

80 U.S.

THE TRS-80 USERS JOURNAL

Vol. V, No. 4

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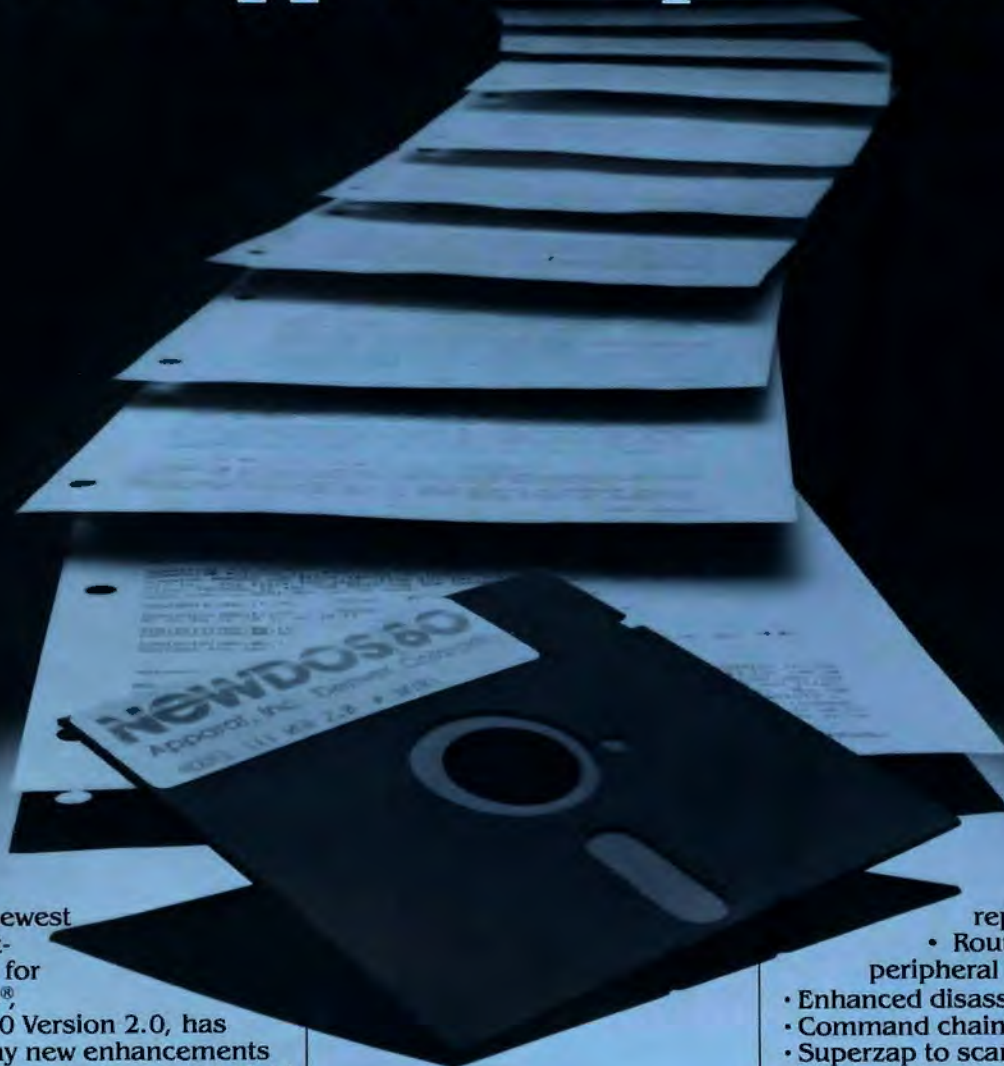
April 1982

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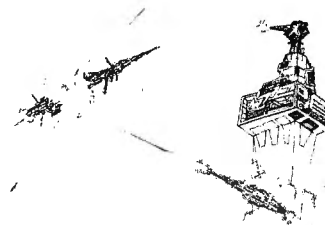
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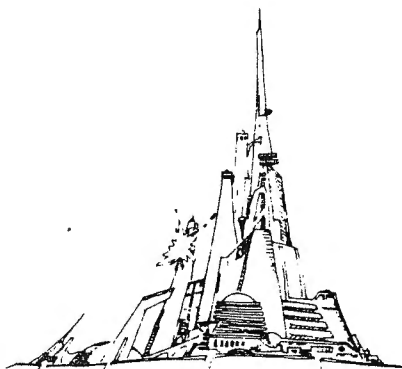
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AARDVARK - 80

TRS 80 COLOR

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OUR COVER for this investments issue features model Lesta Herr with silver dollars in her eyes. The silver dollars were minted in 1881—the computer printout is current. Frederick A. Johnsen, photographer.

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80-U.S.

THE TRS-80 USERS JOURNAL

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Editorial

Someone once said that there are three kinds of people in the world: those who make things happen, those who watch things happen and those who wonder what happened. Here it is, our very first April issue, and we have no April Fool jokes for you. Maybe that's a joke in itself, since almost everyone else does it.

David Ahl put out a wonderful April Fool issue of Creative Computing two years ago. It had it all—a parody issue of the other computer magazines. We weren't big enough to be included, apparently, so we were left out.

In any case, it looks as though we belong to the third group of people, the ones who wonder what happened.

As for *making* things happen, the Tandy Corporation apparently did just that with their Color Computer. In spite of the fact that some people claim it is dead and almost buried, it is indeed alive and doing well. So much so, that we are stepping up our coverage of it considerably. This is not because we *expect* it to be a big deal—it is.

Hardly a day goes by here without phone calls, cards and letters from excited Color Computerists asking for more, more. It's almost like the Model I all over again, just three years later.

With the addition of disk drives and more memory, the Color Computer hangs right in there with the best of them, even as a small business machine. The Color Computer with tape alone is a hot machine. It took something like the Color Computer to get us Model I owners back to respecting tape because it loads so well on the Color Computer.

It seems like an odd twist of life that if you want to know anything about taxes, you don't go to IRS, and if you want to know something about politics, you don't go to see a politician. If you want to know what Tandy is making happen, read the Wall Street Journal.

Mr. Juge said there would be no Model IV or V. He was right—they called it the Model 16. The joke is on us—were you watching?

Mike**Letters**

I am writing in regard to an article of mine which appeared in *80-U.S.* January 1982 issue on page 88. It was titled, "How to Find Execution Points". There was a typographical error on page 90 of the article which was brought to my attention by Bob Rogers of New Castle, Indiana. In the section labeled, "The Easy Way" there is a PEEK statement which if typed in as it appears will return a value of 0. The statement reads:

```
PRINT PEEK(16607+PEEK
(16608))*256
```

It should have read:

```
PRINT PEEK(16607) + PEEK
(16608)*256
```

I hope this didn't cause your readers any difficulties and again thanks to Bob Rogers for calling it to my attention.

Glenn W. Collura
Streetsboro, Ohio

It was the Sep/Oct 79 issue that got me started with *80-U.S.* And, I've been a subscriber since then. You've got a great periodical going and I for one am glad to see it go to a monthly. The articles and programs are excellent. I'm slowly grasping the programs in machine language, so I'll be looking forward to those, in particular.

When I was building up my TRS-80 Model I system from the early days (Dec 78) and finally got my first disk drive, then a Radio Shack line printer II, I was quite elated with Scripsit. After going through four LP II's, about two months for each unit, I began to get rather discouraged with the whole shootin' match. The first printer literally began to smoke from the printhead jamming itself to the extreme right. The local Radio Shack dealer made an offer of exchanging the last unit for a Line Printer IV. Boy! I thought, that's neat. Now I could have proportional printing and spacing. But lo, nothing of the kind. The documentation does not recommend the proportional font for right-

justification! Now that's a fine how-do-you-do. Here I have Scripsit and the LP IV but can't use it as I had hoped to.

Then when I received the Nov/Dec 80 (80-U.S.), on page 99, there was the answer to my dilemma, PROSOFT! Now I thought I could do all the great things that I couldn't do with Scripsit. Well, I was right. I called them folks in North Hollywood and ordered their first programs PROP, SUBEDIT and SUBSCRIPT. And it worked, right off the bat. Chuck Tesler who heads up ProSoft has been helpful and understandable to deal with. I have since updated the early program to NewScript, with the full screen editing. I highly recommend this word processor which now supports many different printers, not only the LP IV.

Good luck on expanding your excellent magazine to a monthly.

George A. Seipp
Gretna, Louisiana

(NewScript was evaluated in our February 1982 issue for those who care to refer to it. Thanks for the kind words, George. — Ed.)

January 82 monthly!! You said it was coming! WOW! Deadlines just *might* make it *harder* to catch bugs in the very next issue!

Donald Hennessey
(You're absolutely right Donald, and we would have said where you were from, but your postcard arrived uncanceled and without return address. — Ed.)

Dear Captain 80,

First of all, I am new to this magazine but know you for your work on *The Captain 80 Book of BASIC Adventures* which is really decent (neat). I am now subscribing to this mag because it is more personal than the other one. Also, I will probably use more programs here than anywhere else. Now, to business. Some ideas are: do background info on program writers and interviews with program reviewers (preferably with the staff). Give ideas about games, programs for use. Give self reviews of any programs *you* write. Keep witty, Chief!!

Agent 1460680

Mike Tipton

Grandview, Missouri

PS: Loved your book, perfect! except for the disk random adventure generator program. I only got Level II 16K — oh well, another one or two years...

Folks,

We'd be delighted to subscribe to your magazine. Unfortunately, my kids, who are mad about computing, have mislaid the magazine (*sample issue*) so I don't know how much to send you for a subscription. But, they tell me, at least one program worked very well and they are excited about your magazine. Please send me subscription details. The BASIC Adventure book seems to work very well they tell me. (*The kids*) found little difficulty in transcribing it for an ATARI.

Bob Olmsted
Port Orford, Oregon

(Good for them, we knew it could be done! Actually, there really isn't that much difference between ATARI and TRS-80 BASIC. — Ed.)

Just a note of complaint about one of your advertisers, to wit: your January 1982 issue, pages 26 and 27 from Crystal Ware Software. I am always interested in adventure and arcade games and was intrigued with their ad, although this is the only publication that I have seen it in for TRS-80 software.

Upon calling long distance I find that only three games are available for the TRS-80 out of all those listed.

I suggest that before you accept any further advertising from anybody, make sure that what they advertise is for the appropriate publication.

Ivan M. Schaffel
New Haven, Connecticut

(Thanks for calling that to my attention. I am usually so busy during production time that I only read the ads when the magazine is off the press. We'll watch it. — Mike)

Your article on arrays in the February 1982 issue (by Dettmann) was really great. I wish he could carry on with this to the end. In the

same manner he wrote this article, of course.

J. R. Laughlin
Houston, Texas

(By now you have probably seen the March 1982 issue, where Terry continues his tutorial on arrays, and you will find part three in this issue. He will keep it up as long as there is interest like yours. — Ed.)

May I reply to Captain 80, January '82, in your column, with regard to U.S. software and its importation and sale in Britain?

Firstly, full marks for your description of U.K. Customs & Excise in "action!" They really do not know what software is, and suspect it to be softcore pornography on tape or disk. Secondly, the words "rip-off" may have come to the U.K. from the U.S., but that doesn't mean we didn't know about it before! Over here entrepreneur means the same thing! Britain has a different attitude to imports than many countries, and most here feel that a 200% markup is the just reward for spending ten minutes on import documentation.

We, at Wordsworth, are continually looking for very well-written software, generally utilities or stimulating games, available in the U.S. from source, to be imported as cassettes or disks with documentation. For programs that require little documentation, a retail of \$15 in the U.S. would approximate £9.50 our price and \$30, £16.90. For heavyweight documentation a \$100 program should sell for £69.90 or thereabouts, at \$1.80 to £1.00. I hope you can now see that we are not all in the glossy hyped-up world of add-on prices.

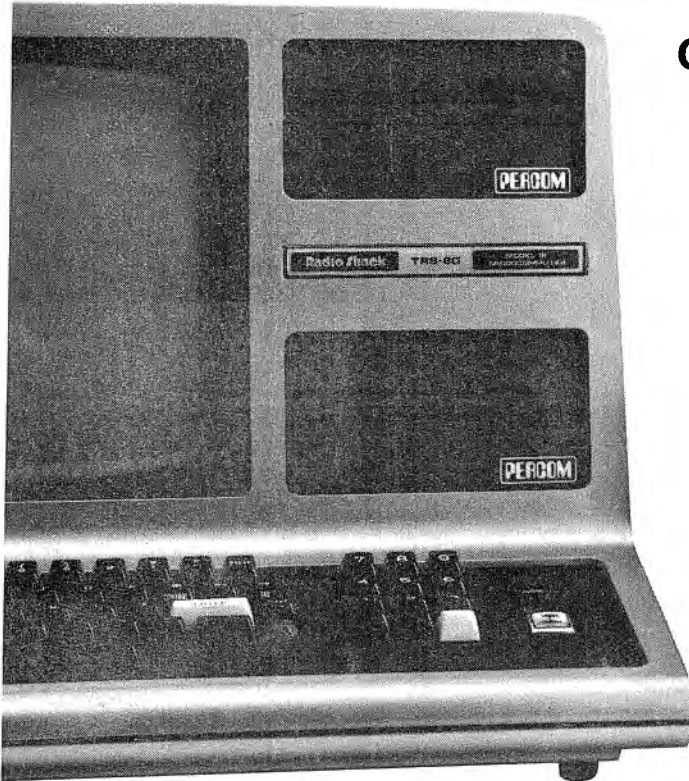
Our interest is only with reliable, useful and interesting software, at present for TRS-80 only, and with first class documentation. Any of your readers or advertisers who have an interest in export might like to contact us.

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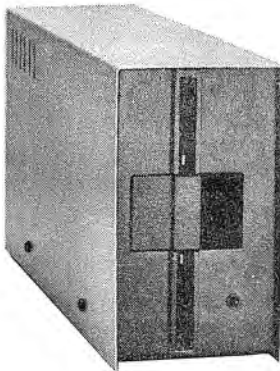


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How to order - Order by calling Access Unlimited toll-free on 1-800-527-3475. Or order by mail. Orders may be charged to a VISA or Master Card account, or paid by cashier's check, certified check or money order. COD orders require 25% deposit. Sorry, we cannot accept personal checks. We pay shipping and insurance charges on orders over \$1,000.00. Add approximate insurance and shipping charges for orders under \$1,000.00. If in doubt about these charges, ask when you call in your order. Texas residents include 5% sales tax. Minimum mail order \$20.00. Allow 2 to 4 weeks for delivery.

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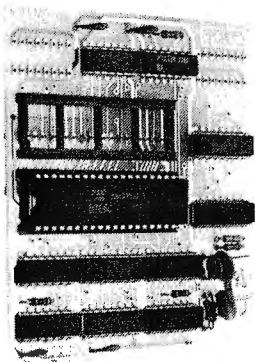
Everybody's Favorites - for Less!

Percom Data Separator	\$23.95
Green Screen I, II, or III	\$18.95
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— LOWER PRICES

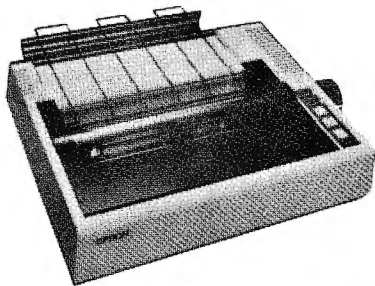
Percom's Proven DOUBLER II†

Upgrade Your Model I to Double Density for only \$159.95



And not with some unproven hacker's kit, either. But with an assembled and fully tested Percom DOUBLER-II†. The DOUBLER-II† simply plugs into the disk drive controller socket of your Expansion Interface. Then it lets you store over four times more on one side of a diskette, depending on the drive, than you can store on standard Tandy Model I drives. Other features: • Reads, writes and formats *either* single- or double-density • Includes DBLDOS™, a TRSDOS* compatible disk-operating system • Runs TRSDOS*, NEWDOS††, Percom OS-80† and other single-density software immediately. Change to double-density operation when convenient • Lets Model III software be read on your Model I • Includes on-card high-performance data separation and write precompensation circuitry.

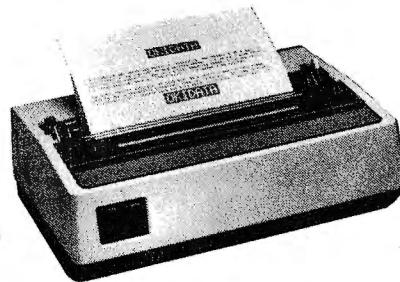
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Just flick a switch to connect your TRS-80* printer port from device #1 to device #2. Or, "Quick-Switch" a peripheral between computers. Versions for RS-232 or Centronics interfacing. Includes 5-foot 34-pin cable with card-edge socket, box-mounted 34-pin card-edge plugs. From \$79.95.

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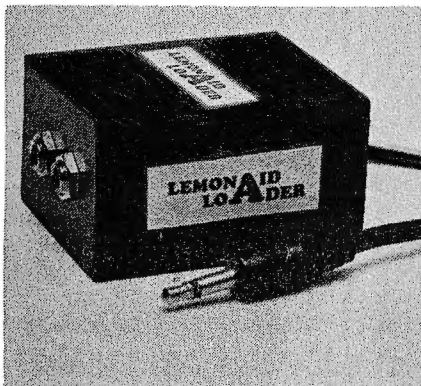
* Trademark of Tandy Radio Shack Corporation
†† Trademark of Apparat Corporation

What's new in hardware and software. Plus other services.

Model II Graphics

Maxtek, Inc., has introduced hardware and software to make your Model II TRS-80 a very exciting graphics machine. The hardware consists of a single plug-in board. The software includes a Symbol Generator, Graph Plotter, 3-D Generator, Surface Plotter and Graphics Terminal. Their Toll-Free number is 1-800-421-1423. Maxtek, Inc., 2908 Oregon Court, Torrance, CA 90503-2683

Circle #136



LemonAid loader

The LemonAid Loader is designed to make cassette tape loading reliable and easy on the Model I TRS-80. The loader compresses, peaks and shapes the cassette output to reduce loading errors due to noise or tape variations without critical recorder volume settings. The price postpaid in the U.S. is \$12.95. There is a money back guarantee. Available from Lemons Tech Services, 325 N. Highway 65, Buffalo, MO 65622-0429

Circle #129

Warm fuzzy software for the leisure industry

Market Computing Inc., a new clearinghouse for microcomputer software is the first to provide programs for the field of leisure management. The programs are available for use on the Radio Shack Model II or III. Programs cover such areas as class registration, tennis tournament draws and swim-meet scheduling. To order or ask questions call 800-426-1200 or write Marketing Computing, 93 Pike Street, Room 310, Seattle, WA 98101

Circle #135

Pocket desk console

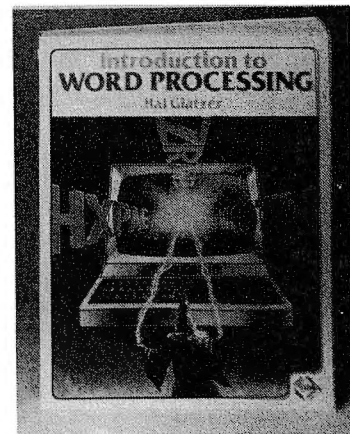
A Pocket Computer "Desk Console" has been introduced for the Sharp PC-1211, and TRS-80 Pocket Computers with printer. It's made of handsome black plastic and has space for three cassette boxes, a full set of 3 x 5 cards, two paper rolls, a spare print ribbon and the interface cable. The unit sells for \$19.95 plus 2.50 shipping and 6% tax for CA residents. Interested persons should contact FOX/WALKER 4650 Arrow Highway, Bldg. G-17, Montclair, CA 91763. (714) 621-3400

Circle #131

Alcor Compiler for CP/M

Alcor Systems has released a new Pascal Compiler that runs on the TRS-80 Model I/III and Z80 equipped CP/M systems. Alcor Pascal is a complete implementation of Jensen and Wirth standard Pascal, with over 20 language extensions. A full screen text editor is included with the compiler. Included is a 250-page documentation package that consists of a Beginners Guide, Tutorial, Reference Manual and more. The Compiler package retails for \$199 and the Advanced Development package that contains the p-code optimizer and native code generator is \$125. Contact Alcor Systems, 13534 Preston Road, Suite 365, Dallas, TX 75240 (214) 226-4476

Circle #132



Word processing book

Introduction to Word Processing by Hal Glatzer has just been released by SYBEX. It reveals to us all in understandable terms the whys and hows and what-ifs connected with the world of word processing. This book is required reading for anyone just starting into word processing. For further information contact Jane Yeung, SYBEX, Inc., 2344 Sixth Street, Berkeley, CA 94710. (415) 848-8233

Circle #128

New Coloring Book

TRS-80 Color Programs, from dilithium Press, is written by Tom Rugg and Phil Feldman, authors of the popular 32 BASIC programs series. Their new book is designed specifically for the TRS-80 Color Computer and will get the reader started with all sorts of programs. The book contains 37 fully-documented programs for every level of ability. The book has about 50% games, 25% educational programs and 25% practical uses. The programs are written in BASIC and they are bug-free if entered exactly as shown. Price is \$19.95. The book contains 323 pages and is available from dilithium Press, 11000 S. W. 11th Street, Suite E, Beaverton, OR 97005 or contact Cathy Filgas at 800-547-1842

Circle #130

Model I Tape Operated System

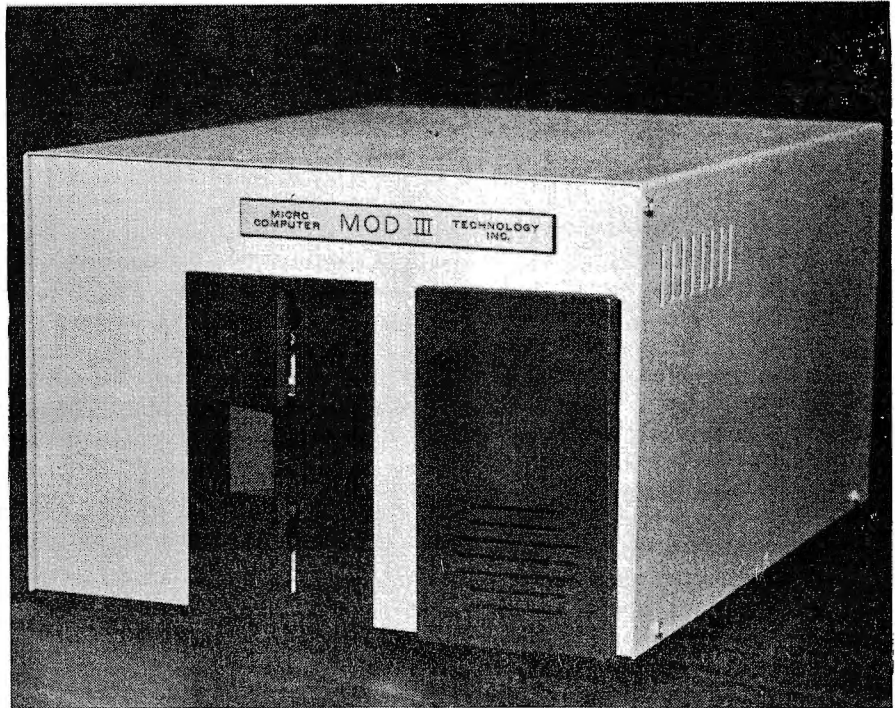
KWICOS is a machine-code program that adds disk-like commands to Level II BASIC, providing a new and improved Cassette Operating System to supplement the standard CSAVE/CLOAD/SYSTEM routines. This is a software-only enhancement and requires no hardware modifications or add-ons. All operations are effected by simple commands in the Level II "Immediate" mode. The main features added by KWICOS are: Both BASIC and machine-code write, read, verify and search functions; variable cassette baud, 2x through 6x; visual aid for setting the playback volume; break key is active during all cassette operations; extensive protection against lock-up or garbage loading during read operations; program titles may be up to 32 characters long; optional password protection; simple merge command chains BASIC programs directly from tape; and more. Priced at \$24.00 postpaid, for Model I, Level II, 4K to 48K, it is available from KWIK Software, PO Box 328, Bolivar, MO 65613

Circle #133

Home/business programs

DOUGHFLO is a system of programs compatible with the TRS-80 Model I or III. It is for home or business bookkeeping, tax preparation, cash flow analysis and financial planning. Besides immediate checkbook balance and profit/loss, expense totals are available in reports which can group expenses by numerous sort keys, including category, range of dates, description, amount, receipt or check number. Bar graphs, grand total and expenses as percent of total income are some of the many reports provided. Receipts are easily accessible, making DOUGHFLO an excellent accounts payable ledger and posting system. Available and ready to run with sample data files, it runs on both 32K and 48K Model I & III. Price is \$98.95 from ALPHANETICS, PO Box 597, Forestville, CA 95436 or use 24-hour phone (707) 887-7237

Circle #134



Educational Math Programs

Olympia Software, Inc., has just released six educational math programs for the TRS-80 Models I and III. They teach subtraction, addition, multiplication and division. One of the programs also compares fractions. In all of the programs, the person playing the game must answer the question correctly to continue playing. The games all have action and graphics and children will enjoy playing while learning. The programs are available from Olympia Software, Inc., 8915 Skokomish Way N.E., Olympia, WA 98506. Price per game is \$24.95

Circle #127

Free sample newsletter

The publishers of Software Review™, a new, bimonthly newsletter which evaluates computer programs for the TRS-80 Models I and III will give readers a free sample issue. Send a self-addressed, stamped (37¢) return envelope to Software Review, 92 Washington Ave., Cedarhurst, NY 11516.

Circle #125

New hard disk drive

MTI has announced the immediate availability of a 5 and 7.5 megabyte external Winchester hard disk system for use on any TRS-80 computer system. The disk system is so easy to install, that you simply plug its cable connector into the rear expansion port. The external Winchester hard disk system uses the Micro Systems hard disk operating system version 3.3.9 which is file compatible to the TRSDOS. The 5 megabyte disk drive (Model 1421) is a complete self-contained unit which includes a Winchester drive, controller, power supply and cables in an attractive enclosure selling for \$2799. The Micro Systems DOS Plus hard disk operating system (Model 1507) sells for \$299. Products are available for immediate delivery. MTI products are available through a network of over 65 dealers and OEM's throughout North America. World wide distribution is available. For more information or the location of the dealer nearest you, please contact Microcomputer Technology Inc., 3304 W MacArthur Blvd., Santa Ana, CA 92704 (714) 979-9925

Circle #126

Tandy topics

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

Greetings from Texas on the last day of January! It's clear, sunny and in the 60s . . . and the remains of last night's snow have almost melted. It's true what they say about Texas weather . . . if you don't like it, wait a couple of hours.

Our weather isn't the only thing that can get mixed up. This column has been a bit confused. My first one was too long-winded, so we agreed to run it in two parts—Nov/Dec 1981 and January 1982. I wrote February before I got the word, so it had to be pruned too. Mike received our new product announcement so late that it could only be shoehorned into the March issue by substituting it for my column. It should be about time for the Texas weather *and me* to get back on track!

This month (now that I am able) it seems only proper to talk about the new TRS-80s. I haven't seen 80-U.S. for March yet, so please excuse any duplications.

TRS-80 Model 16

We're very excited about this new, top-of-the-line TRS-80. It employs two processors: the MC-68000 and the Z-80A. The 68000 is really a 32-bit microprocessor with a 16-bit external data path. Clock speed is 6Mhz in the Model 16. So, what's so great about that? IBM and others have 16-bit machines, right? True.

First of all, the 68000 is generally accepted to be the most powerful microprocessor available today. Second, the Z-80A does the I/O and other housekeeping, allowing the 68000 to apply all of its power to processing. Third, the Z-80A allows you to run your Model 16 in "Model II mode", and use every existing

Model II program. Fourth, one of Model 16's two serial communications ports will support Bisynchronous or SNA/SDLC communications with IBM and other mainframes. And last (or maybe first, depending on your viewpoint) Model II owners can upgrade their Model II to include the 68000 and up to 256K RAM! The upgrade price with 128K RAM included is \$1,499.

A Model II owner who needs to expand won't have to convert to new hardware and can continue to use

*I believe the fact that
Model 16 is a natural evolution
is the really revolutionary
concept of the product.*

all existing software systems. He will have the advantages of 16/32-bit speed and memory addressing for future applications and isn't faced with equipment costs four to five times that of his Model II to advance to the next level of performance and capability. A reporter told me recently that he had interviewed by phone, a number of industry leaders for their reaction to our announcement. One had said that it sounded "more evolutionary than revolutionary" to him. I believe the fact that Model 16 is a natural evolution is the really revolutionary concept of the product. So, I thank the author of that thought—whoever you may be! You suggested a very good way to express the significance of our new product.

Model 16 is slated for April/May shipment. Multi-user capability

should be available around mid-summer. Couple that with the availability about that same time of Arcnet (which can accommodate either Model II or 16) and you can see a very significant expansion path for TRS-80 business users.

The 16 is a "new look" for us, too. The case is a textured off-white color and the disk drives are new, thin-line double-sided, double-density units, capable of 1.25MB per drive. Now, your desktop TRS-80 can have 2.5MB of disk storage internally and up to 512KB of internal RAM.

The one-drive, 128KB Model 16 will retail for just \$4,999. The multi-user system (available mid-year) will support one user on the 16's keyboard and two more on terminals, with partitioned memory. One last comment. In case you were wondering, we are *not* discontinuing Model II. Model 16 is an additional family member.

TRS-80 DT-1 Terminal

For our Model 16 multi-user customers, or anyone needing a really good, affordable terminal, we have the DT-1, at \$699.00. Its cabinet is patterned after Model III, but with the textured, off-white finish. (When you see this finish, I'd appreciate hearing your opinion!) The screen is 80x24, upper/lower case and the character set includes some special characters (single) to indicate control functions.

For instance, the carriage return symbol is a small "C" in the upper left corner of the character block and a small "R" in the lower right corner. It emulates four popular terminals by ADDS, Hazeltine, Lear-Sigler and Televideo.

Characteristics are set from the keyboard rather than from the usual dip switches. Your setup can be stored in a state-of-the-art EEPROM. Of course, you can alter the setup on a permanent or temporary basis, as you like.

Model II Graphics Board

At our January 19 introduction, we also showed a new high resolution graphics board for Model II (or Model 16). It allows easily programmable, 640x240 bit-mapped graphics. You get 16K graphics memory on the board and a disk containing "Graphics BASIC". It's only \$499 plus required installation.

The screen is X-Y mapped and 11 new simple graphics commands with a multitude of powerful extensions, make graphics a snap.

Draw a line between two points with one command. Extensions to the LINE command allow it to define a box with the specified points as opposite corners. Define a CIRCLE by specifying center and radius. Extensions allow varying the aspect ratio to make it an ellipse.

Graphics BASIC's PAINT command includes "paint styling": Any enclosed area can be painted in an almost endless variety of patterns — great for pie charts, graphs, even your favorite "Snoopy" picture, I suppose. There's also "line styling", which draws lines in a variety of textures, giving a distinct look to each line on a multi-line graph.

You can define a "viewport" on your screen—an area in which the graphics display will be contained. The board's separate graphics video memory allows overlaying of graphics and text, either of which are clearable separately. That's just the beginning, but if I tell it all, there'll be no space to talk about the other dynamite new product.

Pocket Computer Model PC-2

Those of you for whom our original PC (in true Radio Shack tradition, now the "PC-1") wasn't enough, hang onto your hats! PC-2 will tempt you beyond the point of resistance. Its 2,640 byte memory is expandable. A 4K RAM module will be available immediately and an 8K module, shortly. A single memory expansion port allows plug-in of a

RAM, ROM or RAM/ROM module to 16K. The 16KB PC BASIC has been improved almost to the power of Level II or Model III BASIC. Strings can be defined to 80 characters and arrays can be two dimensional. New commands include PEEK, POKE, LEFT\$, MID\$, RIGHT\$, INKEY and more.

The 26-character display includes upper and lower case characters and is *fully bit-addressable* for really neat graphics. Print your letters upside down, backward, reverse type, or even program a freight train to chug across the display. There are six function keys, addressable in three different modes each, for a total of 18 programmable functions. There are "definable" keys (similar to PC-1).

A new 8-bit processor makes PC-2 an order of magnitude faster than its little brother. Fifty-plus hours of

The first demo I saw was an American flag, in color, after which the computer played "Stars and Stripes Forever"!

operation are provided by replaceable AA cells (non-rechargeable). There's a battery-saving circuit which turns power off after several minutes of inactivity. If a phone call interrupts you in mid-calculation and power goes off—good news! Press the "on" button and you're right back where you were—same memory and screen contents. Price of the PC-2 will be \$279.95.

There will be soon, an RS-232 adapter for PC-2, making it an ideal on-the-go terminal. PC-1 continues in our line. We feel its smaller size and attractive price will continue to have wide appeal to a very large number of users.

PC-2 Printer/Cassette Interface

To call this little jewel simply "PC-2 Printer/Cassette Interface", is an injustice. It's a portable, compact *4-color plotter/printer*, using easily-replaceable ballpoint pens, which also features a cassette interface for not one, but *two* cassette recorders. Why two? Well,

for example, you can CLOAD an old data tape from one recorder, update it and CSAVE a new data tape on the second recorder without ever touching a recorder button or tape.

The graphics are great! Even though this combination is a very serious, hard-working computer system, it has its playful side too. The first demo I saw was an American flag, in color, after which the computer played "Stars and Stripes Forever"! Oh, did I forget to say that there's a programmable tone generator in the PC-2? The printer/plotter uses standard cash register type paper, not thermal or electrostatic. It comes with built-in Ni-Cads, which also power the PC-2 when it's plugged in, saving the computer's non-rechargeable batteries. The printer/plotter will retail for only \$239.95.

If you've really wanted a take-along computer, but haven't felt they were advanced enough yet, take a look at PC-2! You're in for a pleasant surprise.

All of these new products are expected to be available in April or May. You'll find them all written up in detail in our new RSC-7 Computer Catalog, available now from your nearest Radio Shack outlet. We hope you like them.

One last comment. In January, it seems a rumor was started that we were about to discontinue the TRS-80 Color Computer. Naturally, it caused concern to some Color Computer owners. The reason quoted was the failure of CC to meet our sales expectations. Be advised, there is no plan to discontinue our Color Computer this year or next year. On the contrary, we're developing more software and accessories for it than ever. As to not meeting our expectations—I won't quote numbers, but I will say that going into the Christmas season, we built Color Computers to very aggressive sales projections. Instead of having inventory left over, we sold out our warehouses to the bare walls.

Believe it—the TRS-80 Color Computer is a real winner. Don't be concerned when you hear idle guesswork. Some folks get their enjoyment from "stirring the pot". There's just no kick in reporting non-controversial facts. ■

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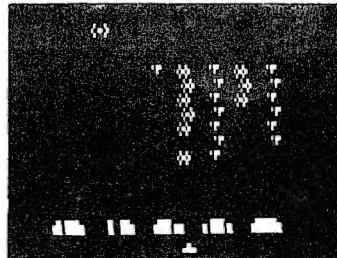
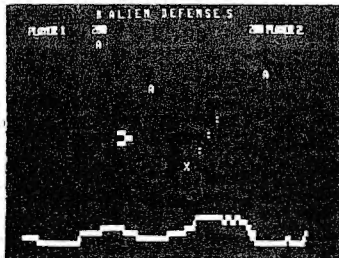
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Mod I or III Disk*, 32K

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Only Mod III version has
Extended Graphics.



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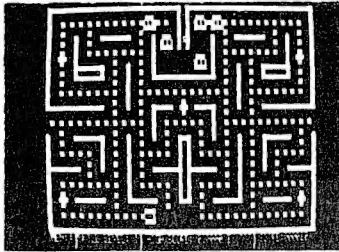
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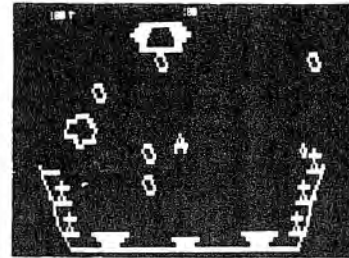
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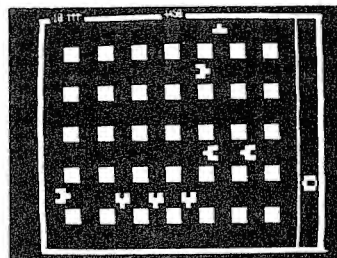
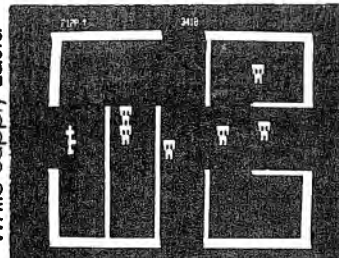
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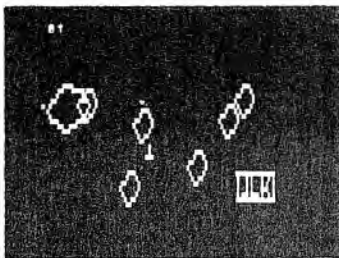
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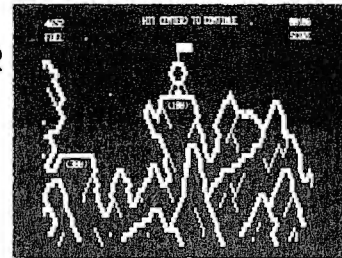
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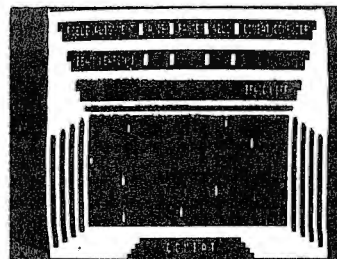
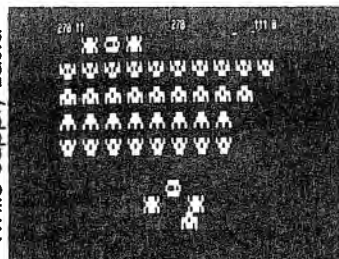
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Software Development System Rom Pack	\$89.95
C Bug Monitor	\$29.95
Disassembler (Source Generator)	\$49.95
Color Computer News (Latest Issue)	\$2.50

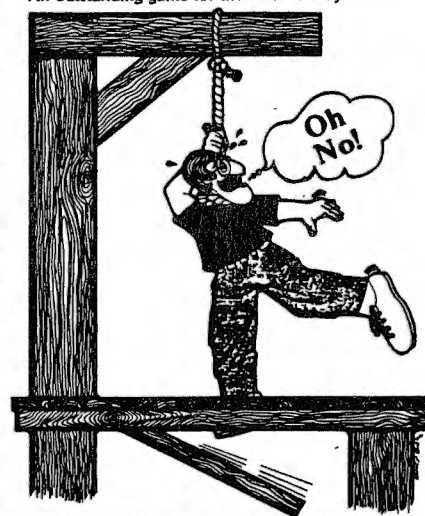
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Requires 16K

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Darned if it isn't income tax time again. It seems to be coming around faster each year. This issue will not tell you how to avoid it, but maybe some of the financial information will help you for next year.

Corrections

Our March cover story, "Micro-computers in Medicine", included a news release that is a little confusing. The Radio Shack release appears on page 17. Martin B. Winston, directory of publicity for Radio Shack/Tandy Corp., was the author of the release, *not* a computer operator in a Texas mental health facility. Sorry for the mixup, Martin.

In the February '82 issue, the program for "Automatic Tape SAVE" on page 36 should have noted that for Model III you need to change the OUT statements in lines 65000 and 65002 to OUT 236,4 and OUT 236,0. This is for Model III only. The OUT statements shown on page 36 are for Model I only.

In @News for February, Jim Perry claims that Fastmath and Reducing, two CAI programs written by Nancy Sandler and modified by Gerold Melin, are bonus programs in the Exatron Educational Library. Nancy says, no, they are not! Apparently, the programs are being sold by her. Jim has pulled his usual vanishing act. His entry for this issue is left over from two previous issues. Come on, Jim!

We announced in February that Tom Huber had left for new challenges elsewhere. The elsewhere, it turns out, is at the Heath Company in Michigan. He tells us that he has a technical writing position there — on the Heath H89 computer. Sounds like a good deal, Tom. Have fun.

The reader survey . . .

In this issue, you will find our second reader survey. The first one we did was two years ago, in March, 1980. It does become necessary, from time to time, to see if our idea of who our readers are is, indeed, a reality.

The survey will give us lots of information that will enable us to serve you better. And, let's not kid

anyone. It will serve us better too! It's the best of both worlds since it will serve both of us.

We need to know the distribution of the various models of computers so that we can tailor our editorial content evenly. We need to know what you intend to buy to upgrade your systems, or even if you don't intend to do so — that's important too. Some of the information seems to be just plain curiosity, but there are reasons for most of it. Some of it has to do with information our advertisers want to know — and why not, since they also serve our readers.

The results of the survey will be tabulated and somewhere about the July or August issue, we will print the results. It should be interesting to compare with the results we obtained two years ago. If you have it, check the July/August 1980 issue for the results of the first survey.

. . . and a contest!

As you probably know by now, 80-U.S. has published two books, the Model I *Disk Interfacing Guide*, by William Barden, Jr., and the *Captain 80 Book of BASIC Adventures*, by Bob Liddil.

Since we are in the business of publishing, it seemed a natural thing to do. We tried doing software on diskette and tapes, but soon found that it ought to be left to those who do it best. In any case, we intend to go further with the book publishing idea and are setting up a division of 80-Northwest Publishing, Inc., to do just that.

What we need is a name for the book publishing division. There are a couple of restrictions to the name, since we can't have one someone else already has. Also, we would like it to be called ". Books". Just one word prior to the word books. The name need not be a computer-oriented name, since we may just branch off into basket weaving or something at a later date. (It depends on what Tandy does, doesn't it?)

Probably a word meaning "spare time", "leisure", "hobby", or to that effect, would be appropriate.

Now, here is how you can win a crisp, easy \$100.00 bill: Just think

up a good name for the book division and write it on your reader survey card just below your return address. No, there will be no drawing. We don't want to be stuck with whatever comes up. We will pick through the entries very carefully and find the one that suits us best. That one will be the winner. Naturally, no one connected directly with 80-U.S. will be eligible (sorry associate editors). The choice will actually be up to the whim of the greedy publisher.

In the event that two or more like entries are received, the one bearing the earliest postmark will get the C-note. If two or more winners share the same postmark, they will just have to split the prize.

We'll cut off entries on the 30th of May, 1982, so get your ideas in before then. We have two or three computer-related books in the works now and they *need* a family name! Remember that one good word will get you a hundred bucks — such a deal!

In this issue

I'm especially happy with the cover of this issue. The idea for the glasses on an investment issue was mine. Fred (the photographer) and I talked about it one Saturday afternoon, the glasses were ready Monday evening and Fred took the shots that night. The following Thursday, we were picking through the finished slides. No doubt which we liked best!

Now I've run out of space, so you will have to check our brand-new contents pages to see the features of this issue. Incidentally, that new layout is the work of our typographer, Cathy Doud. No, we don't have a staff artist yet, but we think the job was handled with just the right touch — don't you?

It just goes to show you — when things go right, they really go right. Don't forget to send in your survey and enter the "Name the Book Division" contest. It will be the easiest hundred you ever made. Well, maybe not, but give it a try.

Don't worry about income tax time. The IRS has to have their day, too. Remember that you always make the kind of days you have.

Mike

Looking for a SPELLING CHECKER?

```
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```
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```
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```

```
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B) Input File Name = TEST
C) Next Program Name = NONE
D) Alternate Char. Set = 0
E) Extended Word List = N
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G) Wait For SPELL disk = N
```

```
Press appropriate key to change an option.
Press (X) to exit edit.
```

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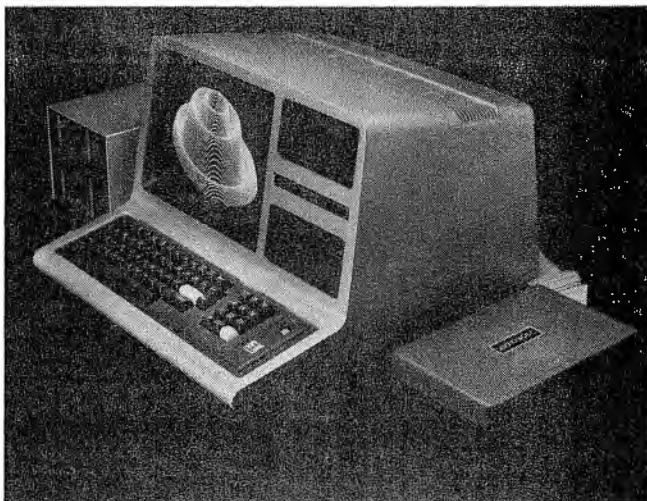
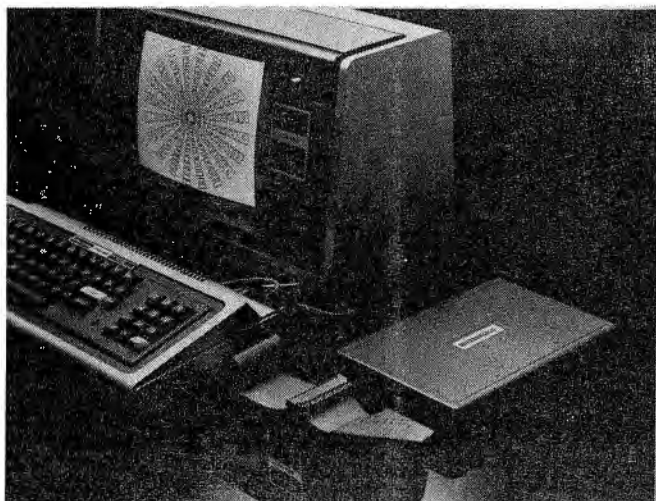
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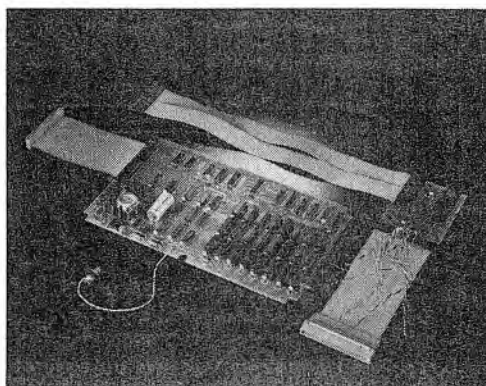
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Making ends meet

A pension portfolio analysis



Model I/III

Ted Byrne, South Hadley, MA

The Fed's have made major changes in the tax laws in 1981 and we can all benefit. But the real biggie is the new rule for the Individual Retirement Account (IRA) that lets any wage earner put away as much as \$2,000 a year, a married couple with two sources of income up to \$4,000 and a couple with one source of income can store up to \$2,250 in an IRA.

All of these dollars come off the top of your income and neither the principal or compounded interest is taxable until you start drawing the money out at retirement. Since these accounts will be enjoying money market rates of interest, the compounding will also stay ahead of the inflationary rate. Hence, the ravages of the declining dollar can be offset. If you do it right, you've got a chance to create a retirement portfolio that will let you enjoy sirloin just as often in your golden years as you do today . . . *making both ends meat!*

This program lets you estimate the amounts you will enjoy in an IRA at any given maturity, with different interest rates, interest computations and payments. If you've got a printer, then you can make a hard copy for yourself or a friend (or client). You can mix up to five different independent variables into each run. Interest rates can vary quite a lot over a twenty, forty or sixty year period and you can try several combinations in a "what if" game.

My TRS-80 Model III is just perfect for this kind of computation. The busy work that goes into this kind of multiple future value computation used to be an awful bore. Now, I can just fire up my disk drives, punch in some data and tear off sixty complex calculations in milliseconds—Whew!

While I put this together on TRSDOS Version 1.3, there is nothing here that should not be easily adapted to other versions. Of course, the printer options depend upon your having a printer and a CMD "Z" routine. If you lack either, you should edit the routines associated with lines 800 and 1030. The program should work as well on cassette as on disk if you make those alterations.

You can make the entire thing faster with single precision numbers, but I wouldn't recommend that. You're already dealing with quite a few relevant places.

The program is menu driven and has five parts. Part 1 lets you enter data for Parts 2 and 3. Or, you can enter the data separately into each section. The advantage of Part 1 is that it allows you to make a number of runs without reinitializing. Part 2 will let you compute the value of an IRA at age 65 given your present age, estimated interest rates and compounding methods.

While the compounding examples seem to imply that only four methods will work, this is not the case. You may enter any known method. Part 4 allows tabular computation for a larger number of years (5-45).

Part 5 was an afterthought which seems most interesting to me now. Given the years to maturity, compounding basis, interest rates and your marginal tax rate, the program will really show off the magic of compounding and the tax savings possible under IRA deferral. Part 6 is the conventional quit option just to tidy things up.

Now, suppose you put away \$4,000 per year for 30 years at an average rate of 10%. How many microcomputers could you buy? Or, how much steak?

If you want sirloin today *and* when you retire, this program will tell you if you're doing things right to come out *making both ends meat!*

Ed. Note— Remove the ending semicolon in Line 670 when using a line printer so that proper column margins may be maintained if you have selected menu item 4.

Program Listing for Making Ends Meat

10 '** IRA COMPUTATION (Rev. with tax Lo
ss 12/22/81) - COMPOUNDING PROBLEM: Versi

April, 1982 17

Cover story

on II.1 **** 12/07/81 : C. Ted Byrne -
BYRNE/SOFT ASSOCIATES: South Hadley, Ma.
01075.
20 CLEAR

30 '** MAIN PROGRAM STARTS HERE **
40 CLEAR1000:N=0:R=0:A#=0:X\$="":D2=0:O=0
50 GOSUB 1520

60 CLS' ** MENU INSTRUCTIONS **
70 CLS:PRINT@132,"Welcome To 'Making Both
Ends Meat' - Here's My Menu ":GOTO 90
80 O=0:CLS:PRINT@148," ** MENU **
90 PRINT@268,"1. I Need IRA Instructions
."
100 PRINT@332,"2. Enter New IRA Data."
110 PRINT@396,"3. Compute The Value Of I
RA At Age 65."
120 PRINT@460,"4. Compute An Entire IRA
Table."
130 PRINT@524,"5. Determine interest inc
ome
140 PRINT@588," otherwise lost to t
axes."
150 PRINT@652,"6. Quit."
160 PRINT@788,"Type number of your select
ion (1-6)";
170 FOR OVER = 0 TO 127
180 SET(OVER,0)
190 SET(OVER,47)
200 NEXT OVER
210 FOR UNDER = 0 TO 47
220 SET(O,UNDER)
230 SET(127,UNDER)
240 NEXT UNDER

250 Q1\$=INKEY\$:IFQ1\$=""GOTO 250
260 IF VAL(Q1\$)<1 OR VAL(Q1\$)>6 GOTO 28
0
270 ON VAL(Q1\$) GOTO 1130 , 310 , 900 ,
570 , 1620 , 290
280 PRINT@788,"0000PS! I asked for a numb
er from 1 to 6.":FOR X=1 TO 500:NEXTX:CLS
:GOTO80

290 CLS:END
300 '**INDEPENDENT VARIABLES ENTERED HERE
**
310 CLEAR1000:DIMD#(60),Y(9),G#(60),F#(60
):Q1\$="2":GOTO340
320 CLEAR1000:DIMD#(60),Y(9),G#(60),F#(60
):Q1\$="3":GOTO340
330 CLEAR1000:DIMD#(60),Y(9),G#(60),F#(60
):Q1\$="4":GOTO340
340 G\$="\$###,###,###.##":DT\$=TIMES
350 X\$="":CLS:INPUT"How old are you now "
;X1:X=65-X1
360 PRINT:PRINT"It's possible that intere
st rates will vary in the future,

370 PRINT" so I'm going to ask you for th
e three interest rates you
380 PRINT" feel might most probably preva
il until you retire."

390 PRINT:INPUT"WHAT IS THE LOWEST RATE
RATE OF INTEREST (Ex. 4% = 4)";R1:R=R1*.0
1

400 PRINT:INPUT"YOUR SECOND RATE OF INTER
EST ";R2:R3=R2*.01

410 PRINT:INPUT"YOUR THIRD RATE OF INTERE
ST ";R4:R5=R4*.01

420 PRINT:INPUT"AND WHAT WILL THE ANNUAL
PAYMENTS BE (Up to \$2000 single, \$4000jo
int)";P

430 PRINT:INPUT"ON WHAT BASIS; YRLY=1, QT
RLY=4, ANNUALY=365, ETC. (How does yourba
nk credit interest)";B

440 ' ** CONTINUOUS COMPOUNDING FORMULATI
ON **

450 CLS:PRINT@330,"Now, let me think abou
t this ...

460 D2=1

470 FOR N = 1 TO X

480 D#(N)=(P+D#(N-1))*(1+(R/B))[(B)

490 G#(N)=(P+G#(N-1))*(1+(R3/B))[(B)

500 F#(N)=(P+F#(N-1))*(1+(R5/B))[(B)

510 NEXTN

520 ON VAL(Q1\$) GOTO 80 , 80 , 900 ,

580 ,290

530 '** GOTO FUTURE VALUE PRINTOUT **

540 GOSUB 910

550 X\$="":O=0:D4=1

560 '** FUTURE VALUE TABLE **

570 IF D2<>1 THEN 330 ELSE 580

580 CLS:PRINT"YEARS TO ", "FUTURE PRE-TAX

-----/PMTS=\$"P"-----/"

590 PRINT"MATURITY", "VALUE AT"R1"%", "VALU
E AT"R2"%", "VALUE AT"R4"%"

600 PRINT"-----"

-----"

-----"

610 FOR Y=1 TO 9

620 IF0=1 GOTO 660 ELSE IF D4=1 GOTO

660 ELSE IF D4=1 GOTO 630 ELSE 640

630 IF D4=1 THEN 640 ELSE 660

640 D4=0:READY(Y)

650 DATA 5,10,15,20,25,30,35,40,45

660 N=Y(Y)

670 PRINTY(Y);:PRINTTAB(11)USINGG\$;D#(

N);:PRINTTAB(30)USINGG\$;G#(N);:PRINTTAB(4

8)USINGG\$;F#(N);

680 NEXTY

690 IF0=1THENGOTO700 ELSE710

700 PRINT:PRINT:PRINT :CMD"Z","OFF":'** L

INE FEED **

```

710 '** BOXING INSTRUCTIONS **
720 FOR OVER =0 TO 127
730 SET(OVER,7)
740 SET(OVER,36)
750 NEXT OVER
760 FOR UNDER =7 TO 36
770 SET(20,UNDER)
780 SET(62,UNDER)
790 SET(96,UNDER)
800 NEXT UNDER
810 IF0=0 THEN 820 ELSE 850
820 0=1:PRINT:PRINT"WOULD YOU LIKE A PRINTOUT OF THIS?"
830 X$=INKEY$:IFX$=""THEN830
840 IFX$="N"THEN 850 ELSE IF X$="Y" THEN 1110 ELSE 830
850 PRINT@832,"Press  $\pi$  <SPACE BAR>to return to "
860 PRINT"  $\pi$  menu. ":0=0:D4=1
870 X$=INKEY$:IF X$="" THEN 870 ELSE 880

880 IF X$=" " GOTO 80 ELSE 880

890 '** FUTURE VALUE PRINTOUT **
900 IF D2<>1 THEN 320 ELSE 910
910 CLS:PRINTCHR$(23):PRINT@64,"IF YOU PAY $"P" ANNUALLY
920 PRINT"into this account, AT 65
930 PRINT"you will have;
940 PRINT:PRINTUSINGG$;D#(X);:PRINT" if interest rates average "R1"%."
950 PRINTUSINGG$;G#(X);:PRINT" if interest rates average "R2"%."
960 PRINTUSINGG$;F#(X);:PRINT" if interest rates average "R4"%."
970 IF X$="Y" THEN 1000 ELSE 980
980 GOSUB1050
990 IFX$="Y"THEN GOTO 910 ELSE 1010
1000 PRINT:PRINT:PRINT:CMD"Z","OFF"
1010 PRINT:PRINT@768,"Press  $\pi$ <SPACE BAR> to return to
1020 PRINT"  $\pi$  menu."
1030 X$=INKEY$:IFX$="" THEN 1030 ELSE IF X$=" " GOTO 80 ELSE 1030

1040 ' **PRINT SUB ROUTINE **
1050 PRINT@768,"Do you want a printout ?"
1060 X$=INKEY$:IF X$="" THEN 1060
1070 IFX$="N" THEN RETURN ELSE 1080
1080 IF X$="Y"THEN 1100 ELSE 1060
1090 GOTO 1060
1100 0=1:CLS:CMD"Z","ON":PRINT:PRINT:PRINT:PRINT,,DT$:PRINT:PRINT:RETURN
1110 0=1:CMD"Z","ON":PRINT,,DT$:GOTO580

1120 '** INSTRUCTIONS **
1130 CLS:PRINT" On January 1, 1981 the tax laws in the united states changed

```

```

1140 PRINT"dramatically. They made an important new incentive to saving
1150 PRINT"possible to all wage earners without exception. From that date
1160 PRINT"everyone earning wages could open an Individual Retirement
1170 PRINT"Account now well known as an IRA. The meaning? You can now
1180 PRINT"put away $2,000 as an individual, $4,000 as a working couple
1190 PRINT"filing jointly, or $2,250 as a single wage earning couple.
1200 PRINT
1210 PRINT" You can put these dollars into a retirement account and
1220 PRINT"PAY NO TAXES on the contribution, or on ANY DOLLARS COMPOUNDED
1230 PRINT"until you retire. Thus if you're in the fifty percent tax
1240 PRINT"bracket, and put $4,000 into an IRA this year, you reduce
1250 PRINT"your tax liability by $2,000. It actually only costs you
1260 PRINT"$2,000 then to save $4,000! Where else can you make a $4,000
1270 PRINT"gift to yourself for just $2,000?
1280 GOSUB1490
1290 CLS
1300 PRINT
1310 PRINT" And the money will compound at high money market rates!
1320 PRINT"How quickly? It's astounding. This program is designed to
1330 PRINT"estimate how much you, or a friend might enjoy in an IRA
1340 PRINT"at age 65 at various annual rates of contribution.
1350 PRINT" Oh yes, just in case you think it's all being done with
1360 PRINT"mirrors - it's not. Sure inflation will continue the entire
1370 PRINT"time. But money market rates have an 'inflationary premium'
1380 PRINT"built in....thus even though the dollar will buy something
1390 PRINT"less in the future, these rates will keep the real value of
1400 PRINT"your money ahead of the sinking dollar.
1410 GOSUB1490
1420 CLS
1430 PRINT@ 256,
1440 PRINT" So, just fill in the info . . . and find out how you can
1450 PRINT"enjoy top sirloin now, and the n. It's a system for making . . .
1460 PRINT".....both ends neat!

```


Cover story

```
1470 GOSUB1490
1480 GOT080
1490 PRINT@975,"<PRESS ANY KEY TO CONTINU
E>";
1500 J$=INKEY$:IFJ$="" THEN 1500 ELSE RET
URN

1510 '**BILLBOARD SUBROUTINE**
1520 CLS:PRINT@64,STRING$(64,147)
1530 PRINT@339,"MAKING BOTH ENDS MEAT"
1540 PRINT@540,"By
1550 PRINT@724,"BYRNE - SOFT c. 1981"
1560 PRINT@960,STRING$(63,178)
1570 T=1000
1580 FOR I=1T0T
1590 NEXT
1600 PRINT@848,"A Pension Portfolio Analy
sis";
1610 FOR X= 1 TO 1800: NEXT: RETURN

1620 ' ** THIS IS THE TAX LOSS MODULE - T
AXLS/IRA - 12/22/80
1630 CLS:PRINT:PRINT:PRINT:PRINT:PRINT
1640 PRINT" This module is specially d
esigned to let you estimate
1650 PRINT"how much tax bite you would su
ffer on the same investment
1660 PRINT"without an IRA. It will show y
ou just how much of the an-
1670 PRINT"nually compounded interest you
would lose if it weren't
1680 PRINT"sheltered. Thus I will ask you
for the number of years
1690 PRINT"until your IRA matures (years
until you'll retire), the
1700 PRINT"rates interest will average ov
er those years - your best
1710 PRINT"guess of course, and your marg
inal tax bracket. The savings
1720 PRINT"will be obvious."
1730 PRINT:INPUT" PRESS <ENTE
R> TO CONTINUE";X
1740 CLEAR 1000
1750 DIM TX(11), A$(45),D$(60),E$(60),Y(9
),G$(60),F$(60):N=0:R=0:A#=0
1760 CLS:PRINT" PLEASE <ENTER>:"
1770 PRINT:PRINT: INPUT"THE NUMBER OF YEA
RS I SHOULD COMPUTE (1 to 45)";X
1780 IF X<0 OR X>45 THEN 1790 ELSE 1800
1790 CLS:PRINTCHR$(23):PRINT@468,"WHHH000
PS!!":FORX=1. TO 800:NEXTX:GOTO 1770
1800 PRINT:INPUT"THE INTEREST RATE WHICH
YOU THINK WILL PREVAIL ";R1:R=R1*.01
1810 PRINT:INPUT"AND WHAT WILL THE ANNUAL
PAYMENTS BE (1 to 4000)";P
1820 PRINT:INPUT"ON WHAT BASIS (YRLY=1:QT
RLY=4:ANLY=365)";B

1830 PRINT:INPUT"WHAT'S YOUR MARGINAL TAX
BRACKET (EX. 30%=30)";TX1
1840 TX=TX1*.01
1850 'CMD"Z","ON"
1860 CLS:PRINT"TAX TABLE: INTEREST INCOME
LOST UPON ANNUAL PAYMENTS OF $"P".";
1870 PRINT"-----
-----"
1880 PRINT"YEARS TO ";:PRINTTAB(11);"FUTU
RE PRE-TAX ";:PRINTTAB(30);"/PRE-TAX VALU
E ";:PRINTTAB(51);"/ LOST TO"
1890 PRINT"MATURITY";:PRINTTAB(11);"VALUE
AT"R1"%";:PRINTTAB(33);"AFTER TAX";:PRIN
TTAB(52); TX1 "TAX"
1900 PRINT"-----/-----/---
-----/-----"
1910 GOSUB 2130
1920 FOR Y=1 TO 9
1930 'Y(Y)=Y(Y)+Y
1940 READ Y(Y)
1950 DATA 5,10,15,20,25,30,35,40,45
1960 N=Y(Y)
1970 G$="###,###,###.##"
1980 G2$="##,##,##.##"
1990 PRINTY(Y);:PRINTTAB(12)USINGG2$;
D#(N);:PRINTTAB(33)USINGG2$;E#(N);:PRINTT
AB(50)USINGG$;D#(N)-E#(N);
2000 NEXT Y
2010 GOTO 2080
2020 P1=P*X:PRINT:PRINT"TOTAL OF "X" PAYM
ENTS AT $";:PRINTUSINGG$;P;:PRINT" ANUALL
Y IS
2030 PRINT"EQUAL TO $";:PRINTUSINGG1$;P1
2040 P2=P1*TX: PRINT:PRINT"TOTAL TAXES ON
THESE PAYMENTS WOULD HAVE BEEN $";:PRINT
USINGG1$;P2
2050 PRINT:PRINT:P3=F#(X)+P2: PRINT"TOTAL
TAXES PAID ARE $";:PRINTUSINGG$;F#(X);:P
RINT" + $";:PRINTUSINGG1$;P2
2060 PRINT:PRINT"TOTAL TAXES WOULD EQUAL
$";:PRINTUSINGG$;P3;:PRINT" IN "X" YEARS.
"
2070 'CMD"Z","OFF"
2080 PRINT:PRINT"WOULD YOU LIKE TO GO AGA
IN (Y or N)?";
2090 X$=INKEY$:IF X$="" THEN 2090
2100 IF X$="Y" THEN GOTO 1740
2110 IF X$="N" THEN 2120 ELSE 2090
2120 RESTORE:GOT080
2130 ' ** CONTINUOUS COMPOUNDING FORMULAT
ION **
2140 FOR N= 1 TO X
2150 R1=R*TX1
2160 E#(N)=(P+D#(N-1))*(1+(R1/B))[ (B)
2170 D#(N)=(P+D#(N-1))*(1+(R/B))[ (B)
2180 NEXTN
2190 RETURN ■
```

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RESPONSE:	

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Investment management

Buy/sell decisions with your TRS-80

Model I/III 16K Level II or Disk

Michael M. T. Henderson, Lawrence, KS

Making money with securities is easy if you follow these basic principles: (1) Buy sound stocks or mutual fund shares. (2) Buy more shares when the price is low. (3) Sell shares when the price is high..

The first principle is well known and volumes have been written about picking investments, diversifying, etc. I will not try to cover the subject here. This article is about using your TRS-80 to manage your chosen investments according to the last two principles.

It is notoriously difficult to buy at the bottom and sell at the top. If I knew how to do that, I wouldn't need to work for a living. What we want is a tool which allows us to sell our investments *gradually* as they rise in value and to acquire more of them (again, gradually) as they fall in value. All we need, really, is a formula plus the realization that buying or selling *all* of our holdings in a particular security is unwise. We will always miss the best opportunities.

The program shown below provides such a formula for a portfolio of up to 20 different securities. Using this formula, you can ignore the Dow-Jones Industrial averages, stop worrying about the prime rate, buy a newspaper with a list of stock prices every three months and let your TRS-80 do the worrying.

Lines 100-200 display the menu, check to see whether or not you have a diskette and store this information for use in the later I/O routines. When you create a new data file, the amount of cash you have invested is stored as C(I). The value, V(I), and the control value, CV(I), are set equal to C(I). The latter two change as you update stock prices using the routines at 2000. If the price goes up from the original purchase value, the value increases, but the cash invested stays the same. Likewise, if the price goes down, value decreases while investment remains the same.

The control value is the interesting variable. It changes only as you buy more shares and then only by

half the amount newly invested. If you sell shares, it doesn't change at all. It is the difference between the actual and the control values that triggers the buy/sell instructions at line 2110, which are in turn blocked if fewer than 10 shares would change hands. The computer applies the formula for you and lets you sleep at night, confident that a "do nothing" instruction meant that the price had not changed enough to make it worth buying or selling any shares.

Suitable securities for investment

A stock which never moves is not suitable since you will never buy or sell, and it will just sit there losing ground to inflation. You want about as much volatility as you can be comfortable with (look up "Beta" in any investment handbook). You also want a stock whose individual share prices are relatively low so that when your TRS-80 tells you to buy or sell a certain number of shares, that number will be closer to the magic 100 so beloved (and charged lower commissions for) by stockbrokers than to a weird number which will sock you with an "odd lot differential" charge. Many mutual funds fit the bill, offering the advantages of liquidity, low individual share prices and small (or no) commissions on sales or redemptions. The new fund groups which allow you to switch your assets between growth and income or money market funds in the same group (by phone) offer an almost ideal vehicle for this investment tool.

It would be wise, before rushing out and investing your money on my say-so, to try out the formula on a stock with a known history. Pick a date in the past, initialize a data file with the stock's price as of that date, pretend you bought 1000 shares or so and then update the file with the new price every three months after the "initial purchase" date. Keep track of the money you put

in and took out. See if by today's date you would be richer than if you had bought and held. In nine out of ten cases, you will be richer than had you been calling the exact turns in the Dow Jones Industrial Average. (If you could do that, you should be publishing a market letter and making bigger bucks than possible from investing).

The best feature of this investment tool is that you don't have to hope that stock prices will rise forever after you buy shares. If they rise, you take some profits; and if they fall, you get the chance to buy more. The only stocks this won't work with are those which fall straight down from the moment you buy them. No investment strategy will work with those.

For a more detailed explanation of this investment strategy, I recommend the book on which the formula is loosely based: *How to Make \$1,000,000 in the Stock Market—Automatically!*, by Robert Lichello, \$2.75, Signet Books New American Library, 1633 Broadway, New York, NY 10019. It is cited in the REMs at the beginning of the program.

```

10 REM INVESTMENT MANAGEMENT PROGRAM B
Y MICHAEL M. T. HENDERSON
20 REM DEPARTMENT OF LINGUISTICS, UNIVE
RSITY OF KANSAS
30 REM LAWRENCE, KANSAS 66045
40 REM 7/1/81
50 REM THIS PROGRAM SCIENTIFICALLY DETERMINE
S HOW MANY STOCKS
60 REM TO BUY/SELL AS STOCK PRICES FALL
/RISE. IT CAN BE RUN
70 REM MONTHLY OR QUARTERLY. THE FORMUL
AS ARE LOOSELY DERIVED
80 REM FROM ROBERT LICHELLO'S "HOW TO M
AKE $1,000,000 IN THE
90 REM STOCK MARKET--AUTOMATICALLY!" (S
IGNET 1977).
100 CLEAR 1000:DEFINT I:DIM N$(20),N(20
),C(20),V(20),PC(20):D$=""
110 IFPEEK(16396)=201THENDD=0:DD$="TAPE
"ELSEDD=1:DD$="DISK"
120 CLS:PRINT@10,"INVESTMENT MANAGEMENT
PROGRAM - UP TO 20 STOCKS"
130 PRINT:PRINT,"MENU":PRINT:P=15
140 PRINTTAB(P)"1 - CREATE NEW DATA FIL
E":PRINTTAB(P)"2 - COMPUTE PURCHASE/S
ALE
150 PRINTTAB(P)"3 - RECORD PURCHASES/SA
LES":PRINTTAB(P)"4 - RECORD DATA ON "
DD$
160 PRINTTAB(P)"5 - READ DATA FROM "DD$
:PRINTTAB(P)"6 - DISPLAY FILE CONTENT
S
170 PRINTTAB(P)"7 - ADD A RECORD":PRINT
TAB(P)"8 - END"
180 GOSUB 1190:IF XX<1 OR XX>8 THEN 120

```

```

190 XX=VAL(XX$)
200 ON XX GOTO 220,390,550,730,850,1010
,1110,1290
210 GOTO 120
220 'CREATE A NEW DATA FILE
230 I=1:GOSUB250
240 GOTO120
250 CLS:IF I=20 THEN 380
260 PRINT@782,"ENTER RECORD
NO. ";I
270 PRINT@704,STRING$(64,"-")
280 PRINT@74,"";:INPUT"NAME OF STOCK :
";N$(I)
290 PRINT@138,"";:INPUT"NO. SHARES
";N(I)
300 PRINT@202,"";:INPUT"CASH INVESTED
";C
310 C(I)=C:V(I)=C:PC(I)=C
320 PRINT@330,"";:GOSUB1210
330 GOSUB1230
340 PRINT@768,"TO CORRECT THIS RECORD,
HIT 'CLEAR'.":PRINT"TO SAVE IT AND GO
ON TO ANOTHER RECORD, HIT ENTER.";CH
R$(30)
350 PRINT"TO CLOSE THE FINKEY$LE, TYPE
'C'.";CHR$(30)
360 GOSUB1190:IFASC(XX$)<>31ANDASC(XX$)
<>13AND XX$<>"C" THEN 340
370 IF ASC(XX$)=31 THEN 250ELSE IF XX$=
"C" THEN 380 ELSEIFASC(XX$)=13THENI=I
+1:GOTO250
380 IM=I:CLS:PRINT"FILE CLOSED. ";:GOSU
B1210:RETURN
390 'COMPUTATION SUBROUTINE
400 CLS:INPUT"DATE OF RECORD FOR THIS S
SESSION: ";D$
410 GOSUB1150
420 CLS:PRINT"TYPE THE PRICE OF ";N$(I)
;" AS OF ";D$;": ";
430 INPUTP
440 V(I)=P*N(I)
450 PRINT
460 IF PC(I)>V(I)THEN M=PC(I)-V(I)-(V(I)
)/10):Z=M/P:GOTO 490
470 IF PC(I)<V(I)THEN M=V(I)-PC(I)-(V(I)
)/10):Z=M/P:GOTO 500
480 GOTO510
490 IF Z=>10PRINT"BUY"INT(Z/10+.5)*10"
SHARES.":GOTO520ELSE 510
500 IF Z=>10PRINT"SELL"INT(Z/10+.5)*10"
SHARES.":GOTO520ELSE 510
510 PRINT"DO NOTHING."
520 PRINT"TO SEE ANOTHER RECORD TYPE '
'. TO SEE THE MENU
530 PRINT"HIT ENTER":GOSUB1190:IFASC(XX
$)<>13 AND ASC(XX$)<>91THEN 520

```

Feature program

```
540 IF ASC(XX$)=91 THEN 410 ELSE GOTO 1
10
550 'UPDATE SUBROUTINE
560 CLS:GOSUB 1150
570 GOSUB 1230
580 INPUT"NO. SHARES BOUGHT/SOLD ";S
590 INPUT"DOLLAR AMOUNT OF TRANSACTION
";D
600 PRINT:PRINT"IF TRANSACTION WAS A
TYPE"
610 PRINT,"BUY","B":PRINT,"SELL","S"
620 GOSUB 1190:IF XX$<>"B"AND XX$<>"S"THEN
600
630 IF XX$="S" THEN 660
640 C(I)=C(I)+D:V(I)=V(I)+D:N(I)=N(I)+S

650 PC(I)=PC(I)+(D/2):GOTO 670
660 C(I)=C(I)-D:V(I)=V(I)-D:N(I)=N(I)-S
670 CLS
680 GOSUB 1230
690 IF N(I)=0 THEN PRINT"NO SHARES LEFT.
DELETING RECORD #";I:FOR I=I+1 TO IM:
N$(I-1)=N$(I):N(I-1)=N(I):C(I-1)=C(I)
:V(I-1)=V(I):PC(I-1)=PC(I):NEXT I:IM=
IM-1
700 PRINT"TO UPDATE ANOTHER RECORD TYPE
'.'.":CHR$(13);"TO SEE THE MENU, HIT
ENTER."
710 GOSUB 1190:IF ASC(XX$)<>13 AND ASC(
XX$)<>91 THEN 700
720 IF ASC(XX$)=91 THEN 560 ELSE 120
730 'RECORD ON TAPE/DISK
740 IF D$=" " THEN INPUT"WHAT IS TODAY'S D
ATE";D$
750 CLS:IF DD=1 THEN OPEN"O",1,"DATA":PRIN
T#1,IM;CHR$(34);D$;CHR$(34);:GOTO 790
760 PRINT"LOAD DATA TAPE. PRESS RECORD
& PLAY KEYS.":GOSUB 1210
770 PRINT"RECORDING..."
780 PRINT #-1,IM,D$:GOSUB 960
790 FOR I=1 TO IM
800 GOSUB 1000
810 IF DD=1 THEN PRINT#1,CHR$(34);N$(I);CH
R$(34);N(I);C(I);V(I);PC(I):GOTO 830
820 PRINT#-1,N$(I),N(I),C(I),V(I),PC(I)

830 NEXT I:IF DD=1 CLOSE
840 PRINT:PRINT"RECORDING FINISHED.";IM
;"RECORDS WERE WRITTEN.":GOSUB 1210:G
OTO 110
850 'READ FROM TAPE/DISK
860 CLS:IF DD=1 THEN OPEN"I",1,"DATA":INP
UT#1,IM,D$:GOTO 900
870 PRINT"LOAD DATA TAPE. PRESS PLAY KE
Y.":GOSUB 1210
880 PRINT"READING..."
890 INPUT #-1,IM,D$:GOSUB 960

900 FOR I=1 TO IM
910 GOSUB 1000
920 IF DD=1 INPUT#1,N$(I),N(I),C(I),V(I)
,PC(I):GOTO 940
930 INPUT #-1,N$(I),N(I),C(I),V(I),PC(I)
)
940 NEXT I:IF DD=1 CLOSE
950 PRINT:PRINT"READING FINISHED.";IM;"
RECORDS WERE READ.":GOSUB 1210:GOTO 1
20
960 'I/O DISPLAY SUB
970 PRINT:PRINT@322,IM;"RECORDS ARE BEI
NG PROCESSED. RECORD DATE IS ";D$
980 RETURN
990 'COUNTER
1000 PRINT@399,"NOW ON RECORD NO.";I:RE
TURN
1010 'DISPLAY SUB
1020 CLS:F$="$###,###.## $###,###.##
#"
1030 PRINT" NAME";TAB(21)"NO. SHARES";
TAB(39)"VALUE";TAB(50)"CASH INVESTED
1040 M=0:T=0
1050 FOR I=1 TO IM
1060 PRINT I;N$(I);TAB(24)N(I);TAB(33)U
SINGF$;V(I);C(I)
1070 M=M+C(I):T=T+V(I)
1080 NEXT I
1090 PRINT" TOTALS AS OF "D$;TAB(33)US
INGF$;T;M
1100 GOSUB 1210:GOTO 120
1110 'ADD SUB
1120 I=IM+1
1130 GOSUB 250
1140 GOTO 110
1150 CLS: 'DISPLAY STOCK NAMES
1160 FOR I=1 TO IM
1170 PRINT I;" ";N$(I),
1180 NEXT I:INPUT"NUMBER OF THE STOCK WA
NTED ";I:IFI>IM THEN GOTO 1150 ELSE RETU
RN
1190 XX$=INKEY$:IF XX$="" THEN 1190:'IN
KEY$ ROUTINE
1200 XX=VAL(XX$):RETURN
1210 'DELAY SUB
1220 PRINT"<ENTER> TO CONTINUE":GOSUB 1
190:RETURN
1230 'RECORD DISPLAY
1240 CLS:PRINT"THE RECORD FOR "N$(I);"
IS:"
1250 F$="$###,###.##"
1260 PRINT" NO. SHARES VALUE"
1270 PRINTTAB(4)N(I);TAB(15)USINGF$;C(I)
)
1280 RETURN
1290 'END OF PROGRAM
1300 END
```

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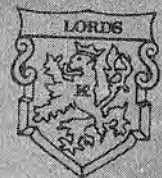

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- Estimating appreciation of the value of a house over a period of years or depreciation of a house or apartment by a landlord.
- Calculation of the annual growth rate percent if the present value is known and the future value can be estimated.

Example 1

If unit cost of an item is \$50.00 in 1982 and a 5.2% increase per year is anticipated, what will the unit cost be in five years?

STARTING YEAR? 1982
 STARTING YEAR VALUE? 50.00
 FUTURE YEAR? 1987
 AVG. ANNUAL GROWTH RATE IN %? 5.2

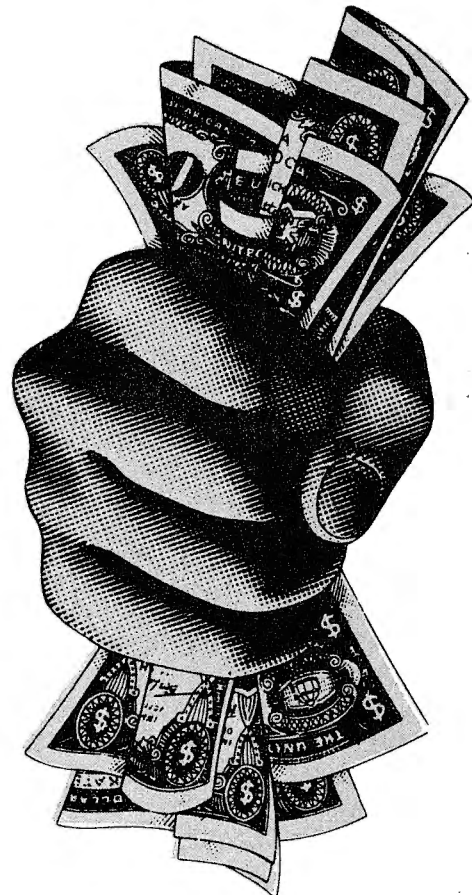
FUTURE VALUE IS \$64.42

DO YOU WANT VALUE FOR EACH YEAR (YES OR NO)? YES

1982	\$50.00
1983	\$52.60
1984	\$55.34
1985	\$58.21
1986	\$61.24
1987	\$64.42

Example 2

A piece of property has doubled in value by 1982 over the purchase price of \$2500 eight years ago. How much has the property value appreciated per year?



Financial program

STARTING YEAR? 1974
STARTING YEAR VALUE? 2500
FUTURE YEAR? 1982
FUTURE YEAR VALUE? 5000

AVG. ANNUAL GROWTH RATE IS 9.1%

Example 3

In 1980, you put \$1000 in a fund that is averaging 12.5% return per year and plan to reinvest all dividends. What will the \$1000 amount to in 10 years?

STARTING YEAR? 1980
STARTING YEAR VALUE? 1000.00
FUTURE YEAR? 1990
AVG. ANNUAL GROWTH RATE IN %? 12.5

FUTURE VALUE IS \$3247.33

Documentation

The heart of the program is in the key equations in lines 150 and 270 for calculating future value and line 400 for determining average annual growth rate. (Please note: some TRS-80s may generate a bracket instead of an up arrow to indicate exponentiation.)

If desired, greater or less accuracy is easily obtainable by changing the applicable print-using formats in lines 160, 220 or 410. If answers do not require "\$" signs, lines 160 and 220 may be changed accordingly.

Lines

10-30Description of program.
40-80Introduction.
90.....Selection of future value or annual growth rate.
100-140.....Inputs for future value.
150-170.....Calculates and displays future value.
180-200.....Input for yearly detail.
220-240.....Subroutine to print table headings for yearly detail.
250-330.....Displays yearly amounts and counts to see if screen is filled.
350-430.....Inputs and display for average annual growth rate.
450-470.....Subroutine to hold display for viewing.
190, 340, 440 Sets up another run.

Program Listing for Growth Rate

```
10 REM - PROGRAM FOR FINDING FUTURE GRO  
WTH VALUES OVER ANY NUMBER OF YEARS &  
VARIOUS GROWTH RATES.  
20 REM - CALCULATES GROWTH COMPOUNDED A  
T ANY PERCENT FOR ANY NUMBER OF YEARS  
.  
30 REM - CALCULATES AVG. ANNUAL GROWTH  
RATE FOR ANY AMOUNT OF GROWTH AND ANY  
NUMBER OF YEARS.  
40 CLS:PRINT:PRINT  
50 PRINT TAB(10) "G R O W T H R A T E  
P R O G R A M"
```

```
60 PRINT TAB(10) "-----"
-----"
70 PRINT: PRINT TAB(32) "BY W. R. WAYMA  
N"
80 PRINT: PRINT: PRINT: GOSUB450
90 CLS: PRINT: PRINT: PRINT: PRINT: INP  
UT"DO YOU WANT FUTURE VALUE (F) OR AN  
NUAL GROWTH RATE (R)";X$: IF X$="R" T  
HEN 350
100 PRINT: PRINT: PRINT: INPUT"STARTING  
YEAR";SY
110 INPUT "STARTING YEAR VALUE";A
120 INPUT"FUTURE YEAR";FY
130 N=FY-SY
140 INPUT"AVG. ANNUAL GROWTH RATE IN %"
;R
150 F=A*(1+R/100)^N
160 B$="FUTURE VALUE IS $#####.##"
170 PRINT USING B$;F
180 PRINT: PRINT: INPUT"DO YOU WANT VAL  
UE FOR EACH YEAR (YES OR NO)";Z$
190 IF Z$="NO" THEN 90
200 CT=0: GOSUB220
210 GOTO250
220 C$="#####.##"
230 CLS:PRINT TAB(20)"YEAR",TAB(37)"AMO  
UNT"
240 PRINT TAB(20)"----",TAB(35)"-----  
--" : RETURN
250 PRINTTAB(19)SY;:PRINTTAB(35);:PRINT  
USINGC$;A
260 FOR I=1 TO N: CT=CT+1
270 F=A*(1+R/100)^I
280 T=SY+I: IF CT<10 THEN GOTO 310
290 GOSUB 450
300 CT=0:GOSUB220
310 PRINT TAB(19) T;:PRINT TAB(35);:PRI  
NTUSING C$;F
320 NEXT I
330 GOSUB 450
340 GOTO 90
350 PRINT: PRINT: INPUT"STARTING YEAR";  
SY
360 INPUT"STARTING YEAR VALUE";A
370 INPUT"FUTURE YEAR";FY
380 N=FY-SY
390 INPUT"FUTURE YEAR VALUE";F
400 R=((F/A)^(1/N)-1)*100
410 PRINT: A$="AVG. ANNUAL GROWTH RATE  
IS ###.##"
420 PRINT USING A$;R
430 PRINT: INPUT"DO YOU WANT VALUE FOR  
EACH YEAR (YES OR NO)";Z$
440 IF Z$="NO" THEN 90 ELSE 200
450 PRINT:PRINT"ANY KEY TO CONTINUE"
460 W$=INKEY$: IF W$="" THEN 460
470 RETURN
```


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Jim Peyton, Georgetown, KY

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Payback will neither strain your machine's memory (it runs in less than 700 bytes) nor wear out either of your typing fingers (only 15 program lines, 10 without a printer—just omit all line numbers ending in 5). It runs on all models. For Model II, change CHR\$(24) in line 10 to SPC(67). (Ed. Note— For Model II, also remove the :Print @64, CHR\$(31) in Line 80.)

One further comment. Payback is programmed for single precision. If you are dealing with more than six figures and are a Virgo (picky, picky) and are willing to sacrifice some speed, set variables M, P and T to double precision.

Listing 1
For Model I/III
Model II with changes

```

10 '***** P A Y B A C K *****
20 '*      BY JIM PEYTON      *
30 '*      GEORGETOWN KY      *
40 '*****
50 CLS:PRINTTAB(24)"P A Y B A C K"CHR$(
  243)"= = = = = ="
60 PRINT:INPUT"PRINCIPAL";P:PI=P:Z$="##
  ###.## "
70 INPUT"ANNUAL INTEREST";R:IFR>1,R=(R*
  .01)/12ELSER=R/12
80 INPUT"TERM (IN MONTHS)";T:X#R/(1-((
  1+R)^-T)):MP=P*X#
90 INPUT"HARDCOPY (Y/N)";Y$:CLS:IFY$="Y
  "THENY=-1

```

30 80-U.S. Journal

```

100 PRINT"MO. "TAB(6)"PAYMENT"TAB(19)"I
  NTEREST"TAB(32)"PRINCIPAL"TAB(48)"BAL
  ANCE"
110 IFYTHENLPRINT"MO."TAB(6)"PAYMENT"TA
  B(19)"INTEREST"TAB(32)"PRINCIPAL"TAB(
  48)"BALANCE"
120 FOR I=1TOT:IFI=TTHENMI=P*R:MP=P+MI:
  P=OELSEMI=P*R:P=P+MI-MP
130 TI=TI+MI:PRINTUSING"### ";I;:PRINTU
  SINGZ$;MP;MI;MP-MI;P
140 IFYTHENLPRINTUSING"### ";I;:LPRINTU
  SINGZ$;MP;MI;MP-MI;P
150 IF(I<T)AND(I/12=INT(I/12))INPUT"HIT
  ENTER";Z:PRINT@64,CHR$(31);
160 NEXT:PRINT"TOT ";USINGZ$;TI+PI;TI;P
  I;P
170 IFYTHENLPRINT"TOT ";USINGZ$;TI+PI;T
  I;PI;P
180 PRINT:INPUT"FOR ANOTHER CALCULATION
  HIT ENTER";Z:RUN

```

Listing 2
For Color Computer

```

10 CLS:PRINTTAB(6)"P A Y B A C K
  "
20 PRINT:INPUT"PRINCIPAL";P:PI=P
  :Z$="#####.##"
30 INPUT"ANNUAL INTEREST";R:IFR>
  1 THEN R=(R*.01)/12 ELSE R=R/12
40 INPUT"TERM (MONTHS)";T:X1=R/(
  1-((1+R)^-T)):MP=P*X1
50 INPUT"HARDCOPY (Y/N)";Y$:CLS
60 FOR I=1 TO T:IF I=T THEN MI=P
  *R: MP=P+MI: P=0 ELSE MI=P*R:P=P
  +MI-MP
70 PRINT"MONTH ";I
80 TI=TI+MI
90 PRINT"MO. PAYMENT = ";:PRINTU
  SINGZ$;MP
100 PRINT"INTEREST = ";:PRINT
  USINGZ$;MI

```

Financial program

```

110 PRINT"PRINCIPAL  = ";:PRINT
USINGZ$;MP-MI
120 PRINT"BALANCE DUE = ";:PRINT
USINGZ$;P
130 IF Y$="Y" THEN GOSUB250
140 PRINT:INPUT"PRESS ENTER TO C
ONTINUE";EN:CLS
150 IF Y THEN PRINTUSING"### ";I
;:PRINTUSINGZ$;MP;MI;MP-MI;P
160 NEXT
170 PRINT"TOTALS"
180 PRINT"TOTAL PAYMENTS = ";:PR
INTUSINGZ$;TI+PI
190 PRINT"TOTAL INTEREST = ";:PR
INTUSINGZ$;TI
200 PRINT"PRINCIPAL PAID = ";:PR
INTUSINGZ$;PI
210 PRINT"BALANCE DUE  = ";:PR
INTUSINGZ$;P
220 IF Y$="Y"THEN GOSUB410
230 PRINT:INPUT"FOR A REPEAT HIT
ENTER";Z:RUN
240 END
250 PRINT#-2,"MONTH ";I
260 PRINT#-2,STRING$(20,"=")
270 PRINT#-2,"MONTHLY PAYMENT"
280 PRINT#-2,USINGZ$;MP
290 PRINT#-2
300 PRINT#-2,"INTEREST"
310 PRINT#-2,USINGZ$;MI
320 PRINT#-2
330 PRINT#-2,"PRINCIPAL"
340 PRINT#-2,USINGZ$;MP-MI
350 PRINT#-2
360 PRINT#-2,"BALANCE DUE"
370 PRINT#-2,USINGZ$;P
380 PRINT#-2,STRING$(20,"=")
390 FOR X=1TO4:PRINT#-2:NEXTX
400 RETURN
410 PRINT#-2,"TOTALS"
420 PRINT#-2,STRING$(20,"=")
430 PRINT#-2,STRING$(20,"=")
440 PRINT#-2,"TOTAL PAYMENTS"
450 PRINT#-2,USINGZ$;TI+PI
460 PRINT#-2
470 PRINT#-2,"TOTAL INTEREST"
480 PRINT#-2,USINGZ$;TI
490 PRINT#-2
500 PRINT#-2,"PRINCIPAL PAID"
510 PRINT#-2,USINGZ$;PI
520 PRINT#-2
530 PRINT#-2,"BALANCE DUE"
540 PRINT#-2,USINGZ$;P
550 FOR X=1TO5:PRINT#-2:NEXT X
560 PRINT#-2,STRING$(20,"=")
570 PRINT#-2,STRING$(20,"=")
580 RETURN

```



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Un-number

Outsmart your TRS-80

Model I Level II

Shane Causer, Brunswick, GA

Step right up! Don't be shy! See the niftiest routine in a long time! You've heard of re-number routines. Here's an un-numberer.

Now that I have your attention, let me explain the un-numberer. What it does is change all line numbers to zeros. "Fine, but what good is it"?, says one young man. Simple, my friend: it prevents tampering.

Imagine, if you will, a person of questionable character who obtains a copy of your program and decides to "revamp" it. He loads the program, LISTs it, and all the line numbers are zero. End of one would-be tamperer and pirate.

Let me explain what we're going to be doing.

The TRS-80 stores a program not by line numbers, but by the addresses in memory *before* the location in RAM where the line numbers are stored. As a matter of fact, line numbers are only actually used in GOTO or GOSUB statements. (Note to purists: Yes, line numbers are also used to tell the TRS-80 that it is a program line not to be executed immediately.)

Since we know that, we can do anything we want to the line numbers and the program will still run perfectly. All that must be done is to write a subroutine that changes the line numbers for us. To save time, try Listing 1.

Write a program (the simpler, the better) *without* GOTOs or GOSUBs. Enter Listing 1, type RUN 65300, LIST the program and all the line numbers up to 65300 will be zero. Not bad, huh?

Let me explain Listing 1. P is the beginning of RAM and P1 is the pointer to the next line number pointer. Line 65320 checks to see if the line number to be changed is in the subroutine. If it is, the subroutine ends. If it isn't, line 65330 changes the line number to zero, switches values for P and P1 and loops back to begin again.

If you feel very frisky, change line 65330 to read: 65330 POKE P+2,RND(255): POKE P+3, RND(255): P=P1: GOTO 65310.

Run the subroutine as you did before and LIST the program. All the line numbers are now random. Imagine the look of a pirate when he sees line number 15390 come before line number 10!

Unfortunately, listing 1 only works for programs with no GOTO or GOSUB statements. As I said before, line numbers are a necessity for those commands and un-numbering a program will result in the much-despised UL error (undefined line error). To un-number a program using GOTO or GOSUB, enter listing 2.

or GOSUBs, enter Listing 2.

It takes a little bit more to use Un-number with a program that uses GOTOs and GOSUBs. To use Listing 2, you must make note of all lines referred to by GOTOs or GOSUBs. When you are asked to save a line by Listing 2, type a "Y" if it is a line referred to by a GOTO or a GOSUB. If it isn't used by a GOTO or GOSUB, simply press ENTER. While this listing takes some of the mystery out of a program, it is still effective.

I know what you are thinking, so let me warn you: You cannot, *cannot*, use the random number functions in Listing 2. The Z-80 BASIC interpreter has to have sequential numbers in the line number positions to work properly. Sorry.

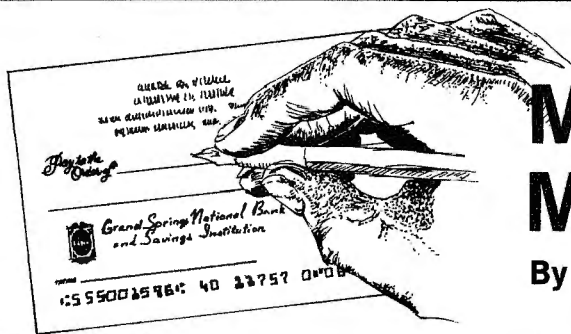
After the program has been "un-numbered", it can be CSAVED and CLOADED as normal. While the "un-number" routines don't affect the copying of any programs, it does cut down drastically on the amount of tampering done to a program.

Listing 1 Un-number

```
65300 P=17129
65310 P1=PEEK(P)+PEEK(P+1)*256
65320 IF PEEK(P+2)+PEEK(P+3)*256=65300,
      END
65330 PRINT"SAVE LINE #";PEEK(P+2)+PEEK
      (P+3)*256;
65340 INPUTZ$:IFZ$="Y"THENZ$="":P=P1:GO
      T065310
65350 POKE P+2,:POKE P+3,0:P=P1:GOT0653
      10
```

Listing 2 Un-number

```
65300 P=17129
65310 P1=PEEK(P)+PEEK(P+1)*256
65320 IF PEEK(P+2)+PEEK(P+3)*256=65300
      THEN END
65330 PRINT"SAVE LINE #";PEEK(P+2)+PEEK
      (P+3)*256;
65340 INPUT Z$:IF Z$="Y" THEN Z$="":P=P
      1:GOT065310
65350 POKE P+2,0:POKE P+3,0:P=P1:GOTO 6
      5310
```



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By Andrew P. Bartorillo

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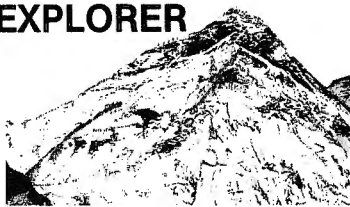


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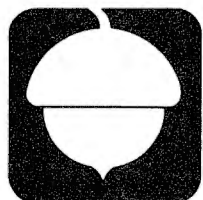


By John Allen

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Model I/III 48K

Negley Monet, San Pablo, CA

Have you pampered and softworn your computer weary? Are you itching to perk up the ol' baud? Or, getting down to basics, *do you want to upgrade your Level I?*

If so, you'll find that happiness is "Bionic Basic." Bionic Basic, written by Glynn Owen, is Apparat's latest triple-packaged disk operating machine language software that gives your BASIC/CMD a booster shot—with very few side effects.

You realize the first side effect when you receive and fire up the "Starter Package." *It's contagious!*

As usual, Apparat's documentation is thorough, easy to understand and beautifully packaged. And, as usual, the pages are unnumbered.

The Bionic Basic library routines are said to operate with one disk drive and TRSDOS (2.2 or 2.3), NEWDOS (2.1 or 80), or VTOS (4.0). After trying them in TRSDOS, single and double densities; and NEWDOS80, ditto, I'm addicted!

The starter package contains three machine language modules appropriately named: FIREUP, INSTALL and REMOVE.

FIREUP zaps your present BASIC so the ROM interpreter can locate library routines INSTALLED; while REMOVE wipes out unwanted library routines, saving memory.

As it should be, your computer does all of the work—and brags about it. Also, if you try to INSTALL a routine in an unzapped BASIC, or try to install a routine already resident in BASIC, (heaven forgive us absent-minded souls), you're told about that, too.

All routines in Bionic BASIC are invoked by:

CMD (DESIRED ROUTINE),

with the space between CMD and your routine optional. Trying to renumber with CMD minus the following

quotation mark is an uh-uh.

After FIREUP (see Listing 1), you may skip the documentation and have a demonstration.

You'll find it helpful to INSTALL the WHAT routine first. That's the directory. With 17 library routines, you might forget which you have plugged in, so you may enter:

CMD WHAT,

and, *presto!* All INSTALLED routines appear.

The DEMO program (written in BASIC with plenty of simple REMARKS for us tyros) displays all library routines and you're guided through the one of your choice, step-by-easy-step—IF that routine has been INSTALLED.

Each routine in the demonstration starts on a line multiple of 1000, so there's no problem finding them when you want to LIST for further study.

Two routines (LOAD and RUN) are demonstrated in DEMO2, which, if run, does no more than recall the original DEMO—but list it and learn how these two routines are used.

If you've ever written a program and fallen in love with your variables, scalar or arrayed, the LOAD routine in this package is a *Whoopie!* With it, you can carry your variables over from one Basic program to another. I/O, too!

Only one routine is not utility. Appropriately, it's called FLASH. It's great to show your best friend, Mr. Smart Mouth, when he ribs you about playing with your silly "home computer." FLASH gives you a flashing cursor of your choice—any character or graphic (just like Model III!).

If you've ever had DATA trouble, wondering why "Suzie" kept showing up when you expected "Toledo,"

you will love the RESTORE command. This gives you the option of placing the DATA pointer at the DATA line number of your choice, meaning no more loops to read the desired data. With a little imagination, you can see that this could be a powerful tool in a lengthy program.

Let's say you have 50 DATA lines—1000 through 1500—and two of them read:

```
1100 DATA Tandy Corp., January 19, Discovered
America
1110 DATA IBM, April 1, Albert J. Parkhouse
```

Elsewhere in your program:

```
20 INPUT "WHAT DO YOU WANT" ;K$
50 IF INSTR(K$, "POP") >OCLS:CMD RESTORE,
1110: READA$, B$: PRINT@192, "YOUR POP'S
BIRTHDAY IS "B$
60 IF INSTR(K$, "HANGER") >OCLS:CMD
RESTORE,1110: READA$,B$,C$: PRINT@192, A$ "
INVENTED THE WIRE COAT-HANGER
90 IF INSTR(K$,"WAIT") >OCLS:CMD RESTORE,
1100: READA$: PRINT@192, "THE "C$" MAKES
YOU WAIT THE LONGEST!
```

You can even randomize the DATA:

```
800 R=RND(10)
810 CMD RESTORE, 4000+10*R:READA$:PRINTA$
```

In this example, the DATA lines must be numbered 4010 through 4110. It'd be a terrific routine for horoscope buffs—bloat the DATA with "good day today"!, "expect delivery today"!, "stay off escalators" and "beware of a blonde"!

One of the beauties of this routine is that you are able to read the same data over and over—endlessly.

The GOTO and GOSUB routines take the bite out of those bytes in your subroutines. You may GOTO line 30 many times in your program and renumber before completion.

What is that line number again? With GOTO and GOSUB, the line has a LABEL, which it retains no matter how many times you renumber. So, instead of GOTO30, it would be CMDGOTO,"RTN," and that line (formerly 30) would carry the LABEL: CMD=, "RTN" no matter what the line number.

GOSUB lets you do away with a flock of loops in your programs. For example, one line reads:

```
900 CMD =,"P":FORQ=1TO2000:NEXT:RETURN
```

Then, whenever you want a pause in your program, enter: CMDGOSUB, "P".

Both of these routines can help business programs because variables may be used:

```
10 INPUT "WHAT ACCOUNT";H$
20 CMD GOTO,H$
90 CMD=,"AWEDIS": PRINT"SY AWEDIS & SONS,
34 DELLA ST, etc.
```

Side effect: None of the library routines will work if your BASIC is unzapped. You can't run your fancy program without paying the SYNTAX; nor can you give pal Joey a copy of that mind-boggling game you designed with Bionic BASIC commands in it, unless Joey's BASIC has been goosed, too.

The SHIFT routine lets you alter all characters to upper case, to lower case, or switch those in upper to lower and vice versa. This comes in handy if you do not have lower case modification. How many times have you wondered what's wrong with your computer when your printer gives out a JOHN SMITH? Know what I mean?

The REPEAT routine shifts your keyboard into high, and you've got controlled keyboard bounce while MOVE lets you shuffle blocks of memory about. One application lets you screw up the video display memory block so you can scroll any part of the screen at will. *Show off!*

When you get the starter package (no waiting), you will probably sit up all night finding new things you can make your computer do for you. Fun! Then, in the morning, bleary-eyed and woozie, you'll call Apparat's toll-free number and order the editing and array packages, hating yourself for not saving \$15 by ordering the whole thing in the first place.

As you can see, the library routines are designed to let your computer do more work while you sit around and wonder how the devil it happens.

In conclusion, I think you'll find Bionic BASIC the greatest scratch since you first got the itch!

Bionic BASIC, Apparat, Inc., 4401 S. Tamarac Pkwy., Denver, CO 80237, (800) 525-7674, Model I/III 48K, complete package #2-103 \$74.95, starter package #2-100 \$49.95.

Listing 1

```
DOS READY
FIREUP
STARTUP PACKAGE HAS BEEN INSTALLED
```

```
DOS READY
INSTALL WHAT
INSTALLATION COMPLETED
```

```
DOS READY
INSTALL GOSUB
INSTALLATION COMPLETED
```

```
DOS READY
INSTALL WHAT
ROUTINE ALREADY INSTALLED
```

```
DOS READY
BASIC
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By George Duisman from Personal Software
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Model I 16K tape... \$19.95

the PROGRAM STORE

TIME QUEST

By William Demas from Programmer's Guild
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By David Hanes from Liberty

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By William Demas from Fantastic

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From Adventure Int.

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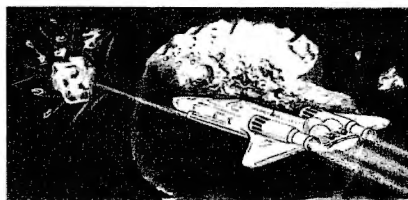
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By Steven Kearns from Acorn
Gigantic antimatter rocks appear on the Tactical Display Screen of your spacecraft. You blast away with lasers and they just explode into smaller chunks. To score in this fast arcade game with sound, you must destroy the rocks. To stay in the game at all, you must avoid them!

To add to your woes, time bombs appear periodically. If their timers reach zero -- BOOM! And if that's not enough, the aliens will be glad to send out some spaceships loaded with antimatter torpedoes. Fire thrusters to move, shoot laser cannon, jump to hyperspace -- anything to avoid the onslaught. One or two players can compete, with five levels of difficulty.

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



By John Allen from Acorn
More features, thrills, and sound than even John Allen's famous PINBALL. Once you load ASTROBALL into your TRS-80, the arrow keys become flipper buttons, the screen becomes the play board, and you become the "Pinball Wizard!"

A flying saucer, spaceships, meteors, and black holes add to the fun as your ball realistically zings around the board. ASTROBALL will have all your family and friends lining up for the pinball action and challenge. Five skill levels.

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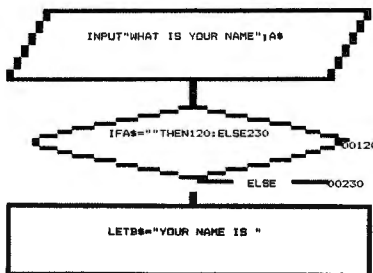


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By Ainsworth & Baker from Microsoft
Speed up your programming and word processing with this excellent touch-typing instructional program. Divided into two sections, the program first teaches proper finger positioning. You practice keying various characters, the program adding new ones as you progress. In the practice paragraph section, you are evaluated for accuracy and rated in words per minute. The program continuously adjusts to your increasing skill, telling you which characters you miss and where you are slow. One of the most practical programs we know of for TRS-80.

Model I 16K tape...\$14.95

THE DOCUMENTER



From P80NUT Software

If you would love to be able to document your programs with a flowchart but lack the time, talent, or inclination, this program is for you. THE DOCUMENTER will produce a logical flowchart directly from any suitable BASIC program and print it on the screen or most lineprinters.

You get a flowchart and branch map that will help you follow program flow and aid your debugging efforts. Even memory-filling programs can be broken down into segments and flowcharted.

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By Chuck Acree from Acorn

A comprehensive genealogical program. It quickly and easily sets up a data base that holds name, date and place of birth, marriage and death information, plus a comment line for each ancestor.

YOUR FAMILY TREE will display/print a complete "pedigree" for any family member; a 3-generation chart may be displayed/printed showing the number of known ancestors beyond each branch of the tree. The program will also display a U.S. outline map showing migration across the country. You get full search capabilities on any key field. Capacities: 16K tape: 45-55 ancestors. 32K tape: 175, disk: 100, 48K tape: 300, disk: 225.

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By Andrew P. Bartorillo from Acorn

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PERSONAL PROPERTY INVENTORY

By Southern Systems from Hayden

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ACCEL 2 BASIC COMPILER

From Allen Gelder

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

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

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

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EDIT

From Allen Gelder

A powerful utility for editing BASIC programs. Allows full-screen, word processor-type editing to save you time and frustration. This machine language program loads into upper, protected memory and is invisible until invoked from the keyboard.

EDIT uses a command structure similar to the popular SCRIPSIT word processor, so it is easy to use right away. Block and global commands are supported, so deletions, replacements and other changes to the entire program are extremely easy to do.

16-48K relocatable tape for tape or disk systems...\$39.95

DISASSEMBLER

By Roy Soltoff from MisoSys & Acorn

A two-pass disassembler for TRS-80 that converts machine code to Z-80 assembly language listings. DISASSEMBLER produces symbolic labels with output to video, printer or tape (or disk in version 2 only). Radio Shack's Editor/Assembler will read and load the tapes for easy modification and reassembly. Extend the capabilities of Editor/Assembler with this utility. On tape for two different memory locations.

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Arrays

Part III: Tables

T. R. Dettmann, Associate editor

In the last installment, we talked about arrays as a good way to solve problems involving a lot of numbers that are related to one another. We can also do that with tables by using arrays with more than one index.

An array with two indices (some languages allow up to seven) is called two-dimensional. We often think about it as if it were a table. One index refers to the rows and the second refers to the columns.

People who do much work with mathematics might want to visualize them as matrices. If you are experienced with matrices, it's a good way to look at it. Most of us ordinary folk just think of them as big tables.

To set up a two-dimensional array, we use a DIM statement just like we did for arrays, only now we put two numbers in the parentheses:

```
DIM TBL (10,15)
```

That looks innocent enough until you stop to think how much memory is wrapped up in that array.

Just like the one dimensional arrays we looked at before, the number in the parentheses is the maximum value of the index. Since each index can start at zero, that means for the TBL above, we have 11 rows and 16 columns. (You could reverse the terminology, but I'll persist in calling the first number rows and the second columns just for convenience.)

There are 11 x 16 storage spaces taken for data in memory associated with this array: 176 spaces. If we double the first dimension to make the statement:

```
DIM TBL (20,15)
```

then we add 10 new rows for *every* column. We're now using 21 x 16 or 336 spaces. Memory usage with multi-dimensional arrays goes up fast!

If you aren't careful when setting up and using multi dimensioned arrays, you could find that you are out of memory without really expecting it.

To see one use of two-dimensional arrays, look at the program included with the article. You probably wouldn't really want to write a multiplication table exercise program with a two-dimensional array since you can compute the result so easily, but it will show you how it could be done.

The program is extensively remarked to indicate what's happening. It also includes some interesting tidbits for you to play with, like a timed input routine that brings in only numbers for answers and some random numbers in various places to keep the play from getting boring.

You might also be interested in the little routine that

adjusts the time allowed to a player to answer if he gets too good. Try it, or challenge someone to it, and see if you can hold the top level at a high score. I dare you!

Bigger Tables

It's possible to have more than two dimensions to an array. There is no limitation given in the manuals for the number of dimensions in BASIC. In fact, one of the manuals says that the only limitation on the number of subscripts is a matter of how much memory is available.

I've found by experiment that on a Model I, if I start increasing the number of dimensions, I get a bad subscript (BS) error when I go above six subscripts.

This kind of thing is alright for play, but as a practical thing, I've found in use that I never need more than two dimensions in an array. With more than two dimensions it becomes too easy to lose track of things. The program simply becomes unmanageable.

If you really feel a need for three or more dimensions, don't hesitate to use them, but ask yourself whether there isn't a better way first.

Practical Problems

The multiplication table program is nice, but hardly more than a demonstration of the use of arrays. There are many cases, though, where a two-dimensional array makes your life a whole lot easier. A case in point is the United Parcel Service (UPS) charge table I mentioned last time. If you look at a UPS charge table, it has package weights down the left side in increments from one pound to fifty. It has UPS zones across the top in a range from two through seven. The UPS zone is taken from a map centered on your location.

If you know the zone and the weight of a package, you look in the appropriate row and column to find how much it will cost you to send the package. Several people have tried to develop a simple mathematical formula for those charges from the table with no luck. When asked, UPS has indicated that there isn't a simple way to compute the charges.

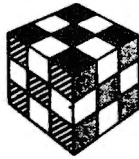
That kind of situation makes it hard to computerize a UPS billing program. If you do much shipping by UPS, you would like to include a copy of the invoice in the package including shipping charges. You could just look it up by hand and type it into the computer, but why should you do the work.

The computer can do the table search for you. Set up an array, call it UPS and dimension it as "DIM UPS (50,5)". Use the first index for the weight in pounds (always round off to the next higher before going into the array) and the second index is the UPS zone number

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Basically BASIC

minus two.

If we call the weight WT and the zone ZN, then the cost to send WT pounds to zone ZN is UPS (WT,ZN-2). You can use that to figure your invoice and have the invoice (and copies) generated by the computer automatically.

We'll do some more array manipulations in the next few months to see what can be done. Next installment, though, we'll move on to doing a little more programming.

Have you ever felt (while beating your head against a wall trying to find out why your program won't work) that there must be a better way? There is. There is no reason that anyone can't program in such a way that your programs run first time every time. It's not a matter of learning BASIC better or the machine better. It's a matter of the way you solve problems using the language.

Next installment, we'll go over some techniques for programming in a fashion that lets you build your programs clearly and easily to solve your problems. The technique involves using the GOSUB to help break your problem down into smaller, solvable pieces.

You'll find that by using GOSUB carefully, your programs will not only be easier to build, they'll also be easier to use and easier to change.

Program Listing for Arrays, part 3: Tables

```
10 REM*****
20 REM
30 REM MULTIPLICATION TABLES
40 REM
50 REM BASICALLY BASIC - PART 3
60 REM
65 REM THIS PROGRAM IS WRITTEN SO THAT
ALL LINE NUMBERS
66 REM WHICH ARE MULTIPLES OF 10 ARE NE
EDED - INCLUDING
67 REM REMARKS. LINES WHICH ARE NOT MUL
TIPLES OF 10
68 REM (ALL EXPLANATORY REMARKS) MAY BE
DELETED.
70 REM*****
75 REM CLEAR SOME SPACE FOR ST
RINGS AND RANDOMIZE FOR
76 REM RANDOM VARIABLES
80 CLEAR500:RANDOM
85 REM HERE WE SET UP THE MULT
IPLICATION TABLE MT,
86 REM A 2 DIMENSIONAL ARRAY W
ITH 121 SPACES AND
87 REM THE SKILL LEVEL ARRAY S
L$ WITH 5 SPACES
90 DIM MT(10,10),SL$(4)
95 REM THIS IS WHERE WE SET UP
THE TABLE BY LOOPING OVER
96 REM IT'S INDICES
100 FORI=1TO10:FORJ=1TO10:MT(I,J)=I*J:N
```

```
EXTJ:NEXTI
105 REM READ IN THE SKILL LEVEL
S
110 FORI=1TO4:READSL$(I):NEXTI
120 DATA EINSTEIN,ADVANCED,INTERMEDIATE
,NOVICE
125 REM SOME INTRODUCTORY QUEST
IONS
130 CLS:PRINT"READY TO PRACTICE YOUR MU
LTIPLICATION TABLES?"
140 PRINT"WHAT'S YOUR SKILL LEVEL?"
150 PRINTTAB(5)"(1) NOVICE"
160 PRINTTAB(5)"(2) INTERMEDIATE"
170 PRINTTAB(5)"(3) ADVANCED"
180 PRINTTAB(5)"(4) NOBODY DOES IT BE
TTER"
190 PRINT:PRINTTAB(10)"ENTER YOUR SKILL
LEVEL";:INPUT SL
195 REM IF THE SKILL LEVEL ISN'
T CORRECT, GET ANOTHER
200 IF SL<1 OR SL>4 THEN 190
205 REM HERE'S WHERE WE GET TRI
CKY, MX IS THE TIMER MAXIMUM
206 REM FOR ENTERING ANSWERS, W
E FIRST SET THE BASE LEVEL
207 REM WHICH DEPENDS ON SKILL
LEVEL CHOSEN (THE MORE SKILL,
208 REM THE LESS TIME TO ANSWER
) AND THEN ADD A RANDOM OFFSET
209 REM IN THE RANGE + OR - 100
FROM THAT
210 MX = 200*(5-SL) + RND(200) - 100:NC
=0:NW=0:NUM=0:CT=0
215 REM NUM IS THE NUMBER OF PR
OBLEMS, NC IS THE NUMBER CORRECT
216 REM NW IS THE NUMBER WRONG
220 PRINT"I'VE ADJUSTED YOUR TIME TO AN
SWER FOR YOUR SKILL LEVEL"
230 PRINT"AND THROWN IN MY OWN LITTLE F
UDGE FACTOR -- GOOD LUCK"
235 REM THIS IS THE START OF TH
E PROBLEM LOOP
240 PRINT
245 REM PICK TWO NUMBERS IN THE
ALLOWED RANGE (1-10)
250 I=RND(10):J=RND(10)
260 PRINT"WHAT IS ";I;" TIMES ";J;"? ";
265 REM GET AN ANSWER AND INCRE
MENT THE NUMBER OF PROBLEMS
270 GOSUB330:NUM=NUM+1
275 REM DEPENDING ON WHETHER IT
'S RIGHT OR WRONG, DO SOMETHING
280 IF ANS <>MT(I,J) THEN GOSUB420ELSE
GOSUB510
285 REM HERE'S WHERE WE FIGURE
OUT WHAT TO CALL THE PLAYER
286 REM AND DISPLAY THE GRADE,
```



```

WE FIGURE WHAT THE PLAYER IS
287 REM          BY LOOKING AT THE TIME
LIMIT FOR ANSWERING
290 IN=MX+100:IF IN>800 THEN IN=800 ELS
E IF IN<200 THEN IN=200
300 IN = INT(IN/200):PRINTTAB(20)SL$(IN
);" SCORE ";INT(NC*100/NUM);" %"
305 REM          GO AND TEST TO SEE IF T
HE PLAYER IS TOO GOOD OR TOO BAD
310 GOSUB600
315 REM          GO GET ANOTHER PROBLEM
320 GOTO240
330 REM - - - - - TIMED INPUT ROU
TINE - - - - -
335 REM          IN$ WILL HOLD THE NUMBE
R, TM IS THE TIMER
336 REM          THE TIMER RUNS STARTING
HERE, EACH TIME WE LOOK FOR
337 REM          A KEY, ADD 1 TO IT AND
CHECK IT AGAINST THE LIMIT (MX)
340 IN$="":TM=0
350 TM=TM+1:C$=INKEY$:IF C$="" THEN IF
TM>MX THEN 410 ELSE 350
355 REM          IS ENTER IS PRESSED, TH
EN WE HAVE THE ANSWER
360 IF ASC(C$)=13 THEN 410
365 REM          IF THE KEY IS LETTER E,
THEN START OVER
370 IF C$="E" THEN RUN
375 REM          IF THE KEY IS BACKSPACE
, THEN GET RID OF THE LAST CHARACTER
380 IF ASC(C$)=8 THEN IF LEN(IN$)>0 THE
N PRINTC$;:IN$=MID$(IN$,1,LEN(IN$)-1):G
OTO350
385 REM          IF THE KEY WASN'T A NUM
BER, THEN IGNORE IT
390 IF C$<"0" OR C$>"9" THEN 350
395 REM          IF WE PASS ALL THE TEST
S, THEN ADD IT TO THE STRING AND
396 REM          PRINT IT
400 PRINT C$;:IN$=IN$+C$:GOTO350
405 REM          ONCE ENTER IS PRESSED O
R WE TIME OUT, COMPUTE THE ANSWER
410 ANS=VAL(IN$):PRINT:RETURN
420 REM - - - - - GOT IT WRONG -
- - - -
425 REM          COUNT THE WRONG ANSWERS
430 NW=NW+1
435 REM          PICK A RANDOM MESSAGE A
ND PRINT IT
440 X=RND(5):ON X GOSUB460,470,480,490,
500
450 RETURN
460 PRINTTAB(20)"WRONG DUMMY - I'M ASHA
MED TO BE WORKING FOR YOU":RETURN
470 PRINTTAB(20)"CAN'T YOU GET IT RIGHT
?":RETURN

```

```

480 PRINTTAB(20)"YOU WON'T GET VERY FAR
THAT WAY":RETURN
490 PRINTTAB(20)"I CAN'T BELIEVE YOU BE
LIVE THAT!":RETURN
500 PRINTTAB(20)"YOU'RE KIDDING ME":RET
URN
510 REM - - - - - GOT IT RIGHT -
- - - -
515 REM          COUNT THE CORRECT ANSWE
RS
520 NC=NC+1
525 REM          PICK A RANDOM MESSAGE A
ND PRINT IT
530 X=RND(5):ON X GOSUB550,560,570,580,
590
540 RETURN
550 PRINTTAB(20)"HOORAY! YOU GOT IT":RE
TURN
560 PRINTTAB(20)"OK WISE GUY, I KNOW YO
U GOT IT RIGHT":RETURN
570 PRINTTAB(20)"MMMMMMMMM --- GOOOOOOO
OOD":RETURN
580 PRINTTAB(20)"THAT WAS WORTH WAITING
FOR":RETURN
590 PRINTTAB(20)"ANOTHER POINT FOR YOU"
:RETURN
600 REM - - - - - ADJUST FOR IMPR
OVEMENT - - - - -
605 REM          IF THERE HAVEN'T BEEN 2
0 PROBLEMS SINCE THE LAST ADJUSTMENT,
606 REM          THEN DON'T BOTHER TO AD
JUST YET
610 IF (NUM-CT)<20 THEN RETURN
615 REM          SETUP AND TEST SOMETHIN
G TO SEE HOW WELL THE PLAYER IS DOING
620 TST = (NC-NW)/NUM
630 IF TST<0 THEN GOSUB660
640 IF TST>+.5 THEN GOSUB700
650 RETURN
660 REM - - - - - DOING POORLY -
- - - -
670 PRINT"YOU AREN'T DOING SO WELL - SO
I'M GOING TO MAKE IT EASIER"
675 REM          CT IS THE NUMBER OF PRO
BLEMS AT ADJUSTMENT (FOR THE CHECK
676 REM          IN STATEMENT 610) - ADJ
UST THE TIME TO ANSWER
680 CT=NUM:MX = MX*2
690 RETURN
700 REM - - - - - DOING WELL - -
- - - -
710 PRINT"YOU'RE TOO GOOD - I CAN'T STA
ND IT SO WATCH OUT CHARLIE"
715 REM          ADJUST THE TIME TO ANSW
ER
720 CT=NUM:MX = MX/1.5
730 RETURN

```

Cost to operate an appliance

Pocket computer

Stephen Fournier, Surrey, B. C., Canada

It is increasingly necessary to know the cost of operating an appliance these days. With the rising cost of power and the dwindling dollar, that porch light running 24 hours a day may not be worthwhile. You may also have second thoughts about the dishwasher, electric blanket or garbage disposal. Or, like me, you may find that some of your goodies take a lot less money than you may have thought to run.

Before using this program, you need to know your electricity rates. If you don't already know, your power company will be glad to tell you. For me, the first 550 kilowatt hours are charged at the rate of \$0.0489 per KWH. The remaining KWH are charged at \$0.03089 \$78.800, but exact answers are nice to have.) For my shown in lines 40-70, 90 and 300. Those are the only lines needing change because of different rates.

You need two consecutive readings from the electric meter to run the program. The easiest way to obtain those is from your last electricity bill. Or, if you know how, take readings of your own about one week apart.

In a sample run, the first reading was 1086 and the second reading was 3208. That makes total consumption 2122 KWH and the cost of power \$78.79858. (My power company rounds that off to \$78.00, but exact answers are nice to have.) For my portable television that uses 13 watts per hour, the cost per hour of operation is \$0.0004. Two hours' use each day totals \$0.0008 per day, \$0.0243 per month and \$0.292 per year. That's almost low enough to justify buying the thing.

To view the program, line 10 shows that the program was written to be run in the DEFined mode and the previous meter reading is entered.

Line 20 inputs the second reading and if the meter went over 9999 and started over again at 1000, sets the value of B to give you the correct consumption.

Line 30 computes and prints the consumption and lines 40 through 90 give the cost of power.

Line 100 inputs the wattage of the appliance to be tested. If the appliance doesn't show its wattage requirement, enter zero and lines 100 and 400-410 will compute the wattage from amperage.

Line 120 breaks everything down to cost per hour and line 130 displays it.

Line 140 is for an appliance that is on continuously or off-and-on all day (freezer, water heater, etc.), when you use SHFT D and is where you run into the proverbial "error factor."

At line 500, you input how many hours you estimate the appliance is running per day. Going back to line 200, line 210 prints the cost per day, line 220 the cost per month and line 230 the cost per year.

Line 240 says to do the wattage computing for another

(or the same) appliance, then SHFT S. The purpose of the latter parts of lines 120 and 200 is to prevent scientific notation which would cause the figures to run off the display. Any number smaller than 1/100 of one cent is rather meaningless.

The reason for having a portable computer comes to light as you walk around your home or business and find the cost to operate each appliance right where it is sitting. You have to walk to it anyway to read the wattage or amperage.

By the way, this program is great for checking the mathematics of the power company since they are prone to error. When I found a discrepancy one month in my bill, a quick call to the power company uncovered a rate increase I hadn't been informed of. After many apologies, they offered to send me a notice of rate increase.

BASIC Listing for Cost to Operate An Appliance

```

5 : REM "COST OF APPLIANCE"
7 : REM "KILOWATT-HOURS"
10 : "A":INPUT"PREVIOUS METER READING?";
A
20 :INPUT"PRESENT METER READING?";B:IFB
<ALET B=B+10000
30 :C=B-A:PRINT"CONSUMPTION = ";C
40 :IFC<550 THEN 90
50 :D=550:E=D*.04589
60 :F=C-D:G=F*.03089
70 :I=5.00+E+G
80 :PRINT"COST OF POWER =$";I:GOTO100
90 :I=5.00+(C*.04589):GOTO80
100 : "S":INPUT"WATTAGE OF APPLIANCE ?";
J:IFJ=0GOSUB400:GOSUB300
120 :K=(J/1000)*M:K=INT(K*10000)/10000
130 :PRINT"COST PER HOUR =$";K
140 :PRINT"FOR CONT. USE,<SHFT D>"
150 :GOTO100
200 :P=S*365:Q=P/12:P=INT(P*10000)/1000
0:Q=INT(Q*10000)/10000
210 :PRINT"COST PER DAY =$";S
220 :PRINT"COST PER MONTH =$";Q
230 :PRINT"COST PER YEAR =$";P
240 :PRINT"TO RUN AGAIN <SHFT S>"
250 :END
300 :M=(I-5.00)/C:RETURN
400 :INPUT"AMPERAGE OF APPLIANCE ?";L
410 :J=L*120:RETURN
500 : "D":INPUT"HOURS ON PER DAY? ";R
510 :S=K*R:GOTO 200 ■

```



This Grizzly Looking Character Is Losing The Bug Battle!

TOO BAD! He continues to "WHIP" those miserable varmits the hard way . . . while the real answer is at his fingertips. He's not alone either! BUGS are an inevitable part of programming, and if you have ever tried to program in Assembly/Machine Language, you know exactly what we are talking about

When we purchased our first TRS-80*, we were no strangers to machine language programming. We tossed out BASIC the first day, preferring to get right down to the nuts and bolts of things. What a shock! The Debugging Aids at the machine level were horrible! They were awkward to read, did not provide enough, or the right kinds of information, and required eight hands and gymnastic ability to switch from one command to another. Ridiculous!

WE DIDN'T SUFFER LONG!

Our first project was to create a truly powerful Debugging Tool. We called it *BUGOUT*, ran some advertisements, and sold a bundle of them. You know, the American dream come true. But that wasn't the end of our quest for a truly superior product. We asked every *BUGOUT* customer to give us their best ideas. Ideas that would make our product far superior to any other Debugger, and believe us, some of our customers are absolutely brilliant!

We received a truck-load of fantastic ideas, and you guessed it, we overhauled the original *BUGOUT* and created the most powerful, versatile, and easy to use Machine Language Debugger ever written for Mod I or III computers. . . BAR NONE!

HERE IT COMES

Our new Debugger is called *BUGOUT/PRO*. It is 11.5K of extremely powerful coding, and it is simply loaded with marvelous options waiting to come to the aid of beginner and expert alike. Anyone who is even remotely involved with Assembly/Machine Language programming can use *BUGOUT/PRO*. It comes with two manuals, one for beginners, with an INTERACTIVE course of instruction, and one for experts, with all the advanced features clearly spelled out.

WHAT DOES IT DO?

BUGOUT/PRO does all the things you would expect a Debugger to do, and more . . . a lot more! Beyond that, and even more important than what it does, is how it does it, how the data is displayed, and how easy it is to use!

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RISK-FREE EXAMINATION

That's right, you can examine *BUGOUT/PRO* in your own home or office with our 100% guarantee of satisfaction. If *BUGOUT/PRO* doesn't live up to your expectations, simply return it for a full refund. What could be more fair?

BUGOUT/PRO sells for **\$69.95** and is worth every penny we ask, and more! Just think of all the hours you've wasted searching for bugs. *BUGOUT/PRO* will make Assembly/Machine Language programming faster, easier, and far more enjoyable. Beginner or expert, *BUGOUT/PRO* is the Cadillac, Lincoln, and Rolls Royce of Debuggers rolled into one.

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When you own *BUGOUT/PRO*, you are on the road to winning the bug battle. *BUGOUT/PRO* is supplied on TAPE or DISK, and either version automatically runs on both Mod I and Mod III computers. TAPE and DISK versions are identical, but be sure to specify which one you want. We accept Master Charge, Visa, Money Order, or Personal Checks. Foreign Orders and C.O.D.'s are \$5.00 extra. Washington state residents add 5.3% sales tax.

Take advantage of our *RISK-FREE* offer today. *BUGOUT/PRO* is a must investment for all machine language programmers.

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TRS-80 for retired persons

Fred Guth, Clayton, MO

If ever there was a better mousetrap built for retired persons than a Radio Shack TRS-80, I'd surely like to know about it. The TRS-80 defeats the two worst enemies of retirement: time on your hands and keeping the mind active. The TRS-80 has been a blessing for me, and I recommend it to anyone who has already retired, or to those about to retire. Even when it's time to eat, I hate to leave my computer and my wife's mind is at ease because she knows where I am and that I'm happy!

Retirement was a heart-wrenching thing for me in the first place. For 39 years I'd worked for my dad's old lighting company. What a glamorous business it was! We dealt with architects and engineers, electrical distributors and contractors pretty much all over the country, so there was much traveling to do and many friends here and there. There was a constant effort to design new ideas that would please a most discriminating client and then sell them properly. Fun — you bet it was!

Then within two years my world was shattered. My brother had come down with the nerves and had to retire. Then he and the rest of the family wanted to cash-in. My glamorous world had caved in. Oh, I did get a five-year contract to stay on, but my job would be like that of a senator, to advise and consent. Phooie! — and nuts to conglomerates. I lasted four months at that and then cut out into the unknown.

That first year of retirement was plain murder. I played golf three times a week, but my old gang was still working so it was with strangers. I'd visit my farm once a week and my wife and I travelled, but it wasn't like my old business travels where I'd always see friends in each city.

Then when tax time came around, I tried to do my own taxes (for the first time in 20 years). But I couldn't even read those darned instructions that Uncle Sam puts out. So later that year I went to an H & R Block Tax school, then worked for Block for the next five years. A great experience — the Block people are nice to work for and their customers are very fine people. So, I really learned taxes again.

It was about this time that I happened into a Radio Shack, to buy some Fire Alert batteries. Radio Shack had brought out their TRS-80 the year before. So here it was, November 1978, that I watched a 15-year-old school boy working out a program on the demonstrator computer that converted English measurements to metrics. The young fellow was nice enough to explain what he was doing, and it impressed the heck out of me. I'd never seen a computer in the flesh before, and now I was watching some of the miracles it could do. Boy, it could calculate and print out the answers fast. I was hooked. If this young fellow could work a computer, maybe I could. I bought my Level I outfit that day.

I began with the Level I, and practically memorized that wonderful beginners' book, I felt more confident each day. Then in about three months, I just had to get disks and a printer. I wanted to get away from the recorder which is so slow. So I graduated to disk and printer, and have really enjoyed my setup ever since.

When my Spinwriter was up and going, I bought an Electric Pencil. This software program is the greatest, even though it isn't Radio Shack's. In fact, Radio Shack didn't have their Scripsit until much later. So I stick to my Pencil because it's so easy to use. Besides using it for

letters, text, etc., I use it as a Data Base System. I had bought one of those supposedly super data base systems and it was a dog. So now, I maintain many records on my Pencil disks, such as my insurance records, cattle records, magazine subscriptions (the magazines have a way of sending out four or five letters saying my subscription has run out — but now I know where I stand). I'm surely sold on the Pencil.

Before I bought the Electric Pencil, the first thing I wanted on my new disks and printer was a good record system where I could watch my stocks and bonds. Fortunately, I ran into a fellow named John Knoderer at the Radio Shack, and he was a freelance programmer. I might mention that today, you can buy any number of such programs, but in 1979 they weren't available. John made a program that taught me a bit about random access files, and the program is still the best one I've seen.

John taught me quite a lot that was not in the books, simple things like the care of disks and the like. Also, he is a nut on taxes and he showed me some tricks that set me on my way. Since that time I've written tax programs and published them in book form. This has been fun. I get letters from buyers all over, and each one is struggling with their computer as I am. Along this line, I'm convinced that anyone can write computer programs on the subjects that they really know. They may not be expert programs but they will do what you want them to do. It simply takes patience, some arithmetic background and plain, old-fashioned logic.

Charlie, a friend of mine, has been working on the same program since the day I first met him three years

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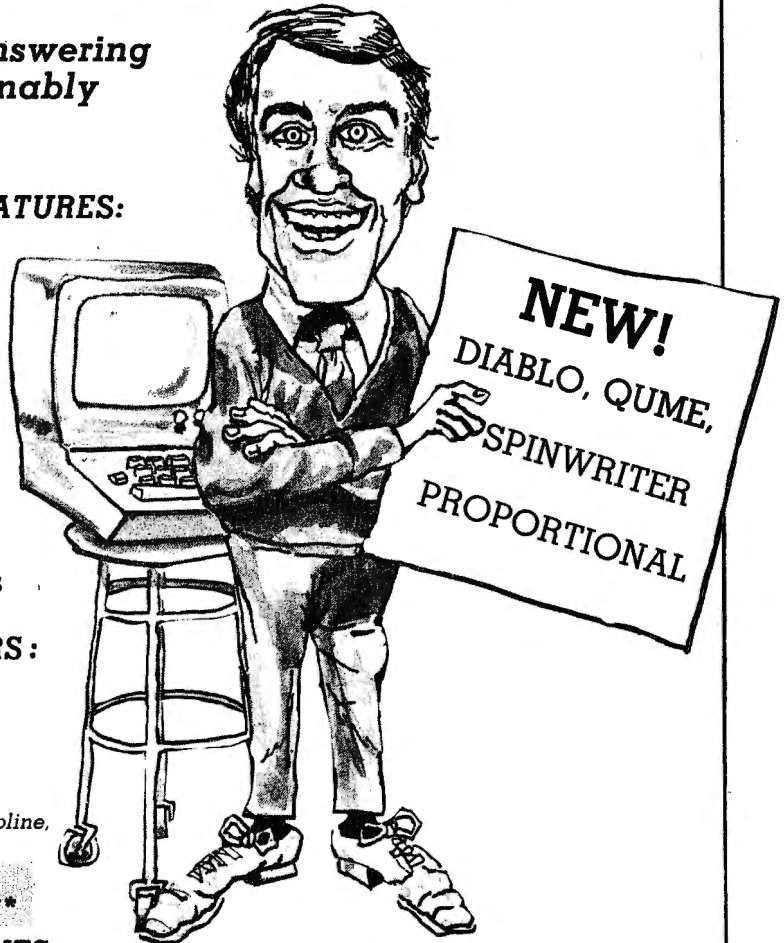
the manual:

"It definitely rates the first '10' given to any documentation reviewed in this column." (A.A. Wicks, COMPUTRONICS, October, 1981)

the software: "An excellent Word Processor" (D.H.); "Absolutely fantastic" (S.E.S.); "You have features that I cannot duplicate on my \$14,000 system" (J.B.)

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Personal experience

ago. As he says, if his program ever works out, he'll have the key to Fort Knox! His idea is based on the principle that everything happens in cycles — sine wave cycles. He is endeavoring to find the sine wave of past performances of the stock market. He has every Dow Jones closing figure on diskette, since the market began in 1878. His computer works from 12 to 24 hours a day, mostly unattended, but on and on it goes. It looks for the sine wave for various periods of history. Charlie is undaunted, changes his program periodically and on and on goes his computer. Oh, I forgot to mention — Charlie has worn out one computer and is now working on a Model II. Best of luck, my friend!

As to what other programs might be of interest to oldtimers like me, there are so many. I bought Radio Shack's General Ledger program on which I keep records for my farm and for a small company I'm interested in. Then I have a Galactic Software Mail program on which I maintain about a dozen lists

including a list of old friends' names and addresses. I don't want to forget them! Recently, I purchased the well-known VisiCalc program, and though I'm just beginning to understand its many facets, I see many possibilities for its use in stock trading.

Now how does this keep me busy? These store-bought programs are just part of it. What really keeps me busy is learning to program. I do feel pretty good about what I've learned so far, but gosh, there is so very much more to learn.

I've bought many "How To" books on programming, but they are all alike. They only go so far and only tell you what to *do*, not what *not to do*, and that comes only through trial and error. But I have the time to keep wading along, learning little by little.

The best help I've gotten in programming ideas is from the various magazines. Each issue of every magazine will have one or two programs that interest me, and I'll spend quite a bit of time typing that

program in and making it run right. I'll learn a trick or two with each new program because every programmer programs a little differently. This is because he learned his trade at a different school using different methods. For example, I thought my tax programs were pretty good, but early this year, in a magazine, there was a tax program that was out of this world! I spent three weeks off-and-on, learning that method.

Fellow retirees, if you are looking for a way to stay busy, and a way to keep your mind from stagnating, buy a TRS-80. You will find a world of enjoyment plus the satisfaction of accomplishing something every time you perfect your own program. And for sure, don't be afraid just because you don't know anything about computers. If you have reasonable patience, you'll lick it and feel like a million in doing so. You'll never own anything in these Golden Years that will give you more satisfaction than will a TRS-80. I'll bet on it! ■

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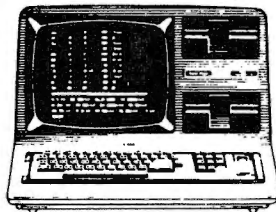
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Bequest

Find the exit and inherit the old miser's wealth

Model I

R. Shane Causer, Brunswick, GA

"... and I, Jonathan Montgomery, being of sound mind and healthy body, do bequeath my worldly possessions to the person who can conquer my maze."

And so begins Bequest, a three-dimensional adventure (with sound) for the 16K Level II TRS-80. It places the player in a maze, leaving him to navigate through it without getting killed by any of the death traps scattered through the maze.

Movement is through the arrow keys. The right and left arrows change the direction the player is facing while only the up arrow causes movement in the direction the player is facing.

A machine language sound routine is used in Bequest. Since the routine is string-packed, memory size is answered by pressing the ENTER key. To make use of the sound routine, plug the auxiliary plug into the jack of a small amplifier or speaker.

I am not going to explain the inner workings of the program. If I did, it would lessen the amount of fun and entertainment in roaming through the maze.

The program is rather long, so use the Level II BASIC AUTO command when entering the line numbers. Also, use the accepted abbreviation for the PRINT statement: a question mark (?).

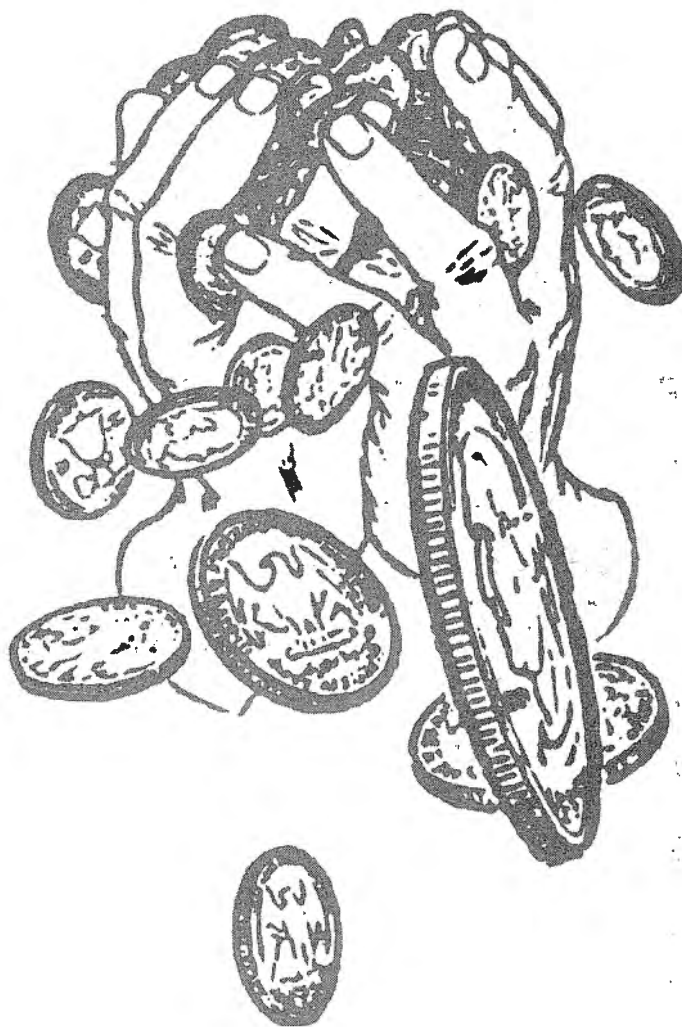
A word of warning: Since the maze is in *complete* perspective, you may be confused at first. The three-dimensional perspective takes some getting used to but is easily recognizable after a few plays.

Good luck and remember the motto of the adventurers: make maps!

```

9 RANDOM:Z=64:Y=23:CLS:FORD=0T025:X=RND
(3)-2:W=RND(3)-2:FORV=0TORND(28):IFZ+
X<0ORY+W<UORZ+X>64ORY+W>23,NEXTD:GOTO
10ELSEZ=Z+X:Y=Y+W:SET(Z,Y):SET(127-Z,
Y):SET(127-Z,47-Y):SET(Z,47-Y):NEXT:N
EXTD
10 PRINT@389,"====B E Q U E S T - A G
A M E O F G R E E D====":PRINT@4
60,"====B Y S H A N E C A U S E R =
====":CLEAR500:DIMA(104),M(12),W$(10
):SZ$="A.....B.....C.....D.....E"
20 SI=VARPTR(SZ$):SJ=PEEK(SI+1)+256*PEE
K(SI+2):FORSK=SJTOSJ+26:READSX:POKESK
,SX:NEXT:IFPEEK(16396)=201POKE16526,P
EEK(SI+1):POKE16527,PEEK(SI+2):GOTO29

```



```

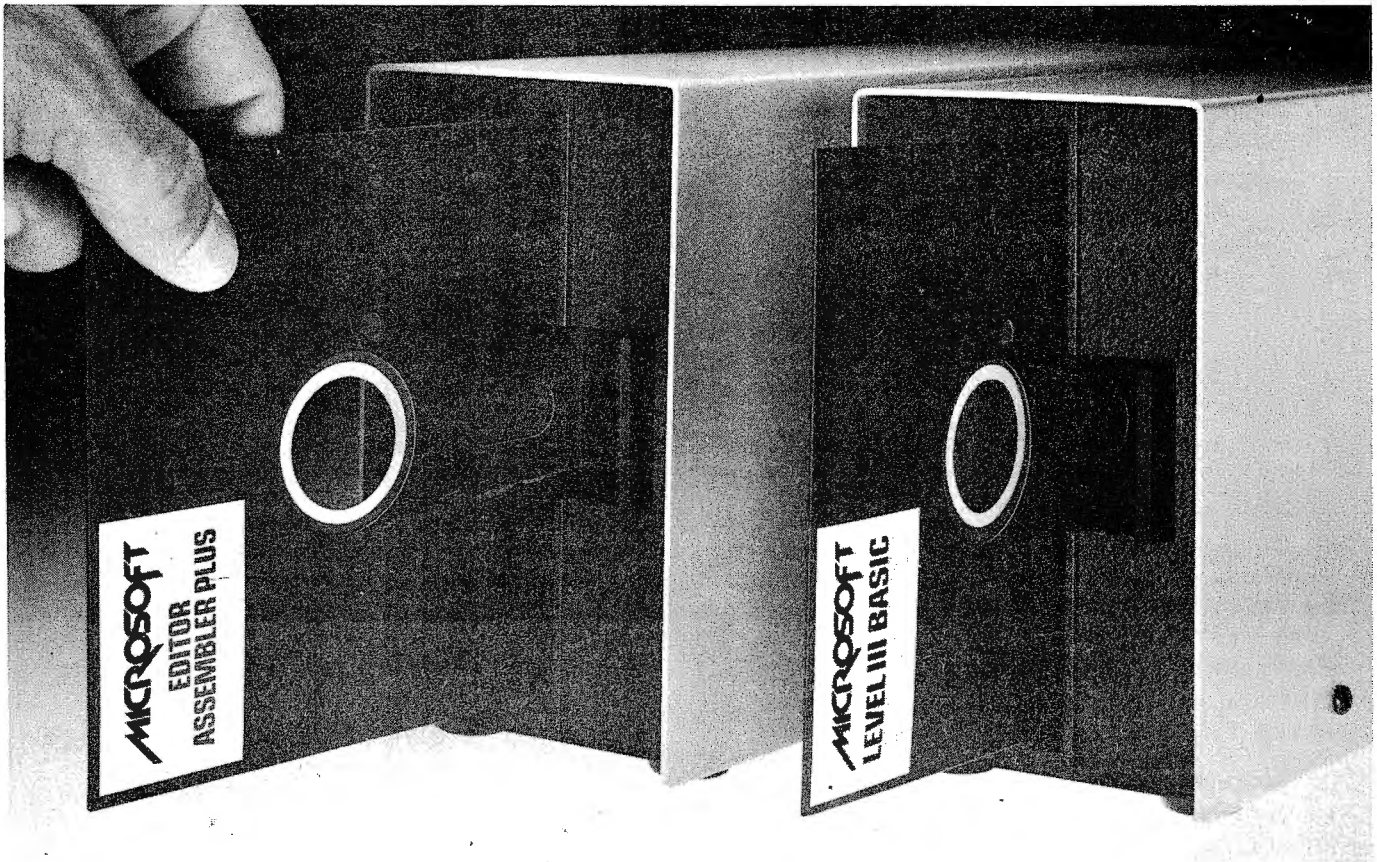
:DATA205,127,10,77,68,62,1,105,211,25
5,45,32,253,60,105,211,255,45,32,253,
13,16,238,175,211,255,201
21 CMD"T":DEFUSR0=PEEK(SI+1)+256*PEEK(S
I+2):POKE14308,0
29 GOSUB1500:CLS:GOSUB1420:L=0:P=320
30 M(L)=P:L=L+1:IFL>12THEN40ELSEP=P+5:G
OTO30

```


Game

```
40 MP=0:GC=0:LM=0:Z1$=STRING$(31,140)+C
HR$(94)+CHR$(93)+STRING$(31,140):FORI
=0TO104:READA(I):NEXT:E=0:X=A(100):D=
3:CLS:GOSUB910
50 GOSUB1120:PRINT@435,"MOVES:";:PRINT@
500,Q;:ONE+1GOTO60,90,110,130,150
60 PRINT@103,W$(0);
70 PRINT@78,W$(1);
80 PRINT@910,CHR$(133);:PRINT@935,CHR$(
138);:GOTO170
90 PRINT@146,W$(2);

100 PRINT@163,W$(3);:GOTO170
110 PRINT@213,W$(4);
120 PRINT@224,W$(5);:GOTO170
130 PRINT@215,CHR$(144);:PRINT@222,CHR$(
160);:PRINT@542,CHR$(138);:PRINT@535
,CHR$(133);
140 PRINT@279,W$(6);:PRINT@286,W$(7);:G
OTO170
150 PRINT@281,CHR$(148);:PRINT@284,CHR$(
168);:PRINT@473,CHR$(129);:PRINT@476
,CHR$(130);
160 PRINT@345,W$(8);:PRINT@348,W$(9)
170 IFVAL(MID$(B$,4,1))=0THEN240
180 SF=USR(1300):ONE+1GOTO190,200,210,2
20,230
190 PRINT@40,CHR$(184);CHR$(142);CHR$(1
31);:PRINT@936,CHR$(180);:PRINT@1000,
CHR$(130);CHR$(173);CHR$(144);:GOTO31
0
200 PRINT@164,CHR$(131);:PRINT@100,CHR$(
160);CHR$(184);CHR$(142);CHR$(171);:
PRINT@740,CHR$(144);:PRINT@804,CHR$(1
39);CHR$(180);:PRINT@869,CHR$(130);CH
R$(173);CHR$(186);:PRINT@935,CHR$(139
);:GOTO310
210 PRINT@225,CHR$(131);:PRINT@161,CHR$(
160);CHR$(184);CHR$(174);:PRINT@609,
CHR$(144);:PRINT@673,CHR$(139);CHR$(1
80);:PRINT@738,CHR$(130);CHR$(175);:G
OTO310
220 PRINT@223,CHR$(184);CHR$(174);:PRIN
T@543,CHR$(180);:PRINT@607,CHR$(130);
CHR$(175);:GOTO310
230 PRINT@285,CHR$(142);CHR$(171);:PRIN
T@476,CHR$(130);CHR$(173);CHR$(186);:
PRINT@542,CHR$(139);:GOTO310
240 SF=USR(1300):ONE+1GOTO250,270,280,2
90,300
250 T=40:B=936
260 PRINT@T,STRING$(5,176);:PRINT@B,STR
ING$(5,140);:GOTO310
270 PRINT@164,STRING$(3,131);CHR$(171);
:PRINT@740,STRING$(3,176);CHR$(186);:
GOTO310
280 PRINT@225,STRING$(2,131);CHR$(171);
:PRINT@609,STRING$(2,176);CHR$(186);:
GOTO310
290 PRINT@223,CHR$(176);CHR$(186);:PRIN
T@543,CHR$(140);CHR$(174);:GOTO310
300 PRINT@285,CHR$(140);CHR$(174);:PRIN
T@477,CHR$(131);CHR$(171);
310 IFVAL(MID$(B$,6,1))=0THEN380
320 SF=USR(1300):ONE+1GOTO330,340,350,3
60,370
330 PRINT@11,CHR$(131);CHR$(141);CHR$(1
80);:PRINT@909,CHR$(184);:PRINT@971,C
HR$(160);CHR$(158);CHR$(129);:GOTO450
340 PRINT@78,CHR$(151);CHR$(141);CHR$(1
80);CHR$(144);:PRINT@145,CHR$(131);:P
RINT@847,CHR$(158);CHR$(129);:PRINT@7
84,CHR$(184);CHR$(135);:PRINT@721,CHR
$(160);:GOTO450
350 PRINT@146,CHR$(157);CHR$(180);CHR$(
144);:PRINT@212,CHR$(131);:PRINT@722,
CHR$(159);CHR$(129);:PRINT@659,CHR$(1
84);CHR$(135);:PRINT@596,CHR$(160);:G
OTO450
360 PRINT@213,CHR$(157);CHR$(180);:PRIN
T@597,CHR$(159);CHR$(129);:PRINT@534,
CHR$(158);:GOTO450
370 PRINT@279,CHR$(151);CHR$(141);:PRIN
T@535,CHR$(135);:PRINT@471,CHR$(181);
CHR$(158);:GOTO450
380 SF=USR(1300):ONE+1GOTO390,410,420,4
30,440
390 T=10:B=906
400 PRINT@T,STRING$(4,176);:PRINT@B,STR
ING$(4,140);:GOTO450
410 PRINT@142,CHR$(151);STRING$(3,131);
:PRINT@718,CHR$(181);STRING$(3,176);:
GOTO450
420 PRINT@210,CHR$(151);STRING$(2,131);
:PRINT@594,CHR$(181);STRING$(2,176);:
GOTO450
430 PRINT@213,CHR$(181);CHR$(176);:PRIN
T@533,CHR$(157);CHR$(140);:GOTO450
440 PRINT@279,CHR$(157);CHR$(140);:PRIN
T@471,CHR$(151);CHR$(131);
450 IFQ=0THEN470
460 IF((X+(E*Y)=A(100))*(D=1))+((X+(E*Y
)=A(101))*(D=3))THEN630
470 IFVAL(MID$(B$,3,1))=1THEN490
480 GOTO600
490 SF=USR(1300):ONE+1GOTO500,520,540,5
60,580
500 PRINT@910,CHR$(141);:PRINT@935,CHR$(
142);:PRINT@14,CHR$(176);:PRINT@39,C
HR$(176);:T=15:B=911
```



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April, 1982 49

Game

```
510 PRINT@T,STRING$(24,176);:PRINT@B,STR
RING$(24,140);:GOTO630
520 PRINT@146,CHR$(151);:PRINT@163,CHR$(
171);:PRINT@722,CHR$(181);:PRINT@739
,CHR$(186);:T=147:B=723
530 PRINT@T,STRING$(16,131);:PRINT@B,ST
RING$(16,176);:GOTO630
540 PRINT@213,CHR$(151);:PRINT@224,CHR$(
171);:PRINT@597,CHR$(181);:PRINT@608
,CHR$(186);:T=214:B=598
550 PRINT@T,STRING$(10,131);:PRINT@B,ST
RING$(10,176);:GOTO630
560 PRINT@215,CHR$(176);:PRINT@222,CHR$(
176);:PRINT@535,CHR$(141);:PRINT@542
,CHR$(142);:T=216:B=536
570 PRINT@T,STRING$(6,176);:PRINT@B,STR
ING$(6,140);:GOTO630
580 PRINT@281,CHR$(156);:PRINT@473,CHR$(
131);:T=282:B=474
590 PRINT@T,STRING$(3,140);:PRINT@B,STR
ING$(3,131);:PRINT@284,CHR$(172);:GOT
O630

600 SF=USR(1300):E=E+1:IFE>4THEN630
610 GOSUB910
620 GOTO50
630 M$=INKEY$:IFGC=1THENPRINTCHR$(23);C
HR$(28);:SF=USR(1300)
640 E=0:IFM$=CHR$(91)THEN680
650 IFM$=CHR$(9)THEN750
660 IFM$=CHR$(8)THEN780
670 GOTO630
680 CLS:IF(X=A(100))*(D=1)THEN810
690 IF(X=A(101))*(D=3)THEN840
700 GOSUB950
710 IFVAL(MID$(B$,3,1))=1THEN820
720 Q=Q+1:IF(GC=1)AND(Q>LM)THEN1240ELSE
X=X+Y
730 GOSUB910
740 GOTO50
750 CLS:D=D+1:IFD<5THEN760ELSED=1
760 GOSUB910
770 GOTO50
780 CLS:D=D-1:IFD>0THEN790ELSED=4
790 GOSUB910

800 GOTO50
810 PRINT@338,"YOU LOSE. OUT AT ENTRAN
CE.":GOTO850
820 FORI=10TO19:FORJ=3TO4:SET(I,J+Z):SE
T(I+25,J+Z):NEXTJ:Z=Z+1:NEXTI:FORI=13
TO8STEP-1:SET(19,I):SET(44,I):NEXT:Z=
0:FORI=19TO33:FORJ=8TO9:SET(I,J+Z):SE
T(I+25,J+Z):NEXT:Z=Z+1:NEXT
830 FORZQ=2055TO2080:SF=USR(ZQ):NEXT:FO
RZQ=5915TOZQ+20:SF=USR(ZQ):NEXT:PRINT
@530,"ZZZAAPPPP!!":PRINT@653,"YOU JUS
T RAN INTO THE ELECTRIFIED WALL!":GOT
O850
```

```
840 CLS:PRINT"YOU DID IT! YOU COMPLETE
D THE MAZE IN";Q;"MOVES!":PRINT"THE L
AWYERS ARE PREPARING TO SETTLE JONATH
AN MONTGOMERY'S":PRINT"ESTATE.":FORT=
1TO2500:NEXT:GOSUB1270
850 PRINT@960,"WANT TO TRY AGAIN?";
860 M$=INKEY$:IFM$=""THEN860
870 IFM$="Y"RESTORE:RUN
880 IFM$="N"THEN900
890 GOTO860
900 CLS:PRINT@320,"OKAY":END
910 IFD=1THENY=-10
920 IFD=2THENY=1
930 IFD=3THENY=10
940 IFD=4THENY=-1
950 IFX+(Y*E)<0THENB$=STR$(A(7))ELSEB$=
STR$(A(X+(Y*E)))
960 IFD=1THENRETURN
970 FORI=2TO4:B4=VAL(MID$(B$,4,1)):B5=V
AL(MID$(B$,5,1)):B6=VAL(MID$(B$,6,1))
:B3=VAL(MID$(B$,3,1))
980 P=10000+B4*1000+B5*100+B6*10+B3:B$=
STR$(P):NEXTI:RETURN
990 DATA1101,11001,11100,11001,11100,1
1001,11010,10100
1000 DATA11011,11100,10001,10110,10101,
10111,10101,10111
1010 DATA11101,10001,11010,10100,10101,
11001,10010,11010
1020 DATA10000,11010,10100,10011,11110,
10101,10101,10111
1030 DATA11011,11100,10111,11101,10011,
11000,11010,10110
1040 DATA10001,11010,11000,10010,11010,
10100,11001,10100
1050 DATA11011,11100,10001,11110,10101,
11001,11110,10111
1060 DATA10111,10011,11010,10110,10011,
11110,10101,10101
1070 DATA11001,11110,11001,11010,11100,
11101,11001,11010
1080 DATA10010,10000,10010,11010,10110,
11001,10000,10110
1090 DATA10101,11001,11100,10111,11011,
11010,11100,10111
1100 DATA10101,11101,10111,10101,10011,
11010,11010,11010
1110 DATA10010,11010,10010,10110,7,91,4
5,10,10
1120 IFX=71THEN1140ELSEIFX=6THEN1170ELS
EIFX=69THEN1200ELSEIFX=8THEN1210ELSEI
FX=32THEN1220ELSEIFX=27THEN1250
1130 RETURN
1140 W$="":CLS:FORY=1TO15:W$=W$+CHR$(14
9)+CHR$(26)+CHR$(24):NEXTY:FORPP=0TO3
1:PRINT@PP,W$;:PRINT@62-PP,W$;:CLS:NE
XT:FORZQ=1TO5:SF=USR(1200):NEXTZQ:PRI
NT@32,STRING$(2,W$);
```

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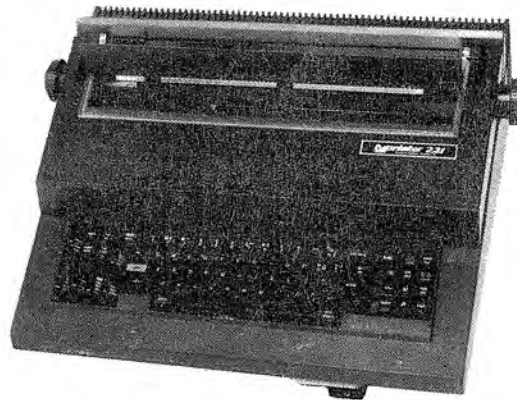
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Game

```
1150 PRINT@22,"!!!!!! S-M-A-S-H !!!!!":P
RINT@67,"THE WALLS SPRANG SHUT ON YOU
, CRUSHING YOU TO A PULP!"
1160 GOT0850
1170 PRINT"MACHINE GUNS POP OUT OF THE
WALLS AND BEGIN FIRING...":FORP=320TO
383STEP5:PRINT@P,CHR$(183);CHR$(187);
:NEXT
1180 FORZQ=1TO100:RG=RND(13)-1:PRINT@M(
RG),STRING$(2,191);:SF=USR((RND(5)*10
0)+200):PRINT@M(RG),CHR$(183);CHR$(18
7);:NEXT
1190 PRINT@64,"LEAVING YOU IN A IN A RI
DLED PILE OF BLOOD.":GOT0850

1200 PRINT"-----YAHHHHHH!!!!!!":PRINT"
A TRAP DOOR OPENED, AND YOU FELL TO Y
OUR DEATH.":GOT0850
1210 FORP=128TO896STEP64:PRINT@P,Z1$;:S
F=USR(1380):NEXT:PRINT@0,"SPIKES SPRI
NG FROM THE WALLS, IMPALING YOU.":PRI
NT@64,"YOU DIED A QUICK AND VIOLENT D
EATH.":GOT0850
1220 IFMP=1THENRETURNELSEPRINT"YOUR EAR
S ARE RINGING AND YOUR VISION BLURS."
:PRINT"----YOU REALIZE THAT YOU ARE B
EING GASSED!!!!":PRINT"YOUR HOUR IS A
T HAND!!!!":PRINT@960,"== PRESS ENTER
=="
1230 IFINKEY$<>CHR$(13)THEN1230ELSEGC=1
:LM=Q+10:MP=1:CLS:RETURN
1240 PRINT@0,"YOU SLOWLY SUFFOCATE, YOU
R HOPES OF FORTUNE CRUSHED.":PRINT@6
4,"YOUR BODY REMAINS IN THE MAZE, NEV
ER TO BE FOUND.":GOT0850
1250 PRINT"WALLS BLOCK YOUR PASSAGE, TR
APPING YOU INSIDE.":PRINT"WATER BEGIN
S TO POUR IN AROUND YOU!":AS=STRING$
(64,191):ZY=6:FORZX=0TO41:SET(ZX,ZX+Z
Y):SET(127-ZX,ZY+ZX):NEXT:PRINT@960,L
EFT$(AS,63);:POKE16383,191

1260 FORZQ=1TO250:NEXT:FORP=896TO128STE
P-64:PRINT@P,AS;:FORZQ=1TO250:NEXTZQ,
P:PRINT@64,CHR$(30);:PRINT@84,"**** Y
OU DROWNED !! ****":GOT0850
1270 CLS:PRINT"ACCORDING TO THE WILL YO
U RECIEVE:"
1280 IFQ<95PRINT".....A PILE OF DIAMOND
S!":SF=USR(520)
1290 IFQ<90PRINT".....A BOX OF RUBIES!"
:SF=USR(530)
1300 IFQ<85PRINT".....A COLLECTION OF E
MERALDS!":SF=USR(540)
1310 IFQ<80PRINT".....A SACK OF SAPPHIR
ES!":SF=USR(550)
1320 IFQ<75PRINT".....50,000 SHARES OF
I.B.M. STOCK!":SF=USR(560)
1330 IFQ<70PRINT".....100 LBS. OF GOLD!
":SF=USR(520)

1340 IFQ<65PRINT".....300 LBS. OF SILVE
R!":SF=USR(530)
1350 IFQ<60PRINT".....$8,000,000!":SF=U
SR(540)
1360 IFQ<55PRINT".....75,000 SHARES OF
AT&T STOCK!":SF=USR(550)
1370 IFQ<50PRINT".....A COLLECTION OF R
ARE COINS!":SF=USR(560)
1380 IFQ<45PRINT".....AND A CHALET IS S
WITZERLAND!":SF=USR(520)
1390 IFQ>=95PRINT".....A RING VALUED AT
$5.82!":FORT=1TO100:SF=USR(540):NEXT
:RETURN
1400 PRINT@704,"ESTIMATED TOTAL VALUE:
$";
1410 FORZQ=1TO2:SF=USR(500+(RND(6)*10))
:FORT=1TO3:K=RND(9):PRINTRIGHT$(STR$(
K),1);:NEXTT:PRINT", ";:NEXTZQ:FORT=1T
O3:SF=USR(500+(RND(6)*10)):K=RND(9):P
RINTRIGHT$(STR$(K),1);:NEXT:PRINT".00
"::RETURN
1420 PRINT".....YOU HAVE BEEN CHOSEN BY
AN ECCENTRIC MILLIONAIRE":PRINT"TO I
NHERIT HIS VAST FORTUNE. ALL YOU HAV
E TO DO IS GO ALONG":PRINT"WITH THE W
ILL: YOU WILL ENTER A MAZE AND RECEIV
E THE FORTUNE"
1430 PRINT"WHEN YOU LEAVE.":PRINT".....
THE AMOUNT OF HIS FORTUNE YOU RECEIVE
":PRINT"DEPENDS ON THE NUMBER OF MOVE
S YOU TAKE TO LEAVE THE MAZE.":PRINT"
.....THE ARROW KEYS ARE USED FOR MOVE
MENT. ONLY THE UP ARROW"
1440 PRINT"ACTUALLY MOVES YOU. THE OTH
ER ARROWS WILL ONLY POINT YOU":PRINT"
IN THE GIVEN DIRECTION (LEFT FOR THE
LEFT ARROW, RIGHT FOR THE":PRINT"RIGH
T ARROW).":
1450 PRINT"--PLUG A SPEAKER INTO THE A
UX JACK OF THE RECORDER FOR":PRINT"SO
UND, THEN PRESS ENTER.":
1460 FORZQ=0TO99:IFINKEY$<>CHR$(13)THEN
SF=USR(11091+ABS(50-ZQ)):NEXT:GOT0146
OELSEReturn
1500 FORZZ=0TO10:W$(ZZ)="" :NEXT
1510 FORR=1TO13:W$(0)=W$(0)+CHR$(170)+C
HR$(26)+CHR$(24):W$(1)=W$(1)+CHR$(149
)+CHR$(26)+CHR$(24):NEXT
1530 FORL=1TO10:W$(2)=W$(2)+CHR$(149)+C
HR$(26)+CHR$(24):W$(3)=W$(3)+CHR$(170
)+CHR$(26)+CHR$(24):NEXT
1540 FORL=1TO7:W$(4)=W$(4)+CHR$(149)+CH
R$(26)+CHR$(24):W$(5)=W$(5)+CHR$(170)
+CHR$(26)+CHR$(24):NEXT
1550 FORL=1TO4:W$(6)=W$(6)+CHR$(149)+CH
R$(26)+CHR$(24):W$(7)=W$(7)+CHR$(170)
+CHR$(26)+CHR$(24):NEXT
1560 FORL=1TO2:W$(8)=W$(8)+CHR$(149)+CH
R$(26)+CHR$(24):W$(9)=W$(9)+CHR$(170)
+CHR$(26)+CHR$(24):NEXT
1900 RETURN ■
```



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good information in these
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Short leaders for data tapes

Speed cassette storage and retrieval

Model I Level II

Kenneth R. Smith, Baltimore, MD

My guess is that many TRS-80 Model I owners have purchased software or have written programs to manipulate large amounts of data using cassette tape for data storage. I would be willing to bet that many of those programs are no longer used because of the enormous amount of time required to write (record) the data tape and to read (play back) the data tape. The purpose of this article is to provide a way to speed the cassette tape data storage and retrieval process considerably, by not requiring any changes to the original program, not interfering with other utility programs, not using up much memory and not needing hardware changes.

There are several methods already available to speed up the input and output of cassette data tapes. They involve purchasing costly hardware modifications, or modifying software, or a combination of both hardware purchase and software modification. The software methods that I've seen usually require extensive modification to the original program wherever PRINT# or INPUT# statements appear. They usually require lengthy machine language drivers and separate buffers which can use up hundreds or thousands of bytes of RAM. In a 16K machine, these solutions may not be practical. Considerable time will also be lost in modifying the original program.

In seeking a solution to the problem, I looked for a software patch which would not require (1) changes to my original program, (2)

hardware changes and (3) large amounts of memory. The result is a patch of 48 bytes which needs no modification of the original program, no hardware and no interference with any USR routines already in memory. As an added benefit, the storage capacity of each data cassette is greatly increased.

What are leaders, anyway?

Most of the time spent reading and writing data on tape is in reading and writing leaders. The TRS-80 uses a leader of 256 bytes of zero followed by one byte of A5 (hex) that allows the cassette motor to build up speed and synchronizes the circuitry with the A5 byte. Every time you issue a PRINT# command, a leader of 256 bytes is written, even if the data which follows consists of only one byte! If you have a program that writes 200 records of 50 bytes each onto tape, each of those 200 records will have a 256-byte leader. That would mean 10,000 bytes of data and 51,200 bytes of leader.

Time is saved by writing leaders that consist of 40 bytes of zero followed by an A5 byte, instead of the 256-byte leader provided by Radio Shack. Since INPUT# doesn't care whether the leader is one byte long or one thousand bytes long, I experimented until I found that 40 bytes of zero were enough to allow the cassette motor to build up speed before encountering the A5 byte. This number works reliably for my computer/recorder combination. Your particular installation may allow you to use an even shorter leader, or it may require you to use a

longer one. In any case, you should be able to use a lot less than 256 bytes.

How it's done

Examining the contents of the Level II ROM, I found that whenever a PRINT, PRINT@ or PRINT# instruction is encountered, control is passed to 206FH, where a CALL is made to the DOS exit at 41CAH. After returning from 41CAH, a check is made to see if PRINT@ is present. If it is, the correct screen address is computed (or an FC error is produced), and control is passed to 209BH to write the data on the screen. If PRINT@ is not present, control is passed to 208FH, where a check is made to see if PRINT# is present. If it is, the cassette motor is turned on, a leader is written and control is passed to 209BH to write the data onto tape. If not, control merely passes to 209BH to write the data somewhere else.

The leader is written by issuing a CALL to 0284H, which in turn CALLs 01FEH to turn the cassette motor on, then loads 255 into the B-register to loop and writes 255 bytes of zero followed by one byte of A5. Control returns to the place where it was called. All that is necessary to write shorter leaders is to be able to change that 255 in the B-register to some smaller number like 40. Since the 255 that we want to change is in ROM, we can't make any changes there. Instead, the solution required jumping out of ROM, making the change and jumping back in.

I needed a way to get out of ROM. The closest DOS exit was at 206FH, so I used it to "plant" a jump

instruction to the beginning of my patch. By the way, in using this exit in this way, you would be interfering with DOS if you had a disk system. That should not matter to those implementing the patch, however, since most will be non-disk users anyway.

By exiting the ROM at 206FH, which occurs some time before I need to write the leader, I would

have to duplicate all the code in ROM between exit and the writing of the leader in my routine. Therefore, I duplicated the PRINT@ code in my routine. Following that code, I checked for PRINT#. If it was not present, control merely went back to ROM. If it was present, I created a leader of 40 bytes before going back to ROM.

Only one small problem

remained. Control was passed to my routine by a CALL instruction which PUSHes a return address onto the Z-80 stack. Since I would not be returning to the same place in ROM, I needed a way to get rid of that return address without affecting any of the Z-80 registers being used by the ROM (all of them). Lucky for me, the Z-80 has an alternate set of registers. All I did

Program Listing 1

```

41CA          00100          ORG      41CAH      ;SET UP EXIT FROM ROM
41CA C3D07F    00110          JP        START
7FD0          00120          ORG      7FD0H      ;FOR 16K
00130 ;*****
00140 ;* SHORT-LEADER ROUTINE FOR PRINT#          *
00150 ;* FOR NON-DISK MODEL 1 LEVEL II          *
00160 ;* WILL NOT INTERFERE WITH ANY USR ROUTINES *
00170 ;* BY KENNETH R. SMITH, JULY 16, 1981      *
00180 ;*                                          *
00190 ;* FOR 32K, CHANGE ORG TO BFD0H ON LINE 120 *
00200 ;*                                          *
00210 ;* FOR 48K, CHANGE ORG TO FFD0H ON LINE 120 *
00220 ;*****
00230
00240
7FD0 D9       00250 START  EXX          ;SENT HERE FROM ROM ADDRESS
7FD1 E1       00260      POP          HL          ;206FH VIA DOS EXIT AT 41CAH
7FD2 D9       00270      EXX          ;ELIMINATE RETURN ADDRESS
7FD3 FE40     00280      CP          '@'      ;IF NOT PRINT@, GO ON TO
7FD5 2019     00290      JR          NZ,NOTAT;SEE IF PRINT#
7FD7 CD012B   00300      CALL       2B01H     ;OTHERWISE PERFORM
7FDA FE04     00310      CP          04H      ;ROUTINE FOUND IN
7FDC D24A1E   00320      JP          NC,1E4AH;ROM FROM 2076H TO 208EH
7FDF E5       00330      PUSH       HL
7FE0 21003C   00340      LD          HL,3C00H
7FE3 19       00350      ADD        HL,DE
7FE4 222040   00360      LD          (4020H),HL
7FE7 7B       00370      LD          A,E
7FE8 E63F     00380      AND        3FH
7FEA 32A640   00390      LD          (40A6H),A
7FED E1       00400      POP        HL
7FEE CF       00410      RST        08H
7FEF 2C       00420      INC        L
7FF0 FE23     00430 NOTAT  CP          '#'      ;IF NOT PRINT#, RETURN TO
7FF2 C29B20   00440      JP          NZ,209BH;ROM ADDRESS 209BH
7FF5 CDFE01   00450      CALL       01FEH    ;TURN ON CASSETTE MOTOR
7FF8 0628     00460      LD          B,40     ;GET READY TO WRITE 40 BYTES
7FFA CD8902   00470      CALL       0289H    ;WRITE 'EM!
7FFD C39620   00480      JP          2096H    ;RETURN TO ROM
0072          00490      END          0072H  ;ADDRESS FOR SYSTEM /
00000 TOTAL ERRORS

```

```

NOTAT  7FF0 00430  00290
START  7FD0 00250  00110

```


Utility program

was exchange registers, POP the address off the stack and exchange the registers back again.

To create a leader of 40 bytes, my routine calls 01FEH to turn on the cassette motor, loads 40 into the B-register and then calls 0289H, which is the rest of the ROM routine to write the number of bytes dictated by the B-register, followed by one A5 byte.

The patch is 48 bytes long (program listing 1) and is completely relocatable since internal jumps are relative and absolute jumps are made only to ROM addresses. The number of bytes to be written is loaded into the B-register on Line 460. You may need to change this value.

Better yet, the BASIC version (program listing 2) is *self-relocating*! It PEEKs at the MEMORY SIZE you have set (if any), deducts enough room for the patch, POKEs in the patch, sets a new MEMORY SIZE and resets all necessary pointers. Therefore, if you are already using other patches or routines in high memory (like KBFIX, KBEEPFIX, a printer driver, or whatever), the BASIC version of this patch will relocate itself just below the other routines automatically. Make sure it is the last patch you load, otherwise you might load some other non-relocatable routine right over it and destroy it.

If you run the program more than once, it will continue to relocate itself each time you run it. There would be multiple copies of the patch, but only the last one loaded would be in use.

The patch I have presented here will not interfere with other routines. CSAVE, for example, will still write 256-byte leaders in front of program dumps. If you have any USR routines located in high memory, this program will not interfere with those, either.

How to Use the BASIC Version of the Patch

First, load in any other utility routines you need. Then, CLOAD the BASIC version of the patch and RUN it. It will ask you how many bytes you want in your leader. Then, CLOAD your main program and RUN it. If your program has INPUT# statements in it, "old" tapes with long leaders as well as "new" tapes with short leaders will be read. With the patch in place, PRINT# will only *write* tapes with short leaders.

You will need to experiment with your particular computer/recorder combination to see what length leader you need to use. Perform the following test until you are satisfied that you have found the minimum length leader:

1. Generate a data tape using the

program below:

```
10 FOR X= 1 to 10 : PRINT#-1,X :  
NEXT X
```

This program will write the numbers from one to ten onto tape, each number preceded by a leader.

2. Read this tape back into the computer using the program:

```
20 INPUT#-1,X : PRINT X : GOTO  
20
```

If all the numbers from one to ten are not displayed when RUNNING program 2, you must use a longer leader. If all the numbers appear, keep trying shorter leaders until you find the shortest length leader which works reliably on your system.

I keep the BASIC version of the patch on the same tape as the main program, just before the main program, with one additional line: CLOAD (see program listing 2). Then, when I RUN the patch, it relocates itself *and* loads the main program for me. This saves a little time and trouble.

So, if you have programs that read and write a lot of data on tape, RUN them again using this patch. You will still have to read the old data tape with those long leaders into the computer one last time, but after that, you can zoom along with short leaders!

Program Listing 2

```
100 REM*****  
*****  
110 REM  
120 REM SHORT-LEADER ROUTINE FOR PRINT#  
130 REM FOR NON-DISK MODEL 1 LEVEL II  
140 REM SELF-RELOCATING BELOW ANY OTHER  
UTILITIES  
150 REM WILL NOT INTERFERE WITH ANY USR  
ROUTINES  
160 REM BY KENNETH R. SMITH, JULY 16, 1  
981  
170 REM  
180 REM*****  
*****  
190 CLEAR 50  
200 A=PEEK(16561)+PEEK(16562)*256  
210 A=A-49:B=INT(A/256):C=A-B*256  
220 POKE16561,C:POKE16562,B  
230 A=A+2:B=INT(A/256):C=A-B*256  
240 POKE16842,195:POKE16843,C:POKE16844  
,B  
250 IFA>32767 THEN A=A-65536  
260 POKE 16553,255  
270 FOR I=A TO A+47: READX:POKE I,X: NE  
XTI  
280 DATA 217,225,217,254,64,32,25,205,1  
,43,254,4,210,74,30,229  
290 DATA 33,0,60,25,34,32,64,123,230,63  
,50,166,64,225,207,44  
300 DATA 254,35,194,155,32,205,254,1,6,  
40,205,137,2,195,150,32  
310 INPUT"WRITE HOW MANY LEADER BYTES (  
0-255)";X  
320 POKE A+41,X  
330 CLEAR50 (End of original program.)  
340 CLOAD
```




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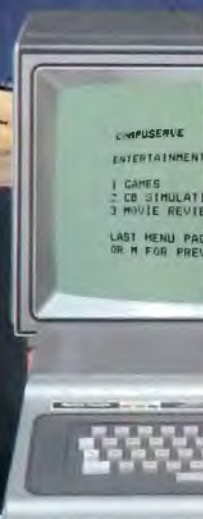
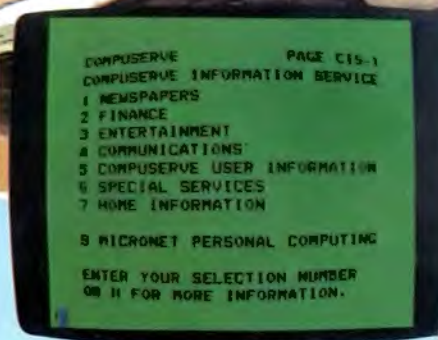
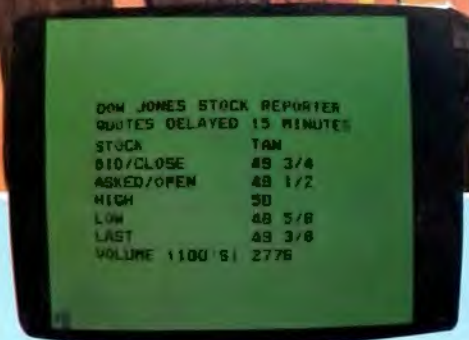
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Don Scarberry, Editor

Upholding their promise to support the Color Computer with add-on peripherals, Tandy Corporation released the LP-VII Line Printer. A pleasant bonus is that this new printer will interface to all other models of computers that Radio Shack produces. This recent addition to Radio Shack's growing line of computer equipment hit the streets at the low price of only \$399.00. I'll bet that shook a few competitors off their foundations! The LP-VII, as this printer is called, is another Radio Shack winner in my estimation.

The price seemed unbelievable when compared to prices of dot-matrix printers offered by other manufacturers. Because my Color Computer needed a companion, I trotted on down to the local Radio Shack to see exactly how much printer I could get for \$399.00. Seems I've been doing an awful lot of trotting since Radio Shack started making computers. I dashed into the shopping mall and quickly located my store. I call it mine because of all the money I've shelled out since 1978 for Model Is, IIIs, Color Computers, disks, printers, etc. Gotta keep up with the Jones', right?

I stumbled into the store and, half out of breath, gasped, "Where is it?" The guy looked at me kind of funny and left the store without saying a word. "May I help you?" a voice from behind me asked. "Sure," I said, "But that last clerk was sure strange." "Oh, he was a customer," replied the sales clerk. "Oh," I said, as I tried to regain my buying composure.

"Well, I'd very much like to see that new printer you advertised in this month's flyer." "You mean the new one—the LP-VII—the \$399.00 one?" "Yeah. That's the one," I answered excitedly. "We don't have any. I didn't order one because I wasn't sure if it would sell. But I'll be glad to take your order." Boy, that last statement was sure reminiscent of the old Model I days.

"Well," I stalled, "I really wanted to see the thing and check its specifications." In reply, the salesman grabbed his copy of the ad and read off the information, which only amounted to a few sentences. It seems that the ad was the only information the store had pertaining to the LP-VII. If I wanted to see one, I would have to order it. This could take about a month, the clerk informed me. If I wanted to see one sooner, I would have to pay the full amount in advance. Paying in advance, it seems, gives the customer preferential treatment.

Letting the sales clerk believe that his oratory was sufficient to convince me that I ought to purchase the printer, I laid my money down and placed my order. "How long will it take this time," I asked with subtle signs of disappointment. "About two weeks," he said.

To make a long story short, a little over a month later, my printer arrived. Paying in advance didn't win me the

preferential treatment I had expected. Enough of my hardware hardships. Let's get down to the business at hand and determine what kind of stuff the LP-VII is made of and whether or not I got my money's worth.

As mentioned earlier, the price tag on the LP-VII is set at \$399.00. For that, you get the printer and one ribbon. Optional cables are available for interfacing the printer with all Radio Shack computers and are listed in Table 1 along with several other accessories. A few comments about the accessories and options listed in Table 1 are needed.

Owners of the Model I without the expansion interface must use part 26-1411 because this cable includes the electronics to interface the CPU with the serial requirements of the LP-VII. This explains the \$20.00 higher price as opposed to the cables for the other models (excluding the one for color). The other models already have the serial interface installed. The "A" suffix of the Model III cable's part number indicates that cable is shielded and use of it will allow the Model III to maintain compliance with FCC regulations for class B certification. Use of the non-shielded version (without the A suffix) may cause objectionable radio or television interference.

The graphics software driver listed in Table 1 is a must if you plan to use the printer's graphics capabilities. I could discover no literature outside the LP-VII instruction manual that even hints at the need for this software. As you accept delivery of your printer (or before you order) be sure to stipulate you'd like this software driver. There's no additional charge for this item as of this writing. I suspect that Radio Shack will begin including the software with subsequent shipments, but be safe and check the contents of your package.

Armed with my printer, cable for the Color Computer and fresh pin-feed paper, I set out to hook up and start printing. Total set-up time (excluding reading the manual) was a mere ten minutes. There were only a few simple connections to make in order to begin operation. Hookup was as simple as connecting a pair of speakers to a stereo set. All that was necessary was to install the ribbon, check to be certain the power switch was off, plug the power cord into a wall outlet, connect the interface cable to the RS-232C Din jacks in back of the printer and Color Computer, load the paper and, finally, turn on the power switch.

At about this point, the instruction manual introduces you to the input selector switch. This switch must be set according to the model computer and cable you are using. Table 2 illustrates the necessary switch settings for each model. As you can see, there are only

Hardware evaluation

three settings to choose from. For Model I through Model III, the Par (parallel) setting will be chosen, but notice the two possible settings for the Color Computer. The 7BS (seven-bit serial) mode is provided for those Color Computers that are not utilizing the software driver necessary for dot graphics. My printer, as mentioned above, was delivered without the driver and consequently it was necessary to use the 7BS switch setting in order to begin printing. Those computers with the software driver installed will need to select the 8BS (8-bit serial) setting.

The LP-VII comes equipped with tractors requiring pin-feed type paper. The lack of a pinch roller/platen combination prevents the use of other papers such as roll (without pin holes), single sheet, etc. The dimensions for paper thickness are critical. For single part paper, thickness should range between 2.8 and 3.5 mils with 3 mil as the suggested value. The LP-VII, Radio Shack claims, will accept up to 3-part forms, but they will have to be of the carbonless variety. Paper width may vary between 4.5 and 9.5 inches.

If you're buying the printer to print labels, be advised: An informed source tells me he knows of no self adhesive label that will work with the LP-VII but there are labels available with thicknesses (including backing) that fall within the range specified for the print paper. These, however, are not self adhesive and will have to be moistened to be applied.

The LP-VII's buffer is analogous to an empty storage bin. As the computer dumps bytes of information into the buffer, the printer constantly extracts and then prints them. Regrettably, the buffer in the LP-VII is sufficiently small that your computer will be doing a lot of waiting. It will store only up to 90 bytes of data including control codes. This is very small and inefficient when compared to other printers with much larger buffers. This simply means that you won't have access to your computer while you are doing a lot of printing.

The American Standard Code for Information Interchange (ASCII) identifies 32 control codes for printers in addition to the codes for printable characters. These codes are sent to your printer (by the computer) as data but will be interpreted as abbreviated instructions. Of these 32 codes, the LP-VII recognizes only nine and ignores all of the rest. Table 3 lists these codes and their corresponding functions. Remember—in order for the printer to recognize codes for graphics functions, the graphics software driver must be loaded into your computer. Without the driver, all graphics codes will be ignored by the printer.

Table 4 is a list of all the characters the LP-VII can produce. This list was generated using the LP-VII to illustrate print quality as well. Note the lack of true lower case descenders on the lower case characters. The double width heading was generated using CHR\$(31) as a control code. A noteworthy point is that if more than 80 text characters are received by the printer without a carriage return, the print will wrap around to the next line without losing any data. If you would like a copy of the control codes listed in Table 4 to use as a reference, then use the short program in Listing 1. The table produced by the program will be an exact

duplicate of the one in this article, so you won't have to cut up your magazine.

The graphics driver is a simple program on cassette ready to load with the CLOADM command of 4K or 16K Color Computers. The graphic pattern codes are stored in decimal 128 to 255. Therefore, the statements (for the Color Computer):

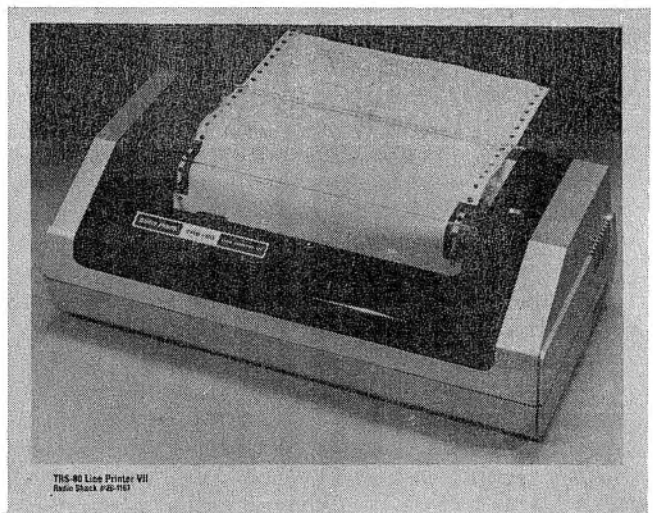
```
10 PRINT#2, CHR$(18)
20 PRINT#2, CHR$(128)
```

will put the printer in the graphics mode and then print a 1 column graphic pattern. Computers other than color will need to use the standard LPRINT. Table 5 will serve to illustrate how each graphics character is printed.

The LP-VII is capable of printing up to 480 7-high vertical dot columns on a single line and you may select practically any print position on the line. Additionally, if you get tired inputting all those CHR\$s, you'll be glad to hear the LP-VII has a repeat code feature. Use of this feature will save valuable memory space while writing graphics programs.

Table 6 lists the LP-VII's general specifications and should provide you with enough information to make your own comparisons to other printers on the market. Those people who need a printer but cannot afford all the luxuries of higher priced machines or don't have a need for high quality print, high speed, etc., will be delighted with the performance of the LP-VII. If you're considering this printer for business or data processing—don't! There are too many limitations for it to be used in such an environment.

If the \$399.00 price tag is within your budget and you have not experienced the use of a printer but do have need of hardcopy, buy it. At 30 characters per second, it will still out-type you.



Ed. Note—According to the December, 1981 TRS-80 Microcomputer News published by Radio Shack, all newly manufactured TRS-80 Color Computers brought in for a 32K upgrade will receive a new ROM (version

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Features of this program include:

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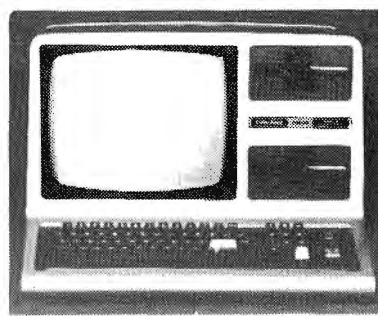
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NOTE These Model III computers contain Apparat installed disk drives and memory They are warranted by Apparat Inc for 90 days



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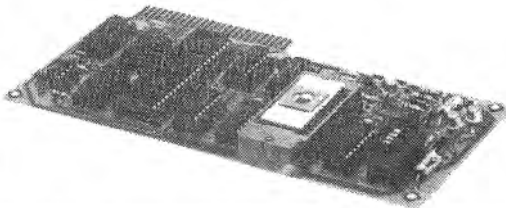
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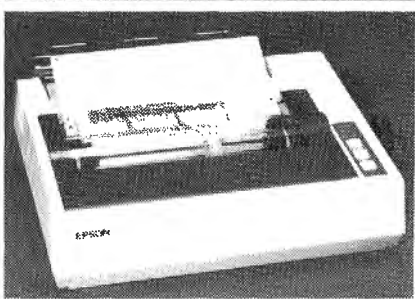
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NEWDOS/80 Version 2.0

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



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Hardware evaluation

1.1) in place of the earlier 1.0 version. This new Rom will be installed automatically and free of charge with the memory upgrade.

If you do upgrade, you will be glad to know that Radio Shack has provided a dot-addressable graphics driver in the new ROM. You won't have to load the software driver that Radio Shack provides with Color Computers which contain the earlier ROM.

Table 1

COMPUTER	CABLE/ Part #	PRICE
Model I CPU	26-1411	\$59.00
Model I + Exp. Interface	26-1401	39.00
Model II	26-4401	39.00
Model III	26-1401	39.00
	26-1401-A	39.00
Color Computer	26-3020	4.95
Graphics software driver	70-2013	No chg.
Fanfold pinfeed paper	(500 sheets)	7.95
Ribbon Cassette	26-1424	8.95

Table 2

COMPUTER	Select Switch Setting
Model I CPU	Par.
Model I + Expansion Interface	Par.
Model II	Par.
Model III	Par.
Color Computer without software driver	7BS
Color Computer with software driver	8BS

Table 3

CONTROL CODE		FUNCTION
Decimal	Hex	
10 or 13	0A or 0D	Prints out buffer and generates a line feed.
16,nn	10,nn	Generates print starting at (nn+1)th character position.
18	12	Converts printer to graphics mode.
26	1A	Prints buffer and returns carriage to start of same line.
27,16,h1	1B,10,h1	In graphics mode starts print at (h1+1)th dot position where h1 specifies a value from zero to 479.
28,aa	1C,aa	Causes next graphic "pattern" to be repeated aa times. aa is a number between zero and 255.
30	1E	Selects alphanumeric print mode.
31	1F	Selects double-width character size.

Table 4

LINE PRINTER VII CHARACTER SET											
CODE		CHAR	CODE		CHAR	CODE		CHAR	CODE		CHAR
DEC	HEX		DEC	HEX		DEC	HEX		DEC	HEX	
32	20		64	40	@	96	60	`			
33	21	!	65	41	A	97	61	a			
34	22	"	66	42	B	98	62	b			
35	23	#	67	43	C	99	63	c			
36	24	\$	68	44	D	100	64	d			
37	25	%	69	45	E	101	65	e			
38	26	&	70	46	F	102	66	f			
39	27	'	71	47	G	103	67	g			
40	28	(	72	48	H	104	68	h			
41	29	)	73	49	I	105	69	i			
42	2A	*	74	4A	J	106	6A	j			
43	2B	+	75	4B	K	107	6B	k			
44	2C	,	76	4C	L	108	6C	l			
45	2D	-	77	4D	M	109	6D	m			
46	2E	.	78	4E	N	110	6E	n			
47	2F	/	79	4F	O	111	6F	o			
48	30	0	80	50	P	112	70	p			
49	31	1	81	51	Q	113	71	q			
50	32	2	82	52	R	114	72	r			
51	33	3	83	53	S	115	73	s			
52	34	4	84	54	T	116	74	t			
53	35	5	85	55	U	117	75	u			
54	36	6	86	56	V	118	76	v			
55	37	7	87	57	W	119	77	w			
56	38	8	88	58	X	120	78	x			
57	39	9	89	59	Y	121	79	y			
58	3A	:	90	5A	Z	122	7A	z			
59	3B	;	91	5B	[	123	7B	{			
60	3C	<	92	5C	\	124	7C	|			
61	3D	=	93	5D	]	125	7D	}			
62	3E	>	94	5E	^	126	7E	~			
63	3F	?	95	5F	_	127	7F				

Table 5

128	129	130	131	132	133	134	135
136	137	138	139	140	141	142	143
144	145	146	147	148	149	150	151
152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167
168	169	170	171	172	173	174	175
176	177	178	179	180	181	182	183
184	185	186	187	188	189	190	191
192	193	194	195	196	197	198	199
200	201	202	203	204	205	206	207
208	209	210	211	212	213	214	215
216	217	218	219	220	221	222	223
224	225	226	227	228	229	230	231
232	233	234	235	236	237	238	239
240	241	242	243	244	245	246	247
248	249	250	251	252	253	254	255

Table 6

GENERAL SPECIFICATIONS

Print method	Impact dot matrix print
Character matrix	5x7 dot matrix
Alphanumeric characters	96 characters (ASCII standard)
Graphics	Dot addressable. 7 dots/col. 480 col.

Color computer owners, 32K PLUS DISKS* \$298.⁰⁰

Yes, that's right - for as little as \$298.00 you can add 32K of dynamic RAM, and a disk interface, to your TRS-80 Color Computer! If you just want the extra memory it's only \$199.00, and you can add the disk interface later for \$99.00.

Just plug the *Color Computer Interface (CCI)*, from Exatron, into your expansion socket and "Hey Presto!" - an extra 32K of memory. No modifications are needed to your computer, so you don't void your Radio Shack warranty, and Exatron give both a 30 day money-back guarantee and full 1 year repair warranty on their interface.

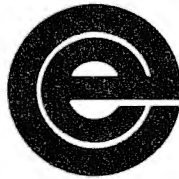
The *CCI* also contains a 2K machine-language monitor, with which you can examine (and change) memory, set break-points, set memory to a constant and block-move memory.

So what about the *CCI Disk Card*? Well as we said it's only an extra \$99.00, but you'll probably want Exatron's *CCDOS* which is only \$29.95 - unless you want to write your own operating system. The *CCI Disk*

Card uses normal TRS-80 Model I type disk drives, and *CCDOS* will even load Model I TRSDOS disks into your color computer - so you can adapt existing TRS-80 BASIC programs.

As a further plus, with the optional *ROM Backup* adaptor, you can dump game cartridges to cassette or disk. Once the ROM cartridge is on cassette, or disk, you can reload, examine and modify the software. The *ROM Backup* adaptor is only \$19.95.

For more information, or to place an order, phone Exatron on their Hot Line 800-538 8559 (inside California 408-737 7111), or clip the coupon.



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- Please send a CCI Disk Card for \$99.00
- Please include CCDOS and manual for \$29.95
- Also include a ROM Backup adaptor for \$19.95

Please add \$5.00 for shipping to all orders, and 6 percent sales tax in California.

Name

Address

City

State Zip

Charge my:

MasterCard Interbank Code

Visa Expiration Date

Card

Check enclosed for

Ship COD (\$2.00 extra)

Signature

Hardware evaluation

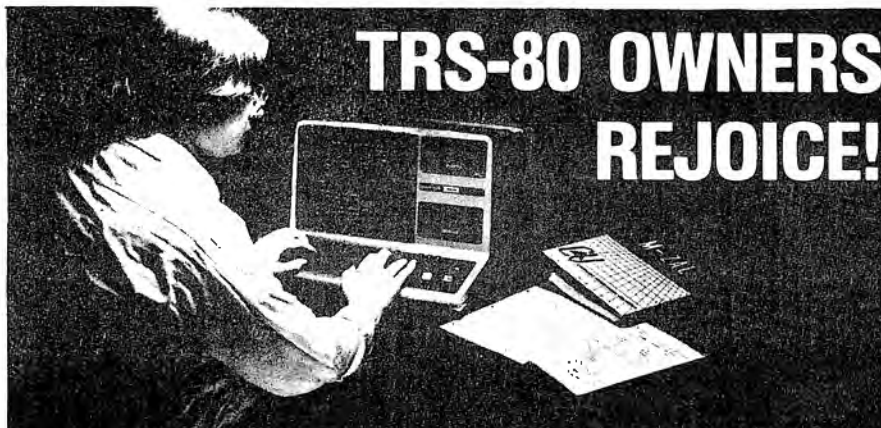
Character codes	7 or 8 bit ASCII serial or 8 bit par.
Character size	Height: 7 dots (1/9 inch) Width: 5 dots (1/12 inch)
Print speed	30 char./sec. at 10 cpi — 80 col.
Characters/inch	Max. 80 characters A. 10 CPI at 80 columns B. 5 CPI at 40 columns
Lines/inch	Alphanumeric mode: 6 Graphics mode: 9
Line feeds/sec	Alphanumeric mode: 5 Graphics mode: 7.5
Paper feed	Pin feed
Paper width	4.5 to 9.5 inches
Number of copies	Up to 3 copies (carbonless)
Inked ribbon	Inked roller built-in cassette type
Measurements	5.32 x 16.0 x 8.25 inches (H x W x D)
Weight	8.6 lbs.
Power requirements	105-135 VAC, 60 Hz for USA and Canada, 220-240 VAC for Europe and Australia
Power consumption	15 watt max. during character printing — 5 watts at idle

Listing 1

```

10 PRINT#-2,CHR$(31)TAB(5)"LINE PRINTER
VII CHARACTER SET"
20 PRINT#-2,STRING$(40,95)
30 PRINT#-2,CHR$(30)
40 PRINT#-2,TAB(8)"CODE";TAB(18)"CHAR";
TAB(30)"CODE";TAB(40)"CHAR";TAB(55)"C
ODE";TAB(65)"CHAR"
50 PRINT#-2,CHR$(31)STRING$(40,95)
60 PRINT#-2,CHR$(30)
70 PRINT#-2,TAB(6)"DEC";TAB(11)"HEX";TA
B(28)"DEC";TAB(33)"HEX";TAB(53)"DEC";
TAB(58)"HEX"
80 PRINT#-2,CHR$(31)
90 PRINT#-2,STRING$(40,95)
100 PRINT#-2,CHR$(30)
110 FOR X=32 TO 63
120 PRINT#-2,TAB(6)X;TAB(11)HEX$(X);TAB
(20)CHR$(X);TAB(28)X+32;TAB(33)HEX$(X
+32);TAB(42)CHR$(X+32);TAB(53)X+64;TA
B(58)HEX$(X+64);TAB(67)CHR$(X+64)
130 NEXT X
140 PRINT#-2
150 PRINT#-2,CHR$(31)STRING$(40,95)
160 PRINT#-2,CHR$(30) ■

```



Our professional quality software development tools let you program your TRS-80 with more ease and power than you ever imagined possible. Programming will become a pleasure when you use our full screen editors. These editors are not just patched up word processors. They have been specially designed to enhance the BASIC and ASSEMBLER programming languages. Our assemblers provide full screen option menus to relieve you of the burden of remembering command names. Combine user oriented features like this with the finest and most extensive documentation in the industry and you will see why programming a TRS-80 is now better than ever.

T-ZAL: TAPE BASED ASSEMBLER: Assemble to memory or tape. Create relocatable SYSTEM tapes! Includes relocating LOADER pgm. 8 character symbols with XREF. Upgrades to disk when you do!
Mod 3 Cat # 1250-20 \$ 49.95

FULL SCREEN PROGRAM TEXT EDITORS: All CAU full screen editors support four way cursor motion and scrolling with user selectable auto repeat and scroll speeds. Totally visual character insert, delete, and change. Block move, copy, delete. Global find and change. Editor for BASIC also provides automatic line renumbering and 26 user-definable macro keys.

For Tape and Disk BASIC:
Mod 1 Cat # 1010-20 \$24.95
Mod 3 Cat # 1210-20 \$29.95

For Mod 1 EDTASM source files:
Tape Cat # 1010-30 \$24.95
Disk Cat # 1010-31 \$34.95
(Disk version shipped on tape.)

M-ZAL: DISK EDITOR/ASSEMBLER: Modular Assembler Language development system includes full screen text editor, multi-pass assembler, and object module linker. Allows 8 character symbols and source file chaining/nesting with *INCLUDE cmd. Full support for relocation and global symbols. Symbol table with cross reference. Req. 32K Disk system.

Mod 1 Cat # 1050-10 \$149.00
Mod 3 Cat # 1250-10 \$149.00

XBUG: DEBUGGING TOOL & MONITOR: Display/Modify memory and regs. Set up to 10 invisible and transparent breakpoints. Multi-speed single step. Load/Copy/Create SYSTEM tapes. Uses only 2.5K and can be dynamically relocated to any address.

Mod 1 Cat # 1020-10 \$19.95
Mod 3 Cat # 1220-10 \$19.95

Note: these products are not available for level 1 machines.

When ordering specify Model, RAM size, # of disks.

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Professional Software

for TRS-80 computers



Investment Analysis

CS-3305 Cassette (32K) \$24.95

This program was originally developed for personal use by an investment specialist Creative Computing Software now makes this package available for you to analyze your investments and investment decisions. Programs in this package include regression analysis, stock market simulations, market/stock values, risk analysis, time related investments, and tax analysis.

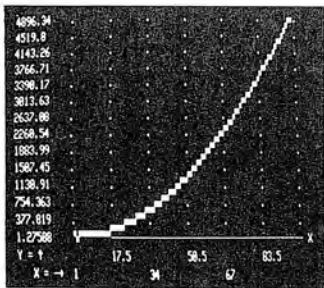
Graphic Package

CS-3301 Cassette (16K) \$19.95
CS-3801 Diskette (32K) \$24.95

This package provides a variety of interesting and useful graphing routines. Graphing Package combines text and TRS-80 graphics to plot a variety of functions and other graphs.

1. Bar Graph

Bar Graph plots graphs for up to six different categories. An optional display does conversion to a line graph.

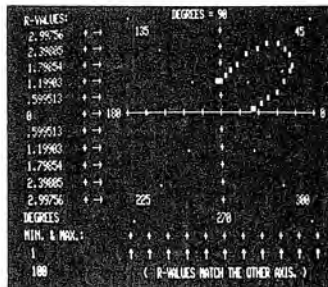


2. Cartesian Coordinate Graphing

This program plots a standard X-Y graph from a user entered function. A special feature of this program automatically scales of the Y-axis.

3. Polar Coordinate Graphing

Rarely found in computer graphing packages, this polar



graphing program provides plots of polar functions. The program labels all axes, features automatic scaling, and lets you input the range and increment of the plot. A unique and valuable program.

4. Parametric Graphing

Parametric functions are functions in which both x and y are expressed in terms of an independent variable t. The resulting graph is X vs Y. This program allows the user to input two parametric functions and produces a graph.

5. Linear and Parabolic Regression

These two programs are used for data analysis which can later be entered into the graphing routines. Regression routines analyze how well a series of points fit on a linear or quadratic function.

Advanced Statistics

CS-3303 Cassette (16K) \$24.95

CS-3505 Disk (32K) \$24.95

This package may be the ultimate in statistical applications for the TRS-80. Advanced Statistics will provide you with the ability to perform statistical tests never before available on small computers. Its cassette based data file system allows you to store, retrieve and transform data files for use in several different tests.

1. File Manager

File Manager, the heart of the statistical file management, allows you to create, edit, and transform data files. Unique to this program are features that allow the user to perform transformations on variables, extract and create subfiles, and selectively copy records. Up to twenty variables and an unlimited number of cases can be processed.

2. Descriptive Statistics

Descriptive Statistics computes the mean, standard deviation, standard error of estimate, variance, skewness, kurtosis, range, median, and quartiles for a variable and constructs a histogram for each value. A test scoring option for conversion of raw scores into percentiles is included.

3. Two Variable Statistics

This program calculates descriptive statistics for each variable. It performs a t-test for the difference of means, computing the product-moment correlation coefficient and its associated significance level. In addition, it performs linear regression and computes standard error of estimate for Y.

4. Crosstabulation

This program constructs contingency tables for displaying frequencies, column percentages and table-wide percentages for each cell. It computes the Chi-square, the level of significance and gamma statistics. Tables as large as 10x10 may be evaluated.

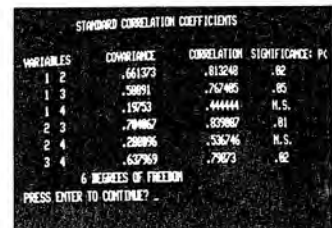
5. Regression-Trend Analysis

This program computes least-squares regression coefficients from time-series or paired data for best-fit equations (linear, parabolic, hyperbolic, logarithmic, power, exponential and cubic types). Calculates standard error of estimate for each equation and more.



6. Multiple Linear Regression

Performs multiple linear regression using up to ten independent variables. The program computes both unstandardized and normalized coefficients, covariance, multiple correlation coefficient, and the standard error of estimate.



7. Correlation Analysis

Computes product-moment correlation matrices, multiple correlation coefficients and partial correlation coefficients with their associated significance levels.

8. Analysis of Variance

This program performs one-way and two-way analysis of variance for a maximum of ten groups in each control variable. Statistics include the mean and standard deviation for each group, sum of the squares, degrees of freedom, mean square, F-ratios, and significance level.

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creative computing software

Standard & Poor's Stockpak

An investment management system

Model I/III 32K Two disk

Paul R. Prescott, M.D., Norman, OK

Anyone who has investments in the stock market deals with the frustration of keeping accurate and adequate financial records for tax purposes. The brokerage houses do a good job with record keeping, but some of the "fun" is sacrificed, along with commissions.

Many people would like to do their own stock selecting but feel inadequate in this area despite the fact that numerous books written on the subject show how easy this is. Sounds like a perfect area for a little computerized help, right? The computer nicely performs the number crunching operations needed to select investments and we all know how well it handles data storage. Radio Shack has made available an extremely powerful program that answers both needs.

Standard & Poor's "Stockpak and Portfolio Management System" is really two separate programs that can be used together to form a stock selection system and investment portfolio. Minimum system requirements are for 32K Level II Model I or III with two disk drives. A 132 column tractor feed printer is strongly recommended to take full advantage of the numerous detailed reports which this system can generate. Most of the reports can be viewed on the monitor, however.

The program presents an impressive package. The 181-page

manual is well written and easily understood. It includes 16 appendices which make reviewing various system features a breeze. A helpful section explaining financial terms is also included, as are four system diskettes. All of this forms a powerful, highly interactive program for the incredibly low price of \$49.95. This price is somewhat deceptive. Utilizing all of the features can cost a lot more.

Portfolio Management System

Diskette 1 provides the programs needed to maintain a listing of investments and all transactions involving them. The system can handle up to 100 securities with as many as 30 transactions for each one including buy and sell, stock and cash dividends, and stock splits. All data are maintained on a separate disk.

This program is essentially a dedicated data base management system. It allows all of the usual features such as add, change, delete and list. Numerous protective features are built in. The last menu used can be called by pressing a single key to "bail out" if necessary. Entries are either posted or changed only after you are asked if all is correct.

Total gains or losses are automatically computed and the program even takes into account the

order of events and keeps them straight for you. Stock splits and dividends are accurately tracked by date and ex-dates (the date after which a new buyer is not entitled to the latest dividend) are accounted for. Thus, a complete financial summary, including commissions, is maintained for tax purposes.

The reporting part of this program is where it really shines. Eight different reports can be automatically generated. The "Net Position Report" summarizes all current holdings for value, gains and losses. The "Rate of Return Report" compares your performance to the latest S & P Index to show how well (or poorly) you have done.

To provide even more aid at tax time, "Profit Summary and Dividend Receipt Reports" can be printed as well as summaries of all long and short term gains or losses. Finally, for planning tax strategy, the computer can provide a listing of the dates on which securities become eligible for long term capital gains.

Stockpak for Selecting Securities

The Stockpak part of the package uses the three remaining diskettes. Diskette 4 is a sample DATA disk which lists 30 data items on 900 companies made up of the S & P 500,



250 other companies on the New York Stock Exchange and 150 others listed either on the New York or American Exchanges or over the counter. This data was as of January 31, 1980, in my version of the package. Also included is a News section written by S & P which summarizes financial and economic news and market indicators. The data provided on each company is comprehensive and should be more than enough to aid any knowledgeable investor in selecting securities for his portfolio. This is the *real* power behind the program.

Just how do you go about doing this? The program is structured to allow searching the stock data base by any combination of financial data you desire. Diskette 2 allows you to create up to 25 criteria sets of calculations and relationships between any of the 30 data items and store them in a "library". This library can then be used to screen the companies on the data disk to automatically find those which fit the criteria you have defined for a potential investment. You can screen by multiple sets of criteria to further narrow the field.

A data dictionary is provided which includes 49 common stock market ratios including price-to-earnings, yield and market value, 5 commonly used constant values and 30 data items for each stock listed.

Up to 100 additional data dictionary elements of your own creation can be added to the dictionary. All elements can be changed or deleted. Using any combination of these, you can create up to 25 criteria sets for screening the companies and store the sets for future use. The program again helps those who are learning investment strategy by providing 10 predefined criteria sets which screen by the most accepted and useful data elements.

With 900 companies to screen, the procedure can use a lot of time. To simplify this, a smaller directory can be created which includes only 12 of the 30 data items provided for each company.

Combining Both Programs

Your own stock portfolio naturally needs to be updated with the latest prices, S & P Index, etc. This can be accomplished by merging your data base with the data on the stock diskette. This updates the current price, ex-date, PE ratio and S & P for your stocks. Also, a "spinoff" file can be created which will build a separate data base including only your stocks, but adding all of the other data items on the data base disk. This permits much more comprehensive analysis of your portfolio than can be accomplished with only the data that you enter by hand.

Comprehensive Reporting

Diskette 3 provides full report capabilities. With this program, you create any type of report you desire, using any of the data elements. Up to 50 separate report formats can be created and stored on disk for future use.

Let the Buyer Beware!

As you can see, this program package is a flexible, highly interactive, powerful approach to financial investment analysis. It has one serious drawback. The stock data base diskette is provided as an example only. The data is over one year old. The Portfolio Management System provides for entry of five of the possible 30 company data elements, but the Stockpak screens and reports are of little value unless all data are available.

Included with the package is a subscription application which will provide you with a new data disk every month for one year plus an "Investor's Newsletter" created by Standard and Poor's. Price: \$200.00 per year. Without this monthly update service, the program is essentially limited to use of the Portfolio Management System described at the beginning of this review. The cost of \$49.95 provides you with only a dedicated data base system unless you subscribe.

Despite this drawback, unless you like trying to keep track of capital gains, dividends, etc., by hand, the Portfolio Management System alone is a worthwhile program and great time-saver. You could, of course, create a similar program yourself or use a non-dedicated DBMS to create one.

Is the \$200 fee for the monthly update a good value? Only if you wish to select your own investments and don't mind being limited to only those stocks that S & P chooses to include. Doing it yourself and operating through discount brokers to lower commission fees cuts the net cost of the updates to a more "reasonable" figure. The criteria sets and reports built into the program are top notch and follow most investment guidelines faithfully. Even at a total cost of \$249.95 for the first year, it could be well worthwhile. ■

Files and foibles

Handling space problems using random files

All models

T. R. Dettmann, Associate editor

A major problem for the random access file user is the management of file space within his file. Unlike rewriting a sequential file, a deletion from a random access file doesn't close up the space on the diskette. The file doesn't grow shorter. Once created, the file has only one way to grow, and that's up!

One solution (an inefficient one, but sometimes the only viable one) is simply to rewrite the file to a new one as if it were a sequential file. This can recover the space that would otherwise just be holes in the file.

A very efficient solution is to keep an allocation table, just like the disk directory does. This is a good approach when the file size is strictly limited because there must be one space in the allocation table for every record in the file. This is true whether the record is in use or not.

If an allocation table gets large, then searching it for a space to put a new record can be time consuming. Another efficient way to remember where the holes are in our file is to use a *stack*.

So what is a stack?

A stack is a simple form of "Data Structure" which allows us to recover things that we put there in a simple way. You may have heard about stacks in reading about machine language programming. The Z-80 processor in the TRS-80 Models I, II and III uses one. The 6809 processor in the Color Computer has two!

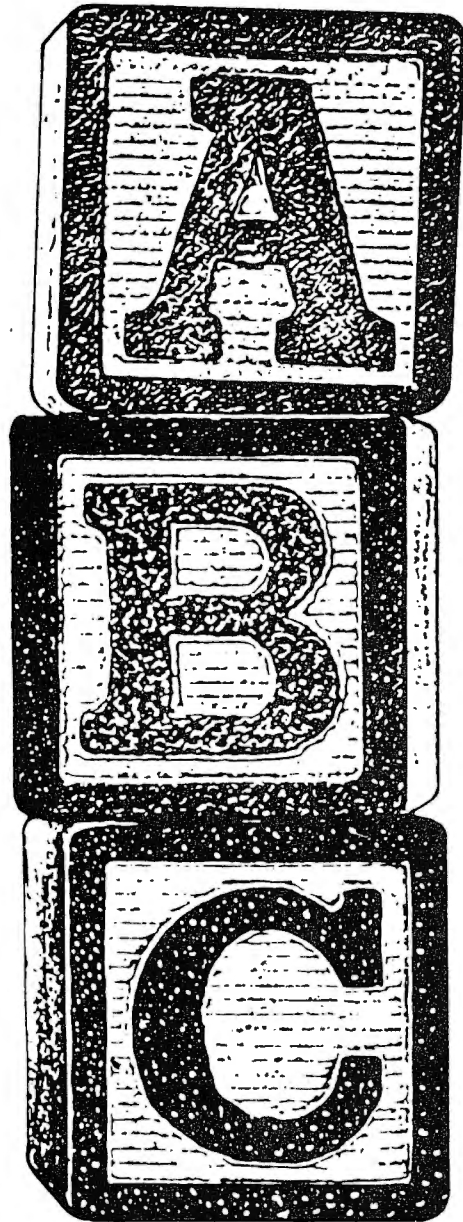
Maybe you have heard about stacks by reading about Forth, a computer language that uses stacks for everything. Stacks aren't limited to unusual languages or machine language programmers. They don't require a degree in computer science or math.

A stack is what is known as a *last in — first out (LIFO)* data structure. That means that the last thing you put into the stack is the first that comes out when you ask for something.

The most common example of how a stack works is a cafeteria tray dispenser. When clean trays come out of the kitchen, they are put on top of the stack of trays already there. As people come by, they take trays off the top of the stack for use. Computer stacks work the same way.

When we put something on the stack, we say that we are going to *push* it onto the stack. When we take the top item off the stack, we say that we've *popped* it off the stack.

In order to make a stack in memory, we could use an array, call it *STK*. To tell what's on the top of the stack (the last item added and the first to be removed), we use



a stack pointer, call it *SP*. *SP* will have the array index for the top of the stack.

Initially, the stack is empty so we set *SP* to zero. If we find $SP = 0$, we know the stack is empty when we do a

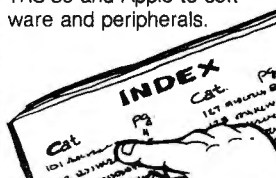
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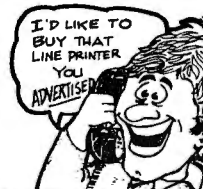
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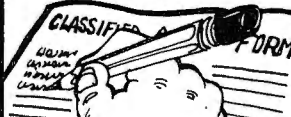
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File handling technique

POP.

When we PUSH something on the stack, we add one to the stack pointer and store the item at the array location specified by index SP.

When we POP something, we take the item from the array location given by SP and then subtract one from SP to point to the new top of the stack.

We could write our stack subroutines like this:

```
1000 REM,PUSH OPERATION
1005 REM  FIRST TEST FOR STACK FULL
1010 IF SP>=MX THEN PRINT"STACK
FULL":RETURN
1020 SP=SP+1:STK(SP)=X:RETURN

1100 REM POP OPERATION
1105 REM  FIRST TEST FOR STACK EMPTY
1110 IF SP<=0 THEN PRINT"STACK
EMPTY":RETURN
1120 X=STK(SP):SP=SP-1:RETURN
```

In this case, MX is the dimensioned size of our stack array and X is the number to be stored for PUSH and recovered for POP. We'll spend more time talking about stacks some time in the future.

So, what good is this?

A stack is a simple way to keep a record of something you want to get back, like deleted records from a random access file. But a memory stack would mean that we'd have to save the stack before we leave the program, not a very efficient technique.

To avoid having to keep saving and loading the stack, let's keep the stack on its own random access file instead. To do this, let's assume you can use variable length records. (Models II and III can, so can the Color Computer, some Model I DOS's cannot, if you can't, then you'll have to use sub-records like we have done before).

The sample program illustrates the technique. When we add a record to the file, say by typing: ADD TERRY, the program will look at the stack file (DATAFILE/STK). The first record on the file is the stack pointer and it points at the record on top of the stack. When the program first starts, it is initialized to one. If the "get" record number routine finds that the stack pointer is one, then it adds the new record to the end of the data file (DATAFILE/DAT).

When the stack pointer is greater than one, that means that records have been deleted from the file. In that case, the top element is popped off the stack, and returned to the calling routine as the record number to store at.

When a record is deleted, the record number it was found at is pushed onto the stack so that it can be recovered for the next add.

The program provides two PRINT commands to look at the file and the stack. With these you can add and delete items and then look to see what's happened. Try this sequence of commands:

```
ADD TERRY
ADD MIKE
ADD ROGER
```

```
DELETE MIKE
PRINT FILE
PRINT STACK
ADD LARRY
PRINT FILE
PRINT STACK
```

Make up your own sequences of commands and try them. Keep printing the stack and the file to see what happens with every new command.

Some notes

As far as the technique goes, it should be clear that it isn't compatible with something like HASH coding. The hash generator does it's own assignment to records so a stack won't help here.

Stack techniques can really help when you are using any technique where the location of the information isn't used as the access key. If we're keeping an index, or using a list-linking technique (something we'll cover later), then it doesn't matter where we put the item, only that it's in the file.

In this case, we have to add a call to some special routine that updates the index or the list whenever we add something to the list. You should be able to make this program function that way simply by adding some new modules.

The sample program is a core upon which you can build some interesting list-handling programs. Add an index so you can print out in sorted order, and you have a fairly general list-handling program.

When extending the program for other use, also be careful to add additional checks for errors as well as a program error trap. You might add additional commands that will allow you to change files, kill files, print to a line printer, sort an index, form and index in a file and so forth. Let your imagination be your guide.

```
10 REM *****
20 REM
30 REM  FILES & FOIBLES PART 7
40 REM  FILE SPACE MANAGEMENT - STACK T
ECHNIQUES
50 REM
60 REM  TERRY R. DETTMANN
70 REM  FILENAME: STKMGMT/BAS
72 REM
73 REM  THIS PROGRAM IS WRITTEN SO THAT
ANY LINE NUMBER WHICH
74 REM  IS NOT A MULTIPLE OF TEN MAY BE
DELETED ALL LINES WHICH
75 REM  ARE MULTIPLES OF TEN ARE NEEDED
, EVEN REMARKS
76 REM  YOU MAY TYPE IN THE PROGRAM USI
NG THE AUTO FUNCTION FOR
77 REM  CONTINUOUS SEGMENTS OF LINES
80 REM *****
85 REM          INITIALIZATION
90 CLEAR 1000:DEFINT A-Z
```

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File handling technique

```

95 REM          OPEN AND PREPARE THE FI
LES - BE CAREFUL THAT YOU
96 REM          CAN OPEN VARIABLE LENGT
H FILES THIS WAY
100 OPEN"R",1,"DATAFILE/DAT",25
110 OPEN"R",2,"DATAFILE/STK",2
120 FIELD1,25 AS FD$
130 FIELD2,2 AS STK$
135 REM          SET UP THE ALLOWED COMM
ANDS IN PC$ AND SECOND WORDS
136 REM          IN SW$
140 PC$="ADD DELETEEDIT HELP PRINT
END "
150 SW$="STACK FILE "
155 REM          IF FILE 2 IS OF ZERO LE
NGTH THEN IT NEEDS TO BE
156 REM          INITIALIZED
160 IF LOF(2)=0 THEN LSETSTK$=MKI$(1):P
UT2,1
185 REM          WELCOME MESSAGE PRINTED
ONLY ON LOGIN TO THE SYSTEM
190 CLS:PRINT"WELCOME TO STACK FILE MAN
AGEMENT":PRINT"TYPE HELP FOR COMMANDS"
200 REM - - - - - COMMAND LOOP -
- - - - -
205 REM          GET A COMMAND
210 LINEINPUT">> ";CD$
215 REM          LOOK FOR ANY BLANK SPAC
ES
220 LC=INSTR(CD$," ")
225 REM          IF THERE IS ONE THEN EX
TRACT THE FIRST WORD AS A COMMAND
230 IF LC=0 THEN W$=CD$ ELSE W$=MID$(CD
$,1,LC-1):CD$=MID$(CD$,LC+1)
235 REM          LOOK UP THE COMMAND, IF
IT ISN'T THERE IT'S AN ERROR
240 C=INSTR(PC$,W$):IFC=0THENPRINT"ERRO
R - ILLEGAL COMMAND, TRY HELP":GOTO200
245 REM          ADJUST THE COMMAND TOKE
N FOR THE ON-GOSUB
250 C=INT(C/6)+1:IF C=6 THEN CLOSE:PRIN
T"GOODBYE":END
255 REM          EXECUTE THE APPROPRIATE
COMMAND
260 ON C GOSUB1000,2000,3000,4000,5000
265 REM          GET ANOTHER COMMAND
270 GOTO200
300 REM - - - - - GET RID OF LE
ADING SPACES IN CD$ - - - - -
310 IF LEN(CD$)>0 THEN IFMID$(CD$,1,1)=
" "THENCDS$=MID$(CD$,2):GOTO310
320 RETURN
350 REM - - - - - REMOVE BLANKS F
ROM END OF CD$ - - - - -
360 IF LEN(CD$)>0 THEN IF MID$(CD$,LEN(
CD$),1)=" "THENCDS$=MID$(CD$,1,LEN(CD$)-
1):GOTO360

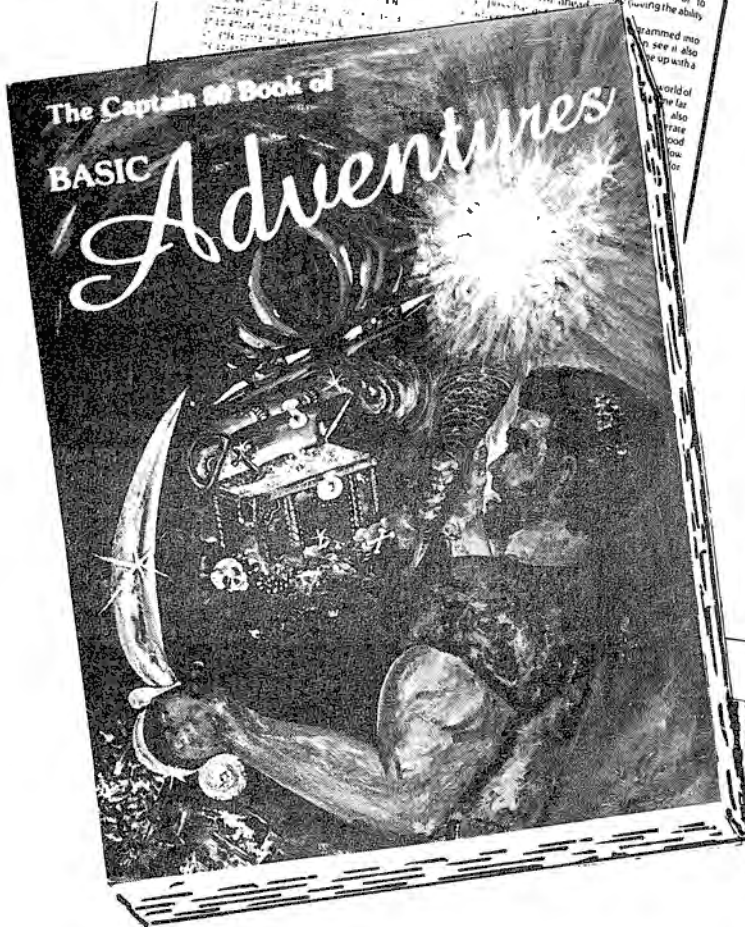
```

```

370 RETURN
400 REM - - - - - GET FREE SPAC
E - - - - -
405 REM          FIRST GET THE STACK POI
NTER, IF IT INDICATES STACK EMPTY
406 REM          THEN THE NEW RECORD GOE
S AT THE END OF THE FILE
410 GET2,1:IF CVI(STK$)<=1 THEN RN=LOF(
1)+1:RETURN
420 SP=CVI(STK$)
425 REM          IF THE STACK ISN'T EMPT
Y, GET THE RECORD NUMBER AT THE
426 REM          TOP OF THE STACK
430 GET2,SP:RN=CVI(STK$)
435 REM          SINCE WE'VE REMOVED SOM
ETHING FROM THE STACK, REDUCE
436 REM          THE STACK POINTER BY 1
440 LSETSTK$=MKI$(SP-1)
445 REM          UPDATE THE STACK POINTE
R
450 PUT2,1
460 RETURN
500 REM - - - - - LINEAR SEAR
CH FOR AN ITEM - - - - -
505 REM          SET THE ERROR FLAG FOR
FOUND CONDITION
510 EF=0
520 FORRN=1TOLOF(1):GET1,RN
525 REM          LOOK FOR THE OCCURANCE
OF THE SEARCH PATTERN
530 GF=INSTR(FD$,CD$)
535 REM          IF THE PATTERN IS FOUND
, RETURN THAT RECORD
540 IF GF<>0 THEN RETURN
550 NEXTRN
555 REM          IF THE WHOLE FILE IS SE
ARCHED, THEN THE PATTERN HASN'T
556 REM          BEEN FOUND, RETURN AN E
RROR FLAG TO INDICATE THIS
560 EF=1:RETURN
600 REM - - - - - PUSH A DISK
ADDRESS ON STACK - - - - -
605 REM          GET THE CURRENT STACK P
OINTER AND INCREASE IT
610 GET2,1:SP=CVI(STK$):SP=SP+1
615 REM          PUT THE RECORD NUMBER 0
N THE STACK
620 LSETSTK$=MKI$(RN)
630 PUT2,SP
635 REM          PUT THE NEW STACK POINT
ER IN IT'S POSITION
640 LSETSTK$=MKI$(SP)
650 PUT2,1
660 RETURN
1000 REM - - - - - ADD TO FIL
E - - - - -

```


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```

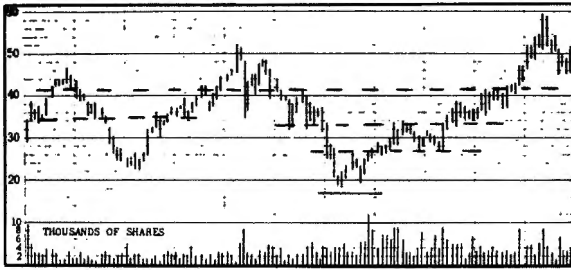
1005 REM          GET RID OF LEADING SPAC
ES
1010 GOSUB300
1015 REM          GET A RECORD NUMBER
1020 GOSUB400
1025 REM          STORE THE INFORMATION
1030 LSETFD$=CD$:PUT1,RN
1040 RETURN
2000 REM - - - - - DELETE FRO
M FILE - - - - -
2005 REM          LOOK FOR THE ITEM
2010 GOSUB500:IF EF=1 THEN PRINT"ERROR
- ITEM NOT FOUND":RETURN
2015 REM          SAVE IT'S ADDRESS FOR F
UTURE USE
2020 GOSUB600
2025 REM          MARK IT DELETED IN THE
FILE
2030 LSETFD$="DELETED RECORD":PUT1,RN
2040 RETURN
3000 REM - - - - - EDIT FILE
- - - - -
3005 REM          SEARCH FOR THE ITEM
3010 GOSUB500:IF EF=1 THEN PRINT"ERROR
- ITEM NOT FOUND":RETURN
3015 REM          IF FOUND, PRINT IT AND
ASK FOR CORRECTION
3020 PRINT FD$
3030 LINE INPUT"CORRECTION: ";C$
3035 REM          IF THERE WAS NO CORRECT
ION, MAKE IT KNOWN AND FINISH
3040 IF C$="" THEN PRINT"NO CHANGE":RET
URN
3045 REM          OTHERWISE, PUT THE CORR
ECTED RECORD BACK IN THE FILE
3050 LSETFD$=C$:PUT1,RN:RETURN
4000 REM - - - - - PRINT HELP
LIST - - - - -
4010 PRINT:PRINT
4020 PRINTTAB(10)"POSSIBLE COMMANDS ARE
:";PRINT
4030 PRINTTAB(15)"ADD ITEM - ADDS ITEM
TO THE FILE"
4040 PRINTTAB(15)"DELETE ITEM - DELETES
THE ITEM FROM THE FILE"
4050 PRINTTAB(15)"EDIT ITEM - GETS THE
ITEM FROM THE FILE AND ALLOWS CHANGES"
4060 PRINTTAB(15)"HELP - PRINTS THIS LI
ST
4070 PRINTTAB(15)"PRINT FILE - PRINTS T
HE FILE TO THE SCREEN"
4080 PRINTTAB(15)"PRINT STACK - PRINTS
THE STACK FILE TO THE SCREEN"
4090 PRINT:PRINT:RETURN
5000 REM - - - - - PRINT LIST
S - - - - -
5005 REM          REMOVE BOTH LEADING AND
TRAILING SPACES FROM THE COMMAND

```

```

5010 GOSUB300:GOSUB350
5015 REM          IS A SECONDARY COMMAND
WORD THERE? IF NOT THEN ERROR
5020 L=INSTR(SW$,CD$):IF L=0 THEN PRINT
"ERROR - ILLEGAL COMMAND, TRY HELP":RET
URN
5025 REM          COMPUTE THE COMMAND TOK
EN
5030 L=INT(L/5)+1
5035 REM          EXECUTE THE COMMAND
5040 ON L GOSUB 5100,5300
5050 RETURN
5100 REM - - - - - PRINT STACK -
- - - - -
5110 PRINT:PRINT
5120 PRINTTAB(5)"CONTENTS OF THE STACK
FILE"
5125 REM          WE'LL ALWAYS PRINT THE
STACK POINTER, EVEN AT FIRST
5130 GET2,1:PRINTTAB(10)"STACK POINTER
=> ";CVI(STK$)
5135 REM          IF THE STACK IS EMPTY,
LET IT BE KNOWN
5136 REM          AND IF THE STACK FILE I
S EMPTY THEN LEAVE
5140 SP=CVI(STK$):IF SP<=1 THEN PRINTTA
B(10)"STACK EMPTY";:IF LOF(2)<>0 THEN P
RINT" => ";GOTO5160 ELSE PRINT:RETURN
5145 REM          MARK THE BOTTOM CLEARLY
5150 PRINTTAB(10)"BOTTOM OF STACK => ";
5155 REM          PRINT ALL EXISTING RECO
RDS IN THE STACK FILE
5160 FORI=2TOLOF(2):GET2,I
5165 REM          WHEN WE GET TO THE ELEM
ENT THE STACK POINTER POINTS AT,
5166 REM          THEN MARK IT SPECIALLY,
OTHERWISE, JUST PRINT THE NUMBERS
5170 IF I=SP THEN PRINT" <";CVI(STK$
);"> "; ELSE PRINT CVI(STK$);
5180 NEXTI
5185 REM          CLEARS THE ';' STILL PE
NDING FROM PRINTS JUST DONE
5190 PRINT
5200 RETURN
5300 REM - - - - - PRINT FILE - -
- - - - -
5310 PRINT:PRINT
5320 PRINTTAB(5)"CONTENTS OF THE FILE"
5325 REM          CHECK TO MAKE SURE THER
E'S ANYTHING AT ALL IN THE
5326 REM          FILE, REMEMBER, FOR-NEX
T LOOPS ALWAYS GO AT LEAST ONCE!
5330 IF LOF(1)<=0 THEN PRINTTAB(10)"FIL
E EMPTY":RETURN
5340 FORI=1TOLOF(1):GET1,I
5350 PRINT"RECORD: ";I;" HOLDS: ";FD
$
5360 NEXTI
5370 RETURN
60000 SAVE"STKMGMGT/BAS" ■

```



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Captain 80

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Here's Joe Software Reviewer, keyboard in hand, ready for another exciting round of new programs. Disguised as the owner of a Radio Shack dealer store, I passed the word among the neighborhood computer orphans that there would be free TRS-80 games today. My disguise is perfect. I'm dressed in a three-piece business suit, with a look of incredible authority on my face. Standing here clutching an Osborne Accounts Receivable package to my chest, I am the epitomy of computer store management. AHA! Here come the munchkins!

I have always liked the Big Five Software arcade games and so have the youngsters who have first contact with them in the store. The newest offering, Robot Attack, features sound and voice. The only other program on the market, as of this writing, to utilize voice, is the adventure, Forbidden Planet. It is unfortunate that Forbidden Planet was available for reference. Otherwise, Robot Attack's voice would have been hailed as the greatest thing since Bugs Bunny and peanut butter.

The voice through the cassette port technology is still primitive, true. Where the adventure voice is an enhancement to the overall game, the Robot Attack voice is overmodulated, irritating and obviously pieced together from different inputs. Not that the adventure voice is perfect. It at least has inflections and tones—moods if you will.

"I SEE something!" the adventure voice says, excitedly.

"Robot Attack!!" screams the Big Five voice in a tone reminiscent of five central park muggers with pipes telling you your mortal span is ending.

The sound in other Big Five

games enhances the action in the game. It is wasted in this one. There is no action. The entire offering seems to be more of a conscious brag of prowess in machine language graphics and sound techniques on the part of the authors than a serious attempt to market a meaningful bit of entertainment. The opening is long and ponderous (if I have to read one more program starting, "a long time ago in a galaxy far away," I think I'll die), and the authors violated the first commandment of commercial software, which reads, "Thou shalt not *insult, degrade or downrate* the player."

Played without the voice or sound, Robot Attack becomes a reasonably clever shoot 'em up requiring plenty of dexterity and, in some cases, split second timing. The graphics are not bad by arcade standards. Speed is a little slow, but there is a lot on the screen to be updated, so that is excusable. The loading was a little shaky. The Model I (500 baud) side wouldn't load at all and the 1500 baud side took five tries. All in all, Robot Attack was a disappointment, not necessarily as a stand-alone, but when compared to its peers both in and out of Big Five. The kids who tested it as I watched stated it best. They pulled the plug on the sound, played five rounds of Robot Attack, hit the reset button and loaded Fasteroids. I hope this was just a local opinion. Big Five, for all of their efforts, deserve better. But for fifteen dollars, so do we.

The Cornsoft Group, whose Missile Attack (published by Scott Adams) enjoyed a long lifespan of popularity and sales, has come up with another old favorite translated to the TRS-80. Scarfman, as it is titled, is Pacman microized. It loses nothing from the coindrop arcade

version. The chomper has ultra-fast response. The ghosts are everywhere and also move quickly. The graphics are excellent! There is no ponderosity here—only lean, hard arcade action. The authors have nothing to prove. All of their efforts are marshaled into the production of a top notch product.

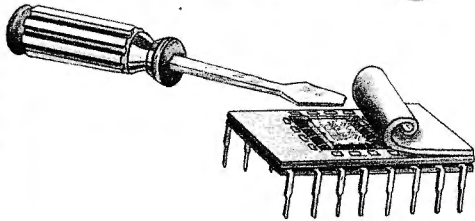
Loading was effortless. The title page was concise and to the point. Even the packaging was laid back—two color to be sure—but one gets the impression that all the expense and effort were directed toward the program development. Result? When this program was presented to the kids, they couldn't leave it alone. During the entire hour allotted to Scarfman, cheers, whistles and cries of delight could be heard from the computer room. There was considerable disappointment when it was announced that we were moving on to the next game.

It was about this time that Aggravation 80 (the Software Secret Agent's BBS which is located in the same room as the game computers) suddenly came alive. The kids were fascinated by the computer's seeming ability to operate unassisted. The operator on the other end was new to telecommunicating and was leaving a message to "all software traders." One of the boys who'd been game testing studied the message for a moment, then reached over to the modem and turned it off, as he'd seen me do occasionally in other situations. By doing so, he unceremoniously popped that BBSer right off the phone line.

"I don't want to see that," he said casually to no one in particular, and went back to the Model III to see if his tape had loaded yet.

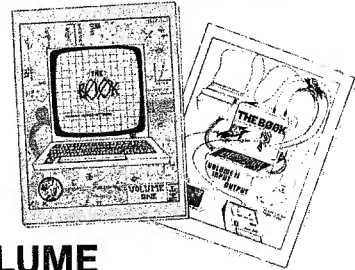
AMEN, Kid! There may be hope for us yet. ■

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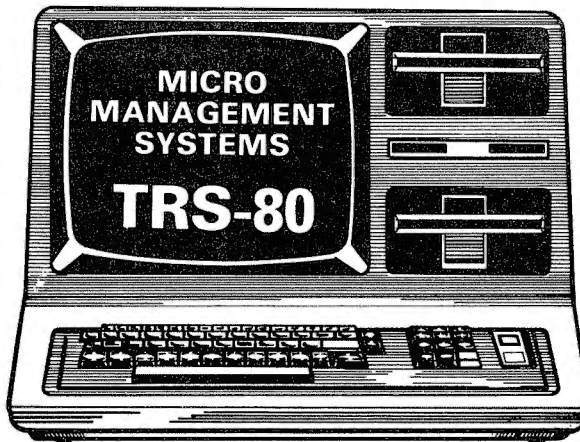
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Real estate

Volumes 1-5

Jim Klapproth, Associate editor

Radio Shack has recently released a business applications package that should meet the needs of anyone involved in the complex world of real estate. This would include those not only in the profession of real estate sales, but also investors, brokers, lenders, appraisers or managers of real property. The package is complex enough to satisfy the requirements of those needing powerful decision-making tools, but yet segmented so as to provide benefits to users with lesser needs. Since the package is divided into five separate volumes, each containing four individual programs, it is not necessary to purchase all five volumes if only one or two will satisfy your requirements. A brief summary of each of the first four volumes will be presented so that the prospective buyer may choose those that are applicable. Volume five was not available for review.

The advantages of using these programs on computers over calculators, whether programmable or non-programmable, are that the programs are permanently stored on cassette or diskette, and easily loaded with a simple command. Secondly, the programs are self-prompting and self-documenting, eliminating the need for constant reference to a separate manual. Third, much more information can be displayed on the screen than on a small calculator display. Fourth, the programs each offer editing and "sensitivity testing," a fancy name for the ability to plug in different variables in order to test the investment situation. The speed and power of the microcomputer offers the real estate professional a remarkable decision-making tool previously unknown.

Each volume contains two cassette tapes, each containing two programs and a 30-page loose-leaf notebook. The programs all run under 16K Level II or Model III

BASIC and can be easily transferred to diskette. As we have come to expect from Tandy, no loading problems were encountered with any of the tapes and the documentation was excellent. Volume one includes four of the most important and frequently used routines. Compound Interest calculates the six compound interest functions: amount of one, amount of one per period, sinking fund factor, present worth of one dollar, present worth of one per period, and partial payment factor. Resale Analysis calculates the required resale price needed to achieve a given yield on equity investment, the requisite change in value from the original price of the investment and the mortgage balance at time of sale.

Stepped Income Analysis is a complex, rather slow-running, program which analyzes net operating income based on income streams that vary at regular intervals over given time periods. For example, on a long term lease, rents generally will increase over a given time period. This program computes present worth of all income streams so that an investor may determine whether or not their basic investment return requirements will be met. Rates of Return calculates the rate of return of an investment three separate ways. The three ways are: Internal Rate of Return (IRR), the Modified Internal Rate of Return (Modified IRR), and the Financial Management Rate of Return (FMRR). In each case, examples are given in the documentation in order to guide the user through each type of computation. A glossary of terms is included in Volume one, making this an indispensable part of the overall Real Estate Library of programs.

In Volume two, the first program is Mortgage Amortization. This gives the user a complete amortization schedule, either on the screen or on hardcopy. In fact, all of

the programs include the option of hardcopy at any time. The amortization schedule includes a periodic summary of the payment number, the amount applied to interest, the accumulated interest, the amount applied to the principal and the mortgage balance. Mortgage Balance is a program that calculates the status of a mortgage at a particular point in time and gives the total amount paid, total interest paid, total principal paid, portion of loan paid off and the mortgage balance.

Mortgage Payments and Terms is a program that will calculate any one of the five elements of a mortgage amortization given the other four. For example, if the user knows the mortgage amount, the annual interest rate, the term of the mortgage, and the number of payments, the program will calculate the mortgage payment amount. The final program is Wrap Around Mortgage Analysis. This little jewel calculates the yield on a wrap around mortgage, in which an existing mortgage amount and payment terms are used as part of a new loan structure. It will also figure the required interest rate on the new loan necessary to achieve a certain yield.

Volume three starts off with Income and Expenses, which projects all income and expense on income producing property, including vacancy and collection losses, and produces a monthly, quarterly, semi-annual or annual schedule of results. Here we are limited to 20 different I & E items and up to ten projection periods. The manual points out that for a large project, such as a shopping center, several successive runs may be performed, and the individual answers may be totalled and entered in a final run. Appreciation or Depreciation determines the value changes over a five or ten year period, using up to six user-defined

equity yield rates. The program uses the complicated "Ellwood" formula for its calculations.

Variable Income Analysis is the third program in this volume. It allows the investor to determine the present worth of variable future income streams, including income reversion. It will analyze up to 240 individual cash flows. The final offering in this package is After Tax Overall Capitalization Rate, which calculates an overall rate for use in investment analysis by considering the specific investment effects of applying certain portions of current federal income tax law. The overall rate produced by this program is that rate consistent with a given after tax equity yield goal, and stated mortgage information.

Volume four starts off with Ellwood Analysis, which calculates such factors as: mortgage constants for each mortgage, the sinking factor, the basic capitalization rate, the composite overall rate and the Ellwood mortgage coefficients for each mortgage. Overall Rate

calculates the simple overall rate by applying the Ellwood formula again. By extracting the overall rate from known sales of comparable properties, the rates may be strong indicators of their value. The next (third) program is the most interesting and the most graphic. It is titled Ellwood Graphs, and it depicts graphically the equity yields of up to five separate mortgages. The final program in this volume is called Sensitivity Analysis. In Sensitivity Analysis, all variables are held constant except the one you are testing for change. This program will calculate any one of the following factors, given the other variables: mortgage constants and amounts, indicated overall capitalization rate, cash flow rates, gross income multipliers, indicated price per unit, breakeven occupancy requirement, required value change and resale price to accomplish stated requirements, and equity yields for various mortgage combinations.

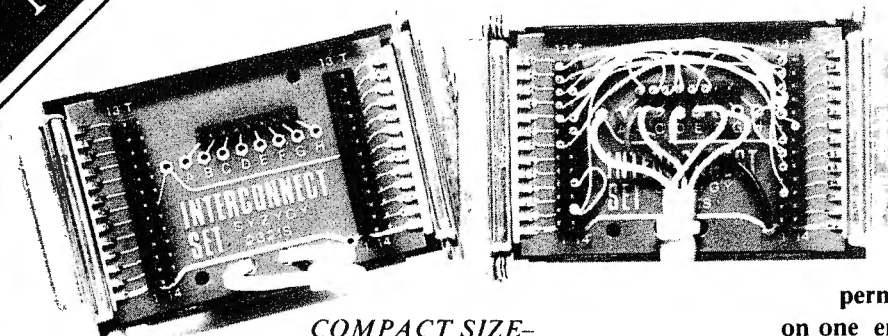
The fifth volume, which was

unavailable for this review, contains programs which determine straight line, declining balance and sum of the years digits depreciation. My overall impression of this package was favorable. All programs performed very well, with only one discrepancy between the expected result as printed in the manual and the actual computed result. The documentation was quite clearly written, with examples of each type of calculation. The ability to perform sensitivity analysis on most all of the programs is a powerful tool for the prospective investor. For the professional, or even the budding entrepreneur, these programs should give an edge of advantage over those who do not have such tools. ■

Real Estate, Vols. 1-4 are produced by Radio Shack and priced at \$29.95 per volume. Ed. Note: Vol. 5, referred to in this evaluation is no longer available due to government changes regarding depreciation.

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Figuring irregular surfaces

Work in feet and inches, decimals or fractions

Model I/III

Robert Hood, Bremerton, WA

It is very useful in engineering, scientific and mathematical programs to have the following input and output handling capabilities:

1. Input of dimensions in feet and inches without conversion to feet.
2. Input of dimensions as integers and fractions without conversion to a decimal number.
3. A pause routine to prevent scrolling of data on the screen.
4. Review of input data and correction of errors without restarting entry of data.
5. Selection of screen or printer output as desired.
6. Modification of data for rerun without input of all new data.

The above capabilities may be obtained by using a conversion routine at each dimension input statement for items 1 and 2; going to a subroutine at the end of selected blocks of statements for items 3 and 4; and using an operation selection routine for items 4, 5 and 6.

Data input

Listing 1 illustrates a program that can be used in a typical conversion requirement like 3 feet, 6 and $\frac{1}{4}$ inches which may be entered in any of the following ways:

- | | | |
|---|------------|--|
| 1 | 3.62083, 0 | Entry in feet |
| 2 | 3, 6.25 | Entry in feet and inches |
| 3 | 3, 6, 4 | Entry in feet, inches and sixteenth inches |
| 4 | 3, 0, 100 | Entry in feet and sixteenth inches |
| 5 | 0, 42.25 | Entry in inches |
| 6 | 0, 42, 4 | Entry in inches and sixteenth inches |
| 7 | 0, 0, 676 | Entry in sixteenth inches |

Although some of these entries at times would be impractical, the capability to input data in these seven formats is available at any time with the routine.

Lines 110 and 120 need to be used only once at the beginning of the program. Lines 130 and 140 are needed each time a dimension input is required. "Y" and "Z" are reset to zero in line 140 to allow repeated use for inches and numerators. It also allows for the omission of zeroes on input beyond the second dimension. Just hit the enter key after the second comma. Omitting a comma will create the ?? prompt requesting additional input data which may clutter your screen. Line 150 sets up a flag and then jumps to the data changing routine (explained later).

Data correction routines

Errors in data may be corrected three different ways:

1. On entry, backspace and retype the data before striking the enter key.

2. After entering ten items, strike "C" to make changes.

3. After entering all of the data, review it on the screen and go into a selection routine for corrections to any incorrect entries if needed.

Method 1 is a standard procedure and is used as indicated. Method 3 is part of an "operation selection" routine and will be discussed later.

Line 200 sets the format for use in a print using statement. Line 210 begins a loop for input of the values while the beginning input statement flag "R" is set in line 215.

After input of 10 sets of data, line 220 will branch to the subroutine starting at line 800. The flag "F" is used to prevent a continuous loop which is reset in line 240.

Line 230 prints the value of K as identification of the data set entered in line 250 (feet, inches and the numerator of the fraction).

Line 260 is the limit of the loop started in line 210 and line 270 jumps to the correction subroutine. The subroutine's return statement will branch back to the main body of the program.

Line 800 prints user instructions. Line 810 sets up the inkey\$ routine and terminates the subroutine on depression of the enter key. Line 815 jumps line 820 if the variables are non subscripted. Line 820 sets the "F" flag and increments "D" by 10 or sets it for the last segment if less than 10 items. Line 830 jumps to the input group of the program in Figure 1 on pressing the "C" (correction) key. Line 840 returns to the inkey\$ line 810.

Line 700 checks for a printer flag and skips the routine if set. Line 710 is the operator prompt for the inkey\$ routine in line 720.

Operation selection

The operation selection routine is simply a method of allowing the user a choice of various operating procedures that are built into a program. These routines are usually labeled "menu".

Line 400 returns to a screen print mode. Lines 410 through 460 print the selection menu.

Line 470 resets summation type variables which are not normally assigned a value but are used in the formula: $A=A+3*B$.

Lines 480 and 490 are for user input and branching to the desired routine. Line 495 jumps to the beginning of the routine if a wrong entry is made.

Making changes

In making corrections to data, the following sequence will occur:

1. Operator selects an item to be changed.
2. Program jumps to the desired input statement(s).
3. Correct data is input by operator.
4. If no data is input, original data is retained.
5. Proceed to next data set or to the selection menu.
6. Optionally, hit break and type GOTO 410 to go to the selection menu. This retains the data. *Do not type RUN* as this will reset *all* values to zero.

Irregular area calculation program

Included is a listing for a program which computes the approximate area of the irregular figure shown in

Figure 1

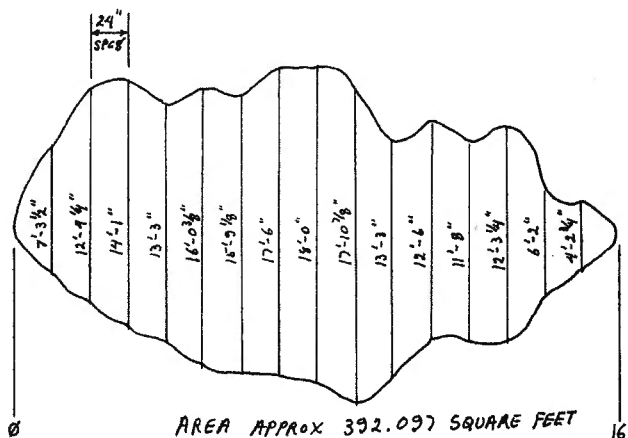


Figure 1. This program uses all of the previously described routines.

There are 3 general formulae used for calculating the approximate area of an irregular figure. They are the "Trapezoidal Rule," "Durand's Rule," and "Simpson's Rule." Of the 3 rules, Simpson's generally gives the greatest accuracy and is used here. The formula is stated as the area equals one-third of the chord spacing times the summation of the first and last chord length plus four times the sum of the odd numbered chord lengths plus two times the sum of the even numbered chord lengths. In symbols, this resolves to the equation:

$$A = \frac{1}{3} * H * (Y(0) + Y(N) + 4 * (Y(1) + Y(3) + \dots + Y(N-1)) + 2 * (Y(2) + Y(4) + \dots + Y(N-2)))$$

where Y(0), Y(1), Y(2) . . . Y(N) are the lengths of a series of equally spaced parallel chords, H is the spacing of the chords and N is an even number of chord spaces. The greater the value of N, the greater the accuracy of the approximation. The program allows a value of up to 100 for N.

Listing 1

```

10 CLS
20 DEFINT J,K,N
30 DIM A(100),C(100),E(100):A$="###":B$="###.###"
40 PRINT:PRINT"THIS PROGRAM COMPUTES THE APPROXIMATE AREA OF AN IRREGULAR SURFACE IN SQUARE FEET USING SIMPSON'S RULE."
50 PRINT"INPUT DESIRED DENOMINATOR FOR FRACTIONS OF INCHES ";D1
70 IF D1<=0 CLS : GOTO 60
80 PRINT:PRINT"SET UP ON THE SURFACE AN ODD NUMBER OF EQUALLY SPACED PARALLEL CHORDS. INPUT THE NUMBER OF DIVISIONS, SPACING OF DIVISIONS AND LENGTH OF EACH CHORD FROM LEFT TO RIGHT AS REQUESTED."
110 PRINT:INPUT"INPUT AN EVEN NUMBER OF DIVISIONS (2 TO 100)";N
120 IF N/2>INT(N/2)PRINT"DIVISION ERROR":GOTO110
130 IF N>100 PRINT"TOO MANY DIVISIONS":GOTO110
140 PRINT:INPUT"INPUT SPACING OF CHORDS (FT,IN)";W,Y,Z:W=W+Y/12+Z/D1/12:Y=0:Z=0
150 R=1 : GOSUB 720
160 CLS:PRINT:PRINT"INPUT LENGTH OF EACH CHORD (FT,IN)
170 FOR K=D TO N
180 R=2
190 IF K/10=INT(K/10) AND K>0 AND F<>1 GOSUB720
200 PRINTUSINGA$,K;:PRINT" ";
210 F=0
220 INPUT A(K),Y,Z:A(K)=A(K)+Y/12+Z/D1/12:Y=0:Z=0
230 NEXT K
240 GOSUB 720
250 POKE16414,88:POKE16415,4
260 FOR J=0 TO 12
270 IF S=4 LPRINT CHR$(138)
280 NEXT J
290 CLS:PRINT:PRINT"SELECT OPERATION"
300 PRINT"1 REVIEW DATA & RETURN
310 PRINT"2 MAKE CHANGES
320 PRINT"3 OUTPUT TO SCREEN
330 PRINT"4 OUTPUT TO PRINTER
340 PRINT"5 TERMINATE PROGRAM
350 A=0:C=0:E=0
360 INPUT S
370 ON S GOTO 420,650,420,400,390
380 GOTO 260
390 PRINT@595,"PROGRAM TERMINATED":END
    
```



```

400 POKE16414,141:POKE16415,5
410 FOR J=1 TO 500:NEXT
420 IF S=4 PRINT" AREA OF IRREGULAR
    FIGURE":PRINTCHR$(138)
430 CLS:PRINT:PRINT"THE CHORDS RUN FROM
    O TO";N;"& ARE SPACED";W;"FEET."
440 PRINT"CHORD LENGTH (FT)
450 FOR K=0 TO N
460 PRINTUSINGA$;K;:PRINT" ";:PR
    INTUSINGB$;A(K)
470 IF K/10=INT(K/10) AND K>0:GOSUB 780

480 NEXT K
490 IF K=N+1 GOSUB 830
500 IF S=1 GOTO 250
510 FOR K=1 TO N-1
520 A=A+A(K)
530 NEXT K
540 FOR K=1 TO N-1 STEP 2
550 C=C+A(K)
560 NEXT K
570 FOR K=2 TO N-2 STEP 2
580 E=E+A(K)
590 NEXT K
600 T=W/3*(A(O)+A(N))+4*C+2*E)
610 PRINT:PRINT" ";:PRINT"AREA OF
    SURFACE IS APPROXIMATELY";T;"SQUARE F
    EET.":PRINT:PRINT
    
```

```

620 IF S=4 GOTO 250
630 GOSUB 830
640 GOTO 250
650 CLS:PRINT:PRINT" SELECT ITEM TO B
    E CHANGED
660 PRINT"1 NUMBER OF CHORD DIVISIONS
670 PRINT"2 CHORD SPACING
680 PRINT"3 CHORD LENGTHS
690 D=0:INPUT Q
700 ON Q GOTO 110,140,160
710 GOTO 650
720 PRINT"CHECK DATA HIT ENTER TO CON
    TINUE HIT C FOR CORRECTION
730 I$=INKEY$:IFI$=CHR$(13)CLS:RETURN
740 IF R<>2 GOTO 760
750 F=1:D=K-10:IFK>N THEN D=INT(N/10)*1
    0
760 IF I$="C" THEN ON R GOTO 110,160
770 GOTO 730
780 IF S=4 RETURN
790 PRINT"PRESS ANY KEY TO CONTINUE
800 P$=INKEY$:IF P$="" THEN 800
810 CLS:PRINT"CHORD LENGTH (FT)
820 RETURN
830 IF S=4 RETURN
840 PRINT"PRESS ANY KEY TO CONTINUE
850 P$=INKEY$:IFP$="" THEN 850
860 RETURN
    
```

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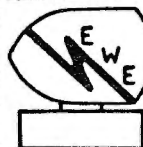
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MODELS I & III



@Love



Problems and solutions with ESF

Model I Level II 16K plus Stringy Floppy

Stephen W. Cox, Cincinnati, OH

The purchase of a TRS-80 Model I in June of 1980 was the beginning of a love-hate relationship which balanced on a thin edge until the balance in my checkbook allowed the purchase of an Exatron Stringy Floppy in May of 1981. The Stringy Floppy (affectionately called ESF) definitely tipped the scale to the love side.

My purpose in writing this is to share with non-ESF owners as well as ESF users, some of the ESF's good points and bad points as I see them.

In my prior ESF days, one thing which caused TRS-80 hate was the need to apologize to friends for a four minute load. I could see the enthusiasm fade from their faces as I tried to explain why a computer should take so long. Shrinking four minutes to 25 seconds is an incredible task which the ESF does miraculously well.

It must be pointed out that if there are four 16K programs on an ESF tape (wafer) and the wafer is at the beginning of the first program, the total load time for the fourth program will be about one minute and 40 seconds. That still beats four minutes.

My unit arrived complete with power supply, connecting cables, programs and manual. It was all well packed.

I did have trouble with the starter kit programs which came with the ESF. There are eight programs on the wafer. Some are SYSTEM and some BASIC. None of the BASIC programs would load, so I made backup copies of the SYSTEM programs and while trying to load the BASIC again, the ESF ate the tape (pulled out of the wafer). I've had one other tape eaten. I returned them and Exatron replaced them free.

The second starter kit tape would not load at all, so I called the toll free number and talked to a technician. He agreed to send one more starter kit tape. When it arrived, it worked and I've had no tape problems since.

One of the nicest things about an ESF is its lack of RAM usage. Data handling is done with software which takes about 1100 bytes and sits below BASIC, but the @ Save, @ Load and @ New commands are in a ROM which is called up by typing SYSTEM (Enter) then typing /12345 (for debounce) or /12346 (for non-bounce). Four bytes are then loaded below the memory size to point to the ROM and the memory size reset to protect the bytes.

Even these four bytes do cause problems. In some BASIC programs which contain machine language, the

program sets its own memory size. Since the ESF ROM looks at the memory size to find where its four control bytes are, any change will cause the ESF not to start on an @ Load or @ Save. While following the above procedure will bring back the ESF control, it's a problem which can be eliminated by using the program in Listing 1.

This program will tell where and what to POKE for auto memory size and relocation of the ESF bytes. Non ESF owners can use the memory sizer only, by skipping the numbers below with (*) in front of them. To use the program:

1. Type SYSTEM (Enter).
2. Type /zero (Enter).
3. Enter the desired memory size.
- *4. Type SYSTEM (Enter).
- *5. Type /12345 or /12346 (Enter).
6. Load the program in Listing 1 and run it.

7. At the start of your program, add a line which pokes each address with the values shown. (Non ESF owners should poke only addresses 16561 and 16562).

8. End the line with a CLEAR 50 (or whatever your program requires).

Now, when your program runs, it will set its own memory size and relocate the ESF bytes. If your program already sets its own memory size, that line should be removed from the program.

SYSTEM tapes cause a different problem. If the ESF bytes are overwritten while a SYSTEM program is loading, the drive will not shut off and you may end up with a memory size message. The only way I've found around this is to set the memory size below the starting address of the SYSTEM program and recall the ESF. Now the system program will load. I've found most SYSTEM programs will load with memory size set at 18000. If not, they should work with no memory size set. A nice feature with SYSTEM tapes is the auto start, which starts running the program as soon as it is loaded.

Backing up BASIC programs is as easy as @ Save and SYSTEM programs are almost as easy. First, the ESF-80 monitor is used to load in the SYSTEM program and display the start, end and auto start addresses. Then the WRITE command is used to put the program on a wafer.

Beware: The start and auto start addresses are not always correct. Programs which contain multiple

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Color cornucopia



Color Computer
T. R. Dettmann,
Associate editor

CORNUCOPIA: (from Latin — *Cornu Copiae* — horn of plenty, an inexhaustible store).

The Color Computer is probably one of the hottest new items on the market right now. We all waited for IBM to come out with their system, but it's in a different league altogether.

In order to better understand the Color Computer, we'd like to spend some time exploring some of its abilities. We are not going to concentrate exclusively on any one area of the color system, but we will try to spend some time exploring its most interesting features.

Character graphics

By now we all know that the Color Computer is a really amazing graphics machine. Just walking through the graphics programs in the manual is enough to give you several sleepless nights. But you can also get graphics with print statements. Try this short program:

```
10 INPUT"RANGE(LOW,HIGH)"
;L,H
20 FOR I = L TO H
30 PRINT I,CHR$(I);
40 NEXT I
50 GOTO 10
```

This short little program will print the characters of the alphabet and special characters when I is less

than 128. When you let I be greater than or equal to 128, it will print color graphics blocks.

If you start combining color graphics blocks, you can do quite a bit of low-resolution graphics programming without having to use the normal graphics functions.

Some other things you can do are to POKE your graphics into the screen. The normal video display looks like memory to the computer. It's located at addresses &H0400 through &H05FF. You could try writing to the screen like this:

```
10 FOR I = &H0400 TO &H05FF
20 POKE I, 255
30 NEXT I
```

This will completely blank out the screen (slowly) with color. Try drawing some lines this way, or poking some figures to the screen.

If you are going to be poking to the screen, you should be aware that it isn't always there. Depending on the graphics mode, it may take more or less space to control the screen display.

Memory & the Color Computer

One of the most frequent questions we get is where are things in the Color Computer ROM? Here are a few addresses with some functions for each:

&HA390 Enter a line from

the keyboard.
&HA910 CLS command
&HAC73 Do nothing loop
&HB99C Print a string of text

To have some fun with the ROM, try printing the ASCII characters in the ROM with this routine:

```
10 INPUT"START,FINISH"
;ST,FI
20 FOR I = ST TO FI
30 X = PEEK(I)
40 PRINT CHR$(X);
50 NEXT I
```

To print the contents of the ROM, you will have to go from &HA000 through &HBFFF for the BASIC ROM and &H8000 through &H9FFF for the expansion ROM.

When the INPUT statement comes up, you can input the numbers directly in the special HEX format:

```
START, FINISH?
&HA000,&HBFFF
```

When you do the listing, look for the commands in BASIC, the Copyright Notices in each ROM and other tables and messages. You will recognize them easily, since they are the only meaningful strings of characters.

Color Computer Tape Files
The Color Computer has a very

useful ability to name tape files for use with a program. Let's say you're a teacher, and you want to be able to keep track of some information on several classes of students.

Since you are probably limited in memory (even with the 32K machine) you can't keep all of them in memory at once so you break up your list into classes as a natural division point.

In order to find a particular class, you can let the computer do the work by using named files. When you want to read in information from the tapes, instead of using some default name or a standard one like "DATA", write your program to let you input the name you want from the keyboard, then let the computer find it. A routine for that might look like this:

```
1000 REM INPUT TAPE FILE FF$
1010 LINE INPUT "WHAT TAPE
FILE: ";FF$
1020 PRINT "PRESS ENTER
```

```
WHEN THE TAPE IS READY"
1030 MOTOR ON
1040 C$ = INKEY$:IF C$=""
THEN 1040
1050 IF ASC(C$)<>13 THEN 1040
1060 MOTOR OFF
1070 OPEN "I",-1,FF$
1080 N = 0
1090 IF EOF(-1) THEN 1130
1100 N = N + 1
1110 LINE INPUT #-1,ST$(N)
1120 GOTO 1090
1130 CLOSE -1
1140 RETURN
```

You can write a similar routine for output. This is written for the 16K Extended BASIC machine. If you don't have Extended BASIC, you will have to use INPUT instead of LINE INPUT.

The way it works is like this: line 1010 finds out what file you really want, then lines 1020-1060 allow you to position that tape. Line 1040 inputs a single character from the keyboard. If there is no character pressed, it simply waits. Line 1050 tests to see if that character was an

ASCII value 13, (the value for the ENTER key).

Once we say we are ready, line 1070 asks for the file by name (FF\$) on the cassette (-1) and asks to INPUT from it ("I"). Line 1080 sets the counter of the number of elements read in to zero (none yet), and line 1090 checks to see if we are at the end of the tape file. If we are, there's nothing more to read in, so we go to line 1130 where we release the file and the tape drive.

Line 1100 increases the number of students read in by one (since we're not at the end of file, we're about to read one) and line 1110 reads a student into the array ST\$. Then we go back to see if we're at the end of the tape file yet.

Writing the file back to tape is just the reverse. Color Computer files are simple to handle and very powerful if used carefully. Disk based color systems use much the same techniques for accessing files, so experience on the tape systems is valuable for working with disk based files. ■

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Finish line

Model I/III

Steve Tallman, Hillsboro, OR
(Steve is eleven years old. — Ed.)

I was watching my dad type a program and that gave me an idea of writing my own program. I asked if he would give me some help on writing my program. He said, "Why not." He asked, "What about?" That gave me an idea that I had to think. All of the sudden it came: "Finish Line."

Before I learned my dad was building a floppy machine and a line printer every time I passed the computer I thought what the heck is that doing here. I don't even know how they work. As days passed I figured out that they're useful for one thing. It's quicker using the floppy while loading in programs. Now I use them all the time.

It was hard typing it in. For instance once I typed a 0 (zero) for an O (letter O), being so dumb I looked in the next line. Another time I forgot the comma in a PRINT @. Actually, I forget it almost every time. While typing, I learned SET (the graphics command) and FOR . . . NEXT loops.

One bad thing was sharing the computer with a sister at the same time. For hours I sat and watched my sister do her program. When my turn rolled up, time flew as if minutes were seconds. After my turn, sometimes I sat down and watched TV.

It took me weeks to accomplish this hard task. As soon as I was finished, I was more than happy to see it done. Then it finally worked as I had planned. It took me so long, though, because my sister was writing a program also. I got a little tiny bit of help from my dad, but not enough to matter.

Instructions

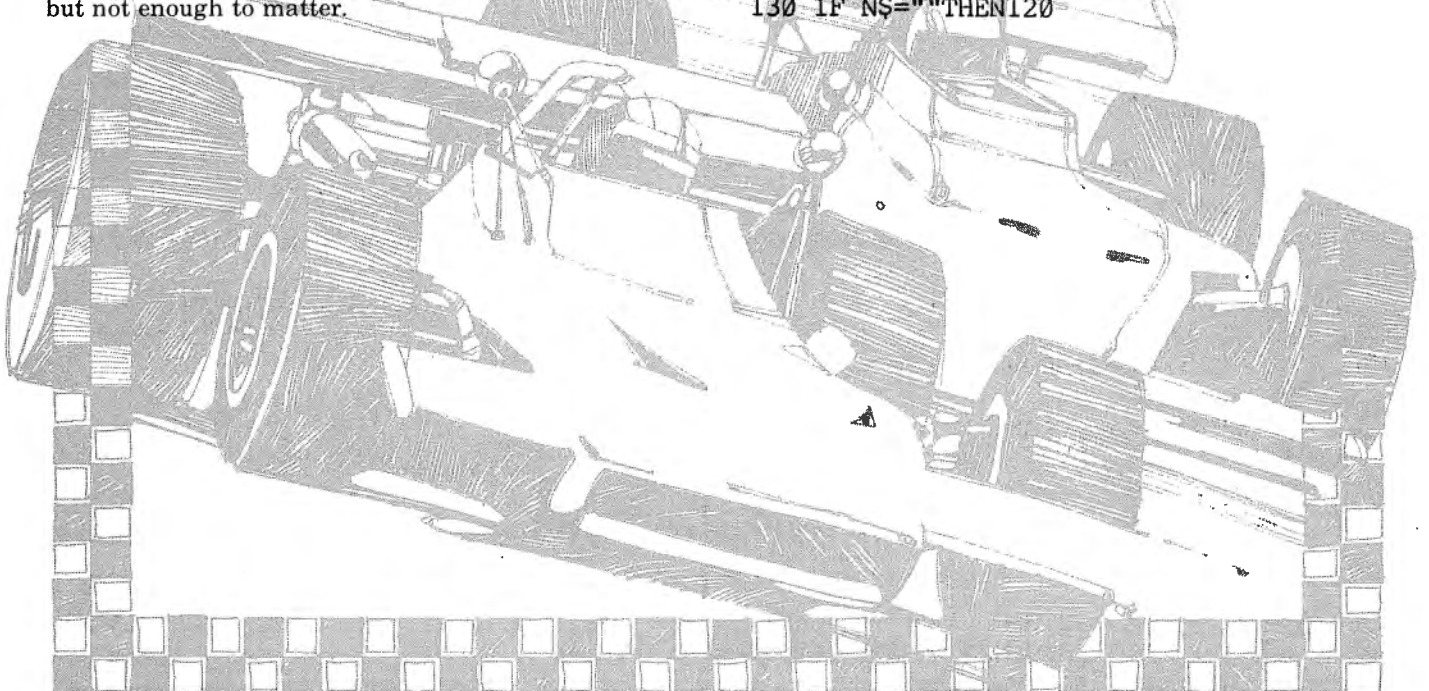
Have you ever dreamed of going 150 m.p.h. down TV highway? Well, you can on the TRS-80, Level II. Here's how it goes. You have a car at the top of the screen and you try to stay in the road at the same time dodging the lines in the road. If you happen to hit one, you get +5 seconds on your time.

BASIC Listing for "Finish Line"

```

10 CLS
20 PRINT@20,"*** FINISH LINE ***"
30 PRINT@404,"ENTER NAME HERE";
40 INPUT$
50 CLS
60 PRINT@203,"YOU WILL HAVE A CAR AT TH
   E TOP OF THE "
70 PRINT@267,"SCREEN. TO STEER THE CAR
   YOU WILL HAVE TO"
80 PRINT@331,"PUSH ',' TO GO LEFT AND '
   .' TO GO"
90 PRINT@395,"RIGHT. IF YOU HIT THE WAL
   L IT'S +5"
100 PRINT@459,"SECONDS. TO BE FAIR STAY
   IN THE ROAD."
110 PRINT@523,"TYPE NUMBER DESIRED"
120 PRINT"1=SUPER HARD 2=HARD 3=SO SO 4
   =SIMPLE";:INPUT$
130 IF N$=""THEN120

```



```

150 IFN$="1"THENL=700:X2=19:X3=10:GOTO2
00
160 IFN$="2"THENL=600:X2=17:X3=9:GOTO20
0
170 IFN$="3"THENL=500:X2=15:X3=8:GOTO20
0
180 IFN$="4"THENL=400:X2=13:X3=7:GOTO20
0
190 GOTO120
200 CLS:PRINTCHR$(23):PRINT@20,"THREE":
FORX=1TO150:NEXTX
230 CLS:PRINTCHR$(23):PRINT@20,"TWO":FO
RX=1TO150:NEXTX
250 CLS:PRINTCHR$(23):PRINT@20,"ONE":FO
RX=1TO150:NEXTX
260 CLS
270 X1=24:D=15390:TIME=0
280 FORX=1TOL
290 GOSUB450:REM ERASE THE CAR
300 GOSUB460:GOSUB460:GOSUB460:'CHECK F
OR KEY DOWN
310 GOSUB440:REM DRAW THE CAR
320 X1=X1+RND(X2)-X3
330 TIME=TIME+HIT
340 GOSUB510:REM ADD TO SCORE
350 IFX1>97THENX1=97
360 IFX1<0THENX1=0
370 SET(X1,45):SET(X1,46):SET(X1,47):SE
T(X1+30,45):SET(X1+30,46):SET(X1+30,4
7)
380 PRINT@960,
390 NEXTX
400 CLS:PRINT@20,"YOUR TIME WAS ";TIME:
PRINT@788,"DO YOU WANT ANOTHER GAME (
Y/N) ";:INPUTN$
410 IFN$="Y"THEN120
420 IFN$="N"THENPRINT"ENTER AGAIN SOMET
IME":RUN"MENU"
430 GOTO400
440 POKED,131:POKED+1,191:POKED+2,131:P
OKED+64,143:POKED+65,191:POKED+66,143
:RETURN
450 POKED,32:POKED+1,32:POKED+2,32:POKE
D+64,32:POKED+65,32:POKED+66,32
460 P=PEEK(14368)
470 IFP=16THEND=D-1:IFD<15360THEND=1536
0:REM,
480 IFP=64THEND=D+1:IFD>15421THEND=1542
1:REM.
490 RETURN
500 IFN$="Y"THEN
510 REM
520 HIT=0
530 IFPEEK(D+128)>128THENHIT=5
540 IFPEEK(D+129)>128THENHIT=5
550 IFPEEK(D+130)>128THENHIT=5
560 RETURN ■
    
```



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TPI-1 tape interface

Pocket Computer and TRS-80 shake hands

Model I/III cassette or disk

80-U.S. staff

If you own a TRS-80 Model I or Model III and have also purchased a TRS-80 Pocket Computer, you might be happy to hear that there is a new device available which will allow your Model I or III to read data tapes produced by the Pocket Computer. This device is called the TPI-1 tape interface and is accompanied by a machine language utility program, a BASIC demonstration program and a sample Pocket Computer data file. Also included in the package, is well written documentation that clearly explains theory of operation, hookup and run procedures.

Our test unit was fully assembled and included the proper ribbon cable for connection of the TPI-1 interface. You will need to provide an external nine volt power supply and cassette patch cord in order to complete connection to your computer.

Installation of the interface is quite straight forward and takes only minutes. The step-by-step instructions inform you to turn off all power to the computer and then plug the ribbon cable connector into the expansion port on the keyboard or screen printer port of the expansion interface. Next, plug a nine volt DC adapter into the power jack of the TPI-1. Last, plug one end of the patch cord into the tape jack of the TPI-1 and power up the TRS-80. Type a few characters into the computer to verify that everything works.

The next step was to load the system program "Pocket Tape I." This program is offered on cassette or disk for the Model I or Model III. Loading instructions are given for both versions and both machines. We used the Model I disk version which made the loading process seem effortless. Looking at the cassette loading instructions revealed an equally simple loading process. The demo program, provided on our disk, was then loaded.

It was at this point that we confronted our first problem. The instructions directed us to load the Pocket Computer cassette (containing the data file) into the recorder. We didn't have one! The cassette versions of the software included the data file but our diskette did not. We fudged and used one of the sample cassette data files.

The next step was to load the demo program provided in the documentation, prepare the sample Pocket Computer data cassette and then attempt to load the data into our Model I. With the demo program, we were able to read the Pocket Computer data into a buffer in the Model I and obtain a complete printout on the screen. We were also able to choose any portion of the data and display it on the screen.

The demo program is just that. It serves to illustrate how to obtain the data from the pocket computer cassette and then display it on the

video monitor. If you wish to be able to manipulate the data in any other way, you will have to write a BASIC routine that will accomplish the task.

It must be noted that this hardware and software combination will only read data that has been created by the pocket computer. It will not allow the transfer of BASIC programs. Also, the program provided will not allow you to write tapes of any kind.

In summary, the hardware and software provided performed exactly as advertised. Documentation is clearly written and uses a simple step-by-step approach. A line-by-line description of the demo program is also provided. With this device, anyone can create data on the smaller, more convenient, Pocket Computer while working in the field. The data can then be loaded into the bulkier computer at home or in the office and manipulated in any way desired. This approach sure beats trying to lug a big Model I or III around—not to mention the fact that you might not have an electrical outlet available at every location that a computer is needed. ■

The TPI-1 Tape Interface is available for \$49.95 from Green River Systems, P.O. Box 552, Auburn, WA 98002, (206) 735-0275. Pocket Tape I (program) on cassette is \$24.95 and on disk is \$29.95.

Timer/BAS

A disk drive timing program

Model I with disk

Mike Andreas and Charles Knight, Arlington, TX

This is a disk drive timing program for Level II or disk BASIC. Level II? Why would anyone write a disk drive timer program for Level II BASIC? This program was written to facilitate testing your computer at those times when your system won't boot up and you can't find out why.

You can load the Level II version of this program from tape and determine whether the drives are properly timed and if the FDC is accepting commands. You should have at least one copy of this program on cassette filed away for the time you might need it in addition to the copy you keep on disk. After all, the best insurance for any contingency is being prepared for it.

The disk drives for the Model I are supposed to spin the disk at 300 RPM with 2% accuracy. TRSDOS will fail format with less tolerance than this on most machines. This provides 6 RPM (revolutions per minute) leeway on each side of 300 RPM. However, some systems are more sensitive than others. Some disks have more internal friction than others and so the drives will spin at slightly different speeds with different media. They must, however, be within this range no matter what media is being used.

The speed of the disk also affects compatibility from one drive to another. If a disk that is written on a drive spinning at 294 RPM is placed in a drive rotating at 306 RPM, it most likely won't work right even though both drives are within their rated tolerance. Even if it does seem to work, chances are the operating system is having to re-read sectors more often than usual causing wasted time and, on writes, parity and lost data errors.

To use the program, load it under the BASIC you are using and place a diskette in all drives that you intend to check. You needn't worry about the data on the disk, as no writing will take place. All you're doing is counting index pulses. If you have "flippy" drives, be sure the disk has only one sector index hole punched out or you'll get readings around 600 RPM. It would be a good idea to have the disk write protected in case the drive is causing other problems. When you are set up with diskettes mounted, type "RUN" and the program will remind you to check your drives. Do not count on being able to recover from an error. Just don't make any to start with. You may hold down the "S" key to start the test anew, or hold down the "R" key to reset the weighted average and highest-lowest readings. Now, input the drive number to be timed and press ENTER.

The timer program listing contains the disk BASIC statements followed by the Level II statement as a

REM statement in those places where a different syntax is required. For your Level II version, simply remove the REM marker or statement and place it in front of the statement for the disk version. You'll also have to eliminate the CMD"T" in line 15 for Level II.

Line 5 forces the FD1771 floppy disk controller to reset itself. This statement does the same thing the RESET button does to the CPU. This also forces single density mode for those who have Percom or LNW doublers.

Line 20 clears enough string space so you'll not be bothered with BASIC's garbage collection routine. The machine language routine requires that the value "D", which is the drive number code, be an integer. This is also taken care of in line 20.

Lines 50 to 100 (or 110) poke the machine code into A\$ and inform the computer where to find it.

Lines 200 to 240 supply the instructions and get the input of the drive number.

The code at lines 250 to 280 converts the drive number into the binary format (1, 2, 4 or 8) because the FDC selects the drive by setting a bit that corresponds to the drive to be accessed.

The screen is printed in lines 400 to 450 and the main program loop begins at line 460.

Line 500 or 505 calls the machine language subroutine which times one revolution of the diskette each time it is called. The first loop at line 500 or 505 serves primarily to allow the drive motor to come up to speed.

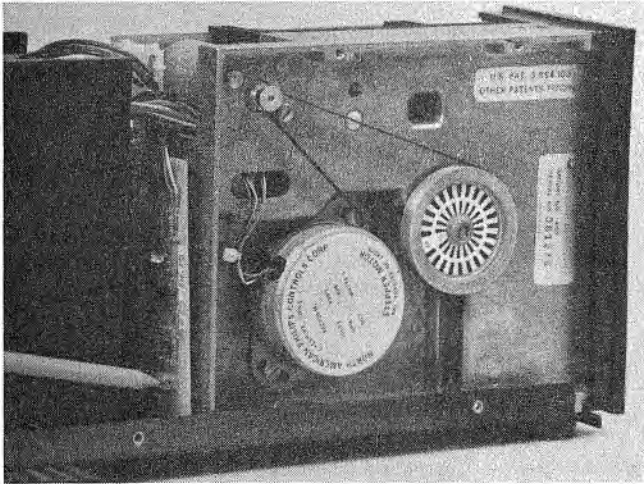
After the data is read and printed, the keyboard is checked for the row by PEEKing 14310, ANDing this with eight checks for the "S" key and ANDing with four checks for the "R" key. This works for both upper and lower case, eliminating the need for a case conversion routine. The error routine serves to print the error in a known place on the screen without messing up the data and serves as an aid for debugging the program.

The data statements beginning at line 1000 are the machine language routine. Each group of numbers is followed by a REM statement containing the mnemonics, labels and comments documenting the routine.

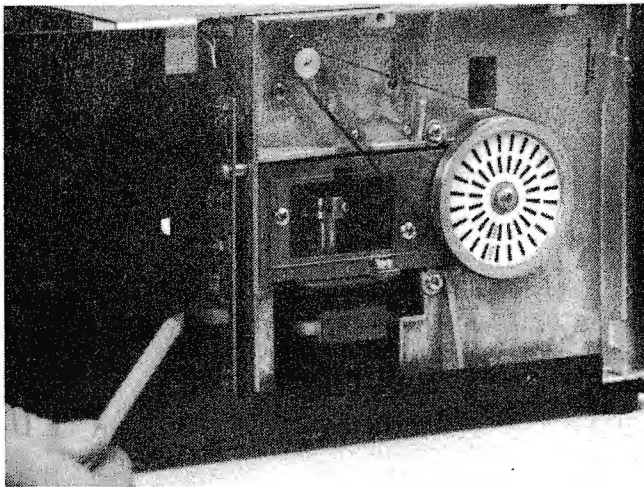
When entering the routine, it is necessary to wait for the start of an index pulse and begin incrementing a counter until the start of the next index pulse. It is possible to enter the routine during a pulse. That condition must be sensed and handled.

The timing loops take 30 T-states to execute and each T-state is .564 microseconds, so 30 T-states take 16.91

Utility program



The Shugart 35 track as supplied by Radio Shack. The pencil points to the speed adjustment.



Newer Tandon drive supplied by Radio Shack. Note that the adjustment must be reached from the reverse side of the drive. The cable extender will partially obstruct the path, but need not be removed.

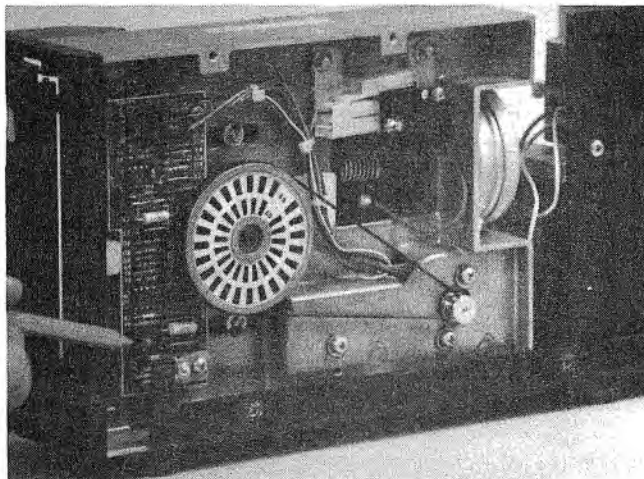


Photo of the Siemens drive as sold by Percom. Some drives are shipped mounted upside down from the one in this photograph.

microseconds to execute. The timing loop will increment BC once during this period. The value in BC is returned to BASIC by the PUSH-POP exchange just before the routine is exited. The conversion to RPM is done in BASIC at line 610 or 615. The value returned by the machine language subroutine will be 11827 for a drive rotating at exactly 300 RPM.

The photographs show the locations of the speed adjustments for three popular drives. Figure 1 shows the older Radio Shack Shugart 35-track drive. Figure 2 is the newer Radio Shack drive made by Tandon which, by the way, is a 40-track drive and will work as a 35-track under TRSDOS, but as a 40-track under any DOS that supports that many tracks.

Figure 3 is a photo of a Siemens drive of the type sold by Percom and others. The MPI as sold by Aerocomp has a small hole in the bottom of the case and the speed can be adjusted without removing the cover. I have never seen seals on the drive cover screws, so you should be able to remove the covers without voiding your warranty. There just isn't any way that they can tell that the case has been removed if the screws aren't scratched up. All 5¼ inch minifloppies are powered by only +12 and +5 volts, so you can safely make adjustments while the program is running without worrying that you might electrocute yourself. Be safe, however, and use an insulated shaft on your screwdriver to be sure you don't damage the electronics. Be sure you know where the speed adjustment is on your drive before attempting any adjustments. You wouldn't like to find yourself adjusting for minimum smoke, would you?

By using this program regularly, you can keep your drives running correctly and may be able to save a service trip if drive speed is your problem. We hope this program helps to save your money or time.

```

10 REM*****
20 REM* DISK DRIVE SPEED TEST *
30 REM* COPYRIGHT (C) 1981 *
40 REM* BY MIKE ANDREAS AND *
50 REM* CHARLES KNIGHT *
60 REM*****
70 POKE14316,254:POKE14316,208:REM RESE
   T 1771
80 CLS:PRINT"DISK SPEEDOMETER":PRINT
90 CMD"T"DISK BASIC ONLY
100 CLEAR1000:DEFINTD,X-Z:DIMA(11),D(36
   )
110 ONERRORGOTO600
120 RESTORE
130 A$=STRING$(6,0)
140 FORX=0TO35:READD(X):NEXTX
150 DD$=STRING$(37,0):K=VARPTR(DD$):KK=
   256*PEEK(K+2)+PEEK(K+1):J=KK
160 IFKK>32767THENKK=KK-65536:J=KK
170 FORX=0TO35:POKE(J+X),D(X):NEXTX
180 DEFUSR1=KK:'USE THIS LINE INSTEAD O
   F 110 FOR DISK BASIC VERSION

```

Utility program

```

190 'POKE16526,PEEK(K+1):POKE16527,PEEK
(K+2):'USE THIS LINE
INSTEAD OF 100 FOR LEVEL II VERSION
200 PRINT"PUT A BLANK DISK IN THE DRIVE
YOU WISH TO MEASURE"
210 PRINT"IF YOU FAIL TO DO THIS, YOU M
IGHT BE ABLE TO RECOVER"
220 PRINT"BY PRESSING 'BREAK' AND TURNI
NG OFF THE DISK DRIVE"
230 PRINT:PRINT"HOLD DOWN 'S' TO TERMIN
ATE TEST"
240 PRINT"HOLD DOWN 'R' TO RESET WEIGHT
ED AVERAGE,HIGHEST & LOWEST":PRINT
250 INPUT"WHICH DRIVE (0-3)";D:DN=D:D=D
+1
260 IFD=1ORD=2THEN320
270 IFD=3THEND=4:GOTO320
280 IFD=4THEND=8:GOTO320
290 GOTO250
300 'X=USR(D)'LEVEL II
310 X=USR1(D)'DISK
320 CLS:PRINT@76,"ITERATIONS","R.P.M.
DRIVE#";DN;
330 PRINT@128,"CURRENT";
340 PRINT@192,"AV LAST 10";
350 PRINT@256,"WEIGHTED AV";
360 PRINT@320,"HIGHEST";
370 PRINT@384,"LOWEST";
380 CL=16.9101E-6:SE=60:SE=SE/CL
390 'FORY=0TO9:X=USR(D):PRINT@139,X;"
",SE/X;" ";:NEXTY:'LEVEL II
400 FORY=0TO9:X=USR1(D):PRINT@139,X;"
",SE/X;" ";:NEXTY:'DISK
410 'XL=USR(D):XH=USR(D):AW=(XL+XH)/2'L
EVEL II
420 XL=USR1(D):XH=USR1(D):AW=(XL+XH)/2'
DISK
430 FORZ=0TO9
440 'X=USR(D):A(Z)=X:PRINT@139,X,SE/X,:
'LEVEL II
450 X=USR1(D):A(Z)=X:PRINT@139,X,SE/X,:
'DISK BASIC
460 IFX<XLTHENXL=X
470 IFX>XHTHENXH=X
480 NEXTZ
490 AV=0:FORY=0TO9:AV=AV+A(Y):NEXTY:AV=
AV/10
500 PRINT@203,AV,SE/AV,
510 PRINT@331,XL,SE/XL,
520 PRINT@395,XH,SE/XH;" ";
530 AW=(AW*7+AV)/8
540 PRINT@267,AW;" ",SE/AW;" ";
550 IFPEEK(14340)AND8THEN580
560 IFPEEK(14340)AND4THEN410
570 GOTO430
580 PRINT@800,"";
590 END

```

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Circle # 47

Utility program

```

600 PRINT"ERROR IN LINE#";ERL;ERR/2+1
610 RESUME580
620 ' ;MACHINE LANGUAGE ROUTINE TO TIM
    E ONE REVOLUTION
630 ' CALL OA7FH ;GET DRI
    VE # & PUT IN HL
640 DATA205,127,10
650 ' LD A,L ;PUT DRI
    VE # IN A
660 DATA125
670 ' LD HL,37E0H ;POINT
    TO DRIVE SELETC
680 DATA33,224,55
690 ' LD (HL),A ;TURN ON
    DRIVE
700 DATA119
710 ' LD L,OECH ;POINT TO
    FDC STATUS REG.
720 DATA46,236
730 ' LD BC,0 ;ZERO OUT
    COUNTER
740 DATA1,0,0
750 ' WAIT BIT 1,(HL) ;TEST FOR
    INDEX PULSE, DON'T
760 DATA203,78
770 ' JR NZ,WAIT ;START C
    OUNT IN MIDDLE
780 DATA40,252
790 ' TEST1 BIT 1,(HL) ;WAIT FOR
    START OF NEXT
800 DATA203,78
810 ' JR Z,TEST1 ;INDEX P
    ULSE.
820 DATA40,252
830 ' TEST2 INC BC ;UPDATE COUNT
    ER DURING
840 DATA3
850 ' BIT 1,(HL) ;INDEX PU
    LSE
860 DATA203,78
870 ' JR NZ,TEST2
880 DATA32,251
890 ' TEST3 BIT 1,(HL) ;UPDATE C
    OUNTER UNTIL
900 DATA203,78
910 ' INC BC ;NEXT IND
    EX PULSE
920 DATA3
930 ' JR Z,TEST3
940 DATA40,251
950 ' PUSH BC ;PUT COUNTER
    VALUE
960 DATA197
970 ' POP HL ;INTO HL
980 DATA225
990 ' JP OA9AH ;AND RETUR
    N IT TO BASIC
1000 DATA195,154,10
    
```

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Three utilities from Krumholz

Free space in memory

I thought some of your readers might be interested in the following utility routines. The two bytes at 16548 always contain the address of the start of the BASIC program. The first two bytes of Listing 1 contain the address of the second line. By poking this address into 16548-16549, the space used by the first line is free for whatever purpose. The advantage of using this technique for short machine language routines is that no memory size is required, no high memory is used and it works with either Level II or Disk BASIC.

Listing 1

```

10 REM DEFINE CURSOR
20 REM *LINE #10 MUST BE EXACT IN LENG
  H
30 REM *PROGRAM TO ALLOW CURSOR CHARACT
  ER TO BE CHANGED
40 REM *DEFAULT TO BLOCK CURSOR - TRUMA
  N KRUMHOLZ
50 L=PEEK(16548):H=PEEK(16549):A=L+H*25
  6
60 POKE 16548,PEEK(A):POKE16549,PEEK(A+
  1)
70 FOR I=0 TO 18:READD:POKEA+I,D:NEXT
80 INPUT"ENTER DECIMAL ASCII OF DESIRED
  CHARACTER";Z
90 IF Z>32 AND Z<192 THEN POKE A+14,Z
100 POKE 16415,H:POKE 16414,L:CLS:NEW
110 DATA 205,88,4,229,245,42,32,64,126
120 DATA 254,95,32,3,62,143,119,241,225
  ,201

```

Listing 2 Margin Set Program

```

10 REM --MARGIN SET PROGRAM -- BY T. KR
  UMHOLZ
20 REM * LINE #10 MUST BE EXACT IN LENG
  TH
30 REM * THIS PROGRAM PROTECTS ITSELF I
  N LOW RAM.
40 REM * IT REMAINS EFFECTIVE UNTIL A B
  OOT OR RESET.

```

Model I Level II or Disk BASIC

Truman Krumholz, Springfield, MO

```

50 L=PEEK(16548):H=PEEK(16549):A=L+H*25
  6
60 POKE16548,PEEK(A):POKE16549,PEEK(A+1
  )
70 FOR I=0 TO 42:READ D:POKE A+I,D:NEXT

80 CLS:PRINT"MARGIN SET":PRINT
90 INPUT"ENTER NUMBER OF COLUMNS ON PRI
  NTER";CO:IF CO>132 THEN 80
100 INPUT"ENTER NUMBER OF SPACES FOR LE
  FT MARGIN";LM
110 INPUT"ENTER NUMBER OF SPACES FOR RI
  GHT MARGIN";RM
120 CO=CO-(RM+LM):IFCO<1 THEN PRINT"MAR
  GINS TOO WIDE":GOTO100
130 POKEA+12,CO:POKEA+31,LM
140 POKE16423,H:POKE16422,L:LPRINT:CLS:
  NEW
150 DATA 229,121,254,13,40,16,33,41,64,
  52,126,254,80
160 DATA 40,2,24,22,205,141,5,14,13,33,
  41,64,54,0,205
170 DATA 141,5,6,8,14,32,205,141,5,16,2
  49,225,195,141,5

```

Listing 3 Echoes Screen to Printer

```

10 REM - THERE MUST BE SIXTY-FOUR CHARA
  CTERS AFTER REM IN LINE NUMBER 10
20 REM * ECHOS EVERYTHING THAT GOES TO
  THE SCREEN TO THE PRINTER, INCLUDING
  MISTAKES - T. KRUMHOLZ
30 REM * SHIFT 'ENTER' TO ENABLE, SHIFT
  'SPACE' TO DISABLE
40 REM * DISABLE WHEN OUTPUT IS GRAPHIC
  S - LPRINT NOT AFFECTED
50 L=PEEK(16548):H=PEEK(16549):A=L+H*25
  6
60 POKE16548,PEEK(A):POKE16549,PEEK(A+1
  )
70 FOR I=0 TO 68:READ D:POKE A+I,D:NEXT

```

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Circle # 50

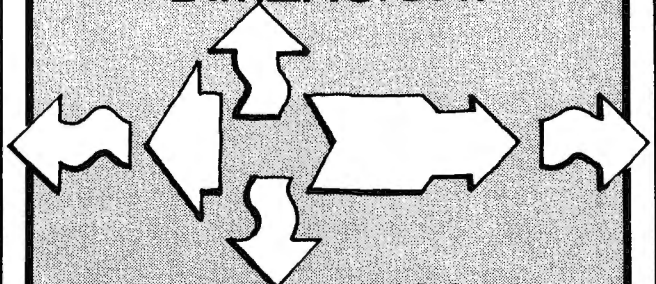
Utility programs

```

80 B=PEEK(16406):C=PEEK(16407)
90 F=(A+29)/256:G=INT(F):J=INT((F-G)*25
  6)
100 K=(A+68)/256:M=INT(K):N=INT((K-M)*2
  56)
110 P=(A+42)/256:Q=INT(P):R=INT((P-Q)*2
  56)
120 S=(A+60)/256:T=INT(S):U=INT((S-T)*2
  56)
130 POKEA+1,B:POKEA+2,C
140 POKEA+20,N:POKEA+26,N:POKEA+31,N
150 POKEA+21,M:POKEA+27,M:POKEA+32,M
160 POKEA+36,R:POKEA+37,Q
170 POKEA+51,U:POKEA+52,T
180 POKE16415,G:POKE16414,J
190 POKE16407,H:POKE16406,L
200 CLS:NEW
210 DATA 205,0,0,79,58,128,56,183,121,2
  00,254,32,40,10,254,13
220 DATA 192,62,1,50,0,0,175,201,175,50
  ,0,0,201,245,58,0,0,254
230 DATA 1,204,0,0,241,195,88,4,121,254
  ,31,200,254,28,200,245
240 DATA 205,0,0,32,251,241,50,232,55,2
  01,58,232,55,230,240
250 DATA 254,48,201,0 ■

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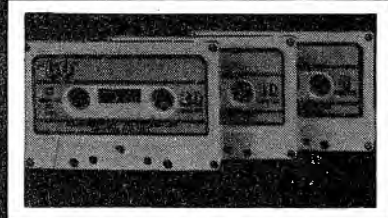
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@ News

Jim Perry

Electronic Spreadsheet Mods

I have been playing with the "Electronic Spreadsheet" and have a couple of comments.

I was using a percent calculation command, dividing one column by another and got a divide by zero error. It seems that if you have a LAB line, that you must number each column on this line as you will get the /0 error — or leave out LAB.

I often wish to print a whole 12 months' data on one page using condensed type. I have made the following changes to accomplish this:

- Change line 118: add DIM CN(15) to dimension number of columns. In setting up, label size of 12 column width of 7 will fit nicely in 120 print spaces, condensed.
- Change line 508: CLS:END.
- Add line 510: PRINT "DO YOU WANT CONDENSED PRINT (Y/N)?" INPUT Y\$: IF Y\$="Y" THEN 104.
- Add line 512:LPRINTCHR\$(30);:GOTO 104'set up small print.
- Change line 502: in the ON IG GOTO change 104 to 510.

I wanted to @NEW a wafer which I had forgotten to do earlier:

- Change line 505: CLS: PRINT "DO YOU WISH TO NEW A WAFER (Y/N)?" INPUT Y\$="N" THEN 516 ELSE IF Y\$="Y" THEN 514 ELSE GOTO 505.
- Add line 514: PRINT "AFTER 'NEWING', TYPE 'CONT' TO @FREEZE":STOP
- Add line 516: CLS:PRINT @520, "SAVING WITH @FREEZE":@FREEZE1:GOTO 500

I also wanted to know memory used in the program:

- Change line 507 by adding after FRE(W\$): PRINT "MEMORY USED IS";49152—MEM: INPUT "PRESS ENTER FOR MENU": W\$...

Type Right Secretary

Type Right Secretary (TRS) is a word processor for ESF or cassette, written by Duncan Pitman. It is a machine language program less than 4K in length and will work with a 16K (or greater) TRS-80 or PMC-80. A lower-case modification is not required to use the program.

With more than 30 commands available, the TRS program can do most things that are expected from a word processor program. With it you can insert and

delete characters or lines; find and replace specified character strings; move, insert or delete blocks of text; right-justify text and merge files together.

Possibly the most powerful feature of TRS is the ability to embed control code sequences within the text. If you have a smart printer such as an MX-80, this feature allows you to format the output in many different ways. The 12-page manual was produced on an MX-80 with liberal use of embedded control code functions, giving double width and emphasized characters.

Figure 1 Type Write Secretary Command Summary

Functions:

Arrow keys move cursor as indicated.

Shift right arrow—cursor to next tab.

Shift up arrow—cursor to text start.

Shift down arrow—cursor to text end.

<Break>	D	Delete character
"	O	Open up text
"	A	Add a line
"	N	New line at cursor
"	K	Kill line
"	E	Display capital letters
"	S	Scroll text up
"	R	Roll text up
"	Clear	Erase text after cursor
"	C	Precedes control code
"	X	Precedes escape code
"	*	Text marker

Subroutines:

<Break>	<Break>	Subroutine access
PA		Packs file
UN		Unpack file
JU		Justifies text
IN		Inserts marked text block
ER		Erases marked text block
MO		Moves marked text block
D*		Removes all * markers
WI		Clears text before the cursor
SE		Sets tab at cursor position
RE		Removes tab setting
FI		Finds character string

EX Finds and replaces string
 SI Single space printing
 DO Double space printing
 CA Upper case printout only
 BO Upper and lower case printout
 PL Print line that cursor is on
 PF Print from cursor line to end
 PC Print control characters
 @LOADn Stringy Floppy load
 @SAVEn Stringy Floppy save
 CLOAD Load cassette file
 CSAVE Save cassette file
 BA Return to BASIC command level
 (Warm restart address /20204)

The biggest drawback to TRS is the way in which it displays lower case letters—it doesn't! In order to see which characters will be printed as lower case you have to press BREAK then "E". This causes all upper-case letters to be temporarily displayed as graphics blocks. If your TRS-80 has not had a lower case modification fitted then this is certainly a slick way to indicate which characters are lower case, but it is frustrating if your computer has been modified.

Type Right Secretary is a program that you will either love or hate. It has some features that are great (embedding control codes in text) and some that are hum (no lower case display). At \$24.95 it is not over priced and is certainly better than any of the BASIC word processors I have used. ■

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Reviews

**Nanos Systems
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Nanos Systems Corporation has recently introduced a handy set of reference cards for the TRS-80 Model I, II, III and Color Computer. There are two different cards available for each model computer.

The first card is primarily for BASIC programmers and contains quick references to virtually every function which pertains to the appropriate model. This accordion-style card contains the Level II memory map, graphics characters and corresponding control codes. All the BASIC statements and Level II reserved words are presented and defined in a condensed format. Additionally, there are tables which illustrate memory overhead, special keyboard keys, print using characters, video screen line layout, BASIC internal codes and printer control codes. There's even a HEX/DEX conversion chart among its many features.

The second card is designed primarily for assembly language programmers and consists of panels which fold up accordion-style. One side contains practically every item described above for card one, while the other side contains quick reference charts and tables for virtually every item pertaining to assembly language programming.

If you are tired of using your TRS-80 instruction manual as a reference, then you will find these cards to be extremely valuable as a time-saving device as well as for reference.

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Don Scarberry

**Meteor Mission II
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Model I/III — \$15.95**

Meteor Mission II is a fast-paced arcade game which is easy to understand and to play. Your ship is dropped from a mother ship which hovers back and forth across the screen. You must maneuver the ship through a field of various-sized asteroids. You land your ship using the thrust button to slow down. On your way up, you can shoot the asteroids or speed up with your thrust button. The ship must be docked with the mother ship. The purpose of the mission is to rescue stranded astronauts.

As your skills improve, more asteroids are formed and they move faster. They reach a speed faster than your ship's so you had better have a lot of extra ships to your credit. To add to the excitement, meteor showers randomly swoop down at your ship. Your only defense against them is to stay out of their way.

Some asteroids will blink on and off a few times and will turn into a flagship. The flagship can do no more harm than an asteroid but is worth many points. Bonus points are also given if you rescue a group of six astronauts without a crash.

The graphics of Meteor Mission II are very good. Asteroids glide swiftly and smoothly across the screen. Astronauts jump on their waiting pads and shout, "Help!" Meteor showers hurtle toward your ship. Flagships are easy to spot. Landing pads with their scoring values are displayed at the bottom of the screen. The ship fires, thrusts and slows down just when you touch the button, not a second too late.

Sound effects are not very fancy but are more than I had expected. A short tune when docking with the mother ship, a shriek on landing, a bleep when a flagship forms and other sounds are features of this game.

There is a problem with the game

(or at least my version). In the two-player mode, if the second player earns an extra man, the extra man will either go to the first player or else the entire screen will fill up with arrows, which signifies the number of remaining ships you have. I think it is just as easy to play two one-player games, so I overlooked this error.

The game is well worth the \$15.95 and arrives rather quickly through the mail. The game is impossible to master to a point where it lacks challenge. A good game may last 20 minutes or so, but that comes after a couple of months. You really save the quarters with this one. Try to beat 83,190, my highest score!

Kevin Shutz

Starfighter

Adventure International
Box 3435 Longwood, FL 32750
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Starfighter by Sparky Starks is one of the newest games from Adventure International. It is advertised as an arcade simulation boasting sound effects, full graphics display, save game feature, infinite playing time and comes with a 32-page instruction manual.

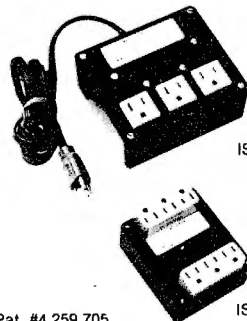
The ultimate goal of Starfighter is to gain in rank from new pilot to the coveted rank of Star Lord. This is by no means an easy task. In fact, if by some chance you were able to surpass the rank of Star Lord, a special password will appear on the screen. Advise Adventure International of this password and you will receive a special gift.

When I saw its instruction manual, I knew that Starfighter was going to be like no other game that I had even seen. The manual is called the New Pilot Induction Manual. Below these words on the cover is the insignia of the Solar Galactic Authority (SGA) and the words "top secret." The entire manual is devoted to the efficient use of the Starfighter craft.

Further reading discloses that you are commissioned by the SGA to pilot the SC-78503 Starfighter. The SGA is at war with the Petro Resource Conglomerate (PRC).

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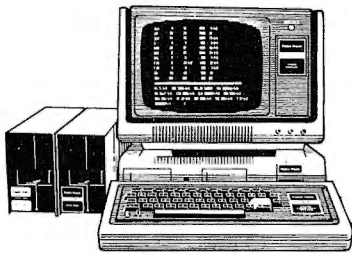
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Reviews

Your mission is to go into space and search for PRC craft. By destroying PRC craft, you gain in military rank.

The documentation for Starfighter is one of the best that I've seen. Every command is thoroughly explained in its own paragraph. There is a chapter on hypercharge, operational procedures, data display and a description of every craft that you will encounter.

The game is more complicated than described here. If you do not wish to study the manual for an hour just to learn the basics of the game, or you do not have the time to spend hours on end playing it, then this game is not for you. If you do have time to do these things, then I highly recommend it, but watch out—it can be highly addictive.

Starfighter is a two program package—the training simulator and the main mission. The simulator allows you to perform a simulated operation of the game or to encounter 11 of the 13 possible crafts. The simulated operation is the same as the main mission except it lacks Landbase Central.

Starfighter is available on cassette for a 16K Model I, Model III, PMC-80 or on disk for the Model I. A Model III disk version is in the works—call for availability.

Matt Friedenbergl

Lunar Lander
Adventure International
Box 3435, Longwood, FL 32750
\$14.95 tape, \$20.95 disk
Model I/III

Lunar Lander is a faithful replica of the popular arcade game by the same name. Written by Jack Moncrief and Mike Wall, it stretches the TRS-80 to its graphic limits. Using some of the latest frame by frame technology, Lunar Lander achieves a remarkable degree of realism, even though a slight flicker is detectable. For those who have never seen the arcade version, we will describe the game briefly.

In the opening scene, the lunar surface is presented two dimensionally as a series of jagged peaks and valleys at the bottom of the screen. The LEM is depicted in the upper center of the screen. With 5000 units

of fuel on board, you (the LEM pilot) must burn the main thruster and small directional rockets in order to make a safe landing on the lunar surface.

The LEM descends slowly at first, then the moon's gravity takes over and pulls the vehicle faster and faster downward. You must burn the main thruster (using the space bar) in order to slow the descent of the module. Each time you fire the thruster, a large flame appears at the bottom of the module and sound effects add an audible confirmation of the burn. Each burn uses up vast quantities of precious fuel. An audio-visual low fuel warning comes on when the supply falls below 1000 units.

There are several landing sites marked on the lunar surface. Each is designated with a number indicating how many points a successful landing will earn. In addition, there is a fuel depot where you may land in order to refuel up to three times during the mission. The mission is terminated when your fuel supply runs out.

The graphics are superb, with every rock and crevice shown in full detail. Several of the landing sites have narrow approaches—so narrow that it is almost suicide to attempt them. Landing the module successfully in the harder sites takes hours of practice and lots of patience.

Lunar Lander is certainly one of the most realistic and imaginative simulations for the TRS-80 to date. The animation and sound effects are excellent. The game is fun and challenging—even educational to a degree. Who knows? Maybe my five year old son is now in training for the day that he will land a real LEM on the surface of some, as yet, unknown planet.

Jim Klaproth

Berserk
TRS-80 Color Computer 16K
Microworks
 P.O. Box 1110
 Del Mar, CA 92014
 (714) 942-2400
 \$24.95

On an unknown planet, in an unknown galaxy, there rages an ongoing war between the last remaining humanoids and a race of robots. This war is a new fast action game by Mark Data Products.

Berserk consists of 75 different rooms, each of these rooms having a different floorplan. Besides different floorplans, each room contains a different amount of robots, ranging from two to twelve. The object of the game is to get through as many rooms, killing as many robots, as possible.

The only way to gain points is to

kill the robots. For each robot killed, you receive 50 points. The robots fire the same type of laser as you do, though sometimes more accurately.

Their intelligence, or accuracy in firing, increases as the number of rooms completed increases. When firing, you are stopped wherever you are, which makes showdowns with robots a fairly tedious task.

Besides being killed by enemy robot fire, which utilizes great sound effects, you can also be killed by running into any of the walls. When a robot has been hit, it takes him a few moments to complete his short circuiting. If you run into him during this time or any other time, you are killed.

To keep you from playing around in a room that has been eliminated of all robots, a small bouncing happy face appears a few moments after you enter a room. This happy face can pass through the walls and is immune to attack. Being touched by "smiley" means instant death. If caught in a foot vs. smiley race away from him, you have a slightly faster pace. During battles, though, he can really sneak up on you.

Berserk can be played by either one or two people. Joysticks are required. Berserk utilizes Hi-Res graphics and superb sound effects to create one of the most enjoyable games for the TRS-80 16K Extended BASIC Color Computer.

Roy Seney

OMNITERM

What is OMNITERM?

OMNITERM is a professional communications package for the TRS-80 that allows you to easily communicate and transfer files or programs with almost any other computer. We've never found a computer that OMNITERM can't work with. It's a complete package because it includes not only the terminal program itself, but also conversion utilities, a text editor, special configuration files, serious documentation and serious support.

Why do I need it?

You need OMNITERM if you need to communicate efficiently with many different computers, or if you want to customize your TRS-80 for use with one particular computer. You need OMNITERM to SOLVE your communications problems once and for all.

What do I get?

The OMNITERM package includes the OMNITERM terminal program, four conversion utilities, a text editor, and setting files for use with popular computers such as CompuServe, the Source, and Dow Jones — just as samples of what you can

The ULTIMATE TRS-80 Terminal Package

do for the computer you want to work with. The package includes six programs, seven data files, and real documentation: a 76-page manual that has been called "the best in the industry." And OMNITERM comes with real user support. We can be reached via CompuServe, Source, phone, or mail to promptly answer your questions about using OMNITERM.

What do I need to use OMNITERM?

A Model I or Model III TRS-80, at least 32K of memory, one disk, and the RS-232 interface, or Microconnection modem. OMNITERM works with all ROMs and DOSes, and will work with your special keyboard drivers.

What will it do?

OMNITERM allows you to translate any character going to any device: printer, screen, disk, keyboard, or communications line, giving you complete control and allowing you to redefine the character sets of all devices. It will let you transfer data, and run your printer while connected for a record of everything that happens. OMNITERM can reformat your screen so that 80, 32, or 40 column lines are easy to read and look neat on your TRS-80 screen. It even lets you get on remote computers with just one keystroke! The program lets you send special characters, echo characters, count UART errors, configure your UART, send True Breaks and use lower case. It accepts VIDEOTEX codes, giving you full cursor control. It will even let you review text that has scrolled off the screen! Best of all, OMNITERM will save a special file with all your changes so you

can quickly use OMNITERM for any one of many different computers by loading the proper file. It's easy to use since it's menu driven, and gives you a full status display so you can examine and change everything.

"OMNITERM has my vote as the top TRS-80 terminal program available today" Kilobaud Microcomputing, June 1981, pages 16-19.

OMNITERM is \$95 (plus shipping if COD) Call for 24 hour shipment. Manual alone \$15, applied toward complete package. Visa, M/C, and COD accepted. MA residents add 5% tax. Dealer inquiries invited.

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Reviews

**B-1 Nuclear Bomber,
Avalon Hill
4517 Harford Road
Baltimore, MD 21214
\$15.00 for Model III**

Avalon Hill introduced its microcomputer games in 1980 and, according to the store where I purchased my game, has had fair success with them. Included with the cassette is a two-color map and very good documentation. It's enclosed in a very nice box for convenient storage. Although there's no indication on the box that this program will work on a Model III, there are references to the machine in the instructions. It seems to run just fine on my Model III.

The game is a computer simulation in which you must fly to Russia, drop your bomb on your primary target and return safely to your base. You have the option of nine alternate targets and a chance to destroy Soviet defense complexes along the way. These are handy if your primary target happens to be deep inside Russian territory and you're out of fuel.

The commands are simple and straightforward. They are broken up into four categories—flight control, navigation, combat and bombing. All commands include AL for changing altitude, CO for changing course and AU for autopilot. Flying high increases the chance of detection but flying too low may be fatal. Course may be determined by asking your navigator (NA) and naming a city or defense complex. You'll do all your "flying" on auto. Navigational commands help you locate cities, complexes and current conditions. Combat commands include ECM (electronic counter measures) which enables you to confuse both the Sams and Migs the Russians will be launching. The problem is, the more you use it, the less effective it becomes. You may also try EV (evasive action) which causes severe changes in course. Your last option is a Phoenix missile. Although effective, they must be used sparingly as they are the only weapon that can destroy a defense complex and you are only given six missiles.

The game is error-free and loads well. I did have to correct a lower case "m" where a capital "M" should have been, but that had no effect on the operation of the game. Since the game is written for 16K, no one could expect a gigantic strategy. However, with the tremendous resources of Avalon Hill, I expected a little bit more than I got for my fifteen dollars. The game could be much improved by adding the excitement of real time. When you have seven assorted things flying toward you and you sit back, have a cup of coffee and discuss world politics and nothing happens, it loses quite a bit of the effect. The electronic counter measures seem to work too well. I flew to Russia and back several times with very little trouble. I finally had to go on a very destructive mission to run into serious trouble. In essence, I would recommend this game for the beginning gamester as it is simple to use and error proof. Although technically well done, the games leave something to be desired for the experienced player.

Mark E. Renne



**Paper Tractor Hardware
Paper Tractor, Ltd.
P.O. Box 4218
Santa Barbara, CA 93103
\$19.50**

Not long after purchasing my TRS-80 Model III, I found that without a printer the 15-line display on the screen made program writing and editing very difficult. What use is a word processing program without a printer?

My search for a printer was almost as soul wrenching as the purchase of a computer. I finally settled on an Epson MX-80 as the best combination of features and price. The only thing I regretted was not having friction feed, as I do some writing on my own letterhead. After a little experimenting, I was

able to feed my letterhead paper with the fan fold tractor.

You can imagine my surprise at seeing an ad for a "... unique solution to the restrictive nature of the tractor feed printer." The only other friction feed adaptor I had seen for the Epson was a hardware modification for \$75.00. This paper tractor for \$19.50 (plus 6% sales tax in California) looked like a good deal.

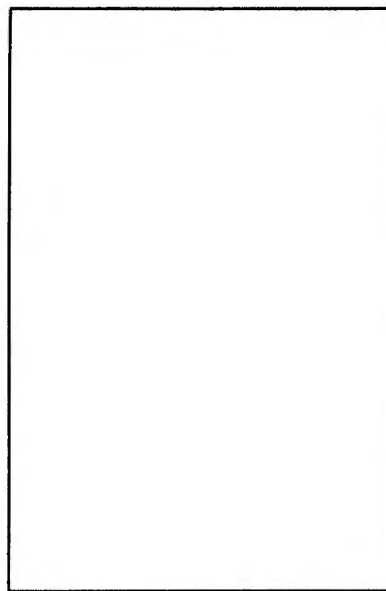
My first surprise was when I phoned in my order. I found there was an additional charge of \$3.50 for postage and handling. When you have gone so far as to make a phone call, a little thing like \$3.50 certainly isn't going to stop you.

My second surprise was coming home and finding a cylindrical mailing tube with the Paper Tractor, Ltd. return address. I'm sure you all know the sinking feeling in my stomach when I opened the tube and found a clear plastic sheet about 9.5" wide and 26" long with a taper at one end. On either edge are holes just like tractor feed paper and on one side there are flaps or sleeves to hold the paper in place. After inserting the paper in the sleeves, the plastic sheet is fed through the printer just like the tractor paper would feed and the sheet being carried is manually positioned at the proper place to start printing.

Figuring I had nothing to lose by trying, I did load a sheet of paper and fed the paper tractor into my printer. The first thing I found was that the thickness of the plastic pushed the ribbon up and over the print head. The ribbon must be manually repositioned prior to printing. Other than that, the paper tractor does operate as advertised and, "... turns your tractor feed printer into a friction feed printing system. Inexpensively." If the ad mentioned how this was accomplished or the extra \$3.50 postage and handling, I wonder how many orders they would get?

If you occasionally need friction feed for your printer and don't feel \$23.00 is too much to spend, this is the thing for you. You may want to save your pennies, however, to put with the \$23.00 and purchase the \$75.00 conversion kit.

Thomas Dowd



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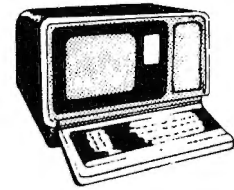
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Reviews

The Argus Chronicle
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P.O. Box 336
Maynard, MA 01754
(617) 568-8641
Cassette 16K LII \$19.95
Disk 32K \$24.95

If you're really into adventure games, then you should be aware of a new one from Edu-Ware East.

The Argus Chronicles, a machine language adventure game, places you aboard the starship Argus, which is returning from a deep space mission. An explosion in the warp engines has left you with only maneuvering power and two hours of life support. All of your radios are dead and your only hope for survival is to reach the safety of Space Station Alpha.

Suddenly, you spot Space Station Alpha dead ahead. Your attempts to raise someone on the hailing frequency are futile. The docking light is lit and so you dock your ship.

You exit the craft and begin to investigate. Why didn't anyone answer the radio, you wonder. Shortly, your wanderings disclose the reason. Alpha is deserted and further investigation reveals massive destruction everywhere.

A walk through the reception room discloses smashed furniture. Strange marks are discovered on the armory wall and outside, wrecked space craft are everywhere. A closed hatch leads to some unknown area. You open it. Fool! You just opened an exit door which releases all pressure. The air escapes into outer space and you with it. Your body explodes into a billion fragments of human pulp as you're sucked out into the endless void...

If all this sounds rather dramatic, it's because as I was playing the game, my imagination began running rampant. Playing the Argus Chronicles is much like reading a good mystery. You never know what's going to happen next. Unlike a book, a replay of the game will offer a variety of scenarios. You're always alert to avoid danger and the plot thickens as you try to discover the reason for the destruction on Alpha.

I was killed no less than four times

before I finally had to quit in order to get this review written. Each time, I just had to continue playing in an attempt to solve the mystery. The Argus Chronicles is like a good book that you can't put down.

This game is tough to crack, but you aren't even aware of that because it's so easy to become engrossed in the plot. Like other adventure games, you can pick up objects which may be needed later, examine items or your surroundings, drop objects and get an inventory of what you have picked up. You can travel in various compass directions with one or two word commands. There's even a HELP command which will display clues which may help you out of a situation. Another handy feature is that you can restart the game without having to reload it. Nice, if you get killed often.

If you have never played an adventure game, the Argus Chronicles should be your first. If you have played with them, this game will probably be the one with which all others are compared.

If this review seems short, it's because I have to hurry back to Space Station Alpha and find out where everyone is. This time I won't open the pressure hatch.

Henry Aldridge

E-Z Sounds
Model I/III Tape or Disk 16K
Adventure International
P.O. Box 3435
Longwood, FL 32750
(800) 327-7172
\$19.95

As a programmer, I had been searching quite some time to find a good sound routine that I could use in my programs without violating a copyright and that was inexpensive enough for me to use frequently. Soon after I began my search, I noticed in the latest Adventure International catalog, a program named E-Z Sounds, which would work on any TRS-80 home computer. It did not require royalties if it was used in a marketed program. I was elated at the prospect and I ordered it immediately.

Once E-Z Sounds had arrived, I

realized how much programmers could benefit from such a utility. For the many TRS-80 users in the country who wanted sound, but didn't know how to get it, this was the program for them (and for me). E-Z Sounds has many features which come in handy frequently such as full compatibility with disk or non-disk BASIC, sound interrupt key, simple translation and encoding, and simple sound editing capabilities. James Talley, the author, has used the E-Z Sounds routine in several of his own programs such as Kid-Venture, which shows that he has faith in his own work.

Within the manual, there is an explanation as to how the sound is achieved. The documentation clearly shows how the OUT statement is the key to sound and how E-Z Sounds utilizes the cassette port in this manner. Surprisingly enough, this sound routine itself is only one line! I felt a little strange remembering that I paid \$20 for a sound routine which was only a single line, but I found that there was a large demonstration program following the "bare bones" sound routine which helped to justify the cost.

The demonstration is a collaboration of many favorites which are all coded nicely, though they are greatly shortened versions of the original songs. The demonstration is called "Nickelodeon" and begins with a picture of a juke box, along with a menu of song "types" ranging from gospel to old favorites to patriotic music. The music itself is entertaining, though the process of "dropping nickles" into the juke box takes time and can be both boring and annoying.

Also within the manual, is the listing of the sound routine. The routine itself is "line packed", which means that the E-Z Sounds routine starts off as a line of almost 200 blank spaces, but is "packed" with machine language program data. The sound routine must be in machine language for speed, which was my shortcoming in attempting to make computer sounds on my own.

The sound routine is probably as good as can be achieved with the present hardware of the TRS-80


system, though there is still a little raspiness in the music and sound produced through the auxiliary port. The manual thoroughly explains how to encode sound by using a string. In addition to the basic documentation, some musical renditions are given, already encoded, to help the user get a general idea of how to work the program.

The 28-page E-Z Sounds documentation has a rather long section on the "Terminology of Music", which goes through what music is, what the significance of notes and rests are, and how music is coded on sheets.

Another fault is that there are some serious typographical errors which would go unnoticed by a novice or intermediate programmer. These errors are not minor and could be disastrous to any program. Therefore, a knowledge of the USR function is very helpful for any person interested in using E-Z Sounds.

I would say that E-Z Sounds is a well made program, but it costs a little more than it's really worth. If you have a knowledge of the USR function, or you are just desperate for a sound routine that you can use in your own programs, E-Z Sounds is for you. Otherwise, it's just an expensive demonstration.

Tim Knight



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Reviews

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Prosoft has written a simple utility that speeds up the operation of a BASIC language program. The utility, called Faster, is simple to use and ingeniously simple in concept. The result of using Faster to optimize BASIC code varies from minimal speed-up on some programs to outstanding speed-up on others. Prosoft claims that Faster will increase a program's speed by 15%-50%. From experience, I would say that the range is closer to 0%-85% depending on the type of program and its use of variables.

Using Faster



Faster comes on tape if ordered by itself and on diskette if ordered with other disk software. Either way, it can be put on disk or used directly from tape. Regardless of the medium used, Faster is loaded and run according to the usual procedures. Faster is compatible with TRSDOS, DOSPLUS, LDOS, Model III TRSDOS and NEWDOS-80. Instructions for transferring the Faster program from tape to disk are included for each of the operating systems mentioned above.

Once faster is loaded into memory, the BASIC program to be worked on is loaded into memory and run. It is not necessary to run the entire BASIC program as long as it is run through enough of the program to get a representative sample of the variable use. You will note that the BASIC program under Faster control will operate slower than usual. This is because Faster is at work.

At any time in the operation of the BASIC program, the numbers "567" can be hit simultaneously. This will bring up the Faster menu. The menu

will give you the options to "Clear Table", "Exit", "Summary", "Detail" and "Video/Printer".

The summary option selects variable print-out in descending order of frequency of use. With summary selected, the selection of video prints the variables on the CRT and the printer option prints them on the printer. The detail option produces the same list of variables but includes the number of times each variable was accessed by the BASIC program.

What Now?



That's really all there is to Faster. This list of variables is what you are after. BASIC accesses variables through a look-up table. Each time a variable is used, the interpreter searches the look-up table from top to bottom until it finds the variable. Obviously, if the most frequently used variable is at the bottom of the table, a great deal of time is wasted in searching through the table on each access. That is the elegant simplicity of Faster. It counts the number of times that a variable is used and then puts the variables in order from the most frequently used to the least frequently used. It is now up to you to put the variables in the look-up table in the proper order.

That may sound like a big job, but in fact, it is not. The addition of a DIM statement or two will do the job. Faster will tell you which lines in the program have CLEAR, DIM, DEFINT, DEFSTR, DEFFN, etc., statements. All you have to do is locate the last CLEAR statement before the main portion of the program and insert a DIM statement listing the variables in the order displayed by Faster directly after it. Other DIM statements can be removed (carefully, you don't want to remove a line that is referenced from another place in the program) and the special define statements (i.e., DEFINT) can be moved to a location directly following the inserted DIM statement(s).

How Fast is Faster?



The speed increase gained by this manipulation of variables depends on the type of program that is optimized. For example, I wrote a statistical program called Anova which requires numerous calculations. Once the data is entered, the calculations will take anywhere from 20 seconds for minimal data amounts, to several minutes with the larger data input.

I tested this program with a standard set of numbers as data. The calculation portion of the program took 24.7 seconds to complete. After using Faster, which took about 10 minutes, the same data was reentered in the same order.

First, I noted that the data entry time had decreased. It wasn't necessary to wait a second or so in order for the data to be processed before the next data element could be entered. Second, the calculation time was so fast, I missed the timing the first time around. I finally timed it out at 4.4 seconds. That is a remarkable increase.

On the other hand, a data transfer program that I wrote requires constant keyboard control and is limited by the baud rate of the modem I use. I had already optimized the program to take a steady 21.4 seconds per record and even after the use of Faster the time was 21.4 seconds. That doesn't mean that Faster didn't help. It simply means that I had already reached the limits of my equipment and any increase made by Faster would not show up.

Faster is a must for any programmer and especially for those using lengthy mathematical calculations. It will speed up games as well as applications and it will work on any BASIC program regardless of who wrote it. I recommend Faster to everyone. It is, in my opinion, one of the best inexpensive utilities available.

Richard C. McGarvey

Are you using your computer in your home workshop? Just to get you started, here is a simple little program that will very quickly show you where to set the guide on your miter box to create a box or frame of "X" number of sides.

```
10 REM MITER BOX BY J E
BAKER
20 CLS
30 INPUT"ENTER NUMBER OF
SIDES TO FIGURE";S
40 A=30
50 IF 360/(2*(90-A))=S THEN
GOTO 100
60 A=A+1:IFA>85THEN GOTO
200
70 GOTO 50
100 PRINT"SET YOUR MITER
BOX TO"A
120 PRINT:PRINT:GOTO 30
200 PRINT"CANNOT COMPUTE
THAT ANGLE":GOTO 30
```

If you wish a larger variety of sides, change line 60 to a smaller increment for A (such as .25 or even .1) Happy cutting!

Be careful of static electricity. If you work around computers and are walking across nylon carpeting, try spraying a light solution of "Downey" fabric softener on the carpets. You may have to try different ratios of water to Downey for the best results. This should drastically reduce the static.

A note on the conversion of BASIC listings for the Color Computer: Some versions of Microsoft BASIC allow abbreviations to the IF...THEN statement. Many versions of BASIC will allow you to leave out the THEN in this statement. The Color Computer does not allow this shortened version. When converting Model I or III programs for the Color Computer, be sure to convert any IF...THEN statements to the full syntax.

To disable and enable the BREAK key on Model I with various operating systems, POKE the following: Level II 16396,23 disables and 16396,201 enables. NEWDOS 2.1, 5BA5H,0 disables and 5BA5H,1 enables. NEWDOS80, 4369H,0 disables and 4369H,16 enables. TRSDOS 2.3, 23886,0 disables and 23886,1 enables.

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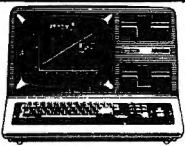
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E. J. Neiburger, D.D.S., Editor
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**Concinnator
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Some time ago, I ventured out in an attempt to learn what seemed to be an unattainable goal: assembly language. Just when I was beginning to get used to it, I decided to get a Model III computer. Much to my regret, my EDTASM version 1.2 was useless on the Model III. Well, I wasn't going to sit around and wait for my local Radio Shack to get another version from Tandy, so I bought Concinnator, a program by James Williams, distributed by Byte Miser Software and The Alternate Source.

Concinnator is a patch to the Model I version of EDTASM 1.2. I quickly discovered that it does much more than just make the program run, though. When it arrived at my home, I loaded in EDTASM and then Concinnator just as the instructions told me to do. "EDTASM/Concinnator" appeared at the top of the screen and the program was ready to run.

Along with Concinnator comes a free program, Systpe, which is the source code of a program that will combine EDTASM and Concinnator into one program so that the user doesn't have to load in two programs each time.

I thought that would be great, if only I'd had a good copy. It seems that the Alternate Source sent me a copy of a bad master tape and to this day, I do not have a Systpe which will work. After several phone calls to the Alternate Source in Lansing, I hadn't made much progress and decided it wasn't worth it. Hopefully, they have the master tape fixed by now.

As I mentioned before, Concinnator has a large number of new features. There are 14 new routines, each of which I will discuss briefly. To get into the Concinnator command mode, which allows the user to access these special commands, merely press an illegal command while in the normal Editor/Assembler (such as the letter

X).

Here are the extra features which come with Concinnator that are detailed in the thorough documentation:

1. You may reserve memory for machine language programs. This can be altered at any time, which is very helpful.

2. Dump assembled programs directly into memory, as opposed to dumping them on tape. This dumping to memory is good because it makes the next feature possible.

3. Execute dumped program. At any time, the programmer may run the program in memory. However, if the program crashes the system, the "Cass?" message will appear. Never fear, though, since Concinnator protects against system crashes and can resume wherever it left off.

4. Use of the CLEAR key. Nice for those messy programs.

5. Use of the BREAK key. Helpful for aborting loads.

6. Verify source dumps. This is fantastic, since the user can check the save after using the (W)rite command.

7. Key debounce. Helpful for Model I users.

8. Upper and lower case.

9. Selectable baud rate (for Model III only).

10. Display number of bytes left in text buffer. This is useful since a constant track of memory left is displayed.

11. Convert, display and modify contents of memory. This is almost like having a built-in T-Bug.

12. Enter SYSTEM mode. Even while using Concinnator, SYSTEM tapes may be loaded.

13. Enter BASIC's command mode. You can even save a program, like a Hex/Decimal conversion program, in memory to access.

14. Return to BASIC. This will return to the "Cass?" question.

As you can see, the features of Concinnator are pretty interesting and definitely useful. There is a special note to Model III users, though, which states that the assembled code is saved on tape in "segments", which will not work on a machine. Well, the Alternate Source has helped out with that, also, by supplying "Cypall", a

utility that will load in the "segmented" assembled output and copy it as a continuous program. I also had some trouble getting the hang of doing that, but it turned out very well.

I truly like Concinnator. I think that any other assembly language programmer with a TRS-80 Model I and, especially, the Model III, would think it useful too. Although I've had some trouble with the free program, Systpe, the other free program, Cypall, works fine. Of course, Concinnator itself is a great way of beefing up that EDTASM 1.2.

Tim Knight

**Hellfire Warrior
Automated Simulations
PO Box 4247
Mountain View, CA 94040
\$39.95 plus \$2 s/h
32K tape or disk Models I & III**

Hellfire Warrior is a continuation of the Dunjonquest series initiated by the game, "Temple of Apshai". This fascinating, real-time, role-playing game is an absolute boon to the frustrated Dungeons and Dragons fan.

Your quest is to rescue the warrior queen Byrnhild, who lies captive in the bottom of a demon-haunted pit. She is guarded by a nine-headed Pyrohydra, and Death itself will attempt to prevent your escape from the darkness of Lower Hell.

One of the more interesting aspects of this game is the Innkeeper function, which allows you to define a character from a previous game, such as "Temple of Apshai", or from one of your own creations. If you like, the innkeeper will develop a character for you. As you proceed through the four levels of the dunjon, your character will grow in his or her attributes as well as experience. Six main qualities are considered for each character: Strength, Constitution, Dexterity, Intelligence, Intuition and Ego. Some of these characteristics are fairly obvious while the importance

Reviews

of others is more obscure. For instance, while intuition will be the most important factor in finding secret doors and passages, dexterity will also be a factor.

Before actual play begins, you will have the enjoyment of bartering for your provisions with the three shopkeepers in the town. Your first stop will be with Gulik the Armorer. You will have an opportunity to haggle over the price of the various swords, shields and armor he has to offer. Likewise, you will be able to visit Fnord at the Apothecary and Malaclype the Mage in his Magic Shoppe. This haggling process is really as much fun as the game itself and is very entertaining for visitors who might be looking over your shoulder.

After outfitting yourself for your adventure, you will be able to choose the level of the dunjon you wish to enter. As would seem natural, the deeper you go, the more formidable the foes you will encounter and the greater the rewards. As you travel through the various levels of the dunjon you will find treasures which can be used to purchase new provisions for future outings. If you should have the misfortune of being killed in the dunjon, you might be found by one of the wanderers who will revive and return you to the inn for a price. If you are so unfortunate as not to be found, alas, you will become fodder for one of the monsters of Hellfire Warrior.

There are a variety of these monsters in the various levels of the dunjon. Some will be more annoyance than threat, while others are deadly to the unprepared adventurer. Your methods of battle include normal attack, thrust and parry. Each offers its own blend of offense and defense. In addition, you may fire normal or magic arrows, provided you have any. There are also special weapons within the dunjon for your use including a blowgun and javelin. The monsters you encounter in each successive level are increasingly powerful. Some have the ability to permanently reduce the attributes of your character.

Within the sixth level are minotaurs and other "taurs". This level is a maze which requires some careful searching to exit. The

seventh and eighth levels contain creatures of the dead and undead, as well as dragons and firebrakes.

Movement of your character is controlled by number commands indicating the number of feet you wish to move. Direction commands provide steering.

Other commands allow you to use the provisions you have purchased. You may drink the elixir to restore spent strength and apply healing salves to your wounds. Secret doors may be found and opened, traps may be spotted and treasure grabbed or dropped. Altogether, the control you have over your character is quite complete, providing an extra sense of involvement during the course of the adventure.

The documentation provided by Automated Simulations is excellent. A 64-page booklet clearly explains the procedure of the game and gives some insight as to your best chance of success. A folklore account of the entire dunjon is given in "The Adventures of Brian Hammerhand".

This proves invaluable in your quest for the warrior queen. Full explanations of the many commands are given as well as a couple of hints to aid you (if necessary) through some of the more difficult portions of the quest. Also included with the documentation is a command card. This hard-card lists all the commands available to you as you play and it is a very handy reference in the initial stages of your adventure. Eventually, you will learn the available commands and no longer need the card. In the back of the booklet is a description of each level of the dunjon. It provides colorful graphic descriptions of the various rooms and treasures within each level of the pit.

As of yet, I have not found Byrnild the Fair. My wife wakens me at night, asking me who this Byrnild is that I have been mumbling about in my dreams. Hopefully, I will be able to slay the foul demons and bring her to the light of day before Automated Simulations releases another blockbuster like Hellfire Warrior.

Joel Mapes



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April, 1982 111

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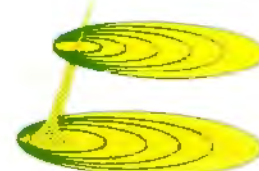


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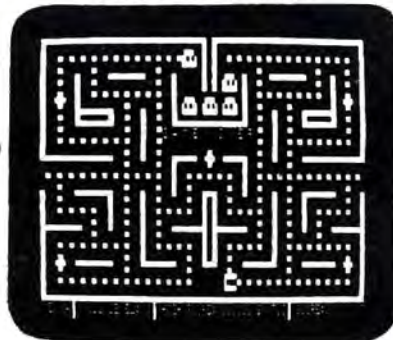
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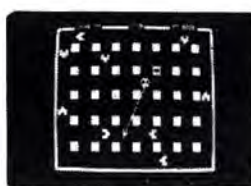
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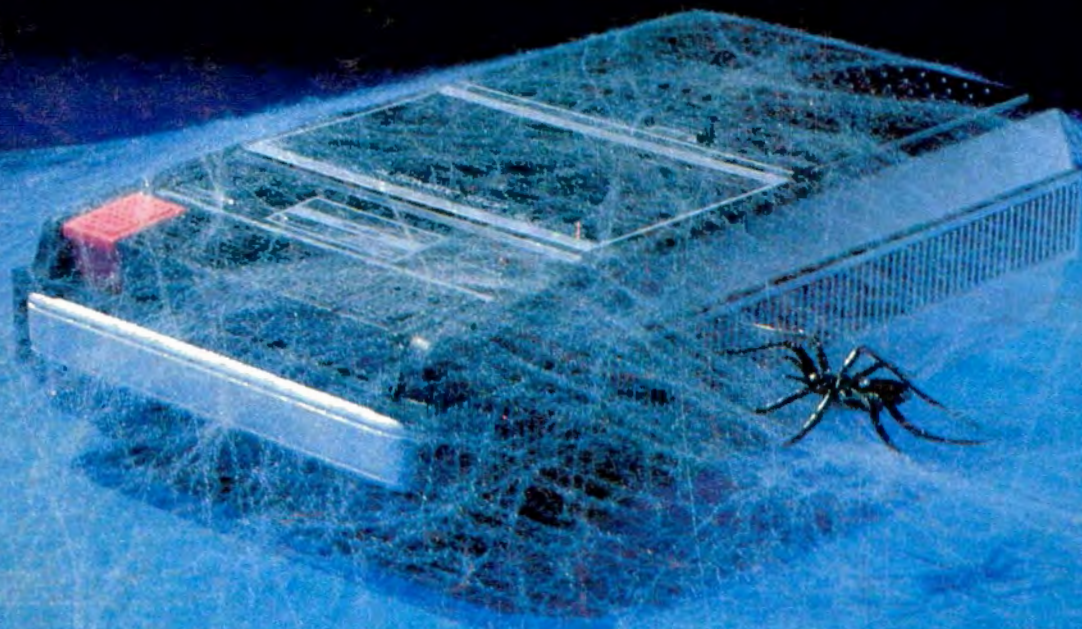
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