRINT
240 POKE &H4042,X(5)*10+X(4) :POKE&H4041
,X(3)*10+X(2)
250 POKE &H4045,X(12)*10+X(11) :POKE&H40
46,X(9)*10+X(8):POKE&H4044,82
260 'THE PREVIOUS TWO LINES STORE CLOCK
INFO IN SYSTEM CLOCK
280 CMD"CLOCK"
290 CMD"S"
300 '** SET TIME
310 PO=128:'I/O PORT ADDRESS
320 PRINT"IF YOU INTEND TO CHANGE TIME,
ENABLE WRITE
ON MODULE - ANY KEY TO CONTINUE"
330 IF INKEY$="" THEN 330
340 OUT PO+14,0:'STOP CLOCK
350 INPUT"ENTER MONTH,DAY,YEAR";MO,D,Y
360 INPUT"ENTER DAY OF WEEK (1-7, SUNDAY
=1)";DW
370 INPUT"ENTER TIME HH,MM (HIT RETURN W
HEN SECONDS=0)";H,M
380 H1=INT(H/10):H0=INT((H-H1*10))
390 M1=INT(M/10):M0=INT((M-M1*10))
400 PRINT H1;H0,M1;M0
410 OUTPO+4,M0:OUTPO+5,M1:'MINUTES
420 OUTPO+6,H0:OUTPO+7,H1:'HOURS
430 OUTPO+8,(D-INT(D/10)*10)
440 OUTPO+9,INT(D/10):     'DAYS
450 OUTPO+10,DW:           'DAY OF WEEK
460 OUTPO+11,(MO-INT(MO/10)*10)
470 OUTPO+12,INT(MO/10):   'MONTHS
480 OUT PO+13,Y2:'FIX UP FOR LEAP YEAR
490 OUT PO+14,1:'START CLOCK
500 PRINT"REMOVE WRITE ENABLE JUMPER - A
NY KEY TO CONTINUE"
510 IF INKEY$="" THEN 510
520 RUN
530 'FIGURE DAY OF WEEK
540 IF X(10)=0 THEN DW$="IMPROPER DAY OF
 WEEK":RETURN
550 FOR J=1TOX(10)
560 READ DW$
570 NEXT
580 RESTORE:RETURN
590 DATA "SUNDAY","MONDAY","TUESDAY" ,"W
EDNESDAY","THURSDAY","FRIDAY","SATURDAY"
,"DAY OF WEEK MESSED UP"
600 'UTILITY TO MANIPULATE INDIVIDUAL LO
CATIONS IN CLOCK CHIP
605 PO=128
610 INPUT"READ OR WRITE";IO$
620 IF IO$="W"THEN670
630 INPUT"RELATIVE ADDRESS (1-15)";A
640 B=INP(PO+A)AND15:IF B=15 THEN640
```

```
650 PRINTB
660 GOTO610
670 INPUT"RELATIVE ADDRESS (1-15)";A
680 INPUT"DATA";D
690 OUT PO+A,D
700 GOTO610
800 CLS:PRINT@0,"CLOCK NOT OPERATIONAL
OR TIME NOT SET.  IF CLOCK IS INSTALLED,
TYPE BASIC *.  FOLLOW WITH RUN300."
810 CMD"S"
```

Listing 2 — Cassette Version

```
10 '** CLOCK MODULE (PERMA-TIME) ......
DISK BASIC NOT REQUIRED
20 ' BY RB ENTERPRISES - RAY BENNETT
30 '** NOTE: TO CHANGE YEAR, MODIFY LAST
 ENTRY IN LINE 250
40 '              TO CHANGE TIME/DATE, TY
PE 'RUN 300'
                UTILITY TO PLAY WITH C
LOCK AT 600.
50 CLEAR 200
60 PO=128:'I/O PORT ADDRESS
70 DIM X(15)
80 PRINT@0,STRING$(192," ")
90 A=INP(PO+2)AND15:IF A=0 OR A=15 THEN
A=INP(PO+2)AND15:IF A=0 OR A=15 THEN 800
:'TEST FOR ACTIVE DEVICE
100 'READ IN DATA BUFFERS OF CLOCK
110 FOR I=2TO12
120 X(I)=INP(PO+I) AND 15:'ONLY CARE ABO
UT FIRST NIBBLE
130 IF X(I)=15 THEN GOTO120:'FIX A FUNNY
 IN CLOCK CHIP
140 NEXT I
150 X(7)=X(7)*10+X(6):'CONVERT HOURS FRO
M 2 NIBBLES TO 1 BYTE
170 IF X(7)>=12 THEN X(7)=X(7)-12:P$="PM
" ELSE P$="AM"
180 IF X(7)=0 THEN X(7)=12
200 PRINT@0,X(7);":";X(5) *10+X(4);":";X
(3)*10+X(2);;P$,
210 GOSUB 530:'FIGURE DAY OF WEEK
220 PRINT@64,X(12);X(11);"/";X(9); X(8),
DW$,
230 PRINT
240 GOTO100
300 '** SET TIME
310 PO=128:'I/O PORT ADDRESS
320 PRINT"IF YOU INTEND TO CHANGE TIME,
```

```
ENABLE WRITE
ON MODULE - ANY KEY TO CONTINUE"
330 IF INKEY$="" THEN 330
340 OUT PO+14,0:'STOP CLOCK
350 INPUT"ENTER MONTH,DAY,YEAR";MO,D,Y
360 INPUT"ENTER DAY OF WEEK (1-7, SUNDAY
=1)";DW
370 INPUT"ENTER TIME HH,MM (HIT RETURN W
HEN SECONDS=0)";H,M
380 H1=INT(H/10):H0=INT((H-H1*10))
390 M1=INT(M/10):M0=INT((M-M1*10))
400 PRINT H1;H0,M1;M0
410 OUTPO+4,M0:OUTPO+5,M1:'MINUTES
420 OUTPO+6,H0:OUTPO+7,H1:'HOURS
430 OUTPO+8,(D-INT(D/10)*10)
440 OUTPO+9,INT(D/10):     'DAYS
450 OUTPO+10,DW:           'DAY OF WEEK
460 OUTPO+11,(MO-INT(MO/10)*10)
470 OUTPO+12,INT(MO/10):   'MONTHS
480 OUT PO+13,Y2:'FIX UP FOR LEAP YEAR
490 OUT PO+14,1:'START CLOCK
500 PRINT"REMOVE WRITE ENABLE JUMPER - A
NY KEY TO CONTINUE"
510 IF INKEY$="" THEN 510
520 RUN
530 'FIGURE DAY OF WEEK
540 IF X(10)=0 THEN DW$="IMPROPER DAY OF
 WEEK":RETURN
550 FOR J=1TOX(10)
560 READ DW$
570 NEXT
580 RESTORE:RETURN
590 DATA "SUNDAY","MONDAY","TUESDAY", "W
EDNESDAY","THURSDAY","FRIDAY","SATURDAY"
,"DAY OF WEEK MESSED UP"
600 'UTILITY TO MANIPULATE INDIVIDUAL LO
CATIONS IN CLOCK CHIP
605 PO=128
610 INPUT"READ OR WRITE";IO$
620 IF IO$="W"THEN670
630 INPUT"RELATIVE ADDRESS (1-15)";A
640 B=INP(PO+A)AND15:IF B=15 THEN640
650 PRINTB
660 GOTO610
670 INPUT"RELATIVE ADDRESS (1-15)";A
680 INPUT"DATA";D
690 OUT PO+A,D
700 GOTO610
800 CLS:PRINT@0,"CLOCK NOT OPERATIONAL
OR TIME NOT SET.  IF CLOCK IS INSTALLED,
TYPE RUN300."
810 END
```

Moving day for DEBUG

Relocate it for better results

Model I/III tape systems

Don Bazzurro, West Springfield, MA

The Radio Shack Debug monitor program (catalog #26-2000) is a powerful debugging and programming tool. For those of us who dabble in the world of machine language, it permits operations that otherwise would be extremely difficult and time consuming, if not downright impossible.

After marveling at Debug's wide range of capabilities and to some extent mastering its use, I found that it lives in an undesirable neighborhood (4332H-493FH), overlapping RAM that is occupied by BASIC programs and in some cases, even certain machine language programs (e.g., EDTASM). To overcome this limitation, I undertook to move Debug to an "uptown" address. Upon completion of the project, I found it more useful than ever.

It occurred to me that other computerists might also benefit from the advantages of a relocated Debug. Since I have a 48K RAM system, I relocated it to the suburbs near the end of Memory Lane (C032H-C63FH). The move involved a memory block transfer and disassembly of the code to determine which addresses must be changed and which values must not be, in order for it to function at its new location. Realizing that not every system has 48K RAM, or memory large enough to run a disassembler along with Debug, my purpose is to describe the step-by-step procedures that will result in a more effective, relocated, Debug program for 16K systems. I call this program Hibug, to avoid confusion.

If my instructions seem a little too elemental, please bear with me. Too many times, I have learned that things quite obvious to the author may take hours for the reader to decipher. Incidentally, the procedures described here were performed on a Model III, but I see no reason why they shouldn't apply to a Model I as well.

The first decision was to select a new home for Hibug. I chose 7332H to 793FH for two reasons. First, it moves it up to a point where there is approximately 12K of memory below it for BASIC programs and yet more than 1.5K above it for machine language applications in a 16K system (see Figure 1). The second reason is that moving it exactly 3000H locations makes the move easier. Only the high order address bytes need to be changed to make it functional after the move. Having found a suitable new home for Hibug, we can get into the nuts and bolts of the move.

Step 1: Load Debug.

Step 2: This step will relocate Debug's starting point from 4332H to 7332H. Using the D (display), and M (modify memory) commands, punch in the short, machine language memory block transfer program (see Listing 1) at addresses 6000H to 6011H. When you're satisfied the code has been entered correctly, you can execute it using the J (jump) command. Jump Address = 6000 <ENTER>. Now, verify the transfer has been made successfully by displaying the relocated Debug at addresses 7332H to 793FH by using the D command.

Step 3: Make a tape of the relocated Debug, using the W (write) command. I call this tape Unbug, since it is not corrected or functional. Insert a blank cassette in the recorder, and set it to record. Press <W> S=7332 E=793F T=7909 N=UNBUG <ENTER>. I suggest repeating this step several times on the same tape to insure a good save.

Step 4: You now have the uncorrected Unbug on tape. Before taking step 4, power down (turn off) the computer to clear all memory. Then, turn the computer back on and load Unbug using the system command: SYSTEM *? UNBUG <ENTER>. When the tape is loaded and the system prompt reappears, return to BASIC by resetting the computer using the reset button. *Do not turn it off.* Set memory size at 29000, then type in and run the BASIC program to change 43H-49H to 73H-79H (Listing 2). This will change all memory locations containing values between 43H and 49H to 73H and 79H. Having completed step 4, we now have our relocated Highbug with 170 values changed. Unfortunately, 66 of these changed values were not addresses, but machine language instructions which must be restored before our Hibug will work properly.

Step 5: Reset the computer again using only the reset button. *Do not turn it off.* Using the system command, reload the original Debug. Then, using the D and M

commands, carefully restore the 66 original values as indicated by Table 1. (The values to be restored were determined by disassembly.) When this has been completed, you will have a workable Hibug program residing at 7332H to 793FH with an entry point of 7909H (30985 decimal) and all that remains is to write it to tape using the W command. Press W S=7332 E=793F T=7909 N=HIBUG <ENTER>.

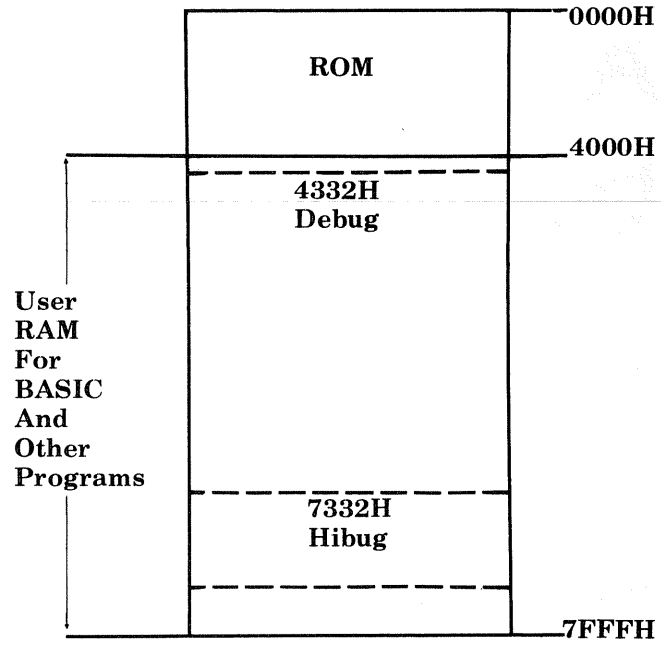
Again, I would recommend making several copies of your new Hibug. Model III users may wish to modify the contents of memory location 4211H to 01 (using the M command) before writing the tape in order to record at 1500-baud (Cassette high).

This entire process should take less than an hour's labor of love and in the end, you will have added a valuable utility to your library. With your new Hibug, you should be all set to do some high-falut'n programming. ■

Table 1
66 Values to be Restored

HEX ADDR	CHG FROM	BACK TO	HEX ADDR	CHG FROM	BACK TO
7349	73	43	74EE	73	43
7351	73	43	74F2	74	44
7355	73	43	74F3	74	44
735E	73	43	74F5	75	45
7361	73	43	7508	73	43
737E	73	43	7510	73	43
7397	77	47	7522	73	43
73AC	73	43	7527	73	43
73B0	74	44	752A	73	43
73B4	79	49	7548	73	43
73DD	73	43	754C	73	43
73FF	73	43	7567	73	43
7402	73	43	756D	73	43
7414	73	43	757B	73	43
7418	73	43	75FD	73	43
7446	73	43	7613	73	43
747D	73	43	763C	77	47
748A	73	43	7646	73	43
74A3	73	43	7663	79	49
74AC	76	46	766B	73	43
74B1	73	43	7679	77	47
74B5	74	44	7680	73	43
74B6	75	45	7687	73	43
74BA	78	48	768C	73	43
74C0	76	46	76A3	73	43
74C5	73	43	76A6	73	43
74C9	74	44	76C4	75	45
74CA	75	45	7725	79	49
74CE	78	48	783D	78	48
74D3	79	49	7842	77	47
74D8	79	49	78DB	77	47
74E3	73	43	7905	73	43
74EA	78	48	7923	75	45

Figure 1 — Memory Map (16K System)



Listing 1 for Machine Language Memory Block Transfer Program

```
HEX ADDR      CODE          REMARKS

  6000         21        ;Loads HL with
  6001         32         source of memory
  6002         43         transfer (4332H)
  6003         11        ;Loads DE with
  6004         32         transfer destination
  6005         73         (7332H)
  6006         01        ;Loads BC with
  6007         0E         number of bytes
  6008         06         to transfer
  6009         ED        ;Transfer and
  600A         A0         decrement counter
  600B         EA        ;Do again
  600C         09         if not
  600D         60         finished yet
  600E         00        ;NOP - (no operation)
  600F         CD        ;Return to
  6010         09         DEBUG when
  6011         49         finished
```

Listing 2 — BASIC Program to Change 43H-49H to 73H-79H

```
10 CLS:PRINT CHR$(23)
20 P=29490:Q=1
30 FOR N=1 TO 1550
40 A=PEEK(P)
50 IF A<67 OR A>73 THEN 80
60 A=A+48:POKE P,A
70 PRINT@ 390,Q;"MEMORY LOCATIONS CHANGED"
75 Q=Q+1
80 P=P+1
90 NEXT N
100 PRINT@ 664,"FINISHED"
```

A Color Computer spelling bee . . . with sound

Color Computer

Craig Hunt, Herndon, VA

One of the Color Computer's many talents is the ability to make work fun — even homework! My daughter Sara has often been given a list of words to memorize for a quiz or spelling bee. This program helps remove the drudgery from studying a list of words. My son David has used it to study his reading list. A child could use it to prepare for the national spelling bee. It is even useful for an adult, like me, who has trouble spelling recieve. Receive?

The power of this program lies in the Color Computer's ability to store and retrieve voice data on an audio cassette. The cassette control commands, MOTOR and AUDIO, can be used to provide auditory data with any program. A spelling quiz is a natural application for this capability. The success of Texas Instruments' Speak 'n Spell™ can attest to the usefulness of voice output in a spelling quiz.

A unique feature of "SPELLBEE" is the ability to produce spelling quizzes for later use. Most programs of this type require that the quiz information be stored in DATA statements within the program. Each new quiz is a modified version of the original program. SPELLBEE provides a facility with which the parent or student can build a quiz tape for use later. Changing quizzes is merely a matter of changing tapes. Reloading programs is not required.

At the start, the program provides a menu to allow the user to select the function to be performed. Function one is the actual running of a spelling quiz. More about this later. Function two is the building of a quiz tape. This function needs some discussion. The quiz tape is composed of two distinct pieces. The first part is a data file entitled WORDS. It contains character strings for the proper spelling of each word to be used. The second part of the tape is an audio voice recording of the proper pronunciation of each word in the WORDS file. Of course, each section of the tape must contain the words in exactly the same order. Function two provides the software necessary to build the quiz tape. Let's look in detail at how this is done.

Instructions are displayed when the tape-build routine is entered, and the user is prompted with SPELLING WORD?. At this time, you should enter the correct spelling of a word from your list. The prompt will be in response to the prompt when no words are left in your list.

The user is then given the opportunity to review the list just entered. The prompt REVIEW LIST? is displayed. NO is the default. In order to review the list, you must answer YES or Y. The words will be displayed in two columns on a full screen. This will give you a total of 28 words to review at a time. Each word will be identified by a unique number. At the bottom of the screen, the prompt "ANY CHANGES? will be displayed. Again, NO is the default. To change a word, you must answer YES or Y. If YES is entered, the prompt changes to NUMBER,WORD?. You should enter the number used to identify the word, a comma, and the correct spelling of the word.

You will notice that a full set of 28 numbers is displayed on the screen even if there are less than 28 words. These extra numbers can be used to add words to the list. Enter a comma with no number or word to show that you have finished entering changes. This somewhat strange technique for signaling the end of input is due to the INPUT statement in line 1090 having two variables.

You will be shown the same page of words with your corrections inserted and be given a chance to again make changes. If you have no changes for this page, the procedure will repeat for each succeeding page until either the maximum of 100 words is reached or there are no more words in your list.

The word list is now ready to be written to tape. You will be prompted to prepare a cassette for recording. Load and position a cassette, press PLAY and RECORD. Press the ENTER key when you are ready, and the file WORDS will be written to tape. Believe me, this is not as complicated as it sounds!

Now, we're ready for the fun part — recording voice data for the Color Computer. You will be prompted to ready the cassette recorder for voice recording. To do this, just leave the PLAY and RECORD buttons

PRICES AND SERVICE TOO GOOD TO PASS UP!

PRODUCTS FOR THE TRS-80®

COLOR COMPUTER

	tape	disk
Bugout (Monitor)	16.95	n/a
Oracle (Graphic Monitor)	n/a	25.75
Ultra 80CC (Editor/Assembler)	n/a	42.50
Ultra 80CC Plus Oracle	n/a	64.95
Soundsource (with Cable)	21.95	n/a
Typing Tutor	n/a	17.25
Color Games by Lance	15.95	n/a
CCthello	12.75	14.95
Ghost Gobbler or Cosmic Invaders	17.50	20.50
Colorout	n/a	11.95
Color Scarfman	17.25	n/a
Deathplanet: The Dogstar Adv.	15.95	n/a
Dunkey Munkey	21.95	n/a
Mean Craps Machine	15.95	n/a

GAMES

	tape	disk
Attack Force or Cosmic Fighter	12.75	15.95
Super Nova or Galaxy Invasion	12.75	15.95
Meteor Mission II or Robot Attack	12.75	15.95
Stellar Escort or Defense Command	12.75	15.95
Weerd	15.95	15.95
Forbidden City or Forbidden Planet	n/a	29.95
Hyperlight Patrol	n/a	15.50
Defiance (Disk Only) or Panik	15.50	19.50
Devil's Tower	12.75	15.95
Alien Defense or Bounceoids	13.95	17.25
Caterpillar or Scarfman	13.95	17.25
Penitrator	21.75	21.75
Regilian Worm	14.95	16.95
Armoured Patrol or Eliminator	19.95	19.95
Rear Guard or Sea Dragon	19.95	19.95
Adv. Tripac 1-3, 4-6, 7-9, or 10-12		31.75
Adv. Hint Book #s 1-12		6.95

Lazy Writer

Features include page breaks before printing, disk directory without going to DOS, user definable function keys, and more. Prints super & subscripts, boldface, underlining, reverse indents, headers & footers, automatic page numbering, and more. Lazy Writer should be your selection if your word processing needs involve long or complicated documents.

$149.95

Lazy Writer Extensions:
Lazydoc, $55.95 Lazytab, $13.95
Lazycalc, $27.95 Lazydraw & Lazydo, $18.95
Special Package, Lazycalc-tab-draw-do, only $37.95
Proportional Spacing Packages. DWII or Centronics 737 or 739, $27.75; Qume Sprint 5 or C. Itoh F10, $46.75; Radio Shack Line Printer VIII, $36.95.

THE MICRO CLINIC

Two programs by David Stambaugh. The **FLOPPY DOCTOR** checks the function of disk drives with 11 separate tests. The **MEMORY DIAGNOSTIC** provides a complete check of every memory address in your TRS-80.

Model I – **$24.50** Model III – **$28.50**

PERCOM

Doubler II	**$155.95**
Data Separator	**$27.95**

INVENTORY MASTER

By Logical Systems, Inc.

$95.00

(Model I or III)

GEAP & DOT WRITER

$89.95

MAXI MANAGER	**$119.50**
MAXI MAIL	**$79.95**
MAXI CRAS	**$79.95**
MAXI STAT	**$169.95**

OMNITERM

The best "smart" terminal package available for the Model I/III. It's menu driven and includes a text editor, four conversion utilities, and setting files to access all of the popular data bases such as CompuServ, the Source, Dow Jones, etc. User defined keys and automatic reformatting of data to the size of your screen are only two of many extra features. The 76-page manual also has been called the "best in the industry" List $95.00

$79.95

LDOS®

LDOS was designed with the user in mind—a must for every Model I/III owner even if you have other advanced operating systems. Features full keyboard type-ahead, a true print spooler, hard disk support, data transportability between the Model I and II, Job Control Language, communications utility, customer service number for technical support, and so much more!! The 400-page manual provides step by step instructions for every phase of LDOS and includes explicit examples of each command and utility. This is the one. List price $129.00.

$114.95

ELECTRIC WEBSTER

No other spelling checker has the features of Electric Webster. Its speed and ease of use are superb—after typing your document on your work processor, press a key and Electric Webster proof-reads your document and displays all misspellings or typos on the screen. The optional correcting feature can display errors in context and even display the dictionary to verify the correct spelling. "Electric Webster is the Cadillac of vocabulary programs", **80-Micro,** 9/82.

$129.50

Includes Correcting Feature

Hyphenation Option	41.95
Grammatical Error Option	34.95

CAU Basic Editor	$ 24.75
GEAP	46.50
LNYX Auto Dial/Answer Modem	239.95
M-ZAL Release Two	134.50
Newdos/80 Version 2	134.95
Newscript 7.0	99.95
Mailing Labels Option	26.95
Newscript Plus Mailing Labels Option	114.95
ST80-III™ Comm. Syst. (Mod I/III)	134.50
Trashman (speed up utility)	34.50

Small Business Systems Group

Accounts Receivable	Accounts Payable
General Ledger	Inventory
Invoicing-Order Entry	Payroll
Model I or III (List $250/Module)	192.50/Module
Model II (List $350/Module)	299.50/Module

Verbatim Diskettes, 5¼" SS/DD 26.50

- 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 **ST80-III** is a TM of SBSG, Inc.

depressed, and remove the MIC plug. On my system, the MIC plug is the gray plug with the larger shaft; however, your cable colors may be different. It is the plug closest to the volume control on a CTR-80A. Regardless of what recorder you have, there will be two plugs very close together. The one with the larger shaft is the MIC plug. The plug with the small shaft is the REM (remote) plus and must be left in.

When you have readied the recorder, press the ENTER key. You will be prompted to speak each word as it is displayed into the condenser microphone on your CTR-80A. Don't get nervous! As each word is displayed, wait for the tape to start moving. Give the tape an instant to get underway, then speak the word clearly into the microphone. You will know you are recording if the red LED flashes in response to your voice.

I found that I could pronounce the word twice with no difficulty with the built-in delay set at 2000. Adjust the delay to make it comfortable for you. The delays are set by a FOR . . . NEXT loop at line 1550. You will be prompted to return the recorder to normal when the word list is complete. To do this, return the MIC plug to its socket, and rewind the tape. Press ENTER when you are ready, and you will be returned to the menu.

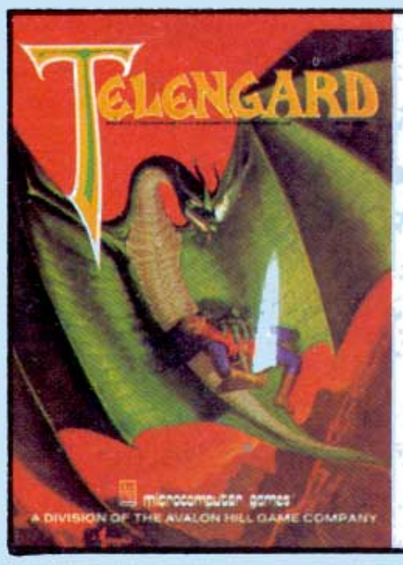
Now that we have built a quiz tape, we can actually use it to run a spelling quiz. Enter "1" as the menu selection to run the quiz. You will be prompted for your name, and to prepare a quiz tape for reading. After you load the tape and press PLAY, press ENTER. The WORDS file will be read into memory. This file provides the correct spelling against which the student's response is compared.

The user is prompted to spell each word as it is pronounced by the computer. The tape moves again and out of the television speaker comes the recorded voice pronouncing the word to be spelled. Not bad! The keyboard is scanned. If a key is pressed, it is compared to the current character expected for the word being spelled. If it is correct, it is printed. If the character is wrong, a warning tone sounds, and the character does not print. If four mistakes are made in any word, the correct spelling of the word is displayed and the quiz continues on to the next word. This procedure continues until all words have been processed.

The conclusion of the quiz is a display which informs the student of the number of words used in the quiz and the number which the student correctly spelled. Additionally, a list of those words which were misspelled is displayed on the screen to give the student feedback on the words that need further study. One of the best features of this program is the list of misspelled words. It is important to know how many words you missed, but it is more important to know which ones. I also like the character-by-character feedback when entering a word. It helps pinpoint where in a word the student is going wrong. This can be helpful for situations like the IE in "recieve." I feel the quiz portion of the program is well designed and could be used as a

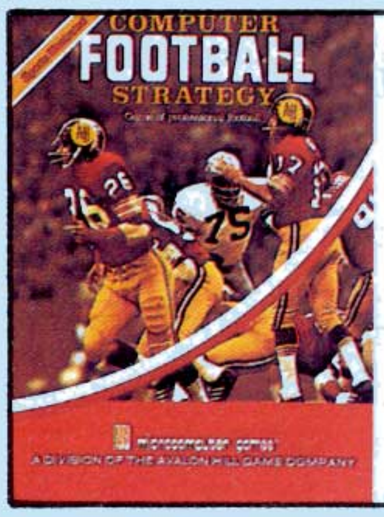
The Thinking Man's Gamemaker

WARNING: Do not buy Avalon Hill Microcomputer Games unless you are above average!



TELENGARD—Microcomputer Dungeon Adventure game. In the mysterious underworld of TELENGARD there are fifty levels of ever-more complex mazes for mighty adventurers to explore. Various means of survival tactics are at the adventurer's disposal and all of the necessary ingredients have been incorporated into this solitaire **real time fantasy and role-playing game.**

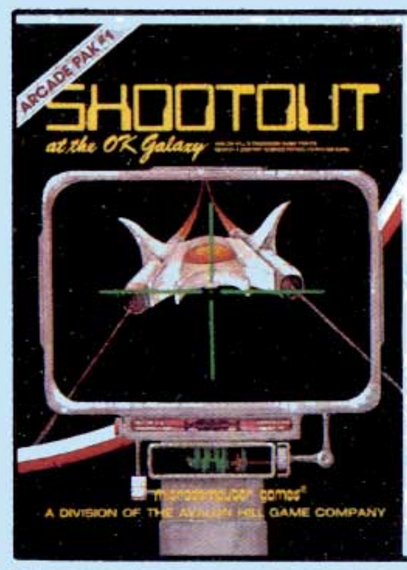
G.F.S. SORCERESS—The first **science-fiction adventure game** of the continuing saga of Joe Justin and Selena Sakarov aboard the Galactic Federation Starship Sorceress. In the game, the player takes the part of Joe Justin as he attempts to clear himself of a false charge of mutiny. Beautiful full-color manuals are included giving the player useful clues in his or her attempt to prove Joe Justin's innocence.



COMPUTER FOOTBALL STRATEGY—Thrilling computer version of Avalon Hill's famous board game. Based on the award-winning Sports Illustrated game of professional football, **Computer Football Strategy** forces the player to constantly make the right decisions about his team's offensive and defensive formations. Match wits against the computer or against a live opponent.

VOYAGER—A solitaire computer game that challenges the human player to explore the four levels of an alien spacecraft's maze-like corridors and rooms in 3-D simulated graphics, all the while avoiding robots programmed to blast any intruders. In order to win, the human must destroy all power generators and escape or hunt out and annihilate the killer robots. **VOYAGER** comes with color-animated graphics and sound capabilities.

V.C. (short for Viet Cong), is Avalon Hill's first game ever on the controversial Viet Nam War. Under your command is the chopper based air-mobile and heavily armed 1/509th Air Cavalry and 9/15th Field Artillery for fire support. It is an **unconventional conflict.** You have the task of bringing the civilian population under your protection where the enemy (played by the computer) can hide amongst the people, and where the politics of terrorism and friendship can turn the people you want to save against you.



SHOOTOUT—30 ALIEN WARSHIPS HAVE ENTERED YOUR PATROL ZONE. OK, shields up?, energy level . . . check, azimuth set?, yup. This may sound like the latest summer space movie thriller but in fact it's the preparations YOU will make when playing Avalon Hill's new solitaire arcade strategy game **SHOOTOUT AT THE OK GALAXY.** Over 2 years in the making, **SHOOTOUT** is purely graphical combining arcade excitement with just the right touch of strategy.

These games are for the sly and clever. Check on the chart at right to see if the game is compatible with your home computer. Most Avalon Hill Microcomputer Games are also compatible with the following home computer systems: Apple II®; Atari 400 & 800®; IBM P.C.®; and Commodore VIC-20, PET CBM & 2001®. **Available at finer computer stores everywhere! Or call TOLL FREE: 1-800-638-9292 for fast credit card purchase. Ask for Operator 80.**

microcomputer games®

A DIVISION OF

The Avalon Hill Game Company

4517 Harford Road • Baltimore, MD 21214

SOFTWARE GAMES	CASS. TRS-80 Color	CASS. TRS-80 Models I & III	DISK TRS-80 Models I & III	PRICE
B-1 Nuclear Bomber		16K		16.00
			32K	21.00
Midway Campaign		16K		16.00
			32K	21.00
North Atlantic Convoy Raider		16K		16.00
			32K	21.00
Nukewar		16K		16.00
			32K	21.00
Planet Miners		16K		16.00
			32K	21.00
Lords of Karma		48K		20.00
			48K	25.00
Computer Acquire		16K		20.00
Computer Statis Pro Baseball		16K		25.00
			32K	30.00
Tanktics		16K		24.00

SOFTWARE GAMES	CASS. TRS-80 Color	CASS. TRS-80 Models I & III	DISK TRS-80 Models I & III	PRICE
Computer Baseball Strategy		32K		17.00
Galaxy		16K		20.00
			32K	25.00
Voyager	16K	16K		20.00
Foreign Exchange		16K		20.00
Draw Poker		16K		16.00
Andromeda Conquest		16K		18.00
			32K	23.00
Telengard				
			48K	28.00
VC				
			32K	25.00
G.F.S. Sorceress		48K		30.00
			48K	35.00

SOFTWARE GAMES	CASS. TRS-80 Color	CASS. TRS-80 Models I & III	DISK TRS-80 Models I & III	PRICE
Fredericksburg			32K	35.00
Conflict 2500		16K		16.00
			32K	21.00
Empire of the Overmind		48K		30.00
			48K	35.00
Stocks and Bonds		16K		20.00
			32K	25.00
Computer Football Strategy			32K	21.00
Guns of Fort Defiance		16K		20.00
			32K	25.00
Dnieper River Line		32K		25.00
			32K	30.00
Shootout at the OK Galaxy	16K	16K		20.00
Tank Arkade		16K		15.00

I hereby certify that I am one sharp dude. Therefore, please send me _____ (*number*) copies of _____ (*game title*) on _____ (*cass. or disk.*) for _____ (*type of computer*).

I enclose a total of $_____ (include 10% for postage and handling).

☐ Let me take an IQ test first. In the meantime please send me your FREE full-color game catalog with details on all your software.

Name _____

Address _____

City _____ State _____ Zip _____

☐ CHECK ☐ MONEY ORDER ☐ CHARGE (see below)

☐ AMERICAN EXPRESS ☐ CHOICE ☐ VISA ☐ MASTERCARD

Account No. _____ Expiration Date _____

For fast credit card ordering call Operator 80 TOLL FREE at 1-800-638-9292.

Send Check or Money Order to:

AVALON HILL MICROCOMPUTER GAMES

Dept. 80 • 4517 Harford Road • Baltimore, MD 21214

base for other spelling quiz programs, even without voice recording.

This program could easily be modified to meet your specific requirements. If a printer is available, you may wish to use it when outputting lists of words. The use of two columns when listing words on the screen would be undesirable if individual words are very long. You may notice that music is not my strong point. Music that appeals to your children would be a plus in this program. As you can see, this program is really just a building block for your own creativity. Design it to meet your needs. ■

Program Listing for SPELLBEE

```
10 'TITLE PAGE
20 CLEAR 2000: CLS(0)
30 PRINT@203,"SPELLING BEE";
40 PRINT@392,"COPYRIGHT 1982 BY";
50 PRINT@425,"SADARE SOFTWARE";
60 FOR S=150 TO 225:SOUND S,1: NEXT S
70 'W$ IS THE WORD ARRAY
80 DIM W$(99),EW(100),VT$(14)
90 'SET-UP MUSIC
100 DATA "T6;O2;L2;G;L4;C;D;E;F;","L2;G;
C;P16;C;","L2;A;L4;F;G;A;B;","O3;L2;C;O2
;C;P16;C;F;","L4;G;F;E;D","L2;E;L4;F;E;D
;C;","L2;O1;B;O2;L4;C;D;E;C","L2;E;L1;D;
L2;G;","L4;C;D;E;F;","L2;G;C;P16;C","L2;
A;L4;F;G;A;B;"
105 DATA "O3;L2;C;O2;C;P16;C;F;","L4;G;F
;E;D"
110 DATA "L2;E;L4;F;E;D;C;D;D;E;","L2;F;
O1;B;L1;O2;C"
120 FOR TI=0 TO 14: READ VT$(TI): NEXT T
I
130 'USER SELECTS FUNCTION
140 CLS: PRINT@67,"1. RUN SPELLING QUIZ"
150 PRINT@99,"2. BUILD QUIZ TAPE"
160 PRINT@0,"ENTER SELECTED NUMBER";
170 INPUT F
180 ON F GOTO 210,840
190 GOTO 140
200 'QUIZ ROUTINE
210 CLS: INPUT"WHAT' YOUR NAME";PN$
220 PRINT"THANKS,";PN$
230 FOR DL=1 TO 500: NEXT DL
240 CLS: PRINT"LOAD AND READY QUIZ TAPE.
";
250 INPUT"READY, PRESS ENTER";R$
260 'LOAD WORDS
270 OPEN"I",-1,"WORDS"
280 FOR X=0 TO 99
290 INPUT#-1, W$(X)
300 IF EOF(-1) THEN 320
310 NEXT X
320 CLOSE -1
330 CLS: PRINT PN$;", I'LL SAY THE WORD,"
```

```
340 PRINT"YOU SPELL IT WITH THE KEYBOARD
."
350 'GET CURRENT WORD
360 FOR Y=0 TO X
370 PRINT@224," "
380 L=229
390 IF W$(Y)="" THEN 670
400 WL=LEN(W$(Y))
410 'SAY WORD
420 GOSUB 1540
430 'GET CURRENT CHARACTER
440 FOR P=1 TO WL
450 L=L+1
460 C$=MID$(W$(Y),P,1)
470 I$=INKEY$: IF I$="" THEN 470
480 'CHECK KEYBOARD CHARACTER
490 IF I$=C$ THEN 570 ELSE PLAY"V5;C": E
=E+1
500 IF E<4 THEN 470 ELSE E=0
510 'WORD SPELLED INCORRECTLY
520 ET=ET+1
530 PRINT@230,W$(Y)
540 EW(ET)=Y
550 FOR DL=1 TO 1000: NEXT DL
560 GOTO 650
570 PRINT@L,I$
580 NEXT P
590 'WORD SPELLED CORRECTLY
600 SCREEN 0,1
610 TI=TI+1: IF TI>14 THEN TI=0
620 PLAY "V5;"+VT$(TI)
630 FOR DL=1 TO 500: NEXT DL
640 E=0
650 NEXT Y
660 'DISPLAY TOTAL SCORE
670 CLS
680 PRINTPN$;", HERE IS HOW WELL YOU DID
."
690 PRINT"YOU HAD";Y+1;" WORDS TO SPELL"
700 TC=(Y+1)-ET
710 PRINT"YOU GOT";TC;" WORD CORRECT"
720 IF ET=0 THEN PRINT"FANTASTIC!!!": GO
TO 800
730 'DISPLAY MISSPELLED WORDS
740 IF ET>1 THEN S$="ESE WORDS:" ELSE S$
="IS WORD:"
750 PRINT"YOU NEED TO STUDY TH";S$
760 FOR X=1 TO ET
770 N1=EW(X)
780 PRINTW$(N1)
790 NEXT X
800 'END WITH MUSIC
810 FOR X=0 TO 14: PLAY VT$(X): NEXT X
820 END
830 'BUILD ROUTINE
840 CLS: PRINT"BUILD QUIZ TAPE."
850 PRINT"ENTER EACH WORD WHEN PROMPTED."
```

```
860 PRINT"WHEN FINISHED, JUST PRESS ENTE
R."
870 'GET SPELLINGS INTO ARRAY
880 FOR X=0 TO 99
890 INPUT"SPELLING WORD";W$(X)
900 IF W$(X)="" THEN 930
910 NEXT
920 'REVIEW SPELLING LIST
930 CLS: INPUT"REVIEW LIST";YN$
940 IF YN$="YES" OR YN$="Y" THEN 960 ELS
E 1190
950 'DISPLAY WORD FOR REVIEW
960 FOR X=Z TO Z+26 STEP 2
970 PRINT X;W$(X),X+1;W$(X+1)
980 IF X=98 THEN 1010
990 NEXT X
1000 'PROMPT FOR CHANGES
1010 PRINT@480,"ANY CHANGES";
1020 INPUT YN$
1030 IF YN$="YES" OR YN$="Y" THEN 1040 E
LSE 1170
1040 PRINT@448,"WHEN PROMPTED ENTER NUMB
ER,WORD";
1050 FOR DL=1 TO 1000: NEXT DL
1060 PRINT@448," "
1070 PRINT@448,"NUMBER,WORD";
1080 'GET CORRECTED WORD
```



```
1090 INPUT N,CW$
1100 'NOTE THAT A COMMA SHOULD
1110 'BE INPUT WHEN FINISHED
1120 IF CW$="" THEN 960
1130 'UPDATE WORD ARRAY
1140 W$(N)=CW$
1150 GOTO 1060
1160 'CHECK THAT ALL REVIEWED
1170 IF X=98 OR W$(X)="" THEN 1190 ELSE
Z=Z+28: GOTO 960
1180 'WRITE WORD TO TAPE
1190 CLS:PRINT"READY QUIZ TAPE FOR WRIT
ING."
1200 INPUT"READY. PRESS ENTER";R$
1210 OPEN"O",-1,"WORDS"
1220 FOR X=0 TO 99
1230 IF W$(X)="" THEN 1260
1240 PRINT#-1,W$(X)
1250 NEXT X
1260 CLOSE -1
1270 'VOICE INPUT ROUTINE
1280 'DISPLAY INSTRUCTIONS
1290 CLS:PRINT"READY TAPE FOR VOICE RECO
RDING."
1300 PRINT"REMOVE MIC PLUG (GRAY PLUG WI
TH"
1310 PRINT"LARGE SHAFT). LEAVE THE OTHER
"
1320 PRINT"PLUGS IN. WHEN READY PRESS EN
TER"
1330 INPUT R$
1340 CLS:PRINT"SPEAK THE WORD DISPLAYED"
1350 PRINT"ON THE SCREEN INTO THE MIKE"
1360 PRINT"WHEN THE TAPE IS MOVING."
1370 FOR DL=1 TO 1000:NEXT DL
1380 'GET A WRD
1390 FOR X=0 TO 99
1400 IF W$(X)="" THEN 1480
1410 'DISPLAY THE WORD
1420 PRINT@230,W$(X)
1430 FOR DL=1 TO 500:NEXT DL
1440 'RECORD VOICE
1450 GOSUB 1540
1460 NEXT X
1470 'FINISHED TAPE BUILD
1480 CLS:PRINT"REWIND AND REMOVE QUIZ TA
PE"
1490 PRINT"REPLACE MIC PLUG. READY, PRES
S"
1500 INPUT"ENTER";R$
1510 'RETURN TO MENU
1520 GOTO 140
1530 'CASSETTE CONTROL ROUTINE
1540 AUDIO ON:MOTOR ON
1550 FOR DL=1 TO 2000:NEXT DL
1560 MOTOR OFF:AUDIO OFF
1570 RETURN
```

— COMPUTER SHACK —

★ BEST BUY ON DISKS ★

BASF has taken one of the best disks and made it even better. The quality is so good that BASF guarantees each disk for not one year, not five years, but for LIFE. If anything ever goes wrong you can return it to us or to BASF and it will be replaced at no charge. Can you believe MAJOR brand name, LIFETIME guarantee, FAST shipment and at these prices.

35/40 Track Single Density 1 side ... $19.95
35/40 Track Double Density 1 side... $21.95
35/40 Track Double Density Flippy ... $29.95
The following come in special Computer Shack packaging.
35/40 Track Double Density 2 sides.... $29.95
77/80 Track Double Density 1 side... $25.95
77/80 Track Double Density 2 sides.... $29.95

All of the above come in Boxes of 10 with BASF labels, hub rings and Tyvek sleeves. All disks have one write protect notch and one read hole, except the Flippy's which have two.

Disk Savers (vinyl sleeves) 20 for **$6.00**
Colored Disk box (holds 10 disks) ... $2.95@
5 Colored Disk boxes (red, blue, green, yellow, and brown asst. colors).... **$14.50**

FAMILY TREE

Excellent family genealogy program works on both the Model I or Model III. Along with the normal documentation we send a manual with over 200 pages of instruction on how to research your family tree. You can get three different printouts, a family tree or a family report of each person, or a birthday printout. Sort on Birthdays. The Nebraska State Genealogical Society tested our program and said "Your program will help form a valuable data source that may be accessed an used in different ways. The printouts are excellent."
Disk or Tape **$29.00**

JOVIAN

Newest game by Dunlevy and Frayer. This is Cyborg with a space theme! 9 screens of action simultaneously. Featuring WRAP AROUND ACTION™. Most exciting spaceship type game out for the TRS-80.
Only ..... **(19.95/24.95)**

ARACHNID PLUS

Three exciting first class **arcade** games for the TRS-80. A special value pack including a real time arcade game, an exciting car race game, and a strategy game. All excellent games for only ..... **(19.95/24.95)**

SUPER DIRECTORY

The Best Catalog program on the market. One program reads Multidos, NewDos 80, Dos Plus, LDos and TRS-DOS. Automatic density recognition! Automatic track count. Reads almost anything. Superfast sort routines! (Sorts on 5 different fields). Super fast find routines (five different find routines including a string search)
ONLY..... **$39.95**

NEW!
MONTHLY BILL SYSTEM

This is a new program for the businessman who wants to send a monthly or quarterly bill to the same people every billing period. (Landlords, garbage man, etc.) The program will send out a bill to each person (you can set the frequency, monthly, quarterly, etc.). It then has a very easy way of inputing your paid customers. This will help you to keep track of who is past due. Gives you printouts of your financial condition at any time.
Disk only..... **$149.95**
We also have a Special program for Auto, and Home Insurance agents, Call for complete details.

Small Business Programs

CHECKING ACCOUNT Mod 1 or III, 48k disk $39
Excellent check writing program for small businessman or for personal use. Menu operated for easy use. Has Screen editor, 99 catagories or expenses. Sorts on payee, Check number, or date. It can print your checks on the printer.

BILLING SYSTEM Mod. I or III, 48k disk $39.00
A billing system written by a businessman for his own use. It is simple, fast and easy to use. Has a screen editor for quick error correction. Prints out invoices, then will send a monthly bill to each customer. It will add interest or carrying charges. This is not a complicated accounts receivable it is a simple but effective way to keep track of who owe's you money for the company that doesn't do a lot of credit business.

E BASIC

There are five major **Dos's** on the market all have there good points. Some folks like one, some like another, but every single reviewer has said that MULTIDOS had the BEST BASIC. Some would stop here, but not Vernon Hestor. He now brings us EBASIC, a new innovative state of the art basic. It makes Graphics and Sound EASY. This will give the basic programer more power than ever! Here are some of the new basic commands: print(a,b), input (a,b), line input (a.b), print$, call, sort, lapeling, array read, array let, cound, shape, circles, cubes .... All of this and you still have over 38K for your basic programs. EBASIC is only $29.95 for MultiDos owners.

MULTIDOS

MULTIDOS got bigger and better. New EASY ZAP, New TAPE/CMD, and the New DISK DRIVE TIMER. All of this and its still the cheapest full Dos going..... **$99.95**

Z DOS

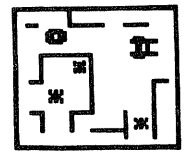
Z Dos the Dos for the person who does not want to spend a hundred dollars or more for an improvement over TRS-DOS. For only $39.95 you will double your fun. For only $39.95 you can get what reviewers in three different magazines said was the BEST BASIC for the TRS-80.
Buy MultiDos at the list price of $99.95 and you can take 20% off of any or all of the following.
E Basic $29.95 ..... Super Directory $39.95
Aerocomp Doubler $149.00

SUPER DOS

If you are using TRS-DOS, on the Model III, you can now take out some of its biggest drawbacks. SUPERDOS will make a few automatic zaps to your copy of TRS-DOS and it will boot up instantly! It will give you error messages in English. It has a short directory, and on the long directory it will pause to give you a chance to read the screen.
Only..... **$19.95**

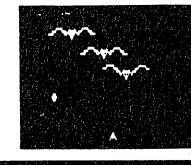
CYBORG

This is the biggest blockbuster to come along since the first BIG FIVE games hit the market. A real TRS-80 classic. The first game for the TRS-80 that features **WRAP AROUND GRAPHICS**™. This exciting game occurs in an interstellar space station. This game features graphics that are super fast and move smoothly in all FOUR directions. Rated #1 three months in a row.
ONLY ..... **(19.95/24.95)**



DEMON SEED

The greatest graphics effects yet in a real time arcade game for the TRS-80. Birds of various sizes drop down on you. A gian space ship must be destroyed. A great game based on the arcade game Phoenix™.
Only ..... **(19.95/24.95)**



COMPUTER SHACK

1691 Eason ● Pontiac, Michigan 48054
Info: **(313) 673-8700** ● Orders: **CALL TOLL FREE (800) 392-8881**
Master charge and VISA OK. Please add $3.00 for shipping in the U.S.A. - $5.00 for Canada or Mexico - Proper postage outside of U.S. - Canada - Mexico.
Dealers: We are distributors for all items in this ad. Write for our catalog and price list.

The creators of DOSPLUS II

An interview with Kim Watt and Steve Pigliarulo

Pete Carr, Port Orange, FL

I was scheduled to do a DOSPLUS II evaluation for *80-U.S. Journal* and I was waiting for the system to be finished. In the meantime, I was offered by Dennis Brent, Kim Watt's publisher, the chance to do an exclusive interview with the creators of DOSPLUS II, Kim Watt and Steve Pagliarulo. When the system was finished I met them at Micro-Systems Software, located in Boca Raton, Florida. They were both to be there and give me a firsthand look at the new system. I jumped at the chance, knowing very well that a personal explanation of their combined efforts would be an interesting and educational inside look.

For some reason there just hasn't been the outside software support for the Model II that the Model I and III have had. I think this support is one of the big reasons for the Model I and III's popularity. Kim and Steve have been very influential in the Model I/III world and I was anxious to see what they had brought to the Model II/16 user. It's welcome news that someone took the initiative to create something new for the Model II/16 user.

Mark Lautenschlager, from Micro-Systems Software and Dennis Brent, from PowerSoft were also there.

Pete: "How and why did PowerSoft and Micro-Systems Software link talents for the DOSPLUS II project?"

Steve: "We were in Dallas and stopped by to see Kim and Dennis at PowerSoft. I mentioned to Kim that we were getting ready to start a Model II project and said that we were looking for some help. At that point we had made no firm decisions on exactly how we were going to do it. Kim gave a definite yes."

Pete: "Would you say that DOSPLUS II is your combined experience of writing Dosplus 3.4 and programs like Super Utility +?"

Kim: "It's a lot more than that. I think it's the next evolution of DOSs and you'll find that in the future people will try to imitate things that we have done with this DOS. We have some features that are just totally unique to this system. Not only at the user level, but also at the programmer level. Some people may think that we just moved DOSPLUS 3.4 over to the Model II but it really is a brand new generation of DOS."

Steve: "I think one of the most important differences is the way that we evaluate commands. We evaluate commands in such manner that the users do not have to have any specific limits placed on them. It's a free format, more or less, using very simple words like: from here to there, using this parameter, using this mask. We've gone from command parsing to command evaluating where we take a command and evaluate it and try to determine what the user wants out of that command."

Pete: "A new feature that DOSPLUS II has brought to the Model II/ 16 user is true device independence. For example, he can now route, link, filter, etc."

Kim: "Saying it's device dependent would be more appropriate."

Mark: "Yes. In that sense Kim's using the term device independence properly. Other TRS-80 DOSs implement device independence in a more rigid sense. We've allowed for much more device flexibility."

Kim: "We left ourselves very open to future devices which may exist for the Model II/16. We can very easily implement a high speed tape backup, different hard drives, or a five inch floppy drive. We support some very huge devices. DOSPLUS II will support 820 megabyte drives. So you can access a phenomenal amount of data at one time. You're also not restricted to 65535 records per file anymore."

Pete: "What about BASIC?"

Mark: "We have added features like shorthand (L for LOAD, E for EDIT, etc.), label addressing, global search and replace, reference utility, multi-array sort, that the BASIC programmer is going to want to have. We did leave room for SNAPP's extensions like extended file managing support, screen mapping, etc."

Pete: "I notice that DOSPLUS II gives the user about 4K more RAM memory. How is that done?"

Steve: "The stack management for the video section and several other areas were totally messed up. You couldn't run high level programs in that higher part of memory. Their solution was to lock the upper part of memory out of the system totally. It was a software problem from day one. We solved the problems with stack management and now that memory is free. There are no memory restrictions with our system at all. Our memory management is so nice. When you finish with space it is automatically reallocated and available to the user."

Kim: "The top bank of memory is overlapped and bank selected with

the video. The video actually shares RAM in the common area. By controlling a port, you control which bank is currently selected. So if you have code in the RAM portion when the video is selected, with program counters in that area, you can see that there's a conflict. So they just locked out that whole area from the user. Now BASIC picks up 4K, VisiCalc picks up 4K and so on."

Pete: "Do you find the Model II/16 to be much more sophisticated than the Model III, or was it like going to a big Model III?"

Steve: "No, it's not like going to a big Model III at all. It's a much, much nicer machine. It's been overlooked for too long. Hardware-wise it's much better. People have always claimed there were problems with the hardware, but I don't think so. I think it's wonderful."

Kim: "There are a great deal of chips in the Model II/16, like the direct memory access chips, the counter timer circuitries. Everything is running in interrupt mode two so that if a device needs to be serviced like the @KI (keyboard) it automatically generates an interrupt on the lines so that there's never any software pulling. It's all done through hardware. It allowed us to do much more than could be physically done on a Model III. The Model II/16 has a higher speed clock, bigger diskettes. Everything is just quicker and bigger all the way around."

Pete: "The Model 16 comes with thinline double-sided drives. Will DOSPLUS II allow the user to access both sides?"

Steve: "Our one system can replace 2.0, 4.0, 4.1, etc. We've totally eliminated the need to have different purpose operating systems. DOSPLUS II runs floppies, hard drives, double-sided drives, as it comes stock from us. Our one single system carries it all."

Kim: "There are 16 devices in the system in which eight of them are drives. You can define them anyway that you want. You can have one hard drive broken up into eight logical drives. With our system you don't need a floppy in drive 0 to boot the hard drive, either. Before, if your floppy drive broke you couldn't boot your hard drive. We don't have that problem as DOSPLUS II allows you to boot directly from the hard drive. You will also notice that we bootup much faster. If it weren't for the BOOT ROM it would be even faster."

Steve: "It's very hard to describe just how flexible the system really is. People will just have to sit down and see what we've done. Since day one I've never wanted to work with the Model II, and now the Model 16, because it was so restrictive to use. We've totally removed all those problems. I think we're opening new doors for programmers and that machine."

Kim: "Another previous problem we took care of is on a hard drive if a file exceeds the size of a floppy. There is no way to move that file off of the hard drive. We allow you to span floppy disks. You can have an 8 megabyte hard drive file and copy it to floppy diskettes and back again if you want. We've added new system commands like new Supervisor calls that are compatible with TRSDOS, plus a lot of new ones that are unique to us. Machine language programmers are going to like the technical section of the manual. They will find that there are so many useful calls in this system. By making a single three-byte call they can now have enormous power at their fingertips. The system is only restrictive if you try to do something that would crash the system. Those are the only kinds of restrictions, though. We have not stopped people from looking at our code or restricted DEBUG memory boundaries."

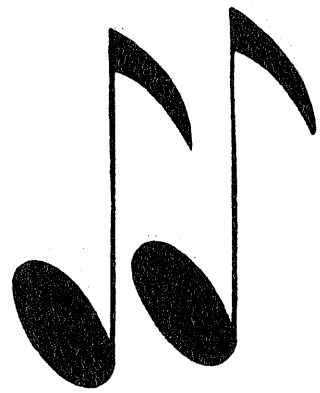
Pete: "What will the system be able to offer business users?"

Steve: "If he has a secretary backing up his disk he will notice the time saved by using our system. Reading and writing data files will be much faster. The time that DOSPLUS II will save him during a day's work could be used for more productive purposes.

Kim: "Steve and I have every kind of software available to us and every kind of computer. Not just because we have written this system, but we will both probably use DOSPLUS II for all of our future development work. We started this project using Model III's, then moved the code to the Model II/16 as we finished it. We just couldn't work with the DOS that comes with the Model II and 16. Now we don't have to anymore." ■

Com 80

Modems — The sound of music



Donald L. Stoner, Mercer Island, WA

Last time, you were promised a dose of "sugar-coated theory." Let's talk about how your computer is able to "fraternize" with another computer over the telephone network. Hopefully, avoiding prolonged technical incantations will make the theory a bit easier to digest.

Modems—The Sound of Music

The key to this new dimension in your computing is called a modem. Basically, a modem is a device for coupling your computer to the telephone line so that you can move information from one place to another. The information can be any type of data that can be stored in one computer and which needs to be transferred to another computer. That covers a lot of territory!

Connecting your computer to the direct-dial telephone network is not simply a matter of running the data bits down the wire. Even low-cost computers propel 1's and 0's around faster than a speeding bullet. Can you imagine what would happen if you connected those dashing digits directly to the telephone line? It would wipe out conversations from Anchorage to Zambowanga and maybe decommission a few communication satellites along the way.

A modem converts the 1's and 0's running around inside your computer into musical tones that can be sent over the phone line. The sending process is called modulation. The modem also converts the incoming tones (from the computer you are talking to) back into the 1's and 0's your computer can understand. This process is called demodulation. The name modem is a contraction of the names for the two functions. If you happen to be a computer, the results are truly the sound of music.

By the way, if you live in the Puget Sound area, you can call (206) 447-9012 in Seattle, Washington, and hear what a real live modem sounds like. Unless you are another modem, don't expect it to do anything except whistle at you.

Good Guys and Bad Guys

There are two principal types of modems, direct connect (good guys) and acoustic (boo-hiss). Back in the old days of computers (the early 70's), one was not supposed to connect anything to the telephone line. Only the telephone company could provide this service in king-like fashion.

A company called Carterphone (good guys) invented a device to couple mobile two-way radios into the telephone network via the telephone handset. There was no direct wire connection, just acoustic coupling to the speaker and microphone of the two-way radio. The telephone company (bad guys) didn't much like the idea and they sued Carterphone Corporation. When it comes to talking on the telephone, you might well ask, "What's the difference between a speaker/microphone and a human head?" The court asked the same question and concluded that the answer was "Nothing." Thus, Ma Bell took a right hook when the judge awarded the decision to Carterphone and opened the floodgates for devices connected to the telephone line.

Shortly thereafter, someone invented a box that would couple a computer to the telephone line. The principle was the same as the Carterphone device. The handset was jammed into rubber cups that contained the microphone and speaker. Inside the box was circuitry that performed the modulation and demodulation function. It was called an acoustic modem. It did the job, sort of, but was (and is) plagued by noise and low sensitivity. The telephone handset picks up room noises (like a clacking typewriter) and translates the sounds into garbage. Thus, the sensitivity (ability to demodulate weak signals) has to be kept very low to avoid noise pickup. As a result, the acoustic modem does not work very well on long distance or marginal voice circuits. A further problem is the loud tone the modem must ram into the telephone handset. This noise can be very annoying in the quiet environment required by the acoustic modem.

"Whistle boxes" have been made virtually obsolete by modern direct connect modems. They plug directly into the telephone line (hence the name, direct connect) so that no acoustics are involved. With an autodial/autoanswer option, even the telephone instrument is not

required.

Now that you have a bit of history under your belt, let's talk about what is required to direct-connect a modem to your telephone line.

Eight Telephone Lines?

The characters you see on your printer originate from an eight-bit data bus that runs around the inside of your computer. If you use a parallel printer (the most common type), the eight bits are presented simultaneously (or in parallel) to the printer. That's why there are so many wires in the cable that connects the printer to the computer. There is one for each data bit, plus a busy line, out-of-paper line, and a few others thrown in to confuse the poor guy trying to make his own printer cable.

If you tried to send these data bits in parallel to someone else, you would need eight telephone lines, one to carry each of the data bits. Obviously, this is not practical. Also, it is not necessary. The eight data bits that make up one of 256 discrete characters (two to the 8th power) can be sent in serial fashion, that is, one after another in a continuous stream. This is the scheme used when you drive a serial printer. A minimum of two printer wires are required, one for the data, plus a common (ground) return wire. The serializing process is accomplished by the RS-232 circuitry in your computer.

A drawing of the conversion from parallel to serial is shown in Figures 1 and 2. As shown, there are zeroes on data lines D0, D3, D4 and D5, while the remaining four data lines contain ones. When converted to a serial stream (Figure 2), the data bits follow each other with the least significant bit (LSB) to the left.

There is one major problem with serializing the data in this manner. How does the device which utilizes the data know when it starts and ends? Each time you plunk on a key, something detects that data is present. That might work except for one thing. There are only two data states: one and zero.

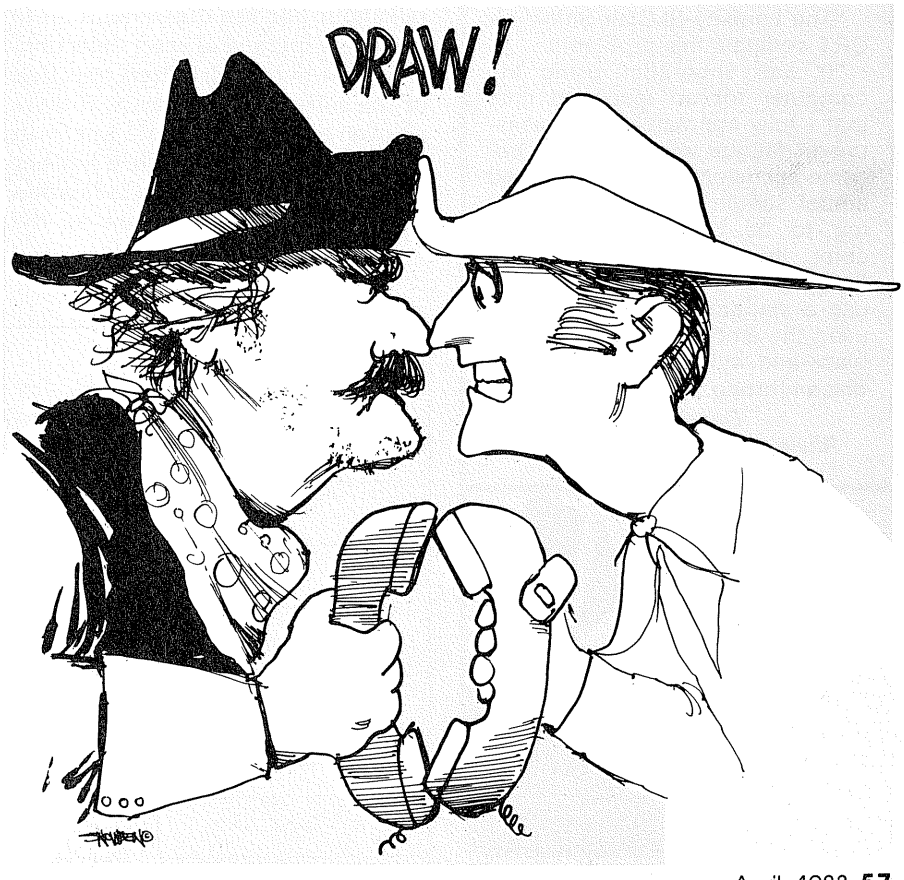
What if the first data bits were in the same state as the normal resting state of the data line? These data bits would be ignored until there was a change in state on the serial line. In other words, since the LSB (D0 in Figure 2) is not a zero, the device looking at the serial stream would not detect a change in state until the second data bit (D1) had arrived. Needless to say, it would not print the correct character.

A change in state is the operative phrase, as Alexander Haig used to say. One of the other functions of the RS-232 circuitry in your TRS-80 is to prefix the eight serial data bits (a byte) with a change-of-state bit to identify the starting point of the byte. Appropriately enough, this is called the start bit and is shown in Figure 3. Another bit is tacked on at the end of the byte stream (yes, it is called the stop bit). Thus, the computer at the other end of the circuit knows where each byte starts and stops. The start bit occupies a specific length of time. The stop bit, however, can be any length. For example, if you are packing on the keyboard, the stop bit lasts from the end of one keystroke to the start bit occurring at the beginning of the next keystroke.

This is called byte-synchronized, or asynchronous, transmission. This serial stream of data is fed to the modem modulator. The RS-232 circuitry in your computer also reverses the process. The incoming data is in serial form. The RS-232 circuitry strips off the start and stop bits. It then converts the serial stream back into eight bits in parallel and applies the byte to the computer data bus.

ASCII? No, ASCII does not turn on a donkey's ignition circuit, even though it is pronounced that way. The code of 1's and 0's that determines if a character is an A, B, C, etc., has been standardized into the American Standard Code for Information Interchange (ASCII, or ass-key). Your TRS-80 manual will show a chart of the 128 characters that make up the full ASCII set.

The first thirty-two (CHR$0 to CHR$31) are called control, or non-printable, characters. As the name implies, they are used to control functions. For example, the tenth character (CHR$10) is called LF, or line feed. There are characters for end of line (EOL), end of frame (EOF), start of transmission (STX),



end of transmission (ETX), and so on.

The remaining characters, up to 127, are used for upper- and lowercase alpha characters, along with punctuation, numbers and so on. Note that these 128 characters (CHR$0 to CHR$127) require only seven data bits to define them (two to the 7th power equals 128).

Parity

Even though the ASCII code for alpha numerics and control characters is standardized, the makeup of a computer byte is not. As just mentioned, it takes only seven bits to transmit 128 control and printable characters in the ASCII code. However, most computers, like the TRS-80, are eight-bit machines. There are 256 discrete combinations or characters (two to the 8th power) with an eight-bit code. In the TRS-80, the remaining 128 characters above the printable and control codes are used to control graphic characters. It is the eighth bit that turns on this second group of 128 characters and causes most of the confusion with standards.

This is because most computer systems at the other end of your telephone line use the seventh bit to provide a method of error detection. When the byte is serialized, a section of the software keeps track if there an even or odd number of 1's or 0's in the byte. The software then adds or omits the eighth bit as an indication of parity. If the software at the receiving end of the circuit also makes the same calculation, it can be used to indicate if an error has occurred. This is called odd, or even, parity transmission and is useful when transmitting blocks of data that are not seen on the screen.

More often than not, the first-time modem user gets garbage on the CRT screen. Usually, the response is, "This blankey-blank|"#$%&'()*= (fill in computer, software, modem, telephone line, host, or other favorite culprit).

Actually, the culprit is probably the operator's unfamiliarity with the usage of the eighth bit for parity error checking. Keep in mind that if the software accepts the eighth bit, and it is present, your computer is switched into the upper 128 characters which represent graphics. If the garbage consists of a lot of graphics symbols, the computer you are tied to may want a 7-bit, rather than an 8-bit byte.

As a starting point, go to the communication parameter section of your software. Select a 7-bit byte (sometimes called a "word," even though it is only one letter in length), no parity and one stop bit. This setup will usually suffice for most systems. If you still get "garbage," contact the system operator (SYSOP) and determine what byte construction the system requires.

I had hoped to put the theory section behind us this time, but there is so much to tell you that we'll continue in the next installment. ■

Figure 1

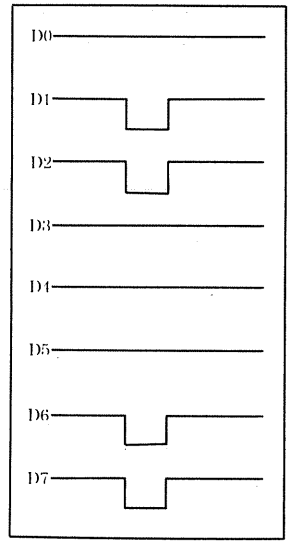


Figure 2

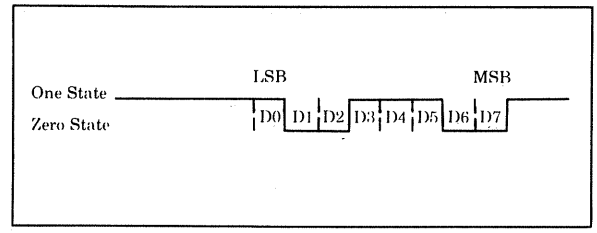
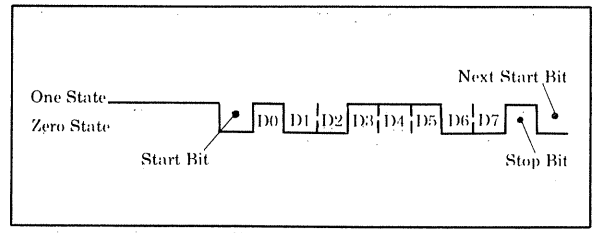


Figure 3



The choice is yours...

```
FORMAT,1=40,* DATA *,12/27/82.PASSWORD<ENTER>
BAD PARAMETER(S)
                    or
FORMAT<ENTER>
Which drive contains the diskette to be formatted ? 1
Name of diskette to be formatted (default "* DATA *")?
etc....
```

Our users think you'll pick MULTIDOS.

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

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

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

Also available from CEC...

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

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

Model I orders specify single, double or P density.

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

System Innovators

COSMOPOLITAN ELECTRONICS CORPORATION
5700 PLYMOUTH ROAD
ANN ARBOR, MICHIGAN 48105

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

Authorized Dealers

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

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

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

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

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

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

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

BASIC bits

Understanding assembly code

Models I/III

Thomas L. Quindry, Burke, VA

No matter whether you are a non-programmer, a BASIC programmer, or something else, sometimes you must come to grips with entering machine language programs in your computer. When that neat little machine language routine is published in *80-U.S. Journal* or other magazine, you may want to take advantage of it and yet not spring $30 and up for an editor/assembler program to load it. Though, in many cases it is easier, you don't need an editor/assembler to enter these little routines if a full disassembled listing is given, complete with machine code.

To enter these gems, though, you will need to know at least the fundamental idea of what a listing means and how it is generated. You will also need to have some type of utility program to load the machine code and save the program that you have POKEd into memory. You will not need to know assembly language.

The object of this month's column is to give you this understanding of compiled assembly code listings. Programs such as TRSDOS with the DEBUG utility (disk system), Radio Shack's T-Bug, MISOSYS' TUTIL, or other machine language monitor programs can be used to translate your selected machine language programs into memory from the published listing and then save it as a SYSTEM program. Or, as an alternative, use Spencer Hall's Decipoke from the October, 1982 *80-U.S. Journal* (page 82). Following his instructions, you can enter code into memory, examine it, and place it in data statements to obtain a CLOADable version of the machine language program. In many cases, Decipoke will give you the more convenient form for your machine language routine if it is to be called from a BASIC program. It becomes part of your BASIC program.

In order to illustrate assembled source code and what each column means in a listing, let me first give you a sometimes-usable program written in compiled assembly source code. This program, given in Listing 1, will allow your computer to determine the amount of its available memory. It is designed be called from BASIC via the USR(0) function of the form PRINT USR(0). The answer will be either 20479 (4K RAM), 32767 (16K RAM), -16385 (32K RAM), or -1 (64K RAM), provided all of your memory is working properly.

In examining the listing, and ignoring the lines which have a semicolon (;) for the moment, you will see seven columns. Look at the second row down from the top of the listing. This line is needed to tell the assembler where to start assembling the code.

Notice that the first column, 7500, and the sixth column, 7500H, are similar. (The second, fourth and seventh columns are blank.) The 7500 in the first column is the starting address for the machine language program given in hexadecimal code. The 7500H in the sixth column was the programmer's specification for where the starting address should be. It could just as well have been given in decimal or octal code, but the first column still would have given the hexadecimal conversion for it. Sometimes there are EQUates above this, or remarks, as on the first line of the program. All words placed after a semicolon are part of a remark statement, much like the REM or apostrophe (') type of REM statement in BASIC.

The next line starts off with the same code, 7500, in the first column as in the previous row. The first column is the address column. It gives the hexadecimal address of where the code in the second column will be loaded into memory. This second column is what you key in starting at the address in column one.

Only the first and second columns are needed to enter the program directly into memory. You must convert these codes to decimal if you are POKEing them in from BASIC, or you can enter them as hexadecimal code if you have the proper utility program as explained above.

In the listing, the code in column two, starting at the address 7500, is 21FF00. You look at each pair of

numbers or letters separately. Thus, you are really reading 21H, FFH, and 00H as the three hexadecimal bytes which make up the compiled source code for the assembly language mnemonic, LD HL,00FFH given in columns five and six.

Column three is the line number given in five-digit notation and column four is the label column. These labels are used by the assembler to compute addresses. The last, or seventh, column which is preceded by a semicolon is the remarks column. The remarks column can actually start anywhere after column three as long as the semicolon is the first character of the remark. We have seen this in row one of the listing.

Let's assume that you have a utility program such as those described above. My experience is with the MISOSYS Tape Utility Program, TUTIL, so I will describe how it is used to ENTER and SAVE a program. When using this utility program, a command is first given to enter the hexadecimal code. For this program, the command is IN H 7500, which stands for input hexadecimal code starting at 7500H.

After that command is entered, the address, 7500, and the next sixteen bytes presently in memory starting at 7500H, are displayed on the screen. By keying in 21FF00 and hitting ENTER, I have changed the code in memory to that specified.

The next display given by the utility program is the sixteen bytes starting at 7503H. Notice that this corresponds with the address given in the compiled source code listing for the next line, 00130, as given in column three.

I can continue by entering 25, which is the only code in the second column of that line. I can continue ENTERing the data for up to 16 hexadecimal pairs of data before hitting ENTER if I wish, or hit ENTER at this point and have the corresponding line display data from 7504H up to the next sixteen bytes. Lo and behold, 7504 is the same as my next address in column one. I input 7E2F77AE20F9C39A0A just to speed things up and hit ENTER once more. The entire program is in memory. This process can be continued as long as it is needed to enter a program into memory. Since we are through, hitting ENTER once more gets us out of the memory edit mode and the TUTIL program returns to its command mode.

Just entering a program is not fulfilling. Besides entering it, you will want to save it to tape or disk. This tape utility program will only save to cassette, although other programs are available, such as TRSDOS with DEBUG, which will enter the code and allow you to save or DUMP it to disk. With TUTIL, though, I now ENTER: PU N 7500 750C 7500 MEMORY.

This stands for Punch a tape, New, start at 7500H, end at 750CH, starting or transfer address is 7500H, and the SYSTEM program name is MEMORY (six letters maximum). Now, place a tape cassette in your recorder, put it in the record mode and press ENTER. The program will be recorded on the tape. Now that the program is saved on cassette, it can be put into the computer using the SYSTEM command and the program name, MEMORY. Oh yes, on the last line of the program listing is an END statement in column five, followed by a label, START.

Column one of this last row has 7500, which was computed from the label, START. An editor/assembler, when compiling the code, uses the label in column six to compute the address of 7500 specified by the label, START in row three, column four. This 7500 is where the program starts. Labels which appear in column six must have a corresponding label in column two in order to be properly computed. Once a label appears in column two, it cannot be repeated in that column. A label in column six can be repeated as many

Listing 1
Memory Subroutine for use with the BASIC USR Function

```
Col 1   Col 2   Col 3   Col 4   Col 5     Col 6     Col 7

                00100   ;CHECK  AVAILABLE MEMORY
7500            00110           ORG       7500H
7500    21FF00  00120   START   LD        HL,00FFH
7503    25      00130   CHK     DEC       H
7504    7E      00140           LD        A,(HL)
7505    2F      00150           CPL                 ;CHANGE 0'S TO 1'S, 1'S TO 0'S
7506    77      00160           LD        (HL),A
7507    AE      00170           XOR       (HL)
7508    20F9    00180           JR        NZ,CHK    ;IF A AND (HL) NOT THE SAME
                00190                               ;IF A AND (HL) THE SAME,
                00200                               ;NO RAM PRESENT HERE
                00210                               ;HL NOW HAS HIGHEST RAM LOCATION
750A    C39A0A  00220           JP        0A9AH     ;PASSES VALUE TO BASIC PROGRAM
7500            00230           END       START
00000 Total Errors
```

times as necessary. Every label in column six will refer to the unique memory location noted by the existence of the unique label in column two.

On to some reader questions.

Question: I have written a very useful data handling program for amateur radio that requires a large string data base. The program only used about 8K out of 48K. For some time now, I have been trying to find a way to CLEAR more than 32767 bytes. Since negative numbers can't be used, I am assuming that I would have to POKE it into memory much like I do for memory size. My problem is that I have not been able to find the proper location to POKE the information into. Is it possible to clear 40K to 42K on a Model I and if so, what is the address or procedure? — S. R. Bath, NY

Answer: Many times the correct answer can just sit there and stare you in the face and you don't recognize it. As you said, you know the addresses for POKEing memory size. For the benefit of other readers, the address is 16561 and 16562 for the low (LSB) and high (MSB) bytes, respectively. If you wanted to change the memory size from your BASIC program, you would POKE two bytes lower than what you wanted to save in these locations. Now, just think a minute. What happens with your string space now? If you look at a memory map of your computer, you will see that your saved memory is located from the highest address down to the value stored in the memory size pointer address that is given above. Following that, the next X specified bytes make up your reserved string space. If you have moved your memory size pointer lower in memory and have changed no other pointers, you have lost some, or all, of your reserved string space. That depends upon whether you go down more bytes than what you reserved for string space.

If you have lost all of your reserved string space (usually the case) and try to run your program, you will get an OM (out of memory) error. To get it back, you CLEAR 50, or whatever value of string space you want, to reset the reserved string space. There's your answer. Just think in reverse. If you start with saved memory, CLEAR string space and then give up the saved memory, it should revert to reserved string space. That is exactly what it does.

Let's say that your program takes much less than 16K of memory and you want to CLEAR 40000 bytes for string space in your 48K computer, either a Model I or Model III. This is much more than the 32767 maximum using the conventional CLEAR. In your BASIC program, or while in the command mode, use the following: POKE 16562,127: CLEAR 7232: POKE 16562,255.

This is assuming that you didn't save any memory in response to the MEMORY SIZE? question and don't want to protect any. If you enter the command PRINT FRE(A$), you will see that you have 40000 bytes reserved for string space. The same technique will work when protecting memory, but you will have to compute different numbers into the above.

What you are doing with this method is protecting memory to the top of 16K. The value of 127 corresponds to 7FH, the most significant bit (MSB). By CLEARing 7232, you are setting your CLEAR pointer to an address that is 7232 bytes below the top of 16K memory. You are restoring memory size to the top of 48K. The CLEAR pointer remains the same. Voila! The equivalent of CLEAR 40000.

In lieu of the above, you can accomplish the same thing by altering the reserved string space pointer at 16544 and 16545. This requires some calculation and, of course, trying to remember the pointer location. I like the first method.

Next time, I will devote the column entirely to questions and answers on topics related to BASIC programming techniques and problems.

Remember to send your requests for future column topics, questions and tips to me, care of *80-U.S. Journal*, 3838 South Warner Street, Tacoma, WA 98409. Send a self-addressed stamped envelope and I'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. ■

BEFORE YOU GET TOO EXCITED ABOUT LOBO'S NEW COMPUTER, THERE'S SOMETHING YOU SHOULD KNOW.

There's plenty to be excited about in Lobo's new MAX-80,™ as you'll see in just a minute.

But first we want to warn you: you can't get one right away. Already, orders are coming in faster than we can build systems. However, if you can appreciate an incredible price/performance bargain, you'll agree the MAX-80 is well worth waiting for.

WHAT'S ALL THE EXCITEMENT ABOUT?

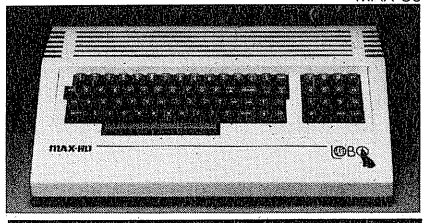
We're glad you asked. And the answer is pretty simple. Just look at this list of *standard* features:

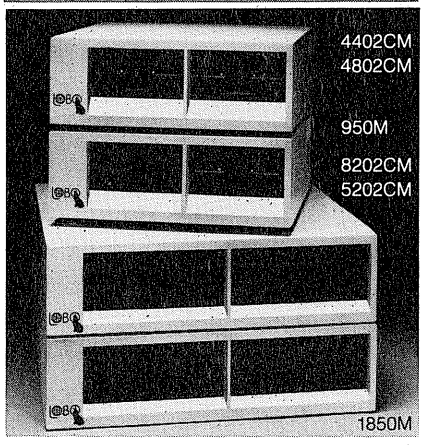
- *5 MHz Z-80B processor.* That's 2½ times the speed of a TRS-80 Model III or SoftCard/Apple!
- *64k RAM.* 128k is a low-cost option.
- *CP/M included.* A few more dollars get you LDOS, an incredibly powerful operating system that lets you run standard Radio Shack software.
- *Software-selectable 25 x 80, 16 x 64, and 16 x 32 screen formats.* For full compatibility with CP/M and TRS-80 applications.
- *All disk interfaces built in.* Plug in any combination of 5¼" floppies, 8" floppies, and Winchester disk.
- *Two RS-232 serial ports.* Ready to plug in modems, printers, or what-have-you.
- *Centronics-type parallel port.* For any printer using this standard interface.
- *Plus:* numeric keypad with 4 function keys, software definable text and graphics characters, built-in clock/calendar with battery backup, and buffered I/O expander port.

Now for the best part: *the factory-direct price for all this power is just $820—including shipping and Lobo's standard 1-year hardware warranty!*

WHAT TO DO NOW.

Call Lobo toll-free. Tell us what hardware and software configuration you're interested in (see below), and we'll give you an exact price and shipping date.





CPU and Accessories

MAX-80 computer with 64k RAM and CP/M 2.2	**$ 820.00**
64k expansion RAM (installed)	**$ 95.00**
12" (diag.) high-resolution anti-glare green phosphor monitor	**$ 175.00**
LDOS operating system	**$ 69.00**

Dual 5¼" Floppy Disk Systems

4402CM single-sided, 40 track; 180 kB per diskette	**$ 690.00**
4802CM double-sided, 80 track; 720 kB per diskette	**$1,175.00**

Dual 8" Floppy Disk Systems

NOTE: Lobo CP/M permits reading and writing standard single-sided, single density CP/M disks with either of these systems.

8202CM single-sided, double density; 577 kB per diskette	**$1,185.00**
5202CM double-sided, double density; 1155 kB per diskette	**$1,485.00**

Winchester Disk Systems

950M 5¼" system: 4.8 MB hard disk plus 720 kB floppy	**$2,405.00**
950MX same as 950M above but no floppy drive	**$2,100.00**
1850M 8" system: 8.0 MB hard disk plus 1155 kB floppy	**$3,085.00**

The Lobo Warranty

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

ALL PRICES INCLUDE SHIPPING WITHIN THE U.S.A.
California residents add 6% sales tax.
Payable by credit card, check, or money order.

TOLL-FREE ORDER NUMBERS:
U.S. (except California);
800-235-1245
In California: **800-322-6103**
Hours: 7AM—5PM Pacific Time

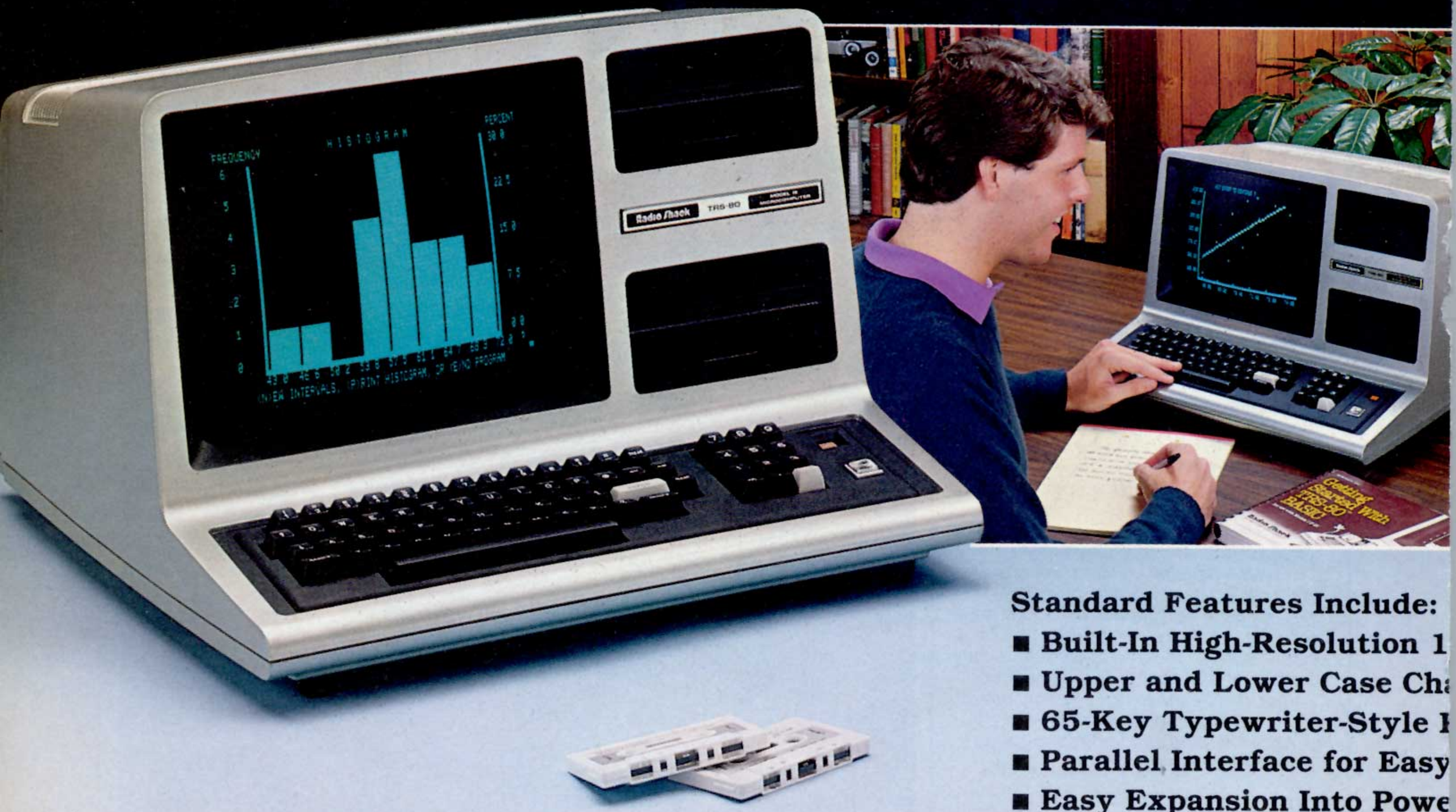
MasterCard VISA

LOBO SYSTEMS INC.

Dept. US483
358 S. Fairview Ave.
Goleta, CA 93117

Prices subject to change without notice.

SALE! Huge Saving
TRS-80® Model



Standard Features Include:

- **Built-In High-Resolution 1**
- **Upper and Lower Case Cha**
- **65-Key Typewriter-Style K**
- **Parallel Interface for Easy**
- **Easy Expansion Into Powe**

16K TRS-80
Model III BASIC

799.00
Reg. 999.00

Save $200

(Cat. No. 26-1062)

Two Great Computer Buys. Whether you're an old computer hand wanting to move up, or a newcomer looking for the best value in a personal computer, there's a TRS-80 Model III to fit your needs—and, with these fabulous prices, right now is the best time to buy.

Why Pay More? The 16K Model III's screen, keyboard and parallel printer interface are built-in—not extra. Just add a cassette recorder to load any of the thousands of ready-to-run programs, all designed for "the best-supported microcomputer in the world".

Write Your Own Programs. Our powerful Model III BASIC language has the features you need, including fast, reliable cassette operation at 1500 baud. Yet it's easy to master with our highly readable tutorial and reference manuals, both included with Model III.

Grow With Model III. As your computer horizons expand, so does Model III. You can start with our sale-priced $799 Model III and easily—and economically—expand into a powerful, professional system! You can increase internal memory to 48K. Add up to four double-density 5¼" disk drives, each with 184K of on-line storage. Or get the increased memory, two built-in drives and RS-232C ready-to-go—at additional big savings (shown at right)!

gs on Radio Shack's III Computers

The Versatile, All-in-One Computer That's Ideal for Personal or Professional Use Is Now Even More Affordable!

2" Monitor
aracters
Keyboard with Numeric Pad
Printer Connection
rful, Advanced Features

48K 2-Disk with RS-232C

Save $500

1795.00

Reg. 2295.00

(Cat. No. 26-1066)

Horizons Unlimited. Adding disk drives means more than just increasing data storage and improving access time. You get our powerful TRSDOS™ operating system and Disk BASIC for greater programming capability. And you can add our optional languages to program in Compiler BASIC, COBOL, FORTRAN or Assembler. Or add our business software for planning, word processing, electronic filing and more.

Great Graphics! Our optional high-resolution graphics give your Model III superb 640 x 240 (153,600 pixel) resolution and includes a Graphics BASIC language that makes creating charts and illustrations a snap.

Peripherals Galore. We have dot matrix and formed character printers, plotters, phone modems and a 5-megabyte hard disk system—all designed to work with your Model III.

Hurry—Sale Ends 4/25/83. You can get the sale-priced Model III that fits your needs at the Radio Shack Computer Center, store or participating dealer near you.

Radio Shack®

The biggest name in little computers®

A DIVISION OF TANDY CORPORATION

Retail prices may vary at individual stores and dealers.
Special order may be required.

Exploring VisiCalc

Storing checkbook information

Models I/II/III

Timothy K. Bowman, Spokane, WA

About this time of the year, many of us turn our thoughts to preparing our income tax return. Like many of you, I made New Year's resolutions to keep better records so that my tax return preparation could be easier. This month, let's use VisiCalc to create a template that will store our checkbook information in an easy-to-store (and retrieve) manner.

Begin by typing in the information given in Figure 1. Before beginning, you might want to review the sample printed copy which is given as Figure 2. Let me also give you some hints that will make typing in the program a bit easier.

The single and double lines are simply repeating labels. For example, the first repeating label occurs at position B4. Position your cursor there and type "/ - - ". Then, with the cursor at position B4, use the replicate function (/R) to duplicate the label in the rest of the row through P4. The same procedure should be used for the labels found on lines 12 and 14. Line 14, of course, uses the equal sign as the repeat character.

Before typing in any of the values in cell positions F5 through M5, down to F11 through M11, position the cursor at F5. Type /F$ to declare a dollar format for that cell position. Then, replicate it on line 5 from position G5 to M5. Conclude by replicating the positions F5 to M5 by positioning the cursor at position F5; type /R.M5 ENTER F6.F11.

Create the total formula found at position F13 and then replicate it in positions G13 through G17. Do the same with the distribution formula at G16 and positions H16 through M17.

You have probably figured out by now that the replicate command is quite a powerful tool for the VisiCalc spreadsheet creator. It really speeds up the process.

At this point, you are ready to type in the sample data I have provided, or you could insert some personal data of your own. Of course, the expense category labels could be changed to fit your particular circumstances. Another helpful trick to speed up data input, and help insure that none is lost, is to put the first check number as a value in positions A5, create a formula in position A6 which is A5+1, and replicate it in positions A7 through A11. You can now observe automatic check numbering!

Taking Command

For simplicity's sake, I have included only seven lines of data. However, many of us write quite a few more checks than that. I would suggest that you determine what is the average number of checks that you write, position your cursor on row 11, and insert a new row by typing /IR. Repeat that process for as many lines as you need.

Hold it! What if I write 50 checks a month? I would need to type /IR 43 times. Is there an easier way? Yes, there is. Let's use a command file.

Start by saving the above spreadsheet to disk. Clear the screen using the /C command. In position A1, type "/IR ENTER. Replicate the formula in positions A2 through A10. Save this spreadsheet by typing /PF with a filename of ADD 10ROW/VC and press ENTER. Answer the prompt for the lower right position with B10 and press ENTER. It is important that the VC suffix be added, otherwise the VisiCalc program will add a PRF suffix and you will not be able to view the filename using the /SL ENTER command sequence. Clear

Figure 2 Sample Check Register November, 1983

Check #	Date	Payee	Amount	Sales Tax	Food	Utility	Medical	Auto	Enter-tainment	Misc.	Other Comments
2396	11-15	Sears	106.70	6.70						100.00	Purchase Computer Program
2397	11-17	Safeway	212.20	12.20	200.00						
2398	11-23	Dr. Jacobs	23.97				23.97				
2399	11-24	Electric Power Co.	42.96			42.96					
2400	11-29	Jones Automotive	56.49					56.49			Car Repair
2401	11-30	Cash	10.00						10.00		
2402	11-30	ABC Mortgage Co.	395.00							395.00	Mortgage Payment
TOTALS			847.32	18.90	200.00	42.96	23.97	56.49	10.00	495.00	
Distribution of Expenses			100.00	2.23	23.60	5.07	2.83	6.67	1.18	58.42	

the spreadsheet and reload the original template and position the cursor on line 22. Type /SL ADD10 ROW/VC ENTER. Then, sit back and watch ten lines be added automatically. Now, isn't that easier? It's true that we would still have to repeat the preceeding process four or five times, but we could have created a command file to insert 43 lines. If you doubt it, try it. It works.

For those of you who are interested in further information on command files, obtain copies of *TRS-80 Microcomputer News*, September, 1982, pages 17-18, and a followup article in the December, 1982 issue on pages 35 and 36. These can be found at your local Radio Shack Computer Center or dealer.

The above template can be stored to disk and used to store a month's or quarter's worth of data. You should find that it takes just a few minutes to initially create and then update this template. It eliminates having to write or purchase a checkbook program.

Followup

In my January column, I asked if anyone was aware of a patch that would allow the Model III enhanced VisiCalc to run on a Model I. A reader in Michigan advised me that Apparat has such a patch.

The patch requires the Model I to have double density and is available to registered owners of NEWDOS/80 and requires that operating system. For further information, contact Apparat, Inc. at 4401 S. Tamarac Parkway, Denver, Colorado 80237, or phone (303) 741-1778.

There is also a patch for LDOS users and it was published in the LDOS quarterly of October, 1982. For more information, contact Logical Systems, Inc., 11520 N. Port Washington Road, Mequon, WI 53092 (414) 241-3066.

Thanks to all who have written. If you have a question, comment or suggestion, write to me in care of *80-U.S. Journal*. Please enclose a SASE envelope. ■

Figure 1

```
>M17:/F$(+M14/F14)*100
>L17:/F$(+L14/F14)*100
>K17:/F$(+K14/F14)*100
>J17:/F$(+J14/F14)*100
>I17:/F$(+I14/F14)*100
>H17:/F$(+H14/F14)*100
>G17:/F$(+G14/F14)*100
>F17:/F$@SUM(G17...M17)
>D17:"penses
>C17:"ion of Ex
>B17:"Distribut
>M15:/-=
>L15:/-=
>K15:/-=
>J15:/-=
>I15:/-=
>H15:/-=
>G15:/-=
>F15:/-=
>M14:/F$@SUM(M6...M12)
>L14:/F$@SUM(L6...L12)
>K14:/F$@SUM(K6...K12)
>J14:/F$@SUM(J6...J12)
>I14:/F$@SUM(I6...I12)
>H14:/F$@SUM(H6...H12)
>G14:/F$@SUM(G6...G12)
>F14:/F$@SUM(F6...F12)
>B14:"TOTALS
>M13:/--
>L13:/--
>K13:/--
>J13:/--
>I13:/--
>H13:/--
>G13:/--
>F13:/--
>O12:"Payment
>N12:"Mortgage
>M12:/F$395
>L12:/F$
>K12:/F$
>J12:/F$
>I12:/F$
>H12:/F$
>G12:/F$
>F12:/F$395
>D12:"tgage Co.
>C12:"  ABC Mor
>B12:"   11-30
>A12:+A11+1
>M11:/F$
>L11:/F$10
>K11:/F$
>J11:/F$
>I11:/F$
```

```
>H11:/F$
>G11:/F$
>F11:/F$10
>C11:"  Cash
>B11:"   11-30
>A11:+A10+1
>O10:"r
>N10:"Car Repai
>M10:/F$
>L10:/F$
>K10:/F$56.49
>J10:/F$
>I10:/F$
>H10:/F$
>G10:/F$
>F10:/F$56.49
>D10:"utomotive
>C10:"  Jones A
>B10:"   11-29
>A10:+A9+1
>M9:/F$
>L9:/F$
>K9:/F$
>J9:/F$
>I9:/F$42.96
>H9:/F$
>G9:/F$
>F9:/F$42.96
>E9:"o.
>D9:"c Power C
>C9:"  Electri
>B9:"   11-24
>A9:+A8+1
>M8:/F$
>L8:/F$
>K8:/F$
>J8:/F$23.97
>I8:/F$
>H8:/F$
>G8:/F$
>F8:/F$23.97
>D8:"obs
>C8:"  Dr. Jac
>B8:"   11-23
>A8:+A7+1
>M7:/F$
>L7:/F$
>K7:/F$
>J7:/F$
>I7:/F$
>H7:/F$200
>G7:/F$12.2
>F7:/F$212.2
>C7:"  Safeway
>B7:"   11-17
>A7:+A6+1
>P6:"Program
>O6:"Computer
>N6:"Purchase
>M6:/F$100
>L6:/F$
>K6:/F$
>J6:/F$
>I6:/F$
>H6:/F$
>G6:/F$6.7
>F6:/F$106.7
>C6:"  Sears
>B6:"   11-15
>A6:2396
>P5:/--
>O5:/--
>N5:/--
>M5:/--
>L5:/--
>K5:/--
>J5:/--
>I5:/--
>H5:/--
>G5:/--
>F5:/--
>E5:/--
>D5:/--
>C5:/--
>B5:/--
>O4:"ments
>N4:"Other Com
>M4:"   Misc.
>L4:"tainment
>K4:"  Auto
>J4:"Medical
>I4:"Utility
>H4:"Food
>G4:"Tax
>F4:"Amount
>C4:"  Payee
>B4:"   Date
>A4:"Check #
>L3:"Enter-
>G3:"Sales
>C3:/FR
>A3:/F$
>F2:" 1983
>E2:"November,
>D2:"ter
>C2:"eck Regis
>B2:"Sample Ch
>G1:"Figure 1.
/W1
/GOC
/GRA
/GC9
/X>A1:>A4:/TH
/X>A1:>A1:
```

BASIC bingo

Let your computer do the work

Models I/III

David Busch, Ravenna, OH

Does your family fight over who gets to call the bingo numbers whenever you get together for a friendly game? Is your group or organization looking for a way to add a little space-age appeal to an old-fashioned game?

Here's Basic Bingo, a program for TRS-80 Model I or III computers, which uses the pseudo-randomness of your micro to draw numbers and display them on the screen. All you need to play are some bingo cards, and a few willing participants.

Those wanting to use the program before larger groups may want to rig-up displaying the CRT output on a larger screen. A large black-and-white monitor, such as those used in schools to teach computer courses, would be ideal. In a pinch, an RF converter and an ordinary television (the bigger the better) would work. (Has anyone connected his TRS-80 up to a large screen projection television yet?)

Basic Bingo will choose regulation bingo letter and number combinations, and display them in a line at the bottom of the screen. In addition, a chart is drawn showing all numbers drawn under the B, the I, N, G and O during play. For those of you who are not bingo aficionados, the chart is used to help those playing multiple cards to update and doublecheck themselves.

Drawing numbers is very simple. Any player hits any key (except B) to trigger the next selection. When a valid bingo has been scored, a B is entered to reinitialize the program and start a new round.

Here's how the program works: The "drum" containing the numbered balls is simulated by a string array, BNGO$(n). This array is loaded with the correct letter and number combinations, which range from B1 through O75. Fifteen numbers are available under each of the five letters, so a FOR...NEXT loop of 1 to 5 (commencing at line 60), loads the numbers 1-15, 16-30, 31-45, 46-60 and 61-75 into BNGO$(n) in the proper spot. A nested loop goes from C to C+14, with C incremented by 15 each time the inner loop is begun.

Then, the variable AM, which shows how many numbers remain in the array "drum" is set to its initial value (75) in line 130, and play commences.

The screen is drawn in a module at lines 240-370. Then, any time a non-B key is hit, control branches to a

subroutine at line 160. A random number from one to AM is selected. That number, R, points to the element of the array BNGO$(R) which is considered to be the next number drawn. However, before the selection is displayed, the program must first account for the missing number.

If the number drawn does not happen to be the last one in the array, control drops down to line 190. There, the final element (BNGO$(AM)) is deposited in the "hole" left by the "removal" of the most recently drawn number. Then AM is decremented by one, to signify that the array has one less element.

If R happens to equal AM, the "closing up" step is omitted. Control then returns to the display portion of the program. The letter and number chosen are printed on the bottom line of the display.

The numeric portion of the selection is computed in lines 520 to 530, and stored in variable V. From that value, the program can determine what row and column the number has in the chart. For example, by dividing V by 15, the program can tell which of the five letter rows the choice belongs in. Determining the remainder when

ROW-1 times 15 is subtracted from V points to the column in which the number fits. These data are used to calculate P, the PRINT @ position for N$.

Good luck, I hope your bingo cards are all winners.

Program Listing for Basic Bingo

```
1 '*********************************
2 '*            BINGO              *
3 '*         DAVID BUSCH           *
4 '*     515 E. HIGHLAND AVE.      *
5 '*    RAVENA, OHIO 44266         *
6 '*********************************
10 CLEAR 1000
20 RANDOM
30 DIM BNGO$(75)
40 C=1
50 DATA B,I,N,G,O
60 :  FOR N=1 TO 5
70 :    READ LE$(N)
80 :    FOR N1=C TO C+14
90 :      BNGO$(N1)=LE$(N)+STR$(N1)
100 :   NEXT N1
110 :   C=C+15
120 : NEXT N
130 AM=75
140 GOTO 240
150 ' ****** Select Number *******

160 R=RND(AM)
170 NXT$=BNGO$(R)
180 IF AM=R GOTO 200
190 BNGO$(R)=BNGO$(AM)
200 BNGO$(AM)=""
210 AM=AM-1
220 RETURN

230 ' ****** Draw Screen ******

240 CLS
250 TA=128
260 :  FOR N=1 TO 5
270 :    PRINT @ TA,LE$(N);
280 :    TA=TA+128
290 :  NEXT N
300 :  FOR Y=4 TO 33
310 :    SET (4,Y)
320 :    SET (127,Y)
330 :  NEXT Y
340 :  FOR X=4 TO 127
350 :    SET (X,4)
360 :    SET (X,33)
370 :  NEXT X

380 ' ****** Take a number ******

390 PRINT @ 847,"Hit any key to draw nex
t number";
400 PRINT @ 15,"ENTER   B  FOR   B I N G
 O";
410 PRINT @ 978,">>>";
420 PRINT @ 998,"<<<";
430 FOR C=1 TO 20:NEXT C
440 PRINT @ 978,"     ";
450 PRINT @ 998,"     ";
460 A$=INKEY$:IF A$="" GOTO 390
470 IF A$="B" RUN
480 GOSUB 160
490 PRINT @ 988,"     ";
500 PRINT @ 988,NXT$;


510 ' ****** Calculate display position
on screen ******

520 N$=MID$(NXT$,2)
530 V=VAL(N$)
540 IF INT(V/15)=V/15 ROW=INT(V/15):GOTO
 560
550 ROW=INT(V/15)+1
560 COL=V-(ROW-1)*15
570 P=(ROW*128+COL*4)
580 PRINT @ P,N$;
590 GOTO 390
```

HOME · PERSONAL · BUSINESS COMPUTERS & EQUIPMENT DISCOUNT PRICES

BUY BY DIRECT-MAIL

1-800-841-0860

CONVENIENT ORDER ENTRY

MICRO MANAGEMENT SYSTEMS INC.

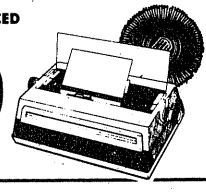
TRS-80 COLOR COMPUTER

DISCOUNT PRICED FROM **CALL**

BUY DIRECT 26-3004

SMITH CORONA TP-1 DAISY WHEEL PRINTER

DISCOUNT PRICED FROM **$559**



BUY DIRECT

commodore

VIC 20 COMPUTER..... **$CALL**
VIC 1530 RECORDER... **$CALL**
VIC 1541 DISK DRIVE... **$CALL**
VIC 1525 PRINTER..... **$CALL**

commodore

COMMODORE 64 COMPUTER
C-64..... **$CALL**
COMMODORE 64 SOFTWARE..... **$CALL**

TRS-80 MODEL 16 COMPUTER

DISCOUNT PRICED FROM **$4098**

BUY DIRECT 26-6001

TRS-80 PRINTERS
MFG BY RADIO SHACK

DWP-410..... **$1287.00**
DMP-100..... **$339.00**
DMP-200..... **$679.00**
DMP-400..... **$1015.00**
DMP-500..... **$1525.00**

OKIDATA PRINTERS

ML 80..... **$CALL**
ML 82A..... **$CALL**
ML 92P..... **$CALL**
ML 93P..... **$CALL**

EPSON PRINTERS

MX 80..... **$CALL**
MX 100..... **$CALL**
FX 80..... **$CALL**

TRS-80 MODEL III COMPUTER

DISCOUNT PRICES FROM **$588**

BUY DIRECT 26-1061

NEW TRS-80 PRODUCTS $CALL

ATARI
HOME COMPUTERS
DISCOUNT PRICED FROM **$548** ATARI 800

FRANKLIN
ACE 1000 & 1200 COMPUTER
DISCOUNT PRICED FROM **CALL**

TRS-80 MODEL 12 COMPUTER

DISCOUNT PRICED FROM **CALL**

BUY DIRECT

ALL TRS-80'S ARE PURE RADIO SHACK EQUIPMENT AND COVERED BY THE MANUFACTURERS WARRANTY

CALL US BEFORE YOU BUY!
We continue to offer NEW PRODUCTS. Check us on any products not listed.

WE OFFER YOU
- Fast Delivery
- Low Prices
- Large Inventory
- Toll Free Phones
- Brand New Products

FREE
- Discount Price List
- MFG's Copy of Warranty

CALL 912-377-7120

MICRO MANAGEMENT SYSTEMS INC.
Parcel Division Dept. 5
2803 Thomasville Rd. • Cairo, Ga. 31728
Ga & Info 912-377-7120

SAVE MONEY
Prices and products subject to change without notice. Orders subject to acceptance and verification.

Captain 80

and the magic software machine

Bob Liddil, Contributing editor

Here's Max, sentient computer program and sidekick to Captain 80, filling in for that individual who is away on assignment looking into the aspects of business and accounting software as it applies to beach bunnies on the island of Maui in Hawaii. It's a tough assignment, but someone has to do it.

Meanwhile, I am left to hold down the fort in New Hampshire where the temperature is low enough to freeze silicon chips into little sandy icicles.

Before he left, the Captain loaded up all four disk drives on the Model I and the Color Computer so I would have plenty to do in his absence. The programs he left me are hot. Most of them are, anyhow.

A new company called Funsoft has just burst onto the arcade software scene. We knew them in an earlier time as Malibu Microcomputing. Every talented programmer on the coast must have gone to the beach, because these programs are top notch, deluxe and terrific.

Apple Panic (referring to the red fruit) is a blast. Picture a ladder-and-platform situation with little Andy (refers to Android Nim and the classic robot character) looking at walking apples who've become crazed and turned on you. (Their explanation, not mine.) Your only hope is to stomp holes in the brick floors and when the animated apples drop into the holes, you pounce on them and stomp their little heads until they fall, arms-awaving, to their doom on the floor below.

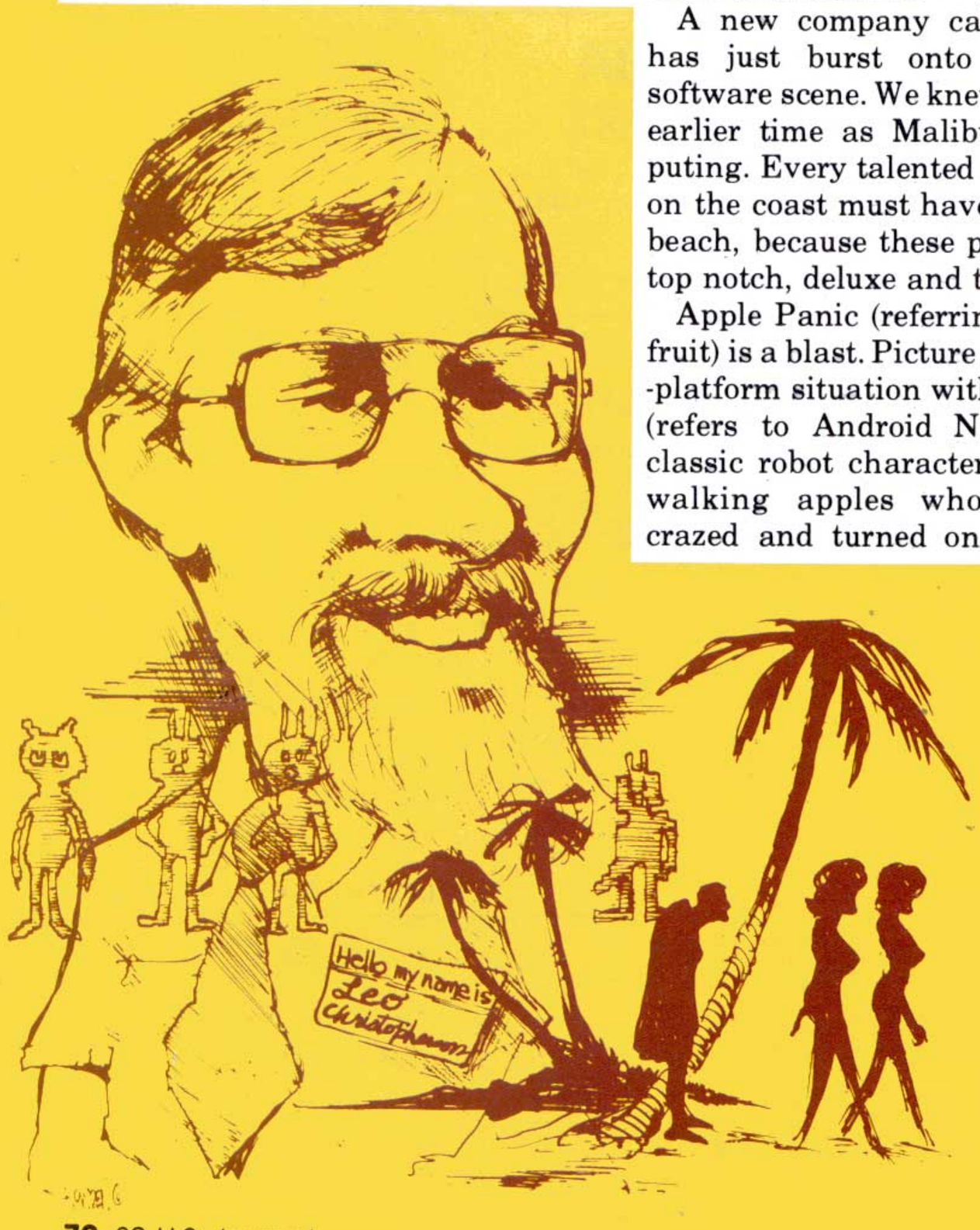
The graphics are clean and flicker-free. The motion is fluid and active enough for the most hard-core arcadeophile. The sound employs both music and a reasonable voice for maximum enjoyment.

The quality of the program is very high and leaves nothing out. The impression of having received quality in exchange for cash is a lasting one.

The fun from Funsoft doesn't stop here, for there is Bable Terror. The fact that this is a thinly disguised Pac-program shouldn't deter you. In fact, the lack of dots, energizers or other telltale Pac-signs, is a pleasure to twitch-weary players such as the Captain and myself. At any rate, one moves through the maze alternately chomping Bables or dodging unknown enemies. The maze is much larger than the screen, so there is plenty to do.

Here, too, voice and music combine to enhance a highly professional offering. Author Lemperur has given us some alternate shapes, but as in Apple Panic (which he also wrote), the influence of Leo Christopherson and the early shapes pioneered in basic classics is unmistakable.

In The Black Hole, the Christopherson influence vanishes unless



the high quality of the animation could be credited to Leo's early example. Here, we have a Galaxian-style program with a twist. The entire game is being conducted in an ever-tightening corridor leading, inevitably, to the mother ship (deja vu).

Yes, indeed, we've been here before and although the Dorfians have a few tricks up their sleeves, there is the feeling that any one of a dozen mother ships from countless zap-pop games may suddenly appear and scatter your atoms all over the cosmos.

The Black Hole gets high marks for game content, animation quality and difficulty. Put this one in your library alongside the many, many, many similar programs.

Mad Mines is an explosive program that works well. It, too, is an Invaders-Galaxian-Phoenix-style twitch with slim variations. But it seems to hold the energies and attentions of the young humans who come in almost daily to try out the new games. As in other rap-em, zap-ems, the lazer base is left-right bound at the bottom of the screen while the baddies (in this case, the mines) come down to do harm to you.

For the last of the Funsoft games, I decided to visit the Timerunner in his modest beach house three streets down from the Old Programs' Home, to get an exclusive interview.

Max: "Mr. Runner, I see that your programmer/publisher has dressed you up in very fine packaging for distribution across America."

TR: "That's true, Max. They are proud of me and my unique game plan which isn't a derivative of any popular coin-op arcade game."

Max: "There seems to be a definite Christopherson influence in the graphics characters displayed on the screen by you and your cousins. Can you explain that?"

TR: "Well, there's no doubt that Leo Christopherson was the single greatest influence on animation for the TRS-80 since the beginnings of that machine. The Andy characters in Android Nim were lifelike and had much personality. The "Andys" in Timerunner have zero personality and really aren't supposed to. After all, there can be only one master. My programmer was trying to get the best, most meaningful pictures possible from the TRS-80 and little "Andys" are the cleanest, most movable creatures possible in block graphics."

Max: "That's true. Tell me, are there other features that make you a good buy?"

TR: "Sure. My game plan, though simple, will take many hours to master and a much longer time to gain proficiency. You wouldn't believe how many humans crack up when they hit the spacebar and all those defender-droids get shaken upside down like so much popcorn. Plus, my music/voice effects enhance my overall value greatly. By the way, you know, all of my cousins and I are joystick-compatible."

Max: "Yes, I know. My human got a joystick from Big Five in the mail the other day. He played you for hours and hours. Didn't get any work done at all. Say, if you could sum up your net worth in one sentence, what would you say?"

TR: "I guess I would have to say that I'm the most highly-playable game in the Funsoft group. After all, I'm original, and full of action. And, best of all, I don't have a single, solitary laser anywhere in my grid."

Max: "There you have it, right from the program's mouth. I do have to agree with his assessment of his virtues. He is the most playable of his group . . . or at least in a tie with Apple Panic for the title of best-of-series."

As an afterword, I should say to retailers that the packaging of the Funsoft games is utterly top drawer. This operation is graphically professional, inside and out. You might get some complaints about the protected media, but most people have long since adjusted to that as a fact of life.

To the consumer, get going on these — they are not ho-hum rehashes by any means. They are all worth their sticker prices for adult, child, or a smart program to play for months after purchase.

This is Max saying, "Next time he goes to Hawaii, he'd better have a 16K Pocket Computer for me to ride in or I'll download him to the far reaches of Arctic Adventure and never let him surface again." ■

A basic data base

Simple building blocks for a cassette oriented system

For all models

Paul Frank, Signal Mountain, TN

When I first realized what computers could do, I knew that I had to own one. I also knew that I'd never be able to pay for it myself. A writer by profession and a journalist by trade, my real yen for a computer was based upon my dislike of typing and retyping manuscripts. I mean, isn't it obvious to everyone that computers were really invented to be word processors?

But how to pay for it? Like most journalists nowadays, I did my work in an office where I was given a word processor that doubled as a typesetter. The sparetime writing I was doing then couldn't even begin to justify, let alone pay for, a computer of my own.

Then, I happened upon a small organization that was paying someone else to update and run off their mailing list as well as send out a little newspaper once a month. When I found out they were shelling out enough in a single year to completely pay for a 16K Model III, my wheels started smoking.

When the smoke cleared two weeks later, the computer had arrived. A few days after that came the printer; then the Radio Shack tape-based mailing list program and Scripsit! I sneaked down into the basement with the real reason for my foray into modern-day high technology. My wife barely saw me for weeks.

Problems and Problems

Well, I got it all working in a matter of hours and hurriedly typed in the thousand-name mailing list. (That's "hurriedly" in two, 22-hour marathons with some help from my wife who kept shaking her head in disbelief.) That done, I spent the next three months wrestling with The Thing. Surely, I'd weep (bleary-eyed at 3 a.m.), surely The Thing can do a better job than this.

The Thing kept the names in alphabetical order beautifully, but the post office doesn't want newspapers in alphabetical order. They want them in ZIP code order.

Well, The Thing would sort that way, too, but it took all night or all day, and if there was a power blip... well, forget it.

Not only that, but for some reason, The Thing just "hung up" every now and then in the middle of making changes — sometimes just a few seconds, other times a few minutes.

And The Thing had to be fed the mailing list program every time it was turned on, and then fed the names, too. But the maximum capacity of each file was only 80 names. For a rapidly-changing mailing list of 1000 names, that meant 20 different files of about 50 names each. Each of those files might need an all-night or all-day sort from ZIP code to alphabetical and back again; and each of the files had to be revised, then saved and revised again. And at 500 baud, too, not 1500 the computer was capable of.

Even after all that, all of the names had to be rearranged once more, manually, because the ZIP code sorts were never quite the way the post office had to have the newspapers arranged.

Enough! I finally declared.

Education out of Desperation

While most of the Model III manual was really beyond my comprehension, I spent day after day reading it over and over again until, finally, understanding emerged. I began to realize that BASIC really isn't anything weird at all. It's just a language used to talk to the computer so that it will know what to do with the information you give it.

I started rolling again when I coupled up with the meaning of the words READ and DATA, and then found some very friendly string commands. My wheels started smoking again when I found IF... THEN and GOTO. I realized I could use BASIC to talk to my Model III the same way I'd been using English to talk to the readers of the newspaper I wrote for.

My computer and I have been friends ever since. The Thing hasn't been off the shelf.

A Very Basic Data Base Program

(You fancy programmers forget it. This is for us dummies trying to stay alive while the computer pays for itself.)

The main thing to do with any massive amount of data, of course, is to get it into the computer in the first place. But you've got to cram it all in so that the computer can understand what its got. To a computer running BASIC, "understand" usually means arranging the information so the computer can READ it, then decide whether it should be PRINTed, LPRINTed or FORGOTten. There may not be a BASIC word "forgot," but any computer does a lot of it. Your job is to make sure it only FORGETs what it's supposed to.

One of the easiest things for a computer to READ is a DATA statement in which the individual things it READs are divided apart with commas, like this: 100 DATA 100, Frank, Paul, 3-83, 921 Signal Road, Signal Mountain, TN, 37377. It's simple to make use of such a DATA statement by READing it: 10 READ D, L$, F$, M$, A1$, A2$, S$, Z.

That sticks the information (data line number, last name, first name, membership expiration date, first address line, second address line, state and zip) into the computer's memory. I learned that a computer can do it just as easily a couple hundred times in a very few seconds, one right after the other. Just add: 5 FOR I = 1 to 200 and 99 NEXT I.

While it was true that every time a new DATA was READ the old one was forgotten, that didn't matter, because I usually entered the addresses in the ZIP code order the way the post office had to have them. Changes in the DATA statements were made easily using the ROM-based EDITing commands.

The problem was finding one particular name to make the changes. Not so difficult with a pair of lines flanking the READ statement:

```
3 'INPUT "What name do you want to find"; X$
```

And:

```
20 'IF X$ = L$ THEN PRINT D
```

That gave me the line number to be EDITed.

Or, I could go directly to a PRINT or LPRINT of the same information with just a quick EDIT of 20 to branch to PRINT and LPRINT directions:

```
20 'IF X$ = L$ THEN 80
```

Lines 80 and 81, the "output" lines, are kept as a pair:

```
80 'CLS:PRINT F$" "L$:PRINT A1$:PRINT A2$", "S$" "Z
81 'LPRINT F$" "L$:LPRINT A1$:LPRINT A2$", "S$" "Z
```

Short Is Beautiful

The beauty of the program, of course, is that it's so short that it can be stored with each set of data statements and allows virtually all available RAM to be

used for DATA storage rather than for operating instructions. You don't have to feed in the program first.

There are a few other handy lines thrown into Listing 1, also. You will note that most of the lines in the listing are REMed out. I usually keep the longer ones in the program all the time and unREM them when I need them. I write the shorter ones as I need them.

You already know about lines 3 and 20, the pair to find a particular name. Line 30 outputs (either PRINT or LPRINT) memberships expiring in a given month — *extremely* useful.

Line 85 is handy. UnREMed, it lets you control the rate at which you advance through a READ and PRINT of the entire list. Every time you touch a key, the next name is displayed on the screen.

Lines 88 and 89 are equally handy. They keep a running tab on the number of addresses that have been READ or selected by the various program lines: indispensable for preparing postal reports as well as insuring DATA isn't being lost during CSAVEs and CLOADs.

Finally, line 6500 can be used to delineate the end of the entries. Also, note the use of commas to keep the flow of information ordered. That's crucial for proper READs — otherwise you'll wind up with someone's address being "3-83." For the same reason, it's a good idea to keep at least one non-string value in each DATA statement. The DATA line number is the obvious place. That way, the computer will tell you very quickly when you get things out of order. That's a real SN.

For those rare occasions when a true alphabetical sort is needed, it's fairly simple to let the computer do all of the work by concatenating a series of DATA READs into a single string, dumping the strings onto tape, then feeding them back into an array.

This process is shown in lines 25 of Listing 1 as well as Listing 2. Line 25 plucks out all of the A's through L's and PRINT#-1s the concatenated strings onto tape. As you may have guessed, Listing 2 fetches them back again, feeds them into an array, "bubble sorts" them and LPRINTs them out in alphabetical order. A quick EDIT of line 25 to change the "<77" to ">76" will take care of the M's through Z's. If you don't move the paper in your printer, you'll wind up with a straight-through alphabetical sort of every name on your list.

Both the PRINT#-1(ing) as well as the INPUT#-1(ing) and sorting can just as easily be done in any number of blocks you like to accommodate smaller or larger mailing lists.

Awkward? A little, but if you've only got 16K available, the very nature of arrays and the way they process stuff gobbles up memory awfully quickly. And arrays, at least in Microsoft BASIC, are really pretty slow at keeping themselves tidied up. Besides, for a twice-yearly sort, the extra half-hour of fiddling with tapes could scarcely justify an investment in a disk drive.

Phooey to the Radio Shack guy who told me you can't alpha-sort DATA lists. "Why don't you buy our tape-based mailing list program?" he asked. "Ha!" I answered. "Ha!"

Mailing Lists Were Fun and Profitable, But . . .

While I don't do mailing lists any more, I do use a slightly altered version of the same program for keeping track of my personal business accounts. (See Listing 3.) In this case, there are two kinds of DATA statements, one for income, the other for expenses:

100 DATA 100, Source of income, Variable field, Date received, Amount, Tax status.

The tax status category is for two kinds of income, "to be taxed" (entered as TBT) or "already taxed" (AT). Since both statuses end in "T," it becomes a simple matter to total all income for the year by writing a line such as:

22 IF RIGHT$(S$,1) = "T" THEN 80 ELSE 99

Line 88 is changed to A = A + A — and a PRINT A command at the end of the RUN tells me my total income. I write that down, then write a new line 80 to fetch only "TBT" income — and PRINT A again.

The TBT run is especially useful because it can give me a running tab of current income upon which taxes are still owed. That way, I can keep one eyeball on how much I should have in the bank to pay taxes at the end of the year. While I don't really mind owing taxes, it can be disenchanting not having the money to pay them.

In the case of expenditures:

110 DATA 110, Check written to, Purpose of check, Date written, Amount, Tax status.

The DATA line number (D) becomes the same as the check number. The tax status becomes "D" or "ND"

(deductible or non-deductible). The "purpose of check" category is limited to descriptions as listed in part II of Schedule C of the IRS standard 1040 tax form. It becomes very easy, then, to write lines like 3 and 27, both of which I usually keep on hand, but REMed out until needed.

3 INPUT "Which category of deduction (see Schedule C, Part II)";X$
27 IF P$ = X$ THEN 80 ELSE 99

A separate RUN can then be made for each category. At the end of each RUN, just LPRINT P$,A and transfer it onto Schedule C.

Simple? Yes. Basic? Very! Brief? Extremely.

Since I usually write what lines I need when I need them, the program rarely occupies more than ten lines. I also write them a lot shorter: line 3 of Listing 3, for instance, becomes "3 INPUTX$." Certainly not user-friendly, but I'm the only user.

Powerful? Enough for me to pay for my Model III in a year. Since then, I've added a 16K upgrade and easily keep a year's bookkeeping on a single CSAVE.

Incidentally, I can also produce about five times more completed manuscripts than I ever could have with my clunky old typewriter. It's obvious that the guy who invented the first computer was a finger-weary writer.

Disks? Well, I pine for them occasionally, but I'll sure not shell out the money. I'll let the computer do that whenever it decides to become productive enough to pay for them. ■

To run on Color Computer, change lines 80, 81 and 89 to:

In Listing 1—
80 CLS: PRINT D: PRINT TAB (4) F$: PRINT TAB (4) L$: PRINT TAB (4) M$: PRINT TAB (4) A1$: PRINT TAB (4) A2$", "S$" "Z
81 PRINT #-2, F$" "L$ TAB (26) M$: PRINT #-2, A1$: PRINT #-2, A2$", "S" "Z
89 PRINT @230, "NUMBER OF ADDRESSES = ";K

Leave Listing 2 As Is.

In Listing 3, change line 81 to:
81 PRINT#-2,D: PRINT#-2, S$,PS: PRINT A" "T$,,D

Listing 1

```
3 'INPUT"WHAT NAME DO YOU WANT TO FIND";
X$
5 FOR I=1 TO 200
10 READ D,L$,F$,M$,A1$,A2$,S$,Z
20 'IF L$=X$ THEN PRINT D
25 'IF ASC(LEFT$(L$,1)<77 THEN PRINT#-1,
L$+" "+F$+"+" / "+A1$+" / "+A2$+" / "+S$
+" / "+Z+" / "+D
30 'IF M$="4-83" THEN 80 ELSE 99
```

```
80 'CLS:PRINT D:PRINT F$" "L$TAB(26)M$:P
RINT A1$:PRINTA2$", "S$"  "Z
81 'LPRINT F$" "L$TAB(26)M$:LPRINT A1$:L
PRINTA2$", "S" "Z
85 'X$=INKEY$:IFX$=""THEN85
88 K=K+1
89 PRINT@460,"NUMBER OF ADDRESSES= ";K
99 NEXT I
100 DATA 100,FRANK,PAUL,4-83,921 SIGNAL
ROAD, SIGNAL MTN, TN, 37377
110 'DATA 110,ETC,ETC,,,,,
65000 'DATA 65000,,,,,,
```

Listing 2

```
5 DIM A$(200)
10 FOR I=1 TO 110
15 INPUT#-1,A$(I)
16 IF RIGHT$(A$,5)="65000" THEN 160
20 NEXT I
159 '********** STANDARD BUBBLE SORT ***
*******
160 T=0
170 FOR I=1 TO 110
180 IF A$(I)<= A$(I+1) THEN 200
190 X$=A$(I):A$(I)=A$(I+1):A$(I+1)=X$
195 T=1
200 NEXT I
210 IF T=1 THEN 160
219 '********** PRINTS THE ALPHA SORT **
********
220 FOR I=1 TO 110
225 LPRINT A$(I)
230 NEXT I
```

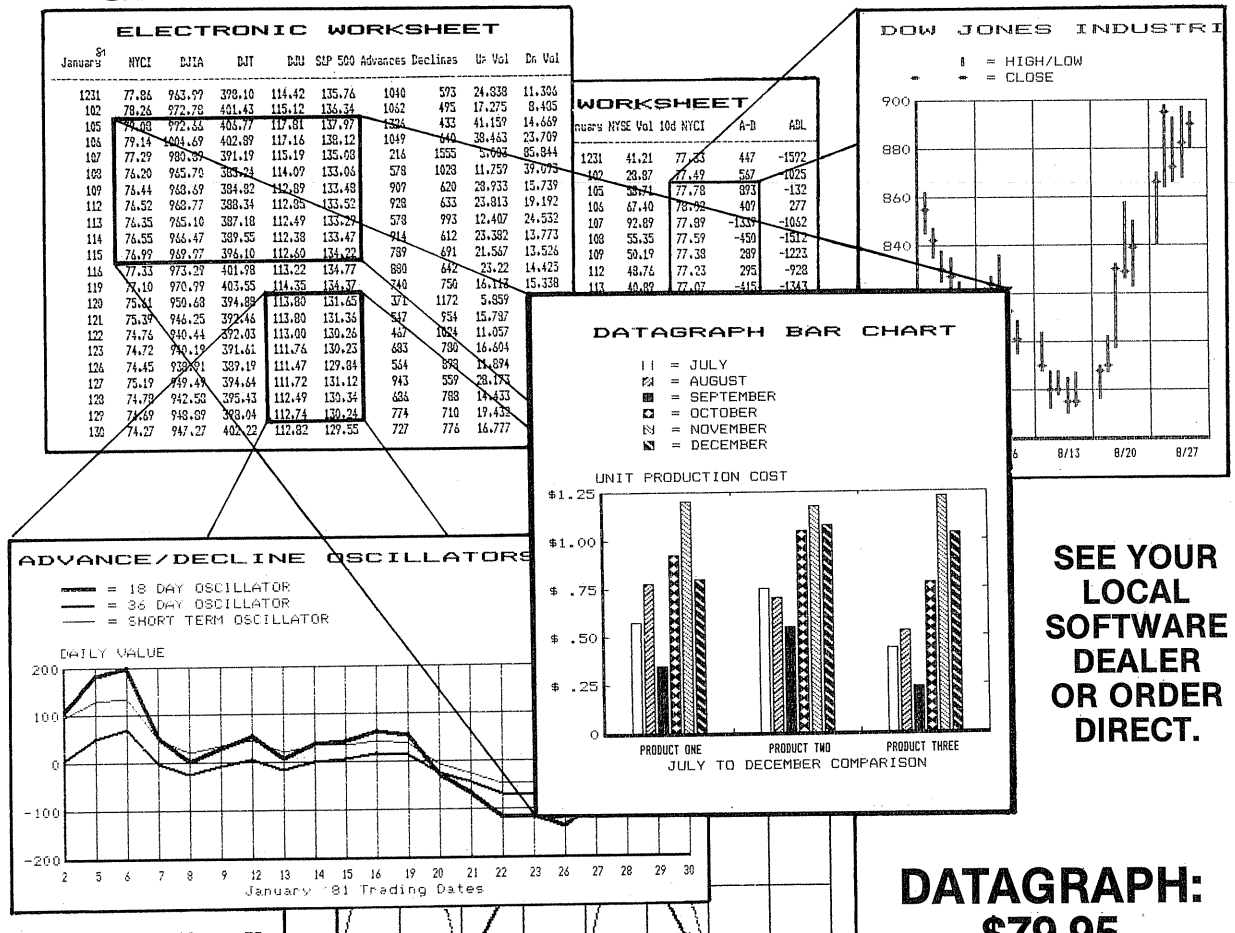
Listing 3

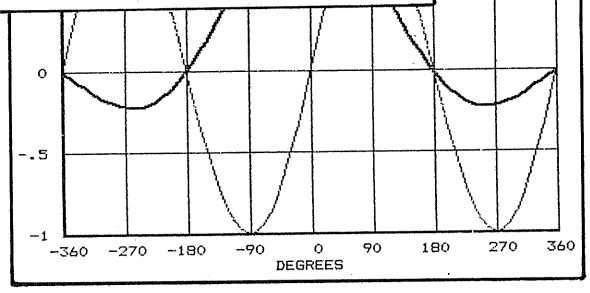
```
3 'INPUT "WHICH CATEGORY OF DEDUCTION (S
EE SCHEDULE C, PART II)";X$
5 FOR I=1 TO 200
10 READ D,S$,P$,D$,A,T$
22 'IF RIGHT$(S$,1)="T" THEN 80 ELSE 99
27 'IF P$=X$ THEN 80 ELSE 99
80 'PRINT D:PRINT S$,P$:PRINT A"   "T$,,
D$
81 'LPRINT D:LPRINT S$,P$:PRINT A"   "T$
,,D$
88 'A=A+A
99 NEXT I
100 DATA 100, 80-US,COMPUTER ARTICLE, 1-
15-83,$30000,TBT
110 DATA 110, 80-US,REFUND OF OVERPAYMEN
T FROM 80-US,3-23-83,$29999,D
```

DATAGRAPH*

T.M. 3RD GENERATION PRINTER GRAPHICS PROGRAM

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





SEE YOUR LOCAL SOFTWARE DEALER OR ORDER DIRECT.

* 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 - Plot each data set with Linear, Stair-Step, or Bargraph curves. * OPTIONAL MIN/MAX VALUES - Extends graph beyond the values of the Data Sets. * DATA SET DESCRIPTIONS - Prints text descriptions of each Data Set in graph legend. * TEXT 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.

DATAGRAPH: $79.95

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

USER REQUIREMENTS

COMPUTER
- TRS-80 MODEL I 48K
- TRS-80 MODEL III 48K
- LNW80 48K

DOS
- TRSDOS 1.3, 2.3
- NEWDOS, NEWDOS/80
- DOSPLUS 3.4, LDOS 5.1

DISK DRIVES
- SINGLE DRIVE (NOT TRSDOS)
- DUAL DRIVE (PREFERRED)

GRAPHICS PRINTER:
- MX-80 GRAFTRAX, OR GT+
- MX-100
- LINEPRINTER VIII, DMP 200
- NEC 8023 A-C, C.ITOH 8510
- IDS 460/560, 480, 80/132
- OKIDATA 82/83

++ OTHER VERSIONS IN DEVELOPMENT

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

MICRO SOFTWARE SYSTEMS • MICROPLOT, INC.

DEALER INQUIRIES WELCOME

PHONE (714) 526-8435

1815 SMOKEWOOD AVE. • FULLERTON, CA 92631

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

Accessing Profile files from BASIC

Models I/II/III

Terry R. Dettmann, Associate editor

Since the introduction of Profile on the Model II, I've had numerous applications using it. It has saved me quite a bit of time and made my job simpler in building a data base.

However, Profile does have some limitations. For example, it doesn't sort on more than one field, you can't select records if they aren't in segment 1, you can't make reports with more than 2 lines. In short, some of the fancy things you might like to do require some programming.

Radio Shack has recently introduced several new packages for Profile Plus (II) to fill some of these gaps, but by and large there will continue to be a need for special programming to solve special problems. It helps to have some simple routines to make it easy to work with any Profile file. That's what this article is about.

The programs included with this article illustrate the technique of locating information in a Profile file system and displaying it. It turns out that it really is very simple since the structure of Profile files is simple.

Unfortunately, I can't say as much about Profile III+ on the Model III. I'm told that it's identical to Profile II+. Assuming that's so, Model III owners can use these same techniques. When I can verify these techniques on a Model III system, I'll be sure to let you know. To summarize, the techniques covered in this article will work on Model II Profile and Profile Plus. They should work on Model III Profile Plus. They will *not* work on Model I Profile.

Let's look first at the structure of a Profile file system and how we can find data in the system.

Profile File Structure

For recovering information from a Profile file, the key file to look at is the "MAP" file. If you look at a disk directory where you have stored a Profile file system, you'll notice that the name you gave the file system is padded with zeros out to eight characters and it is used as the filename for all files in the system.

We'll be concerned with the following files:

'/MAP' - This file is a map of the file system showing the lengths of each data field, their headings, and the length of each file.

'/KEY' - This is the searching and sorting segment (segment 1). All Profile logical records are 85 characters in length but they are stored three to a physical record of length 256 bytes.

'/DAT' - The segment 2 file.

'/DA2' - The segment 3 file.

'/DA3' - The segment 4 file.

Figure 1 shows the relationship of the files for a sample Profile system with the name 'ADDRESS'. All of the files have a filename of ADDRESS0 and are identified with their appropriate extension.

We could look at the data files, but the key to doing this is the 'MAP' file. Let's concentrate on it.

Figure 2 shows a typical record in a MAP file. It starts out with a single byte which, as far as I am aware, doesn't hold any significant information. Since I've never had to use it for anything, I can only assume that

Figure 1

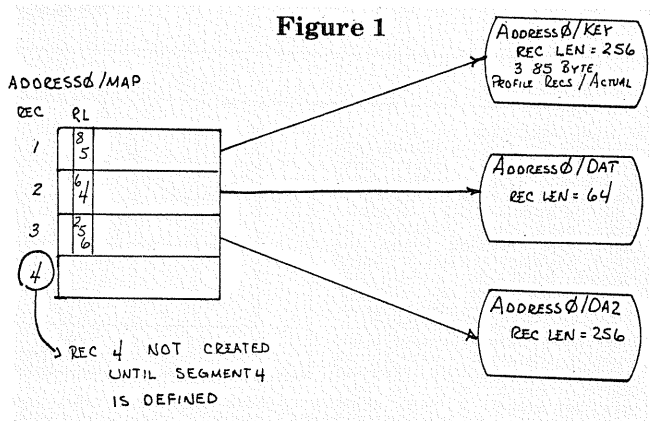


Figure 2

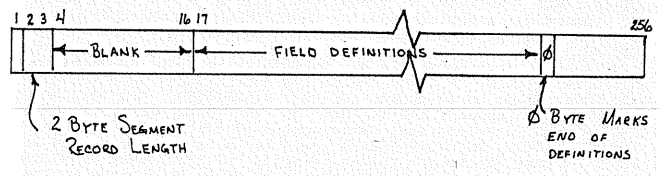
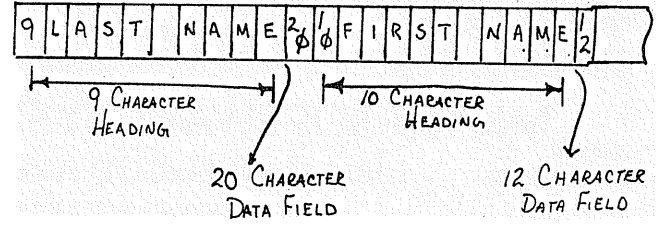


Figure 3



it can safely be ignored.

Bytes 2 and 3 hold the record length of the associated segment. Notice that this is the "logical" record length for that segment. For segments 2 through 4, this is also the physical record length if we're dealing with a Profile II+ system. Segment 1, however, always uses a 256-byte physical record and 85-byte logical records.

Bytes 4 through 16 are blank in all the files I have used. If they are filled at some point during processing, I've never noticed it nor have I ever needed what might be there. So, I ignore them.

The most important part of each record is the field definition area starting in byte 17. This can hold up to 240 characters that specify how the data items are stored in the file and their field headings.

A single data item is shown in Figure 3. Each entry consists of the following:

The first byte gives the field heading length.

Bytes two through the length of the field heading give the actual field headings.

The last byte gives the length of the actual data field.

Once we recognize this structure, it becomes possible to read the MAP file to determine where everything is and what it means.

Now, if the Profile program can read the MAP file, it stands to reason that we can write another program for this purpose in BASIC.

Read and List the Fields

The first program, Listing 1, reads the MAP file for a given Profile file system and lists the information about the fields in the system. Specifically, the field names, field lengths, and the file each field is on are listed by the program. Since this is the heart of the second program that lists the data items, let's look at Listing 1 and see how it works. Be sure to open four (4) files before running either listing 1 or 2.

The first part of the program (through line 200) just sets up the program. The dimension statement in line 110 lays out arrays for the field names (HD$), the data field lengths (LN%), the file number a data field is on (FL), and the record length for each file (FF).

The main part of the program (lines 200-999) simply inputs a filename, makes a correctly formatted Profile filename out of it by padding it with zeros, and then reads the MAP file.

Subroutine 1000 is of major interest. It reads the MAP file and then calls subroutine 1200 to decode each of the field definition entries. Each entry is stored in the arrays as it's decoded so it can be easily printed.

Try running this program on one of your existing Profile data base files to check its output against your definition of the file.

Read and Print the Data

Once we can get all the information from the MAP file, it becomes possible to extract the data from the data files.

The second program, Listing 2, starts where the first program left off. It takes the information and opens the data files in subroutine 1300. Then subroutine 1500 is used to get the data from an individual record. If there is

data in a record, subroutine 1600 prints the data.

The key to subroutine 1300 is to be able to put together legal OPEN statements and FIELD statements. For each file, first a legal filename, with extension, is formed (F$) and the physical record length, FX, is pulled out so the file can be opened for use. Note, if you are using Profile II and not Profile II+, all files use 256-byte physical records.

Subroutine 1400 is called to field the file for each data field stored there. It's important to use integers here to avoid type mismatch errors during the fielding.

Segment 1 is fielded in a special way. Three fields of 85 character length are set up. They are unpacked as needed only when the data is being retrieved. Subroutine 1500 gets a Profile data record from the various segments and stores the data in array DA$. Segment 1 is handled specially by subroutine 1550 because three "logical" records are packed in each "physical" record. Since the other segments are not packed, they are simply brought into memory and nothing further needs to be done with them.

Notice in the subroutine at 1550 that there is special processing if the first byte of an 85 character record in segment 1 is zero. If this is so, it means the record is not currently in use. It might never have been filled or it might be deleted. Whichever is the case, we don't want it included in our processing so we ignore it by setting a flag. The flag, EF, equals one when the record isn't used.

Once a record is in memory, we can do anything. Subroutine 1600 simply prints the record on the screen. However, it easily could have created an index for sorting, or a printed report, or zero some fields and restore them, or anything else you need.

Both programs were run on about a dozen Profile file systems without problems.

What Next?

Extending these programs is a relatively simple manner. For example, read the map file and then read in fields from a number of records to form invoices or statements. You could make up reports that are indexed by some field in other than segment 1.

Profile is one of the best pieces of software offered by Radio Shack. It easily ranks with Scripsit and VisiCalc in usefulness. But its maximum usefulness is only available to those willing to extend it with some BASIC programming. ■

Listing 1 — Profile

```
10 REM**********************************
**********************************
20 REM
30 REM              READ PROFILE FILES DEMON
STRATION
40 REM              BY TERRY R. DETTMANN
50 REM              FOR 80-US JOURNAL
60 REM
70 REM              VERSION 0.0      12/82
80 REM
90 REM**********************************
```

```
********************************
100 CLEAR10000
110 DIM HD$(144),LN%(144),FL(144),FF(4)
120 DEFFNHDR$(X$)=STRING$((78-LEN(X$))/2
,"-")+" "+X$+" "+STRING$((77-LEN(X$))/2,
"-")
200 REM - - - - - - - - - MAIN PROGRAM -
 - - - - - - - - - - - - - - - - - -
210 CLS:PRINTFNHDR$("PROFILE FILE READER
"):PRINT:PRINT
220 LINEINPUT"FILENAME: ";FF$
230 FF$=LEFT$(FF$+"00000000",8)
240 GOSUB1000:IF N=0 THEN PRINT"ERROR -
FILE DOESN'T EXIST":PRINT:PRINT:GOTO220
250 FORI=1TON:PRINTI,HD$(I),LN%(I),FL(I)
:NEXTI
999 END
1000 REM - - - - - - - - GET HEADING INF
ORMATION - - - - - - - - - - - - - -
1010 N=0
1020 OPEN"R",1,FF$+"/MAP"
1030 FIELD1,1 AS D1$,2 AS RL$,13 AS D2$,
240 AS HE$
1040 IF LOF(1)<=0 THEN GOSUB1150:RETURN
1050 FORI=1TOLOF(1):GET1,I
1060     FF(I)=CVI(RL$)
1070     IN$=HE$
1080     GOSUB1200:IF LN<>0 THEN 1080
1090 NEXTI
1100 CLOSE:RETURN
1150 REM - - - - - - - - OOPS - FILE DOESN
'T EXIST - - - - - - - - - - - - - -
1160 CLOSE:KILL FF$+"/MAP"
1180 RETURN
1200 REM - - - - - - - - DECODE HEADING
ENTRIES - - - - - - - - - - - - - -
1210 LN=ASC(MID$(IN$,1,1)):IF LN=0 THEN
RETURN
1220 N=N+1:HD$(N)=MID$(IN$,2,LN)
1230 LN%(N)=ASC(MID$(IN$,LN+2,1))
1240 FL(N)=I
1250 IN$=MID$(IN$,LN+3)
1260 RETURN
```

Listing 2 — Profile

```
10 REM********************************
**********************************
20 REM
30 REM          READ PROFILE FILES DEMON
STRATION
40 REM          BY TERRY R. DETTMANN
```

```
50 REM            FOR 80-US JOURNAL
60 REM
70 REM            VERSION 1.0      12/82
80 REM
90 REM**********************************
*******************************
100 CLEAR10000:DIMFE$(4),DA$(144),DB$(3)
110 DIM HD$(144),LN%(144),FL(144),FF(4)
120 DEFFNHDR$(X$)=STRING$((78-LEN(X$))/2
,"-")+" "+X$+" "+STRING$((77-LEN(X$))/2,
"-")
130 FE$(1)="/KEY":FE$(2)="/DAT":FE$(3)="
/DA2":FE$(4)="/DA3"
200 REM - - - - - - - - - - MAIN PROGRAM -
 - - - - - - - - - - - - - - - - - -
210 CLS:PRINTFNHDR$("PROFILE FILE READER
"):PRINT:PRINT
220 LINEINPUT"FILENAME: ";FF$
230 FF$=LEFT$(FF$+"00000000",8)
240 GOSUB1000:IF N=0 THEN PRINT"ERROR -
FILE DOESN'T EXIST":PRINT:PRINT:GOTO220
250 GOSUB1300
260 FORI=1TOLOF(1)
270     FORJ=1TO3:AR=(I-1)*3+J
280         GOSUB1500:IF EF=0 THEN GOSUB16
00 ELSE PRINT@(23,0),USING"RECORD: ####"
;AR;
290     NEXTJ
300 NEXTI
310 CLOSE
999 END
1000 REM - - - - - - - - - GET HEADING INF
ORMATION - - - - - - - - - - - - - -
1010 N=0
1020 OPEN"R",1,FF$+"/MAP"
1030 FIELD1,1 AS D1$,2 AS RL$,13 AS D2$,
240 AS HE$
1040 IF LOF(1)<=0 THEN GOSUB1150:RETURN
1050 FORI=1TOLOF(1):GET1,I
1060     FF(I)=CVI(RL$)
1070     IN$=HE$
1080     GOSUB1200:IF LN<>0 THEN 1080
1090 NEXTI
1100 CLOSE:RETURN
1150 REM - - - - - - - - OOPS - FILE DOESN
'T EXIST - - - - - - - - - - - - - -
1160 CLOSE:KILL FF$+"/MAP"
1170 RETURN
1200 REM - - - - - - - - - DECODE HEADING
ENTRIES - - - - - - - - - - - - - -
1210 LN=ASC(MID$(IN$,1,1)):IF LN=0 THEN
RETURN
```

```
1220 N=N+1:HD$(N)=MID$(IN$,2,LN)
1230 LN%(N)=ASC(MID$(IN$,LN+2,1))
1240 FL(N)=I
1250 IN$=MID$(IN$,LN+3)
1260 RETURN
1300 REM - - - - - - - - - - OPEN DATA FIL
ES FOR USE - - - - - - - - - - - -
1310 K=0:FORJ=1TO4:IF FF(J)=0 THEN RETUR
N
1320     F$=FF$+FE$(J)
1330     IF J=1 THEN FX=256 ELSE FX=FF(J)
1340     OPEN"R",J,F$,FX:KN%=0
1350     PRINT"OPENING FILE";J;"  ";F$
1360     GOSUB1400:IF EF=0 THEN 1360
1370 NEXTJ
1380 RETURN
1400 REM - - - - - - - - - FIELD CURRENT F
ILE - - - - - - - - - - - - - - - -
1410 EF=0:ON J GOTO 1450,1420,1420,1420
1420 IF FL(K+1)<>J THEN EF=1:RETURN
1430 K=K+1:FIELDJ,KN% AS DM$,LN%(K) AS D
A$(K)
1440 KN%=KN%+LN%(K):RETURN
1450 EF=1:FIELDJ,85 AS DB$(1),85 AS DB$(
2),85 AS DB$(3)
1460 FORK=1TO144:IF FL(K)=1 THEN NEXTK
1470 K=K-1:KM=K:RETURN
1500 REM - - - - - - - - - - GET RECORD NU
MBER AR - - - - - - - - - - - - -
1510 EF=0:FORK=1TO4:IF K=1 THEN GOSUB155
0:IF EF=1 THEN RETURN ELSE 1540
1520     IF FF(K)=0 THEN RETURN
1530     GETK,AR
1540 NEXTK:RETURN
1550 REM - - - - - - - - - - GET KEY RECOR
D - - - - - - - - - - - - - - - -
1560 GET1,I:LL=1:IF MID$(DB$(J),1,1)=CHR
$(0) THEN EF=1:RETURN
1570 FOR L=1TOKM:DA$(L)=MID$(DB$(J),LL,L
N%(L)):LL=LL+LN%(L):NEXTL
1580 RETURN
1600 REM - - - - - - - - - - DO ANYTHING W
ITH THE RECORD - - - - - - - - -
1610 CLS:PRINTFNHDR$("RECORD NUMBER:"+ST
R$(AR)):PRINT:PRINT
1620 FOR K=1TO144:IF LN%(K)=0 THEN 1650
1630     PRINT HD$(K);TAB(40)DA$(K)
1640 NEXTK
1650 PRINT:PRINT
1660 LINEINPUT"PRESS ENTER TO CONTINUE";
X$
1670 RETURN
```

Vehicle maintenance

How the City of Lander, WY keeps track on their Model III

Jeff Clack, Denver, CO

The microcomputer has opened up information handling in hundreds of fields in both the private and the business world. This article is about the city of Lander, Wyoming, and how it has utilized the TRS-80 Model III in keeping maintenance and cost records for a fleet of 56 vehicles and 47 pieces of equipment.

In March of 1980, I began using a Model I for a few tasks in the Water Department; primarily keeping track of water meter installations, repairs and other meter records. Fast data storage and retrieval (with random access) plus sorting by address, date or any other category has proven a time saver, especially when coupled with a line printer to make a hard copy of the results.

Mr. Pete Allen was appointed Public Works Director by Mayor Del McOmie in July, 1980 and this was when our microcomputer started to play a major role in information handling. Both men understood the various size and system capabilities and have stressed both mainframe and micro use in mass data manipulation. Currently, inventories, turbidity results, appointments and almost all paperwork for the Public Works Department is done on the Model III.

One major expense for any municipality is a fleet of vehicles and equipment. Originally, the program described below was written for the Model I but has since been converted to the Model III.

Program Overview

Vehicle maintenance record keeping was done by hand and I was assigned the task of building a program that would do the task in less time and with greater accuracy. As the program was being written, the Maintenance Department started to use a daily record of the fuel, oil, repair, etc., that was used by any unit.

Each morning, except weekends and holidays, the daily record is changed and recorded. The license number, vehicle mileage and quantities of fuel or supplies are keypunched into the maintenance program. On the average, this takes fifteen to thirty minutes. Repair orders are keypunched three to four times per month.

Each department has a separate and different key to the fuel pumps. When the daily record is fathered, all master readings and the department key readings are recorded. The total used must match the amount on the record (within a gallon) or a check is made. Any failure to record a fillup can be accounted for by department and often to time of day — sometimes to a specific vehicle.

Four data files are used by the program. VEHONE/DTA is a permanent line/item listing of all entries, sorted by date, department and vehicle. VEHTWO/DTA is a changing file that keeps track of the mileage and status of licensed vehicles for maintenance purposes. VEHTHREE/DTA performs the same function for equipment with engine-hour meters. VEHFOUR/DTA is a permanent record of major repairs.

As the daily information is keypunched, the program records the primary data, then branches to the second or third file to update either. These files are coded by department and license and change from day to day as mileage or engine hours increase. Fuel costs are computed automatically from current bulk prices during line/item entry. As prices change, the program is updated.

At any time, a maintenance update can be printed for Don Hundley, the maintenance supervisor. The first two columns identify department and vehicle. The next four are current entry date, mileage/broken meter code, mileage and average MPG. The next three columns show the last minor maintenance date, mileage at that time and elapsed miles since that date.

CITY OF LANDER
VEHICLE MAINTENANCE UPDATE

VEHICLE	CURRENT ENTRY		AV	LAST MINOR/ELAPSED MIL			LAST MAJOR/ELAPSED MIL		
ADM 1280	12/14/81	M 89,625	18	12/14/81	89,625	0	11/10/81	87,838	1,787
ADM 1789	12/15/81	M 39,190	17	11/18/81	38,793	397	10/16/81	36,661	
CEM 745	09/18/81	M 43,929	6	07/21/80	43,394	535			
CEM 1358	12/11/81	M 27,229	3	10/08/					
CEM 1770	12/18/81	M 24,153	8	10/2					
ENG 1790	12/15/81	M 13,625	14						
ENG 2152	12/01/81	M 3,230	4						
INS 1117	12/18/81	M 37,260							
INS 1364	12/01/81	M 14,4							
INS 2180	11/13/81	M							
LPD 866	12/17/81	M 46							
LPD 1002	12/21/81	M 4							
LPD 1167	12/09/81								
LPD 1188	12/18/8								
LPD 1427	12/18/								
LPD 1731	12/2								
LPD 2142	12/								
MNT 546	12								
P&R 191									
P&R 741									
P&R 742									
P&R 85									
P&R 8									
P&R 1									
P&R									
P&R									
PWD									
PWD									
ST									
S									
S									

Sample Reports

CEMETERY — DE

SUMMARY OF VEHICLE LINE/ITEM LISTING:

25.6	GAL REGULAR FUEL	0 Q
40.6	GAL UNLEADED FUEL	1 QTS
20.0	GAL DIESEL FUEL	0 QTS TRANS
$ 120.00	TOTAL LABOR COST	0 QTS ANTI-F
$ 154.01	TOTAL PARTS COST	0 LBS LUB
$ 104.62	TOTAL FUEL/MISC COST	
378.63	TOTAL COST	

1981 VEHICLE MAINTENANCE

DATE	UNIT		MIL/HR		FUEL		OIL	HYD	TRN	TAU	LUB	LABOR	PARTS	FUEL	TOTAL
11/11/81	P&R	R-2	H 0	R	0.0		2	0	0	0	0	300.00	199.07	1.80	500.87
11/16/81	MNT	546	M 70,860	R	0.0		0	0	0	0	0	15.00	83.50	0.00	98.50
11/25/81	P&R	868	M 29,713	R	0.0		0	0	0	0	0	60.00	38.78	0.00	98.78
11/25/81	STS	S-3	H 1,501	D	0.0		0	0	0	0	0	60.00	7.26	0.00	67.26
11/27/81	P&R	R-3	H 1,860	D	0.0		11	0	0	0	2	330.00	199.01	11.60	540.61
11/27/81	STS	S-8	H 0	R	0.0		0	0	0	0	0	210.00	160.20	0.00	370.20
11/30/81	CEM	C-2	N 0	R	0.0		0	0	0	0	0	75.00	152.22	0.00	227.22
11/30/81	STS	S-22	N 0	R	0.0		0	0	0	0	0	150.00	9.71	0.00	159.71
11/30/81	STS	S-23	N 0	R	0.0		0	0	0	0	0	90.00	0.00	0.00	90.00
12/01/81	CEM	C-5	H 1,935	D	10.0		0	0				0			
/01/81	CEM	1358			15.		6								
81	F														

PER VEHICLE SUMMARY — DECEMBER 1981

DEPT/LIC		GALS FUEL	OIL	HYD	TRN	TAU	LUB	LABOR	PARTS	FUEL & MISC		TOTAL
ADM	1280	66.8	6	0	0	0	0	30.00	6.85	87.56	$	124.41
ADM	1789	21.8	0	0	0	0	0	0.00	0.00	26.81	$	26.81
CEM	1358	25.6	0	1	0	0	0	45.00	1.79	31.36	$	78.15
CEM	1770	40.6	0	0	0	0	0	0.00	0.00	50.20	$	50.20
ENG	1790	30.7	0	0	0	0	0	0.00	0.00	37.76	$	37.76
ENG	2152	7.8	0	0	0	0	0	0.00	0.00	9.59	$	9.59
INS	1117	36.6	0	0	0	0	0		0.00	43.85	$	43.85
INS	1364	11.3	0	0	0						$	13.90
	866	77.2	5								$	174.99
	1002											258.58
	1167											19.93

The final three columns reflect the same information for a major maintenance.

A minor maintenance is performed every 2,000 miles on our vehicles and consists of oil and filter change plus general work. A major maintenance is performed at 10,000 miles and includes a tune-up, packing of wheel bearings and similar work. For city equipment, file three updates basically the same information except in engine hours. A minor maintenance is performed at 100 hours and a major one at 1,000 hours.

At a glance, the maintenance supervisor can see which unit is due for maintenance and those almost due, and can schedule his personnel accordingly. The individual departments send the units to the shop as required and prearranged. Normally, the supervisor receives a printout on Friday in order to schedule the next week's work.

On a monthly schedule, two reports are generated. SUMMARY/BAS takes the line/item file and loads the monthly information into an array for manipulation. The Department Summary report is generated first and lists totals of all the information: gallons of regular fuel used, quarts of oil, etc., plus dollar totals. The second, the Per Vehicle Summary, lists the same information but totaled by unit and is an overall view of what a vehicle or piece of equipment is costing the city.

The Department Summaries are primarily for the Public Works Director, but each department head gets a copy of his department totals. All departments receive a copy of the Per Vehicle Summary for reference and analysis. When done by hand, these two reports took days to generate; now, only two to three hours. The total time needed per month is approximately thirty manhours to accomplish the same job that previously required a full-time position for one person. Don estimates that approximately forty hours per month are saved by his maintenance department since mileage and hours are recorded on the computer. Previously, he had to call the different departments and get a speedometer reading to determine if a service was required.

Three to five times each month, a bulk supplier will deliver fuel to the city. For budget purposes, each department is charged for fuel according to the percentage used in the previous month. If a department uses 10% of all the regular in a given month, 10% of the regular fuel bill is charged against the budget for the next month. Several methods were considered for this computation, but the percentage method works best for our purposes.

Special requests are easily handled. For instance, with minor changes, an average MPG was obtained for a six-month period on all the police vehicles. This figure reflects the vehicle performance more accurately since it takes into account the different drivers,

weather and maintenance performed. A noticeable improvement has been seen in the MPG during the past eight months due to proper and timely maintenance.

When time permits, I am continually making changes that speed up the program or improve it. Currently, subroutines are being added to SUMMARY/BAS so that year-to-date totals are included on the reports. When budget time arrives this spring, each department supervisor will be able to project the year's maintenance and fuel needs much more accurately.

Modifications and Considerations

The advantage of data storage on disk is well known. For the record, on the first 5¼" minidisk filled with data, a total of eight months are stored; 3,195 entries for a total of 165.1K. The equivalent in paper fills a large box in the storeroom.

103 vehicles and pieces of equipment are included in our current data files, but the number could just as easily be 50 or 200. Access time would be speeded up or slowed according to the number. Almost any number of entries per month could be handled with the limit being determined by the preference of the programmer or operator. Prior to having a 48K machine, I managed by "overlapping" two or more sorts in order to move the appropriate data to its proper place in the stack. For a sizeable fleet, 32K is required and 48K is recommended.

The major difference between our Model I and Model III versions is the method of sorting data. In the Model I version, a machine language program called SORT/CMD was used and loaded under DOS. This was accessed by the USR function. On the Model III, this was replaced with a short CMD"O" subroutine.

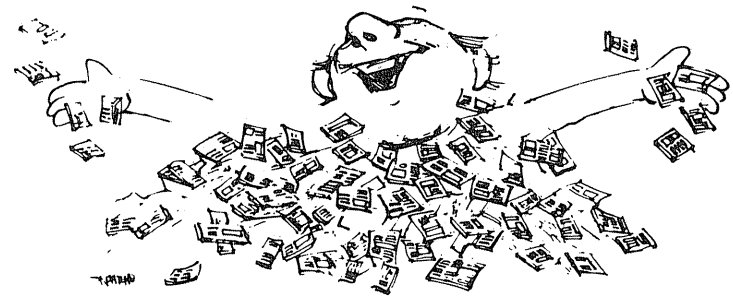
Currently, MAINT/BAS is 10.8K in length and SUMMARY/BAS is 5.3K. For the moment, either can be loaded and run in our 48K with enough RAM available to facilitate current arrays and the number of entries. As the programs grow, or if a smaller RAM machine is used, shorter routines could easily be accessed by a main menu which would leave as much RAM as possible for data manipulation.

When I originally wrote these two programs, they were designed for the City of Lander's specific needs and our particular maintenance program. Since then, I have not seen a similar program advertised or listed anywhere. If anyone has written one, I would like to compare notes. ■

Since the submission of this article, Mr. Clack has enhanced and updated the programs he has described. Readers who desire further information about the programs (Model I or III) should contact Mr. Jeffrey D. Clack, 1974 South Clarkson, Denver, CO 80210. The programs are still being actively used by the City of Lander, Wyoming. —Ed.

In the chips

The numbers game



Models I/III

Spencer Hall, Associate editor

It's amusing how many legends and old wives' tales are told in the computer community. Read one article and you're told with solemn authority that SPOOL stands for Special Peripheral Operation On Line. Another authority is certain that it stands for Simultaneous Printer Output On Line. They both make sense, so who cares? Then, there's that business about the origin of the word "bit."

Most people agree that it has to do with the word binary. I don't. There's a more remantic possibility. With not a shred of evidence to go on, I'm convinced that some great pioneer of electronic data handling named the parts of an eight-bit byte after the parts of a Spanish dollar. Remember the pieces of eight that pirates stole from Spanish galleons and buried all over the shores of North America? These were pie-shaped wedges chopped out of Spanish dollars minted of silver and having eight sides. They were called bits and were, I'm told, a common currency in the American colonies. Two bits out of eight were a quarter of a whole coin. Hence, today's slang word for twenty-five cents. Eight bits used to make a dollar and now they make a byte. You'll have to admit that it's a possibility.

What else they make and what they make possible is the subject of this, and a future column. We've made a big thing of the fact that the hardware inside your computer records nothing but eight-bit bytes. Here's another mind bender. The only thing it can do with these bytes is to add a pair of them. It can move them from place to place, of course, but that's not "computing." We said, also, that everything a computer does it does with switches. Let's look at how it adds with switches.

Our BASIC training program this month is an animated simulation which demonstrates how the computer adds any two bytes you choose. I'll talk you through its use in the following paragraphs. Have this program up as you read and perform the steps I describe. You can learn without doing this, but it will be much less interesting and more quickly forgotten.

The program asks for a first, then a second, byte to be added. To start, please enter 1 first and then 127. The display shows our symbolic representation of the byte standing for 1 at the top with only the rightmost bit "on." At the left is its decimal value and at the right is its binary representation. Directly below it are the same three representations of 127. If you have used our earlier training programs, this is old stuff. The numeric values of each bit are shown across the top exactly as before. Across the bottom, we've added the standard place value of the bits. For those of you who don't have the program, the screen looks like Figure 1.

Figure 1 — Sample Screen Layout

```
      128 64 32 16  8  4  2  1
      --- --- --- --- --- --- --- ---
  1    -   -   -   -   -   -   -   *    00000001

127    -   *   *   *   *   *   *   *    01111111

      --- --- --- --- --- --- --- ---
       7   6   5   4   3   2   1   0
```

Bit Positions

Touch any key and see what happens when the addition process begins. Electric current passes through "on" bit 0 of the 1 byte to the corresponding switch in the 127 byte. This is a flip-flop, meaning that if it is on when it gets a pulse, it turns off, but turns on the adjacent bit. This bit behaves the same way. In our simulation, the bit

symbol travels downward toward its counterpart below which then behaves exactly as described. Since the 127 byte has bits 0 through 6 "on," they immediately turn off in sequence from right to left until bit 7, which was off, gets turned on.

The computer must now connect the other seven bits to see if they affect the total. Since these are all "off," their descent in our animation doesn't change the lower byte. To get things over quickly, touch the A key. The action will proceed automatically until you get the DONE message. The result is a byte with only bit 7 "on." As the numbers at the top indicate, this has a value of 128, which is the sum of 1 and 127.

Now, for some fun, reverse these numbers. Enter 127 first, then the 1. Hit A right away for the automatic mode. Upper bit 0 is "on," when it descends to lower bit 0, which is also on. Lower bit 0 is turned off and bit 1, representing two, is turned on. Now, bit 1 from above, which is also on, does exactly the same thing to the newly-on bit 1 below it. This process is repeated across the byte, until all bits are off except bit 7. It seems that 127+1 is the same as 1+127.

To help you understand what is going on, each time an on bit is added to the lower byte, its decimal and binary interpretations in the display are updated to show its current value. Each component of a byte representing a number is literally "switched" into the byte to which it is being added.

Use this program to watch any two numbers of your own choosing being added together. See how the answer byte is incremented by the value of each "on" bit as it is switched in. Some numbers are extremely dull. Others offer plenty of action. Try 7, 15, 31 and 63 in the first byte. You will see at once why I recommend them. After fifteen or twenty minutes with this program you will understand binary arithmetic and its similarity to decimal arithmetic without any further help from me.

What good is a computer that can only add numbers that total 255 or less? For sums greater than 255, there's going to be an on byte worth 256 left over after the answer byte is written. Where does it go?

Come to think of it, where are the two bytes we have been watching? Are they in any of the 65536 memory locations we have mentioned? Actually, one has to be in the computer's "brain," the CPU or microprocessor we mentioned last time. This brain contains a number of eight-bit registers which hold bytes just as memory does. In the Zilog Z80 (or Z80A), which is the brain of the TRS-80, the second number, which must be increased, will be located in the A register. The first number could be in register B, C, D, E, H, L, N or even out somewhere in memory.

Incidentally, everything you have learned up to now applies to any eight-bit microprocessor, so your time hasn't been wasted even if you're planning to switch to some other type of CPU.

That last bit, with a value of 255, which is generated when our total is more than 255, goes in a special place. It goes in bit number 0 of a CPU register called F. This is a special register whose byte doesn't have a numerical value at all. F stands for Flag. Flags in computing are simply signals which mean something, like the yellow

ribbon in the old oak tree. (Hope you remember that popular song from the Fifties!) In this case, bit zero high in the F register means that the addition just performed resulted in a value which was 255 higher than the value now in the A register. Bit 0 in the F (or flag) register of the Z80 is called the carry flag.

The design of any microprocessor must permit adding bytes in two of its registers, leaving one the same as it was and changing the other into the sum, exactly as you saw it happen in our BASIC simulation. One thing which makes any microprocessor different from another is the number and designation of locations from which (sources) bytes can be added into the "accumulator." In technical terms, you've just learned something about the "one-byte add group" of the Z80 microprocessor.

In our microprocessor, the large numbers represented by pairs of registers can also be added. That is one of the many features which make the Z80 a powerful eight-bit microprocessor. Sixteen-bit microprocessors, such as the Motorola 68000, used in the TRS-80 Model 16, can add thirty-two-bit numbers with similar speed. This, in part, is why their introduction has made such waves in the microcomputer industry.

Let's take a moment now and describe, for the first time, where *In the Chips* is leading you. We've tried to introduce the most fundamental ideas of microcomputing in a relaxed way, avoiding any of the frightening technical terms until the common sense reality behind them was entirely clear. Learning to understand microcomputers and to program them in their various native languages is not just a matter of learning the symbolic language peculiar to one microprocessor. Without the many insights which most "experts" hardly realize they possess, the knowledge of a given microprocessor's instruction set isn't really of much use. Stay with "In the Chips" and you'll acquire a computer sophistication which will make any other writing on the subject seem familiar instead of frightening.

There's much more we could tell you about how a computer uses bytes to perform almost any arithmetic operation on numbers of any size. For instance, the computer subtracts by adding. There's another bit in the flag register which tells whether the byte in the A register is a positive or negative number. You can read about these mysteries in other places. We have more important matters to discuss here, beginning next time. ■

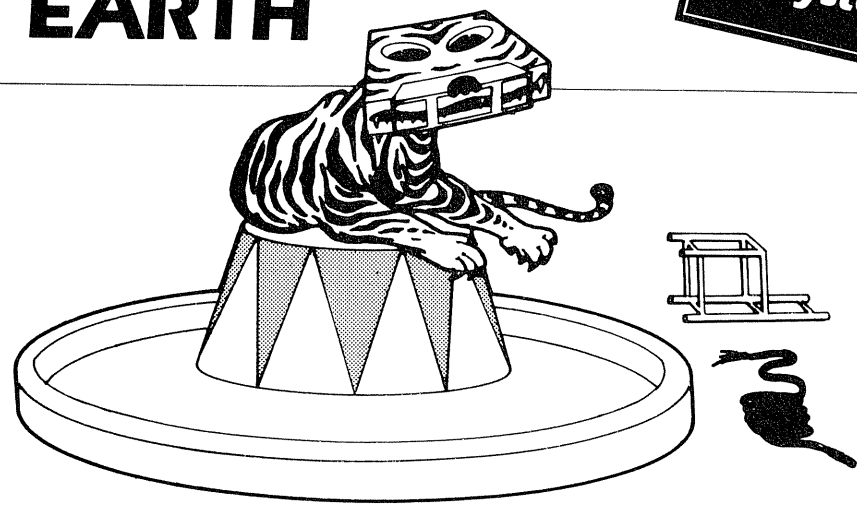
Program Listing — In the Chips

```
3 CLEAR 500:DEFINT A-Z
5 DEFSTR X,Y:X=CHR$(195):Y=CHR$(196)::GO
TO 110
6 FOR Z=1 TO 40:NEXT:RETURN
9 Z$=INKEY$:IF Z$="" THEN 9 ELSE RETURN
10 '-- CONSTRUCT "*" AND 1/0 VERSIONS OF
 BINARY NUMBERS --
15 BI$="":BT$=""
20 T=128
30 A=B/T
```

```
40 IF A<1 THEN BI$=BI$+"-"+Y:BT$=BT$+"0"
:GOTO 60
50 BI$=BI$+"*"+Y:BT$=BT$+"1":B=B-T
60 T=T/2:IF T<1 THEN RETURN ELSE 30
70 G=1:BZ=BZ+DB:B=BZ:GOSUB 15:BZ$=BT$
80 PRINT@768,CHR$(196);:PRINT@768,BZ;:PR
INT@881,BZ$;:RETURN
90 '— BUILD DISPLAY PIECES --
110 V$="128"+X+"64"+X+"32"+X+"16"+X+"8"+
Y+"4"+Y+"2"+Y+"1"
120 BE$=STRING$(3,140)+"  "
130 FOR J=1 TO 8:BR$=BR$+BE$:NEXT
140 IB$="7"+Y+"6"+Y+"5"+Y+"4"+Y+"3"+Y+"2
"+Y+"1"+Y+"0"
150 '— INPUT TWO ADDENDS —
160 CLS:INPUT"FIRST INTEGER";B:B1=B:GOSU
B 15:M1$=BI$:T1$=BT$
165 PRINT@36,;
170 INPUT"SECOND INTEGER";B:B2=B:GOSUB 1
5:M2$=BI$:T2$=BT$
180 B3=B1+B2:IF B3>255 GOTO 160
190 PRINTTAB(9) "ANY KEY ADDS A BIT (A =
 AUTOMATIC)"
200 '-- BUILD DISPLAY --
210 PRINT@263,V$:PRINT@327,BR$
220 PRINT@392,M1$:PRINT@712,M2$:PRINT@77
5,BR$
230 PRINT@384,B1:PRINT@434,T1$;:BZ=B2:BZ
$=T2$:GOSUB 80
240 PRINT@840,IB$;
250 PRINT@980,"BIT POSITIONS";
260 '-- BEGINNING OF ARROWS —
270 KX=9:E=0:AL=15600
280 FOR K=15851 TO 15816 STEP -5
285 G=0
290 POKE AL,32:AL=AL-5:POKE AL,92
300 IF Z$<>"A" GOSUB 9
310 DB=2[E:E=E+1
320 GOSUB 6:KX=KX-1
330 S=PEEK(K-64)
340 FOR I=K TO K+192 STEP 64
350 POKE I,S:GOSUB 6:POKE I,32:NEXT
360 BN=KX
380 IF S=42 AND PEEK(I)=42 THEN POKE I,4
5:IF G=0 THEN GOSUB 70:GOTO 400:ELSE GOT
O 400
390 IF S=42 AND PEEK(I)=45 POKE I,42:IF
G=0 THEN GOSUB 70:NEXT:ELSE NEXT
400 BN=BN-1
405 IFBN<>0 THEN 420 ELSE IF K=15811 THE
N 440 ELSE NEXT
410 GOTO 440
420 GOSUB 6:I=I-5:GOTO 380
430 PRINT@914,CHR$(205)
440 POKE AL,32:PRINT@976,"DONE - ANY KEY
 REPEATS";
450 GOSUB 9:GOTO 160
```

THE GREATEST SOFTWARE DEAL ON EARTH

Radio Shack Color Computer TDP System 100



Tame your computer without breaking your wallet's spirit! Quality programs on tape for the price of peanuts!

A subscription to **Chromasette Magazine** consists of 6 to 8 ready-to-load useful, practical, and fun programs delivered by First Class Mail every month. Programs like Curve Fit, Diggem, Graph Text, List Mod, Robot Run, House Adventure, and Keep Text.

Treat yourself to a great show — get a subscription to **Chromasette Magazine.** Or catch a single act and try a back issue. You'll be delighted by the tricks your computer will do!

The Bottom Line:

1 year (12 issues)	$50.00
6 months (6 issues)	$30.00
Single Copies	$ 6.00

Calif. residents add 6% to single copies. North America — First Class postage included. Overseas — add $10 to subscriptions and $1 to single copies. Sent AO rate.

The Fine Print: All issues from July 1981 available — ask for list. Programs are for the Extended BASIC model and occasionally for disks.

Chromasette Magazine

Chromasette MAGAZINE

P.O. Box 1087 Santa Barbara, CA 93102 (805) 963-1066 MasterCard/Visa

If you have a Radio Shack TRS-80 Model I or III there is Cload Magazine with programs on tape or disk especially tailored for your system.

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

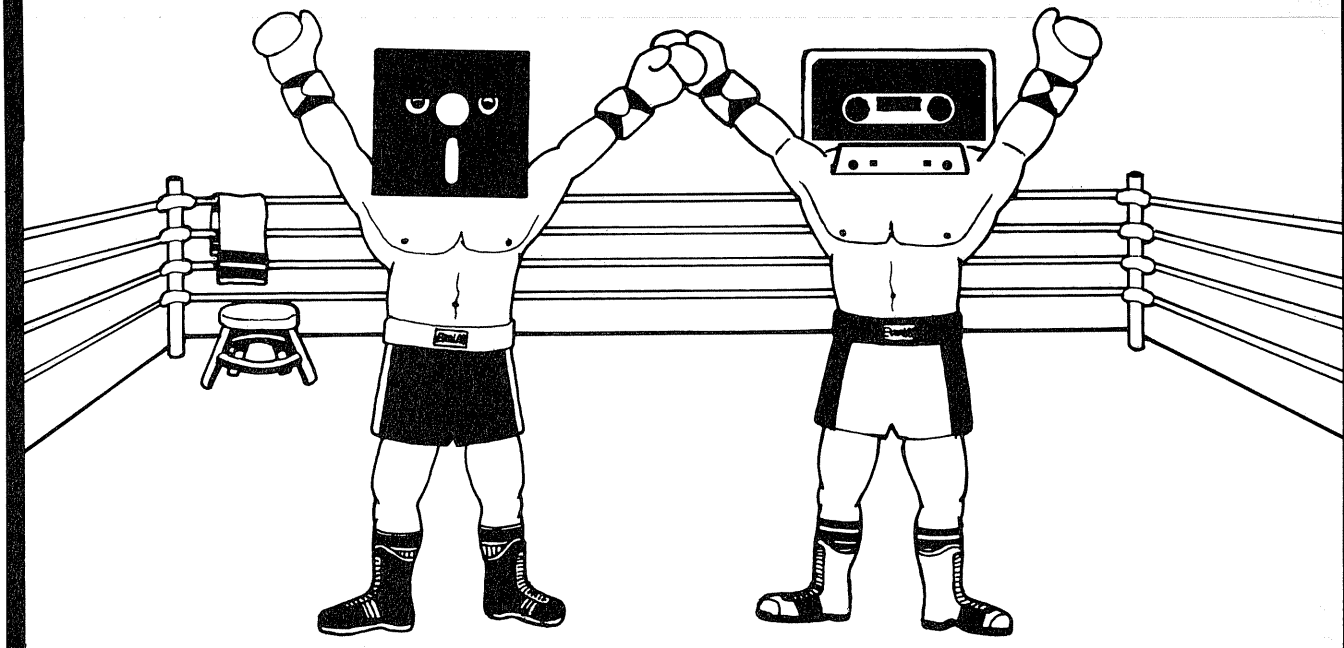
CLOAD MAGAZINE INC.

TRS-80 Model I

And In This Corner, Another Champion.....

TRS-80 Model III

CLOAD'S DISK VERSION!



Get 12 tapes OR disks a year containing over 75 quality programs — without knocking out your budget!

We finally gave in . . . After over FOUR years of publishing some of the best (aren't we pompous), useful and fun programs on tape, we are now offering **CLOAD Magazine on disk,** too!

A subscription to **CLOAD Magazine** (tape or disk) consists of 6 to 8 ready-to-load programs delivered by First Class Mail every month. What a winner!

Fight high software prices — Get a subscription to **CLOAD Magazine.** Or just throw a single punch and try a back issue . . .

The Bottom Line:

	Tape	Disk
1 year (12 issues)	$50.00	$95.00
6 months (6 issues)	$30.00	$55.00
Single Copies		
Back Issues	$ 6.00	$11.00
Good Games #1	$12.00	$23.00
Adventures #1	$13.00	$24.00

California residents add 6% to single copies
North America — First Class postage included
Overseas — add $10 to subscriptions and $1 to single copies Sent AO rate

CLOAD MAGAZINE INC.

(805) 962-6271

P.O. Box 1448
Santa Barbara, CA
93102

MasterCard/Visa

The Fine Print:
All issues from Oct 78 available on tape Issues from Oct 82 available on disk, also Ask for list (24 Level I issues also available).

Basically BASIC

Using relational logic operators

For all models

BASIC has six relational operators: < (less than), > (greater than), = (equal to), <= (less than, or equal to), >= (greater than, or equal to), < > (not equal to). These relational operators are used to test whether expressions are true or false. On the TRS-80, an expression using a relational operator will return -1 if the expression is true and 0 if it is false. A few examples:

PRINT 1>2. This returns 0. The expression is false; 1 is not greater than 2.

A = 1>2: PRINT A. This also returns a zero. Here, we have assigned the false (0) result of the logical expression 1>2 to variable A. Printing A gives us 0.

PRINT 2<7. This returns -1. Since 2 is less than 7, this expression is true and the result shows as -1.

PRINT 3=3. The expression is true and we get -1.

Now try A=3=3. Although it looks strange, the expression 3=3 is true and when we PRINT A (the variable to which the result has been assigned), we get the true sign, -1.

Logical Operators

In addition to the relational operators, BASIC has three logical operators; AND, OR, and NOT. These logical operators allow us to test whether multiple relationships are true or false.

The logical operator AND returns -1 (true) if all of the relationships compared with AND are true. For example:

PRINT 1=1 AND 2<3. Both are true and -1 is printed.

PRINT 1=1 AND 2<3 AND 4< >4. Since 4< >4 is false, the result of the entire expression is false and 0 is printed.

OR returns -1 (true) if any of the relationships are true. As an example: PRINT 1=1 OR 1< >1. The result here is true (-1) because the first relationship (1=1) is true.

The logical operator NOT seems to confuse a lot of people. They are more used to convoluted logic than computer logic. Computers are quite simple-minded. They don't recognize "gray areas" of truth. If an expression is not totally true, it is false. Try it. PRINT NOT -1. You get 0. Now PRINT NOT 0. You get -1. So, we see that NOT true (NOT -1) is false (0) and NOT false (NOT 0) is true.

Experiment with logical and relational operators until you have a good understanding of how they work. Note that we haven't used IF...THEN statements. This true-false logic is the logic of IF . . . THEN statements. We can't use IF . . . THEN statements in user-defined functions, but we can, and will, use the logic.

Putting True-False Logic Into User-defined Functions

Suppose we are writing a program for a seller of widgets. They have a system of discounts based upon the number of widgets ordered (we'll call this W). An order of one to four gets no discounts; five to nine gets discount number 1; ten to nineteen gets discount number 2 and twenty or more gets discount number 3.

We could program this using a series of IF . . . THEN statements:

```
IF W<5 THEN D=0
IF W>4 AND W<10 THEN D=1
IF W>9 AND W<20 THEN D=2
IF W>19 THEN D=3
```

We could also pack all of this IF . . . THEN logic into one line: D = -((W>4) + (W>9) + (W>19)).

Let's analyze this to see how it works. First, we test to see if the order (W) qualifies for discount number 1 (W>4). If this test is true, we get -1. If false, we get 0. Then we test whether it is also large enough to get discount number 2 (W>9) and get another -1 if true. Again, we test if it is also large enough to get discount number 3 (W>19) and again the test returns -1 if true and 0 if false. Now, we add the results of all of the tests. We get 0 if all are false (W is not greater than 4), -1 if W is greater than 4 but not greater than 9, -2 if two are true (W is greater than both 4 and 9 but not greater than 19), and -3 if all three tests are true. To get a positive number, we multiply the result by -1. Eureka. We have stuffed four lines of IF . . . THEN logic into a single line!

Now we can write a function: DEFFN D (W) = -((W>4) + (W>9) + (W>19)). Let's say the program uses the variable N for the number of widgets ordered. To call our function, we ask for FN D(N) (function D of N) and it returns the discount number.

Let's get a little fancier with our logic manipulation. Suppose the sales manager decides not to give a discount for orders of fifty or more. (Don't ask me why. I'm not the sales manager.) How do we include this in our function?

We start by setting a top limit which, when reached, will return 0. W<50 will do this. (So will more complex tests, such as NOT (W>49) or W <=49.) This gives us a test that is true (returns -1) if W is less than fifty and is false (returns 0) if W is fifty or more.

We multiply this test by -1 (-(W>50)) to make the result positive. Then, we multiply the previous equation by this. What does this do? Multiplying by 1 (meaning W is less than 50) gives us the same result we had before. Multiplying by 0 (meaning W is not less than 50) makes the result 0.

Now we can include this in our function definition: DEFFN D (W) = -(W>4) + (W>9) + (W>19)) * -(W<50). We have a fancy little one-liner to call whenever we have to determine which discount to use.

You can perform all kinds of amazing tricks with functions by manipulating the -1's and 0's of true-false logic. All it takes is a little imagination and an understanding that true is not false and false is not true.

User-defined Functions without DEF FN

You say you don't have disk BASIC yet? You say you have a Color Computer whose Extended BASIC allows only numeric user-defined functions, and then only single-variable arguments? Tell ya what I'm gonna do: I'm going to show you how to create user-defined functions (almost) without the DEFFN statement. Read on, MacDuff.

Remember that a user-defined function is nothing more than a one-line subroutine. To calculate the result, the definition expression uses variables passed to it through the argument. The result is returned to the calling function in a form similar to (and which can be used as) a variable. The result is always a single variable.

So, why can't we write a one-line subroutine as an assignment statement which will calculate the result and assign it to a variable? We call the subroutine as we would call the defined function (DEFFN NA) and use the variable returned as we would use the function (FN NA).

There are two differences from the DEF FN statement: 1) Before calling the subroutine, we must assign the information it is to process (the argument variables of a function) to the same variables the subroutine expression uses. 2) The result will be returned as a variable.

Here's how to do it: First, write the subroutine. 1) Write the logic for the subroutine's expression (this will be the same as the logic for the definition expression in a DEF FN statement). 2) Assign it to a variable. 3) Add a RETURN statement. 4) It's a good idea to add a REM statement noting which variables must be padded to the subroutine.

Then, write the call: 1) Assign values to the variables to be passed to the subroutine. 2) GOSUB. 3) Use the variable to which the result has been assigned to process the information returned.

A Numeric Input Check

We'll write a function and subroutine which checks numeric input as an example. I use this routine in my programs more than any other. First, a standard input-checking routine which doesn't use either a function or a subroutine:

```
200 INPUT "ENTER A NUMBER BETWEEN 2 AND 5" ; R1
210 IF R1 < 2 or R1 > 5 THEN PRINT "BAD INPUT" : GOTO 200
220 . . . program continues . . .
```

Here's the same routine with a user-defined function:

```
10 DEFFN RF(R,LO,HI) = R<LO OR R>HI
20 M1$ = "BAD INPUT"
200 INPUT "ENTER A NUMBER BETWEEN 2 AND 5" ; R1
210 IF FN (R1,2,5) THEN PRINT M1$ : GOTO 200
220 . . . program continues . . .
```

Now, here it is using a subroutine. Note that the subroutine is written in an early program line. The program operates faster this way.

```
20 M1$ = "BAD INPUT"
40 GOTO 200 (jump over the subroutine(s) to the start of the program)
50 REM NUMERIC INPUT CHECK SUB - R1=USER RESPONSE, RF=BAD INPUT FLAG
52 RF = R1<LO OR R1>HI : RETURN
200 INPUT "ENTER A NUMBER BETWEEN 2 AND 5" ; R1
205 LO=2 : HI=5 : GOSUB 52
210 IF RF THEN PRINT M1$ : GOTO 200
220 . . . program continues . . .
```

I've intentionally not explained why line 210 doesn't use the form IF RF < or FN(R1,2,5)> = (something) THEN . . . By now, you should be able to figure it out.

These routines may look more complicated than the simple example. They are if you have only one item of input to check. If you have a program with several input routines, the function (if you have it) or the subroutine (if you don't) will save both programming and execution time. That's BASIC. ■

Tandy topics

CP/M 3.0 and TRS-XENIX — New operating system options

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

I've just returned from the CP/M'83 show in San Francisco. If Digital does that again, San Francisco is going to have to expand Moscone Center. Wow! What a crowd. There were a good number of exhibits, but the crowd was "somethin' else." Having the best part of double pneumonia, I walked the show Friday morning, mostly before it was open to the public, and left. On the way out, I couldn't shove my way through a few of the aisles. People were shoulder to shoulder. Yet, I'm told the crowd didn't get there until Saturday. Good show, guys.

CP/M 3.0 for Models II and 12

Radio Shack's presence at a CP/M Show apparently surprised a lot of people. Of course, it was prompted by our introduction of "CP/M Plus" (version 3.0) for the Models II and 12. Ours will be the first version 3.0 available on any computer. In case you were there and got a show brochure, the price was wrong. The brochure said $299 and it should have been $249. CBASIC is also available at $99.

Multi-user is a Reality

In addition, we had our first public showing of three other new products at CP/M'83. Finally, TRS-XENIX is real, and available, for multi-user operation on Model 16 or converted Model II or 12. I think those of you who have had any exposure to a UNIX system (yes, it's a true Bell-licensed UNIX, implemented by Microsoft) will be pleasantly surprised at the ease of operation of our version.

For example, installing a new user isn't a matter of typing two lines of hieroglyphics with the aid of five manuals spread open in front of the system operator. You're prompted for the operator name, then asked to type a password, type the password a second time, then press BREAK to abort. If you don't abort, you have a new user! It's that simple.

Want to install a Radio Shack application package? It's a simple two-option menu. 1) Install an application, or 2) Quit. Choose 1, and you're prompted to insert the disk. Next thing you see is "installation complete" and the two options again.

Don't let me lead you astray. TRS-XENIX is just as powerful as you've heard. As Datsun likes to say, "It's awesome!" (Uh . . . I trust that's not trademarked.) It's without question, the most powerful operating system available today for a micro-computer. The speed and power are there, and for most applications it's fairly simple to use. For the UNIX pro, you can go beyond the shells and use all of the capabilities you're used to. I hadn't gotten very close to the project, and my first look at the draft of the manual was on the airplane to San Francisco. My honest impression is that the TRS-XENIX "Core" (think of it as a runtime system) offers more features if you want/need them than does TRSDOS, but really isn't any more difficult to run. In fact, I'm sure some of you may consider it easier.

Note that I mentioned another key word: "Core." *The Core system is what you get free with every Model 16 and 16 upgrade for your Model II or 12.* No language is included, so you can't use it to develop software. The full development system is available separately for $750. The Core consists of about 55 modules, where the development system is closer to 250 modules, and includes the "C" Language, Unix Visual Editor, Electronic Mail, Spelling Checker, and other utilities. It's for the programmers, while the Core is all you need to run multi-user applications.

Our RUNCOBOL is a part of the Core system, so virtually any Model

16 COBOL programs will run. However, there is no provision in our single-user Model 16 programs for keeping one user out of a file while another is updating it. (The common name for such an occurrence is "disaster.") Multi-user versions of the Model 16 (68000 processor) single-user software will be free to current owners. A word of caution: Don't install any multi-user versions until you have multi-user versions of everything you're running. You'll have to dedicate your hard disk to TRS-XENIX, so you can't run your old hard disk software under TRSDOS at the same time, except from floppy.

There are a couple more things you might want to know about TRS-XENIX. There will eventually be a floppy version, although you can expect it to have reduced capabilities. The current version is hard disk only. Next, as you know, we've advertised multi-user as working in 256K RAM. Many applications will run fine, with three users and 256K. As far as we know now, 256K is always okay with two users. But, there are some cases, such as three users all running our more complex accounting packages, where 384K will be required. TRS-XENIX dynamically allocates memory, so even then, users will probably see a marked improvement in performance if they go to 512K.

Where does this leave the Model II owner who upgraded? (We've said they could go only to 256K.) Well, that limitation was due to the capabilities of the Model II power supply, and it will no longer apply. Any owner of a converted Model II who upgrades with us to 512K, will have his power supply changed at no charge to him.

What Else Is Coming for TRS-XENIX?

Common question, so here's a partial answer. A new BASIC interpreter, upward-compatible with current BASIC, but containing some multi-user commands and able to use the expanded memory; COBOL compiler with multi-user commands; and Microsoft's Multi-Plan should be available around the time you're reading this. Later, look for FORTRAN, Pascal, a word processor, and a screamer of a data base manager.

New DMP-2100 Printer

Sorry, I got a little carried away. I was going to tell you about the other new products we had at the show. Obviously, the Model 12 was shown, but I told you all about that last month and I'm running out of space. So, quickly, number three was the DMP-2100 printer, which you'll have to see to believe! Like our other printers, it has three modes: data processing, word processing, and graphics. Unlike our others, the word processing mode offers letter-quality printing! It uses a 24-wire print head (nine is more common), and can print 32,4000 dots per square inch. The word processing mode produces fully-formed, letter-quality characters, with a single pass, at 100 characters per second.

Data processing speed is 160 cps, or 60 lines per minute at 132 characters per line. Boldface and underline are supported as well as a variety of print styles in standard, condensed and expanded versions. Dot matrix sizes are 18 x 24 for standard, 36 x 24 for hi-res monospaced, and n x 24 for proportional-spaced characters. Accessories include tractor feed and a sheet feeder.

On to a different subject. Apparently, not many software authors out there know it, but our Tandy duplication plant, who does our cassette duplication, also does some tape production for companies other than Tandy. If you want to have some software produced on tape, call them. Contact Ray Schwengler, General Manager, at 401 NE 38th Street, Fort Worth, TX 76106. Reproducing tapes (especially in Model I format) isn't that easy, and these guys have it down pat.

If our new products sound good, you need a copy of our new RSC-9 computer catalog. It's at your local Radio Shack now. I am out of time and space, so see you next month. Have I got some excitement in store for you then! ■

Files and foibles

Compacting file information

Models I/II/III

Terry R. Dettmann, Associate editor

A major problem in storing information on files is being able to store as much as possible and not run out of space. As a general rule, I generally advocate the KISS algorithm (Keep It Simple Stupid!). Applied to data files, this means don't be too fancy.

However, every now and then you have to live within some special limitations and still accomplish miracles. Then the simple approach isn't enough and it is time to do something else.

A good example of what I'm talking about is storing a date. For most files, where the available record space is large enough, or the file itself will be small enough, I generally store the date in whatever form it is given. At most, I'll transform it to some form desired for output.

If we are keeping the date in the form MM/DD/YY, I'll even leave in the slashes. This requires eight character spaces on a file. But what if you don't have eight? What if only six are available?

The simple answer is to eliminate the slashes and store the date. However, we introduce a new complexity. We have to keep six characters filled no matter what or we don't know what we have. For example, it we just store 11183 for a date, is that 1/11/83 or 11/1/83? With the slashes there's no problem, but without them, we have to pad with spaces or zeros to make everything come out right (011183 or 110183). This means that we'll have to have an input routine that can keep things straight.

As with everything else, there's no free lunch. To get more compact storage, we need to either do more programming or burden the user with more requirements to remember.

What if we don't even have six character positions but we still have to store the date? What is the smallest number of character positions we can use? Two bytes! We have to pack the data tightly, but it can be done.

Listing 2 inputs a date string, breaks it down to month, day and year, and then packs them into two bytes as shown in Figure 1. It displays the two-byte string and its equivalent integer. Then it unpacks the date to show that it gets back the same thing you asked it to pack.

The technique here is to decide first how many bits are needed to represent a given number. Months go from one to twelve, so four bits can hold any legal month number. Days go from one to thirty-one so we need five bits for them. Finally, a year can go from zero to ninety-nine and seven bits are needed for that. Our total is sixteen bits (two bytes).

To pack the numbers, we first form the values that will eventually be in each byte as regular integers, then we convert them to characters and make a character string out of it. This simple technique will work as written on any of the TRS-80 computers and can be useful for getting date information into and out of random access files.

Another packing technique involves space compression. In many applications, we generate many blank spaces which can't be eliminated but which just waste space. For example, in many program listings you find that the author has used blank spaces to indent his lines. Keeping the blanks makes the program more intelligible, but wastes space.

If we assume that there are no graphics characters to be saved, there is an easy way to compress the text material, keep the spaces, and cut any string of them down to just one byte.

To do this, we note that all the ASCII printable characters have numbers less than 128. To compact a line of spaces, we could simply count the number of spaces in a portion of the line and replace that portion with a single ASCII character which is 128 or more.

We simply assign the ASCII character values above 127 for our own use. Let's say that 128 means one blank

space, 129 means two, and so on. Then, in scanning a line, if we find ten spaces, we replace them by CHR$(137) (137-127=10 blank spaces). When we want to return to normal, we simply scan the line for all characters with an ASCII value above 127 and replace them by the corresponding number of spaces. Listing 1 illustrates this blank packing technique.

Space compression techniques generally arise from need. They always involve a tradeoff somewhere, usually in increased processing. However, it can be a useful tradeoff. ■

Listing 1 — Files and Foibles

```
10 REM**********************************
**********************
20 REM
30 REM          DEMONSTRATION OF LINE PA
CKING
40 REM          BY TERRY R. DETTMANN
50 REM
60 REM          PACKLINE/BAS
70 REM          VERSION 0.0  12/82
80 REM
90 REM**********************************
**********************
100 CLEAR1000
200 REM - - - - - - - - PACK A LINE - - -
- - - - - - - - - -
210 CLS:PRINT"PACK LINE EXPERIMENT":PRIN
T:PRINT
220 LINEINPUT"LINE------>";LN$
230 GOSUB500
240 PRINT"PACKED---->";LN$
250 GOSUB600
260 PRINT"UNPACKED->";LN$
270 PRINT:GOTO220
500 REM - - - - - - PACK THE LINE - - -
- - - - - - - - - -
510 L=INSTR(LN$," "):IF L=0 THEN RETURN
520 N=1
530 FORI=L+1TOLEN(LN$):IF MID$(LN$,I,1)<
>" " THEN 550
540 N=N+1:NEXTI
550 LN$=MID$(LN$,1,L-1)+CHR$(127+N)+MID$
(LN$,L+N)
560 GOTO500
600 REM - - - - - - UNPACK THE LINE - -
- - - - - - - - - -
610 I=1
620 IF I>LEN(LN$) THEN RETURN
630    IF ASC(MID$(LN$,I,1))<=127 THEN I
=I+1:GOTO620
640       N=ASC(MID$(LN$,I,1))-127
650       LN$=MID$(LN$,1,I-1)+STRING$(N,
" ")+MID$(LN$,I+1)
660       I=I+N:GOTO620
```

Listing 2 — Files and Foibles

```
10 REM**********************************
20 REM
30 REM          DEMONSTRATE DATE PACKING

40 REM          TERRY R. DETTMANN
50 REM
60 REM          PACKDATE/BAS
70 REM          VERSION 0.0 12/82
80 REM
90 REM**********************************
**********
100 CLEAR1000
200 REM - - - - - - - - PACK DATE - - -
- - - - - - - -
210 CLS:PRINT"PACK DATE EXPERIMENT":PRIN
T:PRINT
220 LINEINPUT"DATE IN FORM MM/DD/YY: ";D
$
230 GOSUB500:IF EF=1 THEN 220
240 PRINT"PACKED:   "; D1$,CVI(D1$)
250 GOSUB600
260 PRINT"UNPACKED: "; D2$:PRINT
270 GOTO220
500 REM - - - - - - - - PACK THE DATE -
- - - - - - - -
510 EF=0:GOSUB700
520 IF MO%<1 OR MO%>12 THEN PRINT"MONTH
ERROR":EF=1:RETURN
530 IF DY%<1 OR DY%>31 THEN PRINT"DAY ER
ROR":EF=1:RETURN
540 IF YR%<0 OR YR%>99 THEN PRINT"YEAR E
RROR":EF=1:RETURN
550 B1%=MO%*16+INT(DY%/2)
560 B2%=(DY%-INT(DY%/2)*2)*128+YR%
570 D1$=CHR$(B1%)+CHR$(B2%)
580 RETURN
600 REM - - - - - - - UNPACK THE DATE -
- - - - - - - -
610 B1%=ASC(MID$(D1$,1,1)):B2%=ASC(MID$(
D1$,2,1))
620 MO%=INT(B1%/16):DY%=(B1%-INT(B1%/16)
*16)*2 + INT(B2%/128)
630 YR%=B2%-INT(B2%/128)*128
640 M$=RIGHT$("00"+MID$(STR$(MO%),2),2)
650 D$=RIGHT$("00"+MID$(STR$(DY%),2),2)
660 Y$=RIGHT$("00"+MID$(STR$(YR%),2),2)
670 D2$=M$+"/"+D$+"/"+Y$
680 RETURN
700 REM - - - - - - - - EXTRACT MONTH DA
Y AND YEAR - - - -
710 MO%=VAL(D$):L1=INSTR(D$,"/"):L2=INST
R(L1+1,D$,"/")
720 DY%=VAL(MID$(D$,L1+1))
730 YR%=VAL(MID$(D$,L2+1))
740 RETURN
```

lower your UPPERCASE

Converting your software

Models I/III

Ken Hipple, Brandon, MS

As more people buy Model IIIs and more Model I owners install lowercase drivers in their machines, there is a small, but annoying, problem that will bother them. Most programs available have all of their messages, prompts and questions in all uppercase letters. When your machine can handle lowercase as well, this can be slightly upsetting.

You can correct this by editing the program, but this can be time consuming. An easier, quicker way is to use this program. It is designed to examine a BASIC program in memory and convert any string that it finds to a mixture of upper- and lowercase letters based on a given set of guidelines.

One problem with a program like this is that it can be difficult to determine exactly which letters should be capitalized. It depends not only on rules of English but, in some cases, on individual preference. When I wrote this program, I decided that in certain cases I would not lowercase a letter. These cases are as follows:

1. The first letter of a string.
2. The first letter after any of the following characters: period, exclamation, question, dash (or minus), parentheses, and slash.
3. The first letter following a group of more than one space.
4. Single character strings (example: "Y").
5. A single word between two apostrophe marks (i.e., 'ENTER').

These were arbitrary decisions based on what I felt would best suit my needs. Since this was bound to lead to letters being lowercased that I wanted to remain uppercase, I also included an edit routine so that changes could easily be made.

The first program I wrote to achieve the above objectives was totally in BASIC and had what I felt were several large disadvantages. It required that the target program be saved as an ASCII file and that a second ASCII file be used to save the results. The program was slow since it did a read from disk for each line of the target program. Finally, it required Disk BASIC.

I did not know how to overcome these problems until I ran across an article describing how BASIC programs are stored in memory. Briefly, each line of BASIC starts with a four-byte header and is terminated with a single byte that contains a zero. The first two bytes of the header are, respectively, the LSB (least significant byte) and MSB (most significant byte) of the first memory location of the next line of the program. After the last line of the program, these are both zero. The last two bytes of the header are the LSB and MSB of the line number. The LSB of the beginning of the BASIC program is in location 16548 and the MSB is in 16549.

In all of the above cases, to find the actual number represented by the LSB and the MSB, the formula is X= LSB + MSB * 256. With this knowledge, it was a simple matter to rewrite my lowercase program to operate on a program in memory. At the same time, I made my first attempts at Z-80 assembly language and the lowercase routine in this program is the result of those attempts.

The program is easy to use, especially if you have a disk. If your machine is not 48K, the first thing to do is to make the changes shown in Figure 1. After this is done, save the program on tape, or to disk, as an ASCII file.

Now, if you are using disks, any time you wish to use the program, all that you must do is MERGE it onto your target program. The line numbers of the lowercase program are all 65000 or greater. If the target program has line numbers in this range, then one of the programs will

have to be renumbered or the problem lines of the target program deleted. After the merge is done, enter RUN 65000 and the program will tell you what to do. If you are using tape, the merge process is a little more difficult.

To accomplish the merge using tape, follow these steps:

1. CLOAD the target program and check to make sure that the line numbers of the program to be merged are all larger than those of the program in memory. Do a PRINT PEEK (16548), PEEK (16549). Write down the results.
2. Do a PRINT PEEK (16633) and write down the result.
3. If the above result was zero or 1, go to step 4. Otherwise, do the following: POKE 16548, PEEK (16633)-2 POKE 16549, PEEK (16634) go to step 5.
4. Do the following: POKE 16548, PEEK (16633) + 254 POKE 16549, PEEK (16634)-1.
5. CLOAD the program to be merged, then POKE the original values of 16548 and 16549 back into those locations.

The two programs should now be merged so you are ready to begin by typing RUN 65000.

Instructions on how to use the edit routine are included in the program. For those of you who do not care to use the edit routine, or if you need the memory taken up by it, the machine language routine by itself will lowercase the entire target program.

To do this, you must first set the memory size to the value indicated in the first REM statement of the BASIC program (line 65005). Next, POKE in the routine using the DATA statements on lines 65400 to 65515 and the FOR . . . NEXT loop on line 65135 with the value of MM set as shown in line 65030. Set the USR entry point to one of the locations given in the second REM statement of the program (line 65015). With this done, load the target program and execute the following statement: X= USR (PEEK(16548) + PEEK(16549) * 256). When READY appears, your program has been lowercased.

This version of my lowercase program overcomes all of the disadvantages that the first one had. There is no need for saving the target program as an ASCII file and a second file is not needed. It can be used on both tape- and disk-based machines. It is fast. When edit is not used, a typical 16K program will be lowercased in under five seconds. Using edit, the speed is dependent on the user.

Two words of caution. First, watch for string comparisons that have been lowercased. The reason for this is, for example, that "Yes" and "YES" are not equal. Second, in programs with string or line packing, the lowercase routine may be fooled into changing a value that is not part of a string. This can happen if one of the values in the packed machine language routine is 34, which is the ASCII value for a quote mark.

If your target program does not run correctly after being lowercased, one of the above problems has occurred. The first case is easily fixed by changing the comparison value back to all uppercase letters. The second case can be a little more difficult. You may be able to use edit to correct the mistake. If not, the easiest solution is to delete the offending lines, lowercase the

resulting program, save this as an ASCII file, load the original program, and merge the above ASCII file with it.

I hope you will find this utility useful. If you are like me, having lowercase available and not being used can be annoying. This program provides a quick, easy way to get rid of that annoyment. If you have any improvements or suggestions, I'd like to hear of them. ■

Figure 1
Changes needed to run on machines other than 48K

1. Change line 65000 as indicated in line 65005
2. Change line 65010 as indicated in line 65015
3. Change line 65025 as indicated in line 65030

4. Change each item underlined to 191 for a 32K machine and 127 for a 16K machine:

```
65230 POKE MM+214,42: POKE MM+215,236: POKE MM+216,255:
      POKE MM+217,195: POKE MM+218,154: POKE MM+219,10

65400 DATA 205,127, 10, 62,  0, 50,236,255, 35,126
65405 DATA 254,  0,202,214,255,254, 34, 32,245, 62
65410 DATA   1, 50,235,255, 35,126,254, 34, 40,234
65415 DATA 254,  0,202,214,255,254, 65, 56, 27,254
65420 DATA  91, 48, 23, 58,235,255,254,  1, 32,  7
65425 DATA  62,  0, 50,235,255, 24,223,126,198, 32
65430 DATA 119, 50,236,255, 24,214,254, 32, 32, 61
65435 DATA  35,126,254,  0,202,214,255,254, 34, 40
65440 DATA 183,254, 32, 32, 17, 62,  1, 50,235,255
65445 DATA  35,126,254,  0, 40,118,254, 32, 40,246
65450 DATA  24,180, 35,126,254,  0, 40,106,254, 32
65455 DATA  40, 11,254, 65, 56,166,254, 91, 48,162
65460 DATA  43, 24,158, 43,126,254, 65, 32,151, 24
65465 DATA 168,254, 33, 40, 24,254, 40, 40, 20,254
65470 DATA  41, 40, 16,254, 45, 40, 12,254, 46, 40
65475 DATA   8,254, 47, 40,  4,254, 63, 32,  8, 62
65480 DATA   1, 50,235,255,195, 24,255,254, 39,194
65485 DATA  24,255, 34,238,255, 35,126,254, 34, 32
65490 DATA   6, 42,238,255,195, 24,255,254, 32, 32
65495 DATA   6, 42,238,255,195, 24,255,254,  0, 32
65500 DATA   6, 42,238,255,195, 24,255,254,  0, 32
65505 DATA 220,195, 24,255, 35,126,254,  0, 40,  6
65510 DATA  35, 35, 35,195,  8,255, 35,126,254,  0
65515 DATA 202,154, 10, 24,242,  0,  0,  0,  0,  0
```

BASIC Listing for Lowercase

```
65000 POKE 16561,254: POKE 16562,254: CL
EAR 50
65005 REM THE ABOVE LINE AUTO. SETS THE
MEMORY SIZE.
   MEM. SIZE FOR 48K=65278: POKE 16561,2
54: POKE 16562,254                  FOR
 32K=48894: POKE 16561,254: POKE 16562,1
90                        FOR 16K=32510: POKE
 16561,254: POKE 16562,126
65010 IF PEEK(16396)=195 THEN DEFUSR=(&H
FF00) ELSE IF PEEK(16396)=93 THEN POKE 1
6526,0: POKE 16527,255 ELSE PRINT "REPLA
CE THIS LINE WITH ONE THAT WILL SET THE
USR ENTRY POINT     CORRECTLY FOR YOUR MA
CHINE.": STOP
65015 REM THE ABOVE LINE SETS THE USR EN
TRY POINT USING DEFUSR OR POKES DEPENDIN
G ON WHETHER THE SYSTEM IS TAPE OR DISK
BASED.
48K - DEFUSR=&HFF00 OR POKE 16527,255
32K - DEFUSR=&HBF00 OR POKE 16527,191
16K - DEFUSR=&H7F00 OR POKE 16527,127
65020 DEFINT A-M,O-Z: V=0: VD=14404: VE=
14462: NN=0: NP=0: NI=0: I=0: CN=0
65025 MM=-256
65030 REM CHANGE MM TO AGREE WITH THE VA
LUE LISTED FOR YOUR
        MEMORY SIZE:        48K    MM= -25
6
                            32K    MM= -16
640
                            16K    MM= 325
12
65035 ON ERROR GOTO 65385
65040 GOTO 65055
65045 PRINT CHR$(14): PRINT "Press any k
ey to continue.";: D$=INKEY$
65050 IF INKEY$="" THEN 65050 ELSE PRINT
 CHR$(15): RETURN
65055 N=PEEK(16548)+PEEK(16549)*256
65060 CLS: PRINT "This program will conv
ert upper-case letters to lower-case"
65065 PRINT "based on the following guid
elines.  All letters will be made"
65070 PRINT "lower-case except the first
 letter after any of the following"
65075 PRINT "symbols: '";CHR$(34);"', '!
', '.', '(', ')', '/', '-', '?'.  Any le
tter"
65080 PRINT "which follows a group of tw
o or more spaces will remain upper-"
65085 PRINT "case.  Also, a set of lette
rs between two ' marks will stay"
65090 PRINT "upper-case provided no spac
es appear between the marks."
65095 REM       ROUTINE TO READ THROUGH D
ATA STATEMENTS UNTIL ONLY THOSE FOR THE
LOWER-CASER PROG. ARE LEFT
65100 READ D$: IF D$<>"START UPLOW DATA
NOW" THEN 65100
65105 GOSUB 65045
65110 CLS: PRINT "To use this program it
 must first have been saved as an ASCII"
65115 PRINT "file.  The program to be lo
wer-cased is loaded into memory"
65120 PRINT "and this program is merged
to it.  The target program must not"
65125 PRINT "have any line numbers large
r than 64999.  After the merge is
done enter RUN 65000 to run this program
.  When you are done
this program will automatically delete i
tself so that the targetprogram will be
ready to be saved."
65130 REM       ROUTINE TO POKE MACHINE L
ANGAUGE ROUTINE INTO MEMORY
65135 DT=0: FOR I=MM TO MM+239: READ D:
POKE I,D: DT=DT+D: NEXT
```

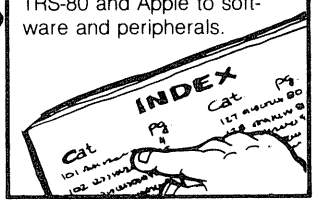
```
65140 IF DT<>28002 AND DT<>26658 AND DT<
>25314 THEN PRINT "ERROR IN DATA STATEME
NTS.  CHECK VALUES.": STOP
65145 GOSUB 65045
65150 CLS: PRINT "You may run this progr
am in one of 2 modes: Automatic or Edit.
"
65155 PRINT "In automatic the program op
erates on the whole target program"
65160 PRINT "without any user interventi
on.  In Edit the program makes its"
65165 PRINT "changes and then gives you
the opportunity to make any changes"
65170 PRINT "you wish."
65175 PRINT CHR$(14): PRINT "Which mode
do you want: (A)utomatic or (E)dit? ";
65180 D$=INKEY$: IF D$="" THEN 65180 ELS
E PRINT CHR$(15);
65185 IF D$="A" THEN 65360 ELSE IF D$<>"
E" THEN 65175
65190 REM       EDIT ROUTINE INSTRUCTIONS
65195 CLS: PRINT "The following are the
commands used in Edit:
   LEFT ARROW- moves cursor back one spa
ce
   RIGHT ARROW- moves the cursor forward
 one space
   UP ARROW- starts editting over at beg
inning of target prog."
65200 PRINT "   T- toggles a char. betwe
en upper & lower case and moves
      the cursor forward one space
   'ENTER'- ends editting of current lin
e
   Q- ends editting for whole program"
65205 PRINT: PRINT "Note:  All BASIC res
erve words & symbols that are not betwee
n"
65210 PRINT "two quote marks are shown a
s a graphics char. (";CHR$(137);").  Thi
s"
65215 PRINT "is because of the way these
 items are stored in memory."
65220 GOSUB 65045
65225 REM       NEXT LINE MAKES CHANGES T
O MACH. LANG. ROUTINE SO THAT CONTROL RE
TURNS TO BASIC AFTER EACH LINE IS LOWER-
CASED
65230 POKE MM+214,42: POKE MM+215,236: P
OKE MM+216,255: POKE MM+217,195: POKE MM
+218,154: POKE MM+219,10
65235 GOTO 65260
65240 REM       GET A CHARACTER AND CHECK
 IF IT IS A RESERVE WORD OR SYMBOL
65245 CN=PEEK(N+NC): IF CN>128 THEN CN$=
CHR$(137) ELSE CN$=CHR$(CN): IF CN=34 AN
D (N+2<NN) THEN TG=-1-TG
```

```
65250 N=N+1: RETURN
65255 REM      GET LINE NUMBER AND LOCAT
ION OF START OF NEXT LINE OF CODE
65260 PRINT CHR$(15): CLS: NP=N+4: NN=PE
EK(N+NC)+PEEK(N+NC+1)*256: NL=PEEK(N+NC+
2)+PEEK(N+NC+3)*256: IF NL>64999 THEN 65
365 ELSE N=N+4: TG=0
65265 X=USR(N+NC):    REM      LO
WER-CASE A LINE
65270 PRINT "Old line:": PRINT NL
65275 IF X=0 THEN N=NN: GOTO 65260:
REM  IF NO CHANGE WAS MADE GO DO NEXT LI
NE OTHERWISE GO PRINT THE LINE
65280 FOR NI=N TO NN-1: IF PEEK(NI+NC)>1
28 THEN PRINT CHR$(137); ELSE PRINT CHR$
(PEEK(NI+NC));
65285 NEXT: PRINT @ 512, "Changes:"; CHR
$(14)
65290 REM      ACTUAL EDIT ROUTINE
65295 V=PEEK(VD) AND PEEK(VE): V1=V+PEEK
(14417): IF V=0 AND V1=0 THEN 65295
65300 REM      IF V=64 THEN RIGHT ARROW
WAS PRESSED SO SPACE FORWARD
65305 IF V=64 THEN IF N+1<NN THEN GOSUB
65245: PRINT CN$;: GOTO 65295 ELSE 65295
65310 REM      IF V=32 THEN LEFT ARROW W
AS PRESSED SO SPACE BACK
65315 IF V=32 THEN IF N>NP THEN N=N-2: P
RINT CHR$(8);: GOSUB 65245: GOTO 65295 E
LSE 65295
65320 REM      IF V=16 THEN T WAS PRESSE
D SO TOGGLE CHAR. BETWWEN UPPER AND LOWE
R CASE IF IT IS BETWEEN QUOTE MARKS
65325 IF V=16 THEN V=64: IF ((CN>96 AND
CN<123) OR (CN>64 AND CN<91)) AND TG THE
N CN=CN+(32*SGN(95-CN)): PRINT CHR$(8);C
HR$(CN);: POKE N-1+NC,CN: GOTO 65305 ELS
E 65305
65330 REM      IF V=1 THEN ENTER WAS PRE
SSED SO DONE WITH THIS LINE
65335 IF V=1 THEN N=NN: GOTO 65260
65340 REM      IF V1=2 THEN Q WAS PRESSE
D SO END PROGRAM
65345 IF V1=2 THEN 65365
65350 REM      IF V=8 THEN UP ARROW WAS
PRESSED SO START OVER
65355 IF V=8 THEN N=PEEK(16548)+PEEK(165
49)*256: GOTO 65260 ELSE 65295
65360 X=USR(N+4+NC):  REM   GET HERE I
F AUTO. MODE WAS SELECTED
65365 CLS: PRINT CHR$(14); "Done.  Do yo
u want to run the program again (Y/N)?";
: D$=INKEY$
65370 D$=INKEY$: IF D$="" THEN 65370 ELS
E IF D$="Y" THEN PRINT CHR$(15): RESTORE
: GOTO 65055 ELSE IF D$<>"N" THEN 65370
65375 DELETE 65000-65515:   REM   DEL
ETE THIS PROG. WHEN DONE
65380 REM      IF ERROR WAS OVERFLOW THE
N SET CORRECTION FACTOR (NC) TO THE CORR
ECT VALUE (-65536 OR 0)
65385 IF ERR=10 THEN NC=-65536*((NC/6553
6)+1): RESUME
65390 PRINT "ERR="ERR, "ERR/2+1="ERR/2+1
, "ERL="ERL: STOP
65395 DATA "START UPLOW DATA NOW"
65400 DATA 205,127, 10, 62,  0, 50,236,2
55, 35,126
65405 DATA 254,  0,202,214,255,254, 34,
32,245, 62
65410 DATA   1, 50,235,255, 35,126,254,
34, 40,234
65415 DATA 254,  0,202,214,255,254, 65,
56, 27,254
65420 DATA  91, 48, 23, 58,235,255,254,
 1, 32,  7
65425 DATA  62,  0, 50,235,255, 24,223,1
26,198, 32
65430 DATA 119, 50,236,255, 24,214,254,
32, 32, 61
65435 DATA  35,126,254,  0,202,214,255,2
54, 34, 40
65440 DATA 183,254, 32, 32, 17, 62,  1,
50,235,255
65445 DATA  35,126,254,  0, 40,118,254,
32, 40,246
65450 DATA  24,180, 35,126,254,  0, 40,1
06,254, 32
65455 DATA  40, 11,254, 65, 56,166,254,
91, 48,162
65460 DATA  43, 24,158, 43,126,254, 65,
32,151, 24
65465 DATA 168,254, 33, 40, 24,254, 40,
40, 20,254
65470 DATA  41, 40, 16,254, 45, 40, 12,2
54, 46, 40
65475 DATA   8,254, 47, 40,  4,254, 63,
32,  8, 62
65480 DATA   1, 50,235,255,195, 24,255,2
54, 39,194
65485 DATA  24,255, 34,238,255, 35,126,2
54, 34, 32
65490 DATA   6, 42,238,255,195, 24,255,2
54, 32, 32
65495 DATA   6, 42,238,255,195, 24,255,2
54,  0, 32
65500 DATA   6, 42,238,255,195, 24,255,2
54, 39, 32
65505 DATA 220,195, 24,255, 35,126,254,
 0, 40,  6
65510 DATA  35, 35, 35,195,  8,255, 35,1
26,254,  0
65515 DATA 202,154, 10, 24,242,  0,  0,
 0,  0,  0
```

How to Buy or Sell Computer Equipment and Software

START HERE WITH...

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



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

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

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

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

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

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

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

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

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

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

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

☐ 1 year $10.00 ($30.00 in Canada)

☐ I have enclosed my free classified ad.

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

NAME: _____

ADDRESS: _____

CITY: _____

STATE: _____ ZIP: _____

COMPUTER SHOPPER
P.O. Box F115 • Titusville, FL 32780
Telephone: 305-269-3211

Inside the stringy floppy

Converting cassette tape I/O to be floppy-compatible

Model I

Glenn W. Collura, Streetsboro, OH

About one and one-half years ago, I purchased a Stringy Floppy unit from Exatron Corporation. The unit has lived up to my expectations and then some. It has performed flawlessly the entire time that I have owned it. There is one small problem, though.

Since purchasing the Stringy Floppy, I have transferred all of my programs to wafers (mini-cassettes about the size of a business card). Well, almost all of them. BASIC programs present no problem. Most machine language programs can be transferred just as easily. The problem that I have run into, has been in converting cassette tape I/O to Stringy Floppy I/O.

A good example of this would be a cassette-based data management program which uses cassette tape to store data. Programs such as this, if written in BASIC, are not to hard to modify. You can easily list the program and edit or insert lines with the appropriate Stringy Floppy commands. The small problem I ran into was in converting machine language programs from tape I/O to Stringy Floppy I/O.

Not having a great amount of experience in machine language programming, I was somewhat reluctant to tackle this problem. I finally convinced myself that it would be a good way to learn a little more about machine language, and at the same time get something done that I had been putting off for too long. There was a certain program that I enjoyed very much which finally convinced me to go ahead with this project: Micro Music from Radio Shack (no longer available — Ed.).

Micro Music was one of the first programs I purchased after buying my computer. I feel it is a very good music program for the money. You can have your computer playing music in no time at all. I had quite a few songs, which I had written for Micro Music, saved on tape. I put the Micro Music program on wafer with no problem. The only drawback was that every time I wanted to play or compose a new piece of music, I was forced to load or write the song to tape. This was quite annoying, to say the least.

The program (approximately 4K) would load from wafer in under thirty seconds. However, it took much longer to load a 1K song from tape. Since the purpose of the Stringy Floppy was to save loading time and increase the usefulness of my computer, I decided to convert the tape I/O to Stringy Floppy I/O.

Getting Started

The first thing I did was to get out the Exatron User's Manual which came with my unit. There was a small section in the back of the manual regarding assembly language operations. It listed CALLs to the ROM located in the Stringy Floppy unit and the parameters needed to use them (registers used, data expected, etc.). I was convinced that my problem could be solved since there were CALLs to write both data and programs to wafer under machine language control.

The next step would be to actually examine the Micro Music code and make the necessary changes. The remainder of this article will describe in detail how to find the locations that need to be changed and how to go about making the changes. You may find this very useful even if you are not using a Stringy Floppy, since the same techniques could be used in converting a tape-based program to run from disk.

First, you will need a good monitor program. Exatron supplies such a program with the Stringy Floppy unit. A disassembler will be useful, but is not entirely necessary.

Step 1

The first step in converting a program such as this is to find the locations in the program which actually call the cassette read and write operations. With Micro Music,

and a disassembler program in memory, I started to examine the program. Near the very end of the program code, I found the first CALL to turn on the cassette. The location was 48DCH. This turned out to be the start of the write operation. Examining a few more addresses revealed a CALL to location 0287H. A CALL to location 0287H writes the leader and sync byte to tape. I kept examining the program until I located a CALL to location 01F8H. This would surely be the end of the subroutine to write to tape since a CALL to 01F8H turns off the cassette.

By locating the appropriate calls to turn the cassette on or off, and the various calls to read or write, you will be able to find most tape routines in any other machine language programs you own. Some programs use their own tape I/O routines instead of using ROM calls. These routines may be a little harder to locate. You can modify the tape I/O for Stringy Floppy, disk, or possibly a printer routine. The possibilities are endless.

If you don't have a disassembler you can still find the calls by using a monitor program. They are not found as easily though. In machine language a CALL 0212H would appear as CD,12,02. CD is the code for a CALL instruction. 12,02 would be address 0212H in standard Z-80 code. (High order byte last.)

Next, I started looking for the routine which read in the cassette tape. This routine was found at locations 493AH through 496CH. To verify that this was indeed a read from tape routine, I located a CALL 0296H. This CALL looks for leader and sync byte. I now had both of the memory areas which needed to be modified.There were still a few more things I needed to know before I started to write my new subroutines.

I needed to locate the addresses in memory which were used to store the data to be transferred. The easiest way to locate an area such as this is to load in some data that can be recognized easily. I loaded in the ESF-80 monitor program supplied with the ESF unit. Returning to BASIC (GO 1A19), I loaded the Micro Music program from wafer. I went into the command mode of Micro Music and loaded a song from tape.

After it had loaded, I hit reset, then jumped back to the monitor program. Using the ASCII dump, I searched through memory until I found the song. Starting at memory location 4A05 was the filename of the song, a space, and the music itself. In this particular case, it was not necessary to find the end address of the data area. Since Micro Music allows only 1K of memory for each song, I knew I would have to read and write a 1K block starting at location 4A05H. I was now ready to write my new subroutines.

Step 2

In the ESF user's manual, section IV is entitled Assembly Language Operations. Most subroutines you would need are listed, as well as a description of how they operate. I found the subroutines I needed to use and began to write the new I/O routines.

I decided to write the subroutine to save data to wafer first. This way, I could still load my old data from tape and then save it to wafer. I thought this would be better than retyping all of the data. Listing 1 is the complete write patch. The first instruction loads the file number into the A register. In the Micro Music program, location 4A05H was the first address of the filename. Since the ESF (Exatron Stringy Floppy) does not support filenames (without some modifications), I used this location to get the file number. Micro Music looks at the first six locations starting at 4A05H to get the filename you specify during a load or save operation. It is still possible to use filenames as long as the first character is a number. For example — 1SONG or 2MUSIC. The next instruction converts the file number. If you entered 1 for your first file number, it would appear in the A register as 31H. By using the SUB instruction, we change it to 1 before writing it to wafer.

The rest of the routine should be self-explanatory. If you are interested in a complete description of the CALLs used, consult your ESF user's manual. The last instruction JP 48FA causes a jump to the last location of the old cassette save subroutine. By doing this, the program continues as though the song were saved to tape.

Listing 2 is the complete read patch. This subroutine is also commented and should be self-explanatory except for one portion that I would like to explain. After the CALL 3003 instruction, there is a block move routine. This routine moves your song to the video monitor. When Micro Music loads a song from cassette, it displays it on the video monitor as the tape is loading. The CRT screen is filled (one note at a time) as the tape loads. Since the Stringy Floppy is so much faster than cassette, I chose to load the song into memory and then move it to the video monitor all at once.

The LD HL 4A0B instruction sets the start address of memory to be moved. LD DE 3C00 is the first address of the destination where the block of memory is to be moved. LD BC tells the computer how many bytes (in hex) are to be moved. The instruction LDIR actually performs the memory transfer.

How To Use The Patches

The first step in using these patches is to load the ESF-80 monitor program into memory. Micro Music loads into memory from 4300H to 4971H with an execution point of 4300H. Make sure you load your monitor above these locations. You *must* load the monitor program first. The ESF-80 monitor loads initially at 4300H and is then relocated to the memory area you specify. If Micro Music is loaded first, the monitor will overlay it when loaded.

After loading the monitor program, return to BASIC by typing GO 1A19. (I am using version 2.1 of the ESF-80 monitor. Version 3.2 uses one-letter commands instead of two-letter commands.) Now @LOAD your copy of Micro Music. While Micro Music is loading, hold down the SHIFT key. This will override the auto execute feature in the ESF firmware. This procedure is fully explained in the ESF user's manual in section 3.5,2c. After Micro Music has loaded, jump back to your monitor program. This is accomplished from BASIC by

typing SYSTEM (ENTER) then typing '/' followed by the starting address of the monitor in decimal.

Once you are back in the monitor program, enter the command IC 48DC. This command will display the present contents of memory location 48DCH and also allow you to change its contents simply by entering the new data. If you are unfamiliar with this procedure, consult the ESF-80 monitor user's manual, section 3.1. Enter the object code (left column) exactly as it appears in Listing 1 (ex., 3A,05,4A etc.). When you have completed entering this data, go back and verify it to make sure there are no mistakes. After verifying that the patch has been entered correctly, save a copy of the entire Micro Music program to wafer. Insert a blank wafer into your unit and type the command WP 1,4300,4971,4300. You now have a working copy of Micro Music that will read songs from cassette and write them to wafer. I suggest that you transfer any songs you have on cassette to wafer before continuing with the final patch. Remember to use a file number when saving songs to wafer. Micro Music will operate exactly as before except now the SAVE command will write to wafer instead of cassette.

Now that you have your existing songs on wafer, it is time to finish modifying the program. Return to the ESF-80 monitor program. Enter the command SC 0,4300,5000. This will clear all memory between the specified addresses. Return to BASIC and @LOAD the modified copy of Micro Music. Once again, hold down the SHIFT key to keep the program from executing.

When the program has finished loading return to the ESF monitor. Using Listing 2, enter the object code exactly as it appears, starting at location 493AH. Do this the same way you did for the write patch. Once again, check your coding to make sure you have made no mistakes. Once this is entered, you will have the complete version of Micro Music modified for Stringy Floppy. All cassette I/O is now changed. Before saving this copy of the program, there is one more modification you might wish to make. It is not necessary to make this change. It will not affect the operation of the program.

When in the command mode of Micro Music you have two options — LOAD or SAVE. After entering either of these commands the program responds with READY CASSETTE. Since we are no longer using the cassette recorder, we might as well change the message to something more appropriate. I decided to have the message read READY STRINGY. This is a simple modification. Locations 48B1H contain the hex codes for the letters C A S S E T T E. Using the IC command of the ESF-80 monitor, change these locations to 53,54,52,49,4E,47,59,20. The message will now appear as I mentioned above. Using the WP command, save the final copy to wafer just as we did earlier.

There you have it: a completely modified version of Micro Music. Load it into your computer and read in a few of the songs you saved on wafer earlier to verify that the read portion operates correctly. This will also verify the message we changed to be correct. The routines described in this article should help you modify other cassette-based programs to run on the Stringy Floppy. ■

Listing 1

```
48DC            00090   ORG 48DCH
48DC 3A054A     00100   LD A,(4A05H)    ;FILE #
48DF D630       00110   SUB 30H         ;CONVERT FILE #
48E1 F5         00120   PUSH AF         ;SAVE FILE #
48E2 CD0F30     00130   CALL 300FH      ;MOVE TO BEGINNING OF FILE N
48E5 210B4A     00140   LD HL,4A0BH     ;BEGINNINF OF SAVE
48E8 010104     00150   LD BC,0401H     ;# OF BYTES
48EB F1         00160   POP AF          ;FILE # AGAIN
48EC CD2730     00170   CALL 3027H      ;WRITE FILE & EOF
48EF C3FA48     00180   JP 48FAH        ;RETURN
0000            00190   END
```

Listing 2

```
493A            00090   ORG 493AH
493A 3A054A     00100   LD A,(4A05H)    ;GET FILE #
493D D630       00110   SUB 30H         ;CONVERT IT
493F CD0F30     00120   CALL 300FH      ;MOVE TO BEG. OF FILE N
4942 210B4A     00130   LD HL,4A0BH     ;LOAD ADDRESS
4945 010104     00140   LD BC,0401H     ;# OF BYTES
4948 CD0330     00150   CALL 3003H      ;READ FILE
494B 210B4A     00160   LD HL,4A0BH     ;START ADDRESS
494E 11003C     00170   LD DE,3C00H     ;DESTINATION
4951 010104     00180   LD BC,0401H     ;LENGTH
4954 EDB0       00190   LDIR            ;MOVE IT!
4956 C36A49     00200   JP 496AH        ;RETURN
0000            00210   END
```

I would appreciate hearing from anybody that has made similar conversions. If you have any difficulty with these modifications feel free to drop me a line. Also, if there is anyone that does not want to make these modifications themselves, send to me on wafer (10') an original copy of Micro Music plus $3.50 and I will return the modified copies to you. I also have several songs available for Micro Music which use all the features of the program. Most of the songs are classical arrangements slightly modified for Micro Music. If you are interested in these send a blank wafer (10') plus $3.50 to: Glenn Collura, 9615 Seminole Trail, Streetsboro, OH 44240.

FREE
business software directory

Micro Architect, Inc.
96 Dothan St., Arlington,

MA 02174

CONVERT-A-DISK

Single-sided disk drive users increase your disk storage by 100%!!!

Convert-A-Disk will work with any 5¼-in. single-sided disk drive no matter what type of computer you are using.

Why pay hundreds of dollars to increase your disk storage?? Convert-A-Disk will allow you to convert all your existing disks to give you a 100% increase disk storage capacity.

Send $15 check or money order to:

CONVERT-A-DISK
P.O. Box 15277
Portland, OR 97214

THE ULTIMATE IN SOFTWARE UNPROTECTION

FPS–3 IS A FRONT PANEL SIMULATOR FOR THE TANDY CORP. TRS80 MODEL III

JUST FLIP A SWITCH AND! ! !

THE PROGRAM IN MEMORY IS COPIED TO YOUR CHOICE OF DISK OR TAPE. TO RUN THE COPY SIMPLY BOOT THE DISK FROM RESET OR LOAD THE TAPE WITH THE SYSTEM COMMAND. YOU DO NOT NEED ANY TECHNICAL KNOWLEDGE TO USE THE FPS–3. ALL YOU NEED TO INSTALL THE FPS–3 ARE A HALF HOUR OF YOUR TIME AND A SCREWDRIVER. THE COST FOR A COMPLETE FPS–3 IS ONLY $50.

WHAT THE SOFTWARE GODS HAVE HIDDEN

THIS LITTLE SHALL REVEAL DEVIL

J.E.S. GRAPHICS, P.O. BOX 2752, TULSA, OK. 74101 CALL 918 742 7104.

SPECTRUM PROJECTS

Basic Aid
"An excellent program and fine utility."
Rainbow Review—Aug. 82
Single control key input of BASIC commands. $34.95

Spectrum Stick
"More like arcade joysticks than anything we've yet encountered."
Rainbow Review—Oct. 82
Response and control put the joy back in color computing. $39.95

Colorcom/E
"Out of thousands of programs, this program... SUPER!"
80-US Review—Nov. 82
A smart communications package. Disk or Rompack $49.95

CoCo/EAD
Color Computer Editor, Assembler and Debugger $6.95

Spectrum Paddle
For quicker side-to-side action and higher scores. $19.95

CALL NOW
212-441-2807
FOR FAST DELIVERY
All orders plus $2 shipping

SEND TO
DEPT. 02 93-15 86TH DRIVE
WOODHAVEN, N.Y. 11421
NY residents add sales tax

AIDS(TM) USERS...NOW YOU CAN

KONVERT!

+ REFORMAT AIDS(TM) FILES!
+ ONE-PASS FILE CONVERSION
+ ADD, CHANGE, DELETE MULTIPLE FIELDS
+ HANDLES ALL FIELD TYPES
+ FILE SIZE NOT LIMITED BY AVAILABLE MEMORY
+ EASY-TO-USE...MENU-DRIVEN AND INTERACTIVE
+ STILL MORE FEATURES!
+ INCLUDES MANUAL

ONLY $29.95 POSTPAID FROM:

SEASOFT

PO BOX 7362, SEATTLE WA 98133
PHONE: (206) 775-9801

REQUIRES MODEL I, 2-DISK, 32K
WA RESIDENTS ADD TAX
AIDS(TM) BY META TECHNOLOGIES

SUPER* DATABASE

*The **toughest DBMS** on the block and the **only one** with all these features*

- ★ **40 fields, 21 field types, data compression**
- ★ **Search** with selectors on any, all, or selected fields by string, substring, range or comparison or **instant** retrieval by record number or binary search
- ★ **Multi level sort** any, all, or selected fields in any order
- ★ Print **reports** to the screen or to the printer on any, all, or selected fields in any order
- ★ **Transfer, post** or **move** data in **any, all,** or **selected** fields to one or several databases
- ★ **Arithmetic** in stored file, in calculated field or apply varied calculations to any applicable field
- ★ **3 years** in development—**proven** in 2 years of test marketing
- ★ **Production input** on any number of fields

Now available for: TRS 80 model 1/111 $250*
*TRS 80 model 11/16 *Osborne 1—*CPM $300*

C D C
13715 Vanowen Street, Van Nuys, CA 91405
(213) 873-6621 or 1 (800) 692-5235

*Registered TM ISA, Tandy, Osborne, Digital Research

MODEL I/III SOFTWARE BY: Rip

*** RIPCHECK ***
SUPER FAST MENU DRIVEN PAYABLES SYSTEM * 4 USER DEFINED ACCOUNTS * 156 VENDOR NAMES/ADDRESSES ** 400 ACTIVE PAYABLES ** PAST DUE FLAGGING ** AUTO - BACKUP ** HI-MEM FILESPEC RETENTION ** REVIEW BY MONTH/CODE/MONTH & CODE/KEY WORD ** HANDWRITTEN OR PRINTED CHECKS/REGISTER DISPLAY PAYABLES DUE FROM 1 TO 99 DAYS ON FORMATTED DISKETTE $59.95

*** RIPBONDS ***
A COMPUTERIZED PORTFOLIO FOR ALL BOND INVESTERS. COMPUTES ACCRUED INTEREST AND YIELD TO MATURITY OF ALL HOLDINGS WITHIN SECONDS. MACHINE LANGUAGE SORT BY BOND NAME/INTEREST/MATURITY DATES. ** RETAINS SOLD ISSUES BY FISCAL YEAR ** REPORTS ON CURRENT AND SOLD ISSUES ON FORMATTED DISKETTE $89.95

- REQUIRES 48K - 2 DISK DRIVES - DD - AVAILABLE WITH A **DOSPLUS* 3.4 KERNEL OPERATING SYSTEM FOR MODEL III ONLY.
* TRADEMARK OF *MICRO-SYSTEMS SOFTWARE*

GLENN/CLIFF ASSOCIATES
8301 EAST MONTEBELLO
SCOTTSDALE, ARIZONA 85253
(602) 941–0609

TRS-80 DISK and TAPE USERS!!!
Protect your investment in disks and tapes! END loading problems. One **TOOL** does it ALL!

Tape Reproduction System
Tape or **Disk Utility for Model I** or **III**

- Read TAPE and/or DISK
- Write TAPE and/or DISK
- Verify TAPE written will load
- **ANY** TRS-80 protocol TAPE
- Identifies BASIC, SYSTEM, EDTASM
- Change program name as desired
- Select tape speed H/L (Mod III)
- Select tape port 0/1 (Mod I)
- **OFFSET** load addresses
- **UNOFFSET** load addresses if offset
- Displays operational STATUS plus
  - Diskette directory (0-3)
  - Load Map (start-end addresses)
  - NAME, LENGTH, FORMAT of data
  - START, END, EXECUTE addresses
- Automatic protocol conversion
- **SINGLE** disk drive copy (Mod I)
- Archives on TAPE for DISK or TAPE
- Run TAPE programs from DISK
- 14 Menu-driven features in all!
- DISK features require TRSDUM

TRSTUM-16K tape systems ..... ONLY $16.95
TRSDUM-1 drive TRSDOS systems..... ONLY $17.95
Specify Model I or III - add $1.00 postage and handling
Send check, money order or SASE to:

CRB Microtools
"Software M TOOLS for the 80's"
14835 N. First Avenue
Phoenix, AZ 85023
TRS-80 & TRSDOS - trademarks of Tandy Corp.

CARTRIDGES FOR EPSON MX-80*

Factory Fresh New Stock. Your choice of Black, Blue, Red Brown or Green.

1 for $6.95
3 for $16.00
12 for $59.95

All Prices Postpaid. Mix or match any way you want. Michigan orders add 4% tax. Mail Sales Only. USA Orders Only.

Pete Skeberdis
PO Box 27
Fremont, Michigan 49412

Prices good only while current supplies last.

* EPSON MX-80 Trademark of Epson America Inc.

Reviews

BASIC Conversion Handbook
The Brain Bank, Incorporated
Hayden Books, Inc.
Radio Shack Cat. #62-2088
$5.95

There are people in this world who own other brands of microcomputers. Many of these folks have Apple or Commodore PET machines, and most are worth knowing and sharing programs with. Even though the TRS-80, Apple and PET have different screen layouts and significant differences in their reserved word lists, the syntax of BASIC remains quite similar from machine to machine. About three or four times each year, I get to deal with these similarities and differences when an Apple owner hands me a program listing and says, "You've got to try this one."

Conversion is a challenge and after several hours of fun entering and debugging, success can be rewarded with a swell of pride in one's puzzle-solving skills. In my own case, I've sometimes wondered what PR#2 really stands for, and some of the CALLs used by Apple owners make little sense. Sometimes, leaving these out causes an obvious problem which is quickly solved. Other times, I've had to work the riddle for a long time, or submit to the ultimate humiliation of having to ask. Radio Shack's recent announcement of the BASIC Conversion Handbook pulled me right in to my local Computer Center.

David Brain and a team of three other capable writers have provided the user with six conversion tables, each comparing one machine to one other microcomputer. Each of these tables takes the reserved word list of the subject computer (Apple, PET or TRS-80) and, to the right of this, lists the equivalent (or similar) word from the object computer's word list.

To the right of these two columns is a comment column describing how the subject computer executes the command or program statement. After each listing is a very short section which contains some discussion of the screen graphics available on the subject computer. These discussions are far from complete expositions, but will help the programmer to identify graphics commands.

The book does a good job with brief descriptions of available POKEs and CALLs which equate to commands or subroutines in the object computer. (I never knew that "CALL -936" on an Apple was like CLS on the TRS-80.)

A short appendix contains subroutines for Apple and PET. These permit translation of TRS-80 verbs which store strings, format arithmetic variables, or use RND(X). Another appendix contains short graphics programs to illustrate graphics and I/O in each of the three language dialects. The final appendix contains two listings of the PET character and graphics set. Also included are screen coordinates to assist in translating screen formats.

There is room for improvement in this book and it is not without several annoying shortcomings. Restriction of the TRS-80 word lists to Level II in a 16K machine works a hardship on the owner of an Apple or PET. There is a distinct

NEW CATALOG OF PROGRAMS FOR THE TRS-80 Model I/III

- ☐ Many New Programs
- ☐ Quality User-Tested
- ☐ Excellent Documentation
- ☐ Tape/Disk Compatibility
- ☐ Emphasis on Usefulness
- ☐ Menu Driven User Friendly
- ☐ Low Hobbiest Prices
- ☐ Money Back Guarantee

Send $1 for catalog which includes $2 discount coupon to:

Practical Programs
1104 Aspen Drive
Toms River, NJ 08753

Dental Computer Newsletter

E. J. Neiburger, D.D.S., Editor
1000 North Avenue
Waukegan, IL 60085

The D.C.N. is an international group of dentists, physicians and office management people who have interests in office computers. Though the emphasis is on microcomputers, many members use minis. We cater to all makes and brand names.

Annual membership dues $15.00. Membership runs from January to January. If you join mid-year, we will supply you with the year's back issues.

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.

COMTRONIC SYSTEMS

PMS-1
PROPERTY MANAGEMENT SYSTEM

- Saves Hours of Bookkeeping
- Increases Accuracy
- 100% User Support
- User Friendly System
- 350 Units Per Diskette
- Complete Tenant File
- Current Tenant Report
- Late Rent Report
- Late Rent Notices
- Rent Payment History
- Vacancy Report
- Income Statement
- Expense Ledger
- Change of Rent Notices

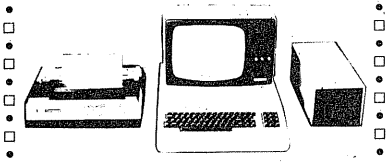
For TRS-80 Model I and III 32K One Disk Drive.
Excellent for Management Companies or Individuals.
$169.95 on Diskette with Manual, Documentation and Sample Files.

LOAN AMORTIZATION PROGRAM
Prints or displays an amortization schedule for a given mortgage contract. Perfect for Real Estate Investors.

For TRS-80 Model I and III 16K Computers
$12.95 on tape and $15.95 on Diskette

"SATISFACTION GUARANTEED"
COMTRONIC SYSTEMS
4028 Somerset Lane, Kent, WA 98032

LNW80 COMPUTERS



- IN STOCK NOW!! CALL FOR SPECIAL PRICES ON LNW80s, NEC PRINTERS, RGB COLOR MONITORS, AND TANDON DISK SYSTEMS.

***** NEW LNW SOFTWARE! *****

EXCELLONIX

7180 Woodrow Wilson Dr
Los Angeles, CA 90068

(213) 650-5754 - (714) 973-1939

Writer's Professional Submission Register

Record-Keeping System
Menu Driven -updates current submissions
-lists all subs. each MS
-lists all subs. to each publication -lists all subs. each form/genre
-lists entire register-updates address for each publication -displays and/or prints.
-TRS-80 III (TM Tandy Corp.) 48K 2 Disks.
$59.95. Check/MO.
Joseph Nichols Publisher
Box 2394, Tulsa, OK 74101

MODEL I SOFTWARE BY: Rip "Masque"

MASK AND PROTECT YOUR BASIC PROGRAMS. EDITING OF MASKED LINES IS VIRTUALLY *IMPOSSIBLE*. MAKES MONITOR AND HARD-COPY LISTINGS DIFFICULT TO READ.....

*** MASQUE1 ***
INSTANT MASKING AND DE-MASKING OF BASIC PROGRAM LINES..... $24.95

*** MASQUE2 ***
PERMANENTLY MASKS BASIC PROGRAM LINES. CANNOT BE DE-MASKED.... $29.95

*** MASQUE3 ***
MASQUE1 AND MASQUE2 COMBINED IN ONE PACKAGE..... $39.95

- REQUIRES 48K, DISK DRIVE -
- SEND CHECK OR MONEY ORDER TO -
100
GLENN/CLIFF ASSOCIATES
8301 EAST MONTEBELLO
SCOTTSDALE, ARIZONA 85253

MODEL II PROGRAMS

TUTORPAK
An integrated package of 30 lessons that tutor the user in the BASIC language. Ideal for Model II owners who wish to learn BASIC in a self-paced manner . . . . . $30.00.

DEMOPAK
A smorsgasboard of 50 programs for leisure and personal use. Included are games (28) personal finance (12), math/stat. (10). All for less than $1.00 per program! . . . . . $40.00.

BUDGET MONITORING SYSTEM
Monitors multiple project or personal budgets. Tracks expenditures, encumberances, and balances in user defined categories on actual and percent complete bases. Ideal for busy researchers, businesmen, or engineers who wish to monitor projects budgets . . . . . $40.00.

Send Check or money order to:
Southfork Software
68 Fairlake Drive
Hattiesburg, MS 39401
Specify TRSDOS 1.2 or 2.0 Version with order.

IEEE-488 TO TRS-80* INTERFACE

Everything needed to add *powerful* BASIC GPIB-488 controller capability to TRS-80 Model 1 or 3, Level 2 or DOS with a minimum of 16K.

488-80B
For Model 1 Operation

488-80C
For Model 3 Operation

Model 488-80B or 488-80C Price: $375.
+ shipping, insurance & tax
WHEN ORDERING SPECIFY DISK OR TAPE

SCIENTIFIC ENGINEERING LABORATORIES
11 Neil Drive • Old Bethpage, NY 11804
Telephone: (516) 694-3370

**Trademark of Tandy Corp.*
There is no affiliation between Scientific Engineering Laboratories and Tandy Corp. or Radio Shack.

change in organization and layout of the tables as one moves from one machine to another. (This appears to be a lack of editorial thoroughness but will have little effect unless the book finds its way into a classroom where several brands of machine are in use.)

Reserved words referred to as commands on one machine are called arithmetic functions on another machine. Similarly, program statements for one machine are called commands for another. If you don't find the statement you're looking for, check another section of the table. The Brain Bank should get together again — first to clean up organization for a second edition, then to put together a followup volume which might include Disk BASIC and file handling with a little seasoning of data structures for the Commodore, Apple and Radio Shack machines.

If you are looking for a definitive reference work to support a microcomputer course, or help in technical writing, save your $5.95 and use it as partial payment on one of the larger volumes (spell that Lien). If you just need a quick reference listing of APPLESOFT and PET BASIC to help your TRS-80 hobby, this book can be a long-term friend. My use falls into the latter category and I felt that the $5.95, plus gasoline to the Computer Center, was worthwhile!

Paul Hine

BREVI-T
Model I/III disk
For NEWDOS/80 Users
SofTrends, Inc.
26111 Brush Ave.
Euclid, OH 44132
(216) 289-2002
$20.00

For NEWDOS/80 version 1 and 2 owners, this new software offering, BREVI-T (pronounced "brevity") is very useful. Glenn Emelko, the author, took a good idea and out came BREVI-T. It is presently available for the models I and III and best of all, it is at the reasonable cost of only $20.

BREVI-T is a fabulous piece of software. Simply described, it is a line of instructions in one keystroke. It is not just single keystroking such as the period or comma in NEWDOS/80's enhanced BASIC; more than one command can be executed in a BREVI-T line. It is a utility that is somewhere between single command keystroking and the NEWDOS/80 chaining function.

What can you do with it? There are simple tasks such as to eliminate always typing CMD" ", or automatically copy disk one to disk two in one keystroke and so on. I found that it was very useful in helping to instruct a beginner on the computer. For example, a chain of events may be executed before another function. Assume you want to route your outputs differently, look at a directory, then continue running the program. An experienced user could set-up a BREVI-T command so that those functions would be performed. The operator could do it and never have to learn any specialized DOS commands or syntax. It makes creating more fool-proof programs much easier.

I was concerned that it would consume time while being executed, but it was all in vain. It takes very little of the time that NEWDOS/80 uses to look for commands. I began to wonder if it took up too much space in memory. It doesn't take any! The author has hidden it somewhere in the disk SYS routines. I searched all over and couldn't find it. Very impressive, it is fast and takes no extra room in memory. Where was the catch?

I finally found a couple of weak points. First, you cannot execute a BREVI-T command from within another BREVI-T command; it is not recursive. Second, while in BASIC you cannot execute a CMD"BREVI-T command" where the command is a DOS BREVI-T command. BREVI-T commands have two places of origin, either DOS or BASIC. Each of these has its own command file. You cannot execute one while in the other. These are my only two, minor, complaints. Everything else is very slick.

Albert Niessner, III

Trashman
Machine Language Utility
Prosoft
P.O. Box 560
N. Hollywood, CA 91603
Ordering: (800) 824-7888, oper. 422
Tech. assistance: (213) 764-3131
TRS-80 Model I and III, $39.95

I recently received a review copy of a program just released by ProSoft of North Hollywood, CA. The same firm that makes NewScript and FASTER, just to name two of their better known products. This latest release is called, simply enough, Trashman. No, it isn't a new game. It is a serious piece of software designed to assist serious BASIC programmers in increasing the throughput of data in their programs. It does this by reducing the time to perform that age-old malady of Microsoft's BASIC interpreter: string compression, or garbage collection. Many articles have been written about that subject, so I'll skip that in this review.

Actually, this is not a new program at all. It has existed in a hidden form in the keyboard driver that NewScript uses. However, that keyboard driver, with its type-ahead buffers, printer buffers, and the like, take up some 6K of memory. Trashman takes up 578 bytes of memory plus two bytes of memory for each active string in your program. So, if your program has 500 strings, a not unreasonable number, especially if you have a string array, then Trashman will require 1578 bytes, or just a little over 1.5K, to run. Not a bad trade-off if their claimed improvement of 94 to 98.9 percent in delays due to string compression are to be believed. After a little testing, I believe.

I wrote a couple of short, do nothing programs designed only to create strings so that string compression would be forced. String compression took place three times within the program. The compression times were approximately 4.47, 9.34, and 13.37 seconds each without Trashman. With Trashman running the times were from approximately .4 to .66 seconds! I have to agree that the program works as advertised. These trials are not exact, but are close enough to give you a good idea of the improvement that Trashman offers. These times were obtained on a Model I running at the standard 1.77 MHz. On a Model II or either model with a speed-up modification, the times will decrease, but their relative difference should remain the same.

Trashman came to me on a 35-track single-density diskette with the one file on it. Instructions for moving the file to all five major operating system disks and on both computers were included in the instructions. The instruction sheet is four pages long and includes everything you have to know to operate the program.

The major drawback, if there is one, to using Trashman is its requirement that it be the last program residing in high memory. That is, it must be the first program that is in protected memory. It is self-relocating and will reset the high memory pointer to protect itself once it is loaded. That feature should help users out some. Actually, I can see ways that it could be used without being the last program loaded, but that delves into a technical aspect which isn't needed now. Suffice it to say, it could be done without too much trouble by a knowledgable programmer.

Once Trashman is loaded into memory, it is only a matter of giving three BASIC statements either from the keyboard or from within a program to activate the program. If your programming application requires chaining BASIC programs, then you should only call Trashman into service once at the very beginning of your

program. This point is well covered in the documentation. The program seems invisible to the user. Except for the tremendously improved performance of your program, you probably won't even know that you are using it. And that is just the way a program like this should be.

Although it is sold just like any other program for the home user, ProSoft will license buyers to use the program with any of the software that they would like to market. If your BASIC application uses lots of strings and is now suffering from severe slowdown due to garbage collection, then you should contact ProSoft and ask about this great new utility program. This is a proven piece of software, having been used within NewScript for about two years now. You should expect no trouble from it. ProSoft has given us another bonus for our TRS-80s, and programs like this will sure help to put a little pride in the words "Trash Eighty."

Jerry L. Latham

Copyart Word Graphics Processor
Model I/III 2 Disk Systems 48K
Simutek, Inc
4877 E. Speedway Blvd.
Tucson, AZ 85712
(602) 323-9391
$149.99
Additional Printer Drivers $19.95
Scripsit Dictionary $139.95

Copyart is a new program from Simutek, the people who brought us the ZBASIC compiler for the Models one and three. As you may have already surmised, Copyart was written using the ZBASIC compiler. It has all the speed that any machine language word processor has. Why another word processor you may ask? We already have Scripsit, Lazy Writer, Newscript, Superscript, Pensadyne, Electric Pencil, Qwerty, and a host of others. Well, Copyart is a little different. It is a word processor, but its true power is in its ability to do graphics easily and quickly, and in combination with normal text.

Copyart is patterned after Scripsit in screen layout, with fourteen lines reserved for text entry, the fifteenth line is a horizontal bar, and the bottom line is reserved for messages. A large, flashing block cursor is standard. The cursor is positioned with the four arrow keys and a line is ended with the ENTER key. Automatic line wrap-around occurs when the end of the line is reached. The video line width can be set from 64 to 255. The @ symbol key is the control key. No provision is made for entering this symbol in text, which could be a problem for those who need it. The CLEAR key functions to tighten up text after an inserted line leaves a gap.

There are several control functions such (d)elete, (i)nsert, (q)uick line delete, (t)ab set, (k)ill tab, (s)tatus, (h)elp, (f)ill screen from buffer, (g)raphics on, (c)ontrol code, (w)ord delete, etc. Simplicity is the key word here. I found that I could use Copyart like an expert after a quick trip through the manual. The mnemonic commands make remembering the control keys a breeze. Boldface and underlining are included for printers that are capable. Italics can be done on the Epson printers with Graftrax by inserting the proper control codes into the text, as they can any other special function. Find and replace functions are included, with repeat in order to change all occurrences of a certain word. Block move is done a little differently on Copyart. Each line of the text to be moved is placed in a buffer and then popped out wherever you wish to move it to. Another nice feature is horizontal scrolling. Whenever the video line width exceeds 64 characters, the screen scrolls beyond the 64th position in order to enter more text into that region.

Printer format commands are used throughout the text to tell the printer how to format the text properly. The command include page length, top and bottom margin, right and left margins, headers, footers, page numbering, single or double spacing, justification (on, off, or ragged right), emphasized print, change character size, and proportional spacing. Proportional spacing is supported only on the C-Itoh Centronics 737/739 and Line Printer IV. The proportional spacing is not as good as other word processors. For example, the spacing between words is not uniform, but it still looks better than unjustified text. Right justification of other proportional printers such as NEC, Diablo,C-Itoh, and Smith Corona is not supported at the present time, but is being worked on. The main printers that are supported are the Epsons, the Okidatas, and the Centronics 737/739 series. Any parallel printer that has the ability to turn off automatic linefeeds after carriage returns can be used. Serial printers are not supported at this time.

One limitation is the mandatory installation of a lowercase modification in the machine. Copyart will not work without one. The manual provides instructions on how to add this to your Model I, or you can have Radio Shack or Simutek install one for about $50. Another novel feature of Copyart is that it is a protected program. However, you can make all the copies you want and even give the copies to all of your friends. The catch is that the software is matched to a hardware "key" and will not run without it. The "key" is a potted DIN connector that plugs into the cassette port of the computer. Simutek claims that there are 18 versions of the key, each with a different code in the serial number. If you lose your key, you may obtain a replacement for $40 and only one extra key is allotted per customer. Pretty slick!

Graphics is the area where Copyart really shines. No other word processor can beat Copyart in this area. By simply hitting control-g you are in graphics mode. At this time there are three modes: 1)draw, which leaves a lit pixel wherever you move the cursor; 2) erase, which leaves an unlit pixel wherever the cursor is moved; and 3) move, which simply allows movement without change. The cursor has two speeds: fast and slow. There is also a built-in graphics character set which creates large graphic characters automatically. You can control the horizontal and vertical size of the letters, the direction of the letters (horizontal or vertical), and regular or inverse video background. The letters are actually quite attractive. Graphics can be intermixed with normal text and can even be used in headers or footers, like a logo.

Printing graphics is done very nicely by the Epsons and Okidatas, but what about the others? Well, Copyart has pseudographics, that allow you to do things like bar graphs, posters, and other low resolution graphics. This is accomplished by overstriking two characters to form a solid dot. The built-in graphics characters print fairly well on my Line Printer IV, and simple graphics look pretty good. Actually, any printer that can turn off linefeeds can do pseudographics.

This was definitely the easiest word processor to learn and use. There are some features that are missing, like subscripts, but now how often does one use them? The main features, boldface, underlining, and double-width, are uncomplicated. The things that were missing in Scripsit are included in Copyart, such as a directory function, a help function, the ability to kill, append, chain, and having a program that runs without patching your operating system. Add the ability to do graphics, and you have a first-rate package. Simutek is certainly one of the pioneers in the ever-changing world of microcomputer software. My prediction that we would soon see some excellent software created with the ZBASIC compiler is already coming true.

Jim Klaproth

Copyart II, a new version, also allows sorting of text, math functions with up to 32 digit precision, a Scripsit dictionary option and included for no charge is a mail list and mail merge program. Ed. ■

Bulletin board

This bulletin board space is available free to individuals with single or unusual items for sale or trade, and for other announcements of interest to the general readership of this magazine. 80-U.S. Journal reserves the right to reject any commercial advertising in this section and suggests using our display advertising for that purpose.

These notices are free of charge and will be printed one time only on a space available basis. Notices will be accepted from individuals or bona fide computer user clubs only. All announcements must be typed, contain 75 words or less and include complete name and address.

Need Help to modify TRS-80 Model I Tiny Pascal cassette to operate on the Model III. Any advice, aid, patch, reference, source or object code modification will be appreciated. G. S. Newman, 135 S. 19th St., Philadelphia, PA 19103.

Model I Interface and disk drive. Radio Shack primary drive (#26-1160) and 32K interface (last 16K not from RS), used and in excellent working order. Supplied with cables and accessories. Asking $270 for the drive and $325 for the interface. Roger Hoxie, 12034 La Serna Drive, La Mirada, CA 90638.

Software for sale. Nearly 50% off on original cassette tapes for the Models I and III. These are all new originals, no copies. Mostly arcade type games (Big Five, Adventure Int'l, etc.) but also some utilities and educational programs. Will consider trading. Send a sase for free list to Dr. Michael W. Ecker, Luzerne 8, Viewmont Village, Scranton, PA 18508.

Name Change: To better reflect our status as an international organization with worldwide membership, the East Texas Color Computer Club is changing its name to International Color Computer Club. For details on how to become a member, contact us at 2101 E. Main St., Henderson, TX 75652. Canadian residents write to 96 Carleton Dr., Saskatoon, Sask. S7H 3N6.

PEEK and POKE more powerful programs. Easy-to-use guide to over 50 special addresses. Make programs tamper proof. Input many keys at a time, automatic repeat key for Model I, set up USR subroutines easily. Change cursor, track its location, determine available memory. More! Only $4.00. David Lewis, Box 88-USJ, Shady, NY 12479.

Can Anybody tell me how to take incoming signals for a Motorola Teleprinter and convert them to a format usable by a Model I and printer? Any help or suggestions would be appreciated. David Youngs, 519 No. Pine Way, Anaheim, CA 92805 (714) 772-0666.

Voice Synthesizer for sale. Used one hour, complete with all manuals and talking Eliza tape. $250, firm. Contact Rick Remynse, 9550 Ravine Rd., Kalamazoo, MI 49009 (616) 385-4109.

For sale: PMC-81 with numeric pad, four function keys, u/l case, auto key repeat, print screen, dumb and host terminal routine, sound. Model I level II software compatible. Zenith high-resolution green monitor. Tape recorder and software. $550. Michael Boman, 450 North Mathilda R201, Sunnyvale, CA 94086 (408) 733-0976.

Dvorak Keyboard typewriter. Owner switched to TRS-80. IBM type-bar, purchased new 1965, works ok but could benefit by tune-up. First $250 takes it. FOB Zip 95441.

Also, writing a book on cryptology as related to the micro. Would appreciate tips, old books, recent developments, data, photos. Useable contributions will earn you a copy of the book. Waldo T. Boyd, P.O. Box 86, Geyserville, CA (707) 857-3434.

80-Grafix for the Model I. Used little and have found it did not suit my needs. $100 or best offer. Mike Stein, 5064 Rebel Ct., San Jose, CA 95118 (408) 266-6089.

How do you interface a Model 33 TTY (20 mA loop) to a Color Computer? Timothy J. McIlwee, R.R. 2 Box 462A, Dundee, IL 60118.

For Sale: NCR Thermal dot matrix printer with power supply, parallel interface for E/I of Model I, and documentation. Prints 30 characters per second, 96 ASCII characters, u/l case, plus LF, CR, BS. 80 chr/line, 10 chr/in., 6 lines/in., uses NCR or Silent 700 thermal paper. Friction feed, quiet, attractive case. May be easily connected to any other computer parallel port. $150. Roy T. Beck, 2153 Cedarhurst Dr., Los Angeles, CA 90027.

Looking for used equipment? Need a buyer for equipment you no longer use? Merchandise Listing Service is a monthly publication of Clearing House for Advanced Technologies (C.H.A.T.). Tailored for users of personal and small business computers, the listing services publishes, without charge to subscribers, want-ads that provide national exposure for the purchase or sale you want. Telephone service is also provided for up-to-the-minute listings. For more information, write to Clearing House for Advanced Technologies, Drawer 2139 Dept "C", Corona, CA 91720. ■

For immediate release

Cassette-based Systems

Futureview Inc. offers software designed for the cassette-based users of the Model I/III and Color Computer. Their new line of software features a speed sort machine language routine with easy documentation. Data is in RAM at all times and storing to tape is only done at the end of the session.

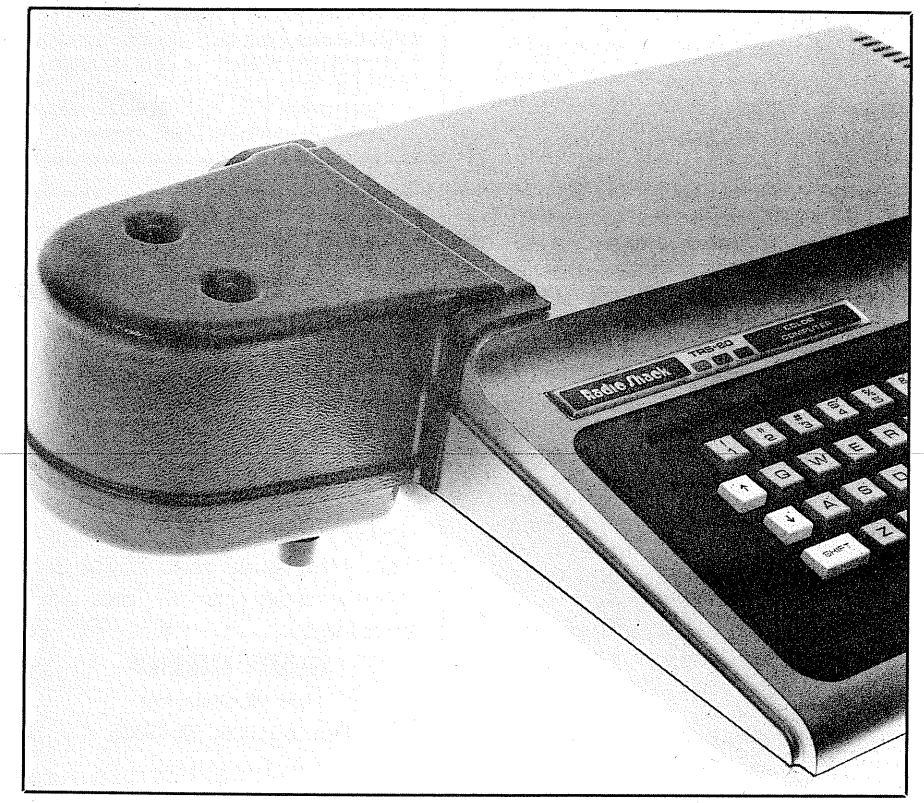
Packages include Electric Bookkeeper and Sales/Inventory ($49.95 each); Speed Writer and Addresser, an interactive word processing and addressing system ($24.95 each); and Check System, also for $24.95. The company also offers games (with a fantasy and science fiction theme) as well as programs developed especially for children. For a catalog, include a SASE and contact Futureview Inc., P.O. Box 101, Joplin, MO 64802 or call (417) 781-6999.

Information Retrieval Service

Knowledge Index, offered by Dialog Information Services, Inc., allows users to tap into data banks which cover engineering, electronics, business, law, medicine, agriculture, education, and news. Subscribers will be able to scan over four million entries from over 10,000 journals and publications.

Information, in the form of abstracts, will give users of the system summaries as well as citations to the magazines in which the complete article can be found. The system allows for key word (or phrase) searching and logical operators such as AND, OR, or NOT are available. The cost is $24 per hour with a one-time fee of $35. Complete descriptive literature is available by calling (800) 528-6050, Ext. 415, or (800) 352-0458, Ext. 415 (in AR), or (800) 528-0470, Ext. 415 (in AK and HA), or write to Knowledge Index, Dialog Information Services, Inc., 3460 Hillview Ave., Palo Alto, CA 94304.

Co Co-Cooler



CP/M Utility Programs

TangData is offering a collection of utilities for the CP/M Disk Operating System. You can read and write to disk sectors, show extents, list ASCII programs and even have single-disk file transfer.

All programs work in single, double and extended double-density formats. Each allow easy, single-key operation and require a minimum of learning to operate. The programs are available in 8 inch format ($24.95) or 5.25 inch format ($19.95). They are suitable for the Model II, 16, or Model I with a CP/M adapter. For complete information contact TangData Corporation, 100 Eames Street, Framingham, MA 01701 or call (617) 872-7520.

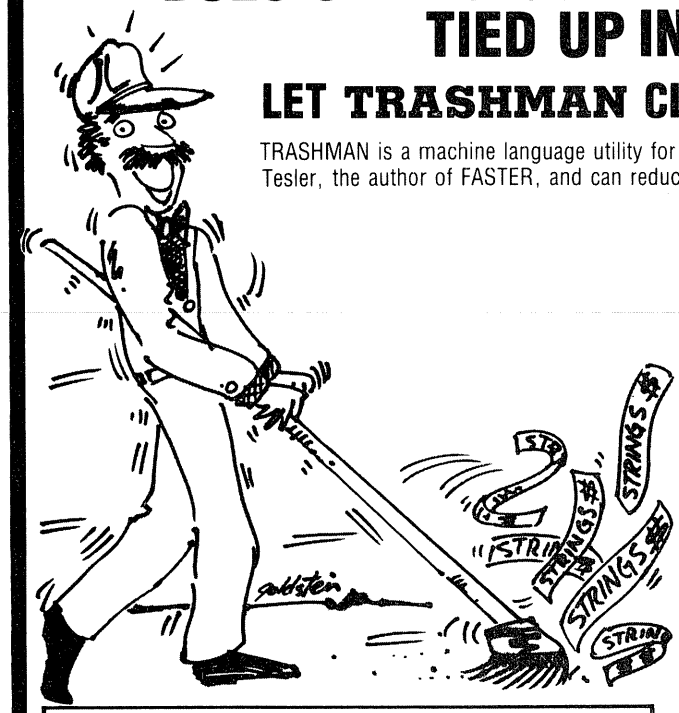
Co Co-Cooler

Rem Industries, Inc. have developed an add-on fan for the TRS-80 Color Computer. It will hold computer temperature rise, in even worst case situations, to below 15 degrees. The housing is made of high-impact plastic and has its own rubber support feet, allowing no stress to be put on the computer housing. It is designed as a separate unit and attaches easily to the back left side of your computer. For information, contact Rem Industries, Inc., 9420 "B" Lurline Ave., Chatsworth, CA 91311 or call

DOES STRING COMPRESSION HAVE YOU TIED UP IN KNOTS?

LET TRASHMAN CLEAN UP THE MESS!

TRASHMAN is a machine language utility for the TRS-80 Models I and III. It was written by Glenn Tesler, the author of FASTER, and can reduce BASIC's string compression time by 95% (see table below).



WHAT'S STRING COMPRESSION?

When a BASIC program changes a string (words, names, descriptions), it moves it to a new place in memory, and leaves a hole in the old place. Eventually, all available memory gets used up and BASIC has to push the strings together to free up some space. This takes time. Lots of time. The computer stops running for seconds or minutes, and you may even think it's "crashed". The keyboard won't work, and until all the strings have been collected, you just have to sit and wait. Then things run for a while, until string compression is needed again. And again.

If you're using your computer for business, that wastes your money. If you're using it personally, it wastes your time.

WHAT'S THE SOLUTION?

As soon as you start using TRASHMAN, those delays almost disappear. It uses less than 600 bytes of memory, plus 2 bytes for each active string. It works with other machine language programs and with all major operating systems. It's easy to use, comes with complete instructions, and can be copied to your own disks.

WHAT'S THE CATCH?

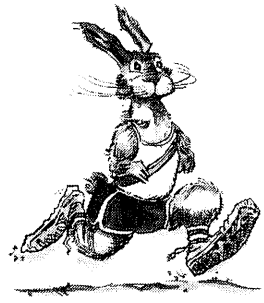
If a BASIC program uses only a few strings, very little time is wasted in string compression, and TRASHMAN won't be helpful. But, if hundreds of strings, including large string arrays, are used, TRASHMAN is just what you need.

# STRINGS	SECONDS DELAY NORMAL	SECONDS DELAY TRASHMAN	PERCENT IMPROVEMENT
250	11.8	0.7	94
500	45.8	1.6	96.5
1000	179.6	3.5	98
2000	713.2	7.8	98.9

TRASHMAN is available on disk for just $39.95.

(All timings done on TRS-80 Model I. Model III 15% faster, but pct. improvements identical. Listing of timing program available on request.)

SAVE TIME WITH FASTER



"FASTER" speeds up most TRS-80 BASIC programs by 20-50%. It's helped hundreds of satisfied people and it can help you. Detailed instructions make it easy to use. FASTER analyses your BASIC programs *while they run*, then displays a simple change, usually one line, that sequences program variables so the ROM will find them faster.

You can use FASTER to speed up programs you've bought, as well as programs of your own. Since it isn't a compiler, your BASIC programs can be read and changed afterwards. FASTER works on business programs, models, and games. The more complex your program, the better the results.

Does FASTER really work? Yes! Just check the reviews in *Personal Computing*, May, 1981, p. 116: **"FASTER is effective and easy to use"**; *80 U.S. Journal*, April, 1982, p. 106: **"I recommend FASTER to everyone"**; and *80 MICRO* (April, 1982, p. 40): **"If you...would like a significant increase in the run-time speed, then buy FASTER."**

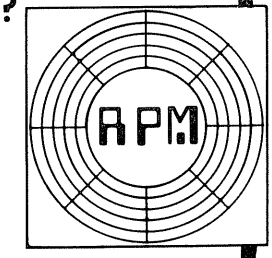
FASTER runs on the TRS-80 Models I and III, 16-48K tape or disk, and all major operating systems. **$29.95**

"QUICK COMPRESS" takes only 276 bytes of memory, and removes the blanks and remarks from even the largest BASIC program in less than 3 seconds. It produces smaller, faster programs without altering their logic.

$19.95

SPECIAL: FASTER and QUICK COMPRESS: **$39.95**

ERRATIC DISK DRIVES?



You can avoid unnecessary disk errors and repair bills by using **RPM.** This easy-to-use program measures the rotational speed and fluctuations of your disk drives, and warns you if they are running **too fast, too slow, or unevenly.**

Incorrect or erratic speed is a common cause of unexplained disk errors and loss of data. RPM's documentation explains how to **detect** *and* **correct** these problems quickly and easily. As *80 MICRO* (April, 1982, page 41) said: **"If your drives have problems I recommend RPM before paying to get it repaired."**

RPM is supplied on diskette for the TRS-80 Models I and III. We suggest you order a copy *before* you need it.

$24.95

ORDER FROM YOUR LOCAL SOFTWARE DEALER, OR CALL NOW, TOLL-FREE:

(800) 824-7888, Operator 422
CALIF: (800) 852-7777, Oper. 422
ALASKA/HAWAII: (800) 824-7919

FOR TECHNICAL INFORMATION CALL:
(213) 764-3131, or write to us.

PROSOFT®

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

TERMS: We accept VISA, MasterCard, checks, or even cash. Please add $2.00 shipping/handling within U.S.A. or Canada, and $5.00 overseas. C.O.D. charge is $2.00 in U.S. only. We ship within one day of receiving orders.

(213) 341-3719.

Kopy 500/1500

Kopy is a copying program that will allow a Model III user to copy single-part machine language programs from tape, **in or out**, at 500 or 1500 baud. The program shows the object filename of the program being copied, starting address, entry point, and the total number of bytes. It is written in machine code, is fully compatible with the Model I, consumes little memory and sells for $5.95. Contact The Software Exchange, 1615 Compton Rd., Cleveland Hts., OH 44118.

Datagraph

Datagraph will transform VisiCalc files into high-resolution, custom graphs on your TRS-80 computer and graphics printer.

It plots data stored by VisiCalc, or a user's own program, using the DIF format. The program can accept 1000 input data points, plot multiple data sets per graph, and create line, scatter, or bar graphs. Features include automatic scaling, grid selection, text label entries and more. Datagraph is available for the Model I or III with 48K and the Epson, Nec, C.Itoh, IDS, Okidata, RS VIII, RS DMP-200 printers are supported. The package sells for $79.95 and a Colorplot version for the IDS Prism printer is $89.95. Contact Micro Software Systems, 1815 Smokewood Ave., Fullerton, CA 92631 or call (714) 526-8435.

Color Computer Keyboard

The WP professional keyboard has 53 keys in a standard arrangement, with four additional user-definable function keys. It is non-sculptured with white legend, fully assembled and tested. Prices start as low as $89.95, contact Spectrum Projects, 93-15 86th Drive, Woodhaven, NY 11421 or call (212) 441-2807, modem call (212) 441-3755.

Dual Port Expander

TJN Systems announces the release of the Y-PAK dual port adapter for the Color Computer. The device eliminates the need for removing the disk controller each time a game cartridge is used and it plugs directly into the existing cartridge slot. Two LED indicated switches provide control of the Y-PAK. The retail price of the Y-PAK is $70 when mail ordered from B. Erickson Software, P.O. Box 11099, Chicago, IL 60611. Dealer inquiries for wholesale pricing should be directed to TJN Systems, 765 Rt. 3, Suite 111, Bensenville, IL 60106.

IBM Electronic Typewriter Interface

Cybertext Corporation has developed a simple, low cost interface board that allows IBM

Electronic Typewriters to be upgraded and used as letter quality printers by any microcomputer that is equipped with a Centronics printer port.

The board fits inside the typewriter and a ribbon cable extends to the computer. The system is transparent and passes characters from any word processor software or from program print routines of all kinds. The device does not alter the IBM, all connections are either plug or clip on. The price is $275 and for details contact Cybertext Corp., 1695 10th Street, P.O. Box 860, Arcata, CA 95521 or call (707) 822-7079.

Automatic Stock Tracker

H & H Trading Company has released Stock Tracker 2.6 for the TRS-80. It automatically gets stock data from the Dow Jones Information Service and processes it. The computer will process daily price and volume quotes on all securities tracked; retrieving quotes on up to 100 stocks per call.

Stock Tracker 2.6 is an enhancement of the Stock Tracker 2.5 which is a keyboard data-entry version. The original Stock Tracker is used to perform technical volume analysis of individual securities, generate buy and sell signals, graphs, and other information on demand. A companion program, called Market Tracker, retails for $225 and is used for overall stock market analysis and trend prediction.

Users are required to have Model I/III (48K), two or more disk drives, TRSDOS, Radio Shack Modem II, telephone outlet, 80-column printer, Stock Tracker version 2.5 ($395), Videotex or other subscription to Dow Jones and/or CompuServe electronic data bases. Stock Tracker version 2.6 retails for $295, and there is an annual maintenance fee of $100 for updates whenever the data base protocol or format is altered. For information, contact H & H Trading Company, P.O. Box 549, Clayton, CA 94517 or call (415) 672-3233.

Personal Diary

My Personal Diary is a year-round computerized log of events and daily happenings. A two page display for each day of the year shows notes, registers birthdays, anniversaries, and other yearly recurring events. The calendar display highlights important days for each month. Printout capability is included. Available for the TRS-80 on diskette for $29.95 plus $1.50 s/h from International Computer Products, 346 Western Ave., Los Angeles, CA 90004.

Model 16 CP/M

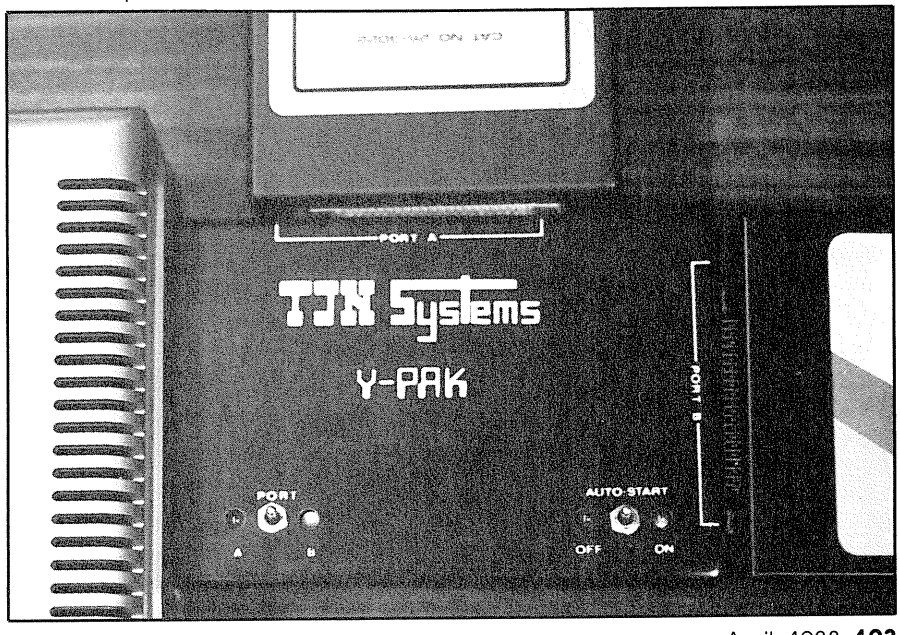
TriSoft has introduced the CP/M-68K operating system for the Model 16 and the Model II Enhanced computers. It adds speed and the power of the 16/32 bit MC68000 under CP/M-68K while maintaining compatibility with the vast library of CP/M 2.2 software.

The TriSoft CP/M-68K operating system runs in conjunction with CP/M 2.2. Easy context switching allows the user to go quickly from one to the other. While under CP/M-68K, the Z80 processor acts as an I/O slave, freeing the 68000 for more tasks.

Support utility programs and a 68000 assembler are included. An industry standard C compiler is also available. For more information contact TriSoft, 4102 Avenue G, Austin, TX 78751 or call (800) 531-5255, Ext. 784.

Color Computer Keyboard

Dual Port Expander



Advertiser index

Advertiser	Page
ABC Data Products	117
Aardvark	17
Abacus Associates	99
Access Unlimited	10, 11
Acoustic Research	117
Adventure International	76, 125
Allen Gelder Software	50
Alpha Products	34
Alps	15
American Small Business Computers	48
American Software Club, Inc.	29
Anitek Software Products	92
Applied Micro Systems, Inc.	47
Avalon Hill Microcomputer Games	49
B. T. Enterprises	37
Barclay Whyte Associates	115
Bob's Charts	118
CDC	67, 111, 117
CLOAD Magazine, Inc.	95
CRB Microtools	111
Chromasette Magazine	94
Communication Cable Company	112
Compu-Kit	51
Computer Label Co.	118
Computer Plus	89
Computer Shack	53
Computer Shopper	107
Computer Systems & Services, Inc.	115
Computer Trader	103
Comstar Research	115
Comtronic Systems	113, 117
Convert-A-Disk	111
Cosmopolitan Electronics Corp.	59
Cybertext Corp.	73
Data Mania, Inc.	115
Dental Computer Newsletter	113
Digital Images	118
Dillio, Gary	119
Direct-To-Tape	118
Downeast Digital	118
EAP Company	113
80-U.S. Journal	9, 36
Epson America, Inc.	26, 27
Excellonix	113
Fantastic Software	3
Future View	124
Glenn/Cliff Associates	111, 113
HBJ	82
HPB Vector	91
Hexagon Systems	88
Holman D-P Service	115
Holmes Engineering, Inc.	103
Institute for Scientific Analysis	39
International Color Computer Club	117
International Communications Expert	117
Interpro Corp.	42
J.E.S. Graphics	111
Jan Tech	112, 118
KCH Consulting, Ltd.	92
Kalglo Electronics Co., Inc.	119
Kensoft	118
Kjell Engineering	99
Langley-St. Clair Systems, Inc.	58, 127
LeSarge, Theodore	112
Lindbergh Systems	8
Lobo Drives	63
Logical Systems, Inc.	126
Lyben Computer Systems	117
MISOSYS	75, 85
Marymac Industries, Inc.	43
Mercer Systems	73
Micro Architect, Inc.	111
Micro Management Systems, Inc.	71
Micro Moonlighter Newsletter	118
Micro Software Systems	79
Micro-Systems Software, Inc.	2
MicroLabs, Inc.	83
Microsette	20
Midwest Comp-U-Tron	70
New Classics Software	68
Nichols, Joseph, Publisher	113
Nocona Electronics	16
Ocean, Inc.	115
Orion Instruments	84
PAB Software, Inc.	124
PMC Software	21
Pan American Electronics	93, 115
Parson's Software	117
Perry Oil & Gas, Inc.	77
Pioneer Software	40
Powersoft	13, 52
Practical Computer	118
Practical Programs	113
Process Control Technology	89
Programmer's Guild, The	105
Prosoft	7, 121
Quatrk Computer Systems, Inc.	117
REM Industries	115
Radio Shack	64, 65, 128
Rainbow, The	78
Sales Data, Inc.	55
Scientific Engineering Laboratories	113
Seasoft	111
Skeberdis, Pete	111
Snappware	32, 33
Software Options, The	41
South Fork Software	113
Spectrum Projects	111
Starlight International	93
TAB Publishing	62
TOPS Programming Enterprises	115
Vespa	122
Wadsworth Electronic Publishing	81
Wiley, John & Sons	25
Zeta Software	88

FROM THE ARCADES OF TOMORROW . . .

A MICROCOMPUTER EXPERIENCE FOR TODAY

Arcaders who've seen and played the ATARI and TRS-80 versions of STRATOS came to the same conclusions — these state-of-the-art games were ahead of their time. After all, any program that boasts crisp graphics, punchy sounds, joystick compatability and a full complement of extras, like high score saving and multi-player option has a definite touch of tomorrow.

THE GAME'S SCENARIO IS A REAL KNOCKOUT

The object is to successfully defend a futuristic city from waves of attacking alien ships.

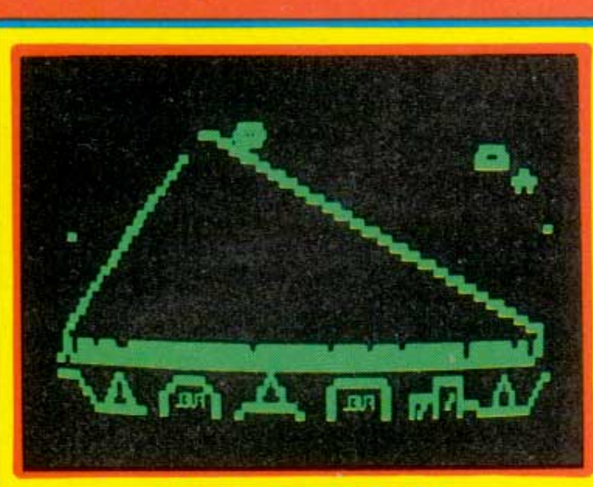
ATARI SCREEN SHOT
The battle begins! Atari version features colors and sounds that YOU can change!

And these crafty alien critters are just part of a rapid-fire graphics bonanza that includes meteor swarms, multiple attack waves, and even a free-moving saucer that will repair your city's damaged force field on the ATARI version.

GOOD NEWS

You don't have to wait years for the spectacular — STRATOS is available now for the ATARI and TRS-80 systems.

STRATOS. Entertainment of the future — today.



TRS-80 SCREEN SHOT
The TRS-80 version blows you away with its Arcade Action Graphics(tm)!

Adventure INTERNATIONAL

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.

Published by ADVENTURE INTERNATIONAL
a subsidiary of Scott Adams, Inc.
BOX 3435 • LONGWOOD, FL 32750 • (305) 830-8194

ARCADE GRAPHICS ACTION™

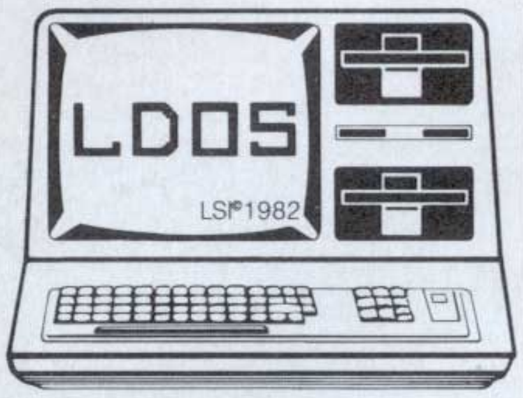
AVAILABLE NOW!

ATARI 400/800 16K TAPE . . .	050-0161	$34.95
ATARI 400/800 32K DISK . . .	052-0161	$34.95
TRS-80 16K TAPE	010-0161	$24.95
TRS-80 32K DISK	012-0161	$24.95

PRICES SUBJECT TO CHANGE

LDOS MICRO REVIEW

Volume 1 No. 2 ★ SPECIAL EDITION ★★★ April 1, 1983



*You'll think you've made the DOS strike of the decade when you turn your micro on to LDOS. You'll find a bonanza of features like full keyboard type-ahead; a true background spooler; file backup by date, class, and between different drive types; hard disk support; data transportability between Model I and III; and a complete communications utility including disk file send and receive. Support for Radio Shack's Doubler and selected others is also provided.

With our Job Control Language, you get true "hands off" running of your application programs — give a single command and then walk away. The 400 page manual includes examples of all commands and utilities. The Operator's Guide gives you step by step instructions on how to use LDOS with your applications. Stop running with only "half" a computer! Let LDOS provide the missing features to speed up and simplify your TRS-80 computer system! Visit a dealer or contact LSI for more information on the most popular sophisticated operating system for your TRS-80.

LDOS is available worldwide through thousands of dealers for just $129+S&H.

*Certain features of LDOS require specific hardware.

The BASIC Answer

The BASIC Answer is a BASIC text processing utility. It is designed to allow the BASIC programmer to build code in a structured manner. "Source" code is written with a word processor or text editor which allows the user to exploit the powerful editing and movement features characteristic to those types of editors. Source code can even be created by your own BASIC interpreter. **The BASIC Answer** is then used to process these files into normal interpretive BASIC code.

Free Yourself from Line Numbers

The BASIC Answer allows substitution of labels for **line numbers!** This means that your BASIC code now can read like a novel. Instead of the typically undescriptive "GOSUB 1000", a label such as "GOSUB @Search.Name" is used. Imagine yourself reading code filled with such descriptive branches and understanding it at a glance, even years later. This feature even allows totally relocatable BASIC routines without the renumbering problems.

TRS-80 is a trademark of Tandy Corporation. LDOS is available for the TRS-80 Model-I and Model-III. Prices and specifications subject to change without notice. LDOS and The BASIC ANSWER are products of Logical Systems, Inc.

```
ORLP!=2TOHA!PRINT@32,"primes found
FHA!/LP!=INT(HA!/LP!)THENGOTO48"CH
EXTLP!:IFVAL(FA$)=LO!THENFA$="* Pr
R!(CO%)=LO! on this scan"USING"##,
R$(CO%)=FA$LEN(FA$)-1)FORLO!=ST!T
O%=CO%:PS%=PS%+1ELSEFA$=LEFT$(FA$,
ORLP!=ØTO1ØPRINT@Ø,"factoring "US
RINT@64*LP!+192,PR!(LO%),PR$(LO%):
O%=LO%-INPUT"ORIGIN OF SCAN";IN$Ø
FLO%=-1IFVAL(IN$)<2THEN11NG"###,##
EXTLP! ST!=INT(VAL(IN$))##";PS%;R
O%=CO%+INPUT"   END OF SCAN";IN$(
FCO%=11EN!=INT(VAL(IN$))IMPR!(1Ø),
FHA!/LP!=INT(HA!/LP!)THENGOTO48"CH
EXTLP!:IFVAL(FA$)=LO!THENFA$="* Pr
R!(CO%)=LO! on this scan"USING"##,
R$(CO%)=FA$LEN(FA$)-1)FORLO!=ST!T
O%=CO%:PS%=PS%+1ELSEFA$=LEFT$(FA$,
ORLP!=ØTO1ØPRINT@Ø,"factoring "US
RINT@64*LP!+192,PR!(LO%),PR$(LO%):
O%=LO%-INPUT"ORIGIN OF SCAN";IN$Ø
FLO%=-1IFVAL(IN$)<2THEN11NG"###,##
EXTLP! ST!=INT(VAL(IN$))##";PS%;R
O%=CO%+INPUT"   END OF SCAN";IN$(
ORLP!=2TOHA!PRINT@32,"primes found
FHA!/LP!=INT(HA!/LP!)THENGOTO48"CH
```

A New Concept in Variable Usage

The BASIC Answer allows variable names to be as long as 14 characters and ALL 14 are significant. Imagine reading:

"IF ACCNT.OVERDUE #> 0 THEN GOSUB @PRINT.DUN"

rather than

"IFAO#>0THEN GOSUB52130"

Which would you rather read? It also introduces to BASIC the concept of Global and Local variables. This feature circumvents the tedious problem of variable tracking because a Local variable is only viable in its own subroutine!

NOW AVAILABLE
LDOS 5.1 Quick Reference Card
$5.95+S&H.

End the Multiple Machine Hassle

The BASIC Answer introduces the concept of **"Conditional Translation."** This feature allows the programmer to place different "machine dependent" code simultaneously into the same Source Code. **The BASIC Answer** can be "switched" when processing to ignore the unwanted or include extra code! No more multiple master programs to confuse maintenance. All the masters could now be rolled into the same program. Modify the one master and you've modified them all. Process the same code with different switches set, and get two or more versions from the same source. **The BASIC Answer** combines the self-documenting power of COBOL with the relative ease of BASIC together with the power of a word processor. **The BASIC Answer is available for just $69.00+S&H.**

* **The BASIC Answer** requires the LDOS Operating System.

LOGICAL SYSTEMS INC.

8970 N. 55th Street
P.O. Box 23956
Milwaukee, WI 53223
(414) 355-5454

"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.

Radio Shack Announces a NEW TRS-80® Computer...With the Lowest Price Ever!

Pocket Computer Model PC-4
69.95 26-3650

PC-4 Cassette Interface
39.95 26-3651

PC-4 Printer
79.95 26-3652

Our Lowest-Priced Pocket Computer Ever! The new PC-4 is ideal for students, mathematicians and engineers because of its programming versatility, yet it measures only $^3/_8 \times 6^1/_2 \times 2^3/_4$"—slim enough to fit into pocket or purse. And with its matching components, it becomes a complete, portable computing system that's ready to go where you go.

Programmable in BASIC. The PC-4 goes beyond mere programmable calculators because it features the most popular computer language—BASIC. Common commands like GOSUB, LIST, STEP, and up to 13 others can be entered just by pressing two keys. Numeric accuracy is 10 digits. String variables can be up to 30 characters in length, and string commands include LEN, MID and VAL. There's a 12-character alphanumeric display, yet program lines can be up to 62 characters long.

Use It As a Calculator, Too. Built-in math functions include trig and inverse trig, radians and gradians, log, exponent, square root, angular conversions and absolute values.

How Is It Possible? The custom CMOS VSLI chip is the answer. It lets you maintain up to ten short programs in its 544-step memory—or combine programming area for longer programs. Each program can be identified and recalled with a single-key label.

Expandable, Too. For additional program and data space, get a 1K memory module. Add the cassette interface to store and load programs at 300 baud using an optional cassette recorder. Add the PC-4 printer and print 20 characters per line at 60 lines per minute.

Pick One Up Today! The super-light (just 4 oz.!) TRS-80 PC-4 is now at the Radio Shack Computer Center, store or participating dealer nearest you.

Radio Shack®

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

Send me the New RSC-9 Computer Catalog!
Mail To: Radio Shack, Dept. 83-A-178
300 One Tandy Center, Fort Worth, Texas 76102

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____

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