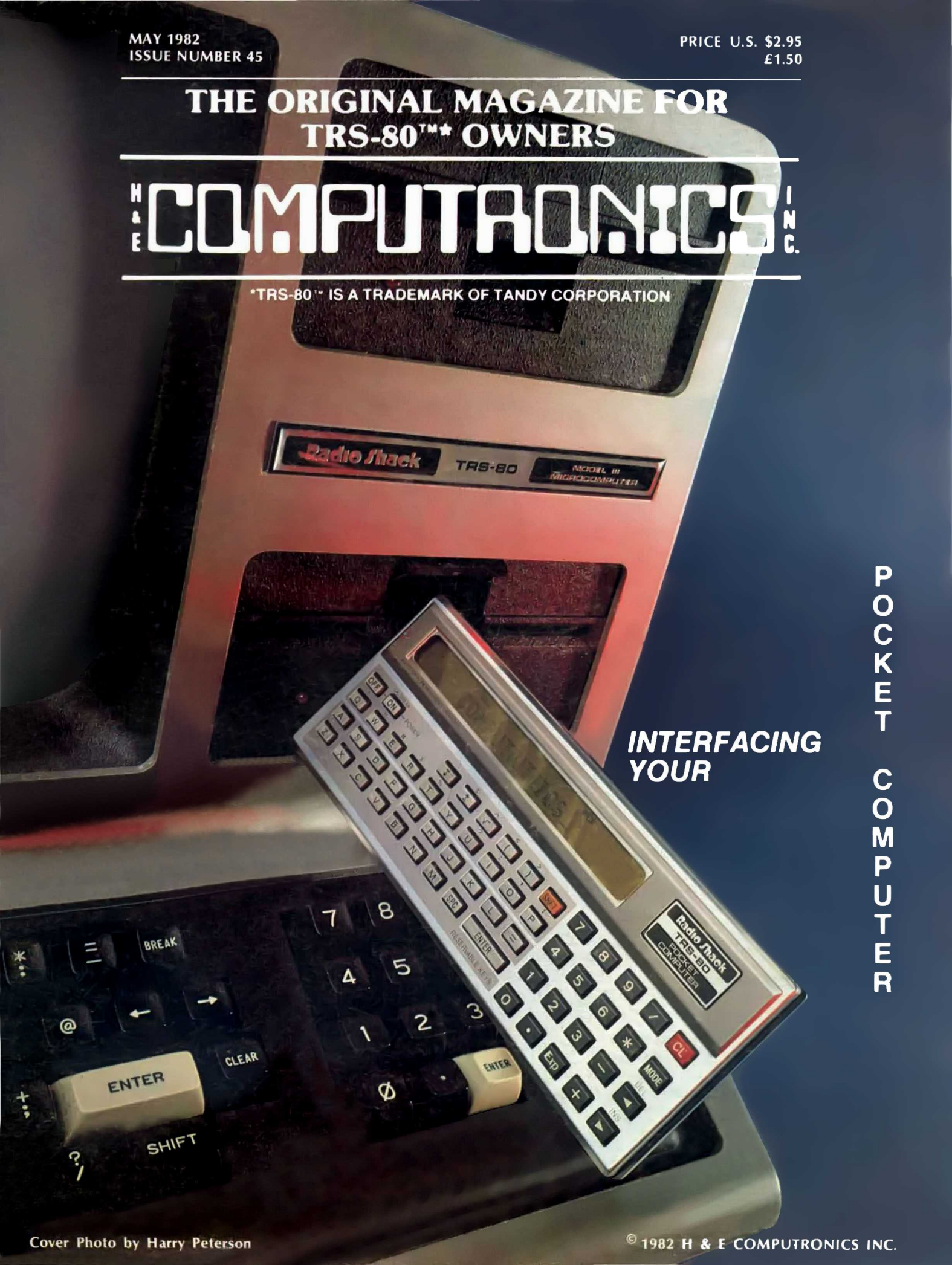
MAY 1982
ISSUE NUMBER 45

PRICE U.S. $2.95
£1.50

THE ORIGINAL MAGAZINE FOR TRS-80™* OWNERS

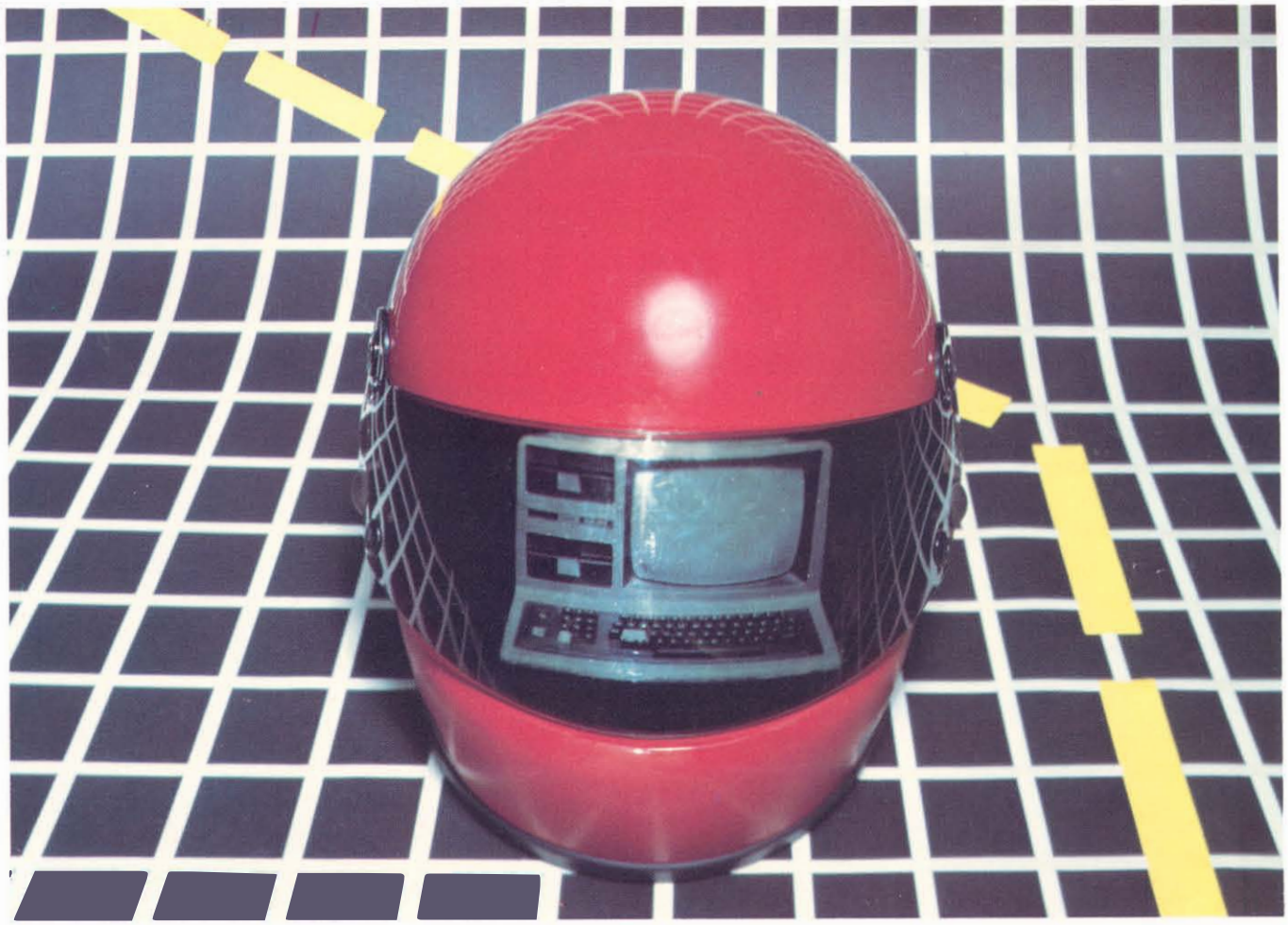
H&E COMPUTRONICS INC.

*TRS-80™ IS A TRADEMARK OF TANDY CORPORATION



INTERFACING YOUR POCKET COMPUTER

Cover Photo by Harry Peterson



Dosplus shifts into overdrive for business.

THE NEW DOSPLUS 4.0 HARD DRIVE SYSTEM MEANS BUSINESS

MAKE A SWIFT SHIFT The DOSPLUS 4.0 Hard Drive System turns your TRS-80 into a powerhouse for business applications. Shifting up to a hard drive is just like moving up from tape to floppy. It makes good business sense. You get the power, the dependability, the speed and capacity of a hard drive to power the software you need to keep your business in top gear.

MIND YOUR OWN BUSINESS The power potential of the TRS-80 driven by DOSPLUS 4.0 Hard Drive System lets you mind your own business just like the big companies do. You can control accounts receivable, accounts payable, inventory, payroll, invoicing and a whole lot more accurately and with confidence because DOSPLUS 4.0 is the only current operating system designed from conception for hard disk operation.

DOSPLUS 4.0 T.C.B. (Takes Care of Business) What good is a DOS if you have to spend so much time getting it to perform properly that your business suffers? The DOSPLUS Hard Drive System takes care of the computer while you take care of your business. It's a smooth, swift and silent business partner with the potential to handle up to 40 megabytes of capacity in 4, 10 meg units." So now you can shift your TRS-80 into over drive with DOSPLUS.

THE DOSPLUS 4.0 FEATURES

- Single volume addressing/Double sided floppies seen as one drive—Any single file can expand to limit of hard drive (up to 10 meg.)
- Hard disk—disk editing utilities • Incredible I/O speed
- Runs any combination of densities or tracks
- Also operates 8" drives with special hardware—comes with expanded users guide and complete DOS technical section on I/O calls and DCB organization
- "PLUS" ALL OF THE SENSATIONAL NEW DOSPLUS 3.4 FEATURES

THE DOSPLUS 4.0 HARD DRIVE SYSTEM

- Smooth, silent, swift • Error-free disk I/O
- *Add on up to 4, 10 meg units for a total of 40 megabytes!
- Plugs on the 50 pin data bus.—no loss of floppy drives
- Completely self-contained—just plug it in and go

*10 meg units available Soon.

NOTE: Specify 40 or 80 track when ordering DOS diskette. After initial bootup, user can create any DOS desired.

STARTING FROM $2995 COMPLETE TAKE YOUR MICRO TO THE MAX.

Lifetime warranty on original media.

For more information Reader service card 384

DOSPLUS DOSPLUS first in quality! First in the industry!

MS Inc. Micro-Systems Software, Inc. Specializing in the Tandy Line 5846 Funston Street Hollywood, FL 33023

CALL TOLL FREE (Outside of Fla.)
1-800-327-8724 ext. 197
FOR VISA/MASTERCHARGE/C.O.D. ORDERS TOLL FREE LINES WILL ACCEPT ORDERS ONLY!
For Applications and Technical information call (305) 983-3390 or drop us a card.
Dealers inquiries invited

MAY 1982 **ISSUE NUMBER 45**

CONTENTS

FEATURES

REGULAR DEPARTMENTS

All correspondence should be addressed to The Editor, H & E Computronics, Inc., 50 North Pascack Road, Spring Valley, NY 10977. Unaccepted manuscripts will be returned if accompanied by sufficient first class postage. H & E Computronics will not be responsible for the return of unsolicited manuscripts, cassettes, floppy diskettes, program listings, etc. not submitted with a self-addressed, stamped envelope. Opinions expressed by the authors are not necessarily those of H & E Computronics, Inc.

For information about receiving copies of *COMPUTRONICS* in quantity contact:
Worldwide Media Service, Inc.
386 Park Avenue South
New York, New York 10016
Attenion: Sandra A. Joseph
Cable: WORLDMEDIA
Telex: 620430 (WUI)
Tel.: (212) 686-1520

U.S. and Canadian Distributor
H & E Computronics, Inc.
50 North Pascack Road
Spring Valley, New York 10977
Attention: Steven M. Kahan
Tel.: (914) 425-1535

BITS AND PIECES

Howard Y. Gosman

ON THE COVER: INTERFACING THE POCKET COMPUTER

If you check out the ads in this issue of COMPUTRONICS, you'll see that we're advertising two brand new pocket computers.

The first is the new SHARP POCKET COMPUTER. As most of our readers know, SHARP manufactures the RADIO SHACK POCKET COMPUTER. H & E COMPUTRONICS, INC. now has the PC-1500 (equivalent to the TRS-80 PC-II).

Our second pocket computer is called the LINK. H & E COMPUTRONICS, INC. jumped at the chance to become PANASONIC's first authorized POCKET COMPUTER dealer. The LINK is higher priced than the SHARP. Although prices start at $500, most people will wind up paying $675 (that includes additional memory and MICROSOFT BASIC).

The two new pocket computers represent a big step forward for computer owners and are far more advanced than the original RADIO SHACK POCKET COMPUTER. Both computers can be interfaced to the TRS-80 or any other computer, making word processing, data storage, inventory control, price quotes, etc. all available at your fingertips. The PANASONIC POCKET COMPUTER can also be interfaced with any color (or black and white) television. The addition of a very complete MICROSOFT BASIC makes it a truly portable computer. The color graphics on the new SHARP printer (or RADIO SHACK PC-II) makes it very attractive for many diverse uses.

MODEL II OWNERS NOTE

I have just tried out the latest RACET COMPUTES utility called FASTBACK. It is unbelievable. It allows the user to backup a diskette in well under a minute. Imagine, backing up all of your data diskettes on a daily

continued on page 5

The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE is published by H & E Computronics, Inc., 50 North Pascack Road, Spring Valley, New York 10977. *The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE* is not sponsored, nor in any way officially sanctioned by Radio Shack, a division of Tandy Corporation.

The purpose of the *H & E COMPUTRONICS MONTHLY NEWS MAGAZINE* is to provide and exchange information related to the care, use, and application of the TRS-80™ computer systems. H & E COMPUTRONICS, Inc. does not take any financial responsibility for errors in published materials. Users are advised to check and edit vital programs carefully.

The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE encourages comments, questions, and suggestions. H & E COMPUTRONICS will pay contributors for articles and programs published in the magazine.

The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE is typeset by Photonics, Ltd., 188 Highwood Ave., Tenafly, NJ 07670, and is printed by Kay Offset Printing Service, Inc., 154 Grand Street, New York, NY 10013.

SUBSCRIPTION RATES

$24 per year	SURFACE MAIL	U.S. Only
$36 per year	FIRST CLASS MAIL	U.S.
$36 per year	AIR MAIL	Canada and Mexico
$48 per year	AIR MAIL	Outside U.S., Canada and Mexico
$3 per copy	Single Copies	U.S., Canada and Mexico
$4 per copy	Single Copies	Outside U.S., Canada and Mexico

Foriegn subscriptions and sales should be remitted in U. S. funds drawn on a U.S. bank.

YOUR SUBSCRIPTION HAS EXPIRED IF . . . THE NUMBER ABOVE YOUR NAME AFTER THE DASH ON YOUR MAILING LABEL IS 45 (OR LESS). THE NUMBER FOLLOWING THE DASH TELLS YOU THE LAST ISSUE THAT YOU WILL RECEIVE. For example, if your subscription number is 16429-45, your subscription expires with this issue (issue #45).

SAVE / on Software and Hardware for TRS-80®

CHEXTEXT®

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

Features of this program include:

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

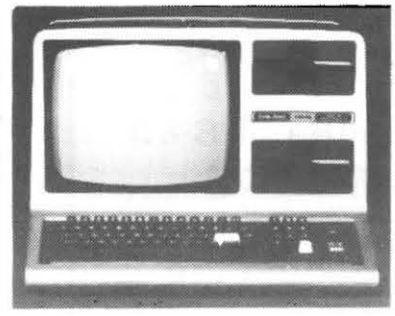
NEW LOWER PRICE $59.95

MODEL III PRICE LIST

(All 48K with TANDON drives)

1 single sided 40 track drive	$1695.00
2 single sided 40 track drives	1895.00
1 dual sided 40 track drive	1820.00
2 dual sided 40 track drives	2145.00
1 single sided 80 track drive	1845.00
2 single sided 80 track drives	2175.00
1 dual sided 80 track drive	1995.00
2 dual sided 80 track drives	2395.00
with RS-232 C Add	115.00

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



MISCELLANEOUS SUPPLIES

DISKETTES

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

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

PAPER

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

OTHER

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

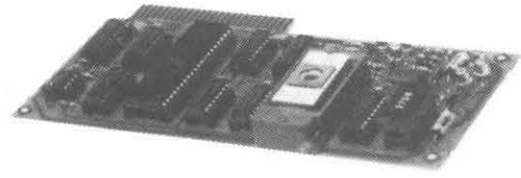
APPARAT'S PROM BLASTER

An eprom programmer for all 25 X X and 27 X X chips. TRS-80®

MOD I & III	$149.00
CABLE	$ 17.95

BUS EXTENDER

mini version with 2 card slots and no enclosure ..... $ 69.95



SPECIAL - FREE GRAFTRAX

with EPSON MX-80 Printers

MX-80 **$499.00**

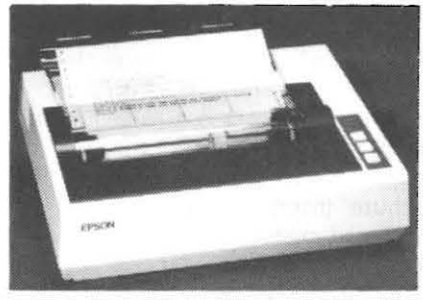
MX-80F/T **$575.00**

MX-100 **$775.00**

Printer Cables **$24.00**

(Specify Computer Type)

WE ALSO STOCK OKIDATA & NEC PRINTERS CALL FOR PRICES



ASSORTED ITEMS OF INTEREST

MICRO CLINIC, Mod I $24.95, Mod III $29.95
The ultimate in memory & disk diagnostics

MEAL MASTER, Mod I & III Disk $24.95
meal planning & grocery shopping aid

FLEXTEXT/80 (requires Graftrax) **$34.95**
ultilize the additional features of the MX-80 printers under model I & III scripsit

MICRO ACCOUNTING SYSTEM, $479.00
Interactive G/L, A/R, A/P & checkbook manager

UNI-TERM/80, $89.00
Universal terminal program that takes advantage of the extended NEWDOS/80 commands

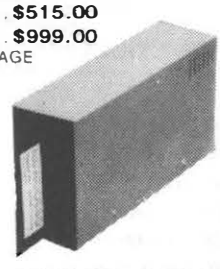
BASIC BETTER & FASTER BOOK, $23.95

NEW LOWER PRICES ON TANDON DISK DRIVES

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

- Single sided 40 track **$285.00**
- Dual 40 or Single 80 track **$415.00**
- Dual sided 80 track **$515.00**
- **Special** - 2 Dual sided 80's **$999.00**

(ADDS ALMOST 1.5 MEGABYTES OF STORAGE TO A D. D. MOD I OR A MOD III)



MODEL I DOUBLE DENSITY PACKAGE

Converts a standard TRS-80 Model I to Double Density.
Apparat Doubler & NEWDOS/80 V 2.0
$278.00 value for only **$219.00**
Doubler alone **$129.00**

NEWDOS/80 Version 2.0

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

Some Features available are:

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

All this plus much more for only

$149.00

InfoWorld
Software Report Card

NEWDOS/80 Version 2.0

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	☑
Documentation	☐	☐	☐	☑
Ease of Use	☐	☐	☑	☐
Error Handling	☐	☐	☐	☑

VISA

Apparat, Inc.

"On-going Support for Microcomputers"

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

Scripsit & TRS 80 are a registered trademark of Tandy Corporation

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

THE CRYSTAL BALL

(News and Rumors of Interest to TRS-80™ Owners)

Instead of discussing rumors, this month's *Crystal Ball* will concentrate on **facts**—things that have already happened, but you may not yet have heard of them.

BIG COMPANIES RUSHING INTO COMPUTER BUSINESS

Many large corporations are rushing to get into the personal computer business in ways that would have seemed impossible even a year ago. **Sears** Business Product centers opened in October 1981 and became one of the primary outlets for the IBM Personal Computer (the other was the ComputerLand store chain). These exist now mainly in the midwest, but Sears is rapidly trying to expand to other areas of the country.

Macy's has now inaugurated a department for the sale of personal computer hardware and software. Called "Computer Solutions", it will start only in the Union Square location in Macy's of San Francisco. This will be a test market. Macy's executives will be looking carefully at the results to determine whether to open outlets in New York and the midwest.

American Express is now selling the Sinclair ZX81 computer, the world's cheapest micro, through the mail, in a brochure inserted into bills sent to credit card customers. This could well become the most popular computer in history, primarily because of its low price ($150) and also because they have been selling extremely well in England. Now the **Timex Corporation**, sole manufacturer of the ZX81 since its invention, plans an extensive marketing campaign for the computer in the United States.

REAGAN'S TECHNOLOGY CURBS MAY STIFLE TECHNOLOGY

The Reagan administration has been taking serious steps to reduce the flow of technology out of the United States into the Soviet Union. They plan to do this by placing all kinds of classifications on technical information and the export of products from this country.

There is no question that a serious problem has existed in this area, but many R & D scientists feel that this approach will have a chilling effect on technology here at a time when Japan and France are possibly overtaking the United States in some of these developments. Japan already has the lead in semiconductor manufacturing, and new curbs on U.S. exports may simply allow the Japanese and French to move into markets where we are still at least competitive. The engineering and higher education communities have already been stunned by the announcements made to date.

FRANCHISE STORES EXPANDING COMPUTER RETAIL MARKET

One of the hottest new businesses is the computer hardware and software franchise store. There are many reasons for this situation, which will be apparent if you stop to think about it:

- Franchise stores have greater purchasing power because they can make large purchases at greater discounts than individual stores.
- There is greater competition from captive stores owned by big companies like Radio Shack (Tandy), IBM, Digital Equipment Corp. and Xerox.
- The large number of new systems on the market has made product evaluation extremely difficult for all but those with the most competent technical staff. Even then, many stores have been "burned" by products that did not perform as advertised, such as the Apple 3.
- The explosive growth of the personal computer industry has opened the way for a greater number of stores.

It is not yet clear what pattern will emerge to dominate the microcomputer marketplace. Many micros will still be sold by the manufacturers, either directly or through outlets, like Radio Shack. Others will be sold by salesmen who visit customers but who cannot show them the finished product until they have bought it, complete with software. Most of these franchise stores will be showrooms, where customers can view all the latest products, both hardware and software, before purchasing.

The most successful computer franchising operation has been the Com-

puterLand stores, which are now registered in every state and which generated sales of over $200 million last year. Other franchisers to watch are MicroAge Computer Stores, On Line Microcenters, the Computer Store, Byte Industries, Computer Mart, New Century Data (Super Tec) and Programs Unlimited. ■

continued from page 2

basis in minutes! The program is available now and sells for $75.

CATALOG #9 IS ON THE WAY

H & E COMPUTRONICS, INC. has just completed CATALOG #9. All current subscribers should be receiving their new catalog shortly.

A LOOK AT THE MODEL 16

Radio Shack announced their new Model 16 computer with a lot of blaring trumpets, but it has been very hard to get detailed information about the machine, and of course nobody has yet received one. We have now seen the specifications, and it is time to separate the fact from fiction.

The main reason for introducing the Model 16 after an obviously hurried development was to counter the inroads that IBM has been making on the small business computer market. IBM has a 16-bit machine—one which can offer advantages over almost all the most popular microcomputers now—so it seems Radio Shack had to offer a 16-bit machine too. In spite of the fact that there is a powerful 16-bit processor in the Model 16, I doubt that ANY users will be prepared to make use of it for a long time to come, because Radio Shack has NO software for it. That is why Radio Shack also included a Z-80 microprocessor, exactly like the Models 1, 2, and 3. What most people will wind up doing is just using the old 8-bit Z-80. So why get a Model 16?

The reason why you should consider a Model 16 is that its storage capacity is terrific. In the space occupied by one Shugart 8-inch disk drive on the Model 2, you get two double-sided Tandon disk drives. Thus you get four times the storage capacity—two and a half megabytes—in the same space. No other popular manufacturer has such a bargain at the present time. In fact, that is precisely where the IBM computer is weakest, and it will not be until IBM (or some other company) introduces a hard disk drive that its capacity will be in the same ball park as the Model 16.

In addition to the two internal floppy disk drives, Radio Shack has introduced an 8.4 megabyte hard disk drive for both the Model 2 and the Model 16, and there is even a secondary unit, up to three of which can be added to the primary unit for a total capacity of over 33 megabytes. If you buy all this, however, the cost will be in the megabucks—over $20,000!

To get back to the 16-bit processor of the Model 16, the only software Radio Shack has said it has is an Editor/Assembler package. This will go over with the business users like a lead balloon! There is talk about a COBOL language development system ("COBOL" stands for "COmmon Business Oriented Language", and it is the most popular business language for mainframe computer systems), but we don't think that the machine will really be attractive until Radio Shack gets a version of BASIC running on the machine that is compatible with all the Model 2 Basic software they already have. That is not likely to happen very soon, because the 68000 processor of the Model 16 has a completely different architecture from the 8080-Z80 architecture of the Models 1-3.

That is where IBM seems to be ahead of the rest at this time. IBM used the Intel 8088 processor in the PC. This processor was specifically designed as an "upgrade" of the 8080, and it includes all of the 8080 registers as well as several new ones. It is possible to take any 8080 program and get it running on the 8088 with simply a translation program, and therefore there is a multitude of software that is already running on the IBM before Radio Shack even has a BASIC for the 68000.

The real reason for the importance of 16-bit processors in the new microcomputers is that they can address more than 64K bytes, which is the maximum for all 8-bit processors. Ultimately, the Model 16 can be expanded to an internal memory of 512K—over half a million bytes, 8

continued on page 6

continued from page 5

times the capacity of the Model 2. Someday, that will be an important point, but not at the moment.

THE DT-1 TERMINAL

At the same time that Radio Shack announced the Model 16 and the PC-2 pocket computer, they also announced the new DT-1 Data Terminal. Just as the Model 16 is a beefed-up Model 2, this looks like a "watered down" Model 3. It has a white cabinet instead of the gray Model 3 (just like the white Model 16 instead of the gray Model 2). We would advise anybody considering this unit to consider instead a 16K Model 3 with RS-232C interface and Howe Software's SMART TERMINAL program. That way, for practically the same cost they can get an entire computer that can someday be expanded. The DT-1 can never be expanded, although in other respects it looks like a good machine and quite suitable for "dumb terminal" applications.

MODEL I DOUBLE DENSITY

The Model 1 is not dead! Just when we thought Radio Shack had given up on it, they announce a new double density disk kit for the Model 1 for $149.95. This has been available from other companies for a long time now, but Radio Shack didn't seem to approve. Now they have even released a new double density version of TRSDOS 2.3, which contains all the features of TRSDOS 1.3 on the Model 3. Model 1 users can now increase the capacity of a single disk drive to 152K bytes—184K on a 40-track drive.

The good thing about this is that it may lead to a standard for double density operation on both the Model 1 and the Model 3. Maybe even the diskettes will be usable in both machines. ■

LETTERS TO THE EDITOR

Radio Shack's Service

Your comments on RS repair policies hit a resonant note with me. I battled their weird ideas to the point where I was almost ready to go down and see my friendly Apple dealer, who will guarantee that I will never be down over 24 hours. Along came a buyer for my Model I, and I let it go and then bought a Model III with everything on it, because it was available on the spot.

I have tried to schedule my unit for service, at the RS center's convenience, and it has never been acceptable to them. Yes, if I would buy a service contract at 12% of the purchase price, they would give me a priority contract and drop what they were working on to fix it, but no deal on the appointment bit. I am 55 miles away from the service center, part of it thru city traffic, and I can figure on three hours minimum for the round trip. Another three hours when I go back after it, and if you are paying an employee to do this or doing it yourself at whatever rate you use, this can be expensive. Hopefully, the Model III will stay together better than the Model I, but I've developed a drive problem which needs service, and for once they have agreed to a date and time. I'll have it up there then and hopefully take it back with me. If not, I am going to look at some of the newer offerings. In a business application, you cannot afford to have a computer out of service for 5 to 7 days, as they suggest.

Now, we have been using Teletype machines in our office for 20 years or so, and service has never been a problem. On a non-contract basis, we have never had to wait more than two hours for a serviceman to arrive with all of the parts needed to do the job. RS should learn a lesson from Western Union in the service area.

And they will learn it, too! With IBM, who has an excellent service department, getting into microcomputers as heavily as they seem to be, they will be able to provide service like RS never believed!

I have tried to figure out the logic that rules at RS, and I am at a loss to understand it. I can only surmise that they got into it heavy at first with games and figure that all the rest of us can be brushed aside a easy as a game enthusiast. That just isn't so. When I buy a machine of any kind, it has to pay for itself, and then pay me a profit after it has been amortized. Down time is costing me, and I resent the fact that a manufacturer has told me that it will work and it fails me. I realize that anything made by a human being is subject to failure, and I can excuse a few minor inconveniences, but a week's wait is unrealistic. I did not think that the boys in the ivory towers in Tandyville were that naive.

When I bought my first Model I, I asked several RS salespeople about how much redundance I would need to build into the system to avoid delay during a breakdown. Almost universally, they said that it would never be a problem, no need to buy two of anything! Add to this, the fact that I received a letter form on of the inhabitants of Tandy Towers, asking me what the term "emulate" meant, when I mentioned that function of the Apple III.

So, I have formed a number of opinions on the RS organization and their policies. The first is that they have a good product. Second, their service is based upon a false premise when business applications are concerned. Third, they are not acquainted with their competition well enough to know what is going on, and ergo, cannot describe the features of their machine that would be comparable or competitive with their antagonists. Their salespeople, except for the Computer Center personnel, are woefully lacking in a basic understanding of their product, and this is hurting them in the marketplace.

I would suggest that if this attitude continues, there will arise service personnel in even the small towns, and TV repairman or an amateur radio enthusiast who will be able to offer reasonably quick service on most any of the micros. We will be able to get the service we need WHEN we want it.

Let's face it, RS was the king of the hill at one time, but they're not any more, and the only way that they can even try to regain their position is to beef up their service and the expertise of their salespeople. I've found some good natured, well-informed and intelligent people in the RS stores, but also a lot of the other kind, and it's too bad.

continued on page 8

GUARANTEE
30 DAY, MONEY BACK† GUARANTEE
†Less 10% restocking charge.

If you are looking for The Finest In Word Processing Systems you can . . .

1. Purchase and examine all other word processing programs on the market, and then purchase **Lazy Writer®**
   or . . .
2. You can purchase **Lazy Writer®** first. **It's your money!**

Lazy Writer® Mod I or III
$175.00
*Requires 2 Disk Drives to convert only.

Proportional Spacing Option Now Available for Daisy Wheel II Printer – **Only $29.95**

MICRO PROOF
Spelling Checker

*A product of Cornucopia Software

- EASY TO USE
- 50,000 WORD VOCABULARY & EXPANDABLE
- RECOGNIZES PREFIXES & SUFFIXES
- REQUIRES ONLY 32K OF MEMORY & 2 DISK DRIVES
- AFFORDABLE & AVAILABLE IN THREE FORMS: fully independent program to identify errors; independent program to identify and correct errors; or with a conversion program that will permit MICRO PROOF to operate from within.

	Was	Now Only
Basic Micro Proof	$125.00	**$89.50**
with Correcting Feature		**$149.00**
Special Lazy Writer® Version with Correcting Feature works from within Lazy Writer®	$189.50	**$149.50**

Scriptsit Versions Available – Call for Price

THE COMPLEAT IDIOTS BOOKKEEPER
– Now Is Tax Season –

Turn your baskets full of receipts
into one super organized group of paper work.

If your income tax is a pain
you don't have The Compleat Idiots Bookkeeper!

Mod I & III – **$49.95**
FREE Overview Available

MAKE V.C.

Changes files to VISI CALC interchangeable for mod or V.C. file into The Compleat Idiots Bookkeeper readable files.

Mod I & III – Only **$24.95**

C.O.D. – certified check, M.O. or cash only. Most orders shipped next day. All orders must have shipping included. Please add 2% or $2.50, whichever is higher for shipping. Michigan residents, please add 4% tax. Add extra $1.50 for C.O.D. Personal checks take 3 weeks to clear. Out of the country orders add $10.00 extra shipping.
*TRS-80 is a product of Radio Shack, div. of the Tandy Corp.

SSM SOFT SECTOR MARKETING, INCORPORATED
6250 Middlebelt • Garden City, Michigan 48135
Order Line **800-521-6504**
Michigan Orders & Questions **313-425-4020**

The American Express® Card. Don't leave home without it.™
MasterCard
VISA

continued from page 6

The time has come into the micro business to either fish or cut bait, and time will tell whether RS is willing to do it or go back to peddling radio parts. I hope that they awaken to their opportunities, but only time will tell. One thing is sure, time WILL tell, and it probably won't be too long!

I hope that they shape up. I'd hate to have to ship out this new Model III!

Robert N. L. Forman
Monmouth IL 61462-0068
(309) 734 6127

Our Model 2 Free Diskette

Finally — I've been moved to action in support of the Mod II "Free" diskette that has evoked so much criticism. Nothing in your publications has led me to believe that this was complete, polished, ready-to-run software that would completely satisfy all of the needs of every MOD II user.

While several of the programs have been useful with some imaginative modification, its real value to me has been as an Erector Set. By careful study of each of the programs, I have picked up many little routines and coding tricks that I have seen nowhere else — for instance, the user of DEFFNRV$ to reverse the initials in the menu of the Word Processor. Rick Lederman's "Numerals to Word Phrases" has become a part of a large program just for printing checks. Gordon Williams "Text Formatter" is amazing in its simplicity, and I have modified it extensively to work with a mailing list of over 500 names. It has produced hundreds of letters such as this one, and for this purpose I prefer it to either of the Word Processors on the disk, as well as Scripsit.

Just keep on doing what you are doing — both publications are great, and the typos just add a little spice.

A. L. Shuhart
4730 Birchwood Circle
Carlsbad, CA 92008

Error in Radio Shack Editor/Assembler

In reference to a fatal error in Radio Shack's Editor/Assembler, Tape #26-2011, version 1.0 by Microsoft: After a few frustrating days of trying to type in the source code for the Morse receive only program in June 1981 COMPUTRONICS, it appeared there was an error in the Editor/Assembler or a bug in my particular tape. I decided the best route to confirm this was to have my local Radio Shack dealer try this program on a brand new Editor-Assembler, which he gladly did. Alas, the same error crept in! It seemed the 1.0 version of the Editor would not save the source code past the 220th line of test. A short call to the Tandy Corp. placed by my local Radio Shack dealer verified my suspicions. A bug indeed existed in the 1.0 version of the Editor/Assembler.

I now possess a new tape, also #26-2011, which is the 1.1 version by Microsoft, and indeed it does assemble the program quite well. I must point out, however, I am surprised that no one has spotted a slight problem in getting the receive only program to jump to the "INPUT TIME" statements! It states in line 340,350,3104 & 3105 that if the "shift S" is pressed the program will automatically jump to the appropriate time inputs. However, it will not due to the fact that it calls for an ASCII decimal 115 in lines 340 & 3104, the reason being that decimal 115 in ASCII is small S and the only way the Model 3 can execute this command in the program is to first press "Shift 0", then press "S". The Model 3 must go through this sequence in order to get into the lower case mode.

The only other problem I encountered with the program is that the Model 3 is fairly critical of input voltage as well as frequency. It is certainly prudent to utilize the phase lock loop system, also to "lock" to the incoming Morse signal, the system the author recommends.

Even though I had my problems with the Editor/Assembler and the program itself, I must say in all fairness that the local Radio Shack dealer was most courteous and helpful in determining the problem. I'm sure there are some of my fellow "hams" out there who can now stop tearing their hair out by what I have pointed out above. I must ask the question, though, of how many would stop and take the time and patience to type in this many

lines of text besides me?

George T. Isleib
GTI Electronics
RD 2 Box 234B
Leighton PA 18235

Error in Amortization of Loans Program

In working with the program "amortization of loans" in issue #41 I came across an error in Line 100 the (>) greater than symbol should be replaced by the up arrow, raised to a power. This will permit period payment to be calculated.

Norman Epstein
7349 W. Frost Dr.
Littleton, CO. 80123

Correction to SPELLOUT

I am writing this letter to you, using your Super Basic Text Editor. I have a TRS-80 Model I Level II with 48K and a Centronics 1 printer. Out of all the magazines I subscribe to, your's is still the best.

I have been working on Gordon Speer's Spellout program, which appeared in your January 1982 issue, page 60.

With few changes I have made to the <from the left> portion, lines 400 to 440, it now reads from the left to the right same as the others.

To accomplish this, I bring in the letters one line above Mr. Speer's then drop it down into the correct place. I also changed it into an input program, which allows me to type in my own message, up to 60 letters long.

Here are the changes:

from
```
120 LET M$="H & E COMPU-
TRONICS"
```
to
```
120 PRINT"ENTER YOUR MESSAGE
<60 CHARACTERS MAX>"PRINT:
INPUT M$
```
from
```
410 FOR N=L TO 1 STEP  -1
```
to
```
410 FOR N=1 to L
```
from
```
420 FOR X=0 to 32-L/2+N
```
to
```
420 FOR X=0 TO INT<32-L/2+N>
```
from
```
430 PRINT @ 511+X,"
"+MID$<M$,N,1>;
```
to
```
430 PRINT @ 447+X,"
"+MID$<M$,N,1>;:  IF X=INT<32-
L/2+N>
PRINT STRING$<2,8>;
```

add
```
432 NEXT X
435 PRINT @ 511+X,
MID$<M$,N,1>," ";
```

from
```
440 NEXT X,N
```
to
```
440 NEXT N
```

Jack S. Willett
14089 Buckner Dr.
San Jose, CA. 95127

Using DOSPLUS 3.4 with Word Processor

After using TRSDOS 2.3 since it came out, I reacently decided to move up to DOSPLUS 3.4. It's dynamite! I heartily recommend it to anyone presently using TRSDOS, especially if their disk drives do not all have the same track capacity.

The only problem I have encountered is that Dr. Howe's Word Processor does not print hard copy properly when operating with DOSPLUS. After some experimentation, I have found a small patch which provides proper operation with DOSPLUS and does not affect operation with TRSDOS, and since the patch applies only to the LPRINT statements, it permits proper printing of old text files.
les.

If you are using "WORD/OLD" (which I prefer), make the following changes:
```
1155 IF SP>0 THEN FOR M=1 TO SP:
LPRINT CHR$(31):NEXT M
1170 LPRINT TAB(LM);A$(J);
CHR$(31)
```
Users of "WORD/NEW" should make the following changes:
```
1360 IF SP>0 THEN FOR M=1 TO
SP:LPRINT CHR$(31): NEXT M
1390 LPRINT TAB (LM);A$(J);
CHR$(31)
```
Incidentally, I am successfully using

continued on page 10

continued from page 9

the Microsoft Basic Compiler with DOSPLUS 3.4 but do not expect it to support the enhanced BASIC commands; haven't tried it.

Richard L Davis
3926 Bledsoe Ave
Los Angeles CA 90066

Square Root Subroutine

Re: Your request for Square Root Subroutine in *Computronics* March, 1982 Page 61.

My TRS-80 Level II came with a Level I book as well as the added Level II book.

In the Appendix A: Subroutines, there are several routines (level I) for various math functions. I took the Level I square root and converted it slightly to double precision Level II:

```
10 DEFDBL A-Z
20 INPUT "SQ. RT. OF X";X
30 IF X=0 THEN Y=0: PRINT 0:
GOTO 20
40 IF X >0 THEN 60
50 PRINT"ROOT OF NEG.NO.!!":
GOTO 20
60 Y=X*.5:Z=0
70 W=(X/Y-Y)*.5
80 IF(W=0)+(W=Z)THEN PRINT
"Y=";Y:GOTO20
90 Y=Y+W:Z=W: GOTO 70
```

Victor Reinhart
61 Kirkland St.
Guelph, Ontario, Canada

Visicalc Printing

Thanks for your answer to my question about printing out of VISICALC on my teletype using the TRS-232 driver. I'm afraid that I was unable to change the driver address at 401EH from 0458H to 058DH. As soon as I got to the 8 the system would reset. This happened under both TRSDOS and NEWDOS/80 version 2.

The value of reading and re-reading the manuals was brought home to me when I discovered the answer I was looking for in the VISICALC manual under the heading "print command".

A VISICALC file is normally saved on disk by using the "/ S S" routine. The file must be saved this way because it is the only format VISICALC will read. The file may also be saved using the "/ P F" command. By positioning the cursor at the upper left corner of the document to be printed, answering the prompts with the file name and disk drive, and positionin the cursor at the lower right corner, it is saved on disk. The name extension "/PRF" is automatically appended.

The file is now loaded under SCRIPSIT and may be printed as it appears using the default print format, or the desired print format can be inserted. The file may be handled as any SCRIPSIT file. Text may be added, blank lines inserted, or other SCRIPSIT files chain-loaded (using the "L,C" command). Finally, the "P,S" command results in the printout I have been seeking for so long.

The only limitation, of course, is the number of columns that can be printed. My teletype limits me to 72 columns, so my file either has to be configured with this in mind, or it has to be chopped into sections by the cursor positon and each section saved separately. The resulting print-outs can be pasted together if a large spread sheet is desired. There is no limit to depth.

Jay Cox
15 Lake Drive East
Wayne, NJ 07470

Another Poem

MY 80'S AND ME!
My twin TRS-80's are
The very best of friends.
They interface with one another
—Gee, it never ends!
While one of them is busy doing
"Chores" around the house
—Controlling our environment—
The other's with my spouse.
They might be playing Blackjack, or
My home-made football game.
(It's really fun, and yes, has won
Some neighborhood-type fame!)

With two TRS-80's,
The possibilities
Extend to near infinity
—Or so it seems to me!
In terms of sheer computing speed,
They don't just "compliment",
But MULTIPLY each other's pow'r
To quite a great extent!
I always knew that having two
Would be more fun than one.
But yet, I never dreamed that they
Could get so much more done!

The secret? 'Tis the interface.
It is my pride and joy.
My wife say's I'm exactly like
A kid with some new toy!
I did design it all myself
—The interface, I mean.
And, if I do say so myself,
It really works quite keen.
You see, it lets my 80's work
In mutual-type tandem.
They BOTH do more than if they just
Computed, well, at random.

I've spent a lot of time to make
The interface just right.
If you'd like full particulars,
Then be my guest. Just write!

Michael Herbert Shadick
Cedar Square West, Apt. E-414
1515 South Fourth Street
Minneapolis, MN 55454

H & E Computronics welcomes letters on any subject. If you wish a personal reply, please enclose a self-addressed, stamped envelope.

H & E Computronics also welcomes readers to submit programs, articles, or reviews for publication. Please address correspondence to:

The Editor
H & E Computronics
50 North Pascack Road
Spring Valley, NY 10977

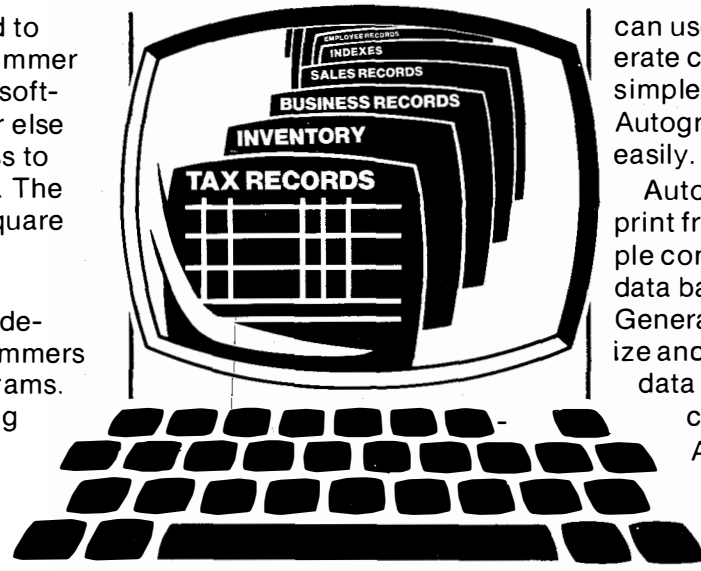
Please submit programs on media (cassettes or diskettes). Also please indicate the system it was prepared on, and include any necessary instructions. ■

Announcing AUTOGRAMMER.

Now you can write the programs your business needs— even if you have no programming experience!

Until now, you either had to hire an expensive programmer to custom tailor existing software to your business, or else try to adapt your business to someone else's software. The classic dilemma of the square peg in the round hole.

But now there's Autogrammer. Software designed to let non-programmers generate their own programs. No need for programming knowledge. No need to learn any programming language. All you have to know are the needs of your own business.



EASY!

Autogrammer is as easy to use as a typewriter, yet so powerful it puts all the muscle of your computer right at your fingertips. Many applications require only 10 or 15 minutes to complete. What you type on the screen, Autogrammer turns into a machine-language program that's ready to run.

VERSATILE!

Autogrammer has thousands of applications for both business and personal needs. Inventory records, sales and earnings projections, tax calculations, forecasts, employees files, stock market analyses. Using Autogrammer, you can create even complex programs such as tracking inventories, adding purchases, subtracting sales, crediting accounts, report and adjust for daily sales, add back to inventory, make adjustments for credits, defects, shipping charges, and much more. Having this kind of vital information available can simplify business decisions and save you money.

FLEXIBLE!

As your needs change, Autogrammer-generated applications can easily be revised, updated, expanded, or combined. Autogrammer writes finished, stand-alone programs which do not require Autogrammer for running. They work first time, every time. Everybody in your organization can use Autogrammer to generate custom programs. It's so simple, anyone can become an Autogrammer quickly and easily.

Autogrammer allows you to print from screen with one simple command or list the entire data base. The optional Report Generator allows you to organize and then report from the data base in the format you choose.

Autogrammer by Roklan costs $299.95 and is available for Tandy TRS-80* model II and soon for models I, III and CP/M versions, with other versions soon to come. Optional Report Generator, $199.00, for in-depth reporting from the data base.

LET'S FACE IT.

Nobody knows your business like you do. With Autogrammer, you can write your own programs and gain control of your own business by generating exactly the information you need.

Autogrammer for TRS-80* model II is available from H&E Computronics Inc. and other major distributors and dealers nationally.

The end of the square peg in the round hole.

*Registered trademark of Tandy Corp.

Roklan Software

10600 W. Higgins Road, Suite 200, Rosemont, Illinois 60018

PROGRAM PREVIEWS

A. A. Wicks

This Month: Auto Writer

There may be a plethora of data base management programs around, but as far as I am concerned there will never be enough. I make this statement because it seems that those being produced today are approaching a degree of sophistication that rivals, if not exceeds some of the capabilities of large mainframe systems. One that comes to mind is "Maxi Manager," which was reviewed in the June 1981 issue, and the updated version will be briefly reviewed soon.

The foregoing, of course, is a lead-in to the review of another management program. But this one should more properly be called an information processing system, because it is extrinsically unique—it uses your word processing program as its "host" so to speak, as well as providing several outputs from the data bases that you may create. The program, AUTO-WRITER, by David S. Walonick, President of Walonick Associates, is produced by Midwest Data Systems of Minneapolis, Minnesota, a division of the former company.

The program package comprises one or more disks (depending upon the system used), and an operating manual. Enclosed with the latter is an insert card (which will also vary by disk operating system), that immediately describes the preparation and installation of operating disks. It is worth mentioning that this instruction is probably the least complicated information for performing this function that I have ever read—and it worked, the first time (a fairly unusual experience)!

There are a total of five programs on the disks—STATS, SELECT, SORT, LETTERS and REPORT. By using your word processor in conjunction with these programs, you may create your own data base, and then use the functions of the word processor (or a built-in Editor), to maintain and edit the base. The word processing program may be SCRIPSIT™, Lazy-Writer™ or Electric Pencil™. This sounds like a departure from the norm, so let's see what is going here.

STATS is a sort of troubleshooting program that searches a prepared data base for errors or inconsistencies, displaying on the monitor any that are found in the process. It also reports on the number of records in the file and the length of each field.

SELECT creates a new file that is based upon requests made by the user, which is then drawn upon as required. For instance, the file could permit a "selected" group of addressees to receive a particular letter—perhaps only females age 25 - 40.

LETTERS has a multiplicity of capabilities. For instance, a form letter may be created in which you can insert from a mailing list base, up to 20 different names, addresses, key words or phrases. This same list may be used to print labels or envelopes. In an immediate mode, the date or other information may be inserted directly from the keyboard. Also, you may embed format codes for such things as modifying margins, for example; and control codes allow printer control while operating. There is also an editing mode within LETTERS that makes it possible to either change the form of a letter, or create another one,and words, phrases, format codes and other changes may be entered at any time.

REPORT, the last of these programs, is dedicated to report types of documentation, such as accounts payable and receivable, inventories, etc. Manipulation and printing of files is accomplished with this program, and page and column headings may be arranged. As with LETTERS, it provides you with access to up to 1000 records of up to 20 fields. It will then print these in your choice of format, with headings, page numbers, and automatic print control. All of these programs within AUTO-WRITER will be discussed in greater detail presently.

Initially, I found the information provided in the manual regarding starting the data base, somewhat confusing. The statement is made that one should set up a data base of information, and then goes on to describe (quite well, incidentally), fields, records and files. But it fails to explain actually how to go about doing this with the program. Do you load your word processor and type in a data base? Or do you use some feature of AUTO-WRITER to do it? Such information is skipped over entirely, and the manual goes on to describe the use of terminators in the entries that are made. Further questions arose when the terminator information and a record example were followed by directions for Field Labels—a process that probably should have been mentioned first.

I do not consider myself particularly inept, but it did require some thought to find the "magic door" to the program. A short descriptive paragraph is definitely needed in the manual at this point, especially if the producers hope that this program will be used by inexperienced personnel in a business environment. The answer was as first suspected—you set up your word processor (SCRIPSIT in this instance), and prepare your data base labels and then your fields, directly within the word processor. You then "save" this material (to a separate data disk located on your second, or more drives). The save must be in ASCII, which requires the "A" option with SCRIPSIT, but is automatically done with Electric Pencil or Lazy Writer.

Now you must return to your DOS, in order to be able to call the AUTO-WRITER programs. This means removing the word processor from the System drive. (I was fortunate in being able to do the procedure differently, as I have four drives, but we will assume you have the minimum of two drives.) The program you may call now (but not necessarily), could be STATS—in order to utilize the functions it contains to check your data base for format or input errors.

STATS provides several options—you may list all records in the file, or only those containing errors. Of course, these are program technical errors—not a misspelled name in a mailing list or anything like that, but rather an error such as a missing entry for a ZIP code. You also have an output choice: Screen, Printer, or Disk. All of these functions are

More for your Dollars!

LDOS PACKAGE SPECIALS.

THE ULTIMATE DISK-OPERATING SYSTEM LDOS™

The new generation of operating system for the TRS-80.™ Far superior to any on the market. It is a totally independent device system, capable of device linking, routing, setting, and filtering. LDOS will support 5" and 8" floppies, single/double density, single/double sided, and up to 80 tracks. Excellent documentation in a tab indexed manual (over 280 pages). Call today. Available for Model I or III. . . .only $129.00. LDOS™ is a product of Logical Systems Inc. Also available: EDAS 5.5 Model I and III. . . $79.00

LDOS PACKAGE SPECIALS

		YOU SAVE
LDOS + MAIL/FILE	**$199.00**	**$89.00**
LDOS + INVENTORY MOD I	**$199.00**	**$89.00**
LDOS + INVENTORY MOD III	**$299.00**	**$89.00**
LDOS + STOCK MARKET MON.	**$179.00**	**$49.00**
LDOS + EDAS	**$179.00**	**$29.00**
LDOS + FED (FILE EDITOR)	**$149.00**	**$20.00**
LDOS + LED (LDOS EDITOR)	**$139.00**	**$20.00**
LDOS + FED & LED	**$169.00**	**$30.00**
LDOS + FILTER PACKAGE	**$169.00**	**$20.00**
LDOS + "LC" LANGUAGE	**$229.00**	**$50.00**
LDOS + MONITOR	**$139.00**	**$15.00**
LDOS + ULTRA TREK	**$129.00**	**$19.95**
SUPER LDOS DEVELOPMENT PACKAGE		
LDOS + LC + FED + LED + EDAS + FILTER PKG. + MONITOR	**$369.00**	**$144.00**

**Offer good during April & May, 1982

FED - THE LDOS FILE EDITOR

This is the ultimate in file "ZAP" type tools for use with your LDOS system. Full access to files. ASCII and HEX searches, find a load address or where a byte loads. Full HEX or ASCII modify, even to the directory. Two display modes and a built in menu plus unique features that have never been available in this type of system tool. Available now for just. . . $40.00

LC - LDOS "C"

This is a very powerful implementation of the "C" programming language. It comes complete with an extensive function library and generates executable code or assembler source that is compatible with either the MAC-80 or EDAS. For efficient creation of both systems and applications code, this is the language. The language of the future now for just. . . .$150.00.

LED - LDOS TEXT EDITOR

This is the official LDOS text editor designed for writing and maintaining almost any type of text. Handles both line number and unnumbered text files with word processor like functions. Great for all types of pure ASCII source files, even BASIC, and for PATCH and JCL files. Many special features make this editor a "must have" program for the serious user. Finally, a functional text editor for just. . . .$30.00.

FILTER PACKAGE

This package is a collection of powerful filter for the LDOS "devices" to bring out the true power of the LDOS concept. Included are a HEX-DECIMAL-BINARY-CALCULATE-CONVERT filter for your keyboard, a filter to expand basic code to a formated structure during listing and a complete translations filter to convert any or all 256 possible characters to other characters even in a by directional mode. Use this package to give your system a DVORACK keyboard or to have your system talk in EBCDIC. Many, many handy additions to your LDOS system for just. . . .$60.00.

MONITOR - THE LDOS DISK I/O MONITOR

This program brings to LDOS the power of a mini or mainframe error monitor system. When a disk error of any sort occurs, the monitor takes control and allows the operator to select: ABORT, CONTINUE, RETRY or IGNORE. This allows recovery from many problems that before would have caused the loss of data or the interruption of program. Don't let a simple parity error ruin your day again! Get the program that pays for itself the first time it does its job. Be in control of your system for just. . . $25.00.

MAILING SYSTEMS - MAIL/FILE-SERIES II

NEW Series II Mail/File has all of the outstanding features of the original Series I Mail/File, PLUS many additional qualities which again will set standards for this type of system. "Word processor" type input editor, fast sorting, and fabulous editing capabilities are a few of its features. Name and ZIP code are under constant sort. A really great Mailing List-Data Base manager. Model I system will handle up to 600 names. Model III system will handle up to 1200 names. . . .$159.00

BUSINESS SYSTEMS - INVENTORY MASTER SYSTEM

The program to fill your needs. Control up to 2700 items. With today's market, keeping on hand only what your demand calls for is reason enough to let your TRS-80 accurately and effectively take care of your inventory. Always know what to stock and when to stock it. This system has many features which were modeled after a main frame system of large capacity. Model I version just. . . .$159.00. Model III version just. . . .$259.00. Also available for the Model I or III Stock Market Monitor: Cassette version. . . .$89.00. Disk version. . . .$99.00.

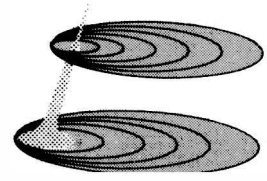
Money orders, credit cards & cod's shipped within 24 hours.

TRS-80™ is a trademark of Tandy Corp.

Can't wait? Call

414/241-8030

galactic software ltd.
11520 North Port Washington Road
Mequon, Wisconsin 53092



performed using interactive dialog with the computer, which is very clearly defined. Typically, in the above procedure, the screen will display the options, and asks, "Which?" During a screen display you can stop and start a scroll by pressing the "S" key, but once you have pressed "Enter" for the display, you must be very quick in pressing "S" if you want to see the initial items of data.

In using STATS for error reporting, whether there are errors or not, a report is provided that shows "number of valid records in file," "number of invalid records," and a total. This is in addition to a report under each erroneous record, which in itself states the error; for example, "Missing information in record."

If there are errors to be corrected, it is better to print out the erroneous items for reference, because you must return to your word processing program, call the original file into it, and make your corrections, locating them by Global Search, possibly.

One more item of interest in STATS is the portion of the final report mentioned above, which provides a list of the Field Labels and their maximum field lengths. This information is for use when using REPORT. It is better to retain this information as a printed record for this purpose, as it will provide you with the facts with which to format your reports—column width, as an example.

The preceding program may or may not need to be run, as was mentioned. However, to utilize AUTO-WRITER fully, you will probably use SELECT a great deal. Particularly, you will need it if you wish to target certain data for specific purposes such as (for a mailing list), specific criteria defining certain addressees. In this case you would merely type "SELECT" from DOS Ready and the program will request the file specification. Once this query is responded to, you will then be asked for a new file name—this one will be dedicated to the resultant data from the extraction you will be making. Now, the dialog will state, "Select If." You may now define the characteristics for selection. Continuing to use a mailing list as a simple example, you might wish to select only those addressees in a particular State, for example, California. You therefore add right along with the displayed "Select If" the words,"State = CA." In this example, you could also select by ZIP code, in which case you could be very selective if desired, by selecting one ZIP code, or a range (Select If ZIP>91301 and ZIP<96000). The possibilities here are quite interesting, and very useful. As another example, an inventory might be chosen by a limitation of part number ranges; or, a low stock level could be extracted. Selection could be by age groups in a personnel list, male or female, ethnic origin—the list could continue indefinitely.

There is also a broad base of equivalency available in SELECT. You may choose from Equal To (example given), Less Than, Less Than or Equal To, Greater Than, Greater Than or Equal To, and Unequal To. Standard keyboard symbology is used for all of the foregoing, in response to "Select If." Within a limit of 255 characters, complex statements may be built by freely using the words "and" and "or." "Select If" compiles the new data base in the same sorted order as the original file. As stated, a small business enterprise will use this very useful function to great advantage.

The next program in AUTO-WRITER is SORT. (It should be mentioned here that the sequence of AUTO-WRITER programs as reviewed is not significant—they may be used at any time with your data base, in any order you choose.) A sort is a sort, one might say, but we are always interested in the answers to two questions: How fast? and, What is accomplished? Well, this sort is fast, and it sorts alphabetically or numerically, in either ascending or descending order. In addition, for mailing list or similar applications it is possible to extract the ZIP code, even though it may be embedded within a line; and you may sort by last name, which massible to extract the ZIP code, even though it may be embedded within a line; and you may sort by last name, which mas, in fact, it would be redundant.

Numerical sorts would normally be used whenever a unit of measurement is the field, but you could also use it this way if there were a Field for "Item No." As with the previously described "Select If," a new file specification is defined for the planned newly sorted file.

The last two programs, to be discussed in turn, are to be sure, unique—both in their method of operation and their application to the data base. Unique, but nevertheless, usefully so. LETTERS has its own built-in screen editor, and verges on being a fully operating word processor. The documentation suggests that it is just that; however, if it is, this is minimal. Briefly, the Editor operates in many ways, as does Electric Pencil, with such requirements as a Control Key (Shift-Down Arrow together), followed by various letters. For example, +Control—D to delete one character. Some special key functions are provided, such as +Control—L, which displays all of the Field Labels in your data base. Some of these control characters will operate only with the program REPORT, and will have no effect in LETTERS.

There are eleven control keys used in the Editor mode, one more in LETTERS, and three more in REPORT. When using the Editor, the mode is "overwrite." That is, everything under the cursor will be displaced by new typing. All keys are repeating, arrow keys move the cursor, and so on. I will comment further on the Editor function later.

LETTERS assists in preparing form letters, envelope addressing, and labels. Reference must be made to your original data base fields. Once more we are assuming a mailing list is the example, but possibly with additional information—sex (Mr., Mrs., Miss, Ms.), and other specifics. The fields to be used must be selected and enclosed within what is described as an Identifier. The Identifier is an opening parenthesis and an asterisk, and an asterisk and parenthesis for closing. Thus, the information within is not printed but operated upon by the program. Thereupon, the letter layout is created, either with your word processor or the editor-processor within the program. Wherever a variable will appear, you type in the Identifier. For example, the name line would be typed in as: (*SEX*) (*FIRST NAME*) (*LAST NAME*), and so on. The salutation would be typed: Dear (*SEX*) (*LAST NAME*): followed by the body of the letter.

Pretty simple, isn't it? By the same method, a phrase within the body of the letter may be made variable by inserting the Identifier (*?PHRASE*). This causes the printer while printing a letter to stop, and the screen will display whatever you have previously typed in the place of

SUPER UTILITY +

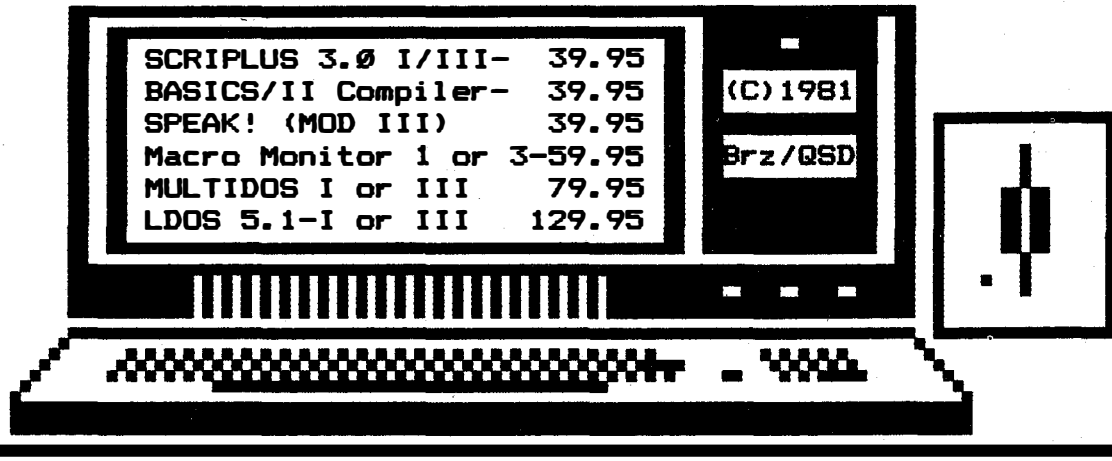
SUPER UTILITY +
(C)(P) 1981 BY
BREEZE/QSD, INC.

By: KIM WATT

Read Paul Wiener's review on page 366
in the Jan. '82 80-MICROCOMPUTING.(tm)
SU+ has even MORE features now!!

Mod I or III	SPECIAL Mod I/III	80 Track versions
$74.95	$124.95	AVAILABLE ON
(specify)	Boots on EITHER machine!	REQUEST

NEW BOOK by KIM WATT- "SUPER UTILITY+ TECH MANUAL" - $14.95



POWERDRAW

A SCREEN GRAPHICS UTILITY FOR MOD I or III
SAVE SCREENS IN 6 DIFFERENT FORMATS!

By: KIM WATT only 39.95

YOU CAN NOW EASILY CREATE, SAVE,
OR PRINT GRAPHIC SCREEN DISPLAYS!!

POWERSOFT

GREAT for EPSON's! With or without GRATRAX-80(tm)

11500 Stemmons Expressway - Dallas, Texas 75229

M/C-VISA CARDS Accepted	(214)484-2976 -- MicroNet# 70130,203 Join OUR Xtra-80 Sig ON MicroNet! From the "OK" prompt, type: R QSD	Write for our FREE Catalog!

DEALER INQUIRIES INVITED

US/CANADA Orders ADD $5 Shipping/Handling
(This ENTIRE AD was created using PowerDraw!)
PowerSoft is a division of Breeze/QSD, Inc.
Radio Shack is a TM of the TANDY CORP.
See US at NCC in Dallas! April 21-25!

FOREIGN add $10
U.S. FUNDS ONLY
for shipping.
NO personal
checks PLEASE!

"PHRASE." If you had typed in your layout: (*?Enter vehicle*), the display would show "Enter vehicle." You would then, by keyboard entry, type in the make of car you might be discussing in your letter (an insurance solicitation, perhaps). The dialog then states, "Should this data be used for all letters (N/Y)?" If the reply is affirmative, then the entire remaining run of letters will be as you have indicated for the make of vehicle entered (unless cleared or changed by the Editor). Up to ten keyboard inputs may be inserted during any particular program run.

The layout of the letter is formatted by Format Codes within the program. Each code is preceded by a period, as, ".LL40"—this sets the line length to 40 characters, in this example. There are 12 Format Codes but one of them operates only on an NEC Printer to set the pitch. All Format Codes have default values.

It was not quite clear in the manual as to whether one called for Format Codes, or merely inserted them in the letter at appropriate locations. Based upon an example given later on, it became evident that you just go ahead and insert them, on their own line, incidentally. The end result is very similar to NewScript™ (reviewed in October 1981 issue), and in many cases the Codes are the same, but enough differences exist to not rely on this assumption, if you happen to work with both AUTO-WRITER and NewScript.

Using the Control Codes, it is very easy to print envelopes at the time each letter is printed. However, this requires attendance at the printer as well as the keyboard if you are entering keyboard variable data. This is not going to be any problem if you are manually sheet-feeding anyway.

The subsequent interactive operation of LETTERS is excellent. After calling for your letter from file, a very clear screen dialog steps you through each part of the requirements, to permit you to change, delete, or add to your letter; print by record numbers at any pot of the requirements, to permit you to change, delete, or add to your letter; print by record numbers at any poal segment of this omnific program, REPORT, is probably the most complex to utilize, and yet it is of outstanding value. This complexity comes not from its operation or formatting requirements, but rather because it is difficult to visualize its output. The report format may be generated, using your previously prepared data base, by using your word processor. On the other hand, you may also just run REPORT and utilize the Editor, as in the case of LETTERS—the same Control Codes are available. As with LETTERS, the formatting commands are imbedded within the program, permitting total control of page length, top margin, etc., in the printout. One of the format sections includes the Heading, a description of what appears at the top of the report. Some very nice headings may be developed using this function, and it may be laid out and spaced as you desire, without worrying about tab functions or counting spaces. The manual gives as an example an Accounts Receivable heading, with date, page number location on sheet, name, address, city, ZIP; plus current, +30, +60, +90 column headings—all "prettied-up" with two decorative lines—and all done with REPORT.

There are a few control codes that are helpful in preparing headings such as these. One allows you to display the number of characters from the beginning of a line, representing the current cursor position. Another will request the character position where you wish to place the cursor. Typing a number immediately places the cursor at that location. In addition, each page may be automatically page-numbered. No need to type repetitive characters either, such as decorative asterisks or hyphens—another control code will immediately repeat a character if you respond to a query as to the number of repetitions you desire.

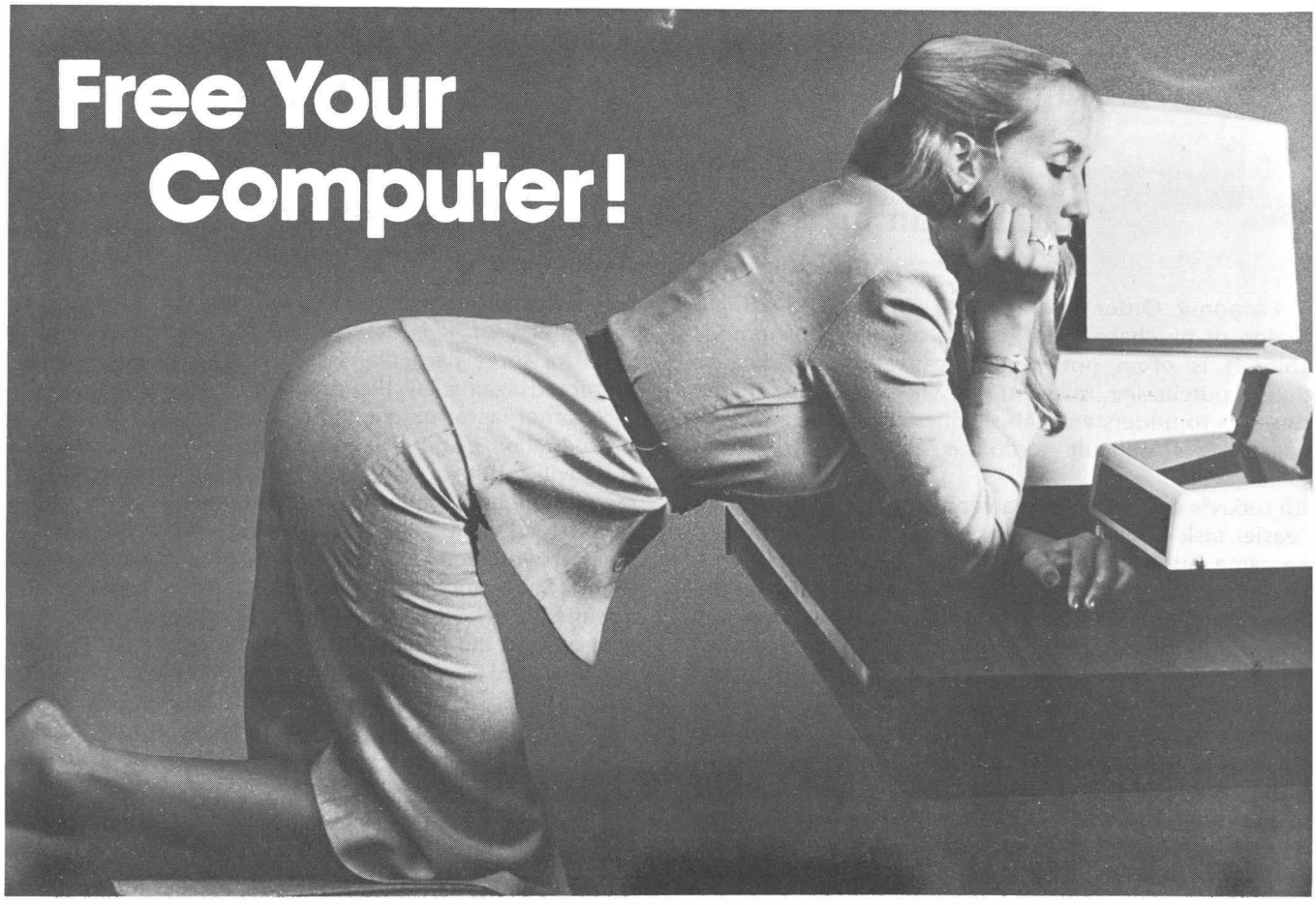
Performing the foregoing is easy; however, very few reports will be restricted to a 64-character width, and this leads to the visualization problem mentioned above. What happens? Exactly the same thing as when you type in any line of more than 64 characters—the line will wrap-around. In text, this is not likely to bother anyone, but in columnar headings this can be confusing. There is no window control that might enable you to view across your maximum printing width, such as 80 columns. This can be visually confusing to some persons. The program author has not abandoned you to this problem, however. The Format Section permits you to describe where the columns and rows of data will be printed. By a short series of codes, adequately described in the manual, you may define exactly where you want each entry of data to appear. You may line up easily decimal pont columns (as for dollars and cents). It would probably be helpful to work with a columnar pad and character rule for the initial layout; it should then be quite easy to enter character positions for the report.

In evaluating AUTO-WRITER, my reaction went from an initial feeling of frustration to one of satisfaction and respect for its capabilities. Once into the program, I realized that any difficulties I had were being caused by the documentation. Not that it is inadequate (far from it), but in its general flow of information. It is almost as if it had been written by several writers who did not get together on the final draft.

The program itself does everything it sets out to do, and provides the user with a degree of control over the final outcome that is not present in most data base management programs. The "word processor" within a word processor could be a repressive influence upon the rapid input of formatted data. You may well find yourself operating between two different sets of word processing commands on one data base. However, if you can operate with the internal editor-word processor, you can considerably speed up the preparation of form letters, for instance. Once the data base fields were established, I found the keyboard input of data to be much faster than many systems. I have no hesitation in recommending this program to anyone who has a need to perform information processing over a wide range of subjects. The capability of form letter insertion may alone be well worth the whole cost of the program for anyone sending out advertising, solicitation or dunning correspondence.

From a production viewpoint the manual that accompanies the program is excellent. It has been prepared as an 8½ by 11-inch document of 38 single-sided pages, composed by daisy-wheel printer, with good sharp printing. The cover is soft card stock, with the manual bound by spiral plastic. The many examples given in the manual are excellent, and the writing itself is neither ponderous nor frivolous—being

continued on page 40



Hardware Spool!

CUE is a communications processor which rapidly accepts from your computer data to be printed and then goes off-line to drive the printer —independent of your computer, which is now free. CUE is better than software spooling since none of your computer's memory, processing power, or disk drives are tied up. CUE is available in parallel, serial, or with both in 2- and 4-port models (connect several printers or computers) with from 16K to 32 K memory. Use as an interface.

Prices begin at $299.

MicroCompatible

(404) 874-8366

151 6th St., P.O. Box 7624, Atlanta, GA 30357

PRACTICAL BUSINESS PROGRAMS

A Program for Economic Order Quantity Analysis with the TRS-80 Pocket Computer

S. M. Zimmerman, Ph.D. and L. M. Conrad

The Economic Order Size, or EOQ approach to sizing a production or purchase order, is one of the best methods available. It is often not used because the production scheduler, purchasing manager or whoever is doing the ordering fails to understand the significance of the concept, and because it is "difficult" to do the calculations to get the desired answers.

With today's calculators it is a very easy task to do. It is an even easier task when the TRS-80 Pocket Computer is used for the same purpose.

When using the computer all one has to do is answer the questions asked and then read the answer. It is also necessay to understand the concept, when it should be followed closely, when you can use the value as an approxiation, and when it should not be used at all.

The EOQ model included in our program is for the purchase case. It assumes instantaneous delivery of goods when they arrive and it does not face the issue of safety stock. Lead time, the time between when an order is placed and when it is received, is assumed to be fixed and known. All costs are assumed to be known with some degree of accuracy. The costs of storage are assumed to be allocated according to the average amount of material in inventory. In other words, no area is reserved for a particular product. The storage areas are shared between products according to their needs.

The total cost equation from which our EOQ equation is obtained is:

Total cost = ordering cost + insurance cost + storage cost + material cost

All carrying costs allocated on a percentage basis are considered insurance costs. All carrying costs allocated on a per piece basis are considered storage costs. For those who are concerned, the total cost equation in symbols will not be given. If you are intersted in these equations, look up the purcahse order EOQ model in any production management or purchasing text book for additional information.

The EOQ equation will be given in words so as to reduce the possibility of using the equation in error. You do not need to memorize the equation, as it is part of this program. The EOQ equation is:

EOQ=SQR ((2 * DEMAND/YR * ORDER COST)/(PRICE/UNIT INSUR. RATE/YR + STORAGE COST))

In order to use your TRS-80 to solve this equation all you need to know is the DEMAND/YR, the ORDER COST, the PRICE/UNIT, the INSUR. RATE/YR and the STORAGE COST/YR in that order. The most important thing to be concerned with is whether the numbers you have refer to the value per year. It is easy to use daily demand or monthly costs for some particular value. This type error cannot be protected against by the program.

Another factor to keep in mind is a change in the value of a production or purchase order in the neighborhood of the EOQ will result in very small changes in the total cost. This means if an adjustment up or down must be made to obtain a unit load or a price break, do it and don't worry. The numbers your accountant or cost engineer gave you to use in the EOQ equation cannot be exact. Slight adjustments will not affect the bottom line. The EOQ approach is designed to get you into the neighborhood of the best results only. It is not intended to give you an exact answer.

RUNNING THE PROGRAM

This program may be run in the DEFineable or RUN MODE. If you have a printer now is the time to turn it on. Now type in R. or RUN and hit ENTER for the RUN MODE, or SHFT and then SPC for the DEFineable MODE. For a brief period of time the letters EOQ will be printed on the display then the following question will appear:

DEMAND/YR

Input the estimated annual useage. Assume you plan to sell 8000 units this year of a particular product. Type 8000 and hit ENTER.

ORDER COST

This question asks for the estimated cost of processing a purchase or production order. Assume this number is $50.00. Type 50 and hit ENTER.

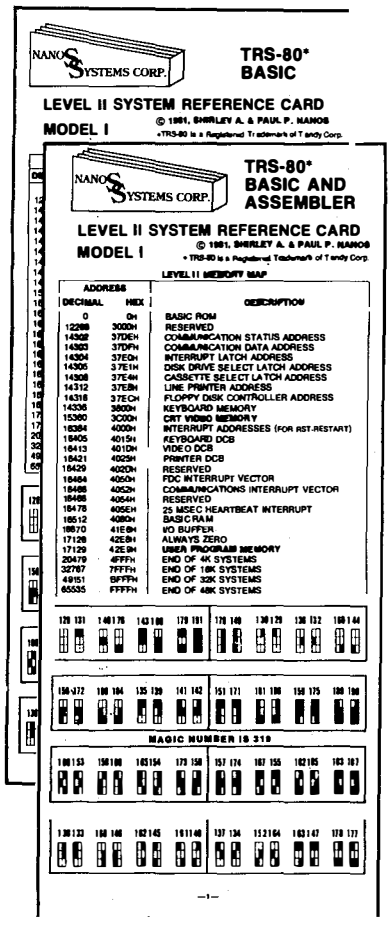
PRICE/UNIT

The price per unit should be known. If you plan to order a quantity such as to get a price break, use that value. If the EOQ does not come out close, redo the calculations using the non-price break value etc. Assume the price per unit you expect to pay is $4.99. Type 4.99 and hit ENTER.

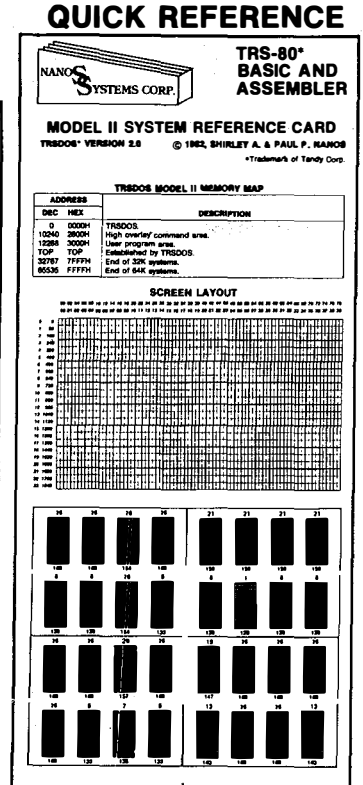
INS. RATE/YR

The cost of carrying an item in inventory may be calculated as a percentage of price, as an insurance rate, or as a fixed value per piece. All costs which are charged as a rate should be inputted here. Assume you only charge insurance

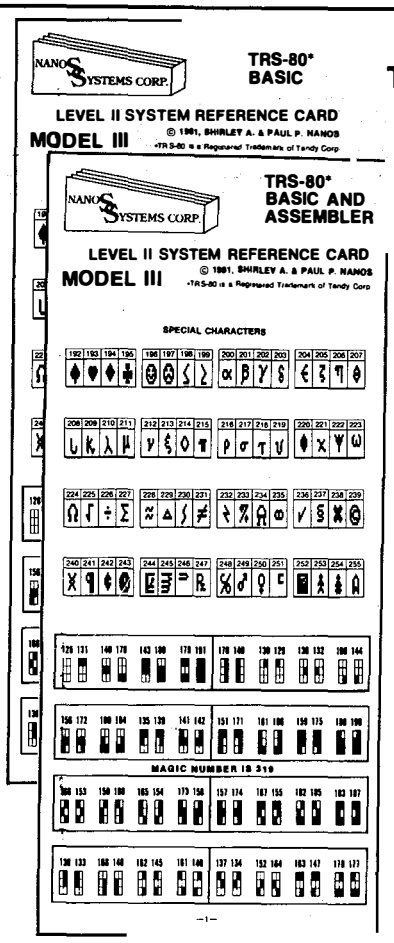
continued on page 33



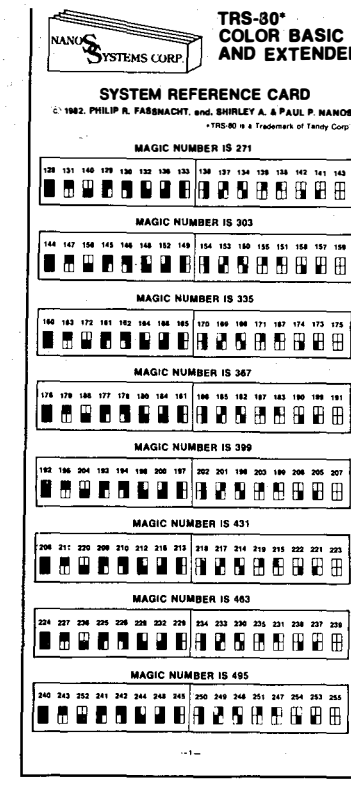
NEW! QUICK REFERENCE



SAVE TIME!



NEW! THROW AWAY THE BOOK



USE THE CARD!

MODEL I

BASIC: Buff & Blue
5 Panels, 10 Pages
(For the Classroom)
Memory Map.
Easy Graphics.
Basic Statements.
Basic Functions.
Basic Facts.
Special Characters.
Basic Commands.
Edit Subcommands.
PRINT USING Examples.
Message & Codes.
Reserved Words.
Special Keys.
Ascii Character Chart,
with Space Compression Codes.
Control Codes.
Basic Internal Codes.
Hex/Dec Conversion Chart.
Screen Line Layout.
BASIC & ASSEMBLER: Buff
8 Panels, 16 Pages
(For the Pro)
Complete Z80 Instructions.
Assembler Instructions,
Commands, Operators.
Editor/Assembler Commands,
and Edit Subcommands.
Flags, Conditions, & Chart.
Internal Routines.
Assembler Error Msgs.
Plus all items in the Basic Card,
except Internal Codes.

MODEL II

BASIC & ASSEMBLER: Green
10 Panels, 20 Pages
(For the Business)
Small Memory Map.
Screen Layout.
Easy Graphics.
Complete Z80 Instructions.
Series-I Assembler Instr,
Commands, Operators, and Edit Subcommands.
Assembler Error Msgs.
Power-up Error Msgs.
Flags, Conditions, & Chart.
Wild Cards, DOS Messages.
SVC Procedure Panel.
Host Logon Panel.
Version 2.0 Lib Command Formats and
System Utility Formats.
Basic Functions & Statements.
DOS File Naming Convention.
Basic Commands & Edit Subcommands.
Special Keys.
Basic Internal Codes and Reserved Words.
Basic Msgs & Codes.
PRINT USING Examples.
Special Characters.
"DO" Utilities & BASIC Command.
Ascii Character Chart with SVC Names and
Numbers.
Control Codes.

MODEL III

BASIC: Blue & Buff
6 Panels, 12 Pages
(For the Classroom)
Special Characters.
Kana Characters.
Euro-Characters.
Memory Map.
Special Keyboard Functions.
Ascii Char Chart w/Space Compression Codes.
Control Codes.
Casette Loading Err Msgs.
Basic Commands, Edit Subcommands, Special
Chars, Basic Statements, Facts, Functions,
Derived Functions, Special Operations (POKEs).
PRINT USING Examples.
Basic Msgs & Codes.
Basic Internal Codes.
Reserved Words.
Screen Line Layout.
BASIC & ASSEMBLER: Blue
10 Panels, 20 Pages
(For the Pro)
Complete Z80 instructions.
Assembler Instructions, Commands, Operators.
Series I Editor/Assembler Commands & Edit
Subcommands.
Flags, Conditions, & Chart.
Hex/Dec Conversion Chart.
Assembler Error Msgs.
Internal CALL Routines.
Break Processing Procedure.
Plus all items in the Basic card.

COLOR

BASIC & EXTENDED: Grey + 9 Colors.
8 Panels, 16 Pages
(For the Artist)
All Color Graphics.
System Commands.
PRINT USING Examples.
Special Characters.
Special Keys.
Cassette Loading Err Msgs.
Basic Functions & Statements.
Playing Music, Making a Circle,
and Drawing Panels.
Derived Functions.
Messages & Codes.
Musical Notes, by Octave, in Color,
Including Rests and Time.
Memory Map.
Reserved Words.
Internal Codes.
A Page of Tips.
Ascii Char Codes Chart,
Including Inverse Graphics and Color Graphics
Control Codes.
Color Group Chart.
Pmode Information Summary.
Screen Line Layout.
Extended Graphics Pmode
Illustrations.

Each card is a complete summary of the reference manuals and the microcomputer. Cards are two or more colors, printed on 80 pound Beckett Antique cover stock or a comparable stock, stretch-wrapped in plastic for shipping. They are accordion-foldup cards, in the same style as the traditional IBM reference cards used on the major computers for years. Fold-up size is eight and one-half by three and three-quarter inches, so they will fit easily into the shirt pocket. These cards provide a complete summary of the manuals plus many extras at your fingertips.

RETAIL ORDER FORM

Please send me:

( ) Copies of MODEL I BASIC & ASSEMBLER @ $4.95
( ) Copies of MODEL I BASIC-ONLY @ $2.95
( ) Copies of MODEL II BASIC & ASSEMBLER @ $5.95
( ) Copies of MODEL III BASIC & ASSEMBLER @ $5.95
( ) Copies of MODEL III BASIC-ONLY @ $3.95
( ) Copies of COLOR BASIC AND EXTENDED @ $4.95

NAME: _____

ADDRESS: _____

CITY _____ STATE _____ ZIP _____

Indiana Residents Add 4 Percent for Indiana Sales Tax

Send Check or Money Order to:

NANOS SYSTEMS CORP.
P.O. BOX 24344
SPEEDWAY, IN 46224
(317) 244-4078

Wholesale prices available when you purchase over 24 cards of the same kind.

Super wholesale prices for over 99 cards of the same kind.

Educational Institutions special prices for under 25 cards.

MODEL III CORNER

Hubert S. Howe, Jr.

This Month: The TRS-80 Model III RAM

XFERSYS

I would like to begin this month by correcting some remarks I made in the March issue regarding the XFERSYS/CMD utility program which is contained on the TRSDOS 1.3 system diskette. I complained that XFERSYS was undocumented and that it seemed fairly useless in any event because all it did was copy BASIC, CONVERT and XFERSYS itself to another diskette.

It turns out that there is a very useful function for XFERSYS, if you had started working extensively with TRSDOS 1.1 or 1.2 before 1.3 came out. Diskettes used under the earlier systems were formatted differently, and they could not be read using 1.3. XFERSYS was therefore created to transfer files from TRSDOS 1.1 and 1.2 diskettes to 1.3 diskettes. Unfortunately, it does one other thing which was not very well publicized by Radio Shack, and this requires some explanation.

With TRSDOS 1.3, Radio Shack decided to change the way that the end-of-file byte is recorded in the directory. To correct for the new method, XFERSYS performs a scan of the target diskette after the file has been copied and reduces the EOF record by one for any file whose EOF byte is non-zero. Unfortunately, Radio Shack forgot to provide a way to correct the directories of data diskettes. That means that any data diskette created under 1.1 or 1.2 may contain files which appear one sector longer than they actually are when run under 1.3. Radio Shack warns of this problem indirectly in its *TRS-80 Microcomputer News* by saying that you should not upgrade any application diskettes unless you have verified that the application program will run correctly under 1.3

Making a change of this magnitude so late in the game is very unprofessional, and it would never be done by an experienced computer company like IBM without extensive documentation and upgrading programs. There are probably many casualties among user programs. Other problems are likely to occur with the non-Tandy DOSs, none of which are compatible with TRSDOS. Each of these has a conversion program to transfer files from TRSDOS diskettes to the DOS format. With the TRSDOS 1.3 changes, it is likely that the last records of files converted will not be correct. They may either have an extra sector of garbage at the end or be missing some of the last bytes.

RAM Outline

The TRS-80 Model III RAM begins at location 4000H and extends up to FFFFH, or to the highest location in which you have RAM memory chips installed. The terminology of "16K, 32K, or 48K RAM" refers to the amount of RAM that it is possible to install in the machine, not to the addresses where it is installed; you have to add 16K to get that value. Hence, 16K RAM begins at 4000H and extends to 7FFFH, etc.

The main reason why it is important to know about the TRS-80's RAM in some detail is that the system has reserved much of it for its own use, and you will mess things up if you try to use locations that are reserved for some other purpose. "User RAM" doesn't begin until after the area reserved by the system. Since so many of the details of RAM usage are undocumented by Radio Shack, there is legitimate reason for concern about this matter.

There is one important reason why the system places items into RAM rather than into ROM: RAM can be modified, and ROM cannot. In this way, some of the functions initialized by the system can be overridden by user programs.

Fortunately, most users can get along without understanding every last detail of the RAM usage, although some details are critical. Table 1 gives an outline of the RAM for the Model III, and most of the rest of this column will be devoted to filling in the details of this outline. This table shows details applicable to all cassette systems. Disk RAM usage extends this by about another 10K. (All addresses will be referred to in hexadecimal form, but the "H" following the number will be deleted.)

Starting Location	Function(s)
4000	RST vectors
4015	Keyboard, Video, Line Printer DCBs
402D	DOS return vectors
4036	Keyboard work area (7 bytes)
403D	Interrupt vectors
404C	Unused (stack area during Bootstrap)
4080	Division support routine
408E	Basic work area
4101	Variable type table (26 bytes)
411C	Accumulator 1 (for math operations)
4126	Accumulator 2
4130	ASCII conversion work area (25 bytes)
414A	Double precision division work area (8 bytes)
4152	Disk Basic vectors
41A6	DOS Links
41E5	RS232 DCBs
41FD	Keyboard scan data
4203	Break/Interrupt vectors
420C	Cassette data, other misc. information
4216	Clock data
421D	I/O Router DCB
4225	System Stack area (62 bytes)
42E8	Keyboard buffer (256 bytes)
43E9	Program space (to MEM SIZE specified)

Figure 1: Outline of RAM usage for the TRS-80 Model III.

H&E COMPUTRONICS INC.

WABASH WARRANTY FLEXIBLE DISKS

SPECIAL INTRODUCTORY OFFER

5

2

wabash®
5-YEAR WARRANTY
8" Maxi-Myte
Flexible Disks

The only 8" diskettes guaranteed to perform for a full five years.

Single Side / Double Density

$39.95 EACH BOX OF 10

wabash® 2-YEAR WARRANTY
5¼" Mini-Myte Flexible Disks

The only 5¼" diskettes guaranteed to perform for a full two years.

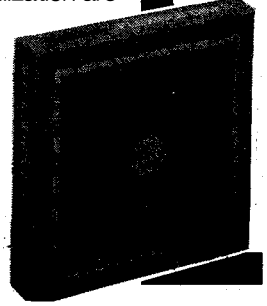
Single Side / Double Density

$34.95 EACH BOX OF 10

COATING The Coating process has been recently improved by our revolutionary SR-3000 manufacturing process, resulting in a completely uniform surface, with excellent adherence to the polyester base. The result: consistent signal quality which is crucial to all applications, on all appropriate drives.

PUNCHING State-of-the-Art equipment at the Paoli plant assures precision punching and assembly for every Wabash diskette. Certification and initialization are also care fully supervised at this stage, guaranteeing satisfactory use of Wabash diskettes for years to come.

Ask us about our other in-stock and ready-to-ship products including printer ribbons, pressure sensitive labels, paper, media storage equipment, and more!



CALL TODAY OR SEND COUPON
800-631-2818 24-HOUR HOTLINE 914-425-1535

H&E COMPUTRONICS INC. 50 N. Pascack Road Spring Valley, N.Y. 10977

☐ Please send me ____ boxes of 8" Maxi-Myte Flexible Disks at **$39.95** per box. Please add $3.00 for shipping.

☐ Please send me ____ boxes of 5¼" Mini-Myte Flexible Disks at **$34.95** per box. Please add $3.00 for shipping

☐ Please send me more information about other Computronics products.

☐ Check enclosed ☐ VISA ☐ master charge ☐ AMERICAN EXPRESS

Credit Card No. _____ Exp. ____/____

Name _____

Address _____

City/State/Zip _____

Phone (____) _____

RST Vectors

RST (restart) operations on the Z-80 microprocessor are one-byte instructions that cause a CALL to locations in the "first page" of memory (the first 64 bytes). These are usually implemented in different computer systems in different ways, but it is important to application programs to be able to use at least some restarts if possible. This is a potential problem, because the TRS-80 has ROM in the first memory page, but fortunately Radio Shack has provided a method of using these instructions by "vectoring" (jumping) these calls out of ROM into the lowest area of RAM. In this way, the actions that the restart operations perform can be affected by user programs, by putting a jump into the appropriate location.

Use of the restart operations is still somewhat restricted, however, because some of them are used for specific purposes both by Basic and by the disk operating system. These functions are summarized in Table 2, which shows the RST operation, the vector location, the usual address (put there by the system on bootstrap), and the function.

(decimal)

RST	Vector	Function
Ø	none	System bootstrap
8	4ØØØ	(1C96) Basic syntax check
16	4ØØ3	(1D78) Get next character
24	4ØØ6	(1C9Ø) Compare HL to DE
32	4ØØ9	(25D9) Get current variable type
4Ø	4ØØC	(4B82) Break key vector (set in DOS only)
48	4ØØF	(44ØD) DEBUG Breakpoint
56	4Ø12	(3Ø18) Interrupt vector

Table 2: RST vectors, set in Model III RAM on bootstrap.

Data Control Blocks (DCBs)

A Data Control Block, abbreviated DCB, is an area of RAM that controls communication with input/output devices. It is a good thing that Radio Shack devised this system, because otherwise the correction of errors in the system or interfacing of non-standard equipment to the computer would require a new ROM. All DCBs have different structures, but they have at least some items in common. They are all eight bytes long. The first byte is a "type" flag, and the next two bytes give the driver address. (It is not clear what Radio Shack means by the type flag, but guesses are made below.) The remaining bytes contain parameters used by the device, and some of these may be empty for particular devices.

The Model III RAM has three areas set aside for DCBs: the keyboard, video display, and line printer are at 4015-402C, the RS232 interface is at 41E5-41FC, and the I/O router is at 421D-4224. These are all summarized in Table 3.

Vectors

As discussed in the previous column on the ROM, a "vector" is simply a jump to another location where the actual operations relating to some function are carried out. Vectors are used so that all the references to these external operations can be put in one area, even though they may jump all over the place.

There are several sets of vectors located in the Model III's RAM area. One of them, the RST vector group, was

Address	Initial Contents	Function
4Ø15	1	Keyboard DCB. Type=1 (read?)
4Ø16-7	3Ø24	Driver address
4Ø18	Ø	Right shift toggle
4Ø19	1	Caps lock toggle
4Ø1A	7	Cursor blink count
4Ø1B	Ø	Cursor blink status (Ø=off)
41ØC	Ø	Cursor blink switch (Ø=blink)
4Ø1D	7	Video DCB. Type=7
41ØE-F	Ø473	Driver address
4Ø2Ø-21	3CØØ	Cursor position (3CØØ-3FFF)
4Ø22	Ø	Cursor on/off flag (Ø=off)
4Ø23	BØ	Cursor character
4Ø24	Ø	Tabs/Special char. switch (Ø=Tabs)
4Ø25	6	Line Printer DCB. Type=6
4Ø26-7	Ø3C2	Driver address
4Ø28	43	Lines/page (67)
4Ø29	1	Lines printed +1
4Ø2A	1	Characters printed +1
4Ø2B	FF	Printer width-2 (255=infinite)
4Ø2C	Ø	Unused
41E5	1	RS232 Input DCB. Type=1 (read)
41E6-7	3Ø1E	Driver address
41E8	Ø	Input buffer (1 character)
41E9	Ø	Bit 2=driver on/off Bit 1=wait/no wait
41EA-C	?	Unused
41ED	2	RS232 Output DCB. Type=2 (write?)
41EE-F	3Ø21	Driver address
41FØ	Ø	Output buffer
41F1	Ø	Bit 2=driver on/off Bit 1=wait/no wait
41F2-4	?	Unused
41F5	2	RS232 Initialization DCB. Type=2
41F6-7	3Ø1B	Driver address
41F8	55	Baud rate code (See Ref. Manual)
41F9	6C	Configuration code
41FA	FF	Wait/No Wait switch
41FB-C	?	Unused
421D	2	I/O Router DCB. Type=2
421E-F	3739	Driver address
4220-1	Ø	Destination device name
4222-3	Ø	Source device name
4224	?	Unused

Table 3: DCB addresses and the functions of each byte.

Attention

BARGAIN HUNTERS

Receive Hundreds of Classified Ads Like These Every Month

HARD DISK DRIVE Diablo Mod 31 1.2 MByte std. density. Includes power supp. and cable, rack mount slides, amd manual. Excellent condition. $450. Ca... 1601 ...03

IMPACT PRINTER 165 CPS Serial and parallel interfaces-Eight Selectable character sizes-Single and double width characters-uses standard plain paper - same mechanism as the integral data ... 1 year old $589, ...

HEATHKIT H-11/DEC LSI-11 system, 32K Byte storage, reader 1 punch, video terminal, complete software. Cost $4500 assembled, $3500 kit. Like new. Sell for $2250. 305-962-6677. 2058 Griffin Rd., Ft. Lauderdale, FL 33312.

FOR SALE: Interdata (Perkin-Elmer) 7/16 Mini with 32KB core, front panel, 50A PWR supply. Includes HS tape reader, interfaces for LP, 2 (TTY), and RS-232 (Full duplex, programmable). Includes manuals and much SW (Basic, Fortran, OS, etc.,). $800 - After 6 P... 603... 2035

COMPUTER AUTOMATION ALPHA 16; 16 k-word core memory,RTC, PF-R. Modified Mod. ASR-33 TTY Manuals, utilities, assemblers and many option boards - 16 bit I/O Driver, 16 bit I/O, Asynch modem contr. 64 bit output, 10 bit A/D - D/A. Fairly complete documentation. Up and running in Fortran. Not much more than TTY at $1000. **Herb Sauer, 303-494-8724.**

FOR SALE: Heath H9 video terminal, excellent condition, $175 or best offer. You ship. **[214] 962-4484**

WANTED: DIGITAL Group 32K memory board without memory chips and Phi deck controller board (kit, assembled or not working). W... 1510 NW 35th. T... 32...

PET COMPUTERS moving up to LSI-11. Pet business system priced to sell. PET 2001-16N Computer $800; 2040 Dual Floppy 340K (holds more data than 6 TRS-80 disks) $1,100. Digital cassettes (2) $60 each. System complete with Text Editor, disk sort, database software, real estate software and more $2,100. Call **PAUL** (313)971-8447

COMPUTER SHOPPER, the new buy, sell, and trade publication, is ready to help you with the latest information on personal, small business and large-system computers, accessories and software.

Each ad-packed issue is full of bargains you are looking for. Included are ads from individuals throughout the United States who are selling their good, pre-owned equipment just so they can trade-up to new equipment coming on the market.

But, COMPUTER SHOPPER'S bargains won't be yours unless you subscribe. This useful, money-saving publication can become your way to communicate with other buyers, sellers, and traders all over the nation.

Whether you are a hobbyist or a part-time user, COMPUTER SHOPPER will put you in touch with the nationwide computer marketplace in time for you to take advantage of bargain opportunities.

Have something to sell? A COMPUTER SHOPPER subscriber probably wants to buy it.

Looking for a part, component or even a complete system? A COMPUTER SHOPPER subscriber probably wants to sell it.

COMPUTER SHOPPER is THE marketplace for anything in computers and is read by thousands of people who are ready to buy.

COMPUTER SHOPPER offers a unique format in which classified ads are categorized for fast location of specific items. Combining this with low individual ad rates — **12** cents a word - makes it the ideal place for buyers and sellers to communicate. And, its mix of individual, dealer, and manufacturer ads enable subscribers to find what they want at the best price possible.

COMPUTER SHOPPER will work for you in other ways, too. If you are just thinking about getting into computers, it can help you learn product availability and prices before you make a decision. And, through the timely ads, COMPUTER SHOPPER will keep you abreast of changes in the market which could create bargain opportunities for you.

BUT COMPUTER SHOPPER cannot work for you unless you subscribe.

Want to look us over first? We'll give you your first issue FREE and then bill you for the next 12. If you are not convinced COMPUTER SHOPPER suits your needs, just write "cancel" on the invoice and return it.

And, to let COMPUTER SHOPPER start working for you right now, with a paid subscription we'll also give you a FREE classified ad to sell your pre-owned equipment or to find equipment you want.

If you don't need to use the free classified ad now, use it anytime during your subscription

Subscription: $10/year, 12 issues plus your first free one. Bank cards accepted. Money back guarantee

The Nationwide Marketplace for Computer Equipment

COMPUTER SHOPPER

P.O. Box 23 ● Titusville, Florida 32780

Telephone 305-269-3211

MasterCharge or VISA orders only, call TOLL FREE 800-327-9920.

discussed above. Here we will concentrate on the Maskable and Non-Maskable Interrupt vectors, Disk Basic vectors, and the DOS Links. All of these relate to very specific operations.

Interrupt vectors are branches that are used when special conditions exist. The device or condition that causes the jump to the vector comes from "outside" the currently operating program, and must be implemented in the hardware of the computer. Two examples are the clock, which interrupts the computer every second, and the Reset button, which must be pushed by the operator. Table 4 shows both the Maskable and Non-Maskable Interrupt vectors (most of which are unused).

Port EØ, Bit	Jumps to	which contains	Function
			Maskable Interrupt Vectors
Ø	3365	(code)	cassette bit goes high
1	3369	(code)	cassette bit goes low
2	4Ø46	JP 35A9	Cursor blink and clock
3	4Ø3D	JP 35FA	Unused
4	42Ø6	JP 35FA	Unused
5	42Ø9	JP 35FA	Unused
6	4Ø4Ø	JP 35FA	Unused
7	4Ø43	JP 35FA	Unused
			Non-maskable interupt vectors
	66	JP 4Ø49	if disk interrupt, else
		JP Ø	Reset button

Table 4: Maskable and Non-Maskable Interrupt Vectors in Model III RAM.

As owners of disk systems know, Disk Basic adds several statements to the Basic language that do not exist in cassette Basic. Nevertheless, if you try to execute one of these statements in cassette Basic, you will get the "L3 Error" message. This indicates that the system at least recognizes that the command exists, but doesn't know what to do with it.

From our discussion of the ROM last month, we recall that the way Basic recognizes commands is by scanning a table starting at location 1650 in the ROM. Since all the data read from the disk drives have to go into RAM, a similar table must be located there for the Disk Basic commands. That table is the Disk Basic vector table, and it is shown in Table 5, which shows the addresses located in the table if Disk Basic has been properly initialized. There are two other possibilities: cassette Basic, which initializes all these addresses with a "JP 012D" instruction (which produces the "L3 Error" message), and the disk operating system, which does NOT initialize this area at all. (The TIME$ vector at location 4176 is initialized to a JP 3030, since its code is in the ROM.)

Similar to the Disk Basic vectors, the "DOS Links" table is for operations to which the disk operating system adds some processing. These are not simply Basic statements, but aspects of working with the disk system where more is required. For example, in a cassette Basic system you only

Vector Location	Function	Vector Address
4152	CVI	(JP) 5A96
4155	FN	523A
4158	CVS	5A99
415B	DEF	52FF
415E	CVD	5A9C
4161	EOF	5DEF
4164	LOC	5E33
4167	LOF	5E7C
416A	MKI$	5A7D
416D	MKS$	5A8Ø
417Ø	MKD$	5A83
4173	CMD	5374
4176	TIME$	3Ø3Ø
4179	OPEN	5FC3
417C	FIELD	5CF3
417F	GET	5ECØ
4182	PUT	5EBF
4185	CLOSE	5CB8
4188	LOAD	5BBB
418B	MERGE	5C52
418E	NAME	566F
4191	KILL	6ØCD
4194	&	57Ø3
4197	LSET	5D4C
419A	RSET	5D4B
419D	INSTR	567B
41AØ	SAVE	5C9Ø
41A3	LINE	5427

Table 5: Disk Basic Vectors, for Disk-Basic-only operations.

Vector Location	Vector Address	Function
41A6	(JP) 427B	Error Message
41A9	5322	USR N
41AC	5C38	Ready
41AF	57DA	INKEY$
41B2	5C7B	After line encode
41B5	59FD	After program update
41B8	5AØC	After program clear
41BB	5CE9	Used during NEW and END
41BE	5451	Used during I/O reset
41C1	5813	System output
41C4	5822	Keyboard wait
41C7	5BB3	RUN EXP
41CA	5368	Sequential file output
41CD	5A19	Between print items
41DØ	5A18	New video line
41D3	59E5	During print outputting
41D6	5459	Start of Input
41D9	5759	MID$ on left of equals sign
41DC	5AB3	Start of read scan
41DF	5471	Read
41E2	59C8	System auto-start

Table 6: DOS Links to operations that can be enhanced when operating under Disk Basic.

get abbreviated error messages; in Disk Basic, you get the message spelled out, because it is read from the system diskette. Table 6 summarizes the DOS links, which are located immediately following the Disk Basic vectors. As above, the addresses loaded into these locations on Disk Basic initialization are given as well. In cassette Basic, these locations are initialized with a RETurn instruction, and in the DOS alone they are uninitialized.

Basic Work Area

A large amount of the remaining reserved RAM area is used for various and sundry purposes by the Basic interpreter. These locations and their functions are shown in Table 7.

Miscellaneous RAM Use

Finally, there are several low RAM bytes that are reserved for miscellaneous purposes that don't fit into any of the above classifications. These are summarized in Table 8.

Bibliography

There have now been published several books that discuss the ROM and RAM usage on the TRS-80 Model 1 and 3 computers, all of which have been helpful in assembling the information presented in this column and the previous one. For readers interested in knowing more about these matters, these books are listed here along with some remarks about what to find in them:

Pathways through the ROM. Edited by George Blank, published by Softside Publications, 6 South Street, Milford, NH 03055. Mostly applicable to the Model 1, this book contains chapters by Robert M. Richardson, Roger Fuller,

Address(es)	Function
420C-D	Address of cassette write routine
420E-F	Address of cassette read routine
4210	Bit mask for port EC
4211	Cassette baud rate (Z=500, NZ=1500 baud)
4212	Cassette blinker counter
4213	Default interrupt vector setting
4214	Number of video lines to protect
4215	Unused in cassette Basic
	CLOCK DATA:
4216	Heartbeat counter
4217	Second
4218	Minute
4219	Hour
421A	Year
421B	Day
421C	Month

Table 8: Miscellaneous RAM usage.

Address(es)	Function
4Ø8E-F	Address of USRØ subroutine
4Ø9Ø-2	3 bytes used in RND computation
4Ø93-5	INP routine
4Ø96-8	OUT routine
4Ø99	INKEY$ storage
4Ø9A	ERR storage
4Ø9B	Printer column position
4Ø9C	Device routing flag (-1=tape, Ø=video, 1=printer)
4Ø9D	Display line length
4Ø9E-F	Video display width
4ØAØ-1	Top of free memory
4ØA2-3	Current line number
4ØA4-5	Data pointer
4ØA6	Line cursor position, used for TAB
4ØA7-8	Address of keyboard buffer
4ØA9	Cassette input flag (Ø=tape)
4ØAA-C	Random number seed
4ØAD	unused
4ØAE	Variable locate/create flag, used DIM and LET
4ØAF	Number type flag: 2=integer, 3=string, 4=single, 8=double
4ØBØ	Data type flag during text encoding, or Operator number during expression evaluation
4ØB1-2	Top of string space (Memory Size)
4ØB3-4	Pointer to next available string space
4ØB5-D5	String pointer workspace (33 bytes)
4ØD6-7	Pointer to next available string location
4ØD8-9	Position flag (4 uses)
4ØDA-B	Line number during DATA scan
4ØDC	Active FOR flag
4ØDD	Input text flag
4ØDE	Read/Input flag (Z=input), or PRINT USING delimiter
4ØDF-EØ	Execution address for SYSTEM tape or Basic Program, or pointer to result variable in evaluation
4ØE1	AUTO flag (NZ=on)
4ØE2-3	AUTO current line number
4ØE4-5	AUTO line number increment
4ØE6-7	Encoded statement pointer
4ØE8-9	Stack Pointer pointer
4ØEA-B	Error line during RESUME
4ØEC-D	"Current" line number, used by EDIT
4ØEE-F	Saved position before error, used by RESUME
4ØFØ-1	Address of ON ERROR
4ØF2	Error trapping flag (NZ=in trap now)
4ØF3-4	Address of decimal point in ASCII conversion, or saved position in expression evaluation
4ØF5-6	Last line executed, used by CONT
4ØF7-8	Last byte executed, used by CONT
4ØF9-A	Simple variables pointer
4ØFB-C	Arrays pointer
4ØFD-E	Start of free memory
4ØFF-41ØØ	Data pointer

Table 7: Basic RAM work area

John Hartford, and others. Richardson's Introduction to the "Disassembled Handbook for TRS-80" contains information on how to decode the ROM and explanations of many of the subroutines therein. Fuller's "Supermap" contains detailed comments on each byte or group of bytes in the ROM, Hartford's "DOS Map" gives similar comments on the disk operating system. The book also includes the specification sheets for the Western Digital 1771-01 floppy disk controller chip, used in the Model 1.

MOD III ROM Commented, published by Soft Sector Marketing, Inc., 6250 Middlebelt Road, Garden City, Michigan 48135. Authors are not listed, but the book gives "credits" to several people. Similar to Fuller's "Supermap", this book presents a complete disassembly of the Model 3's ROM and low RAM addresses, with comments on each line. While this is clearly the best book for the Model 3, it contains absolutely no explanation of what all this means, and beginners will probably be lost.

Microsoft Basic Decoded & Other Mysteries for the TRS-80, by James Farvour. Volume 2 in the TRS-80 Information Series, published by IJG Computer Services, 1260 W. Foothill Blvd, Upland, CA 91786. Although written in a somewhat turgid style and containing numerous typographical errors, this book contains one of the most detailed discussions of the TRS-80's ROM and Basic interpreter. While it is based on the Model 1, most of it is also applicable to the Model 3. The book contains a complete disassembly of the ROM, showing the object code and instruction mnemonics but NOT the operands (apparently because of fear of copyright infringement), and detailed comments on every instruction in the ROM. The book is manufactured so that hundreds of pages will pull out, in order to be inserted into a three-ring binder, so that you can paste in the complete disassembly using Apparat's disassembler.

The book does not explain how to use the ROM subroutines to interface with Basic programs and speed up execution. For that you need:

Basic Faster and Better & Other Mysteries, by Lewis Rosenfelder. Volume IV in the TRS-80 Information Series, published by IJG Inc. (address above). Contains explanations of how to perform numerous useful and important operations in a combination of Basic and assembly language, often using the subroutines in the ROM. This book is definitely not for the novice. Basic programs published in the book look incomprehensible but perform some seemingly impossible tasks. Could be used as a textbook for advanced college course in computer science—or perhaps better, graduate school. ■

PROGRAM CONVERSION (PART IV)

Richard Kaplan

This month I will deal with converting APPLE II programs (in APPLESOFT) to the Models 1, 2, and 3. Almost every TRS-80 owner has had the frustrating experience of finding a very useful program in a magazine, only to realize that the program will not run on his machine without modification. Unfortunately, if you do not have access to an APPLE manual in a situation such as this, it is almost futile to attempt to convert the program.

SCREEN FUNCTIONS

Clearing the screen on the APPLE is achieved through the HOME statement. This can be replaced with CLS on any model TRS-80. These two statements are identical in function.

On the APPLE, the cursor may be positioned on the screen with the statements VTAB and HTAB. For instance, the program line 10 VTAB 2:HTAB 10:PRINT "THIS IS A TEST" would position the cursor at the second line from the top and at the tenth position from the left of the screen and print "THIS IS A TEST".

To convert a given set of X and Y values in the expression VTAB X:HTAB Y, you should use the TRS-80 expression "PRINT @ (X*64) + Y - 65", on the MODEL I or MODEL III. On the MODEL II, the equivalent expression would be "PRINT @(X,Y),;". For example, let's suppose we have the following program on the APPLE:

```
10 HOME
20 FOR I=1 TO 100
30 VTAB 1: HTAB 1: PRINT I
40 NEXT
```

An equivalent program for the MODEL I or MODEL III would be:

```
10 CLS
20 FOR I=1 TO 100
30 PRINT @ (1*64)+1-65,I
40 NEXT
```

An equivalent program for the MODEL II would be:

```
10 CLS
20 FOR I=1 TO 100
30 PRINT @ (1,1),I
40 NEXT
```

DISK ACCESSS

Disk routines are undoubtedly the most machine-dependent portion of any BASIC program. The APPLE has a disk access method entirely different from the TRS-80s. While it is actually quite easy to convert disk routines, you should first have some idea of how the APPLE handles disk access.

APPLE SEQUENTIAL FILES

A sequential file is a file in which file entries are put onto disk in exactly the same order they are entered. If you have a mailing list and wish to see the 99th name, you must first read in all 98 records (names) before the one you want.

All APPLE disk commands are contained within PRINT statements. In order to signify that your PRINT statement is a disk command, you must PRINT CHR$(4) as the first character to be printed. If this is done, the rest of the line is NOT printed, but it is instead sent to the operating system to evaluate what type of disk command you wish to use. (NOTE: very often APPLE programmers place the statement D$=CHR$(4) at the beginning of their programs for convenience purposes. Whenever a disk command is used, it is then only necessary to PRINT D$ instead of PRINTing CHR$(4).)

In order to use a disk file on the APPLE, the file must first be OPENed. In order to do this, you execute the statement PRINT D$;"OPEN XXXX". (XXXX can be whatever name you wish to give your file.) This statement signifies to the APPLE that you wish to use file XXXX in the future. You may open up to 3 files at any one time. (Actually, you may have as many as 16 files at once, but you would have to first execute the MAXFILES command; more on that in a future month).

If you wish to place data into your disk file, you must now signify to the APPLE that you wish to do this. This done with the WRITE statement. Assuming you have already OPENed a file, the format for the WRITE command is PRINT D$;"WRITE XXXX". What this does is divert all subsequent PRINT statements to the disk file named in your WRITE statement. If you are done PRINTing information into the file, you may simply type PRINT D$. This will cancel the effect of your WRITE statement.

If you desire to READ information from a disk file, you must also OPEN the file. After this is done, you should execute the statement PRINT D$;"READ XXXX". This will take all subsequent INPUTs from the disk file instead of from the keyboard. Again, this effect is cancelled through the command PRINT D$.

After you have finished READing or WRITEing your disk file, you should CLOSE your file, thus signifying that you are done with this file. The syntax for this command is PRINT D$;"CLOSE XXXX".

Let's write a program now to OPEN a file called TEST and place the words COMPUTER, COMPUTRONICS, and APPLE into the file. Your program could read:

```
10 D$=CHR$(4)
```

Now let's suppose that you wish to retrieve the information you have entered into your file. The words COMPUTER, COMPUTRONICS, and APPLE should go into variables A$,B$, and C$, respectively.

TRS-80 SEQUENTIAL FILES

Now that you have a basic understanding of APPLE disk access, it is necessary to explain TRS-80 disk access, which is somewhat similar.

On the TRS-80, there is no need to PRINT a CHR$(4) for disk commands. In addition, the OPEN, READ, and WRITE commands have been combined into one on all three TRS-80s.

On any TRS-80, it is necessary to specify as part of your OPEN statement whether you wish to READ or WRITE a file. If you wish to READ a file, the format is OPEN"I",1,"XXXX". If you wish to WRITE a file, the format is OPEN "O",1,"XXXX". "I" stands for input, and "O" stands for output. The 1 denotes the file number. As with the APPLE, more than one file may be open at one time.

On the MODEL I, the default setting is three files. On the MODEL II the default is 0 files. In order to use 3 files on the MODEL II, for example, you should enter BASIC-F:3 when you enter BASIC. On the MODEL III, you can use the same notation as with the MODEL II, or you can simply answer "3" when you are asked "How many files?" after loading BASIC.

In order to place information onto a disk file which has also been opened for output, you should use the PRINT # command. For example, if you wish to place the word TEST into disk file number 1, you could use the command PRINT #1, "TEST".

In order to retrieve information from a disk file on the TRS-80, you should use the INPUT # command. To retrieve information into variable A$ for example, you could use the command INPUT #1,A$.

When you are done inputting or outputting data to or from a disk file, you should close the file. The command CLOSE will close ALL files presently open. CLOSE #1 would close ONLY file number one, CLOSE #2 only file two, etc.

Now let's write a program, as we did for the APPLE, to OPEN a file called TEST and place the words COMPUTER, COMPUTRONICS, and APPLE INTO THE FILE. Your program coulde read:

```
10 OPEN "O",1,"TEST"
20 PRINT#1,"COMPUTER":PRINT#1,"COMPUTRONICS":
PRINT #1,"APPLE"
30 CLOSE
```

Now let's suppose you wish to retrieve the information you have entered into your file, as we did on the APPLE. You would like the words COMPUTER, COMPUTRONICS, and APPLE to go into variables A$, B$, and C$, respectively:

```
10 OPEN "I",1,"TEST"
20 INPUT #1,A$,B$,C$
30 CLOSE
```

APPLE RANDOM-ACCESS FILES

A random-access file is a file in which data can be read or written to ANY record AT ANY TIME. If you had a mailing list, for instance, you could examine and edit the 100th name on you list without reading in any other names. With a sequential file, you would have to read in all names on the file, change the 100th name, and then write EVERY NAME back into the file. If you had 10,000 items on your mailing list, for example, using random-access files would save you 9,999 disk reads and 9,999 disk writes. Obviously, random-access files are a must for serious disk programmers.

The APPLE treats a random-access file as a collection of individual sequential files. Commands must be prefixed by PRINT D$ (D$=CHR$(4)) as a sequential file. OPEN, CLOSE, READ, and WRITE statements are still used, but some additional information must be given in the OPEN,

continued on page 41

SOFTWARE REVIEW

Spencer Koenig

STARFIGHTER by Sparky Starks (Adventure International)

Starfighter log: Time-11:32:20, Day-Tuesday, Year-1026 New Standard Space Calendar. I have just gone into a hyperjump from Landbase Seven after receiving the necessary maneuvering fuel and hypercharge. All systems are normal, and, as usual, leaving a Landbase is a two jump vector (I wish they could shorten it, it takes up so much battle time). My problems at this point are twofold: I must re-establish my enemy kill count to insure promotion, and I must secure my score within a reasonable amount of time during this shift, or my mate says she'll divorce me on grounds of lack of emotional support. She claims I haven't spent enough time with her and the offspring. I don't think she understands me or the job I'm doing any more.

I'm following the procedure now for long distance location of craft. This requires my fighter craft status remaining in navigation mode and my pressing the control button labeled "E"xtended gravity scan. I'm not sure, but my scanner seems a little sluggish. This might be due to the low condition rating of my ship. As soon as I have enough bounty, I'm taking this baby in for an overhaul at Landbase One.

Time 11:33:30. The "E" scan shows something at 227. Going through the check list: Speed 0, beam/wave weapon (cone shift) set at 99. I press the key marked Clear (the key to clear the system), then holding down the "E"+"D"rive keys, I enter hyperspace with controls set to put me in the vicinity of whoever-it-is.

Once in hyperspace I hold down the "B"eam key + the "C"combat, the "T"racking + the "I"dentify and the 0 speed key simultaneously. If anyone should find this log in the event that I don't make it, I recommend this approach. It seems to have worked quite well, for me, these 12 months.

I guess its safe to complain. About the only thing I don't like about these jumps is that they can take so long. Well, what the heck, it's a small price to pay for glory.

I'll be coming out of the hyperjump any second. All control keys noted above are pressed for maximum immediate response, and—there she is. My beam weapon is ready, tracking's good, she's off to my left. I have to get her centered in my sights to get a good I.D. Target range says she's 11000 and closing. She's firing on me—no time to go into Hyperjump. My energy field is dropping fast. Whoever it is is a good shot. "L"ocking on to her, I'm gaining speed. Distance 9,000 and closing. A message comes up on my Combat Computer.

Craft Identified: LC-1719 Ball Turret Gunship. Friendly, notice, Friendly.

Friendly!!!!! Who's kidding whom—5000 and closing. That guy wants to kill me!!! Shields low."S"ending beacon. Going to "N"avigation mo—

There is a loud explosion. Then the screen blanks out. A message scrolls across the top of the screen asking for volunteers.

Greetings,

You are hereby notified of your possible acceptance into the service of the S.G.A. (Solar Galactic Authority). If you qualify (by purchasing the necessary database), you will embark upon a most rewarding, if not THE most rewarding, endeavor, in the opinion of many (this officer included) who serve at this time.

At the moment of your enlistment into the corps, you will receive a 32 page "New Pilot Induction Manual" that will contain information on several topics. These topics are: (1) operational procedures of the SC-78503 starfighter craft, (2) proper procedure when dealing with landbase systems (where you will refuel/receive bounty for enemy destroyed/overhaul etc.), (3) use of the starfighter simulator upon which you will train (4) the various types of craft, enemy and friendly, that you will encounter, and, lastly (5) the socio/political environment which we all have to deal with (as diplomatically as possible).

The manual will contain a great deal of information, much of which will seem unintelligable and unnecessary (the price you pay for a military career). One of the purposes of this review is to rectify this situation, somewhat, regarding the use and control of the craft, as well as conditions which have a direct bearing on promotional considerations. For follow up information on the other subject areas refer to your manual.

To begin with, the S.G.A. will issue you an SC-78503 STARFIGHTER, one of the most advanced piece of fighting gear to wear the S.G.A emblem. Your job is to search for and destroy the enemy. They are the P.R.C. (Petro Resource Conglomerate). It should be noted that there are many games that are comparable to Starfighter, for example the Atari game SPACE RAIDERS. This, however, is not a game. It is the real thing. Death can be quick, explosive and often spectacular.

The computer image that you get on your screen is the best output that has so far been accomplished within the capabilities of your TRS-80. The action is fierce and quickens as your abilities and talent improve your rank. The sound of the enemy firing on you is terrifying, and when you finally kill your first EXXONERATOR or MARAUDER, the ensuing explosion is, well, EXPLOSIVE!!! I am sure the sound of success will bring a smile to your face. Do not be fooled. The enemies (there are many types) are often difficult and always dangerous.

It will be your job to maintain your craft, including fuel and hypercharge. This is accomplished by earning bounty for the types of craft you destroy. Your promotion or demotion is considered according to the same principles. The choice is yours as to apply your kill for bounty OR promotion, but not both.

Often you will find that identification by your computer is slow, and you will have to rely on instincts developed in

battle. If by chance you happen to kill a friendly craft, you will find you are properly rewarded. So take care when deciding FRIEND OR FOE.

Now, on to a more complex issue: the operation of your craft. The Starfighter has two modes of operation. The first is the "N"avigation mode (due to a computer error, you might find it spelled "navagation." Correction can be accomplished using Superzap).

Under "N"avigation, you have the following capabilities: (1) you may do a scan for the nearest Landbase (pressing the 0-7 key). (2) You may try for an "E"xtended range scan to locate possible enemy. (3) You may go into a hyperjump (i.e an emergency escape). There are several other options available. Any of these keys may function within this mode: "S"end beacon, "K"ill beacon, "R"equest beacon, "H"ypercharge remaining, "M"aneuvering fuel remaining, "Clear" all settings, and finally "P"lease tow (MAY DAY MAY DAY).

The arrow keys are also operational under the "N"avigation mode; however, there is one point to be made in this regard. When comming out of hyperspace your board and settings are in a locked position and you have no control of movement. Therefore, to gain mobility, you must first go into "C"ombat mode and press any of the "0-7" velocity control keys, and, if you wish, return to "N"avigation mode. It is under these circumstances that the arrow keys function under the "N"avigation mode.

You will find that after several hours on your tour, you will want to go to a Landbase. This is accomplished by first scanning for the nearest Landbase, using the procedure mentioned above. When the proper response for the Landbase is given, you hold down the number Landbase you located and the "D"rive key simultaneously.

As an officer and a gentleman (or lady), you are an ambassador of good will, and your best behavior is required during your stay on any landbase. Do I make myself clear?

You will be instructed as to when you may leave the Landbase by a message scrolling across your screen. There is one exception: Landbase One, where overhauls are taken care of, allows for immediate departure upon completion of any repairs.

This is not documented in your manual. There are a great many things not covered in your manual. This is due to the fact that your ship will respond differently under different situations, and it is up to you to get to know her. T ere are some rumors alluded to in your manual. It is up to yc ɔ test for varification.

When in "C"ombat mode, the following comm nds are active: velocity keys 0-7, "B"eam/"W"ave weapon, "F"ire, "I"dentify target, "L"ock on target, and, of course, the "S","K","R","H","M", and the "P" commands as well.

A word to the wise: you will find the most important keys to be your arrow keys, "B"/"W" weapons keys, "L" and "F" keys. The "L"ock command should be used carefully as it can provoke an attack by a friendly as well as enemy. Instead, use the arrows to locate and maintain sights.

The "F" must also be used carefully. If you try to shoot while your weapons are in the process of shifting from 99 degrees to "W"ave or to "B"eam weapon or visa versa, you will have an error condition that will result in loss of energy

continued on page 32

continued from page 31

from your "H"ypercharge field. This error is accompanied by a warning beep from your computer as it tries to compensate for your stupidity.

Let me state that the authorities are aware of your ambition to get to the enemy as soon as possible. We don't want any dead heroes, so take your time in training. Your manual will exalain the process. The simulation will allow for those error conditions mentioned until you get the hang of it.

When you finally wish to come home (home is Landbase 0) the procedure is the same for any Landbase. Saving your record is accomplished by pressing the "W"riting to "T"rack or "W"+"T" keys and then the "D" key. This is done when you are offered the opportunity to go out again after your promotion or demotion.

When your are ready again to assume command of your craft, you can recover your records by booting up your computer, hitting the ready to "B"oard button, and holding down the "R"ead "T"rack keys together. You will be prompted as to which record you want. At that point you will prepare to depart.

If you should find, at some later point, that you are stranded and unable to get response from the towing service or that the enemy is about to capture or kill you, you can self-destruct. This is done by pressing the up arrow, the down arrow and the shift key. This, too, is not clearly noted in the documentation. In fact, I am proud to say that this information was related to me personally by High Commander Adams, himself.

In closing, understand that those at the top salute you and await you to rise through the ranks. There is a special reward for those who reach the rank STAR LORD: a secret message will be revealed. Until then, Pilots, good luck and good hunting.

Spencer Koenig
153-27 73rd Avenue
Flushing, NY 11367 ■

CORRECTION
to INTEREST FORMULAS

As many readers have pointed out, there were numerous errors in the *Interest Formulas* program that was published in the March 1982 issue. Not only was every *up arrow* printed as the "greater than" character, but line 1370 was also completely garbled. We apologize to those readers who spent time typing in this program only to have it produce errors. The complete list of lines that need correction follows:

```
67Ø S=P*((1+I)↑N)
82Ø P=S*(1/((1+I)↑N))
95Ø R=S*(I/(((1+I)↑N)-1))
1Ø9Ø R=P*(I*((1+I)↑N))
11ØØ R=R/(((1+I)↑N)-1)
124Ø S=R*(((1+I)↑N)-1)/I
137Ø INPUT "YEARLY RATE OF RETURN";R
138Ø P=R*(((1+I)↑N)-1)
139Ø P=P/(I*((1+I)↑N))
161Ø I=((S/P)↑(1/N))-1
173Ø R=D/I-(N*D/I)*(I/(((1+I)↑N)-1))
18ØØ P=R*(((1+I)↑N)-1)/(I*(1+I)↑N):IF QQ=Ø THEN 182Ø
193Ø P1=R1*((IE+1)↑M)
194Ø J=1/((1+I)↑M)
```
■

continued from page 18

in this manner and the rate is 12% based on average inventory evaluation. Input 12 and hit ENTER.

STORAGE COST/YR

For all costs charged on the basis of average inventory put this value in here. Assume the cost is $1.22 per item. Type 1.22 and hit ENTER.

EOQ 663.21222116

The economic order quantity is 663 items. The format of the value has not been controlled just in case you were working with millions of gallons. The answer in that case would 663.21 ... millions of gallons.

SUMMARY

EOQ is a technique which many business persons should be using. Having the program available in a pocket computer such as the TRS-80 Pocket Computer means the task of doing the calculations is reduced to a minimum. It is hoped more people will use this very valuable business tool as a result.

For those of you who may be interested in further learning materials for the pocket computer, we would like to point out our books recently published by Wm. C. Brown Company Publishers. "Learning To Use Your Pocket Computer" covers the basic use and programming of this innovative instrument. Our second book is "Practical Programs For The Pocket Computer." Both of these should be available in your favorite bookstore or computer shop.

Steven M. Zimmerman,Ph.D.
College of Business
University of South Alabama
Mobile, Alabama 36688

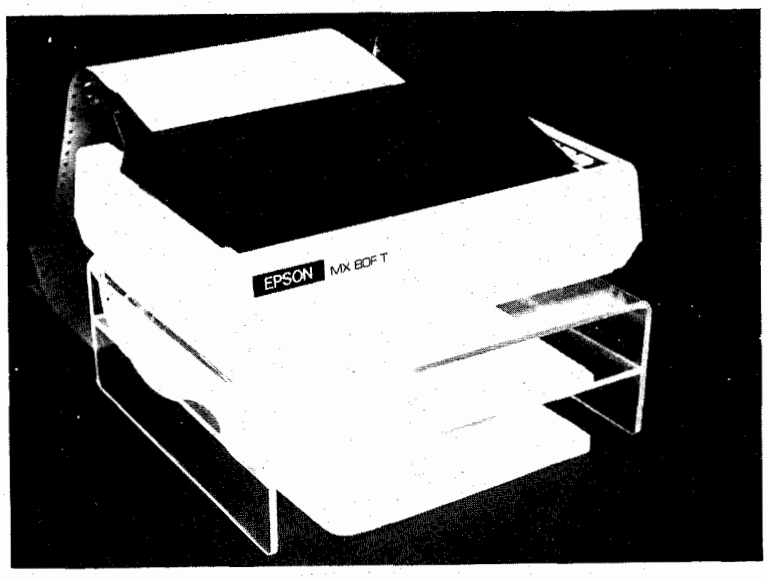
Leo M. Conrad
Imagineering Concepts
P.O.Box 9843
Mobile, Alabama 36691-0843

PROGRAM LISTING

```
30:" "PAUSE "EOQ":INPUT "DEMAND/YR ";N:
INPUT "ORDER COST ";C
35:INPUT "PRICE/UNIT ";P:INPUT "INS. RATE/YR ";I:
I=.011:
                INPUT "STORAGE COST/YR ";H
40:E=SQR (( 2N*C)/(P*I+H)):PRINT "EOQ ";E:GOTO30
99:END
```

NOTE:ON THE TRS-80 POCKET COMPUTER YOU DO NOT USE THE WORDS SQR FOR SQUARE ROOT BUT RATHER THE SYMBOL. ■

MX-80/100 OWNERS



PRINTER STANDS

End the mess of paper from your desktop printer. Paper is fed from under the printer and allowed to stack neatly behind your machine. Made from the highest quality clear plexiglass, this is a handsome addition to home or office. Available in two sizes - Regular for printers such as MX-80, Microline80, etc. or Large for printers such as MX-100, DataRoyal, DWII etc. Available with extra shelf for quick and easy forms change.

Regular (300010) **29.95**
Regular w/shelf (300011) **44.95**
Large (300020) **34.95**
Large w/shelf (300021) **49.95**

MX-80 RELOADS

Reload your own MX-80 & MX-100 Ribbon Cartridges, and save money. These endless loop Silver Dollar Ribbon packs load into your worn cartridge easily, saving you money. Now available in **Blue** and **Red.**

Black (500000) ..... **$3.95 ea.**
Red (500010) ..... **4.95 ea.**
Blue (500020) ..... **4.95 ea.**

Black (500001) ..... **$39.50 doz.**
Red (500011) ..... **49.95 doz.**
Blue (500021) ..... **49.95 doz.**

MX-80 RIBBON CARTRIDGE

Same as original cartridge, with the additional feature of "Mobis" loop which turns the ribbon 180° after each run through the cartridge extending ribbon life. As you know MX-80 cartridges cost $15.00 from most sources, but these are only $10.95 each or save even more by buying 3 at $29.95.

1 cartridge (500050) **$10.95**
3 pack (500051) **$29.95**

NEW — ***We now carry the DIGIAC MULTIUSER COMPUTER. Call for details on MULTIUSER Processing!!***

BT ENTERPRISES

171 Hawkins Road
Centereach, New York 11720

(516) 981-8568 (Voice)
(516) 588-5836 (Data)
MNET-70331, 105

VISA MasterCard

Dealer Inquiries Welcome

Add $2.00 S & H
NYS res. add appr. tax

UNITERM

'The Universal Terminal Program'

The FIRST and ONLY terminal program for both the Model I and Model III TRS-80 computers. Written by Pete Roberts, this program will soon become the standard of terminal software. Unique features includes a Handsome binder with over 75 pages of instructions and examples. Free upgrade policy using local Bulletin Boards and MicroNET. Expanded functions such as 'Type to buffer', 'Display Buffer', Define Auto logon, polling, signon, and connect messages! Requires 32K disk system. Only **$79.95**

ST80III, OMNITERM, SMART80, SMARTIII owners!!! Upgrade to 'UNITERM'! Send your ORIGINAL program disk and receive 'UNITERM' for only **$29.95!!**

CONNECTION-80 BBS

Run your own Computer Bulletin Board. This software package when combined with your Model I or Model III TRS-80 and an Auto Answer Modem will convert your computer into a mini-times share system. Functions include message leaving, both public and private, message retrieving, Bulletins, Downloading, merchandise, product ordering, chat, etc. This is a full feature system, and well known for excellence among modem users. Only **$199.95**

NEWDOS/80 OPERATING SYSTEM

The Hottest Disk Operating System for the TRS-80 Model I and III. Version 2.0 with full single and double density support, allows the use of and combination of disk drives types and densities. Full Double density support when used with a Doubler. On the Model I, you can read and write Model III compatible data disks. On the Model III, you can write Model I single or double density data disks for use on the Model I. Includes: Expanded directories, dynamic basic merge and delete, selective variable clearing, enhanced basic editing, Enhanced chaining functions, Superzap utility, Disk enhanced editor assembler and disassembler, and much more. Special Price, **$139.95**

M-ZAL

This is the most powerful Editor Assembler for the TRS-80 ever written. Features a full screen editor, a menu driven asembler, and an interactive linker which allows the linking of /CMD and /RLD files. Files can be loaded to Disk or Tape! Assembly Language programs like Dick Balcom, and Pete Robert claim that this is the best Editor Assembler on the market! Special Price, **$129.95**

THE COPYRIGHT KIT

A self-instruction booklet on copyrighting the computer software you write. Includes step by step instructions, sample forms, as well as discussions of copyrights, patents and trade secrets, your rights secured by copyrights, legal remedies upon infringements, material not copyrightable and MUCH MORE! Written by Attorneys. Published by National Attorneys Publications and distributed exclusively through B.T. Enterprises. IF YOU EVER WROTE A COMPUTER PROGRAM, YOU NEED THIS BOOK! **$12.95**

COPY III

This Model III Utility, written by Dick Balcom, allows you to load system tapes into your computer at either 500 or 1500 Baud and then copy them onto a new tape at either 500 or 1500 Baud. Includes 10 page instruction manual, **$9.95**

CASOP

The CASOP utility by Paul Spoltore allows you to copy system tapes, find load locations, check for hidden messages, modify program blocks, relocate program blocks, and merge two tape programs together. A sort of 'SUPERZAP' for tape users, **$24.95.**

MODEL I DISK DRIVE CASES

Clear Cases for your model I disk drives, complete with power supply for 5-1/4 inch disk drives.

Single Drive Case **$79.95**
Dual Drive Case **$109.95**
Triple Drive Case **$139.95**
Quad Drive Case **$169.95**
Smoked Plexiglass Cases, Add **5.00/**per drive

LYNX MODEMS

The finest Auto Answer/Dial Modem on the market! This is a direct connect modem for your model I or III. Does not require an RS232-C interface in your computer! Season Special, ~~$299.95~~ **$249.95**

AMBER EASE

Amber filter for your computer. Amber has been shown to be the easiest on the eyes. Easy to install. (Shown on computer above.) Season Special, All TRS-80 Models, **$19.95**

TIC-TOC-80 MICROCLOCK

A microclock for your TRS-80 Model I. Gives your computer the correct time and date on powerup. Clock is maintained on a lithium battery for long life. Plugs onto the I/O Buss of the TRS-80 Model I and does not require any modifications for most computers. Complete with extensive documentation and a disk with utilities. SPECIAL NOW AVAILABLE IN KIT FORM!

Complete assembled and tested **$99.95**
Kit with P/C board, parts and instructions **$59.95**
Kit with P/C board, parts list and instructions **$19.95**

OTHER MYSTERIES

We carry the full line of IJG 'Other Mysteries' books at discount prices. These books are a must for computer users.

TRS—80 Disk and Other Mysteries	~~$22.50~~	**$19.95**
Basic Decoded and Other Mysteries	~~$29.95~~	**$26.95**
Custom TRS-80 and Other Mysteries	~~$29.95~~	**$26.95**
Basic Faster & Better	~~$29.95~~	**$26.95**

DISK BULK ERASER

Use this handy, portable, non-electric disk bulk eraser anywhere you need it. No need for power, as this unit needs no electricity to function. No user should be without one. Available for the amazing low price of **$4.95.**

DISK STORAGE BINDER

This is a handy 3 ring binder that folds flat for easy use. Complete with 10 plastic pages to store your disks. (Each page holds 2 disks.) Makes transporting your disks as easy as picking up a book!

Binder and Pages (Limited time special) **$9.95**
Extra disk pages alone. (each) . . . . . **$ .50**

MODEL III MEMORY KIT

This kit is all that you need for easy installation of an additional 16K or 32K in your Model III. Complete with 8 page instruction book that has been hailed as '. . . The best instructions we have ever seen . . .'. High quality 150ns memory chips make this the best kit available.

16K . . . **$44.95** 32K . . . **$79.95**

BT ENTERPRISES

171 Hawkins Road
Centereach, New York 11720

(516) 981-8568 (Voice)
(516) 588-5836 (Data)
MNET-70331, 105

VISA MasterCard

Dealer Inquiries Welcome

Add $2.00 S & H
NYS res. add appr. tax

BEGINNER'S CORNER

Spencer Koenig

Welcome to Beginner's Corner. As most of you who have been following this series know, this column is devoted to those with little or no experience working with a microcomputer. With this in mind, I feel very lucky getting the opportunity to do this column because I consider myself, first and foremost, a beginner. This gives me a chance to clarify what I know, and also to learn from you. I believe that being a beginner means always having the opportunity to learn something new (thank you, Love Story).

This brings me to my next point: there is a world of useful information available to you, which I intend to discuss. My question is: what would you like to see, to learn about, and have explained? I also want to know what some of your problems and experiences have been. This information always helps others with similar experiences more easily to use this fantastic piece of computer equipment. You might also have solved a problem that someone else may still be up against, so let's hear from you!

Most of the information I'll be sharing with you is based on the experiences and problems I've faced (not always successfully) in the two years plus that I've had my TRS-80. When I first got my machine, there weren't very many sources of information for the beginner. I consider this to have been one of my BIGGEST problems. I often wondered where to begin (sorry, Love Story). Where do you get the basic information, besides that given out by Tandy, on how this machine works?

Since then, the amount of available information on the TRS-80 has improved greatly. There are all kinds of books (some I hope to review) and magazines, all kinds of programs for the beginner to learn one thing or another, and a variety of organizations that people can go to to "pick the brains" of those who know and understand this machine better. My interests cover a wide range, and I'm looking forward to sharing insights and information with you. OK, enough about hopes and goals of the future. Let's start with how I began and why I got a computer in the first place.

Approximately two years ago, I was enrolled in the Queens College Graduate Music department studying electronic music (among other things). Under this heading of electronic music comes computer music. It just so hament studying electronic music (among other things). Under this heading of electronic music comes computer music. It just so haors and terminals fairly early, usually just when you are making progress on whatever project you happen to be working. The solution was to get my own terminal and hook up to the university system.

The first step was determining what I needed to do to accomplish this task. The choices were: (1) buy a terminal, (which at the time cost $1200 and up brand new), (2) buy a new TRS-80 that was capable of being used as a smart terminal as well as a computer, or (3) buy a used TRS-80 (which at the time wasn't extremely expensive). At that time, I wasn't aware of where to go to get a used terminal. When I called the dealers in my area they quoted prices which made the new terminals look reasonable. You know what I mean, the for-$50-to-$150-more-I-might-as-well-get-the-new-one syndrome.

As it turns out, I was better off buying a used TRS-80 computer instead of a new terminal or a new TRS-80. To be precise, I bought a used TRS-80 Mod I LII 16K. I Then discovered that.the computer wasn't all that I needed: I also required some peripherals (at this stage, I also started picking up the jargon). The peripherals required were: (1) the R.S. expansion interface, (2) an RS-232-C interface, (3) an acoustic coupler modem, and (4) a smart terminal program to get the whole system working. These days you can get modems that contain all the RS-232-C electronics required. I should mention that there are other types of modems called direct connect modems that attach directly to the phone line.

I think it is time to back track a little. It occurs to me that some of you might not be aware of what these peripherals are or what they do. A "modem" is a device to which the telephone connects in order to allow signals to be transmitted across the phone lines. You can often see one next to a teller when you go into a bank. It's a square-ish looking thing with rubber cups that are about the size of a telephone receiver and mouthpiece (stop looking at the teller, that's not what I'm talking about).

Modem stands for "modulator/demodulator". A modem is used, together with the RS-232-C interface, to transmit data across the phone lines. One of Radio Shack's products is a modem (actually it is a product by the Novation company). This device is connected by cable to the RS-232-C board, contained (on the model 1) in the expansion interface.

When the RS-232-C board is connected properly to the modem and the computer, you have a system that is capable of being used as a terminal. This is a great little machine, the TRS-80.

The modem I bought was an old Omnitech that I picked up inexpensively from an electronics firm on Long Island. The expansion interface and RS-232-C were bought new because they weren't available used. I think I should make a comment as to why I bought everything I could in used condition. You have to remember that I was a graduate student, and most of these items were bought with money I had for my education. Did I get an education! I think that getting my computer was the best purchase I've made since I got my first car and went on my first "mobile" date.

All these new toys presented me with lots of interesting, exasperating, and frustrating problems. Some of these problems weren't always with the hardware. I have learned that many problems can arise from simple ignorance and failure to read and understand instructions. Don't get me wrong, it wasn't always my fault (isn't that typical?).

Allow me to give a prime example: having set up the system, I proceeded to test it out, in order to make sure all was in order. The Communications package I used was a tape based smart terminal program from Howe Software (Smart Terminal). The set up was complete, and I was ready to call up the university computer system and get to work.

This is where the problems began. For some reason, it was impossible to log on. (Log on means to get connected to the computer system.) This then allows you to access files and data.

I couldn't figure out what the problem was. I followed all the steps. I loaded the program and dialed the phone number of the university's telephone hook up. There was the usual high pitched squeal of the university modem on the other end. All of my TRS-80 cables were connected to the correct inputs and outputs. Unfortunately, there was no response from my computer. There was supposed to be a welcome message appearing on my TRS-80's screen. Did this mean I wasn't welcome? Anything was possible, but unwelcome was unlikely. "Perhaps I had better check out my system again completely" I thought.

The software seemed to load OK, or was it? At that time I had no way of really knowing. The first step I took was to get the cassette modification that R.S. was offering. After all, it was free. I figured that the program might be only partially loaded correctly. I was obviously wrong, as you will see. The cassette mod taken care of, I once again tried to log on, again without success.

The next step was most interesting. As I found out, the RS-232-C connection in the expansion interface has got to be the worst kind of connector there is. The RS-232-C board rests on top of a contact that is held in place by two screws and washers on both the top and the bottom.

I learned that when the expansion unit gets hot, its possible for these screws to loosen up and the connection to become less than reliable. OK, I made sure that the screws were good and tight. In fact they were tightened to the point of ruining the threads of the screw holders!

One has to remember that plastic, unless it of the military combat type, isn't as strong as one would hope or expect. I brought the expansion unit to R.S. for repair. While I was there, they were nice enough to set the RS-232-C board on the connector properly.

Once again its time to play "Hook up to the University Game." What do you think happened? I'll tell you: nothing. It still didn't work. I Pressed down on the RS-232-C, reload the software, pray to the deities of CPU's. Nothing helped. Next step, I went to R.S. and had the cables checked out, and they checked out OK. It was at this point that I packed up the whole set-up and went down to the Radio Shack Computer Center on Broadway in the New York City financial district.

Previously, I had all my repairs done at a R.S.C.C on Long Island, but they couldn't seem to help me. I had suggested that I might try setting up my system at their store and try to log on while they would be watching over my shoulder. In this way they would be able to help me find the problem more directly. The manager at this particular Computer Center said no, and that was that.

The manager from the Wall street area, however, was more helpful and informative. I found that I was able to log on using one of his systems. I also found out that, using my system and one of R.S.'s modems, I could still log on. "Aha" you say. "Aha" I say. "Aha" R.S. manager says. The problems were all based on an old used modem.

continued on page 40

COLOR COMPUTER CORNER

Joseph Rosenman

This month I'm going to talk about some of the graphics features of Extended Color Basic. First, some thoughts. On the one hand, the more I learn about the Color Computer, the more impressed I find myself with the potential and power of this machine. On the other hand, the software and hardware support available is very dissapointing. Last month, I roasted Radio Shack for what I see as their "unfortunate disk drive disaster". I also explained why I believe that other companies haven't stepped in to fill the void. Prehaps Radio Shack will make the ROMs containing the Color Computer DOS available for sale separately (very doubtful). This might allow companies to provide "economy" expansion interfaces that are Radio Shack compatible. Prehaps companies like Apparat (of NEWDOS/80 fame) will step in with a Color Computer NEWDOS. I firmly believe that whatever future the Color Computer has as a non-game system relies on a powerful and inexpensive disk system. The question is, what does the Color Computer have to offer that ATARI, MATTEL, and APPLE don't? Of course, the APPLE is a fully developed microcomputer system (with a fully developed price as well). On the other hand, my impression of the ATARI and MATTEL systems is that they are primarily "game" systems, and they do their job quite well. Somehow, the Color Computer has yet to emerge with a clear "personality". Radio Shack has failed to give a strong direction to the Color Computer.

Radio Shack also failed in the same way with the Model 1. Fortunately, the Model 1 came on the scene when there was no competition. In fact, I would go so far as to say that the Model 1 was downright revolutionary. It created its own personality. The Model 3 is an extension of the Model 1, and so wasn't introduced into a void. What will the future hold? I certainly can't say, but it seems that something has to change if the Color Computer is going to takes its deserved place in the general market.

In the coming issues, along with programming features such as the present issue offers, I will begin to discuss the 6809 microcomputer and machine language programming on the Color Computer. Often, the programmer needs to to use assembly language to have the computer do certain things (in a reasonable amount of time). I have been presenting a series on Assembly Language (for Rank Beginners) over the last several issues along with the Color Computer Corner. I suggest that any Color Computer users who are interested in learning Assembly Language review the first two or three articles, since they provide the necessary background in number systems. As a "confirmed" assembly language programmer, I can assure you that nothing is quite as satisfying as programming the computer on the level closest to its own operations.

Presented below is a program for the 16K Extended Basic Color Computer. It makes use of several interesting features of Extened Color Basic, and features the use of "multi-paging" with the video graphics. By describing the operation of this program in detail, I hope to describe ways in which YOU might be able use some of these features.

```
10 ' DEMO PROGRAM 1
20 ' BY JOSEPH ROSENMAN
30 POKE 65495,1:' SEE NOTE!!!
40 PMODE 1,1 : PCLS : PCLEAR 8
50 X=10:Y=50:'DELAY/REPEAT
60 'ENTRY OF MAIN LOOP
70 GOSUB 210
80 Z=RND(2)-1
90 FOR L=1 TO 7 STEP 2
100 FOR J=1 TO 8
110 K=(J-1)*32
120 PMODE 1,L:SCREEN 1,Z
130 COLOR RND(4),0
140 LINE (K,0)-(K+31,191),PSET,BF
150 NEXT J,L
160 FOR J=1 TO Y:FOR K=1 TO 7 STEP 2
170 GOSUB 180:NEXT K,J:GOTO 60
180 PMODE 1,K:SCREEN 1,Z
190 FOR L=1 TO X : NEXT L
200 RETURN
210 PMODE 4,1:PCLS
220 PMODE 4,5:PCLS:RETURN
230 END
```

First of all, let me describe what this demonstration program does. The program uses PMODE 1, and reserves 4 graphic screens, each 2 pages (3K) each. PMODE 1 only permits a four color combination. Therefore, there are two "color sets" available in PMODE 1. The color set can be selected via the SCREEN command. The program will draw 8 stripes (selected randomly) in each of the 4 page areas (numbered 1, 3, 5, and 7). After the stripes have been drawn, the program will rapidly shift the 4 screens to the display, creating a changing pattern. After this has displayed, the program will regenerate new screens, and again display them. Each new display could be in either of the two color sets.

Line 30: This is a very interesting little gem! Believe it or not, this command changes a setting in the SAM chip that will increase the CPU speed from .9 megahertz to 1.8 megahertz. Unfortunately, there may be some machines that don't work at the higher speed. The only way to find out is to try it. The command that will restore the computer to normal speed is POKE 65494,1. If you do intend to use the higher speed, make sure you restore the speed to normal before using the cassette (and probably the disk as well). You can find out more about this commands (and others) in the TRS-80 Color Computer Technical Reference Manual.

Line 40: This just begins the initialization process. "PMODE 1,1" causes the PMODE type to be set, and sets display to begin at Page 1. The "PCLS" causes page 1 to be cleared. "PCLEAR 8" reserves 8 pages of video. Each page is 1.5K, so 8 pages requires 12K of RAM. This leaves only 4K for both program and DATA storage. If you intend to work with the maximum number of video pages, you will probably find that the 32K RAM upgrade is a necessity. In PMODE 1,

the maximum number of available displays is 4 (since each display requires 2 pages). PMODE 2 also uses only 2 pages per display. PMODE 3 and PMODE 4 require 4 pages for each display. Therefore, in the higher PMODE settings, there can be only 2 displays simultaneously. Note that the commands "PMODE 1,1 : PCLS : PCLEAR 8" won't cause the display to switch from text to graphics. The SCREEN command accomplishes the switch.

Line 50: The X variable is used to determine the value in the delay loop. This loop is used to determine how long the screen will display, before the next screen is displayed. The Y variable determines how many times the sequence of 4 different screens appear.

Line 70, 210-220: The GOSUB calls the subroutine that clears all the video screens. Notice the way that this subroutine works. First, the PMODE is set to type 4,1. Then, the display is cleared (PCLS). PMODE 4 requires 4 pages per display. PMODE 4,5 points to the second display. By temporarily going into PMODE 4, I was able to clear all the screens using 2 commands, rather then 4. Of course, when it is time to again display the new "stripes", the PMODE will revert to type 1. This subroutine is called at the beginning of each display cycle.

Line 80: This statement sets the variable Z to either a 1 or a 0. This is then used to determine the color set used in PMODE 1 (as an argument in the SCREEN command).

Line 90: This is the statement that controls the initializing of the 4 display areas. Everything between this statement and line 150 is part of this Loop. Only odd numbered values are produced by the statement "1 to 7 STEP 2", so the values used in controlling the loop are also used as the argument in the PMODE command. Remember, the second argument of the PMODE command determines what page to begin the display from.

Line 100: This is the statement that controls the generation of the eight stripes on each display, also terminated at line 150.

Line 110: This statement determines the starting position for each stripe. Each stripe is 32 "units" wide. It would also have been possible to set the command in line 100 to incorporate this statement. For example, one could have used the statement "FOR J=0 TO 224 STEP 32" instead. I elected to divide the statements into two different lines, to help make the program understandable.

Line 120: Using the variable from line 90, this statement sets the proper display page "PMODE 1,L". It also causes that display page to appear "SCREEN 1,Z". Recall that variable Z was set in line 80.

Line 130: This is the command that determines what color each stripe will be. The first argument of the COLOR command determines the foreground color, and the second argument determines the background color. The background color is always 0, and the foreground color is always 1 to 4. What's that, did I hear a question? There should be. We both know that there are actually 8 colors. Why would I restrict myself to only colors 1 to 4? Of course, the answer is I haven't. When the command "SCREEN 1,1" is executed, all colors 1-4 are shifted up 4 to the values 5-8. The background color is also shifted up 4 from 0 to ee03' is executed, all colors 1-4 are shifted up 4 to the values 5-8.

The background color is also shifted up 4 from 0 to). K+31,191 is the ending position (bottom left part of the stripe). The PSET argument causes the "box" to be set to the foreground color. Finally, the BF argument causes the "box" to be filled in with the color (determined by the COLOR command in line 130).

Line 150: This line terminates both loops.

Line 160: At this point, the display phase of the program is about to begin. Again, we have a pair of loops (nested loops, since one is inside of the other). Recall that variable Y determines the number of display repetitions that are to take place. The "outer" loop counts from 1 to Y. The inner loop controls the display of the proper video pages. Notice that it uses the same structure as the loop in line 90.

Line 170: This statement has three sections. First, it calls the subroutine that displays the proper screen, and delays for a moment. The second function is to increment the loops in line 160 "NEXT K,J". After the loops have both expired, the third section is executed. The third section is a "GOTO 60" that starts the whole process again.

Line 180: This statement causes the proper display to appear.

Line 190-200: This is the delay loop. All it does is count from 1 to X. If this loop wern't included, the display would change to fast for the computer to form a picture. Line 200 is the return from the subroutine.

So you think you understand this program? OK, rewrite it so the stripes are horizontal instead of vertical (that's not a "challenge", just a suggestion for a good learning experience. You can also play around with some interesting animation. Why not "draw" four figures in the different display areas, then shift them around using different PMODE page starts? (HINT: if you don't want to see what is being drawn, use the command "SCREEN 0,0". This will force you back into text mode while the graphic displays are being updated.)

Of course, this program is only a demonstration of some of the instructions in Extended Color Basic and what can be done with them. Another interesting demo program would be to draw four displays with random circles, and flash them by in the same way the stripes were used in this program. You can consider each instruction a "tool" that can perform some useful function. For example, I could have created the stripes using PSET commands instead of LINE. Do you want to guess how long it would have taken to create each display with PSETs (even at the fast CPU speed)? I also could have used the line command to draw 32 vertical lines. Instead, I drew 1 diagonal line, and included the command argument to fill in the box. When working with graphics and animation, it is necessaary to ferret out every trick in the book to speed up execution.

Machine language programs can run much faster than Basic programs, but they are more difficult to write. It should be noted that each command in Basic actually uses a special machine language subroutine to perform its operations. The problem is that most commands are general purpose. This means that they have to go through a long process of determining the desired options (and eliminating the many undesired options). This Extended Basic includes several very powerful commands (such as LINE, PAINT, CIRCLE) that actually work very quickly. While machine language subroutines might perform faster, the commands Microsoft included permit complex operations to be exeuted quickly and easily.

If you come up with a program that further demonstrates some of the features discussed in this column, send it in. The best way to learn is to examine programs of other users, and to try the new techniques out yourself.

Joseph Rosenman
35-91 161st Steeet
Flushing, New York 11358 ■

---

continued from page 16

completely non-technical, so that office operating personnel should have no difficulty in understanding the concepts of the program. Nevertheless, as previously mentioned, the general organization could be improved upon. And, should the producers revise the manual at any time, I would urge them to correct the many misspellings of rather simple words—such as, "copywrite," "seperate," and "curser," this last word appears misspelled no less than 42 times. This, and a little reformatting will make this an excellent manual. As it stands, it rates a "5" on our 1 to 10 scale.

The program is supplied on up to two Dysan diskettes, and is available for the word processors mentioned, as well as for any of the Disk Operating Systems except DOSPLUS™.

AUTO-WRITER - Walonick Associates, Inc., 5624 Girard Avenue South, Minneapolis, MN 55419; for TRS-80 Models I, III with 48K, two disk drives, upper/lower case. - $72.83

A. A. Wicks
30646 Rigger Road
Agoura, CA 91301 ■

---

continued from page 37

This time I went back to the electronics firm to see what could be done about my modem. I brought him the device, we wen into the shop, he hooked it up to his system which is a teletype machine, and, lo and behold, he could log on. Now what do you say? Next, I took my old modem home (sounds like an old blues or folk tune) and hooked it up to my system. Guess what? I couldn't log on. I called back the electronics firm and made an appointment for me to take my whole system to his shop so we could try again.

Sure enough, we couldn't log on with my system, but we could with his. It seems that logging on with a teletype is less crucial or requires a less accurate signal to be able to communicate over a telephone line. The technician and I both learned something. After that, I tried to find out how to repair the modem to improve the specifications, or "specs" as they are often called, so that it would be usable on my system. For this information it was necessary to call Omnitech, because the modem was so old that spare parts for it weren't usually available.

This time, I finally got smart. I didn't think it was a good idea to play Russian roulette with my system, my car and my time. By this, I mean that I was tired of running around. I made a deal with the boss and was able to invest some money in trade and buy a new modem.

The moral of the story is, sometimes it's more expensive to go the second hand route, but you do meet some of the nicest people that way. In this case I got an education on the benefits of not giving up, and doing as complete an

investigation and check up on my system as possible. When checking out your system it pays to go from step to step, or from component to component in my case. When doing this kind of troubleshooting it's a good idea to try replacing each of the components to localize the problem. I understand that's how the pros do it.

I also learned that all R.S. representatives aren't the same, and that it pays to make friends. If I had just had the modem checked out first—but then I wouldn't have learned about possible future problems that occur with the RS-232-C due to its poor means of connection.

There is an available cure for the poor connector by ordering a "connector brace" from Gunn Industries, 704 Franklin, Austin, Texas 78751. It consists of two plastic lucite blocks and four long screws. The blocks are put on top and below the connectors. The screws are long enough to reach from beneath the RS-232-C board plus the connectors and the blocks. When these screws are tightened, they exert enough force to insure a good contact between the connectors and the RS-232-C.

Since these problems have been taken care of, I've been living and telecommunicating happily ever after. Well, almost. Naturally there have been other problems to take their place, and I'm sure you'll be hearing about them as we go along. Until next time, see you at Beginner's Corner.

Spencer Koenig
153-27 73rd Avenue
Flushing, NY 11367 ■

continued from page 29

READ, and WRITE statements.

When a random-access file is opened on the APPLE, a record length must be established. The record length signifies the maximum possible characters for any one record. If you were creating a mailing list, for example, and the total characters for the name, addresss, and any other information for any one person would be 50 characters, then you should use a record length of 50. A record length too high wastes disk space, since extra characters are treated as spaces. A record length too small would be disastrous, as either your data could not fit onto the disk or names on your list would get distorted, deleted, or merged in with each other.

In order to open a random-access file with a record length of 50, you would execute the statement PRINT D$;"OPEN XXXX,L50".

If you wish to place data into your random-access file, you must now specify in your WRITE statement which record you wish to write. Let's say that you wish to update the 100th name of your mailing list. The syuntax for the appropriate WRITE statement would be PRINT D$;"WRITE XXXX, R100". If you wished the value 100 to be contained within a variable, such as A, the syntax would be PRINT D$;"WRITE XXXX,R";A. After you write statement, you can use PRINT statements to place data into that record, as with a sequential data file.

continued on page 45

ASSEMBLY LANGUAGE FOR RANK BEGINNERS (PART 3)

Joseph Rosenman

If you think that I'm going to talk about numbers again, think again. Except for the answers to the questions from the last issue, we move on to bigger and better things! Speaking of those answers:

Hex into Decimal:

1ØH = 16	7BH = 123
2694H = 9876	342H = 1Ø1Ø
ØABCH = 2748	3Ø9H = 777
ØDADH = 35Ø1	7BEH = 1982
162EH = 5678	ØBACH = 2988

Decimal into Hex:

467 = 1D3H	22 = 16H
4Ø13 = FADH	3Ø53 = BEDH
645 = 285H	747 = 2EBH
999 = 3E7H	135 = 87H
2ØØØ = 7DØH	3771 = EBBH

Did I say no more numbers? Well, there will actually be plenty of numbers coming, and all of them in Hex! Of course, if you practiced the number exercises I provided in the last issue, you must all be experts by now. The difference is that qe will be using these numbers now. If it turns out that you are REALLY having a hard time with HEX/DECIMAL conversions, there is one suggestion I can offer. Texas Instruments manufactures a calculator known as the "TI Programmer" for about $60.00. This calculator can perform basic arithmetic in Decimal, Octal, and Hexadecimal. It also allows conversions between the different bases. Let me stress that YOU DON'T HAVE TO GO OUT AND BY THIS CALCULATOR in order to study assembly language programming. You will find that the only conversions that will be made frequently will be between binary and hex, the easiest conversion of them all! In fact, you will probably find that you can accept hex nearly as readily as you accept decimal, since you, as the programmer, will be doing very little math.

We use hex numbers as ADDRESSES. Yes, it's almost time to talk about computer architecture and organization. The only remaining "number thing" that needs to be defined now is the "K".

You will frequently hear computer people refer to quantities of things in "K"s. A "K" is roughly a thousand. In fact, it is exactly 1024 or 400H. 4K is 4028 or 1000H, 16K is 16096 4000H. Now, 32K must be 16K+16K right? Right! So in Hex, 32K is 4000H+4000H, or 8000H. 64K is 10000H. Important point 1: while it is true that 64K=10000H, computers always include 0 as a number. This means that a 64K machine will refer to the numbers 0000H-FFFFH: a total of 10000H values. What are these numbers? They are addresses! An address is a unique place in the memory of a computer that can hold a number. In an eight bit machine, like the TRS-80 models 1, 2, and 3, the largest number that can be stored in any given address is a byte (255 or FFH).

How are addresses used? Let me describe some ways in which the computer would use addresses. Let's say that we have a program in memory at address 6000H, that is 200H bytes long (this means that the program will exist in memory from location 6000H to location 61FFH). When we want to "execute" this program (that is, make it do it's thing), we will tell the CPU to "go to address 6000, get the machine instruction there, and do what it says." The CPU will automatically "get the next instruction in sequence after the instruction at 6000H, and do what IT says." This will continue until the entire program has been executed. Then what? Believe it or not, the only time the computer (under normal circumstances) stops computing is when the power is off. This means that every second that your computer is quietly sitting and placidly displaying a "DOS READY", it actually is executing some 400,000 instructions! What is it doing? Essentially, it is running through an instruction loop (a set of instructions that repeats endlessly, or until some specific condition is met) that reads characters from the keyboard, displays them, and puts them into a buffer (a place in memory used to store or accumulate numbers). It also is looking for an ENTER. When it finds the ENTER, it will attempt to figure out what the instructions in the buffer mean. If it can figure it out, it will do what was requested. Otherwise, it will display an error message, then go back to waiting for a new buffer to examine.

If the largest line that you could possibly enter is 255 characters long (nearly 4-64 character long lines), then you would require a buffer of 255 bytes (FFH). If the buffer started at 4000H, then the characters would be stored from 4000H to 40FFH. The question of how such programs work will be taken up at a later date. What I want to discuss here is the hardware side of the question. If you recall the first article in this series, I mentioned that computers have certain "characteristics", such as Program and Data Memory, Input/Output, Arithmetic/Logical processing, and mass storage. The program and data memory are the different memory addresses we've been discussing. You can think of each memory location as a special "box" that can be uniquely identified by its address. (Surely you have seen rows of "clone" houses. Each looks alike, but each also has a different postal address. Occupant "X" might be destined for address 4000, and occupant "Y" might be destined for address 4001. "X" and "Y" are the contents of the addresses.)

Ok, so we have a place to hold numbers in memory. How does the computer know what to do? Enter the CPU (Central Processing Unit). Built into the CPU are certain inherent abilities. The CPU can get a number from a memory address, or put a number into a memory address. It can do things to numbers it has gotten (like add them, negate them, or perform logical operations on them). The CPU keeps track of where in memory the program it is currently executing is located. How does it do all this (and more)? Let's take a peek inside a particular CPU, the Zilog Z-80.

The CPU contains special internal boxes, just like memory locations. These boxes don't have addresses; they have names. They are known as registers. On the Z80, registers can hold either 8 bit or 16 bit numbers. Refer to figure 1 for a

diagram of the registers in the Z80. You will notice that there are two sets of registers AF, BC, DE, and HL. One set is known as the "prime" set and the other set as the "alternate" set. It is possible to use only one set at a time. It is also possible to switch the prime and alternate sets with only one or two commands. For now, don't worry about the alternatessible to switch the prime and alternate sets with only one or two commands. For now, don't worry about the alternate, IY, PC, SP, R, or I.

The register pairs AF, BC, DE, and HL can be split into single registers. The rule is that every two letter register is a 16 bit register, and every one letter register is an 8 bit register. For example, the registers DE can either be used as a 16 bit register, or as two 8 bit registers (D and E). The IX, IY, PC, and SP registers CANNOT be split into single registers. The R and I registers are always only 8 bit registers. (Editor's note: there are undocumented Z80 instructions that do allow the two halves of registers IX and IY to be used separately.)

Register A: This register is known as the accumulator. All 8 bit arithmetic and logical operations involve the use of this register.

Register F: This is known as the Flag register. It contains special information like "The answer was zero," or "there was an overflow in the last operation" (i.e., the number was too large to be contained in the register). We will talk more about the flags later on. By the way, you can't use the AF register pair in the same sense that you can use BC, DE, and HL. The F register isn't used to contain DATA, only flags.

Registers B, C, D, E, H, and L: These are general purpose eight bit registers. They are used to hold numbers during operations that require several instructions. For instance, one reasonable sequence of instructions might include:

(1) Get a number from memory and put in register A.

(2) Get a number from memory and put in register B.

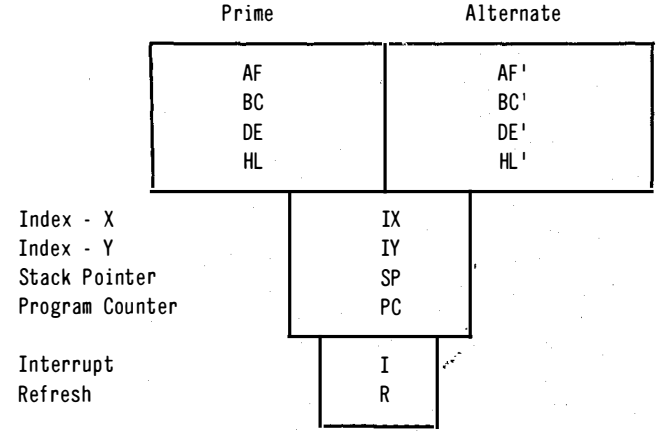
(3) Add the contents of register A and B, (leaves the answer in A).

(4) Put the answer from register A into memory.

Register Pairs BC and DE: These are general purpose 16

continued on page 46

Z80 Registers



SPELLWIDE, FALLING, AND PLINK

Gordon Speer

SPELLWIDE

Several people wrote about SPELLOUT and some asked for a double wide version. Because the letters are wider you must limit your message to a maximum of 30 letters and spaces. Just as in the program SPELLOUT, it brings the letters in from all four directions, in turn. This is an easy type of animation to add to your programs to keep them interesting.

```
10Ø 'FALLING
11Ø LET G=9.8                    'ACCELERATION OF GRAVITY
12Ø CLS
13Ø PRINT,"     F  A  L  L  I  N  G":PRINT
14Ø PRINT "TIME      D  I  S  T  A  N  C  E
       V  E  L  O  C  I  T  Y "
15Ø PRINT " SEC     METERS     FEET    MILES
    M/SEC    FT/SEC    MI/HR"
16Ø PRINT
17Ø FOR T=I*1Ø+1 TO I*1Ø+1Ø     'TIME IN SECONDS
18Ø LET DM=.5*G*T↑2             'DISTANCE IN METERS
19Ø LET DF=DM*3.28Ø84           'DISTANCE IN FEET
2ØØ LET MI=DF/528Ø              'DISTANCE IN MILES
21Ø LET VM=G*T                  'VELOCITY IN METERS PER SECOND
22Ø LET VF=VM*3.28Ø84           'VELOCITY IN FEET PER SECOND
23Ø LET MH=VF*6Ø/88             'VELOCITY IN MILES/HR
24Ø PRINT USING"###";T;
25Ø PRINT USING"##########.#";DM;
26Ø PRINT USING"#########";DF;
27Ø PRINT USING"######.##";MI;
28Ø PRINT USING"#########.#";VM;
29Ø PRINT USING"########.#";VF;
3ØØ PRINT USING"#######.#";MH
31Ø NEXT T
32Ø INPUT "(ENTER) FOR MORE";Q
33Ø LET I=I+1
34Ø GOTO 12Ø
```

FALLING

When an object falls, near the surface of the earth, it increases in speed by 9.8 meters per second every second. Actually, the air resistance soon becomes great enough to change this, so all objects eventually reach some terminal velocity. For skydivers this is about 120 miles per hour. If you neglect the air resistance, it is possible to calculate the speed and distance an object falls very accurately. The first person to explain this correctly was evidently Galileo, who suggested that if you were to drop a small rock and a large rock from the top of the Tower of Pisa, they should reach the ground at the same time. If you would like to find how long this would take, you should know that the Leaning Tower is about 54 meters high. That is slightly more than the height of Niagara Falls. It is not a small tower.

FALLING is a good example of a program that prints a reference chart. If you have a printer, simply change each PRINT statement to LPRINT.

```
1ØØ 'SPELLWIDE
11Ø CLEAR 1ØØØ
12Ø LET M$="THIS IS WHERE THE MESSAGE GOES"
13Ø LET L=LEN(M$)
14Ø IF L/2<>INT(L/2) THEN M$=M$+" ":GOTO 13Ø
15Ø CLS:PRINT CHR$(23)
16Ø REM FROM THE TOP
17Ø FOR N=1 TO L                 'CHARACTER NUMBER IN MESSAGE
18Ø FOR V=Ø TO 8                 'LINE NUMBER ON SCREEN
19Ø IF V=Ø THEN 21Ø
2ØØ PRINT @ (V-1)*64+3Ø-L+2*N," ";
21Ø PRINT @ V*64+3Ø-L+2*N,MID$(M$,N,1);
22Ø NEXT V,N
23Ø FOR DELAY=1 TO 1ØØØ:NEXT
24Ø CLS:PRINT CHR$(23)
25Ø REM  FROM THE RIGHT
26Ø FOR N=1 TO L
27Ø FOR X=62 TO 3Ø-L+2*N STEP -2
28Ø PRINT @ 512+X,MID$(M$,N,1)+" ";
29Ø NEXT X,N
3ØØ FOR DELAY=1 TO 1ØØØ:NEXT
31Ø CLS:PRINT CHR$(23)
32Ø REM  FROM THE BOTTOM
33Ø FOR N=1 TO L
34Ø FOR V=15 TO 8 STEP -1
35Ø IF V=15 THEN 37Ø
36Ø PRINT @ (V+1)*64+3Ø-L+2*N," ";
37Ø PRINT @ V*64+3Ø-L+2*N,MID$(M$,N,1);
38Ø NEXT V,N
39Ø FOR DELAY=1 TO 1ØØØ:NEXT
4ØØ CLS:PRINT CHR$(23)
41Ø REM FROM THE LEFT
42Ø FOR N=L TO 1 STEP -1
43Ø FOR X=Ø TO 3Ø-L+2*N
44Ø PRINT @ 51Ø+X," "+MID$(M$,N,1);
45Ø NEXT X,N
46Ø FOR DELAY=1 TO 1ØØØ:NEXT
47Ø GOTO 15Ø
```

PLINK

Here is a short program just for fun. You can think of it as a football punt or a golf chip shot, but I imagine it to be a giant tiddly-wink lofted by a steam catapult. Press the space bar to play. The longer you hold down the space bar, the higher the wink goes.

```
1ØØ 'PLINK
11Ø CLEAR 1ØØØ
12Ø CLS
13Ø PRINT ,,,"HITS    "Z1
14Ø PRINT ,,,"MISSES  "Z2
15Ø IF Z1+Z2=Ø THEN 17Ø
16Ø PRINT ,,,"PERCENT "INT((Z1*1ØØ+.5)/(Z1+Z2))
17Ø PRINT @ 9Ø4,CHR$(18Ø);STRING$(7,176);CHR$(184);
```

```
180 PRINT @ 945,CHR$(188)CHR$(188);
190 PRINT @ 960,STRING$(63,131);
200 LET X=100                    'STARTING POSITION
210 LET T=0                      'TIMER, RESET
220 LET H=0
230 IF PEEK(14400) <> 128 THEN 230
240 IF PEEK(14400) = 128 THEN LET T=T+1
   :GOTO 240                     'TIMER
250 FOR I=1 TO 130               'HORIZONTAL POSITION
260 LET V=T-I                    'VERTICAL SPEED
270 LET H=H+V*T/100              'HEIGHT
280 LET X=X-1
290 IF X < 0 THEN 370
300 LET Y=44-H/9
310 IF Y < 0 THEN 340
320 IF Y > 44 THEN 350
330 SET(X,Y): SET(X+1,Y)
340 NEXT I
350 IF X>15 AND X<32 THEN Z1=Z1+1: PRINT @ 768,"PLINK";:
FOR D=1 TO 1000: NEXT: GOTO 370
360 PRINT @ 768,"MISS";: FOR D=1 TO 1000: NEXT
370 LET Z=Z+1                    'SHOTS TAKEN
380 LET Z2=Z-Z1                  'MISSES
390 GOTO 120
```

Gordon Speer
3304 Woodlawn Road
Sterling, IL 61081 ■

continued from page 41

If you desire to READ information from a disk file, you must OPEN the file. After this is done, you should execute the statement PRINT D$;"READ XXXX,R100" if, for example you desired to read record 100.

When using random-access files on the APPLE, it is extremely important to rememeber the file length. The APPLE does not keep track of this for you. If you forget the file length for your file, there is absolutely no way to get this information from the computer, and you could destroy your file if you use the wrong file length and WRITE to the file.

Now we can write a program to OPEN a file called TEST, and place the names TOM, DICK, and HARRY into the file:

```
10 D$=CHR$(4)
20 PRINT D$; "OPEN TEST,L20"
30 A$(1)="TOM":A$(2)="DICK":A$(3)="HARRY"
40 FOR I=1 TO 3
50 PRINT D$;"WRITE TEST,R";I
60 PRINT A$(I)
70 NEXT
80 PRINT D$;"CLOSE TEST"
```

If we want to reOPEN the file, replace DICK with RICH, and PRINT the contents of the file, we could use the following program:

```
10 D$=CHR$(4)
20 PRINT D$;"OPEN TEST,L20"
30 PRINT D$; "WRITE TEST,R2
```

```
40 PRINT "RICH"
50 FOR I=1 TO 3
60 PRINT D$;"READ TEST,R";I
70 INPUT A$:PRINT D$:PRINT A$
80 NEXT
90 PRINT D$;"CLOSE TEST"
```

TRS-80 RANDOM ACCESS FILES

On the TRS-80, a random-access file is opened with the OPEN "R" command. This command has exactly the same parameters as do OPEN "I" and OPEN "O".

The TRS-80 does not treat random-access files as a collection of sequential files, as does the APPLE. After a file is OPENed, the programmer must specify what variable(s) will be used within each record. This could be analogized as setting up which variables will be used to READ and WRITE to your sequential files on the APPLE

The TRS-80 FIELD statement is used to specify what variable will reprsent the various elements of each record. Let's say, for instance, that you wish to set up a random-access file containing names and addresses. Assuming you are using file 1, you could use the statment FIELD 1, 15 AS A$, 15, as B$. This would allocate 15 bytes for the name and 15 for the address.

In order to assign values to FIELDed variables, you should use the LSET or RSET statements. These place the variable into the file buffer and place spaces before or after the entry to fill the buffer. Thus, if you wanted your first record to read John Smith 50 Main Street, you could use the statements LSET A$ ="John Smith" and LSET B$="50 Main Street".

In order to actually place a record into a disk file, you should use the PUT statement. Assuming you have FIELDed and LSET your buffer, as described above, you could use the statement PUT 1,1 to update the file. The first "1" denotes the file number, while the second denotes what record is to be updated.

The GET statement is used to retrieve information from a file. Assuming the file has been FIELDed, the statement GET 1,1 would retrieve the information saved above.

As with the APPLE, we can write a program to OPEN a file called TEST and place the name TOM, DICK, and HARRY into the file:

```
10 OPEN "R",1,"TEST"
20 FIELD 1,10 AS A$
30 A$(1)="TOM": A$(2)="DICK": A$(3)="HARRY"
40 FOR I=1 to 3
50 LSET:A$=A$(I)
60 PUT 1,I
70 NEXT
80 CLOSE
```

If we wanted to reOPEN the file, replace DICK with RICH, and PRINT the contents of the file, we could use the following program:

```
10 OPEN "R",1,"TEST"
20 FIELD 1,10 AS A$
30 LSET A$="RICH"
40 PUT 1,2
50 FOR I=1 to 3
60 GET 1,I
70 PRINT A$
80 NEXT
90 CLOSE
```

This concludes this month's tips on program conversion. If you have any comments or suggestions, or if there is a specific topic which you would like to see coverted, let me know. I would very much like to hear from people who have successfully converted their programs or who need help in conversion. Simply write to Richard Kaplan, c/o H & E Computronics. ■

---

continued from page 43

bit registers. They can be used to hold 16 bit numbers, which includes memory address. For instance, you might use register DE to hold the address of the input buffer for the keyboard. You could then tell the computer to store the character just entered into the "contents of the number pointed to by the DE register."

Register Pair HL: This register can be used just like registers BC and DE. In addition, if you are performing 16 bit arithmetic (i.e., add the contents of BC and HL), it can only be done with the HL register. In other words, the HL register pair is an accumulator for 16 bit operations, just like the A register is for eight bit operations.

Register PC: This register controls the address that the computer is currently executing. PC always contains the address of the NEXT instruction to be executed. Since it contains an address, it is a 16 bit register. PC stands for Program Counter.

Register SP: This register is known as the Stack Pointer, and contains the address of the "Stack". A stack is a special kind of storage buffer, and will be discussed in more detail at a later date. The SP register is a 16 bit register, and always contains the address of the stack.

Register IX and IY: These are 16 bit "index" registers. They are similar to register pairs BC and DE except for two special differences: (1) they can't be split into two 8 bit registers, and (2) they permit indexing. Indexing means that you can temporarily add an offset to the address contained in the IX or IY register to get to new address. In other words, if IX contained 4000H (the address of a table) and you wanted the fifth element of the table, you would ask the computer for "the contents of IX + 4". This type of indexing corresponds to the structure of a singly-subscripted array.

Register R: This is the "Refresh" register. It is used by the internal hardware of the computer to insure that the memory remains reliable. It is almost never used by programmers, and we won't need to discuss it further.

Register I: This is the "Interrupt" register. It is used to distinguish between different levels of interrupts (up to 255). It only works if the Z80 is in "Interrupt mode 2". Unfortunately, TRS-80 users can't make use of interrupt mode 2, so this register isn't used. The TRS-80 only has two kinds of interrupts: Non-Maskable (the reset button), and Maskable. Interrupts are a rather complicated subject, and can't be elaborated on now. I might write about them in a future issue. Suffice it to say that interrtupts inform the CPU that "something has happend". Interrupts are often used in I/O programming. The TRACE function and the Time Of Day function both use interrupts.

These are the Z80 registers. The concepts of having registers, a program counter, and "flags" or "status" is (as far as I know), a universal feature of all computers. The specific size, quantity, and function of the registers differ markedly from one type of computer to another. Let's make sure that a particular concept is clear: An address is a 16 bit number that points to a memory location. The actual memory location contains an 8 bit number. To access anything in memory, you will need two numbers: the address and the value (the value will either be saved in memory or read back from memory).

The CPU keeps track of what it is doing through the use of two registers, the PC and the F. The PC register keeps track of what address is going to be executed next, and the F register keeps track of the "results". If you add 7 and 2, the result is 9. In addition to the "answer", the computer will keep track of the type of answer in the F register. Recall that there are 8 bits in a byte (and 8 bits in the F register). Each bit can be either on or off (1 or 0). The way the "flags" work is that each bit is a flag for a specific condition. There are 6 flags in the F register (2 bits are unused).

Of all the flags mentioned, the S, Z, and C are most frequently used. Only certain machine instructions will cause flags to be set or reset. As we study individual instructions, we will also note how the flags are used by those instructions.

Joseph Rosenman
35-91 161 Street
Flushing, New York 11358 ■

```
Bit:  7  6  5  4  3  2  1  Ø
      S  Z  .  H  .  P/V  N  C
```

(7) S Sign flag. If Ø, the number is positive. If 1, the number is negative.

(6) Z Zero flag. If Ø, the result is zero. If 1, the result is non-zero.

(4) H Half-carry flag. Set if carry from bits 3 to 4. Bits 3 and 4 are the connecting bits between the two nybbles. This flag is used infrequently.

(2) P/V Parity/Overflow flag. This flag also is used only in special circumstances. It is set if there is an overflow or underflow (number too large or too small). During I/O operations, it keeps track of the "parity" of the recieved or transmitted numbers.

(1) N Add/Subtract flag. Primarily used by a special Z-8Ø instruction (the DAA or Decimal Adjust Accumulater). Until you want to use the DAA instruction, forget it.

(Ø) C Carry flag. If an add generates a carry or a subtract a borrow, this flag is set. Also, if a 1 bit is "shifted'' out to the left, this flag is set. (More on shifting in the next issue).

POCKET COMPUTER CORNER

A Program for Amortization Tables and Balloon Notes

S. M. Zimmerman, Ph.D. and L. M. Conrad

This program is designed to aid all lenders and borrowers who must get involved with the details of the money lending process. With our present inflation, more and more people have had to enter the money lending and borrowing business because of the inability of obtaining funds through normal channels.

The program is menu driven, and all the user does is answer a series of questions to obtain any desired results. The TRS-80 Pocket Computer may be carried in one's pocket or pocketbook with this program already loaded into the computer, ready instantaneously to help with the task of customizing a business or real estate transaction.

A loan consists of a flow of cash or credit from one person to a second person at the start of the loan in exchange for a series of cash flows from the second person back to the first over the life of the loan. The most common loan today is an equal payment loan. In this type of loan the payments are usually monthly and of equal value. This program has been designed to assume the payments will be fixed end of period and monthly only.

RUNNING THE PROGRAM

The program may be run in the DEFineable or RUN MODES. In the DEFineable MODE, the operator hits SHFT and then SPC in that order. In the RUN MODE, the user types RUN and hits ENTER. In both cases the first thing the user sees is the main menu: (NOTE: Now is the time to turn your printer on if you have one for your pocket computer).

1-AMORT.,2-BALLOON

Selecting 1 and hitting ENTER results in running the AMORTIZATION program. Selecting 2 results in the BALLOON program. Assume you selected 1. The next question on the display will be:

YEARS

In this program, you may repay a loan in any number of years. If you wish to repay the loan in six months, input a .5 and the program will work. Usually it is expected that the loan will be for some integer year. Assume for example that the loan is for a two year period. Type 2 and hit ENTER.

The next question is:

ANNUAL %

Interest rates have been so variable that it is difficult to select one which will be realistic. A 12% interest rate is easy to check by hand, so it was selected for this example. Type 12 and hit ENTER.

The next question is:

LOAN

This question is asking for the amount of dollars or credit given at the beginning of the loan. Assume this value was $1,000. Type 1000 and hit ENTER.

The program now goes into execution. The first thing it calculates is the equal payment to be paid by the lender monthly. This result will be printed on the display.

PAYMENT7 47.07

You must hit ENTER again to get the computer to continue with its calculations if you do not have a printer. After a short delay you will see the following on the display.

N 1 IN 10.00

Hit ENTER again and you will see:

RE 37.07 LO 962.92

The first display showed the period and the interest expense. The second display shows the reduction of loan for the period, and then the remaining balance of the loan. You will be able to obtain the following results by hitting ENTER after each result is placed on the display. Do not forget to write the results down, or you will have to go through the process again.

N 1 IN 9.63

RE 46.61 LO 0.00

The biggest problem when using this program is to remember to write down the results. It took three runs to obtain the results seen above.

After the amortization table is complete, the program will return to the main menu.

1-AMORT.,2-BALLOON

The selection of 2 and hitting ENTER results in the following question:

BALLOON PAYMENT

Assume you are concerned with the amortization table and you want to know what is due and payable at the end of the 12th month. A balloon at the end of 12 months. Input 12 and hit ENTER.

You will now have to answer the questions relative to YEARS, ANNUAL %, and LOAN in exactly the same manner as was done above. Assume you answered 2 years, 12% and $1000 as in the first example.

In a short period you will see:

PAYMENT 47.07

This is exactly the same result obtained in the first example. After hitting ENTER and a short delay, you will see on the display:

N 12 IN 5.71

continued on page 50

THE NEW LEADER

Anthony T. Scarpelli

Are you tired of waiting that eternal time for your PRINT#-1 data to be saved onto tape, or for it to be loaded back? If you are, then read on, for I have written a short routine in assembly language that can easily be loaded by your Basic programs to give you a one second leader, or shorter, for your PRINT# statements.

My wife wanted a mailing list, and I started to write one in Basic. It didn't have to be fancy, so I decided not to purchase one. I had decided that all the names could very easily be put into strings, but to use the PRINT# statement would make the loading and retrieving of those strings on cassette a very long process. I had been considering looking into what ROM routines caused the long four second leader, so this project made me really jump in. One evening, with my *Supermap* and *Disassembled Handbook for TRS-80, Vol.2* in hand, I discovered the secrets of how the ROM creators created their secret code for a 255 byte leader.

It all starts when the PRINT statement is decoded by the ROM interpreter routines. The program jumps to 206FH, where such things as "#", "@", USING, TAB, comma, semicolon, string, and colon are checked. The first instruction found at 206FH is a CALL to 41CAH. The code at this location is simply a RETurn; but if you are familiar with your memory map, you would have noticed that 41CAH is in RAM, with 41CBH and 41CCH having no codes at all. This turns out to be a boon to us assembly language programmers, because we can literally write our own routines if we understand what the ROM is doing. The program jumps to 0284H with a CALL. This routine turns on the cassette recorder, writes the 255 byte leader, writes the A5H sync byte, and then returns to write out the data that follows the PRINT# statement.

In order to change the time of the leader, this is the routine that has to be changed. Since ROM cannot be changed, our only recourse is to use that first jump to RAM which can be changed to jump to a new routine which we shall write to make that shorter leader. Thus, at 41CAH, which contains a C9H (RET), we put a C3H (JP, jump) and the address where we will jump to. In my case, since I have 48K of memory, the address was FD69H. If you don't have 48K, you will have to use your own address here. Now look at the assembly language listing.

```
00100 ;-- PROGRAM NAME: LEADER
00110 ;
00120 ;-- A PROGRAM THAT PRODUCES A ONE SECOND
00130 ;   LEADER FOR USE IN PRINT# DATA SAVES
00140 ;-- REPLACES FOUR-SECOND LEADER ROUTINE
00150 ;-- IS RELOCATEABLE, AND CAN EASILY BE POKED
00160 ;   INTO MEMORY WITH A BASIC PROGRAM
00170 ;
00180          ORG     0FD69H
00190          CP      23H             ;PRINT#
00200          RET     NZ              ;BACK TO ROM IF NOT
00210          CALL    01FEH           ;TURN ON CASSETTE
00220          LD      B,40H           ;1 SEC LEADER
00230          XOR     A               ;ZERO ACC.
00240 LOOP     CALL    0264H           ;OUTPUT BYTE IN ACC.
00250          DJNZ    LOOP            ;  UNTIL FINISHED
00260          LD      A,0A5H          ;SYNC BYTE
00270          CALL    0264H           ;OUTPUT BYTE
00280          LD      A,80H           ;SPACE
00290          LD      (409CH),A
00300          RET
00310          END
```

Listing 1: Assembly Language Program

After the comments, line 180 indicates where the routine will be assembled. If you have an Editor/Assembler, then here is where you would put your own address. From line 190 on we are essentially using the routine in ROM, but with a few differences. In line 190 we ComPare the number in the accumulator with 23H, which is the ASCII number for a # character. If the compare operation results in a Not-Zero, that is, if the accumulator did not contain a 23H, then we RETurn back to ROM and go about business as usual. If the number was a 23H, however, we stay in this routine and do our own thing.

In line 210 we go to a routine that simply turns on the cassette. In the next line we have our most important number. This number determines how many zeros are written to tape as the leader. Since ROM has an FFH at this point which represents about four seconds, I just divided that by four to come up with a one second count of 40H. If you want to try a shorter leader, then by all means try a smaller number here; I never tried anything shorter, but remember that a leader is necessary to get the cassette up to speed and to take care of any time problems when the cassette shuts down during a load operation.

In the next line we see an instruction that zeros the accumulator in one opcode. In line 240 we call a routine that sends whatever is in the accumulator out to the port that the cassette recorder is connected to. Then the instruction in line 250 Decrements the B register, which contained the leader count, and Jumps back to the location specified as long as the B register is Not Zero. Line 260 loads the accumulator with the standard sync byte of A5H. In binary this is 10100101. We send it out to tape with line 270, and in line 280 we put an 80H into the accumulator. This is a space character, with which the ROM program ends the PRINT# routine. It also allows the ROM program to continue in a normal manner to jump over the regular PRINT# routine, because after the next line, when we return, we are actually going back to 2072H in ROM. If anything else was put here there would be no guarantee that we would have a well working routine.

Now that we have the routine written and working, we need to get it into memory. Since it was so short, and since it is used exclusively in Basic programs, I wrote a short program that shows how it is poked into memory and tested. Now take a look at the Basic program. After all the REM

information we come to our first real statements in line 110. The assembly language program was converted from hex into decimal and then placed in DATA lines. These are poked into memory by a loop. The program's start and end address are in line 110. In 120 you will see a formula that you won't find in the Level II Basic Reference Manual. In the manual it is stated that to POKE or PEEK into memory higher than 32767 you must use the formula: -1*(desired address - 32767). In my machine this formula just doesn't work properly. It does poke and peek, but at the wrong ends of memory. To get the assembly language program to work in a 48K machine I had to use the formula: desired address-65536. If you poke the data into high memory with the old formula and try to run the program, and if you end up in never-never land, try this new formula.

```
10 REM -- ROUTINE TO SHORTEN LEADER TO 1 SECOND
20 '   -- TO BE USED FOR PRINT#-1 DATA SAVES
30 '
40 '-- CAUSES ROM CALL AT 206FH TO JUMP TO NEW ROUTINE --
50 '-- ORIGINALLY:  206FH       CALL 41CAH
60 '--              41CAH       RET
70 '-- NOW:         41CAH       JP FD69H        ;C3 69 FD
80 '-- * NOTE: CHANGE JUMP TO YOUR OWN LOCATION
90 '
100 '-- POKE IN NEW ROUTINE FIRST:
110 FOR I=64873 TO 64897
120   READ D: POKE I-65536,D
130 NEXT I
140 '
150 DATA 254,35,192,205,254,1,6,64,175,205
160 DATA 100,2,16,251,62,165,205,100,2,62,128,50
170 DATA 156,64,201
180 '
190 '
200 '-- NEW JUMP CODE:
210 '-- 41CAH=16842     C3H=195  69H=105  FDH=253
220 '-- POKE IT IN:
230 POKE 16842,195: POKE 16843,105: POKE 16844,253
240 '
250 '
260 '-- TEST TO CONFIRM OPERATION --
270 '
280 CLS : CLEAR 100
290 PRINT "PRINT #-1 ONE SECOND LEADER TEST"
300 PRINT : INPUT "ENTER YOUR NAME";N$
310 PRINT : INPUT "ENTER YOUR STREET ADDRESS";A$
320 PRINT : INPUT "ENTER A NUMBER";A
330 PRINT : INPUT "ENTER A 2ND NUMBER";B
340 PRINT : INPUT "PLACE RECORDER IN RECORD MODE, PRESS <ENTER>
WHEN READY";X
350 PRINT #-1,N$
360 PRINT #-1,A$
370 PRINT #-1,A
380 PRINT #-1,B
390 '
400 PRINT : INPUT "REWIND TAPE, PLACE RECORDER IN PLAY, PRESS
<ENTER> WHEN READY";X
410 PRINT : N$="": A$="": A=0: B=0 '-- NO CHEATING ALLOWED!
420 INPUT #-1,N$ : PRINT N$
430 INPUT #-1,A$ : PRINT A$
440 INPUT #-1,A : PRINT A
450 INPUT #-1,B : PRINT B
460 PRINT : PRINT "FASTER, ISN'T IT?  GOOD LUCK!"
```

After we get the assembly language program into memory, we have to change the RAM locations that will point to it. This is done in line 230, and that's it. To be able to test it out, the rest of the Basic program shows how two string variables and two numeric variables are saved on tape with the one second leader being recorded for each PRINT#-1 statement. In line 410 we null out the variables to be sure that what gets loaded into the computer is actually what we put onto tape. Then play back the tape and see if it all works. If it does, you are on your way to much shorter loads and saves. If you have any trouble you should make sure that your DATA statements are correct, and that your POKEs are to the right locations. You can also write a short routine that will PEEK the assembly language program out of memory so that you can compare it to the data listings.

I have already implemented this routine in my word processor, which is in Basic, and it surely speeds things up. It won't take you long to find other programs where you can use it. I hope you find this article useful. It shows that knowledge of assembly language is extremely useful, and with a little help from your friends, the knowledge of ROM can get you a computer system that really helps you out rather than hinders you. When all you have is a cassette recorder, any increase in speed gives you a little high.

Anthony T. Scarpelli
98 Foxcroft Dr.
Scarborough, ME 04074 ■

---

continued from page 48

and after hitting ENTER again:

RE 571.18 LO 0.00

The value $571.18 was the unpaid balance at the end of the 11th month. The $5.71 is the interest due at the end of the 12th month. To get the total due these two numbers must be added together.

LIMITATIONS

The primary limitations of the TRS-80 Pocket Computer which affect this program are the 24 character screen and the lack of a printer. The trade-off which must be faced is whether to print out a single value at a time or to print out two at a time on the small display. In the program the selection was to print two items at a time. This meant the largest loan which can be handled is $999,999.99.

SUMMARY

This program will produce either amortization table information or the value of a balloon note. It is useful as it is but will be of much greater value when a printer becomes available. Any printer, even one with a limited number of columns, is better than copying all the numbers produced by hand.

HONEST JOHN

Robert T. Huff

HONEST JOHN is a program that determines a winner for ANY decision. The objective may be either positive or negative. The outcome of the game is input when you are asked the question "the person with the correct guess . . .". Here you input a phrase such as "will get breakfast in bed" (positive), or "must serve breakfast in bed" (negative). Any number of people may play the game.

HONEST JOHN is a number-guessing game. Each person is asked to guess a number between 1 and 100. (The last number is set by B in line 200.) If the player does not get the number right, the computer tells him whether the correct number is greater or less than the number he selected, and play passes to the next player.

The program will run on a Model I, II, or III.

```
1Ø REM                    <HONJOHN>
2Ø CLS : PRINT CHR$(23): PRINT @ 18,"HONEST JOHN
3Ø PRINT @ 82,"-----------
4Ø PRINT : PRINT @ 138,"AN ORIGINAL PROGRAM": PRINT
5Ø PRINT @ 282,"BY:
6Ø PRINT @ 4Ø4,"BOB  HUFF
7Ø FOR A=1 TO 2ØØØ: NEXT A
8Ø RANDOM
9Ø CLEAR 1ØØØ
1ØØ CLS: PRINT @ 2Ø,"HONEST JOHN": PRINT @ 84,"-----------":
PRINT : PRINT
11Ø PRINT "THIS EXERCISE DETERMINES A WINNER FOR ANY DECISION.
12Ø PRINT "THE OBJECTIVE MAY BE EITHER POSITIVE OR NEGATIVE.
13Ø PRINT : PRINT TAB(3)"EXAMPLES:
14Ø PRINT TAB(6)"(POSITIVE) - WILL GET BREAKFAST IN BED.
15Ø PRINT TAB(6)"(NEGATIVE) - MUST SERVE BREAKFAST IN BED.
16Ø PRINT : PRINT : INPUT "HOW MANY PEOPLE ARE PARTICIPATING";I
17Ø INPUT "THE PERSON WITH THE CORRECT GUESS . . . . . ";WL$
18Ø CLS
19Ø FOR N=1 TO I: INPUT "PARTICIPANTS NAME  ";NM$(N): NEXT N
2ØØ A=1:B=1ØØ
21Ø X=RND(98+1)
22Ø FOR N=1 TO I: CLS : PRINT NM$(N)" , I AM THINKING OF A
NUMBER BETWEEN"A"AND"B".
23Ø PRINT "IF YOU GUESS IT, YOU "WL$".
24Ø PRINT : INPUT "WHAT NUMBER DO YOU GUESS ";Q
25Ø IF Q=A OR Q=B THEN GOSUB 39Ø
26Ø IF Q=A OR Q=B THEN PRINT "YOU"DM$"!  TRY AGAIN.":
PRINT "( LESS THAN"B", AND MORE THAN"A")": PRINT : GOTO 24Ø
27Ø IF Q>A AND Q<B AND Q>X THEN PRINT : PRINT "MY NUMBER
IS SMALLER THAN "Q".":B=Q
28Ø IF Q>A AND Q<B AND Q<X THEN PRINT : PRINT "MY NUMBER
IS LARGER THAN "Q".":A=Q
29Ø IF Q<A OR Q>B THEN GOSUB 39Ø
3ØØ IF Q<A OR Q>B THEN PRINT : PRINT NM$(N)", YOU"DM$".":
PRINT "TRY A NUMBER BETWEEN "A" AND "B".": PRINT : GOTO 24Ø
31Ø IF Q=X THEN CLS: FOR A=1 TO 969: PRINT " WINNER";: NEXT A:
PRINT : PRINT : GOTO 33Ø
32Ø FOR TL=1 TO 1ØØØ: NEXT TL
33Ø IF Q=X THEN PRINT : PRINT NM$(N)", YOU "WL$".  MY NUMBER
WAS"X".": PRINT STRING$(64,"-"):NG=NG+N: PRINT : PRINT "THERE
WERE A TOTAL OF"NG"GUESSES.";: GOTO 36Ø
34Ø NEXT N
35Ø NG=NG+I: GOTO 22Ø
36Ø PRINT "  DO YOU WANT TO PLAY AGAIN";: INPUT PA$
37Ø IF LEFT$(PA$,1)="Y" THEN 8Ø
38Ø CLS: PRINT @ 41Ø,"SEE YOU LATER . . .": END
39Ø FOR C=1 TO 1Ø: READ D$(C)
4ØØ DATA " IDIOT"," NINCOMPOOP" ," DUMMY"," PEA BRAINED
BUZZARD"," MAKE THE VILLAGE IDIOT SHINE"
410 DATA " BEETLE BRAIN"," HAVE THE SMARTS OF A JACKASS",
" MUST HAVE CEMENT BETWEEN YOUR EARS"," !ST GRADE DROP OUT",
" CAN'T COUNT"
420 NEXT C
43Ø DM=RND(1Ø):DM$=D$(DM)
44Ø RESTORE : RETURN
```

Robert T. Huff, CLU
11104 Ridgemeadow
Dallas, Texas 75218 ■

If you are interested in further information about the pocket computer, we would like to suggest our newly published book from Wm. C. Brown Company Publishers entitled "Learning To Use Your Pocket Computer". It covers the use and Basic programming for the TRS-80 and the Sharp PC 1211 Pocket Computers. Our second book, "Practical Programs For The Pocket Computer" will be out shortly from the same publisher.

Steven M. Zimmerman,Ph.D.
College of Business
University of South Alabama
Mobile, Alabama 36688

Leo M. Conrad
Imagineering Concepts
P.O. Box 9843
Mobile, Alabama 36691-0843 ■

PROGRAM LISTING

```
1:" "INPUT "1-AMORT.,2-BALLOON ";X
1Ø:GOSUB 3Ø:GOTO 4Ø
2Ø:INPUT "BALLOON PAYMENT ";B:GOSUB 3Ø:Y=B:GOTO 4Ø
3Ø:INPUT "YEARS ";Y:INPUT "ANNUAL % ";A:INPUT "LOAN ";L:
  Y=12Y:A=.Ø1A/12
31:R=L*((A*(1+A)↑Y)/((1+A)↑Y-1)):USING "########.##":
  PRINT "PAYMENT ";R:RETURN
4Ø:FOR J=1TO Y-1:C=A*L:GOSUB 6Ø:D=R-C:L=L-D:IF X=1GOSUB 5Ø
41:NEXT J:J=Y:C=A*L:GOSUB 6Ø:D=L:L=Ø:GOSUB 5Ø
42:GOTO 1
5Ø:USING "###":PRINT "N ";J;USING "#######.##";" IN";C:
  PRINT"R";D;" L ";L:RETURN
6Ø:E-INT(C*1ØØ)/1ØØ:F=C-E:C=E:IF F>.ØØ5LET C=C+.Ø1
61:RETURN
99:END
```

NOTE:THE ↑ SIGN MEANS TO RAISE TO A POWER

SCRIPSIT II AND THE NEC SPINWRITER 5530

James H. Wilbanks, Ph.D.

To realize greater potential from their general purpose systems, computer users purchase and use word processing programs such as SCRIPSIT from Radio Shack. When these programs are used to produce business or professional papers or correspondence, many users soon realize that a better appearing printed text is required than can be produced on dot matrix or thermal printers. In fact, a letter quality printer is needed. Even the higher price of a quality printer does not appear to deter the user if professional looking text is deired.

Matching printers with word processing programs can be a problem. This review describes the NEC Spinwriter Model 5530 and the features as implemented through the SCRIPSIT II word processing program.

THE NEC SPINWRITER 5530

The Spinwriter 5530 prints fully formed characters at a maximum of fifty-five character per second bidirectionally. The printer uses a Centronics-type parallel interface which means it has "plug and run" capability with the TRS-80 Model II.

Fully formed characters are produced from fiberglass reinforced plastic thimbles. The thimble is arranged so that each of the sixty four spring action fingers supports two characters, one above the other. A maximum of 128 characters can be contained on one thimble. Each kind of thimble may have a different number of characters. For example, the PICA 10 thimble has only ninety-six characters.

Print is formed as the thimble rotates to its print position and impresses through the ribbon onto the paper. Ribbons may be either a continuous cloth type or a one time carbon film. This is an advantage over some other letter quality printers which only use the one-time film. A user may draft, revise, and edit using cloth ribbons, and produce final copy with the film ribbon. In the process, the user saves a considerable amount of money.

The NEC 5530 handles paper sixteen inches wide producing a print line of 136 columns at 10 characters per inch or a maximum of 163 print columns at 12 characters per inch. Paper handling can be accomplish-ed by using the built in friction feed. Other options for form handling can be purchased, such as pin feeds, tractors, or cut sheet feeders, to meet special needs. The vertical tractor can be easily removed allowing the manual feeding of single sheets of letter head stationery. These arrangements allow the Spinwriter to be used for most kinds of forms handling form mailing labels to continuous feed applications.

Front panel operator controls also help with paper handling. Form length, top of form set, from ejects, annunciator LEDs, tests, and other operations can be performed from this panel. The number of lines per form and the number of printed lines per inch can be selected form the control panel.

SCRIPSIT II

SCRIPSIT II is a low to medium cost word processing program form Tandy/Radio Shack. The program operates under the DOS operating system from Tandy on the TRS-80 Model II. A similar (but considerably less powerful) program is available for use with the Model I. Printing commands are passed to the printer through control codes. Some of the codes are not recognized by the Spinwriter.

SCRIPTSIT supports the following printer com-mands, not all of which work with the Spinwriter: bold printing, bold and underlined, underlined, double underlining, overstrike, strike through, super/subscripting, and swap codes to modify the command codes.

BOLD PRINTING is accessed through the Control 0 code. Using this code with the Spinwriter provides emphasis by overstriking each character a number of times. It appears that the width of the formed characters is not changed, but the inking of the characters does make the letters stand out more clearly.

Another attention getter is *underlining*. Underlining is accessed through the shift hyphen code. Before and after the text to be underlined provide this code. The Spinwriter accepts this arrangement and *underlines the desired text.*

Text may be **bold** and *underlined.* SCRIPSIT uses Control 0 and the shift hypen to instruct the Spinwriter to do this kind of printing. SCRIPSIT documentation states that bold, underlined, and bold/underline can be accomplished on printers that backspace. It does not appear that the Spinwriter backspaces; rather, it seems to print the character, then the underline character before proceeding to the next print column.

SCRIPSIT supports the strike through printing technique. This kind of printing often appears in legal documents. The strike through format is accessed by typing Control hyphen before and after the text to be struck through. This is an example of the Spinwriter:

~~text to be struck~~

SCRIPSIT provides for subscripting and superscripting. The control codes for these formats are ignored. The double underline feature is also unsupported. Double underline code causes a single underline on the Spinwriter. Many of the swap codes are not implemented on the Spinwriter by the codes listed in SCRIPSIT documentation.

SUMMARY

The NEC Spinwriter 5530 is a quality printer producing fully formed text. It does not recognize all the control codes provided in the SCRIPSIT II word processing program. Most notably, SCRIPSIT does not take advantage of the bidirectional capability of the Spinwriter. Under SCRIPSIT, the printer is unidirectional. This has the effect of slowing printer output to approximately half of its capability. In addition, certain command control codes are unrecognized or ignored.

These limitations appear to be in the codes/print driver used in SCRIPSIT rather than of the printer itself. (Note: the writer has seen all these feature implemented in a more costly word processing program, including bidirectional printing.)

The Spinwriter and SCRIPSIT jointly provide the professional appearing text required in small business or home offices. ■

SOFTWARE TUTORIAL

NEWDOS/80 Version 2.0 by Apparat, Inc.

Joseph Rosenman

I had thought of reviewing this new version of the popular NEWDOS/80 Disk Operating System (abbreviated DOS), but decided not to. Instead, I believe that several articles describing some of its new features would be more useful. What's more, I expect that the information I present will be "random access". By this I mean that I will not be presenting an exhaustive and methodical presentation of the NEWDOS/80 system. Instead, I will select those features that I feel are of special merit and interest. In all cases, I will try to present examples to help elaborate on the description given in the documentation.

First, some general impressions. While NEWDOS/80 2.0 was written for both the Models 1 and 3, separate versions are required for the two computers. I do not own a Model 3 and must leave special observations focusing on that system to Dr. Howe in the Model 3 Corner. The new version is clearly "upwardly compatible" from version 1.0 on the Model 1. Having used the Model 3, I can see that Apparat incorporated several features found on the Model 3 TRSDOS into the new version of NEWDOS/80. I also have heard from Dr. Howe that the Model 1 compatibility of the new version, while being of tremendous value on the Model 1, is a serious handicap on the Model 3. The reason for this is the disk storage method used is not fully compatible with other Model 3 DOS'S, including TRSDOS. These columns will focus on the Model 1, where NEWDOS/80 2.0 is a welcome addition.

This is a BIG DOS. Instead of the 15 "SYS" modules of version 1.0, this version contains 23. The DOS includes: Built-in Lower Case, blinking cursor, auto-repeat on held key, repeat of prior command, enhanced chaining, enormousley enhanced system configuration options (via PDRIVE and SYSTEM). The BASIC includes single stepping, variable swapping, forward/backward paging, text compression, and array sorting. Of course, the above list is very abbreviated. Such regulars of NEWDOS/80 as DIRCHECK and SUPERZAP have been upgraded as well. Experienced NEWDOS/80 users will be able quickly to adjust themselves to the new version. Beware of software compatibilities, however. This IS a NEW system, and Apparat relies on the users to report incompatibilities (and, perhaps, supply corrections). One I know of right off is the Electric Pencil (version 1). Pencil seems to be unable to save files or list Directories under NEWDOS/80 2.0. I am fairly sure a solution to the problem will be found sometime soon. In any case, a careful test run BEFORE you commit valuable data to the new system is certainly in order. (By the way, a period of checkout and adjustment is standard in the computer industry.) Many personal computer users are insulated from this "painful" aspect of computer use. When using a system as sophisticated as NEWDOS/80 (especially early in its life), one has to expect a period of adjustment.

Since I recently published an article about the SYSTEM and PDRIVE commands for NEWDOS/80 1.0, these are the first areas I will explore for version 2. As you can see from the list provided below, there are many new options. You will also note that, in a sense, the Model 1 and 3 versions were combined, with the inappropriate options automatically defeated by the DOS. Also, rather then re-assign codes from scratch, Apparat picked up where they left off in version 1.0. While it would have been nice if they could have assigned "meaningful" codes to the specific options, I think (using two letter codes) that this couldn't be done. In cases like this (arbitrary assignment), it is important to maintain uniformity whenever possible. Apparat, having chosen the path of uniformity, has made the job of version 1.0 to version 2.0 upgrade much easier. It should be observed that one version 1.0 code (AH) is no longer relevant, and so it has been made "null". In the table below, I included a special field at the extreme left. If there is a 1 or a 3 there, it indicates that the option is ONLY used on that particular model number TRS-80. Options AA-AS were included in version 1.0.

```
     AA: Enables or Disables passwords.
     AB: Selects a "Normal"' or a "Run-Only" mode.
(1)  AC: Selects the NEWDOS/80 keyboard debounce.
     AD: Enables or Disables the "JKL" screen print option.
     AE: Enables or Disables the "123" debug entry option.
     AF: Enables or Disables the "DFG" Mini-Dos option.
     AG: Determines whether BREAK will produce a 01 or a 00.
*    AH: ---> Not used in NEWDOS/80 version 2.0.
(1)  AI: Lower case option.
     AJ: Option to have keyboard spot "JKL", "123", & "DFG".
     AK: Option to determine whether "JKL" will dump graphics.
     AL: Number of drives connected to the computer.
     AM: Number of tries permitted in correcting disk I/O errors.
     AN: Default drive for the DIR command.
     AO: Default drive for file save.
     AP: HIMEM address.
     AQ: Enables or Disables the CLEAR key.
     AR: Password checking during disk copy.
(1)  AS: Allows or Prevents Lower Case in BASIC.
     AT: Determines whether CHAINING is in record or character mode.
     AU: Enables or Disables the "repeat key" function.
     AV: Initial delay before key repeat.
     AW: Number of sector re-writes allowed after verify failure.
     AX: Highest ASCII character printable for the printer.
     AY: Enables or Disables "Date and Time" query on boot up.
     AZ: Enables or Disables Date and Time reset on warm boot.
     BA: Enable or Disable "Boot Masthead" display (routing).
(3)  BB: Define clock interrupt rate.
     BC: Enable or Disable operator interruption of CHAINING.
     BD: Enable or Disable operator overriding of AUTO feature.
     BE: Enable or Disable the R (Repeat) command.
(1)  BF: Autoset lower case mode (if possible).
     BG: Enable or Disable keyboard "Caps lock".
     BH: Enables or Disables "blinking cursor".
     BI: Determines cursor character.
     BJ: Loop timing modification (for speed-up mods).
     BK: Enables or Disables special Directory protection.
```

BM: Enable or Disables verify after formatting.
(1) BN: Toggles between Model 1 and Model 3 DAMs.

Since the meaning of codes AA-AS hasn't changed, I must refer readers to issue 38 of *Computronics*. In my article on the SYSTEM and PDRIVE commands, I described those codes and how they are used. Let's pick up with code AT.

AT: If "N" puts chaining into record mode. If "Y" puts chaining into character mode. Chaining refers to the CHAIN (or DO) files. In record mode, the chain process can include both whole records from the chain file on disk, and single character input from the keyboard. In character mode, all input must come from the disk file (the keyboard is locked out until completion of the Chain file).

AU: If "Y" enables the repeat key function. If "N" disables it. If enabled, any key depressed longer then the "initial interval" will start repeating. The initial interval is set with option AV. The key will repeat as fast as the resident program can accept them, up to 12 per second.

AV: The number of 25 ms periods to wait before beginning key repeat. For example, if AV=20, there will be a .5 second delay (25*20=500 milliseconds).

AW: The number of sector re-writes permitted. If sector write succeeds, the sector is read back and compared with the original. This option determines how many times the DOS will attempt to re-write the sector if the verify fails. Previously, the DOS permitted no retries.

AX: The highest permitted ASCII code to be printed. Any value higher then this is replaced by a period or a blank. This option allows the DOS to "filter" out values the printer might not be able to handle. The graphics codes (128-191) and space compression codes (192-255) are perfect examples. If your printer can't handle graphics, set this value to 127. If it can handle graphics but not space compression codes, set this value to 191. (Most printers that accept codes 192-255 probably define them as something other then space compression codes anyway.)

AY: If "Y", causes DOS to request Time and Date when Cold Boots occur. If "N", skips the Time and Date request, and sets the values to zeros. The system will cold boot whenever it doesn't find a useable DOS system in memory. This condition will occur when you first "power-up", or when memory gets "scrambled" by some program that has "run-amok".

AZ: If "Y", causes DOS to request Time and Date when Warm Boots occur. If "N", skips the Time and Date request, and leaves the values the way they were. The system will warm boot if the reset button is pressed, or execution goes to address 0, etc.

BA: If "Y", causes all display output to be routed away from the CRT. If "N", display output follows the normal display path. If activated, this option will prevent the NEWDOS/80 masthead (and the BASIC masthead) from being displayed. The effect of this option is the same as if the operator entered "ROUTE,DO,NL".

BB: If "N" clock interrupts are expected 60 times per second. If "Y" clock interrupts are expected 50 times per second. This option DOES NOT set the rate of clock interrupts. It does allow the NEWDOS/80 software to "expect and work with" the selected rate. (MODEL 3 only)

BC: If "Y", the operator can cancel chaining, or pause while chaining. If "N", chaining can't be interrupted. Needless to say, if the DOS is set for the RUN-ONLY mode (option AB), this option will be forced to "N".

BD: If "Y", the operator can override the AUTO feature when booting up, by holding down the ENTER key. If "N", the AUTO feature cannot be overridden. RUN-ONLY forces BD to "N".

BE: If "Y", the "repeat" command is enabled. If "N", the repeat command simply causes a "DOS READY" response. The repeat command causes the last entered DOS line to be re-executed. It is invoked by typing "R".

BF: If "Y", causes an automatic LCDVR,Y command at boot up. If "N", causes an automatic LCDVR,N command at boot up. The LCDVR command causes the Lower Case Driver to be activated or deactivated ("Y" activates this option). (Model 1 only)

BG: If "Y", causes an automatic LC,Y command at boot up. If "N", causes an automatic LC,N command at boot up. The LC command acts like a kind of software "CAPS LOCK". If "Y", the keyboard will start in lower case mode. (The combination of SHIFT-0 can be used to toggle back and forth between upper case and lower case.)

BH: If "Y", cursor blinking is enabled. If "N", cursor blinking is disabled.

BI: Contains the correct ASCII value for the cursor character. Any valid ASCII character can be used as a cursor character.

BJ: If not equal to 1, is a multiplier value for loop timing adjustments. This option is only used if there is a "speed-up modification" added to the TRS-80. It has nothing to do with CPU speed switching, but can help the DOS adjust to a different speed.

BK: If "Y", allows the command WRDIRP, and the DIRCHECK functions W and C to be executed. If "N", causes the above commands to be rejected with a "DISK ACCESS DENIED" response. The WRDIRP command reads and re-writes the directory sectors in the current format (see option BN). This command is frequently used during model 1 and model 3 diskette exchanges. It has the potential of destroying the directory (that is why Apparat has a special option forbidding its use). DIRCHECK option W does the same thing WRDIRP does, and option C clears unused FPDEs.

BM: If "Y", causes the Disk Formatting routine to verify the the sectors just formatted. If "N", the verify phase is skipped.

BN: If "N", causes the Directory DAM (Data Address Mark) to be set to the Model 1 code. If "Y", causes the DAM to be set to the Model 3 code. The DAM is a special code that exists in the area "in between" the sectors. This command should only be used when transfering diskettes between Model 1 and Model 3 NEWDOS/80 version 2 systems. (Model 1 only)

Quite a list! It is well worth your time to select the appropriate options for your particular system, since this will allow the DOS to work "with you" rather then to fight with you. When I present the next "tutorial" column on NEWDOS/80 version 2, I will talk about the enhanced PDRIVE command and some of the new Library commands. If any readers have specific questions about a NEWDOS/80 feature, I will be happy to try to explain its correct use.

Joseph Rosenman
35-91 161 Street
Flushing, NY 11358 ■

SOFTWARE REVIEW: SCARFMAN

George Kwascha

Arcade Junkies! A TRS-80 version of the popular PAC MAN has finally arrived. This version, called SCARFMAN, is written by Philip Oliver and published by the Cornsoft Group. My disk version, purchased from Alpha Products, runs on 32K Level 2, Models 1 and 3. A cassette version is also available for 16K Level 2, Models 1 and 3. I highly recommend buying and Alpha Products joystick to play this game. Using the keyboard arrows makes game playing very tedious and awkward.

The object of SCARFMAN is to "eat" your way to as many points as your skill and dexterity can manage, before being eaten up yourself. You are faced with an elaborate maze filled with dots. You are provided with four Scarfmen at the beginning of the game. The game graciouslyawards an extra man as a bonus at 20,000 points. The Scarfmen, shaped like a big "C", appear, one at a time, at the bottom of the screen. It is up to you to move them through the maze, scroring points for eating dots. Sound easy? Unchallenging? Not quite! While each Scarfman maneuvers through the maze gobbling dots, he is pursued by five "monsters". The awkwardly shaped monsters start the game in a chute at the top of the screen. These malevolent critters have two modes of existence. With their eyes in the raised position, they chase Scarfman, attempting to eat him up. With eyes in the lowered position, they avoid Scarfman and can be eaten by him for additional points. So you ask, how can we lower these monster eyes? The maze has five crosses, one positioned in the center of the screen and one in each of the four corners. When Scarfman eats a cross: all five monsters lower their eyes, slow down, and try to avoid Scarfman. If eaten by Scarfman, they return to the chute and exit with raised eyes, chasing Scarfman again. Any monster not eaten by Scarfman, eventually reverts back to the raised eyes mode. Before monsters revert back, they will blink for a few seconds, warning you of the impending change in strategy. The time delay for reverting back depends on the skill level at that time. The skill level increases with each cleared screen. Increased skill levels also cause monsters to get better at searching out Scarfman. Sound like fun? It's great, once you become used to operating the joystick. The game alson provides you with sound through the cassette plug. If you attach a speaker amplifier, you can hear Scarfman eat his way around the maze.

Program Loading

The disk version supplied works on a Model 1 or 3. The model 1 version is self-booting in drive 0. The model 3 version requires powering up under TRSDOS, then inserting the Scarfman disk into drive 1 and typing Scarfman and hitting enter. The cassette version loads using the System command.

Instructions

As usual with most games, instructions are not prolific. Here are a few points that I discovered by trial and error:

1. After ending a game, hit Enter to start a new game.
2. Hitting Break and Clear simultaneously, will end the game.
3. During play, the bottom of the screen indicates the number of men left to play, difficulty level, top score, and current score. If you score more than the top score, a screen displaying the alphabet appears at the end of the game. Moving the cursor with your joystick and pressing the fire button will record your high score and initials. These instructions appear on the screen, but not in the literature.

Complaints

No program is without its faults. One person's complaint is another person's joy. My big beef with this game is not the game itself but the fact that I could not make a Backup copy of the Model I version. I have no real problem with this if the distributor will provide a replacement upon destruction of my original, when the time comes (and experience says it will). No mention of such a policy is made in the literature.

Another minor irritation is the manner in which the bottom score-keeping portion of the screen is displayed. It is displayed during the game when all the action is taking place. When the game starts, I have yet had time to take my eyes and concentration off dots and Scarfman. I guess that's part of the challenge. A momentary delay between games to inspect the display would have been helpful.

Another feature that would add to the competitive nature of Arcade Junkies, would be the saving of high scores in a disk file. This feature is available with othe quality arcade software on the market and would be a delightful addition to SCARFMAN.

Conclusion

Since the graphics of the TRS-80 are limited, SCARFMAN does not fully resemble its arcade counterpart. But we've all learned to live with those deficiencies in our beloved machines. Overall, I found the game of SCARFMAN to be quite habit forming, exciting, intellectually and violently satisfying. The instructions state that a good game is 75,000 points, while the world record is 200,920 points. Well, the Cornsoft Group will have to revise their instruction sheet. My top score to date has been 241,450 points. Anybody out there score higher?

George Kwascha
8007 Mahogany Drive
Charlotte, NC 28212 ■

Text Manipulation for Word Processing

Mel Patrick

Word processing is probably one of the most common uses for computers in the business world today. Just looking at the market you can observe the many types available ranging form simple Basic to complex Basic and then the extremely elaborate Machine language versions.

The machine language versions are generally considered to be the ultimate for control and versatility. These versions are usually shorter then their Basic counterparts and offer the user more control over various parameters. And while they asre more efficient they leave the user little or no room for modification for their particular application. The only other drawback, until you get used to using it, is the multitude of commands that must be learned to support the program. This is even more obvious if you look at the documentation for some of programs such as *Electric Pencil*, or Radio Shack's *Scripsit*.

Basic Processing

Basic word processors are menu driven so they are not nearly as confusing as the machine language versions. But being in Basic they are, for the most part, slow at the best of times. They also do not utilize memory as efficiently as the machine language versions and are therefore larger in size and don't offer the user the same control. However the user does have an advantage in the fact that he can modify the program for his particular system or application.

The area where most Basic processors fail sadly is, first, the input routine, and second, the save and load option. The input routine is INKEY$ loop which checks the text you enter for valid text or a control code and acts accordingly. The reason for using the INKEY$ is that if you used the INPUT command instead you would not be allowed to enter some punctuation as text. The INKEY$ allows the user to input anything so it is used quite extensively.

The second area, and the one that this article is concerned with is the saving and or loading of text files to cassette or disk. This area is one that is extremely inefficient and really shouldn't be. While the INKEY$ will allow you to input punctuation as text, your cassette or disk is not very appreciative of your efforts. Because of the way the Level II ROM views the text file data, as it either loads or saves it to cassette or disk, you have a problem. The problem is that if you have a string variable that contains a delimiter (such as a comma), the ROM stops transmitting or receiving the text data from cassette or disk, and then either continues on through your data or, if that was the last variable to work with, returns you to the menu. You have at no doubt one time or other got the "EXTRA IGNORED" error message because you input a comma into a string variable.

Possible Solution

So how do you save punctuation to cassette or disk without upsetting the ROM? It's not all that difficult really. If you look at a Basic word processor listing, you will probably see that a subroutine was called just before and immediately after saving your text file to cassette or disk. Looking further, you'll notice that this same routine was called after you loaded a text file. What this subroutine did was to change all of the punctuation in your text file to some other character that the ROM would allow to be saved or loaded. Then when it was called the second time, it changed all the characters back to what they were in the first place. You can think of the routine as sort of a flip-flop idea.

Most of the better quality Basic word processors use this approach of changing the text file data before and after a save or load. Normally the punctutaion is changed to a graphics character because the ROM will allow these to be saved or loaded. I use this method myself with complete success.

The idea of swapping graphics charcters for punctuation is excellent in theory, but alas, in practice it's not very fast. For example, normally with a routine like this, each line of your text file is searched, character by character, and if any punctuation or graphics characters are found they are changed accordingly. If you have 120 lines of text at 72 characters per line it would take the computer approximately 15 minutes to search through them.

This in itself is bad enough, but now you have to add your saving time to this, and THEN if you want to return to the menu, you have to call this routine again to change everything back. The same holds true if you load a file: you would have to wait approximately 15 minutes before you return to the menu.

By owning a disk system you can ease this feeling because your loading and saving time is short. With a cassette system you may as well curl up with a good book, because it's going to take a while.

Programmers use various ways to speed up the search and swap subroutine, such as using an identifier at the start of each text line that is going to contain punctuation. That way the subroutine only has to look for the lines that have an identifier in it and search that line. Another method is to use quotes at the start of each line containing punctuation. Again this idea has drawbacks because of the justify and hardcopy functions. These ideas do speed up the routine somewhat, but there are still other ways that are easier and more efficient to use.

The Subroutines

Listing 1 is an example of the simplest and the slowest version of the swap routine. This routine searches each line for either punctuation or a graphics character and flip/flop them accordingly. A variation of this routine would look at the first character of each line and if was an identifier it would then search that line for punctuation or graphics characters. As stated before, the drawback to this routine is that the identifier must be saved and loaded and then dealt with in the justify and the hardcopy routines. Most of the Basic processors use this routine or a modified version of it. The other drawback to this routine is its size. Considering what it does, it's not too efficient.

```
10 REM THIS SUBROUTINE IS FOR CHANGING TEXT FILE DATA TO GRAPHICS
20 REM CHARACTERS OR VICE-VERSA. I=NUMBER OF TEXT LINES
30 REM D$(#) CONTAINS THE FILE DATA TO SEARCH THROUGH
40 FOR LC=0 TO I
50 FOR S=1 TO LEN(D$(I))
60 IF MID$(D$(LC),S,1)=CHR$(58) THEN MID(D$(LC),S,1)=CHR$(162):
GOTO 140
70 IF MID$(D$(LC),S,1)=CHR$(59) THEN MID$(D$(LC),S,1)=CHR$(164):
GOTO 140
80 IF MID$(D$(LC),S,1)=CHR$(34) THEN MID$(D$(LC),S,1)=CHR$(129):
GOTO 140
90 IF MID$(D$(LC),S,1)=CHR$(44) THEN MID$(D$(LC),S,1)=CHR$(160):
GOTO 140
100 IF MID$(D$(LC),S,1)=CHR$(160) THEN MID$(D$(LC),S,1)=CHR$(44):
GOTO 140
110 IF MID$(D$(LC),S,1)=CHR$(162) THEN MID$(D$(LC),S,1)=CHR$(58):
GOTO 140
120 IF MID$(D$(LC),S,1)=CHR$(164) THEN MID$(D$(LC),S,1)=CHR$(59):
GOTO 140
130 IF MID$(D$(LC),S,1)=CHR$(129) THEN MID$(D$(LC),S,1)=CHR$(34)
140 NEXT S
150 NEXT LC
160 REM HERE YOU CAN RETURN TO YOUR PROGRAM
```

Listing 2 is a completely different approach. This routine finds the start address of string space (remember when you CLEAR## in Basic you set up and address pointer in RAM) and then finds the top of memory (below what you may have already saved for the memory size option). These two variables are then placed into a FOR/NEXT loop and the entire string area is search through. Punctuation that is found is changed to graphics or vice versa. This routine requires less time and is smaller in size then the previous one.

Listing 3 is identical to listing 2, only it is written in machine language. Again this routine finds that start of string space and then searches, changing data as need be until it reaches the top of memory. The difference between this routine and the other two is SPEED ! This routine will search through 30,000 bytes make any changes needed in less then 2 seconds. The size of the routine is also a bonus. It's only 89 bytes long.

```
10 REM SECOND SUBROUTINE FOR CHANGING PUNCTUATION USING
20 REM PEEK AND POKE COMMANDS.
30 REM S = START OF RESERVED STRING SPACE
40 REM F = TOP OF MEMORY (OR MEMORY SIZE IF YOU SET ONE).
50 S = PEEK(16545)*256+PEEK(16544)
60 F = PEEK(16562)*256+PEEK(16561)
70 FOR T=S TO F
80 IF PEEK(T)=34 THEN POKE T,129: GOTO 160
90 IF PEEK(T)=44 THEN POKE T,160: GOTO 160
100 IF PEEK(T)=58 THEN POKE T,162: GOTO 160
110 IF PEEK(T)=59 THEN POKE T,164: GOTO 160
120 IF PEEK(T)=129 THEN POKE T,34: GOTO 160
130 IF PEEK(T)=160 THEN POKE T,44: GOTO 160
140 IF PEEK(T)=162 THEN POKE T,58: GOTO 160
150 IF PEEK(T)=164 THEN POKE T,59
160 NEXT T
170 REM RETURN TO YOUR PROGRAM
```

The routine is called from basic using the USR(0) command. The start address must be poked into the USR(0) command point as per the instructions in the Level II manual. The routine has no jumps or calls within itself so it is relocatable anywhere you want. Because this routine will normally reside in high memory, you must protect it using the memory size option. For example, if you had a 16k system, you would set memory size to 32768. Then by POKE16526,166: POKE16527, 127 you have set up the USR(0) function. After that each time you want to change the text file data you give the command Z=USR(0), and it will run the subroutine and then return to your basic program.

```
ØØ1ØØ ;THIS ROUTINE IS TO CHANGE PUNCTUATION INTO
ØØ11Ø ;GRAPHICS CHARACTERS OR VICE-VERSA TO FACILITATE
ØØ12Ø ;SAVING TEXT FILES TO CASSETTE OR DISK.
ØØ13Ø ;THIS VERSION IS FOR THE TOP 89 BYTES OF
ØØ14Ø ;16K SYSTEMS. NOTE THE USER MUST POKE THE START
ØØ15Ø ;ADDRESS INTO THE USR(Ø) COMMAND LOCATION.
ØØ16Ø         ORG     7FA7H           ;START OF ROUTINE
ØØ17Ø START   LD      HL,(4ØAØH)      ;STRING SPACE POINTER
ØØ18Ø LOOP    LD      A,(4ØB1H)       ;LSB TOP OF MEMORY
ØØ19Ø         CP      L               ;AT TOP OF MEMORY?
ØØ2ØØ         JR      NZ,SEARCH       ;GOTO ROUTINE IF NOT
ØØ21Ø         LD      A,(4ØB2H)       ;GET MSB TOP MEMORY
ØØ22Ø         CP      H               ;ARE WE THERE YET?
ØØ23Ø         RET     Z               ;YES THEN BACK
ØØ24Ø ;THIS FIRST SECTION CHECKS FOR PUNCTUATION TO
ØØ25Ø ;CHANGE TO GRAPHICS CHARACTERS.
ØØ26Ø SEARCH  LD      A,','           ;LOAD COMMA BYTE
ØØ27Ø         CP      (HL)            ;IS IT A COMMA?
ØØ28Ø         JR      Z,COMMA         ;YES THEN CHANGE IT
ØØ29Ø         LD      A,':'           ;LOAD COLON BYTE
ØØ3ØØ         CP      (HL)            ;IS IT A COLON?
ØØ31Ø         JR      Z,COLON         ;YES THEN CHANGE IT
ØØ32Ø         LD      A,';'           ;LOAD SEMICOLON
ØØ33Ø         CP      (HL)            ;IS IT A SEMICOLON?
ØØ34Ø         JR      Z,SEMI          ;YES THEN CHANGE IT
ØØ35Ø         LD      A,'"'           ;LOAD QUOTE BYTE
ØØ36Ø         CP      (HL)            ;IS IT A QUOTE
ØØ37Ø         JR      Z,QUOTE         ;YES THEN CHANGE IT
ØØ38Ø ;THE NEXT SECTION CHECKS FOR GRAPHICS TO CHANGE
ØØ39Ø ;BACK TO PUNCTUATION.
ØØ4ØØ         LD      A,129D          ;GRAPHICS QUOTE BYTE
ØØ41Ø         CP      (HL)            ;IS IT THE SAME?
ØØ42Ø         JR      Z,GQUOTE        ;YES THEN CHANGE IT
ØØ43Ø         LD      A,162D          ;GRAPHIC COLON BYTE
ØØ44Ø         CP      (HL)            ;IS IT THE SAME?
ØØ45Ø         JR      Z,GCOLON        ;YES THEN CHANGE IT
ØØ46Ø         LD      A,164D          ;GRAPHIC SEMICOLON BYTE
ØØ47Ø         CP      (HL)            ;IS IT THE SAME?
ØØ48Ø         JR      Z,GSEMI         ;YES THEN CHANGE IT
ØØ49Ø         LD      A,16ØD          ;GRAPHIC COMMA BYTE
ØØ5ØØ         CP      (HL)            ;IS IT THE SAME?
ØØ51Ø         JR      Z,GCOMMA        ;YES THEN CHANGE IT
ØØ52Ø CONT    INC     HL              ;ADVANCE POINTER
ØØ53Ø         JR      LOOP            ;LOOP TIL DONE
ØØ54Ø ;THIS SECTION CHANGES THE PUNCTUATION INTO
ØØ55Ø ;GRAPHICS BYTES.
ØØ56Ø COMMA   LD      (HL),16ØD       ;COMMA TO GRAPHICS
ØØ57Ø         JR      CONT            ;BACK TO LOOP
ØØ58Ø SEMI    LD      (HL),164D       ;SEMICOLON TO GRAPHICS
ØØ59Ø         JR      CONT            ;BACK TO LOOP
ØØ6ØØ COLON   LD      (HL),162D       ;COLON TO GRAPHICS
ØØ61Ø         JR      CONT            ;BACK TO LOOP
ØØ62Ø QUOTE   LD      (HL),129D       ;QUOTE TO GRAPHICS
ØØ63Ø         JR      CONT            ;BACK TO LOOP
ØØ64Ø ;THIS SECTION CHANGES THE GRAPHICS CHARACTERS
ØØ65Ø ;BACK TO PUNCTUATION.
ØØ66Ø GQUOTE  LD      (HL),'"'        ;REPLACE GRAPHICS BYTE
ØØ67Ø         JR      CONT            ;BACK TO LOOP
ØØ68Ø GSEMI   LD      (HL),';'        ;REPLACE GRAPHICS BYTE
ØØ69Ø         JR      CONT            ;BACK TO LOOP
ØØ7ØØ GCOMMA  LD      (HL),','        ;REPLACE GRAPHICS BYTE
ØØ71Ø         JR      CONT            ;BACK TO LOOP
ØØ72Ø GCOLON  LD      (HL),':'        ;REPLACE GRAPHICS BYTE
ØØ73Ø         JR      CONT            ;BACK TO LOOP
ØØ74Ø         END     1A19H           ;BASIC ENTRY POINT
```

Listing 4 is a routine that you can add to your word processor. It will poke the machine language portion into high memory and setup the USR(0) call. This version is for 16K systems. For 32K or 48K systems you will have to change lines 40 and 80 to:

40 FOR T=-16473 TO 16385: REM for 32K systems

80 POKE16526,167:POKE16527,191:REM for 32K systems

40 FOR T=-89 TO -1:REM for 48K systems

80 POKE16526,167:POKE16527,255:REM for 48K systems

Remember that you will still have to reserve MEMORY SIZE. Set the size that fits you systems as follows; 32679 for 16K, 49063 for 32K and 65446 for 48K.

```
1Ø REM THIS ROUTINE WILL POKE IN THE DATA FOR THE MACHINE
LANGUAGE
2Ø REM SUBROUTINE AND SETUP THE USR(Ø) CALL.
3Ø REM NOTE THIS VERSION IS FOR A 16K SYSTEM
4Ø FOR T=32679 TO 32767
5Ø READ J
6Ø POKE T,J
7Ø NEXT T
8Ø POKE 16526,167: POKE 6527,127:REM SETUP THE USR(Ø) CALL
9Ø REM YOUR PROGRAM GOES HERE
1ØØ DATA 42,16Ø,64,58,177,64,189,32,5,58,178,64,188,2ØØ,162,44
11Ø DATA 19Ø,42,38,62,58,19Ø,4Ø,41,62,59,19Ø,4Ø,32,62,34,19Ø,4Ø
12Ø DATA 35,62,129,19Ø,4Ø,34,62,162,19Ø,4Ø,41,62,164,19Ø,4Ø,28
13Ø DATA 62,16Ø,19Ø,4Ø,27,35,24,2Ø2,54,16Ø,24,249,54,164,24,245
14Ø DATA 54,162,24,241,54,129,24,237,54,34,24,233,54,59,24,229
15Ø DATA 54,44,24,225,54,58,24,221
```

Listing 5 is an example of how to use the machine language version in your basic word processor. Lines 50 to 140 are the save routine, and lines 150 to 230 are the load routine. Note that this is only an example, and you may have a different set of routines in your processor. It was only to show where you would locate the USR(0) calls to change the text data before and after saving and loading.

continued on page 62

™TRS80 color

From the January 1981 issue of the CSRA Computer Club newsletter:

> There was some amusement at the November meeting when the Radio Shack representatives stated that the software in the ROM cartridges could not be copied. This month's 68 Micro Journal reported they had disassembled the programs on ROM by covering some of the connector pins with tape. They promise details next month. Never tell a hobbyist something can't be done! This magazine seems to be the only source so far of technical informations on the TRS-80 color computer™. Devoted to SS-50 6800 and 6809 machines up to now, 68 Micro Journal plans to include the TRS-80 6809 unit in future issues.

To get the MOST from your 6809 CPU - This is the BEST SOURCE! The ONLY Magazine for the 6809 Computer. Months Ahead of All Others!

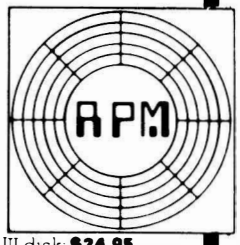
68 MICRO JOURNAL

5900 Cassandra Smith
HIXSON, TN 37343

USA
1 Yr.- $24.50 2 Yr.- $42.50 3 Yr.- $64.50
*Foreign Surface Add $12.00 Yr. to USA Price
*Foreign Airmail Add $36.00 Yr. to USA Price
*Canada & Mexico Add $5.50 Yr. to USA Price

ERRATIC DISK DRIVES

RPM measures the rotational speed and variation of your disk drives, and reveals a common cause of unexplained errors. Simple one-key operation, runs under any DOS, interchangeable between Models I and III. Shows current and average speeds, plus fluctuation history. Recovers from severe errors. Documentation explains how to adjust drives. Use RPM monthly for best results. 32-48K Model I or III disk: **$24.95**



AMAZING PROGRAM SPEEDS UP BASIC

Your time is valuable, so why waste it on slow-running BASIC programs? PRO-SOFT's "FASTER" will analyze those programs *while they run*, then show you a simple change (usually one new line) that can reduce run-times by up to 50%. TRS-80 Models I and III **$29.95**.

CALL NOW TOLL-FREE FOR ORDERS ONLY:
(800) 824-7888, Oper. 422
Calif: (800) 852-7777, Oper. 422
Alaska/Hawaii: (800) 824-7919, Oper. 422

For technical information, write or call us directly:

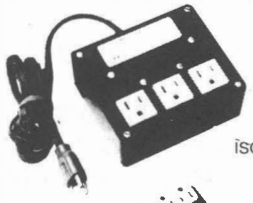
PROSOFT

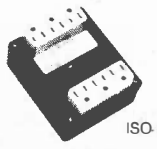
P.B. 839 / No. Hollywood, Ca. 91603 / (213) 764-3131

Check, M/C, VISA ok. Add $2.00 for COD. 6% sales tax in California, and $5.00 for shipment outside North America.

DISK DRIVE WOES?
PRINTER INTERACTION?
MEMORY LOSS?
ERRATIC OPERATION?

Don't Blame The Software!





Power Line Spikes, Surges & Hash could be the culprit! Pat. #4,259,705
Floppies, printers, memory & processor often interact! Our patented ISOLATORS eliminate equipment interaction AND curb damaging Power Line Spikes, Surges and Hash. Guaranteed!

- **ISOLATOR (ISO-1) 3 filter isolated 3-prong sockets; integral Surge/Spike Suppression; 1875 W Maximum load, 1 KW load any socket $69.95**
- **ISOLATOR (ISO-2) 2 filter isolated 3-prong socket banks; (6 sockets total); integral Spike/Surge Suppression; 1875 W Max load, 1 KW either bank $69.95**
- **SUPER ISOLATOR (ISO-3) similar to ISO-1 except double isolation & Suppression $104.95**
- **SUPER ISOLATOR (ISO-11) similar to ISO-2 except double isolation & Suppression $104.95**
- **MAGNUM ISOLATOR (ISO-17) 4 Quad Isolated sockets; For ULTRA-SENSITIVE Systems $181.95**
- **CIRCUIT BREAKER, any model (Add-CB) ..... Add $9.00**
- **CKT BRKR/SWITCH/PILOT (-CBS) ..... Add $17.00**

AT YOUR DEALERS

MasterCard, Visa, American Express
ORDER TOLL FREE 1-800-225-4876
(except AK, HI, PR & Canada)

Electronic Specialists, Inc.
171 South Main Street Natick, Mass 01760
Technical & Non-800: 1-617-655-1532

Totally NEW!

ACCEL3

BASIC Compiler

Model I/III, all DOS

$99.95

M/C, VISA
CA add 6%

ALGORIX

Allen Gelder Software
(415) 387-3131
Box 11721 San Francisco CA 94101

NAMES

Wayne F. Cummings

What's in a name? Probably a lot more than most people think. Psychologists say that an individual's name is one of the first things he or she is judged by. In fact, it is second only to appearance in making that all-important first impression. Like it or not, we all make instant judgments about people based on such incomplete data as a name. So whether it's that new-born baby in your house or that newly-created character in your dungeon, don't start he/she/it out in this world (or any other) without a proper name.

The problem with most names is that they are over used. There seems to be no end of Toms, Dicks and Harrys. If you don't believe that, just try yelling "Hey John!" in a crowded public place. You are liable to stop traffic. How strange that we Americans, who pride ourselves on our individuality, exhibit such conformity in naming our offspring. However, if you still value individual uniqueness, then here's a program for you.

The program produces as many randomly generated names (words) as the user wishes. These names can be from 2 to 8 characters in length. These particular parameters were chosen because words shorter than 2 characters are not really words, but simply letters, and words longer than 8 characters tend to be difficult to pronounce. (There are exceptions, of course.)

In fact, the entire underlying program design revolves around eliminating unpronounceable names. The chance of creating an English word by randomly selecting letters from the alphabet is not very good. The problem is that there are too many consonants and not enough vowels. Just try saying "QBASTKR" or "OMLZK". Therefore, two pseudo-random methods of word production have been employed in this program.

The first method uses a formatting string. This string must contain only "C"s and "V"s. It might also be the same length as the words being generated. A sample might look like this: CVCV. This string tells the program that the first position in each word must contain a consonant, the second a vowel, the third a consonant, and the fourth a vowel. Different vowels and consonants may, and probably will, occur in each word; but the *format* — the position of consonants and vowels - will remain the same. It has the advantage of virtually eliminating "garbage" words, but also reduces the uniqueness of each word.

The second method uses variable probabilities. The user selects the percentage chance of a vowel occurring at each character position. For example, a 40 would indicate a 40% chance of a vowel in the first position, and in every position thereafter. Naturally, that means that a consonant has a 60% chance in each position. This method has the advantage of creating widely varied words, but many of them will still be pronounceable.

To further reduce "garbage" words, the letter "Q" has been dropped from the list of consonants. In English, Q is almost always followed by a U. If it is not, good luck. Checking for this contingency was more of a bother than it was worth. Thus, the Q was dropped.

On balance, this program should give the user many unique yet utterable names from which to choose one that is "just right". Less experienced programmers might also notice that it is a good example of the use of error-trapping techniques.

```
1000 REM:  ************************************************
1010 REM:  ****       TRS-80 RANDOM WORD GENERATOR      ****
1020 REM:  **** PROGRAMED BY WAYNE F. CUMMINGS (JAN '80)****
1030 REM:  ****   3324 HARRISON AVE. ROCKFORD,IL 61108  ****
1040 REM:  ************************************************
1050 C$="BCDFGHJKLMNPRSTVWXYZ": V$="AEIOU": RANDOM
1060 '         INITIALIZATION ROUTINE
1070 CLS: PRINT "THIS PROGRAM GENERATES RANDOM NAMES
 (WORDS) ";
1080 PRINT "WITH 2 TO 8 LETTERS IN EACH.": PRINT
1090 PRINT @192,"HOW MANY LETTERS (2-8)";: INPUT NL
1100 IF NL>8 OR NL<2 PRINT @192,CHR$(255): GOTO 1090
1110 PRINT @ 256,"HOW MANY WORDS DO YOU WANT GENERATED";
1120 INPUT K: IF K<=0 PRINT @ 256,CHR$(255): GOTO 1110
1130 '         SELECT OPTIONS ROUTINE
1140 CLS : PRINT "YOU CAN CONTROL THE KINDS OF NAMES YOU
WILL "
1150 PRINT "GET IN TWO WAYS:": PRINT
1160 PRINT "(1)  SPECIFY THE LOCATIONS OF VOWELS AND ";
1170 PRINT "CONSONANTS."
1180 PRINT TAB(5)"EXAMPLE: CVCV     (C = CONSONANT, V =
VOWEL)"
1190 PRINT : PRINT "(2)  SPECIFY THE % CHANCE OF A VOWEL
OR ";
1200 PRINT "CONSONANT OCCURING."
1210 PRINT TAB(5)"EXAMPLE: VOWELS = 60%     CONSONANTS = 40%"
1220 PRINT TAB(12)"(EACH LETTER HAS A 60% PROBABILITY OF
BEING"
1230 PRINT TAB(12)" A VOWEL AND A 40% PROBABILITY OF BEING
A ";
1240 PRINT "CONSONANT)": PRINT
1250 PRINT @ 704,"WHICH OPTION DO YOU WANT (1 OR 2)";: INPUT
FO
1260 IF FO<1 OR FO>2 PRINT @ 704,CHR$(255): GOTO 1250
1270 PRINT @ 768,"OUTPUT TO PRINTER (Y OR N)";: INPUT PO$
1280 IF LEFT$(PO$,1)="Y" OR LEFT$(PO$,1)="N" THEN 1300
1290 PRINT @ 768,CHR$(255): GOTO 1270
1300 CLS : ON FO GOSUB 1320,1520: END
1310 '         ====================+
OPTION 1 (FORMATTING)+
====================
1320 PRINT "PLEASE ENTER A";NL;"CHARACTER STRING USING
A 'C' ";
1330 PRINT "TO REPRESENT A"
1340 PRINT "CONSONANT AND 'V' TO REPRESENT A VOWEL"
1350 REM       CHECK FORMAT STRING ERRORS
1360 INPUT F$: FOR X=1 TO LEN(F$)
```

continued on page 62

PRINTERS FOR THE 80's

OKIDATA

MICROLINE 80	349.
MICROLINE 82-A	499.
MICROLINE 83-A	749.
MICROLINE 84	1,095.

C. Itoh

STARWRITER 25 CPS/P	1349.
STARWRITER 45 CPS/P	1699.
STARWRITER 25 CPS/S	1439.
STARWRITER 45 CPS/S	1799.

CENTRONICS

739-1/P FREE $75 2 COLOR CHIP INC'L	$599.
739-3/S FREE $75 2 COLOR CHIP INC'L	699.

NEC

8023-A	$509.

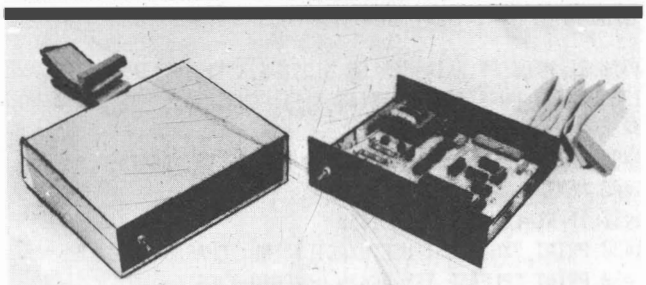
VISA

FREE SHIPPING, HANDLING & INSURANCE

766 Middle Hancock Road
Peterborough, NH 03458 (603) 525-6621

BC BUSINESS COMPUTERS of Peterborough

TELETYPE INTERFACE



- PARALLEL PORT TO SERIAL DATA
- INTERFACE ASR & KSR 33 TELETYPES
- MODEL I, II, & III COMPATABLE
- NO SOFTWARE OR MEMORY REQUIRED
- 20 MA. CURRENT LOOP FORMAT
- SIMPLE LLIST, LPRINT COMMANDS
- LINEFEED AFTER CARRIAGE RETURN
- 110 BAUD RATE STANDARD
- PA RESIDENTS ADD 6% SALES TAX

$139.95

GTI ELECTRONICS CO.

RD 2, BOX 234B, LEHIGHTON, PA 18235
717-386-4032

MS PROFESSIONAL COMPUTER CASSETTES

TRS-80* · APPLE · COMMODORE·ATARI

Instant Play Sliding Lock Out Doors

Micro-comp Cassettes
Maxell Computer tape

Head Cleaner to keep your recorder at peak performance.

CERTIFIED AT 1600 FCI ONE YEAR WARRANTY

List price Micro-comp starting at $3.95-Head Cleaner $3.95

SPECIAL INTRODUCTORY OFFER!

MICRO-COMP MODEL	UNIT PRICE	10 PACK
C-10 (50 feet)	$2.95 ☐	$20.00 ☐
C-20 (TRS-80*) (100 feet)	3.15 ☐	22.00 ☐
C-30 (150 feet)	3.35 ☐	24.00 ☐
C-60 (300 feet)	3.55 ☐	26.00 ☐
Head Cleaner	2.95 ☐	20.00 ☐

*TRS-80-trademark of the Tandy Corp.

☐ CHECK ☐ MASTER CHARGE ☐ VISA

Minimum order for credit cards $10.00

Card Account No. _____ Expiration Date _____

Name _____

Address _____

City _____ State ____ Zip _____

Mail to P.O. Box 806, Shelton, CT 06484

Dealer's Inquiries Welcomed

AUTO-WRITER

NEW!

YOU ALREADY OWN THE BEST DATA BASE MANAGER AVAILABLE . . .

It's Your Word Processor . .

Use your word processor to create and maintain a FREE-FORMAT data base. There is NO NEED TO ABBREVIATE because of fixed-length fields.

Sort your data base by any field.

Print form letters and reports, automatically selecting and extracting information from your data base.

Use format codes to control the printing of form letters and reports.

Create subsets of your data base with the powerful SELECT-IF software.

Requires 48K, 2 disk drives, and lowar case Model I or III. Available for most Disk Operating Systems.

NOW AT THE SPECIAL INTRODUCTORY PRICE OF $72.83
(Manual available separately for $20.00)
AUTO-WRITER . . . IN A CLASS BY ITSELF
WRITE OR CALL NOW FOR A FREE BROCHURE

MIDWEST DATA SYSTEMS
a division of Walonick Associates, Inc.
5624 Girard Ave. So., Minneapolis, MN 55419
866-9022

continued from page 60

```
137Ø IF MID$(F$,X,1)="C" OR MID$(F$,X,1)="V" THEN 14ØØ
138Ø PRINT CHR$(34); MID$(F$,X,1); CHR$(34);" IS NOT A
VALID";
139Ø PRINT " FORMAT CHARACTER.  PLEASE TRY AGAIN.": GOTO 136Ø
14ØØ NEXT X
141Ø IF NL=LEN(F$) THEN 145Ø
142Ø PRINT "YOU MUST USE EXACTLY";NL;"CHARACTERS.  ";
143Ø PRINT "PLEASE TRY AGAIN.": GOTO 136Ø
144Ø REM       WORD GENERATION
145Ø CLS : FOR Y=1 TO K
146Ø FOR X=1 TO LEN(F$)
147Ø IF MID$(F$,X,1)="C" GOSUB 164Ø  ELSE GOSUB 165Ø
148Ø IF LEFT$(PO$,1)="N" THEN 15ØØ
149Ø NEXT X: LPRINT W$,: W$="": NEXT Y: RETURN
15ØØ NEXT X: PRINT W$,: W$="": NEXT Y: RETURN
151Ø '          ==========================+
OPTION 2 (PROBABILITY)+
==========================
152Ø PRINT @ Ø,"PERCENTAGE CHANCE OF A VOWEL OCCURING
(Ø - 1ØØ)";
153Ø INPUT P: IF P>1ØØ OR P<Ø PRINT @ Ø,CHR$(255): GOTO 152Ø
154Ø PRINT : PRINT"REMEMBER, THAT MEANS CONSONANTS HAVE
A";1ØØ-P;
155Ø PRINT "% CHANCE OF OCCURING.": FOR X=1 TO 9ØØ: NEXT
156Ø REM       WORD GENERATION
157Ø CLS: FOR Y=1 TO K
158Ø FOR X=1 TO NL: PE=RND(1ØØ)
159Ø IF PE<P GOSUB 165Ø ELSE GOSUB 164Ø
16ØØ IF LEFT$(PO$,1)="N" THEN 162Ø
161Ø NEXT X: LPRINT W$,: W$="": NEXT Y: RETURN
162Ø NEXT X: PRINT W$,: W$="": NEXT Y: RETURN
163Ø '          CONSONANT/VOWEL RANDOM SELECTORS
164Ø C=RND(2Ø): W$=W$ + MID$(C$,C,1): RETURN
165Ø V=RND(5): W$=W$ + MID$(V$,V,1): RETURN
```

Wayne F. Cummings
3324 Harrison Avenue
Rockford, IL 61108 ■

---

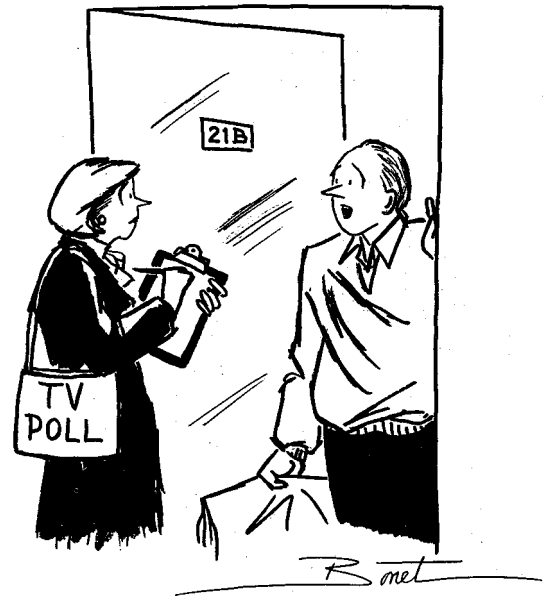
continued from page 58

```
1Ø REM THIS IS AN EXAMPLE OF HOW TO USE THE MACHINE VERSION
2Ø REM TO CHANGE YOUR TEXT DATA BEFORE AND AFTER ANY I/O.
3Ø REM i ASSUME THAT THE SUBROUTINE IS IN MEMORY AND THE USR(Ø)
CALL
4Ø REM IS POKEd ACCORDINGLY.
5Ø CLS :REM THIS IS THE SAVE ROUTINE
6Ø INPUT "ENTER FILENAME FOR TEXT : ";N$
7Ø N$=N$+"/TEXT"
8Ø X=USR(Ø):REM THIS CONVERTS PUNCTUATION TO GRAPHICS CHARACTERS
9Ø PRINT #-1,N$,I:REM I= THE NUMBER OF TEXT LINES
1ØØ FOR X=1 TO I
11Ø PRINT#-1,D$(X)
12Ø NEXT X
13Ø X=USR(Ø):REM NOW CHANGE GRAPHICS BACK TO PUNCTUATION
14Ø RETURN :REM NOW BACK TO MENU
15Ø CLS :REM FILE LOAD ROUTINE
16Ø INPUT "ENTER FILENAME TO LOAD :  ";N$
17Ø N$=N$+"/TEXT"
18Ø INPUT #-1,N$,I:REM I= NUMBER OF TEXT LINES
19Ø FOR X=1 TO I
2ØØ INPUT #-1,D$(X):REM INPUT THE DATA
21Ø NEXT X
22Ø X=USR(Ø):REM NOW CONVERT GRAPHICS TO PUNCTUATION
23Ø RETURN :REM GO BACK TO MENU
```

Summary

If program size is a strong consideration, and you want to keep it as small as possible to allow for more text in file, then I suggest you make an assembly language version using either Editor/Assembler or TBUG and load it in as a separate program. Then you only have the routine in memory once.

I have used the machine language version in both my commercial and homebrew word processors with total success. These routines may not provide the ultimate answer, but they certainly make Basic Word Processing a lot more convenient to use in the meantime.



"MY FAVORITE PROGRAM? CHESS MASTER: TSR-80!"

PACIFIC OFFICE SYSTEMS

INCOME TAX...

PERSONAL INCOME TAX INTERVIEW PROGRAM written in BASIC by a tax attorney as he would conduct a personal interview to organize taxpayer's data into Federal income tax categories for 1981 tax returns. Program leads the user through an extensive checklist of personal events which can have income tax consequences, giving numerous examples and explanation of tax law for each YES answer.

Covers events such as marriage, divorce, birth, death, employment, lay-offs, retirement, travel, change of residence, accidents, illness or injuries, business ventures, self-employment, education, investments of money or time, prizes, scholarships, insurance recoveries, tax-exempt income, bad debts, etc., as well as the commonly known income items and deductible expenses.

Program also carries out computations for depreciation schedules, joint vs. separate returns, itemized vs. standard deductions, depreciation vs. tax credits, etc., in order to help make important tax decisions. Includes 1981 Tax law changes, references to related areas such as gift and inheritance taxes, trusts, estates, partnerships, corporations, pension and retirement plans, tax-exempt organizations, etc. Includes booklet of useful IRS tax forms, other tax publications, and toll-free phone number of tax attorney. Available on cassette or diskettes for most popular micros. Price $49.95

OTHER POS PRODUCTS . . .

- POS-100 NRZ1 Tape Drive Controller/Formatter $795.00
- POS 800/1600 Universal Tape Drive Controller . . . . $1495.00 (4K/16K buffer, RS-232 or Parallel Ports to CPU)
- POS I/O Conversion Kit for IBM Office Selectric . . . $150.00
- POS ASCII Printer Interface for IBM I/O Selectric . . . $249.95
- POS IBM ASCII Selectric Printer (Parallel Interface) . $895.00
- GTE IS Model 560 ASCII Selectric I/O Terminal $995.00
- POS Daisy-Wheel Printer Interface for TRS-80 Model I . $249.95
- Variable Width FORMS TRACTOR for 15" Selectrics . . $95.00

PACIFIC OFFICE SYSTEMS
2265 Old Middlefield Way • Mt. View, CA 94043 • (415) 493-7455

The Electronic Astrologers™

cast an accurate birth chart for any date, time and place from 1880 to 2000, *then tell you what it means!* They give personalized astrological consultations of 1500 words or more, based not just on your Sun sign, but on the unique relation of ALL the planets at your birth moment.

ASTRO-SCOPE™

delineates your character, its strengths and weaknesses, and touches on many areas of life such as relationships, finances, career and life goals. Text is by Steve Blake, psychology-oriented astrologer and popular lecturer, and Robert Hand, pioneer in astrological microcomputing and author of four bestselling astrology books. $30

Sex-O-Scope™

tells you things your astrologer would blush to reveal! John Townley, author of *Planets in Love*, an editor of *Sexology Today*, and a student of *all* forms of sexual behavior, uncovers your tastes and turn-ons. $30

for
TRS-80* Model I or III, with TRSDOS, 32K RAM, 2 drives
Apple II† with Applesoft, 32K RAM, 1 drive

†TM of Apple, Inc. *TM of Tandy Corp.

WE TAKE MASTERCARD AND VISA

AGS Software
Box 28, Orleans, Ma. 02653
Telephone 617/255-0510
Outside USA please add $2.50 shipping charge

GOBBLER

ALIEN INVADERS

SSI's new additions to the GAME market.

Turn the tables on monsters set on consuming the gobbler. Skill levels from beginner to expert. Written in machine language, advanced graphics, with motivational sound to add to the excitement of gobbling up the monsters. Let the gobbling begin !!

MODEL I & III TAPE-$16.95
DISK-$19.95

An exciting new addition to the space war family of programs. SSI's new ALIEN INVADERS space war game offers fast arcade action. It has a large selection of level of play so the player can start at beginner and advance to expert.

Models I & III 16K Tape $19.95
Disk $24.95

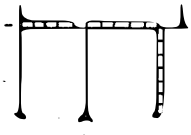
BOTH COME WITH EXCITING SOUND

STRUMAP 3.0 w/ Data File Editor

Now the structural program that brought main frame computing pwer to the micro has an editor and a choice of units-kips,-lbs,in,ft & metric. Write data files and then save them to disk, load from disk, delete, insert or change lines of data. Several loads can be put into the file and combinations of loads w/ load factors can be used.

Analysis plane frames or continuous beams and find moments, shears and axial forces in each member. Also, get joint displacements-vertical, horizontal, and rotational.

MODEL I 48K 1-Disk .....Disk $349.95



SUPERIOR SOFTWARE INC

Send for a complete listing of our programs.
Enginnering
Education
Business
Games

MISSOURI RESIDENTS
PLEASE ADD
4½% STATE SALES TAX

Write SSI for information about marketing your programs: P.O. Box 11676 Kansas City, MO 64138

MANUFACTURING CONTROL SYSTEMS

MICS module - Manufacturing Inventory Control
15 reports for inventory, purchasing, and stockroom control. "Reserved" parts feature.

BOMP module - Bill of Materials Processor
For "complex product" control of inventory.

SHOC module - Manufacturing Shop Order Control
Order scheduling and backlog/shipment reporting.

LABP module - Labor Collection/Performance Reptg
Daily, weekly, and monthly labor reporting by employee, job and overhead accounts, and department and operation. Actual job costing reports.

JCST module - Manufacturing job cost reporting
Job status and completion reporting with performance to standards. Variance reporting. Overhead determination monthly and year-to-date.

All modules for Models I and III, 32K minimum systems. Master menu driven - full operator prompted. Expandable to fit your growth needs.

Model I modules from $295, Model III from $345

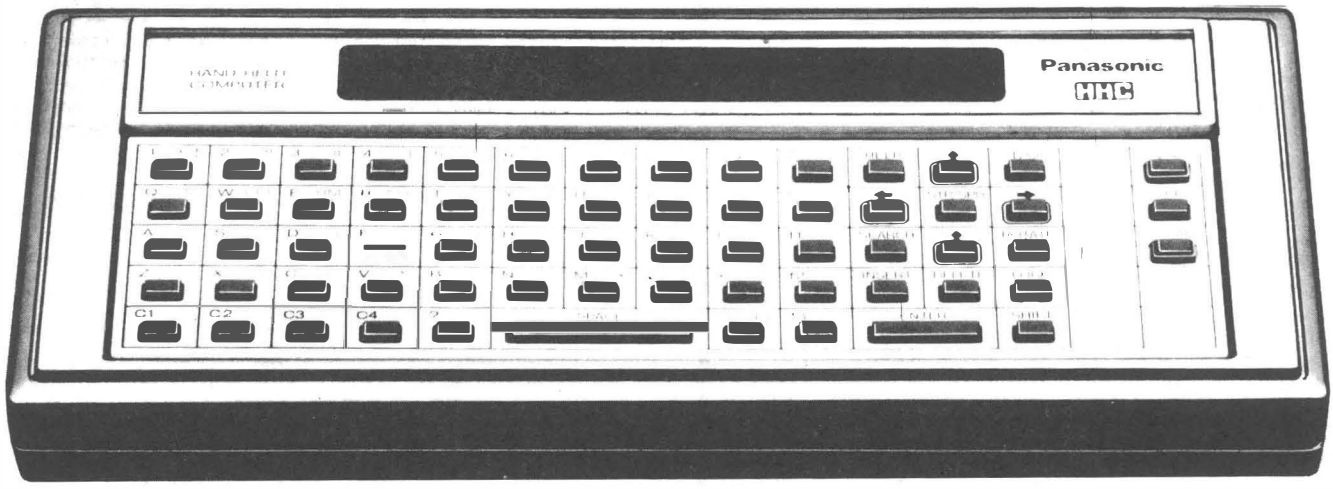
Send for catalog of ELTEC business modules

ELTECH Associates

Specialists in manufacturing business systems
2466 Moreno Drive, Los Angeles, Ca 90039
(213) 663-0347

Introducing . . . .

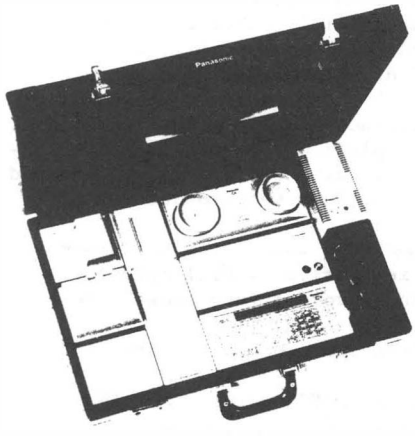
THE LINK



Panasonic

HAND-HELD COMPUTER SYSTEM

The Link will revolutionize the way you do business. Salesmen, Executives, Engineers — everyone who needs information and computing power at their fingertips, whether in the office or on the road, will find The Link an invaluable tool.



PORTABLE — A built-in rechargeable battery pack powers The Link when you're in the field -- the AC Adaptor/Recharger takes at home or the office. Innovative new circuitry allows The Link to use far less power than conventional microprocessors -- even when you turn it off, its memory stays active and keeps your data safe. When connected to its peripherals, The Link can be carried in its custom-fitted attache case, or used as a desk-top unit that travels from office to office.

VERSATILE — The modular peripherals allow you to customize the system for your specific needs. The Link can be anything you want it to be, from a pocket-size problem-solver for business and technical calculations to an attache-case computer terminal, sending order and billing data over phone lines to your company's computer, receiving credit and inventory data, and displaying text and graphic presentations on your customer's color TV.

POWERFUL — The Link Capsule System enables use in a wide variety of applications -- The Link capsules contain programs in 24-pin ROM (Read Only Memory) chips that can be easily changed by inserting them into one of The Link's three ROM slots. In addition, The Link is provided with 16K of internal ROM, up to 4K of internal RAM (Random Access Memory), and is expandable to a total of 52K of RAM and 64K of ROM.

THE LINK PRIMARY UNIT — (Built-In 2K bytes RAM) **RL-H1000 $500.00**
(Built-In 4K bytes RAM) **RL-H1400 $600.00**

AC ADAPTOR/RECHARGER — Allows operation of The Link on 120V AC current, recharges main unit's battery pack. **RD-9498 $58.00**

MICRO PRINTER — Thermal 5 × 7 dot matrix printer provides "hard copy" records from any program performed or data received by The Link. Give a customer a printed record of an order entered, or a printed receipt when using The Link as a portable cash register. Send your Sales force a schedule of appointments, complete with names and addresses of prospects.

RL-P1003 $300.00

ACOUSTIC MODEM — Expands The Link to unlimited power and storage capacity. The Acoustic Modem connects The Link to any telephone handset and allows it to transmit and receive information from other computers. Gives access to home and office computers, time-sharing networks and data base systems -- from anywhere you have access to a telephone, The Link can become a remote data terminal.
RL-P4001 $286.00

TV ADAPTOR — Connects The Link to any TV set, so that you can view up to 16 lines (by 32 characters) of data on screen, rather than viewing it a line at a time on The Link's LCD Display. An entire "page" of data can be received and displayed on screen. Also allows use of color graphics for impressive presentations of charts and diagrams -- perfect for conferences, demonstrations, and complicated information analysis.
RL-P2001 $349.00

RS-232C SERIAL INTERFACE — Allows you to connect The Link directly to large-format printers, main frame computers, or any other devices that use the industry-standard RS-232C interface (Note: the RS-232C Capsule is necessary for operation of the RS-232C peripheral).
RL-P3001 $254.00

PROGRAMMABLE MEMORY — Adds extra random-access memory (RAM) to The Link, greatly extending its internal storage capacity. Up to six memory modules may be added simultaneously, giving The Link a total RAM storage capacity of 52K bytes. Each module carries a memory protection back-up battery pack to keep your data safe.
(4K bytes) **RL-P9001 $221.00**
(8K bytes) **RL-P9002 $330.00**

INPUT/OUTPUT ADAPTOR — Allows up to six peripherals of any kind to be connected to The Link's main unit (one via I/0 cable).
RL-P6001 $158.00

ATTACHE CASE — Holds Primary Unit, I/0 Adaptor, two large-size peripherals, (TV Adaptor and Acoustic Modem), three small-size peripherals (RS-232C Serial Interface, Programmable Memory, Micro Printer), plus AC Adaptor, Antenna Selector Box, TV cables, owners manual, and others.
RL-9808 $163.00

I/0 CABLE — For sixth peripheral. **RL-P6006 $86.00**

RS-232C CABLE — Used to connect the serial interface to a printer or other device. **RD-9145 $35.00**

ROM SOFTWARE CAPSULES

Microsoft BASIC	RL-5600157 $79.95
Telecomputing 1	RL-5600456 $34.95
Telecomputing 2	RL-5600556 $39.95
RS-232C	RL-5600656 $39.95
Snap Operating System	RL-5600358 $149.95
Snap BASIC	RL-5600258 $99.95

FUTURE SOFTWARE CAPSULES

- Field Computing
- Sales Order Entry
- Field Diagnostics
- Mobile Medicine
- Programmable Data Collection
- Professional Timekeeping/ Cost Accounting
- Remote Quality Analysis and Control
- Remote Sales Demonstrations
- Bidding and Estimating
- Field Auditing
- Portable Word Processing
- Personal Finance
- Portable Point Of Sale
- Field Report Generator
- Survey

For More Detailed Information Send $1.00 For A Complete Descriptive Brochure

COMPUTRONICS
MATHEMATICAL APPLICATIONS SERVICE™

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

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

VISA AMERICAN EXPRESS MasterCharge

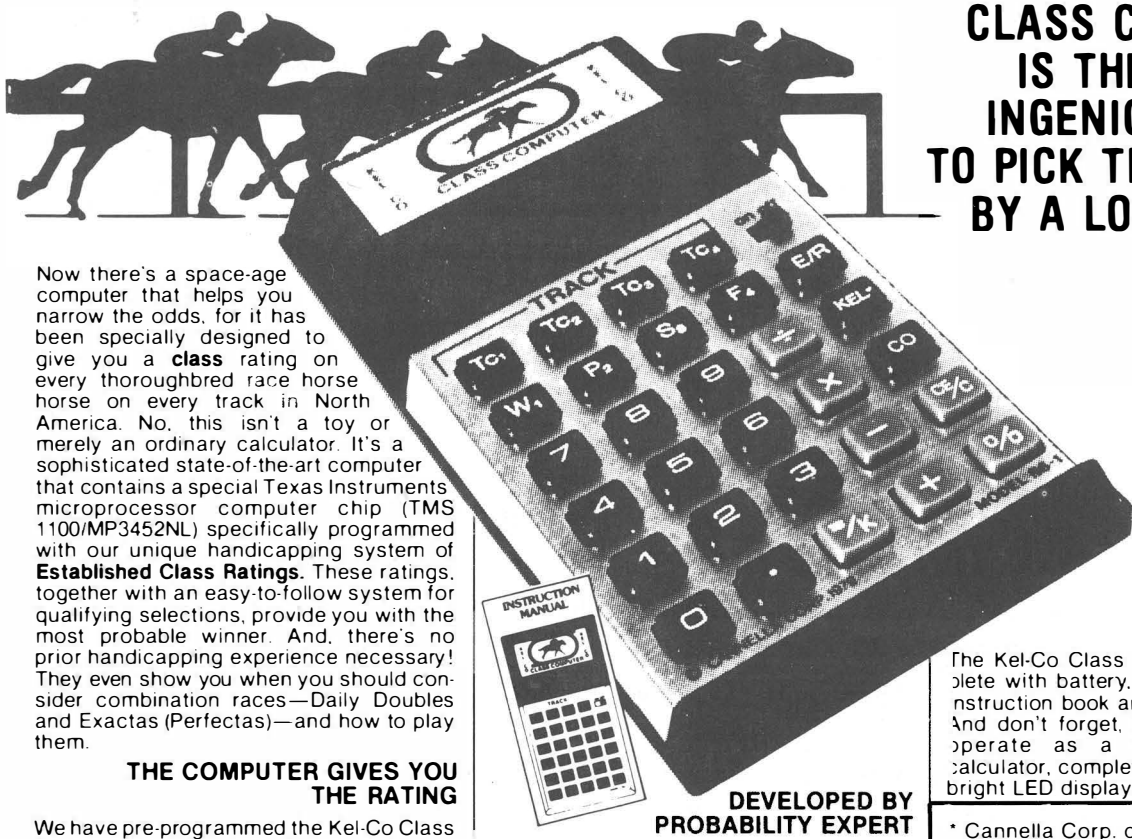
24 HOUR ORDER LINE
(914) 425-1535

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

***** ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE*****

MEET THE COMPUTER WITH HORSE-SENSE.

COMPUTER PICKS WINNER 70% OF THE TIME*



THE KEL-CO CLASS COMPUTER IS THE MOST INGENIOUS WAY TO PICK THE HORSES, BY A LONG SHOT.

You'll Come Out A Winner

Now there's a space-age computer that helps you narrow the odds, for it has been specially designed to give you a **class** rating on every thoroughbred race horse horse on every track in North America. No, this isn't a toy or merely an ordinary calculator. It's a sophisticated state-of-the-art computer that contains a special Texas Instruments microprocessor computer chip (TMS 1100/MP3452NL) specifically programmed with our unique handicapping system of **Established Class Ratings.** These ratings, together with an easy-to-follow system for qualifying selections, provide you with the most probable winner. And, there's no prior handicapping experience necessary! They even show you when you should consider combination races—Daily Doubles and Exactas (Perfectas)—and how to play them.

THE COMPUTER GIVES YOU THE RATING

We have pre-programmed the Kel-Co Class Computer with the four different formulas accounting for purse distribution used by every racetrack in North America. To operate simply 1) enter the track category number where the horse has raced 2) enter the number of Wins, Places, Shows and Forths 3) depress the E/R button 4) enter the earnings and 5) push the E/R button. The computer instantly evaluates each horse's performance and displays the horse's **Kel-Co Established Class Rating.**

PRINCIPLE OF ESTABLISHED CLASS

The rating developed by the computer is based on the premise that thoroughbred class is best measured by the size of the purses that the horse has **successfully** competed for in the recent past. This rating is determined mathematically by the computer as a function of the horse's earnings and finish positions from past performance charts. In very basic terms, this would probably mean that a horse with only one win and $5,000 in earnings would be likely to beat a horse with three wins and only $8,000 earned.

The rating also indicates the purse size of the race in which the horse is likely to win if fit and ready. This means that a horse running in a race with a lower purse value than his rating represents a real "drop down" and a potentially strong bet. A horse with a lower rating than the purse value, however, is moving up in class and will seldom be a serious contender.

DEVELOPED BY PROBABILITY EXPERT

The Kel-Co Class Computer is based upon the same principles as the Kel-Co Slide Rule, developed by Dr. A. Stuart Kelsey in 1969. Dr. Kelsey is a probability and statistical expert and was a member of the space research team which perfected the Lunar Excursion Module for the Apollo space program. Applying his expertise in probability studies, Dr. Kelsey created a system that made his Slide Rule the most widely used handicapping aid in North America. That same method is embodied in the Kel-Co Class Computer.

The Kel-Co Class Computer comes complete with battery, AC adaptor, operating instruction book and handicapping guide. And don't forget, the computer will also operate as a powerful 4-function calculator, complete with percent key and bright LED display.

* Cannella Corp. claims that strict adherents to the system will find themselves in the money about 70% of the time. **Money** magazine put it and a competitor through their paces and concluded, "There is no question that either kel-Co or Racetrack II can help a lout like me (or even an experienced bettor) to invest more scientifically at the expense of poor suckers....."

H & E Computronics offers its full 30-day Money-back Guarantee on the Thorough-Bred Computer.

H & E COMPUTRONICS, INC.
50 N. PASCACK ROAD • SPRING VALLEY, NEW YORK 10977 (914) 425-1535
OUTSIDE N.Y. STATE - CALL TOLL FREE (800) 431-2818

PLEASE SEND ME: THOROUGHBRED COMPUTER $99.95
TROT COMPUTER $129.95
☐ VISA ☐ MASTERCARD ☐ AMERICAN EXPRESS

Card Number _____ Card Expires _____

_____
(Your Signature Here)

Please Print
Name _____

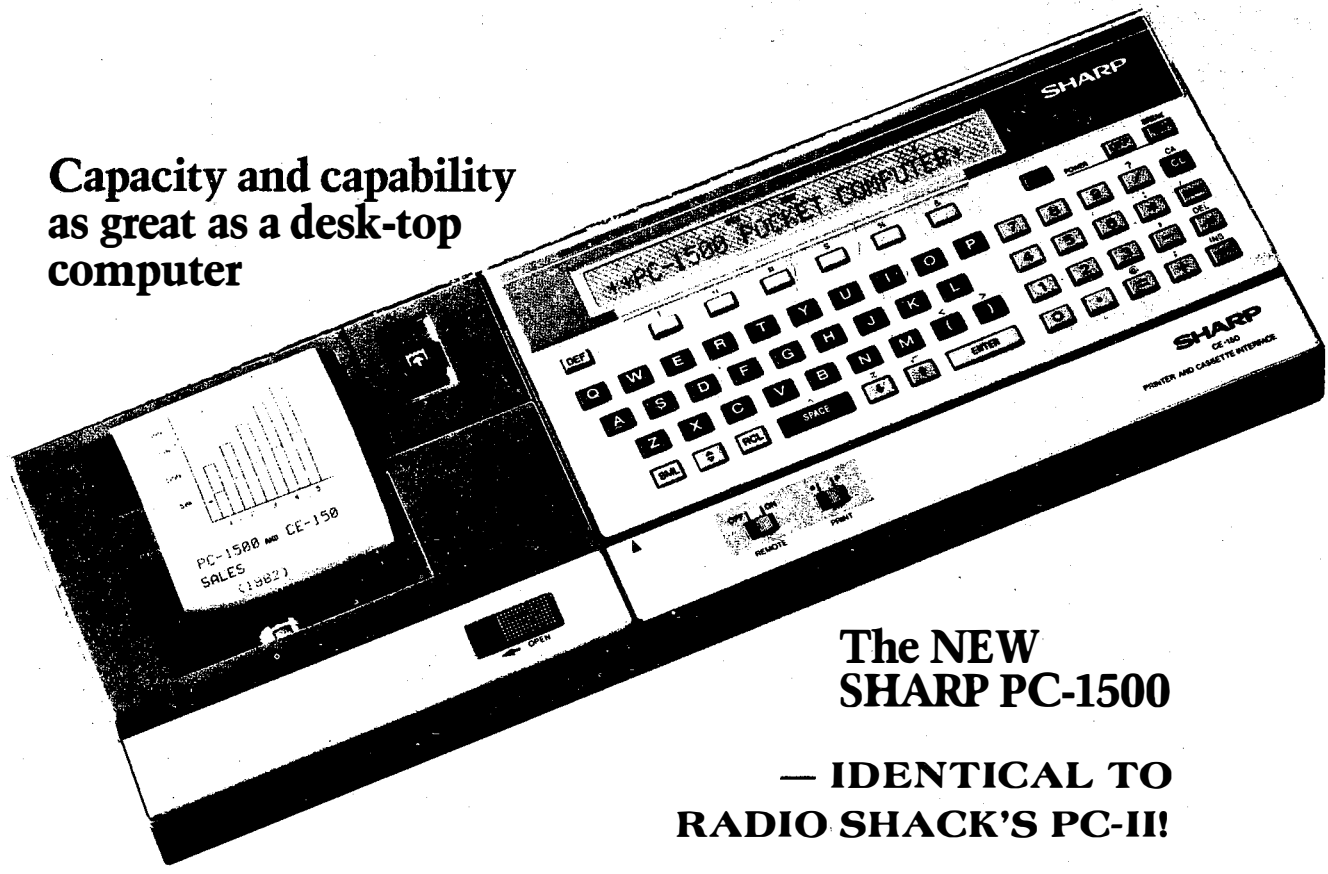
Address _____

City _____ State _____ Zip _____

NOW IN STOCK!

Look what you can get in a Pocket Computer

Capacity and capability as great as a desk-top computer



The NEW SHARP PC-1500

— IDENTICAL TO RADIO SHACK'S PC-II!

Here's the ideal pocket computer or first step for anyone who is thinking about a personal computer. Sharp's New PC-1500 is designed for business, technical, personal and educational uses.

Large Memory
You get 16K bytes of ROM plus 3.5K bytes of RAM that can be optionally expanded with a 4K or 8K RAM and eventually a 16K RAM. You get memory protection with Sharp's Memory Safe Guard.

Four-Color Printer with Graphics Capability
The printer is preprogrammed to draw charts, graphs, curves, and game symbols. You can program your own graphics. The number of digits per line can be varied between 4 and 36.

Typewriter Keyboard
The typewriter keyboard gives alpha-numeric capability in both upper and lower case. Special software keys can be used to reserve functions or commands.

Expanded BASIC
The easy to use BASIC language is expanded to include variables that can be freely defined using one or two characters, variables in two-dimensional arrays for easier matrix calculations, variable strings, commands for mini graphic display, and many other advanced features.

Clock Function and Scheduling
Month, date, hour, minute and alarm clock provides a living calendar with an audible beep and message display to remind you of all scheduled events. The stop watch and timer offer numerous applications.

Interfaces
The double cassette interface allows recording of your programs and data for future use. The RS-232C interface and other peripherals soon to be offered will further increase the PC-1500 system's capability.

Order Today

PC-1500 Computer	$279.00
CE-150 Printer	$239.00
CE-150 Memory Module	$75.00

COMPUTRONICS INC.
MATHEMATICAL APPLICATIONS SERVICE™

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

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

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

VISA AMERICAN EXPRESS

24 HOUR ORDER LINE
(914) 425-1535

* ALL PRICES AND SPECIFICATIONS SUBJECT TO CHANGE***

ADVERTISING DIRECTORY

The Original Magazine for Owners of the TRS-80™ MicroComputer

MODEL I • MODEL II • MODEL III • POCKET COMPUTER • COLOR COMPUTER

Software for TRS-80 Owners

H & E COMPUTRONICS INC.

Monthly Newsmagazine for TRS-80 Owners

MONTHLY NEWS MAGAZINE

- PRACTICAL APPLICATIONS
- NEW EXPANDED BUSINESS SECTIONS
- GAMBLING
- GAMES
- EDUCATION
- PERSONAL FINANCE
- BEGINNER'S CORNER
- NEW PRODUCTS
- SOFTWARE EXCHANGE
- MARKET PLACE
- QUESTIONS & ANSWERS
- PROGRAM PRINT OUTS

...and MORE!

YOUR CHOICE FREE

with your Subscription or Renewal

A. NANOS SYSTEMS CORP.

TRS-80 At Your Fingertips Complete quick reference guide to basic, assembly language* and graphic codes —all at your fingertips for all TRS-80 computers (specify computer).

Assembly Language Section N/A for Color Computer

OR

B. **A Word Processor, Data Management System and Cleanup** (A maze game) All on cassette. (Add $3 for diskette, add $5 for modified MOD-II diskette version —N/A on color computer or pocket computer.)

H & E COMPUTRONICS INC.

50 North Pascack Road
Spring Valley, New York 10977

CALL TOLL FREE 800-431-2818
(Outside of New York State)

24 HOUR ORDER LINE 914-425-1535

master charge · VISA · American Express Card

☐ One Year Magazine Subscription $24 ☐ New ☐ Renewal
☐ Two Year Magazine Subscription $48.00 ☐ New ☐ Renewal
☐ Sample Issue $4. ☐ Mod II Newsletter Subscription $18

Your Choice: TRS-80™ at Your Fingertips ☐ or Word Processor/ Data Management ☐
Model I ☐ Model II ☐ Model III ☐ Color Computer ☐ Pocket Computer ☐

NEW! NEW! MOD-II NEWSLETTER 18/Year (or 12 issues)

Name Address City

State Zip Signature

Credit Card Number Expiration Date

Add $12/Year (Canada, Mexico)—Add $24/ Year Air Mail outside of U.S.A., Canada, and Mexico
All Prices and Specifications Subject to Change

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp.

Maxi Manager

The finest Data Base Manager Available

CHECK THESE COMPARISONS!

	CCA DATA MANAGER	ADDS III with CACS IV	MAXI MANAGER	RADIX 10	PROFILE
FILE CAPACITY & FORMAT					
Maximum # of disks per file	1	N/A	4	31	4
Maximum # of records per file	2450	Note 1	32,767	10,199	65,535
Maximum record length	249	254	800	255	255
Maximum # of characters per field	249	254	40	254	255
Maximum # of fields	24	20	20	127	153
Maximum # of characters per field label	15	16	19	12	765
Variable length records (pack sectors)	No	Note 2	Yes	No	No
FIELD TYPES					
Alphanumeric	Yes	Yes	Yes	Yes	Yes
Numeric	Yes	Yes	Yes	Yes	Yes
Fixed decimal numeric	Note 4	Yes	Yes	No	No
Date (MM/DD/YY)	Yes	No	Yes	No	No
Extended date (MM/DD/YYYY)	No	No	Yes	No	No
Calculated equation	Note 5	Yes	Yes	No	No
Permanent fields	Yes	No	No	No	No
SORTING					
Machine language assisted	No	Yes	Yes	Note 7	Yes
Sort by any field	Yes	Yes	Yes		No
Number of Sort Key files	1	Note 6	5		1
Numeric sort	Yes	Yes	Yes		No
Ascending sort	Yes	Yes	Yes		Yes
Descending sort	Yes	Yes	Note 11		Yes
Sort within a selected range	No	Note 12	Yes		No
Sort multiple fields simultaneously	Yes	Yes	Yes		No
FILE MAINTENANCE					
Fixed length input fields	Yes	Yes	Yes	Yes	Yes
Single key entry of common data	No	No	Yes	No	No
Single field EDIT selection	Yes	Yes	Yes	Yes	Yes
Skip record (next or previous)	Yes	Yes	Yes	No	Yes
Search & EDIT record	No	Yes	Yes	No	Yes
Search & DELETE record	No	Yes	Yes	No	No
Auto rejection of alphanumeric data in numeric field	Yes	Yes	Yes	No	No
RECORD SELECTION TECHNIQUES					
Record number	Yes	N/A	Yes	Yes	No
Binary search (high speed)	No	No	Yes	No	No
Maximum # of simultaneous keys	1	4	10	31	1
RELATIONAL COMPARISONS					
Equal	No	Yes	Yes	Yes	Yes
Not equal	No	Yes	Yes	No	Yes
Greater than	No	Yes	Yes	Yes	Yes
Less than	No	Yes	Yes	Yes	Yes
Instring	Yes	Note 13	Yes	Yes	No
AND/OR	No	Note 14	Yes	Yes	No
Wild card masking	No	Note 13	Yes	No	No
PRINTING					
User specified page title	Note 8	Yes	Yes	No	Note 10
User specified column headings	No	Note 13	Yes	No	Yes
Automatic page numbering	Yes	Yes	Yes	Yes	Yes
Right justification	No	Yes	Yes	No	No
User defined column widths	Yes	Note 13	Yes	Yes	Yes
User defined column separators	No	No	Yes	No	No
Keyboard entered columnar values	No	No	Yes	No	No
Merge data into form letters	No	Note 13	Yes	No	No
Form filling applications	No	Yes	Yes	No	No
Columnar totals	Yes	Yes	Yes	No	No
Columnar subtotals generated upon change in a specific field	Yes	Yes	Yes	No	No
Built in screen print	No	Note 13	Yes	No	No
MISCELLANEOUS					
Cost	$75.00	$109.90	$99.95	$99.00	$79.95
Punctuation allowed within data fields	Yes	No	Yes	Yes	Yes
Upper/Lower case	Note 3	Yes	Yes	Note 3	Note 3
Built in RS-232-C driver	Note 3	Note 3	Yes	Note 3	Note 3
Built-in TRS-232 driver	Note 3	Note 3	Yes	Note 3	Note 3
Programmer's interface	Note 9	Note 9	Yes	No	Note 9
Sample DATA disk	No	Yes	Yes	No	No
Documentation (# of pages)	?	65	180	38	29

NOTE 1. Total sort & update capability dependant on memory size. File size limited by DOS.
NOTE 2. Sequential files only.
NOTE 3. User must apply own driver routine.
NOTE 4. Hard copy print out only.
NOTE 5. Four functions (+ - * /) only.
NOTE 6. Data records physically re-ordered in memory only.
NOTE 7. Available as a separate program for $99.95.
NOTE 8. 120 character maximum.
NOTE 9. Data structures defined in manual.
NOTE 10. 132 characters maximum.
NOTE 11. User option (files can be read from ascending or descending order).
NOTE 12. Range selection performed outside of sort.
NOTE 13. Limited.
NOTE 14. And is available.

The jury is in and the verdict is . . . "outstanding!" Reviews from all of you who purchased MAXI MANAGER (not to mention raves by many top microcomputing magazines) have heralded it as the definitive data base managing system. We knew that business owners and hobbyists demanded the finest data base managing system available. To all of you who praised us for MAXI MANAGER, we extend our thanks. And to those of you who have yet to try MAXI MANAGER, we invite you to experience this incredible system today. But don't take our word for it (or our jury's). Judge for yourself.

JUST CHECK SOME OF THESE FEATURES

- Supports eight different relational search techniques.
- Comes with programmer's interface.
- Over 180 pages of documentation.
- Supports up to 20 user defined fields of 40 characters each.
- Record length up to 800 characters.
- Files can be up to four disks in length.
- Compatable 35, 40, 77 & 80 track drives with proper operating system.
- Has calculated equation fields.
- Complete report generator.
- Works hand in hand with almost any word processor.

MAXI MANAGER for TRS-80 Models 1 & 3 Requires 48K of RAM and 1 disk drive minimum.

MODEL 1 version is compatable with NEWDOS 2.1, DBLDOS, NEWDOS/80, DOSPLUS, TRSDOS, LDOS, VTOS.

MODEL 3 version is compatable with LDOS 5.1 and NEWDOS/80 version 2.

MAXI MANAGER version comes on TDOS, a special version of the DOSPLUS operating system.

For the TRS-80 Model 1 & 3
Order No. 012-0096

$99.95

A Division of Scott Adams, Inc.
Adventure International • Box 3435 • Longwood, FL 32750
TOLL-FREE ORDER NUMBER: (800) 327-7172
IN FLORIDA (305) 862-6917
SHIPPING AND HANDLING CHARGES ARE EXTRA
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

ai