A Buyer's Guide to Languages

April 1983
USA $2.95 (UK£2.00)

80micro®

A WAYNE GREEN PUBLICATION

the magazine for TRS-80 users*

The Muscle Micros

Supercharged MIIIs
Hit the Open Road

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An 80 Micro
Sports Special



Plus:
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April 1983
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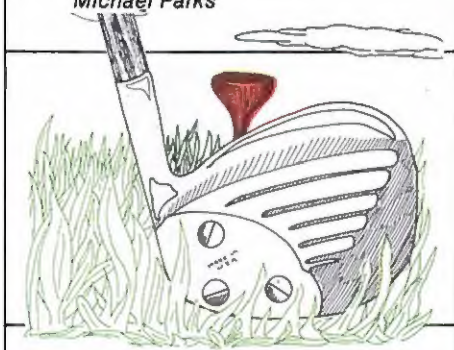
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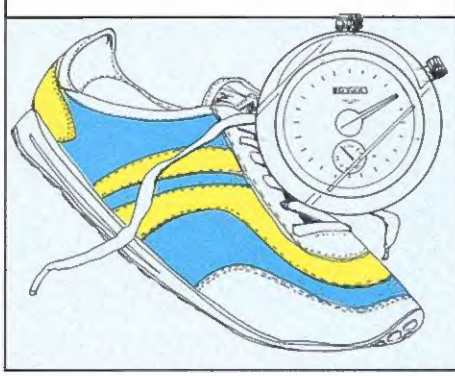
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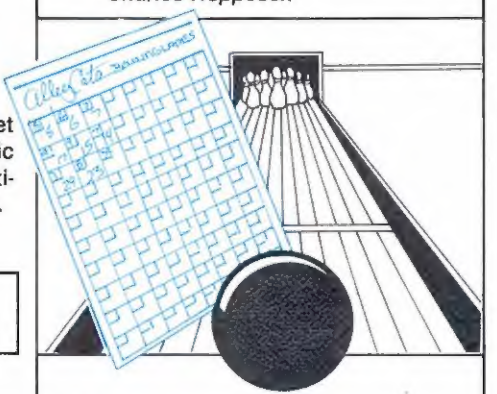


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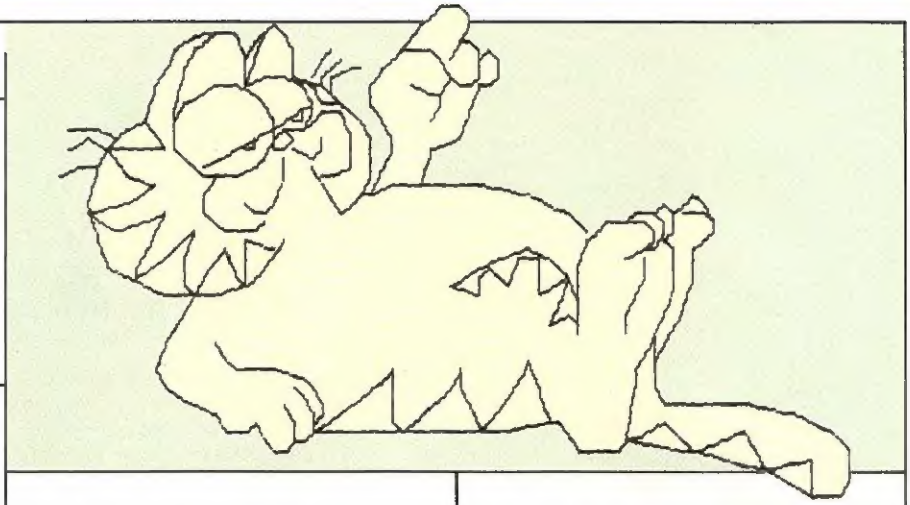
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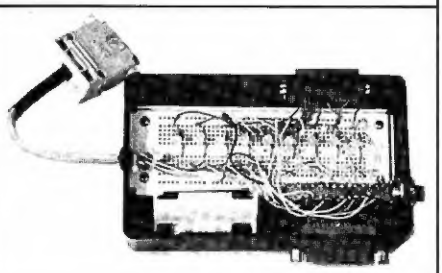


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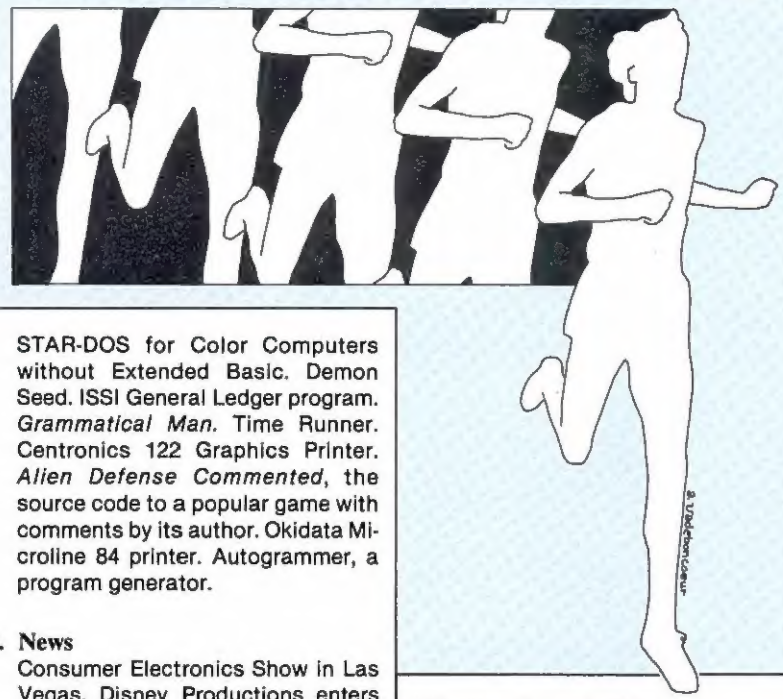
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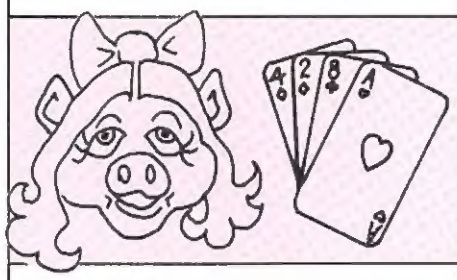
80 formats its program listings to run 64-characters wide, the way they look on your video screen. This accounts for the occasional wrap-around you will notice in our program listings. Don't let it throw you, particularly when entering assembly listings.

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STAR-DOS for Color Computers without Extended Basic. Demon Seed. ISSI General Ledger program. *Grammatical Man.* Time Runner. Centronics 122 Graphics Printer. *Alien Defense Commented*, the source code to a popular game with comments by its author. Okidata Microline 84 printer. Autogrammer, a program generator.

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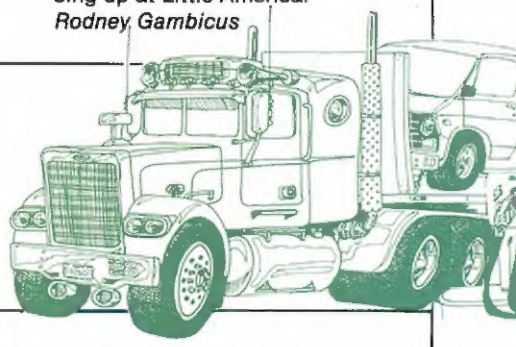
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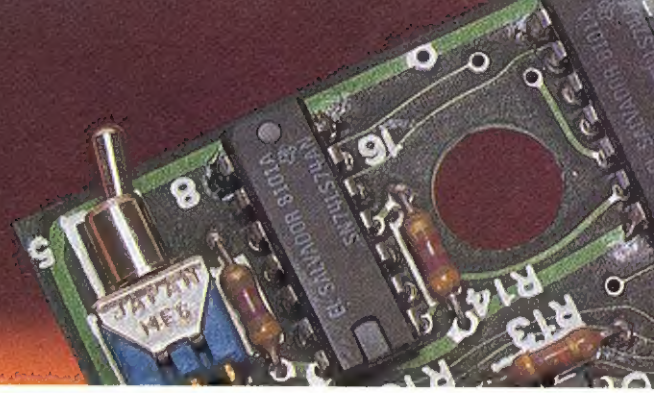


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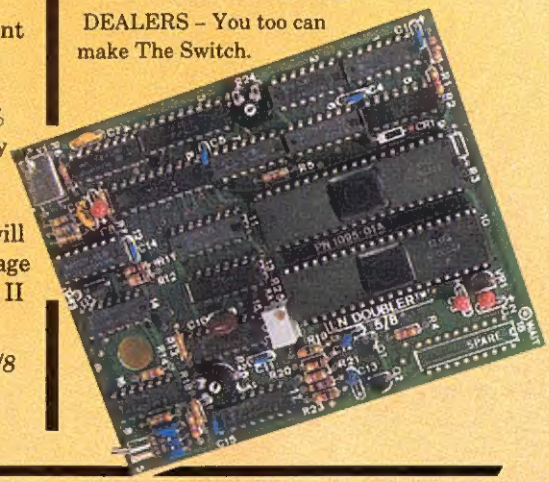
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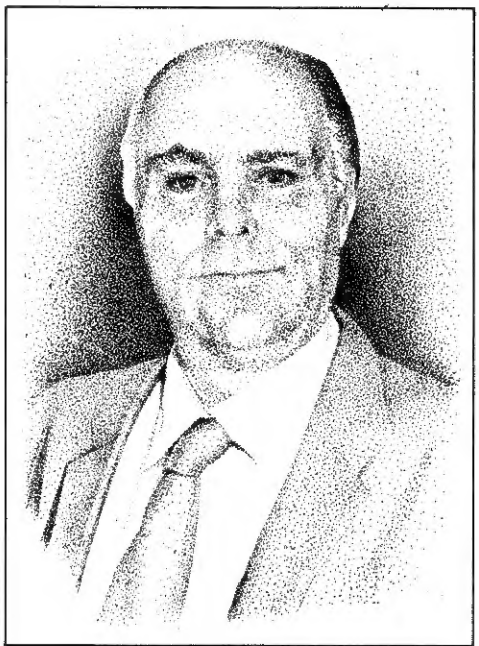
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REMARKS

by Wayne Green



The pocket computer pager?

No doubt thinking that they could pull one over Wayne's eyes while he was in Asia, the folks at Tandy sneakily bought out a pocket pager firm. But a little item on page 8 of *The Wall Street Journal* gave it all away.

Hams are used to making phone calls from anywhere and everywhere via Touch-Tone pads on their hand transceivers or mobile rigs. These signals are picked up by automatic relay stations with antennas on the tops of mountains, tall buildings, or television towers. Thus the range of a small handheld transceiver (HT) is extended from perhaps half a mile to 50 or more.

This technology, which hams have been using for well over 10 years, was brought into widespread use by our ham magazine, *73*. I sensed the importance of this mode of communications back in 1969 and got started with promoting it. At that time these relay stations—repeaters, they are called—were the province of a tiny handful of ham two-way radio experts. By dint of publishing hundreds of articles on repeaters, several books, and a monthly newsletter and organizing symposiums from coast to coast, I eventually got this to be the number 1 ham activity, with over 150,000 hams active through repeaters and over 5,000 active repeaters around the country. The activity spread around the world, and I even found one down in Swaziland when I visited there.

We did quite a job popularizing that mode of communications for hams. Now it is getting to be time for the average person to be able to take advantage of this technology.

Hams have gotten used to being able to whip out an HT and make a telephone call through a repeater from anywhere. I've made 'em while skiing down the slopes of mountains in several states. I've made 'em while walking in New York. The FCC is finally getting around to setting up a system where anyone will be able to do this. And Tandy has their foot in the door via their new pocket pager acquisition.

This communications is a natural to marry with computers. Not only will it be practical to send and receive messages while we are just about anywhere; with a pocket computer type of unit, we'll be able to write the message we want to send... and read the answer. Digital high speed computer communications can take place easily at 25,000 words per minute, which means that the average message of 100 words would take about zzzit to receive or send. I wonder how long it will be before the Radio Shack HHC has an antenna on one side that we can pull out? Or perhaps one of those little rubber stubs? At the frequencies involved, an antenna...a full-sized quarter wave... will only be a bit over 3 inches long. A 5/8ths wavelength gain antenna would be about 8¼ inches long.

I can see how it is going to be. I'll be putting on the skis at Aspen in a few years when there is a beebeep from the pocket. A message has arrived and needs answering. As I go up the lift I read the message and type out an answer, read it back on the 10-line LCD screen, and push the send button.

The message goes out, after automatically getting a cue signal from the local repeater, and is confirmed as error-free. The repeater forwards it to a satellite, where it is stored and then repeated to the addressed repeater ... stored again and then sent to the addressee. By storing messages from a wide range of customers the transmission rate of the satellites can be very high, with messages queued up for sending.

It is going to take a lot of engineers to design, build and install the system, technicians to keep it running, and sales people to sell all of the equipment and services involved.

You want data? You will be able, with your hand computer, to access any data base in the world. It's coming... and the opportunities are there for you to benefit from all this if you see it far enough ahead. Obviously the Tandy folks see it and are laying their plans.

Oh, you probably won't be lofting the satellites the system will need, but you certainly can get into business designing some of the needed equipment... and start early with some of the services this network will make practical.

The Model 16

The 16 has some good prospects, if it gets supported. I'd like to hear from users who have gotten it to do anything except creep along running Model II programs. And I know a lot of us would like to see articles on conversions of peripherals and programs designed for other systems to run on the 16. Let's send in those old cards and letters, folks.

There's a II/16 magazine, which is thinner than my wallet after Christmas, indicating that there is a great need for more information to be written in this field. Of course, there is a problem in getting articles on the II or the 16 in that most of the owners bought the machines for business; they have less of a personal interest in the computer's development. I see that less than 10 percent of the *80 Micro* readers have the systems, which reflects that viewpoint.

Hobbyists and enthusiasts generally are the ones to experiment with program conversions, new operating systems, hardware modifications to run with other equipment, networking, and so on. The average businessman buys his computer, gets the dealer to install the programs and then uses it as a

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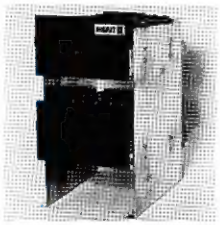
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We have to admit that we decided upon *Hot CoCo* with some trepidation. Some among us felt that the name implied games and frivolity, that people wouldn't take the magazine seriously.

But we finally decided that *Hot CoCo* conveyed the enthusiasm that we, and most Color Computer owners, feel about the machine. It is, in a sense, our guarantee that the magazine will be vibrant and (of course) colorful.

Hot CoCo will contain the same kinds of practical applications and utilities for which *80 Micro* is known. And we will give you that information in an exciting and entertaining manner. After all, who says that technical material has to be dull?

Like *80 Micro*, *Hot CoCo* will be geared toward the intermediate user. We will, however, also make it accessible to the beginner. So whether you're ready for Assembly language or have just written your first Basic program, *Hot CoCo* will have something for you.

That's it in a nutshell. By the time you read this, we'll be well on the way to producing the first issue, due out in June. If you're a Color Computer owner, be sure to check *Hot CoCo* out. If you're not, check it out anyway—you just might decide that it's time to add a Color Computer to your arsenal.

* * * * *

Certain questions have dogged mankind through the ages. Is there life after death? Is there a Supreme Being? And, of course, who invented the slashed zero?

The slashed zero (Ø) is utterly indispensible to computing. Without it, thousands upon thousands of computerists would long ago have cut their wrists while trying to write programs or type in listings. Data-entry people everywhere would be in a constant state of fear, each new zero or oh bringing on a new rush of frenzied panic.

But where did it all start? Who came up with the idea? And why?

It's conceivable that the slashed zero has been around much longer than computers. Perhaps it made its debut with the advent of the Industrial Revolution and stamped machine parts. Perhaps it goes back further, to the dawn of accounting and bookkeeping procedures.

Does anybody out there know? We'll give a subscription to someone who comes up with a documented answer. ■

"Inside AIDS-III" (*80 Micro*, March 1983, p. 136) included an incorrect phone number for SofTrends Inc. The correct number is 216-289-2002.

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Creator Commentary

I fully share Bruce Tonkin's feelings, as stated in "The Creator," about Applesoft and CBasic (*80 Micro*, January 1983, p. 74). Yet his own Creator program submits without protest to a defect as limiting as any he attributes to the "6502-based toys" and other languages: the Field statement.

Any language that is incapable of doing file I/O without all the nonsense of two sets of variables, that cannot read and write numeric values without first converting them to strings, and that is incapable of relative byte addressing, is as unsuitable for serious programming as one lacking the features that Tonkin lists in his article.

A TRS-80 has nearly ¼ of its memory committed to a version of Microsoft Basic; this fact makes it a machine to be programmed in Basic. System software for the TRS-80 must take this into account if it is to be truly useful, and yet to date NEWDOS80 is the only DOS to even try.

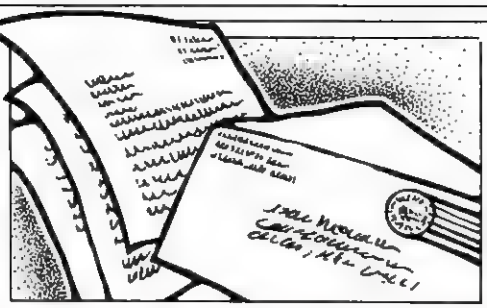
I find this inexplicable and disappointing, since it severely limits the utility of these remarkable machines. I suppose, as Tonkin explicitly states, that the problem comes from attempts to be compatible. However, compatibility with a low standard ensures low-performance products.

With all the competition occurring in the system software market, I am appalled that this situation continues to exist. Let's get this game off the TRSDOS standard. Programmers should be demanding better tools, and end users should be demanding the higher-performance products and lower development costs that are possible with improved tools.

Bob Penny
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Boulder, CO 80302

Creative Sort

"The Creator," by Bruce Tonkin (*80 Micro*, January 1983, p. 74), creates data-base management programs in Basic by writing them line by line to the disk. The program lines are not written in order, which poses a problem when



using the program under some DOSes (such as NEWDOS80).

When added to the end of Tonkin's program, Program Listing 1 will read the newly created program from the disk, sort the program lines (using the CMD"0" feature from NEWDOS80), and write the program back to the disk in the proper order.

In order to load the program into the W$ array, the preceding lines of The Creator must be deleted. Line 2980 deletes lines 1–2960 of The Creator, and line 2990 clears sufficient string space for the sort. Lines 3010–3040 read in the

Quality Software Costs

I was astonished that the cover story of your January 1983 issue would suggest that good business software should cost no more than $10 a copy. I'm certain most of your readers realize that the effort and expense required to produce a quality software product are far greater than that selling price could justify.

Those who have worked with mainframe computers know that IBM's mainframe version of our Newscript word processor, for example, rents for almost $300 per month!

The selling price of a product is based on many factors, including development costs, ongoing business costs, profit objectives, and competition. In the case of a piece of software such as Newscript, these costs may be approximated as follows.

Time to develop the product. The programming plus documentation for Newscript has, to date, taken almost two man-years. This tremendous effort required very skilled, experienced programmers. The primary author had 18 years of data-processing experience with IBM before starting the project, and 10 years of that was with editors, word processors, and interactive time-sharing systems.

I know this because that author is my husband, Chuck, and he was a Consulting Systems Engineer at IBM before we formed Prosoft. Had he stayed at IBM, he would have been paid two years' salary (and there would be no Newscript available for the TRS-80). Now, the delayed compensation has to come from sales revenues.

Most TRS-80 users expect after-the-sale support. If they don't understand how to use a piece of software, have problems with it, or need additional features, they write or call the manufacturer. We feel lucky to be in an industry where the value of this kind of customer service is appreciated, and many of our customers have given us very helpful feedback as to what they need in a product.

We've found an unanticipated pleasure in getting to know many of them through their phone calls and letters. However, it's very expensive for us to provide this necessary support.

It costs several thousand dollars a month to provide qualified people, office space, and training. To date, we have never interviewed a job applicant who was willing to work just for the fun of it; they all expected to be paid a good salary in return for their time and skills.

There are many expenses associated with running any business, including salaries, insurance, rent, equipment, and supplies. Again, these come to considerably more than $10 for each copy sold of Newscript, and I suspect that most long-established businessmen would laugh at our naiveté in setting our product prices as low as we did. We

```
2960 CLOSE
2970 REM SORT ROUTINE BY W.J. WILSON - DECEMBER 1982 - TO BE APP
ENDED TO THE CREATOR BY BRUCE TONKIN
2980 CMD"F",DELETE 1-2960
2990 CMD"F=SASZ",20000:DIMW$(1000),W(1000):WI=0
3000 CLS:PRINT"THE CREATOR IS NOW SORTING THE LINE NUMBERS INTO
ASCENDING ORDER. THIS WILL TAKE JUST A MINUTE, THEN YOUR PROGRAM
 WILL BE READY TO RUN."
3010 OPEN "I",1,PQ$
3020 IFEOF(1)THEN3050
3030 WI=WI+1:LINEINPUT#1,W$(WI):W(WI)=VAL(W$(WI))
3040 GOTO3020
3050 CMD"O",WI-1,W(1),W$(1)
3060 OPEN"O",2,PQ$
3070 FORJ=1TOWI:PRINT#2,W$(J):NEXTJ
3080 CLOSE
3090 PRINT:PRINT"FINISHED!":END
```

Program Listing 1

program lines from the disk, line 3050 sorts them, and lines 3060–3080 save the sorted program lines to the disk.

Be sure to save the appended program before running it, as line 2980 will delete most of it!

W. Jeffrey Wilson
3102 Sawtelle Blvd. #3
Los Angeles, CA 90066

Demons Debugged

"Suppress Those Demon Transients" (*80 Micro*, Anniversary Issue 1983, p. 578) was informative in advising people of the hidden hazards in their power outlets. A couple of points need to be clarified, however.

RFI (radio frequency interference) is a subset of the broader spectrum of EMI (electromagnetic interference). They are not different forms of noise; RFI is EMI, but not all EMI is RFI. Computers and disk-drive motors both generate EMI.

Static electricity is not an EMP (electromagnetic pulse). EMPs typically occur due to lightning discharge, nuclear weapons detonations, or other sudden horrendous electrical phenomena.

Clamping voltage refers to the voltage that the varistor (surge suppressor) clamps the output voltage to under a surge condition. The lower this voltage, the better. Capacity of suppressors is correctly rated in "joules," which is energy-absorbing capacity, not overvoltage-handling capacity.

Charles F. Kerchner, Jr.
Kalglo Electronics Co. Inc.
6584 Ruch Road
Bethlehem, PA 18017

True to the II

You have finally printed what I've been waiting for: games and programs that run on the Model II. Because of PEEK and POKE commands in Model I and III programs, it's very frustrating to make most of those you print work on a II. Let's see more programs for our Model IIs.

Dave Dolata
321 Watson St.
Ripon, WI 54971

They're on the way.—Eds.

simply didn't know how much it costs to change from a family business run from the house to a "normal" business with office space, employees, and ongoing bills.

Most of your readers buy disks and paper, and can estimate what it costs us for each copy of our products: A high-quality disk (often a flippy, rated for two-sided use), a 280-page book, a reference card, and miscellaneous packaging materials and boxes, cost pretty close to $10 all by themselves. In some cases, it's been over $10, and in no case is it free.

And then there is the cost of advertising, another little detail that cannot be ignored. We could have the most marvelous product in the world, but no one would buy it unless he knew it existed and what it could do. But the magazines that run the ads have high expenses and profit objectives also, so they in turn charge for the ad space.

When you figure the number of copies of a software product sold per month, and the cost of ad space, you'll find it often costs more than $10 per copy just for the ad! I must stress here that neither the sellers nor the buyers can avoid this: A business must advertise to survive, and people can only buy things they know exist.

Finally, there is the matter of dealers and dealer discounts. We LOVE dealers. They multiply our selling powers a hundredfold or more. They can reach customers who otherwise never would know that Newscript exists, give them demos, overcome the normal distrust of buying a mail-order item, and provide local, immediate, in-person support afterwards.

However, a dealer has a problem. Like ourselves, he has expenses, and has to show a profit to stay in business. So, he has to buy our products at a substantial discount from the retail price. This is true of any retailer in any business.

But it also means that Prosoft doesn't get $125 for each copy of Newscript sold. Most of our sales are through dealers, so most of our sales are at considerably less than $125 a copy (or, if it's a utility, much less than $25–$40 a copy).

In the early 1970s, I was told that it cost IBM $15 to mail an empty carton. That sounded ludicrous at the time, and I attributed it to bureaucratic inefficiency. Now I'm the one paying the bills, and it seems that Prosoft can ship the same empty box for about $5 or $6 (remember, UPS charges about two bucks just for the postage, and the box costs almost a buck).

Your readers and our customers deserve and demand good value for their money, and a manufacturer who will still be around to service his products after the sale. To accomplish this, the manufacturer must set his prices fairly for his customers and his own continued existence.

Debbie Tesler, President,
Prosoft
P.O. Box 560
No. Hollywood, CA 91603

```
10 CLEAR 500
20 CLS: PRINT"FROM THE CONFINES OF GOVERNMENT BUREAUCRACY, TO CO
RPORATE"
30 PRINT"COMMUNICATIONS, TO POLITICS, BUZZ WORDS AND PHRASES ARE
"
40 PRINT"INCREASINGLY USED TO MASK THE REAL FACTS, OR TO CREATE"

50 PRINT"AN IMAGE OF ERUDITION, OR TO SIMPLY INTENTIONALLY SAY"
60 PRINT"NOTHING. YOU TOO CAN ACCESS THESE BUZZ PHRASES FOR"
70 PRINT"WHATEVER USE YOU MAY HAVE BY ENTERING ANY THREE-DIGIT"
80 PRINT"NUMBER."
100 FOR I=0 TO 9: READ A$(I): NEXT I
110 FOR J=0 TO 9: READ B$(J): NEXT J
120 FOR K=0 TO 9: READ C$(K): NEXT K
130 PRINT @512,"ENTER ANY THREE-DIGIT NUMBER.>";:INPUT N$:IF LEN
(N$) <>3 THEN PRINT @512, STRING$(40,32):GOTO130
140 LN$=LEFT$(N$,1):MN$=MID$(N$,2,1):RN$=RIGHT$(N$,1)
150 FOR I=0 TO 9: IF VAL(LN$)=I THEN LN$=A$(I)
155 NEXT I
160 FOR J=0 TO 9: IF VAL(MN$)=J THEN MN$=B$(J)
165 NEXT J
170 FOR K=0 TO 9: IF VAL(RN$)=K THEN RN$=C$(K)
175 NEXT K
180 P$=LN$+" "+MN$+" "+RN$+"'":PRINT:PRINT"YOUR BUZZ PHRASE IS '
";P$
190 PRINT: INPUT "NEED ANOTHER PHRASE? (Y OR N)";Z$:IF Z$="Y" TH
EN PRINT @512, STRING$(40,32):PRINT @640, STRING$(60,32):PRINT @
768, STRING$(60,32):GOTO130
195 END
200 DATA INTEGRATED, TOTAL, SYSTEMATIZED, PARALLEL, FUNCTIONAL,
RESPONSIVE, OPTIONAL, SYNCHRONIZED, COMPATIBLE, BALANCED
210 DATA MANAGEMENT, ORGANIZATIONAL, MONITORED, RECIPROCAL, DIGI
TAL, LOGISTICAL, TRANSITIONAL, INCREMENTAL, THIRD-GENERATION, PO
LICY
220 DATA OPTIONS, FLEXIBILITY, COMPATIBILITY, MOBILITY, PROGRAMM
ING, CONCEPT, TIME PHASE, PROJECTION, HARDWARE, CONTINGENCY
```

Program Listing 2

Questionable Conversion

I recently received a printout of a Model III game that was copyrighted 1980 (part of a friend's computer literacy course). At first I intended to convert it for my Color Computer, but after seeing the copyright, I'm not sure. Is it legal to convert a copyrighted program to a different computer?

Dan Redding
418 E. 10th St.
Gibson City, IL 60936

You're probably OK, as long as your conversion is only for personal use.—Eds.

Verbal Violence

Too much of *80 Micro*'s constructive criticism of Radio Shack or of Shack products is buried under barrages of sarcasm and negativism. Why not work harder at writing persuasive arguments instead of verbal assaults?

The IQ and literacy levels of your subscribers is undoubtedly more than a cut or two above the national average. If you believe you have to persist in this form of journalistic bloodletting in order to hold your subscribers, please think again.

S. Thomas Tompach
1800 E. Sixth St.
Merrill, WI 54452

Instant Buzz

We have all heard the many buzz words and phrases used extensively in corporate communications, government publications and releases, and politics.

80 Micro readers may have occasion to use such phrases, and Program Listing 2 will supply them.

Bill Crusinberry
Houston, TX

Time Manager Patch

The Time Manager program sold by Radio Shack for the Model III is useful, but it has an irritating bug. One of the menu choices permits the selection of various flags to specify such things as upper- or lowercase, and line feeds.

It's intended that the user optionally write these flags to the data disk to preserve them for subsequent accesses of the data, but this feature does not function. The programmer forgot that the SRL (HL) instruction does not shift the carry bit. He should have used RR (HL) instead. The fix is:

PATCH TIMEMGR/CMD (ADD=863C, FIND=3E, CHG=1E)
PATCH TIMEMGR/CMD (ADD=8642, FIND=3E,CHG=1E)
PATCH TIMEMGR/CMD (ADD=8648, FIND=3E,CHG=1E)
PATCH TIMEMGR/CMD (ADD=864E, FIND=3E,CHG=1E)

If you would like the default disk drive number to be 2 instead of 1, move the code from 7CE3 through 7CF2 up one byte so that it starts from 7CE2 (this uses a NOP that formerly resided there). Then add 3E and 02 at 7CF2 and 7CF3 respectively.

Lynn Gallup
5932 Grove St.
Edina, MN 55436

Basic Modifications

I would like to make a few comments and suggest a few simple modifications to my article, "A Basic Compiler in Basic" (*80 Micro*, October 1982, p. 122).

The program as published contains no typographical errors or known bugs, so if you type it correctly it should work as expected. It works equally well on a Model I or III.

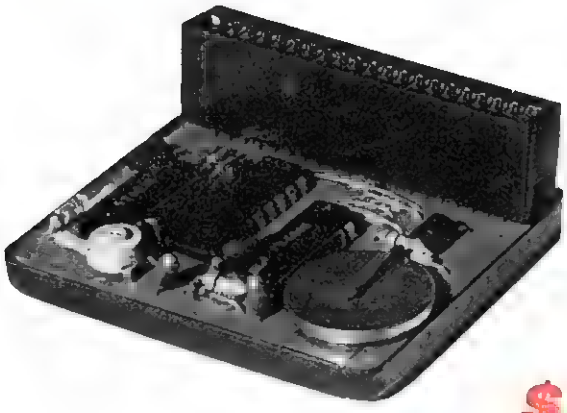
The following modifications make the program compatible with cassette and disk systems with 16K, 32K, or 48K. They also make the compilation process faster by 20–30 percent. The user must still specify the memory available (MR = -2 or 1 or 0 for 16K or 32K or 48K respectively in line 1005).

- Change the statement D1 = D1 + 256 in line 836 to D1 = D1 + SGN(MR + 2)*256.
- Change the statement P1 = P1 + 256 in line 840 to P1 = P1 + SGN(MR + 2)*256.
- Delete lines 848–857.
- Change lines 847, 1000, 1230, and 1300 as shown in Program Listing 3.

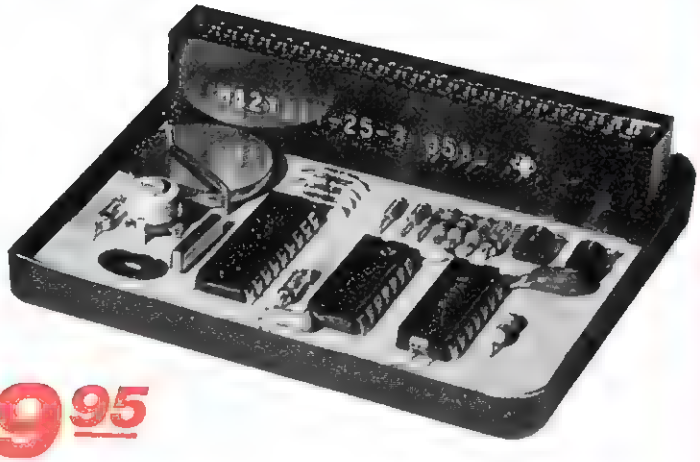
The changes in lines 836, 840, and 1300 make the program compatible with cassette and 16K systems. The change in line 847 and the deletion of lines 848–857 speed up the routine that converts a single precision constant into

NEWCLOCK-80

MODEL I

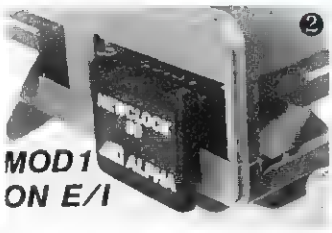


MODEL III



$59.95









Wouldn't it be nice if your computer could always boot up with the right time and date and then stay accurate. Newclock-80 will enhance your Model I or III system with powerful clock/calendar/timer functions.

Using LSI (large scale integration) and custom circuits, Newclock-80 provides MO/DATE/YR, HR:MN:SEC plus AM/PM and day of week and even takes care of leap years! It continues to keep time and date with quartz accuracy when the computer is turned off or experiences a power failure. A single battery lasts over 2 years.

Compatibility: Newclock-80 is compatible with any operating system, including DOSPLUS, NEWDOS, LDOS. With its fully decoded circuitry it will work with any other hardware you may own. Bus expanders are available.

Installation is very simple, no tools, no disassembly, no soldering. Just plug it in, that's all. There is no power supply or messy cable. Newclock-80 plugs into the rear of the keyboard ❸ or side of the Exp. Int. ❷. Model III Newclock fits the 50 pin card edge (underneath) ❶

The Software: Newclock-80 is as easy to use as it is to install. -"SET", a Basic program, is used only once to set the time and date and select 12 or 24 hour format. -"TIMESTR", also in Basic, patches your computer "TIME$" function to read Newclock-80. It also adds "TIME$" to keyboard-only systems, a short routine is simply "poked" into low memory.

Newclock-80 uses 12 ports (176 to 188): 6 for the time, 6 for the date. The data is conveniently stored in decimal form, no conversion is needed You can read or modify any digit using simple Basic "INP" and "OUT" statements.

No risk trial. Order your Newclock-80 today, see how easy it is to install and operate then decide within 30 days if you want to keep it. If for any reason you are not delighted with its quality and performance, you may return it for a prompt and courteous refund.

Your unit will come complete ❹ with software on tape, detailed instructions, handy reference card, and a 90 day warranty. Specify Model I or III. Software is also available on disk: add $5.
Lithium battery (not included) available from RADIO-SHACK (#23-162) or add $1.50 to your order.

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```
[illegible]
10:P=35:GOSUB512:C1=PEEK(Z+1):GOSUB910:P=35:GOSUB512:C1=PEEK(Z+2
):GOSUB910:P=35:GOSUB512:C1=PEEK(Z+3):GOSUB910:Q=Q-1:RETURN
1000 CLEAR200:DEFINTA-Q,S-Z:DIML1(100),L2(100),A(50),D(25),E(25)
:Q=0:P=0:PC=0:PN=0:M=0:C=0:C1=0:V1=0:P1=0:C$="":E1=0:D1=0:V0=0:X
=0:Z=0:L=0:Z1=0:F$="BASIC COMPILER"+STRING$(50," "):T$=CHR$(32)+
CHR$(58)+CHR$(32):CLS
1230 FORJ=1TOL-2:IFDN=L1(J)THENDN=L2(J):PRINTL1(J);:J=L-2
1300 PRINT:A$=INKEY$:IFPEEK(16396)<>201THENDEFUSR0=MCELSEC1=MC:G
OSUB636:POKE16526,E1:POKE16527,D1
```

Program Listing 3

four-byte representation.

Changing line 1000 speeds up the program overall by defining the most-used variables early. Finally, changing line 1230 speeds up the routine that adjusts the jump addresses of the compiled code. None of these changes has any effect on the machine code produced by the compiler.

Dimitri P. Bertsekas
M.I.T., Rm. 35-210
Cambridge, MA 02139

Model Modem

If you are having problems transmitting or receiving with your modem, you can try three methods that finally worked for me.

First, I replaced the 25-foot telephone cord between the wall and the modem with a short seven-foot cord.

Then I plugged the cord from the modem directly into the wall jack. Before, it had gone into a Y-plug at the wall. This was a big improvement, but I still saw about 50 percent mistypes appearing on my screen when I transmitted.

Last, I grounded my computer. My house has older wiring and the sockets only accept a two-prong plug, so I had been plugging into an adapter and leaving the ground wire unconnected.

This had never affected my computer, disk, or printer operations, but as soon as I attached the ground wire to the screw holding the plate to the wall, the last of my modem problems was solved. It now works 100 percent of the time.

Tom Purnell
Crow Enterprises
32533 Regents Blvd.
Union City, CA 94587

CC Reception

I would like to commend Michael Chuck on his "CC CQ" article (*80 Micro*, December 1982, p. 200). For those hams who have done their own 32K upgrade, the following modification to the program will allow it to receive.

In the machine-loading program, change both 6's in line 90 to 4's, and the 7 in line 100 to a 5. In case your RAM upgrade was configured differently, you can PEEK(65314) and replace the 7 in line 100 with the PEEK value, and the 6's in line 90 with a value equal to the PEEK–1.

Mark Wilson
Box 794
Potsdam, NY 13676

80 ALERT

Occasionally, 80 Micro receives letters from readers who have had difficulties with our advertisers. Most of the time, these problems are resolved to the satisfaction of all parties, but some problems appear to be insoluble.

As a service to readers and advertisers alike, 80 Alert will pinpoint distributors who cannot be reached, by readers or by our advertising department, for customer service. Anyone who has current information about a manufacturer or distributor mentioned in the column is welcome to write and update our data.

We've received five letters concerning Shannon Magnetics, or Data Resources (304 Elati St., Denver, CO 80223). In each case, the reader ordered supplies, mostly disks, and paid by credit card. Although the credit cards were charged immediately, the supplies never arrived.

Shannon Magnetics told customers that the disks were back-ordered. The company agreed to send refunds, but customers report that they never received them.

We have not been able to contact Shannon Magnetics. The company's telephone numbers have been disconnected, and they have not answered correspondence. So far, we have been unable to obtain any further information.

AFL Products Inc. has recently moved to a new location. Its correct address is 1315 F Nelson St., Denver, CO 80215.

NEWDOS80 Doesn't?

As I write this, I'm hoping that you will tell me I'm all wrong, but I believe that David Busch's article, "Nine Programming Tricks," is all wrong about the NEWDOS80 1.0 and 2.0 REF finding Print statements to change to LPRINT by entering REF"PRINT (*80 Micro*, Anniversary Issue 1983, p. 56).

NEWDOS will find variables and strings such as "Please print your name clearly." It will not find Basic statements such as PRINT, GOTO, and LPRINT.

Also, Busch's other eight programming tricks were rather elementary and not very tricky.

Edward O. Noble
P.O. Box 759
Mesilla Park, NM 88047

Yes, It Does

You got your wish; I am happy to tell you that you are all wrong. NEWDOS-80 will find keywords such as PRINT or GOTO using the REF command, exactly as described in my article and the NEWDOS80 2.0 documentation (p. 7–7).

I suggest you load a Basic program, type REF=PRINT, and watch the results carefully. If the string you are looking for is unpacked (not a keyword), you can still find it by using the format REF"string. There are three or four other REF formats in NEWDOS80 that I haven't even covered. It is a very powerful command.

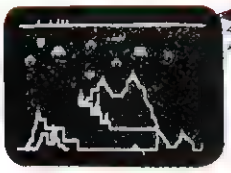
As to the other eight programming tips, 80 Micro *has always been aimed at TRS-80 users of all competency levels. If you find a given article too simple, I'm sure you'll find something among*

All photos are actual TRS-80 screens.



REAR GUARD

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



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



PANIK

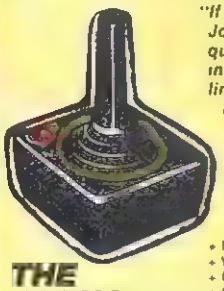
Trapped at an enemy building site, your fate seems certain. Your laser is empty and evil Mizors are closing in. You'll have to climb ladders and think one step ahead of the various monsters. A challenging game for agile minds. From Fantastic Software with voice (Disk has larger vocabulary). Price: B



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

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–80 Microcomputing 80 Reviews, Jan '82

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5. CATERPILLAR – *Good rendition*
6. CRAZY PAINTER – *Unique game concept*
7. DEFENSE COMMAND – *Tough struggle*
8. STELLAR ESCORT – *Fast and Challenging*
9. ROBOT ATTACK – *With voice*
10. SEA DRAGON – *Amazing "Seascape"*

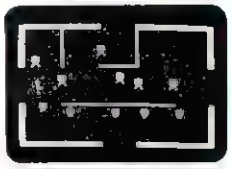
STELLAR ESCORT

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



ROBOT ATTACK

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



LUNAR LANDER

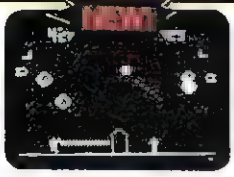
As a vast panoramic moonscape scrolls by, select one of many landing sights. The more perilous the spot, the more points scored. If you land safely. You control LEM main engines and side thrusters. One of the best uses of TRS-80 graphics we have ever seen. From Adventure International. With sound. Price: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





SUPER NOVA

Asteroids float ominously around the screen. You must destroy the asteroids before they destroy you! Big asteroids break into little ones! Your ship will respond to thrust, rotate, hyperspace and fire. Watch out for that saucer with the laser! As reviewed in May '981 Byte Magazine. Price: A



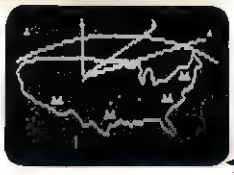
OUTHOUSE

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



GALAXY INVASION

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



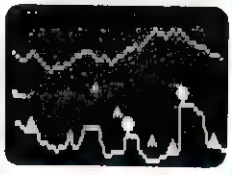
LASER DEFENSE

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



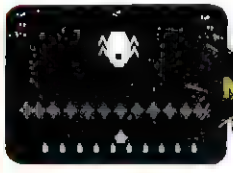
CHICKEN

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



PENETRATOR

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



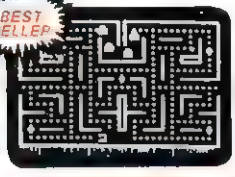
DEFENSE COMMAND

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



BOUNCEOIDS

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



SCARFMAN

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



ARMORED PATROL

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



CATERPILLAR

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



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David D. Busch
515 Highland Ave.
Ravenna, OH 44266

Lacking Lobster

I travelled all over Mississippi, Louisiana, and Tennessee clutching Kaczor's "Tracking Lobster" program (*80 Micro*, December 1982, p. 150). I didn't find any.

Please print an article about tracking crawdads, or at least a Tracking Doodlebug Hole program.

Leigh L. Klotz, Sr.
119 Harmony
McComb, MS 39648

Integrated Information

The concept of integrated software sounds exciting. Are you aware of any integrated software programs being developed for the TRS-80 Model III?

I would appreciate any advice or information you can give me regarding this subject.

David F. Smith
2047 Pine River Drive
Kingwood, TX 77339

Limited to 48K of RAM, the Model III is probably not suitable for complex, memory-intensive programs such as the new integrated packages. With the announcement of the 128K, 80-column Model IV and the continued development of the 16-bit Model 16, integrated software will become available on Tandy computers over the next one to two years.—Eds.

Printer Driver Problems

We have received many responses to an Input letter requesting information about printer drivers for SuperScripsit (January 1983, p. 16). For a sampling of solutions to the problem, see Feedback Loop, p. 376.—Eds.

NODOS News

My article titled "NODOS 80" (*80 Micro*, Anniversary Issue 1983, p. 96) makes utilities and commands normally only found on disk systems available to the cassette tape user. The index and guide for Load 80 inadvertently excluded the fact that the four NODOS 80 source code listings would be on the Anniversary Issue tape.

I have received numerous requests for the object code (SYSTEM program) from persons who either do not have an editor/assembler or would rather have a single program to load instead of the four parts compiled from the source code.

For those interested in receiving the System (machine language) program, I will provide a high-quality cassette with two copies for $10. The charge stated is a copying, cassette, and postage charge, not a sales price for a program. I am not offering to supply the source code; you can get this from *80 Micro* on Load 80.

The program I am offering contains the compiled code given in Listings 1–4 of the NODOS article as corrected below. It is ready to run using the System command.

If you plan to key in NODOS 80 yourself, the correction below should be made to the code given in Program Listing 4:

```
16820 SABERR CALL 24A0H
```

This ends the problem of hanging up the computer if you enter the partial command CMD"O or CMD"O".

I don't plan to support the program in any other way since it is an adaptation of another's code; I trust the original authors have fully tested their code. Minor problems I have discovered that are not fatal are discussed in the article.

I will try to answer any questions by mail if you include a self-addressed and stamped envelope.

Thomas L. Quindry
6237 Windward Drive
Burke, VA 22015

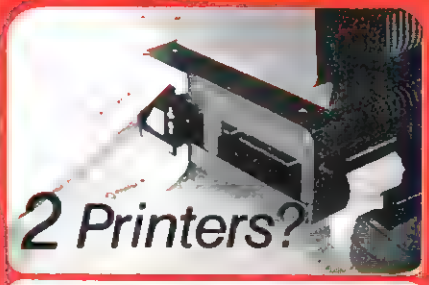
Color ABCs

My youngest child is 2½ years old. He recognizes a few of the alphabet let-



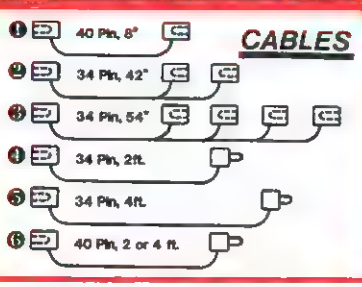
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GREEN SCREEN WARNING

IBM and all the biggies are using green screen monitors. Its advantages are now widely advertised. We feel that every TRS-80 user should enjoy the benefits it provides. But **WARNING**: all Green Screens are not created equal. Here is what we found:

- Several are just a flat piece of standard colored Lucite. The green tint was not made for this purpose and is judged by many to be too dark. Increasing the brightness control will result in a fuzzy display.
- Some are simply a piece of thin plastic film taped onto a cardboard frame. The color is satisfactory but the wobbly film gives it a poor appearance.
- One "optical filter" is in fact plain acrylic sheeting.
- False claim: A few pretend to "reduce glare". In fact their flat and shiny surfaces (both film and Lucite type) ADD their own reflections to the screen.
- A few laughs: One ad claims to "reduce screen contrast". Sorry gentleman but it's just the opposite. One of the Green Screen's major benefits is to increase the contrast between the text and the background.
- Drawbacks: Most are using adhesive strips to fasten their screen to the monitor. This method makes it awkward to remove for necessary periodical cleaning. All (except ours!) are flat. Light pens will not work reliably because of the big gap between the screen and the tube.

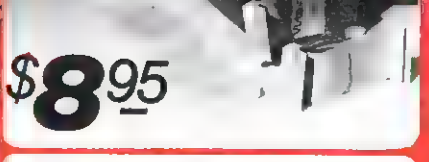
Many companies have been manufacturing video filters for years. We are not the first (some think they are), but we have done our homework and we think we manufacture the best Green Screen. Here is why:

- It fits right onto the picture tube like a skin because it is the only **CURVED** screen **MOLDED** exactly to the picture tube curvature. It is Cut precisely to cover the exposed area of the picture tube. The fit is such that the static electricity is sufficient to keep it in place! We also include some invisible reusable tape for a more secure fastening.
- The filter material that we use is just right: not too dark nor too light. The result is a really eye pleasing display.

We are so sure that you will never take your Green screen off that we offer an unconditional money back guaranty: try our Green Screen for 14 days. If for any reason you are not delighted with it, return it for a prompt refund.

A last word: We think that companies like ours who are selling mainly by mail should: list their street address; have a phone number (for questions and orders); accept CODs, not every one likes to send checks to a PO box; offer the convenience of charging their purchase to major credit cards. How come we are the only green screen people doing it?

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ters on signs and in books, so I decided to see if he could identify them on our 16K Color Computer. I was overwhelmed by his response!

As soon as I showed him how to push the A key and he observed it on the screen, he took over the machine. I printed out the entire alphabet on a separate sheet of paper and he punched the keys. To check his understanding, we went to the screen and he pointed to the letters he knew and told me what each one was.

My husband sold me on the capabilities of a home computer; now I am persuading other mothers to invest in their children's educations. The Color Computer is a valuable asset to our home.

Patricia Ford
P.O. Box 952
Steubenville, OH 43952

Cure for TRSDOS 2.3B

I read with interest Jerry Reiser's letter (*80 Micro*, January 1983, p. 16) concerning his problems with using the operating system on Radio Shack's Series I Editor/Assembler disk version, TRSDOS 2.3B.

The B must stand for bad! He's right—no documentation, no support, and incompatibility with TRSDOS 2.3. I once shared his frustration, but now I can offer some advice that should alleviate the pain. Just follow these steps:

- Take the Editor/Assembler disk with that "improved" operating system, and put it in very close proximity to a magnetic bulk eraser.
- Turn on the bulk eraser.
- Invest in a copy of NEWDOS80 Ver. 2.0. It has a nice editor/assembler, a modification of Radio Shack's cassette version, that seems to be compatible with TRSDOS 2.3.
- Save your Series I manual; it was well worth the $34.95 you paid for the program. The instructions are pretty much the same for the Apparat version, except use B instead of Q to exit to DOS, and use slashes (/) instead of commas (,) to separate the switch commands.
- Pretend you never heard of TRSDOS 2.3B.

Of these five instructions, the fifth is the easiest, but the first and second can be performed with diabolical joy. My third suggestion is the most difficult, but worth the effort.

Chuck Agne
1315 E. Mulberry #24
San Antonio, TX 78209

Government Group

Ninety-nine percent of all Model II owners appear to be nongovernmental users, and most business programs are aimed at nongovernmental users. Governmental users require programs designed for the exclusive use of governmental operations. General Ledger programs written for business applications will not work for small cities.

I am trying to organize a list of Model II users involved in governmental operations who can assist each other, and exchange information and programming techniques.

Joe R. Chance
P.O. Drawer W
Livingston, AL 35470

Cassette QuickCalc

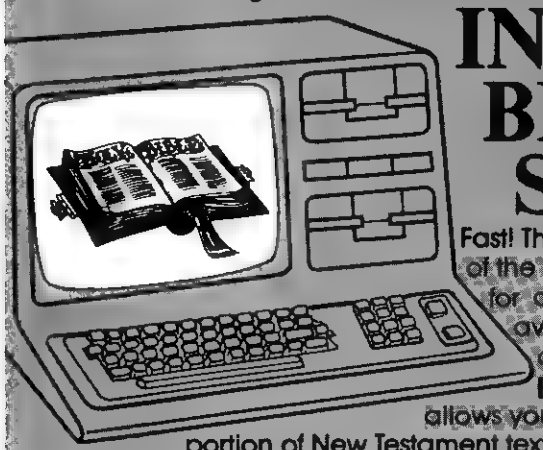
Some readers have had problems with my "QuickCalc" article (*80 Micro*, October 1982, p. 114). I neglected to mention that the printing routine is only compatible with the Model III.

Location 16427 on the Model III provides the maximum printer line length minus two. Certain Model I operating systems do the same, but a cassette-based Model I does not. In this case, the print routine is slightly more complicated:

```
3010 Delete the "POKE 16427,62:"
3020 FORT=0TO15:SP=T*64:
FORT1=0TO63:ML=PEEK(15360+SP+T1):
IFML=191THENLPRINT"*";ELSELPRINT
CHR$(ML);
3030 NEXT:LPRINT"":NEXT:LPRINT
TAB(4)STRING$(62,"-"):PRINT@0,
STRING$(64,32);:GOTO30
```

Kurt Leafstrand
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PowerSoft on piracy

In the February 1983 issue, we published a sampling of reader reactions to software piracy; we called the section To Copy or Not to Copy. The focus of the discussion was a letter appearing in the November 1982 issue that offered information on copying Super Utility Plus should PowerSoft Inc. be unable to provide back-ups. The following letter is PowerSoft's reaction to the controversy surrounding its product and to the opinions expressed in 80 Micro.

At PowerSoft, we are committed to supporting the registered owners of Super Utility Plus. We are demonstrating our concern with a special offer. Upon receipt of your self-addressed stamped envelope (use 37 cents postage), we will send you the technique for dumping a CMD file of SU+ version 2.2z that is tailored to the DOS for which you configure it. We will also include a description of how the SU+ disk is arranged and how the protection is achieved.

This only applies to registered owners. If we don't have your card, you don't get the sheets. We will also include a discussion by Kim Watt on the theory of mixing densities on a single disk.

In his February Feedback Loop (p. 410), Terry Kepner states that "Kim Watt... is the only one I know who has solved this problem, and he's not telling his secret." This information will now be available to registered owners free of charge. The people who register are the ones who will profit.

We had considered printing all of this information in the magazine, but decided that it should only be available to registered owners. This does not apply to the new version 3.0 of SU+.

The SU+ Controversy

To Copy or Not to Copy.... that is the question. Why the hysteria over not being able to copy Super Utility Plus? First of all, let us give our side of why Super Utility is on a protected disk.

Supporting SU+ in the past has been a simple matter. The disk is protected. That means that theoretically only purchasers of the software will be using it. Therefore, when someone calls us on the phone and has a question or problem, we can simply answer his question. We don't have to put him on hold while we look him up in our data base.

Now, due to the fact that some magazines, companies, and individuals are making it possible for non-registered users (read that as pirates) to use our software, supporting registered owners has been hampered. From this point on, registered owners will be required to give us their name, address, and SU+ serial number when calling. We will then check PowerMail for verification. No registration, no help.

This is exactly the same way that LSI, Apparat, Micro Systems Software, Prosoft, and many other companies have always operated. Now it is going to have to be that way due to pirates. We get calls every day from people who have no idea what to do next (no manual). They also do not have any idea what their serial number is (no master disk), but they want our help.

Another idea behind a protected SU+ is that when someone would call with a problem, we'd know what code was in his computer. With a CMD file, there are always numerous consumer-applied patches and zaps. We cannot support SU+ if people start tampering with the code.

There is no reason to be concerned about SU+ being protected for a number of reasons. First, once the disk is booted and the program is loaded, the disk can be removed from the system and put away. It is only in the drive for around a minute! SU+ is totally memory-resident and contains its own internal operating system.

A back-up copy has been included in the package ever since Sept. 1, 1982. Those who purchased the program prior to that date may purchase a back-up disk for $10 including postage. The price had been $5 for the last two years, but due to increased costs in labor, postage, and packaging, we had to raise this.

If you have two copies of SU+, there is no reason to be concerned that you will be without it. You should keep one copy by your system, and another in a separate location for back-ups and master disks.

We can always repair a master disk at a nominal charge, and our turn-around time is fast. We have thousands of registered owners, and we believe that they are very happy with the product, and with our support and service.

SU+ is a 38K machine-language program when set up as a CMD file. That eats up most, if not all, of your disk. Even if you have 40-track double-density disks, and especially if you are using single density, you don't have much room left for anything else. This makes it impractical to have SU+ as a CMD file.

There seems to be two types of programmers. One type is the true innovator who treats his profession as a craft, not as a job. He is artistic and devoted to programming, working at it full time to support himself and his family. If he doesn't get royalties, he quits programming and does something else.

Then there are the leeches who want to make a quick buck on someone else's code and effort. You've seen their ads. They'll sell you a 1-byte patch (with directions) for $30 to back up Scripsit or VisiCalc. They do not care about the author, or the support the author will have to give. They do not have integrity.

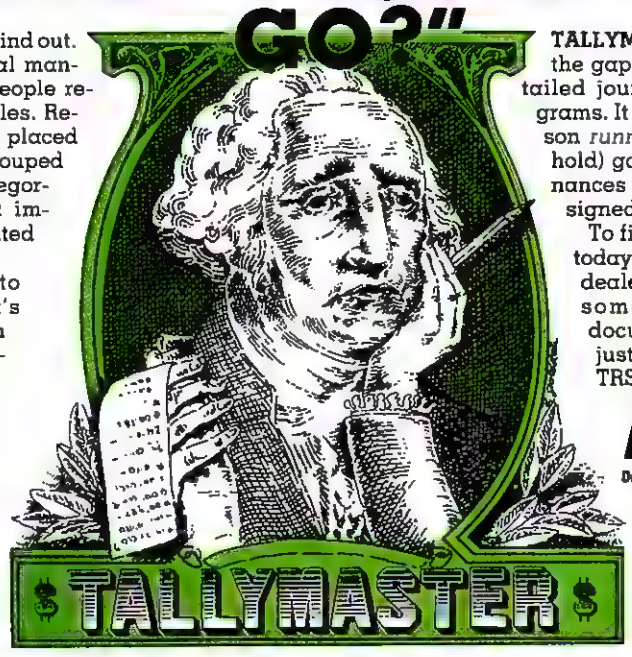
It is easy for them to justify the existence of their software by saying that they are providing a public service. Actually, they are looking to make a quick buck and deny good programmers the royalties they are due. This is a fact. The guy who wrote Scripsit deserves to be paid for every copy out there that is being used, right?

There is no valid reason for any registered owner of SU+ 2.2z to pay any money for copy programs. If you bought one, send it back. Only

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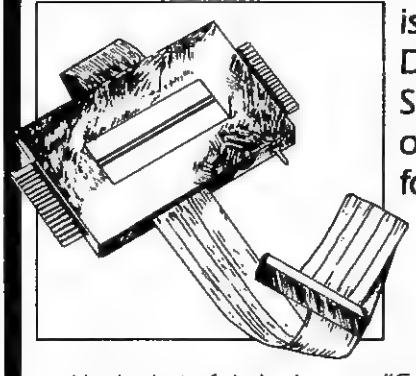
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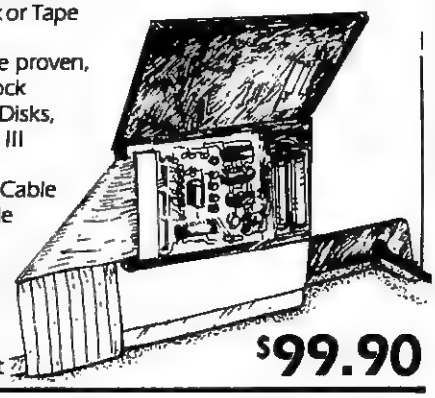
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these pirates have a need for it now.

The February 1983 *80 Micro*

Theodore C. Hossfeld states that "the utility itself is designed to break others' protection." Wrong! That is just one of 80 different functions that SU+ contains. It was intended to copy garbled disks, so that a repair attempt can be made without destroying the only copy of the bad disk.

It does not copy any disk by any imaginable means. We even state that fact in the manual. It was not designed to be a game-disk copier. You should know that it was not intended for that purpose although you perhaps bought it for that purpose.

Roxton Baker states, "Acorn, Med Systems, SubLogic, Adventure International, PowerSoft...silently sell protected programs." I cannot speak for the others, but SU+ is the *only* protected item in our entire product line.

All our other products come on a special disk that boots in either machine, which by nature makes it protected, but it will transfer as many copies of the software to your disk as you like. It is also readable as a data disk by LDOS, DOSPLUS, and MULTIDOS. No protection there.

Jason Matthews at Apparat talks about the hardware lock used for Copyart as a solution to software piracy. That's OK now, but what happens when many major programs, maybe even including an operating system, have their own hardware locks? Are you going to have a chain of them? Will they even work together? Will Alpha Products need to make us a hardware-lock extension cable with 3–10 sockets?

Jeffrey Sherman says that companies that sell protected software have "no regard for the customer after the sale." How untrue in our case. We have files full of letters from happy customers. You name a major corporation or government agency, and it has SU+.

Mr. Sherman says that "If companies sold software at reasonable prices, there would also be less pirating." He adds, "Why does the same package cost more for the Model II and III than it does for the Model I?" First of all, SU+ is a bargain for the money. Every TRS-80 magazine has said that it is well worth the purchase price. If you ever crash a disk in the middle of the night, you can appreciate SU+.

Next, every single program that PowerSoft sells will work on the Model I or III, and you get both versions (if necessary) in the same package on a disk that will boot up on either machine! We do not want to be included in categories where we do not belong.

SU+ boots in Model I or III, and the new 3.0 version will not only boot in both of those, but in a 35-, 40-, or 80-track drive as well. MAX-80 support is coming too.

As regards support, PowerSoft sponsors its own Special Interest Group (SIG) on CompuServe. We were the second TRS-80 oriented SIG on MicroNET after Richard Taylor's MNET-80, and have been in operation for two years on MNET.

We actively support all of our software products right on the net. We have sections divided into PowerSoft, Snappware, DOSPLUS, DOSPLUS II, LDOS, Communications, MAX-80, Mod II/16, and IBM PC. These sections are manned by Kim Watt, Bob Snapp, Lance Micklus, Renato Reyes, Mark Lautenschlager, Dennis Brent, Bill Vermillion, Doug Hogarth, and all the people directly involved with the products being supported.

Other experts in the field frequent our board, and it is not too often that a question goes unanswered. This is free of charge to any purchaser of a PowerSoft product.

Spencer Trimble (as well as the unknown letter writer) seems to be concerned by the fact that PowerSoft or other companies that sell protected software may go under and he will be stuck. This is ridiculous. A product like SU+ is one of our greatest assets. In the very unlikely event that we were in a bind, do you think that we would just throw the product in the trash? We believe the product would continue.

Jean Witt says that our protection "seriously limits the usefulness of the program," and that "Every time the disk makes a revolution, magnetic coating wears off." Maybe insignificantly so, but it certainly does not affect the use of SU+.

As noted previously, once the program is booted, it is totally memory-resident and the disk may be removed from the system. You have that disk plus your back-up copy, so it is doubtful that you will be without SU+.

Of course, that wasn't good enough for WittSoft, as shown in their recent ads. We appreciate WittSoft's kind words about SU+, but that doesn't make what they're doing right.

Perhaps they should be made aware that every back-up and/or CMD file of SU+ contains the serial number of the purchaser. There is a way to display that on the screen. The name can be traced from that point. We have already caught several people who have violated the agreement that they signed by letting the program out of their protective custody. Support is immediately suspended, for starters.

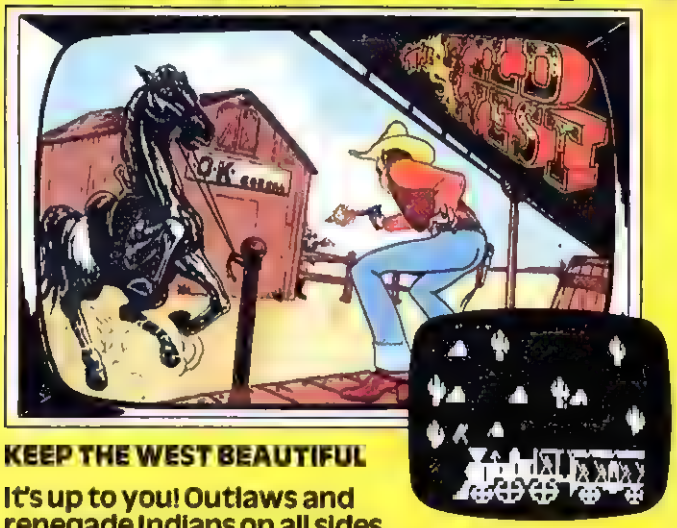
Finally, Jean Witt says that "the program brags about its ability to duplicate protected disks while the author has ensured his own work would remain uncopied." First of all, we don't brag about special copy. We challenge you to show us one ad that brags about backing up protected disks. Your ad brags! The only purpose of your program is to back up our program, and that is a leech. If we wanted to brag we would say, "Will back up any disk," but we don't because it won't.

Now, where does that leave the magazine publisher? Eric Maloney, Managing Editor of *80 Micro*, says that they don't want to "aggravate an already-volatile situation." *80 Micro* will continue to carry ads for copy programs. They walk a fine line. They exist on advertising, not magazine sales; it is a fact of life.

Mr. Maloney has been a gentleman in our discussions on this issue. The editorial opinion does seem ambivalent, however. Consider Mr. Green's $10,000 reward for ISI pirated software. He has always been *very* anti-piracy. What is next? Where will it stop? Maybe when you see a full page claiming, "Nothing Is Sacred Anymore!"

We have never highlighted our special copy function in SU+. In the

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meantime, Roxton Baker's program does purport to back up much software. He is a one-man crusade, and he means to win by forcing away every good programmer we have left. He gives his own software away, so why shouldn't everyone else?

It is also curious that the publishers of Mr. Baker's software insist on publishing a way to back up SU+ several times a year in their magazine. They also once published ways to copy some of Med Systems' games. The president of Med Systems responded, to which they cried, "Sour grapes!" Magazines must take a stand somewhere and stick to it.

Utility of the Year

We would like to take this opportunity to thank our users for voting SU+ as 1982 Mod I/III Utility of the Year. That means a lot to us, and it has to say something for the program. We feel that the first emotional response to this issue was by people who do not own the program and are angry because they cannot get a copy from their friends.

Kim Watt
Dennis Brent
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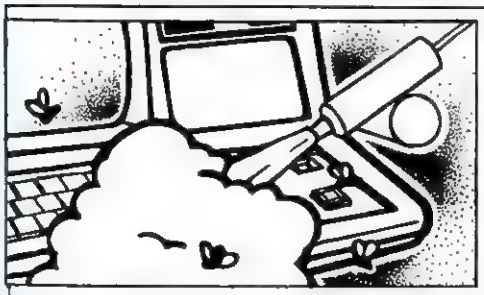
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requires 48k. specify Model I or III single or double density

MedSoft

DEBUg



1410 W=Z(K,J):Z(K,J)=Z(K,J+1):
Z(K,J+1)=W

Bruce Douglass
1005 West Main
Vermillion, SD 57069

Flaws and fixes

Line Correction

The "Regress" program listing in the December 1982 column of Copernica Mathematica (p. 458) requires a minor revision. Line 1410 should be:

Editing the Picture Editor

A reader has reported a bug in my "Easy Picture Editor" (December 1982, p. 388). The program offers an option to select and change the background color of a display. As implemented, this can't work. If you attempt to change the background color you will erase the entire display.

To correct this bug, it is necessary to select a background color before setting up the graphics mode and clearing the screen. Listing 1 shows the lines that need to be changed in the article program listing to correct this problem.

Ron Ginger
17 Potter Road
Framingham, MA 01701

Change the following lines to:

```
10    CLEAR 1000:DIM L$(50):GOSUB 2100
20    CS$ (0) = "GREEN  YELLOW BLUE  RED  ":CS$ (1) = "BUFF  CYAN
MAGNTA ORANGE "      !note use 7 spaces for each color
25    CLS:BL$ = STRING$(32," "):CM = 1
305   CP = 33:GOSUB 45
325   PRINT @33,CS;CS$(CS);
345   CP = 65:GOSUB 45:GOSUB 55
355   FC = C:PRINT @64,BL$;
360   PRINT @62 + ((FC - 4*INT(FC/5))*7),"DRAW";
365   PRINT @62 + ((BC - 4*INT(BC/5))*7),"BACK";
960   X$ = STR$(LN( + "PMODE 3,1:COLOR" + STR$(FC) + "," + STR$(BC) + ":PCLS
      :SCREEN 1,1":PRINT #-,X$
2010  PRINT @33,CS;CS$(CS);
2015  PRINT @62 + ((FC - 4*INT(FC/5))*7),"DRAW";
2020  PRINT @62 + ((BC - 4*INT(BC/5))*7),"BACK";
```

Delete line 375

Add new lines:

```
2100  REM INIT BACKGROUND COLOR
2105  CLS:PRINT "WELCOME TO PIC-ED"
2110  PRINT "YOU MAY USE ONLY 4 COLORS"
2115  PRINT "1-GRN 2-YEL 3-BLU 4-RED"
2120  PRINT "5-BUF 6-CYN 7-MAG 8-ORA"
2125  INPUT "SELECT BACKGROUND COLOR (1-8)";C$
2130  BC = INSTR(1,"12345678",C$):IF BC = 0 THEN SOUND 10,5:GOTO 2125
2135  IF BC>4 THEN CS = 1 ELSE CS = 0
2145  PMODE 3,1:COLOR FC,BC:PCLS
2150  RETURN
```

Program Listing 1. Picture Editor Listing

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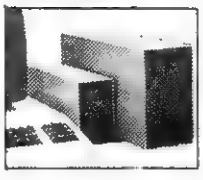
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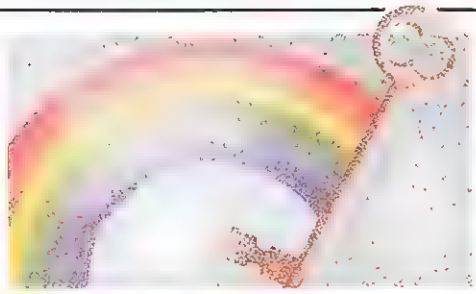
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THE COLOR KEY

by Scott Norman



Home management in color

I'd like to discuss several data-base managers (DBMs) suitable for handling the personal information that families often accumulate: address books, recipe files, insurance policies, mailing lists, hobby material, whatever. There are now several CoCo DBMs geared to handle this kind of material. Some of them also serve as generalized electronic memo pads.

At the upper end of the range, these programs become suitable for handling data for small businesses. There is also a certain degree of overlap with spreadsheet calculators and calendar programs, but I'm going to discuss those at another time.

A DBM is a program that takes a file of related items and performs such functions as adding, changing, and deleting information, and searching, sorting, and listing all or part of the file. The totality of information about any entry in the file is generally called a record, and each distinct piece of information is called a field.

The degree of sophistication you require of a DBM depends on the nature of the material you want to record. As a rule, you can expect to trade simplicity of operation for number of features.

The Low End

The overall capability of DBMs is a much more rational basis for comparison than price. The low end of the scale is occupied by programs that work like electronic scratchpads, encouraging you to jot down personalized inventory data in a free-form manner.

These programs have some capability for searching through a file and for printing specific records, but are limited in other respects.

My favorite electronic notebook, Bill Dye's C.C. File (Trans Tek, 194 Lockwood Lane, Bloomingdale, IL 60108), accepts records up to 250 characters in length. That's about the only limitation it places on you as the user; you call the shots where record organization is concerned.

Text and numerical fields of any length can be entered in any order, and there are no privileged keywords reserved for the program's search routine. Records within a file aren't even required to have the same structure.

For seven bucks you get a cassette with separate ASCII recordings of C.C. File set up for tape and disk files. There's also a single sheet of instructions; in this case, that's all you need.

It's easy to make a working copy of the program you need in compact tokenized form. This is one DBM that can work reasonably well with cassettes, since the entire data file is resident in memory while you're working with it.

There are no options for sorting records or for merging files, so there's no real need for a random-access storage medium. The program does feature dynamic storage allocation, so it knows whether you have a 16K or a 32K machine and makes the appropriate adjustments.

C.C. File allows you to search for and selectively print records. The search key can be any string of symbols that clearly identifies the record you want. You can designate keywords for a search by setting off the keys with special symbols—a leading asterisk, perhaps. The only symbols reserved for C.C. File's own use are the field separator @ and >, which is used to insert 10 blank spaces to format a video or printed listing.

There are also provisions for updating a file by deleting or adding records. The commands for editing a record are essentially the same as those used in Trans Tek's other programs for text processing and mailing-label preparation; it's nice to come upon a command set that's used in more than one place.

C.C. File is the perfect DBM for off-the-cuff personal inventory work; in fact, it was originally called QUAD Data Base, for quick and dirty.

Within the last couple of weeks, a decent challenger has shown up in the guise of Radio Shack's new Personafile disk. At this writing, the Shack has not announced a disk version of Color File, and it's not clear to me whether Personafile is intended to fill that role; the programs do differ considerably.

Personafile is the creation of Robert Kilgus, who also wrote Spectaculator, Radio Shack's spreadsheet calculator for the Color Computer. Like C.C. File, Personafile allows you to record unstructured information about topics of interest. Records can be marginally longer—256 characters—and are identified by two keys: a subject, or general topic heading, and a tag that is specific to the record. Each can be up to 22 characters long.

The example used to demonstrate the concept in the manual is that of a specific recipe; the subject heading is Recipes, and the tag is Tacos (the Fort Worth influence, I guess). You can recall records by subject, tag, or both, and an asterisk can be used as a wild-card search character if you either can't recall or don't care about all of a search field.

The program produces alphabetized listings of both subjects and tags. These index listings are always updated, but the files themselves are not sorted. A listing of a complete file contains the records in the order in which they were entered.

The two-level identification structure makes it easy to keep multiple files on a single disk, and a disk can hold up to 540 records.

One of the best aspects of Personafile is its intelligent use of on-screen prompts. Since a 256-character record only occupies half of the CoCo's screen, there's plenty of room for command-prompting lines. The usual record-editing, printing, and deletion options are available, and the prompts make it possible to use the program without reference to the manual after a short familiarization period.

The only problem is the price—$59.95. That's a lot of money for a program without sophisticated sorting and selection capabilities. I wonder how much of the cost is tied up in the new packaging format: nice three-ring binders with colored cover inserts, color printing inside the manuals, the works.

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More for Your Money

I rather like Color File. I think it gives cassette-based systems a fair degree of flexibility; since the program itself resides in a ROM pack, even a 16K machine has enough RAM for data files of reasonable size.

There are seven predefined file structures for common household applications (including addresses, warranties, and auto maintenance), plus the option of setting up your own.

A good way to go about the business of computerizing your household affairs is to use some of the stock formats for your everyday jobs, then strike out on your own as you dream up new applications.

Color File has commands for sorting a file in either ascending or descending order according to the data in any specified field, selecting records according to whether or not they satisfy some criterion, and printing the results of such a selection. A command line is always present at the bottom of the screen to inform you of your options, although it's cryptic compared with the prompts in Personafile.

For example, the main menu that appears when you set out to enter data into a file is:

ADD CHG DEL SEL ORD TAP PRT

These are the commands for adding a record to the file, changing a record, deleting one, selecting a group of entries for display, ordering (sorting) the file according to some criterion, recording the data on tape, and printing selected entries.

Selecting one of these options by entering its first letter will generally bring up a second-level menu that gives you the option of proceeding, canceling the command, or editing whatever you have just entered into the file. In the editing mode the four arrow keys can be used individually to position the cursor, or in conjunction with the shift key to insert or delete spaces or complete lines.

The program's principal strengths lie in its capabilities for sorting and selection. The second-level menu for the select option reads:

SEL NO! FLD ALL = #< >

SEL is used to actually carry out a search set up by some of the other options, while NO! is used in several Color File menus to cancel the whole operation in question.

FLD is used to specify which data field within a record will be used for selection, and its critical value; in Color File, data entry is always performed on a video "form" with numbered and titled fields. The final four options are used to set up the criterion to be enforced in the search.

You can specify a "hit" as having a selection field whose value either matches or fails to match the critical value (= and # options), or you can specify a one-sided mismatch with < and >. The selection process works with all alphanumeric characters and punctuation marks, according to their ASCII codes.

Color File is written in machine language, so the search routine moves quickly. It picks out records satisfying the selection criterion to form a separate data base that can be manipulated like any other: sorted, printed, or subjected to further selection processes. This gives you a limited ability to concatenate selection criteria.

Let's suppose you are working with a predefined medical history file. If you want to trace all the insurance payments to a certain doctor, you can select all the records carrying that doctor's name and then choose the ones for which a nonzero insurance payment was entered.

In terms of Boolean logic, you can AND selection criteria together. More powerful DBMs permit the logical OR operation as well, but this is beyond the capabilities of Color File. You could do it if it were possible to merge subsets of a given file selected by two independent searches, but you would have to take precautions to guard against doubly selecting records that satisfied both criteria.

You don't actually lose any information from your data base when selecting records. You can always cancel the effects of a search by returning to the second-level menu for SEL and choosing the ALL option.

Robert Kilgus has done a good job with Color File. The predefined formats can be helpful to the beginner, especially if you can accept the rather brief fields and records that they permit. At $29.95, Color File sits squarely in the middle range of Color Computer DBMs in both price and features.

Approaching the Big Time

If you want significantly more power and flexibility in a DBM, you have to go to a disk-based system. That's not any guarantee of satisfaction; there are a lot of programs and some of them don't have much to offer.

I've recently used one with real potential, though. It's called Homebase, and it was created by Ben Stokes, who does small-business system consulting (Homebase Computer Systems, P.O. Box 3448, Durham, NC 27702).

Homebase requires 32K of RAM, and its $75 price tag takes it out of the impulse-purchase category, but it is worth a close look.

Homebase's strength arises from its ability to generate and manage text and data (i.e., numerical) files from one set of programs. In this way, it represents a first step toward the totally integrated software that is supposed to eventually rule the applications world.

It is an extremely flexible package; you can sort records according to their names or according to any text or numerical data they may contain, including dates and telephone numbers.

There are facilities for merging files, and a limited capability for performing calculations on data arrays. You could say that Homebase overlaps text-processing programs at one end of its abilities and spreadsheet calculators at the other. It's not optimized for either task, though, and should be judged on its strengths as a data-base manager.

Like many DBMs, Homebase presents the user with nested menus for opening, editing, and closing files, and for using utility programs. It isn't a trivial program to use, but the manual does go to unusual lengths to lead you along.

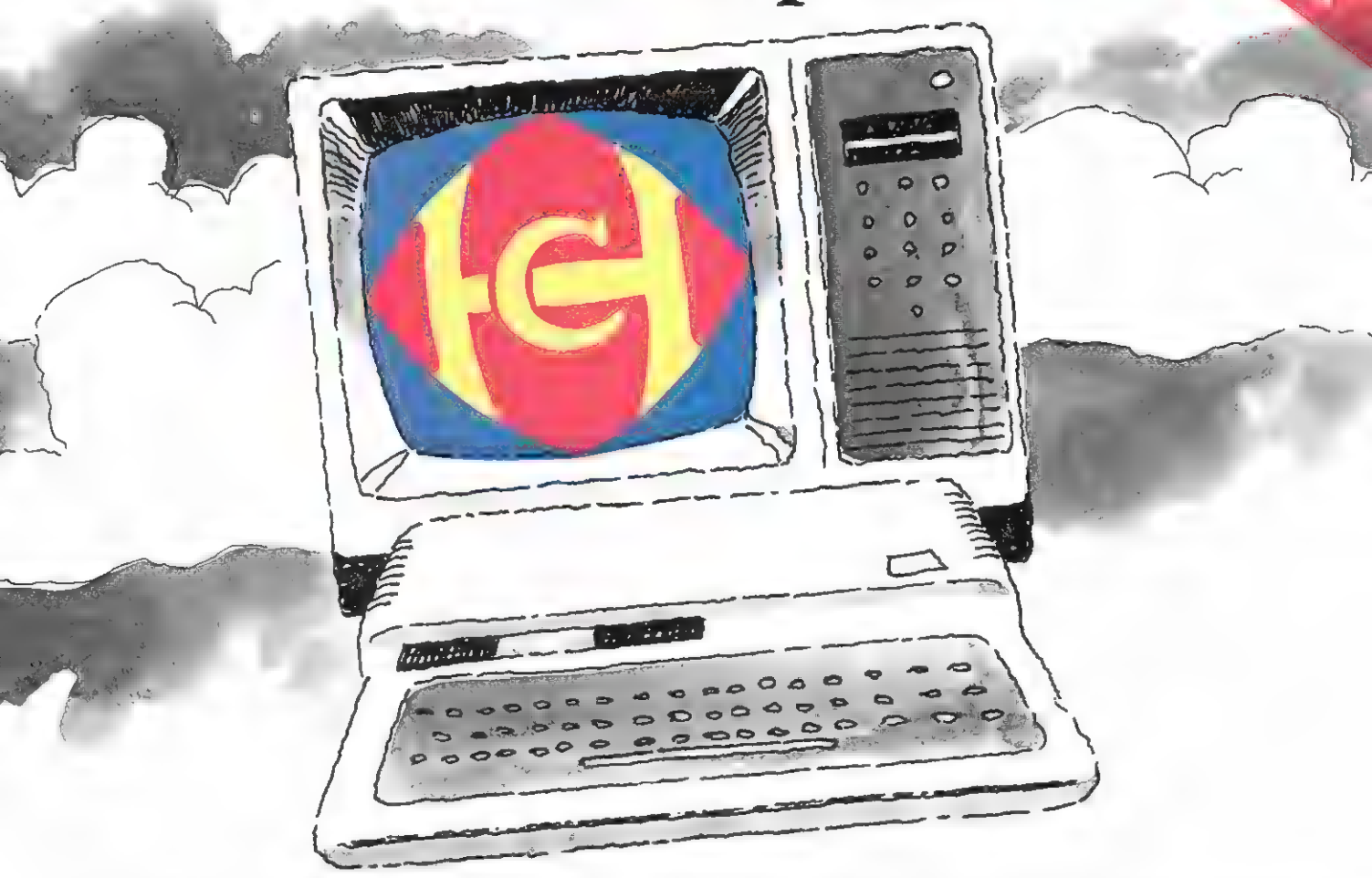
Homebase comes with the printed promise that purchasers completing the warranty registration card will be provided with telephone support and a form for documenting problems or recommending changes. This is a refreshing change from the negative attitude of too many software vendors.

Since it's set up for a single-drive system, Homebase requires a certain amount of swapping between program and data disks. Should the wrong one be in the drive at any point, things come to a halt and you receive a prompt to change disks; the system itself is relatively crash-proof.

Text files may be up to 480 characters long, with records entered in what seems to be free form; no specific meanings are attached to individual lines on the display. It is worthwhile to keep

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some semblance of order in text records, however, because during selection operations one can opt to limit target-string searches to specific lines and character positions.

You can also select records on the basis of their names, rather than the information they contain. I quickly got into the habit of including a dummy record named "Form" or "Template" in each text file to remind me of how things are organized.

Like Color File, Homebase can AND selection criteria together. The inverse of any selection criterion can be specified through the use of an Exclude command. You can elect to query an address book file for the dope on anyone whose last name does not begin with N, for example, and this lets you do the whole job with one selection.

The text management portion of Homebase includes commands for editing records, and for performing global search-and-replace operations. These do not make it a word processor; there are no commands for high-speed cursor movement, the insertion and deletion operations are a little strange, and 480-character records are hardly appropriate for handling straight text. Still, it's nice to see even this level of sophistication in a CoCo application program.

The Text Utilities package includes additional goodies. Merge lets you add all or a selected portion of one file to another existing file. I've used this to manage an inventory of phonograph records, moving data from a "want" file to a "have" file as the collection grows. I suspect the list of such applications is endless.

Generate creates a new file with blank records, each having the name of a record in an existing file. This works even if the old file contains numerical data instead of text. The new one is always a text file, however.

Copy does what you might expect, and you must give the copy a new name. If you select a portion of the original before copying, the new file will contain only the ones you have selected.

Synchronize is useful if you have two files with records of the same name in each (different data about the same items). If you select particular records from one file, Synchronize allows you to extract the matching records from the other one. The files need not be of the same type (text/data). This option is very handy.

Backup allows you to make back-up copies of files on either disk or cassette. The Utilities package also has a Load command for reading such cassette files.

If Homebase did nothing other than handle text files in this manner, Ben Stokes would have done a fine job. In fact, the system does much more. It handles data files with sufficient agility to deserve consideration as the core of a small project-management system, for starters.

I want to go into this in some detail, however, so I'm going to put it off until next month's column. At the same time, I'll tantalize you with Bill Dye's latest offering, which brings something approaching the capability of VisiCalc to the Color Computer. ■

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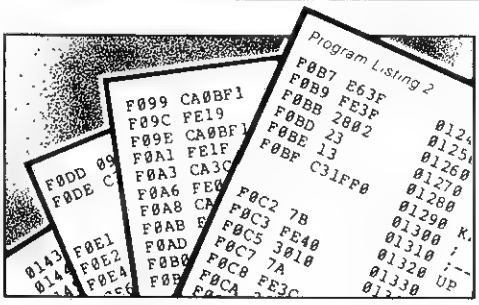
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by Hardin Brothers



Understanding relocatable code

In my two previous columns, I discussed fixed-location routines. This month's Assembly-language topic is relocatable code.

Programs written in relocatable code can be executed from any place in memory without any changes. All Basic programs are relocatable because they are entirely independent of their position in memory. Neither Basic nor the programmer cares if the line 10 CLS: CLEAR 500 is stored at 5200H or 0F000H. Both positions interpret and execute the line in the same manner.

Internal CALLs, JUMPs (JPs), and tables are not relocatable because they use absolute instead of relative addresses. The former two mnemonics assemble as 3-bytes. The first byte is the instruction itself; the second two are the address to branch to. If you relocated the object code, this address would be incorrect. Likewise, internal tables are assigned labels that are assembled to absolute addresses.

But if you can avoid internal CALLs, JPs, and tables, writing relocatable machine-language routines isn't difficult. Any program that avoids these three items is relocatable, including programs that CALL or JP to ROM routines and those that access fixed-position tables. In general, short routines are often relocatable; complex commercial programs rarely are.

Relocatable code is not magical or pure, but it does lend itself to at least three common interfacing techniques when combined with Basic programs. Relocatable routines, unlike fixed-position routines, can be stored in string variables, literal strings, and integer arrays.

The Demonstration Routines

Program Listings 1 and 3 show left and right screen rotations; Program Listing 2 interfaces the rotation routine with Basic.

You can alter the routines in Listings 1 and 3 to clear the screen by scrolling everything off to the left or right. Simply change lines 280 and 600 in Listing 1 and lines 330 and 690 in Listing 3 to read: LD A,20H. Scrolling new information onto the screen requires a 1K buffer and some minor rewriting. If you modify the routines, be sure to adjust the data statements in the Basic programs.

Listings 1 and 3 each contain a time delay to help synchronize the screen rotation to the video refresh circuitry and the video scan rate. I used the delay value (0C8H or 200) that gave the best-looking screen on my Model I; you may have to adjust the delay for your computer. I found my delay value by trial-and-error, so if any reader can explain how to calculate the correct number of T states to synchronize the software with the computer, please write.

Packing String Variables

The simplest method for interfacing a relocatable routine to Basic is to use a string variable. First, translate the routine into 1-byte decimal values (use the Convert program from last month), and place those values in a data statement. After clearing sufficient string space, load the routine into a string using the instructions:

```
FOR I=1 TO (routine length)
READ D
A$=A$+CHR$(D)
NEXT I
```

(See lines 80, 90, 150, and 160 in Listing 3.)

Your second task is to access the routine from Basic, for which you'll need the VARPTR function. To find the USR

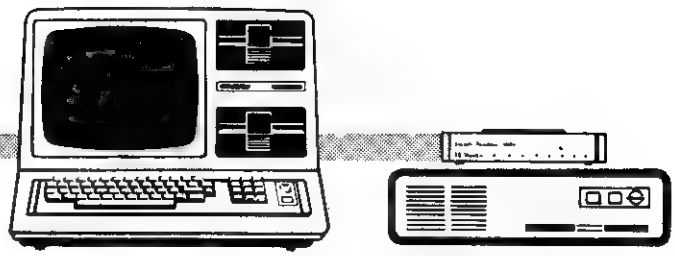
Program Listing 1

```
                00100 ;*********************************
                00110 ;*                               *
                00120 ;*  LEFT SCREEN SCROLL           *
                00130 ;*     ROUTINE                   *
                00140 ;*   USE ONLY WITH               *
                00150 ;*     STRING VARIABLES          *
                00160 ;*                               *
                00170 ;*********************************
                00180 ;
                00190 ;
7F00            00200           ORG     7F00H
7F00 0640       00210           LD      B,40H           ;64 TIMES THROUGH ROUTINE
7F02 C5         00220 LOOP1     PUSH    BC              ;SAVE COUNTER
7F03 11003C     00230           LD      DE,3C00H        ;DE==> TOP OF SCREEN
7F06 21013C     00240           LD      HL,3C01H        ;HL==> TOP OF SCREEN +1
7F09 0610       00250           LD      B,10H           ;16 LINES PER SCREEN
7F0B C5         00260 LOOP2     PUSH    BC              ;SAVE LINES COUNTER
7F0C 013F00     00270           LD      BC,003FH        ;63 CHAR.S IN LINE
7F0F 1A         00280           LD      A,(DE)          ;GET 1ST CHAR. IN LINE
7F10 EDB0       00290           LDIR                    ;MOVE THEM ALL LEFT
7F12 12         00300           LD      (DE),A          ;THE FIRST BECOMES LAST
7F13 13         00310           INC     DE              ;BUMP
7F14 23         00320           INC     HL              ;   POINTERS
7F15 C1         00330           POP     BC              ;GET LINE COUNT
7F16 10F3       00340           DJNZ    LOOP2           ;DO 16 LINES
7F18 01C800     00350           LD      BC,00C8H        ;VALUE FOR TIME DELAY
7F1B CD6000     00360           CALL    0060H           ;ROM DELAY ROUTINE
7F1E C1         00370           POP     BC              ;GET CHARACTER COUNTER
7F1F 10E1       00380           DJNZ    LOOP1           ;GO UNTIL FINISHED
```

Listing 1 continues

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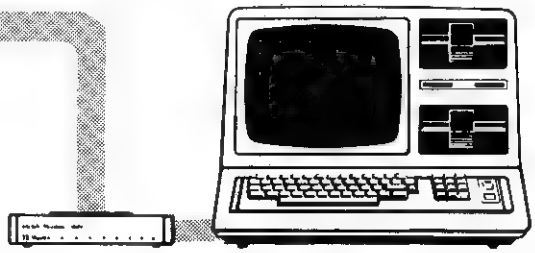
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  'TOTSALE' > 4999. AND 'ZIP' < 4000 AND (FNJD("03/31/83")-FNJD('SALEDATE'))<180 OR INSTR ('ITEMS', "WIDGIT")
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address, include in your Disk Basic program:

```
A=PEEK(VARPTR(A$)+2)*256
      + PEEK(VARPTR(A$)+1)
IF A>32767 THEN A=A-65536
DEFUSR0=A
```

The command VARPTR(A$) returns the address of the length of A$. The 2 bytes in memory following the string length contain the address of the beginning of the string. VARPTR(A$)+2 contains the most-significant byte; multiply its contents by 256 before adding them to the contents of VARPTR(A$)+1. Put the resulting value in integer range before the DEFUSR statement.

Finding the string address is simpler in tape-based systems. Once again the VARPTR function is used, but no extra variables or conversions are needed. Simply transfer the string address to the USR address 1 byte at a time as follows:

```
POKE 16526,PEEK(VARPTR(A$)+1)
POKE 16527,PEEK(VARPTR(A$)+2)
```

You need to observe one important rule when packing string variables. Because any string command can invoke Basic's garbage collection routine and move all strings around in high memory, reset the USR address before every new access of the routine.

Variable string packing has three disadvantages. First, the Data statements must be included in the Basic program, which uses up memory. Second, the packed strings reside in cleared high memory and cause more frequent program pauses for garbage collection. And third, the data must be read and the strings packed each time the program is run; if the program contains more than one or two short routines, string packing can cause unnecessary delays.

Packing Literal Strings

Instead of storing machine-language routines in string variables that move around in high memory, store them in literal strings that are fixed within the Basic program itself. Once the Basic program is loaded into memory, literal strings don't move, because they are never transferred to the cleared string storage area. To keep the strings from being transferred to high memory, make sure your program never modifies them after they are defined.

Listing 1 continued

```
7F21 C9        00390          RET                     ;RETURN TO BASIC
               00400 ;
               00410 ;
               00420 ;*********************************
               00430 ;*                               *
               00440 ;*  RIGHT SCREEN SCROLL           *
               00450 ;*    ROUTINE                    *
               00460 ;*   USE ONLY WITH               *
               00470 ;*    STRING VARIABLES           *
               00480 ;*                               *
               00490 ;*********************************
               00500 ;
               00510 ;
7F80           00520          ORG     7F80H
7F80 0640      00530          LD      B,40H           ;64 TIMES THROUGH ROUTINE
7F82 C5        00540 LOOP3    PUSH    BC              ;SAVE COUNTER
7F83 11FF3F    00550          LD      DE,3FFFH        ;DE==> BOTTOM OF SCREEN
7F86 21FE3F    00560          LD      HL,3FFEH        ;HL==> BOT. OF SCREEN -1
7F89 0610      00570          LD      B,10H           ;16 LINES PER SCREEN
7F8B C5        00580 LOOP4    PUSH    BC              ;SAVE COUNTER
7F8C 013F00    00590          LD      BC,003FH        ;63 CHAR.S PER LINE
7F8F 1A        00600          LD      A,(DE)          ;GET LAST CHAR. OF LINE
7F90 EDB8      00610          LDDR                    ;MOVE THEM ALL RIGHT
7F92 12        00620          LD      (DE),A          ;THE LAST BECOMES 1ST
7F93 1B        00630          DEC     DE              ;BUMP
7F94 2B        00640          DEC     HL              ;  POINTERS
7F95 C1        00650          POP     BC              ;GET LINE COUNTER
 F96 10F3      00660          DJNZ    LOOP4           ;FINISH SCREEN
7F98 01C800    00670          LD      BC,00C8H        ;VALUE FOR TIME DELAY
7F9B CD6000    00680          CALL    0060H           ;ROM DELAY ROUTINE
7F9E C1        00690          POP     BC              ;GET COUNT
7F9F 10E1      00700          DJNZ    LOOP3           ;GO UNTIL DONE
7FA1 C9        00710          RET                     ;RETURN TO BASIC
0000           00720          END
00000 TOTAL ERRORS
```

```
10 CLEAR 500
20 CLS
30 '*** CODE FOR ROTATE LEFT ***
40 DATA 6, 64, 197, 17, 0, 60, 33, 1, 60, 6
50 DATA 16, 197, 1, 63, 0, 26, 237, 176, 18
60 DATA 19, 35, 193, 16, 243, 1, 200, 0, 205
70 DATA 96, 0, 193, 16, 225, 201
80 FOR I=1 TO 34: READ C
90 A$=A$+CHR$(C): NEXT I
100 '*** CODE FOR ROTATE RIGHT ***
110 DATA 6, 64, 197, 17, 255, 63, 33, 254, 63
120 DATA 6, 16, 197, 1, 63, 0, 26, 237, 184, 18
130 DATA 27, 43, 193, 16, 243, 1, 200, 0, 205, 96
140 DATA 0, 193, 16, 225, 201
150 FOR I=1 TO 34: READ C
160 B$=B$+CHR$(C): NEXT I
170 M$=STRING$(23,133)+" Screen Rotation "+STRING$(23,138)
180 FOR I=1 TO 6: PRINT M$: NEXT
190 PRINT: PRINT STRING$(15,32)
      + "Press any key to change directions"
      + STRING$(15,32)
200 FOR I=1 TO 6: PRINT M$: NEXT
210 F=0
220 IF F=0 THEN C$=A$ ELSE C$=B$
230 A=VARPTR(C$): B=PEEK(A+2)*256 + PEEK(A+1)
240 IF B>32767 THEN B=B-65536
250 DEFUSR=B
260 '******* Lines 220 - 250 above are for DISK BASIC
            For Tape Systems use:
        230 A=VARPTR(C$)
        240 POKE 16526,PEEK(A+1)
        250 POKE 16527,PEEK(A+2)
270 K=0
280 A=USR(0)
290 FOR I= 1 TO 100: NEXT
300 K=K+1
310 IF K<5 AND INKEY$="" THEN 280
320 F=NOT F: GOTO 220
```

Program Listing 2

However, there is one important difference in the way you must write a routine that will be packed into a literal string. The Basic interpreter reads any byte of 0 in your routine as an end-of-line marker and any byte of 22H as an end-of-string marker; your routine cannot contain either of these values. It will run fine the first time, but after you press break and rerun the program, it is likely to bomb, leaving you with a syntax error in a line that doesn't even ex-

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Apple and Commodore Offer CP/M.

In a recent press conference, the Apple Computer Company stated, "The largest installed base CP/M system in the world today is the Apple II with the Z80 card from Microsoft." In a recent full page ad in the Wall Street Journal, Apple announced CP/M for the Apple III. Commodore, refusing to be left behind, has recently announced their "Emulator" series of computers that support CP/M. There are even rumors that the new Tandy 16 will support a version of CP/M.

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```
Program Main Line:
        .
        .
        CALL    000BH   ;Shift address of next instruction
                        ; to HL pair
        JR      SUB1    ;Relative jump to subroutine
        .               ;Return here after subroutine
        .
        .
        .
SUB1    INC     HL      ;This is the CALLed subroutine
        INC     HL      ;HL+2 ==> return address
        PUSH    HL      ;Put return address on stack
        .               ; Now perform subroutine processing
        .
        RET             ; end subroutine with RETurn
```

Fig. 1. Using 000BH for Relocatable Calls. Uses HL register pair.

```
Program Main Line:
        .
        .
        PUSH    HL      ;Save HL value on stack
        CALL    000BH   ;Shift address of next instruction
                        ; to HL pair
        JR      SUB1    ;Relative jump to subroutine
        .               ;Return here after subroutine
        .
        .
SUB1    INC     HL      ;This is the CALLed subroutine
        INC     HL      ;HL+2 ==> return address
        EX      (SP),HL ;Put return address on stack
        .               ;and recover HL value
        .               ; Now perform subroutine processing
        .
        RET             ;end subroutine with RETurn
```

Fig. 2. Using 000BH for Relocatable Calls. Retains value in HL register pair.

Program Listing 3

```
                00100 ;*********************************
                00110 ;*                               *
                00120 ;*  LEFT SCREEN SCROLL           *
                00130 ;*     ROUTINE                   *
                00140 ;*   (NO 0 BYTES USED)           *
                00150 ;*    USE WITH VARIABLE OR       *
                00160 ;*    LITERAL STRINGS            *
                00170 ;*                               *
                00180 ;*********************************
                00190 ;
                00200 ;
7F00            00210           ORG     7F00H
7F00 0640       00220           LD      B,40H           ;64 TIMES THROUGH ROUTINE
7F02 C5         00230 LOOP1     PUSH    BC              ;SAVE COUNTER
7F03 AF         00240           XOR     A               ;A=0
7F04 163C       00250           LD      D,3CH
7F06 5F         00260           LD      E,A             ;DE==> TOP OF SCREEN
7F07 21013C     00270           LD      HL,3C01H        ;HL==> TOP OF SCREEN +1
7F0A 0610       00280           LD      B,10H           ;16 LINES PER SCREEN
7F0C C5         00290 LOOP2     PUSH    BC              ;SAVE LINE COUNTER
7F0D AF         00300           XOR     A               ;A=0
7F0E 47         00310           LD      B,A
7F0F 0E3F       00320           LD      C,3FH           ;BC=63 CHAR.S PER LINE
7F11 1A         00330           LD      A,(DE)          ;GET 1ST CHAR. OF LINE
7F12 EDB0       00340           LDIR                    ;MOVE THEM ALL LEFT
7F14 12         00350           LD      (DE),A          ;THE 1ST BECOMES LAST
7F15 13         00360           INC     DE              ;BUMP
7F16 23         00370           INC     HL              ;  POINTERS
7F17 C1         00380           POP     BC              ;GET LINE COUNTER
```

Listing 3 continues

"Variable string packing has three disadvantages."

ist. Therefore, Listing 3 shows the horizontal scroll routines rewritten without any zero bytes.

Program Listing 4 shows the literal string method in operation. The strings are defined in lines 110 and 120 with enough dummy characters to accommodate the entire routine. Next, the address of each string is found using VARPTR. Then the data list is read and each value is POKEd into the string. The string is now packed with the routine.

Be sure to save or CSAVE the program before trying to run it. If you stop the Basic program after line 160 and list it, you will see unintelligible garbage as the strings scroll by; this is perfectly normal. Don't edit lines containing packed strings, because by doing so you'll lose part of the machine-language routine.

After the literal strings are packed, you can conserve memory by deleting the data statements and the Read and POKE commands from your Basic program (lines 10–100, 140, and 160 in Listing 4). You can save and CSAVE a program with packed strings just like any other program. If your Basic program uses literal strings to store machine-language routines, it only has to find the routine addresses once because the strings never move.

Any Program Is Relocatable

String packing is the most commonly used technique for interfacing relocatable machine-language routines with Basic programs, but it doesn't work with routines that aren't relocatable. Sometimes it seems impossible to write a routine that does not involve calls to internal subroutines, absolute JPs, or internal tables. There is a way, though, to make all your machine-language programs relocatable. (Jesse Bob Overholt's column in issue 16 of *The Alternate Source Journal* suggested the following technique.)

The folks at Microsoft have provided, in ROM, a key to making any routine relocatable. At 000BH (11 decimal) there are two bytes that, according

Continues on p. 45



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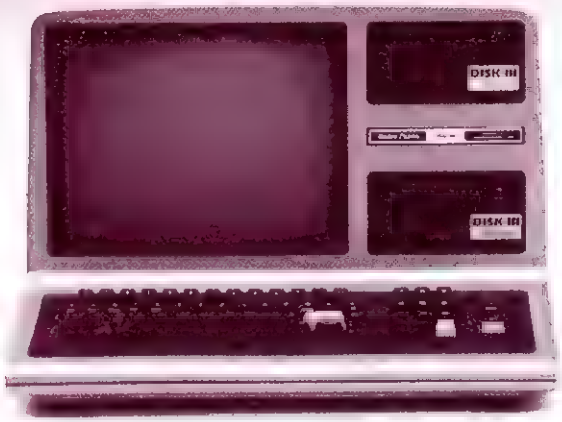
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Listing 3 continued

```
7F18 10F2      00390          DJNZ     LOOP2          ;DO 16 LINES
7F1A 0EC8      00400          LD       C,0C8H         ;B ALREADY = 0
7F1C 0B        00410 LOOP3    DEC      BC             ;DROP COUNT
7F1D 78        00420          LD       A,B            ;GET MSB
7F1E B1        00430          OR       C              ;MERGE LSB
7F1F 20FB      00440          JR       NZ,LOOP3       ;LOOP UNTIL DONE
7F21 C1        00450          POP      BC             ;GET SCREEN COUNTER
7F22 10DE      00460          DJNZ     LOOP1          ;SHIFT SOME MORE
7F24 C9        00470          RET                     ;RETURN TO BASIC
               00480 ;
               00490 ;
               00500 ;*********************************
               00510 ;*                               *
               00520 ;*  RIGHT SCREEN SCROLL          *
               00530 ;*     ROUTINE                   *
               00540 ;*   (NO @ BYTES USED)           *
               00550 ;*                               *
               00560 ;*********************************
               00570 ;
               00580 ;
7F80           00590          ORG      7F80H
7F80 0640      00600          LD       B,40H          ;64 TIMES THROUGH ROUTINE
7F82 C5        00610 LOOP4    PUSH     BC             ;SAVE COUNTER
7F83 11FF3F    00620          LD       DE,3FFFH       ;DE==> BOTTOM OF SCREEN
7F86 21FE3F    00630          LD       HL,3FFEH       ;HL==>BOT. OF SCREEN -1
7F89 0610      00640          LD       B,10H          ;16 LINES PER SCREEN
7F8B C5        00650 LOOP5    PUSH     BC             ;SAVE COUNTER
7F8C AF        00660          XOR      A              ;A=0
7F8D 47        00670          LD       B,A
7F8E 0E3F      00680          LD       C,3FH          ;63 CHAR.S PER LINE
7F90 1A        00690          LD       A,(DE)         ;GET LAST CHAR. IN LINE
7F91 EDB8      00700          LDDR                    ;MOVE THEM ALL RIGHT
7F93 12        00710          LD       (DE),A         ;THE LAST BECOMES FIRST
7F94 1B        00720          DEC      DE             ;BUMP
7F95 2B        00730          DEC      HL             ;  POINTERS
7F96 C1        00740          POP      BC             ;GET COUNT
7F97 10F2      00750          DJNZ     LOOP5          ;FINISH SCREEN
7F99 0EC8      00760          LD       C,0C8H         ;BC HAS VALUE FOR DELAY
7F9B ■■        00770 LOOP6    DEC      BC             ;DROP COUNT
7F9C 78        00780          LD       A,B            ;GET MSB
7F9D B1        00790          OR       C              ;MERGE WITH LSB
7F9E 20FB      00800          JR       NZ,LOOP6       ;LOOP UNTIL DONE
7FA0 C1        00810          POP      BC             ;GET COUNT
7FA1 10DF      00820          DJNZ     LOOP4          ;GO UNTIL ALL LINES DONE
7FA3 C9        00830          RET                     ;BACK TO BASIC
0000           00840          END
00000 TOTAL ERRORS
```

```
5 CLS: CLEAR 500
10 '***** DATA FOR LEFT SCROLL ****
20 DATA 6, 64, 197, 175, 22, 60, 95, 33, 1, 60
30 DATA 6, 16, 197, 175, 71, 14, 63, 26, 237, 176
40 DATA 18, 19, 35, 193, 16, 242, 14, 200, 11, 120
50 DATA 177, 32, 251, 193, 16, 222, 201
60 '***** DATA FOR RIGHT SCROLL ****
70 DATA 6, 64, 197, 17, 255, 63, 33, 254, 63, 6
80 DATA 16, 197, 175, 71, 14, 63, 26, 237, 184, 18
90 DATA 27, 43, 193, 16, 242, 14, 200, 11, 120, 177
100 DATA 32, 251, 193, 16, 223, 201
110 A$="Save thirty-seven spaces here 1234567"
120 B$="Save thirty-six spaces here 00123456"
130 C=VARPTR(A$): A=PEEK(C+2)*256 + PEEK(C+1)
140 FOR I=A TO A+36: READ X: POKE I,X: NEXT I
150 D=VARPTR(B$): B=PEEK(D+2)*256 + PEEK(D+1)
160 FOR I=B TO B+35: READ X: POKE I,X: NEXT I
170 M$=STRING$(23,133)+" Screen Rotation "+STRING$(23,138)
180 FOR I=1 TO 6: PRINT M$: NEXT
190 PRINT: PRINT STRING$(15,32)
      + "Press any key to change directions"
      + STRING$(15,32)
200 FOR I=1 TO 6: PRINT M$: NEXT
210 DEFUSR0=A: DEFUSR1=B     'Use this line for Disk Basic ONLY!!
220 F=0
230 K=0
240 IF F=0 THEN X=USR0(0) ELSE X=USR1(0)
245 '******* Line 240 is only for Disk Basic
        For tape systems use
        235 IF F=0 THEN POKE 16526,PEEK(C+1):
            POKE 16527,PEEK(C+2) ELSE
            POKE 16526,PEEK(D+1): POKE 16527,PEEK(D+2)
        240 X=USR(0)
250 FOR I=1 TO 100: NEXT
260 K=K+1
270 IF K<5 AND INKEY$="" THEN 240
280 F=NOT F: GOTO 230
```

Program Listing 4

Continued from p. 42

to James Farvour's *Microsoft Basic Decoded and Other Mysteries*, are never used by Level II. These two bytes are E1H and E9H, or, in Assembly language:

```
POP  HL
JP   (HL)
```

These bytes do not appear together anywhere else in ROM, and their chance of appearing together randomly is miniscule. Obviously they have a purpose: to assist all machine-language programmers. They can save you hours of work trying to make a machine-language routine relocatable.

Here's what happens when your routine performs a Call 000BH. First, the address of the next instruction is placed on the stack by the Call instruction. Then control is passed to 000BH, where the return address is POPed off the stack into the HL register and control is passed back to your routine—to the instruction after the call. You could obtain the same result with a call and a RET, except the HL register holds the same value as the program counter.

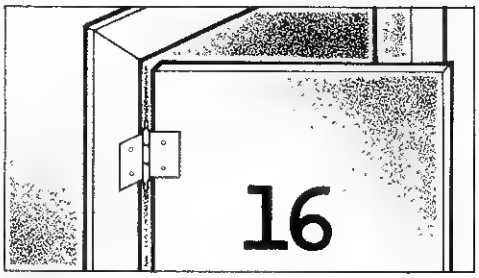
Perform a relative jump (JR) to your subroutine. HL still points to the JR instruction, so increment HL twice to point to the instruction after JR. Then push HL on the stack. Your program can now perform the subroutine and RET to the instruction after JR. (See Fig. 1.) This uses five more bytes than a regular call to a subroutine, but it makes your program truly relocatable without losing the power of the Call instruction.

There is one drawback: the original value in HL is obliterated. To pass the HL value to your subroutine, push HL *before* the call to 000BH and, in the subroutine, perform an EX (SP),HL instead of pushing HL. (See Fig. 2.) This takes an extra byte and 20 more T states, but the negligible delay is worth the extra convenience.

You can use the same idea to find tables in relocatable programs and for more intricate control shifting. Usually, the 000BH call saves you more in time and RAM space than your program expends avoiding a subroutine call. With Call 000BH you can make all your machine-language routines relocatable. You never again have to face the problem of two routines, written at different times, conflicting because they use the same memory space. ■

SUITE 16

by Dan Keen and Dave Dischert



The 16 enhancement option

The Model 16 is selling well, although it is neither designed for the average home, nor always suitable for small businesses.

The Model 16 can store more information on a disk than any other Radio Shack computer, but that's not sufficient reason for buying it. The Shack sells hard disks for both the Model II and III that will store millions of bytes of information.

The real advantage of the Model 16 is its ability to connect to several terminals. Each terminal can access information on the floppy or hard disks. The file or program that an operator may be using on one terminal does not have to be the same one on which another person is simultaneously working.

Therefore, businesses or institutions requiring multi-user and multitasking capabilities are the best candidates for the Model 16.

Reader Forum

Have you wondered about the differences between the Model 16 and the Model 16 Enhancement Option for the Model II?

When a Model II receives the 16 Enhancement Option, two circuit boards are plugged into the Mod II chassis. One board contains the MC68000 chip and its associated circuitry. The second board houses the random-access memory. Memory configurations can be either 128K or 256K of RAM. The upper limit for an upgraded Model II computer is 256K, while the Model 16 can be expanded up to 512K.

The power supply in the Model II must also be changed. The existing supply cannot deliver the extra current needed to properly run the additional electronics. If this supply is not changed, the video display raster will drastically pull in on the sides every time the micro accesses a disk drive.

The upgrade does not affect any disk-drive mechanisms. The Model 16 drives both sides of each disk and therefore can store more on disk than a Model II, even if it has had the 16 upgrade.

The only other difference is the Model 16's green phosphorous screen. The II/16 even takes on the type-ahead feature, where the operator can enter commands while the computer is busy performing another task. (The type-ahead feature is determined by the disk operating system. When Radio Shack's new hard disk is connected to the Model III, it too takes on the capability of type-ahead.)

This feature is especially useful when using the editor/assembler. After creating the source code with the editor program, you must save it on disk. The command QU returns execution to the disk operating system Ready mode. Then the source code is assembled and the assembled code is stored as a disk file. Another program, called a linker, takes the assembled code and develops a stand-alone object code. That code is stored on the disk as a command file (/CMD). Finally, to execute the program, you must type the file name.

That whole procedure can take four or five minutes, with operator input required every minute or two. With the type-ahead feature, the user can enter all commands at once, then do something else while the machine carries out all instructions.

The major drawback is that you cannot see the characters you type when the machine is busy with another job. Your input appears on the screen only when the machine catches up and asks the next question. ■

Assembly-Language Corner

Advertising literature refers to the Model 16 microprocessor as a 16/32-bit chip. So which is it, 16 or 32?

Currently, the MC68000 microprocessor is used in the Model 16 as a 16-bit chip. However, the general-purpose registers in the processor are each 32 bits wide. Therefore, memory addresses can be stored directly in any register. It is not necessary to pair registers to store a memory location, as it is with 8-byte microprocessors. Even though the machine can have 512K of RAM, even the highest address can be stored in 4 bytes (32 bits).

The general-purpose registers appear in two categories, address and data. Both types are 4 bytes wide. The data registers are referred to as D0, D1, D2, D3, D4, D5, D6, and D7. Similarly, the address registers are A0, A1, A2, A3, A4, A5, A6, and A7.

The program counter register, which stores the address of the next instruction to be carried out, is also 4 bytes wide. (It takes 4 bytes to store any memory address in the Model 16.)

Similar to other microprocessors, a flag or status register is used to check the conditions following an operation (such as comparing two values). This register does not need 32 bits, since there are never more than 8 flag bits we need to check. Therefore, the status register is 1 byte wide, just like those in 8-bit microprocessors.

Two bytes are referred to as a word. Four bytes, which total 32 bits, are termed a long word.

Instructions for the 16 are more complex than with the Z80 and other 8-bit microprocessors. But they are capable of doing much more work in a single instruction. Frequently one

or two MC68000 instructions will replace four or five lines of programming with other microprocessors.

Writing Assembly-language programs for the MC68000 is no harder than writing for any other microprocessor.

Since registers are 4 bytes long, instructions must tell the computer how many bytes of a register are going to be used. The suffix B represents a byte, W a word (two bytes), and L a long word (four bytes).

Let's look at an example. The opcode for loading a register is LD, exactly the same as the Z80 mnemonic. To specify how much of the register an instruction is to act on, we tack a B, W, or L onto the opcode. The following instruction will instruct the computer to use one byte (B) of the 4-byte-wide register D1. Here it will load the decimal number 65 into register D1.

```
LDB     .D1,#65
```

Instructions must begin on an even address in memory. Most opcodes for 8-bit microprocessors only require 1 or 2 bytes. But many MC68000 instructions take up 2 or 4 bytes. For this reason it is necessary to ensure proper placement of instructions to prevent an Odd Address Trap error during execution.

Under normal writing conditions, we do not have to be too concerned about this problem. But if we define a single byte of memory within a program and further on we place an instruction, the instruction will fall on an odd address. This can be corrected by defining two bytes instead of one or by placing any defined memory at the end of the program, beyond the point where instructions are to be executed. ■

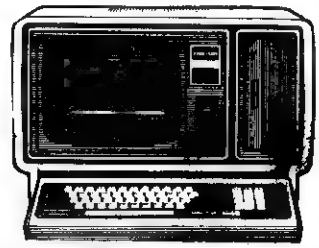
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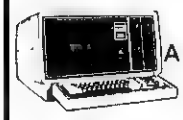
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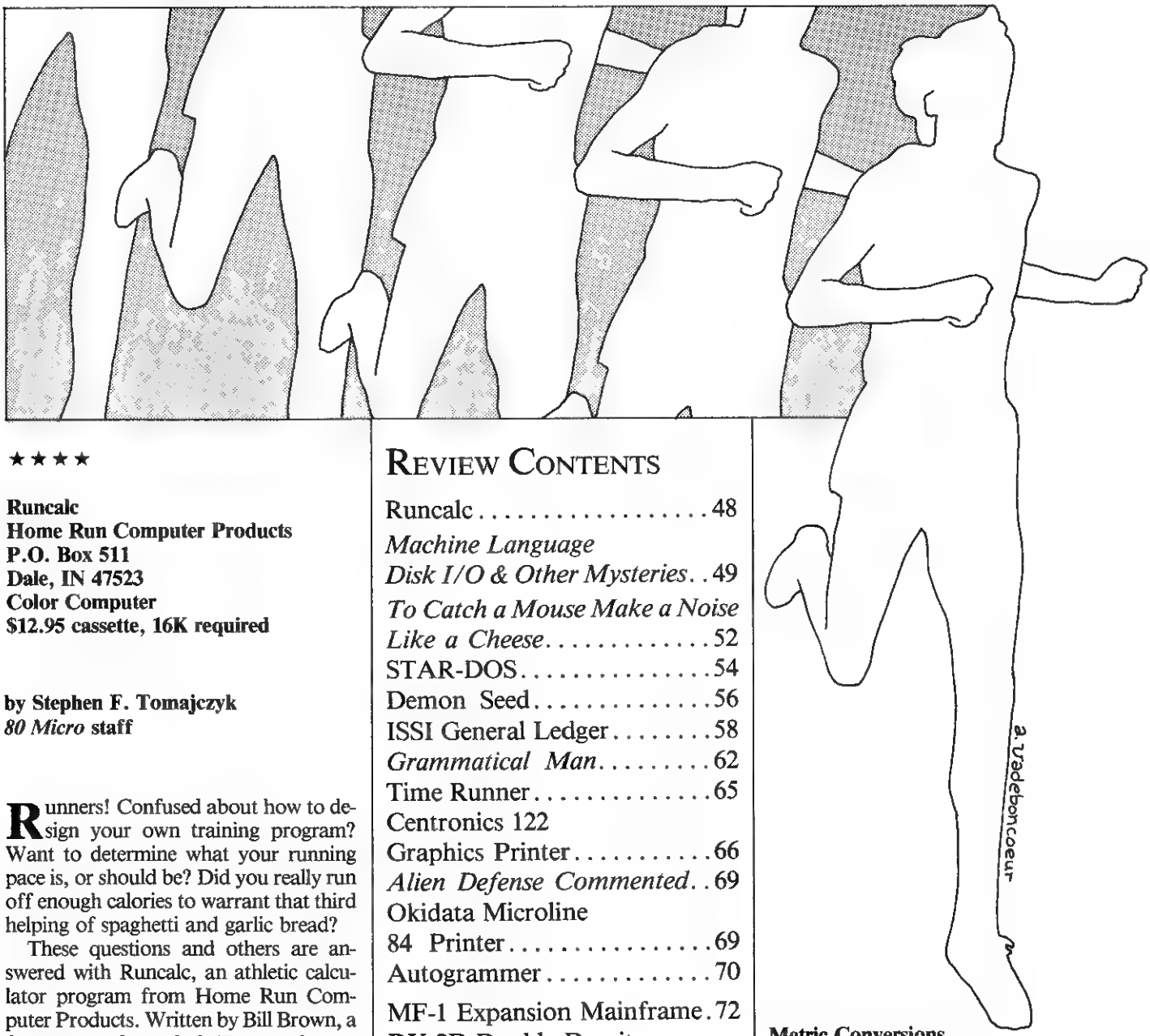
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REVIEWS

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★★★★

Runcalc
Home Run Computer Products
P.O. Box 511
Dale, IN 47523
Color Computer
$12.95 cassette, 16K required

by Stephen F. Tomajczyk
***80 Micro* staff**

Runners! Confused about how to design your own training program? Want to determine what your running pace is, or should be? Did you really run off enough calories to warrant that third helping of spaghetti and garlic bread?

These questions and others are answered with Runcalc, an athletic calculator program from Home Run Computer Products. Written by Bill Brown, a former coach and 2:47 marathoner, Runcalc is a menu-driven program designed for the Color Computer.

Once you've loaded the program, a marathon-thin figure jogs across your screen a few times and you are presented with the main menu. The menu consists of four programs: Pace Computer, Metric Conversions, General Training Goals, and Calorie Calculator. You simply select the program you wish to use, enter the corresponding number, and answer the program prompts.

Pace Computer

Suppose you have just finished running 10.5 miles in 1 hour, 30 minutes, and 30 seconds and you now want to know your pace. The Pace Computer program will determine your average pace per mile and quarter-mile, and your speed in miles per hour, in feet per second, and in meters per second. It is important to remember that the Pace Computer calculates the average pace—not the specific pace per mile. So if you want your actual splits, you'll have to get someone to time and record them for you.

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Our reviewers use a five-star rating system. One star represents the low end of this spectrum, while five stars represent the spectacular and high end of the spectrum.

Metric Conversions

Now for the question that has plagued runners for years: *Does* 400 meters equal 400 yards? The answer can be found with Runcalc's Metric Conversions program, which converts meters to yards, yards to meters, miles to kilometers, and kilometers to miles. However, I was annoyed that you can't determine the decimal fractions of either the standard system or the metric system. You'll need information like this if you run distances shorter than a kilometer, since all program entries must be in decimal form. In this fashion, 125 meters is entered as .125 km.

Goal Calculator

The Boston Marathon is six weeks

away, and you need a concrete idea of what pace you need to break 2 hours and 30 minutes. No need to fret: The Goal Calculator will tell you your goal pace per mile. It will even provide you with your split at any given distance. If you like, it will also show you your cumulative goal time at each split point along the course. For example, if you select one-mile splits in a four-mile race that you want to run in 24 minutes, you'll see:

Split Number	Distance Completed	Elapsed Time
1	1	00.06.00
2	2	00.12.00
3	3	00.18.00
4	4	00.24.00

The major drawback to this charting is that the program tells you the *ideal* pace for a race. . . a classic case of equal division, as illustrated above. In the real world, however, a runner doesn't run a constant pace throughout a race. This fluctuation in pace is not accounted for with the Goal Calculator. Remember, a four-minute mile can still be obtained by running quarter-mile splits of 55, 68, 60, and 57 seconds.

The program also ignores the numerous factors that have a marked effect on a runner's performance: the weather, athletic conditioning, fatigue, racing strategy, the terrain, and the runner's mental attitude.

Regardless, if you keep all this in mind when you use the program to develop a training program, you'll have no problem when you hit the road.

Calorie Calculator

Stop! Don't touch that cream pie! How many calories did you burn off during your run? You can find out with help from the Calorie Calculator program. Just enter your weight (don't lie), how far you ran (again, don't lie), and how long it took you to run your course. The computer will calculate how many calories your body burned.

I found this program interesting, since I've always wondered what all that sweat added up to. With a bit of conscientiousness, you can monitor your exercise to meet a desired caloric intake for weight gain or weight loss. This program provides a good incentive if you are dieting and want to actually see the results of your efforts.

Summary

Try as you may, you won't be able to fool Runcalc with bum information. The program knows when you're lying. For instance, I entered that I had run a quarter-mile in one hour. The computer replied with "Too slow to be running. Please check entry and try again." Obviously the computer knows me well—I cheated. I didn't run the quarter-mile; I crawled it.

The documentation and program prompts are clear, precise, and self-explanatory. Sample calculations are provided, and if you refer to them you should have no difficulty running the individual programs.

"Runcalc can be helpful to any serious runner. . . "

As a bonus, the cassette can be registered with Home Run Computer Products so that you can receive any updates or corrections that are necessary. There is no registration fee attached.

Now, before you put on your running shoes and dash to the mailbox with your order, let me tell you a few things Runcalc will not do. Runcalc will not generate an ideal training regimen for you. The program can't take into account your mental attitude, physical ability, or conditioning. A computerized coach is still years away.

Also, Runcalc does not feature a daily logbook. If you want to keep a daily running diary you'll have to find another program or keep a hand-written journal.

Runcalc will help you evaluate your training quality, compare performance at different distances, determine speed, generate split times, calculate caloric intake, do metric conversions, and establish meaningful goal times for interval training. In other words, it simply aids you in designing a good training program by providing necessary and precise information about yourself.

If you have questions about designing a routine, refer to the manual. Bill Brown shares information about how he integrated the programs to help him train for a sub-2:50 Boston Marathon.

Overall, Runcalc can be helpful to any serious runner who wants to improve his or her performance. My only suggestion is that you keep all the data in perspective.

Now you can lace up your shoes and run to the mailbox. ■

★★★½

Machine Language Disk I/O & Other Mysteries
Michael J. Wagner
IJG Inc.
1953 West 11th St.
Upland, CA 91786
Softcover, 271 pp.
$29.95

by John B. Harrell, III

Michael Wagner's *Machine Language Disk I/O & Other Mysteries* is the perfect reference source for any programmer who would like to try his hand at disk I/O programming without being tied to the support routines of any specific operating system. This expertly assembled, compact, and fact-filled book attempts to demonstrate all the aspects of disk I/O for the Model I and Model III—successfully.

The book is logically arranged into nine chapters and two appendices. It begins with a thorough introduction into the physical structure of the floppy disk and then launches into the important aspects of the floppy-disk controller (FDC). It explains all the basic interfacing information (i.e., memory-mapping addresses or port addresses) in detail.

Wagner first demonstrates how to select a particular disk drive and read the disk-status register. He leaves no room for error and clearly shows the methods used in well-documented Z80 source code usable with any assembler.

The following two chapters are devoted to a detailed explanation of the FDC's commands. Each command is explained and supplemented with an example in Assembly code. Wagner maintains separation between the two computers by writing each chapter for the Model I and providing a supplement to the chapter for the Model III. He demonstrates the differences between single- and double-density operation and the differences between the implementation of disk I/O routines on both computers.

Next he launches into an explanation of disk I/O techniques. The major tool



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he uses is the DISKIO routine for performing full sector I/O. You can take this routine directly from the book's source code and use it as a subroutine in any program. Error codes are returned to the calling program as TRSDOS-compatible numbers that can be used with the TRSDOS error-message display routine. Studying the source code in this routine provides additional insight into the concepts presented.

Mr. Wagner next moves to interfacing with the disk operating system's routines for input and output. Many of these routines are defined and explained in the TRSDOS reference manual, but Wagner takes the time to explain their usage completely and clearly. Other entries into the disk operating system are discussed, although the Assembly-language linkages to these routines are not demonstrated as were the file-manipulation routines. Nor does he cover all the entries into the sophisticated operating systems (NEWDOS80 V2.0, for example). You must consult the particular disk operating system's documentation for these as their entry points are generally not compatible with the other systems, or else do not exist.

In Chapter 8, Wagner presents some useful programs and routines that he has written, some of which are superior utilities. For example, you are presented with the source code for a complete stand-alone error-message processor for TRSDOS error messages. You no longer need a system disk in drive 0 to display comprehensible error messages in the format that you are used to.

Next, Wagner presents the source code for a program that formats a disk in the standard TRSDOS 35-track, single-density format. You can easily change the number of tracks and the sector names (numbers) by making simple changes to the source code. System files are not initialized by this routine so there is no boot sector and no directory on the disk.

Three additional programs—PASSFIND, LOADER/BAS, and ASCIIZAP—are also included.

PASSFIND attempts to find character equivalents of the encoded password value. The 16-bit hash-code value for the password is provided as input; the program displays character equivalents of this encoded value until stopped.

LOADER/BAS, written in Disk Basic, reads any /CMD module and displays the load points and block lengths of the file. The transfer address and number of bytes in the file are also displayed.

ASCIIZAP is a machine-language file manipulator similar in operation to Superzap. Files are accessed by file name and relative sector (same as the Superzap DFS mode). Each sector is displayed in hexadecimal and ASCII character equivalents. Unlike Superzap, when you are going to change a sector, the cursor is displayed in the character section of the video and the file is modified in the ASCII mode.

Each routine exemplifies how to manipulate the TRS-80 file structure on disk and provides you with specific programming techniques. For the novice machine-language programmer, these examples are a superior way to study and learn Assembly language as each routine is clearly documented.

As the final example, Wagner provides the source code for a small disk operating system (S/OS). S/OS is included in two modules and was written to use most of the functions that are described in the book. Unfortunately, the operating system requires specific locations to be occupied on the system disk and Wagner doesn't provide the instructions on how to write S/OS to the disk in the required positions after assembly so that it functions. The reader is left alone to develop the method of setting up the system disk.

Also included is the source code for a smart terminal driver for the Model I user with an RS-232 interface. Term is menu-driven and provides you with a comprehensive selection of options. One of the strongest features of Term is the presentation of well-documented source code providing introduction into the world of Assembly language and more manipulation of the disk operating system's file-handling routines.

The last section of the book is worth its weight in gold to the serious applications programmer and the hardware enthusiast. In the final appendix of the book are the data sheets and applications notes for the FD1771-01 and FD179X-02 floppy-disk formatter/controllers. What is missing from the book text is available in this one concise appendix.

There is one significant omission in *Machine Language Disk I/O & Other Mysteries*. Although Wagner provides

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detailed instructions on switching density modes on the Model III by manipulating the select port, he fails to address the method used to shift density modes on the Model I using a double-density modification, such as The Doubler from Percom. The technique these mods use is extremely simple and could have been easily included in the chapter on disk commands.

One additional small problem is the typesetting errors in some of the programs. These typos cause assembly or syntax errors and can be confusing to the beginner.

I feel that *Machine Language Disk I/O & Other Mysteries* is a superlative effort. It has earned its place on my desk and has already become worn and coffee-stained from use. I highly recommend this work for anyone who has an interest in disk I/O programming. ■

★★★½

To Catch a Mouse Make a Noise Like a Cheese
Lewis Kornfeld
Prentice-Hall Inc.
Englewood Cliffs, NJ 07632
Softcover, 364 pp.
$15

by Timothy Daniel

To Catch a Mouse Make a Noise Like a Cheese comes from the same folks who brought the world solar-powered cigarette lighters and the TRS-80. The author, Lewis Kornfeld, started working for Radio Shack in 1948, survived the merger with Tandy Corporation in 1963, became Radio Shack's president in 1970 and the vice chairman of Tandy in 1980. Kornfeld has sold many transistor radios and CBs, and this book tells how he did it.

It's not often that Radio Shack sells a marketing textbook alongside the Donkey Kong games and imitation Walkmans. Luckily, *To Catch a Mouse* is more than just an underground guide to Madison Avenue; it also serves as an autobiography, a history of Radio Shack, and the home of countless one-liners and puns. Also, *To Catch a Mouse* offers "The TRS-80 Story," complete with G-rating.

First of all, the book is an exposé of the advertising business, both the agency way and the Radio Shack way. You'll find the answers to such titillating questions as why you must give the Radio Shack clerk your name and address every time you buy something, or the secret behind those famous five-cell flashlights.

In what must be a devastating blow to admen everywhere, Kornfeld divulges "the pheromone factor." This secret deals with the way in which a flashy turntable or the most homely power transformer becomes a coveted sex object; it's not done with mirrors, just slick ad copy.

Along the way, Kornfeld shares 65 rules of marketing. They range from "One of the quickest ways of learning what to do in any business situation is first to be able to observe it done correctly" (number 4) to "When opportunity knocks in an unusually loud manner, tear a hole in the wall and make it a second door" (number 63).

Practical? Yes. Earth-shaking? Hardly. But even if your firewood and software emporium doesn't routinely mail out 10 million catalogs, it can be fun to see how the big boys play.

Then there is the TRS-80. No, Kornfeld doesn't share such secrets as the way to make extra backups of Scripsit, nor does he tell how many TRS-80s have been sold. He does recount the computer's origins, with particular attention paid to the marketing effort.

Did you know that the first production run for Model I's was only 1000 units? Or that the first Tandy computer store sold non-Radio Shack computers? *To Catch a Mouse* devotes 27 pages to the TRS-80; Kornfeld is obviously very proud of Radio Shack's computer business.

In outlining his eight reasons for writing *To Catch a Mouse Make a Noise Like a Cheese*, Kornfeld admits to the ego factor and it is reinforced on almost every page. Like most company stories written by a company man, the hero, in this case Radio Shack, can do no wrong. But for a company story, this is humorous and somewhat educational.

Aside from the serious students of marketing and TRS-80 trivia, the people who would benefit most from *To Catch a Mouse* are those who deal with Radio Shack as trading partners or adversaries. ■

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by Scott L. Norman

Peter Stark's STAR-DOS is a moderately priced product that gives owners of unmodified Color Computers some of the same power over disk operations that is enjoyed by FLEX users. It does not allow one to access the all-RAM memory map and use alternative high-level languages; however, STAR-DOS does contain many of the I/O (input/output) routines featured by true disk operating systems.

The Assembly-language programmer communicates with the disk through file control blocks to open, read, write, and close named files. Files can be renamed and deleted, single sectors can be read or written, and the directory can be searched and modified.

The product's disk format is compatible with Radio Shack's, so STAR-DOS and Disk Color Basic can read each other's files. Basic programmers may not need many of the additional features. On the other hand, there is normally no straightforward way to interface the Radio Shack ROM routines for disk management with Assembly-language programs. Here is where STAR-DOS comes into its own.

"...STAR-DOS contains many of the I/O routines featured by true disk operating systems."

System Components

The nonprotected disk contains STAR-DOS itself plus some disk-resident commands. STAR-DOS is a 4K machine-language program that loads into the Basic graphics area at $1000–$1FFF.

Only the stretch between $122E and $1EFF is used exclusively for STAR-DOS code and data; most of the rest of the space is shared with user programs. A portion of this shared space makes up the system stack, while the rest is used for communications with the disk.

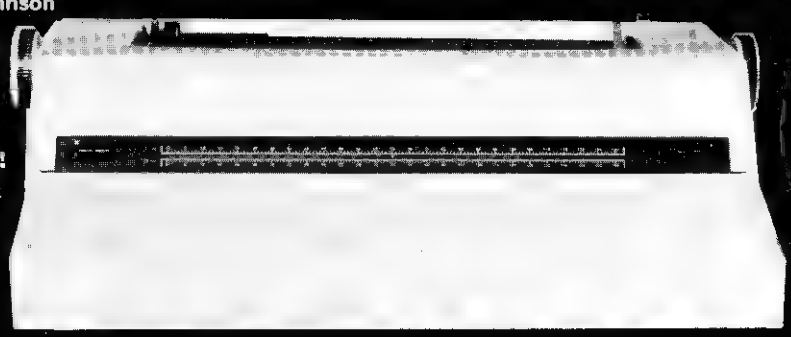
Star-Kits' contention is that Basic will be used when graphics are required, and STAR-DOS will not normally be in memory while Basic is running, so there should be no conflict. This is probably a good assumption, although one wonders where it leaves the Assembly-language game writer. There are few other options if the system is to run in a 16K machine.

The principal parts of the STAR-DOS program are the Command Processor System (CPS) and the File Control System (FCS). The CPS, which is analogous to the disk operating system portion of FLEX, accepts and parses

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user commands before passing them on to the FCS, the real heart of STAR-DOS. The FCS is responsible for locating, reading, and writing disk files, and is therefore similar to FLEX's file-management system.

FLEX has a third component, the Utility Command Set; the STAR-DOS analog is a set of three disk-resident command files and a half-dozen stock memory-resident commands. Users can augment the latter with properly written machine-language files having .BIN extensions, since STAR-DOS can use the file specification formats of either FLEX or Disk Color Basic.

The STAR-DOS manual is unusually complete. It presents commented listings of two of the stock utilities, as well as complete descriptions of many variables, functions, and subroutines available to the user.

The Command Processor System

There are six memory-resident commands available to the CPS, including GET, which loads a binary program file into memory, and XEQ, which is used to execute a machine-language program loaded under STAR-DOS. BAS exits STAR-DOS and reinitializes Basic. PNS (printer nonstandard) deletes STAR-DOS's normal requirement for a handshaking signal from a serial printer and provides line feeds after each carriage-return signal. VON and VOF are the equivalents of Basic's VERIFY ON and VERIFY OFF. One operational difference is that STAR-DOS defaults to VON for safety.

"There are six memory-resident commands available to the CPS, including GET..."

Any word entered in response to STAR-DOS's > prompt that is not the name of one of these commands is assumed to be a call to load and execute a disk-resident command. Thus, if a command procedure named DOTHIS.BIN is present on the disk, entering

```
>DOTHIS
```

is equivalent to

```
>GET DOTHIS.BIN
>XEQ
```

Any arguments needed by the command can be entered on the same line as the command name itself.

The stock disk-resident commands include BUILD, which generates a text file (default extension .TXT) on the disk. Editing facilities are extremely limited and lines are restricted to 127 characters.

DIR gets a directory printout for any specified drive, directed either to a printer or to the CRT. This is an extremely useful command; it furnishes complete information including file name, extension, type (Basic program, Basic data, machine language, or plain text), format (binary or ASCII), number of the first granule, and for ma-

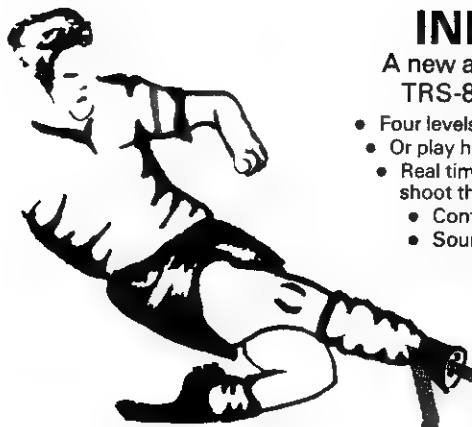
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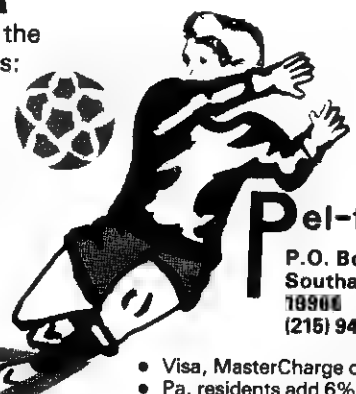
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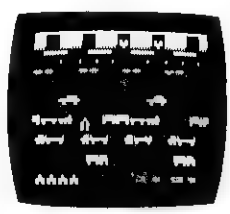


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chine-language programs, the starting, ending, and transfer addresses.

If a binary file loads into several nonconsecutive segments, DIR furnishes the addresses for each. DIR reveals that Telewriter text files (compressed binary format) all begin at $395E, and have their endpoints as transfer addresses.

List lists the contents of text files to the screen or the printer. A default extension of TXT is assumed, although others may be specified. Thus, I have been able to use List to examine the files produced by C. C. Writer, which default to a /CCW extension.

The File Control System

As the part of STAR-DOS responsible for disk I/O operations, the FCS will be of the greatest interest to the Assembly-language programmer. As in FLEX, all communications with the FCS are handled through 320-byte regions of RAM called file control blocks, or FCBs—one for each file open at any given time.

An FCB contains the file specification, the flags and assorted variables used to keep track of the file, and the 256 data bytes most recently read from, or about to be written to, a single disk sector.

The FCB format is not the same as that used by FLEX, but there are analogies; again, the manual gives very complete information on those bytes actually used by STAR-DOS out of the 64 available in each FCB.

There are also examples for reading from and writing to the disk in an Assembly-language program. These typically involve setting up an FCB, pointing the X register to it, jumping in and out of STAR-DOS to assign file names code into the first byte of the FCB, and then using STAR-DOS routines to read bytes from, or write bytes to, the file. The FCB serves as a buffer during the actual read/write operations.

In addition to the subroutines and functions essential to the operation of the FCS, STAR-DOS has others that can be called from user programs. The routines for outputting characters or strings to the video screen or printer are typical examples.

Several variables used by STAR-DOS are also available to the programmer; one example of great practical interest is the serial-port baud rate at $105B–105C. If the user's printer runs at anything other than the default 600 baud, this should be changed and a customized version of STAR-DOS stored for subsequent use.

The procedure is to load STAR-DOS, POKE the value required for the actual baud rate into the two locations (a table is given in the manual), and save the new STAR-DOS on the working disk. STAR-DOS's DIR utility gives the addresses that must be specified in the SAVEM command.

Other variable locations documented in the STAR-DOS manual include the Backspace, Delete, and End-of-Line characters. These are of interest for the conversion of FLEX programs. Although STAR-DOS uses the Radio Shack disk format, and not the linked-list format of FLEX, many programs can be converted by changing a few addresses and reassembling.

Programs that use random files are the most complicated to convert from one operating system to the other, but this can be done if the programmer is sufficiently skilled and patient. The basic information, incuding a rather complete table of names and addresses of FLEX and STAR-DOS entry points and variables, is present in the documentation.

Although STAR-DOS does not claim the degree of control over the user's environment provided by FLEX, it should find a place in the toolkit of the experienced programmer. Peter Stark has performed a real service by providing so many hooks into disk I/O operations. Writers of Assembly-language data-management programs for the Color Computer should now find their tasks greatly eased, and at a modest price. ■

★★★★

Demon Seed
Trend Software
Computer Shack
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Pontiac, MI 48054
Model I or III
$19.95 cassette
$24.95 disk

by Michael E. Nadeau
***80 Micro* staff**

Just when I thought every possible permutation of Space Invaders had come down the pike, Trend Software releases Demon Seed. Like Space Invaders, Demon Seed features wave after wave of attacking creatures. Your ship fires one shot at a time and can use a temporary shield.

Demon Seed is different in that these waves cycle in groups of five. In the first two waves, 18 bat-like beasts flap their wings and swoop down toward your ship. These first waves are relatively easy to master and most like the original Space Invaders.

The second two waves pit you against four large demon-like creatures. These attackers fly back and forth on the screen and swoop with greater accuracy. They begin as small dots moving about on the screen, but they soon "hatch" (hence the name Demon Seed). You must hit these creatures in the head to kill them; shooting their wings off gives you only 20 points, and they are soon regenerated. Once you kill a demon creature, another replaces it until you have eliminated the quota for that wave.

A large mother ship appears in the fifth wave. You must shoot through its defenses before it descends on you while avoiding swooping bat creatures. This is by far the toughest wave, especially in the later rounds when the mother ship descends faster and your shields disappear sooner.

Every time you get through two mother ships, the game goes into a challenge round. The documentation only tells you to expect them and not what they consist of. There are three challenge rounds, and I was pleased with the feature. They add another dimension to the game, though once you figure them out they are no longer a challenge.

The game is not terribly complex, but it remains entertaining after many hours of play. It requires great concentration and fast reflexes. The higher you score, the more difficult Demon Seed becomes. The creatures seem smarter and your shields don't stay on as long.

Demon Seed has some features that should be standard on all arcade games: a pause command, save-high-score option, and on-screen instructions. It also will boot up on a Model I or III.

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I have a few complaints: The game has a screen flicker that is very annoying and strains your eyes. This might have been done on purpose to enhance the effect of the creatures' movements. The game would be much better off without it.

The sound is downright obnoxious.

"Demon Seed is one of the better recently released TRS-80 games."

Though I'm not a great fan of arcade muzak, Demon Seed's "noise" has to be one of the worst among the arcade games currently available. I long for the day when someone puts a sound-disable option on an arcade game.

Demon Seed is one of the better recently released TRS-80 games. If you like arcadia, you won't be disappointed by it. ■

★★★★

ISSI General Ledger Program
International Software Sales Inc.
P.O. Box 223
Newtonville, NY 12128
Model II or II/16
$600

by Charles R. Perelman

The ISSI general-ledger module is a professional and complete implementation for the Model II or Model II/16. If offers as many features as any general-ledger package on the market and is unique in a number of ways.

The general ledger is sufficient for all the accounting needs of many businesses. However, you can obtain accounts receivable, accounts payable, inventory, and payroll programs from ISSI to construct an integrated accounting system.

Module Overview

The module is a mixture of Basic and Assembly language with some protective devices built in to discourage tampering. It requires two disk drives.

No source code is furnished, but the interactions among the large number of files used would make alteration a formidable task in any event. You are expected to use the flexibility of the system to meet your needs, rather than try to customize the software.

To use the system, prepare a disk with a bare-bones TRSDOS system and Basic (version 2.0a or later). With this disk in your built-in drive and the ISSI disk in your second drive, enter "ISSI" and go have a cup of coffee. The program is automatically transferred to your disk by a loader.

You'll probably notice that your disk drive sounds quieter than usual. This is a clever touch. Disk-access time has been cut to about 12 milliseconds for the entire package. Even at this rate, the extensive number of files takes several minutes to load.

The accounting system is an enhanced version of the well-known Osborne general-ledger package that was originally published in CBasic. You can use the general ledger for any type of business. However, there is no provision for automatic accrual reversal, although reversals can be done manually by direct posting. Cash-basis accounting is therefore easier to implement than accrual-basis.

As in any typical balance-forward ledger, all current-month transactions are cleared when the month is closed. You make a written transaction listing to print out an audit trail. Each account is then updated with the new balance.

ISSI has a big plus that many systems lack: a summary file that holds a complete chronological record of all transactions from the beginning of the year. This summary sorts postings by account and can be used as an audio trail for reconstruction of records.

The file-organization specifications are provided in the event that you want to use this data in other Basic programs. You can create programs to extract data for all types of special studies.

You can choose any of 11 operational programs or a Help program from the general-ledger menu. Help gives some guidance in the setup sequence and brief descriptions for each program. It is not really a general operational aid.

Formatting and back-up use TRSDOS utilities built into an End program with some additional prompts that guide and remind you to back up your data.

Posting Data

You post transactions into a cash journal, either receipts or disbursements, or directly into a general journal. Error-trapping is explicit and extensive throughout the module, and there are numerous prompts and descriptions of program action, often in reverse video.

You review all data entered and can change any item before posting to the file. Your debits and credits must be equal to complete normal direct posting, but controlled out-of-balance entry is permitted with an executive password for corrective action.

Other nice embellishments include a display at the bottom of the screen of all details of the last item posted (this helps you keep your place when posting a group of items), totalling of several items with the same reference number (such as a single check or deposit), optional check printing with standard voucher checks from the disbursements journal, and automatic inclusion of check number in the journal for an audit trail.

I found a bug in the check printing that resulted in a check being printed for the last item entered, rather than the total of all items to be included on the check. This might be corrected by the time this review is published.

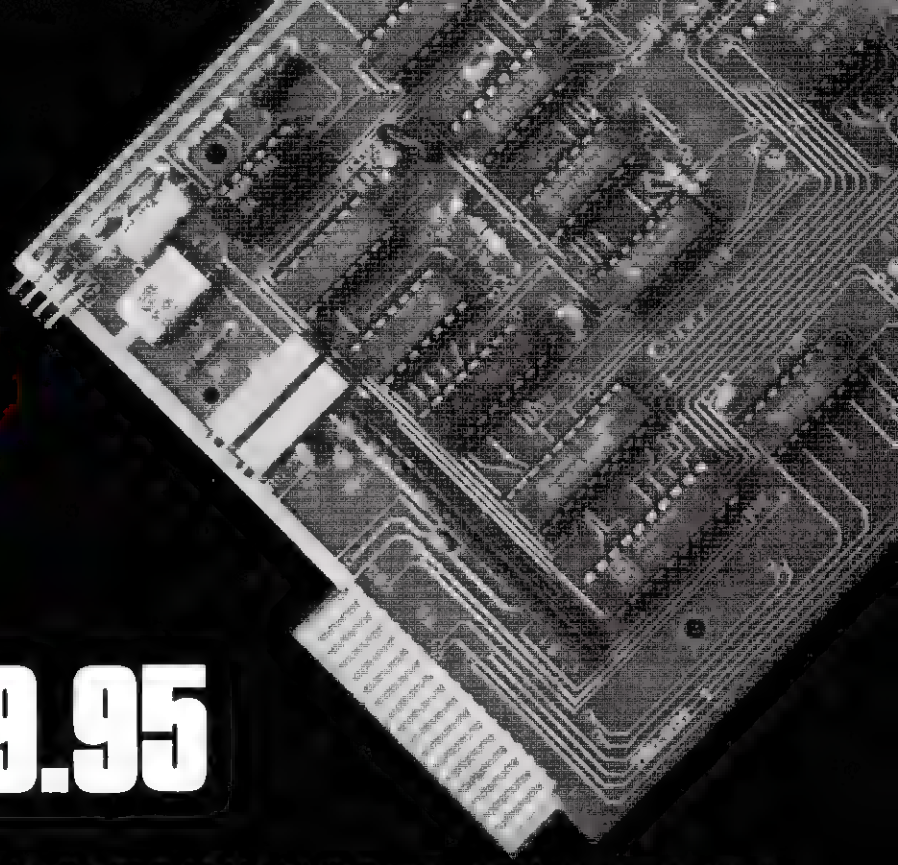
An entry is assumed to be of the same character as the normal balance in the account. This controls the debit or credit nature of the offsetting cash entry in the cash journals. For example, to make payment on an account payable, the entry must be prefixed with a minus sign since you are debiting payables, which has a normal credit balance.

You can enter discounts on accounts payable payments, invoices in gross, and payroll withholding taxes to offset total salary amounts if you are using this module as a complete accounting system. To avoid inadvertent errors, you are warned that these entries reverse the normal cash entry.

Handling Accounts

The chart of accounts processing gives you almost complete flexibility. The system will accommodate up to 700 accounts with identification numbers from 1 to 99999. ISSI recommends use of a hard disk for more than 400. I'm sure a hard disk would speed all aspects of program operation. One digit of an account number to the right of the decimal point can be used for departmental coding.

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tern, you designate accounts as regular (used for processing your data), title (for financial-statement, major-category descriptions), heading (subcategory descriptions), and total (totals groups of figures on financials).

The list of accounts can be scrolled for review and you can easily alter account and statement format parameters. For each account, 16 monthly balances can be retained for comparison purposes.

ISSI has added a whole new dimension to the package with a budget program. A simplified procedure enables you to set up a budget account automatically for each regular income-statement account you create. Budget data can be printed out by itself or added to your regular financial statements with automatic calculation of absolute and percentage variation from budget.

The usual trial, monthly, quarterly, and year-end balance sheet, and income statements are provided. You can make special reports containing only earmarked accounts. Also, you can calculate percentage of sales figures automatically and designate those accounts to be included in the sales total.

The break key is disabled in all programs. When entering data, the left arrow erases an entire newly entered line. You can print the screen at any time with control V. The F2 key usually aborts printing, enabling you to print only part of a schedule or report.

Another of the bells and whistles in the module is a depreciation program. This is a memo account that does not affect your regular account balances. You list fixed assets with purchase date, cost, life, and depreciation method.

Depreciation is figured for the life of the asset, with the year of purchase prorated based on purchase date and your fiscal year. To use the half-year convention, you must enter the seventh month of your fiscal year for purchase date regardless of when the asset was actually acquired.

Straight-line, declining-balance, sum-of-the-years digits, and ACRS (accelerated cost recovery system) computations are made automatically. If salvage value is not appropriate to the chosen depreciation method, an error trap prevents its entry.

The declining-balance routine switches to straight line at the proper crossover point in the life of an asset purchased at the beginning of a year. It does not make this computation properly when initial depreciation is for a partial year. ISSI states that this is being corrected.

ACRS computations are for 3-, 5-, and 10-year property. Although this covers the usual personal-property lives for most users, there is no real-estate ACRS facility. Assets are categorized and summarized by category (for example, machinery). A total depreciation figure is provided for the year.

An alternative calculate mode lets you produce a depreciation schedule for an asset without data being retained in the file. This is a handy tool for accountants or for projections. A printout can be run for future use.

The module also can produce amortization tables, determine principal and interest payments under the rule of 78s, compute sinking-fund requirements, or determine amounts accumulated through annuity payments. You enter three of the four required items: interest rate, periods, total sum, or periodic payment. The program computes the missing item. Complete schedule printout is optional.

System Access

Three passwords are used throughout the programs. To gain entry into the module, you need the system password. Each posting clerk has a personal password that causes his initials to be recorded automatically with each entry he makes. An executive password is required to unmask all clerk passwords or to change the system password.

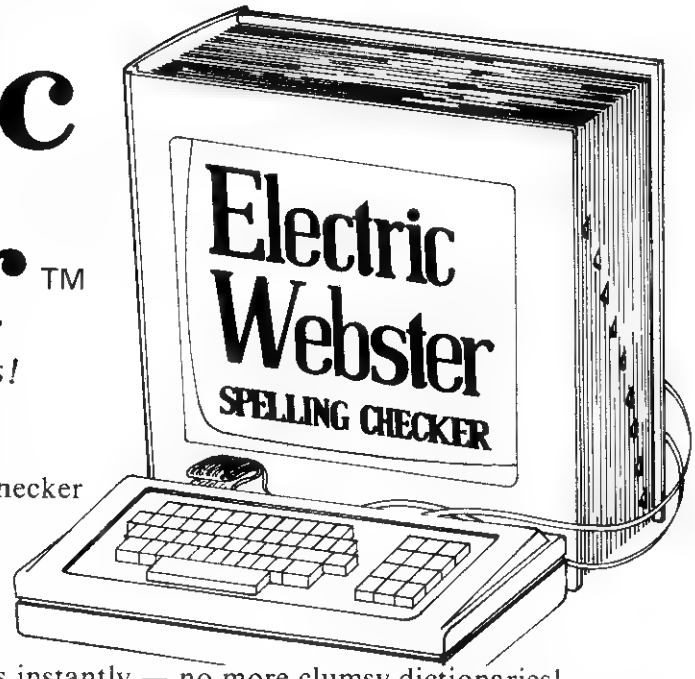
If you want to bypass the posting password, the first four characters of the executive password can be used for posting. Only X's appear on the screen as you type in your password, shielding it from prying eyes.

The posting initials are a good audit-trail tool, but are not secure for fraud detection. The computer assigns the numbers on a pseudo-random basis. The sequence repeats from power up, skipping any numbers already assigned. Clerks can change their passwords at any time.

A little playing with this part of the program can yield the sequence of numbers for later assignments. More importantly, you can circumvent the system by entering the name of another person, making entries with his initials recorded, then deleting his name and password from the file. There will be no rec-

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ord of the unauthorized entry of the phony name, or perhaps your name, with the phony password.

Although flashing messages and reverse video help track the program action, there are times when messages are not sufficient to assure you that activity is continuing properly. This kind of cosmetic element is important to inexperienced users, and I hope these few omissions will be corrected by ISSI since most of the module handles this aspect well.

Program Speed

Routine posting, the most common repetitive task for any accounting package, is rapid. However, the program operates with agonizing slowness when switching to other routines requiring it to update or load files.

To produce the many interrelated entires and program features requires a great many files. Updating them necessitates considerable disk thrashing. Other general-ledger programs suffer from this same problem, and ISSI's increased head-access speed gives it an edge over many of them.

Stripped-down programs in CBasic (a pseudo-compiler) do operate considerably faster. There is a trade-off between program versatility, particularly when much of the programming is in Basic, and processing time.

If you have had experience with other Osborne-based general-ledger packages, you will appreciate the talent and effort used to write this sophisticated enhancement. You will feel at home with the programs, since many of the operational sequences are the same as the original.

"If you have had experience with other Osborne-based general ledger packages, you will appreciate the talent and effort used to write this sophisticated enhancement."

Unfortunately, as with so much other accounting software, the quality of the documentation is not up to par for a system with these capabilities. An executive summary contains a general overview of the programs. The spiral-bound 52-page manual lies flat for easy use and has sufficient margins. It is word-processor produced rather than typeset.

The contents are not well organized. The index should be expanded, and cross-references should be replaced by appropriate page numbers. Nowhere in the manual is the subject of entry correlation mentioned.

The glossary immediately preceding the index contains extraneous information for accounts payable, accounts receivable, payroll, and inventory programs. ISSI has been struggling with improving their manual, but it needs more work. This quality of programming deserves better documentation.

Program updates from ISSI for one year are included free with the module.

The ISSI general ledger has great versatility, extensive features beyond the basic general-ledger accounting functions, and is error-trapped well. You may be able to do all your accounting with it. If capabilities such as voucher-check printing, budgeting, depreciation computations, and amortization tables are important to you, this program is ideal. ■

★★★½

Grammatical Man
Jeremy Campbell
Simon and Schuster
1230 Avenue of the Americas
New York, NY 10020
Hardcover, 273 pp.
$15.95

by John P. Mello Jr.
***80 Micro* staff**

Information is more than something to keep your microcomputer busy. It's a science. And in this book, Jeremy Campbell suggests that it may be a discipline embracing and unifying all disciplines.

Campbell, a Washington, D.C.-based correspondent for the *London Standard,* brings an entertaining and alluring eye to information theory. He explains how information parries the effects of entropy on all systems. While entropy sows randomness, he says, information acts as an agent of anti-chance, enriching life and undermining the mundane.

Campbell's explanations of complex ideas are easy to understand. His use of anecdotes and biographical material takes the dryness out of his material and makes it enjoyable to read.

The author also has a knack for putting ideas in a human context, rather than a theoretical one. He's sensitive to the contrast in styles between two of the leading players in information theory, Claude Shannon ("quiet and self-deprecating") and Norbert Wiener ("a florid and eccentric character, a blower of fanfares for his own accomplishments").

Injections of humor by Campbell add to *Grammatical Man*'s appeal. Take the advice one of Shannon's colleagues gave him when he struggled to find a name for his measure of information. "Call it entropy," the colleague said. "No one knows what entropy is, so in debate you will always have the advantage."

Or Campbell's account of an attempt by Yale engineering professor William R. Bennet, Jr. to simulate the monkey-typewriter-Shakespeare metaphor. After determining that a trillion monkeys typing 10 keys a second at random would take a trillion times the age of the universe to get "To be or not to be: that is the question," Bennet programmed some rules into his computer simulation.

He limited the keys to the 26 letters of the English alphabet. He included spaces and apostrophes. The third act of *Hamlet* was analyzed for the frequency of letters and pairs of letters appearing in it. That frequency was included in the program.

At that stage, Campbell noted, "a large number of indelicate words and expletives appeared, leading Bennet to suspect that one-syllable obscenities are among the most probable sequences of letters used in normal language. Swearing has a low information content!

Campbell's attempt to integrate all knowledge through information theory rings of 16th-century metaphysics. Even the title of the book, *Grammatical Man*, is based on a metaphysical device, the conceit, this one being that the exchange of information in the universe—whether it be between atomic particles, proteins, or humans—is governed by a structure similar to grammars in languages.

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And like those grammars, the rules of information allow the creation of an enormous amount of outgoing information with very little incoming information.

Information theory and the integration of knowledge are so entwined, Campbell contends, that recognition of one led to notice of the other—even in ancient times. He writes, "If Aristotle was a philosopher preeminently able to look at all nature and human affairs as an undivided process full of beauty, which is above all intelligible to human beings, can it be a coincidence that he was also, alone among classical thinkers, a man who arrived at the first glimmerings of a theory of information?"

Grammatical Man also takes time to fence with information counterrevolutionaries:

"If the ideas of information theory are thought of as trivializing nature and the mental activities of human beings, then they have been seriously misinterpreted. Rather, they suggest that systems of all kinds evolve toward more complex states, and that this is the natural order of things."

"Campbell's explanation of complex ideas are easy to understand. His use of anecdotes and biographical material takes the dryness out of his material and makes it enjoyable to read."

This evolution into complexity, Campbell argues, unifies knowledge. "[S]cience and art, philosophy and politics, history and psychology," he writes, "meet on common ground... the barriers between the cultures break down under the recognition that all are incomplete and always will be; that no single discipline or school of thought has a monopoly on the truth. The truth itself has become more difficult to define as a result of the last half-century of discoveries in what used to be known as the exact sciences, making them richer, but not necessarily more exact, and disturbing them to their foundations."

"The lesson of information theory is," he adds, "that choice and constraint can coexist as partners, enabling a system, be it a living organism, a language, or a society, to follow the arrow not of entropy but of history. This is the arrow which distinguishes past from future by moving away from the simple, the uniform and the random, and toward the genuinely new, the endlessly complex products of nature and mind." ■

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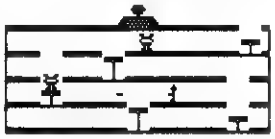
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★★★½

Time Runner
FunSoft
28611 Canwood
Agoura, CA 91301
Models I and III
16K cassette, 32K disk
$24.95

by Eric Maloney
***80 Micro* staff**

Funsoft's games have all the classic features of a B movie—they look cheap, they're all the same, and yet they're a whole lot of fun.

Time Runner is the best of the lot (their other releases include Bable Terror, Mad Mines, and Apple Panic). You're given a grid, and must trace all of the lines with a little ghost-like figure (you start the game with three). When you've traced the entire grid, you move to the next grid, or phase.

You're faced with two types of grids, which alternate. In the first, you start off with a certain number of bonus points, which decrease rapidly as you trace the grid. Your bonus is whatever you have left when you've covered all of the lines.

In the second, each box in the grid is assigned a point value. If you cover two sides of the box, the points start ticking away, until you complete the square.

"Time Runner is video gaming stripped down to its essentials."

To make your task more difficult, a group of little men chase you as you try to complete the grid. Their numbers increase as the game progresses, until the board looks like a rugby scrum. Naturally, if one of them touches you, you lose a man. Dodging these creatures while trying to complete the grid takes a great deal of concentration, particularly after you get past phase 10 or so.

The authors provide several tools to help you along. First, you get an extra man at every 10,000 points. Second, you have three chances to temporarily paralyze your pursuers by touching the space bar. And finally, at certain points in the game, the creatures you're dodging go blind, and you can get extra points by running into them.

Time Runner's appeal lies in its simplicity. The object of the game couldn't be more basic, and yet reaching that object can be challenging. Time Runner is video gaming stripped down to the essentials.

On the other hand, Time Runner offers little variety. You learn its tricks through repetition, and the game can get tedious after a while.

One more positive note: Time Runner is a nonviolent game well-suited for children. It's one that parents will enjoy playing with their youngsters. ■

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★★★★
Centronics 122 Graphics Printer
Centronics Inc.
Hudson, NH 03051
$1,195
by Jake Commander
***80 Micro* staff**

One of the latest creations from the people who gave us the standard Centronics parallel interface, the Model 122 Graphics Printer, has so many features that it has to be microprocessor-controlled. It's an intelligent printer, so to speak.

First, what do you get for your money? Physically, the printer is a significant departure from Centronics' earlier style of microcomputer hardware. It is a sleek, stylish machine that wouldn't look out of place in a modern office. Centronics opted for a neutral buff color with a black base and a lightly smoked paper-cover/front panel. It arrives with a ribbon cassette and a six-foot power cord. You'll need to buy a printer cable to hook it to your micro.

The unit is 21 inches wide, 15 inches from front to back, and 7 inches high. It weighs just under 30 pounds—transportable, not portable.

It can work from either 115 or 230 volts for those Europeans who use those nasty, dangerous high-mains voltages. Another important plus for Europe is that the printer contains character sets and form lengths applicable to France, the United Kingdom, Germany, Italy, Sweden, and Denmark, as well as its default U.S. ASCII codes. This should strengthen its worldwide appeal.

I'd like to make an appeal to all printer manufacturers on behalf of the non-dollar-spending nations (and there are quite a few): If you're aiming for the world market by allowing multiple-character sets, as on the Centronics Model 122, replace the ASCII code for the dollar sign by that particular country's currency sign. If the correct currency sign were available, then the same formatting commands could be put to use in the rest of the world.

Documentation for the printer consists of 36 detailed pages, executed with the professionalism one expects from a large company. There's even a reader's comment form, postage paid. Wow!

The manual covers the usual information: the printer description, installation, operation, and the basics of operator maintenance. However, the manual does not cover advanced maintenance.

The Model 122 is designed for business and personal use. The printer body feels good and solid, and is soundproofed. I noticed, however, it was a slight bit noisier than my Epson MX-80, although not excessively so.

The literature seems aimed at the business audience; it describes the Centronics 122 as an industrial-grade, 132-column, data-processing printer. Well, it doesn't do data processing that I noticed, and industrial grade makes it sound like farm machinery. Sturdy is what it is and I'm confident that it would stand fairly heavy use in a professional environment.

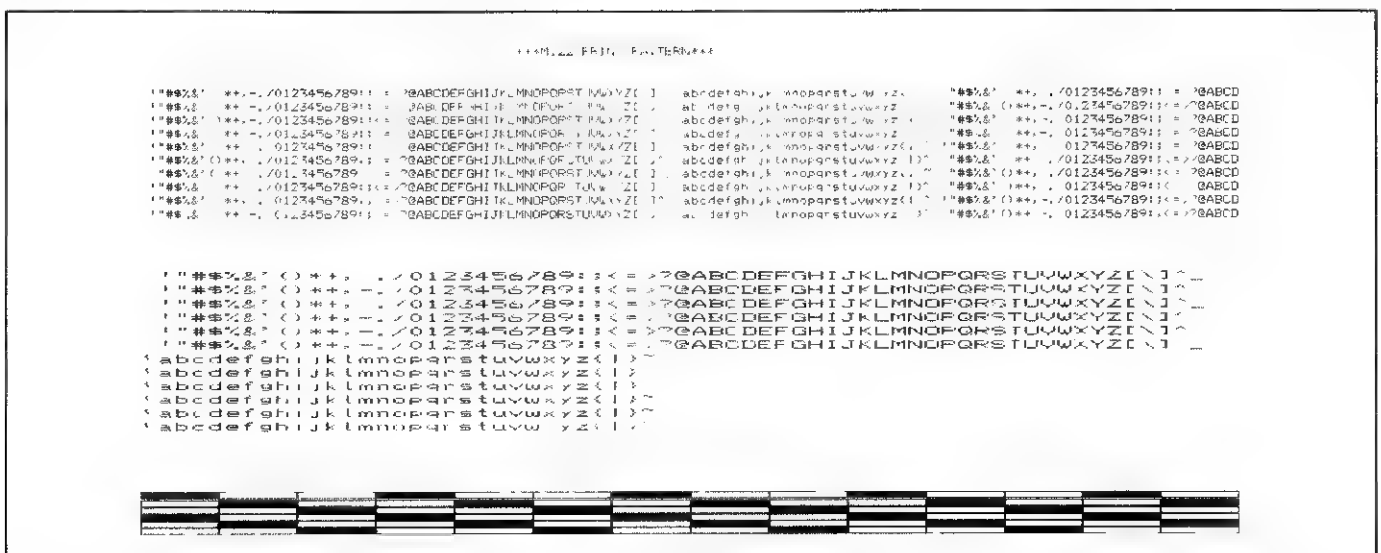
The printer's speed is a respectable 120 characters per second. Interestingly, the manual states that the maximum printing duty is 4,000 characters per minute, but 120 cps equals 7,200 characters per minute. Presumably, under normal printing conditions the differing line lengths give the print head time for a breather, while the bidirectional logic-seeking function travels to the nearest next-line extreme.

The line itself can be up to 132 characters in the 10-characters-per-inch mode, and half that in elongated mode. The printer can accept up to 15-inch-wide paper on adjustable tractors and is capable of friction feed, which is useful for preprinted letterhead stationery.

An important part of this package is the graphics capability. I must point out a couple of its nifty features. For a start, you can use dot-addressable graphics in either six- or eight-pin mode, and you can mix text and graphics on the same line. The sturdy build of the Centronics helps here; the print head is steady as a rock, giving excellent registration for high-quality, repeatable graphics.

Also useful in either graphics or text mode are the many paper-motion commands available that allow changing the line-feed spacing, changing the form-feed spacing, and half-line feeding in forward or reverse to allow sub- or superscripting.

All this adds up to quite a package. The Model 122 Graphics Printer is a sturdy, reliable beast of burden that would make an excellent choice as a printer for either personal or office use. ■



Centronics 122 Graphics

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Alien Defense Commented
Soft Sector Marketing
6250 Middlebelt Road
Garden City, MI 48155
Softcover, 140 pp.
$24.95

by John Ratzlaff

Alien Defense Commented lets you enter the complex world of the real-time arcade game. The book contains the commented source code for Soft Sector Marketing's popular TRS-80 game, Alien Defense. With the source code, you can change Alien Defense to suit your specifications, as well as explore methods for writing your own games.

For 24 pages, the program's author, Larry Ashmun, discusses the techniques he uses to write machine-language games and some of the specific ideas in this program. He goes into detail on certain aspects of the game.

The source-code listing takes about 115 pages, followed by a complete cross-referenced symbol table. It took me 15–20 hours to type in the source code (minus all the comments), and another three to go through a complete listing I printed to find all the errors.

Happily, I observed that the book has been printed directly from an assembly of Mr. Ashmun's program, so it is not subject to typographical errors. When my errors were corrected, the source code worked perfectly.

Of course, I could have that much by simply buying the game in the first place. Several times while typing it in, I asked myself why I hadn't done exactly that. However, I set out to type it precisely because I have found through past experience that I can learn quite a bit about a program while typing. Also, now that I have the source code, I can easily make modifications to suit me, such as skipping the annoying "moose" call before every round.

The advertisement for the book didn't mention that a good disk editor/assembler is needed to type in the source code—specifically, one that can handle source files larger than memory. The book's author recommends Misosys's EDAS, and fortunately that is what I have. It took my 5 MHz Model III over five minutes to assemble the entire program, and that was with no listing to video!

The game itself, Alien Defense, has been reviewed elsewhere. I will not review it here except to say that it takes a long time to learn the controls, but is fun to play after that.

The most valuable experience, however, is the opportunity to learn some of the techniques used in programming complex real-time arcade games. The author is quick to point out that the techniques he uses are not necessarily the best, but simply ones that he learned and that work for him.

The only negative comments I have about the book are the length of time it takes to type the listing, the fact that the pages of the book are not numbered, and the poor grammar used in the discussion section of the book. I had the impression that nobody had edited or proofread the text at all.

Also, it is somewhat ironic that although a disk system is required to assemble this program, the version provided is the nondisk version and will not work on a disk-based system without modification. Fortunately, all you need to do is change the ORG statement, a fact not mentioned in the book.

All in all, *Alien Defense Commented* is well worth the time if you are interested in learning techniques of real-time machine-language programming. ■

★★★½

Okidata Microline 84 Printer
Okidata Corporation
111 Gaither Drive
Mt. Laurel, NJ 08054
$1,395 (parallel port)
$1,495 (serial port)

by Terry Kepner

Have you been looking for a printer capable of almost-daisy-wheel-quality print at 50 characters per second, and yet able to deliver line listings or draft manuscripts at 200 cps? Well the Okidata Microline 84, with its bidirectional print head, is the printer you want.

The Microline 84 supports superscripts, subscripts, underlining, and emphasized printing. You also get 10 characters per inch, 12 cpi, and 17 cpi printing with both single- and double-width printing in each of those fonts.

You can also choose 6 or 8 printed lines per vertical inch, software forms length controls, the ability to design your own set of 64 characters, and dot-addressable graphics.

Besides a friction-feed platen, you also get a free tractor-feed mechanism for continuous-feed computer forms paper. And finally, you get all this in one easy-to-use compact printer with front panel switches that set the form length of the paper (to any one of 10 possibilities), single-line-feed the paper, and complete form-feed.

The Microline 84 printer delivers 132 characters on 15-inch wide paper (or 231 characters in 17 cpi mode), and yet takes only 260 square inches of table space (20-by-13 inches).

The Microline 84 is packed with features that were considered unobtainable in one printer just two years ago. The most important features, in my opinion, are the draft- and correspondence-quality print styles, each available in three different fonts (10 cpi, 12 cpi, and 17 cpi).

Each font can be switched between single- and double-width, even in the same line (but you can't mix fonts on the same line). The high-speed font lets me get my draft manuscripts printed quickly with a minimum of wasted time, using a 9-by-9 dot matrix that forms characters cleanly and clearly—no eyestrain problems with this printer. And there are actually descenders on the g, j, p, q, and y lowercase letters.

The correspondence-quality print (not quite as good as a daisy-wheel printer) produces solid, well-formed characters (using a 13-by-17 matrix) that put standard dot-matrix print styles to shame.

The documentation informed me, correctly, that the printer was easy to set up. The printer is shipped in a well-padded carton that contains all the materials (except printer cable and paper) you need to set up.

The ribbon and tractor-feed mechanism, as well as two spare fuses and the platen knob, were simple to install. It took less than 15 minutes to assemble the unit and plug it into the computer. The ribbon, sold by Okidata, contains a lubricant to keep the print head in maximum operating condition. The print head should be able to print 200 million characters before needing replacement, about 277 hours of nonstop printing at 200 cps.

As I mentioned earlier, the front panel switches let you perform a single line feed, a form feed, select or deselect the printer from the computer, set top of form to current line under the print head, and a forms length dial (3, 3.5, 4, 5.5, 6, 7, 8.5, 11, 12, and 14 inches). In addition to the front panel switches, there are three lights on the front panel: an on/off indicator, a paper-out indicator, and a printer selected/deselected light. These are grouped in a simple layout on the left front of the printer.

Tractor-feed paper is loaded into the printer straight up from below, while cut-sheet paper is fed in from the back (just like a standard typewriter). The tractor-feed mechanism is easy to attach and remove, taking only a few seconds.

The only complaint I have with the tractor feed is that it clamps onto the paper only after the paper has passed the printhead, which makes sense if you're feeding the paper in from below. But if you put the printer on a table and feed the paper in from behind, difficulties ensue if the paper is not directly behind the tractor feed. I wasted more than a few pages of paper because the paper skewed sideways out from tractor-feed mechanism pins and jammed.

I finally rigged a box over the paper to catch the printed paper and to keep the unprinted paper from moving out of alignment behind the printer. Feeding over the edge of the desk worked, but I still had to line the paper directly behind the printer. This problem disappeared when the paper was properly fed in from below the printer.

Other Features

Using the printer's special features is easy—just send the escape character (CHR$(27)) followed by the proper ASCII code required to initiate or halt the desired feature. The printer includes both six and eight lines per vertical inch spacing, but you can also specify any line height you need in increments of 1/144 inch to a maximum 127/144 inch (about 8/10 of an inch). This spacing does not affect the size of the print, only the spacing between the lines.

Unfortunately, superscripting, subscripting, and underlining are automatically terminated when the printer receives a carriage-return command from the computer. But the character fonts and emphasized printing (both styles) remain enabled until turned off. The printer has two styles of emphasized printing: vertical and horizontal. Both styles operate by repeating the letter just printed one-half dot away, either vertically or horizontally.

The Microline 84 also supports incremental printing. Each letter sent to the printer is printed immediately, instead of waiting for a carriage return to initiate the printing of an entire line. Emphasized printing, correspondence printing, superscripting, subscripting, and dot-addressable graphics cannot be used when the printer is in the incremental mode.

You can order the printer to skip as many as 99 lines with a simple escape command, followed by 11 and the number of lines you want skipped. Horizontal and vertical tabs are also software-controlled, with up to 16 for horizontal operation and 54 for vertical.

The printer includes a 64-character graphics set. Unfortunately, it is not the TRS-80 standard set. These graphics are blocks of various shapes, and a few special characters such as a spade, heart, diamond, circle, and so forth.

The user-definable characters are easy to use. Draw a 7-by-11 set of boxes, fill in the dots you want displayed, use the algorithm to determine numbers that describe the each column of the digit, and then send them to the printer with the key character you want assigned to that figure. These defined graphics are accessed by sending the user character code, followed by the ASCII character being used to designate the character you defined.

As for dot-addressable graphics, you have a choice of two resolutions: 72 or 144 dots per inch (both are horizontal measurements, vertical remains at 72 dots per inch in both resolutions). The hi-res mode makes the dots overlap by about 50 percent.

Each column of the graphics mode is divided into eight dots (or seven in the 7-bit format), each dot corresponding to one bit of an 8-bit byte. To use them, just send the escape code, the graphics code (8-bit or 7-bit format), give the number of columns, and then each column's layout. LPRINTCHR$(27)"%2%";CHR$(N);CHR$(n);CHR$(C);CHR$(D); CHR$(E) tells the printer to use the normal resolution, the two N's tell the number of columns, C is the first 8-bit column, D is the second 8-bit column and so forth.

The manual is fairly well written, but is best fit for a technical audience—experimentation is definitely the way to learn how to use this printer. It lacks an index, but a summary of commands at the back of the book is almost as good.

I like the Okidata Microline 84. My wife hates it; she says the high-pitched whine the print head makes as it zips back and forth across the paper drives her crazy. I try to cut down on this by closing the door to the computer room whenever I use the printer. A small price to pay for 200 cps. ■

★★★

Autogrammer
Roklan Software
10600 West Higgins
Rosemont, IL
Model II
$299.95

by Charles R. Perelman

Autogrammer is one of the new breed of business software that promises to enable nonprogrammers to program. It is most useful for business applications that require rapid and repetitive entry of certain items; an invoicing system would benefit greatly from Autogrammer. Within this generator's capabilities, you can create programs suited to your needs even without knowing a computer language.

The Model II version of Autogrammer requires you to boot TRSDOS 2.0 and put Autogrammer into memory. After this is done, the Autogrammer disk can be removed. A single-drive system means the nuisance of disk switching. Generated programs can stand alone or Autogrammer sorted data can be incorporated into Basic programs.

Roklan's triple-barreled approach to the piracy problem is interesting. Autogrammer is furnished in a noncopyable form. When you register your serial number, Roklan sends you a special hotline service number for software support, a disk of utilities and demonstration programs, and free program updates for one year. Additionally, each Autogrammer-created program signs on with a notice that it was generated with the Roklan software, a copyright notice, and your Autogrammer

disk serial number.

Program Creation

Autogrammer has three distinct phases: screen editing to set up an input format, graphics to enhance displays, and validations to limit acceptable entries.

With screen editing, you create input formats for data-base entry. Cursor movement is with the arrow keys and repeat key. Formats are limited to 80-character width. Insert, delete, and reverse-video functions use combinations of CTRL and alphabetic keys.

You revise by typing over. I had difficulty adjusting to Enter centering a line and Tab putting me in the insert function. Back Space homes the cursor. I found this annoying since I automatically try to back space with it.

The F1 key replaces your screen template with a help menu listing all editing commands. Another press of F1 returns your screen.

You use three kinds of brackets for flexible delineation of entry fields. Visible brackets remain as part of the data form. Delimiting brackets limit field size, but are not part of your form. Nonstore brackets permit entry of data or computations that will not be part of the data base. This conserves space and permits more data to be entered in the limited record size.

Control-G switches screen editing to graphics. The F1 help screen displays the full range of Model II graphics. You can quickly enhance your input screen with boxes, borders, and similar separators for a professional appearance. During edit or run, the F2 key prints the graphics characters as periods.

When you finish your screen format, Autogrammer checks for proper matching of brackets, field size (maximum 80 characters, cannot continue on next line), and record size (limited to 255 characters, although the manual says 256).

Validation procedures let you restrict entry in any field with one or more of 10 mnemonic abbreviations. For example, AL = uppercase alphabetic, BL = blank spaces okay, DC = dollars and cents format, and NU = numbers. Using validation combinations, you can rapidly set program parameters. Numerical limits can only be set as number of decimal places. There is no lowercase alphabetical validation.

Validations must be planned and typed carefully. Once typed, changes require a return to screen entry for modification and the repetition of all validations.

The abbreviation DV = default value inserts a user-selected value in a field unless manually overridden. This function speeds repetitive entries such as current date, state, or area code.

The CF = computed field validation uses the four basic arithmetic functions with any two fields of your format, or with a constant and one field. Since the manual tutorial leaves much to be desired, it is fortunate that the software for CF is friendly.

You determine whether each CF field uses a field entry or a user-entered constant for the first operand. A field is selected by moving to it and pressing enter. The operator (+, −, *, /) is specified, and the second operand is selected as a constant or field.

"Validations must be planned and typed carefully. Once typed, changes require a return to screen entry. . ."

The manual states that chaining is not supported. However, you can chain by using a prior result as the first operand for your next computation.

CF is not well-suited to adding columns of figures, but works admirably for computing sales taxes or handling charges that are fixed percentages or absolute values. Using computed fields, I generated all figures on a test invoice with a single entry of sales price. F2 then prints the invoice.

When all validations are entered, Autogrammer creates the machine language program.

Running an Autogrammer Program

When you call the program from TRSDOS Ready, a five-choice menu permits you to add, delete, modify or display a record, or end the program.

You create a data base with Add. Your entry format appears with blank fields. You can enter rapidly with a well-formatted input screen, particularly if you use default values and computed fields. If a field is completely filled, the cursor automatically moves to the next field.

When the last field is filled, the screen clears for the next entry. This feature may speed entry, but if you make a mistake, you must return to the menu, find the record, and modify it. I used a dummy final field to review and make any required changes prior to saving data. Careful planning is needed to optimize the formatting and validations.

When entered, data is automatically sorted in ascending order on the first, or key, field. To modify, delete, or display data, you enter part or all of one or more fields. A file with your selection criteria is displayed almost immediately.

Upper- and lowercase letters entered must match the target record exactly. When searching for multiple items, the match returned may not be the first item. You must check for other applicable records with control-P (prior) and -N (next).

Utility Routines

The Autogrammer utility disk contains Access, a machine-language routine to access the data-base records in key-file sorted order from Basic, DELPAC to delete inactive records and pack the file, GENKEY to create a key file for any ASCII random-access file for use of other data-base files with Autogrammer, DBSDUMP to list all data-base records, and REP to generate reports.

The manual demonstration programs are also included. The placement of Access is technically interesting: at hex FFDF above the Model II video memory, so that memory space does not have to be reserved.

The GENKEY program is slow. It took several minutes to create a key file for 200 items.

REP adds a new dimension of flexibility to Autogrammer. Using some or all fields of an existing data base, you can print a report or create a new data base. Order of fields can be changed, and records saved or printed in either ascending or descending order based on the original key field.

You then prepare an Autogrammer format for the new data base and new key file with GENKEY. This is a little cumbersome, but you can sort a data base by different keys for the overhead of another data base file. REP has no

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total or other math functions.

Note that with a one-drive system, you must use TRSDOS XFERSYS to put a minimum system on the utility disk before using it. This is not in the manual.

GENKEY contains an error in reading visible brackets that creates key fields of the wrong length. I notified Roklan of this problem.

Documentation

The Autogrammer manual is attractively packaged in a three-ring binder, beautifully printed in large, easy-to-read type with generous margins, and includes some actual screen layouts. After an overview of the program, there is a series of tutorials, a summary of commands and functions, brief explanations of utility programs, an article on developing an information system, listings for two basic demonstration programs, a glossary, and screen-layout forms.

"Autogrammer is relatively easy to use and particularly valuable for rapidly entering a data base. As an electronic filing cabinet, it functions well. . ."

The manual is supposedly written for use by a novice with no programming experience. A supplementary manual for REP assumes that you are familiar with Autogrammer.

Although the manual contains a reasonable amount of information, it fails miserably in organization, style, and content for either a beginner or an advanced programmer. This detracts from the interesting and useful software.

There is no index, and information on a given topic is scattered. There are a number of errors, such as improper matching of the graphics shapes with letters used to produce them (the help screen is correct).

It poorly covers the effects of various entry errors and what to do about them. Information on using the nonstore brackets is sketchy, and the use of Access in the demonstration Basic program needs more detailed explanation. A one-sheet summary of all edit, graphics, and runtime controls, particularly on cardboard, would be of substantial help in working with the program.

Conclusion

Autogrammer is relatively easy to use and particularly valuable for rapidly entering a data base. As an electronic filing cabinet, it functions well, if you only need one primary sort field, and if the maximum record and field lengths are sufficient. The computed-field feature is very efficient for invoicing and similar applications.

GENKEY and REP utilities give you the ability to manipulate data in created data bases and to use other data-base files with Autogrammer. I hope that a revised manual will be produced in the near future to strengthen the weakest part of the package. ■

★★★★

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$150, or $99.50 with purchase of another Holmes Board
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Holmes Engineering Inc.
3555 South 3200 West
Salt Lake City, UT 84119
Model I

by Jack Decker

Many Model I owners face a dilemma when they wish to expand their systems beyond the basic 16K cassette configuration. Several interfaces will substitute for the standard Tandy interface, but many are revised or improved versions and share some of the problems associated with the Radio Shack unit. Holmes Engineering has designed a system from the ground up that offers several advantages over these other units.

To understand how the Holmes unit differs from others you should know a bit about the TRS-80 Expansion Interface. The unit contains a real-time clock, parallel-printer port, circuitry to allow the use of two cassette tape recorders, and a single-density floppy-disk controller.

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ilar to the one used for the keyboard unit, provides power. Sixteen integrated-circuit sockets provide memory-expansion capability. Eight or 16 4116 dynamic RAM chips can be inserted into the sockets to provide 16K or 32K of additional memory (a total of 32K or 48K counting the 16K that was previously installed in the keyboard unit). You can purchase an RS-232C interface and install it inside the Radio Shack Expansion Interface, but beyond that, expandability is severely limited.

In contrast, Holmes has designed its units to provide better reliability and more flexibility. About the only feature listed above not available with Holmes Engineering's products is the dual cassette ports; however, other features are available that probably never occurred to Radio Shack.

The first Holmes products were a pair of internal memory boards that install inside the TRS-80 keyboard unit and provide either 32K or 48K total memory (using the 16K already inside the keyboard unit). Holmes internal memory board, The Sprinter II, was reviewed in the November 1982 issue of *80 Micro*, and is mentioned here because it contributes to the overall reliability of the system.

One cause of crashes in stock TRS-80 Model I systems is the physical distance of the expansion memory from the CPU, and the length of the cable used to connect the two. That setup allows electrical noise into the system. The Holmes internal memory units place the expansion memory within the keyboard itself, thereby avoiding those problems. However, for the user who doesn't want to open up his keyboard to install the internal memory unit, there is an alternative that will be explained later.

Holmes Engineering has three new hardware products: the MF-1 Expansion Mainframe unit, the DX-1S Single Density Disk Controller, and the DX-1D Double Density Adapter. The latter two units are sold in combination as the DX-2D Double Density Disk Controller. The MF-1 Expansion Mainframe alone provides no additional capabilities for the TRS-80, but allows for up to four plug-in boards.

The DX-1S Single Density Disk Controller is a card that plugs into the Expansion Mainframe, and provides three of the functions normally found in a Shack Expansion Interface: the real-time clock, the parallel-printer port, and the floppy-disk controller itself. The DX-1D Double Density Adapter plugs into the DX-1S to allow double-density operation and the use of 8-inch disk drives.

The MF-1 Expansion Mainframe

The MF-1 is in a metal enclosure that is 16½ inches wide by 9 1/8 inches deep by 2 7/8 inches high. It has an off-white finish (a welcome change from Tandy silver-grey). The TRS-80 video monitor sits atop the unit nicely; the width and depth of the Mainframe match those of the monitor. On the left side, you'll find the power switch, fuse holder, and power-cord entrance.

In my unit, the cables connecting the disk drives and printer to the cards inside are routed through a slot in the bottom of the mainframe. This is quite inconvenient, as I must remove the cover to attach or detach cables. Holmes has responded by manufacturing the newer units with an opening at the back through which the cables can be routed.

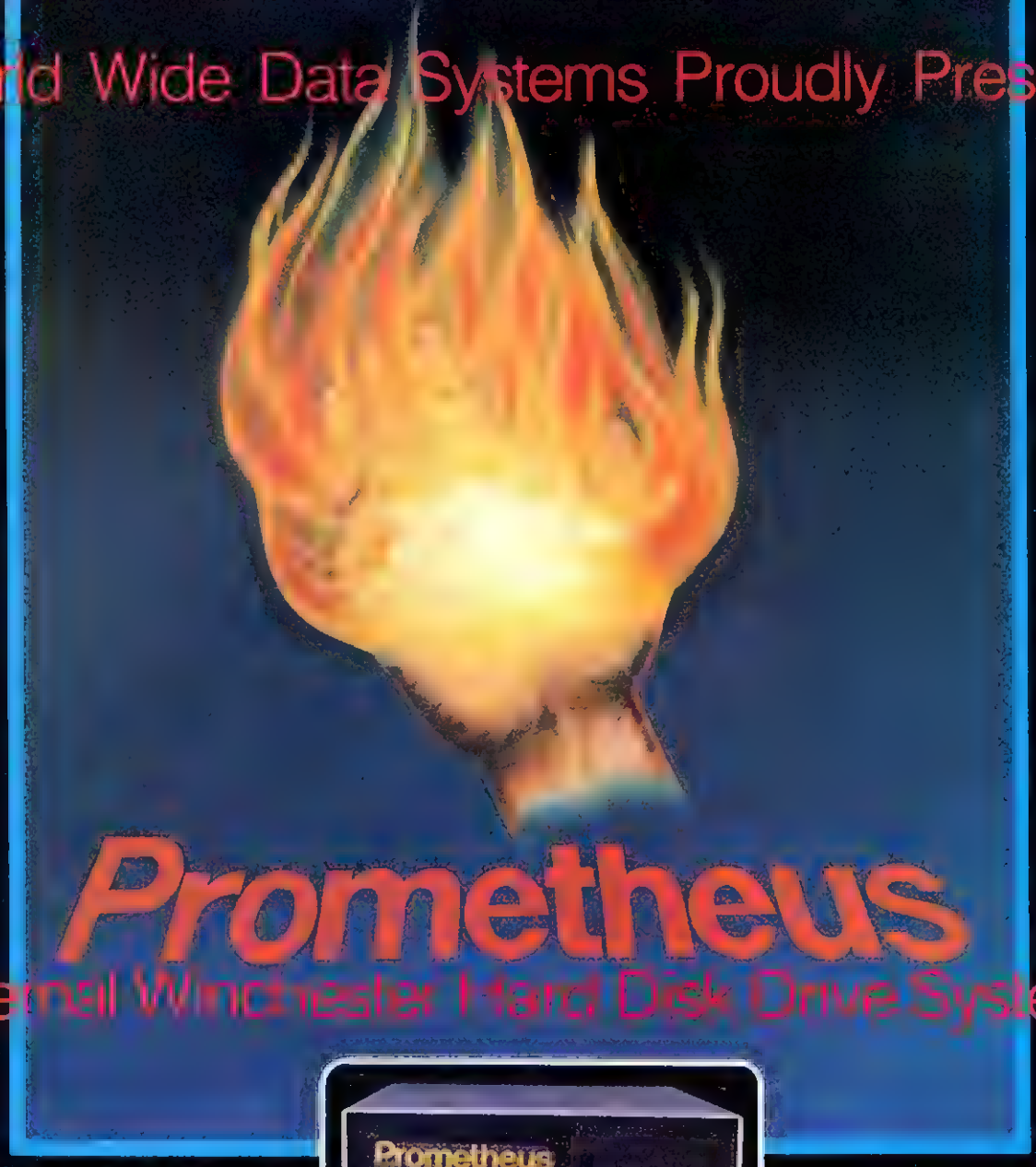
The cable that connects the Mainframe to the TRS-80 keyboard unit comes out of the front left side, and it is about 4 inches long. I find this more than adequate; I actually have about an inch to spare. Holmes states that the length of this cable is short because the Model I keyboard cannot provide strong enough signals to drive a longer cable reliably. They do not advise lengthening the cable, as poor performance will result.

Inside the mainframe is a regulated power supply, buffering circuitry for the address, data, and certain other lines coming out of the TRS-80 keyboard unit, and four 44-pin gold edge connectors. The edge connectors are in a U shape to provide support for the plug-in circuit boards on three sides. Each of the four connectors will accept one Holmes plug-in module, or you can build your own circuit on a Radio Shack plug-in board (catalog number 276-152, 276-153, or 276-154) and plug it into the Holmes unit. Each board may draw up to one ampere from the +5-volt power supply, up to 500 ma (milliamperes) from the +12-volt supply, and up to 50 ma from the −5-volt supply.

This opens up exciting possibilities for the hardware hacker, as projects can be designed to plug into the Expansion Mainframe without worrying about buffering for the address or data lines,

Continues on p 77

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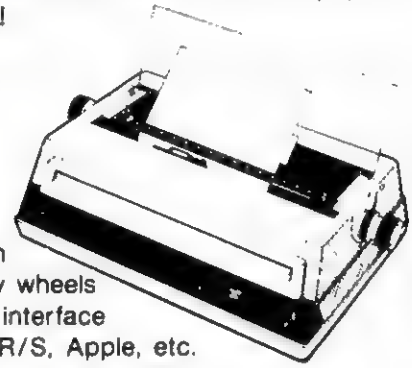
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Continued from p. 74

or a separate power supply (unless there are unusual power requirements). Other hardware manufacturers might eventually design TRS-80 add-ons that will plug into the Holmes Expansion Mainframe.

More needs to be said about the buffering of signals in the Mainframe. Buffering makes the signals stronger and minimizes electrical noise or interference. The Holmes unit buffers all address, data, and critical control signals (RAS, CAS, MUX, RD, WR, OUT, IN, and INTAK) from the keyboard expansion connector. Other such signals (such as RESET, INT, TEST, WAIT, GND) are not buffered, but are still available at the 44-pin connectors inside the Mainframe.

The edge connectors used in the MF-1, the connector that plugs into the rear of the TRS-80 keyboard unit, and the connectors on Holmes' plug-in modules are all gold plated. The user does not have to clean the contacts periodically, as with the Radio Shack Expansion Interface. You must still clean the connector on the back of your keyboard unit occasionally, unless you take Holmes' advice and install a gold edge connector (such as an EAP Company "Goldplug-80").

Installing a plug-in board in the Expansion Mainframe is relatively easy. Remember that the two connectors to the left of the Mainframe are upside down in relation to the two connectors on the right. If you move a board from left of the Mainframe to the right, you'll also have to turn it over. The connectors have a small plastic insert between pins 18 and 19 (and pins V and W) that prevents you from inserting a Holmes plug-in unit upside down. Also, in the unit I received, one connector was marked to indicate where the disk controller board should be placed.

You must be sure to push the board all the way in. When I first installed my disk-controller board, it just wouldn't work properly. I discovered that with a bit more force the board would go into the connector another half inch or so. When it's fully inserted, you will not be able to see any of the gold "fingers" on the card edge. You want to use a moderate amount of force when inserting the board, not enough to break the plastic insert if you are trying to insert the board upside down, but enough to get the fingers all the way into the connector.

The instruction manual is reasonably clear and concise. Unfortunately, the schematic diagram for the bus connectors is a bit faded (but still readable) in the copy I received, and no pinout diagram is provided for the 44-pin connectors. These conditions might be rectified in future printings of the manual (my copy is one of the first).

Actually, the omission of the pinout diagram is not that serious, since the letter/number designations for the pins are printed on the connectors themselves, and the schematic diagram shows which line is connected to each pin. The only problem is that you'll probably need a magnifying glass to read the letters and numbers on the connectors. To aid you in deciphering these, I'll mention that the top row pins are designated with the letters A–Z, except that the letters G, I, O, and Q are not used. The bottom row is numbered 1–22.

Holmes Engineering offers the following plug-in modules for use with the Expansion Mainframe:

- The DX-1S Single Density Disk Controller (with optional DX-1D Double Density Adapter), including the real-time clock and Centronics-compatible parallel-printer port (reviewed below).
- The RX-232 external memory/RS-232 module. This functions as an RS-232C serial port and also provides 32K of external memory for those who don't want to install an internal memory unit within their keyboard.
- The VID 80 80-character video adapter (model VX-1). This unit adds the extra RAM and logic necessary to convert to an 80-character, 64K or 112K CP/M system. It also features improved graphic resolution, full-screen reverse video, and functions in either the 80-by-24 or standard 64-by-16 character mode.

When I received my Expansion Mainframe, a checklist was included that indicated that it had passed five tests before being shipped: 24-hour burn in, check power voltages, check power distribution, check buffer operation, and complete functional test.

This indicates that Holmes Engineering is committed to quality control. Should you have any problems, you can take comfort in the fact that Holmes covers its products with a one-year warranty against defects in material and workmanship (full details of the warranty are in the instruction manual).

I rate the Holmes Engineering Expansion Mainframe as an excellent unit for any TRS-80 user, but especially for those who want to build hardware projects that would normally operate off the TRS-80 bus connector. However, even users that don't have an electronics background will appreciate the expandability of the Holmes system. If you have envied the Apple owners with their plug-in card slots, buy a Holmes Mainframe and you can have the same capability!

"Should you have any problems, you can take comfort in the fact that Holmes covers its products with a one year warranty. . . "

For users who can't figure out what they'd do with four card slots, a unit that only holds two plug-in boards is also available. At this writing, there is only a $20 cost difference between the two units, so unless you're sure you'll never need those extra slots, I'd suggest spending the $20 and getting the extra capacity.

DX-1D Double Density Disk Controller

Holmes Engineering sells two plug-in disk-controller modules that can be used in the Expansion Mainframe: The DX-1S Single Density Disk Controller, and DX-1D Double Density Disk Controller. The DX-1D is a DX-1S with an added DX-1D Double Density Adapter board that plugs into the socket normally occupied by the Floppy Disk Controller chip on the DX-1S.

In this respect, adding double density to a DX-1S is similar to adding a double-density adapter board to a Radio Shack Expansion Interface. The difference is that the double-density adapter board is already attached to the DX-1D and the entire unit has been tested for both single- and double-density operation.

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Like the Expansion Mainframe, the disk controllers undergo a series of quality-control checks before being shipped, inlcuding a 24-hour burn in, read/write/format checks in both single- and double-density modes, and a test wherein they boot and run a word-processor DOS. These tests are performed on a system running at 5.3 MHz (three times the normal speed of an unmodified TRS-80 Model I).

Only a one-page preliminary instruction sheet is available for installing the disk controller inside the Expansion Mainframe. However, the installation is simple. You remove the cover from the Mainframe, slide the disk-controller card into the designated slot, plug the disk drive and printer cables onto their respective card edge connectors, and replace the cover.

"You don't need to be using Holmes products to use the DX-1D Double Density Adapter; it can also be used in the standard Radio Shack Expansion Interface."

As I mentioned previously, you have to make sure that the controller card is pushed all the way in. After I attended to that detail, the disk controller worked perfectly and has been working well ever since, keeping both my disk drives and my printer up and running. I have used it in both the single- and double-density modes and have had no problems with it. I even tried it on another TRS-80 keyboard with a different set of disk drives and it still worked perfectly.

From a phone conversation with Larry Holmes, I learned that the DX-1S Single Density Disk Controller uses about the same circuitry as the Radio Shack disk controller (in the Expansion Interface). To attach the DX-1D Double Density Adapter, you pull the 1771 Floppy Disk Controller IC from its socket, plug it into the Double Density Adapter board, and then plug the Double Density Adapter into the now vacant Floppy Disk Controller socket.

The DX-1D manual provides complete, step-by-step instructions to aid you in this process, but installation is fairly easy, as long as you do not bend any pins, install anthing upside down, or zap the 1771 FDC chip with static electricity.

You don't need to be using Holmes products to use the DX-1D Double Density Adapter; it can also be used in a standard Radio Shack Expansion Interface. It is even possible to use the DX-1D with an Omikron Mapper I as a replacement for the Mapper II, although you'll need additional software for double-density operation and special installation instructions from Holmes Engineering.

After installing a DX-1D Double Density Adapter (or purchasing a complete DX-1D Double Density Disk Controller), you'll be able to use both 5-inch and 8-inch drives, and operate in single- or double-density mode.

However, if you wish to use 8-inch double density, you'll also need a CPU speed-up modification. Holmes recommends their Sprinter speed-up mod, which installs inside the keyboard unit and allows operation at up to three times normal clock speed. In addition, you'll need special 8-inch drive cables (also available from Holmes). It is assumed that your drive 0 will be a 5-inch drive, but if you wish to use an 8-inch drive as drive 0, the instruction manual details how to change the position of two jumper wires on the DX-1D board to accomplish this. You may want to do this if you desire compatibility with Omikron's version of CP/M.

You'll want a disk operating system that supports double-density operation, and Holmes suggests that you buy one that has automatic density recognition. I have found that if an operating system will support the Percom Data Company or the LNW Research Corporation double-density adapters, it will also support the Holmes double-density unit. If you intend to use 8-inch drives, you should configure your operating system as you would for the LNW Research unit; otherwise, you can configure it as you would for either the LNW or Percom units.

The instruction manual for the DX-

1D contains a brief "Theory of Operation" section that tells about the internal workings of the unit. The DX-1D has six main sections: WAIT generator, clock multiplexer, address decoder/chip select latch, 8 MHz clock, digital-phase locked-loop data separator, and write precompensation. The WAIT generator is provided for compatibility with operating systems that attempt to run an 8-inch double-density drive with no speed-up modification installed. You can use the Holmes unit this way, but doing so will at least double the time required to transfer the data to or from an 8-inch disk.

Holmes points out that the data separator is the most critical part of the system, and it is even more critical that the best available circuit be used with 8-inch double-density disks. Holmes uses a 9216 Phase Lock Loop IC to perform this function.

The manual also states that, "The term 'data separator' is not a correct description of the operation of this circuit, but it has gained widespread use. The correct term should be 'clock separator' or 'data recovery circuit.' " The lack of a proper clock separator was one of the serious omissions of the original Radio Shack disk-controller circuit, and caused much frustration among users who couldn't recover data from their disks. I believe Holmes' claims about their data separator, as I have been able to read data from some old used disks.

Write precompensation slightly alters the timing of bits written to the inner tracks of a disk. Think about a circular disk for a moment; as it spins, the inner tracks move past the read/write head at a much slower rate of speed than the outer tracks do, and the length of the tracks is physically shorter near the middle of the disk. If I were storing audio signals on the disk instead of data, I'd find that the frequency response and overall fidelity drops toward the inner tracks of the disk.

Data signals are also harder to recover when stored near the inner part of the disk, so write precompensation makes a slight timing change that allows the data to be read back in more easily (sort of like using Dolby noise reduction on an audio tape). In the DX-1D, however, write precompensation is only activated when a track number greater than 43 is written to, thus it only works with 5-inch 80-track drives or 8-inch drives with 77 or more tracks. Owners

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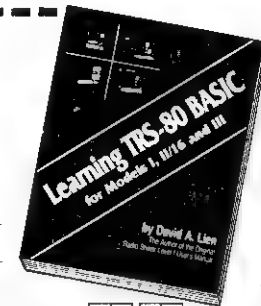
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of 40-track drives shouldn't worry about this, since the tracks on a 40-track disk are twice as wide as those on an 80-track disk; therefore, the fidelity of a 40-track disk is better.

Conclusions

If I had to use one word to describe the Holmes Engineering Expansion Mainframe and Double Density Disk Controller combination, it would be *reliable*. On several occasions, I have used stock TRS-80 disk systems, all of which worked fairly well except for one major shortcoming: Any mucking around with the power lines would immediately destroy any disks in the drives.

In the two months that I have been using the Holmes products, I have not had any such problems. Even when my wife shut off the computer with a disk in the drive, the disk appeared to be undamaged. The cold, dry winter weather has not caused any problems with static electricity, or any of the other instabilities that seem to abound on the Shack systems. I suspect that the extra buffering and greater attention to keeping out electrical noise is what makes the Holmes system behave so reliably.

Keep in mind that to get a full working system that is the rough equivalent of a Radio Shack TRS-80 with the Expansion Interface, you will have to buy the Expansion Mainframe, the disk-controller card, and either a Holmes Internal Memory unit or the RX-232M card to upgrade your memory to 48K. At this writing, Holmes Engineering is offering a special price ($399) on a Holmes Expansion Interface System. It includes a Double Density Disk Controller (DX-1D), RS-232 with 32K RAM (RX-232M), and the four-board capacity Expansion Mainframe (MF-1). This combination will give you everything you'd get with a Radio Shack Expansion Interface, except the dual cassette drives.

"I expect that the extra buffering and greater attention to keeping out electrical noises is what makes the Holmes system so reliable."

Almost any Model I TRS-80 user would be very pleased with the reliability and expandability of the Holmes Engineering Expansion Mainframe and Single Density Disk Controller with Double Density Adapter. In fact, I can think of only three general classes of Mod I owners that might not appreciate the Holmes unit: those who already have an expansion unit that they like, those who need capabilities beyond the ones presently offered by Holmes products, and those who insist on having dual cassette ports. ■

(As of February 1983, Holmes Engineering began offering a complete expansion interface consisting of: The MF-1 Mainframe, the DX-2D with parallel printer port, the RX-232M serial interface with 32K RAM, for $399.)

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The Muscle Micros

by the *80 Micro* Tech Staff

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The gleaming Trans Am in the parking lot didn't seem to take notice as the *80 Micro* tech staff piled out of the rust-ridden Honda Civic they had parked nearby. The sleek road machine roared away with a thunderous blast from the mighty horses under its hood. Spitting dust, the computer geeks headed for a rendezvous with three mysterious new computers—computers they called the Muscle Micros.

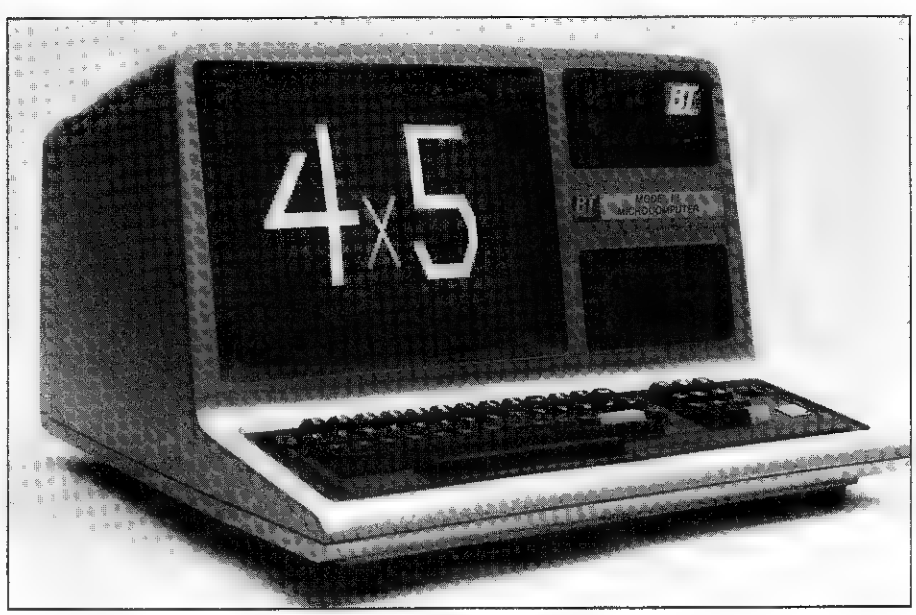
In the technical department, surrounding the trusty Model III that had ground out programs, benchmarks, and Scripsit files for 10 hours a day over the last 20 months, the monster machines whirred steadily. Their red LEDs glaring out at the world, these glittering wonders seemed to beg for a mountain of numbers to crunch and megabytes of data to chew up and store away. And like the menacing Trans Am that had greeted their arrival, the boy technocrats knew that they'd soon be left in the dust by this new generation of microcomputer power.

Here is the account of their skirmish with the strong arm of TRS-80dom.

The Muscle Micros

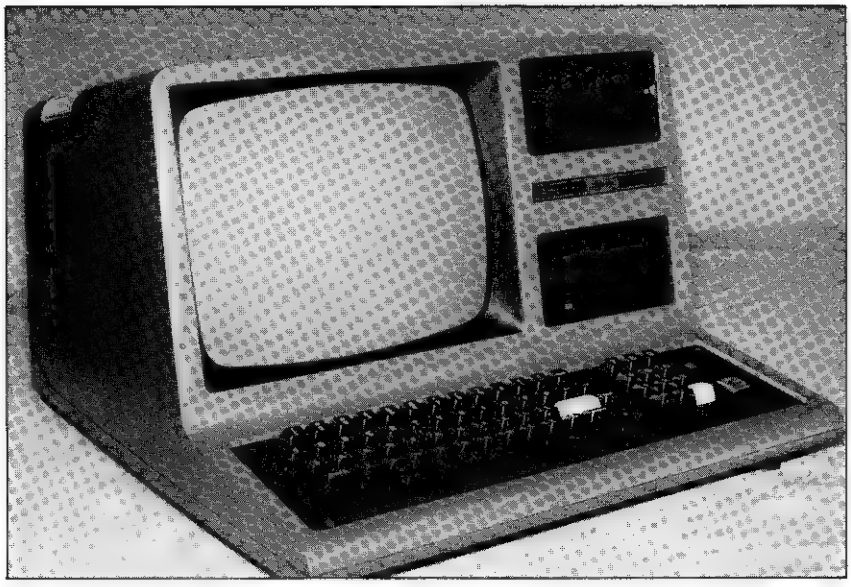
Are they worth the extra money? What do you get for your money, anyway? What can you do with a Muscle Micro that you can't do with a regular TRS-80 Model III?

Answering these questions was the most fun the technical staff had had since they blew up an old CompuColor computer with a model-rocket-launcher igniter—but that's another story.



BT Enterprises 4 × 5

What is a "muscle micro?" It's a Model III with hard-disk storage built into the standard cabinet. They contain very little standard Radio Shack hardware. Essentially, the people making the MMs buy stock 16K Model IIIs and add memory ICs, floppy- and hard-disk controller circuitry, new monitors, keyboards, disk drives, power supplies, fans, speedup kits, and, in MTI's case, a new paint job for the cabinet.



The Computer Model 326

The machines are intended for a professional setting. Although these machines are more costly than a standard Model III, they have a smaller "footprint"—they occupy less space than a Model III with an outboard hard disk drive. Their compact design also lets you move them easily within or between offices.

Before delving into the Muscle Micros, let's look at three important related issues—software availability, reliability, and service.

Software Availability

Hard-disk storage has been available for Model IIIs for around 10 months now. Slowly, software designed to run in hard-disk environment is appearing. Exador's Maxi Manager II has reached the end of its beta-test cycle and will soon be announced by its distributor, Adventure International. Radio Shack is reportedly developing hard-disk versions of Profile and Versafile.

In addition, much of the existing Model I/III software will run on hard disks. The only programs you need to alter are those that use a specific drive for data files, in which case you need only change the drive specification.

Reliability Service

Are the Muscle Micros reliable? Our tests were admittedly not exhaustive—we used the MMs for seven weeks—but had no problems. Theoretically, hard disks are more trustworthy than floppy disks because they are encased in contaminant-free housing. In the long run, then, a Muscle Micro hard disk should prove to be more stable than a standard Model III.

The biggest potential problem a Muscle Micro owner faces is service. All of the machines come from mail-order houses and all are nonstandard as far as Radio Shack is concerned. Radio Shack will not be anxious to provide service for a Muscle Micro—you may have to ship it back to the manufacturer. Alternatively, the MM owner may want to use a local independent service organization like TRW (see *80 Micro*, "Nightmares into Sweet Dreams," February 1983, p. 348).

All three of the manufacturers have customer service departments to handle any problems that develop. The telephone numbers that connect you to these folks require your nickel.

With these caveats, let's take a closer look at these brawny and brainy new machines.

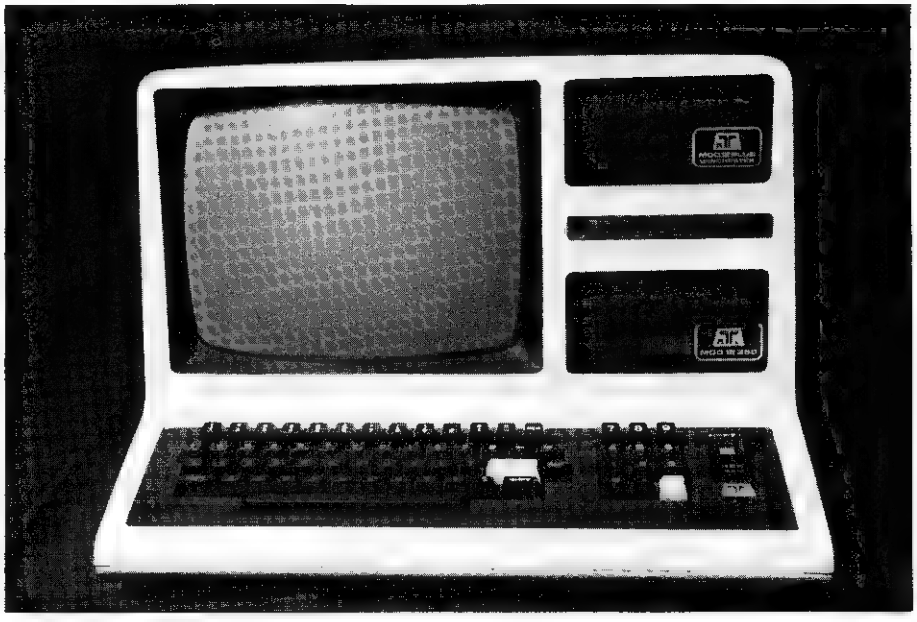
The Hardware

All three review machines contained high-quality NEC memory ICs, bringing RAM up to 48K. These chips can easily accommodate the 4 MHz speedup feature that is standard with the BT 4 × 10 and optional with the MTI and Computex machines.

The Computex and BT units use Tandon TM100-2 40-track floppy disk drives. The BT 4 × 10 features a Mini-Scribe II Winchester disk drive, while the Computex Model 326 uses an Ampex Pyxis Model 13. The MTI Model 326 uses a Tandon TM603-SE hard drive plus a Tandon TM100-4 80-track floppy drive.

Because of the increased power demands of the Winchester hard disks and the cooling fans they require, the MMs have beefed-up power supplies. The Computex 326 and the BT 4 × 10 use and Aztec HD 1224 switching power supply, while the MTI uses a Power General series 4300.

Of the MMs we tested, the BT and Computex machines each provided 10 megabytes of formatted hard-disk stor-



The MTI Model III Plus Winchester





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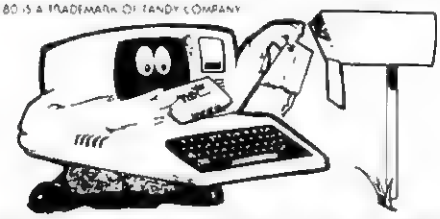
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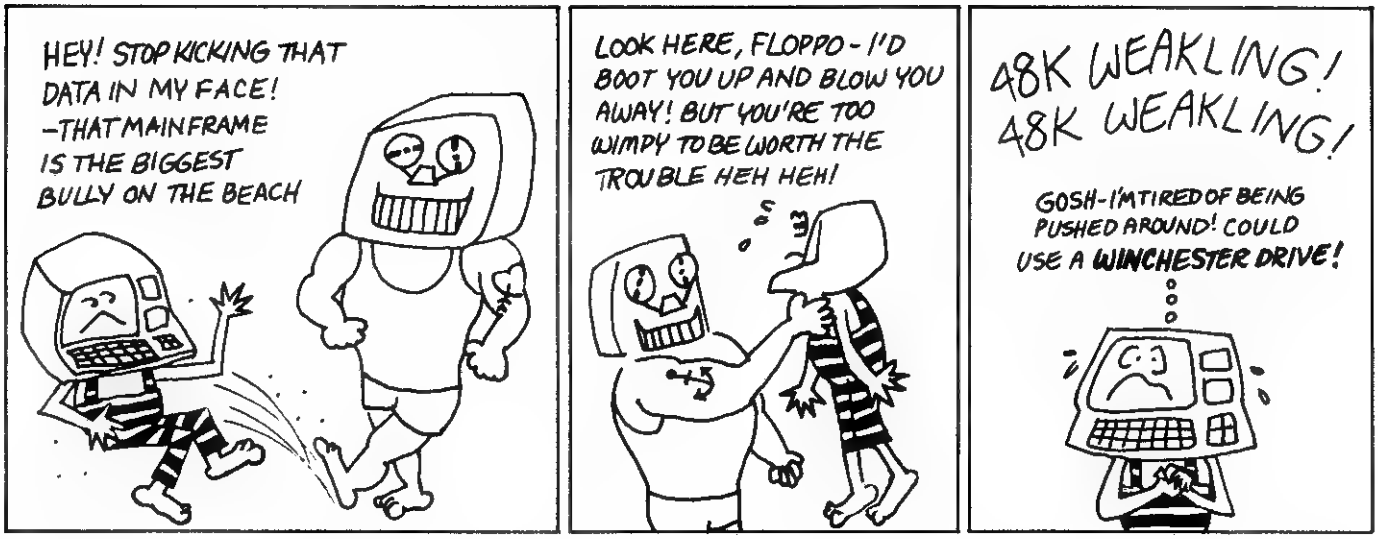
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age; the MTI unit offered 11 megabytes. All of the manufacturers offer a variety of configurations.

The three MM manufacturers understand the value of additional disk space, so, in addition to the hard disk drives, they've added higher-density floppy disk drives. The BT and Computex machines use double-sided, double-density 40-track drives allowing 320K of storage. The MTI folks use an 80-track, double-sided, double-density drive permitting 640K of data storage. All of the machines let you add outboard drives, and DOSPLUS lets you mix 40- and 80-track drives, single- or double-sided.

The units shipped to *80 Micro* were set up and ready to go—the operating systems had been configured to the hardware installed. Instructions for changing the configuration are in the DOSPLUS manuals. Don't bother trying to reconfigure drive 0 from 80 to 40-track operation—DOSPLUS 4.0 doesn't let you reconfigure drive 0. Micro-Systems Software says that later versions of the operating system will include this capability.

Aesthetics/Ergonometrics

The Muscle Micros make a handsome group. The MTI is especially attractive with its off-white cabinet. What really makes these machines look special, though, is that Winchester drive.

The MTI and BT machines have placed the hard-disk unit in the slot normally occupied by floppy drive 1. The BT MiniScribe II has ventilation holes on the front portion of the case. Both MM's Winchesters have a red LED to indicate that the unit is on and running.

The Computex 326 Winchester is located in the slot normally occupied by drive 0—drive 0 has been relocated to the normal drive 1 slot. This arrangement poses no major problems—the only flaw in the design seems to be that the two LEDs used by the Ampex hard disk drive are almost lost behind the plastic at the bottom of the computer's cabinet.

All three machines are decorated with decals proclaiming their immediate progenitor—only Computex left the Radio Shack plastic nameplate on the cabinet.

When you add a hard disk inside a fairly compact cabinet such as the Model III's, you must dissipate the heat that builds up when the system is running. The MM manufacturers have thus added cooling fans. BT uses a Cyclohm fan from Howard Industries while MTI has installed a fan made by EBM Industries. Computex has mounted a standard boxer fan in its Model 326.

The noisiest of the three fans is the BT 4 × 10's; the quietest was the Computex 326's; the MTI fell in-between. The noise of the fans is probably more a function of how they are mounted rather than the brand used. The additional fan noise is not serious, and the hard disks make virtually no noticeable noise of their own.

The Monitors

Each of the Muscle Micros contains a nonstandard video monitor. Since these machines are targeted for the business market, users who will be at the keyboard for several hours a day need relief from the eyestrain and fatigue that can develop. Therefore, all three of our review machines are equipped with slow-decay phosphor monitors.

The BT and Computex machines use a medium-decay phosphor amber monitor made by Langley-St. Clair Industries, while the MTI unit features an RCA equivalent slow-decay green-screen monitor. In addition, the BT Enterprises and Computex machines feature an antiglare device—the BT moni-

tor is coated with antiglare material while the cabinet in front of the Computex monitor is covered with Radio Shack's antiglare filter.

All three machines are easier on the eyes than the standard Model III with its fast decay, P4 phosphor monitor. However, the Muscle Micros are susceptible to having ghosts burned onto the screen—you should clear the screen or turn down the brightness if you leave the machine unattended for any length of time.

The Processor

The Muscle Micros use the standard Model III Z80 microprocessor. As you would expect with a souped-up machine, however, all of the manufacturers provide a 4 MHz speedup kit—the BT Enterprises machine offers the Holmes-Brenner speedup kit as standard equipment, the MTI folks offer their own 4 MHz enhancement as an option, and Computex offers the Holmes-Brenner kit as an option.

The 4 MHz speed-up kit essentially doubles the speed at which the Z80 performs its operations. Standard Model IIIs run at 2 MHz but the speedup kits do significantly enhance the operation of the processor.

```
Bi-Tech Enterprises Quick Menu—Select Menu Item

1—Super-Scripsit                2—Electric Pencil
3—MAS Accounting Program        4—Postman Mailing Sys
5—Uniterm Terminal Pack         6—E.M. Demo
7—M-ZAL Editor Assembler        8—Power Draw
9—ICL48 LSO                     0—Exit to DOS PLUS

H—High Speed On                 N—Normal Speed On

*.Press Number Next to Desired Item.*
```

Fig. 1. Sample Quick Menu Display

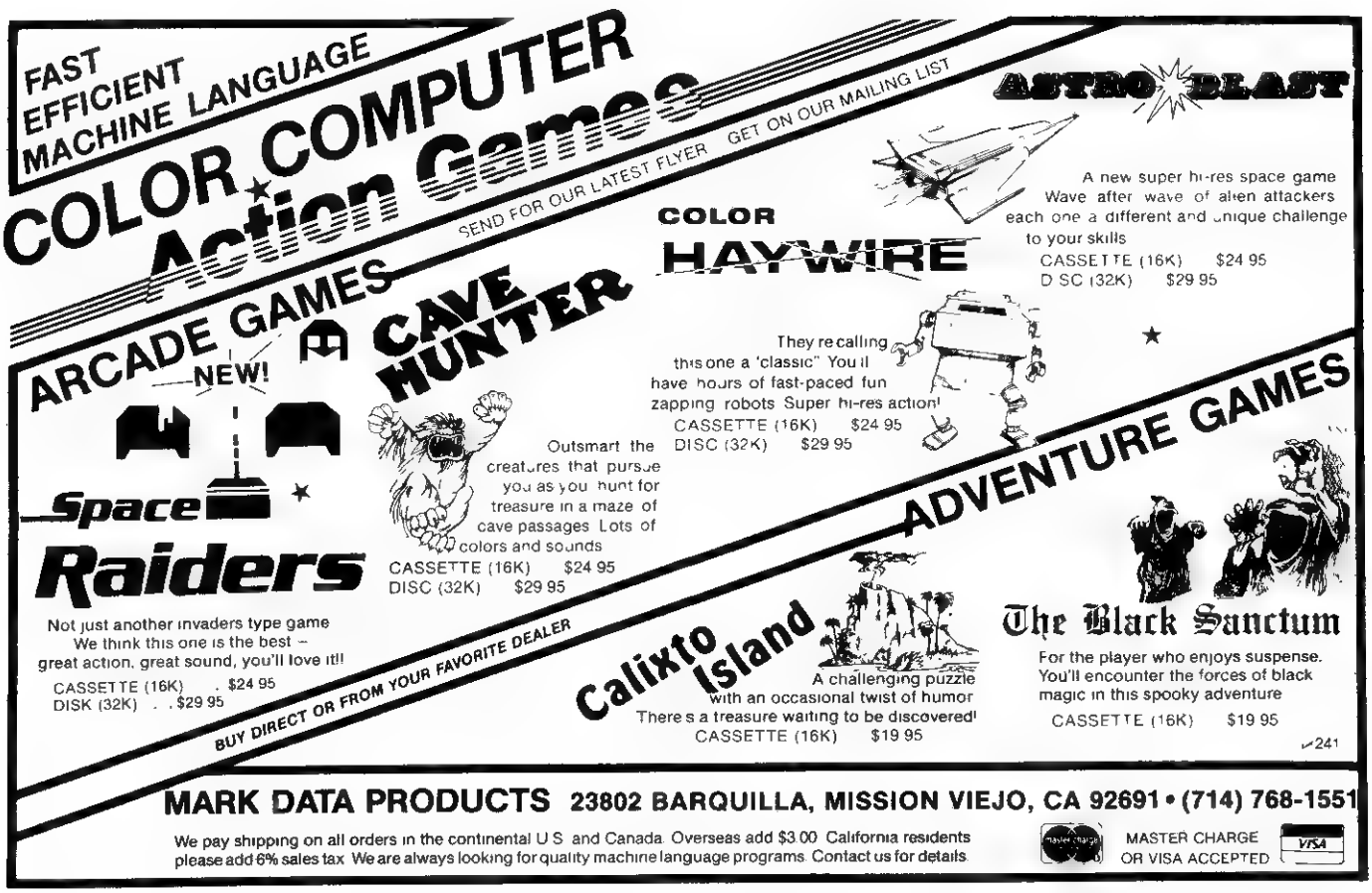
We ran this benchmark to get an idea as to how much difference there was between 2 MHz and 4 MHz operation:

```
10 FOR I = 1 TO 3000
20 PRINT I,
30 NEXT I
```

At 2 MHz, this operation took 72.05 seconds, and at 4 MHz it required 39.45 seconds—a 45.3 percent difference!

We tested only the BT 4 × 10 upgrade. Its high-speed processor operation is toggled on from the BT Quick Menu program shipped with the system—it was a simple matter to press the H key for high-speed operation and the N key to return to normal (2 MHz) speed.

Since one of the primary concerns in using hard-disk storage is the decrease in disk-access time, a processor speedup kit is a logical step in the process



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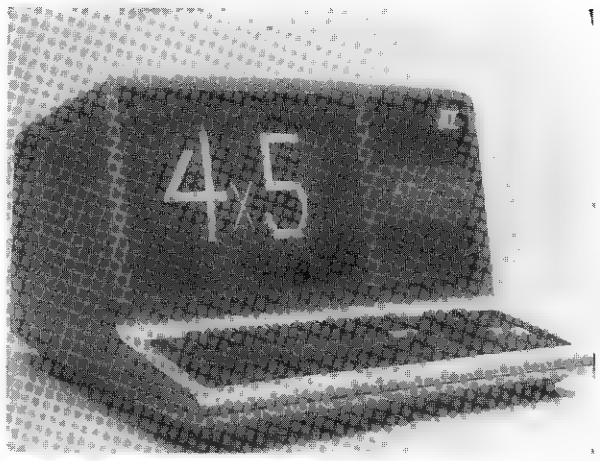
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Program Listing

```
10 '      Bench mark for Muscle Micros
20 '      Author : Art Huston
30 '      Created : 01/06/82
40 '      Updated :   /  /
50 '
60 '      Grancal Subroutine from Mark Lautenschlaeger
70 '
80 '
90 CLEAR1000:CLS:DEFINTA-Z:DEFSTRA:ONERRORGOTO65000
100 CMD"VERIFY (OFF)" 'Read after write OFF
110 CMD"LS" 'Clock speed LOW
120 DR$="4" 'Drive 4
130 GS=22 '22 Sectors/Gran
135 PA=-1 'Pre-Allocate is YES
140 GOTO50000 'Goto Menu
150 'SUBROUTINES START HERE
160 '**Save Protect Top Value** (Destroyed by LIB commands)
170 PT=PEEK(16916)
180 RETURN
190 '**Restore Protect Top Value**
200 POKE16916,PT
210 RETURN
220 '**Set Clock Speed Low**
225 GOSUB160
230 IFNOTHSTHEN250
240 CMD"LS":HS=0
245 GOSUB190
250 RETURN
260 '**Set Clock Speed High**
265 GOSUB160
270 IFHSTHEN290
280 CMD"HS":HS=-1
285 GOSUB190
290 RETURN
300 '**Change GRAN Size**
310 PRINT"Standard GRAN SIZE for the BT is 22 Sectors/Gran"
330 GOSUB160 'Save scroll protect
340 CMD"CONFIG"
350 GOSUB190 'Restore scroll protect
360 PRINT
370 INPUT@970,"What is the new GRAN SIZE (GS) ? ",3,"#";A
380 IFA=CHR$(13)ORA=CHR$(31)THENA=STR$(GS):A=RIGHT$(A,LEN(A)-1):
PRINTSTRING$(3,8);A;
390 GS=VAL(A)
400 FORX=1TO500:RETURN
410 '**Get free GRANS and BYTES on Drive DR$**
420 '**Used when Pre-Allocating Space**
430 PRINT"Reading Directory on Drive "DR$
440 G=0 'Grans = 0
450 '   Create variables to check each bit in each byte
460 '
470 X1=1:X2=2:X3=4:X4=8:X5=16:X6=32:X7=64:X8=128
480 '
490 '   Open directory on correct drive
500 '
510 OPEN"R",1,"Dir/Sys" +":"+DR$, 1
520 FIELD 1, 1 AS D$
530 '
540 '   Get byte "CC" in the GAT
550 '   Add 35 for the number of cylinders
560 '
570 GET 1,205
580 C=ASC(D$)+35
590 '
600 PRINT C;"cylinders. Calculating granule(s)."
610 '
620 '   Read byte at a time for the number of cylinders
630 '
640 FOR J=1 TO C
650 GET 1,J
660 X=ASC(D$)' Get integer value for individual byte
670 '
680 '   Do a logical check to see if bit set or reset
690 '   Bit set - granule allocated
700 '   Bit reset - granule free
710 '   Checking all bits because hard disk can have 8 gpc
720 '
730 IF NOT X AND X1 THEN G=G+X1
740 IF NOT X AND X2 THEN G=G+X1
750 IF NOT X AND X3 THEN G=G+X1
760 IF NOT X AND X4 THEN G=G+X1
770 IF NOT X AND X5 THEN G=G+X1
780 IF NOT X AND X6 THEN G=G+X1
790 IF NOT X AND X7 THEN G=G+X1
800 IF NOT X AND X8 THEN G=G+X1
810 '
```

Continues on p. 93

of beefing up a Model III; if the hard disk speeds up the machine, imagine what a hard disk *and* a 4 MHz processor will do.

Here's an example. We ran this benchmark program to test the disk read/write capability at both 2 MHz and 4 MHz:

```
5 CLEAR5000:DIM A$(100)
10 CLS:OPEN"R",1,"TEST/DAT"
20 FIELD 10 AS D$
30 FOR I=1TO100
40 A$="MICHAEL"
50 LSET D$  A$
60 PUT1, I
70 NEXT I
80 CLOSE
90 OPEN"R",1"TEST/DAT"
100 FOR X=1TO100
110 GET1,X
120 A$(X)  D$
130 NEXT X
140 CLOSE
150 PRINT@400,"FINISHED!"
```

At 2 MHz, the program took 10.08 seconds to run. At 4 MHz, the same operation required only 7.89 seconds, a 21.8 percent increase in speed.

"...imagine what a hard disk and *a 4 MHz processor will do."*

Operating System

The Muscle Micros were shipped with the DOSPLUS 4.0x operating system, created by Micro-Systems Software Inc. of Hollywood, FL. (MTI charges an extra $199 for the hard-disk version of DOSPLUS.) The LDOS operating system also supports hard-disk operation.

DOSPLUS is easy to use—its documentation is first rate. It is also flexible and can accommodate many different configurations of disk drives—40 and 80 track, single- or doubled-sided, hard disks and floppies, and any and all combinations of these devices.

In February, Micro-Systems Software released DOSPLUS version 4.1. This version lets you use multiple Winchester hard disks when used in conjunction with a hardware multiplexer. This equipment was not yet available when this review was penned but should be as you read these words.

In addition to DOSPLUS, BT Enterprises equips their 4 × 5 and 4 × 10 Model IIIs with a Quick Menu program

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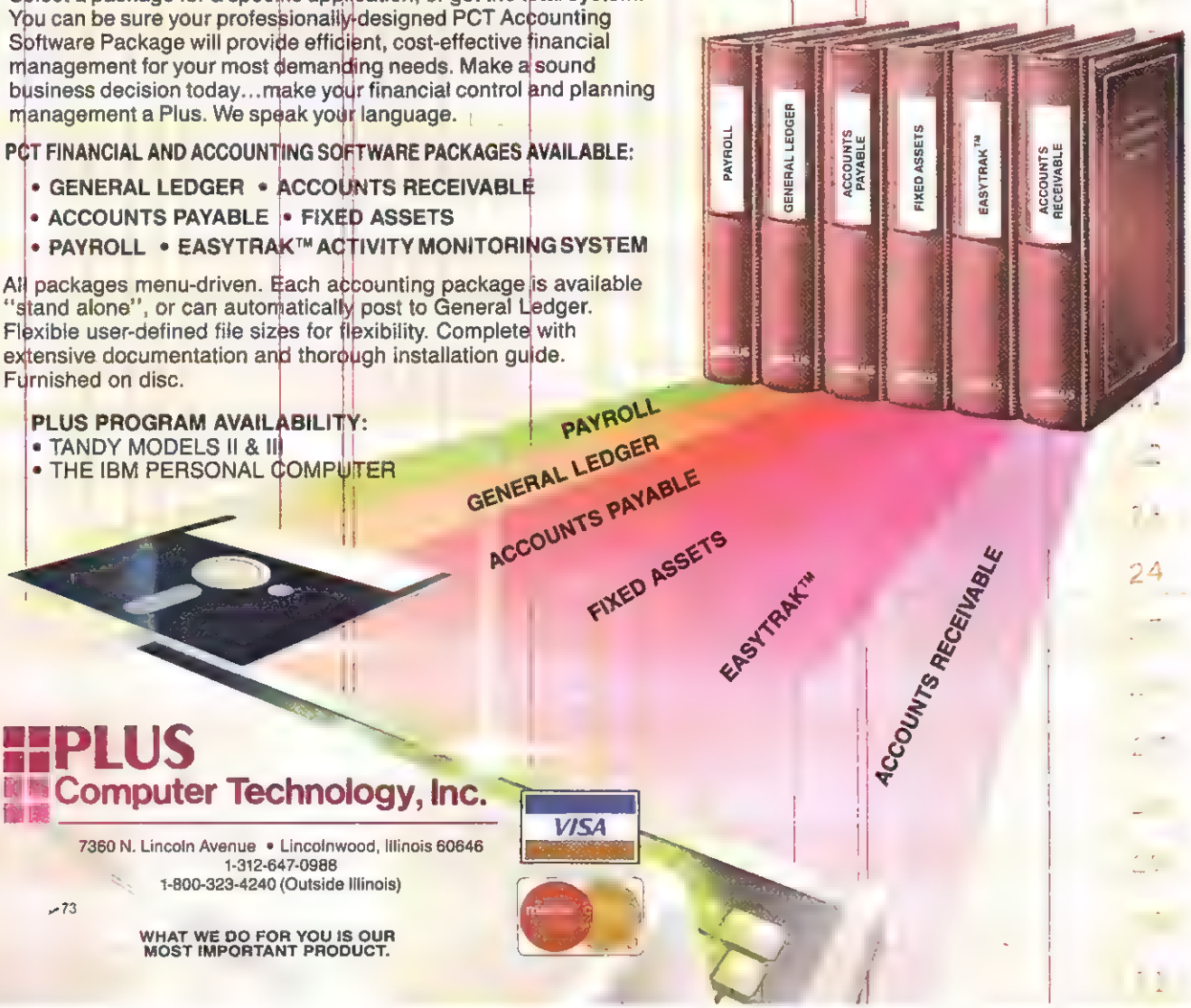
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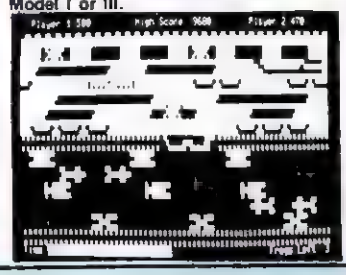
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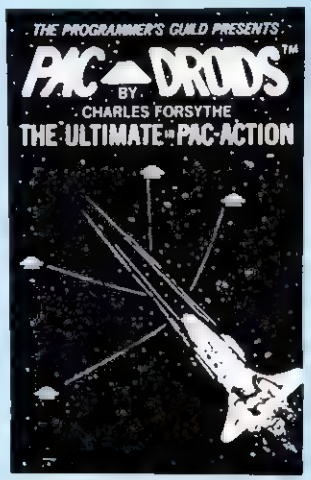
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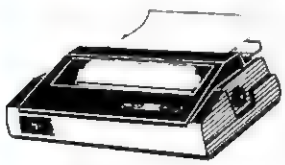
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Continued from p 88

```
820 PRINT ".";' Useless display, nice to look at for user
830 NEXT J' Get next byte
840 CLOSE' When done, close Dir/Sys
850 '
860 '   Set up variables for display
870 '   I am justifying "B" by the print using
880 '   I do not seriously expect more than 1,200 grans
890 '
900 PRINT:PRINT TAB(10) USING"###,###,###";G;
910 PRINT " free granule(s)."
920 B#=INT((256*GS)*G)
930 PRINT TAB(10) USING"###,###,###";B#;
940 PRINT " free byte(s)."
950 RETURN
960 ' End of GRANCAL routine
970 '**Preallocate BNCHMARK/DAT on Drive DR$**
980 'Calls GRANCAL
990 'Use up Maximum Amt. of Space
1000 'If BNCHMARK/DAT is already created, don't do it again.
1005 PA=-1 'Pre-allocate = YES
1010 OPEN"R",1,"BNCHMARK/DAT:"+DR$:LF=LOF(1)
1020 CLOSE
1030 IFLF=32767THEN1200 'File is Max. Length
1040 'Get # Grans on Drive DR$
1050 'If # Grans = 0 then File is Max. Length
1060 GOSUB410:IFG=0THEN1200
1070 'File is not Max. Length
1080 KILL"BNCHMARK/DAT:"+DR$ 'Kill it
1085 GOSUB410 'Get # Grans after file killed
1090 LF#=B#/256 'Get Max. LOF
1100 IFLF#>32767THENLF#=32767 'Avoid error
1110 LF=LF#
1120 A=STR$(LF):A=RIGHT$(A,LEN(A)-1) 'Get LF in A$
1130 A1="CREATE BNCHMARK/DAT"+":"+DR$
1140 A2=" (NRECS=" + A + ")"
1150 A=A1+A2 'Library Command
1160 GOSUB160 'Save Scroll protect
1170 CMD A 'Execute Library Command
1180 GOSUB190 'Restore Scroll protect
1190 PRINT"BNCHMARK/DAT created to "LF" records.":GOTO1210
1200 PRINT"BNCHMARK/DAT already created to "LF" records."
1210 RETURN
1211 '** Un-Allocate BNCHMARK/DAT
1212 PA=0:OPEN"R",1,"BNCHMARK/DAT:"+DR$:CLOSE
1213 KILL"BNCHMARK/DAT:"+DR$
1214 RETURN
1300 '**Get Time**
1310 INPUT@920,"How much time ? (hh:mm:ss) ",8,"$";A
1320 IFLEN(A)<>8THEN1310
1330 IFMID$(A,3,1)<>":"THEN1310
1340 IFMID$(A,6,1)<>":"THEN1310
1350 HR=VAL(LEFT$(A,2)):MN=VAL(MID$(A,4,2)):SC=VAL(RIGHT$(A,2))
1360 SC=HR*60*60+MN*60+SC
1370 RETURN
10000 '**** Select DR$ and Configurations ****
10010 CLS
10020 'Clock Speed
10030 INPUT@320,"Clock Speed :  <L>ow   OR   <H>igh ? ",1,"$";A
10040 IFA<>CHR$(13)ANDA<>CHR$(31)THEN10050
10045 IFHSTHENA="H"ELSEA="L"
10046 PRINTCHR$(8)A;
10050 X=INSTR("LH",A):IFX=0THEN10030
10060 ONXGOSUB220,260 'Low-High
10070 'Get Drive Number
10080 CLS:INPUT@320,"Drive Number ? (0-8) ",1,"#*";A
10085 IFA=CHR$(13)ORA=CHR$(31)THENA=DR$:PRINTCHR$(8)A
10090 IFINSTR("012345678",A)=0THEN10080
10100 DR$=A
10110 'Get GRAN SIZE (GS)
10120 CLS:GOSUB300 'Get GRAN Size
10125 GOTO10180 'SKIP PRE-ALLOCATE QUESTION
10130 'Pre-Allocate it ?
10140 CLS:INPUT@320,"Pre-Allocate the File ? (Y/N) ",1,"$";A
10145 IFA=CHR$(13)ORA=CHR$(31)THENA="Y":PRINTCHR$(8)A;
10150 ONINSTR("YN",A)+1GOTO10140,10160,10170
10160 CLS:GOSUB 970:GOTO10180 'Pre-Allocate
10170 GOSUB1211 'Un -Allocate
10180 FORX=1TO2000:NEXT:RETURN
15000 '***Write File (Pre-Allocated)***
15010 CLS:PA=-1
15020 IFPATHENGOSUB970:OPEN"R",1,"BNCHMARK/DAT:"+DR$:LF=LOF(1):G
OTO15080
15030 GOSUB410 'Get # bytes on Drive DR$
15040 LF#=B#/256
15050 IFLF#>32767THENLF#=32767
15060 LF=LF#
15070 OPEN"R",1,"BNCHMARK/DAT:"+DR$
15080 'Write LF records
15090 E=0
```

Listing continues

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The **OMNITERM** package includes the **OMNITERM** terminal program, four conversion utilities, a text editor and setting files for use with popular computers such as CompuServe, the Source, and Dow Jones — just as samples of what you can do for the computer **you** want to work with. The package includes six programs, seven data files, and real documentation: a 76-page manual that has been called "**the best in the industry.**" And **OMNITERM** comes with real user support. We can be reached via CompuServe, Source, phone, or mail to promptly answer your questions about using **OMNITERM.**

What do I need to use OMNITERM?

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

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

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

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

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

lindbergh Systems

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✓135 (617) 852-0233

Source: TCA818 CompuServe: 70310,267 TRS-80 is a ™ of Tandy Corp.

✓See List of Advertiser on Page 387

that functions as a shell between the user and the operating system, making the system even easier to use. Once the BT micro is turned on and the operating system loaded in from a floppy disk, the Quick Menu program loads automatically and offers you a menu (see Fig. 1) from which you can then select the program you want to run.

BT also bundles an applications package—the Postman mailing list program from Soft Sector Marketing, Garden City, MI—and a Library Management utility from XYZT Computer Dimensions, Inc., New York, NY, with its 4 × 5 (5 megabyte) and 4 × 10 machines.

The Bottom Line

Since all the machines we tested used the same operating system, the only variable was the different hard disk drives. To find out which was the best, we ran the benchmark program in the Program Listing. The results are shown in the Table.

Our benchmarks revealed some startling information about the relative speeds of floppy and hard disks. Hard disks read or write consecutive records from a pre-allocated file roughly 2.2

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489

Listing continued

```
15100 CLS:PRINT@960,"Press ANY key, Start Timing";
15110 IFINKEY$=""THEN15110
15120 CLS:GOSUB160:CMD"TIME 00:00:00":CMD"CLOCK" 'Start timing
15130 PRINT"Writing"LF" records."
15140 FORRN=1TOLF
15150 PUT 1,RN
15160 NEXT
15200 CLOSE
15210 CMD"CLOCK (OFF)":GOSUB190
15220 PRINT@896,"DONE - "E" IO Errors";:GOSUB1300:PRINT@896,CHR$
(30);
15230 K!=(LF)/4:K!=K!/SC:PRINTUSING"###.## Kbytes/sec";K!;
15240 IFINKEY$=""THEN15240
15250 RETURN
20000 '***Write File (Un-Allocated)***
20010 CLS:PA=0
20020 IFPATHENGOSUB970:OPEN"R",1,"BNCHMARK/DAT:"+DR$:LF=LOF(1):G
OTO20080
20030 GOSUB1211:GOSUB410 'Get # bytes on Drive DR$
20040 LF#=B#/256
20050 IFLF#>32767THENLF#=32767
20060 LF=LF#
20070 OPEN"R",1,"BNCHMARK/DAT:"+DR$
20080 'Write LF records
20090 E=0
20100 CLS:PRINT@960,"Press ANY key, Start Timing";
20110 IFINKEY$=""THEN20110
20120 CLS:GOSUB160:CMD"TIME 00:00:00":CMD"CLOCK" 'Start timing
20130 PRINT"Writing"LF" records."
20140 FORRN=1TOLF
20150 PUT 1,RN
20160 NEXT
20200 CLOSE
20210 CMD"CLOCK (OFF)":GOSUB190
20220 PRINT@896,"DONE - "E" IO Errors";:GOSUB1300:PRINT@896,CHR$
(30);
20230 K!=(LF)/4:K!=K!/SC:PRINTUSING"###.## Kbytes/sec";K!;
20240 IFINKEY$=""THEN20240
20250 RETURN
25000 '***Write File***
***(Pre-Allocated - Read only records 1 & 100 )***
25010 CLS:PA=-1
25020 IFPATHENGOSUB970:OPEN"R",1,"BNCHMARK/DAT:"+DR$:LF=LOF(1):G
OTO25080
25030 GOSUB410 'Get # bytes on Drive DR$
25040 LF#=B#/256
25050 IFLF#>32767THENLF#=32767
25060 LF=LF#
25070 OPEN"R",1,"BNCHMARK/DAT:"+DR$
25080 'Write LF records
25090 E=0
25100 CLS:PRINT@960,"Press ANY key, Start Timing";
25110 IFINKEY$=""THEN25110
25120 CLS:GOSUB160:CMD"TIME 00:00:00":CMD"CLOCK" 'Start timing
25130 PRINT"Writing"LF" records."
25140 FORRN=1TOLF/2
25150 PUT 1,1:PUT 1,100
25160 NEXT
25200 CLOSE
25210 CMD"CLOCK (OFF)":GOSUB190
25220 PRINT@896,"DONE - "E" IO Errors";:GOSUB1300:PRINT@896,CHR$
(30);
25230 K!=(LF)/4:K!=K!/SC:PRINTUSING"###.## Kbytes/sec";K!;
25240 IFINKEY$=""THEN25240
25250 RETURN
30000 '***Read File (1-LOF)***
30010 CLS:PA=-1
30020 IFPATHENGOSUB970:OPEN"R",1,"BNCHMARK/DAT:"+DR$:LF=LOF(1):G
OTO30080
30030 GOSUB410 'Get # bytes on Drive DR$
30040 LF#=B#/256
30050 IFLF#>32767THENLF#=32767
30060 LF=LF#
30070 OPEN"R",1,"BNCHMARK/DAT:"+DR$
30080 'Write LF records
30090 E=0
30100 CLS:PRINT@960,"Press ANY key, Start Timing";
30110 IFINKEY$=""THEN30110
30120 CLS:GOSUB160:CMD"TIME 00:00:00":CMD"CLOCK" 'Start timing
30130 PRINT"Reading"LF" records."
30140 FORRN=1TOLF
30150 GET 1,RN
30160 NEXT
30200 CLOSE
30210 CMD"CLOCK (OFF)":GOSUB190
30220 PRINT@896,"DONE - "E" IO Errors";:GOSUB1300:PRINT@896,CHR$
(30);
30230 K!=(LF)/4:K!=K!/SC:PRINTUSING"###.## Kbytes/sec";K!;
30240 IFINKEY$=""THEN30240
30250 RETURN
```

Listing continues

XYZT

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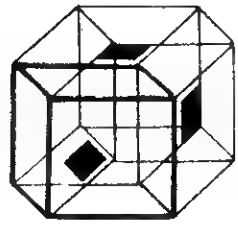
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↙See List of Advertiser on Page 387

Listing continued

```
35000 '***Read File (Max head travel)***
35010 CLS:PA=-1
35020 IFPATHENGOSUB970:OPEN"R",1,"BNCHMARK/DAT:"+DR$:LF=LOF(1):G
OTO35080
35030 GOSUB410 'Get # bytes on Drive DR$
35040 LF#=B#/256
35050 IFLF#>32767THENLF#=32767
35060 LF=LF#
35070 OPEN"R",1,"BNCHMARK/DAT:"+DR$
35080 'Write LF records
35090 E=0
35100 CLS:PRINT@960,"Press ANY key, Start Timing";
35110 IFINKEY$=""THEN35110
35120 CLS:GOSUB160:CMD"TIME 00:00:00":CMD"CLOCK" 'Start timing
35130 PRINT"Reading"LF" records."
35140 FORRN=1TOLF/2
35150 GET 1,1:GET 1,100
35160 NEXT
35200 CLOSE
35210 CMD"CLOCK (OFF)":GOSUB190
35220 PRINT@896,"DONE - "E" IO Errors";:GOSUB1300:PRINT@896,CHR$
(30);
35230 K!=(LF)/4:K!=K!/SC:PRINTUSING"###.## Kbytes/sec";K!;
35240 IFINKEY$=""THEN35240
35250 RETURN
50000 '** PROGRAM STARTS HERE **
50010 PT=5:GOSUB190
50020 PRINTTAB(15)"- HARD DISK BENCHMARK -"
50030 PRINT"Drive Selected :"TAB(32)"Pre-Allocate Space :"
50040 PRINT"Speed set to   :"TAB(32)"GRAN Size :"
50050 PRINTSTRING$(64,95)
50055 GOSUB10000 'Initial CONFIG
50060 'Start Menu Here
50070 PRINT@81,DR$" - ";:IFDR$>"3"PRINT"HARD ";ELSEPRINT"FLOPPY
";
50080 PRINT@117,;:IFPATHENPRINT"YES";ELSEPRINT"NO ";
50090 CLS:PRINT@145,;:IFHSTHENPRINT"HIGH";ELSEPRINT"LOW ";
50100 PRINT@171,USING"###";GS;
50110 PRINT@335,"<1> Change Configurations"
50120 PRINT@399,"<2> Do MIN travel Write Test"
50130 PRINT@463,"<3> Do NOMINAL travel Write Test"
50140 PRINT@527,"<4> Do MAX travel Write Test"
50150 PRINT@591,"<5> Do MIN travel Read Test"
50160 PRINT@655,"<6> Do MAX travel Read Test"
50170 '
50180 '
50190 '
50200 INPUT@910,"# of your option, <CLEAR> to quit ",1,"#*";A
50210 IFA=CHR$(13)THENA="1":PRINTCHR$(24);A;
50220 IFA=CHR$(13)THENA="Q":PRINTCHR$(24);A;:GOTO50240
50230 ONINSTR("123456",A)GOSUB10000,15000,20000,25000,30000,3500
0:GOTO50060
50240 'Quit
65000 '**HANDLE IO ERRORS**
65010 ER=ERR/2+1
65020 IFER<>58THEN65050
65030 E=E+1 'Increment IO Errors
65040 RESUME NEXT
65050 PRINT@896,CHR$(30)"Error"ER"in line"ERL:STOP
65060 END
```

times as fast as floppies. This figure soars all the way to 9.0 and 13.2 when the file is dynamically allocated (requiring trips to the directory to find free space), or when the records being read/written are 100 sectors apart.

These figures suggest that it is the seek time (speed at which a sector is found) that gives the hard disk its advantage. The speeds will be increased more for programs that require reads up and down a file than for those that simply print out a list from a disk file. You can give your floppy system a shot of high octane by keeping this in mind.

The average hard-disk read/write is roughly four times faster than the average floppy read/write. This is a substantial increase, but it's hardly up to BT's advertising claim of a 40-fold increase.

The overriding conclusion from these tests is that hard disks have a much lower seek time—they take less time to find the data on the disk. Once they find it, they read it only around 20 percent faster than floppies.

The second major conclusion is that everyone—whether they're using floppies or Winchesters—should preallocate disk file space! Reads and writes are much faster when the file space on the disk has already been established.

The Party's Over

The Muscle Micros are an alternative to buying a standard Model III and adding an outboard hard disk drive. There is a risk involved in that you can't turn to your uncle Radio Shack if trouble arises. But if you're looking for a clean, powerful machine for a serious application, one of these machines may be for you. ■

Hard Disk Benchmarks in Kbytes/sec (HT = Head Travel)

	Write w/ min HT	Write w/ nom HT	Write w/ max HT	Read w/ min HT	Read w/ max HT	Avg Write	Avg Read
BT	10.66	4.80	7.47	10.74	7.47	7.64	9.11
MTI	9.82	4.00	15.11	9.75	14.95	9.64	12.35
Computex	11.65	4.74	9.96	11.55	9.96	8.78	10.76
Averages:							
Hard Disk	10.71	4.51	10.85	10.68	10.79	8.69	10.74
Floppy	4.97	0.50	0.82	4.70	0.82	2.10	2.26

Table. Read/Write times with varying amounts of head travel.

Minimum head travel is a read/write of a preallocated file. Nominal head travel is a write past the end of a file, resulting in frequent trips to the directory to check for free space. Maximum head travel is consecutive read/writes of records 100 sectors apart

Nominal and maximum head travel figures may have been affected by the location of the directory relative to the file being read or written.

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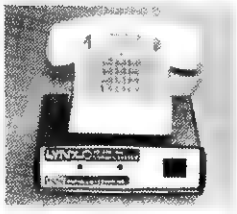
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Language Development Tools

All right, you've gotten pretty good at Basic. Maybe you've tried a little Pascal or Forth. But can you speak C? Fortran? Cobol? PL/1? Runic-80? And which Basic are you familiar with, anyway? CBasic? TBasic? GRBasic?

Enough languages are available for the TRS-80 to run the United Nations. For our first 1983 Software Buyer's Guide, we've compiled a list of where to find them. You can interpret the list using the table below.

The table names companies that supply particular languages for your micro—I/III, II/16, or Color Computer—and the company's entry in the alphabetical list shows system and price information. (Helpful companies answered *80 Micro's* questionnaires and phone calls; other information came from advertisements, Online Inc.'s *1983-84 Micro-Software Directory*, and gossip picked up on street corners.)

A note about operating systems: We've included a sampling apiece of languages for the Color Computer under Flex or OS-9 and Z80 machines using CP/M. More are appearing every day for the former, and the amount of software available for the latter is staggering. A number of companies manufacture CP/M conversion boards for the TRS-80; do-it-yourselfers are referred to Bill Brewer's $5 project in the March 1983 issue (p. 112).

The list is incomplete. Even limiting ourselves to a general survey, and leaving out Assembly language and editor/assemblers—they'll appear in a future Buyer's Guide—we've only been able to scratch the surface.

Still, we hope our list gets you started. Whether it's the teaching ease of Pilot or the businesslike structure of Cobol, the programmer's lexicon offers something for everyone. Some people even devote their lives to learning Level II Basic.

I/III

APL	STSC Inc.
Basic	Algorix Inc., Med Systems Software, Simutek, Tandy/Radio Shack
C	Misosys, Tiny c associates
Cobol	Ryan-McFarland, Tandy/Radio Shack
Forth	Miller Microcomputer Services
Fortran	Aspen Software, Tandy/Radio Shack
Lisp	Far West Systems, SuperSoft
muMath/muSimp	Microsoft

Aardvark-80, 2352 S. Commerce, Walled Lake, MI 48088, 313-669-3110.

The Tiny Compiler, $24.95 on disk or cassette for the 16K Color Computer, is available in either regular or Extended Color Basic versions. It doesn't use a full set of Basic or produce relocatable code, but can compile one location of memory to be relocated elsewhere. The software is not protected, and Aardvark offers lifetime replacement if it ever fails to load.

Alcor Systems, 13534 Preston Road, Suite 365, Dallas, TX 75240, 214-226-4476.

Alcor Pascal, $199 on unprotected disk for the 48K Models I and III with TRSDOS, LDOS, NEWDOS80, or DOSPLUS.

Algorix Inc., Box 11721, San Francisco, CA 94101, 415-681-9371.

The Accel 3/4 Basic compiler ($99.95 on copyable disk or cassette) works under most DOSes on the 16K Model I/III. Edit ($40) is a full-screen Basic editor on disk.



Now the Universal Operating System*, available for the

TRS-80 Model 16§,

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†PCD Supports Systems Software on DEC LSI-II, Radio Shack Models II, III, & 16, Altos, Terak, IBM PC, Apple II+, & Sage.

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Pascal	Alcor Systems, New Classics Software, Tandy/Radio Shack
Pilot	Barker Software, Tandy/Radio Shack

II/16

APL	Telecompute Integrated Systems
Basic	Good-Lyddon, PCD Systems, Tandy/Radio Shack
C	Softworks Limited
Cobol	Ryan-McFarland, Tandy/Radio Shack
Fortran	Aspen Software, PCD Systems, Tandy/Radio Shack
Pascal	PCD Systems

Color Computer

(including Flex and OS-9 systems)

Basic	Aardvark-80, Frank Hogg Laboratory, Microware
C	Dugger's Growing Systems, Microware
Cobol	Microware
Forth	Armadillo, Frank Hogg Laboratory, The Micro Works, Talbot Microsystems
Logo	SDS Computers, Tandy/Radio Shack
Pascal	Computerware, Frank Hogg Laboratory, Microware
Pilot	Tandy/Radio Shack

Armadillo International Software, P.O. Box 7661, Austin, TX 78712, 512-459-7325.

ColorForth ($49.95) comes on cassette for the 16K Color Computer; one side contains the cassette and the other the disk version. It's an implementation of the Forth Interest Group's fig-Forth standard, with some extra commands developed for the CoCo.

Aspen Software Co., P.O. Box 339, Tijeras, NM 87059, 505-281-3371.

Ratfor (Rational Fortran) is available on either 5 1/4- or 8-inch disk for the 48K Models I, II, or III; it runs under most DOSes, and the disk is warrantied to be readable. Price is $75, upgrades at low cost.

Barker Software, P.O. Box 5313, Athens, GA 30604.

An inexpensive Pilot for the Models I and III—$29.95 on disk.

Computerware, P.O. Box 668, Encinitas, CA 92024, 619-436-3512.

Color Pascal, $49.95 cassette and $59.95 disk for the 32K Color Computer. An ASCII text editor is needed for the disk version.

Digital Research, 160 Central Ave., Pacific Grove, CA 93950, 408-649-3896, customer service 408-649-5500.

The creators of CP/M, and suppliers of half a dozen languages for Z80 micros using that operating system: CIS Cobol (48K, $800), Level II Cobol (64K, $1,600), the business-oriented CBasic (48K, $150) and its enhancement CB-80 ($500), Pascal/MT+ (56K, $350), a compiled version of Pascal, and PL/1-80 (56K, $500). Starside Engineering (see below) offers a library of Pascal/MT+ utilities for $75.

Dugger's Growing Systems, P.O. Box 305, Solana Beach, CA 92075, 714-755-4373.

The Small C compiler for the 16K disk Color Computer ($49.95) generates Assembly-language output that must be run through an assembler and editor that supports brackets and special characters. An OS-9 version is $95; a Flex version ($120) features extended commands and floating point. Flawed software is replaced free; upgrades are $25 to $30.

Ellis Computing, 3917 Noriega St., San Francisco, CA 94122, 415-753-0186.

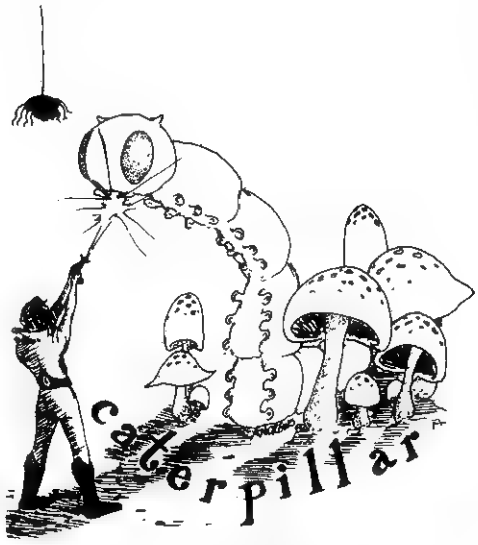
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Z80 CP/M

Ada	RR Software, SuperSoft
APL	Softronics
Basic	Digital Research, Microsoft, Tarbell Electronics
C	InfoSoft, SuperSoft, Tiny c associates
CB-80	Digital Research
Cobol	Digital Research, Ellis Computing, Micro Focus, Microsoft
Forth	Laboratory Microsystems, Martian Technologies, MicroMotion
Fortran	Ellis Computing, Microsoft, SuperSoft

subset), and 48K Nevada Fortran (ANSI-66 subset). Each is available on unprotected 5 1/4- or 8-inch disk for the Model I or II, and costs $29.95 plus shipping and handling.

Far West Systems and Software, P.O. Box 3301, Eugene, OR 97403, 503-485-5155.

UOLISP ($150) is a Lisp for the 48K, two-disk Models I and III. It operates under TRSDOS or LDOS; Far West includes a compiler and assembler, and will replace software if defective.

Good-Lyddon Data Systems, 5486 Riverside Drive, Chino, CA 91710, 714-980-4563.

This company advertises a Microsoft Basic compiler for the Models II and 16; it runs under TRSDOS 2.0 and is priced at $339.

Frank Hogg Laboratory, 770 James St., Suite 215, Syracuse, NY 13203, 315-474-7856.

CC-Forth for the 16K disk Color Computer ($99.95); X-Forth ($149.95 with 400-page manual) for 64K Flex users; and the A-Basic compiler ($150) for 64K Flex or OS-9. Software is not protected; updates are free for 90 days ($2.50 shipping and handling), $10 thereafter. Their catalog lists Basic, Extended Basic, and Pascal (both Dynasoft's $59.95 subset and a $200 compiler) for Flex, too.

InfoSoft Systems Inc., P.O. Box 640, 80 Washington St., Norwalk, CT 06856, 203-866-8833.

InfoSoft's three-pass C compiler ($275) is available on either 5 1/4- or 8-inch disk for 48K or larger CP/M machines.

Ithaca InterSystems Inc., P.O. Box 91, Ithaca, NY 14850, 607-257-0190.

Pascal/Z and the business-oriented Pascal/BZ ($50 each), for Z80-based micros with 48K or more memory using CP/M. The software (either 5 1/4- or 8-inch disk) is not protected; after a 90-day free period, upgrades at nominal cost.

Laboratory Microsystems Inc., 4147 Beethoven St., Los Angeles, CA 90066, 213-306-7412.

Z80 Forth ($50) for CP/M users, supplied on 8-inch disk. It requires 48K and is warrantied for one year, updates at nominal cost. Floating-point and other options available.

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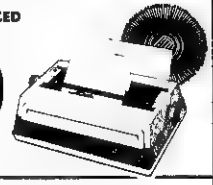
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Martian Technologies, 8348 Center Drive, Suite F, La Mesa, CA 92041, 619-464-2924.

This firm has taken over the marketing of Timin Engineering's Forth products for CP/M: Timin Forth 3.1 (requires 24K, $99.95), Dual-Tasking Forth (32K, $239.95), and ROMable Forth (48K, $199.95). All are supplied on unprotected 8-inch disk, as is a package of Forth application modules ($59.95).

Med Systems Software, P.O. Box 3558, Chapel Hill, NC 27514, 919-933-1990.

GRBasic ($19.95 cassette, $24.95 disk) is a graphics enhancement for Model I/III Basic. It requires 16K of memory, runs under TRSDOS, and can be backed up. There's a 14-day money-back guarantee; Med Systems will replace defective software free, and user-damaged goods for $5.

Micro Focus Inc., 1860 Embarcadero Road, Suite 235, Palo Alto, CA 94303, 415-856-4161.

CIS Cobol ($850) on 8-inch disk for Z80 CP/M micros. 64K is required; upgrades are $120 to licensed owners.

Lisp	Microsoft, SuperSoft
muMath/muSimp	Microsoft
Pascal	Digital Research, Ithaca InterSystems
Pilot	Ellis Computing
PL/1	Digital Research
Runic-80	Starside Engineering

MicroMotion, 12077 Wilshire Blvd. #506, Los Angeles, CA 90025, 213-821-4340.

Forth-79 (32K, 8-inch disk, CP/M) costs $99.95, $139.95 with floating point. Software is unprotected, and MicroMotion promises "unlimited customer service" and free replacement if they make an error.

Microsoft Corp., 10700 Northup, Bellevue, WA 98004, 206-828-8080.

The muMath/muSimp symbolic math package and interpreter is available for the 48K Models I and III ($250), but other Microsoft products are on 8-inch disks for CP/M-80: a 32K Basic interpreter ($350) and 48K compiler ($395), 32K Fortran ($500) and 48K Cobol ($750) compilers, 48K muMath/muSimp ($250), and the muLisp/muStar interpreter (32K, $200).

Microware Systems Corp., 5835 Grand Ave., Des Moines, IA 50312, 515-279-8844.

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the Color Computer using the OS-9 operating system. Answer their ads and you're told the products are available through Radio Shack, which at this writing denies it will support OS-9.

The Micro Works, P.O. Box 1110, Del Mar, CA 92014, 714-942-2400.

Color Forth ($109.95) is supplied on a ROM cartridge. It will work on any Color Computer, from 4K on up; the 112-page manual includes the source listing.

Miller Microcomputer Services, 61 Lake Shore Road, Natick, MA 01760, 617-653-6136.

MMS-Forth ($129.95) is a complete programming environment for the Model I/III; besides the Forth language, it includes its own operating system and full assembler. Most of its source code is supplied, as are utilities such as a full-screen editor. It requires 32K (a 16K version is available on request); the software is not protected, and upgrades are free for 14 days and $10 plus $2 shipping and handling thereafter.

Misosys, P.O. Box 4848, Alexandria, VA 22303, 703-960-2998.

LC ($150 plus $4 shipping and handling) is a C compiler and macro-assembler on two disks for the 48K Model I/III under LDOS. A 300-page manual is provided, and the software is unprotected.

New Classics Software, 239 Fox Hill Road, Denville, NJ 07834, 201-625-8838.

Pascal 80 ($99 plus $2 shipping) for the 48K Model I/III under TRSDOS, LDOS, NEWDOS, MULTIDOS, and DOSPLUS. Not the ANSI version of Pascal, but "very easy to use—ideal for learning." Refund if not satisfied; the software's not protected, and upgrades are $6.

PCD Systems, P.O. Box 143, Penn Yan, NY 14527, 315-536-7428, technical assistance 315-536-7436.

The Universal Operating System (a version of the UCSD p-System), supplied with run-time package and Pascal compiler, lets programs written on a TRS-80 run without change on many other micros. A 64K Model II version is $650, Model 16 version $850; over 1,000 pages of documentation are supplied, and defective disks are replaced free. p-System compilers are available for Basic ($225) and Fortran ($350).

RR Software, P.O. Box 1512, Madison, WI 53701, 608-244-6436.

Janus/Ada ($300–$400) is a compiler package for a subset of the Department of Defense's Ada language. It comes on 8-inch disk for the Model II running under CP/M.

Ryan-McFarland Corp., 9057 Soquel Drive, Aptos, CA 95003, 408-662-2522.

The makers of RS/Cobol and RM/Cobol, the ANSI 3.23-standard versions for the Models I, II, III, and 16. "Contact Tandy," they say when asked about price or service.

SDS Computers, P.O. Box 450, Bogota, NJ 07603.

This firm advertises Tiny Turtle, a logo for the 32K Color Computer with Extended Basic, at $39.95 for cassette.

Simutek Computer Products Inc., 4897 E. Speedway, Tucson, AZ 85712, 602-323-9391.

ZBasic 2.2 ($89.95) is an interactive Basic compiler on disk (most DOSes) or cassette for the Model I/III. The software's not protected, and updates are available at cost difference.

Softronics, 36 Homestead Lane, Roosevelt, NJ 08555, 609-448-2605.

The Softronics APL interpreter ($350) is supplied on 8-inch disk for CP/M machines with 48K or more memory.

Softworks Limited, 607 W. Wellington, Chicago, IL 60657, 312-327-7666.

A full version of Bell Labs C ($950) for the 128K Model 16. The disk is unprotected; there are several user's manuals, and immediate replacement of flawed media.

Starside Engineering, P.O. Box 18306, Rochester, NY 14618, 716-461-1027.

Runic-80 is a language for CP/M users interested in structured programming but wanting an interactive introduction; it's described as being "similar to a user-friendly Forth." It comes on 8-inch disk for 48K machines, but Starside will transfer software by modem if paid in advance. Warrantied to be readable on your machine, Runic-80 costs $49.95, with upgrades $15.

STSC Inc., 2115 East Jefferson St., Rockville, MD 20852, 301-984-5000.

APL*Plus/80 operates under TRSDOS and LDOS on the 48K Model III. $295 including six manuals and two reference cards; updates available at nominal cost, replacement free if disk or chip is defective. The software is unprotected.

SuperSoft, P.O. Box 1628, Champaign, IL 61820, 217-359-2691.

Four languages on 5 1/4- or 8-inch disk for Z80 CP/M: Ada ($300), C ($275), Fortran ($375), and Lisp ($150). The software is protected; SuperSoft will replace faulty copies. Lisp is also available under TRSDOS for the 16K Level II Models I and III ($100 disk, $75 Model I tape).

Talbot Microsystems, 1927 Curtis Ave., Redondo Beach, CA 90278.

A Forth ROM cartridge for 4K Color Computer owners ($110); two versions of T-Forth for Flex ($100 and $250).

Tandy/Radio Shack, Fort Worth, TX 76102.

Your RS dealer offers a pack of languages for the Models I and III: Compiler Basic ($149), Cobol ($199), Fortran ($99.95), Tiny Pascal ($19.95), and MicroPilot ($99.95 Model I, $119.95 Model III).

Model II owners can also try Compiler Basic ($199) and Fortran ($299). The Color Computer can be used for CAI with Color Pilot, $59.95 cassette (16K) or $79.95 disk (32K Extended Color Basic), or go turtling with Color Logo ($99 disk).

Tarbell Electronics, 950 Dovlen Place, Suite B, Carson, CA 90746, 213-538-4251.

TBasic ($100, source code $50) is supplied on 8-inch disk for CP/M users. It requires 32K; defective disks are replaced free, user-crashed ones for $10, and upgrades are $25.

Telecompute Integrated Systems Inc., 251 Spadina Ave., Toronto, Ontario, Canada M5T 2E2, 416-596-6956.

TIS-APL ($495) is an APL programming environment with operating system for the 64K Model II. The software is protected; replacements are free for 90 days, $5 thereafter.

Tiny c associates, P.O. Box 269, Holmdel, NJ 07733, 201-671-2296.

Tiny-c one is a C-subset interpreter ($100) for the Model I; the cassette version requires 16K, disk 24K. Tiny-c two, a compiler on two 8-inch disks for CP/M machines, requires 32K and costs $250. ■

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Tee-Off!

by Michael Parks



In this golf game, you will have to contend with hazards as well as varying wind conditions.

If you like golf games but think they aren't realistic enough, try this one. It runs on a Model I or Model III with 16K. One or two people can play, and you can use either the stroke-play or match-play scoring system.

Each player is asked which of the following give him the most problems: hook, slice, poor distance, bunker shots, or putting. The answer to this question affects the rest of the game.

The answers hook and slice cause the ball to be deflected left and right, respectively, by up to 20 degrees (except when putting). Poor distance reduces the length of each shot up to 20 percent. Problems with bunker shots mean that a sand iron is the only effective club from a bunker. Putting problems subject putts to a variation in distance of up to 20 percent.

After the question is answered, the first hole's layout is displayed, and the first player must select the club and angle for the shot. (You can abort the club selection by using an asterisk for

The Key Box

Model I or III
16K RAM, Cassette Basic
32K RAM, Disk Basic

Program Listing

```
5 REM      *********   GOLF    ********   MIKE PARKS,FEB '82
10 CLEAR100:DEFINTA-Z:K0=0:K1=1:K2=2:K3=3:K4=4:K5=5:X=0:Y=0:XU=0:Y
U=0:F=0:N=0:P=0:T=0:BX=0:BY=0:TX=0:TY=0:NX=0:NY=0:SX=0:SY=0:TS=0:W
S=0:BP=0:H=0:SO=15360:DR!=0.01745329:BK$="...":W$="  WON BY":X$="
LEADS BY":Y$=" HOLES":Z$=" STROKES"
15 P1=960:P2=974:P3=696:P4=760:DIMTA(19,1),WA(13,1),CA(9,3),BX(1),
BY(1),OC(1),ST(1),PT(1),HT(1),TP(1):GOTO80
20 POKEBP,OC(P):TP(P)=INT(TY/K3)*64+TX/K2+SO:OC(P)=PEEK(TP(P)):SET
(TX,TY):SET(TX+K1,TY):BP=TP(P):IFSB=K0THENRETURNELSESB=K0:IFP=K0TH
ENSET(BX(K1),BY(K1)):SET(BX(K1)+K1,BY(K1)):RETURNELSESET(BX(K0),BY
(K0)):SET(BX(K0)+K1,BY(K0)):RETURN
25 WA(WS,K0)=F:WA(WS,K1)=T:WS=WS+K1:N=(T-F)/K3:F=F+SO:POKEF,136:FO
RX=K0TON-K1:Y=3*X:POKEF+K1+Y,176:POKEF+K2+Y,134:POKEF+K3+Y,137:NEX
T:RETURN
30 TA(TS,K0)=F-K1:TA(TS,K1)=T+K1:TA(TS+K1,K0)=F-65:TA(TS+K1,K1)=T-
62:TS=TS+K2:IFF=TTHENN=K0ELSEN=(T-F)/K5
35 F=F+SO:FORX=K0TON:Y=K5*X:POKEF+Y,151:POKEF+Y-K1,131:POKEF+Y-K2,
130:POKEF+Y+K1,131:POKEF+Y-64,189:POKEF+Y-65,184:POKEF+Y-63,144:NE
XT:RETURN
```

Listing continues

PROGRAMMING TOOLS FOR YOUR TRS-80™ MODEL I AND MODEL III

INSTANT ASSEMBLER

The INSTANT ASSEMBLER is a powerful disk or tape based assembler and debugger for the TRS-80. Now you can assemble directly to memory and immediately debug your program with the built in single stepping debugger. Quickly switch from assembler to debugger and back again without losing the source code. This feature makes INSTANT ASSEMBLER an excellent learning tool for assembly language programming.

INSTANT ASSEMBLER is absolutely unique among tape based assemblers in that it produces relocatable code modules that can be linked with the separate LINKING LOADER, which is supplied in two versions for loading programs into either high or low RAM. This lets you build long programs with small modules. INSTANT ASSEMBLER also features immediate detection of errors as the source code is entered, a compactly coded source format that uses 1/3 as much memory as standard source, and many operational features including single stroke entry of DEFB and DEFW, pinpoint control of listings, alphabetic listing of symbol table, separate commands for listing error lines or the symbol table, block move function, and verification of source tapes.

INSTANT ASSEMBLER's debugger provides single stepping with full register displays, decimal or hex entry of addresses, forward or backward memory displays, disassembly of object code in memory, memory display in ASCII format, and hex to decimal or decimal to hex conversion. The single stepper will step one instruction at a time or at a fast rate to any defined address.

INSTANT ASSEMBLER occupies less than 8400 bytes of memory. In a 16K machine this will leave you enough memory to write assembly language programs of around 2000 bytes. This and its module linking feature make INSTANT ASSEMBLER ideal for users with only 16K machines. The instruction manual may be purchased separately for $5, which will apply towards the purchase of the INSTANT ASSEMBLER. In addition to disk I/O, the disk version includes a stand-alone version of the debugger program MICROMIND.

Specify Model I or Model III. TAPE INTASM ..... $29.95 on tape
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INSIDE LEVEL II

The Programmers Guide to the TRS-80 ROMS

INSIDE LEVEL II is a comprehensive reference guide to the Model I and Model III ROMs which allows the machine language or Basic programmer to easily utilize the sophisticated routines they contain. Concisely explains set-ups, calling sequences, and variable passage for number conversion, arithmetic operations, and mathematical functions, as well as keyboard, tape, and video routines. Part II presents an entirely new composite program structure which loads under the SYSTEM command and executes in both Basic and machine code with the speed and efficiency of a compiler. In addition, the 18 chapters include a large body of other information useful to the programmer including tape formats, RAM useage, relocation of Basic programs, USR call expansion, creating SYSTEM tapes of your own programs, interfacing of Basic variables directly with machine code, and special precautions for disk systems. **INSIDE LEVEL II** was reviewed in the April 1982 issue of 80 Micro which said "The book has no flaws, it is a perfect gem." Byte Magazine said "I recommend this book to serious machine language programmers."

Includes updates for Model III. INSIDE LEVEL II $15.95

SINGLE STEP THROUGH RAM OR ROM

STEP80 allows you to step through any machine language program one instruction at a time, and see the address, hexadecimal value, Zilog mnemonic, register contents, and step count for each instruction. The top 14 lines of the video screen are left unaltered so that the "target program" may perform its display functions unobstructed. STEP80 will follow program flow right into the ROMs, and is an invaluable aid in learning how the ROM routines function. Commands include step (trace), disassemble, run in step mode at variable step rate, display or alter memory or CPU registers, jump to memory location, execute a CALL, set breakpoints in RAM or ROM, write SYSTEM tapes and relocate to any page in RAM. The display may also be routed to your line printer through the device control block so custom print drivers are automatically supported.

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DUPLICATE SYSTEM TAPES WITH CLONE

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Our popular smart terminal program has just gotten a lot smarter. After two years of experience with TELCOM and many requests from customers, we have created TELCOM II for the most demanding telecommunications applications. **TELCOM II** maintains the same ease of operation and all the features of our original program (see below), and includes many enhancements. The terminal mode now has a help menu, a large spooler for simultaneous printer output at high baud rates, acknowledges receipt of all commands, and displays control characters. You can now load disk files into the memory buffer from within the terminal mode, transmit the buffer with a single command, and send files a line at a time. You can even view the buffer or data that has already scrolled off the screen. **TELCOM II** has 10 different 40 character programmable messages that can each be sent with a single command, and the messages can now include control codes and delays. It also has 5 different character translation tables for compatibility with different systems. One of the most substantial additions to TELCOM is a full protocol file transfer mode which is compatible with the LYNC program available on CP/M systems and the IBM PC. **TELCOM II** will exchange disk files with any computer running this protocol (including another TRS-80 running TELCOM II), and will automatically correct errors in transmission! Files can be sent to or fetched from an unattended computer with ZERO errors. The extreme ease of use TELCOM is known for has not been compromised. Reconfiguration of the programmable features is done internally from clear menus for fast, easy operation. **TELCOM II** comes with a comprehensive instruction manual which is available separately for $5 (which will apply to subsequent purchase of the program). You won't find a smarter or easier to use terminal program at any price.

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Our original and popular smart terminal program has most of the features needed to communicate with time share systems or for high speed file transfers between two disk based micros over modems or direct wire. It is menu driven and extremely simple to use. Functions include terminal mode, save RAM buffer on disk, transmit a disk file, receive a disk file, examine and modify UART parameters, 8 programmable log on messages, automatic checksum verification of accurate transmission and reception, and many more user conveniences. Supports line printers, lowercase characters, Xon/Xoff protocol, programmable character keys, and even saves itself on disk in different configurations. It will also exchange binary files without conversion to ASCII.

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This program is a full feature print formatting package featuring user defineable line and page length (with line feeds inserted between words or after punctuation), indentation, screen dump, and printer pause. In addition, printing is done from a 4K expandable buffer area so that the LPRINT or LLIST command returns control to the user while printing is being done. Works with cassette or disk systems. Allows printing and processing to run concurrently. Output may be directed to either the parallel port, serial port, or the video screen. 80 Micro said "I can only give my highest recommendation of Spooler and Mumford Micro Systems."

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ball at right angles up or down, and an angle greater than 90 moves the ball backward (i.e., left to right).

The game proceeds under normal golf rules with the player farthest from the hole playing first and the winner of each hole teeing off first on the next hole. At the end of the game, a scorecard shows the par and strokes taken for each hole. When match play is used, the scorecard also shows the number of holes won by each player as well as the number of holes halved.

Restrictions

To make the game as realistic as possible, I added some restrictions for certain situations. These prevent the game from becoming predictable and boring.

If the ball is in a bunker, you must use the proper club or you will botch the shot. If you have specified bunker shots as giving you the most problems, you must use a sand iron to extract yourself from a bunker. Otherwise, you can use any club up to a 5 iron. This is unlike some games in which you can successfully use any club.

When the ball lands in trees, you have the choice of playing the shot or dropping out. If you play the ball, you have the percentage or angle.) Club details are continuously displayed on the screen.

If you select an iron, you must also specify the percentage of full swing required. The angle for the shot can be between 0 and 180 degrees positive or negative. A positive angle moves the ball toward the top of the screen, and a negative angle moves it toward the bottom. An angle of 90 degrees moves the ball at right angles up or down, and an angle greater than 90 moves the ball backward (i.e., left to right).

The game proceeds under normal golf rules with the player farthest from the hole playing first and the winner of each hole teeing off first on the next hole. At the end of the game, a scorecard shows the par and strokes taken for each hole. When match play is used, the scorecard also shows the number of holes won by each player as well as the number of holes halved.

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The game proceeds under normal golf rules with the player farthest from the hole playing first and the winner of each hole teeing off first on the next hole. At the end of the game, a scorecard shows the par and strokes taken for each hole. When match play is used, the scorecard also shows the number of holes won by each player as well as the number of holes halved.

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When the ball lands in trees, you have the choice of playing the shot or dropping out. If you play the ball, you have a 50-percent chance of success; dropping out results in a one-stroke penalty and the ball is moved clear of the trees.

When the ball lands in water or goes out of bounds (off the screen), a penalty stroke is added and you must replay the ball from the previous position. Attempting to use a wood out of the rough results in a shot that goes only 20 yards.

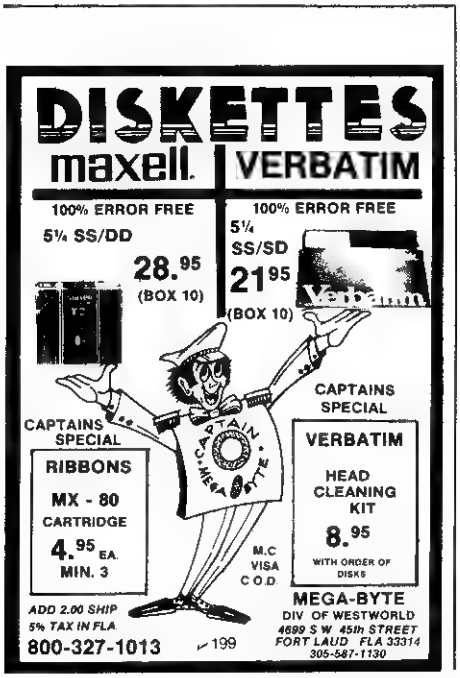
The wind's force and direction are randomly generated for each hole, making the game reasonably difficult. This also provides variation for when you play the game again.

Data Statements and Hole Layouts

The program has nine holes, but you can easily add extra holes or change the layout of existing holes. The basic format for the data statement for each hole

Lines	Description
5–15	contain the usual definition and dimension statements ending with a GOTO 80, which is the start of the program.
20	is a subroutine that moves the ball one position on the screen. OC is used to save and restore the old contents of the screen location.
25–50	contain various subroutines for drawing the hazards. In the case of trees and water hazards, arrays are constructed giving the from and to bounds of the hazard.
55–75	is a subroutine that draws the layout of one hole. The data statements are read and the appropriate hazard-drawing subroutine called.
80–105	contain the program initialization. The number of players, player's initials, stroke or match play and difficulty for each player are requested.
110–135	draw the layout of the hole, print the fixed text at the bottom of the screen, and generate and display the wind direction and force.
140–150	request and input the club and, in the case of an iron, the percentage of full swing.
155	requests the angle of the shot (GOSUB 500), increments and displays the strokes taken (GOSUB 495), checks if the ball is currently in a bunker and, if so, whether the club is suitable.
160	checks if the ball is currently in trees and randomly determines the success or otherwise of the shot.
165–180	calculate the distance hit and the angle offline, adds the angle offline to the angle specified for the shot. Calculates the X and Y axis values for the wind.
185–195	calculate the X and Y values for the shot, check whether the resulting position is off the screen (out of bounds).
200–215	move the ball across the screen by calculating the ratio of horizontal to vertical distance and calling the subroutine at line 20.
220–235	check whether the ball went out of bounds or into water, in which case the ball is reset to the previous position and the strokes taken incremented.
240	checks whether the ball is in the hole, in which case the scorecard is updated and a suitable message displayed depending on the number of strokes taken under or over par.
245–260	check whether either or both balls are in the hole, otherwise they determine which ball is farthest from the hole and set the player code accordingly.
265–280	check whether the ball is on the green and, if so, request the putting strength and calculate the distance hit.
285–315	check and display the status of the ball. If the ball is in trees, then the option of dropping out or playing the ball is given; if dropping out is selected, then the ball is moved up or down the screen until it is clear of the trees.
320–345	are executed at the end of each hole and show the status of the match so far and determine who leads off on the next hole.
350–385	are executed at the end of the game and display the scorecard showing the par, strokes taken, and, in the case of match play, the winner of each hole. The total strokes taken and overall winner are then displayed.
390–410	contain the text strings referred to in line 215.
415–445	contain a subroutine which flashes a ball at the current ball location and a question mark at the location given by QP and waits for input from the keyboard.
450–475	contain a subroutine to check if the ball position is in a hazard. The old contents (OC) value is used to check for a bunker or rough and the boundary arrays for trees or water.
480–490	contain a subroutine to calculate the distance of the ball from the hole.
495	is a subroutine to increment and display the strokes taken.
500	is a subroutine to request and input the angle for the shot.
505	is a subroutine to clear the previous club selection details from the screen and display which player is to play.
510	is a delay subroutine.
515–565	contain the data statements specifying the layout of each hole.
570–585	contain the instructions.

Table I. Description of Program



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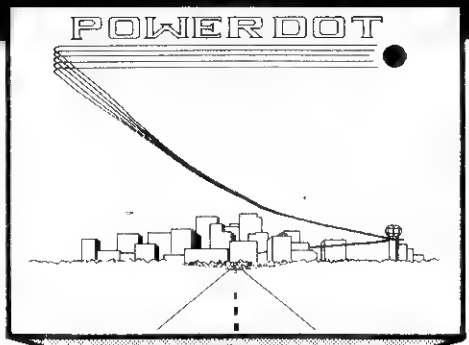
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Listing continued

```
40 PRINT@F,BK$;:PRINT@F+65,BK$;:PRINT@F+129,BK$;:PRINT@F+192,BK$;:
RETURN
45 IFF=TTHENN=K0:ELSEN=(T-F)/K4
50 FORX=K0TON:PRINT@F+X*K4,CHR$(34);CHR$(34);:NEXT:RETURN
55 REM-DRAW HOLE
60 TS=K0:WS=K0:READBX,BY,FX,FY:SET(BX,BY):SET(BX+K1,BY):X=BX-K2:Y=
BY-K2:FORN=K0TO7:SET(X+N,Y):NEXT:Y=BY+K2:FORN=K0TO7:SET(X+N,Y):NEX
T:X=BX+K4:Y=BY-K1:FORN=K0TOK2:SET(X,Y+N):SET(X+K1,Y+N):NEXT
65 SET(FX,FY):SET(FX,FY-K1):SET(FX,FY-K2):SET(FX+K1,FY-K2):BX(K0)=
BX:BY(K0)=BY:IFNP=K1THENBX(K1)=FX:BY(K1)=FYELSEBX(K1)=BX:BY(K1)=BY
70 READX:IFX=777THENREADF,T:PRINT@55,"HOLE"H;:PRINT@118,F;" YDS";:
PRINT@183,"PAR ";T;:CA(H,K2)=T:RETURNELSEIFX>767THENHT=X-767:READF
,TELSEF=X:READT
75 ONHTGOSUB25,30,40,45:GOTO70
80 RANDOM:CLS:PRINT"WELCOME TO BYTE COUNTRY CLUB":PRINT"A CHALLENG
ING COURSE IN RURAL RAMSHIRE":PRINT:PRINT"ONE OR TWO PLAYERS (TYPE
 1 OR 2)"
85 INPUTNP:IFNP=1THEN95ELSEIFNP<>2THEN85ELSEFORP=K0TOK1:PRINT"PLAY
ER";P+K1;"INITIALS";:INPUTP$(P):NEXT:PRINT"STROKE PLAY(S) OR MATCH
 PLAY(M)
90 INPUTS$:IFS$<>"S"ANDS$<>"M"THEN90
95 FORP=K0TONP-1:PRINTP$(P);" WHICH ONE OF THE FOLLOWING GIVES YOU
 MOST PROBLEMS"
100 INPUT"HOOK(0),SLICE(1),POOR DISTANCE(2),BUNKER SHOTS(3),PUTTIN
G(4)";PT(P):IFPT(P)>4THEN100ELSENEXT:P=K0:H=K0:PRINT"DO YOU NEED I
NSTRUCTIONS"
105 INPUT"Y OR N";I$:IFI$="Y"THEN570ELSEIFI$<>"N"THEN105
110 H=H+K1:IFH=10THEN350ELSECLS:WS=K0:TS=K0:GOSUB55:FORX=K0TOK1:ST
(X)=K0:HT(X)=K0:OC(X)=32:NEXT:PRINT@768,"STROKES TAKEN ";:PRINT@81
3,"0----------100 YDS";:PRINT@832,"CLUBS: 1W-4W:300-200 YDS  1-9:2
00-100 YDS  S:SAND IRON(65 YDS)";
115 PRINT@632,"WIND -";:WD=RND(180):IFWD/K2=INT(WD/K2)THENWD=-WD
120 IFWD<-157THENPRINT@P3,"WEST";:WD=-180ELSEIFWD<-112THENPRINT@P3
,"NTH/WEST";:WD=-135ELSEIFWD<-67THENPRINT@P3,"NORTH";:WD=-90ELSEIF
WD<-22THENPRINT@P3,"NTH/EAST";:WD=-45ELSEIFWD<22THENPRINT@P3,"EAST
";:WD=0
125 IFWD>157THENPRINT@P3,"WEST";:WD=180ELSEIFWD>112THENPRINT@P3,"S
TH/WEST";:WD=135ELSEIFWD>67THENPRINT@P3,"SOUTH";:WD=90ELSEIFWD>22T
HENPRINT@P3,"STH/EAST";:WD=45
130 WF=RND(4):IFWF=K1THENPRINT@P4,"LIGHT";ELSEIFWF=K2THENPRINT@P4,
"FRESH";ELSEIFWF=K3THENPRINT@P4,"STRONG";ELSEPRINT@P4,"V/STRONG";
135 GOSUB505
```

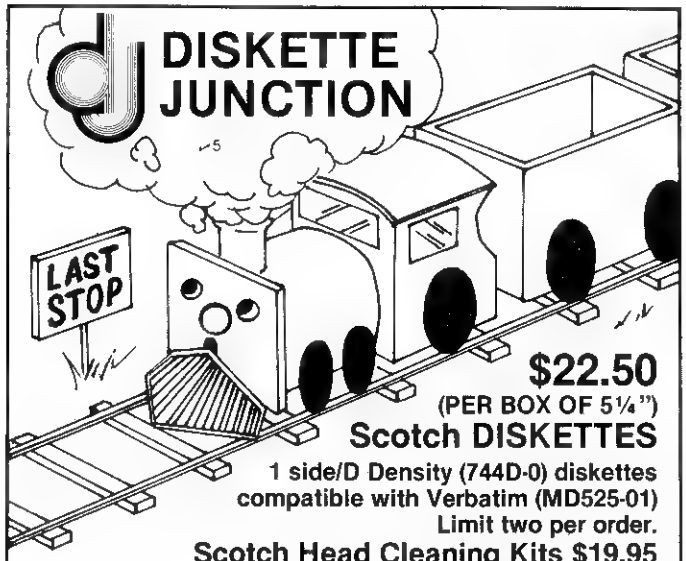
Continues on p. 116

is: tee position (X,Y), flag position (X, Y), hazard type, from, to, from, to, ..., hazard type, from, to, from, to, ..., end indicator(777), distance, par. You should be able to clarify the way the data statements work by plotting one of the holes onto a video display worksheet.

The hazard-type codes are: 768—water, 769—trees, 770—bunker, 771—rough. Observe the following restrictions when specifying the layout data. The tee position cannot have an X value greater than 122, and the Y value must correspond to the center of a graphics block. The flag position must be at least 6 cells down from the top of the screen (or 18 cells up from the bottom) and at least 12 cells in from the side.

The from and to points for water must be divisible by 3, for trees they must be divisible by 5, and for rough they must be divisible by 4. If a single tree or clump of rough is required, the from and to are made the same. In the case of a bunker, the from and to are always the same. ■

Michael Parks can be reached at 118 Byron Ave., New Malden, Surrey KT3 6EZ, England.



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

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	PRODUCER	QUICKPRO	CREATOR
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Full Screen Oriented Input of All Fields	YES	NO	NO
Edit without Retyping with Insert & delete	YES	NO	NO
Restrict field Length automatically	YES	YES	NO
Unlimited Restrict on choice for each field	YES	NO	NO
User defined Custom Prompts for each Field	YES	NO	NO
Full Speed Typing in ALL Fields	YES	NO	YES
Immediate Exit from Any Field to Menu	YES	NO	YES
Enter Fields from last Record automatically	YES	NO	NO
Fast BTREE File Structure (No Sort Needed)	YES	NO	NO
Find Record with Part of a Key	YES	NO	NO
Hi-Speed Global Search for ANY Field in a Record	YES	NO	NO
Duplicate Keys and Multiple Keys Supported	YES	limited	NO
Global Field Replacement Function	YES	NO	NO
Run Predefined Reports from Finished Program	YES	NO	NO
Select Reports from Menu in Finished Program	YES	NO	NO
Sort (machine language) ANY Field Free	YES	NO	NO
Custom Mailing Labels Option (any Size)	YES	NO	NO
Do Calculations on fields in Program	YES	YES	NO
Sell Finished Program with No Royalty	YES	NO	NO
PRODUCER CAPABILITIES & FEATURES			
Toll Free Question Line	YES	NO	NO
Create PROFESSIONAL Finished Program	YES	NO	NO
Modify Program without Starting Over	YES	NO	NO
Ease of Use including Complete TUTORIAL	YES	NO	NO
Number of Calculations allowed per field	8	1	0
Use Field Names for Calculations	YES	NO	NO
Use ALL Math Functions in Calculations	YES	NO	NO
Generates a BASIC Program	YES	YES	YES
Custom Design exact Screen YOU desire	YES	NO	NO
Full Feature Screen Generator (graphics)	YES	NO	NO
Easy Report Generation with Any Restrictions	YES	NO	NO
Complete & Thorough DOCUMENTATION	YES	limited	NO
Detailed Quick Reference Materials	YES	NO	NO
Audio Cassette Tutorial Available	YES	NO	NO
Program Planning Form Provided	YES	NO	NO
Sample Programs Available before Purchase	YES	NO	NO
FREE UTILITIES INCLUDED			
Free Menu Driven DOS Utility Package	YES	NO	NO
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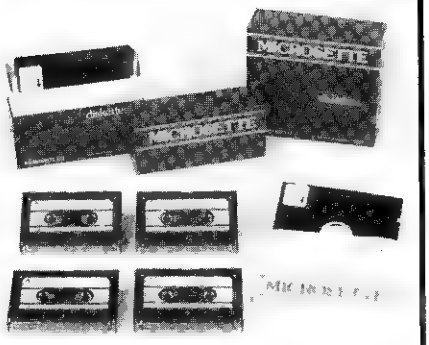
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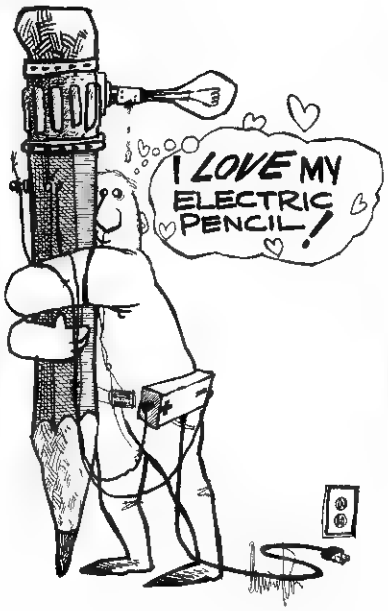
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Continued from p. 112

```
140 PRINT@909,CHR$(240);:PRINT@909,"CLUB      ";:QP=914:GOSUB415:PR
INT@P1,CHR$(255);:A$=LEFT$(I$,K1):IFA$>"0"ANDA$<="9"THEN145ELSEIFA
$<>"S"THEN140ELSECL=15:GOTO150
145 IFLEN(I$)=K1THENCL=VAL(I$)+K4:GOTO150ELSEB$=MID$(I$,K2,K1):IFB
$="W"THENIFA$<"5"THENCL=VAL(A$):W=K1:GOTO155ELSE140ELSE140
150 PRINT@920,"PERCENT FULL SWING      ";:QP=939:GOSUB415:IFI$="*"T
HEN140ELSEIFI$=""THENPRINT@940,"100";:W=K1:GOTO155ELSEW=VAL(I$):IF
W<K1ORW>100THEN150ELSEW=W/100
155 GOSUB500:IFI$="*"THEN140ELSEOB=K0:GOSUB495:IFHT(P)=K3ANDPT(P)=
K3ANDCL<>15ORHT(P)=K3ANDCL<9THENPRINT@P1,"SHOT FLUFFED - STILL IN
BUNKER";:GOTO140ELSEIFHT(P)=K4ANDCL<K5THENPRINT@P1,"SHOT FLUFFED -
 ONLY WENT 20 YARDS";:DH=20:GOSUB510:GOTO175
160 IFHT(P)=K2ANDRND(2)=K1THENPRINT@P1,"BAD LUCK - STILL IN TREES"
;:GOSUB510:GOTO295
165 IFCL<K5THENDH=INT(313-(25*CL)+(25*RND(0)))ELSEDH=INT(256-(12.5
*CL)+(12.5*RND(0)))
170 DH=INT(DH*W):IFPT(P)=K2THENDH=INT(DH*.8)
175 IFPT(P)<K2THENAO=RND(20):IFPT(P)=K0THENAO=-AOELSEELSEAO=RND(10
):IFAO/K2=INT(AO/K2)THENAO=-AO
180 AN=AN+AO:WE=INT((DH*WF)/15):TX=WE*COS(WD*DR!):TY=WE*SIN(WD*DR!
)
185 NX=INT(DH*COS(AN*DR!)+TX):X=INT(NX/K5+(NX/K5-INT(NX/K5))):IFX/
K2<>INT(X/K2)THENX=X+K1
190 NY=INT(DH*SIN(AN*DR!)+TY):Y=INT(NY/10+(NY/10-INT(NY/10))):IFBX
-X<K0THENNX=K0:XU=BX/K2:OB=K1ELSEIFBX-X>126THENNX=126:XU=(NX-BX)/K
2:OB=K1ELSENX=BX-X:XU=ABS(X)/K2
195 IFBY-Y<K0THENNY=K0:YU=BY:OB=K1ELSEIFBY-Y>35THENNY=35:YU=NY-BY:
OB=K1ELSENY=BY-Y:YU=ABS(Y)
200 REM-MOVE BALL
205 TX=BX:TY=BY:IFXU=K0THENN=YUELSEIFYU=K0THENN=XUELSEIFXU>=YUTHEN
N=INT(XU/YU)ELSEN=INT(YU/XU)
210 IFXU>=YUTHENFORF=K1TOYU:FORT=K1TON:TX=TX-2*SGN(X):GOSUB20:NEXT
:TY=TY-SGN(Y):GOSUB20:NEXTELSEFORF=K1TOXU:FORT=K1TON:TY=TY-SGN(Y):
GOSUB20:NEXT:TX=TX-2*SGN(X):GOSUB20:NEXT
215 TX=NX:TY=NY:GOSUB20:GOSUB450:IFP=K0THENIFTP(K0)=TP(K1)THENOC(K
0)=OC(K1):SB=K1ELSEELSEIFTP(K1)=TP(K0)THENOC(K1)=OC(K0):SB=K1
220 REM-CHECK FOR OUT OF BOUNDS OR IN WATER
225 IFOB=K1THENPRINT@P1,"BALL WENT OUT OF BOUNDS - ";:GOTO235ELSEI
FHT(P)<>K1THENBX=NX:BY=NY:BX(P)=NX:BY(P)=NY:GOTO240
230 PRINT@P1,"   BALL WENT INTO WATER - ";
235 PRINT@986,"PLAY FROM PREVIOUS POSITION";:BX=BX(P):BY=BY(P):TX=
BX(P):TY=BY(P):GOSUB20:GOSUB495:GOSUB510:GOTO290
240 IFBX<>FXORBY<>FYTHEN250ELSECA(H,P)=ST(P):IFST(P)=K1THENPRINT@P
1,"A HOLE IN ONE - THE DRINKS ARE ON YOU !!!";ELSEPRINT@960,"DOWN
IN ";ST(P);:X=ST(P)-CA(H,K2):ONX+K4GOSUB390,395,400,405,410:GOSUB5
10
245 REM-CHECK BALL POSITIONS
250 IFBX(K0)=FXANDBY(K0)=FYTHENF=K0ELSEBX=BX(K0):BY=BY(K0):N=K0:GO
SUB480
255 IFBX(K1)=FXANDBY(K1)=FYTHENIFF=K0THEN325ELSET=K0ELSEBX=BX(K1):
BY=BY(K1):N=K1:GOSUB480
260 IFF>TTHENP=K0ELSEP=K1:F=T
265 BX=BX(P):BY=BY(P):IFF>6THEN290ELSEPRINT@832,CHR$(255);:GOSUB50
5
270 PRINT@909,"PUTTING STRENGTH 1-8      ";:QP=931:GOSUB415:CL=VAL
(I$):IFCL<K1ORCL>10THEN270ELSEGOSUB500:IFI$=""THEN270ELSEGOSUB495
275 IFPT(P)=K4THENDH=CL*8+(CL*RND(4))ELSEDH=CL*10
280 TX=K0:TY=K0:GOTO185
285 REM-CHECK & DISPLAY BALL STATUS
290 GOSUB505:IFST(P)=K0THEN140ELSETX=BX:TY=BY:GOSUB450:IFHT(P)<>K2
THEN310
295 PRINT@P1,"   BALL LANDED IN TREES - PLAY(P) OR DROP(D)     ";:
QP=1005:GOSUB415:IFI$="P"THEN140ELSEIFI$<>"D"THEN295ELSEGOSUB495:I
FBY<18THENF=K1ELSEF=-K1
300 REM-MOVE BALL CLEAR OF TREES
305 BY=BY+F:TY=BY:GOSUB20:GOSUB450:IFHT(P)=K2THEN305ELSE140
310 IFOB=K1ORHT(P)=K1THEN140ELSEPRINT@P1,"BALL IS ";:IFHT(P)=K0THE
NPRINT@968,"ON FAIRWAY";ELSEIFHT(P)=K3THENPRINT@968,"IN BUNKER";EL
SEPRINT@968,"IN ROUGH";
315 GOTO140
320 REM-CHECK & DISPLAY STATUS OF MATCH
325 IFNP=K1THEN110ELSEIFCA(H,K0)=CA(H,K1)THENP=PF:CA(H,K3)=K2ELSEI
FCA(H,K0)<CA(H,K1)THENP=K0:PF=K0:CA(H,K3)=K0ELSEP=K1:PF=K1:CA(H,K3
)=K1
330 X=K0:Y=K0:IFS$="M"THENFORF=K1TOH:IFCA(F,K3)=K0THENX=X+K1:NEXTE
LSEIFCA(F,K3)=K1THENY=Y+K1:NEXTELSENEXTELSEFORF=K1TOH:X=X+CA(F,K0)
:Y=Y+CA(F,K1):NEXT
335 IFX=YTHENPRINT@P1,"THE MATCH IS EVEN";:GOTO345ELSEIFX>YTHENPRI
NT@P1,P$(K0);X$;X-Y;ELSEPRINT@P1,P$(K1);X$;Y-X;
340 IFS$="M"THENPRINT@976,Y$;ELSEPRINT@976,Z$;
345 GOSUB510:GOTO110
350 CLS:X=K0:Y=K0:F=K0:NX=K0:NY=K0:PRINTTAB(24)"SCORE CARD":PRINTT
AB(19)"HOLE  PAR  ";:IFNP=K1THENPRINT"SCORE"ELSEPRINTP$(K0);"   ";
P$(K1);:IFS$="M"THENPRINTW$ELSEPRINT
355 FORH=K1TO9:PRINTTAB(20)H;:PRINTTAB(25)CA(H,K2);:F=F+CA(H,K2):P
RINTTAB(30)USING"##";CA(H,K0);:X=X+CA(H,K0):IFNP=K1THENPRINT:GOTO3
65ELSEPRINTTAB(35)USING"##";CA(H,K1);:Y=Y+CA(H,K1)
360 IFS$="S"THENPRINT:GOTO365ELSEIFCA(H,K3)=K2THENPRINTTAB(39)"HAL
VED"ELSEPRINTTAB(41)P$(CA(H,K3)):IFCA(H,K3)=K0THENNX=NX+K1ELSENY=N
Y+K1
365 NEXT
370 PRINTTAB(24)F;:PRINTTAB(29)X;:IFNP=K1THENPRINT:GOTO385ELSEPRIN
```

Continues on p 119

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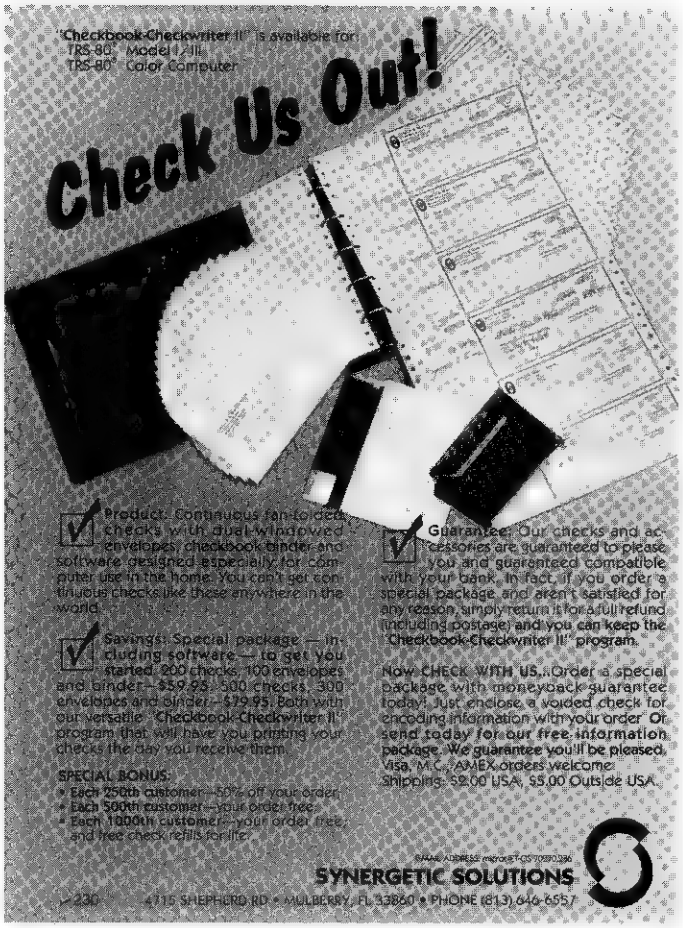
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Continued from p 116

```
TTAB(34)Y:PRINT:IFS$="M"THENIFNX=NYTHEN380ELSEIFNX>NYTHENPRINTTAB(
20)P$(K0);W$;NX-NY;Y$:GOTO385ELSEPRINTTAB(20)P$(K1);W$;NY-NX;Y$:GO
TO385
375 IFX=YTHEN380ELSEIFX<YTHENPRINTTAB(20)P$(K0);W$;Y-X;Z$:GOTO385E
LSEPRINTTAB(20)P$(K1);W$;X-Y;Z$:GOTO385
380 PRINTTAB(20)"THE MATCH WAS HALVED"
385 PRINT:INPUT"HIT NEWLINE FOR A NEW GAME";A$:RESTORE:GOTO80
390 PRINT@P2,"AN ALBATROSS";:RETURN
395 PRINT@P2,"AN EAGLE";:RETURN
400 PRINT@P2,"A BIRDIE";:RETURN
405 PRINT@P2,"A PAR";:RETURN
410 PRINT@P2,"A BOGEY";:RETURN
415 REM-SUBR TO FLASH BALL @ LOCN "BX,BY",A ? @ LOCN QP AND WAIT F
OR I/P
420 BP=INT(BY/K3)*64+BX/K2+SO:I$=INKEY$:I$=""
425 F=K1:T=32:GOSUB440:IFX<>10THEN430ELSEF=K0:T=63:GOSUB440:IFX=10
THEN425
430 POKEQP+SO,32:IFASC(A$)=13THENRETURNELSEIFASC(A$)=8THENIFLEN(I$
)>K0THENI$=LEFT$(I$,LEN(I$)-1):PRINT@QP+K1,"    ";ELSEELSEI$=I$+A$
435 PRINT@QP+K1,I$;:GOTO425
440 POKEQP+SO,T:X=K0:IFF=K1THENSET(BX,BY):SET(BX+K1,BY)ELSERESET(B
X,BY):RESET(BX+K1,BY)
445 A$=INKEY$:IFA$<>""THENRETURNELSEX=X+K1:IFX=10THENRETURNELSE445
450 REM-SEE IF BALL POSITION IS IN A HAZARD
455 HT(P)=K0:IFOC(P)=46THENHT(P)=K3:RETURNELSEIFOC(P)=34THENHT(P)=
K4:RETURNELSETP=INT(TY/K3)*64+TX/K2
460 IFTS=K0THEN470ELSEFORX=K0TOTS-K1:IFTP>=TA(X,K0)ANDTP<=TA(X,K1)
THENHT(P)=K2:NEXTELSENEXT
465 IFHT(P)=K2THENRETURN
470 IFWS=K0THENRETURNELSEFORX=K0TOWS-K1:IFTP>=WA(X,K0)ANDTP<=WA(X,
K1)THENHT(P)=K1:NEXTELSENEXT
475 RETURN
480 IFBX<FXTHENX=(FX-BX)/K2ELSEX=(BX-FX)/K2
485 IFBY<FYTHENY=FY-BYELSEY=BY-FY
490 T=INT(SQR(X[2+Y[2)):IFN=K1THENRETURNELSEF=T:RETURN
495 ST(P)=ST(P)+K1:PRINT@783,P$(K0);ST(K0);:IFNP=K1THENRETURNELSEP
RINTP$(K1);ST(K1);:RETURN
500 PRINT@947,"ANGLE       ";:QP=953:GOSUB415:IFI$="*"THENRETURNEL
SEIFI$=""ORI$="0"THENAN=K0:PRINT@954,"0";:RETURNELSEA$=LEFT$(I$,K1
):B$=MID$(I$,K2):AN=VAL(B$):IFAN>180THEN500ELSEIFA$="-"THENAN=-AN:
RETURNELSEIFA$<>"+"THEN500ELSERETURN
505 PRINT@896,CHR$(255);:IFNP=K2THENPRINT@896,P$(P);" TO PLAY";:RE
TURNELSERETURN
510 FORX=K0TO1000:NEXT:PRINT@P1,CHR$(255);:RETURN
515 DATA122,16,18,11,769,84,114,219,239,768,541,550,602,617,663,68
4,727,748,771,0,16,66,78,128,132,194,194,256,256,322,322,384,396,4
50,510,512,536,552,572,578,598,622,626,640,660,688,692,706,722,750
,754,777,520,5
520 DATA 122,13,36,23,769,132,177,258,278,452,457,492,507,578,588,
612,628,708,753,770,345,345,777,430,4
525 DATA 122,16,32,23,768,31,37,98,104,162,168,223,229,284,290,351
,357,418,424,479,485,546,552,613,619,680,686,741,747,771,3,27,42,5
0,65,93,108,116,131,155,170,178,193,217,232,252,259,275,321,329,38
7,391,448,454,503,509,515,519,562
530 DATA 574,577,585,601,609,624,628,643,675,690,694,705,737,752,7
56,777,425,4
535 DATA 122,19,22,26,771,32,48,94,114,148,176,210,214,242,254,268
,272,308,316,332,334,384,388,450,450,512,512,564,572,578,578,626,6
30,640,644,684,692,706,758,769,66,91,196,206,322,327,770,160,160,4
80,480,777,505,5
540 DATA 122,22,42,14,769,85,115,220,240,356,381,607,627,727,757,7
71,3,15,65,81,131,143,193,205,259,267,321,333,387,399,449,469,515,
539,577,602,643,659,705,721,770,283,283,777,406,4
545 DATA 122,19,20,11,768,3,15,64,69,79,88,112,118,149,158,170,179
,219,225,231,237,286,298,353,359,771,19,51,93,109,130,130,163,167,
192,192,240,252,258,258,302,314,320,324,386,398,448,468,514,574,57
6,628,642,690,704,756,770,144,144,777,516,5
550 DATA 122,22,12,8,769,144,179,280,315,415,440,771,0,0,9,9,256,2
56,322,326,384,392,450,458,512,528,578,630,640,692,706,758,770,206
,206,777,575,5
555 DATA 120,19,68,23,771,2,50,64,116,130,178,192,252,258,314,320,
376,386,406,430,438,448,464,492,504,514,530,554,574,576,596,616,62
8,642,694,704,756,770,359,359,768,29,35,88,96,149,155,216,223,283,
289,347,353,408,414,469,475,533,539,600,606,658,667,719,725
560 DATA 777,261,3
565 DATA 122,13,12,29,771,0,24,32,32,40,52,66,86,94,94,106,114,128
,152,160,160,168,180,194,214,222,222,256,264,322,322,384,384,412,4
12,420,444,462,510,528,572,594,630,656,692,704,704,714,758,770,26,
26,34,34,344,344,352,352,459,459,777,580,5
570 CLS:PRINT"THE FOLLOWING QUESTIONS ARE ASKED FOR EACH SHOT-":PR
INT:PRINT"CLUB - THIS IS SELECTED ACCORDING TO THE DISTANCE REQUIR
ED,":PRINT"  THE DISTANCES FOR VARIOUS CLUBS IS CONTINOUSLY DISPLA
YED"
575 PRINT"PERCENT FULL SWING - ONLY APPLIES TO IRONS,MAY BE USED":
PRINT"  WHEN THE FULL DISTANCE FOR THE CLUB IS TOO FAR.":PRINT"  (
NEWLINE GIVES 100 PERCENT).":PRINT"ANGLE - THIS SPECIFIES THE ANGL
E IN DEGREES ABOVE(+)
580 PRINT"  OR BELOW(-) THE HORIZONTAL. THE RANGE IS +/- 0 TO 180,
":PRINT"  ANGLES > 90 WILL MOVE THE BALL FROM LEFT TO RIGHT.":PRIN
T"  (NEWLINE GIVES 0 DEGREES)."
585 PRINT"PUTTING STRENGTH IS SELECTED BETWEEN 1 AND 8,":PRINT"1 U
NIT WILL MOVE THE BALL 1 BALL WIDTH.":PRINT"WIND DIRECTION IS GIVE
N AS COMING FROM WEST,STH/WEST ETC.":INPUT"HIT NEWLINE WHEN READY
TO PLAY";I$:GOTO110
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Interpro Flexible Mailing List

by Jim Heid

Has your correspondence gotten out of hand? This mailing list system will help organize names and addresses on your Model I or III.

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Scenario 1: You've just received your mail. A large envelope screams, "DATED MATERIAL! OPEN IMMEDIATELY!" Inside, an official-looking document proclaims that you, Mr. Joe Smith, may have won a million dollars. Or perhaps it says that you, Ms. Mary Kelly of 123 West St., have been such a wonderful customer of Sellalot Industries that you're being introduced to a special offer for wonderful customers only.

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A mailing list is a collection of names and addresses organized according to predetermined standards. The list can be as small as a home-address book, or it may be as large as the records of the United States Census Bureau.

Mailing List Programs

Most microcomputer mailing list systems let you enter names and addresses, recall them, change or delete them, sort them alphabetically or by zip code, and print mailing labels. Most mailing lists are updated at regular intervals or when needed.

Most systems also allow you to enter one or more comment lines for each address. A salesperson might use a comment line to denote a customer's past buying habits; a club secretary might use one to record a member's dues payments. Some systems can also insert names, addresses, and comments into a form letter, giving each letter a personal look. This feature is called mailmerge.

The differences between mailing list programs are the ways in which your information is entered, saved, recalled, sorted, and printed. A good mailing list system sorts your lists quickly and comes with good instructions. A good mailing list system is also error free and foolproof; it can be used by inexperienced computer users without fear of crashing the system.

The Interpro Flexible Mailing List

This system is designed for a Model I or III with 48K and two disk drives. Its Disk Basic programs, a machine-language sort program, and several sample and demonstration files are contained on a 5¼-inch disk, packaged with a 66-page manual in a three-ring binder.

The Model I version comes with a disk operating system, a version of Vernon Hester's MULTIDOS. The Model III version is supplied on a data disk and must be copied to a TRSDOS system disk. The Model I version may also be used on the Model III after using the TRSDOS Convert utility.

The documentation states that the system is compatible with any DOS and Basic that support variable-record length files. The MULTIDOS, DOSPLUS, VTOS, Model I LDOS, Model III TRSDOS 1.3, and Model III DOSPLUS systems are all said to be compatible. (Model III LDOS is not listed, although it does support variable-record length files. This may be an oversight in the documentation.)

The documentation is well written. It assumes no technical knowledge and no familiarity with mailing-list programs. Every step is described in detail with clear examples and sample screens. The back of the manual contains helpful worksheets (Fig. 1) that you may use when designing your mailing list. In addition to providing space to write field names and lengths, the sheets contain reminders about the system.

Although the documentation is adequate for using the system, customizers will be disappointed. A small "For Advanced Users" section contains instructions for using the Flexible Mailing List with other DOSes, but no technical information on the programs in the system is provided. The programs may be listed and they include some remarks, but not enough to make the system easy

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Using the Programs

System start-up is easy. You simply insert the system disk in drive 0 and press the reset switch. A message appears on the screen telling you that a demonstration program can be seen by typing DEMO. The message also says that you can prevent its display in the future by typing Auto. The system disk, however, is write-protected, and typing Auto simply returns an error message. Inexperienced computer users may not know that a disk's write-protect tab must be removed before an Auto command can be disabled.

The demonstration program illustrates the system's flexibility by displaying several sample records and fields. (See the glossary of mailing list terms if you do not know what a record or a field is.)

The main program, Mailmenu, is run by typing Start. A Do file then takes over, loading first the machine-language sort program, then Basic. You are then presented with a message reminding you that a write-protect tab must be on the disk in drive 0 at all times. After you read the message and press the enter key, a menu allows you to build a custom mail list, work with an existing mail list, exit to Basic, exit to the DOS, or view a directory of any drive.

The "Build a custom mail list" op-

Continues on p. 125

The INTERPRO Flexible Mailing List worksheet

```
NAME OF FILE     :..................... (MAXIMUM OF 8 LETTERS)
NUMBER OF FIELDS :..................... (MIN = 7, MAX = 26)
FIELD # ' (Standard)      DESCRIPTION                    'LENGTH'
   1    ! (ZIP CODE).....................................!......!
   2    ' (Last Name)....................................!......!
   3    ! (First Name)...................................!......!
   4    ' (Company Name).................................!......!
   5    ! (Street).......................................!......!
   6    ' (City).........................................!......!
   7    ' (State)........................................!......!
   8    ' ...............................................!......!
   9    ! ...............................................!......!
  10    ! ...............................................!......!
  11    ' ...............................................!......!
  12    ' ...............................................!......!
  13    ! ...............................................!......!
  14    ' ...............................................!......!
  15    ! ...............................................!......!
  16    ! ...............................................!......!
  17    ! ...............................................!......!
  18    ' ...............................................!......!
  19    ! ...............................................!......!
  20    ' ...............................................!......!
  21    ! ...............................................!......!
  22    ' ...............................................!......!
  23    ! ...............................................!......!
  24    ! ...............................................!......!
  25    ! ...............................................!......!
  26    ' ...............................................!......!
          TOTAL NUMBER OF CHARACTERS USED (256 MAX)     !......!
NOTE:
1.  Descriptions are limited to 19 characters in length.
2.  You cannot have less than 7 fields in a record.
3.  You cannot have more than 26 fields in a record.
4.  The total number of characters (total of the lengths
    of the fields) cannot exceed 256 characters.
5.  The first seven fields will print on a mailing label
    in this format:
    COMPANY NAME (field 4)
    FIRST NAME (field 3) LAST NAME (field 2)
    STREET ADDRESS (field 5)
    CITY (field 6)   STATE (field 7)  ZIP (field 1)
6.  Make sure that your fields are not too long to fit
    on a label.  Most mailing labels have a width of only 33
    characters.
```

Fig. 1. Mailing List Worksheet

Glossary of Mailing List Terms

Default—A value or response assumed by a program if none is specified by the operator.

Field—A string of characters always referred to as a group. A field is usually one line of data. Examples of fields include name, address, telephone.

Record—A group of related fields treated as a unit (for example, all the name and address information for one person).

Sort—To organize a file in alphabetical or numerical order.

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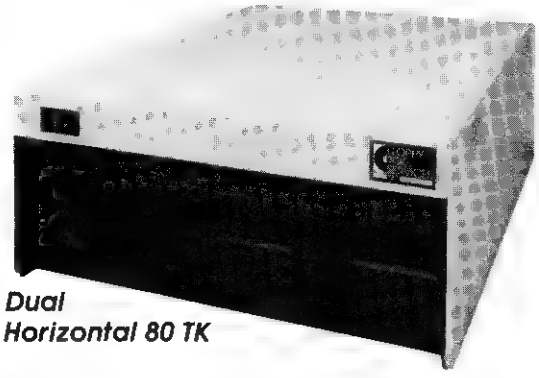
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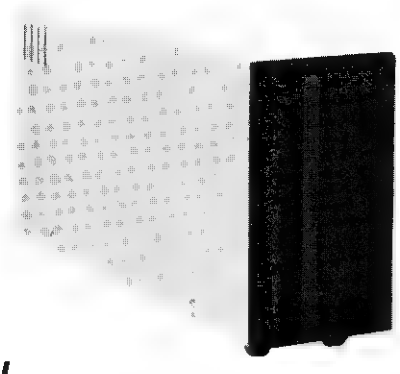
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Continued from p. 122

tion is your first choice when starting. You may specify the number and length of the fields you will need, and the layout of the mailing labels. After you specify this information, the program creates a series of data files that are used when you enter your name and address data.

The file-building sequence first asks what you intend to call your file. You may use any name up to eight characters long. The program checks that your file name is not over eight characters long, and that it does not begin with a number or special character. It does not warn you, however, if your file name contains any illegal characters in any other position (for example, a file called MAIL#2).

The next prompt asks on which disk drive you wish to place your list. The program will not accept a number higher than 3, but it does not check to see if the number you type is actually a valid drive number in your system. For example, it is possible to answer this prompt with a 2 when your system has only two drives (remember that drive numbering begins with zero).

An illegal drive number causes the program to crash when it attempts to store your file—after you have spent time entering data. The program also accepts a reply of zero, which, since drive 0 is write-protected, will also cause the program to crash. The program should either check for legal drive numbers immediately, or it should contain an error trap that allows you to reenter previously incorrect file name data.

After you input the drive number, the program asks how many fields you need—a minimum of seven and a maximum of 26. The program will not accept numbers outside this range. Next, three screens of information are displayed. The first screen is a reminder of how the system stores and sorts your data. Here you learn that the first three fields are used to keep the list in both zip code and alphabetic order.

Field 1 is considered the zip code field, and although you may call it whatever you wish, it will always be used to keep the list in numeric order. Fields 2 and 3 are used for the alphabetic sort. If you wish, you may specify that only field 2 be used for alphabetic sorting.

The second screen of information displays the default settings for printing mailing labels. In the third screen, you are also told that you may change the default settings if you wish.

After displaying the third instruction screen, the screen clears and the prompt "What is the description for Field 1?" appears. You are to type the description, which may be up to 19 characters long. After entering its description, you are told to enter its length. This continues until you have supplied field descriptions and lengths for all fields.

The first and most serious flaw in this section was an intermittent bug that appeared when entering field descriptions and lengths. If, in response to the prompts, I accidentally pressed the period, up-arrow, or down-arrow keys, the system would exit the program and enter Basic's command mode, with an arbitrary program line displayed. If I pressed the comma key, I found myself in the Basic's edit mode, editing an arbitrary line. The problem vanished when I ran the programs under a DOS other than Interpro's.

The second flaw is not a bug, but an example of error-prone programming. After entering the description and length of field 3, the program asks "Is the third field going to be used to maintain the mailing list in alphabetic order (Y/N)?" If you type anything other than Y or N, the program assumes you mean N (No). This could be disastrous if you think you answered Y, but instead pressed T or U (keys directly adjacent to Y). Any program with Y/N prompts should allow only Y or N as answers.

After you type the field descriptions and their lengths, the screen displays a summary of your file's design. This summary tells you how long each of your records will be, which fields will be used for sorting, and what each field's name and length is. You can also change any incorrect data.

The next portion of the file-building sequence determines how your mailing labels will be printed. You are asked for the width, in characters, of your labels. You may choose from one of two default label layouts, or you may design your own. If your field lengths are too long for the default settings or for the width of your labels, you must tell the system which fields you want printed on each line of the label. You may assign up to five fields to each line, as long as their total length is not greater than your label's maximum width.

When you design a custom label layout, the program begins at the top of the label and asks, "What do you want in position 1, on line 1?" You are to enter the number of the field. It then asks "What do you want in position 2, on line 1?" You are to type the number of the field that you want to be printed to

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Review in 80 Microcomputing

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the right of the field number you just entered. This continues until you type Stop instead of a field number. The program then repeats the dialogue for the next label line. You may also type a message, which will be printed on line 5 of each label. The documentation contains enough complete examples and sample screens to make the process understandable.

Two more examples of error-prone programming appear here. First, the program increments the position number as long as you do not type Stop in response to the "What do you want in position X, on line Y" question. This continues until the position equals 11, at which point the program crashes with a "Subscript out of range" error. Second, the program allows you to answer the prompt with 0 even though no field 0 exists. This causes the label printing portion of the program to malfunction when you attempt to print labels.

After you have entered the label layout information, the program determines whether your layout will fit on your labels. If it will not, you must redefine the layout for all lines. It would have been easier if you just had to redefine the layout for the particular lines that were too long.

When you have corrected any typing errors, the program displays the new label formats and once more asks if they are correct. Once again, a Yes/No question is asked, but answers other than a Y or an N are permitted. If you enter anything other than a Y, the program assumes you meant N (No). If your new label formats are not correct, you must reenter all the label layout information. If they are correct, the program asks if you wish to define another mailing list.

```
REC  # 27          1  ADD Names to the JIM File
 1   ZIP                          )
 2   FIRST NAME                 .  )
 3   LAST NAME                     )
 4   ADDRESS                .      )
 5   CITY                          )
 6   STATE                )
 7   COMMENT                       )
 8   COMMENT                .      )
```

Fig. 2. Data Entry Form

If you do not, the system saves the information that you entered and returns to the main menu.

In summary, the file-building option serves its intended purpose, but only if you are careful when using it. The option is not foolproof; it is easy to answer a prompt incorrectly and not be aware of it until later, when the system crashes.

The worksheets in the back of the manual are an excellent idea and should be used when designing a mailing list.

Working with a Mail List

Most functions and features of the Interpro Flexible Mailing List are accessed through the "Work with an existing mailing list" option. You use this option to update, search through, and display or print your mailing list.

Upon selecting this option, you receive the prompt, "What is the Mailing List file name?" You are to enter the file name that you chose when designing your mail list. If the file you specify is not on the disk, the program gives you the option of viewing the directory of any drive.

If your file is on the disk, the program displays a short summary of its design. After you read it, you press the enter key and a main menu appears.

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There is a small discrepancy in the documentation for this section, which, instead of telling you to press enter to continue, tells you to press any key to continue.

The main menu lists the program's options. You can add names to the file, change the information in a record, list the information in a record, delete a record, print the mailing list, re-sort the list, exit to Basic, or exit to the disk operating system. Another option is called "Convert/re-arrange a mailing list file." It is reserved for a future version of the system, and is discussed below.

Except for the first option and the last two, all options assume that you have at least three names in the list. If your list has less, the program can crash if you choose the wrong option. Although the documentation warns you against doing this, it would have been easy to include a test that would display an error message if you chose an option that could not be used.

The first option in the program is used when adding new names to a list. Upon selecting it, the program opens some data files, and, after about eight seconds (as tested on an unmodified Model I), the screen displays a data-entry form for one record (Fig. 2). The name of each field is followed by a row of periods, each of which represents a possible character. The parenthesis at the end of each line denotes the end of that field; you cannot type past it. The number of periods printed is determined by the length of that field, which you specified when designing your mail list. This convenient method of keyboard input is used in many mailing list programs.

The system's author chose to use the Basic INKEY$ function in this part of the program, which forces you to type no faster than approximately 40 words per minute when entering name and address data. If you type faster than this, some of your keystrokes will be lost.

If you are typing a lot of entries, Basic may also enter its string garbage collection routine, which further slows the entry process. These restrictions force you to refer to the screen often to ensure that none of your keystrokes were lost, making touch-typing difficult. I would not want to type 500 names and addresses at 40 words per minute.

After you complete the form for one record, the program displays it again and asks if the information is correct. If it is not, the program asks which field is to be corrected. According to the manual, you are to enter the number of the field that you wish to retype, and a new prompt for that field will be displayed directly below the old, incorrect version. The program, however, does not operate that way—the new prompt is displayed two lines below the old version. For example: Assume you want to correct field number two. You would enter 2 when asked for the number of the incorrect entry. A new prompt, with periods and parentheses, should appear directly below the old field 2. However, the new prompt actually appears directly below the old field 3.

This bug becomes especially prominent when your mail list contains 13 fields or more. This time, the new prompt appears at the bottom of the screen, but the cursor appears one line below the row of periods, completely disrupting the screen format and making it nearly impossible to retype your entry. Interpro is aware of this bug, and I am told that future versions will not contain it.

After your record is correct, the program stores it on disk and asks if you want to add more names. If you respond with Y (Yes), the program clears the screen and again displays the data-entry form. Now, however, only the second, third, fourth, and fifth fields contain blank lines of periods. The other fields retain whatever you typed in the previous record. This time-saving feature eliminates the need to retype such repetitive data as zip codes and states. You can, of course, type over the previous information if you wish.

The record-adding process continues until you answer N (No) when the computer asks if you want to add any more new names, at which point the program loads and executes Resorter, a sorting program.

The sorting program first sorts your file alphabetically, using the contents of field 2. Field 3 is used as a secondary sort key if you designated it as such when configuring your list. After the alphabetic sort, your file is sorted numerically using the contents of field 1, the zip-code field.

The program sorts a 25-record file (8 fields per record) in about 90 seconds, almost all of which is consumed loading and saving the files. The actual sort takes place in a second or two. When your file has been sorted, the Mailmenu program loads and displays its menu.

Updating Your List

Option 2 is used to change the contents of a record. When you select it, the computer asks you to enter the field 2 contents of the item that you want displayed. For example, if you called field

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2 "Last Name" when designing your mail list, you would enter the last name of the person whose record you wished to view. Similarly, if you called field 2 "Company Name," you would enter the name of the company whose information you wished to see. If, when you designed your mail list, you told the program that you also wanted field 3 to be used in alphabetizing, the program would also ask you to enter the field 3 contents. You can also type Start, which displays the first record in your file, or End, which displays the last record.

After you enter this information, the program searches your file for the record that contains a match. When it finds it, it displays it in the same manner as the "Add names" option. If the record is not found, you are returned to the main menu.

You also have the option to scroll forward and backward in the file, using the up- or down-arrow keys. If you want to change the contents of the record, the program asks which field you wish to change. The record-updating process is very similar to correcting an incorrect entry, as described above. Therefore, this option shares the same faults as the name-adding option—the slow typing requirement and the disrupted screen formatting if your file contains more than 12 fields.

Option 3, list a record, operates identically to option 2, except that you cannot change the contents of a record. When you are done viewing the chosen record and any others that you may scroll through, the program returns to the main menu.

Print a Record

Option 4 prints the contents of a chosen record. As in option 2, you first enter the field 2 (and optionally, field 3) information that the program uses when searching records. If the record is found, the computer asks the width of the printer you are using (80 or 132 columns, or other). It then asks if your printer is ready. If you answer Y (Yes) when your printer is not ready, the computer freezes.

Assuming your printer is ready, the program prints the chosen record as shown in Fig. 3. I cannot imagine why anyone would want to print a record in this format. The program could at least also print each field name next to its contents so that you would know to which field each entry was assigned.

Option 5 is used to delete a particular record from a file. You are instructed to type the name to be deleted. You can also type Start to display the first record, or End to display the last. After the desired record is displayed, you are asked again if you wish to delete it. Upon responding Y (Yes), the program deletes the record and returns to its menu.

Printing Your Labels

Option 6 is "Print the mailing list." Your list can be displayed on the video screen only, or it can be printed in either label form or in the haphazard format shown in Fig. 3. The list can be printed

```
03458 DUNCAN          CUR        52 GROVE ST.        PETERBOROUGH        NH
      DUES DUE 5/83          NEXT WORK DAY 4/15
```

Fig. 3. A Printout in Directory Format



in one of three ways: alphabetical order, zip code order (lowest zip first), or disk file order (the order in which each record is stored on the disk). You can also specify a range to be printed (for example, only the names that start with A through G and/or only the zip codes within the range 10000–30000).

You can also instruct the program to print only those records that contain certain items; this is called "specifying search criteria." For example, you can tell the program to print only the records that begin with the word "COMPUTER" in field 9.

In the Interpro Flexible Mailing List, you can specify as many search items as there are fields. The program asks how many criteria there are, then asks for the field number and the code to be matched for each of them. After you specify the search criteria, the program displays a summary of what you have entered, and lets you change any incorrect criteria. None of your search specifications are saved; if you want to use the same criteria in later program runs, you must retype them.

After you specify any search criteria, the program asks if you want your list displayed on the video screen or sent to the printer. If you choose to have the list displayed on the screen only, the file is displayed one record at a time, with each entry next to its field name. Pressing the enter key advances to the next record; pressing the Q key returns you to the main menu.

If you choose to have your file printed, the program asks if you want it printed in mailing label format. If you answer N (No), the program asks if you want it printed in what is called directory format, which is the difficult-to-read style shown in Fig. 3. If you choose this format, the program asks what column-width printer you are using, and if you want to send any control codes to your printer. This lets you select the special fonts or character widths that printers like the Epson MX-80 and Centronics 739 offer. If your printer is not on-line when you enter the control codes, the computer will freeze.

If you choose to print your list in mail label format, the program asks how many labels you want printed for each selected record. It then asks how many columns of labels your paper has, and how many characters can fit across one label. You are then asked if you want to use either of the two standard label settings. If you do not, you can design your own custom label layout, as described above. You can also enter a message, which can be combined with the contents of a field, to be printed on the last line of each label. This portion of the program also lets you send control codes to your printer.

Option 8 of the main menu is called "Re-sort the mailing list." The documentation claims that this option can sometimes repair a file that was damaged when something caused the program or the computer to crash. This may be true in some cases, but if the file cannot be repaired, the Resorter program can itself crash. If it does, it does not close your data files, leaving the disk's directory wide open for destruction.

The final option in the program is called "Re-arrange/convert a mail list." When you select this option, the program displays the message, "Please check your mailing list documentation for instructions," then returns you to the main menu. Upon consulting the documentation, you learn that Interpro will, for a penny per name (minimum charge of $10), convert data files created under a different mailing list program to a format readable by the Interpro Flexible Mailing List.

Interpro is currently writing an enhancement that will be free to registered owners of the Flexible Mailing List. This enhancement will allow the system to read mailing lists created under a different mailing list system. It will also allow you to change the design of your mailing list without retyping all your information. You will be able to add fields or change the length of an existing field.

Conclusion

The Interpro Flexible Mailing List is a very powerful and flexible system. No other TRS-80 mailing list system provides the freedom of configuration that this system does. The documentation is clearly written and easy to understand, the sort process is lightning fast, and the label printing routine is suitable for almost any application. Interpro is also planning several enhancements that will increase the system's flexibility.

The programs in the system, however, are not foolproof. You must be careful when responding to prompts—it is possible to type an illegal response and not be aware of it until later, when the system crashes. It is also possible to send something to a printer that is not on-line, which causes the computer to freeze. And the data-entry section must be able to respond to keystrokes faster. This system has great capabilities, but unless you are careful, you may have problems when using it. ■

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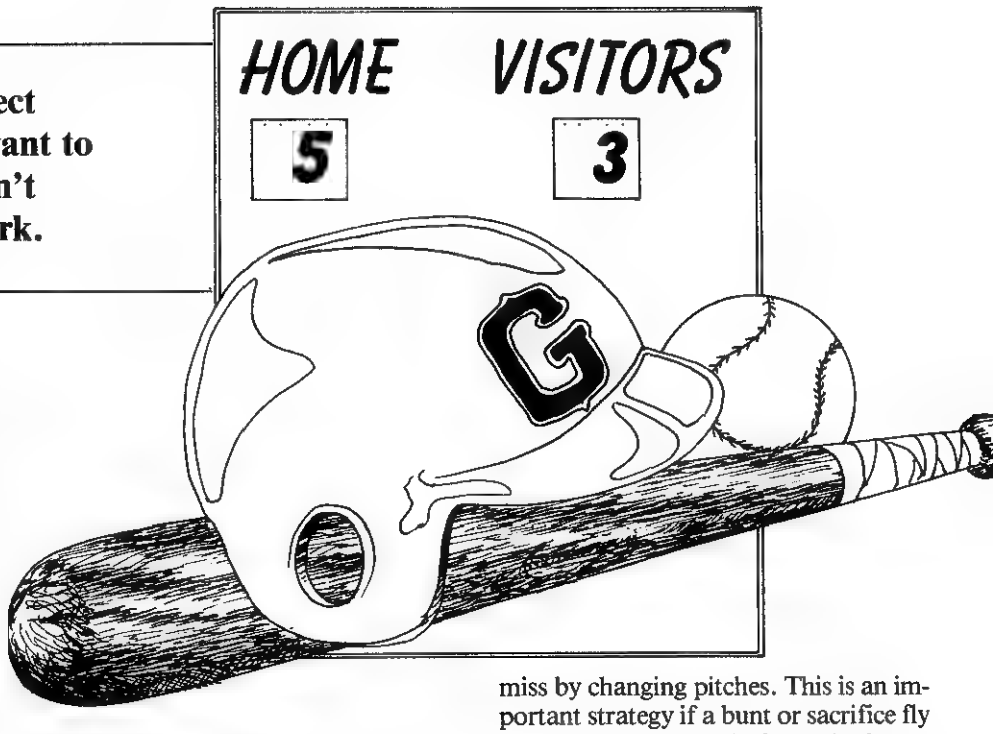
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If April showers are keeping you out of the sandlots, turn on your cassette-based Model I/III and challenge an opponent to a game of baseball. This game focuses upon the classic baseball confrontation—pitcher versus batter.

After playing a musical introduction, the program lets you name the teams. Then the field is displayed. The upper section of the screen contains a scoreboard that lists the score, the inning, balls, strikes, outs, and which team is batting. The lower left section identifies the batter and gives his statistics. The lower right section contains selection prompts for pitching and batting. A small diamond appears in the center of the screen.

The program also emits sounds while the game is in progress. After a while, you will know what is happening just by listening to the sounds.

Playing the Game

To begin the game, the player whose team is in the field selects which type of pitch he wants to throw. His opponent then selects one of five batting options (hit, power hit, sacrifice fly, bunt, or steal). The batter can also take a pitch by not swinging.

The ball is then pitched. To swing, the batter presses the space bar when the ball is over home plate. If he makes contact with the ball, the computer states whether he is out or safe. The computer also calls balls and strikes. The game continues for nine innings and goes into extra innings to break a tie. To exit the game before it's over, press shift and the up arrow as a pitch selection.

Pitching Strategy

The pitcher can select one of five pitches. Fastballs are always in the strike zone and are helpful in preventing steals and bunts. Since a batter has a good chance of hitting a fastball, use this pitch sparingly.

The change-up is never in the strike zone, so the batter's chances of hitting it are poor. Yet, stealing and bunting are easier against the change-up.

The computer usually calls curveballs strikes and sliders balls, and the batter has a better chance of hitting the curve ball. Pitchouts are useful if you want to intentionally walk a batter or if you suspect that a baserunner is stealing. A pitchout is always a ball and cannot be hit. Any runner trying to steal when a pitchout is thrown is called out.

Each pitch's speed differs, so it is possible to get the batter to swing and miss by changing pitches. This is an important strategy if a bunt or sacrifice fly could score a run. To keep the batter from knowing what pitch is made, you'll have to use a piece of paper (or a similar item) to cover up the data pad.

Batting Strategy

When your team is at bat, you must be aware of each batter's statistics as well as the game situation. This helps you select a batting option. Three statistics are kept for each batter—batting average, number of home runs per season, and number of steals per season. These stats affect the outcome of the player's performance at bunting, steal-

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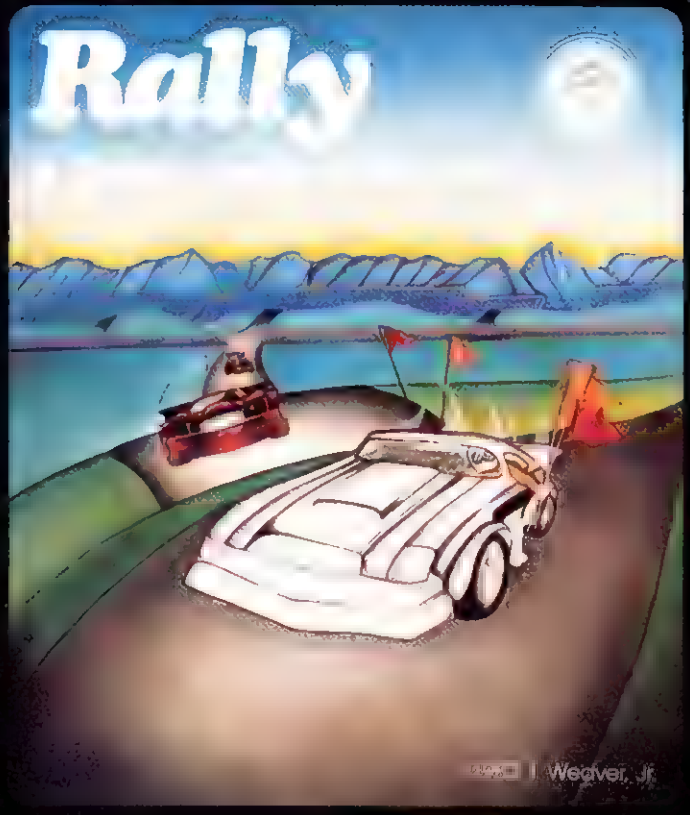
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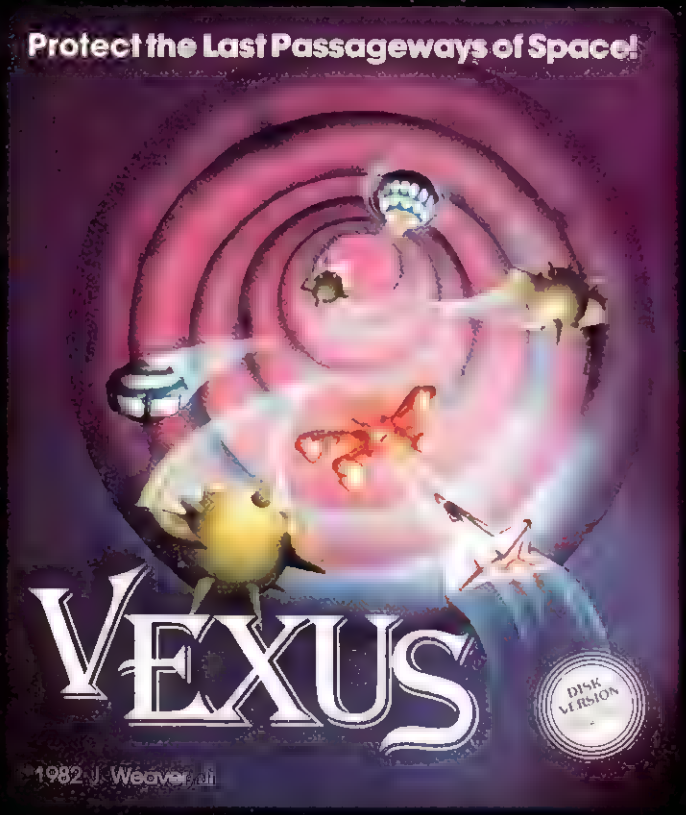
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ing, hitting, and power hitting.

You can use the steal option in two ways. With the straight steal option, the batter takes the pitch as the runner tries to steal. With the hit-and-run option, the batter swings as the runner steals. If the batter grounds out, a double play is avoided. If he gets a hit, the runner advances an extra base.

Bunting is an effective strategy for getting singles. Your chance of legging one out is much better if you hit a slow pitch. A bunt can also keep you out of a double play and at the same time advance the runners. A sacrifice fly can advance a runner from third to home.

The hitting and power-hitting options are similar. The hit option often produces hits of the single and double variety. The power-hit option results in fewer hits, but the hits it does produce will be bouncing off the walls or over the fences.

The Program

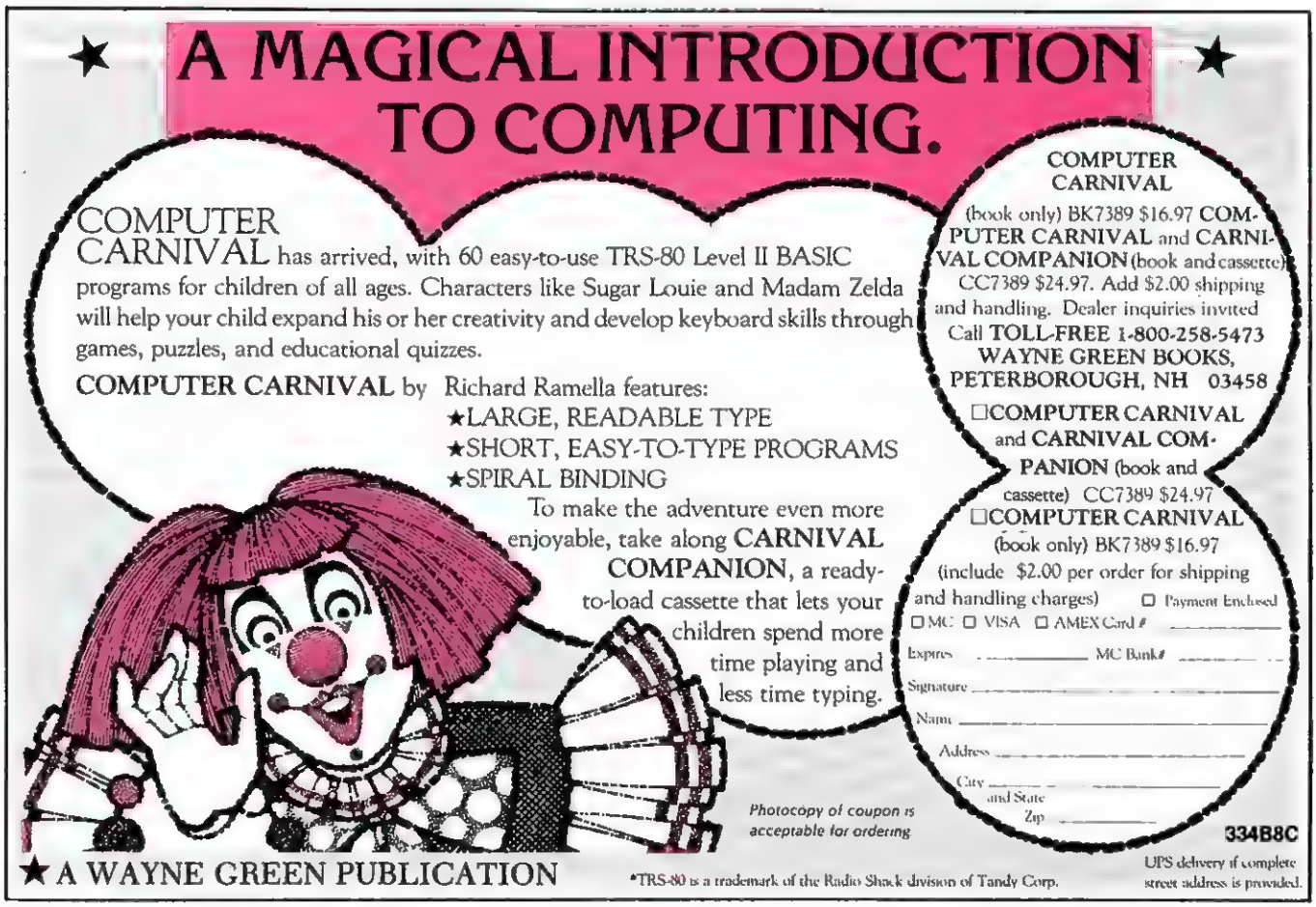
Line 30 in the Program Listing disables the break key. I included this line for two reasons. First, the program sets the memory size at 30999 to protect the screen and music data stored in high RAM. Exiting the program with the break key does not restore the memory size. Second, you could easily hit the break key while playing, and this would be disastrous. However, don't type in line 30 until the program is running properly.

During initialization and introduction, the program reads data from the data statements found in lines 49000–50008 and calls subroutines found in lines 30000–40500. Type in these lines before typing in the main program. If you don't type in the data properly, a call to a machine-language subroutine, such as those in lines 33100–40200, could destroy your work.

Lines 40070–40201 contain a special INKEY$ subroutine that I adapted from the book *Basic Faster and Better & Other Mysteries* by Lewis Rosenfelder (IJG Inc., Upland, CA, 1981, p. 183). I had to convert lines 40130–40139

Lines	Description
0–390	Initialization and introduction
1000–1893	Main program loop
1200–1260	Select Pitch
1400–1470	Select swing
1500–1560	Pitch ball—check for swing
1600–1630	Strike routine
1700–1720	Ball routine
1800–1893	Out routine and end of game
1900–1960	Pitch out routine
2000–2660	Hit routine
2800–2890	Sacrifice fly routine
2900–2990	Bunt routine
3000–3520	Steal routine
4000–4070	Walk routine
5000–5400	Hit but out routine
30001–30002	Delay subroutine
31000–31020	Base check subroutine
32000–32180	Base running subroutine
33100	USR sound routine
40070	Video display string pointer subroutine
40130–40139	Special INKEY$ subroutine
40200–40201	USR screen save subroutine
40500	Single key INKEY$ subroutine
49000–49004	Data—music file
50000–50008	Data—field video and music code

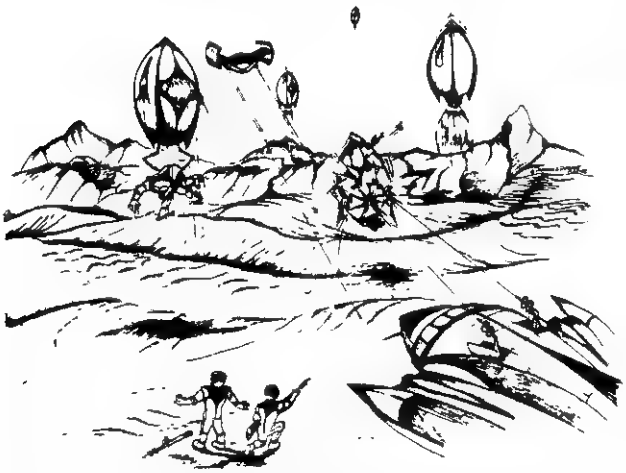
Table 1. Program Line Summary



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of the subroutine to work on a cassette-based system. My adaptation, along with the screen save found in lines 40200–40201, can be used in any program. Consult the book for further documentation and for suggestions on use.

Lines 49000–49004 contain the code for the sound portions of the program. I adapted this from *TRS-80 Assembly Language Programming* by William Barden Jr. (Radio Shack, Fort Worth, TX, 1979). See Table 1 for a summary of all the program lines.

The baserunning routine is the only routine that does not run as listed on the Model I. The program uses the special character code 253 to produce a little figure as a base runner. To modify lines containing this code, see Table 2.

Program Listing

```
1 CLS:MS=30999:POKE 16562,MS/256:POKE 16561,MS-INT(MS/256)*256
2 CLEAR 100: DEFINT A-Z:DIM US(7),TM$(2),CH$(2),SC(2),PL(2,9,3),BA
(3):J=0:US(0)=8448:US(2)=4352:US(4)=256:US(7)=201:L=64
10 PL(1,1,1)=350:PL(1,1,2)=10:PL(1,1,3)=65:PL(1,2,1)=340:PL(1,2,2)
=10:PL(1,2,3)=50:PL(1,3,1)=300:PL(1,3,2)=25:PL(1,3,3)=20:PL(1,4,1)
=300:PL(1,4,2)=60:PL(1,4,3)=15:PL(1,5,1)=280:PL(1,5,2)=35
11 PL(1,5,3)=20:PL(1,6,1)=250:PL(1,6,2)=15:PL(1,6,3)=25:PL(1,7,1)=
250:PL(1,7,2)=10:PL(1,7,3)=30:PL(1,8,1)=270:PL(1,8,2)=10:PL(1,8,3)
=10:PL(1,9,1)=220:PL(1,9,2)=5:PL(1,9,3)=5
12 PL(2,1,1)=380:PL(2,1,2)=5:PL(2,1,3)=60:PL(2,2,1)=320:PL(2,2,2)=
10:PL(2,2,3)=55:PL(2,3,1)=330:PL(2,3,2)=30:PL(2,3,3)=25:PL(2,4,1)=
290:PL(2,4,2)=55:PL(2,4,3)=10:PL(2,5,1)=290:PL(2,5,2)=35
13 PL(2,5,3)=20:PL(2,6,1)=250:PL(2,6,2)=20:PL(2,6,3)=30:PL(2,7,1)=
240:PL(2,7,2)=10:PL(2,7,3)=30:PL(2,8,1)=270:PL(2,8,2)=10:PL(2,8,3)
=5:PL(2,9,1)=200:PL(2,9,2)=5:PL(2,9,3)=5
20 RANDOM:SC(1)=0:SC(2)=0:GO=0
30 POKE 16396,175:POKE 16397,201
50 FOR I=0 TO 173:READ X:POKE 31000+I,X:NEXT I
110 FOR I=1 TO 24:PRINT @ 19+I,"*"
120 FOR T=1 TO 10:NEXT T:NEXT I
130 PRINT @ L+21, "MAJOR LEAGUE BASEBALL"
140 PRINT @ 2*L+30, "BY"
150 PRINT @ 3*L+25, "HAROLD A. KIME
160 FOR I=1 TO 24:PRINT @ 4*L+19+I,"*"
170 FOR T=1 TO 10:NEXT T:NEXT I
180 PRINT @ 517, "HAVE A GOOD TIME PLAYING AND MAY THE BEST PLAYER
 WIN!"
190 GOSUB 33100
198 PRINT @ 650,"ONE SECOND WHILE THE UMPIRES TAKE THE FIELD.";
220 FOR I=0 TO 1023:POKE 31730+I,32:NEXT I
230 READ X,Y:IF X=0 THEN 240 ELSE POKE 31370+X,Y:GOTO 230
240 PRINT @ 844, "WHEN YOU ARE READY TO BEGIN PRESS <ENTER>"
250 GOSUB 40500
260 IF ASC(A$)<> 13 THEN 250
300 REM SELECTION OF TEAMS
310 CLS:PRINT "PLAYER NUMBER ONE, YOU ARE THE AWAY TEAM.  PLEASE T
YPE IN YOUR  TEAM NAME AND PRESS <ENTER>."
320 PO=94:A1=10:GOSUB 40130:TM$(1)=AN$
330 PRINT @ 3*L,"PLAYER NUMBER TWO, YOU ARE THE HOME TEAM.  PLEASE
 TYPE IN YOUR  TEAM NAME AND PRESS <ENTER>."
340 PO=286:A1=10:GOSUB 40130:TM$(2)=AN$
350 IF TM$(1)=TM$(2) THEN PRINT @ 768, "SORRY,  THAT NAME IS ALREA
DY TAKEN.  PLEASE SELECT ANOTHER.":GOSUB 30005:PRINT @ 768, STRING
$(60,32):GOTO 340
360 CLS:PRINT "THE ";TM$(1);" ARE THE AWAY TEAM.":PRINT "THE ";TM$
(2);" ARE THE HOME TEAM."
370 PRINT @ 128, "AM I CORRECT (Y/N) ?":GOSUB 40500
380 IF A$<>"Y" AND A$<>"N" THEN GOTO 370
390 IF A$="N" THEN 310
1000 REM MAIN PROGRAM
1010 IN=1:B=1:TM=1:BU=0:B2=0
1020 A$="D":GOSUB 40200
1030 PRINT @ 105,TM$(1);:POKE 15483,48:PRINT @ 169,TM$(2);:POKE 15
547,48
1040 PRINT @ 8,IN;:OT=0:GO=0:POKE 15982,179:POKE 15711,179:POKE 15
952,179
1041 POKE 31052,100:POKE 31053,170:POKE 31054,100:POKE 31055,200:P
OKE 31056,0:GOSUB 33100:POKE 31052,150:POKE 31053,254:POKE 31054,1
08:POKE 31055,126:POKE 31056,102
1050 PRINT @ 15,TM$(B);
1060 IF GO=1 THEN 1890 ELSE BL=0:ST=0:POKE 15433,48:POKE 15497,48:
PRINT @ 200,OT;
1065 BU=BU+1:IF BU=10 THEN BU=1
1066 POKE 31052,50:POKE 31053,100:POKE 31054,50:POKE 31055,200:POK
E 31056,0:GOSUB 33100
1070 POKE 31052,150:POKE 31053,254:POKE 31054,103:POKE 31055,126:P
OKE 31056,102
1100 PRINT @ 648, BU;
1110 PRINT @ 712,PL(B,BU,1);:PRINT @ 776,PL(B,BU,2);:PRINT @ 840,
PL(B,BU,3);
1200 PRINT @ 626, "SELECT A PITCH";
1210 PRINT @ 690, "<1> FAST BALL";
1220 PRINT @ 754, "<2> CURVE";
1230 PRINT @ 818, "<3> SLIDER";
1240 PRINT @ 882, "<4> CHANGE UP";
1250 PRINT @ 946, "<5> PITCH OUT";
1260 GOSUB 40500:IF A$=CHR$(27) THEN 1892 ELSE P=VAL(A$):IF P<1 OR
 P>5 THEN 1260 ELSE GOSUB 30600
1400 PRINT @ 626, "SELECT SWING";
1410 PRINT @ 690, "<S> STEAL";
1420 PRINT @ 754, "<F> SACR. FLY";
```

Listing continues

Suggested Expansions

Owners of 32K or 48K systems might like to add some extras to the game. If your computer is larger than 16K, change the value of MS in line 1893 to match your memory size.

I left room for you to add lines 400–499—a good place to include a routine to name the individual players. To do this, expand PL(n,n,n) to a four-dimensional array, with the fourth category containing the player's name.

Use the screen-save feature in lines 40200–40201 to flash commercials or other messages of interest between innings or to create a screen display after home runs.

As this is my first attempt at writing a major program, I'm sure many of you will find ways to improve it. For example, you might want to add a routine that shows the movement of the ball after it is hit. Please contact me if you have suggestions. ■

Harold A. Kime is the Dean of Continuing Education at Lancaster Bible College. His address is 252 East Clay St., Lancaster, PA 17602.

Lines	Modification
1940	191
2620–2630	191
2830	191
2920	191
2940	191
3010–3020	191
3100	191
3200	191
3300	191
3500	191
4020–4040	191
5150–5170	191
5210–5230	191
5330–5350	191
5370	191
32010–32040	140
32060–32090	140
32110–32140	191
32160	191

Table 2. Model I owners should substitute character code 253 in the above line numbers with the modification listed.

"THERE IS ONLY ONE WAY TO DESCRIBE THE PERFORMANCE OF POSTMAN MASS MAILING SYSTEM, – 'FLAWLESS'."

nfo World, by Tim Daneliuk, Vol V, No 37, ©1982

InfoWorld
Software Report Card

Postman Version 2.29

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

Business programs have come of age on the TRS-80* Mod I and III and the speed and flexibility of the POSTMAN MASS MAILING SYSTEM, makes it the best buy on the market today. In these rough economic times, every business program purchase must be selected very carefully and be evaluated and compared against all other competitors. POSTMAN MASS MAILING SYSTEM stands up to this scrutiny.

POSTMAN MASS MAILING SYSTEM has the capability of managing 22,000** names on floppy disk drives and up to 292,000** names on a hard disk system. No longer do you have to search from diskette to diskette to find the file you need. POSTMAN MASS MAILING SYSTEM utilizes all of the disk drives you have on line, and presents all at once, one large file totally accessible; as if you only had one large disk drive. In his review, Tim Daneliuk describes this unlimited storage capability aptly by saying: "POSTMAN 'spans' multiple disk drives" despite the unpretentious 5¼-inch mini-floppy disk. This exceptional feature gives you the ability to start with a two disk-drive system and add more disk drives as your business grows, without any difficulty.

Professional people in the industry have remarked how POSTMAN MASS MAILING SYSTEM, written entirely in Machine language and menu driven for simplicity, fulfills a variety of small business needs.

PURGE – Consider for instance, how it can purge duplicate lables, preventing you from mailing multiple information to the same person.

SORT – it has the ability to sort on any or all of the ten data files of the program quickly.

ERROR HANDLING – All erroneous data is trapped. It never fails because of incorrect operator entry.

Commonly Asked Questions About POSTMAN MASS MAILING SYSTEM

Q. How many names can I get on my standard 2 drive TRS-80 Mod III?

A. On the average 1900, depending on your operating system. LDOS is the least – Multi-DOS has over 2,000.

Q. How many disk drives can I run at the same time with your program?

A. At this time only 8 disk drives – 4 floppy disks and 4 hard disks.

Q. What is the capacity of a disk drive?

A. There are many different sizes of disk drives. See the chart below.

MOD I SINGLE DENSITY
- †35 Track Data Disk ..... 642 ea.
- 40 Track Data Disk ..... 742 ea.
- 80 Track Data Disk ..... 1542 ea.

MOD I OR III DOUBLE DENSITY
- †40 Track Data Disk ..... 1346 ea.
- 80 Track Data Disk ..... 2700 ea.
- 80 Track Dual Head ..... 5500+ ea.
- †† 5 Meg Hard Drive ..... 38,000+ ea.
- ††7.5 Meg Hard Drive ..... 68,000+ ea.

†Denotes the size on a standard system from Radio Shack. ††Requires LDOS or DOSPLUS Operating Systems and hard disk version of Postman.

Q. Am I limited to only one disk drive or can I add more drives?

A. You can combine any of the above disk drives, up to a maximum of 4 dual headed 80 track drives, plus 4-7.5 meg hard drives, for a total capacity of 292,000* names. The system to date has been field tested, and is in everyday use at over 100,000 name capacity.

Q. Outstanding having all those names, but how does it effect the speed of the system?

A. As anyone could expect, as a system gets larger it reacts slower. Below is a sample of the different systems.

SYSTEM CAPACITY	SORT TIME - ONE FIELD	SORT TIME ALL 10 FIELDS	INSERT TIME
1,342	12 Seconds	16 Seconds	1 Second
5,500	18 Seconds	28 Seconds	1 Second
11,000	24 Seconds	40 Seconds	2 Seconds
38,000	5 Minutes	7 Minutes	2 Seconds
78,000	8 Minutes	12 Minutes	2 Seconds
200,000	30 Minutes (estimated)	51 Minutes	4 Seconds

The above tests were done with a Mod III and DOSPLUS 4.0 Operating System. The speed you receive will depend on many factors. It should be noted that as you insert a name, it is put in sorted order on the disk. You never need to re-sort, unless you wish to change the order.

Q. Do you plan on adding anything new to your program soon?

A. Yes! and all registered owners of Postman Mass Mailing System can upgrade to the latest version for a nominal fee.

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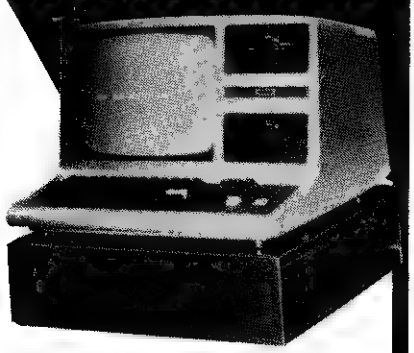
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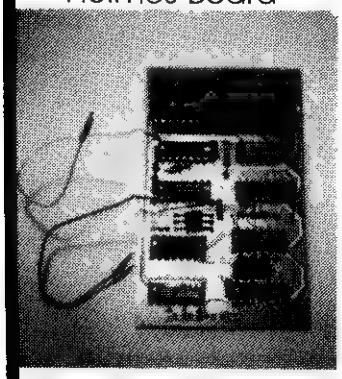
```
1430 PRINT @ 818, "<B> BUNT";
1440 PRINT @ 882, "<H> HIT";
1450 PRINT @ 946, "<P> POWER HIT";
1460 GOSUB 40500:IF A$<>"S" AND A$<>"B" AND A$<>"H" AN
D A$<>"P" THEN 1460 ELSE IF A$="S" THEN S=1 ELSE IF A$="B" THEN S=
2 ELSE IF A$="B" THEN S=3 ELSE IF A$="H" THEN S=4 ELSE S=5
1465 GOSUB 30600
1470 IF S<3 THEN GOSUB 31000:IF BA(1)=179 AND BA(2)=179 AND BA(3)=
179 THEN 1400
1500 C=0:PO=0:POKE 15967,140:FOR T=1 TO 2*P:NEXT T
1510 A$=INKEY$:IF A$=CHR$(32) THEN EL=1:GOTO 1600 ELSE POKE 15967+
PO,32:POKE 16031+PO+C,140:FOR T=1 TO 2*P:NEXT T
1520 PO=PO+64:IF PO=192 AND P=2 THEN C=2 ELSE IF PO=192 AND P=3 TH
EN C=-2 ELSE C=0
1540 IF PO<256 THEN 1510
1550 A$=INKEY$:PRINT @ 861,CHR$(32);CHR$(191);CHR$(179);CHR$(191);
CHR$(32):IF A$=CHR$(32) THEN 2000 ELSE POKE 16287,140:FOR T=1 TO 3
0:NEXT T
1555 A$=INKEY$:IF A$=CHR$(32) THEN EL=0: GOTO 1600
1556 IF P=4 THEN 1700
1560 X=RND(P):IF P=X THEN EL=0:GOTO 1600 ELSE 1700
1600 IF EL=1 THEN POKE 15967+PO,32 ELSE POKE 16287,32
1605 IF P=5 THEN 1900
1608 POKE 31052,40:POKE 31053,100:POKE 31054,0:GOSUB 33100
1609 POKE 31052,150:POKE 31053,254:POKE 31054,108
1610 PRINT @ 989,"STRIKE";:ST=ST+1:PRINT @ 136,ST;:FOR T=1 TO 330:
NEXT T:PRINT @ 989,STRING$(6,32);
1615 IF S=1 THEN GOSUB 3000:IF OT=3 THEN BU=BU-1:GOTO 1820
1620 IF ST<3 AND GO=0 THEN 1200 ELSE IF GO=1 THEN 1890
1630 PRINT @ 986,"STRIKE OUT";:FOR T=1 TO 330: NEXT T:PRINT @ 986,
STRING$(10,32);:GOTO 1800
1700 POKE 16287,32
1701 POKE 31052,25:POKE 31053,200:POKE 31054,0:GOSUB 33100:
   POKE 31052,150:POKE 31053,254:POKE 31054,108
1702 IF P=5 THEN 1900
1705 PRINT @ 989,"BALL";:BL=BL+1:PRINT @ 72,BL;
1710 FOR T=1 TO 330:NEXT T:PRINT @ 989,STRING$(4,32);
1715 IF S=1 THEN GOSUB 3000:IF OT=3 THEN 1820
1720 IF BL<4 AND GO=0 THEN 1200 ELSE IF GO=1 THEN 1890 ELSE 4000
1800 OT=OT+1:PRINT @ 200,OT;
1820 IF OT<3 THEN  1060
1830 IF B=1 THEN B1=BU ELSE B2=BU
1840 IF B=1 THEN B=2 ELSE B=1
1850 IF B=1 THEN IN=IN+1
1860 IF B=1 THEN BU=B1 ELSE BU=B2
1865 IF IN <9 THEN 1040
1870 IF SC(2)>SC(1) AND B=2 THEN 1890
1875 IF B=1 AND IN>9 AND SC(1)<>SC(2) THEN 1890
1880 GOTO 1040
1890 PRINT @ 960, "THAT'S IT.  THE GAME IS OVER.  DO YOU WANT TO P
LAY AGAIN? (Y/N)";
1891 GOSUB 40500:IF A$="Y" THEN SC(1)=0:SC(2)=0:GO=0: GOTO 300 ELS
E IF A$<>"N" THEN 1891
1892 CLS:PRINT "I HOPE YOU ENJOYED THE GAME.  SEE YOU LATER."
1893 MS!=32767:POKE 16562,MS!/256:POKE 16561,MS!-IN T(MS!/256)*256:
POKE 16396,201:CLEAR 50:END
1900 REM PITCH OUT
1910 PRINT @ 985,"PITCH OUT";:GOSUB 30001:GOSUB 30700
1920 IF S<>1 OR BL=3 THEN 1705
1930 GOSUB 31000
1940 IF BA(3)=253 THEN POKE 15952,179 ELSE IF BA(2)=253 THEN POKE
15711,179 ELSE IF BA(1)=253 THEN POKE 15982,179
1950 PRINT @ 985,"CAUGHT STEALING";:GOSUB 30001:GOSUB 30700
1960 OT=OT+1:PRINT @ 200,OT;:BL=BL+1:PRINT @ 72,BL;:IF OT=3 THEN B
U=BU-1:GOTO 1830 ELSE 1200
2000 REM HIT ROUTINE
2010 IF P=5 THEN 1900
2020 POKE 31052,25:POKE 31053,150:POKE 31054,0:GOSUB 33100
2030 POKE 31052,150:POKE 31053,254:POKE 31054,108
2070 ON S GOTO 2100,2800,2900,2100,2100
2100 IF S=1 OR S=4 THEN X=1 ELSE X=2
2110 IF 3*PL(B,BU,1)/(P/2+X)<RND(1000) THEN 5000
2115 IF S=1 THEN GOSUB 3600
2120 H=RND(50)*3[X*PL(B,BU,2)/(P*10)
2130 IF H>500 THEN 2200 ELSE IF H>300 THEN 2300 ELSE IF H>100 THEN
 2400 ELSE 2500
2200 PRINT @ 960, "LONG DRIVE";:GOSUB 30002:PRINT @ 990," HOME RUN
!";:POKE 31078,0:GOSUB 33100:POKE 31078,102:GOSUB 30700:I=4
2210 GOSUB 31000:IF BA(1)=253 AND BA(2)=253 AND BA(3)=253 THEN PRI
NT @ 1010, "GRAND SLAM!";
2220 GOTO 2600
2300 PRINT @ 960, "LONG DRIVE";:GOSUB 30002:PRINT @ 990," OFF THE
WALL IN CENTER FIELD";:I=3:GOTO 2600
2400 PRINT @ 960, "LINE DRIVE";:GOSUB 30002:PRINT @ 990," INTO THE
 CORNER";:I=2:GOTO 2600
2500 PRINT @ 960, "GROUND BALL";:GOSUB 30002:PRINT " THROUGH FOR A
 SINGLE";:I=1
2600 GOSUB 31000:F4=1
2605 FOR H=1 TO I
2620 IF BA(1)=253 THEN F1=1
2630 IF BA(2)=253 THEN F2=1
2640 IF BA(3)=253 THEN F3=1
2650 GOSUB 32000:GOSUB 31000:NEXT
2660 GOSUB 30700:GOTO 1060
```

Listing continues

HARDWARE SPECIAL

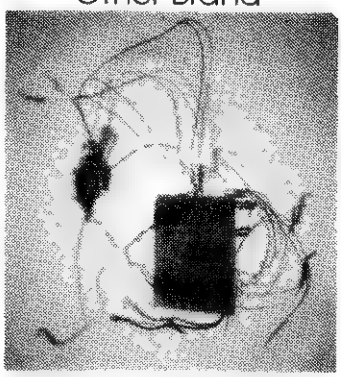
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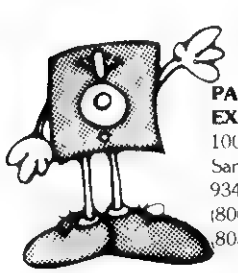
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Listing continued

```
2800 REM SACRIFICE FLY
2805 IF OT=2 THEN PRINT @ 985, "FLY BALL";:GOSUB 30001:PRINT "   H
E'S OUT";:GOSUB 30001:GOSUB 30700:GOTO 1800
2810 PRINT @ 960,"DEEP FLY";:GOSUB 30001:PRINT "  THE RUNNER IS TA
GGING UP.";:GOSUB 30001:GOSUB 30700
2820 GOSUB 31000
2830 IF BA(3)=253 THEN F3=1:RN=1 ELSE IF BA(2)=253 THEN F2=1:RN=2
ELSE IF BA(1)=253 THEN F1=1:RN=3 ELSE 2890
2840 GOSUB 32000
2850 IF RND(RN)=1 THEN 1800
2860 IF RN=2 THEN POKE 15952,179 ELSE IF RN=3 THEN POKE 15711,179
2870 PRINT @ 985,"HE'S OUT!";:GOSUB 30001:PRINT "    DOUBLE PLAY";
:GOSUB 30001:GOSUB 30700
2880 OT=OT+1:GOTO 1800
2890 PRINT @ 985,"HE'S OUT!";:GOSUB 30002:GOSUB 30700:GOTO 1800
2900 REM BUNT ROUTINE
2910 PRINT @ 960, "A BUNT!";:GOSUB 30001:GOSUB 31000
2920 IF BA(3)=253 THEN F3=1
2930 IF BA(2)=253 THEN F2=1
2940 IF BA(1)=253 THEN F1=1
2950 F4=1:GOSUB 32000
2960 IF PL(B,BU,3)>25 THEN PRINT @ 969, "IT'S CLOSE AT FIRST!";:GO
SUB 30001
2970 IF PL(B,BU,3)+4*P>RND(95) THEN PRINT @ 990,"HE'S SAFE";:GOSUB
 30001:GOSUB 30700:GOTO 1060
2980 PRINT @ 990,"HE'S OUT";:GOSUB 30001:POKE 15982,179:GOSUB 3070
0:IF OT+1=3 AND F3=1 THEN SC(B)=SC(B)-1:PRINT @ 64*B+58,SC(B);
2990 GOTO 1800
3000 REM *** STEAL ROUTINE ***
3010 GOSUB 31000:IF BA(3)<>253 AND BA(2)<>253 AND BA(1)<>253 THEN
RETURN
3020 IF BA(3)=253 OR BA(2)=253 THEN RN=150 ELSE RN=125
3030 IF PL(B,BU,3)+5*P<RND(RN) THEN 3500
3100 IF BA(3)=253 THEN F3=1:GOSUB 32000 ELSE 3200
3110 PRINT @ 985,"STOLE HOME!";: GOSUB 30002:GOSUB 30700
3120 RETURN
3200 IF BA(2)=253 THEN F2=1:GOSUB 32000 ELSE 3300
3210 PRINT @ 985,"STOLE THIRD";: GOSUB 30002:GOSUB 30700
3220 RETURN
3300 IF BA(1)=253 THEN F1=1 ELSE RETURN
3310 GOSUB 32000
3320 PRINT @ 985,"STOLE SECOND";:GOSUB 30002:GOSUB 30700:RETURN
3500 IF BA(3)=253 THEN POKE 15952,179 ELSE IF BA(2)=253 THEN POKE
15711,179 ELSE POKE 15982,179
3510 PRINT @ 985,"OUT STEALING";:OT=OT+1
3520 PRINT @ 200,OT;:GOSUB 30002:GOSUB 30700:RETURN
3600 GOSUB 31000:IF BA(3)=253 THEN F3=1:GOSUB 32000 ELSE IF BA(2)=
253 THEN F2=1:GOSUB 32000 ELSE F1=1:GOSUB 32000
3610 RETURN
4000 REM WALK ROUTINE
4010 GOSUB 31000:F4=1
4020 IF BA(1)=253 THEN F1=1
4030 IF BA(1)=253 AND BA(2)=253 THEN F2=1
4040 IF BA(1)=253 AND BA(2)=253 AND BA(3)=253 THEN F3=1
4050 GOSUB 32000
4070 GOTO 1060
5000 R=RND(6):ON R GOTO 5010,5020,5010,5030,5040,5050
5010 PRINT @ 960,"GROUND BALL";:GOSUB 30002:PRINT "        HE'S GOT
 IT!";:F=1:GOTO 5100
5020 PRINT @ 960,"LINE DRIVE";:GOSUB 30002:PRINT "        CAUGHT!"
;:F=2:GOTO 5100
5030 PRINT @ 960,"FLY BALL";:GOSUB 30002:PRINT "         EASY CATC
H!";:F=3:GOTO 5100
5040 PRINT @ 960,"LONG DRIVE";:GOSUB 30002:PRINT "        WHAT A C
ATCH!";:F=3:GOTO 5100
5050 PRINT @ 960,"POP-UP";:GOSUB 30002:PRINT "          HE'S . . .
 ";:F=3
5100 GOSUB 30002:GOSUB 30700
5110 IF OT=2 THEN GOTO 5400
5130 IF F=1 THEN 5140 ELSE 5300
5140 GOSUB 31000
5150 IF BA(3)=253 THEN F3=1
5160 IF BA(2)=253 THEN F2=1
5170 IF BA(1)=253 THEN F1=1
5180 IF F1=1 OR F2=1 OR F3=1 THEN GOSUB 32000
5200 IF S=1 THEN POKE 15982,179:PRINT @ 960,"OUT AT FIRST";:GOSUB
30002:GOSUB 30700:GOTO 1800
5210 IF BA(2)=253 AND BA(1)=253 THEN POKE 15952,179:GOTO 5250
5220 IF BA(3)=253 AND BA(2)=253 AND BA(1)=253 THEN SC(B)=SC(B)-1:P
RINT @ 64*B+58,SC(B);:GOTO 5250
5230 IF BA(1)=253 THEN POKE 15711,179:GOTO 5250
5240 GOTO 5270
5250 POKE 15982,179:PRINT @ 985,"DOUBLE PLAY!";:GOSUB 30002:GOSUB
30700
5260 OT=OT+1:IF OT=2 AND F3=1 THEN SC(B)=SC(B)-1:PRINT @ 64*B+58,S
C(B);
5265 GOTO 1800
5270 POKE 15982,179:PRINT @ 960,"OUT AT FIRST";:GOSUB 30002:GOSUB
30700:GOTO 1800
5300 IF F=2 THEN 5310 ELSE 5400
5310 IF S=1 THEN 5320 ELSE 5400
5320 GOSUB 31000
5330 IF BA(3)=253 THEN F3=1:GOTO 5360
```

Listing continues

Listing continued

```
5340 IF BA(2)=253 THEN F2=1:GOTO 5360
5350 IF BA(1)=253 THEN F1=1:GOTO 5360
5360 GOSUB 32000
5370 IF BA(3)=253 THEN POKE 16223,179:GOTO 5380 ELSE IF BA(2)=253
THEN POKE 15952,179:GOTO 5380 ELSE IF BA(1)=253 THEN POKE 15711,17
9
5380 PRINT @ 985,"DOUBLE PLAY!";:GOSUB 30002:GOSUB 30700
5390 OT=OT+1:GOTO 1800
5400 PRINT @ 990,"OUT!";:GOSUB 30002:GOSUB 30700:GOTO 1800
30001 FOR T=1 TO 280:NEXT T:RETURN
30002 FOR T=1 TO 660:NEXT T:RETURN
30005 FOR T=1 TO 1000:NEXT T:RETURN
30600 FOR I=0 TO 5:PRINT @ 626+I*L,STRING$(14,128);:NEXT I:RETURN
30700 PRINT @ 960,STRING$(62,32);:RETURN
31000 BA(1)=PEEK(15982):BA(2)=PEEK(15711):BA(3)=PEEK(15952)
31010 F1=0:F2=0:F3=0:F4=0
31020 RETURN
32000 REM BASE RUNNING ROUTINE
32010 IF F4=1 THEN POKE 16164,253
32020 IF F1=1 THEN POKE 15913,253:POKE 15982,179
32030 IF F2=1 THEN POKE 15770,253:POKE 15711,179
32040 IF F3=1 THEN POKE 16021,253:POKE 15952,179
32050 GOSUB 30001
32060 IF F4=1 THEN POKE 16041,253:POKE 16164,144
32070 IF F1=1 THEN POKE 15780,253:POKE 15913,32
32080 IF F2=1 THEN POKE 15893,253:POKE 15770,130
32090 IF F3=1 THEN POKE 16154,253:POKE 16021,32
32100 GOSUB 30001
32110 IF F4=1 THEN POKE 15982,253:POKE 16041,32
32120 IF F1=1 THEN POKE 15711,253:POKE 15780,129
32130 IF F2=1 THEN POKE 15952,253:POKE 15893,32
32140 IF F3=1 THEN POKE 16223,253:POKE 16154,160:POKE 31052,25:POK
E 31054,0:GOSUB 33100:POKE 31052,150:POKE 31054,108
32150 IF S <>1 THEN GOSUB 30001
32160 Y=PEEK(16223):IF Y=253 THEN POKE 16223,179:SC(B)=SC(B)+1
32170 PRINT @ 64*B+58,SC(B);:IF IN>=9 AND B=2 AND SC(2)>SC(1) THEN
 GO=1
32180 RETURN
33100 POKE 16526,31000-INT(31000/256)*256:POKE 16527,31000/256:
    J=USR(0):RETURN
40070 PO=PO+15360:AN$="":POKE VARPTR(AN$),A1:POKE VARPTR(AN$)+2,IN
T(PO/256):POKE VARPTR(AN$)+1,PO-INT(PO/256)*256:RETURN
40130 A=0:PRINT @ PO,STRING$(A1,95);
40131 IF A=A1 THEN 40134 ELSE PRINT @ PO+A,CHR$(95);
40132 A$=INKEY$:IF A$="" THEN 40132 ELSE M=ASC(A$):IF M>31 AND M<9
1 THEN PRINT @ PO+A,A$;:A=A+1:GOTO 40131
40133 IF M=8 THEN 40135 ELSE IF M=13 THEN 40138 ELSE IF M=31 THEN
40130 ELSE GOTO 40131
40134 A$=INKEY$:IF A$="" THEN 40134 ELSE M=ASC(A$):GOTO 40133
40135 IF A<A1 THEN PRINT @ PO+A,CHR$(95)
40136 A=A-1:IF A<0 THEN A=0:GOTO 40131 ELSE 40131
40138 PRINT @ PO+A,STRING$(A1-A,32);
40139 GOSUB 40070:RETURN
40200 US(5)=1023:US(6)=-20243:IF A$="S" THEN US(1)=15360:US(3)=317
30 ELSE US(1)=31730:US(3)=15360:M=VARPTR(US(0)):POKE 16526,M-INT(M
/256)*256:POKE 16527,M/256
40201 J=USR(0):RETURN
40500 A$=INKEY$:IF A$="" THEN 40500 ELSE RETURN
49000 REM MUSIC FILE
49001 DATA 221,33,76,121,221,78,0,121,183,194,37,121,201,221,70,1,
62,1,211,255,16,254,221,70,1,62,2,211,255,16,254,13,194,37,121,221
,35,221,35,1,255,255,33,48,0,9,218,69,121,195,28,121
49002 DATA 150,254,108,126,102,153,100,171,98,204,200,171,170,230,
150,254,108,126,102,153,100,171,98,204,200,171,102,153,101,161,102
,153,96,204,99,190,100,171,210,153,99,190,230,230,210,153
49003 DATA 102,153,102,153,106,137,108,126,112,114,106,137,102,153
,100,171,96,204,92,230,150,254,108,126,102,153,100,171,98,204,200,
171,170,230,92,230,150,254,92,230,98,204,99,190,100,171
49004 DATA 240,153,102,153,106,137,255,126,255,126,108,126,106,137
,102,153,100,171,99,181,100,171,240,153,250,137,255,126,0,0
50000 REM FIELD VIDEO FILE
50001 DATA 360,73,361,78,362,78,363,73,364,78,365,71,387,85,388,80
,397,42,398,42,399,42,401,83,402,67,403,79,404,82,405,69,407,66,40
8,79,409,65,410,82,411,68,413,42,414,42,415,42,424,66
50002 DATA 425,65,426,76,427,76,428,83,488,83,489,84,490,82,491,73
,492,75,493,69,494,83,552,79,553,85,554,84,616,130,617,136,618,160
,676,144,677,132,678,129,683,130,684,136,685,160
50003 DATA 707,160,708,136,710,191,711,179,712,191,714,132,715,144
,737,144,738,132,739,129,750,130,751,136,752,160,768,160,769,136,7
70,130,780,129,781,132,782,144,798,144,799,132,800,129
50004 DATA 817,130,818,136,819,160,829,160,830,136,831,130,847,129
,848,132,849,144,859,144,860,132,861,129,884,130,885,136,886,160,8
90,160,891,136,892,130,902,95,903,95,904,95,914,129
50005 DATA 915,132,916,144,920,144,921,132,922,129,936,65,937,84,9
39,66,940,65,941,84,951,191,952,179,953,191,981,191,982,179,983,19
1,1000,78,1001,85,1002,77,1003,66,1004,69,1005,82
50006 DATA 1018,130,1019,136,1020,160,1042,144,1043,132,1044,129,1
064,65,1065,86,1066,69,1067,82,1068,65,1069,71,1070,69,1085,130,10
86,136,1087,160,1103,144,1104,132,1105,129,1128,72,1129,79
50007 DATA 1130,77,1131,69,1132,82,1133,83,1152,130,1153,136,1154,
160,1164,144,1165,132,1166,129,1192,83,1193,84,1194,69,1195,65,119
6,76,1197,83,1219,130,1220,136,1222,191,1223,179,1224,191
50008 DATA 1226,132,1227,129,0,0
```


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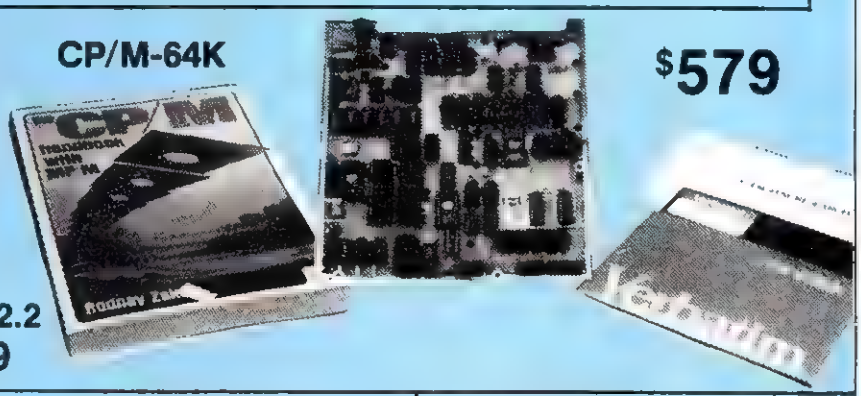
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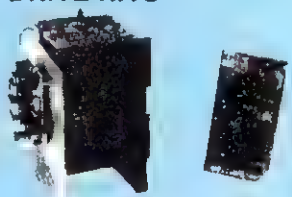
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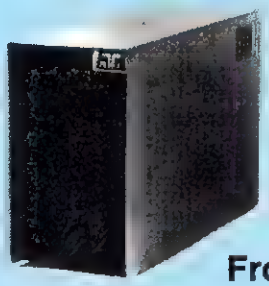
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Punklist

by Eric Maloney

Rock groups—don't despair! This program will soon end your search for that perfect name.

It's the dream of American youth. You buy a beat-up old electric guitar and learn a few chords. Then you hook up with Jimmy down the street, who's been playing the drums since he was three and can do "Toad" on a coffee can. Along comes Goober, the crazy bass player, who can't tie his shoelaces but has a friend who has a friend whose cousin knows somebody in the record business. You're on your way. You're going to be a rock 'n' roll star.

But wait—you can't be a rock 'n' roll star if your band doesn't have a name. How far would the Rolling Stones have gotten if they'd been billed as "A Bunch of Guys with Loud Instruments?"

So you sit down with a bottle of Wild Turkey and put some inspirational music on the turntable (Iron Butterfly's "In-A-Gadda-Da-Vida," perhaps or

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Table 1. Sample Punklist Run

```
HERE ARE YOUR 50 NAMES

THE FOUR-DOOR WRETCHED STUDEBAKERS
BEYOND THE SALIVATING CONSPIRACY
THE ULTIMATE CELLOPHANE TUBA
THE BIZARRE TERROR
ITCHY BROTHER & THE WRETCHED BUDDHISTS
YOUR UNCLE RALPH'S FASCIST WINNEBAGO
THE ULTIMATE CELLOPHANE UNDERWEAR
GEORGE'S OWN WRETCHED PAJAMAS
AUNT BEE'S SMILING SLAVES
SERVANTS TO THE LIPS
THE THROBBING HIPPIES
YOUR TOWN'S TRASH
THE SANITARY SALIVATING BABIES
FRED SMITH & THE PARANOID TRASH
ITCHY BROTHER & THE SATIN DRUG FRENZY
THE 80 MICRO EDITORIAL STAFF
& THEIR POLYESTER RASH
TEN DIGITS AND THE POETIC MILKMAN
THE SENSATIONAL SAVAGE KITTENS
BEAVER CLEAVER'S CELLOPHANE SCUM
THE SENSATIONAL GENERIC CLEFT CHIN
SATAN'S RUBBER TOASTER
YOUR UNCLE RALPH'S SEDUCTIVE ANDROIDS
THE AWESOME FREEZING STRING QUARTET
HOWARD JOHNSON'S SMILING REFUSE
REVENGE OF THE RESTLESS NIGHTMARE
YOUR UNCLE RALPH'S DISGUSTING FUNGUS
GEORGE'S OWN SEDUCTIVE LIPS
THE AWESOME NEON BUBBLE
GOD THE CREATOR AND HIS RESTLESS KITTENS
ITCHY BROTHER & THE BARBEQUED PAJAMAS
THE PUPPY-KILLING FOAMING FLEA MARKET
THE GOLDEN SOUNDS OF THE GROANING AMPERSAND
THE ROCKING MICROWAVE SLAVES
THE FOUR-DOOR DISCO SLAVES
THE VIDEO BUBBLE
THE 80 MICRO EDITORIAL STAFF
& THEIR GENERIC ANDROIDS
TEN DIGITS AND THE NEON CONSPIRACY
THE SANITARY RESTLESS FUNGUS
```

continues

some vintage Fugs), and get to work.

If the Muse is on your side, you might come up with something right away. But let's face it—most of the obvious names have already been taken. Bubble Puppy went by the boards years ago, as did The Chocolate Watch Band and The Electric Prunes. And if you're considering Lothar and the Hand People, forget it.

What do you do, then, when the bottle runs dry? Why, use Punklist, of course.

Punklist randomly generates names for rock 'n' roll bands. If you run it forever, you'll eventually get about 211,140 permutations. That's enough for almost every band in L.A.

The program is simple; it reads three sets of data statements into three arrays, from which it then randomly selects three sets of words. Just for kicks, Punklist also asks for your name and town, which it then adds to the arrays. You can read the results on your monitor, or print them out.

If you're not satisfied with the results, you can change or add to the data statements. If you're still not satisfied, forget the whole thing and take up macrame. ■

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          THE SMILING PUNKS
          WORKING CLASS BURNING STUDEBAKERS
          THE 80 MICRO EDITORIAL STAFF
          & THEIR GIGGLING CLEFT CHIN
          THE AWESOME WANDERING CLEFT CHIN
          SUICIDE SQUEEZE & THE POLYESTER BRIEFCASE
          REVENGE OF THE CRAWLING SHORTSTOPS
          THE PUPPY-KILLING SECRET TUMOR
          AUNT BEE'S GREEN BONGO-BEATERS
          THE PRESIDENT'S GROANING BURGERS
          HOWARD JOHNSON'S SMILING SLAVES
          BIG MAMA'S WRETCHED TWITCH
```

Program Listing

```
5 CLEAR 500
10 AA=45:BB=72:CC=69
20 CLS:DIMA$(AA),B$(BB),C$(CC)
30 PRINT:PRINT:PRINT:PRINT
40 PRINT"    ************************************************
***"
41 PRINT"    *
  *"
42 PRINT"    *
  *"
43 PRINT"    *                  PUNKLIST 5.0
  *"
44 PRINT"    *
  *"
45 PRINT"    *               BY R. ERIC MALONEY
  *"
46 PRINT"    *                (AUGUST 8, 1982)
  *"
47 PRINT"    *
  *"
48 PRINT"    *
  *"
49 PRINT"    ************************************************
***"
100 DATA CORDLESS ELECTRIC,THE SANITARY,THE SENSATIONAL,THE GOLD
EN SOUNDS OF THE,WORKING CLASS,GOD THE CREATOR AND HIS,FRED SMIT
H & THE,REVENGE OF THE,LAWRENCE WELK & THE,THE PUPPY-KILLING,PED
RO'S PLASTIC,THE SEMI-ANNUAL
110 DATA BIG MAMA'S,THE FOUR-DOOR,CLEVELAND'S,THE ULTIMATE,THE M
UTANT,THE AWESOME,THE ROCKING,MY SENSITIVE MOTHER'S,HOSS CARTWRI
GHT'S,THE,THE,AMIDST THE,THE SURFING,AUNT BEE'S,BEYOND THE,SOMEB
ODY'S
120 DATA YOUR UNCLE RALPH'S,YESTERDAY'S,TEN DIGITS AND THE,I AM
JOE'S,CHAIRMAN OF THE,SERVANTS TO THE,SATAN'S,BEAVER CLEAVER'S,G
EORGE'S OWN,THE PRESIDENT'S,HOWARD JOHNSON'S,ITCHY BROTHER & THE
,THE NEXT-DOOR NEIGHBOR'S
130 DATA TOWN,SUICIDE SQUEEZE & THE,THE 80 MICRO EDITORIAL STAFF

& THEIR,NAME
160 FOR A=1TOAA:READ A$(A):NEXT A
170 FOR P=1TO100:NEXT P
200 DATA WRETCHED,DROOLING,USELESS,CRAWLING,GREEN,NEANDERTHAL,HE
AVY METAL,KODACHROME,VIDEO,REPULSIVE,POETIC,POLYESTER,MANIC,PARA
NOID,BATTERED,NUCLEAR,NEON,EXPLODING,MUMBLING,SHRINK-WRAPPED,STR
UTTING,FOAMING,THROBBING,SAVAGE,DEAD,RUBBER
210 DATA FASCIST,INTERSTELLAR,MICROWAVE,SILICON,DEFECTIVE,PINK,C
ELLOPHANE,GENERIC,FLOPPY,BURNING,PICKLED,SATIN,GROANING,SMILING,
RANCID,ILLUSTRATED,SECRET,CLEVER
220 DATA DISGUSTING,BERSERK,FLUORESCENT,FREEZING,NERVOUS,HAPPY,T
ORMENTED,DEAF,TREMBLING,BALD,BARBEQUED,SEDUCTIVE,BIZARRE,ROTTING
,LOATHSOME,DISCO,GIGGLING,WANDERING,SALIVATING
230 DATA RESTLESS,ODORLESS,GODLESS,TIE-DYED,"","","","",""
260 FORB=1TOBB:READB$(B):NEXTB
270 FOR Q=1TO100:NEXTQ
300 DATA PASTRY,BRIEFCASE,WINGTIPS,BUBBLE,SCUM,FUNGUS,OVERDOSE,R
EVOLUTION,LIPS,HIPPIES,FLEA MARKET,RAINCOAT,SLUDGE,VOID,DISCIPLE
S,BUDDHISTS,INSURANCE SALESMEN,HAIRBALL,SLACKS,DRUG FRENZY,BABIE
S,TRASH,CHEESE
310 DATA REFUSE,TUBA,KITTENS,EGYPTIAN FROGMEN,FLAMINGOES,HOUSING
 PROJECT,COMMUTERS,STUDEBAKERS,BONGO-BEATERS,JELLO,CALIFORNIANS,
DENTIST,INSECTS,ASPARAGUS
320 DATA RASH,TWITCH,AMPERSAND,PUNKS,MOOSE,VERMIN,STRING QUARTET
,TOOL,BRIDES,HUDDLED MASSES,ANDROIDS,PAJAMAS,UNDERWEAR,CHEERLEAD
ERS,WINNEBAGO,MILKMAN,TOASTER,TERROR,SLAVES,NIGHTMARE,CLEFT CHIN
,SANDWICH,GYPSIES,BOYS
```

Listing continues

Listing continued

```
330 DATA HOSIERY,UPHOLSTERERS,SHORTSTOPS,CONSPIRACY,TUMOR,MUCK,D
IPTHONGS,BURGERS
360 FOR C=1TOCC:READ C$(C):NEXT C
370 FORR=1TO100:NEXT R
400 CLS:PRINTTAB(12),"<<< PUNKLIST V. 5.0 >>>"
410 PRINT:INPUT"WHAT IS YOUR NAME";N$:PRINT
420 INPUT"WHAT TOWN DO YOU LIVE IN";T$:GOTO510
500 CLS
510 PRINT:INPUT"HOW MANY NAMES DO YOU WANT";N
520 PRINT:PRINT"WOULD YOU LIKE A PRINTOUT (Y/N)?"
525 P$=INKEY$
530 IF P$="Y" OR P$="N" THEN 550
540 IF P$<>"Y" OR P$<>"N" THEN 525
550 CLS:PRINT"HERE ARE YOUR"N"NAMES":PRINT
555 IF P$="N" THEN 570
560 LPRINTCHR$(32):LPRINT"HERE ARE YOUR";N;"NAMES":LPRINT
570 FOR I=1TON
580 GOSUB 1000
590 X$(1)=A$(A)
600 GOSUB 1000
610 X$(2)=B$(B)
620 GOSUB 1000
630 X$(3)=C$(C)
640 IF X$(1)="NAME" THEN X$(1)=N$+"'S"
650 IF X$(1)="TOWN" THEN X$(1)=T$+"'S"
680 IF X$(2)=""THENPRINTX$(1)+" "+X$(3)ELSE GOTO 700
685 IF P$="N" THEN 720
690 IF X$(2)=""THENLPRINTX$(1)+" "+X$(3):GOTO720
700 PRINTX$(1)+" "+X$(2)+" "+X$(3)
705 IF P$="N" THEN 720
710 LPRINTX$(1)+" "+X$(2)+" "+X$(3)
720 FOR T=1TO100:NEXT
730 NEXT I
800 PRINT:PRINT"TYPE 1 FOR NEW LIST; 2 TO EXIT"
810 Z$=INKEY$:Z=VAL(Z$)
820 ONZGOTO500,840,850
830 GOTO 810
840 CLS:PRINT@464,"NOT SO FAST, BUB!":FORU=1TO500:NEXT U:CLS:GOT
O 800
850 CLS:PRINT@464,"TAKE IT EASY, MAN.":END
1000 A=RND(AA):B=RND(BB):C=RND(CC):RETURN
```


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FLEX for the Color Computer

by Steve Odneal

Read how this Color Computer owner fused his Radio Shack Disk System with the versatile and inexpensive FLEX disk operating system.

FLEX has long been a primary operating system for 6809-based machines. I had been experimenting with it for several months before Tandy came out with their disk system for the Color Computer.

It wasn't long before I realized that the Radio Shack disk system has only a few extensions to the standard commands that let you use disks with Basic. Unlike FLEX, there is also no assembler or text editor. So, I thought, why not use FLEX on this system?

Fortunately, the Radio Shack manual included some technical information about the disk system. Once I disassembled their DOS ROM, this information helped me access the disk controller circuits in the software.

The Radio Shack system is double-density, so I modified my disk routines to work with either single- or double-density disks. And so, with the addition of a memory circuit to provide FLEX with a place to execute, the system was running.

About FLEX

Developed in 1977, FLEX consists of approximately 6K of actual program code that performs all disk accessing and terminal control necessary to create and execute programs using disks.

A powerful file-management system handles the allocation and usage of available disk space. There are 22 functions that the programmer can access, providing both sequential and random file support. Terminal management facilities provide control of keyboard input and video display output. Several routines are provided for the preparation and output of formatted data, validation of input, and so on.

Many entry points and user-accessible data areas have been standardized, so that a program written for one version of FLEX will run on another computer system that uses FLEX.

There are several adaptations of FLEX available for the Color Computer. Mine is being marketed through Computer Publishing, Inc.

Text Editor

The text editor is a line-based editor that handles data files larger than those that will fit into memory at one time. The normal find, change, insert and delete functions are provided, and blocks of lines can be deleted, moved and copied. Also, data files can be merged together by the editor, and subfiles can be created from an original text file.

6809 Assembler

The 6809 assembler is a full macro and conditional assembler, supporting both 6800 and 6809 mnemonic operation codes. The macro capability lets you define and name a sequence of instructions once, and then include them in your program by specifying that name whenever you need them.

The conditional-assembly option lets you change the assembled instructions, based on parameters of a macro-call or via assembler execution-time options. Full syntax checking and error reporting is performed, and a sorted symbolic cross-referenced table is printed at the end of the run.

Many options can be specified to control the output listing and the assembler's functions.

FLEX System Utilities

Several of the supplied FLEX system utility commands are not used in the Color Computer implementation; they support software print-spooling, which is not currently available. I won't try to describe all the remaining commands here, but will give a brief summary of the most useful ones.

The ASN command lets you select which disk drives FLEX will access when attempting to find a specified file. The system drive can be a specific drive number, or can be specified to cause an automatic search of all drives. Upon initialization, FLEX defaults to drive 0 for both the system and working drives.

The Build command can be used to

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create small text files for testing, or for EXEC commands. It is used instead of the full editor because of its quick execution, but it does not have any editing capabilities.

The CAT command provides a formatted display of the most important data about the files on a disk. Files from multiple disk-drives can be displayed, and a selection of file names to display is provided.

The Copy command copies one or more files either from disk to disk, or on the same disk. This command is especially useful in reorganizing the sectors of files on a disk for quicker access. Single files, groups of files with similar names, or all files on a disk can be copied.

"Most commands let you specify optional parameters."

The Delete command asks if you are sure you want the named file deleted before actually removing it from the disk directory. The sectors that were assigned to the file will be returned to the free-chain of available sectors.

The EXEC command is used to process a text file as a list of FLEX commands, just as if they had been entered from the keyboard individually. The text file of commands can be built using either Build, or the text editor. The series of commands is then executed by entering the command EXEC with the name of the command file.

The List command provides a listing of a text file. Page numbers, partial printing, and title options are provided. This can also be used to cause FLEX to read through a data file to ensure that no read errors will occur. Any file on disk can be listed, although program binary files will be displayed as random characters.

The Newdisk command initializes a disk in FLEX format. Disks must be initialized before being used with FLEX. Various options are provided to specify single or double density and the number of sides.

A disk name, number, and number of tracks to format are required.

The P command works in conjunction with a PRINT.SYS program to divert displayed output to a printer. It checks to see if the PRINT.SYS program is in memory, loads it from disk (if necessary), and executes the printer initialization routine in the PRINT.SYS program. This P command must be entered on the same line as the command for which output is to be diverted.

The Rename command changes either the file name or the extension of the file.

The Save command saves a portion of memory on disk as a binary file. The start- and end-memory addresses must be entered with the command. Optionally, an execution address can be specified. The file created has the same format as an executable binary program and gives two versions that execute at different memory locations.

The TTYSET command specifies various video display parameters. It is used to set the number of lines displayed before pausing or backspacing and is normally used at startup time to set standard configuration values.

The Verify command indicates if FLEX is to verify disk writes. It can also be used to tell FLEX not to verify writes, if required.

Using FLEX

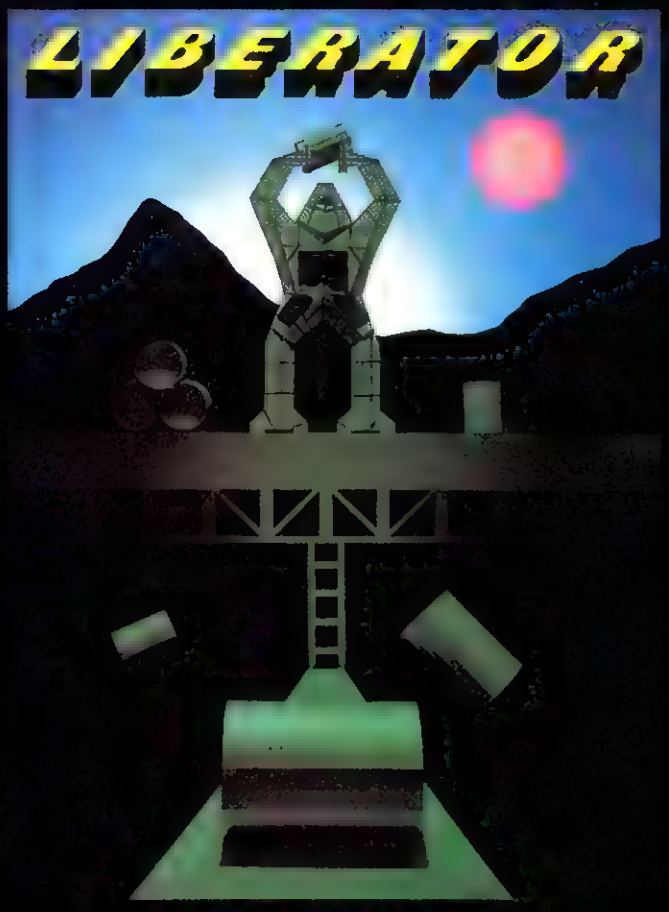
The actual operation of FLEX is quite simple. When FLEX is ready for command input, you are greeted with a prompt of three plus signs and a blinking cursor. To execute a command, enter the name of the command.

To display a list of the files on a disk, enter the command CAT at the + + + prompt. FLEX will search the system-disk directory looking for the CAT utility program. If found, it will be loaded into memory and executed. This whole operation takes only one or two seconds.

The CAT command will search through the disk directory, format the entries, and display the information on the video screen. When the command is finished, control returns to FLEX, and you will receive the + + + prompt again.

Most commands let you specify optional parameters. These values can be used by the program to modify default processing functions or to name a file to be processed. The program must be written so that it can process the input values by using some of the standard functions of FLEX.

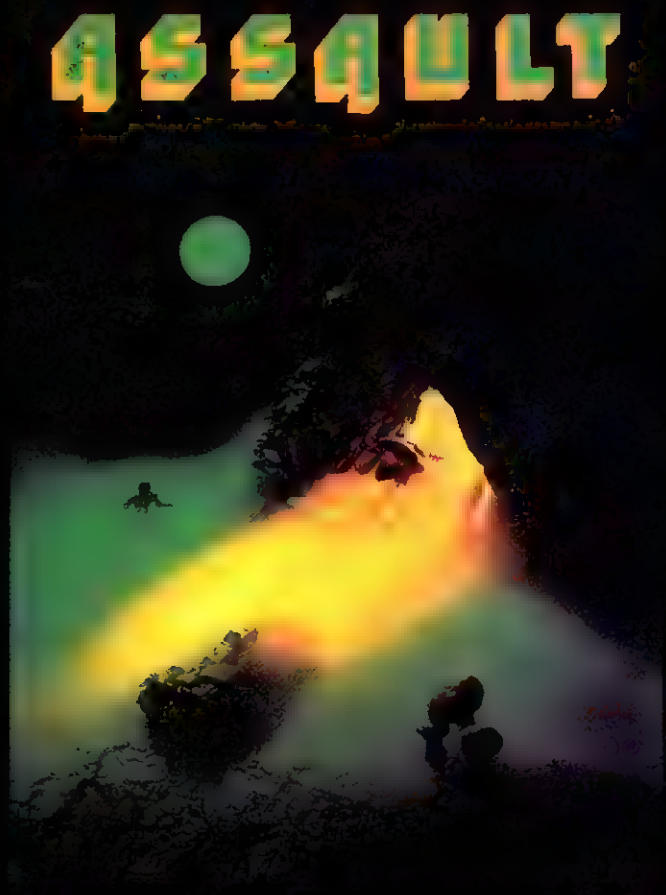
For example, if you want a catalog listing of all the files on drive 3, enter



ASSAULT

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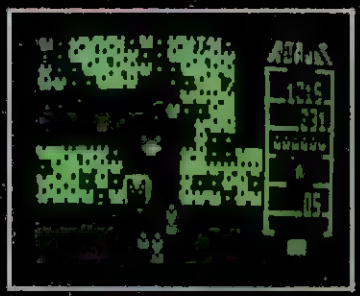
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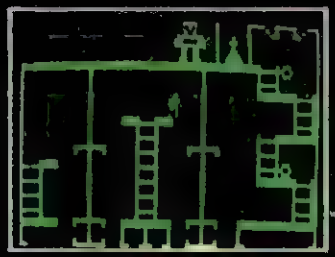


LIBERATOR

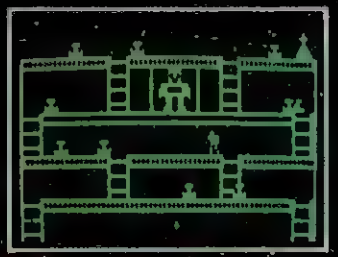
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the command CAT followed by a comma or space and the number 3. The command will read the directory entries from the disk in drive 3 and display them. If you entered CAT 1,S, the command would display all entries on the disk in drive 1 that begin with the letter S. Each command usually has a defined set of optional or required values which may be input.

File Names

Files on disk, whether text data, program data, or Basic programs, must have an assigned name. This name has the format of "file name. extension." The file name can be from one to eight alphabetic or numeric characters, of which the first must be alphabetic. The extension can be one to three characters, with the same combination restrictions. The period is shown for notational clarity only and is not actually part of the file's name on disk.

This 11-character sequence defines a data file on the disk. You can have files on different disks with the same name, but duplicate names are not allowed on the same disk. Whenever you have files with the same name on two different disks, you can specify which disk to access by adding the disk-drive number to the file name.

For example, if you wanted to specify the file MYPROG.TXT on drive 1, enter the file name as 1.MYPROG.TXT. By using standard FLEX file-management routines to process the file, FLEX will access the data file MYPROG.TXT only on drive 1.

FLEX has a suggested standard for file name extensions which most users follow. There are 12 extensions defined, some of which are: TXT for text files; BAS for Basic program files; BIN for binary program files; and CMD for utility command files.

The CMD extension is particularly significant. In the examples of the CAT command above, the actual name of the program on disk is CAT.CMD. If no extension is specified with a command input to FLEX, a CMD extension is assumed. If, however, the program you wanted to execute is named MYPROG .BIN on the disk in drive 1, enter the FLEX command as 1.MYPROG.BIN. FLEX will go to drive 1 looking for that program to be executed.

Disk Formats

There are three basic parts to each disk. The system information record is at a specific place on the disk and contains the name of the disk, and the disk number. You specify these two items when you format the disk with NEWDISK.

The CAT and SIR commands can be accessed by a user program for any purpose. SIR also contains the date the disk was created as well as information that tells FLEX the location of free space on the disk.

Each disk has a directory that contains the name of each active file on the disk, the file type (sequential or random), where the file starts on the disk, the number of sectors in the file, and the date the file was created. The directory area is allocated when the disk is initialized, but is extended automatically by FLEX if you want more than 72 files on a disk.

The last and largest portion of the disk is the data area. Each sector contains a 2-byte pointer to the next sector of the file, if any. The last (or only) sector in a file contains zeros in this pointer. Each data sector contains 256 bytes of information.

Because of the 2-byte link pointer field in a 2-byte record sequence number, there can only be 252 bytes of data in each sector. While this may seem like a waste of disk space, it simplifies reading and writing disk data, and speeds up program execution under FLEX. This simple disk structure makes it relatively easy to fix a disk, or at least recover much of a file after a crash.

Error Recovery

By using quality disks and following normal handling procedures, failures rarely happen. The Newdisk program verifies each data sector as a disk is formatted. If a bad sector is found, it is removed from the chain of sectors on the disk and formatting continues.

A good disk with 35 tracks will contain 340 sectors in single density and 612 sectors in double density. My experience shows that if a bad sector is found during the formatting process, I can usually reformat the disk, and regain that sector.

FLEX automatically verifies all disk write operations. This function is automatically enabled by FLEX, and for that reason should not normally be turned off. As each sector is written to disk, it is read back by the file-management system to ensure that all is well. If not, the write operation is retried many times.

Flex also has a built-in multiple retry function. When reading sectors from a disk, the file-management system will detect any errors, and retry the read operation seven times. If the error persists, the disk-drive read head is restored, and this operation is tried again.

This process will occur four times, giving a total retry of the read 28 times.

Most retries are not visible to the user. Only when the read head is restored and the head again moves to the track where the sector is located is there any indication of trouble. Generally, a single restore operation will help recover from most soft read failures.

Implementation

The FLEX disk operating system occupies memory from $C000 through the end of 64K of RAM on the Color Computer. The first 6K of this area is the core of FLEX; it contains the basic DOS, the file-management system, and a 2K area known as the utility command area. Many of the system utility commands execute in this area, and it is also available for your own programs.

The next 3K of memory contains the disk, keyboard, video and printer routines needed to run a full 64K RAM Color Computer. The Basic ROMs are not used in this version of FLEX for the Color Computer, and effectively disappear during execution of FLEX. For this reason, special video, keyboard and printer routines are loaded with FLEX.

The next 6K of memory provides the graphics pages necessary for high-resolution display formats.

The bottom of memory is left open for user programs, such as the editor/assembler. This memory runs from $0000 through $BFFF with no interference from the Basic ROMs. The high-resolution video-display routines use about 1,000 bytes of the top portion of this memory area for character definitions. This causes no problems, since this area is protected by the video routines from usage by other programs.

What can you do with 48K of RAM? Most FLEX programs use only a small portion of the available 48K of memory. However, some programs use all the available memory space to buffer data, such as the editor, assembler and the Copy command. Some programs for FLEX require 48K of memory, such as many Pascal programs.

You may see advertisements for a program that requires 56K of memory. They are adding the 8K that FLEX normally requires to their own requirement of 48K, so these programs should run with no problem.

Of the FLEX-based software currently available, 99 percent will run on the Color Computer system. The remaining one percent will require some special video-display formats, such as true X-Y cursor addressing and downward scrolling. You will often find a

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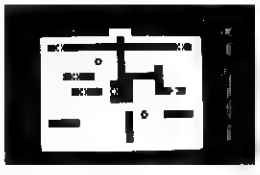
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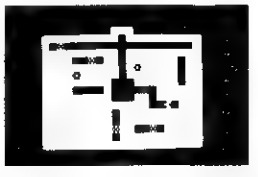
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version of the program that works with normal displays; these will also work with the Color Computer.

Running Basic

As mentioned earlier, the Basic ROMs disappear. While this would seem to imply that you cannot run Basic with FLEX, a Standard and Extended FLEX Basic are available from Technical Systems Consultants.

Of the FLEX programs written in Basic, 95 percent use the Extended version. It is a fast, high-precision Basic, providing nearly unlimited disk file-processing capability. It has several unique features, including virtual arrays. This feature allows data arrays to be dimensioned larger than would fit into memory, since they are maintained on disk. Also, since the data in the array remains on disk, it can be read and updated any number of times by multiple programs, both Basic and machine-language.

In addition, a program is supplied with the FLEX implementation package that allows the Radio Shack Basic ROM code to be put onto a FLEX disk as normal binary program files. Patches are also supplied that will let Color Basic and Extended Basic run like any other FLEX program. These patches do not yet allow disk access from Basic, but these extensions are being developed based on the standard Disk Color Basic formats.

Video Display

FLEX works well on the Color Computer with no modification, except for its video display. The Color Computer's 32-character-by-16-line display format can make data appear confusing since most FLEX programs use a standard video-display format of 64 by 16.

To solve that, I developed a 64-by-24 display format using the high-resolution graphics capabilities of the Color Computer. One problem resulted: Since most television sets are connected to the Color Computer via the RF switchbox, the characters in the 64-by-24 mode tend to smear together. This was less likely with a good quality black-and-white set, but to use FLEX with a color TV would require a modification.

I altered the number of characters displayed on one line to have the following display formats: 32 by 16, 32 by 24, 42 by 24, 51 by 24, and 64 by 24. Each format has a use in the system, but for most television sets, either the 42- or 51-character displays are most suitable.

Software Available

There are many programs available for FLEX-based systems. Some of the programming languages available include Pascal, C, Lisp, Basic, Forth, Pilot, Mumps, Fortran, Assemblers, and cross-assemblers. Usually, several versions of each are available, and I have heard that Cobol is being developed.

Many business programs are available, as are the usual number of games and utility programs. Most of this software is reasonably priced and of excellent quality.

Technical Systems Consultants has an extensive catalog of their software. These programs include an extended set of system utilities, various diagnostic programs, and a powerful debugging aid. A fast sort/merge program and a Basic precompiler are offered, as well. Just recently added is a Motorola 68000 cross-assembler.

System Requirements

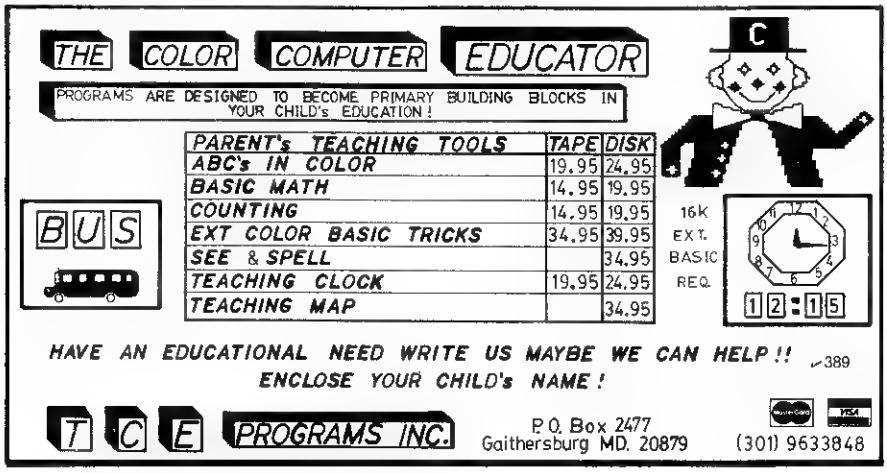
To run FLEX, you must have the Radio Shack Basic Version 1.1 ROM, 64K of RAM, and you must make a simple, reversible circuit change. The Basic 1.1 ROM required lets the proper configuration of the computer be set for the 64K of RAM when the computer is turned on. The circuit change then lets programs access the upper 32K of RAM from $8000 through $FEFF. The implementation manual describes the circuit changes necessary for the C, D, and E versions of the computer circuit board.

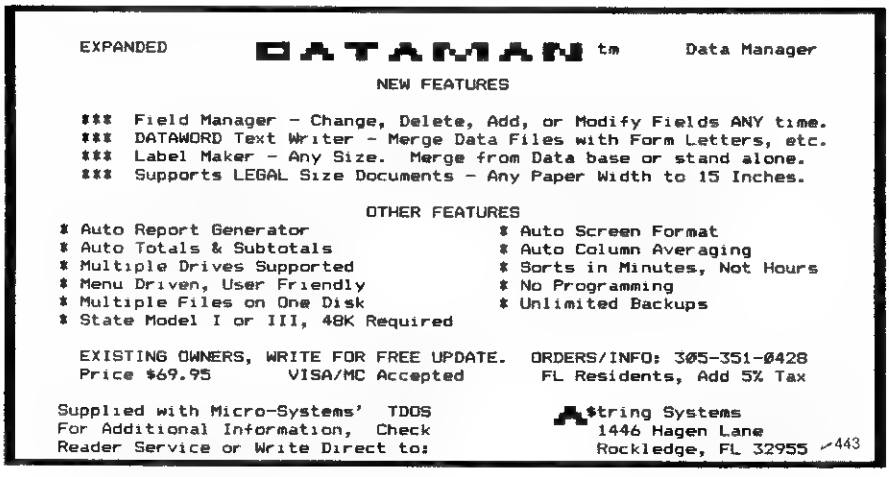
The Basic 1.1 ROM can be obtained from any Radio Shack Computer center for about $36. These changes don't affect any of the Color Computer's standard functions.

A boot disk supplied with the implementation package lets you load FLEX. FLEX is executed by entering a RUN "FLEX" command. After you enter the date, some initialization routines are performed, and the DOS is ready for commands at the + + + prompt.

A procedure outlined in the manual lets you create a disk in both Radio Shack and FLEX formats, providing a convenient method to have a single disk to boot FLEX. You should then have a separate disk with the FLEX utility commands and your own programs.

Several appendices of the implementation manual give information concerning use of the multiple video-display formats and the keyboard control, escape, and user-definable keys. A memory map of the FLEX system is also provided.





Special Programs

Version 1.0 of the installation package provides many utility and special-purpose programs with full documentation.

DISKEX provides a hexadecimal and ASCII display of data sectors on disk. Any drive, track, and sector can be displayed. Changes are made to disk sector data in a memory buffer, and then the sector can be rewritten to the disk. Changes can be entered in either hexadecimal or ASCII format.

MEMEX provides a hexadecimal and ASCII display of the contents of specified memory locations. You can scroll up and down through memory and change any byte of data. Changes can be entered in either hexadecimal or ASCII format.

Newdisk initializes disks in the FLEX format. It is used in place of any similar program supplied with the FLEX DOS system.

RSDIR displays a Radio Shack Color Disk Basic directory. This program reads the directory entries from a Color Disk Basic disk and formats them for display.

The SAVEROM program creates FLEX binary files of the Radio Shack ROMs. This program copies either of the Basic ROMs to a FLEX-format disk file. Patches are included that allow Basic to be executed as a normal FLEX program.

SDC is provided for those who have only one disk drive. You can copy up to five files at the same time from one disk to another on the same drive. All available memory is used to buffer the data in the files, and multiple insertions of the source and destination disks may be required. The source-text of the program is supplied.

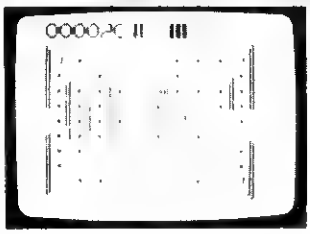
The USERKEYS program sets and displays the user-defined keyboard values. It lets you set any of the 12 user-definable keyboard key values. A display is given of the 12 keys, with the hexadecimal and ASCII value to be generated by each of them.

The multiple video-display formats are the individual formats that I mentioned previously.

If you want to use the Color Computer for serious work, you need the full power and convenience of a real disk operating system. FLEX is just such a DOS, transforming the Color Computer into a powerful, full-function computer system. ■

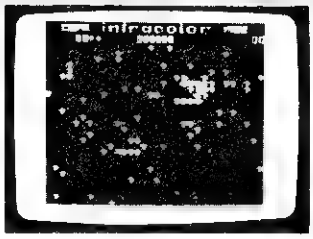
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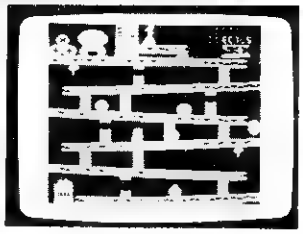
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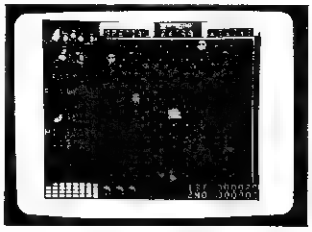
COLORPEDE

Colorpede has a variety of bugs ranging from a tiny bettle to the gigantic colorpede Colorpede has better graphics than Katerpillar but the sound is not as good Colorpede also has a more varied and complicated play routine
Tape **$29.95**



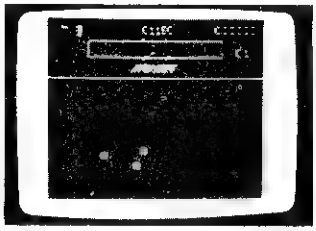
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Using the four stages from the original acrade game, with your joystick in hand try to jump the barrels, collect the pins, manuever your way past the falling jacks, and figure out the crazy conveyor belts. Written by Tom Mix, this ones sure to become a classic!
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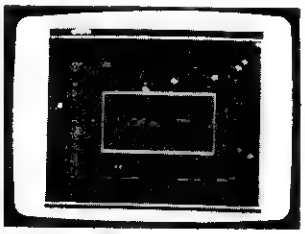
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Now a program for the Color Computer that allows you to download basic programs from Bullet-80 systems. It will also send and receive programs from other Color Computers, Model I's and Model III's.

Direct File Transfer (DFT) is a modem program which will handle the direct uploading and downloading of machine language word processor files, text files, and basic programs directly to tape or disk with no conversion necessary. It is the program you must have to download from any Bullet 80 system. DFT also has a chat mode, and has software controlled half and/or full duplex.

COLOR TAPE COPY $15.95

By Bob Withers

There have been a few copy programs on the market for the Color Computer but none can compare with Color Tape Copy. This program is designed so that you don not lose any of your valuable programs or data bases.

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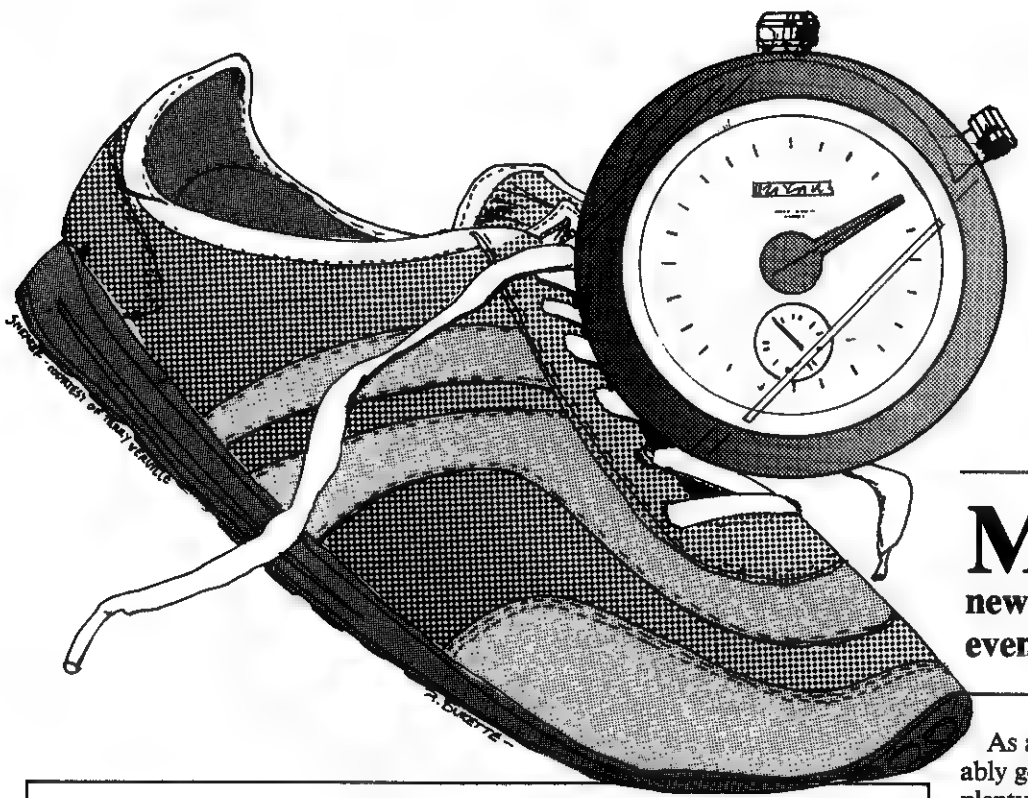
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Split Calculator

by G. Michael Vose



Marathon runners—use this program to set a new personal record, or even win your next race!

As a long distance runner, you probably get lonely at times, but you'll have plenty to think about during your next race if you plot your pacing strategy with this Split Calculator. All you'll need are a well marked racecourse, a wrist-borne stopwatch, and the split times provided by your Model I/III.

Program Listing

```
10 REM ** Split Calculator **
20 REM ** written by Mike Vose **
30 DS$=""
40 CLS:PRINT@400,"Race Split Calculator":GOSUB490
50 CLS:T4=0:C=0:PRINT@130,"Do you want the results sent to the Pri
nter";:INPUTY$
60 CLS:PRINT@130,"How many miles will you be racing";:INPUTDS$
70 PRINT@194,"What Finishing Time is your goal (HH:MM:SS)  ";
80 F$=""
90 A$=INKEY$:IF A$="" THEN 90
100 PRINTA$;:F$=F$+A$
110 IF LEN(F$)<8 THEN 90
120 DS=VAL(DS$)
130 GOSUB330
140 PRINT@320,"This will mean a pace of "P2" minutes and "INT(P+.5
)" seconds per mile."
150 GOSUB490
```

Listing continues

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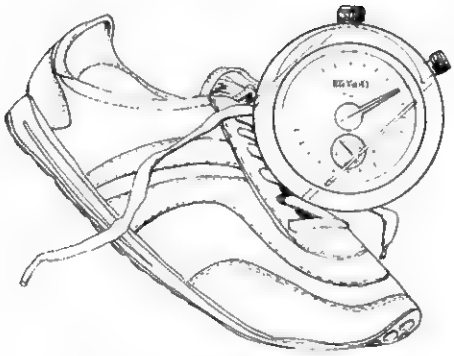
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Pace is the Key

The key to fast times in long-distance races is maintenance of a steady pace. Jackrabbit starts lead to tortoise-like finishes; conversely, slow starts make it difficult to develop speed in the latter stages of a race. This is because the human body, in an effort to preserve its energy, functions best within a narrow range of exertion—wild fluctuations in the expenditure of energy quickly deplete that energy.

Tests on runners have shown that good times are the result of steady pacing. Choose any mile clocked in Alberto Salazaar's world record run in the 1981 New York Marathon and the time will be between 4 minutes 35 seconds and 5 minutes 3 seconds. Obviously, Salazaar trained extensively to prepare for that world record effort. Equally important, however, was his attention to his pace during the race.

Here is your Split-Times Chart for 13.1 miles at 6:55 pace.

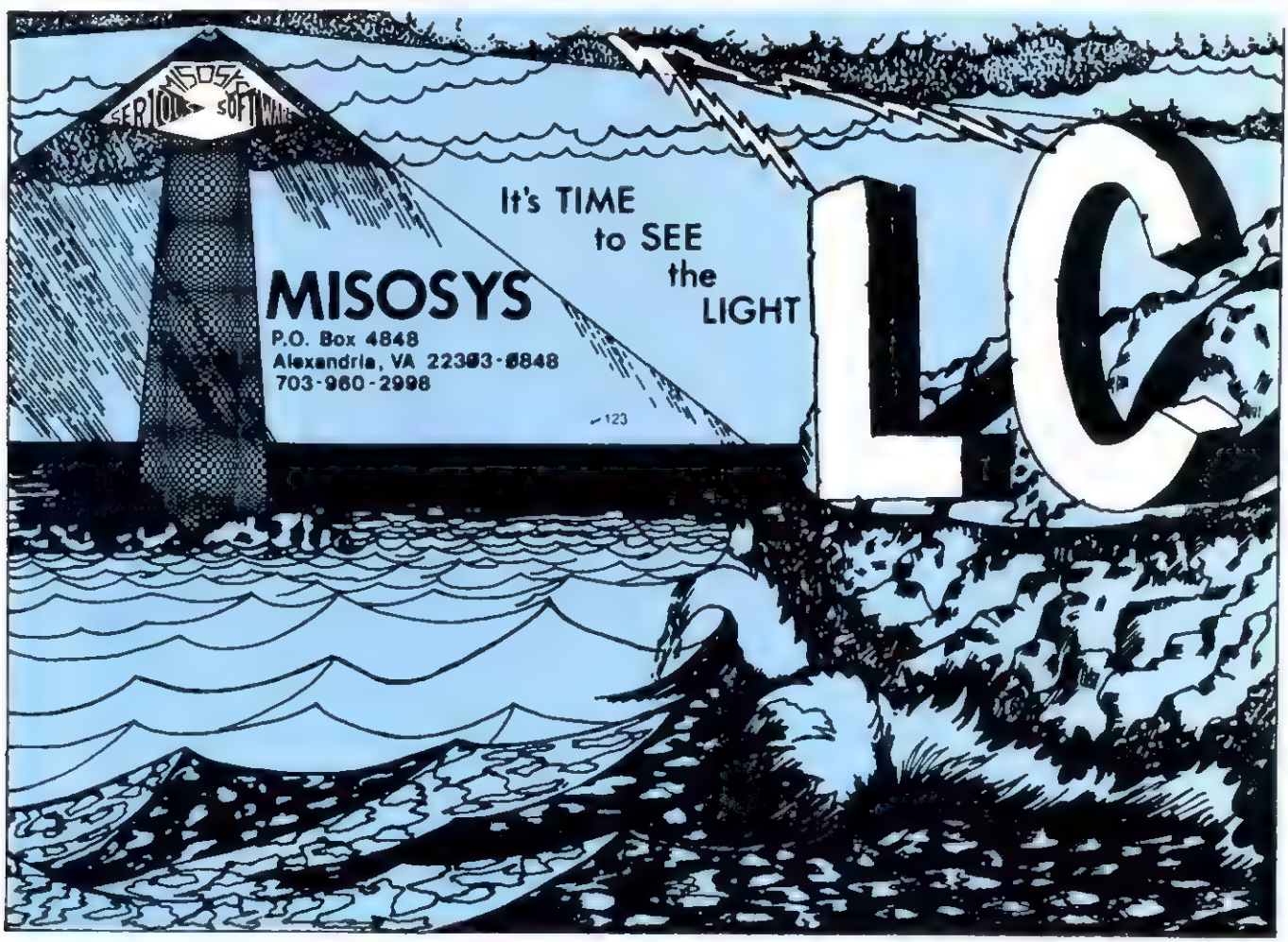
Mile -	1	Split	0: 6:55
Mile -	2	Split	0:13:50
Mile -	3	Split	0:20:45
Mile -	4	Split	0:27:40
Mile -	5	Split	0:34:35
Mile -	6	Split	0:41:30
Mile -	7	Split	0:48:25
Mile -	8	Split	0:55:20
Mile -	9	Split	1: 2:15
Mile -	10	Split	1: 9:10
Mile -	11	Split	1:16:5
Mile -	12	Split	1:23:0
Mile -	13	Split	1:29:55
Mile -	13.1	Split	1:30:30

Fig. 1. Split-Times Chart for a 90-minute half marathon.

The Split Calculator

Once you've established your goal for a race, this Program Listing charts what your time should be at the completion of each mile so you can achieve that goal. Figure 1 is a split-times chart for a half-marathon run in 90 minutes. By checking your watch or having a friend calling out the times as you pass each mile marker, you'll be able to judge whether you need to increase or decrease your pace.

To use the Split Calculator, enter the distance of the race (in miles) and your projected finishing time. The chart can be written to either the TRS-80 screen or to your printer.



The finishing time input routine uses the INKEY$ function of Level II Basic. Avoid using the backspace (left arrow) when you enter the time. Use colons to separate the hours, minutes, and seconds (all three are required) of your input.

"Jackrabbit starts lead to tortoise-like finishes; conversely, slow starts make it difficult to develop speed."

Only a Tool

The Split Calculator can help you gauge your pace during a race but it can't help you achieve an unrealistic goal. You must decide, given your training and conditioning, what finishing time you think is achievable. Once you decide, the steady pace that the split times chart helps you maintain can contribute to your success. ■

Listing continued

```
160 CLS
170 PRINT@140,"Here is your Split Times Chart for each mile."
180 PRINT
190 FORX=1TOINT(DS)
200 V=0:K=0
210 T1=P2:T2=INT(P+.5)
220 T3=X*T1:T2=(T2*X)
230 IFT2>59.5THENT2=T2-60:V=V+1:GOTO230
240 T3=T3+V:IF T3>59.5 THENV=0: T3=T3-60:K=K+1:GOTO240
250 T4=K
260 IFLEFT$(Y$,1)="Y"ORLEFT$(Y$,1)="y"THEN420
270       PRINT"Mile -  "X" Time      "T4" Hrs"T3" Mins and "T2" sec
s."
280 IF INT(VAL(DS$))=X THEN   PRINT"Mile -  "VAL(DS$)" Time   "LEF
T$(F$,2)":"MID$(F$,4,2)":"RIGHT$(F$,2)
290 NEXT X
300 IF LEFT$(Y$,1)="Y" OR LEFT$(Y$,1)="y" THEN LPRINTCHR$(12)
310 PRINT@980,"Do Another";:INPUT K$
320 IFK$="Y"OR K$="y" THEN50   ELSEEND
330 REM**  Routine to Convert Time Into Seconds **
340 REM** H$ is hours, M$ is minutes, S$ is seconds
350 H$=LEFT$(F$,2):M$=MID$(F$,4,2):S$=RIGHT$(F$,2)
360 H=VAL(H$):M=VAL(M$):S=VAL(S$):
370 T=(H*3600)+(M*60)+S:'  CONVERT ALL VALUES TO SECONDS
380 P=T/DS
390 P1=INT(P/3600):P=P-(P1*3600)
400 P2=INT(P/60):P=P-(P2*60)
410 RETURN
420 IFC=1THEN460
430 LPRINT"Here is your Split Times Chart for "DS" miles at "P2":"
;INT(P+.5)" pace."
440 C=1
450 LPRINT
460 LPRINT"Mile - "TAB(8)XTAB(20)"Split  "T4":"T3":"T2
470 IF INT(VAL(DS$))=X THENLPRINT"Mile -"TAB(8)DS$TAB(20)LEFT$(F$,
2)":"MID$(F$,4,2)":"RIGHT$(F$,2)
480 GOTO290
490 FORI=1TO1550:NEXT
500 RETURN
```


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LC Compiler

The "LC" Compiler provides a substantial subset of the C programming language with:
- o Integer subset of C; has access to floating point ROM routines via functions
- o All statements supported except: SWITCH-CASE, GOTO, TYPEDEF, STRUCT, UNION.
- o All operators except "->", ".", SIZEOF, (TYPENAME).
- o Standard I/O redirection with device independence.
- o Input using FGETS or GETS functions support JCL.
- o Dynamic memory management.
- o Sequential files open for: READ, WRITE, and APPEND.
- o LC Generates Z-80 EDAS-IV source code as output.
- o Z-80 "source" libraries in ISAM-accessed PDS files.
- o Compact, one-line compiler invocation for easy use.
- o Compiled programs run on both Model I and Model III
- o IN/LIB accesses graphics and LDOS entry points.
- o LC/LIB includes: FPRINTF, PRINTF, ALLOC, FREE, SBRK, and String functions.
- o LC: The Mod I/III version includes: LC/CMD, LC/LIB, FP/LIB, IN/LIB, EDAS-IV, XREF, and more than 200 pages of documentation.

Requires 2-drive 48K LDOS. Mod I&3 for LDOS: $150+$4S&H

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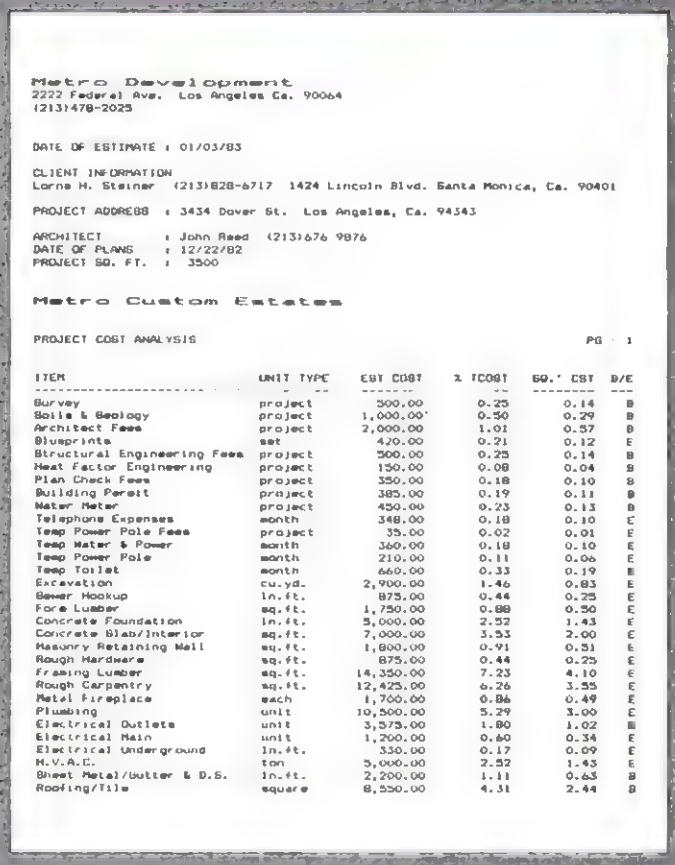
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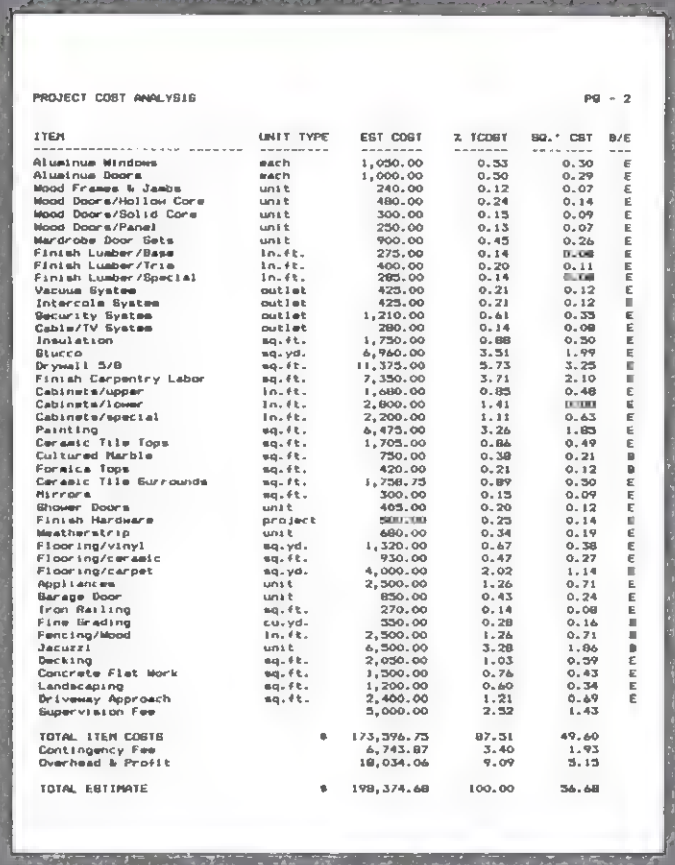
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Metro Custom Estates

PROJECT COST ANALYSIS PG - 1

ITEM	UNIT TYPE	EST COST	% TCOST	SQ.' CST	B/E
Survey	project	500.00	0.25	0.14	B
Soils & Geology	project	1,000.00	0.50	0.29	B
Architect Fees	project	2,000.00	1.01	0.57	B
Blueprints	set	420.00	0.21	0.12	E
Structural Engineering Fees	project	500.00	0.25	0.14	B
Heat Factor Engineering	project	150.00	0.08	0.04	B
Plan Check Fees	project	350.00	0.18	0.10	B
Building Permit	project	385.00	0.19	0.11	B
Water Meter	project	450.00	0.23	0.13	B
Telephone Expenses	month	348.00	0.18	0.10	C
Temp Power Pole Fees	project	35.00	0.02	0.01	E
Temp Water & Power	month	360.00	0.18	0.10	E
Temp Power Pole	month	210.00	0.11	0.06	E
Temp Toilet	month	660.00	0.33	0.19	E
Excavation	cu.yd.	2,900.00	1.46	0.83	E
Sewer Hookup	ln.ft.	875.00	0.44	0.25	E
Fore Lumber	sq.ft.	1,750.00	0.88	0.50	C
Concrete Foundation	ln.ft.	5,000.00	2.52	1.43	E
Concrete Slab/Interior	sq.ft.	7,000.00	3.53	2.00	E
Masonry Retaining Wall	sq.ft.	1,800.00	0.91	0.51	E
Rough Hardware	sq.ft.	875.00	0.44	0.25	E
Framing Lumber	sq.ft.	14,350.00	7.23	4.10	E
Rough Carpentry	sq.ft.	12,425.00	6.26	3.55	E
Metal Fireplace	each	1,700.00	0.86	0.49	E
Plumbing	unit	10,500.00	5.29	3.00	E
Electrical Outlets	unit	3,575.00	1.80	1.02	E
Electrical Main	unit	1,200.00	0.60	0.34	E
Electrical Underground	ln.ft.	330.00	0.17	0.09	E
H.V.A.C.	ton	5,000.00	2.52	1.43	E
Sheet Metal/Gutter & D.S.	ln.ft.	2,200.00	1.11	0.63	B
Roofing/Tile	square	8,550.00	4.31	2.44	B



PROJECT COST ANALYSIS PG - 2

ITEM	UNIT TYPE	EST COST	% TCOST	SQ.' CST	B/E
Aluminum Windows	each	1,050.00	0.53	0.30	E
Aluminum Doors	each	1,000.00	0.50	0.29	E
Wood Frames & Jambs	unit	240.00	0.12	0.07	E
Wood Doors/Hollow Core	unit	480.00	0.24	0.14	E
Wood Doors/Solid Core	unit	300.00	0.15	0.09	E
Wood Doors/Panel	unit	250.00	0.13	0.07	E
Wardrobe Door Sets	unit	900.00	0.45	0.26	E
Finish Lumber/Base	ln.ft.	275.00	0.14	0.08	E
Finish Lumber/Trim	ln.ft.	400.00	0.20	0.11	E
Finish Lumber/Special	ln.ft.	285.00	0.14	0.08	E
Vacuum System	outlet	425.00	0.21	0.12	E
Intercom System	outlet	425.00	0.21	0.12	E
Security System	outlet	1,210.00	0.61	0.33	E
Cable/TV System	outlet	280.00	0.14	0.08	E
Insulation	sq.ft.	1,750.00	0.88	0.50	E
Stucco	sq.yd.	6,960.00	3.51	1.99	E
Drywall 5/8	sq.ft.	11,375.00	5.73	3.25	E
Finish Carpentry Labor	sq.ft.	7,350.00	3.71	2.10	E
Cabinets/upper	ln.ft.	1,680.00	0.85	0.48	E
Cabinets/lower	ln.ft.	2,800.00	1.41	0.80	E
Cabinets/special	ln.ft.	2,200.00	1.11	0.63	E
Painting	sq.ft.	6,475.00	3.26	1.85	E
Ceramic Tile Tops	sq.ft.	1,705.00	0.86	0.49	E
Cultured Marble	sq.ft.	750.00	0.38	0.21	B
Formica Tops	sq.ft.	420.00	0.21	0.12	B
Ceramic Tile Surrounds	sq.ft.	1,758.75	0.89	0.50	E
Mirrors	sq.ft.	300.00	0.15	0.09	E
Shower Doors	unit	405.00	0.20	0.12	E
Finish Hardware	project	500.00	0.25	0.14	E
Weatherstrip	unit	680.00	0.34	0.19	E
Flooring/vinyl	sq.yd.	1,320.00	0.67	0.38	E
Flooring/ceramic	sq.ft.	930.00	0.47	0.27	E
Flooring/carpet	sq.yd.	4,000.00	2.02	1.14	E
Appliances	unit	2,500.00	1.26	0.71	E
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Fine Grading	cu.yd.	550.00	0.28	0.16	E
Fencing/Wood	ln.ft.	2,500.00	1.26	0.71	E
Jacuzzi	unit	6,500.00	3.28	1.86	B
Decking	sq.ft.	2,050.00	1.03	0.59	E
Concrete Flat Work	sq.ft.	1,500.00	0.76	0.43	E
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Driveway Approach	sq.ft.	2,400.00	1.21	0.69	E
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APL Primer—Part V

by Margaret M. Grothman

It's all here—pi and trig functions, the quadratic formula, base conversions, statistics, determinants, and matrix inversions.

In this, the final part of a series on APL, I will introduce some new functions. Several short programs will combine functions discussed in previous months.

Quadratic Formula

The quadratic formula for solving linear equations can easily be set up as a defined function in APL (see Program Listing 1). The mathematical formula is:

$$\frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

The monadic Quadratic function requires you to enter a three-element vector, corresponding to the three coefficients of the linear equation to be solved. In lines 1–3, that vector is separated into three separate variables, A, B, and C.

Line 4 computes the discriminant (b^2-4ac) of the equation. The status of the discriminant as positive, negative, or zero determines whether the roots are real or nonreal. If the discriminant is positive, the equation has two roots that are real numbers. If the discriminant is zero, there is only one real root. A negative discriminant indicates that there are no real roots. Line 5 tests for the negative condition and diverts execution to the error message in line 11.

```
)DEF QUADRATIC COEF
1: A←COEF(1)
2: B←COEF(2)
3: C←COEF(3)
4: DISC←(B*2)__4 ■X A ■X C
5: →(DISC <0)/ NONREAL
6: ROOT1←((__B) + (DISC*.5)) %2 ■X A
7: ROOT2←((__B)__(DISC*.5)) %2 ■X A
8: ROOT1
9: ROOT2
10: →
11: NONREAL: 'THERE ARE NO REAL ROOTS.'
```

Program Listing 1

The equation $2x^2-x-3=0$ has two solutions for x, 1.5 and –1.

```
Enter:  QUADRATIC 2 -1 -3
Result: 1.5
        -1
```

The equation $x^2+2x+1=0$ has a discriminant of 0, so there is only one root. The second example, $2x^2+2x+3$, has no real solution.

```
Enter:  QUADRATIC 1 2 1
Result: -1
        -1

Enter:  QUADRATIC 2 2 3
Result: THERE ARE NO REAL ROOTS.
```

Pi and Trig Functions

The monadic use of shift O produces multiples of pi.

```
Enter:  ■O 2
Result: 6.28319

Enter:  ■O 1 2 3
Result: 3.14159 6.28319 9.42478
```

Dyadic shift O is used for trigonometric functions. The first argument designates the function. In APL80, the following functions are available:

```
 1  Sine
 2  Cosine
 3  Tangent
-1  Arcsine
-2  Arccosine
-3  Arctangent
```

The second argument is the angle ex-

pressed in radians. Since 180 degrees equals pi radians, one degree equals pi divided by 180, or approximately .0174533. To convert from degrees to radians, multiply the number of degrees by .0174533.

For example, to find the sine of 30 degrees, use either of the following two entries to produce the right answer, .5.

```
Enter: 1 ▪O 30 ▪X ▪O 1 % 180
   or
Enter: 1 ▪O 30 ▪X .0174533
```

The first example incorporates the computation of pi divided by 180 degrees. This is done through the monadic use of shift O. The second example uses the factor .0174533 directly.

```
Enter:   2 ▪O 60 ▪X ▪O 1 % 180
Result:  .5 (cosine 60 degrees)

Enter:   3 ▪O 30 ▪X ▪O 1 % 180
Result:  .57735 (tangent 30 degrees)
```

```
)DEF STATS SAMPLE
1: N←▪P SAMPLE
2: MEAN←(+/SAMPLE) % N
3: VARIANCE←(+/SAMPLE-MEAN*2) % N-1
4: STNDEV←VARIANCE * .5
5: LOW←▪L/SAMPLE
6: HIGH←▪H/SAMPLE
7: SAMPLE←SAMPLE[↑SAMPLE]
8: →(0 = 2 ▪J N)/EVEN
9: MID←(N + 1) % 2
10: MEDIAN←SAMPLE[MID]
11: →DISPLAY
12: EVEN: MID←N % 2
13: MEDIAN←(SAMPLE[MID] + SAMPLE[MID + 1]) % 2
14: DISPLAY: 'SAMPLE SIZE =';N
15: 'RANGE IS FROM';LOW;'TO';HIGH
16: 'MEAN =';MEAN
17: 'MEDIAN =';MEDIAN
18: 'VARIANCE =';VARIANCE
19: 'STANDARD DEVIATION =';STNDEV
```

Program Listing 2

Statistics

The Stats program (see Listing 2) computes a set of statistics for a sample population. Statistics produced by the program are the mean, median, range, variance, and standard deviation.

Line 1 finds the number of elements (N) in the vector, SAMPLE. The mean is determined in line 2 by adding the numbers in SAMPLE and dividing by N. Lines 3 and 4 apply the formulas for the variance and the standard deviation. In lines 5 and 6, the maximum and minimum functions are used to find the low and high values in SAMPLE.

The median is computed in lines 7–13. First, the grade-up function is used to sort SAMPLE from low to high. If N is odd, the median is the middle value; if N is even, the median is the average of the two middle values.

Lines 14–19 display the results. Note that the fields are separated from each

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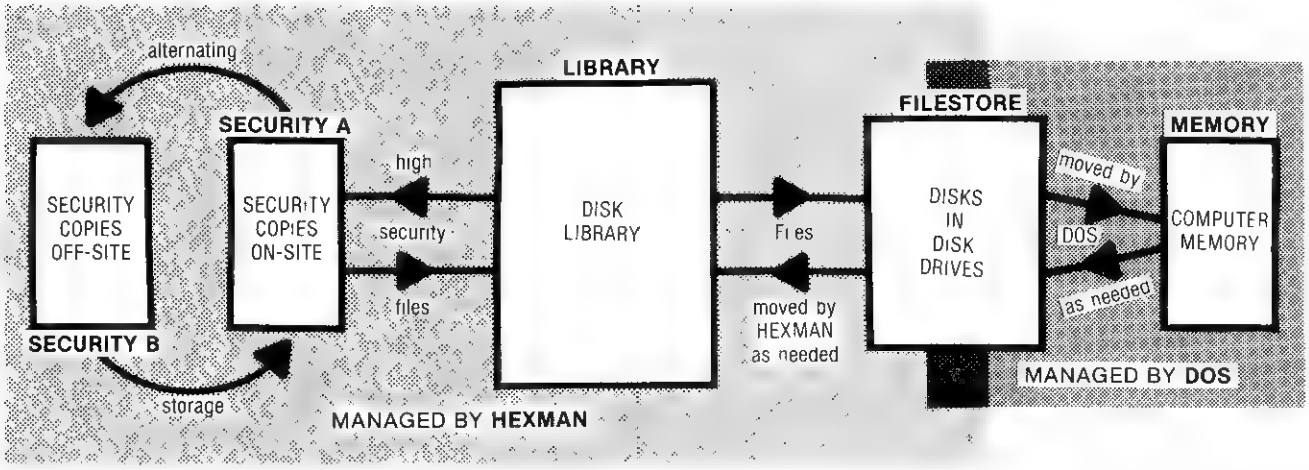
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other by semicolons.

Following is an example that computes the statistics for a sample consisting of the six integers: 1, 3, 4, 5, 7, and 9.

```
Enter:  STATS 1 3 4 5 7 9
Result: SAMPLE SIZE = 6
        RANGE IS FROM 1 TO 9
        MEAN = 4.83333
        MEDIAN = 4.5
        VARIANCE = 8.16667
        STANDARD DEVIATION = 2.85774
```

Encode

Encode is a dyadic function used to convert numbers from base 10 to another base. The argument on the left is a vector whose shape indicates the number of digits, and whose values indicate the desired base. VEC8 in the example below has 10 elements, so there will be 10 digits in the result. All elements of VEC8 are 8's, so the answer will be an octal number.

```
Enter:  ■Q←VEC8←10 ■P 8
Enter:  VEC8 ■T 21970
Result: 0 0 0 0 0 5 2 7 2 2
```

The digits in the left argument need not all be the same. With Encode, you can convert the number of seconds to hours, minutes, and seconds. Or you can convert the number of ounces to pounds and ounces as in the following example:

```
)DEF OZTOLB
1: 'ENTER THE NUMBER OF OUNCES'
2: OZ←■Q
3: LB←0 16 ■T OZ
4: 1↑LB; 'POUNDS AND'; 1↓LB;'OUNCES'
```

Line 3 converts the number of ounces to base 16. The zero is necessary so that pounds and ounces will be printed.

Decode

Decode uses the symbol shift B and is the reverse of Encode. With Decode, you can convert a number from another base to base 10. For example, let's convert hexadecimal 7777 to base 10. The left argument is the old base and the right argument is a vector containing the number to be converted.

```
Enter:  16 ■B 7 7 7 7
Result: 30583
```

Decode does not accept letters as input, so if you want to convert hex numbers using A, B, C, D, E, or F, you must enter 10, 11, 12, 13, 14, or 15 instead. The following example converts hexadecimal 7FFF to its decimal equivalent.

```
Enter:  16 ■B 7 15 15 15
Result: 32767
```

Matrix Inverse

The inverse of a matrix has important mathematical applications. To understand what the inverse is, you first need to know what an identity matrix is. An identity matrix consists of only 1's and 0's. The 1's form a diagonal from upper left to lower right; all other positions contain 0's. For example, a 3-by-3 identity matrix appears as

```
1 0 0
0 1 0
0 0 1
```

When a matrix is multiplied by its inverse, the resulting matrix is an identity matrix. APL80 does not have a built-in function to perform the inverse operation. A user-defined function for matrix inverse would be lengthy and complex. However, there is an easy formula for computing the inverse of a 2-by-2 matrix and it is used in the program Inverse (see Listing 3).

The relationship between a 2-by-2

Continues on p. 164

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Continued from p. 160

matrix and its inverse is shown in the following formula:

$$\begin{array}{cc} \textbf{Matrix} & \textbf{Inverse} \\ \begin{vmatrix} a & b \\ c & d \end{vmatrix} & \begin{vmatrix} \frac{d}{ad-bc} & \frac{-b}{ad-bc} \\ \frac{-c}{ad-bc} & \frac{a}{ad-bc} \end{vmatrix} \end{array}$$

The denominator, ad–bc, is called the determinant. If the determinant equals zero, the matrix has no inverse. The program tests for this condition in line 8, and diverts to the error message, NO-INV, if the determinant equals zero.

```
Enter:   ■Q←MAT←2 2 ■P 3 6 2 4
Enter:   INVERSE MAT
Result:  THIS MATRIX HAS NO INVERSE.
Enter:   ■Q←MAT←2 2■P ■I 4
Enter:   INVERSE MAT
Result:  -2 1
         1.5 -5
```

You can confirm this result by using the MULT program in Part IV of this series to see if an identity matrix is produced when MAT and its inverse are multiplied. If MULT is not already in your workspace, you must reenter it to perform this check.

```
)DEF XR←INVERSE MATRIX
1: DIM←■P MATRIX
2: →(DIM $ 2 2)/WRONGSIZE
3: A←MATRIX (1;1)
4: B←MATRIX (1;2)
5: C←MATRIX (2;1)
6: D←MATRIX (2;2)
7: DET←(A ■X D)__B ■X C
8: ←(DET=0)/NO-INV
9: MATRIX(1;1)←D % DET
10: MATRIX(1;2)←B % DET
11: MATRIX(2;1)←C % DET
12: MATRIX(2;2)←A % DET
13: XR←MATRIX
14: →
15: WRONGSIZE: 'THIS FUNCTION ONLY WORKS ON 2-×-2
    MATRICES.'
16: →
17: NO-INV: 'THIS MATRIX HAS NO INVERSE.'
```

Program Listing 3

```
)DEF LNEQ2
1: #28; #31
2: 'ENTER THE COEFFICIENTS OF THE EQUATIONS.'
3: '....X....Y = ....'
4: #-128
5: A←■Q
6: #-133
7: B←■Q
8: #-140
9: EQ1←■Q
10: '....X....Y = ....'
11: #-192
12: C←■Q
13: #-197
14: D←■Q
15: #-204
16: EQ2←■Q
17: DET←(A ■X D)__B ■X C
18: →(DET = 0)/NO-SOL
19: MATRIX←2 2 ■P A, B, C, D
20: EQMAT←2 1 ■P EQ1, EQ2
21: SOLUTION←(INVERSE MATRIX) MULT EQMAT
22: SOLUTION
23: →
24: NO-SOL: 'THERE IS NO SOLUTION TO THIS SET OF
    EQUATIONS.'
```

Program Listing 4

```
Enter:   MAT MULT INVERSE MAT
Result:  1 0
         0 1
```

The Inverse function is used to solve simultaneous linear equations. Since the Inverse program above only works for 2-by-2 matrices, you can only use it to solve systems of two equations in two unknowns, such as

$$3x + 4y = 17$$
$$2x - 3y = -4$$

Program Listing 4, LNEQ2, calls the user-defined functions Inverse (above) and MULT (from Part IV) as subprograms.

Most LNEQ2 program lines are devoted to setting up the format of the input. The solution process is quite simple and takes place in lines 17–22. The coefficients of x and y are formed into a 2-by-2 matrix called MATRIX, and the values to the right of the equals sign are formed into a 2-by-1 matrix called EQMAT. When EQMAT and the inverse of MATRIX are multiplied together, a third matrix, SOLUTION, is formed. Its dimensions are 2 by 1, and its elements are the two solutions for x.

Like the program Inverse, LNEQ2 calculates the determinant of MATRIX, and passes execution to an error message if the determinant equals zero. If this is the case, there is no solution to the set of equations.

```
Enter:   LNEQ2
Enter:   3 4 17 as coefficients of first equation
Enter:   2 -3 -4 as coefficients of second
         equation
Result:  2.05882
         2.70588
```

To check the accuracy of the solution,

```
Enter:   ((3 ■X SOLUTION (1;1) + 4 ■X
         SOLUTION (2;1)) = 17
Result:  1
Enter:   ((2 ■X SOLUTION (1;1))__3 ■X
         SOLUTION (2;1)) = -4
Result:  1
```

```
)DEF X OUTPROD Y
1: DIM←(■P X), ■P Y
2: TABLE←DIM ■P 0
3: I←1
4: LOOP: TABLE(I;)←X(I) ■X Y
5: →(I = ■P X)/RESULT
6: I←I + 1
7: →LOOP
8: RESULT:TABLE
9: break
```

Program Listing 5

Here is another example.

Enter: LNEQ2
Enter: 3 3 13 as the coefficients of the first equation
Enter: 3 3 12 as the coefficients of the second equation
Result: THERE IS NO SOLUTION.

Outer Product

Outer Product is a useful APL function that the APL80 tape version lacks. Outer Product performs an operation between each element of one array and each element of another. For example, if Outer Product multiplication is performed on two five-element vectors, the result will be a 5-by-5 matrix.

The program OUTPROD (see Listing 5) is not a substitute for a built-in Outer Product function. Its use is limited to vectors and it performs multiplication outer product only. You can change line 4 to perform another function just by changing the shift X symbol to another dyadic function symbol: another arithmetic operator, a relational operator, and so on.

The most obvious application of OUTPROD is a multiplication table.

Enter: ■Q←N← ■I 9
Enter: N OUTPROD N
Result: multiplication table for numbers 1–9

OUTPROD is fun to experiment with. For example, try changing the symbol in line 4 to shift H or shift J. Then type N OUTPROD N again.

The last program (see Listing 6) is Weightloss, useful for planning a diet. It computes the length of time it will take to reach a chosen weight while consuming a certain number of calories per day. 3,500 calories make up a pound, and 15 calories per day maintain each pound of body weight.

The program contains two error traps. If you enter a desired weight that is more than you weigh now, execution will be diverted to the error message GAIN. If the number of calories you select is more than that required to maintain your desired weight, you will never reach your goal. The error message at TOOMUCH lets you select a different number of calories and return to START.

The loop in lines 12–18 computes the difference between the number of calories consumed on each day and the number required to maintain your weight on that day. The difference divided by 3,500 is the amount of weight loss for that day expressed in pounds. ACCLOSS is the accumulated loss, which is subtracted from your present weight to determine the weight for the next loop. Each pass through the loop represents one day. Line 17 prints the day number and the corresponding weight to the nearest pound.

When your weight is within one-half pound of your goal, execution passes out of the loop to RESULT. The Encode function in line 28 converts the number of days to the number of weeks. WEEKS is a two-element vector consisting of the number of weeks and the number of days. In line 29, the take function is used to report the number of weeks, and the drop function is used to report the remaining days. ■

"The last program is Weightloss, useful for planning a diet."

```
)DEF WEIGHT
1: #28; #31
2: 'WHAT IS YOUR PRESENT WEIGHT?'
3: PRES←■Q
4: 'WHAT WOULD YOU LIKE TO WEIGH?'
5: GOAL←■Q
6: →(GOAL>PRES)/GAIN
7: 'HOW MANY CALORIES A DAY DO YOU PLAN TO EAT?'
8: CAL←■Q
9: START:→(CAL > GOAL ■X 15)/TOOMUCH
10: ACCLOSS←0
11: DAYS←0
12: LOOP: LOSS←((PRES ■X 15) CAL) % 3500
13: PRES←PRES_LOSS
14: DAYS←DAYS + 1
15: ACCLOSS←ACCLOSS + LOSS
16: →(PRES < GOAL + .5)/RESULT
17: 'DAY';DAYS;'YOU WEIGH'; ■L PRES
18: →LOOP
19: TOOMUCH: 'YOU MAY NOT HAVE THAT MANY
    CALORIES'
20: 'OR YOU WILL NEVER REACH YOUR DESIRED
    WEIGHT.'
21: 'ENTER A LOWER NUMBER OF CALORIES.'
22: CAL←■Q
23: →START
24: GAIN: 'THIS IS A WEIGHT LOSS PROGRAM'
25: 'IF YOU WANT TO GAIN WEIGHT, FIND ANOTHER
    PROGRAM.'
26: →0
27: RESULT: 'HERE IS THE RESULT'
28: WEEKS←0 7 ■T DAYS
29: 'IN'; 1↑WEEKS;'WEEKS AND'; 1↓WEEKS; 'DAYS YOU
    WILL'
30: 'REACH YOUR DESIRED WEIGHT OF'; GOAL;
    'POUNDS.'
31: 'TO MAINTAIN THAT WEIGHT YOU WILL HAVE TO'
32: 'LIMIT YOURSELF TO'; GOAL ■X 15; 'CALORIES PER
    DAY.'
```

Program Listing 6

Contact Margaret Grothman at 5117 Denton Place, Madison, WI 53711.

References

Goldstein, Larry J., and Schneider, David I. Finite Mathematics and Its Applications. *Englewood Cliffs, New Jersey: Prentice-Hall, 1980.*

Ramsey, James B., and Musgrave, Gerald L. APL-STAT. *Belmont, California: Lifetime Learning Publications, 1981.*

Peelle, Howard A. APL, An Introduction. *Rochelle Park, New Jersey: Hayden Book Company, 1978.*

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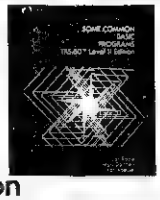
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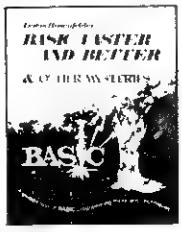
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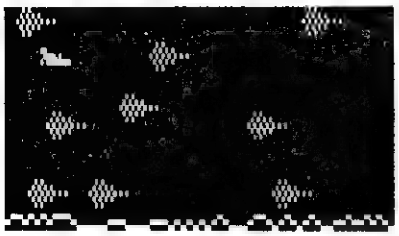
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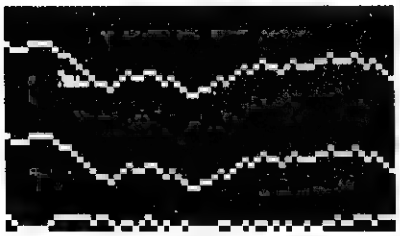
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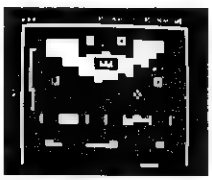


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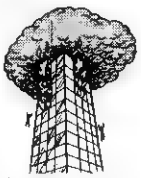


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Inside AIDS-III—Part II

by Robert A. Fiorelli

Last month, we presented AIDS-III. Now you can round off your data-management system with MAPS—III, CALCS-III, and MERGE-III.

This is the second of a two-part series. Part 1, which discussed AIDS-III, appeared last month (p. 136).

AIDS-III was never meant to be all things to all people. It was designed to provide capabilities that are central to any data management task—data entry, sorting, and updating.

Being a memory-based system, it was necessary to support additional features outside of the main program. These small, specialized modules, called subsystems, read data files created by AIDS-III.

The two most widely-used subsystems, MAPS-III and CALCS-III, are in Program Listings 1 and 2. MAPS is used for producing simple reports, mailing labels and lists. CALCS, used for more complex reports, supports automatic page numbering, optional indentation, columnar subtotals and totals, balance-forward calculations, computed columnar values, and more.

To use MAPS, CALCS or any other subsystem, you will have to create a descriptor file. A descriptor file describes the names, lengths and types of fields within a data file. To write a descriptor file, simply choose option 8 on the AIDS-III main menu.

CALCS and MAPS have no sorting capabilities. If you must sort data files, use AIDS.

Table 1 lists all control keys and their functions. MAPS and CALCS both use the standard Basic printer driver. If a printer is attached and ready, the programs will automatically direct their output to it.

If you use a nonstandard printer, change line 60070 of both programs to DATA N. The default page size is 66 lines. If you want to use a different line count, change line 60090 in both programs appropriately.

To terminate either program, skip back to the first screen (Name of Descriptor File:__) and press shift/down

Control Keys	Functions
Enter	Entry complete, accept data
Up arrow	Skip back to previous entry line
Down arrow	Skip forward to next entry line
Left arrow	Backspace, erase last character typed
Right arrow	Right-justify entry data
Shift/Up arrow	Skip back to previous entry screen
Shift/Down arrow	Skip forward to next entry screen
Shift/Left arrow	Erase entire contents of entry line
Shift/Right arrow	Restore line to original contents
Clear	Cancel action, exit to previous action

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arrow. When the word "ready" appears, the program is done.

MAPS-III

Maps is easy to operate. First, you must enter the name of the descriptor file associated with the data file to be printed.

MAPS has three printing options. The first, "Print Down the Page," lists your data in a vertical format. Simply turn on your printer before completing the MAPS record selection sequence. (This sequence is identical to that of AIDS-III.)

The second option, "Print Across the Page," lists your data in a horizontal format. Page numbers and columnar headings are automatically generated. Tear lines are printed on page boundaries.

The third option, "Print User-Defined Format," allows you to define your own output form. Table 2 contains the specifiers you may use.

For example, the user-defined format "A/B/C..D;E////" describes a mailing label. A, the name field, will print on the first line. The street field, B, will print on the second line. The third line will consist of field C, the city, followed by two blank spaces, followed by the state, field D, followed by five blank spaces, followed by field E, the zip. The

A–T	Print contents of specified field
.	Print 1 blank space
;	Print 5 blank spaces
:	Print 10 blank spaces
!	Print 20 blank spaces
/	Skip down 1 line
%	Skip down 5 lines
#	Skip down 10 lines

Table 2. MAPS-III User-Defined Format Specifiers

Line	Subroutine Function
500	Get key pressed (K$) and validate against VC$ - ->VK
800	Enter line @ Q,LEN. = FL,MIN.LEN. = ML,CTRL.CHRS. = CC$
1400	Trim trailing blanks from string S$
2200	Display field names and respective specifiers
3500	Clear screen and display system name
3700	Select records for printing
5400	Close file (FT) and reset file error handler
5600	Input file name, open file if required
6400	Test for file error
6500	Display bad file message, close file, and get entry
7900	Generate a print sample defined by the user
8600	Choose print option (across, down or user-defined)
11000	Generate printed output from selected record
12700	Check for printer "ready"

Table 3. MAPS Variable Index

Line	Subroutine Function
8	Get key and blink cursor
26	Trim trailing blanks from string S$
500	Get key pressed (K$) and validate against VC$ - ->VK
800	Enter line @ Q,LEN. = FL,MIN.LEN. = ML,CTRL.CHRS. = CC$
1000	Convert FV# to string (under format), store in F$
2100	Display field names and respective specifiers
3500	Clear screen and display system name
11030	Subtotal break check
11500	Skip to top of page, print new page header
11700	Generate subtotal lines
11742	Arithmetic expression evaluation
11759	Read data from disk
11800	Generate total lines
12700	Check for printer "ready"
23500	Extract unique characters from Z$ into Z0$
30020	Compile/translate arithmetic expression
50010	Convert arithmetic expression into array form
56000	Select records for printing
56250	Close file (FT) and reset file error handler
56270	Input file name, open file if required
56370	Test for file error
56380	Display bad file message, close file, and get entry

Table 4. MAPS Subroutine Index

Table 5. CALCS Variable Index

Variable	Function
BS$	Home cursor and blank screen
CC$	Control character string for input
CE	Entry character value
CE$	Entry character display block
CH	Valid character's high limit for input
CH$	Field specifier character for display
CL	Valid character's low limit for input
CL$	Clear to end of line
CS$	Clear to end of screen
D1,DC$	Don't care character value
DC	Don't care switch (-1 = Enabled, 0 = Disabled)
DQ$	Double quote character ('')
DR$	Current data record
DS	Maximum depth of selection
F	Field index
F$	Field value
F$(*)	Array of field values
FC	Maximum number of fields
FC$	Valid field specifiers
FD	Right digit count
FD(*)	Array of right digit counts for fields
FI	Print "indexing" control variable
FL	Field length in characters
FL$(*)	Array of file names
FL(*)	Array of field length/type specifiers
FNFM(*)	Function returning alpha selection (-1 = Selected)
FNLF(*)	Function returning length of field in characters
FNMD(V,B)	Function returning remainder of V divided by B
FNNM(*)	Function indicating numeric field (0 = No, -1 = Yes)
FNST$(*)	Function to convert positive value to string
FNVM(*)	Function returning numeric selection (-1 = Selected)
FNVS$(*)	Function to convert numeric to string
FP	Field position
FP(*)	Array of field positions in data record
FT	File type, file number (1 = Load, 2 = Save, 3 = Descriptor)
FT$	File type string
FV#	Field value (numeric)
FV$	Field value (string)

Table 5 continues

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ZBASIC 2.2 DOES NOT SUPPORT THESE BASIC COMMANDS:

1. ATN, EXP, COS, SIN, LOG, TAN, and exponentiation. (However, subroutines are included in the manual for these functions.)
2. ERROR, ON ERROR GOTO, ERL, ERR RESUME
3. No direct commands like AUTO, EDIT, LIST, LLIST ETC, although these commands may be used when writing programs.
4. Others NOT supported: CDBL, CINT, CSNG, DEFFN, FIX, FRE
5. Normal CASSETTE I/O. (ZBASIC supports it's own SPECIAL CASSETTE I/O statements.)
6. SOME BASIC COMMANDS MAY DIFFER IN ZBASIC. For instance, END jumps to DOS READY, STOP jumps to BASIC READY etc.
7. MEMORY REQUIREMENTS: to approximate the largest BASIC program that can be compiled in your machine (at one time), enter BASIC and type: PRINT (MEM-6500)/2. Remember, you can merge compiled programs together to fill memory.

ZBASIC 2.2 SPEED COMPARISON DEMO

To help give you an idea how fast compiled programs are, we have included this demo program:

ZBASIC 2.2 DEMO PROGRAM

Time to compile and run complete program	**:0 MIN. 2 SEC.**
BASIC Execution speed MOD 1, LEVEL II	**:7 MIN. 34 SEC.**
ZBASIC Execution speed MOD 1, LEVEL II	**:0 MIN. 18 SEC.**
BASIC Program size (WITHOUT VARIABLES)	**: 895 BYTES**
ZBASIC Program size (WITHOUT VARIABLES)	**:2733 BYTES**

(Remember that the ZBASIC program includes an 1879 byte subroutine package.) Program shown exactly as compiled and run in BASIC and ZBASIC.

```
10 '========= ZBASIC 2.2 EXAMPLE PROGRAM AND TIME TEST========
20 CLS:CLEAR100:DEFINT A-X:DEFSTR Z:DIM AA(64,24),Z(50):RANDOM
30 AA=100:BB=-1000:CC=3:DD= 3:EE= 9999:ST$="START TIME "+TIME$
40 FOR I=1TO127STEP2 :FOR J=47TO1STEP 3:XX=POINT(I,J):SET(I,J)
50 XX=(I-J)/CC*(7+I+J) :XX=ABS(INT(RND(I*J)-AA)+7) :RESET(I,J)
60 XX=PEEK(I+J) :POKE15360+I+J,J :OUT255,J AND (3*J):XX=INP(I)
70 AB$=STR$(I+J) :BA$=LEFT$(AB$,2) :AA(I/2,J/2)=VAL(BA$)+AA*3
80 BA$=BA$+RIGHT$(BA$,RND(3)) :XX=INSTR(1,BA$,"9"):XX=SQR(I*J)
90 BA$=MID$(BA$,2,2) :MID$(BA$,1,1)=Z :IF XX THEN 100 ELSE CLS
100 IF LEN(BA$))3 OR SGN(XX)=1 AND ASC(BA$)=32 THEN PRINT"+++";
110 IFPOS(0))62 THEN TRON:TROFF:PRINT ELSE XX=NOT(RND(99))+100
120 A$=INKEY$:IF A$="Y" OR A$="y" AND I)120 THEN PRINT"TRUE.."
130 RESTORE :READA,C,Z(J),D:GOSUB170:GOSUB170:GOSUB170:GOTO210
140 NEXT :PRINT"*";:NEXTI:CLS:PRINT@512,ST$,"STOP TIME ";TIME$
150 STOP'============== END OF MAIN TEST LOOP ================
160 DATA 12345,-1,"TEST",-9999
170 ON RND(6) GOTO 180,190,200,180,190,200
180 RETURN
190 RETURN
200 RETURN
210 ON RND(9) GOSUB 180,190,200,180,190,200,180,190,200
220 GOTO140
```

NOTICE ZBASIC 2.0 OWNERS: you can upgrade your ZBASIC 2.0 for no charge. Just send us your original diskette cassette and $15.00 with your registered ser.a. number and copy of your invoice. We will send your ZBASIC 2.2 and updates to your manual.

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Table 5 continued

Variable	Function
HN	Number of fields horizontally displayed
HS	Horizontal screen size in columns
I	Work variable
IC	Control key index (from input)
II	Work variable, user-independent
J	Work variable
K$	Key character
K0	Enter key
K1	Up-arrow key
K2	Down-arrow key
K3	Left-arrow key
K4	Right-arrow key
K5	Shift up-arrow key
K6	Shift down-arrow key
K7	Shift left-arrow key
K8	Shift right-arrow key
K9	Clear key
KD	"Don't-care" entry
L	Work variable, display field names
LC	Line counter
LR$	Copy of previous data record for "indexing"
LS	Length of string in characters
M	"Clear" size, used in memory initialization
ML	Minimum allowed input length in characters
NE	Numeric entry switch (−1 = Numeric, 0 = Alpha)
NF	Number of fields
NF$(*)	Array of field names
NS	Size of field names displayed in characters
OP$	Character string representing option
PC	Number of fields to print
PF	Print field number
PF$	Unique print field list
PF(X)	Array of fields to print
PG	Page number
PI	"Indexing" control variable
PL$	Print line buffer string
PM$(*)	Array of print menu option strings
PO	Main option select variable
PR	Printer available switch (−1 = Available, 0 = Not)
PS	Page size
PT$	Title string
PU$	Printer used (S = Standard, N = Nonstandard)
PV$	String of fields to print
Q	Absolute screen position
RJ	Right-justify flag (0 = No, −1 = Yes)
RS	Record size in characters
S$	Input string, Basic input routine
SB	Count of trailing string blanks
SC	Selection condition mask
SC$	Selection relations characters
SC(*)	Array of selection masks for compound selection
SF	Selected field
SF(*)	Array of selection field numbers
SK	Number of relations in compound selection
SN$	System name
SV$	Selection value
SV$(*)	Array of selection values
TB	Temporary tab, print option menu
TL	Total print line length
TL$	Column heading string, print across option
TL(*)	Array of field print lengths
U$	Up-arrow key
UL$	Separator string, print across option
VC$	String of valid characters for input
VK	Valid character index from single key input
VS	Vertical screen size
X	Index variable, compound selection

Table 6. CALCS Subroutine Index

Variable	Function
BE	Record number, record buffer end
BF	Subtotal break switch
BF$	Subtotal break value
BL	Blank string
BR	Current record number in record buffer
BS$	Home cursor and blank screen
C$	Input expression string for expression translator
C1	Work variable, expression input
CA	Expression translation, operator index
CB	Expression translation, scan pointer
CC$	Control character string for input
CE	Entry character value
CE$	Entry character display block
CF	Expression translation, error flag
CH	Valid character's high limit for input
CH$	Field specifier character for display
CI	Expression translation, work variable
CL	Valid character's low limit for input
CL$	Clear to end of line
CM	Expression translation, minus flag/index
CN$	Field specifier string—all numerics
CO	Expression translation, operand string
CP	Expression translation, operand index
CP$	Field spec string—all print numerics
CQ	Expression translation, work variable
CR	Expression translation, next operator index
CS$	Clear to end of screen
CX	Calculation switch—Field X
CY	Calculation switch—Field Y
CZ	Calculation switch—Field Z
D1,DC$	Don't care character value
DB$(*)	Buffer array of disk records
DC	Don't care switch (−1 = Enabled, 0 = Disabled)
DF	Work variable—display field names
DF$	Field name display list
DG$	Valid digit input string
DH	Delay count
DL	Field name display string length
DP	Dump flag
DQ$	Double quote character (")
DR$	Current data record
DS	Maximum depth of selection
DX	Calculated field name display string
F	Field index
F$	Field value
F$(*)	Array of field values
FC	Maximum number of fields
FC$	Valid field specifiers
FD	Right-digit count
FD(*)	Array of right-digit counts for fields
FI	Print "indexing" control variable
FL	Field length in characters
FL$(*)	Array of file names
FL(*)	Array of field lenth/type specifiers
FNFM(*)	Function returning alpha selection (−1 = Selected)

Table 6 continues



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Table 6 continued

FNLF(*)	Function returning length of field in characters
FNMD(V,B)	Function returning remainder of V divided by B
FNNM(*)	Function indicating numeric field (0 = No, −1 = Yes)
FNQF!(*,*)	Function returning format specifier
FNQR(V!)	Function returning right digit count, numeric field
FNQS(V!)	Function returning field size of numeric field
FNST$(*)	Function to convert positive value to string
FNSZ(I)	Function returning size of field I
FNVM(*)	Function returning numeric selection (−1 = Selected)
FNVS$(*)	Function to convert numeric to string
FNXY$	Function returning calculated field string
FNXZ$	Function returning calculated display string
FP	Field position
FP(*)	Array of field positions in data record
FS(*)	Alternate array of field lengths
FT	File type, File number (1 = Load, 2 = Save, 3 = Descriptor)
FT$	File type string
FV#	Field value (numeric)
FV$	Field value (string)
FX	Extract field count
FX(*)	Extract field list
HN	Number of fields horizontally displayed
HS	Horizontal screen size in columns
I	Work variable
IC	Control key index (from input)
J	Work variable
K$	Key character
K0	Enter key
K1	Up-arrow key
K2	Down-arrow key
K3	Left-arrow key
K4	Right-arrow key
K5	Shift up-arrow key
K6	Shift down-arrow key
K7	Shift left-arrow key
K8	Shift right-arrow key
K9	Clear key
KD	"Don't care" entry
LB$	Last subtotal break value
LC	Line counter
LL	Used in display of field names
LR$	Copy of previous data record for "indexing"
LS	Length of string in characters
M	"Clear" size, used in memory initialization
ML	Minimum allowed input length in characters
NB	Record buffer size in records
NE	Numeric entry switch (1 = Numeric, 0 = Alpha)
NF	Number of fields
NF$(*)	Array of field names
NS	Size of field names displayed in characters
OP$	Character string representing option
PC	Number of fields to print
PF	Print field number
PF$	Unique print field list
PF(X)	Array of fields to print
PG	Page number
PI	"Indexing" flag and field number
PI(*)	Array of "indexed" fields
PL$	Print line buffer string
PP	Page number spacing string
PR	Printer available switch (−1 = Available, 0 = Not)
PS	Page size in lines
PT$	Page title string
PU$	Printer used (S = Standard, N = Nonstandard)
PV$	Temporary copy of print field string
Q	Absolute screen position
QL$	Header string
RJ	Right-justify flag (0 = No, −1 = Yes)
RS	Record size in characters

Table 6 continues

Table 6 continued

S	Work string, input routine
SB	Count of trailing string blanks
SC	Selection condition mask
SC$	Selection relations characters
SC(*)	Array of selection masks for compound selection
SF	Selected field
SF(*)	Array of selection field numbers
SK	Number of relations in compound selection
SN$	System name
SP	Subtotal pending flag
SU	Maximum subtotal field number
SU$	Subtotal underline string
SU(*:)	Array of subtotal flags by field
SV$	Selection value
SV$(*)	Array of selection values
TL	Length of total print line
TL$	Total separator string 1
TL(*)	Array of total field sizes
TP	Total pending flag
TU	Maximum total field number
TU$	Total underscore string
TU(*)	Array of total flags by field
TZ	Totals dumped switch
U$	Up-arrow key
UL$	Total separator string 2
VC$	String of valid characters for input
VK	Valid character index from single key input
VS	Validated by VC$ string control switch
VZ	Vertical screen size
X	Work variable, selection
X$	Display string for X expression
XC	Control index for interpretive expression array
XC$	Work string, expression translator
XE	Expression translation error flag
XF(*)	Array of interpretive commands
XI	Control index for interpretive expression array
XR	Interpretive operator
XT	Expression evaluation switch
XT$	Expression token string
XV	Expression value pointer
Y$	Display string for Y expression
Z#	Calculated result value
Z$	Input string, subroutine 23500
Z0$	Result string, subroutine 23500
Z1	Maximum index of Z1 array
Z1$	String of conversion fields
Z1(*)	Array of numeric fields for conversion
ZB	Subtotal break field number
ZB$	Subtotal break field letter
ZC$	Work string
ZF#	Current balance forward value
ZF#(*)	Array of field balance forward values
ZI$	Balance forward initial value string
ZM	Number of subtracted balance forward fields
ZM$	Balance forward subtracted fields string
ZM(*)	Array of subtracted balance forward fields
ZP	Number of added balance forward fields
ZP$	Added balance forward field string
ZP(*)	Array of added balance forward fields
ZS	Number of subtotal fields
ZS#(*)	Array of field subtotal values
ZS$	Subtotal field string
ZS(*)	Array of subtotal field numbers
ZT	Number of total fields
ZT#(*)	Array of field total values
ZT$	Total field string
ZT(*)	Array of total field numbers
ZX$	X Expression string
ZY$	Y Expression string

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first slash following the E makes the printer skip to the next line. The next three slashes produce three blank lines, completing the six-line label.

CALCS-III

CALCS-III formats reports in a fashion like the Across-the-Page option of MAPS.

CALCS-III includes an "Index-type" report capability. The specifiers of those fields that you want indexed are enclosed in parentheses. If you want to print calculated fields, you must supply field names and formats, as this information is not available from the descriptor file. Default values will appear initially; you can change these to the values you desire.

CALCS-III provides two calculated fields, X and Y. Either or both may be printed on a CALCS-III report. You can define a calculated field by entering a formula including AIDS numeric field specifiers, constants and arithmetic operators.

Operations are done from left to right, and you cannot use parentheses.

The formula for X may include X, but not Y. The formula for Y may include both X and Y.

If an error is detected in a formula, a pair of question marks will appear at the point of error and the phrase "Error??" will be displayed to the right of the formula.

The initial values for X and Y (before any calculations are performed) are both 0. When you select an AIDS data record for printing, the X and Y formulas are computed using the record's field values.

A balance-forward field (Y) produces a running total column. You can specify an initial value, and any number of fields (including X and Y) can be added or subtracted as each record is processed.

If you request, CALCS will generate subtotals when there is a change in a user-specified column. Totals can also be generated for the specified fields at the end of the report. The default fields for totaling will be the same as the subtotal fields, if any.

CALCS-III examines the format of the report you have specified. After 10 to 20 seconds, the analysis will be complete.

When selecting records for processing, you may specify up to four selection criteria, each using one of six relational comparisons. It is possible to select a field which contains all blanks. For example, NAME = Down Arrow will select all records containing a blank name field.

After specifying the selection criteria by which records will be printed, you must enter the name of the disk data file. When you hit the enter key, records will be processed from the beginning of this file.

Printing from the file will halt if you press the up-arrow key, or when all data records in the file have been processed. If the up-arrow key is used to halt before all records in the file have been processed, the file is considered to be ac-

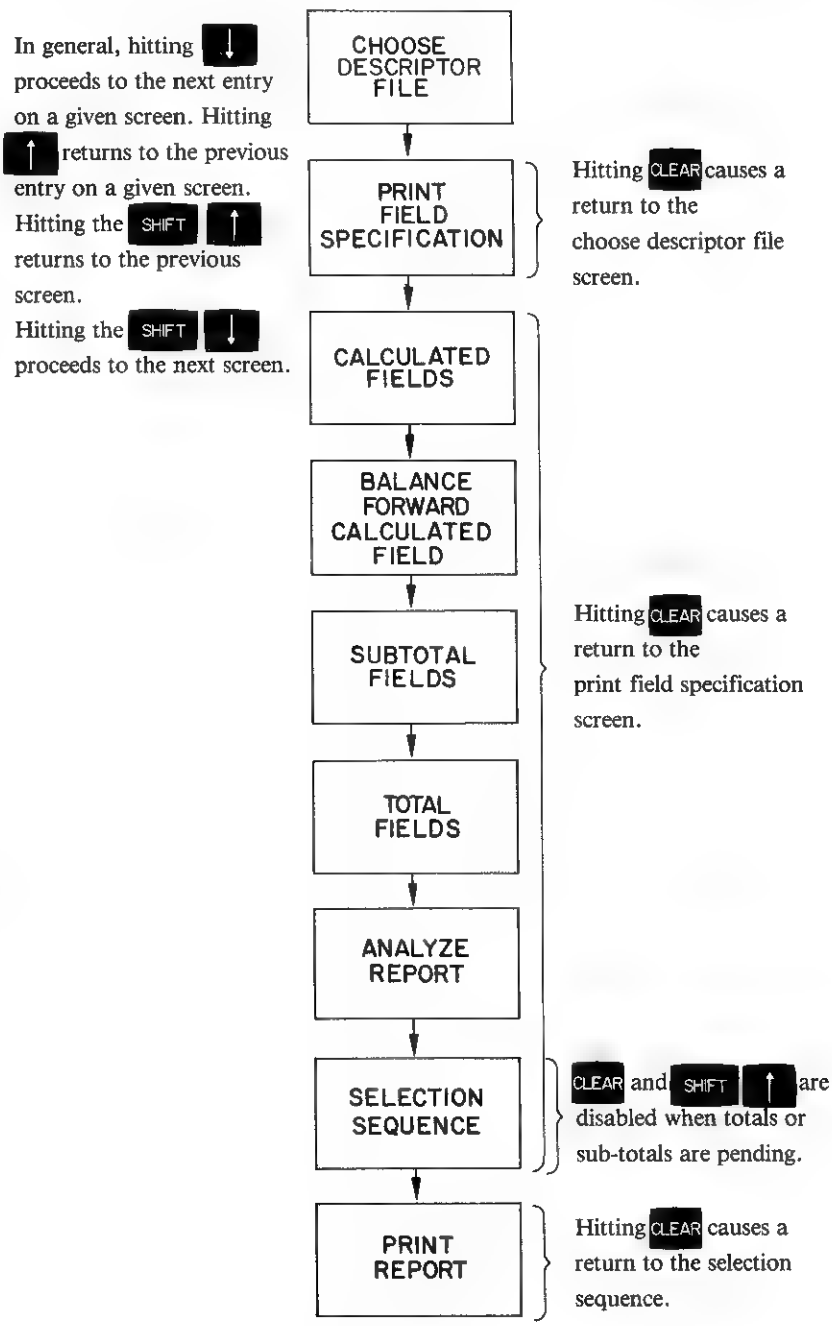


Fig. 1. System Flow

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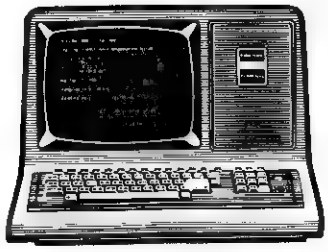
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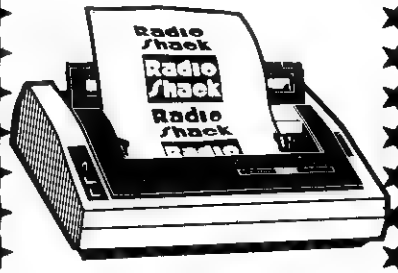
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tive. Entering an * or any file name deactivates an active file. Hitting shift/down arrow will allow continued use of the active file.

The New AIDS-III

A new version of AIDS-III is now available. Unlike earlier systems, it is written entirely in machine language. The effort of producing 20,000 lines of code fell primarily upon Alan Becker and Scott Raymond, assisted by myself. The development relied heavily on Apparat's NEWDOS80 Version 2.0 and MZAL assembler/linker/editor.

The new AIDS remains compatible with all previous AIDS systems. In addition, it configures itself automatically, and will run on a Model I or III with at least 32K or memory, under any major disk operating system (TRSDOS, NEWDOS80, DOSPLUS, LDOS).

In Conclusion

Feel free to use any or all of the information in this series for any non-commercial use.

The entire source code for the programs presented in these articles is available in machine-readable form from SofTrends for $15 (shipping prepaid) within the continental United States, and for $20 in other areas. Documentation is included. We will accept VISA and MasterCard orders.

The source is also available on Load 80. For those of you accepting the challenge of typing in the code, good luck! ■

Robert A. Fiorelli is the president of SofTrends, Inc., 26111 Brush Ave., Euclid, OH 44132, 216-289-2002.

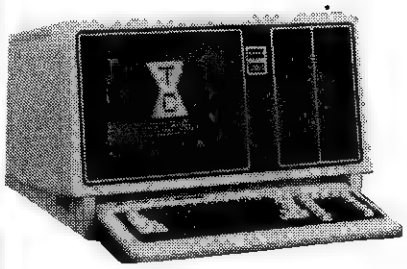
Program Listing 1. MAPS-III

```
1 '(C)1980 BY META TECHNOLOGIES CORP.,(C)1982 BY SOFTRENDS,INC.
2 CLS:PRINT@284,"MAPS-III":PRINT@410,"VERSION 1.5":PRINT@599,"CO
PYRIGHT(C)1982":PRINT@670,"BY":PRINT@728,"SOFTRENDS, INC.":PRINT
:PRINT
300 GOTO 12800
400 REM* KEY IN K$( 1 CHAR.) @ Q, IC IS ACTIVE, VC$=VALID CHARS.
, RETURN VK CHAR. IN VC$
500 PRINT@Q,CHR$(14);:K$=INKEY$:PRINT@Q,CHR$(15);CE$;:IFK$="" TH
EN500 ELSE IC=INSTR(CC$,K$)
600 IF IC THEN VK=0:RETURN ELSE VK=INSTR(VC$,K$):IF VK THEN PRIN
T@Q,K$;:RETURN ELSE 500
700 REM* Q=CSR.PST:FL=FLD.LEN:ML=MIN.LEN(0):FV$=FLD.VAL:CL=CHR.L
OW:CH=CHR.HI:CC$=CTRL.CHR:CE=ASC(ENTRY.CHR):RJ=RIGHT JUST.(RESET
 ON RETURN)
800 S$=FV$:GOSUB1400:LS=LEN(S$)
850 PRINT@Q,STRING$(FL,CE);:PRINT@Q,S$;
900 PRINTCHR$(14);:K$=INKEY$:PRINTCHR$(15);:IFK$="" GOTO900ELSEI
C=ASC(K$)
950 IFIC<CLORIC>CHTHEN1000ELSEIFLS<FLTHENS$=S$+K$:PRINTK$;:LS=LS
+1:GOTO900ELSE900
1000 IFIC=K3ANDLS>0THENLS=LS-1:S$=LEFT$(S$,LS):GOTO850
1050 IFIC=K0AND(LS>=MLORML=0)THENFV$=S$:IC=0:GOTO1250
1100 IFIC=K7THENLS=0:S$="":GOTO850
1150 IFIC=K8THEN800 ELSE IF IC=K4 AND RJ THEN S$=STRING$(FL-LEN(
S$),32)+S$:LS=FL:GOTO850 ELSE IF IC=KD AND DC THEN S$=S$+DC$:PRI
NTDC$;:LS=LS+1:GOTO900
1200 IC=INSTR(CC$,K$):IFIC=0THEN900ELSE 1300
1250 IF NE AND  LEFT$(FV$,1)<>"E" THEN FV#=VAL(FV$):FV$=FNVS$(AB
S(FV#),FD):FV$=LEFT$(LEFT$("E",(LEN(FV$)<FL)+1)+LEFT$("-",(FV#>=
0)+1)+STRING$((LEN(FV$)<FL)*(LEN(FV$)-FL-(FV#<0)),32)+FV$,FL)
1300 PRINT@Q,FV$;STRING$(FL-LEN(FV$),32);:RJ=0:DC=0:NE=0:RETURN
1350 REM* TRIM TRAILING BLANKS FROM S$
1400 LS=LEN(S$):IFS$=STRING$(LS,32)THENS$="":RETURNELSESB=0
1450 IFMID$(S$,LS-SB,1)=" "THEN SB=SB+1:GOTO1450ELSES$=LEFT$(S$,
LS-SB):RETURN
2100 REM* DISPLAY FIELD NAMES
2200 FORI=NFTO1STEP-1:PRINT@2*HS+FNMD(I-1,L)*HS+INT((I-1)/L)*(NS
+3),CHR$(64+I);"-";NF$(I);:NEXTI:RETURN
3400 REM* CLEAR SCREEN & DISPLAY SYSTEM NAME
3500 PRINT BS$;TAB(INT((HS-LEN(SN$))/2));SN$:RETURN
3690 REM* SELECT & XXX SCREEN
3700 SK=1
3710 GOSUB3500:GOSUB2200
3720 PRINT@512,CS$;"SELECT & ";OP$;" RECORDS BY (À-";CH$;"):";
3730 Q=540+LEN(OP$):VC$=FC$:GOSUB500
3740 SF=0:IF IC=4 THEN SC=7:SC(1)=7:SK=1:RETURN ELSE IF IC=2 THE
N 3730 ELSE IF IC THEN 3930 ELSE SF=VK
3750 PRINT@512,CS$;"SELECT & ";OP$;" RECORDS BY ";DQ$;NF$(SF);DQ
$;
3760 PRINT@640,CS$;"= EQUAL";TAB(15);"< LESS THAN";TAB(30);"- LE
SS OR EQUAL"
3770 PRINT@704,"# NOT EQUAL";TAB(15);"> GTR THAN";TAB(30);"+ GTR
 OR EQUAL"
3780 PRINT@832,"CHOOSE RELATION:";
3790 Q=849:VC$=SC$:GOSUB500
```

Listing 1 continues

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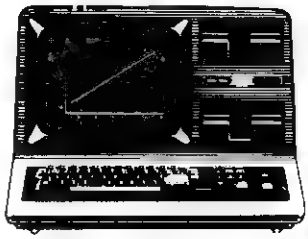


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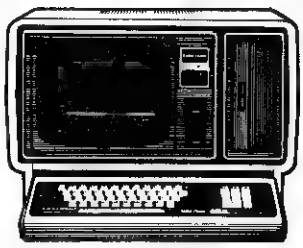
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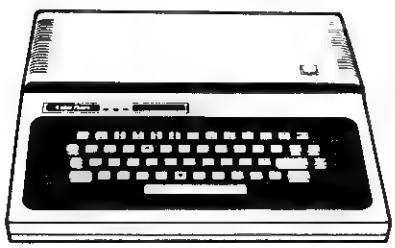


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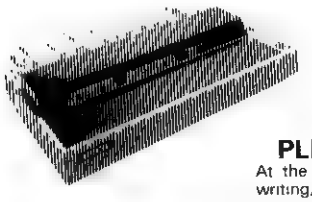
Listing 1 continued

```
3800 ON IC GOTO 3720,3790,3930,3790,3930
3810 SC=VK
3820 PRINT@533+LEN(OP$),CS$
3830 PRINT@576,NF$(SF);MID$(SC$,SC,1);
3840 Q=578+LEN(NF$(SF)):FL=FNLF(SF):ML=1:FV$="":RJ=(FL(SF)>0):NE
=NOT RJ:FD=FD(SF):CL=32:CH=90:GOSUB800:SV$=FV$
3850 IF IC=2 THEN SV$=STRING$(FL,32) ELSE ON IC GOTO 3750,1,3930
,3840,3930
3860 IF SK>1 THEN FOR J=SK-1 TO 1 STEP -1:PRINT@576+(64*(SK-J)),
NF$(SF(J));MID$(SC$,SC(J),1);" ";SV$(J);:NEXT J
3870 PRINT@SK*64+640,"<N>EXT OR <";LEFT$(OP$,1);">";MID$(OP$,2);
":";
3880 Q=SK*64+654+LEN(OP$):VC$="CN"+LEFT$(OP$,1):GOSUB500
3890 ON IC GOTO 3820,3880,3930,3880,3930
3900 SF(SK)=SF:SC(SK)=SC:SV$(SK)=SV$
3910 IF VK=3 THEN RETURN ELSE IF VK=1 THEN 3880 ELSE IF VK=2 AND
 SK<DS THEN SK=SK+1:GOTO3710
3920 GOTO 3880
3930 SC=0:RETURN
5300 REM* CLOSE FILE(FT), SET FL$(FT)="" & RESET 'ON ERROR'
5400 CLOSE FT:FL$(FT)="":ON ERROR GOTO 0:RETURN
5500 REM* GET FILENAME( FL$(FT) ) OF TYPE(FT$) & OPEN (IF REQ'D.
)
5600 GOSUB3500:PRINT@192,"NAME OF ";FT$;" FILE:";
5700 IF FL$(FT)<>"" THEN PRINT@320,"ACTIVE ";FT$;" FILE=";FL$(FT
);
5800 Q=207+LEN(FT$):FL=14:ML=1:FV$="":CL=42:CH=90:GOSUB800:PRINT
@320,CS$
5900 IF IC=2 OR (IC=4 AND FL$(FT)="" AND FT<>3) THEN 5700 ELSE I
F IC THEN RETURN
6000 IF FV$="*" THEN 6600
6100 IF IC=4 AND FT<3 THEN PRINT@Q,FL$(FT);:RETURN ELSE FL$(FT)=
FV$
6200 IF (FT<3 AND FL$(1)=FL$(2)) OR (FT=3 AND (FL$(3)=FL$(1) OR
FL$(3)=FL$(2))) THEN PRINT@384,">>> FILE=";FL$(FT);" IN USE";:FL
$(FT)="":GOTO5700
6300 ON ERROR GOTO 6400:CLOSE FT:OPEN MID$("IOI",FT,1),FT,FL$(FT
):RETURN
6400 IF ERR/2+1<21 THEN ON ERROR GOTO 0 ELSE RESUME 6500
6500 PRINT@384,CS$;">>> BAD FILE=";FL$(FT);
6600 GOSUB5400:GOTO5700
6700 REM* PRINT RECORD FROM USER-DEFINED FORMAT(PF$)
6800 FOR I=1TOLEN(PF$):F=INSTR(".,:!/%#"+FC$,MID$(PF$,I,1)):IF F
=0 THEN 7600
6900 IF F>4 THEN 7200
7000 PRINT STRING$(HV(F)," ");:IF PR THEN LPRINT STRING$(HV(F),"
");
7100 GOTO7600
7200 IF F>7 THEN 7500
7300 FOR II=1 TO HV(F-4):PRINT:IF PR THEN LPRINT " "
7400 NEXT II:GOTO7600
7500 PRINTF$(F-7);:IF PR THEN LPRINT F$(F-7);
7600 NEXTI: PRINT:IF PR THEN LPRINT " "
7700 RETURN
7800 REM* GENERATE USER-DEFINED PRINT SAMPLE
7900 FOR I=1 TO NF:F$(I)=STRING$(FNLF(I),64+I):NEXTI
8000 PRINTBS$;:GOSUB12700:PRINTBS$;:GOSUB6800
8100 PRINTSTRING$(63,"=");
8200 IF PR THEN LPRINT STRING$(LEN(PF$),"="):LPRINT PF$:LPRINT S
TRING$(LEN(PF$),"=")
8300 PRINT@960,"[ ";PF$;:Q=961
8400 GOSUB500:IF IC=1 THEN RETURN ELSE 8400
8500 REM* INSERT CODE FOR FIRST SCREEN HERE
8600 GOSUB3500:PRINT@196,;:TB=INT((HS-24)/2)
8700 FORI=1TO3:PRINTTAB(TB-1);I;"- ";PM$(I):NEXTI
8800 PRINT@433+TB,"CHOOSE OPTION:";
8900 Q=448+TB:VC$="123":GOSUB500
9000 IF IC=1 OR IC=3 OR IC=5  THEN IC=3:RETURN ELSE IF IC THEN 8
900 ELSE PO=VK:FV$=""
9100 GOSUB3500:GOSUB2200:PRINT@512,PM$(PO);:PRINT@576,"SPECIFY F
IELDS (A-";CH$;") TO BE PRINTED:";
9200 IF PO=3THEN 10200
9300 Q=612:FL=NF:ML=1:FV$="":CH=64+NF:IF PO=1 THEN CL=65 ELSE FL
=NF+2*INT(NF/2):CL=40
9350 GOSUB800
9400 IF IC=1 THEN 8600 ELSE IF IC=2 THEN 9300 ELSE IF IC=3 OR IC
=5 THEN IC=1:RETURN ELSE IF IC=4 THEN FV$=FC$:PRINT@612,FV$;
9500 PC=LEN(FV$):IF PO=1 THEN FORI=1 TO PC:PF(I)=ASC(MID$(FV$,I,
1))-64:NEXTI: RETURN
9505 REM* OPTION 2 ( ACROSS THE PAGE )
9510 PV$=FV$:PRINT@704,"PAGE TITLE:";
9515 Q=768:FL=HS-1:ML=0:FV$="":CL=32:CH=90:GOSUB800
9520 IF IC=4 THEN PT$=SN$ ELSE ON IC GOTO 9100,9515,8600,0:PT$=F
V$
9540 PI=0:' SET INDEXING INDICATOR TO 'OFF'
9545 PC=0:' SET COUNT OF FIELD SPECIFIERS
9550 FOR I=1 TO LEN(PV$): PF=ASC(MID$(PV$,I,1)): IF PF>=65 AND P
F<=CH THEN PC=PC+1:PF(PC)=PF-64:PI(PC)=PI:GOTO 9680
9560 IF PF=40 THEN PI=-1 ELSE IF PF=41 THEN PI=0
9680 NEXT I: IF PC=0 THEN 9300
9700 TL=-1:FORI=1 TO PC: F=PF(I)
9800 IF LEN(NF$(F)) > FNLF(F) THEN TL(I)=LEN(NF$(F)) ELSE TL(I)=
FNLF(F)
9900 TL=TL+TL(I)+1:NEXT I: IF TL<(LEN(PT$)+11) THEN TL=LEN(PT$)+
11
10000 PG=1:LC=PS:RETURN
10100 REM* USER FORMAT DEFINITION
10200 Q=640:FL=60:ML=1:CL=32:CH=64+NF:GOSUB800
10300 IF IC=1 THEN 8600 ELSE IF IC=2 THEN 10200 ELSE IF IC=3 OR
IC=5 THEN IC=1:RETURN ELSE IF IC=4 THEN 10200
10400 PF$=FV$
10500 PRINT@768,"(G)ENERATE SAMPLE OR (S)ELECT & PRINT:"
10600 Q=807:VC$="GS":GOSUB500
10700 IF IC=1 THEN 9100 ELSE IF IC=2 THEN 10600 ELSE IF IC=3 OR
IC=5 THEN IC=1:RETURN ELSE IF IC=4 THEN 10600
10800 IF VK=1 THEN GOSUB7900:GOTO9100 ELSE RETURN
10900 REM* INSERT CODE FOR HANDLING 'SELECTED' RECORD HERE
11000 ON PO GOTO 11200,11700,6800
11100 REM* PRINT DOWN THE PAGE
11200 FOR I=1TOPC:F$=F$(PF(I))
11300 PRINTF$:IF PR THEN LPRINT F$
11400 NEXT I:PRINT:IF PR LPRINT " "
11500 RETURN
11600 REM* PRINT ACROSS THE PAGE
11700 IF LC<>PS THEN12250
11800 PRINTSTRING$(TL,"="):PRINT PT$;STRING$(TL-8-LEN(PT$),32);"
PAGE";PG:PRINT:IF PR THEN LPRINTSTRING$(TL,"="):LPRINT PT$;STRIN
G$(TL-8-LEN(PT$),32);"PAGE";PG:LPRINT" "
11900 TL$="":UL$="":FOR I=1TOPC:F=PF(I):F$=NF$(F):TL$=TL$+F$+STR
ING$(TL(I)-LEN(F$)+1,32):UL$=UL$+STRING$(TL(I),"=")+" ":NEXTI
12000 TL$=LEFT$(TL$,TL):UL$=LEFT$(UL$,TL)
12100 PRINTTL$:PRINTUL$:IF PR THEN LPRINT TL$:LPRINT UL$
12200 LC=5:PG=PG+1:LRS=STRING$(RS,32)
12249 ' LINE PRINT STARTS HERE
```

Listing 1 continues

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MX-80	$419
MX-80 F/T	$499
MX-100	$645

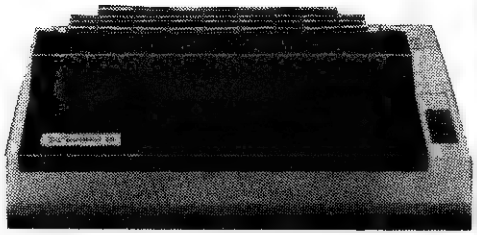
PLEASE!
At the time of this writing, we are expecting a **BIG** decrease in the price of EPSON printers. As always, we will probably have the **lowest prices in the U.S.** So **PLEASE CALL!**

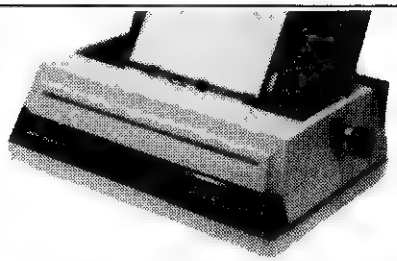
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FX PRINTERS
Call for Prices!

★ STAR MICRONICS ★

GEMINI 10 ● GEMINI 15

The Gemini 10 Star Printer has a wide spectrum of impressive features at a **ROCK BOTTOM** price. The printer comes standard with a 9 wire printhead, 2.3 K buffer, friction and tractor feed and prints 100 cps. It has true descenders, emphasized, double strike, block graphics and hi-resolution; italic characters & user programmable ROM for special characters. Also comes standard. ***180 Day Warranty.** **$389** 10" / **$499** 15"





*Smith Corona is a registered TRADEMARK of SCM Corporation

SMITH-CORONA TP-1

DAISY WHEEL PRINTER

The Smith Corona TP-1 text printer is a microprocessor controlled daisy wheel printer which delivers fully formed executive quality printout at a speed of 144 words per minute. The printer is a simple, low cost, and reliable unit which can be utilized with word processing systems, microcomputers, personal computers, small business systems, or in any environment which requires high quality printing. Its compact size and attractive packaging will allow it to blend into any environment.

$599

COMPATIBLE WITH ALMOST ALL COMPUTER SYSTEMS

RADIO SHACK PRINTERS

DMP 100	$339.95
DMP 200	$679.95
DMP 400	$1015
DMP 500	$1525
Daisywheel II	$1649.00
DWP 410	$1287.95

NEW from BROTHER

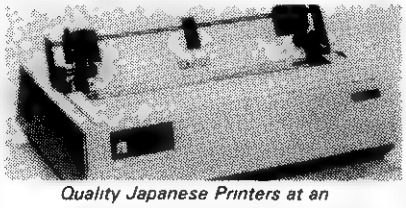
ComRiter CR-1

Especially designed for word processing; 200 words per minute, bidirectional, daisywheel.

$975.00
90 Day Warranty

217

OKIDATA PRINTERS



Quality Japanese Printers at an AFFORDABLE PRICE!!

Microline-82A **425.00**
120 CPS, 9 wire print head, paper up to 9.5" wide

Microline-83A **699.00**
Same as above, but handles paper up to 16" wide

Microline-84 ..... **1049.00** **Parallel Version**

Microline-84 ..... **1149.00** **Serial Version**
16" wide paper, 200 CPS, multi-pass printing for near letter perfect printing

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CALL **1-800-331-3896**

918/825-4844

AMERICAN

118 SO. MILL ST
PRYOR, OK 74361

SMALL BUSINESS COMPUTERS

Listing 1 continued

```
12250 PL$="":FI=-1: FOR I=1 TO PC: F=PF(I)
12300 F$=F$(F):IF PI(I) AND FI AND F$=MID$(LR$,FP(F),FNLF(F)) TH
EN F$=STRING$(FNLF(F),32) ELSE FI=0
12400 PL$=PL$+F$+STRING$(TL(I)-LEN(F$)+1,32):NEXTI: PL$=LEFT$(PL
$,TL)
12500 IF PL$<>STRING$(LEN(PL$),32) THEN LC=LC+1:PRINT PL$:IF PR
THEN LPRINT PL$
12600 RETURN
12680 REM* PRINTER TEST...RETURNS (PR) "TRUE" IF ON...IF PRINTER
 UNIT (PU$) IS 'STANDARD', NO QUERY IS USED.
12700 IF PU$="S" THEN PR=PEEK(14312)<128:RETURN ELSE PRINT"IS TH
E PRINTER ON? ( <Y>ES OR <N>O )"
12720 K$=INKEY$: IF K$="Y" THEN PR=-1:RETURN ELSE IF K$="N" THEN
 PR=0:RETURN ELSE 12720
12780 REM* START/INITIALIZATION
12800 CLOSE:CLEAR0:M=MEM-2000:IF M>32767 THEN CLEAR32767 ELSE CL
EAR M
12810 DEFINT A-Z:RESTORE
12815 REM* READ <KEY> DEFINITIONS
12820 READ K0,K1,K2,K3,K4,K5,K6,K7,K8,K9,KD
12825 REM* READ 'ENTRY' & 'DONT CARE' DISPLAY CHARACTERS
12830 READ CE,D1
12835 REM* READ SYS. CONFIG. DATA( FIELD CNT., HORZ.SCREEN SIZE,
VERT.SCREEN SIZE,DEPTH OF SELECTION, PRINTER USED, PAGE SIZE)
12840 READ FC,HS,VS,DS,PU$,PS
12880 REM* COMPUTE NUMBER OF FIELDS DISPLAYED ON A LINE & SIZE O
F FIELD NAMES
12900 HN=INT((FC+3)/4): NS=INT((HS+1)/HN)-3
12920 DIM NF$(FC),FL(FC),FD(FC),FP(FC),TL(FC),F$(FC),PF(FC*2),PI
(FC*2)
12940 DEF FNLF(V)=ABS(FL(V))
12960 DEF FNST$(V#)=MID$(STR$(V#),2-(V#<0)):' CONVERT NON-NEGATI
VE V# INTO A CHAR. STRING
12980 DEF FNVS$(V#,RD)=FNST$(INT(V#+.5*10[-RD))+LEFT$(".",SGN(RD
))+RIGHT$("000000000"+FNST$(INT((V#-INT(V#))*10[RD+.5)),RD):' CO
NVERT NON-NEGATIVE V# INTO CHAR.STRING WITH RD DIGITS TO RIGHT O
F DECIMAL PT.
13000 DEF FNNM(V)=FL(V)<0
13020 DEF FNFM(S$)=(SC AND (1-3*(MID$(S$,FP,FL)=SV$)-(MID$(S$,FP
,FL)>SV$)))<>0
13040 DEF FNVM(S$)=(SC AND (1-3*(VAL(MID$(S$,FP,FL))=VAL(SV$))-(
VAL(MID$(S$,FP,FL))>VAL(SV$))))<>0
13060 DIM SF(DS),SC(DS),SV$(DS)
13080 DEF FNMD(V,B)=V-INT(V/B)*B
13100 SN$="MTC AIDS-III PRINT SUBSYSTEM (MAPS-III)"
13120 CL$=CHR$(30):CS$=CHR$(31):DQ$=CHR$(34):BS$=CHR$(28)+CHR$(3
1)
13130 U$=CHR$(K1):CC$=U$+CHR$(K2)+CHR$(K5)+CHR$(K6)+CHR$(K9)
13140 CE$=CHR$(CE):DC$=CHR$(D1)
13220 SC$="<>#=-+"
13240 DIM VP(5)
13260 DIM FL$(3)
13280 DIM PM$(3): PM$(1)="PRINT DOWN THE PAGE": PM$(2)="PRINT AC
ROSS THE PAGE": PM$(3)="PRINT USER-DEFINED FORMAT"
13300 DIM HV(4):HV(1)=1:HV(2)=5:HV(3)=10:HV(4)=20
14400 REM* PROGRAM STARTS HERE
14500 GOSUB3500:FT=3:FT$="DESCRIPTOR"
14600 GOSUB5600
14700 IF IC=4 THEN CLOSE:CLEAR500:END ELSE IF IC THEN 14600
14800 LINE INPUT#3,FV$:IF FV$<>"MTCAIDS2" THEN GOSUB6500:GOTO147
00
14900 LINE INPUT#3,SN$: INPUT#3,RS,NF
15000 FORI=1TONF:LINE INPUT#3,NF$(I):INPUT#3,FL(I):IF FL(I)<0 TH
EN INPUT#3,FD(I) ELSE FD(I)=0
15050 INPUT#3,FP(I):NEXTI:GOSUB5400
15100 FC$=LEFT$("ABCDEFGHIJKLMNOPQRST",NF):CH$=CHR$(64+NF)
15150 L=INT((NF-1)/HN)+1
15200 GOSUB8600:IF IC=1 THEN 15200 ELSE IF IC=3 OR IC=5 THEN 145
00
15300 REM* GET & PRINT RECORD(S)
15400 OP$="PRINT":GOSUB3700:IF SC=0 THEN 15200
15500 FT=1:FT$=OP$:GOSUB3500:GOSUB5600
15600 ON ERROR GOTO 0: IF IC=3 OR IC=5 THEN 15200 ELSE IF IC=1 T
HEN 15400 ELSE ON ERROR GOTO 16300
15700 PRINTBS$;:GOSUB12700:PRINTBS$;
15800 REM* SELECT & GET RECORD(S)
15900 IF EOF(1) THEN GOSUB5400:GOTO16325 ELSE IF INKEY$=U$ THEN
16325 ELSE LINE INPUT#1,DR$
16000 IF LEN(DR$)<>RS THEN GOSUB6500:GOTO15600 ELSE ON ERROR GOT
O0
16010 IF SC(1)=/ THEN 16100
16020 FOR X=1 TO SK: SC=SC(X):SF=SF(X):SV$=SV$(X):FP=FP(SF):FL=L
EN(SV$)
16030 IF FNNM(SF) THEN 16050
16040 IF FNFM(DR$) THEN 16060 ELSE 15900
16050 IF NOT(FNVM(DR$)) THEN 15900
16060 NEXT X
16100 FOR F=1TONF:F$(F)=MID$(DR$,FP(F),FNLF(F)):NEXTF:GOSUB11000
:LR$=DR$
16200 ON ERROR GOTO16300:GOTO15900
16300 GOSUB6400:GOTO15600
16325 FOR I=1 TO 1500:NEXTI:GOTO15500
60000 REM* <KEY> DEFINITIONS
60010 DATA 13,91,10,8,9,27,26,24,25,31,31
60020 REM* DISPLAY CHARACTERS
60030 DATA 136,130
60040 REM* FIELD CNT.,HORIZ.SCREEN SIZE,VERT.SCREEN SIZE,SELECTI
ON DEPTH
60050 DATA 20,64,16,4
60060 REM* PRINTER ( <S>TANDARD / <N>ON-STANDARD ) USED
60070 DATA S
60080 REM* NUMBER OF VERTICAL PRINT LINES ON PAGE
60090 DATA 66
```

Program Listing 2. CALCS-III

```
1 '(C)1980 BY META TECHNOLOGIES CORP.,(C)1982 BY SOFTRENDS,INC.
2 CLS:PRINT@284,"CALCS-III":PRINT@410,"VERSION 1.5":PRINT@599,"C
OPYRIGHT(C)1982":PRINT@670,"BY":PRINT@728,"SOFTRENDS, INC.":PRIN
T:PRINT
3 GOTO 12800
5 ' GET KEY & BLINK CURSOR
8 PRINT CHR$(14);:K$=INKEY$:PRINT CHR$(15);: IF K$="" THEN 8 ELS
E RETURN
10 PRINT@Q,;:GOSUB8:IC=INSTR(CC$,K$)
11 IF IC THEN VK=0:RETURN ELSE VK=INSTR(VC$,K$):IF VK THEN PRINT
@Q,K$;:RETURN ELSE 10
12 S$=FV$:GOSUB26:LS=LEN(S$)
13 PRINT@Q,STRING$(FL,CE);:PRINT@Q,S$;
14 GOSUB8
15 IF VS THEN IC=INSTR(VC$,K$):IF IC=0 THEN IC=ASC(K$):GOTO 18
16 IF NOT VS THEN IC=ASC(K$):IF IC<CL OR IC>CH THEN 18
17 IFLS<FLTHENS$=S$+K$:PRINTK$;:LS=LS+1:GOTO14ELSE14
```

Listing 2 continues

LIFE ON THE FAST TRACK

Don't Be Stuck in Low Gear! If You're Still Using A Cassette Tape Player or Only Have One Disk Drive, THEN

GET OUT OF THE STONE AGE!!!

TRS-80 MOD 1 DRIVES

TEAC

BARE	COMPLETE *With Power Supply & Cabinet*
40 Track, Single..... $189	40 Track, Single..... $229
40 Track, Double.... $269	40 Track, Double.... $319
80 Track, Single..... $269	80 Track, Single..... $319
80 Track, Double.... $319	80 Track, Double.... $369

TANDON

BARE	COMPLETE *With Power Supply & Cabinet*
40 Track, Single..... $199	40 Track, Single..... $239
40 Track, Double.... $289	40 Track, Double.... $340
80 Track, Single..... $289	80 Track, Single..... $340
80 Track, Double.... $349	80 Track, Double.... $399

We sell two brands of disk drives for the TRS-80: the TEAC and the Tandon. The TEAC disk drive has a 1 year warranty, the Tandon has a 90 day warranty. The TEAC uses a lead screw actuator, the Tandon uses a split band type actuator. The track to track access rate for the Tandon is 5 milliseconds, as opposed to 25 milliseconds for the TEAC. The TRS-80 Model III requires a faster drive speed than the Model I, therefore the Tandon works better with the Model III. With the slower drive speed requirements of the Model I, the TEAC is a more reliable drive. We have both 40 track and 80 track drives with either single or dual head. All drives are capable of double density. These drives are available either bare or complete with power supply and cabinet. A cable is required to hook up the drives. We have both two-drive and four-drive cables. All drives come with complete instructions for hooking up a system. TEACs and Tandons can be intermixed with other drives on the same system.

HARD DISK SYSTEM FOR THE MODEL III

6* MEG **$1795.00**
Storage amounts approximately equal to 28 Model III Disk Drives

12* MEG **$1995.00**
Storage amounts approximately equal to 61 Model III Disk Drives

19* MEG **$2195.00**
Storage amounts approximately equal to 94 Model III Disk Drives

COMPLETE, READY TO RUN — NOW AVAILABLE!!
LDOS REQUIRED — **$129**

IBM PERSONAL COMPUTER DISK DRIVES

SINGLE SIDE, 40 Track **$209**
DOUBLE SIDE, 40 Track **$299**

These drives are fully compatible with the IBM Personal Computer. They can be used as the first or second drive and come with our **exclusive 90 day warranty!** DOS and Drive Adapters required. Our disk drives adhere to the high quality standards that IBM demands.

RADIO SHACK HARD DRIVES

5 Meg. Primary for Model III
Includes Hard Disk Operating Systems with Basic **$2395.00**

8.4 Meg. Primary for Models II, 12 & 16
Uses TRS-DOS Commands, Plus Specially Designed Enhanced Features **$3199.00**

12 Meg. Primary for Models II, 12 & 16
NEW from Radio Shack..... **$3495.00**

BLOCKBUSTER

COMPLETE MOD III DISK DRIVE

KIT ONLY $350.00 Reg. $595.00

Kit comes complete with power supply, double density disk drive, mounting hardware and instructions. *HURRY! This is a limited offer*

DISK DRIVES for the TRS-80 MODEL III

DRIVE 0		DRIVE 1	
Single Side, 40 Track	$350	Single Side, 40 Track	$199
Double Side, 40 Track	$425	Double Side, 40 Track	$269
Single Side, 80 Track	$425	Single Side, 80 Track	$269
Double Side, 80 Track	$499	Double Side, 80 Track	$319

The disk drives we sell for the Model III are the Tandon drives. Drive 0 includes the controller board, power supply, cables and all mounting hardware. Complete instructions are included for installation. It takes 30 minutes to an hour to install disk drives in a Model III. No soldering is required. TRSDOS operating system is not included in this **low** price.

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AMERICAN SMALL BUSINESS COMPUTERS

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PRYOR, OK 74361
(918) 825-4844

Listing 2 continued

```
18 IFIC=8ANDLS>0THENLS=LS-1:S$=LEFT$(S$,LS):GOTO13
19 IFIC=13AND(LS>=MLORML=0)THENFV$=S$:IC=0:GOTO23
20 IFIC=24THENLS=0:S$="":GOTO13
21 IFIC=25THEN12 ELSE IF IC=9 AND RJ THEN S$=STRING$(FL-LEN(S$),
32)+S$:LS=FL:GOTO13 ELSE IF IC=31 AND DC THEN S$=S$+DC$:PRINTDC$
;:LS=LS+1:GOTO14
22 IC=INSTR(CC$,K$):IFIC=0THEN14ELSE 24
23 IF NE AND  LEFT$(FV$,1)<>"E" THEN FV#=VAL(FV$):FV$=FNVS$(ABS(
FV#),FD):FV$=LEFT$(LEFT$("E",(LEN(FV$)<FL)+1)+LEFT$("-",(FV#>=0)
+1)+STRING$((LEN(FV$)<FL)*(LEN(FV$)-FL-(FV#<0)),32)+FV$,FL)
24 PRINT@Q,FV$;STRING$(FL-LEN(FV$),32);:RJ=0:DC=0:NE=0:VS=0:RETU
RN
25 REM* TRIM TRAILING BLANKS FROM S$
26 LS=LEN(S$):IFS$=STRING$(LS,32)THENS$="":RETURNELSESB=0
27 IFMID$(S$,LS-SB,1)=" "THEN SB=SB+1:GOTO27ELSES$=LEFT$(S$,LS-S
B):RETURN
28 REM***** SINGLE KEY ENTRY=10 ***** FIELD ENTRY=12 *******
400 REM* KEY IN K$( 1 CHAR.) @ Q, IC IS ACTIVE, VC$=VALID CHARS.
, RETURN VK CHAR. IN VC$
500 GOTO10
700 REM* Q=CSR.PST:FL=FLD.LEN:ML=MIN.LEN(0):FV$=FLD.VAL:CL=CHR.L
OW:CH=CHR.HI:CC$=CTRL.CHR:CE=ASC(ENTRY.CHR):RJ=RIGHT JUST.(RESET
 ON RETURN):VS=USE VALIDATION STRING?:VC$=VALIDATION CHAR.STRING

800 GOTO12
990 REM* CONVERT FV# TO STRING & STORE INTO F$
1000 FD=FD(I):FL=FNLF(I):F$=FNVS$(ABS(FV#),FD):F$=LEFT$(LEFT$("E
",(LEN(F$)<FL)+1)+LEFT$("-",(FV#>=0)+1)+STRING$((LEN(F$)<FL)*(LE
N(F$)-FL-(FV#<0)),32)+F$,FL):RETURN
2090 REM* DISPLAY FIELD NAMES( DF$=DISPLAY FIELDS )
2100 DL=LEN(DF$):IF DL>0 THEN LL=INT((DL-1)/HN)+1:FOR I=DLTO1STE
P-1:DF=ASC(MID$(DF$,I,1))-64:PRINT@(2+FNMD(I-1,LL))*HS+INT((I-1)
/LL)*(NS+3),CHR$(64+DF);MID$(".-",2+FNNM(DF),1);NF$(DF);:NEXTI
2110 PRINT@(2+INT((DL+HN-1)/HN))*HS,DX$;:RETURN
3400 REM* CLEAR SCREEN & DISPLAY SYSTEM NAME
3500 PRINT BS$;TAB(INT((HS-LEN(SN$))/2));SN$:RETURN
10900 REM* INSERT CODE FOR HANDLING 'SELECTED' RECORD HERE
11000 REM
11010 REM* CHECK FOR SUBTOTAL BREAK FIELD SITUATION
11020 REM* LB$: LAST BREAK FIELD,  BF$: CURRENT BREAK FIELD, BF:
 TEST FOR BREAK? (NOT FIRST LINE)
11030 IF ZS=0 THEN GOTO 11044 ELSE IF NOT BF THEN BF=-1: LB$=BF$
 ELSE IF LB$<>BF$ THEN GOSUB 11700
11040 REM* PRINT ACROSS THE PAGE
11042 REM* PERFORM EXPRESSION CALCULATION(S), IF REQUIRED
11044 IF XT THEN XI=1: GOSUB 11742: ON ERROR GOTO 11739
11050 REM* COMPUTE FIELD Z ( BAL. FWD. )
11060 IF NOT CZ THEN 11100:' SKIP AROUND IF NO BAL. FWD. COMP.
11070 IF ZP>0 THEN FOR I=1 TO ZP: Z#=Z#+ZF#(ZP(I)): NEXT I:' ADD
 BAL+ FIELDS
11080 IF ZM>0 THEN FOR I=1 TO ZM: Z#=Z#-ZF#(ZM(I)): NEXT I:' SUB
TRACT BAL- FIELDS
11090 REM* COMPUTE SUBTOTAL(S)
11100 IF ZS>0 THEN FOR I=1 TO ZS: J=ZS(I): ZS#(J)=ZS#(J)+ZF#(J):
 NEXT I: SP=-1
11110 REM* COMPUTE TOTAL(S)
11120 IF ZT>0 THEN FOR I=1 TO ZT: J=ZT(I): ZT#(J)=ZT#(J)+ZF#(J):
 NEXT I: TP=-1
11128 REM* PRINT PAGE HEADER, IF REQ'D
11130 IF LC>=PS THEN GOSUB 11500:' PRINT PAGE HEADER
11140 REM* LINE PRINT STARTS HERE
11143 IF CX THEN I=24:FV#=ZF#(I): GOSUB 1000: F$(I)=F$: 'X-FIELD
11146 IF CY THEN I=25:FV#=ZF#(I): GOSUB 1000: F$(I)=F$: 'Y-FIELD
11150 IF CZ THEN I=26:FV#=Z#: GOSUB1000: F$(I)=F$: 'GEN BAL FWD
VALUE
11160 PL$="":FI=-1: FOR I=1 TO PC: F=PF(I)
11170 F$=F$(F): IF F>NF THEN FI=0 ELSE IF PI(I) AND FI AND F$=MI
D$(LR$,FP(F),FNSZ(F)) THEN F$=STRING$(FNSZ(F),32) ELSE FI=0
11180 IF FNNM(F) THEN PL$=PL$+STRING$(TL(I)-LEN(F$),32)+F$+" " E
LSE PL$=PL$+F$+STRING$(TL(I)-LEN(F$)+1,32)
11190 NEXT I: PL$=LEFT$(PL$,TL)
11200 IF PL$<>BL$ THEN LC=LC+1:PRINT PL$:IF PR THEN LPRINT PL$
11210 RETURN
11495 REM* SUBROUTINE - PRINT TOP OF PAGE
11500 IF LC>=PS THEN GOTO 11530
11510 FOR I=1 TO PS-LC: PRINT: IF PR THEN LPRINT " "
11520 NEXT I
11530 PRINT QL$:PRINT PT$;PP$;PG:PRINT:IF PR THEN LPRINT QL$:LPR
INT PT$;PP$;PG:LPRINT" "
11540 PRINTTL$:PRINTUL$:IF PR THEN LPRINT TL$:LPRINT UL$
11550 LC=5:PG=PG+1:LR$=STRING$(RS,32)
11560 REM* PRINT BALANCE FORWARD VALUE(S), IF REQUIRED
11570 IF NOT CZ THEN RETURN:' NOT REQ'D THEN SKIP AROUND
11580 PL$="": FOR I=1 TO PC
11590 IF PF(I)=26 THEN PL$=PL$+STRING$(TL(I)-LEN(F$(26)),32)+F$(
26)+" " ELSE PL$=PL$+STRING$(TL(I)+1,32)
11600 NEXT I: LC=LC+1: PL$=LEFT$(PL$,TL): PRINT PL$: IF PR THEN
LPRINT PL$
11610 RETURN
11690 REM* SUBROUTINE - SUBTOTAL BREAK HAS BEEN DETECTED...CHECK
 FOR PAGE POSITON, GENERATE SUBTOTAL LINES
11700 IF NOT SP THEN RETURN ELSE IF LC+3 >= PS THEN GOSUB 11500:
' PRINT PAGE HEADER
11710 REM* GENERATE SUBTOTAL VALUE(S)
11711 PL$="":J=0:  FOR F=1 TO PC
11712 IF SU(F) THEN J=J+1:I=PF(F):FV#=ZS#(I):GOSUB1000: PL$=PL$+
STRING$(TL(F)-LEN(F$),32)+F$+" " ELSE PL$=PL$+STRING$(TL(F)+1,32
)
11713 IF J<SU THEN NEXT F ELSE FOR J=1 TO ZS: ZS#(ZS(J))=0: NEXT
 J
11714 LC=LC+3: PL$=LEFT$(PL$,LEN(PL$)-1): PRINT SU$: PRINT PL$:
PRINT
11715 IF PR THEN LPRINT SU$: LPRINT PL$: LPRINT " "
11716 LB$=BF$: SP=0: RETURN
11720 REM* SELECT & GET RECORD(S)
11721 IF BR=BE THEN GOSUB56250:IF DP AND (SP OR TP) THEN GOSUB 1
1700: TZ=-1:GOSUB 11800: DP=0: GOTO 11740 ELSE GOTO 11740
11722 IF INKEY$=U$ THEN 11740 :'LINE INPUT#1,DR$
11723 REM* GET BUFFERED DISK RECORD
11724 DR$=DB$(BR): IF BR<NB-1 THEN BR=BR+1 ELSE GOSUB 11759
11725 IF LEN(DR$)<>RS THEN GOSUB56380:GOTO24300 ELSE ON ERROR GO
TO0
11726 IF SC(1)=7 THEN 11733
11727 FOR X=1 TO SK: SC=SC(X):SF=SF(X):SV$=SV$(X):FP=FP(SF):FL=L
EN(SV$)
11728 IF FNNM(SF) THEN 11730
11729 IF FNFM(DR$) THEN 11731 ELSE 11721
11730 IF NOT(FNVM(DR$)) THEN 11721
11731 NEXT X
11732 REM* BREAK RECORD INTO INDIVIDUAL FIELDS
11733 IF FX THEN FOR J=1TOFX: F=FX(J): F$(F)=MID$(DR$,FP(F),FNSZ
(F)): NEXTJ
11734 REM* CONVERT COMPUTATIONAL NUMERIC FIELDS
11735 IF Z1>0 THEN FOR I=1 TO Z1: J=Z1(I): ZF#(J)=VAL(F$(J)): NE
XT I
```

Continues on p 188

DISCOUNT SOFTWARE FOR THE TRS-80

FARM and RANCH MANAGEMENT

BEEF PROJECTION		$20.00
BEEF RATION		$15.00
DAIRY COW		$15.00
FEED LOT	Models I and III	$35.00
	Model II	$100.00
FARM RECORD		$35.00
GOVERNMENT PROGRAM		$15.00
GRAIN STORAGE		$15.00
LOAN		$15.00
MACHINE COST		$20.00
RECORD MANAGEMENT		$15.00
ESTATE TAX		$25.00
FEED FORMULATOR		$35.00
PASTURE PROJECTION		$20.00

HARDWARE REQUIREMENTS FOR THE ABOVE PROGRAMS (MINIMUM) TRS-80 Model I or III with 48K and one disk drive. For Model II Versions of the above programs, please add $5.00 per program (Feed Lot Program Add $65. Buy all the above programs and save even more. Model I and II Versions only $250.00 (Save $30). Model II Versions Only $350 (Save $55.)

NEWDOS, DOSPLUS
AND NOW
LDOS!!
YOUR CHOICE, ONLY $129 EACH.

NEWDOS, DOSPLUS AND L DOS are three of the most advanced operating systems ever available for the TRS-80. After spending thousands of dollars on your computer, why limit yourself by using an inferior operating system?

Order Today!!!!

RADIO SHACK SOFTWARE

MODEL I, III

Stock Pack	26-1507	$44.95
General Ledger I	26-1552	$87.95
Inventory Control I	26-1553	$87.95
Accts. Payable	26-1554	$138.00
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Small Business COMPUTERS



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

Epson.

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

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

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

But that hardly scratches the surface.

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

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

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

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

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

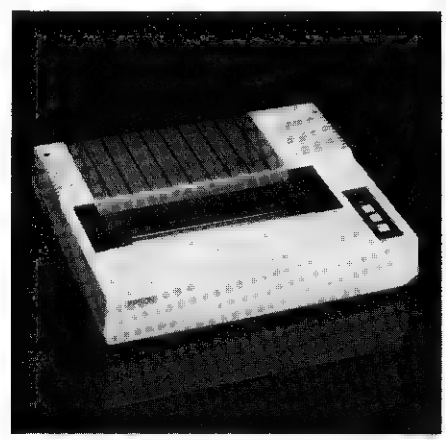
Hard-to-beat hardware.
The FX-80 has all the hardware features you've come to know and love on the MX Series: logic seeking, bidirectional printing, the by-now-famous disposable printhead, and more.

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

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

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

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



✓97

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✓See List of Advertiser on Page 387

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11736 IF ZS>0 THEN BF$=F$(ZB):' EXTRACT SUBTOTAL BREAK FIELD
11737 GOSUB 11030: LR$=DR$:' PERFORM PRINT WITH SELECTED RECORD
11738 ON ERROR GOTO11739:GOTO11721
11739 GOSUB56370:GOTO24300
11740 FOR I=1 TO DH:NEXTI:GOTO24200
11741 REM* SUBROUTINE - EXPRESSION INTERPRETER
11742 ON ERROR GOTO 11755: XE=0
11743 XR=XI(XI): 'GET OPERATOR CODE
11744 XV=XI(XI+1): XI=XI+2: 'GET VALUE POINTER
11745 REM* OPER. CODES: <0 - STORE,  0 - LOAD INIT. VALUE,  1 -
ADD,  2 - SUBTRACT,  3 - MULTIPLY,  4 - DIVIDE,  5 - DIVIDE & TR
UNCATE
11746 IF XR<0 THEN 11750 ELSE ZF#=SGN(XV)*ZF#(ABS(XV)): 'GET VAL
UE ( CONSTANT OR FIELD )
11747 IF XR=0 THEN FV#=ZF# ELSE IF XR=1 THEN FV#=FV#+ZF# ELSE IF
 XR=2 THEN FV#=FV#-ZF# ELSE IF XR=3 THEN FV#=FV#*ZF# ELSE IF XR=
4 THEN FV#=FV#/ZF# ELSE IF XR=5 THEN FV#=INT(FV#/ZF#)
11748 GOTO 11743
11749 REM* STORAGE CONTROL SECTION
11750 IF XE AND 1 THEN F$=" *** CALCULATION ERROR ( DIVISION BY
ZERO ) IN FIELD-"+CHR$(64-XR)+" ( "+NF$(-XR)+" ) BELOW ***":PRIN
T:PRINT F$:PRINT: IF PR THEN LPRINT " ":LPRINT F$:LPRINT " "
11751 IF XE AND 2 THEN F$=" *** CALCULATION ERROR ( OVERFLOW ) I
N FIELD-"+CHR$(64-XR)+" ( "+NF$(-XR)+" ) BELOW ***":PRINT:PRINT
F$:PRINT: IF PR THEN LPRINT " ": LPRINT F$:LPRINT " "
11752 IF XE<>0 THEN FV#=0: XE=0
11753 ZF#(-XR)=FV#: IF XV<0 THEN RETURN ELSE XI=XI-1: GOTO 11743

11754 REM* ERROR-TRAPPING FOR CALCULATIONS
11755 IF ERR=20 THEN XE=XE OR 1:FV#=1:ZF#=1:RESUME: 'DIVISION BY
 ZERO ERROR
11756 IF ERR=10 THEN XE=XE OR 2:FV#=1:ZF#=1:RESUME: 'OVERFLOW ER
ROR
11757 RETURN: 'UNKNOWN ERROR ???
11758 REM* (RE-)FILL DATA FILE INPUT BUFFER
11759 BR=0
11760 IF NOT EOF(1) THEN LINE INPUT#1,DB$(BR): BR=BR+1: IF BR<NB
 THEN 11760
11761 BE=BR: BR=0: RETURN
11790 REM* SUBROUTINE - GENERATE TOTAL(S) ON REPORT
11800 IF NOT TP THEN RETURN ELSE IF LC+3 >= PS THEN GOSUB 11500:
' PRINT PAGE HEADER
11810 REM* GENERATE TOTAL VALUE(S)
11820 PL$="":J=0:  FOR F=1 TO PC
11830 IF TU(F) THEN J=J+1:I=PF(F):FV#=ZT#(I):GOSUB1000: PL$=PL$+
STRING$(TL(F)-LEN(F$),32)+F$+" " ELSE PL$=PL$+STRING$(TL(F)+1,32
)
11840 IF J<TU THEN NEXT F ELSE IF TZ THEN FOR J=1 TO ZT: ZT#(ZT(
J))=0: NEXT J
11850 LC=LC+3: PL$=LEFT$(PL$,LEN(PL$)-1): PRINT TU$: PRINT PL$:
PRINT TU$
11860 IF PR THEN LPRINT TU$: LPRINT PL$: LPRINT TU$
11870 TP=0: RETURN
12680 REM* PRINTER TEST...RETURNS (PR) "TRUE" IF ON...IF PRINTER
 UNIT (PU$) IS 'STANDARD', NO QUERY IS USED.
12700 IF PU$="S" THEN PR=PEEK(14312)<128:RETURN ELSE PRINT"IS TH
E PRINTER ON? ( <Y>ES OR <N>O )"
12720 K$=INKEY$: IF K$="Y" THEN PR=-1:RETURN ELSE IF K$="N" THEN
 PR=0:RETURN ELSE 12720
12780 REM* START/INITIALIZATION
12800 CLOSE:CLEAR0:M=MEM-4000:IF M>32767 THEN CLEAR32767 ELSE CL
EAR M
12810 DEFINT A-Z:RESTORE
12815 REM* READ <KEY> DEFINITIONS
12820 READ K0,K1,K2,K3,K4,K5,K6,K7,K8,K9,KD
12825 REM* READ 'ENTRY' & 'DONT CARE' DISPLAY CHARACTERS
12830 READ CE,D1
12835 REM* READ SYS. CONFIG. DATA( FIELD CNT., HORZ.SCREEN SIZE,
VERT.SCREEN SIZE,DEPTH OF SELECTION, DISPLAY HOLD DELAY FACTOR,
NUMBER OF DISK BUFFERS, PRINTER USED, PAGE SIZE)
12840 READ FC,HS,VZ,DS,DH,NB,PU$,PS
12880 REM* COMPUTE NUMBER OF FIELDS DISPLAYED ON A LINE & SIZE O
F FIELD NAMES
12900 HN=INT((FC+3)/4): NS=INT((HS+1)/HN)-3
12903 REM* COMPUTE DISPLAY HOLD DELAY FACTOR ( 1 SEC. = 100: MDL
-I, 50: MDL-II )
12905 DH=DH*100
12908 REM* CREATE DISK DATA BUFFERS
12910 DIM DB$(NB-1)
12920 DIM NF$(26),FL(26),FS(26),FD(26),FP(26),TL(26),SU(26),TU(2
6),F$(26),PF(52),PI(52)
12940 DEF FNLF(V)=ABS(FL(V))
12950 DEF FNSZ(V)=ABS(FS(V))
12960 DEF FNST$(V#)=MID$(STR$(V#),2-(V#<0)):' CONVERT NON-NEGATI
VE V# INTO A CHAR. STRING
12980 DEF FNVS$(V#,RD)=FNST$(INT(V#+.5*10[-RD))+LEFT$(".",SGN(RD
))+RIGHT$("0000000000"+FNST$(INT((V#-INT(V#))*10[RD+.5)),RD):' CO
NVERT NON-NEGATIVE V# INTO CHAR.STRING WITH RD DIGITS TO RIGHT O
F DECIMAL PT.
12985 DEF FNQR(V!)=INT((V!-INT(V!))*10+.5):' RETURNS NUMBER OF D
IGITS DEFINED TO BE RIGHT OF DECIMAL ( LL.R )
12987 'DEF FNQL(V!)=INT(V!):' RETURNS NUMBER OF DIGITS DEFINED T
O BE LEFT OF DECIMAL ( LL.R )
12990 DEF FNQS(V!)=INT(V!)+1+FNQR(V!)-(FNQR(V!)<>0):' RETURNS SI
ZE OF DEFINED NUMERIC FIELD ( LL.R )
12995 DEF FNQF!(A,B)=ABS(A)-1-B+(B<>0)+.1*B:' RETURNS FORMAT SPE
C. ( LL.R ) GIVEN FIELD SIZE ( A ) AND RIGHT DIGITS ( B )
13000 DEF FNNM(V)=FL(V)<0:' RETURNS 'TRUE' IF NUMERIC FIELD
13010 DEF FNXY$(A,B,C)=LEFT$("X",ABS(A AND (CX OR CY)))+LEFT$("Y
",ABS(B AND CY))+LEFT$("Z",ABS(C AND CZ))
13015 DEF FNXZ$(A,B,C)=LEFT$("    X="+NF$(24),-255*(A AND CX))+L
EFT$("    Y="+NF$(25),-255*(B AND CY))+LEFT$("    Z="+NF$(26),-2
55*(C AND CZ))
13020 DEF FNFM(S$)=(SC AND (1-3*(MID$(S$,FP,FL)=SV$)-(MID$(S$,FP
,FL)>SV$)))<>0
13040 DEF FNVM(S$)=(SC AND (1-3*(VAL(MID$(S$,FP,FL))=VAL(SV$))-(
VAL(MID$(S$,FP,FL))>VAL(SV$))))<>0
13060 DIM SF(DS),SC(DS),SV$(DS)
13080 DEF FNMD(V,B)=V-INT(V/B)*B
13100 SN$="MTC AIDS CALCULATION SUBSYSTEM - III (CALCS-III)":DG$
="0123456789."
13120 CL$=CHR$(30):CS$=CHR$(31):DQ$=CHR$(34):BS$=CHR$(28)+CHR$(3
1)
13130 U$=CHR$(K1):CC$=U$+CHR$(K2)+CHR$(K5)+CHR$(K6)+CHR$(K9)
13140 CE$=CHR$(CE):DC$=CHR$(D1)
13220 SC$="<>#=-+"
13260 DIM FL$(3)
13280 DIM ZF#(66),ZS#(26),ZT#(26), ZS(26),ZT(26),ZP(26),ZM(26),Z
1(26),FX(26),XI(100)
14400 REM* PROGRAM STARTS HERE
14500 GOSUB3500:FT=3:FT$="DESCRIPTOR"
14600 GOSUB56270
```

Listing 2 continues

Listing 2 continued

```
14700 IF IC=4 THEN CLOSE:CLEAR500:END ELSE IF IC THEN 14600
14800 LINE INPUT#3,FV$:IF FV$<>"MTCAIDS2" THEN GOSUB56380:GOTO14
700
14900 LINE INPUT#3,SN$: INPUT#3,RS,NF
15000 FORI=1TONF:LINE INPUT#3,NF$(I):INPUT#3,FL(I):IF FL(I)<0 TH
EN INPUT#3,FD(I) ELSE FD(I)=0
15020 REM* SAVE A DUPLICATE OF THE FIELD LENGTH IN FS(*)
15030 FS(I)=FL(I)
15050 INPUT#3,FP(I):NEXTI:GOSUB56250
15100 FC$=LEFT$("ABCDEFGHIJKLMNOPQRST",NF):CH$=CHR$(64+NF)
15190 REM* CALCS QUERY SCREENS START HERE
15195 NF$(24)="CALC X":NF$(25)="CALC Y":NF$(26)="BAL FWD": PT$=S
N$: FOR I=24 TO 26: FL(I)=-14: FS(I)=-14: FD(I)=2: NEXT I
15198 REM* OBTAIN FIELDS TO PRINT INFORMATION
15200 GOSUB3500:DF$=FC$:CX=-1:CY=-1:CZ=-1:DX$=FNXZ$(-1,-1,-1):GO
SUB2100
15205 ZI$="0":ZM$="":ZP$="":ZS$="":ZT$="":ZX$="":ZY$="":FOR I=1
TO 26: FL(I)=FS(I): ZF#(I)=0: NEXT I
15207 ZS=0: ZT=0: X$="": Y$=""
15210 PRINT@512,"SPECIFY FIELDS (A-";CH$;",X-Z) TO BE PRINTED:"
15220 FL=2*INT((NF+3)/2)+NF+3:ML=1:VS=-1:VC$=FC$+"XYZ()":FV$="":
 IF HS-FL>43 THEN Q=552 ELSE Q=576
15222 GOSUB800: IF IC=4 THEN FV$=FC$:PRINT@Q,FV$;:IC=0 ELSE IF I
C THEN ON IC GOTO 15222,15222,14500,1,14500: ' SAVE FIELDS TO BE
 PRINTED
15224 PV$=FV$: ' SAVE FIELDS TO BE PRINTED
15226 PI=0:' SET INDEXING INDICATOR TO 'OFF'
15228 PC=0:' SET COUNT OF FIELD SPECIFIERS
15230 FOR I=1 TO LEN(PV$): PF=ASC(MID$(PV$,I,1)): IF PF>=65 AND
PF<=90 THEN PC=PC+1:PF(PC)=PF-64:PI(PC)=PI:GOTO 15234
15232 IF PF=40 THEN PI=-1 ELSE IF PF=41 THEN PI=0
15234 NEXT I: IF PC=0 THEN 15220
15236 CX=INSTR(FV$,"X")>0: CY=INSTR(FV$,"Y")>0: CZ=INSTR(FV$,"Z"
)>0
15238 ZB$=CHR$(PF(1)+64): 'ASSIGN DEFAULT SUBTOTAL BREAK FIELD
15240 PF$="":CN$="":CP$="":FOR I=1 TO NF: J=I+64: IF FNNM(I) THE
N CN$=CN$+CHR$(J): IF INSTR(FV$,CHR$(J)) THEN CP$=CP$+CHR$(J)
15243 IF J-64<=NF THEN IF INSTR(FV$,CHR$(J)) THEN IF INSTR(PF$,C
HR$(J))=0 THEN PF$=PF$+CHR$(J)
15245 NEXT I: ' PF$ = UNIQUE PRINT FIELDS ( NO PSEUDO FIELDS ) .
.. CN$ = ALL NUMERICS ... CP$ = ALL PRINT NUMERICS
15260 PRINT@640,CS$;
15262 IF CX THEN PRINT@640,"NAME OF FIELD ";DQ$;"X";DQ$;": ";NF$
(24);: PRINT@669+NS,"FORMAT: ";STR$(FNQF!(FL(24),FD(24)));
15264 IF CY THEN PRINT@704,"NAME OF FIELD ";DQ$;"Y";DQ$;": ";NF$
(25);: PRINT@733+NS,"FORMAT: ";STR$(FNQF!(FL(25),FD(25)));
15266 IF CZ THEN PRINT@768,"NAME OF FIELD ";DQ$;"Z";DQ$;": ";NF$
(26);: PRINT@797+NS,"FORMAT: ";STR$(FNQF!(FL(26),FD(26)));
15268 PRINT@835,"PAGE TITLE:";: PRINT@896,PT$;
15270 IF NOT CX AND IC=1 THEN 15200 ELSE IF NOT CX THEN 15280
15272 Q=659:FL=NS+5:ML=0:CL=32:CH=90:FV$=NF$(24):GOSUB800: ON IC
 GOTO 15200,15275,14500,16000,15200
15273 NF$(24)=FV$
15275 Q=677+NS:FL=5:FD=1:NE=-1:VS=-1:VC$=DG$:ML=1:FV$=STR$(FNQF!
(FL(24),FD(24))):GOSUB800: ON IC GOTO 15272,15280,14500,16000,15
200
15277 FL(24)=-FNQS(VAL(FV$)):FD(24)=FNQR(VAL(FV$))
15280 IF NOT CY AND IC=1 THEN 15270 ELSE IF NOT CY THEN 15290
15282 Q=723:FL=NS+5:ML=0:CL=32:CH=90:FV$=NF$(25):GOSUB800: ON IC
 GOTO 15270,15285,14500,16000,15200
15283 NF$(25)=FV$
15285 Q=741+NS:FL=5:FD=1:NE=-1:VS=-1:VC$=DG$:ML=1:FV$=STR$(FNQF!
(FL(25),FD(25))):GOSUB800: ON IC GOTO 15282,15290,14500,16000,15
200
15287 FL(25)=-FNQS(VAL(FV$)):FD(25)=FNQR(VAL(FV$))
15290 IF NOT CZ AND IC=1 THEN 15280 ELSE IF NOT CZ THEN 15310
15292 Q=787:FL=NS+5:ML=0:CL=32:CH=90:FV$=NF$(26):GOSUB800: ON IC
 GOTO 15280,15295,14500,16000,15200
15293 NF$(26)=FV$
15295 Q=805+NS:FL=5:FD=1:NE=-1:VS=-1:VC$=DG$:ML=1:FV$=STR$(FNQF!
(FL(26),FD(26))):GOSUB800: ON IC GOTO 15292,15310,14500,16000,15
200
15297 FL(26)=-FNQS(VAL(FV$)):FD(26)=FNQR(VAL(FV$))
15300 REM* INPUT PAGE TITLE
15310 Q=896:FL=HS-1:ML=0:FV$=LEFT$(PT$,FL):CL=32:CH=90:GOSUB800
15320 ON IC GOTO 15290,16000,14500,16000,15200: PT$=FV$:' SAVE P
AGE TITLE
15990 REM* OBTAIN "X=" AND "Y=" FORMULA
16000 IF LEN(CP$)=0 AND CX=0 AND CY=0 AND CZ=0 THEN 23000 ELSE I
F NOT (CX OR CY) AND IC=3 THEN 15200 ELSE IF NOT (CX OR CY) THEN
 18000
16100 GOSUB3500: DF$=CN$:Cl=CX:CM=CX OR CY:DX$=FNXZ$(-1,-1,0):CX
=Cl:GOSUB2100
16120 PRINT@512+INT((HS-29+CX*LEN(NF$(24))+5*(CX AND CY)+CY*LEN(
NF$(25)))/2),"* ";LEFT$(NF$(24),-255*CX);LEFT$(" AND ",-255*(CX
AND CY));LEFT$(NF$(25),-255*CY);" ( CALCULATED FIELD(S) ) *";
16140 IF CX THEN PRINT@640,"  PRINT X= ";ZX$; ELSE IF CY THEN PR
INT@640,"COMPUTE X= ";ZX$;
16160 IF CY THEN PRINT@768,"  PRINT Y= ";ZY$;
16200 REM* GET "X" EXPRESSION
16210 FV$=ZX$
16220 Q=651:FL=HS-22:ML=1:VS=-1:VC$=CN$+DG$+"X+-*/&":GOSUB800
16240 ON IC GOTO 16210,16400,15200,18000,15200
16250 X$="": GOSUB 30020: 'PROCESS EXPRESSION
16260 IF XE THEN X$="": GOTO 16220 ELSE ZX$=FV$: X$=XT$+":X ": '
CHECK FOR ERRORS
16390 REM* GET "Y" EXPRESSION
16400 IF NOT CY THEN 18000
16410 FV$=ZY$
16420 Q=779:FL=HS-22:ML=1:VS=-1:VC$=CN$+DG$+"XY+-*/&":GOSUB800
16440 ON IC GOTO 16210,16400,15200,18000,15200
16450 Y$="": GOSUB 30020: 'PROCESS EXPRESSION
16460 IF XE THEN Y$="": GOTO 16420 ELSE ZY$=FV$: Y$=XT$+":Y ": '
CHECK FOR ERRORS
16600 REM
17990 REM* OBTAIN "Z=" (BAL FWD) INFORMATION
18000 IF NOT CZ AND IC=3 THEN 16000 ELSE IF NOT CZ THEN 20100
18100 GOSUB3500: DF$=CN$:DX$=FNXZ$(-1,-1,0):GOSUB2100
18120 PRINT@512+INT((HS-28-LEN(NF$(26)))/2),"*** ";NF$(26);" ( B
ALANCE FORWARD ) ***";
18140 PRINT@640,"SPECIFY INITIAL VALUE: ";ZI$;: PRINT@768,"SPECI
FY FIELD(S) TO ADD: ";ZP$;: PRINT@896,"SPECIFY FIELD(S) TO SUBTR
ACT: ";ZM$;
18200 Q=663:FL=FNSZ(26):FD=FD(26):ML=1:NE=-1:VS=-1:VC$=DG$+"-+":
FV$=ZI$:GOSUB800
18230 ON IC GOTO 18200,18300,16000,18700,15200:ZI$=FV$
18300 Q=793:FL=LEN(CN$)+2:ML=0:VS=-1:VC$=CN$+FNXY$(-1,-1,0):FV$=
ZP$:GOSUB800
18330 ON IC GOTO 18200,18400,16000,18700,15200:ZP$=FV$
18400 Q=926:FL=LEN(CN$)+2:ML=0:VS=-1:VC$=CN$+FNXY$(-1,-1,0):FV$=
ZM$:GOSUB800
18430 ON IC GOTO 18300,18400,16000,18700,15200:ZM$=FV$
18690 REM* CREATE BALANCE FORWARD DRIVER ARRAYS ( ZP: BALANCE PL
```

Listing 2 continues

Listing 2 continued

```
US FIELDS,  ZM: BALANCE MINUS FIELDS )
18700 ZP=LEN(ZP$): IF ZP>0 THEN FOR I=1 TO ZP: ZP(I)=ASC(MID$(ZP
$,I,1))-64: NEXT I
18720 ZM=LEN(ZM$): IF ZM>0 THEN FOR I=1 TO ZM: ZM(I)=ASC(MID$(ZM
$,I,1))-64: NEXT I
19990 REM* OBTAIN FIELDS TO SUBTOTAL
20000 REM
20100 GOSUB3500: DF$=PF$:DX$=FNXZ$(-1,-1,0):GOSUB2100
20120 PRINT@512+INT((HS-26)/2),"*** COLUMNAR SUBTOTALS ***";: PR
INT@704,"SPECIFY FIELD(S) TO SUBTOTAL: ";ZS$;: PRINT@832,"SPECIF
Y SUBTOTAL ";DQ$;"TRIGGER";DQ$;" FIELD: ";ZB$;
20200 Q=734:FL=LEN(CP$)-CX-CY:ML=1:VS=-1:VC$=CP$+FNXY$(CX,-1,0):
FV$=ZS$:GOSUB800
20230 ON IC GOTO 20200,20400,18000,20700,15200:ZS$=FV$
20400 Q=866:FL=1:ML=1:VS=-1:VC$=PF$+FNXY$(CX,-1,0):FV$=ZB$:GOSUB
800
20430 ON IC GOTO 20200,20400,18000,20700,15200:ZB$=FV$
20690 REM* CREATE SUBTOTALING DRIVER ARRAY ( ZS: FIELDS TO SUBTO
TAL )
20700 ZS=LEN(ZS$): IF ZS>0 THEN FOR I=1 TO ZS: ZS(I)=ASC(MID$(ZS
$,I,1))-64: NEXT I
20800 IF ZS>0 THEN ZB=ASC(ZB$)-64:' DETERMINE BREAK FIELD NUMBER

21990 REM* OBTAIN FIELDS TO TOTAL
22000 REM
22050 ZT$=ZS$
22100 GOSUB3500: DF$=CP$:DX$=FNXZ$(-1,-1,0):GOSUB2100
22120 PRINT@512+INT((HS-23)/2),"*** COLUMNAR TOTALS ***";: PRINT
@704,"SPECIFY FIELD(S) TO TOTAL: ";ZT$;
22200 Q=731:FL=LEN(CP$)-CX-CY:ML=0:VS=-1:VC$=CP$+FNXY$(CX,-1,0):
FV$=ZT$:GOSUB800
22230 ON IC GOTO 22200,22200,20100,22700,15200:ZT$=FV$
22690 REM* CREATE TOTALING DRIVER ARRAY ( ZT: FIELDS TO TOTAL )
22700 ZT=LEN(ZT$): IF ZT>0 THEN FOR I=1 TO ZT: ZT(I)=ASC(MID$(ZT
$,I,1))-64: NEXT I
22990 REM* PERFORM "SETUP" WORK BEFORE PRINTING REPORT
22995 REM* DISPLAY MESSAGE INDICATING SET-UP PROCESSING
23000 PRINT BS$: PRINT@463,"REPORT FORMAT IS BEING ANALYZED . .
.";
23055 REM* ZERO-OUT SUBTOTAL AND TOTAL ARRAYS
23060 IF ZS>0 THEN BF=0: FOR I=1 TO ZS:ZS#(ZS(I))=0:NEXT I
23065 IF ZT>0 THEN FOR I=1 TO ZT:ZT#(ZT(I))=0:NEXT I
23090 REM* CREATE INPUT CONVERSIONS DRIVER ARRAY
23100 Z0$="": Z$=ZS$: GOSUB 23500
23105 Z$=ZT$: GOSUB 23500
23110 REM* EXPAND SUBTOTAL/TOTAL FIELD WIDTHS
23115 Z0=LEN(Z0$): IF Z0>0 THEN FOR I=1 TO Z0: J=ASC(MID$(Z0$,I,
1))-64: FL(J)=FL(J)-3: NEXT I
23120 FOR I=24 TO 26: IF INSTR(ZS$,CHR$(I+64))<>0 OR INSTR(ZT$,C
HR$(I+64))<>0 THEN FL(I)=FL(I)-3
23125 NEXT I
23130 Z$=ZY$: GOSUB 23500
23135 Z$=ZP$: GOSUB 23500
23140 Z$=ZM$: GOSUB 23500
23145 Z$=ZX$: GOSUB 23500
23150 Z$=ZY$: GOSUB 23500: Z1$=Z0$
23200 Z1=LEN(Z1$): IF Z1>0 THEN FOR I=1 TO Z1: Z1(I)=ASC(MID$(Z1
$,I,1))-64: NEXT I
23210 REM* CREATE FIELD EXTRACTION DRIVER ARRAY
23215 Z$=PF$: GOSUB23500: FX=LEN(Z0$): IF FX>0 THEN FOR I=1 TO F
X: FX(I)=ASC(MID$(Z0$,I,1))-64: NEXT I
23220 REM* SET-UP "X" AND "Y" EXPRESSION-TOKENS
23240 XT$=X$+Y$: IF LEN(XT$)>0 THEN XI=1: XC=27: GOSUB 50010: XT
=-1 ELSE XT=0
23300 IF CZ THEN Z#=VAL(ZI$):' SET INITIAL VAL FOR BAL FWD
23450 GOTO 23530:' SKIP AROUND SUBROUTINE(S) ( FOLLOWING )
23490 REM* SUBROUTINE - BUILDS Z0$ TO CONTAIN ALL UNIQUE CHARACT
ERS OF Z$
23500 IF LEN(Z$)=0 THEN RETURN
23510 FOR I=1 TO LEN(Z$): ZC$=MID$(Z$,I,1): IF ZC$>="A" AND ZC$<
=CH$ AND INSTR(Z0$,ZC$)=0 THEN Z0$=Z0$+ZC$
23520 NEXT I: RETURN
23529 REM* SET UP TITLE LINES FOR PRINT PAGES
23530 TL=-1: FOR I=1 TO PC: F=PF(I)
23540 IF LEN(NF$(F)) > FNLF(F) THEN TL(I)=LEN(NF$(F)) ELSE TL(I)
=FNLF(F)
23550 TL=TL+TL(I)+1: NEXT I: IF TL< (LEN(PT$)+11) THEN TL=LEN(PT
$)+11
23560 PG=1: LC=PS: BL$=STRING$(TL,32): PP$=LEFT$(BL$,TL-8-LEN(PT
$))+"PAGE": QL$=STRING$(TL,"=")
23570 IF CZ THEN I=26:FV#=Z#: GOSUB1000: F$(I)=F$: 'GEN BAL FWD
VALUE
23595 REM* COLUMN HEADING LINE GENERATION
23600 TL$="":UL$="":FOR I=1TOPC:F=PF(I):F$=NF$(F):TL$=TL$+F$+STR
ING$(TL(I)-LEN(F$)+1,32):UL$=UL$+STRING$(TL(I),"=")+" ":NEXTI
23605 TL$=LEFT$(TL$,TL):UL$=LEFT$(UL$,TL)
23610 REM* SUBTOTAL UNDERSCORE LINE GENERATION
23615 IF ZS=0 THEN 23640 ELSE SU$="": SU=0: J=0
23620 FOR I=1 TO PC: F=PF(I)
23625 IF INSTR(ZS$,CHR$(64+F))<>0 THEN SU=SU+1:SU(I)=-1: SU$=SU$
+STRING$(TL(I),"-")+" ":J=LEN(SU$) ELSE SU(I)=0: SU$=SU$+STRING$
(TL(I)+1,32)
23630 NEXT I: SU$=LEFT$(SU$,J-1)
23635 REM* TOTAL UNDERSCORE LINE GENERATION
23640 IF ZT=0 THEN 23665 ELSE TU$="": TU=0: J=0
23645 FOR I=1 TO PC: F=PF(I)
23650 IF INSTR(ZT$,CHR$(64+F))<>0 THEN TU=TU+1:TU(I)=-1: TU$=TU$
+STRING$(TL(I),"=")+" ":J=LEN(TU$) ELSE TU(I)=0: TU$=TU$+STRING$
(TL(I)+1,32)
23655 NEXT I: TU$=LEFT$(TU$,J-1)
23660 REM* RESET DUMP/SUBTOTAL/TOTAL PENDING FLAGS
23665 DP=0: SP=0: TP=0
23990 REM* OBTAIN PRINT FILE INFORMATION
24000 REM* GET & PRINT RECORD(S)
24100 OP$="PRINT":GOSUB56000:IF SC=0 THEN IF NOT(TP OR SP) THEN
15200 ELSE24100
24200 FT=1:FT$=OP$:GOSUB3500:GOSUB56270
24300 ON ERROR GOTO 0: IF IC=3 OR IC=5 THEN 24100
24350 IF IC=1 THEN 24100 ELSE ON ERROR GOTO 11739
24400 PRINTBS$;:GOSUB12700:PRINTBS$;:GOTO11721
30000 REM* SUBROUTINE - EXPRESSION TOKENIZATION/COMPILATION
30010 REM* XT$: EXPRESSION-TOKEN STRING,  XE: ERROR FLAG,  C$: I
NPUT EXPRESSION
30020 C$=FV$+";": FV$="": XT$="= ": XE=0: CP=1
30030 CB=CP:' POINT TO BEGINNING OF SCAN . . .  CP: OPERAND DELI
NIATION
30040 ' FIND POSITION OF NEXT ARITHMETIC OPERATOR
30050 CR=999:FOR CI=1TO6:CQ=INSTR(CB,C$,MID$(":+-*/&",CI,1)):IF
CQ<CR AND CQ<>0 THEN CR=CQ:CA=CI: 'CR: POSITION IN C$ OF NEXT OP
ERATOR,  CA: OPERATOR ( ":+-*/&" ) FOUND
30060 REM* CO$: OPERAND,  CM: LEADING MINUS?,  CF: CALCS FIELD S
PECIFIER?
```

Listing 2 continues

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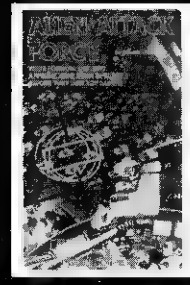
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Listing 2 continued

```
30070 NEXT CI: CM= MID$(C$,CP,1)="-": CO$=MID$(C$,CP,CR-CP): CF=
 MID$(CO$,1-CM,1)>="A" AND MID$(CO$,1-CM,1)<="Z"
30080 IF NOT CM THEN 30090 ELSE IF CR=1 THEN CB=CB+1:GOTO 30050
ELSE IF INSTR("*/&",MID$(C$,CR-1,1))<>0 THEN CB=CB+1:GOTO 30050:
 'UNARY MINUS
30090 IF CO$="" OR CO$="-" OR LEFT$(CO$,1)="?" OR (CF AND LEN(CO
$)+CM>1) THEN FV$=FV$+"??": XE=-1  ELSE FV$=FV$+CO$: IF NOT XE T
HEN XT$=XT$+CO$+" "
30100 PRINT@Q+HS-19,"WORKING ";
30110 IF CA=1 THEN PRINT@Q+HS-19,;: IF XE THEN PRINT "ERROR ??";
: RETURN ELSE PRINT "          ";: RETURN
30120 FV$=FV$+MID$("+-*/&",CA-1,1):CP=CR+1: IF NOT XE THEN XT$=X
T$+RIGHT$(FV$,1)+" "
30130 PRINT@Q+HS-19," WORKING";: GOTO 30030
50000 REM* SUBROUTINE - CONVERTS EXPRESSION-TOKENS INTO ARRAY
50010 I=1: XI=XI-1
50020 XI=XI+1: 'INCREMENT ARRAY POINTER
50030 J=INSTR(I,XT$," "): IF J-I<1 THEN XI(XI)=-99:RETURN ELSE X
C$=MID$(XT$,I,J-I): I=J+1:' EXTRACT TOKEN
50040 IF LEFT$(XC$,1)=":" THEN XI(XI)=64-ASC(RIGHT$(XC$,1)): GOT
O 50020
50050 IF RIGHT$(XC$,1)>="A" AND RIGHT$(XC$,1)<="Z" THEN XI(XI)=A
SC(RIGHT$(XC$,1))-64: IF LEFT$(XC$,1)="-" THEN XI(XI)=-XI(XI): G
OTO 50020 ELSE GOTO 50020
50060 J=INSTR("=+-*/&",XC$): IF J>0 THEN XI(XI)=J-1: GOTO 50020
50070 XI(XI)=XC: ZF#(XC)=VAL(XC$): XC=XC+1: GOTO 50020
55990 REM* SELECT & XXX SCREEN
56000 SK=1
56010 GOSUB3500:DF$=FC$:GOSUB2100
56020 PRINT@512,CS$;"SELECT & ";OP$;" RECORDS BY (A-";CH$;"):";
56030 Q=540+LEN(OP$):VC$=FC$:GOSUB500
56040 SF=0:IF IC=4 THEN SC=7:SC(1)=7:SK=1:RETURN ELSE IF IC=2 TH
EN 56030 ELSE IF IC THEN 56230 ELSE SF=VK
56050 PRINT@512,CS$;"SELECT & ";OP$;" RECORDS BY ";DQ$;NF$(SF);D
Q$;
56060 PRINT@640,CS$;"= EQUAL";TAB(15);"< LESS THAN";TAB(30);"- L
ESS OR EQUAL"
56070 PRINT@704,"# NOT EQUAL";TAB(15);"> GTR THAN";TAB(30);"+ GT
R OR EQUAL"
56080 PRINT@832,"CHOOSE RELATION:";
56090 Q=849:VC$=SC$:GOSUB500
56100 ON IC GOTO 56020,56090,56230,56090,56230
56110 SC=VK
56120 PRINT@533+LEN(OP$),CS$
56130 PRINT@576,NF$(SF);MID$(SC$,SC,1);
56140 Q=578+LEN(NF$(SF)):FL=FNSZ(SF):ML=1:FV$="":RJ=(FL(SF)>0):N
E=NOT RJ:FD=FD(SF):CL=32:CH=90:GOSUB800:SV$=FV$
56150 IF IC=2 THEN SV$=STRING$(FL,32) ELSE ON IC GOTO 56050,1,56
230,56140,56230
56160 IF SK>1 THEN FOR J=SK-1 TO 1 STEP -1:PRINT@576+(64*(SK-J))
,NF$(SF(J));MID$(SC$,SC(J),1);" ";SV$(J);:NEXT J
56170 PRINT@SK*64+640,"<N>EXT OR <";LEFT$(OP$,1);">";MID$(OP$,2)
;":";
56180 Q=SK*64+654+LEN(OP$):VC$="CN"+LEFT$(OP$,1):GOSUB500
56190 ON IC GOTO 56120,56180,56230,56180,56230
56200 SF(SK)=SF:SC(SK)=SC:SV$(SK)=SV$
56210 IF VK=3 THEN RETURN ELSE IF VK=1 THEN 56180 ELSE IF VK=2 A
ND SK<DS THEN SK=SK+1:GOTO56010
56220 GOTO 56180
56230 SC=0:RETURN
56240 REM* CLOSE FILE(FT), SET FL$(FT)="" & RESET 'ON ERROR'
56250 CLOSE FT:FL$(FT)="":ON ERROR GOTO 0:RETURN
56260 REM* GET FILENAME( FL$(FT) ) OF TYPE(FT$) & OPEN (IF REQ'D
.)
56270 GOSUB3500:PRINT@192,"NAME OF ";FT$;" FILE:";
56280 IF FL$(FT)<>"" THEN PRINT@320,"ACTIVE ";FT$;" FILE=";FL$(F
T);
56290 Q=207+LEN(FT$):FL=15:ML=1:FV$="":CL=35:CH=90:GOSUB800:PRIN
T@320,CS$
56300 IF IC=2 OR (IC=4 AND FL$(FT)="" AND FT<>3) THEN 56280 ELSE
 IF IC THEN RETURN
56310 IF FV$="#" AND FT=1 AND (SP OR TP) THEN GOSUB 11700: BF=0:
 TZ=0:GOSUB 11800: FOR I=1 TO DH: NEXT I: GOTO 56270
56320 IF RIGHT$(FV$,1)="#" AND FT=1 THEN DP=-1: FV$=LEFT$(FV$,LE
N(FV$)-1)
56330 IF FV$="*" THEN 56390
56340 IF IC=4 AND FT<3 THEN PRINT@Q,FL$(FT);:RETURN ELSE FL$(FT)
=FV$
56350 IF (FT<3 AND FL$(1)=FL$(2)) OR (FT=3 AND (FL$(3)=FL$(1) OR
 FL$(3)=FL$(2))) THEN PRINT@384,">>> FILE=";FL$(FT);" IN USE";:F
L$(FT)="":GOTO56280
56360 ON ERROR GOTO 56370:CLOSE FT:OPEN MID$("IOI",FT,1),FT,FL$(
FT):IF FT=1 THEN GOSUB 11759: RETURN ELSE :RETURN
56370 IF ERR/2+1<21 THEN ON ERROR GOTO 0 ELSE RESUME 56380
56380 PRINT@384,CS$;">>> BAD FILE=";FL$(FT);
56390 GOSUB56250:GOTO56280
60000 REM* <KEY> DEFINITIONS
60010 DATA 13,91,10,8,9,27,26,24,25,31,31

60020 REM* DISPLAY CHARACTERS
60030 DATA 136,130
60040 REM* FIELD CNT.,HORIZ.SCREEN SIZE,VERT.SCREEN SIZE,SELECTI
ON DEPTH, DISPLAY HOLD FACTOR
60050 DATA 20,64,16,4,10
60053 REM* NUMBER OF DISK RECORD BUFFERS
60056 DATA 5
60060 REM* PRINTER ( <S>TANDARD / <N>ON-STANDARD ) USED
60070 DATA S
60080 REM* NUMBER OF VERTICAL PRINT LINES ON PAGE
60090 DATA 66
61000 REM*DATA "AIDS3/DSC?1","(ABCz)?1"," FIELD?1","4.2?1","[4",
"10?1","C?1","[4","C?1","A?1","?1","[4","AIDS3/DAT?1"
62000 REM*DATA "AIDS3/DSC?1","CXY?1","?1","5.2?1","?1","5.2?1","
[4","C-30?1","C/X?1","[4","[4","[4","AIDS3/DAT?1"
```

Program Listing 3. MERGE-III

```
1 '(C)1980 BY META TECHNOLOGIES CORP.,(C)1982 BY SOFTRENDS,INC.
2 CLS:PRINT@284,"MERGE-III":PRINT@410,"VERSION 1.5":PRINT@599,"C
OPYRIGHT(C)1982":PRINT@670,"BY":PRINT@728,"SOFTRENDS, INC.":PRIN
T:PRINT
20 GOTO10005
999 REM* WORKING SECTION
1000 IM(0)=PI+1:IM(1)=VARPTR(R(0))
1005 IM(2)=0:IM(3)=0:IM(4)=0:IM(5)=0
1010 DEFUSR0=VARPTR(US(0)):D=USR0(VARPTR(IM(0)))
1020 IFD=-1THENCLOSE:RO="":H3="":SO$="":FORI=0TO14:RI(I)="":NEXT
I:FR=0:GOTO10129
1031 IFFR=0THENFR=-1:FC=0:IFMO=2THENRC(1)=R(D):GOTO1040ELSE1040
```

Listing 3 continues

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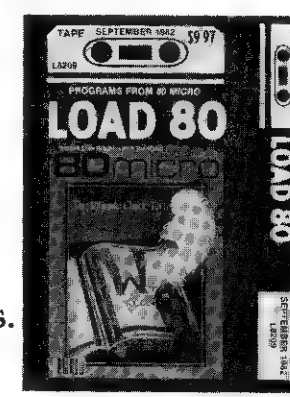
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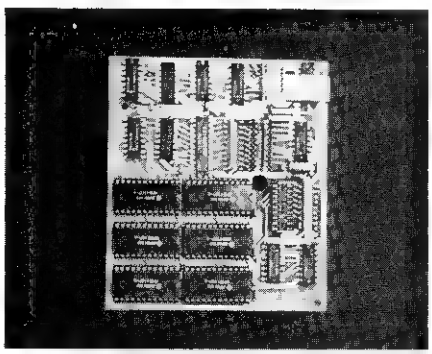
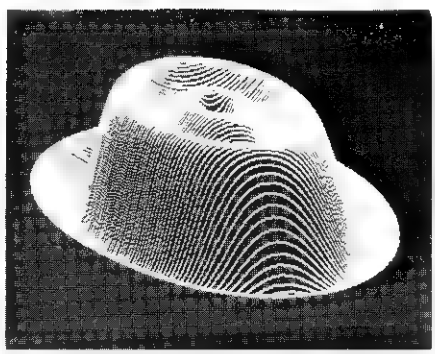
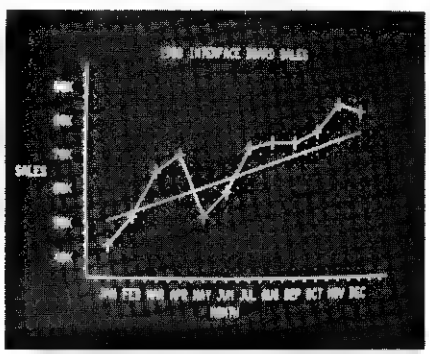
```
1032 IM(0)=4:RC(1)=R(D):IM(1)=VARPTR(RC(0)):DEFUSR0=VARPTR(US(0)
):FC=USR0(VARPTR(IM(0)))=1:IM(0)=FI+1
1040 IFFCTHENPRINT:PRINT"FILE '"RI(D)"' IS NOT IN SORTED ORDER":
GOTO35000
1041 IFMO=1THEN1050
1042 IFMO=2THENIFRC(0)=RC(1)THEN1065ELSE1050
1043 RC(2)=RC(0):IM(0)=2:IM(1)=VARPTR(RC(1)):DEFUSR0=VARPTR(US(0
)):IFUSR0(VARPTR(IM(0)))=0THEN1065
1050 OE=-1:PRINT#1,R(D)
1060 PRINTUSINGA$;D+1;R(D)
1065 IM(0)=FI+1:RC(2)="":IFINKEY$=CHR$(91)THENPRINT"MERGE STOPPE
D":CLOSE:FR=0:GOTO10129
1070 RC(0)=R(D)
1080 IFEOF(D+2)THENR(D)="":CLOSED+2:GOTO1000
1090 OE=0:LINEINPUT#D+2,R(D)
1100 GOTO1000
8999 REM* INPUT ROUTINE
9000 S$=FV$:LS=LEN(S$)
9010 PRINT@Q,STRING$(FL,CE);:PRINT@Q,S$;
9020 IFFL>1THENC4$=CHR$(14):C5$=CHR$(15):GOTO9040
9030 PRINT@Q," ";:C4$=CHR$(8):IFFV$=""THENC5$=CHR$(CE)ELSEC5$=FV
$
9040 PRINTC4$;:K$=INKEY$:PRINTC5$;:IFK$=""THEN9040ELSEIC=ASC(K$)

9050 IFINSTR(CC$,K$)THENIC=INSTR(CC$,K$):GOTO9120
9060 IFFL=1THEN9130
9070 IFIC>CHORIC<CLTHEN9080ELSEIFLS<FLTHENS$=S$+K$:PRINTK$;:LS=L
S+1:GOTO9040ELSE9040
9080 IFIC=8ANDLS>0THENLS=LS-1:S$=LEFT$(S$,LS):GOTO9010
9090 IFIC=13AND(LS>=MLORML=0)THENIC=0:GOTO9120
9100 IFIC=24THENLS=0:S$="":GOTO9010
9110 IFIC=9THEN900ELSE9040
9120 FV$=S$:PRINTSTRING$(FL-LEN(FV$),32);:RETURN
9130 IFIC=13ANDFV$<>""THENK$=FV$
9140 IC=0:VK=INSTR(VC$,K$):IFVKTHENPRINT@Q,K$;:FV$=K$:RETURNELSE
9040
10000 REM* INITIALIZATION
10005 CLEAR0:IFMEM<3000THENCLEAR950ELSEM=MEM-250:IFM>32767THENC
LEAR32767ELSECLEARM
10010 DEFINTA-Z:DEFSTRR,H
10020 DIMIM(86):READX!:DIMUS(X!-1):D=0
10025 FORI=0TOX!-1:READUS(I):NEXTI
10030 SW=64:CE=136:A$="##:%"+STRING$(SW-6,32)+"%"
10035 BS$=CHR$(28)+CHR$(31)
10040 TD=150
10043 CC$=CHR$(91)+CHR$(27)+CHR$(0)+CHR$(26)
10045 DEFFNSP(V)=413+(V<7)*29+(V+1+(V>6)*7)*64
10046 DEFFNMD(V,B)=V-INT(V/B)*B
10047 NS=10
10050 DIMR(14),RI(14),FL(20),FP(20),NF$(20),FD(20)
10070 SN$="MTC AIDS-III File Merge Subsystem (MERGE-III)"
10080 GOSUB15010:FT=3:FT$="Descriptor"
10085 GOSUB15050
10090 IF IC=4 THEN CLOSE:CLEAR500:END ELSE IF IC THEN 10085
10095 LINE INPUT#3,FV$:IF FV$<>"MTCAIDS2" THEN GOSUB15140:GOTO10
090
10100 LINE INPUT#3,SN$: INPUT#3,RS,NF
10105 FORI=1TONF:LINE INPUT#3,NF$(I):INPUT#3,FL(I):IF FL(I)<0 TH
EN INPUT#3,FD(I) ELSE FD(I)=0
10110 INPUT#3,FP(I):NEXTI:GOSUB15030
10115 FC$=LEFT$("ABCDEFGHIJKLMNOPQRST",NF):CH$=CHR$(64+NF)
10116 L=INT(NF/5+.9)
10129 GOSUB60000:FR=0:GOSUB15010:GOSUB14010
10130 FV$=SO$:PRINT@512,"Files are Sorted by: ";:FL=2*NF:CL=43:C
H=64+NF:Q=533:GOSUB9000:SO$=FV$:ONICGOTO10080,10080,1,10130
10132 ONERRORGOTO0
10135 FORI=0TO85:IM(I)=0:NEXT
10140 FS$="":K=-1:FORI=1TOLEN(FV$):K$=MID$(FV$,I,1):A=ASC(K$)
10150 IFA<65THEN10160ELSEFS$=FS$+K$:K=K+1:IM(4*K+6)=ABS(FL(A-64)
):IM(4*K+7)=FP(A-64)-1:IFFL(A-64)<0THENIM(4*K+9)=1
10155 N=INSTR(I,FV$,"-"):P=INSTR(I,FV$,"+"):IF(N<PANDN>0)OR(N>0A
NDP=0)THENIM(4*K+8)=1
10160 NEXTI
10161 PRINT@640,"1) Include ALL records":PRINT"2) Eliminate iden
tical duplicate records":PRINT"3) Eliminate duplicate records, c
omparing only":PRINT"    the "CHR$(34)FS$CHR$(34)" field";
10162 IFK>0THENPRINT"s"ELSEPRINT
10163 FV$="":PRINT@960,"Option?";:Q=968:VC$="123":FL=1:GOSUB9000
:MO=VK:ED=MO>1:ONICGOTO10130,10080,1,10163
10170 GOSUB15010
10220 FV$=RO:PRINT@192,"Output File Name:";:Q=210:FL=14:ML=1:CL=
47:CH=90:GOSUB9000:RO=FV$:ONICGOTO10129,10129,1,10220
10240 MN$=MID$(STR$(2+ED),2):FV$=H3:PRINT@320,"Number of Input F
iles ("MN$"-14)?";:Q=350:FL=2:CL=48:CH=57:GOSUB9000:H3=FV$
10250 FI=VAL(H3):ONICGOTO10220,10129,1,10240
10260 IFFI<2+EDORFI>14THENH3="":GOTO10240
10263 FORI=0TO13:IFI>=FITHENPRINT@FNSP(I),STRING$(19,32);ELSEPRI
NT@FNSP(I),USING"File ##: %            %";I+1;RI(I);
10264 NEXTI
10269 REM* INPUT FILE NAMES
10270 IM(0)=FI:FI=FI-1
10280 FORI=0TOFI
10285 FL=14:ML=1:CL=47:CH=90
10290 FV$=RI(I):CM=FNSP(I)
10300 Q=CM+9:GOSUB9000:RI(I)=FV$
10310 IFIC=1THENIFI>0THENI=I-1:GOTO10285ELSE10240
10311 IFIC=2THENI=0:GOTO10240ELSEIFIC=0THEN10320
10312 FORJ=1TOFI:IFRI(J)<>""ORRI(J)=""ANDRI(J-1)<>""THENIX=J
10313 NEXTJ:FORI=IXTOFI:GOTO10285
10320 IFI=0THEN10340ELSEFORJ=0TOI-1:IFRI(J)=FV$THENNW=-1
10330 NEXTJ:IFNWTHENNW=0:RI(I)="":GOTO10290
10340 IFRI(I)=ROTHENRI(I)="":GOTO10290ELSENEXTI
10342 FV$=CHR$(CE):PRINT@960,"Press <ENTER> when ready";:Q=985:F
L=1:VC$=FV$:GOSUB9000
10344 PRINT@896,STRING$(120,32);
10345 IFIC=1THENI=I-1:FORI=ITOFI:GOTO10285
10346 IFIC=2THEN10240ELSEIFICTHEN10342
10359 REM* OPEN FILES
10360 ONERRORGOTO30000:OE=-1:OPEN"O",1,RO:OE=0
10370 FORI=0TOFI:OPEN"I",I+2,RI(I)
10380 IFEOF(I+2)THENCLOSEI+2:GOTO10410
10390 LINEINPUT#I+2,R(I)
10410 NEXTI:ONERRORGOTO30080
10440 PRINT@1023,;:PRINT:GOTO1000
14000 REM* DISPLAY FIELD NAMES
14010 FORI=NFTO1STEP-1:PRINT@2*SW+FNMD(I-1,L)*SW+INT((I-1)/L)*(N
S+3),CHR$(64+I);"-";NF$(I);:NEXTI:RETURN
15000 REM* CLEAR SCREEN & DISPLAY SYSTEM NAME
15010 PRINT BS$;TAB(INT((SW-LEN(SN$))/2));SN$:RETURN
15020 REM* CLOSE FILE(FT), SET FL$(FT)="" & RESET 'ON ERROR'
15030 CLOSE FT:FL$(FT)="":ON ERROR GOTO 0:RETURN
```

Listing 3 continues

Listing 3 continued

```
15040 REM* GET FILENAME( FL$(FT) ) OF TYPE(FT$) & OPEN (IF REQ'D
 )
15050 GOSUB15010:PRINT@192,"Name of ";FT$;" File:";
15060 IF FL$(FT)<>"" THEN PRINT@320,"ACTIVE ";FT$;" FILE=";FL$(F
T);
15070 Q=207+LEN(FT$):FL=14:ML=1:FV$="":CL=42:CH=90:GOSUB9000:PRI
NT@320,CS$
15080 IF IC=2 OR (IC=4 AND FL$(FT)="" AND FT<>3) THEN 15060 ELSE
 IF IC THEN RETURN
15090 IF FV$="*" THEN 15150
15100 IF IC=4 AND FT<3 THEN PRINT@Q,FL$(FT);:RETURN ELSE FL$(FT)
=FV$
15110 IF (FT<3 AND FL$(1)=FL$(2)) OR (FT=3 AND (FL$(3)=FL$(1) OR
 FL$(3)=FL$(2))) THEN PRINT@384,">>> FILE=";FL$(FT);" IN USE";:F
L$(FT)="":GOTO15060
15120 ON ERROR GOTO 15130:CLOSE FT:OPEN MID$("IOI",FT,1),FT,FL$(
FT):RETURN
15130 IF ERR/2+1<21 THEN ON ERROR GOTO 0 ELSE RESUME 15140
15140 PRINT@384,CS$;">>> BAD FILE=";FL$(FT);
15150 GOSUB15030:GOTO15060
29999 REM* ERROR TRAPPING
30000 IFERR/2+1=54ORERR/2+1=65THENRESUME30040
30010 IFERR/2+1=53THENPRINT@1023," ":PRINT">>>"FT+2"FILE BUFFERS
 MUST BE OPEN":RESUME30030
30020 IFERR/2+1=58ORERR/2+1=68THEN30080ELSEONERRORGOTO0
30030 CLOSE:PRINT"PROGRAM TERMINATED":END
30039 REM* FILE NOT FOUND
30040 CLOSE:FORJ=1TO2:IFOETHENPRINT@291,">>>BAD OUTPUT FILE";ELS
EPRINT@291,">>>FILE"I+1"NOT FOUND";
30050 FORK=1TO2*TD:NEXTK:PRINT@291,CHR$(30);
30060 FORK=1TOTD:NEXTK,J
30065 IFOETHEN10220
30070 FORI=ITOFI:GOTO10285
30080 IFOETHEN30085ELSE30090
30085 IFERR/2+1=61ORERR/2+1=62THENPRINT:PRINT"DISK FULL - MERGE
HALTED":LINEINPUT"PRESS <ENTER> TO CONTINUE";XX$:CLOSE:RESUME101
29
30087 PRINT:PRINT"OUTPUT FILE NOT USEABLE":ONERRORGOTO0:CLOSE:EN
D
30090 PRINT:PRINT"ERROR IN READING FILE '"RI(D)"' FROM DISK":RES
UME35000
30100 ONERRORGOTO0:END
35000 PRINT"PRESS <R> TO RESUME MERGE, <S> TO STOP IT"
35010 K$=INKEY$:IFK$=""THEN35010
35020 IFK$="R"THENPRINT"MERGE RESUMED WITHOUT FILE '"RI(D)"'":R(
D)="":PRINT:CLOSED+2:GOTO1000
35030 IFK$="S"THENPRINT"MERGE STOPPED":CLOSE:GOTO10129
49999 REM* MACHINE CODE
50000 DATA 114,32717,-6902,-7715,26333,-8957,622,1,4352,-1,29661
,-8956,1394,-18562,30248,-23686,10300,-8845,-539,-6687,-14891
50010 DATA 32509,-18676,-11839,10465,-6815,-14891,17955,26147,-5
272,17955,26147,-664,3662,6,-5367,18185,32509,-18670,20776
50020 DATA 14,11582,-16667,1056,-13877,792,4131,-7690,18173,-109
96,-16661,1056,-15925,792,4131,-5130,31185,18173,-500,14339
50030 DATA -5343,-386,8237,15874,20256,-486,8237,15874,-18144,92
48,4899,-5616,5912,-27112,13592,8728,-32744,254,808,6175
50040 DATA 6671,8382,8971,4115,4600,8,6653,-7656,-745,4270,-1609
7,-7727,4408,29149,-8956,1392,22237,-8957,606,2539,2313,1003
50050 DATA 8995,-8925,126,-8815,382,12440,-8769,1134,26333,-1561
1,2714,18511,20297
60000 FORI=ITO14:R(I)="":NEXT:RC(0)="":RC(1)="":RC(2)="":RETURN
```

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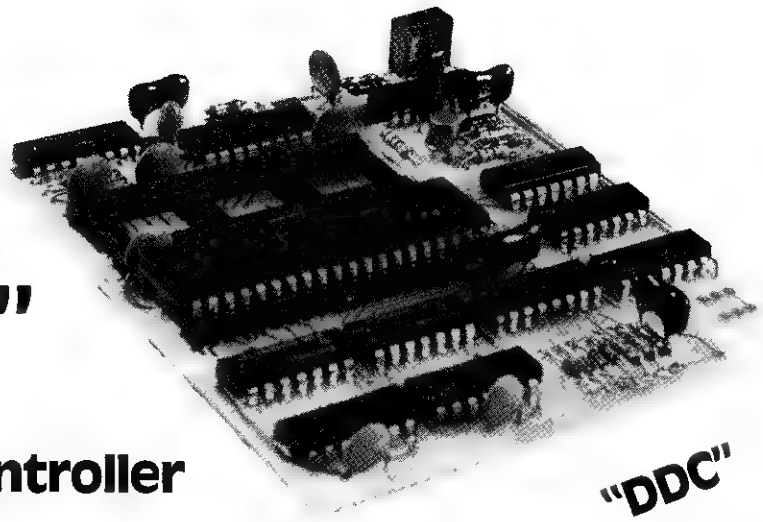
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Double Density Controller



★ Technical Superiority

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The units presently on the market use a write precompensation circuit that is very "sloppy". Board to board tolerance is extremely wide - in the order of ± 100 ns. The "DDC" is accurate to within ± 20 ns.
The bottomline is state of the art reliability!

★ Test Proven

Tests were conducted on AEROCOMP'S "DDC", Percom's "Doubler A"* and "Doubler II"* and LNW's "LNDoubler"** using a Radio Shack TRS80*** Model I, Level 2, 48 K with TRS80 Expansion Interface and a Percom TFD100 * disk drive (Siemens Model 82). Diskette was Memorex 3401. The test diskette chosen was a well used piece of media to determine performance under adverse conditions. The various double density adapters were installed sequentially in the expansion interface.
The test consisted of formatting 40 tracks on the diskette and writing a 6DB6 data pattern on all tracks. The 6DB6 pattern was chosen because it is recommended as a "worst case" test by manufacturers of drives and diskettes. An attempt was then made to read each sector on the disk once - no retrys. Operating system was Newdos/80, Version 1.0, with Double Zap, Version 2.0. Unreadable sectors were totalled and recorded. The test was run ten times with each double density controller and the data averaged. Test results are shown in the table.

★ Features

TRS80 Model I owners who are ready for reliable double density operation will get (1) 80% more storage per diskette, (2) single and double density data separation with far fewer disk I/O errors, (3) single density compatibility and (4) simple plug-in installation. Compatible with all existing double density software.

★ Value

$139.95 **for the BEST double density controller on the market.**
$179.95 for "DDC" complete with DOSPLUS 3.3D
$229.95 for "DDC" complete with LDOS

★ TEST RESULTS ★

MFR & PRODUCT	SECTORS LOCKED OUT (AVG)
AEROCOMP "DDC"	0
PERCOM "DOUBLER II"	18
PERCOM "DOUBLER A"	250
LNW "LNDOUBLER"	202

Note: test results available upon written request. All tests conducted prior to 8-25-81

Aerocomp's 14 day money back guarantee applies to hardware only.
Specials will be prorated. Shipping $2.00 in Cont. US. See opposite page for details.

Data Separators

The advances that make the "DDC" great are incorporated in the new AEROCOMP Single Density Data Separator ("SDS") and Double Density Data Separator ("DDS").

★ Has your original manufacturer left you holding the bag?

If you already own a Percom "Doubler A", "Doubler II" or LNW "LNDoubler", the AEROCOMP "DDS" will make it right. Look at the test results:

MFR. & PRODUCT	SECTORS LOCKED OUT	
	WITHOUT "DDS"	WITH "DDS"
PERCOM "DOUBLER II"	18	1
PERCOM "DOUBLER A"	250	0
LNW "LNDOUBLER"	202	0

Note: Same test procedures as "DDC".
* Trademark of Percom Data Co.
** Trademark of LNW
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★ **"DDS"** **$49.95**
(Use 1791 chip from your DD controller)

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Plugs directly into your existing Double Density Controller. ↙82

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The internal data separator in the WD1771 chip (R/S Expansion Interface) is NOT recommended by WD for reliable data transfer. Do you have any of these problems: Lost data, tracks locked out, CRC errors, disk retry? YOU NEED ONE!

★ **"SDS"** **$29.95**
(For Mod. I; shipping $2.00)

See opposite page▸▸▸▸▸▸



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Random Basic and the Scribe Editor

by Scott Norman

If you're a Color Computer owner using CC FLEX, these two programs from Computerware, Random Basic and the Scribe Editor, may be for you.

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$75

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"Suppose I upgrade to FLEX—what kind of software is available?"

I've been asked this question any number of times since I began working with Frank Hogg Laboratory's Color Computer FLEX operating system.

One of my own interests is high-level languages, and in this review I'll describe a dandy: Computerware's Random Basic. I'll also cover the Scribe Editor, because it is a useful adjunct for preparing and editing Random Basic source code. Keep in mind, though, that you can use Scribe for editing all sorts of FLEX files.

Random Basic

Computerware has been supporting the Motorola 6800 family since the mid-70s, and Random Basic itself ran under the Smoke Signal Broadcasting DOS for several years before the CC FLEX version was written.

It is a full-featured Basic, with comprehensive file-handling capabilities and an extended numerical range that make it suitable for both business and scientific applications. The syntax is pretty close to the American National Standards Institute model, so experienced Color Basic users should have few conversion problems.

Random Basic is furnished as a 50-sector file, RBASIC.CMD, which can be invoked like any other CC FLEX command file—just call it by name. My review copy of RBasic carried a v.2.0 logo, and proved to be compatible with versions 5.0, 5.0:1, and 5.0:2 of the operating system. With the latter two, all RBasic programs and data appear in 51-column, 24-line format, unlike material prepared with Hogg Laboratory's own DBasic.

RBasic saves and loads data through the standard CC FLEX utilities. Users of single-drive systems can copy RBasic onto a working disk together with FLEX.SYS and any other files they need.

RBasic documentation is very fine indeed. Forty pages of information detail the commands, functions, and statements of the language, and include 11 appendices. These cover memory maps, error codes, the use of machine-language subroutines, and details on customizing the language for your own use. A five-page summary at the front of the manual gives one-line definitions of all the available statements.

I can't give a detailed description of every command and function in a review of reasonable size, so I'll report those aspects in which RBasic differs from Color Basic in significant (or at least interesting) ways.

Background

One piece of good news is that RBasic leaves you with lots of program memory: 33778 bytes with either of the two newest versions of CC FLEX, 35826 bytes with the old v.5.0. The corresponding bad news is that it lacks the graphics capabilities of the Microsoft dialects, so you must manage any graphical outputs with POKEs or Print Using statements.

RBasic program lines can contain up to 128 characters, and must have numbers lying between 1 and 9999. Instructions can be abbreviated down to the minimum number of characters required for a unique identification, followed by a period. Thus, Input can be reduced to I., Print to P., and so on.

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The interpreter handles such abbreviations more quickly than full spellings, which is helpful; RBasic is not a fast language. You can overdo a good thing, though. Excessive use of command abbreviations does nothing for the readability of your code.

One feature that does help readability is RBasic's tolerance of long variable names: up to 126 characters, with the first six used by the interpreter for distinguishing variables. Thus, NUMBER and NUMERAL would be recognized as distinct entities. In fact, NUMBER and Number are also distinguished; uppercase and lowercase letters are both allowed, and are considered to be different symbols.

String variables may contain up to 126 characters. The STRING= command sets the maximum length for any given program, with a default of 32. You must know this value when reserving space for random disk files.

RBasic can handle numbers ranging between 1.0E-99 and 9.99...E+99, contrasted with Color Basic's 1.0E+/-38. This can be vital for scientific computation. Depending on the problem and the system of units employed, scientific calculations can chew up exponents pretty fast! I think this feature alone qualifies RBasic for serious consideration by programmers in the physical sciences.

There is an Edit command, but it is fairly limited in scope. You can overtype part of a program line to change it, and extend an existing line, but that's about all. There is no search/replace capability; that and other niceties are the province of Scribe.

RBasic does have an automatic line-numbering feature, though. You can invoke it at any time by the Auto command, with optional parameters to specify the starting line number and the interval. The break key, which functions as control-C, is used to exit the automatic-numbering mode. The lack of a command for renumbering an entire program does take away a little of Auto's luster.

Let is optional in RBasic, just as it is in Extended Color Basic. Optional for the programmer, that is; the interpreter inserts Let wherever it is required by the rules of syntax. This can be a little surprising the first time you list one of your own programs, if you aren't in the habit of inserting Let yourself!

Commands

Several RBasic commands are not available in the CoCo's stock dialects. Many of these take advantage of the power afforded by the operating system; in fact, the Do command allows the user to execute CC FLEX commands directly from RBasic's immediate mode. For example, DO CAT lists the standard FLEX disk catalog on the screen.

Some CC FLEX commands have memory requirements in conflict with those of RBasic itself, however, and should not be used in this way. The manual provides some guidance. Of course, there is also a command (DOS) for exiting to the operating system, and another (MON) for returning to Color Disk Basic.

As befits a language originally devised for modular computers, RBasic has a Port command for defining the control port. This is of little consequence to people intending to use standard I/O, but should be useful to anyone who wants to hook an outboard terminal to a Color Computer.

The printer is defined as port #4. Thus, to obtain a printed listing of an RBasic program, enter LIST #4. Similarly, PRINT #4 statements should be used within programs, replacing the PRINT #-2 of Color Basic.

RBasic has several housekeeping commands to control output format. SKIP N produces N blank lines. LINE= and DIGITS= set the number of print positions in a line, and the number of digits to be printed to the right of the decimal point (unless overridden by Print Using). PAGE= sets the length of a page in print lines.

Associated with each of these commands is a function that lets you learn the current status of the parameter. It is fairly simple to specify print operations that will result in right-justified text, or columns of figures aligned on their decimal points, and so on. All in all, it is much easier to set up a good-looking format for printed output in RBasic than in Color Basic.

The BASE= command is used to specify whether array subscripts are to begin with 0 or 1—very handy for economizing on storage in large programs, and for guaranteeing that subscript arithmetic is kept straight. By the way, RBasic arrays can be one- or two-dimensional, and the maximum value of a subscript is 255.

Speaking of large programs, the Size command generates the number of bytes currently used for program storage, the number currently used for variable storage, and the remaining free memory. Dump returns a list of all variables and open files.

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SCRINPUT assigns all data fields to standard BASIC variables. These can be handled by your BASIC program in the same manner as information gathered by INPUT. You can even include error checking to insure that information is within reasonable bounds.

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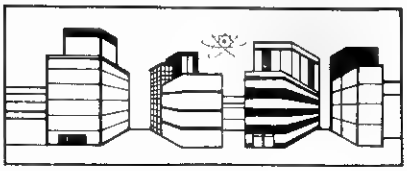
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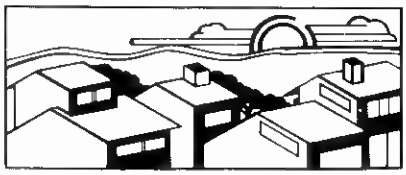
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mands, I should mention the quartet that enable and disable the IRQ and FIRQ interrupts, not normally accessible to the Basic programmer. Clever use of these commands may allow the Color Computer to come close to doing two things at once!

Functions and Statements

RBasic has a full complement of arithmetic and relational operators and Basic functions, including those necessary to handle strings. Novelties include NVAL, which tests the first character in a string to see if it is numeric, and IMOD(X,Y), which returns the integer remainder of dividing X by Y.

SYDR and WKDR are used to obtain the value of the system and working drives currently defined by CC FLEX. These can be concatenated with other strings to make up complete files specs that will ensure that files are routed to the correct drive in a multiple-drive system.

A particular joy to me as an old Fortran programmer is the DEF function, with allows the user to define specialized functions for repeated use within a program. The syntax is simple:

```
DEF FNA(X) = (Defining expression)
```

The letter A can be replaced by any letter in the alphabet, so that you can define up to 26 such functions per program. The defining expression must fit in one program statement, and X is a dummy variable. Thus, if you are using Z as the variable when you have to evaluate the function, you simply write RESULT(Z) = FNA(Z).

There are two additional restrictions: the argument X must be a nonsubscripted variable, and a function must be defined before it is referred to in a program; it isn't like a data statement.

For example, suppose there were no RBasic sine function. You could define your own, using the first few terms of the power series expansion:

```
FNS(X) = 1 - X*X*X/6+
X*X*X*X*X/120 - . . .
```

This could subsequently be used to evaluate the sine of any argument.

Such functions can be of great value to the scientific programmer. Having them around isn't quite as nice as having the named procedures of Pascal and other modern languages, but it sure beats relying on GOSUBs for every repeated operation!

RBasic also has a User function, analogous to Color Basic's USR, which is used to jump to a machine-language subroutine. Another statement, Call, does the same thing but also allows the program to pass a parameter to the subroutine. To pass data back to RBasic, however, another User or an Input command must be involved.

The DEF function was a pleasant surprise. RBasic has another command whose absence from Color Basic has long been a sore point with me: On Error. This can be followed by any Basic statement, and is most often used in error-proofing some portion of a program.

For example, suppose a calculation could yield a numerical result out of RBasic's range, and you wanted the option of continuing the program in that event. The simplest way to guard against a program crash would be to insert, after the last step on the calculation, a statement like On Error GOTO (line number of routine for continuation).

It is even possible to take corrective action that depends on the nature of an error. Two additional functions, ERLINE and ERCODE, return the line number in which an error occurred and a numerical code for the error; you could use this as the basis for a decision of how to proceed. The codes are the same as those reported by the system in the event of a crash.

Disk File Handling

One of the RBasic's biggest selling points is its disk-handling ability. It does a fine job with both sequential and random-access (or, as Radio Shack calls them, direct-access) files.

To see how important this is to CC FLEX users, let's review the file-handling abilities of several Basics, in order of increasing sophistication:

- Basic (Standard CC FLEX v.5.0:1 command): Copies regular (not Extended) Color Basic to RAM. More than 39,000 bytes of RAM are available to user.
- CBasic (Standard CC FLEX command): Copies Extended (not Disk) Color Basic to RAM.
- DBasic (Additional package from Hogg Laboratory): Copies Disk Extended Color Basic to RAM. Supports sequential files only, at this time. I/O is through standard FLEX utilities.
- RBasic: Supports both sequential and random-access files. I/O is through standard FLEX utilities. Does not support Color Computer graphics.

Something for everybody; RBasic performs with all sorts of disk files, as advertised. Most of its functions will be familiar to experienced users of Disk Extended Color Basic, but the Com-

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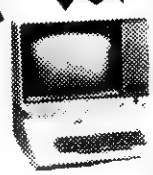
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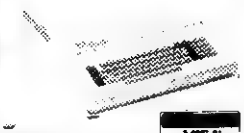
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puterware product has a few unique features.

First, some commands and functions concern generalized disk file handling, rather than being specific to data files. These include the usual facilities for listing, renaming, and deleting files, and a very useful function called FCHK which allows the user to see whether a specified file is on a disk. FCHK allows you to take corrective action within a program if the designated file is not present, just as On Error gives you a chance to avoid other types of program crashes.

There are also some special commands used when saving and loading program files. Replace, followed by a file name, will delete that file from the disk and replace it with the current contents of memory, using the same file name. This is handy when you're working with an evolving program; it guarantees that the latest version is the one saved.

The Chain command allows one RBasic program to call and automatically execute another. The called program replaces the caller in memory.

You can imagine how this might be used in, say, a data-base management system. The main program might consist of little but a menu and a set of Chains to call the subsidiary programs for file creation, searching, and updating. Each subsidiary could finish with a Chain back to the main program. This is very close to the precepts of modular, structured programming.

"There are minor discrepancies between Scribe's performance in a CCFLEX environment and the description in the manual."

RBasic has a few additional commands and functions for dealing with random access files. Expand, for example, allows you to increase the number of records in a previously created file.

RBasic and Disk Color Basic perform many similar operations, but there are enough differences in syntax to make careful study of the manuals worthwhile. For example, a useful RBasic "fummand" (function/command) named RECNO tells you the current position of the record pointer, and (in conjunction with the Set statement) allows you to move the pointer to any location within a file.

The Radio Shack equivalent is LOC, a function that merely returns the current record number of the specified buffer. To move the pointer requires the Get or Put statement, whichever is appropriate. RBasic also has a Get and a Put, but they manipulate data without changing the value of RECNO! When in doubt, read the manual.

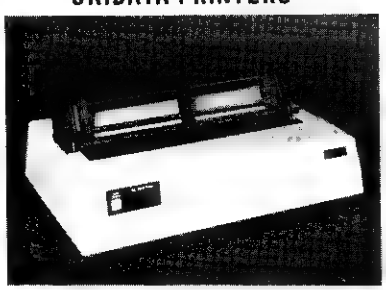
RBasic Summary

I am generally enthusiastic about Random Basic. Its extended numerical range, ability to define Basic functions, and file-handling options make it suitable for fairly serious scientific and business programming. The error-handling ability comes in handy, too!

I have only two reservations: the present lack of a graphics package, and operating speed. RBasic is slow—it takes 2½ to 3 times longer than Extended Color Basic to perform my admittedly elementary benchmark program (the Sieve of Eratosthenes method for find-

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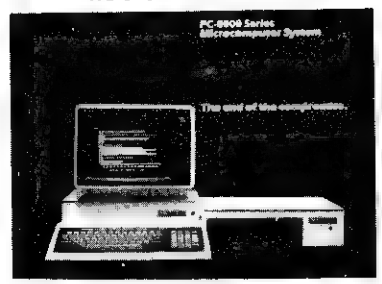


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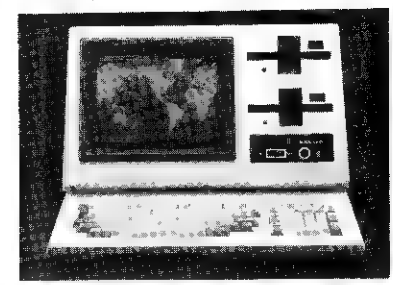


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ing prime numbers).

What you gain is precision: The Color Computer version of RBasic carries nine-digit accuracy through all calculations. Other comparisons have shown that RBasic is second in operating speed only to TSC's Extended Basic among FLEX-compatible Basics.

Scribe Editor

It's always nice to see old friends; that's how I felt when I first fired up Scribe. Many commands in this line-oriented editor's repertoire were used by the Color Editor portion of Computerware's Programmer's Toolkit, which I reviewed in the July/July 1982 issue of *80 Micro* ("Color Computer Utilities," p. 116). In fact, I understand that the same commands are also used in that company's Color Scribe word processor, a healthy sign for those who value consistency in their software.

Scribe is not a full-fledged text processor, since it lacks print-formatting capabilities. Rather, it is a FLEX utility for managing all sorts of text information. It can be used on data files, Assembly-language programs, and high-level language source code. That's why it's included in this review; it provides many line-editing functions that Random Basic lacks.

Like RBasic, Scribe is available for either CC FLEX or the Smoke Signal Broadcasting DOS. The CC FLEX version is a 26-sector .CMD file (my review copy was version 4.5), compatible with all three editions of the operating system available to me.

Scribe's operation can be divided into Input, Command, and Edit modes, and there are five major categories of commands:

- Commands for displaying and moving lines within a file;
- Commands for changing or replacing entire lines;
- Commands for editing within a given line;
- Commands for managing disk files; and
- Commands for defining system parameters and special keyboard characters.

The first two categories are identical with the commands in the Color Editor, and so I will refer readers starved for information about syntax to my earlier review. Suffice it to say that Scribe has extensive facilities for shuffling lines within a file, duplicating lines, and performing global or selective find-and-replace operations on character strings.

Editing a Line

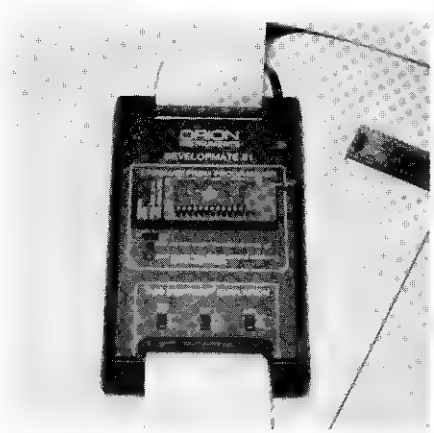
Most of the commands for editing within a line require a control key followed by an alphabetic character; for example, control-E is used to break an existing line for the insertion of new characters. ("Control" is the shift-up arrow combination on the Color Computer, so you must often use both hands, pressing three keys, to generate a single command. This is an unfortunate consequence of the CoCo's limited keyboard, rather than any particular fault of the program's.)

When working with Scribe, I sometimes felt overwhelmed by the sheer number of editing options. The manual (a very good one, by the way) agrees; most people settle on eight or 10 favorite commands and learn to use them proficiently, leaving the rest for special situations.

As an example of the richness of the syntax, there are separate commands for moving forward or backward by a single character or by a word, and the character or word in question may be either copied from the original line to the

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edited version, or deleted. You can appreciate how difficult it is to keep all of the options in mind when editing a file.

I was primarily interested in applying Scribe to RBasic programs, and so was probably less appreciative of word-oriented editing than I otherwise might have been. The commands most useful to me were those that allowed me to jump into the middle of a long statement to correct a syntax error.

In Extended Color Basic's Edit mode, nSx is used to go to the nth occurrence of character x; with Scribe, control-O-x causes a jump to the first place where x appears, and the command must be repeated to advance to each successive occurrence. This is a little awkward, but it is still a great improvement over the editing capability built into RBasic. In fact, by careful use of the Change command in Scribe's Line Modification set, the user can perform this same function with one command; that's what I mean by a rich command suite!

There are minor discrepancies between Scribe's performance in a CC FLEX environment and the descriptions in the manual. The editor was written for another operating system and for a specific terminal (Soroc IQ-120).

Most of the differences I found had to do with how much of the line undergoing editing (the "current line") would be displayed in response to specific commands. In some cases, the manual indicated that only part of the current line should appear on the screen, when in fact the entire line showed up, with a cursor in the form of an underline character marking my place in the middle of the text.

Incidentally, the manual contains information on configuring Scribe to other terminals. This may be of less interest to CoCo owners than to operators of some other machines, but if you happen to have an outboard terminal, you may be able to take advantage of such features as dual-intensity displays.

Disk File Management

Scribe handles disk ASCII files in a flexible manner. Facilities are provided for editing an existing file and saving all or part of the modified version under a new name. You can also save the new file under the former name, simultaneously renaming the original file to indicate its back-up status. There is also the option of continuing an editing session or exiting to the operating system after saving a file. Finally, Scribe will work with files larger than available memory, loading and saving them in piecewise fashion.

"I have only two reservations: the present lack of a graphics package, and operating speed."

Here are a few examples. To begin work on a new file, you answer the opening EDT: prompt with EDIT,,FILENAME.TXT where FILENAME may be preceded by a drive number. Notice the two commas; they are quite necessary! This command causes the disk drive to whirr along for a few seconds, creating the new file's catalog listing. When it has finished, the EDT: prompt returns and you are ready to begin.

If you would like to work on a file already on the disk, and want to save the results of your work under a new name, the initial command is EDIT,INPUT.TXT,OUTPUT.TXT. Now there is only one comma following EDIT. The original file will remain on the disk, intact.

If you want the latest edited version of a file to have the original name, use EDIT,FILENAME.TXT. The original file will be renamed FILENAME.BAK when the new verison is saved.

There are two commands for putting edited material on disk: Save and Log. The first ends the editing session and returns you to the operating system, while the second allows the editing to continue.

Want to work with an existing file and simply save the edited version under the same name without keeping the original at all? Simple: just respond to the initial EDT: prompt with LOAD. You will be prompted for the file name, and a Save or Log at the end of the session will overwrite the old file. You can begin the session with the single command LOAD "FILENAME" if you wish, but note that the quotation marks must be used in this instance to avoid a disk error.

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through the text until the current line is the first line you would like saved. Then enter W #n, where n is the line number of the last line to be saved. An inverse command, Read, can be used to merge files. The disk file whose name is specified after this command will be appended to the in-memory file starting at the current line, so be sure of your position in the active file before Reading, otherwise you could overwrite desired material.

The last file management command, More, is used when working with a file larger than available memory. If you try to load such a file, Scribe will accept as much as possible and then generate the message Text Buffer Full—Complete File Not Read. The system doesn't crash; you can go ahead and edit as much of the file as made it into memory.

When you have finished, the More command saves the text preceding the current line to disk, and then loads as much more of the old file as will fit. The procedure is repeated until the entire file has been processed.

Special Commands

Scribe has a few special commands to make your life easier. For example, MAC followed by a list of editor commands defines a macro: you can then perform the whole set of instructions by hitting Control \. On the Color Computer, the backslash is shift-clear, so you must press a total of four keys to send out a macro. This may still save some work, depending on the complexity of the instruction string.

The REN command will automatically renumber all text lines in memory. The new line numbers will begin at 1 and increase by increments of 1. Remember that these numbers are of significance only to Scribe; if your file happens to be a Basic program you must enter the Basic line numbers by hand as part of the text.

Another command, NU, toggles the Scribe numbers on and off. This may be useful for producing nicely-formatted printed listings.

For the Color Computer, Break is the default ESC (escape) character. Hitting break as the first character of an input line terminates the Insert mode and returns you to Command (line movements) mode. You can redefine ESC, as well as EOL (the end-of-line character). EOL may be used to separate individual commands when typing multiple commands on a given input line. The backslash is the CoCo default.

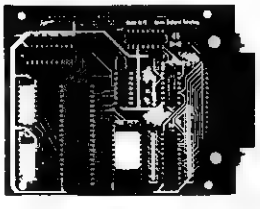
In Summary

Frankly, I have been too spoiled by my screen-oriented word processor to enjoy using Scribe for straight text files; the commands keep getting in the way! It is a very competent editor, however, and I found it quite suitable for working with RBasic source code, which is by nature line-oriented.

It also proved to be very useful when dealing with tabular material, thanks to the user-definable tab stops. I imagine Scribe would be equally at home working with Assembly-language programs, although I did not not use it for this purpose.

Taken together, RBasic and Scribe provide a very respectable programming capability. RBasic has features that should prove very attractive to the business or scientific programmer, and Scribe can carry out any reasonable set of operations on disk files. Both are reasonably priced, and should be seriously considered by all users of the CC FLEX operating system. ■

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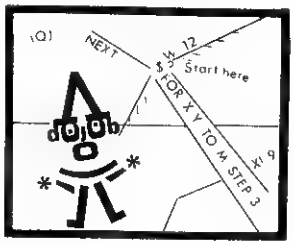
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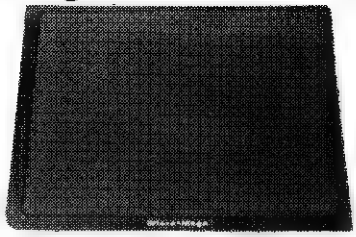
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VCMOD

by Arne Rohde

Are you tired of retyping entire VisiCalc entries when you just want to make a simple modification? Add on this editing function.

It is reasonably simple to provide an editing feature for VisiCalc. The modification consists of a small program loaded in high memory and protected from VisiCalc.

VisiCalc is an electronic spreadsheet program, where an entry can be made for each element of a large two-dimensional array. These entries may either be text (called labels), a numerical value, or a formula to be calculated and thus converted to a numerical value.

In the TRS-80 Model I version, and the converted Model III version, an entry must be retyped in its entirety if it is to be modified. This is no problem for short entries or numeric entries, but can be annoying for long labels and complex numeric expressions.

A common entry error, such as forgetting to put a sign in front of the first coordinate in a value entry, requires a retyping of the entire line to change the entry from a label type to a value type.

Another feature of VisiCalc could be more user friendly. There is a printer setup command available for sending almost any character sequence to the printer. However, it is not possible to generate all the control codes on the TRS-80 Model I keyboard, so it is not possible to send all the sequences. I've been unable to set up my Epson MX-80 to print in condensed mode. Also, the characters being sent to the printer are not visible on the screen. These drawbacks have been corrected in the Program Listing.

Using the Modifications

Start by loading the VisiCalc program VC/CMD, which must be present on disk when the modification program is called. After VC has been loaded, a few locations within the program are modified and control is passed to the normal VisiCalc entry point.

The modified VisiCalc will function normally, except that there are about 230 fewer bytes than usually available for data storage. This should not be a problem for most applications; however, if necessary, VisiCalc can still be loaded without the modifications since it is left unchanged on the disk.

To edit, the cursor must first be positioned over the entry. The entry must be of label or value type. When the comma key is pressed, edit mode is entered on the top line of the display. The comma was chosen because it is the edit command for current line in NEWDOS80 Basic. The original entry is shown, with a leading quotation mark if it is a label entry, and a blinking cursor is positioned over the first character.

Edit has two submodes: replace and insert. On entry, editing is in the replace mode, with a blinking cursor covering the character. The down-arrow key is used to toggle between replace mode and insert mode. The cursor in insert mode is a graphics block underneath the character.

The left- and right-arrow keys move the cursor backwards and forwards along the edit line. The break key is used to exit from edit mode, leaving the original entry unchanged. The clear key deletes the character at the current cursor position.

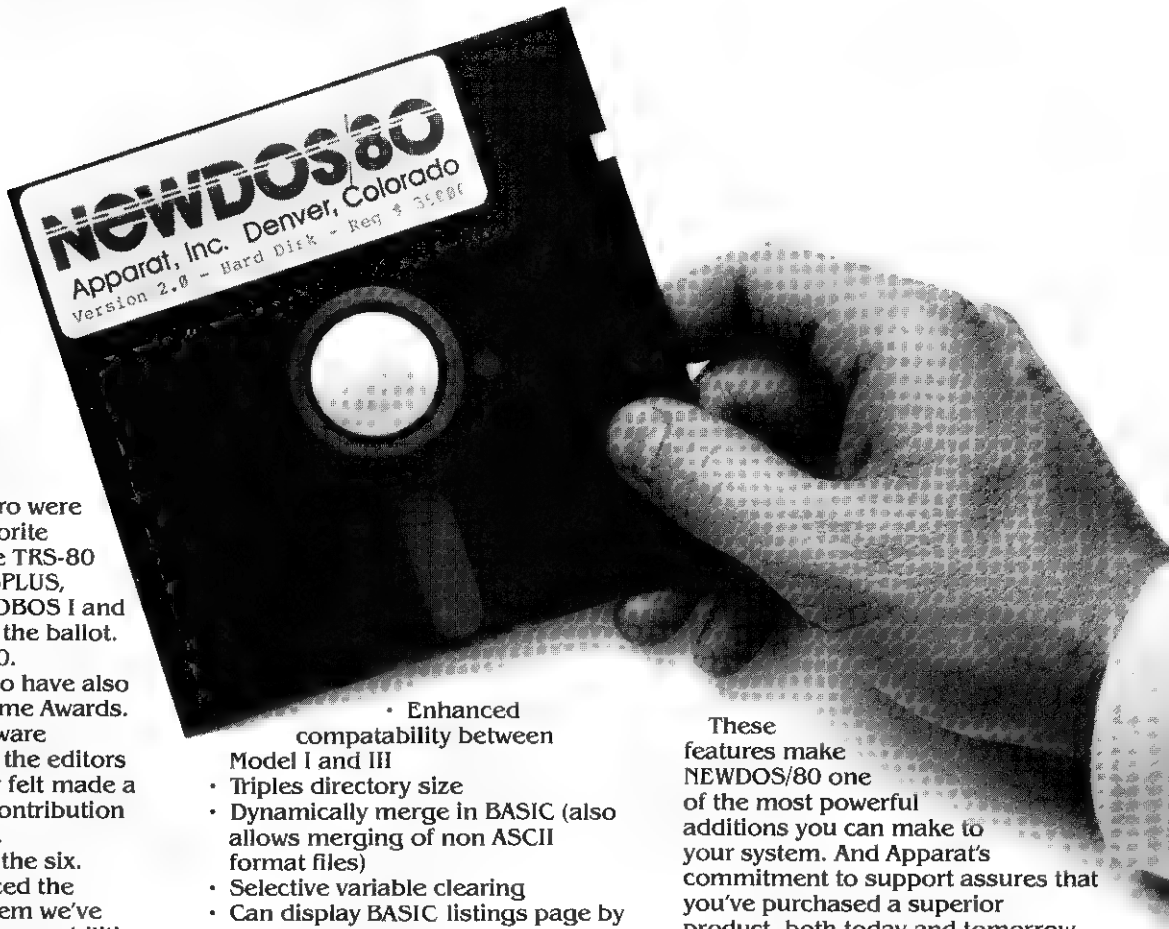
The enter key terminates the edit, returning to normal entry mode for the current entry. The enter key or one of the arrow keys must then be pressed to accept the edited entry; the clear or break keys can be pressed to cancel part or all of the entry.

Any other key will either replace the character at the cursor position, or be inserted in front of the cursor position, depending on the submode. The quotation mark is inserted in front of label entries to retain them as labels, even if they do not have an alphabetic first character. By removing the quotation mark with the clear key, label entries can be converted to value entries. Conversely, value entries can be converted to label entries by inserting a quotation mark as the first character.

The printer setup sequence has been changed to allow entering control char-

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The editors of 80 Micro have also awarded their Hall of Fame Awards. From among every software package on the market, the editors picked only six that they felt made a lasting and significant contribution to the TRS-80 computer. NEWDOS/80 was one of the six.

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For more information see your local computer store or contact Apparat, Inc., 4401 S. Tamarac Parkway, Denver, CO 80237, 303/741-1778.

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acters as a two-key sequence. Only the last two characters entered will be shown on the screen. The first key in a two-key control sequence must be the left arrow. This causes the next key entered to be converted to a control character by stripping the most-significant 3 bits. To enter an escape character (1BH), the left-arrow key is followed by a semicolon (3BH). An SI control code for condensed print (0FH) is a left arrow followed by a slash (2FH) or an upper- or lowercase O (4FH or 6FH).

Graphics characters can be sent to the printer by typing a right arrow followed by another character. The second character will have 80H added to its ASCII value. Thus, right arrow and 5 (35H) will be converted to a vertical graphics line (0B5H) on the printer.

The left and right arrows will be displayed as other characters, the actual character depending on lowercase modifications or model. On unmodified Model Is, they will be displayed as H and I respectively.

Program Description

The program is located in the upper 512 bytes of a 48K memory, but can be relocated to any other location by changing the ORG statement in line 140 and reassembling the program. For a 32K model, the highest possible address would be 0BE00H instead of 0FE00H.

The program has been written for version 1.20Z of VisiCalc, and will have to be modified for other versions. For the Model III, the modification addresses are given for version 1.31Z. These will have to be changed in the program, which has been tested with both a protected and an unprotected Model III version.

Program Listing

```
                        00100 ;
                        00110 ;MODIFICATION TO ALLOW EDITING OF VISICALC LINES
                        00120 ;ARNE ROHDE, PILEVEJ 31, 7600 STRUER, DENMARK
                        00130 ;JANUARY 1982
FE00                    00140           ORG     0FE00H
FE00                    00150 VCMOD     EQU     $
FE00 1144FE             00160           LD      DE,DCBADR       ;COMMAND TO LOAD VC
FE03 CD3044             00170           CALL    LOAD            ;LOAD VC
FE06 CD2844             00180           CALL    CLOSE           ;CLOSE VC FILE
4430                    00190 LOAD      EQU     4430H           ;LOAD FILE
4428                    00200 CLOSE     EQU     4428H           ;DOS CLOSE
648E                    00210 INVALC    EQU     648EH           ;INVALID CHAR ADDR
5357                    00220 VCKCAL    EQU     5357H           ;KEYBOARD CALL
5214                    00230 VCMEL1    EQU     5214H           ;LOAD MEM END
52D8                    00240 VCMEL2    EQU     52D8H           ;LOAD MEM END
8CC0                    00250 VCPCAL    EQU     8CC0H           ;VC PRINTER CALL ADDR
FE09 213CFE             00260           LD      HL,BUFFER       ;MEM END, ROOM FOR BUFF
FE0C 221552             00270           LD      (VCMEL1+1),HL   ;IN LOAD INSTR
FE0F 22D952             00280           LD      (VCMEL2+1),HL   ;IN OTHER INSTR
FE12 3E21               00290           LD      A,21H           ;LD HL,DATA16
FE14 321452             00300           LD      (VCMEL1),A      ;SET INSTR
FE17 32D852             00310           LD      (VCMEL2),A      ;ALSO OTHER
FE1A 2A8E64             00320           LD      HL,(INVALC)     ;OLD CALL ADDR
FE1D 2297FE             00330           LD      (RETRNJ+1),HL   ;STORE IN RETURN
FE20 23                 00340           INC     HL              ;BYPASS 1ST INST
FE21 23                 00350           INC     HL              ;IF BUFFER TO SEND
FE22 23                 00360           INC     HL              ;TO AVOID KEY OVFLO
FE23 2256FF             00370           LD      (RETRNK+1),HL   ;STORE IT
FE26 217DFE             00380           LD      HL,ENTRY        ;ENTRY POINT
FE29 228E64             00390           LD      (INVALC),HL     ;JP Z,8F2CH OLD INST
FE2C 2A5753             00400           LD      HL,(VCKCAL)     ;KEYBD CALL
FE2F 22B9FE             00410           LD      (CVCKEY+1),HL   ;SAVE IT
FE32 226AFF             00420           LD      (VCKOLD+1),HL   ;AND AGAIN
FE35 2AC08C             00430           LD      HL,(VCPCAL)     ;OLD CALL ADDR
FE38 22EAFF             00440           LD      (MPCAL+1),HL    ;STORE IN NEW INST
FE3B 21B5FF             00450           LD      HL,SETUPR       ;NEW CALL ADDR
FE3E 22C08C             00460           LD      (VCPCAL),HL     ;STORE IN CALL
FE41 C30052             00470           JP      5200H           ;START VC
FE44 56                 00480 DCBADR    DEFM    'VC/CMD'
     43 2F 43 4D 44
FE4A 03                 00490           DEFB    03H             ;END OF FILESPEC
0029                    00500           DEFS    41              ;RESERVE 48 BYTES
FE74                    00510 PST       EQU     $               ;START FIXED MEM
FE3C                    00520 BUFFER    EQU     PST-56          ;LINE BUFFER
FE74 00                 00530 INSSW     DEFB    0               ;INSERT OR CHANGE
FE75 0000               00540 CURPOS    DEFW    0               ;CURSOR POS
FE77 0000               00550 FRSTPS    DEFW    0               ;FIRST DATA POS
FE79 0000               00560 BLINCT    DEFW    0               ;BLINK COUNTER
FE7B 00                 00570 CURVAL    DEFB    0               ;CURRENT POS VALUE
FE7C 00                 00580 SW        DEFB    0               ;SW FOR CTRL OR GRAPH
3C00                    00590 SCREEN    EQU     3C00H           ;SCREEN START
3C3D                    00600 FSTLNE    EQU     3C3DH           ;FIRST LINE END
FE7D                    00610 ENTRY     EQU     $
FE7D FD7EB2             00620           LD      A,(IY-4EH)      ;CURRENT CHAR
FE80 FE2C               00630           CP      2CH             ;COMMA SIGN
FE82 2012               00640           JR      NZ,RETRN        ;NO, RETURN
FE84 3E8F               00650           LD      A,08FH          ;REPLACEMENT CURSOR
FE86 3274FE             00660           LD      (INSSW),A       ;SET TO REPLACE
FE89 21003C             00670           LD      HL,SCREEN       ;SCREEN START
FE8C 060B               00680           LD      B,11            ;LOOK FOR (
FE8E 3E28               00690           LD      A,28H           ;LEFT (
FE90                    00700 FINDLP    EQU     $
FE90 BE                 00710           CP      (HL)            ;LEFT (
FE91 23                 00720           INC     HL              ;TO NEXT
FE92 2805               00730           JR      Z,FOUNLP        ;FOUND LEFT (
FE94 10FA               00740           DJNZ    FINDLP          ;MAX 11 POS
FE96                    00750 RETRN     EQU     $
FE96 C30000             00760 RETRNJ    JP      0H              ;REPLACED ADDR
FE99                    00770 FOUNLP    EQU     $
FE99 7E                 00780           LD      A,(HL)          ;GET TYPE
FE9A E61F               00790           AND     1FH             ;REMOVE SIGN BITS
FE9C 23                 00800           INC     HL              ;BYPASS 3 POS
FE9D 23                 00810           INC     HL
```

Listing continues

The addresses to be changed are all found at the beginning of the modification program, in lines 210 to 250. To find the corresponding addresses for other versions of VisiCalc, some means of locating the addresses will be needed, such as the debug module from TRSDOS.

The addresses are each given a name, depending on their function. The first one, INVALC, is the address in the jump instruction that is executed when an invalid character is typed as the first in a line. The address from this instruction is moved to the instruction RETRNJ in VCMOD. It is also used in modified form (3 is added to bypass a call instruction) in the instruction RETRNK. The instruction can be found at or near address 648DH in the sequence:

```
648B FEFE     CP 0FEH
648D CA2C8F   JP Z,8F2CH   ;required instr
6490 FEFD     CP 0FDH
6492 2006     JR NZ,649AH
```

The destination address in the JP instruction need not be 8F2CH, but should be within about 20 or 30 bytes of this address. INVALC is set to the address of the second byte of the JP instruction, in this case 648EH. For version 1.31Z of VisiCalc, the address should be changed to 649EH.

The next value is VCKCAL, an address in a call instruction to get a character from the keyboard. The address is stored in a new call instruction, and is used to restore the old value after the edited string has been passed to VisiCalc. It should be found at or near the address 5357H as part of the following sequence:

```
5354 FDE5     PUSH IY
5356 CDB454   CALL 54B4H ;required
                         instruction
5359 FDE1     POP  IY
535B DDE1     POP  IX
535D B7       OR   A
```

The value of VCKCAL in this case would be set to 5357H, the address of the second byte of the call instruction. The address in the call should be near the value 54B4H. For version 1.31Z, the value should be set to 535BH.

The next two values are required to set the new high-memory address without modifying it permanently. The replaced instructions are LD HL,(4049H) (or 2A4940) for Model I, and LD HL,(4411H) (or 2A1144) for the Model III. They are replaced by instructions to load the new high memory directly. The instructions should be located near 5214H and 52D8H, and the addresses



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Listing continued

```
FE9E 23        00820          INC     HL
FE9F 2275FE    00830          LD      (CURPOS),HL     ;CURSOR POS
FEA2 2277FE    00840          LD      (FRSTPS),HL     ;FIRST DATA POS
FEA5 FE16      00850          CP      16H             ;V FOR VALUE
FEA7 2809      00860          JR      Z,REPEAT        ;YES, CONTINUE
FEA9 FE0C      00870          CP      0CH             ;L FOR LABEL
FEAB 20E9      00880          JR      NZ,RETRN        ;NO, EXIT
FEAD 3E22      00890          LD      A,22H           ;QUOTE FOR LABEL
FEAF F5        00900          PUSH    AF              ;STORE IT
FEB0 1847      00910          JR      INSCHR          ;INSERT CHARACTER
FEB2           00920 REPEAT   EQU     $
FEB2 CD89FF    00930          CALL    STORE           ;STORE CHAR AT CURSOR
FEB5           00940 REPNST   EQU     $
FEB5 CD97FF    00950          CALL    BLINK           ;CURSOR BLINK
FEB8 CD0000    00960 CVCKEY   CALL    0               ;GET KEYBD CHAR
FEBB B7        00970          OR      A               ;CHECK FOUND
FEBC 28F7      00980          JR      Z,REPNST        ;NO, REPEAT
FEBE CDABFF    00990          CALL    RESTOR          ;RESTORE CHAR, HL=(CURPOS)
FEC1 FE01      01000          CP      1               ;BREAK
FEC3 28D1      01010          JR      Z,RETRN         ;YES, EXIT
FEC5 FE1F      01020          CP      1FH             ;CLEAR CHAR
FEC7 284E      01030          JR      Z,DELCHR        ;YES, DELETE CHAR
FEC9 FE09      01040          CP      9               ;CURSOR FORW
FECB 2005      01050          JR      NZ,NOTFFW       ;NO
FECD CD70FF    01060          CALL    INCCUR          ;ELSE INCR CURSOR POS
FED0 18E0      01070          JR      REPEAT          ;REPEAT INPUT
FED2           01080 NOTFFW   EQU     $
FED2 FE08      01090          CP      08H             ;CURSOR BACK
FED4 2005      01100          JR      NZ,NOTREW       ;NOT REVERSE
FED6 CD7EFF    01110          CALL    DECCUR          ;DECR CURSOR POS
FED9 18D7      01120          JR      REPEAT
FEDB           01130 NOTREW   EQU     $
FEDB FE0A      01140          CP      0AH             ;DOWN ARROW
FEDD 200A      01150          JR      NZ,NOTDWA       ;NO
FEDF 3A74FE    01160          LD      A,(INSSW)       ;INSERT SWITCH
FEE2 EE3F      01170          XOR     3FH             ;NEW GRAPHIC CHAR
FEE4 3274FE    01180          LD      (INSSW),A       ;RESTORE
FEE7           01190 JREPT    EQU     $
FEE7 18C9      01200          JR      REPEAT
FEE9           01210 NOTDWA   EQU     $
FEE9 FE0D      01220          CP      0DH             ;ENTER
FEEB 2841      01230          JR      Z,EXITED        ;YES, EXIT EDIT
FEED FE20      01240          CP      20H             ;< SPACE
FEEF 38C1      01250          JR      C,REPEAT        ;YES, IGNORE
FEF1 F5        01260          PUSH    AF              ;STORE CHAR
FEF2 3A74FE    01270          LD      A,(INSSW)       ;CHECK INSERT
FEF5 E601      01280          AND     01H             ;REMOVE REST
FEF7 2014      01290          JR      NZ,REPLC        ;REPLACE CHAR
FEF9           01300 INSCHR   EQU     $
FEF9 44        01302          LD      B,H             ;(CURPOS) TO BC
FEFA 4D        01304          LD      C,L
FEFB 113D3C    01310          LD      DE,FSTLNE       ;FIRST LINE END
FEFE 213D3C    01320          LD      HL,FSTLNE       ;SAME
FF01 B7        01340          OR      A               ;CLEAR C
FF02 ED42      01350          SBC     HL,BC           ;LEN TO MOVE
FF04 2807      01360          JR      Z,REPLC         ;ZERO, NO MOVE
FF06 44        01370          LD      B,H             ;LEN TO BC
FF07 4D        01380          LD      C,L
FF08 213C3C    01390          LD      HL,FSTLNE-1     ;END AGAIN
FF0B EDB8      01400          LDDR                    ;MOVE REMAINING LINE
FF0D           01410 REPLC    EQU     $
FF0D 2A75FE    01420          LD      HL,(CURPOS)     ;CURSOR POS
FF10 F1        01430          POP     AF              ;NEW CHAR
FF11 77        01440          LD      (HL),A          ;STORE IT
FF12 CD70FF    01450          CALL    INCCUR          ;INCR CURSOR
FF15 189B      01460          JR      REPEAT          ;GET NEXT
FF17           01470 DELCHR   EQU     $
FF17 EB        01480          EX      DE,HL           ;(CURPOS) TO DE
FF18 213D3C    01490          LD      HL,FSTLNE       ;END OF LINE
FF1B B7        01500          OR      A               ;CLR C
FF1C ED52      01510          SBC     HL,DE           ;LEN OF MOVE
FF1E 2807      01520          JR      Z,CLRCHR        ;NO MOVE
FF20 44        01530          LD      B,H             ;ELSE STORE LEN
FF21 4D        01540          LD      C,L
FF22 62        01550          LD      H,D             ;GET (CURPOS)
FF23 6B        01555          LD      L,E
FF24 23        01560          INC     HL              ;MOVE FROM
FF25 EDB0      01570          LDIR                    ;MOVE
FF27           01580 CLRCHR   EQU     $
FF27 3E20      01590          LD      A,20H           ;SPACE
FF29 323D3C    01600          LD      (FSTLNE),A      ;CLEAR END LINE
FF2C 18B9      01610          JR      JREPT           ;TO REPEAT
FF2E           01620 EXITED   EQU     $
FF2E 2158FF    01630          LD      HL,GETCHH       ;GET CHAR
FF31 225753    01640          LD      (VCKCAL),HL     ;STORE IN CALL
FF34 2A77FE    01650          LD      HL,(FRSTPS)     ;FIRST POS IN LINE
FF37 E5        01655          PUSH    HL              ;STORE (FRSTPS)
FF38 113CFE    01660          LD      DE,BUFFER       ;MOVE TO BUFFER
FF3B ED5375FE  01670          LD      (CURPOS),DE     ;STORE AS START
FF3F 013800    01680          LD      BC,56           ;LEN
FF42 EDB0      01690          LDIR                    ;MOVE IT
FF44 213D3C    01700          LD      HL,FSTLNE       ;LINE END
FF47 3E20      01705          LD      A,20H           ;SPACE
FF49           01710 CHFCHR   EQU     $
FF49 BE        01720          CP      (HL)            ;CHECK FOR NON-BLANK
FF4A 2B        01750          DEC     HL              ;CONTINUE TILL FOUND
FF4B 28FC      01760          JR      Z,CHFCHR
FF4D 23        01770          INC     HL              ;BACK TO NON-BLANK
FF4E D1        01780          POP     DE              ;(FRSTPS) TO DE
FF4F AF        01790          XOR     A               ;CLEAR CARRY AND ZERO
FF50 ED52      01800          SBC     HL,DE           ;GET NO OF CHARS
FF52 2277FE    01810          LD      (FRSTPS),HL     ;LEN TO MOVE
FF55 C30000    01820 RETRNK   JP      0               ;RETURN TO VC ADDR MOD
FF58           01830 GETCHH   EQU     $
FF58 2A75FE    01840          LD      HL,(CURPOS)     ;NEXT POS
FF5B 7E        01850          LD      A,(HL)          ;GET CHAR
FF5C 23        01860          INC     HL              ;TO NEXT
FF5D 2275FE    01870          LD      (CURPOS),HL     ;RESTORE
FF60 2A77FE    01880          LD      HL,(FRSTPS)     ;LAST POS
FF63 2B        01890          DEC     HL              ;DECR COUNT
FF64 2277FE    01900          LD      (FRSTPS),HL     ;RESTORE
FF67 24        01910          INC     H               ;CHECK NEG
FF68 C0        01920          RET     NZ              ;NO
FF69 210000    01930 VCKOLD   LD      HL,0            ;OLD ADDR
FF6C 225753    01940          LD      (VCKCAL),HL     ;INSERT IT
FF6F C9        01950          RET                     ;RETURN WITH CHAR
FF70           01960 INCCUR   EQU     $
FF70 EB        01970          EX      DE,HL           ;(CURPOS) TO DE
FF71 213D3C    01980          LD      HL,FSTLNE       ;LINE END
FF74 B7        01990          OR      A               ;CLR    C
```

Listing continues

of these instructions are given the names VCMEL1 and VCMEL2. For version 1.31Z, the instructions are at locations 521FH and 52DDH respectively.

The last address to be found is for the setup printer command. It is part of a sequence used to send the typed characters to the printer, at or near the address 8CBFH. Again the required value of VCPCAL is the second byte of the instruction from the sequence:

```
8CBC FD7EB1 LD    A,(IY-4EH)
8CBF CDFC61 CALL  61FCH      ;required
                             instruction
8CC2 CDA353 CALL  53A3H
8CC5 18DF   JR    8CA6H
```

Again the addresses in the call statements need not be exactly as shown, but should be similar. In this case the value of VCPCAL would be set to 8CC0H. For version 1.31Z the value is set to 8CE2H.

After VisiCalc has been loaded and modified, control is passed to its entry point 5200H. If the name of the VisiCalc module is other than VC/CMD, it should be set in the define statement with the name DCBADR in line 480 as a character string.

In modified VisiCalc, whenever an invalid character is typed as the first in a line, control is passed to the entry routine. This examines the character, and if it is not a comma, control is returned to VisiCalc. Otherwise, the top line of the screen is examined for a label or value type.

The edit routine is contained in the lines from REPEAT to RETRNK with calls to some of the subroutines. If the edit routine is exited with the return key, the keyboard call routine will be modified to call the GETCHH routine. The top line is stored in a buffer in high memory, since it will be restored to its original form on reentry to VisiCalc. The routine GETCHH passes the characters one at a time to VisiCalc, until the buffer is empty or a trailing space has been found.

When the final character is passed to VisiCalc, the address in the keyboard call instruction is restored to its original value.

The subroutine INCCUR increments the current cursor position during editing; DECCUR decrements the position. STORE is used to store the character at the cursor position, and to start a new blink sequence. BLINK controls the cursor blink frequency and moves the current cursor or the current character to the actual position. RESTOR is called as a separate routine to restore the character when a keyboard charac-

Listing continued

```
FF75 ED52      02000          SBC     HL,DE           ;CHECK IF END
FF77 C8        02010          RET     Z               ;YES, EXIT
FF78 13        02030          INC     DE              ;INCR CURPOS
FF79           02035 STORCR   EQU     $
FF79 ED5375FE  02040          LD      (CURPOS),DE
FF7D C9        02050          RET
FF7E           02060 DECCUR   EQU     $
FF7E EB        02070          EX      DE,HL           ;(CURPOS) TO DE
FF7F 2A77FE    02080          LD      HL,(FRSTPS)     ;FIRST POS
FF82 B7        02090          OR      A
FF83 ED52      02100          SBC     HL,DE           ;CHECK IF START
FF85 C8        02110          RET     Z               ;YES
FF86 1B        02130          DEC     DE              ;CURPOS -1
FF87 18F0      02140          JR      STORCR          ;SORE CURPOS
FF89           02160 STORE    EQU     $
FF89 2A75FE    02170          LD      HL,(CURPOS)     ;CURSOR POS
FF8C 7E        02180          LD      A,(HL)          ;CHARACTER AT POS
FF8D 327BFE    02190          LD      (CURVAL),A      ;STORE VALUE
FF90 210100    02200          LD      HL,1            ;START BLINK
FF93 2279FE    02210          LD      (BLINCT),HL
FF96 C9        02220          RET
FF97           02230 BLINK    EQU     $
FF97 2A79FE    02240          LD      HL,(BLINCT)     ;BLINK COUNT
FF9A 2B        02250          DEC     HL              ;DECR COUNT
FF9B 2279FE    02260          LD      (BLINCT),HL
FF9E 7D        02270          LD      A,L             ;CHECK L=0
FF9F B7        02280          OR      A
FFA0 C0        02290          RET     NZ              ;NO, IGNORE
FFA1 7C        02300          LD      A,H             ;CHECK MSB
FFA2 E601      02310          AND     01H             ;ALL EXCEPT LSB
FFA4 3A74FE    02320          LD      A,(INSSW)       ;CURSOR VAL
FFA7 F5        02330          PUSH    AF              ;STORE
FFA8 2805      02340          JR      Z,SECURS        ;SET CURSOR
FFAA F1        02350          POP     AF
FFAB           02360 RESTOR   EQU     $
FFAB F5        02370          PUSH    AF
FFAC 3A7BFE    02380          LD      A,(CURVAL)      ;CURRENT VALUE
FFAF           02390 SECURS   EQU     $
FFAF 2A75FE    02400          LD      HL,(CURPOS)     ;CURRENT POS
FFB2 77        02410          LD      (HL),A          ;STORE CHAR
FFB3 F1        02420          POP     AF              ;RESTORE INP
FFB4 C9        02430          RET
               02440 ;
               02450 ;PRINTER SETUP, LEFT ARROW NEXT CHAR TO CONTROL
               02460 ;RIGHT ARROW, NEXT CHAR TO GRAPHIC (ADD 80H FOR A0 TO DF)
FFB5           02470 SETUPR   EQU     $
FFB5 F5        02480          PUSH    AF              ;STORE CHAR
FFB6 3A813C    02490          LD      A,(SCREEN+129)  ;PREV CHAR
FFB9 32803C    02500          LD      (SCREEN+128),A  ;TO LINE BEGIN
FFBC F1        02510          POP     AF              ;NEW CHAR
FFBD F5        02520          PUSH    AF              ;STORE AGAIN
FFBE 32813C    02530          LD      (SCREEN+129),A  ;TO SCREEN
FFC1 FE08      02540          CP      8               ;LEFT ARROW
FFC3 2804      02550          JR      Z,SECTRL        ;YES, SET CONTROL
FFC5 FE09      02560          CP      9               ;RIGHT ARROW
FFC7 2005      02570          JR      NZ,SENTOP       ;NO, SEND TO PRINT
FFC9           02580 SECTRL   EQU     $
FFC9 327CFE    02590          LD      (SW),A          ;SET SWITCH
FFCC F1        02600          POP     AF              ;REMOVE FROM STACK
FFCD C9        02610          RET                     ;AND DON'T PRINT
FFCE           02620 SENTOP   EQU     $
FFCE 3A7CFE    02630          LD      A,(SW)          ;CHECK SWITCH
FFD1 D608      02640          SUB     08              ;LEFT ARROW
FFD3 2808      02650          JR      Z,CNVCTL        ;YES, TO CONTROL
FFD5 3D        02660          DEC     A               ;RIGHT ARROW
FFD6 200A      02670          JR      NZ,NOCONV       ;NO, NO CONVERT
FFD8 F1        02680          POP     AF              ;GET CHAR
FFD9 C680      02690          ADD     A,80H           ;TO GRAPHIC CHAR
FFDB 1806      02700          JR      SENPRT          ;SEND TO PRINT
FFDD           02710 CNVCTL   EQU     $
FFDD F1        02720          POP     AF              ;GET CHAR
FFDE E61F      02730          AND     1FH             ;TO CTRL
FFE0 1801      02740          JR      SENPRT          ;SEND TO PRINT
FFE2           02750 NOCONV   EQU     $
FFE2 F1        02760          POP     AF              ;GET CHAR
FFE3           02770 SENPRT   EQU     $
FFE3 F5        02780          PUSH    AF              ;STORE NEW
FFE4 AF        02790          XOR     A               ;TO CLEAR SW
FFE5 327CFE    02800          LD      (SW),A
FFE8 F1        02810          POP     AF              ;CHAR AGAIN
FFE9 C30000    02820 MPCAL    JP      0               ;TO PRINT, MOD ADDR
FFEC           02830          END     VCMOD
00000 TOTAL ERRORS
```

ter has been found.

The printer setup routine has been intercepted, and control passes to SETUPR for each character to be printed. If the character is a left arrow (08H) or right arrow (09H), it is not printed, but stored in SW. The next character is converted to a control character by ANDing with 1FH if SW contains the value 8, and to a graphics character by ADDing 80H if it contains the value 9.

These conversions can be changed to any other desired conversion. For example, if the printer driver intercepts control characters, these could have bit 7 set to avoid being intercepted by ORing with 80H after ANDing with 1FH.

For each character printed, the value of SW is reset to zero. Note that a left or right arrow followed by the enter key will set up SW if setup is called again before the program is reloaded. This is because VisiCalc has already responded to enter before calling the modified routine.

Possible Extensions

There is a potential problem in the editing routine for users of the Model I who do not have a lowercase modification. Alphabetic characters are converted to a value between 0 and 1FH, and appear on the screen as uppercase only.

To compensate for this situation, a few changes have to be made. In the GETCHH routine, 40H must be added to each character with a value less than 20H before it is passed back to VisiCalc. This can be done by adding three lines between line 1850 and line 1860 (just after LD A,(HL)).

```
1852 CP   20H      ;value 0-1F
1854 JR   NC,$+4   ;no, bypass add
1856 ADD  A,40H    ;yes, convert to
                   uppercase
```

A change may also have to be made in the NOTDWA routine, between lines 1250 and 1260 (just before PUSH AF). These changes will convert an alphabetic character to a value between 0 and 1FH.

```
1252 CP   40H      ;value 40H to 7FH
1254 JR   C,$+4    ;no, bypass mod
1256 AND  1FH      ;convert to display
```

Since this destroys the distinction between the @ and the shifted @ used for exponentiation, lines containing exponentiation cannot be edited correctly on uppercase-only models. Also, all alphabetic characters will be converted to uppercase, so labels containing lowercase letters should not be edited. The only solution to this dilemma would be to fetch and edit the text directly from memory instead of the video RAM, but this would complicate the program considerably.

The same problems, although not of any importance, exist in the printer setup mode, where the characters are POKEd directly into screen memory. The correct character will, however, be sent to the printer.

Another limitation is that the editing is done on the top line of the screen, limiting the text length to about 56 or fewer characters depending on the current coordinate and format specification. For most purposes, this should be sufficient, even though VisiCalc allows labels up to 80 bytes in length. If long labels are to be edited, the extra characters can be inserted after editing, or the program can be modified to perform the editing in a memory buffer.

The editing functions could also be extended if desired, but they have intentionally been kept simple to ease learning and to minimize space requirements.

The program could terminate the sending of characters with a return code (0DH) to force acceptance of the edited code. This would remove the possibility of extending the text after editing, but would eliminate the need for an extra key depression in many cases. ■

Arne Rohde can be reached at Pilevej 31, 7600 Struer, Denmark.



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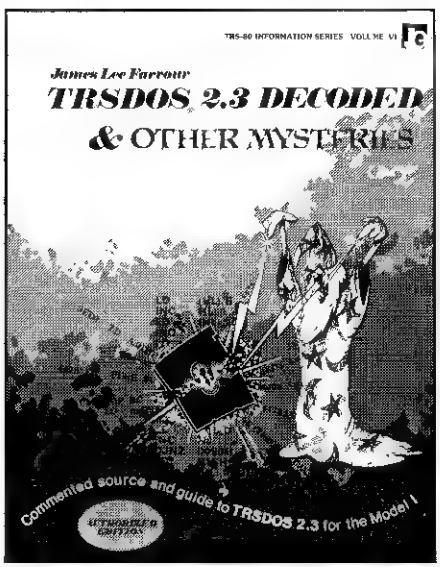
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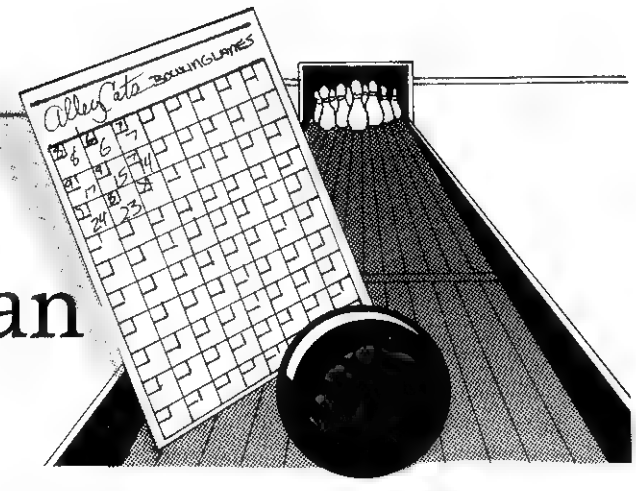
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LOAD 80

Let a TRS-80 keep track of your pins.



Bowling Statistician

Charles W. Hoppesch
270 Surfspray Drive
Merritt Island, FL 32952

Tired of doing those bowling league record books with a pencil, paper, and adding machine? Tired of complaints about math errors? Tired of those drab ABC Standing Sheets? Here is a program to turn you into a perfect math machine—TRS-80 naturally.

The program will handle leagues of up to 24 teams with any number of bowlers per team, calculate member averages, handicaps, and games as well as add up team wins, losses, and total pins. The program prompts for data to initiate the data file, such as names of the league officers, percentage handicap, number of bowlers per team, and other pertinent information. Plenty of prompts will keep you on track when entering weekly results.

This program prints array data horizontally rather than vertically; even if bowling does not interest you, these techniques for array data input, matrix addition, and horizontal data print formatting might.

This program was started in September when, quite by accident and with no encouragement from me, I was elected to the position of secretary for the men's Wednesday night bowling league. This league consisted of 10 teams with five members on each team. A league secretary keeps track of all scores bowled, sums scores from week to week and calculates individual averages and weekly standings. Because it is a scratch league I did not have to calculate handicaps. It did not take me long to realize a pencil, pad of paper and a four function calculator was not the way to do the mathematics and standing sheet preparation. I upgraded to a programmable calculator to automatically perform the math work after entering the weekly data. My wife, however, who types the standing sheets, wanted me to arrange the teams in order of their wins each week; this involved writing down 10 team names and their results. Seeing my TRS-80 unused, I decided a sort program was in order. As you probably have already guessed, one sort led to another and 36 hours later the sort was just one item on the menu of a program which figured handicaps, high team series/games and high individual series/games, did filing, and printed a standing sheet as well.

"Plenty of prompts will keep you on track when entering weekly results."

The Key Box

Level II
Model III
48K RAM
1 Disk Drive or Cassette
8½-Inch Printer

The Bowling Statistician runs on a 48K system with one disk drive and an 8½-inch printer; I have also run it on a 16K machine using tape storage. This was done by splitting the program into two parts; one using the program functions for data manipulation and the other using the print functions.

This program works with the MX-80. I wrote the Bowling Statistician with DOSPLUS, but it runs fine with NEWDOS or TRSDOS. If you have only one disk drive, load the program and insert a data disk. If you have a two-disk system simply put a data disk in drive one.

The program is split into two parts, team and individual, but has a single disk save/load and printing section.

Commands for Team Standing

The following commands are shown in the Menu In Fig. 1.

● Input Disk Data

This command loads the previous week's individual/team results and running totals. When the program prompts for the week number, enter last week's number, (i.e., W12). The W is necessary as the file spec must start with a letter.

● Update Weekly File

This command is used to update the weekly file and add the current results to the previous run-

ning totals after data input. The program automatically sorts to rank the teams by total wins. If a tie occurs the team with the highest total pin count will be listed first. (The sort program was written by Doug Walker and appeared in the September 1980 issue of *80 Micro*.) After entering scores, the program prints the input and the new running totals (games, handicap, average, and total pins). (Fig. 2.) If a mistake is made in the entry of games/wins/losses, enter a 9 for the last entry to the total entry.

● Save Data to Disk

The current week's results and the new running totals will be saved with this command. The program prompts you for the current week's number (i.e., W13). *Be sure to make at least one backup copy!*

● List Records

This will print on video screen the team standings and a total of team wins and losses. Note: If wins do not equal losses, an incorrect data entry was made.

● Sort

Sort allows you to perform another sort of team standings after a file correction has been made.

● Print Standing Sheet

This command prints the total standing sheet: header, team, and individual standings. A sample standing sheet is shown in Fig. 3.

● File Correction

If you make an error during input, this command allows correction of the error and the input of new grand totals.

● Initiate File

This command will establish data arrays and basic league parameters during the first "fire up" of the program. Alter line 70 to fit your league. G$(20,4) is the team data array (20 being the number of teams in the league). Change this to reflect the number of teams in your league.

● Individual Standings

Individual Standings will direct the micro to the Individual program section.

Commands for Individual Standings

The following commands for individual standings are shown on the Menu displayed in Fig. 4.

● Update Weekly File

Use this command to enter the new week's data. The program

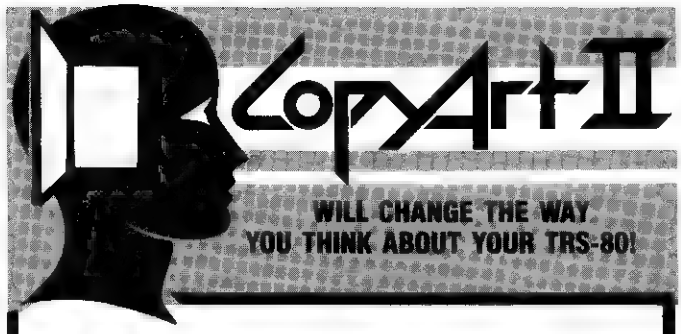
```
BOWLING STATISTICIAN
**************MENU***************
Team
1—Input Disk Data
2—Update Weekly File
3—Save Data To Disk
4—List Records
5—Sort
6—Print Standing Sheet
7—File Correction
8—Initiate File
9—Individual Standings
```

Fig. 1. Menu for Team Standing

```
DATE = 1 DECEMBER 1982
Big Benders          2   2   856   18   22   8605
Alley Gators         3   1   891   21   19   8991
Gutter Gunners       1   3   928   14   26   8707
Goto's               4   0  1191   29   11  11100
Apple Knockers       2   2   933   26   14   9573
Hookers              0   4   739   12   28   7300

Goto's              29              11       11100
Apple Knockers      26              14        9573
Alley Gators        21              19        8991
Big Benders         18              22        8605
Gutter Gunners      14              26        8707
Hookers             12              [illegible]  7300
Total wins = 120          Total Losses = 120
More?.
```

Fig. 2. Printout of Team Inputs



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8. *GRAPHIC CHARACTERS. CopyArt has a built in graphics character generator. Used for typesetting large letters from 3 to 25 times normal size! Yes, you can even print characters down the page as well as across. Black on white or white on black.
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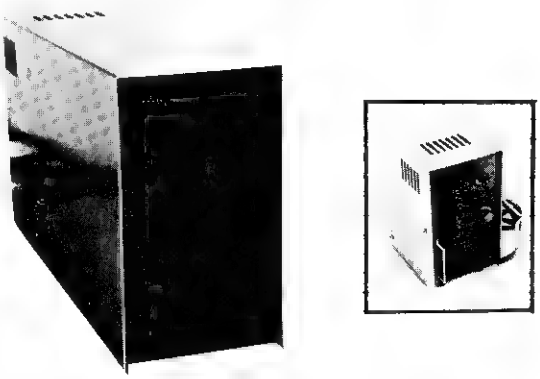
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will prompt you with the name of the bowler to be updated. If the bowler was absent answer the queries with the enter key. Leave the printer on as a record of each entry; the new totals will be printed for each bowler. If you make an error during input, type in '9' for the third game and the total entry will be cancelled.

- List Records

This command establishes the individual record file. The handicap percentage, number of players per team, and more will be requested by prompts. Line 70 establishes the dimensions for the individual data arrays: C$(100,9),J(100),K(100),L(100). 100 is the expected number of bowlers in the league. This value should be changed to fit your league. The computer will ask for the names of the individual bowlers. Enter these by teams; for example, enter the five bowlers from team one first, then the five bowlers from team two, continuing until all regular team members have been input. If a team has an incomplete lineup, enter any unique characters for missing bowler's names. Use a different character for each missing bowler so you can correct the file later. Substitutes may be added in any order.

"The program sorts to rank the teams by total wins."

List Records will permit you to review the individual data results on video.

- Add Substitutes

To add new substitutes to the roster use this command. (Changes in a team's roster should be made using the 'file correction' command.)

- File Correction

This command permits the user to correct a file entry. Pressing enter without additional keystrokes leaves entry as is. Remember to only enter items which need to be corrected and the correct grand totals, not individual game scores.

- Initiate File

- Print Weeks High Games and Series

This command will print all games over 200 and all series greater

MICRO-MIXERS

-STANDINGS AS OF 1 DEC 82-

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SECRETARY-JILL ROM 889-3922

	NAME	WON	LOST	PINS
1	GOTO'S	29	11	11100
2	APPLE KNOCKERS	26	14	9573
3	ALLEY GATORS	21	19	8991
4	BIG BENDERS	18	22	8605
5	GUTTER GUNNERS	14	26	8707
6	HOOKERS	12	28	7300

-NAME-	HCP	PINS	#	AVE	-NAME-	HCP	PINS	#	AVE
* TEAM-1 *					* TEAM-2 *				
JOHN BITE	33	4892	30	163	BEN BAUD	14	5549	30	184
MISSIE BIT	69	3713	30	123	TINA BAUD	77	3442	30	114
* TEAM- 3					* TEAM- 4 *				
TOM CHIP	43	4129	27	152	CHUCK BREAK	4	5873	30	195
JOAN CHIP	53	3807	27	141	GINNY BREAK	23	5227	30	174
* TEAM- 5					* TEAM- 6 *				
DANNY DOS	36	4775	30	159	PAUL RAM	52	4266	30	142
DARLENE DOS	36	4798	30	159	JILL RAM	89	3034	30	101

SUBSTITUTES

NAME-	HCP	PINS	#	AVE	NAME	HCP	PINS	#	AVE
FRANK DIM	67	375	3	125	HELEN DIM	61	396	3	132

Fig. 3. Sample Standing Sheet

than 600. Change these parameters to fit your league's needs.

● Team Standings

This will return the program to the Team menu. However, remember to save the data after inputting, and make a backup.

● Correct High Individual Game/Series

This command allows you to correct errors in individual high standings. Bowlers are indexed by their entry number.

The variables in this program are shown in Fig. 5. The important variable functions are shown in Fig. 6.

The program will run on a Model I if you change the tab values in the Print section. (As you know, the Model I does not tab past 63.)

Say goodbye to pencils, scratch pads, calculators and complaints about math errors. ■

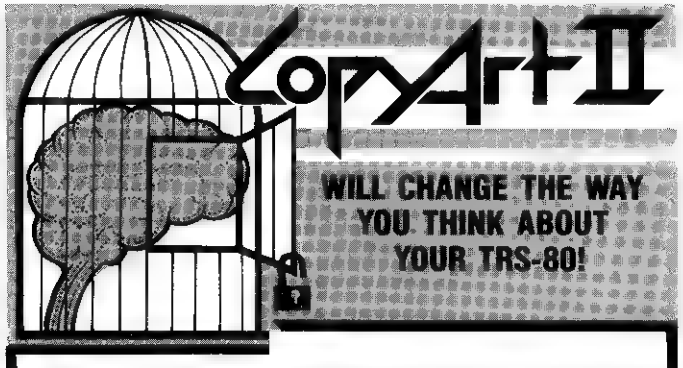
```
**********MENU**********
Individual
1—Update Weekly File
2—List Records
3—Add Substitutes
4—File Correction
5—Initiate File
6—Print Weeks High Games And Series
7—Team Standings
8—Correct High Ind  Game/Series
```

Fig. 4. Menu for individual Standings

Fig. 5. Variables and Locations

```
A       00360 00960 01280 01430 01870 02365 02420 02440 02565
        02620 02640
AT      00290 00300 00360 00470 00550 00690 02350 02370 02550
        02570 02820 02960 03070
AV      01996 01997 02120
B       00940 00990 01080 01480 01760 01905 01920 01996 02220
        02430 02450 02630 02650 02920 03070 03150 06010 06130
BB      02830 02840 20140 20150
C       00070 00350 01010 01020 01030 01040 01050 01060 01490
        01650 01660 01670 01680 01690 01700 01770 01800 01810
        01820 01850 01930 01996 01997 01998 02070 02090 02100
        02110 02120 02150 02160 02170 02230 02240 02250 02260
        02270 02470 02670 02870 02930 02950 03000 03080 03100
        03110 03160 04020 04050 04060 04070 04080 04230 06040
        06050 06060 06070 06080 06220 06230 06240 06250 06260
        06270 06280 06290 06300 11500 11510 11520 11530
C1      00350 00380 01310 01360 01380 01570 01580 01600 01610
C2      00350 00380 01350 01560 01590
CC      00080 02930 02950 03080 03110
D       00350 00390 01550
E       00990 01000
EE      00680 01900 02330 02340 02540 02760
F1      01200 01620 01630
FL      10020
G       00070 00310 00320 00480 00490 00500 00560 00590 00620
        00630 00640 00650 00700 01360 01380 01570 01580 01600
        01610 01660 01670 01680 01690 02390 02590 02840
G1      01005 01020 01030 02010 02020 02040 02070
G2      01005 01020 01030 02010 02020 02050 02070
G3      01005 01020 01030 02010 02020 02060 02070
GS      02070 02090
GT      02090 02120
H       04205 06000 08500 09000 10060 11000 11010 11020 11030
        11500 11510 11520 11530 11760 11770 11780 11790
HC      01250 01060 01996 01997 01998 02010
HH      00920 01050 01997 02350 02550
I       00300 00310 00320 00330 00470 00480 00490 00500 00510
        00550 00560 00590 00620 00630 00640 00650 00690 00700
        00730 00740 00760 01000 01010 01020 01030 01040 01050
        01060 01090 01480 01490 01500 01760 01770 01800 01810
        01820 01850 01905 01920 01930 01960 01970 01990 01996
        01997 01998 01999 02020 02070 02090 02100 02110 02120
        02150 02160 02170 02220 02230 02240 02250 02260 02270
        02290 02370 02390 02450 02470 02570 02590 02650 02670
        02820 02840 02850 02920 02930 02940 02950 02960 02970
        02980 02990 03070 03080 03090 03100 03110 03150 03160
        04010 04020 04050 04060 04070 04080 04220 04230 06010
        06040 06050 06060 06070 06080 06090 06130 06140 06210
        06220 06230 06240 06250 06260 06270 06280 06290 06300
        09002 09003 10010 10020 10030 11000 11010 11020 11030
        20130
I1      00460 00490 01660 01690
I2      00460 00490 00520 01660 01690
I3      00460 00500 01660 01690
I4      00460 00500 00520
J       00070 00360 01120 01150 01180 01340 01360 01380 01400
        01440 02930 02950 03080 03110 03160 20130
J1      01670 01680
J2      01670 01680
J3      01670 01680
*K      00070 00210 00360 00680 01150 01180 01400 01440 02930
        02950 03080 03110 03160
KE      09007 10030 10040 10045 11000 11010 11020 11030
```

Figure 5 continues



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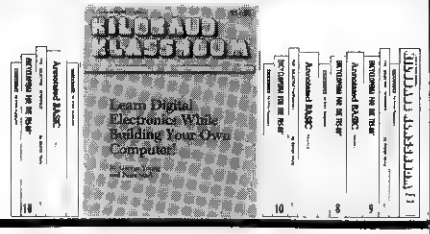
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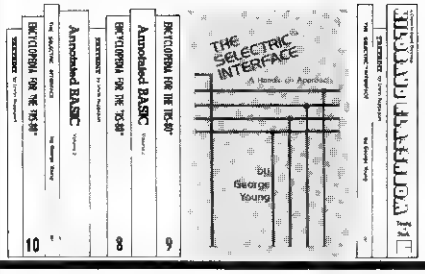
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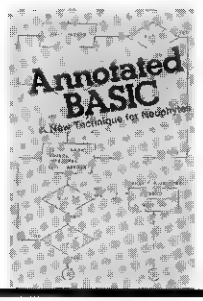
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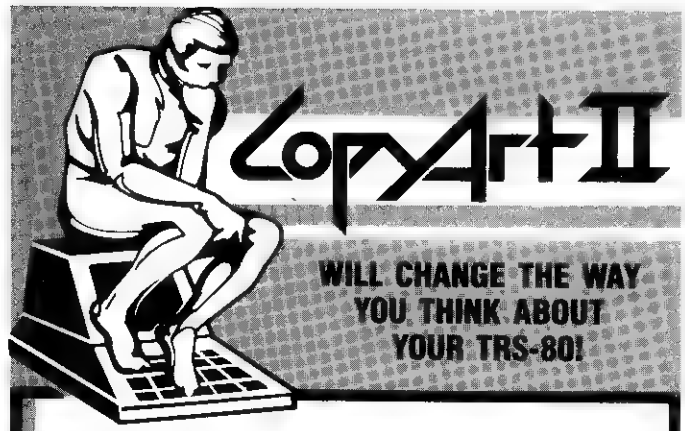
```
L       00070 01340 01360 01380 01390 01400 01410 01440 02930
        02950 03080 03110 03160
L1      00630
LN      00270 02330 02540 02760
LS      09005 09007
M       01280 01330 01340 01400 01410 01440
MM      01750 01770
MS      09004 09005 09007
N       00280 02360 02560 02800
P       00540 00560 00950 00970 01000
PC      00930 01050 01997 02350 02550
PD      00930
PR      00250 02330 02540 02770
Q1      02030 02040 02080
Q2      02030 02050 02080
Q3      02030 02060 02080
QG      02110 02120
QP      02100 02110
QQ      02080 02110
R       00360 00380 00390 00400 00410
RN      09003 09004 09005 10040 10045 11500 11510 11520 11530
S       00070 06090 06110 06120 06140
SC      00260 02330 02540 02780
T       00070 20130
TG      00070 10000 10020 10030 11000 11010 11020 11030
TM      20100 20110 20130 20150
TP      00640
TR      00265 02330 02540 02785
TS      20150
U       00910 02350 02550 02940 02960 02970 02980 03070
V       00880 00890 02190
W       00070 00620 00630 00640 00650 00730 00740 01030 01040
        01905 01960 01970 02020 02150 02160 02170 02310 02320
        02520 02530
W1      00620
X       00530 01530 01730 04030 04040 06040 06050 06060 06070
        06080 06090 06260 06270 06280 06290 06300 10000
X1      00070 02440 02640 04050 04230 06050 06090 06220 06230
        06240 11000 11500
X2      00070 02440 02640 04070 04230 06060 06090 06250 11020
        11520
X3      00070 02440 02640 04060 04230 06070 06090 06270 06280
        06290 11010 11510
X4      00070 02440 02640 04080 04230 06080 06090 06300 11030
        11530
X6      02365 02565 07020 07110 07120 07130 08000 08010 08020
X7      02365 02565 07030 07110 07120 07130 08030 08040 08050
X8      02365 02565 07040 07110 07120 07130 08060 08070 08080
X9      02365 02565 07050 07110 07120 07130 08090 08100 08110
XX      00080 02930 02950 03080 03110
Y       00210 00220 00990 03140 06040 06270 06280 06290 06300
Y1      06050
Y2      06060
Y3      06070
Y4      06080
Z       00710 00720 00730 00740 00750 00910 01905 01940 01950
        01960 01970 02310 02380 02390 02400 02460 02470 02480
        02520 02580 02590 02600 02660 02670 02680 06110 07070
        07080
Z3      01120 01130 01140 01150 01170 01210
Z4      01150 01160 01240 01250
Z5      01150 01250
Z6      00420 01180 01270 01280 01300 01310 01350 01360 01380
        01550 01560 01570 01580 01590 01600 01610
Z7      01160 01170 01180 01210 01220 01340 01360 01380 01400
        01420 01430 01440 01570 01580 01600 01610 01660 01680
Z8      01170 01180 01340 01360 01380 01400 01410 01420 01570
        01580 01600 01610 01670 01690
ZZ      20120
```

Fig. 6. List of Functions and Keywords

```
FOR     00300 00350 00470 00550 00690 00710 01000 01480 01650
        01760 01905 01920 01940 01996 02220 02365 02370 02380
        02440 02450 02460 02565 02570 02580 02640 02650 02660
        02820 02920 03070 03150 04220 06010 06130 06210 08500
        09002 10010 20130
CLS     00060 00090 00220 00240 00290 00370 00540 00670 00780
        00790 00910 00980 01750 01870 01890 02340 02720 03140
        04020 07010
NEXT    00330 00350 00510 00570 00750 00760 01090 01500 01700
        01780 01905 01980 01990 01999 02290 02365 02400 02410
        02440 02480 02490 02565 02600 02610 02640 02680 02690
        02850 02990 03120 03170 04240 06100 06150 06312 09020
        10055 20130
DATA    20000 20010 20020 20030 20040 20050 20060 20070 20080
        20090
INPUT   00250 00260 00265 00270 00290 00310 00320 00530 00540
        00590 00680 00730 00910 00920 00930 01010 01020 01530
        01730 01750 01800 01960 02310 02330 02350 02360 02365
        02390 02420 02430 02440 02470 02520 03140 04010 04030
        04050 04060 04070 04080 06110 07070 08000 08010 08020
        08030 08040 08050 08060 08070 08080 08090 08100 08110
DIM     00070
READ    20130
GOTO    00210 00220 00230 00310 00340 00400 00410 00440 00530
        00580 00600 00660 00720 00740 00770 00880 00890 00900
        00910 00915 01010 01020 01035 01100 01200 01230 01260
        01370 01400 01440 01450 01460 01530 01550 01560 01740
        01790 01840 01950 01970 02000 02115 02200 02300 02510
        02710 03010 03100 03140 03145 04030 04040 04050 04060
        04070 04080 04205 04240 06000 06100 06170 07080 08000
        08010 08020 08030 08040 08050 08060 08070 08080 08090
        08100 08110 08120 10060
IF      00210 00310 00400 00560 00720 00740 00880 00910 00990
        01010 01020 01050 01140 01180 01200 01220 01250 01270
        01280 01310 01350 01360 01380 01390 01400 01430 01440
        01550 01560 01570 01580 01590 01600 01610 01770 01950
```

Figure 6 continues

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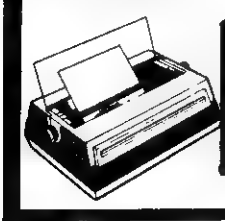
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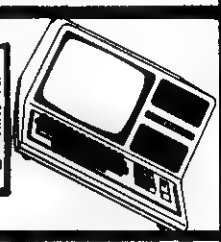
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Figure 6 continued

```
          01970 01997 01998 02040 02050 02060 02190 02230 02250
          02260 02270 02960 02970 03100 03140 04030 04040 06220
          06230 06240 06250 06270 06280 06290 06300 10060 11000
          11010 11020 11030 11500 11510 11520 11530 11760 11770
          11780 11790 20100 20150
GOSUB     00055 00430 01010 01070 01190 01200 01460 01520 01830
          01910 01995 02180 02880 03140 09000 09010 10050
RETURN    01620 01630 01710 01860 01880 03180 04500 06315 07140
          11040 11540 11800 20160
REM       00030 00040 00240 00350 00450 00540 00610 00670 00910
          00970 01110 01290 01320 01470 01510 01540 01640 01720
          01750 01890 02130 02140 02210 02320 02720 02750 02870
          04000 06000 06200 07000
ELSE      00210 00880 00990 01200 01280 01360 01380 01570 01580
          01600 01610 01998 02040 02050 02060 02230 03140 10060
ERROR     01010 01035 02115
RESUME    06320 06340
ON        00220 00890 01010 01035 02115 04040 07080
OPEN      02320 02530 06120
CLOSE     02500 02700 06160
LPRINT    00650 00680 01850 01870 01900 02240 02250 02260 02270
          02280 02723 02740 02760 02770 02780 02785 02800 02810
          02840 02860 02890 02900 02910 02930 02950 03000 03020
          03030 03050 03060 03080 03100 03110 03130 04200 04210
          04215 04230 07100 07110 07120 07130 11500 11510 11520
          11530 11750 11760 11770 11780 11790
DEF       20150
POKE      01680 01690 20130
PRINT     00090 00100 00110 00120 00130 00140 00150 00160 00170
          00180 00190 00200 00310 00370 00480 00520 00700 00790
          00800 00810 00820 00830 00840 00850 00860 00870 00980
          01020 01490 01930 02340 02540 02550 02560 02565 02590
          02620 02630 02640 02670 04020 04050 04060 04070 04080
          06140 06320 06340 07015 07020 07030 07040 07050 07060
          20130
CLEAR     00050
TAB(      00650 01850 01870 01930 02240 02760 02800 02840 02900
          02910 02930 02950 03000 03050 03080 03110 04210 04230
          07015 07020 07030 07040 07050 07100 07110 07120 07130
          11500 11510 11520 11530
TO        00300 00350 00470 00550 00690 00710 01000 01480 01650
          01760 01905 01920 01940 01996 02220 02365 02370 02380
          02440 02450 02460 02565 02570 02580 02640 02650 02660
          02820 02920 03070 03150 04220 06010 06130 06210 08500
          09002 10010 20130
USING     02840 02930 02950 03080 03110
VARPTR    01660 01670 01680 01690 10000
USR       10000 20150
ERR       06320 06340
STRING$   02810 02860 03020 03060 03130 04215 06040 06050 06060
          06070 06080 07100 20120
INKEY$    00210 00880
THEN      00210 00560 00740 00880 00910 00990 01010 01050 01140
          01180 01220 01250 01270 01280 01310 01350 01360 01380
          01390 01400 01430 01440 01570 01580 01590 01600 01610
          01770 01970 01997 01998 02040 02050 02060 02190 02230
          02250 02260 02270 02960 02970 03100 03140 04040 06220
          06230 06240 06250 06270 06280 06290 06300 10060 11000
          11010 11020 11030 11500 11510 11520 11530 20100 20150
STEP      10010
+         00410 00490 00500 00620 00630 00640 00990 01030 01080
          01170 01240 01300 01340 01360 01380 01420 01660 01670
          01680 01690 01810 02070 02080 02090 02110 02310 02520
          02940 03000 03070 03090 06040 06050 06060 06070 06080
          06090 06110 06270 06280 06290 06300 06320 06340 09000
          09007 10045 11000 11010 11020 11030 20100 20130
-         00350 01050 01150 01210 01310 01350 01360 01380 01997
          02980 06040 06050 06060 06070 06080 09005 10010 10020
          20100 20110
*         01050 01997 02960 02970 03070 06300 09005 10045 20100
/         00930 01040 01130 01820 02120 06320 06340 09004
AND       01180 01280 01400
OR        00880 01180 02230 02970 04040
>         00210 00880 01180 01250 01280 01400 01600 01610 02040
          02050 02060 02230 02250 02260 02270 04040 06220 06230
          06240 06250 06270 06280 06290 06300 20100 20150
=         00080 00210 00280 00300 00310 00350 00360 00380 00390
          00400 00410 00420 00460 00470 00490 00500 00550 00560
          00590 00620 00630 00640 00690 00710 00720 00740 00880
          00910 00930 00940 00950 00960 00970 00990 01000 01005
          01010 01020 01030 01040 01050 01060 01080 01120 01130
          01140 01150 01160 01170 01200 01210 01240 01270 01280
```

Program Listing

```
10 ' FOR INFO SEND SASE TO:
20 ' CHARLES W. HOPPESCH
30 ' 270 SURFSPRAY DR.
40 ' MERRITT ISLAND, FL. 32952
50 CLEAR 12000
55 GOSUB20000
60 CLS
70 DIMG$(20,4),W(100,3),C$(100,9),J(100),K(100),L(100),X1$(48),X
2$(48),X3$(48),X4$(48),TG$(50),S$(50),T$(12,4)
80 CC$="######":XX$="####"
90 CLS:PRINT"            BOWLING STATISTICIAN"
100 PRINT"* * * * * * * * MENU * * * * * * * * *"
110 PRINT:PRINT"TEAM-":PRINT
120 PRINT"1 - INPUT DISK DATA
130 PRINT"2 - UPDATE WEEKLY FILE
140 PRINT"3 - SAVE DATA TO DISK
150 PRINT"4 - LIST RECORDS"
160 PRINT"5 - SORT
170 PRINT"6 - PRINT STANDING SHEET"
180 PRINT"7 - FILE CORRECTION
190 PRINT"8 - INITIATE FILE
200 PRINT"9 - INDIVIDUAL STANDINGS
210 K$=INKEY$:IFK$=""THEN210ELSEY=VAL(K$):IFY>9GOTO210
```

Listing continues

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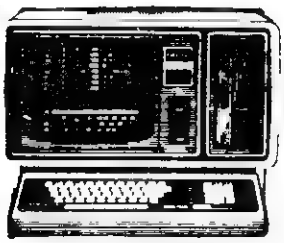
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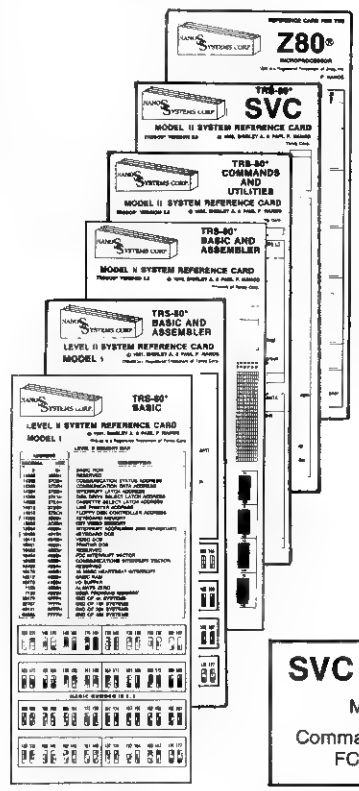
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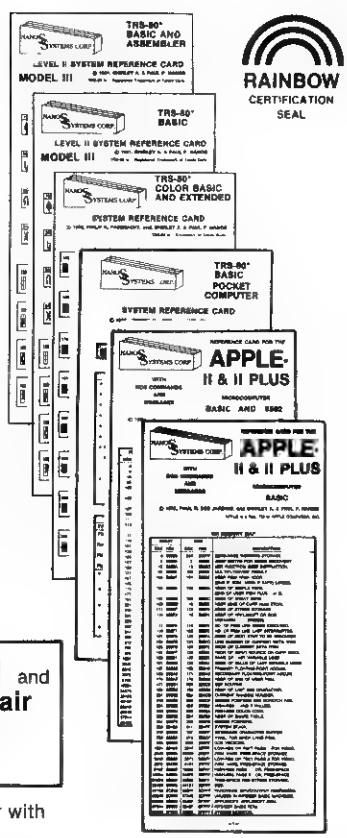
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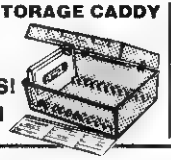
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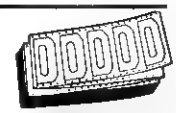
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Listing continued

```
220 CLS:ONYGOTO2310,670,2520,450,350,2720,540,240,780
230 GOTO90
240 CLS:REM'INITIATE FILE
250 INPUT"LEAGUE PRESIDENTS NAME";PR$
260 INPUT"LEAGUE SECRETARYS NAME";SC$
265 INPUT "LEAGUE TREASURERS NAME";TR$
270 INPUT"LEAGUE NAME";LN$
280 N$(1)="NAME":N$(2)="WON":N$(3)="LOST":N$(4)="PINS"
290 CLS:INPUT"NUMBER OF TEAMS";AT
300 FORI=1TOAT
310 PRINT"TEAM #";I;:INPUT"NAME";G$(I,1):IFG$(I,1)="END"GOTO90
320 INPUT"WON";G$(I,2):INPUT"LOSS";G$(I,3):INPUT"PINS";G$(I,4)
330 NEXTI
340 GOTO90
350 FOR C=1TO4:C1(C)=-1:C2(C)=0:D(C)=0:NEXTC    ' SORT PARAMETERS

360 R=1:J=AT:K=1:A=AT
370 CLS:PRINT"SORTING"
380 C1(1)=2:C1(2)=4:C2(R)=1
390 D(R)=2
400 IFR=2GOTO420
410 R=R+1:GOTO370
420 Z6=1
430 GOSUB1110
440 GOTO90
450 REM * DISPLAY SORTED RECORDS *
460 I1=0:I2=0:I3=0:I4=0
470 FOR I=1 TO AT
480 PRINTG$(I,1),G$(I,2),G$(I,3),G$(I,4)
490 I1=VAL(G$(I,2)):I2=I2+I1
500 I3=VAL(G$(I,3)):I4=I4+I3
510 NEXTI
520 PRINT"TOTAL WINS=";I2;"  TOTAL LOSSES=";I4
530 INPUT"MORE";X:GOTO90
540 CLS:INPUT"FIRST FOUR CHARACTERS OF NAME";P$  'CORRECTION
550 FORI=1TOAT
560 IFMID$(G$(I,1),1,4)=P$THEN590
570 NEXT
580 GOTO90
590 I=I:INPUT"NEW NAME";G$(I,1):INPUT"CORRECT TOTAL WINS";G$(I,2
):INPUT"CORRECT TOTAL LOSSES";G$(I,3):INPUT"CORRECT TOTAL PINS";
G$(I,4)
600 GOTO90
610 REM ' DATA ADDITION
620 W1=0:W1=VAL(G$(I,2))+W(I,1):G$(I,2)=STR$(W1)
630 L1=0:L1=VAL(G$(I,3))+W(I,2):G$(I,3)=STR$(L1)
640 TP=0:TP=VAL(G$(I,4))+W(I,3):G$(I,4)=STR$(TP)
650 LPRINTG$(I,1);TAB(18)W(I,1);TAB(22)W(I,2);TAB(26)W(I,3);TAB(
31)G$(I,2);TAB(38)G$(I,3);TAB(45)G$(I,4)
660 GOTO760
670 CLS:REM' UPDATE FILE
680 INPUT"DATE GAMES BOWLED";EE$:LPRINT"DATE=";EE$
690 FORI=1TOAT
700 PRINTG$(I,1);"  ENTER WON: LOSS: PINS";"   (TYPE '9' FOR PIN
S TO CANCEL ENTRY)
710 FORZ=1TO4
720 IFZ=4 GOTO610
730 INPUTW(I,Z)
740 IF W(I,3)=9THENZ=1:W(I,3)=0:GOTO700
750 NEXTZ
760 NEXTI
770 GOTO350
780 CLS
790 CLS:PRINT"* * * * * * * * MENU * * * * * * * *"
800 PRINT:PRINT"INDIVIDUAL-":PRINT
810 PRINT"1 - UPDATE WEEKLY FILE
820 PRINT"2 - LIST RECORDS"
830 PRINT"3 - ADD SUBSTITUTES
840 PRINT"4 - FILE CORRECTION
850 PRINT"5 - INITIATE FILE
860 PRINT"6 - TEAM STANDINGS
870 PRINT"7 - CORRECT HIGH IND. GAME/SERIES"
880 K$=INKEY$:IFK$=""THEN880ELSEV=VAL(K$):IFV<0ORV>8GOTO880
890 ONVGOTO1890,1470,970,1750,910,90,4000
900 GOTO880
910 CLS:INPUT"DO YOU REALLY WANT TO (Y/N)";Z$:IF Z$="Y"THEN INPU
T"HOW MANY PERSONS ON A TEAM";U:GOTO920      REM * FILE INITIATIO
N *
915 GOTO790
920 INPUT"WHAT IS THE NUMBER FROM WHICH HANDICAP IS CALCULATED";
HH
930 INPUT"WHAT IS THE PERCENTAGE HANDICAP";PD:PC=PD/100
940 B=0
950 P=100
960 A$(1)="NAME":A$(2)="G#1":A$(3)="G#2":A$(4)="G#3":A$(5)="SER"
:A$(6)="PINS":A$(7)="AVE":A$(8)="GAMES":A$(9)="HCP"
970 P=100   ' REM  ADD SUBSTITUTES
980 CLS:PRINT"TYPE 'END' FOR NAME TO STOP ENTRY"
990 IFY=5THENE=1ELSEE=B+1
1000 FORI=ETOP
1005 G1=0:G2=0:G3=0
1010 INPUT"NAME";C$(I,1):IFC$(I,1)="END"THEN GOSUB6200:ONERRORGO
TO0:GOTO790
1020 INPUT"GAME 1";G1:INPUT"GAME 2";G2:INPUT"GAME 3";G3:INPUT"#
OF GAMES";C$(I,8):C$(I,2)=STR$(G1):C$(I,3)=STR$(G2):C$(I,4)=STR$
(G3):IF G3=9 PRINT"REENTER ALL GAMES":GOTO1010
1030 W=G1+G2+G3:C$(I,6)=STR$(W):C$(I,5)=C$(I,6)
1035 ON ERROR GOTO 6320
1040 C$(I,7)=STR$(INT(W/VAL(C$(I,8))))
1050 HC=INT((HH-VAL(C$(I,7)))*PC):IFHC<0THENHC=0
1060 C$(I,9)=STR$(HC)
1070 GOSUB 1850
1080 B=B+1
1090 NEXTI
1100 GOTO790
1110 REM *SORTS USING SHELL METZNER ALGORITHM*
1120 Z3=J
1130 Z3=INT(Z3/2)
1140 IFZ3=0THEN1270
1150 Z4=K:Z5=J-Z3
1160 Z7=Z4
1170 Z8=Z7+Z3
1180 IFZ6>1AND(Z7<K OR Z7>J OR Z8<K OR Z8>J) THEN 1240
1190 GOSUB1540
1200 IF F1=2 GOTO1240 ELSE GOSUB1640
```

Listing continues

Listing continued

```
1210 Z7=Z7-23
1220 IFZ7<1 THEN1240
1230 GOTO1170
1240 Z4=Z4+1
1250 IFZ4>Z5THEN1130
1260 GOTO1160
1270 IFZ6=1THEN1300
1280 IFZ6>1ANDM=ATHEN1300ELSE1340
1290 REM * SEE IF THERE IS ANOTHER FIELD TO SORT *
1300 Z6=Z6+1
1310 IFC1(Z6)=-1 THEN1460
1320 REM * SORT SEGMENT COMPUTATION ON INTERMEDIATE THRU MINOR F
IELD SORTS *
1330 M=1
1340 Z7=M:Z8=M+1:J=1:L=0
1350 IF C2(Z6-1)=1 THEN 1380
1360 IF G$(Z7,C1(Z6-1))=G$(Z8,C1(Z6-1)) THEN J=J+1 ELSE L=1
1370 GOTO 1390
1380 IF VAL(G$(Z7,C1(Z6-1)))=VAL(G$(Z8,C1(Z6-1))) THEN J=J+1 ELS
E L=1
1390 IF L=0 THEN 1420
1400 IF L=1 AND J>1 THEN K=M:J=Z7:M=Z8:GOTO1120
1410 L=0:M=Z8
1420 Z7=Z7+1:Z8=Z8+1
1430 IFZ7<A THEN 1350
1440 IF L=0 THEN K=M:M=Z7:J=Z7:GOTO1120
1450 GOTO1300
1460 GOSUB7000:GOTO90
1470 REM * DISPLAY SORTED RECORDS *
1480 FOR I=1 TO B
1490 PRINTC$(I,1),C$(I,2),C$(I,3),C$(I,4),C$(I,5),C$(I,6),C$(I,7
),C$(I,8)
1500 NEXTI
1510 REM * CONTINUATION CHECK *
1520 GOSUB1720
1530 INPUT"HIT ENTER TO CONTINUE";X:GOTO780
1540 REM * RECORD ADDRESS POINTER SWITCH *
1550 IF D(Z6)=2 GOTO1590
1560 IF C2(Z6)=1 GOTO1580
1570 IFG$(Z7,C1(Z6))<G$(Z8,C1(Z6)) THEN 1620 ELSE 1630
1580 IF VAL(G$(Z7,C1(Z6)))<VAL(G$(Z8,C1(Z6))) THEN 1620 ELSE 163
0
1590 IF C2(Z6)=1 THEN 1610
1600 IF G$(Z7,C1(Z6))>G$(Z8,C1(Z6)) THEN 1620 ELSE 1630
1610 IF VAL(G$(Z7,C1(Z6)))>VAL(G$(Z8,C1(Z6))) THEN 1620 ELSE 163
0
1620 F1=2:RETURN
1630 F1=1:RETURN
1640 REM * RECORD ADDRESS POINTER SWITCH *
1650 FOR C=1TO4
1660 I1=PEEK(VARPTR(G$(Z7,C))):I2=PEEK(VARPTR(G$(Z7,C))+1):I3=PE
EK(VARPTR(G$(Z7,C))+2)
1670 J1=PEEK(VARPTR(G$(Z8,C))):J2=PEEK(VARPTR(G$(Z8,C))+1):J3=PE
EK(VARPTR(G$(Z8,C))+2)
1680 POKE(VARPTR(G$(Z7,C))),J1:POKE(VARPTR(G$(Z7,C))+1),J2:POKE(
VARPTR(G$(Z7,C))+2),J3
1690 POKE(VARPTR(G$(Z8,C))),I1:POKE(VARPTR(G$(Z8,C))+1),I2:POKE(
VARPTR(G$(Z8,C))+2),I3
1700 NEXTC
1710 RETURN
1720 REM * Y/N INPUT CHECK *
1730 INPUT"HIT ENTER TO CONTINUE";X
1740 GOTO780
1750 CLS:INPUT"NAME OF BOWLER";MM$    ' REM  FILE CORRECTION
1760 FORI=1TOB
1770 IFC$(I,1)=MM$THEN1800
1780 NEXT
1790 GOTO790
1800 I=I:INPUT"NAME";C$(I,1):INPUT"GAME1";C$(I,2):INPUT"GAME2";C
$(I,3):INPUT"GAME3";C$(I,4):INPUT"CORRECT GRAND PIN TOTAL";C$(I,
6):INPUT"CORRECT GRAND TOTAL OF GAMES";C$(I,8):INPUT"CORRECT HAN
DICAP";C$(I,9)
1810 C$(I,5)=STR$(VAL(C$(I,2))+VAL(C$(I,3))+VAL(C$(I,4)))
1820 C$(I,7)=STR$(INT(VAL(C$(I,6))/VAL(C$(I,8))))
1830 GOSUB1850
1840 GOTO790
1850 LPRINTC$(I,1);TAB(25)C$(I,2);TAB(30)C$(I,3);TAB(35)C$(I,4);
TAB(40)C$(I,5);TAB(45)C$(I,6);TAB(52)C$(I,7);TAB(59)C$(I,8)
1860 RETURN
1870 CLS:LPRINTA$(1);TAB(20)A$(9);TAB(25)A$(2);TAB(30)A$(3);TAB(
35)A$(4);TAB(40)A$(5);TAB(45)A$(6);TAB(52)A$(7);TAB(59)A$(8)
1880 RETURN
1890 CLS:REM' UPDATE FILE
1900 LPRINT"DATE-----";EE$
1905 FOR I=1TOB:FOR Z=1TO3:W(I,Z)=0:NEXT:NEXT
1910 GOSUB1870
1920 FORI=1TOB
1930 PRINTC$(I,1);"  ENTER GAME1; GAME2; GAME3 ":PRINTTAB(25)"(
TYPE '9' FOR GAME3 TO CANCEL ENTRY)"
1940 FORZ=1TO4
1950 IFZ=4 GOTO2010
1960 INPUTW(I,Z)
1970 IF W(I,3)=9THENZ=0:W(I,3)=0:GOTO1930
1980 NEXT
1990 NEXTI
1995 GOSUB6200
1996 FOR I=1 TO B:AV=VAL(C$(I,7)):HC=0
1997 HC=INT((BH-AV)*PC):IF VAL(C$(I,8))=0 THEN HC=0
1998 IF HC<0THENHC=0ELSEC$(I,9)=STR$(HC)
1999 NEXTI
2000 GOTO790
2010 G1=0:G2=0:G3=0:HC=0
2020 G1=W(I,1):G2=W(I,2):G3=W(I,3)
2030 Q1=0:Q2=0:Q3=0
2040 IFG1>0THENQ1=1ELSEQ1=0
2050 IFG2>0THENQ2=1ELSEQ2=0
2060 IFG3>0THENQ3=1ELSEQ3=0
2070 GS=G1+G2+G3:C$(I,5)=STR$(GS)
2080 QQ=Q1+Q2+Q3
2090 GT=VAL(C$(I,6))+GS:C$(I,6)=STR$(GT)
2100 QP=VAL(C$(I,8))
2110 QG=QP+QQ:C$(I,8)=STR$(QG)
2115 ONERRORGOTO6340
2120 AV=INT(GT/QG):C$(I,7)=STR$(AV)
```

Listing continues

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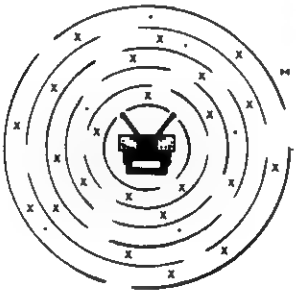
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Listing continued

```
2130 REM HC=INT((HH-AV)*PC):IFHC<0THENHC=0
2140  REM C$(I,9)=STR$(HC)
2150 C$(I,2)=STR$(W(I,1))
2160 C$(I,3)=STR$(W(I,2))
2170 C$(I,4)=STR$(W(I,3))
2180 GOSUB1850
2190 IFV=4THEN780
2200 GOTO1990
2210 REM' PRINT HIGH SERIES AND GAMES
2220 FOR I=1TOB
2230 IF VAL(C$(I,2))=>225 OR VAL(C$(I,3))=>225 OR VAL(C$(I,4))=>
225 THEN2240ELSE2250
2240 LPRINTC$(I,1);TAB(30);
2250 IF VAL(C$(I,2))=>225 THEN LPRINTC$(I,2);"-";
2260 IF VAL(C$(I,3))=>225 THEN LPRINTC$(I,3);"-"
2270 IF VAL(C$(I,4))=>225 THEN LPRINTC$(I,4)
2280 LPRINT""
2290 NEXTI
2300 GOTO790
2310 INPUT"WEEK#- ";Z$:W$="WEEK"+Z$+":1"
2320 OPEN"I",1,W$              '  DISK LOAD OPERATIONS
2330  INPUT#1,PR$:INPUT#1,SC$:INPUT#1,TR$:INPUT#1,LN$:INPUT#1,EE
$
2340 CLS:PRINT@200,"INPUTING ";EE$;" DATA"
2350 INPUT#1,U,HH,PC,AT
2360 INPUT#1,N$(1):INPUT#1,N$(2):INPUT#1,N$(3):INPUT#1,N$(4)
2365 FOR A=1TO3:INPUT#1,X6$(A):INPUT#1,X7$(A):INPUT#1,X8$(A):INP
UT#1,X9$(A):NEXT
2370 FOR I=1TOAT
2380 FORZ=1TO4
2390 INPUT#1,G$(I,Z)
2400 NEXTZ
2410 NEXT
2420 INPUT#1,A$(1):INPUT#1,A$(2):INPUT#1,A$(3):INPUT#1,A$(4):INP
UT#1,A$(5):INPUT#1,A$(6):INPUT#1,A$(7):INPUT#1,A$(8):INPUT#1,A$(
9)
2430 INPUT#1,B
2440 FOR A=1TOAT*U:INPUT#1,X1$(A):INPUT#1,X2$(A):INPUT#1,X3$(A):
INPUT#1,X4$(A):NEXT
2450 FOR I=1TOB
2460 FORZ=1TO9
2470 INPUT#1,C$(I,Z)
2480 NEXTZ
2490 NEXT
2500 CLOSE
2510 GOTO90
2520 INPUT"WEEK #-  ";Z$:W$="WEEK"+Z$+":1"
2530 OPEN"O",1,W$
2540 PRINT#1,PR$:PRINT#1,SC$:PRINT#1,TR$:PRINT#1,LN$:PRINT#1,EE$

2550 PRINT#1,U,HH,PC,AT
2560 PRINT#1,N$(1):PRINT#1,N$(2):PRINT#1,N$(3):PRINT#1,N$(4)
2565 FOR A=1TO3:PRINT#1,X6$(A):PRINT#1,X7$(A):PRINT#1,X8$(A):PRI
NT#1,X9$(A):NEXT
2570 FOR I=1TOAT
2580 FORZ=1TO4
2590 PRINT#1,G$(I,Z)
2600 NEXTZ
2610 NEXT
2620 PRINT#1,A$(1):PRINT#1,A$(2):PRINT#1,A$(3):PRINT#1,A$(4):PRI
NT#1,A$(5):PRINT#1,A$(6):PRINT#1,A$(7):PRINT#1,A$(8):PRINT#1,A$(
9)
2630 PRINT#1,B
2640 FOR A=1TOAT*U:PRINT#1,X1$(A):PRINT#1,X2$(A):PRINT#1,X3$(A):
PRINT#1,X4$(A):NEXT
2650 FOR I=1TOB
2660 FORZ=1TO9
2670 PRINT#1,C$(I,Z)
2680 NEXTZ
2690 NEXT
2700 CLOSE
2710 GOTO90
2720 CLS:REM *PRINT THE STANDING SHEET
2723 LPRINTCHR$(27)"@";
2740 LPRINT" ":LPRINT
2750 REM
2760 LPRINTCHR$(27)"G";:LPRINTCHR$(14)TAB(5)"***********";TAB(18
)LN$;"  **********":LPRINTCHR$(27)"H":LPRINTTAB(26)"-STANDINGS
AS OF ";EE$;"-":LPRINT
2770 LPRINT"PRESIDENT-";PR$
2780 LPRINT"SECRETARY-";SC$
2785 LPRINT"STATISTICIAN-"TR$
2800 LPRINTCHR$(27)"2":LPRINTTAB(7)"PLACE";TAB(18)N$(1)TAB(40)N$
(2)TAB(50)N$(3)TAB(60)N$(4)
2810 LPRINTSTRING$(80,"-")
2820 FOR I=1 TO AT
2830 BB$="##"
2840 LPRINTTAB(8)USINGBB$;I;:LPRINT"-";:LPRINTTAB(14)G$(I,1)TAB(
40)G$(I,2)TAB(50)G$(I,3)TAB(60)G$(I,4)
2850 NEXTI
2860 LPRINTSTRING$(80,"="):LPRINTCHR$(27)"F";
2870 C=2   'STANDING SHEET PRINTING
2880 GOSUB3150
2890 LPRINTCHR$(27)"@"
2900 LPRINT"-NAME-";TAB(20)"HCP";TAB(24)"PINS";TAB(31)"#";TAB(34
)"AVE";TAB(42)"-NAME-";TAB(59)"HCP  PINS   #  AVE"
2910 LPRINTTAB(5)"* TEAM-1 *";TAB(45)"* TEAM-2 *"
2920 FOR I=1TOB
2930 LPRINTC$(I,1);TAB(19)C$(I,9);:LPRINTTAB(23)USINGCC$;J(I);:L
PRINTTAB(28)USINGXX$;L(I);:LPRINTTAB(31)USINGXX$;K(I);
2940 I=I+U
2950 LPRINTTAB(40)C$(I,1);TAB(58)C$(I,9);:LPRINTTAB(62)USINGCC$;
J(I);:LPRINTTAB(67)USINGXX$;L(I);:LPRINTTAB(72)USINGXX$;K(I)
2960 IF I=AT*U THEN 3020
2970 IFI=2*UORI=4*UORI=6*UORI=8*UORI=10*UORI=12*UORI=14*UORI=16*
UORI=18*UORI=20*UTHEN3000
2980 I=I-U
2990 NEXTI
3000 LPRINT" ";C=C+1:LPRINTTAB(5)"* TEAM-";C;:C=C+1:LPRINTTAB(45
)"* TEAM-";C;" *"
3010 GOTO2990
3020 LPRINT" ":LPRINTSTRING$(80,"-")
3030 LPRINTCHR$(30)"SUBSTITUTES"
3050 LPRINTTAB(5)"NAME-";TAB(20)"HCP";TAB(24)"PINS";TAB(31)"#";T
AB(34)"AVE";TAB(42)"NAME";TAB(60)"HCP  PINS   #   AVE"
3060 LPRINTSTRING$(80,"-")
```

Listing continues

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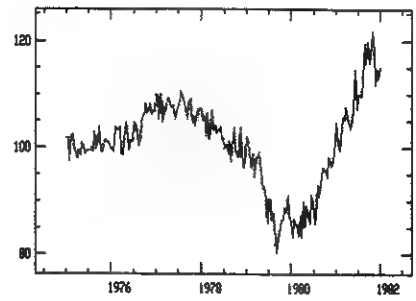
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3070 FORI=AT*U+1TOB
3080 LPRINTC$(I,1);TAB(19)C$(I,9);:LPRINTTAB(22)USINGCC$;J(I);:L
PRINTTAB(27)USINGXX$;L(I);:LPRINTTAB(32)USINGXX$;K(I);
3090 I=I+1
3100 IFC$(I,1)="END"THENLPRINT"":GOTO3130
3110 LPRINTTAB(40)C$(I,1);TAB(58)C$(I,9);:LPRINTTAB(62)USINGCC$;
J(I);:LPRINTTAB(67)USINGXX$;L(I);:LPRINTTAB(72)USINGXX$;K(I)
3120 NEXT
3130 LPRINT" ":LPRINTSTRING$(80,"*")
3140 GOSUB7100:CLS:INPUT"DO YOU WANT INDIVIDUAL HIGHS Y/N";Y$:IF
Y$="Y"THENGOSUB4200ELSEGOTO90
3145 GOTO90
3150 FORI=1TOB
3160 J(I)=VAL(C$(I,6)):K(I)=VAL(C$(I,7)):L(I)=VAL(C$(I,8))
3170 NEXT
3180 RETURN
4000 REM ***** CORRECT IND HIGH SERIES/GAMES *****
4010 INPUT"BOWLERS NUMBER";I
4020 CLS:PRINTC$(I,1);PRINT:PRINT:PRINT"1=HIGH SCRATCH GAME":PRI
NT"2=HIGH HCP GAME":PRINT"3=HIGH SCRATCH SERIES":PRINT"4=HIGH HC
P SERIES":PRINT"5=RETURN TO MENU WITHOUT CHANGE"
4030 INPUT"WHICH DO YOU WISH TO CHANGE";X:IF X=5GOTO780
4040 ONXGOTO4050,4060,4070,4080:IF X =0ORX>4THEN4030
4050 PRINTX1$(I),C$(I,1):INPUT"CORRECT HIGH SCRATCH GAME";X1$(I)
:GOTO780
4060 PRINTX3$(I),C$(I,1):INPUT"CORRECT HIGH HCP GAME";X3$(I):GOT
O780
4070 PRINTX2$(I),C$(I,1):INPUT"CORRECT HIGH SERIES SCRATCH";X2$(
I):GOTO780
4080 PRINTX4$(I),C$(I,1):INPUT"CORRECT SERIES HCP";X4$(1):GOTO78
0
4200 LPRINT
4205 H=0:GOTO9000
4210 LPRINTTAB(29)"---INDIVIDUAL HIGHS---":LPRINT:LPRINTTAB(5)"N
AME";TAB(20)"HIGH GAME";TAB(31)"HIGH GAME(HCP)";TAB(47)"HIGH SER
IES";TAB(60)"HIGH SERIES(HCP)"
4215 LPRINTSTRING$(80,"-")
4220 FOR I=1TOAT*U
4230 LPRINTTAB(1)C$(I,1);TAB(23)X1$(I);TAB(34)X3$(I);TAB(50)X2$(
I);TAB(63)X4$(I)
4240 NEXT:GOTO90
4500 RETURN
6000 H=0: GOTO9000 REM *STRING MAKER FOR AIDS*
6010 FOR I=1 TO  B
6040 X=LEN(C$(I,1)):Y=20-X:X$=C$(I,1)+STRING$(Y," ")
6050 X=LEN(C$(I,2)):Y1=4-X:X1$=C$(I,2)+STRING$(Y1," ")
6060 X=LEN(C$(I,3)):Y2=4-X:X2$=C$(I,3)+STRING$(Y2," ")
6070 X=LEN(C$(I,4)):Y3=4-X:X3$=C$(I,4)+STRING$(Y3," ")
6080 X=LEN(C$(I,5)):Y4=6-X:X4$=C$(I,5)+STRING$(Y4," ")
6090 S$(I)=X$+X1$+X2$+X3$+X4$
6100 NEXT:GOTO9000
6110 INPUT"WEEK";Z:S$="S$"+STR$(Z)
6120 OPEN"O",1,S$
6130 FOR I=1 TO B
6140 PRINT#1,S$(I)
6150 NEXT
6160 CLOSE
6170 GOTO780
6200 REM * HIGH GAMES, SERIES, HANDICAP, SCRATCH *
6210 FOR I=1TOAT*U
6220 IFVAL(C$(I,2))>VAL(RIGHT$(X1$(I),3)) THEN X1$(I)=C$(I,2)
6230 IFVAL( C$(I,3))>VAL(RIGHT$(X1$(I),3))THENX1$(I)=C$(I,3)
6240 IF VAL(C$(I,4))>VAL(RIGHT$(X1$(I),3)) THEN X1$(I)=C$(I,4)
6250 IF VAL(C$(I,5))>VAL(RIGHT$(X2$(I),3)) THEN X2$(I)=C$(I,5)
6260 X=VAL(C$(I,9))
6270 Y=VAL(C$(I,2)):IFX+Y > VAL(RIGHT$(X3$(I),3)) THEN X3$(I)=ST
R$(X+Y)
6280 Y=VAL(C$(I,3)):IFX+Y > VAL(RIGHT$(X3$(I),3)) THEN X3$(I)=ST
R$(X+Y)
6290 Y=VAL(C$(I,4)):IFX+Y > VAL(RIGHT$(X3$(I),3)) THEN X3$(I)=ST
R$(X+Y)
6300 Y=VAL(C$(I,5)):IF3*X+Y > VAL(RIGHT$(X4$(I),3)) THEN X4$(I)=
STR$(3*X+Y)
6312 NEXT
6315 RETURN
6320 PRINT"ERROR #"; ERR/2+1:RESUME 1050
6340 PRINT"ERROR #"; ERR/2+1:RESUME 2140
7000 REM * HIGH TEAM STANDINGS *
7010 CLS
7015 PRINT"1st Place";TAB(20)"2nd Place";TAB(40)"3rd Place
7020 PRINT"1- ";X6$(1);TAB(20)"2- ";X6$(2);TAB(40)"3- ";X6$(3)
7030 PRINT"4- ";X7$(1);TAB(20)"5- ";X7$(2);TAB(40)"6- ";X7$(3)
7040 PRINT"7- ";X8$(1);TAB(20)"8- ";X8$(2);TAB(40)"9- ";X8$(3)
7050 PRINT"10- ";X9$(1);TAB(20)"11- ";X9$(2);TAB(40)"12- "X9$(3)

7060 PRINT"13- NONE"
7070 INPUT"WHICH ONE STARTING WITH THE LOWEST, DO YOU WISH TO CH
ANGE";Z
7080 ONZGOTO8000,8010,8020,8030,8040,8050,8060,8070,8080,8090,81
00,8110,8120:GOTO7080
7100 LPRINTTAB(4)"TEAM GAME";TAB(17)"TEAM GAME HCP";TAB(39)"TEAM
 SERIES";TAB(58)"TEAM SERIES HCP":LPRINTSTRING$(80,"-")
7110 LPRINT"1st-";TAB(5)X6$(1);TAB(20)X7$(1);TAB(40)X8$(1);TAB(6
0)X9$(1)
7120 LPRINT"2nd-";TAB(5)X6$(2);TAB(20)X7$(2);TAB(40)X8$(2);TAB(6
0)X9$(2)
7130 LPRINT"3rd-";TAB(5)X6$(3);TAB(20)X7$(3);TAB(40)X8$(3);TAB(6
0)X9$(3)
7140 RETURN
8000 INPUT"NEW 1ST GAME SCRATCH";X6$(1):GOTO7010
8010 INPUT"NEW 2ND GAME SCRATCH";X6$(2):GOTO7010
8020 INPUT"NEW 3RD GAME SCRATCH";X6$(3):GOTO7010
8030 INPUT"NEW HIGH GAME HCP";X7$(1):GOTO7010
8040 INPUT"NEW 2ND GAME HCP";X7$(2):GOTO7010
8050 INPUT"NEW 3RD GAME HCP";X7$(3):GOTO7010
8060 INPUT"NEW HIGH SERIES";X8$(1):GOTO7010
8070 INPUT"NEW 2ND SERIES";X8$(2):GOTO7010
8080 INPUT"NEW 3RD SERIES";X8$(3):GOTO7010
8090 INPUT"NEW HIGH SERIES HCP";X9$(1):GOTO7010
8100 INPUT"NEW 2ND SERIES HCP";X9$(2):GOTO7010
8110 INPUT"NEW 3RD SERIES HCP";X9$(3):GOTO7010
8120 GOTO90
8500 FOR H=1TO4
9000 H=H+1:GOSUB11750
9002 FOR I=1TOAT*U
9003 RN=I
9004 MSB=INT(RN/256)
9005 LSB=RN-(256*MSB)
```

Listing continues

Listing continued

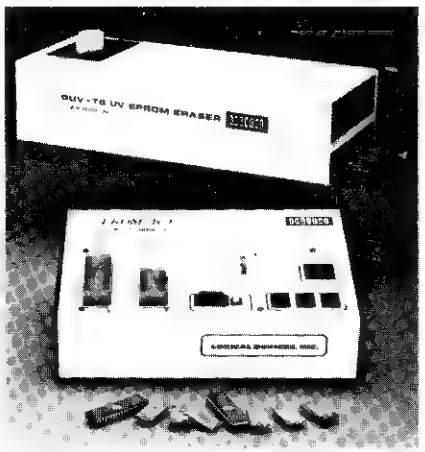
```
9007 KEY$=CHR$(LSB)+CHR$(MSB)
9010 GOSUB11000
9020 NEXT
10000 X=USR1(VARPTR(TG$(1)))
10010 FOR I=AT*U TO AT*U-4 STEP-1
10020 FLD$=LEFT$(TG$(I),LEN(TG$(I))-2)
10030 KEY$=RIGHT$(TG$(I),2)
10040 RN=ASC(LEFT$(KEY$,1))
10045 RN=RN+256*ASC(RIGHT$(KEY$,1))
10050 GOSUB11500
10055 NEXT
10060 IF H=4THEN4210ELSEGOTO9000
11000 IF H=1 THEN TG$(I)=X1$(I)+KEY$
11010 IF H=2 THEN TG$(I)=X3$(I)+KEY$
11020 IF H=3 THEN TG$(I)=X2$(I)+KEY$
11030 IFH=4 THEN TG$(I)=X4$(I)+KEY$
11040 RETURN
11500 IF H=1 THENLPRINTC$(RN,1);TAB(20)X1$(RN)
11510 IF H=2 THEN LPRINTC$(RN,1);TAB(20)X3$(RN)
11520 IF H=3 THEN LPRINTC$(RN,1);TAB(20)X2$(RN)
11530 IF H=4 THEN LPRINTC$(RN,1);TAB(20)X4$(RN)
11540 RETURN
11750 LPRINT
11760 IF H=1 LPRINT"=== HIGH SCRATCH GAME ==="
11770 IF H=2 LPRINT"=== HIGH HCP GAME ==="
11780 IF H=3 LPRINT"=== HIGH SERIES SCRATCH ==="
11790 IF H=4 LPRINT"=== HIGH HCP SERIES ==="
11800 RETURN
20000 DATA 205,127,10,34,42,65,17,251,255,25,229,221,225,221,110
,0,221,102,1,43
20010 DATA 43,34,40,65,221,126,2,50,44,65,42,42,65,229,221,225,4
2,40,65,229
20020 DATA 253,225,62,0,50,39,65,221,110,4,221,102,5,221,94,1,22
1,86,2,221
20030 DATA 78,0,221,70,3,58,44,65,254,0,40,14,120,254,3,56,2,5,5
,121
20040 DATA 254,3,56,2,13,13,26,190,0,40,4,56,18,48,39,19,35,5,13
,121
20050 DATA 254,0,40,7,120,254,0,40,25,32,231,253,43,253,229,193,
221,35,221,35
20060 DATA 221,35,120,177,32,177,58,39,65,254,0,32,153,201,229,2
13,221,229,225,17
20070 DATA 29,65,1,3,0,237,176,221,229,209,1,3,0,237,176,33,29,6
5,1,3
20080 DATA 0,237,176,62,1,50,39,65,209,225,24,195,70,73,78,73,83
,72,76,68
20090 DATA 9,65,44,40,68,69,41,228,2,8
20100 TM=PEEK(16598)+256*PEEK(16599):IFTM>32767THENTM=TM-65536
20110 TM=TM-190
20120 ZZ$=STRING$(255,0)
20130 FOR I=0TO189:READJ:POKE(TM+I),J:T=T+J:NEXTI
20140 BB=PEEK(16549)
20150 IF BB<>66 THEN DEFUSR1=TM:PRINT"NOW SET UP FOR";TS$;"DISK
SYSTEM'S US R1"
20160 RETURN
```


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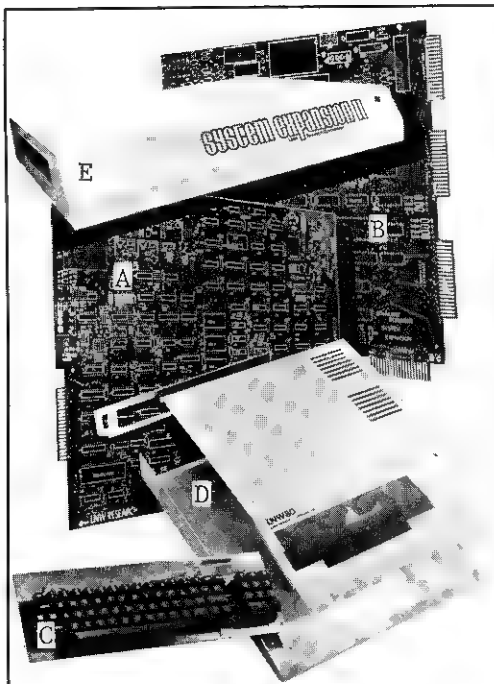
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Color Black Box

by David W. Gangwisch

Stop switching the RS-232 cords for your Color Computer's printer and modem. Build this black box and leave them both plugged in.

Every Color Computer user who has two RS-232 devices must be painfully aware of a limitation in the Color Computer's design. It has only one RS-232 port and no parallel printer port. This is a problem when you have a printer *and* a modem: You have to repeatedly change which cord is plugged into the one RS-232 port.

The little black box described in this article is my solution to this problem. It allows two RS-232 devices to be plugged in and selected with a switch.

Quant.	RS Part #	Description
1	270-251	Deluxe Utility Cabinet
1	275-1384	4P/DT rotary switch
1 pkg.	274-407	knobs
2	26-3020	4-pin DIN cables
1 pkg.	64-3025	grommets

Table 1. Parts List

Construction

The box is simple to build. All the necessary parts are available from your local Radio Shack store, and the only tools required are a drill, a hacksaw, and a soldering iron. Table 1 lists the parts you need, and they are shown in Photo 1.

The total price should be under $20. If you have a printer or a modem, or both, you already have at least one of the necessary cables. The box I chose is a good match for the silver and black colors of the Color Computer, but you can use any suitable box.

Begin the construction by drilling five holes in the box (see Fig. 1). The three holes on the back are for the cables, while the two holes on the front are for

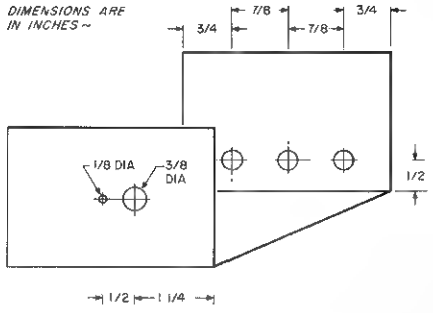


Figure 1

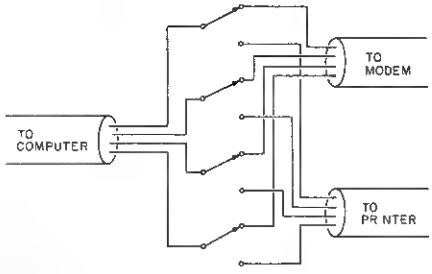


Figure 2

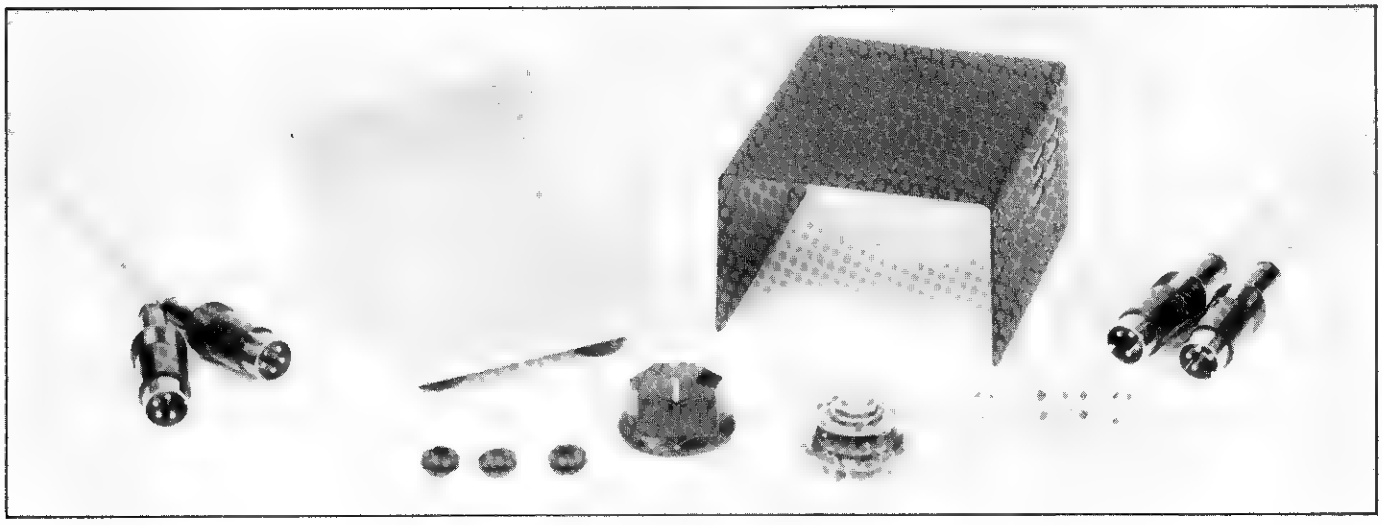
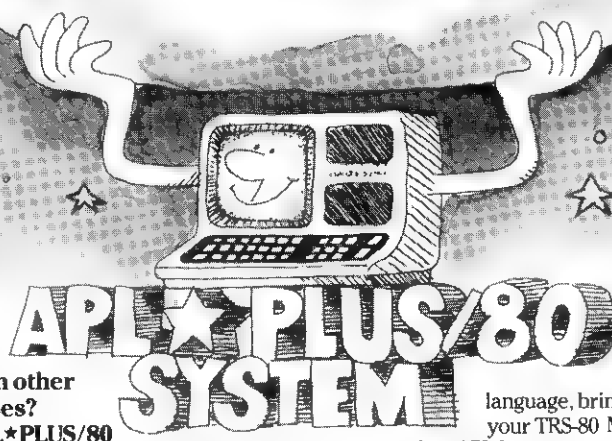


Photo 1

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Challenge to BASIC

Develop a subroutine to group and total unordered costs by job number. The result is a table showing the total cost for each active job, in ascending job order, formatted as a report. Use the following CHARGES:

8.20 5.55 1.59 995.00 2.44 14.32 .87 .79 1.01 149.03 3.42 .86

for JOBS numbered 213 33 4 4 4 4 9 33 213 4 33 33:

JOB	TOTAL
4	$1,162.38
9	$0.87
33	$10.62
213	$9.21

One APL solution is:

```
    ∇ COST FOR JOB;ONCE;SP
[1]   ONCE←(JOB≠1E38),1↓JOB⌽JOB[SP←⍋JOB] ◇ ' JOB      TOTAL'
[2]   'I4,CP/$/F12.2' ⎕FMT ONCE,[1.5] COST[SP]+.×JOB∘.=ONCE
    ∇
```

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the switch. The larger hole on the front of the box is for the switch's shaft and the smaller one is for the locating tab that keeps the body of the switch from rotating.

Next, shorten the shaft of the switch with a hacksaw so the knob fits snugly to the surface of the box. After doing this, clean out any metal particles from the switch contacts. You might cover the body of the switch with a small plastic bag while sawing.

You must now cut the cords. Place your computer, modem, and printer where you want them and select the best location for the switch box. In my situation, it was best to place the printer the farthest from the computer (see Photo 2). As a result, I left the cord for the printer as long as possible, cutting just the plug off one end.

I cut the other cord near the middle, leaving two short cords, one slightly longer than the other. I used the shorter of these for the modem and the longer for the computer. After putting grommets into the three holes in the rear of the box, I threaded these three cords through them.

Next, wire the switch. The circuit diagram in Fig. 2 shows how simple this is. The cable connected to the computer is connected to the innermost tabs on the back of the switch (see Fig. 3). Be sure that all the wires connected to one pole of the switch are the same color. After wiring the switch, check to see that no uninsulated portions of the wires are touching one another (see Photo 3).

Finally, mount the switch and knob, and label the box. I used artist's dry transfer letters to label the box and then sprayed a clear lacquer over the lettering to protect it.

Operation

To use the box, simply connect it between your computer and two RS-232 peripherals. You can select which peripheral your computer is communicating with by turning the knob.

I have had no problems switching from one device to another even while running a program. In fact, moving the switch to the modem position is one way to take the printer off line when using programs that send garbage out the RS-232 port. ■

David Gangwisch can be reached at 10539 Lakemere, Dallas, TX 75238.

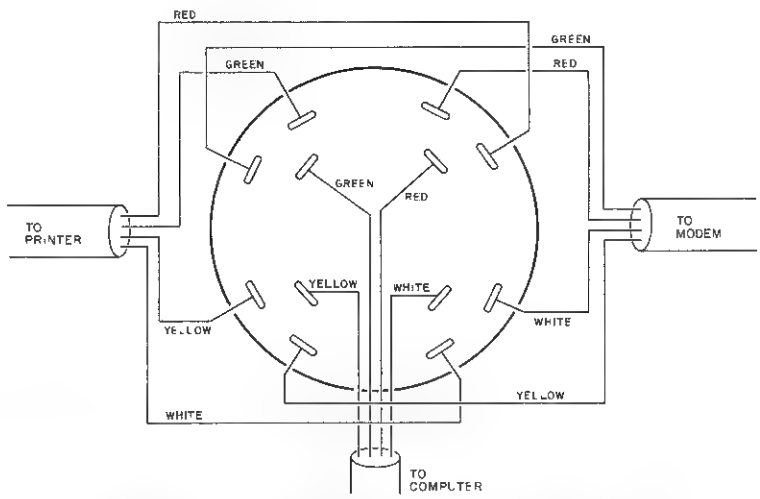


Figure 3

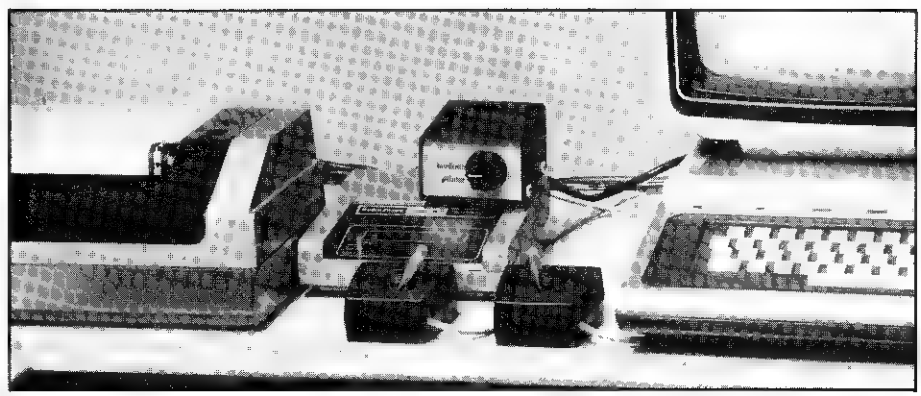


Photo 2

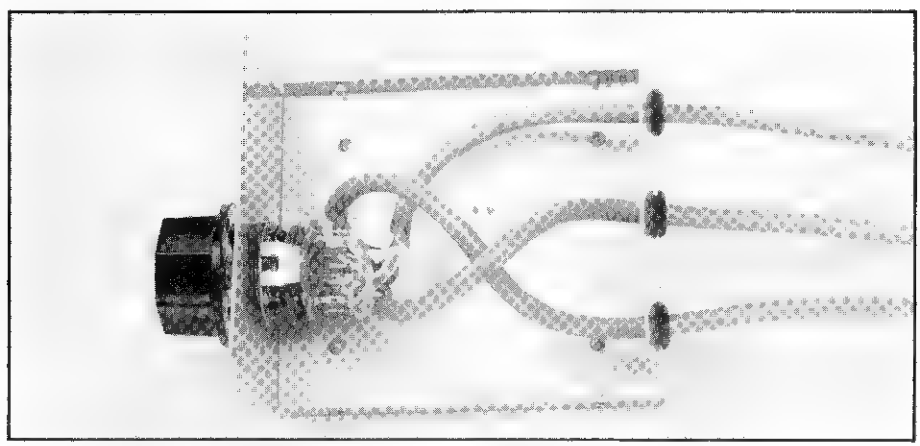


Photo 3

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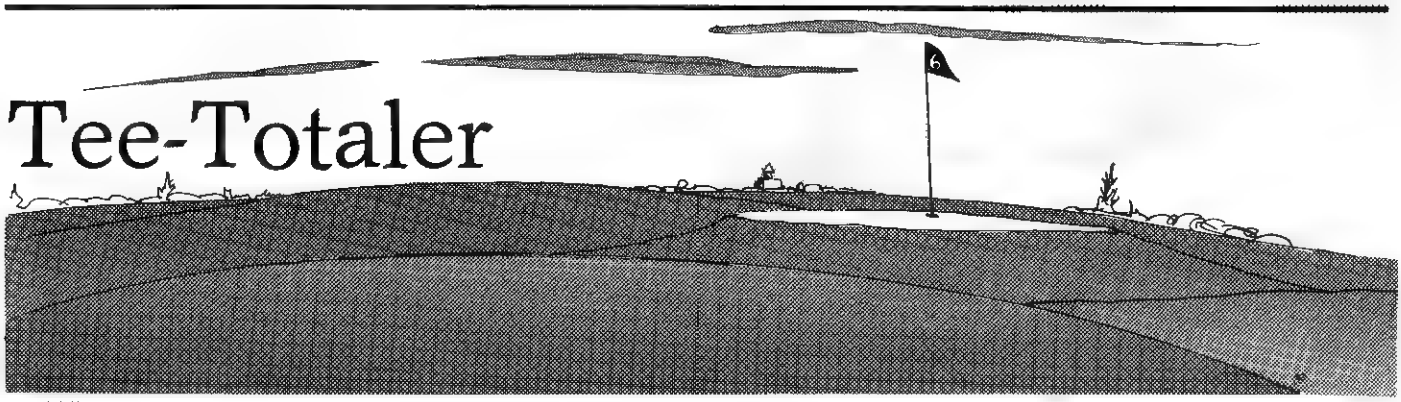
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David Tinis
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Golf is more a social event than a sporting event. Golfers rarely play to beat the course; instead, they play together to beat each other. Any sport involving a number of individuals is beset with record-keeping problems.

Keeping golf league scores is an ideal task for my TRS-80. This program keeps track of a 25-player league for up to 24 weeks. The numbers were chosen arbitrarily because they allow a clean video display. The number of players and weeks can be tailored for your league by changing two variables defined at the beginning of INITGOLF and Scores. While an increase in the number of players or the number of weeks will not affect the printout, it will scroll some information off the screen. This program covers only nine holes per round instead of eighteen, but can be changed by changing one variable.

Scoring within the league is very important to the members. As a result, Scores keeps track of gross scores, net scores, putts per round, and points earned per round.

- Gross Score is the actual number of strokes for the round

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```
100 CLS:CLEAR1500:DEFINTA-Z:NP=25:NW=24
110 PRINT@144,"GOLF LEAGUE INITIALIZATION":PRINT:PRINT"INITIALIZ
ING";:DIM P$(NP),WG(NP,NW),WN(NP,NW),RG(NP),RN(NP),HC(NP,NW),WP1
(NP,NW),TP1(NP),P(NP,NW),PT(NP):FORX=1TONP:P$=" ":RG(X)=0:RN(X)=
0:TP1(X)=0:PT(X)=0:FORY=1TONW:WG(X,Y)=0:WN(X,Y)=0:HC(X,Y)=0
115 WP1(X,Y)=0:P(X,Y)=0:NEXTY
120 PRINT" .";:NEXTX:PRINT
130 PRINT"ENTER PLAYER'S NAMES. '@' WILL END ENTRY"
140 FORX=1TONP
150 PRINT"PLAYER ";:PRINTUSING"##";X;:PRINT" =>";:INPUTP$(X):IFP
$(X)="@"THENP$(X)=" ":X=NP:GOTO160ELSEPRINTP$(X);"'S INITIAL HAN
DICAP =>";:INPUTHC(X,0)
160 NEXTX
170 PRINT:INPUT"ENTER FILENAME OF LEAGUE";L$
180 OPEN"O",#1,L$
185 PRINT"WRITING PLAYER'S NAMES"
190 FOR X=1TONP:PRINT#1,P$(X):NEXTX
195 PRINT"WRITING WEEKLY GROSS SCORES"
200 FOR X=1TONP:FORY=1TONW:PRINT#1,WG(X,Y):NEXTY:NEXTX
205 PRINT"WRITING WEEKLY NET SCORES"
210 FOR X=1TONP:FORY=1TONW:PRINT#1,WN(X,Y):NEXTY:NEXTX
215 PRINT"WRITING HANDICAPS"
220 FOR X=1TONP:FORY=0TONW:PRINT#1,HC(X,Y):NEXTY:NEXTX
225 PRINT"WRITING TOTAL GROSS SCORES"
230 FOR X=1TONP:PRINT#1,RG(X):NEXTX
245 PRINT"WRITING WEEKLY POINTS"
250 FOR X=1TONP:FORY=1TONW:PRINT#1,WP1(X,Y):NEXTY:NEXTX
255 PRINT"WRITING WEEKLY PUTTS"
260 FOR X=1TONP:FORY=1TONW:PRINT#1,P(X,Y):NEXTY:NEXTX
270 CLOSE 1
280 END
```

Program Listing 1

Scores for Week 12

PLAYER	GROSS	NET	HANDICAP	POINTS	PUTTS
GINNY BOSTICK	69	47	23	0.0	26
BUCK BURNS	0	0	0	0.0	0
JOHN CARLIN	47	33	14	15.5	16
TIM COOK	43	35	8	11.5	18
KEN FURNER	43	34	9	13.5	13

Table 1

Total Scores

PLAYER	GROSS	NET	WEEKS	POINTS	PUTTS
GINNY BOSTICK	738	460	12	76.0	274
BUCK BURNS	119	85	2	3.0	38
JOHN CARLIN	710	524	14	110.5	233
TIM COOK	619	503	14	144.0	234
KEN FURNER	735	597	16	119.0	243

Table 2

Lines 20-190:	Initialization, file loading and menu display
Lines 1000-1999:	Entry of scores
Lines 2000-2999:	Display of individual players' scores
Lines 3000-3999:	Display of cumulative scores
Lines 4000-4990:	File saving routine
Lines 5000-5999:	Various subroutines
Lines 6000-6999:	Addition of a new player

Table 3

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

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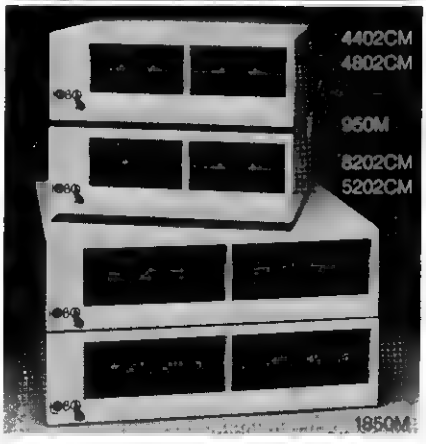
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played.

- Handicap rates the proficiency of a golfer. This allows players with different levels of skill to compete on a more even basis with each other.
- Net Score is gross score minus handicap.
- Points are accumulated by comparing each golfer's net score with other golfer's net scores. For each net score bettered, the golfer receives one point. For each net score tied, the golfer receives one half point. No points are awarded if the golfer fails to better another golfer's net score.

To use the Scorecard program, a data file must be created. The INITGOLF program (see Listing 1) need be run only once at the beginning of league play. Of course, if you keep track of more than one league, run it once for each league, remembering to assign a name to each.

You are asked the names and handicaps of all golfers. If the handicap is unknown or the golfer has no handicap, press enter. When running Scores later, if no handicap is found during the first week, one will be figured and stored. After all player names and handicaps are entered identify the league with a name. This allows the file to be retrieved for updating. It also allows Scores to work with more than one league.

The INITGOLF program supports a league of 25 players over a 24 week span, but can be changed by redefining variables NP (Number of Players) and NW (Number of Weeks) on line 100. Allocate a few extra positions in the league for golfers who may join the league late.

Once INITGOLF is run and a data file created, run the Scores program in Listing 2. You will first be asked for the name of the file previously created. This file will be loaded and the options Menu displayed. You now may perform one of five actions:

- Enter Scores—Enter scores for all players in sequence. If all players are not in the same week of play (due to illness, vacation, and so on), the program automatically determines and displays the week being played by the golfer.
- Score for Individual Player—Displays a player's weekly scores on the video screen or lists them to the printer.
- Cumulative Scores for all Players—Prints scores on an individual weekly basis (Table 1) or for the league to date (Table 2). Each time the latter option is used, scores are recalculated for the entire league season to date.
- Add a Player—Allows you to add a latecomer who wants to catch up with the rest of the league. Of course, an open slot must be available to accommodate the added player.
- End—Writes the updated league file to disk and terminates the program.

The program is written in modules to facilitate modification. A guide to Listing 2 is provided in Table 3.

To modify the program for 18-hole rounds instead of 9-hole rounds, make the following change to Scores: 25 PAR=72 (Or whatever Par is for your course). ■

David Tinis works as a design engineer for National Controls Inc.

Program Listing 2

```
10 REM VARIABLES LIST => NP=NUMBER OF PLAYERS  NW=NUMBER OF
WEEKS  P$(NP)=PLAYER'S NAMES  WG(NP,NW)=WEEKLY GROSS SCORES
WN(NP,NW)=WEEKLY NET SCORES  RG(NP) TOTAL GROSS SCORES
RN(NP)=TOTAL NET SCORE  HC(NP,NW)=WEEKLY HANDICAP
11 REM VARIABLES LIST => WP(NP,NW)=WEEKLY POINTS  TP(NP)=
TOTAL POINTS P(NP,NW)  P(NP,NW)=WEEKLY PUTTS  PT(NP)=TOTAL PUTTS

20 CLS:CLEAR1500:DEFINTA-Z:NP=25:NW=24
25 PAR=36
100 PRINT@144,"GOLF LEAGUE SCORECARD":PRINT:PRINT"INITIALIZING";
:DIM P$(NP),WG(NP,NW),WN(NP,NW),RG(NP),TG(NP),TN(NP),WK(NW),HC(N
P,NW),WP!(NP,NW),TP!(NP),P(NP,NW),PT(NP):FORX=1TONP:P$=" ":RG(X)
=0:PT(X)=0:FORY=1TONW:WG(X,Y)=0:WN(X,Y)=0:HC(X,Y)=0:WP!(X,Y)=0
105 P(X,Y)=0:NEXTY:PRINT" .";:NEXTX
110 PRINT:INPUT"ENTER FILENAME OF LEAGUE";L$
115 PRINT"LOADING FILE";
120 OPEN"I",#1,L$
130 PRINT" .";:FOR X=1TONP:INPUT#1,P$(X):NEXTX
140 PRINT" .";:FOR X=1TONP:FORY=1TONW:INPUT#1,WG(X,Y):NEXTY:NEXT
X
150 PRINT" .";:FOR X=1TONP:FORY=1TONW:INPUT#1,WN(X,Y):NEXTY:NEXT
X
151 PRINT" .";:FOR X=1TONP:FORY=0TONW:INPUT#1,HC(X,Y):NEXTY:NEXT
X
152 PRINT" .";:FOR X=1TONP:INPUT#1,RG(X):NEXTX
154 PRINT" .";:FOR X=1TONP:FORY=1TONW:INPUT#1,WP!(X,Y):NEXTY:NEX
TX
155 PRINT" .";:FOR X=1TONP:FORY=1TONW:INPUT#1,P(X,Y):NEXTY:NEXTX

160 CLOSE 1
170 CLS:PRINT@15,"SELECT ACTION DESIRED":PRINT:PRINTTAB(15);"(1)
 ENTER SCORES":PRINTTAB(15);"(2) SCORES FOR INDIVIDUAL PLAYER":P
RINTTAB(15);"(3) CUMULATIVE SCORES FOR ALL PLAYERS":PRINTTAB(15)
;"(4) ADD A PLAYER":PRINTTAB(15);"(5) END"
180 GOSUB5000:A=VAL(A$):IFA<1ORA>5THEN180
190 ONAGOSUB 1000,2000,3000,6000,4000
200 GOTO170
1000 CLS:PRINT"ENTER SCORES FOR (A) ALL PLAYERS OR (S) A SINGLE
PLAYER"
1005 GOSUB5000:IFA$="A"THEN1040ELSEIFA$="S"THEN1010ELSE1005
1010 CLS:FORX=0TONW:PRINT@X*32,"(";:PRINTUSING"##";X+1;:PRINT")
";LEFT$(P$(X+1),29);:NEXTX
1020 PRINT:PRINT"ENTER SCORE FOR WHICH PLAYER ( 1 -";NP;")";:INP
UTP:IFP<1ORP>NPTHEN1020
1030 X=1
1032 CLS:IFWG(P,X)=0THENPRINT"ENTER ";P$(P);"'S SCORE FOR WEEK "
;X;" ";:INPUTWG(P,X):INPUT"NUMBER OF PUTTS";P(P,X):GOSUB5010:GOT
O1999:ELSEIFX=NWTHENPRINT"LEAGUE PLAY FOR ";P$(P);" COMPLETED.":
GOTO1999:ELSEX=X+1:GOTO1032
1040 FORP=1TONP
1041 IFP$(P)=""THENP=NP:GOTO1050
1042 FORX=1TONW
1044 CLS:IFWG(P,X)=0PRINT"ENTER ";P$(P);"'S SCORE FOR WEEK ";X;"
 ";:INPUTWG(P,X):GOSUB5010:INPUT"ENTER NUMBER OF PUTTS ";P(P,X):
X=NW:GOTO1048
1046 IFX=NWPRINT"LEAGUE PLAY FOR ";P$(P);" COMPLETED."
1048 NEXT X
1050 NEXT P
1999 RETURN
2000 CLS:FORX=0TONP-1:PRINT@X*32,"(";:PRINTUSING"##";X+1;:PRINT"
) ";LEFT$(P$(X+1),29);:NEXTX
2010 PRINT:INPUT"DISPLAY SCORES FOR WHICH PLAYER";A
2015 PRINT"OUTPUT TO (S) SCREEN OR (P) PRINTER":GOSUB5000:IFA$="
P"THEN2050
2020 CLS:PRINT"WEEKLY SCORES FOR => ";P$(A):PRINT@41,"INITIAL HA
NDICAP ";HC(A,0)
2027 PRINT"WEEK  GR  NET   HC   PUTTS      WEEK  GR  NET   HC
PUTTS"
2030 FORX=0TONW/2-1:PRINT@129+X*64,"";:PRINTUSING"##";X+1;:PRINT
"   ";:PRINTUSING"##";WG(A,X+1);:PRINT"   ";:PRINTUSING"##";WN(A
,X+1);:PRINT"   ";:PRINTUSING"##";HC(A,X+1);:PRINT"    ";:PRINTU
SING"##";P(A,X+1);:NEXTX
2035 FORX=0TONW/2-1:PRINT@161+X*64,"";:PRINTUSING"##";X+13;:PRIN
T"   ";:PRINTUSING"##";WG(A,X+13);:PRINT"   ";:PRINTUSING"##";WN
(A,X+13);:PRINT"   ";:PRINTUSING"##";HC(A,X+13);:PRINT"    ";:PR
INTUSING"##";P(A,X+13);:NEXTX
```

Listing 2 continues

Color Computer News



Which was the first magazine to show it's readers how to turn an inexpensive Color Computer into a high-quality 64K 6809 development system?

Which magazine showed it's readers how to turn the Color Computer into a low cost business system using the Flex* operating system?

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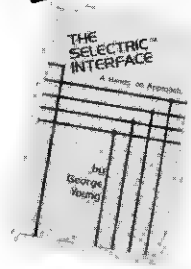
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Listing 2 continued

```
2040 GOSUB5070:PRINT:PRINT"TOTAL GROSS ";:PRINTUSING"###";TG(A);
:PRINT"           TOTAL NET ";:PRINTUSING"###";TN(A):INPUT"PRESS
 <ENTER> TO CONTINUE";AS:GOTO2999
2050 X=PEEK(14312):IFX>128THEN2060ELSE2080
2060 PRINT"PRINTER NOT READY. ABORT? (Y/N)":GOSUB5000:IFAS<>"N"T
HEN2070ELSEPRINT"READY PRINTER AND PRESS <ENTER>":GOSUB5000:GOTO
2050
2070 PRINT"OUTPUT TO VIDEO INSTEAD? (Y/N)":GOSUB5000:IFAS="Y"THE
N2020ELSE2999
2080 LPRINT"WEEKLY SCORES FOR => ";P$(A):LPRINT:LPRINT"INITIAL H
ANDICAP ";HC(A,0):LPRINT
2085 LPRINT"WEEK     GROSS     NET     H'CAP     PUTTS":LPRINT
2090 GOSUB5080:FORX=1TOWK(A):LPRINT"   ";:LPRINTUSING"##";X;:LPRI
NT"       ";:LPRINTUSING"##";WG(A,X);:LPRINT"       ";:LPRINTUSING
"##";WN(A,X);:LPRINT"      ";:LPRINTUSING"##";HC(A,X);:LPRINT"
      ";:LPRINTUSING"##";P(A,X):LPRINT:NEXTX
2100 GOSUB5070:LPRINT:LPRINT"TOTAL GROSS ";:LPRINTUSING"####";TG
(A):LPRINT:LPRINT"TOTAL    NET ";:LPRINTUSING"####";TN(A):LPRINT
2999 RETURN
3000 CLS:PRINTTAB(15);"SELECT ACTION DESIRED":PRINTTAB(15);"(1)
PRINT WEEKLY SCORES":PRINTTAB(15);"(2) PRINT TOTAL SCORES"
3010 GOSUB5000:X=VAL(AS):IFX<1ORX>2THEN3010ELSEIFX=1THEN3020ELSE
3100
3020 PRINT:INPUT"PRINT SCORES FOR WHICH WEEK";A:IFA<1ORA>NWTHEN3
020
3030 FOR X=1TONP:IFP$(X)=""THENP=X-1:X=NP:NEXTXELSENEXTX
3040 GOSUB5060:IFAB=0THEN3055ELSE3999
3055 PRINT"CALCULATING SCORES";GOSUB3400
3060 LPRINTCHR$(14);:LPRINTTAB(10);"SCORES FOR WEEK";A:LPRINT:LP
RINT"     PLAYER              GROSS      NET      HANDICAP      POINT
S     PUTTS":LPRINT
3070 FORX=1TOP:LPRINTP$(X);:LPRINTTAB(24);"";:LPRINTUSING"##";WG
(X,A);:LPRINTTAB(34);"";:LPRINTUSING"##";WN(X,A);:LPRINTTAB(44);
"";:LPRINTUSING"##";HC(X,A);:LPRINTTAB(55);"";:LPRINTUSING"##.#"
;WP!(X,A);:LPRINT"      ";:LPRINTUSING"##";P(X,A)
3075 LPRINT:NEXTX:GOTO3999
3100 FOR X=1TONP:IFP$(X)=""THENP=X-1:X=NP:NEXTXELSENEXTX
3105 FOR X=1TOP:TG(X)=0:TN(X)=0:TP!(X)=0:NEXTX
3120 PRINT@320,"CALCULATING SCORES FOR WEEK =>";
3125 A=1
3127 PRINT@351,A;:FORX=1TONP:IFWG(X,A)<>0THENX=NP:NEXTX:GOTO3130
ELSENEXTX:GOTO3135
3130 GOSUB3400:FORX=1TOP:TG(X)=TG(X)+WG(X,A):TN(X)=TN(X)+WN(X,A)
:TP!(X)=TP!(X)+WP!(X,A):NEXTX
3135 A=A+1:IFA<NW+1THEN3127ELSEPRINT
3140 GOSUB5060:IFAB=0THEN3150ELSE3999
3150 LPRINTCHR$(14);:LPRINTTAB(10);"TOTAL SCORES":LPRINT
3160 LPRINT"     PLAYER              GROSS      NET      WEEKS
  POINTS     PUTTS":LPRINT
3170 GOSUB5080:FOR X=1TOP:LPRINTP$(X);:LPRINTTAB(22);"";:LPRINTU
SING"####";TG(X);:LPRINTTAB(32);"";:LPRINTUSING"####";TN(X);:LPR
INTTAB(44);"";:LPRINTUSING"##";WK(X);:LPRINTTAB(54);"";:LPRINTUS
ING"###.#";TP!(X);:LPRINT"      ";:LPRINTUSING"###";PT(X)
3175 LPRINT:NEXTX
3180 GOTO3999
3400 FOR X=1TONP:WP!(X,A)=0:PT(X)=0:NEXTX
3410 FORX=1TOP:FORY=1TOP
3420 IFWN(X,A)=0 OR WN(Y,A)=0THEN3450
3425 IFX=YTHEN3450
3430 IFWN(X,A)<WN(Y,A)THENWP!(X,A)=WP!(X,A)+1:GOTO3450
3440 IFWN(X,A)=WN(Y,A)THENWP!(X,A)=WP!(X,A)+.5
3450 NEXTY:NEXTX
3455 FOR X=1TOP:FORY=1TONW:PT(X)=PT(X)+P(X,Y):NEXTY:NEXTX
3460 RETURN
3999 RETURN
4000 PRINT:PRINT"SAVING FILE ";L$;
4005 ONERRORGOTO5040
4010 OPEN"O",#1,L$
4020 PRINT" .";:FOR X=1TONP:PRINT#1,P$(X):NEXTX
4030 PRINT" .";:FOR X=1TONP:FORY=1TONW:PRINT#1,WG(X,Y):NEXTY:NEX
TX
4040 PRINT" .";:FOR X=1TONP:FORY=1TONW:PRINT#1,WN(X,Y):NEXTY:NEX
TX
4050 PRINT" .";:FOR X=1TONP:FORY=0TONW:PRINT#1,HC(X,Y):NEXTY:NEX
TX
4060 PRINT" .";:FOR X=1TONP:PRINT#1,RG(X):NEXTX
4075 PRINT" .";:FOR X=1TONP:FORY=1TONW:PRINT#1,WP!(X,Y):NEXTY:NE
XTX
4077 PRINT" .";:FOR X=1TONP:FORY=1TONW:PRINT#1,P(X,Y):NEXTY:NEXT
X
4080 CLOSE 1
4090 CLS:END
5000 AS=INKEY$:IFAS=""THEN5000ELSERETURN
5010 IF WG(P,X)=0THEN5026
5012 RG(P)=RG(P)+WG(P,X)
5014 IF X=1THEN5016ELSE5022
5016 IF HC(P,0)=0THEN5018ELSE5020
5018 Z1=(WG(P,X)-PAR)*.9+.5:WN(P,X)=WG(P,X)-INT(Z1):GOTO5024
5020 Z1=((HC(P,0)*1.1)+WG(P,X)-PAR)*.9/2+.5:WN(P,X)=WG(P,X)-HC(P
,0):GOTO5024
5022 Z1=((RG(P)-(X*36))*.9)/X+.5:WN(P,X)=WG(P,X)-HC(P,X-1)
5024 HC(P,X)=INT(Z1)
5026 RETURN
5030 GOSUB5045:RESUME110
5040 GOSUB5045:RESUME4000
5042 X=(ERR/2)+1:ERROR(X):RESUME20
5045 X=(ERR/2)+1
5050 PRINT"DISK ERROR => ";:IFX=54THENPRINT"FILE NOT FOUND":GOTO
5055ELSEIFX=62THENPRINT"DISK FULL":GOTO5055ELSEIFX=58THENPRINT"D
ISK I/O ERROR":GOTO5055ELSEIFX=69THENPRINT"DISK WRITE-PROTECTED"
:GOTO5055ELSEPRINTX;" <= REFER TO DISK BASIC MANUAL."
5055 RETURN
5060 X=PEEK(14312):IFX>128THEN5065ELSEAB=0:RETURN
5065 PRINT"PRINTER NOT READY. ABORT? (Y/N)":GOSUB5000:IFAS="Y"TH
ENAB=1:RETURNELSEPRINT"READY PRINTER AND PRESS <ENTER>":GOSUB500
0:GOTO5060
5070 TG(A)=0:TN(A)=0:FORX=1TONW:TG(A)=TG(A)+WG(A,X):TN(A)=TN(A)+
WN(A,X):NEXTX:RETURN
5080 FORX=1TOP:FORY=1TONW:IFWG(X,Y)=0THENWK(X)=Y-1:Y=NWELSEWK(X)
=NW
5085 NEXTY:NEXTX:RETURN
6000 CLS:X=1
6010 IFP$(X)=""THENINPUT"PLAYER'S NAME =>";P$(X):INPUT"INITIAL H
ANDICAP =>";HC(X,0):GOTO6999
6020 X=X+1:IFX>NPTHENPRINT"LEAGUE FULL. NO NEW PLAYERS CAN BE AD
DED.":GOTO6999ELSE6010
6999 RETURN
```


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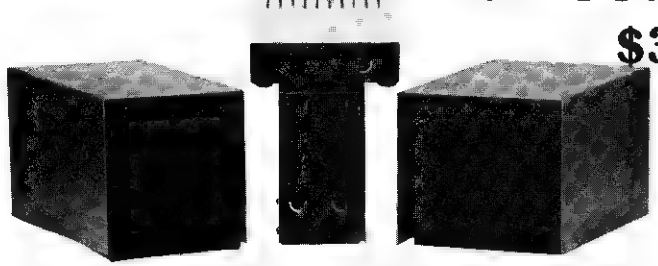
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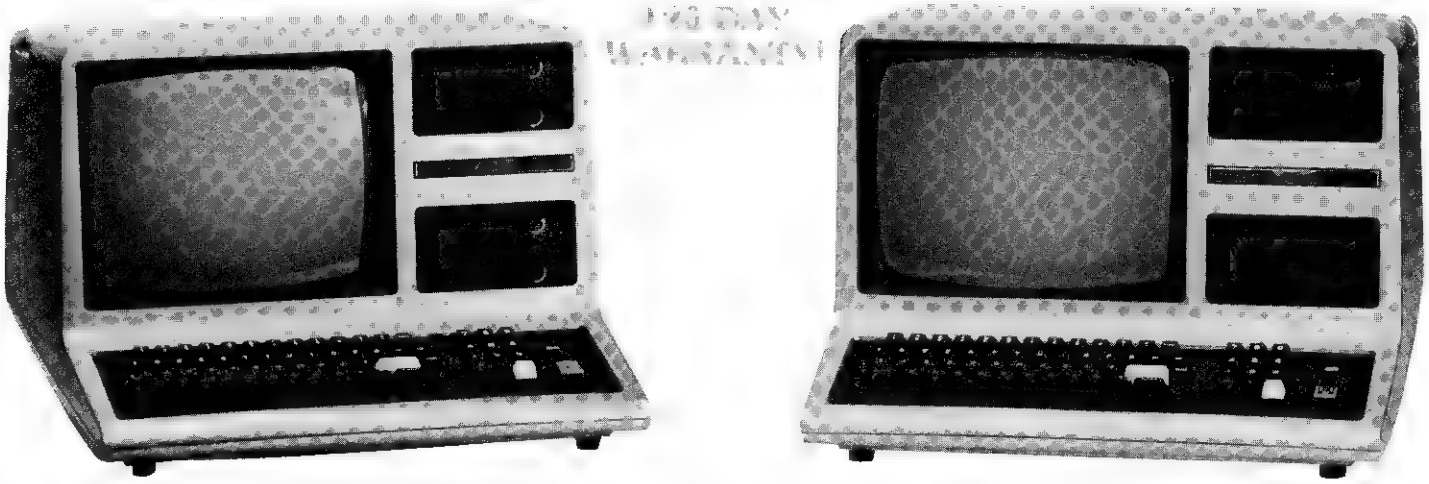
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Program Listing 1

```
10 '****************************
20 '*      ASSIGNMENT 45
30 '*  BY:V.T.ALBINO      3/81
40 '*  80 MICROCOMPUTING-12/81
50 '*    VERSION FOR TRS-80C
60 '*    BY:B.B.WITHAM JR.
70 '* VIRGINIA BEACH, VA.  5/82
80 '****************************
90 CLS:PMODE3,1:PCLS:POKE65495,0
100 LINE(0,110)-(200,110),PSET:LINE(216,110)-(254,110),PSET
110 DRAW"BM200,112;R16U3H1L15G1D3":DRAW"BM230,120;R16U3H1L15G1D3
":DRAW"BM175,124;R18U4H2L2G2L15D3"
120 PAINT(150,109),4,0:PAINT(150,111),2,0
130 DRAW"BM50,102;C2;R8U2R2BL2U1L7U2L2D5F1"
140 DRAW"BM24,180;S8;C3;U4R2D2NL2D2BR2R2U2L2U2R2BR2NR2D2R2D2L2BR
4U4BR2NR2D4R2U2NL1D1BR2BD1U4F1U1R1D4BR8BU4D2R2NU2D3BR2R2U3L2U2R2
":SCREEN1,0
150 FORTM=1 TO1600:NEXTTM
200 P=33:Q=200:R=220:W=150:W$="WHAT SHOULD HE DO?":H=481:H$="HIT
 <ENTER>":G$="HIT <ENTER> TO CONTINUE":GOTO240
210 IFINKEY$="" THEN210 ELSECLS:RETURN
220 SOUNDP,10:RETURN
230 FORT=1 TO1800:NEXT:RETURN
240 CLS4:SOUNDW,1:PRINT@168," ASSIGNMENT 45 ";:GOSUB230
250 SOUNDW,1:PRINT@195," A HARRY FLYNN ADVENTURE ";:GOSUB230:CLS
3
260 SOUNDW,1:PRINT@257," YEAR: 2154 ";:GOSUB230
270 SOUNDW,1:PRINT@321," PLACE:ABODE OF HARRY FLYNN ";:PRINT@353
,"       SPECIAL AGENT        ";:PRINT@385," UNITED EARTH COMMAN
D (UEC) ";
280 GOSUB230
290 SOUNDW,1:PRINT@449," TIME: 0531 ";:GOSUB230:GOSUB230:CLS8
300 FORB=1 TO4
310 POKE65494,0:SOUNDR,10:PRINT@36," ***PRIORITY MESSAGE*** ";
320 FORT=1 TO250:NEXT:CLS8:FORC=1 TO75:NEXT:SOUNDQ,1:NEXT:FORY=1
 TO500:NEXT
330 PRINT@32,"      FOR: COMMANDER FLYNN":PRINT" SECURITY INFO.
 FOR EYES ONLY.":FORT=1 TO32:PRINT"*";:NEXT:GOSUB230
340 PRINT@H,H$;" TO RECIEVE MESSAGE";
350 GOSUB210:GOTO360
360 CLS:SOUNDW,1:SOUNDW,1:PRINT@P,"GOOD MORNING HARRY":PRINT" TH
IS IS SECTOR CHIEF CHRONOS."
370 PRINT:PRINT" THERE'S BEEN SOME TROUBLE IN   THE SIRAN SYSTEM
. ABAR CALLEASE,RULER OF SIRA, HAS KEPT PEACE   WITH EARTH OVER
THE LAST SEVEN  YEARS."
380 PRINT" NOW HIS FAVORITE, 19 YR OLD    DAUGHTER, KURVY CALLEA
SE, HAS   BEEN KIDNAPPED."
```

Listing 1 continues

Now Color Computer owners can join daring Harry Flynn on his wild space adventures.

Regular readers of *80 Micro* are familiar with the exploits of Commander Harry A. Flynn, as detailed in his Assignments 45 and 46 (December 1981, p. 290, and August 1982, p. 66).

Harry, of course, is a 22nd-century adventurer and agent for the United Earth Command. He rescues princesses, saves doomed cities, and generally makes life miserable for the forces of evil.

(Harry, by the way, is a little nonplussed by all the notoriety he has been receiving, although he did ask me to thank all those who wrote letters.)

Unfortunately, until now only Model I or III owners could join Harry on his missions. However, thanks to Burt Witham, Jr., Harry's daring deeds have been translated for the Color Computer.

Program Listings 1 and 2 hold Assignment 45 and Assignment 46, both adapted for the Color Computer. Now you can join the rest of us in the continuing conflict against the crafty, cunning cads from K.R.U.E.L. ■

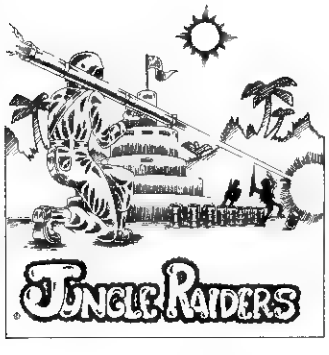
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Extra! Extra!



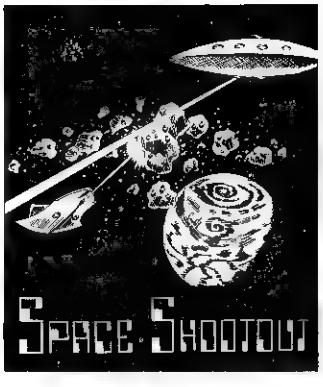
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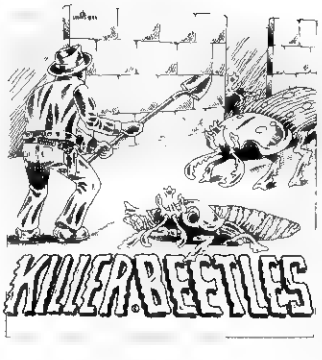












(DV 1982) Blurry eyed users have turned to **DISPLAYED VIDEO** to answer their need for new and exciting arcade games. In response, **DISPLAYED VIDEO** has announced eight new programs for the TRS-80* Models I-III. These arcade type games feature sound, graphics, joystick compatibility and are written in machine language for maximum speed! Both disk and tape versions allow the user to save high scores, a feature not usually found on cassette based games. Maze enthusiasts seem to like Ghost Hunter and Killer Beetles, while gun slingers look toward Insect Frenzy, Jungle Raiders, Space Shootout, Alien Cresta and Battle Stations for excitement. A Game that does not fall into these categories is Hoppy. It features wild drivers, sinking turtles, and hungry alligators. These programs are distributed exclusively by **DISPLAYED VIDEO** and written by Dubois and McNamara. Pricing for these programs is **$15.95** for tape and **$19.95** for disk. Reliable sources inside the company indicate Killer Gorilla will be available by the time you read this.

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Listing 1 continued

```
390 PRINT" HIS POLITICAL ENEMIES ARE       BLAMING EARTH AND DEMA
ND WAR.":PRINT@H,H$;" TO CONTINUE.";
400 GOSUB210:GOTO410
410 CLS:PRINT@P,"CALLEASE HAS ASKED FOR HELP.":PRINT:PRINT" YOUR
 MISSION:"
420 PRINT" TO FIND THE GIRL,                AND TO  RETURN HER,":
PRINT" BEFORE IT IS TOO LATE.":PRINT" MAJOR ORR WILL FILL YOU IN
 ON  THE DETAILS.":PRINT@H,H$;" FOR MAJOR ORR.";
430 GOSUB210:GOTO440
440 CLS:SOUNDW,1:PRINT@P,"GOOD MORNING COMMANDER.          THIS I
S MAJOR ORR.":GOSUB230:CLS
450 PRINT@P,"YOU WILL BE USING A MAKO JET   SLED FOR SURFACE TRA
NSPORT. IT'SALREADY LOADED ON YOUR SHIP. IT IS VERY FAST AND HAS
 TWIN LASER CANNONS, SHIELD GENERATOR, AND  FORWARD SCANNERS."
460 PRINT"THE ENGINES HAVE BEEN CALIBRATEDTO BURN THE AIR ON ZAG
AR."
470 PRINT" THAT'S WHERE THE PRINCESS IS,  OR MORE PRECISELY, WHE
RE SHE WASWHEN HER PERSONAL BEACON STOPPEDTRANSMITTING.":PRINT@H
,H$;" FOR MORE.";
480 GOSUB210
490 CLS:PRINT@P," YOU'LL ALSO BE WEARING THE NEWMEAD CELL ON YOU
R WRIST.          (MATTER ENERGY AMPLIFIER DIODE)"
500 PRINT" IT BRINGS THINGS INTO THE RANGEOF VISIBILTY THAT NORM
ALLY COULDNOT BE SEEN -- A SORT OF SUPER  MICROSCOPE. IT CAN ALS
O PICK UP YOUR THOUGHT WAVES AND MAY BE   DIRECTED INTO A SMALL
FORCE BEAM"
510 PRINT@H,H$;" FOR MORE.";
520 IFINKEY$="" THEN520 ELSE530
530 CLS:PRINT@P,"THAT'S ALL COMMANDER.           GOOD LUCK!":PRI
NT@448,"PRIORITY TRANSMISSION ENDED.    UEC -OUT.        TIME:05
33";:SOUNDW,1:GOSUB230:GOSUB230
540 CLS:SOUNDQ,1:PRINT@P,"THE TAKEOFF AND TRANSIT THROUGHTHE STA
R GATE WERE ROUTINE.     BEFORE LONG ZAGAR APPEARED ON   THE NAV
 SCREEN."
550 PRINT" HARRY LANDED SOME DISTANCE FROMTHE LOCATION WHERE THE
 BEACON   WAS LAST DETECTED. AS HE LEFT   THE SHIP HE BEHELD A Y
ELLOW     DESERT LANDSCAPE WITH A RED SKY."
560 PRINT" THE CARGO DOOR OPENED AND THE  MAKO WAS LOWERED TO TH
E SANDY   GROUND. HARRY GOT IN.";:PRINT@H,H$;" FOR MORE.";
570 GOSUB210
580 CLS:PRINT@P,"  THE ENGINES ROARED TO LIFE,  THEN SCREAMED AS
 THE SLED LIFTEDA METER OFF THE GROUND AND SPED AWAY."
590 PRINT" AFTER 30SECS THE SCANNER PICKEDUP A CLUSTER OF HUTS A
ND A POWERFIELD. THE FIELD WAS CONFIRMED  AS AN ELECTRONIC BARRI
ER WHICH  SURROUNDED THE HUTS.";
600 PRINT@H,H$;" FOR ACTION.";
610 IFINKEY$="" THEN610 ELSESOUNDQ,1:GOTO620
620 CLS:PRINT@P,W$:PRINT@97,"1-TRY TO GET INTO THE HUTS.     2-H
IDE SLED AND HIKE TO THE    BARRIER UNNOTICED.              3-W
ITH SLED SHIELDS BREAK THRU BARRIER.                        4-F
IRE SLED'S LASERS INTO FIELD 5-USE MEAD CELL."
630 PRINT" 6-CALL UEC FOR ASSISTANCE.      7-SCOUT AROUND SOME M
ORE."
640 PRINT:INPUT" SELECT #:";N
650 CLS:SOUNDR,1
660 IFN<1 OR N>7 THEN64
670 ON N GOTO680,720,920,1180,950,1000,1100
680 SOUND244,10:PRINT@P,"IT SEEMS HARRY FORGOT ABOUT THEBARRIER.
 WALKED RIGHT INTO IT   AND WAS STUNNED!";:PRINT@H,G$;
690 GOSUB210
700 CLS:PRINT@P,"HE HAS SET OFF AN ALARM.       ARMORED SENTRY R
OBOTS CARRY HIM AWAY. HE HAS FAILED HIS MISSION.";:GOSUB220:PRIN
T@H,G$;
710 GOSUB210:GOTO2230
720 CLS:PRINT@P,"HARRY HIDES THE SLED BEHIND    SOME ROCKS AND H
IKES TO THE     BARRIER.":PRINT@H,G$;
730 GOSUB210
740 SOUNDQ,1:PRINT@P,W$:PRINT:PRINT" 1-ATTEMPT TO GET INTO HUTS.
     2-USE MEAD CELL.                    3-USE HAND LASER.
750 INPUT"SELECT #:";N
760 IFN<1 OR N>3 THEN740
770 CLS:SOUNDR,1
780 ON N GOTO680,820,790
790 PRINT@P,"HARRY DRAWS HIS HAND LASER AND BLASTS THE BARRIER."
:GOSUB230
800 PRINT" IT HAS NEGLIGIBLE EFFECT BUT ITSETS OFF AN ALARM THAT
 BRINGS   ARMORED SENTRY ROBOTS. THE HAND LASER CANNOT STOP THEM
. HARRY ISVAPORIZED!":PRINT@H,G$;
810 GOSUB210:GOTO2230
820 CLS:PRINT@P,"AS HE APPROACHES THE BARRIER HEHOLDS UP THE MEA
D CELL.          HE STUDIES THE COMPOSITION OF   THE FORMERLY INV
ISIBLE FIELD. ITMAY BREAK DOWN UNDER LASER EIRE.":PRINT@H,G$;:GO
SUB210
830 SOUNDQ,1:PRINT@P,W$:PRINT:PRINT" 1-RETURN TO SLED.
     2-CONTINUE TO EXPLORE.              3-USE HAND LASER.":PRINT
840 INPUT" SELECT#:";N
850 CLS:SOUNDR,1
860 IFN<1 OR N>3 THEN830
870 ON N GOTO880,900,790
880 PRINT@P,"HARRY GETS BACK INTO THE SLED.":PRINT@H,G$;:GOSUB21
0
890 GOTO620
900 PRINT@P,"AS HE LOOKS AROUND, HARRY IS   PICKED UP ON SECURIT
Y SENSORS.":PRINT@H,G$;:GOSUB210
910 GOTO700
920 PRINT@P," HARRY SETS THE SLED'S SHIELDS ON MAXIMUM INTENSITY
 AND...     CHARGES INTO THE BARRIER.":GOSUB230
930 PRINT" UNFORTUNATELY HE UNDERESTIMATEDTHE STRENGTH OF THE FO
RCE FIELD.HARRY IS KNOCKED OUT AS THE SLEDCRASHES INTO THE BARRI
ER.":PRINT@H,G$;:GOSUB210
940 GOTO700
950 PRINT@P,"HARRY DECIDES TO USE HIS MEAD  CELL TO EXAMINE THE
BARRIER.    BUT HE HAS TO GET CLOSER TO DO  THAT.":PRINT@H,G$;:G
OSUB210
960 SOUNDQ,1:PRINT@P,W$:PRINT:PRINT" 1-TRY TO GET INTO HUTS.
     2-HIDE SLED AND HIKE TO BARRIERUNNOTICED.
     3-USE SLED'S SHIELDS TO BREAK  THROUGH.:?
970 INPUT" SELECT#:";N
980 CLS:SOUNDR,1:IFN<1 OR N>3 THEN960
990 ON N GOTO680,720,920
1000 PRINT@P,"HARRY DECIDES TO CALL UEC FOR  ASSISTANCE. AFTER H
EARING HIS   PROBLEM, UEC SAYS IT WILL REFER THE PROBLEM TO THE
COMPU-CEN.   AND GET BACK TO HIM WITHIN THE  HOUR."
1010 PRINT:PRINT" AFTER AN HOUR HARRY STILL HAS  NOT RECEIVED A
REPLY.":PRINT@H,G$;:GOSUB210
1020 SOUNDQ,1:PRINT@P,W$:PRINT" 1- CONTINUE WAITING.
2- ACT ON HIS OWN.";:PRINT@H,G$;
1030 INPUTN:SOUNDR,1:CLS
1040 IFN<1 OR N>2 THEN1020
1050 ON N GOTO1060,1080
1060 PRINT@P,"WHILE WAITING HARRY DECIDES TO EXPLORE ON FOOT.":P
RINT@H,G$;
```

Listing 1 continues

RACET COMPUTES LTD. Integrity in Software
1330 N. Glassell, Suite M, Orange, CA 92667 (714) 997-4950

RACET COMPUTES = SYSTEM SOFTWARE

Give Your TRS-80* a Tremendous Boost with RACET COMPUTES Software

RACET COMPUTES THE Name for TRS-80 Utility Software!! We make the TRS faster, more efficient, and easier to use. Our Programming Aids improve your productivity. Our reputation is for products that are professional in design and work as advertised!!

There are **NO** protection schemes used on our products. We rely on the integrity of the purchaser and reasonable pricing rather than copy protection. A utility, to be useful, must be available on any of your diskettes. The user has a right to backups.

*** Speed-Up Kit Version 2.X ***
For use with Version 2.0 on Model II and XV1 $99.95

NOW WITH OPTIONAL 2-SIDED DRIVE SUPPORT FOR MOD XVI UNDER 2.0!!!
This is a software 'fix' to TRSDOS 2.0. A MUST to users impatient with the speed of TRSDOS. Boot Speed faster by 2 1/2 times. Data reads up to 5 times faster. Time and Date need only be entered once at power on. Retains Verify Detect features.

** Model II Fast Backup Utility ** $75

5 to 10 times faster backups!!! Full disk backup (including verify) in 55 SECONDS on two drive system — 2:15 on a single drive system. In business, time is money and one backup is worth 1000 tears.

** SUPERZAP II for TRSDOS II for Models II and XVI ** $99.95

Recover Blown Files!! Now you can directly access, modify, copy, zero, or print any sector on your diskette OR Radio Shack Hard Drive. Includes a SCAN utility to facilitate a disk search for a specified string. Documentation includes a description of the TRSDOS II directory structure.

** SUPERZAP for CP/M 80** ** $99.95

You asked for it!! And now it's here. Runs on any CP/M Version 2.x system running on a Z80 CPU and 8-inch diskettes!! Recover blown files. Access, modify, copy, zero, and print any sector on disk or in memory — in Hex or ASCII. Full screen editor. File edit mode.

RACET COMPUTES Utilities & Programmers Aids

Generalized Subroutine Facilities (GSF) Mod I $25 Mod II $50 Mod III $30 Includes Multi-key Multivariable and Multi-key Character String Sorts.

Basic Link Facility 'BLINK' Mod I and III $30 Mod II $50 Chain from program to program or merge retaining variables.

Infinite BASIC Mod I $50, Mod III $60 Extends BASIC with matrix functions and 50 more string functions.

Infinite BUSINESS Mod I and III $30 (Requires Infinite BASIC) Printer pagination controls, binary array search, and more!!

Command Process 'COMPROC' Mod I and Mod III $30 Auto your disk to perform any sequence of keyboard instructions.

Diskette Catalog System 'DISCAT' Mod I and III NEWDOS 80 Version 2 $50

Disk Sort/Merge (DSM) Mod I $75, Mod III $90, Mod II $175 Machine language random file sort package. Power available only on large machines.

Keyed File System 'KFS-80' Mod I and III $100 Mod II $175 Machine language BASIC ISAM utility. Binary tree index system.

Model II Utility Package $150 Includes Superzap, bulk copies and other utilities for repair of blown diskettes. Complete documentation on diskette structure and guidance for repair.

Model II Development Package $125 Includes Superzap, Apparat Disassembler and Mod II interface to Microsoft Editor Assembler + and documentation for Mod I and uploading service.

Model II Basic Cross Reference Utility $50

RACET COMPUTES LTD. Integrity in Software
1330 N. Glassell, Suite M, Orange, CA 92667 (714) 997-4950

(714) 997-4950 for order desk. (714) 771-0883 for new BBS service

CALL FOR COMPETITIVE PRICING ON HARD DRIVE SUBSYSTEMS.

CIRCLE READER RESPONSE FOR FREE TRS AND NEC CATALOG

*TRS-80 is a trademark of Tandy Corporation **CP/M is a trademark of Digital Research ✓468

HARD DISK SUPPORT RACET COMPUTES = HARD DISK SUPPORT

FIELD PROVEN HARD DRIVES

5 to 240 MEGABYTES ON LINE for the TRS-80* Mod II/XVI
Winchester and Cartridge Disk Drives available for immediate delivery!!

5 MEGABYTE FOR Mod I, II, and III
CALL FOR PRICING



14+ Megabyte (formatted) ARM Winchester Disk Drive CALL for Pricing
Includes ECC error detection and correction. FAST. Service Contract Available ($30/month/drive). Multiplexor available. SHARE hard drive between four Model II's!!

20 Megabyte CII Honeywell Bull Cartridge Drive $7995
10 Megabytes fixed, 10 removable for the professional installation requiring Removable Media for BACKUP. 60 and 120 Megabyte add-on drives available. Up to 240 MEGABYTES!! Four port multiplexor available to SHARE hard drives.

HARD/SOFT DISKS SYSTEM (HSDS) SOFTWARE

Radio Shack 2.0 Compatible Operating System for Hard Drive Operation. Run your 2.0 software on hard drives without conversion (except drive designation). Compatible with most machine language programs that use the standard calling sequence. Supports ARM, Cameo, Cynthia Bull, Corvus, Data Peripherals, QCS, Radio Shack, and certain other hard drives.

Access **BOTH** your floppy disk drives and hard drive files **INTERCHANGEABLY!!** Complete utilities include HZAP (Hard Disk SUPERZAP), Directory Catalog System, Parameterized FORMAT, HPURGE (Bulk Copy/Purge Utility) and others.

The Hard/Soft Disk System (HSDS) Software has almost two years **FIELD** experience. Version 5.0 adds several enhancements including maintenance of system files on the hard drive, files as large as the disk, the ability to segment the disk as logical drives, and definable directory size. Floppy backup (close to a Megabyte per minute) is provided for Winchester drives.

HSDS for Radio Shack $500
HSDS for Other Drives $400

RACET COMPUTES LTD. Integrity in Software
1330 N. Glassell, Suite M, Orange, CA 92667 (714) 997-4950

CALL FOR COMPETITIVE PRICING ON HARD DRIVE SUBSYSTEMS — BUY WHERE YOU CAN GET SOFTWARE SUPPORT!!
DEALER AND SYSTEM HOUSES — WE HAVE DEALER PRICING!!

CIRCLE READER RESPONSE FOR FREE TRS AND NEC CATALOG.

✓41 *TRS-80 is a trademark of tandy corporation

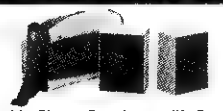
✓See List of Advertiser on Page 387

Listing 1 continued

```
1070 GOSUB210:GOTO900
1080 PRINT@P,"HARRY FIGURES THAT HE HAS BEEN WAITING LONG ENOUGH
 FOR THE WHIZKIDS AT COMPU-CEN.":PRINT@H,G$;
1090 GOSUB210:GOTO620
1100 PRINT@P,"HARRY DRIVES ON UNTIL DARK BUT FINDS NOTHING.":PRI
NT@H,G$;
1110 GOSUB210
1120 SOUNDQ,1:PRINT@P,W$:PRINT" 1- RETURN TO HUTS.
2- KEEP LOOKING."
1130 INPUTN:SOUNDR,1:CLS:IF N<1 OR N>2 THEN1120
1140 ON N GOTO1150,1160
1150 PRINT@P,"HARRY ARRIVES BACK AT THE HUTS.":GOTO620
1160 PRINT@P,"HARRY DRIVES ON IN THE DARK.   SUDDENLY HIS SCANNE
R DETECTS A  MOMMOTH FORM DESCENDING FROM THESKY. ATTRACTED BY T
HE LIGHTS A  GIANT MANTA MOTH SWALLOWS UP THESLED.":PRINT@H,G$;
1170 GOSUB210:GOTO1230
1180 PRINT@P,"HARRY FIRES THE POWERFUL TWIN  LASER CANNONS POINT
 BLANK AT THEBARRIER. THE BARRIER HAS BEEN   WEAKENED SUBSTANTIA
LLY, BUT THE SENTRY ROBOTS OPEN FIRE ON HIM.":PRINT@H,G$;:GOSUB2
10
1190 SOUNDQ,1:PRINT@P,W$:PRINT" 1- TURN ON SHIELDS.
2- USE LASER CANNONS.           3- GET OUT OF THERE!":
1200 INPUTN:IF N<1 OR N>3 THEN1200 ELSESOUNDR,1:CLS
1210 ON N GOTO1250,1220,1220
1220 PRINT@P,"THE SKY IS FILLED WITH RED     LASER BOLTS. THE SL
ED IS HIT.":PRINT@H,G$;:GOSUB210
1230 SOUNDP,6:PRINT:PRINT" G O O D  B Y E  H A R R Y":PRINT@H,G$
;
1240 GOSUB210:GOTO2230
1250 PRINT@P,"LASER BOLTS FLASH AGAINST THE  SLED'S SHIELDS.":PR
INT@H,G$;
1260 GOSUB210
1270 SOUNDQ,1:PRINT@P,W$:PRINT" 1- GET OUT OF THERE.
2- RAM THE BARRIER."
1280 INPUTN:IF N<1 OR N>2 THEN1270 ELSECLS:SOUNDR,1
1290 ON N GOTO1300,1310
1300 PRINT@P,"HARRY ESCAPES WITH HIS LIFE,   FOR NOW, BUT HE HAS
 FAILED HIS  MISSION.":GOSUB220:PRINT" HE IS LATER COURT MARTIAL
ED ANDEXECUTED FOR COWARDICE.":PRINT@H,G$;:GOSUB210:GOTO2230
1310 PRINT@P,"WITH FULL POWER TO THE FRONT   SHIELDS, HARRY CHAR
GES THE NOW  WEAKENED BARRIER.":GOSUB230:PRINT:PRINT" HE BREAKS
THROUGH AND ZOOMS ON PAST THE SLOW MOVING ROBOTS."
1320 PRINT" HARRY QUICKLY HIDES THE SLED   AMONG THE CLUSTER OF
HUTS. WITH LASER GUN DRAWN, HE CHARGES INTOTHE NEAREST STRUCTURE
.":PRINT@H,G$;
1330 GOSUB210
1340 PRINT@P,"IT TURNS OUT TO BE AN ELEVATOR THAT PLUNGES DOWNWA
RD.":GOSUB230:PRINT" HE IS IN A HUGH COMPLEX OF     SILVER GLASS
 PANES. EACH PANE ISSCORED INTO 5 CM SQUARES, AND   EACH SQUARE
IS PERFORATED BY A  SMALL HOLE.":PRINT@H,G$;:GOSUB210
1350 SOUNDQ,1:PRINT@P,W$:PRINT" 1- EXPLORE MORE.
2- EXAMINE PANES."
1360 INPUTN:IF N<1 OR N>2 THEN1350 ELSECLS:SOUNDR,1
1370 ON N GOTO1380,1440
1380 PRINT@P,"HARRY GOES BACK UP THE ELEVATORAND ONCE OUTSIDE HE
 EXPLORES    ANOTHER HUT BUT FINDS NOTHING.":PRINT@H,G$;:GOSUB21
0
1390 SOUNDQ,1:PRINT@P,W$:PRINT" 1- CONTINUE EXPLORING.
2- GO BACK TO GLASS COMPLEX.
1400 INPUTN:IF N<1 OR N>2 THEN1390 ELSECLS:SOUNDR,1
1410 ON N GOTO1420,1340
1420 PRINT@P,"HE RUNS FOR ANOTHER HUT, BUT   THIS TIME HE MEETS
THE ROBOTS INSTEAD.":PRINT@H,G$;
1430 GOSUB210:GOTO1230
1440 PRINT@P,"AS HE TOUCHES THE PANE, HE IS  STUNNED UNCONSCIOUS
. WHEN HE    AWAKENS, HE IS SURROUNDED BY A  SECURITY TEAM. A MA
N WITH GOLD  TEETH IS SMILING. THE MAN SPEAKS":PRINT@H,G$;:GOSUB
210
1450 PRINT@P,"'THE GREAT HARRY FLYNN. I NEVERTHOUGHT I'D MEET YO
U IN PERSON.'":PRINT@H,G$;:GOSUB210
1460 PRINT@P,"(STANDING UP, HARRY RETORTS)   'THE INFAMOUS DR NO
N FROM KRUEL'":PRINT@H,G$;:GOSUB210
1470 PRINT@P,"'YES, K R U E L . KIDNAPPING,  REVOLT, USURPATION,
 EXTORTION   LEAGUE.                         YOU, MR. FLYNN HAVE
 INVADED OUR HOSTAGE STORAGE CENTER.'":PRINT@H,G$;:GOSUB210
1480 PRINT@P,"(HARRY PROBES) 'TELL ME MORE.'":PRINT@H,G$;
1490 IFINKEY$="" THEN1490 ELSECLS
1500 PRINT@P,"'BUT OF COURSE. EACH HOSTAGE ISKEPT FOR FUTURE POL
ITICAL USE.  THEY ARE DATA PATTERNED THEN    LASER STAMPED ON SL
IDES YOU SO  CARELESSLY TOUCHED."
1510 PRINT" INSERT A PELLET LIKE THIS, AND THEY ARE RECONSTRUCTE
D UNHARMED. WITHOUT A PELLET, A NASTY SHOCKIS APPLIED. YOU MAY H
AVE THIS   ONE AS A SOUVENIR.'   (DR. NON  SLIPS THE PELLET INTO
 HARRY'S   SHIRT POCKET.)"
1520 PRINT" 'TOO BAD YOU MUST LEAVE US NOW  .........PERMANENTLY
!'":PRINT@H,G$;:GOSUB210
1530 PRINT@P,"HARRY IS TAKEN TO THE SOLAR    MIRROR.
             ONE OF THE GUARDS EXPLAINS THATDR. NON RESERVES TH
IS FORM OF   EXECUTION FOR SPECIAL GUESTS!"
1540 PRINT" HARRY IS STRAPPED TO THE MIRRORAND THE GUARDS LEAVE.
            AS SOON AS THE SUN RISES HARRY WILL BE INSTANTLY TOA
STED.":PRINT@H,G$;:GOSUB210
1550 SOUNDQ,1:PRINT@P,W$:PRINT" 1- BREAK BONDS.
2- ROTATE MIRROR FROM SUN.      3- USE MEAD CELL
4- PRAY."
1560 INPUTN:CLS:IF N<1 OR N>4 THEN1550:SOUNDR,1
1570 ON N GOTO1580,1620,1660,1650
1580 PRINT@P,"THE BONDS LOOSEN BUT WILL NOT  BREAK.
              SHOULD HARRY:1)KEEP TRYING                    2)TRY
SOMETHING    ELSE."
1590 INPUTN:SOUNDR,1:CLS:ON N GOTO1600,1610
1600 PRINT@P,"HARRY CAN'T LOOSEN THEM ENOUGH BEFORE SUNRISE.":PR
INT@H,G$;:GOSUB210:GOTO1230
1610 GOTO1550
1620 PRINT@P,"MIRROR BUDGES A LITTLE AS BONDSSTRETCH.
              SHOULD HARRY:1)KEEP TRYING.                   2)TRY
SOMETHING ELSE.
1630 INPUTN:CLS:SOUNDR,1:ON N GOTO1640,1550
1640 PRINT@P,"THE MIRROR DOESN'T TURN ENOUGH.":PRINT@H,G$;:GOSUB
210:GOTO1230
1650 PRINT@P,"AS HE PRAYS, HE GETS THE IDEA  OF USING THE MEAD C
ELL.":PRINT@H,G$:GOSUB210:GOTO1550
1660 PRINT@P,"HARRY REMEMBERS WHAT MAJOR ORR SAID ABOUT THE MEAD
 CELL'S BEINGABLE TO AMPLIFY THOUGHT WAVES.  HE CONCENTRATES ON
MOVING THE   MIRROR CONTROL LEVER.":PRINT:GOSUB230
1670 PRINT" NOTHING HAPPENS! SHOULD HARRY: 1)KEEP TRYING.
           2)TRY SOMETHING ELSE."
1680 INPUTN:CLS:SOUNDR,1:ON N GOTO1700,1690
1690 GOTO1550
1700 PRINT@P,"FINALLY THE LEVER MOVES AND THEMIRROR ROTATES FAR
ENOUGH AWAY  FROM THE SUN THAT HARRY NOW HAS THE TIME TO BREAK F
```

Listing 1 continues

Portable Speakers For "Walkman" Style Stereos

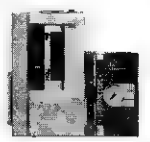


Portable Stereo Speakers with Carrying Case

After skating, skiing, jogging or any other outside activity, just plug these portable stereo speakers into your stereo and you and your friends can enjoy your favorite tapes reproduced by these full range speakers. Great for motel rooms, the beach or in your car. They weigh just 3 lbs. and measure 5½"H x 4¾"W x 2¾"D. The unit uses 3" x 5" 8ohm speakers with a 3 oz. magnet. Speaker system includes two speakers, a carrying case, auxiliary speaker connector cable and signal connector cable. Uses 8 AA batteries. Can be used with both portable stereos shown below, and is compatible with most mini-portable stereo cassettes and FM stereo units.

Part No. TSU-012 . . . . . **$29.95**
AM3-8 8 AA Alkaline Batteries 8 for $7.90

Stereo Cassette Player
with FM Stereo Tuner Pack



- Lightweight Headphones
- Cr02/Metal/Normal Tape Selector
- Anti-Rolling Mechanism

FEATURES: • Blue carrying case, shoulder strap, belt strap • lightweight headphones • FM stereo tuner pack & instruction manual • Talk line • Tone selector • Cr02 Metal Normal tape selector • LED operation indicator • Built-in microphone • Stop-eject-play-rewind-review-fast forward-cue, tape-radio selector functions • Volume control • Ext. power input jack • Headphone jack • Auto-stop mechanism (shuts off player when tape ends) • Anti-rolling mechanism (prevents sound from quivering when walking, jogging etc.) • Weight: 13 oz. • Requires 4 AA batteries (not included) • Size: 6"L x 4"W x 1 1/8"H

Model TWF-802 . . . . . **$69.95**
AM3-4 AA Alkaline Batteries 4/$3.95



CREDIT CARD AM/FM RADIO
World's Thinnest Stereo Hi-Fi

This is a pocketable AM/FM stereo radio with a folding stereo headphone. It weighs just 5 oz. and measures 4¼"L x 2⅝"W x ¼"Thk. Comes complete with radio, headphones and headphone case. Uses two AAA batteries (not included).

Part No. TCR-809 . . . . . **$29.95 each**

JOYSTICKS



JS-5K (Pictured)

JS-5K	5K Linear Taper Pots	$5.25
JS-100K	100K Linear Taper Pots	$4.95
JS-150K	150K Linear Taper Pots	$4.75
JVC-40	40K (2) Video Controller in Case	$4.95

JS KNOB Knob for JS5K,100K,150K . **$.99 ea.**
JVC KNOB Knob for JVC-40 . . **$.99 ea.**

Jameco ELECTRONICS — Digital Thermometer Kit



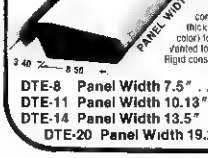
Data sensors — switch controls for indoor/outdoor or dual monitoring — can be extended to 500 feet. Continuous LED 8" high display. Range: 40°F to 199°F, -40°C to 100°C. Accuracy ±1° normal. Calibrate for Fahrenheit/Celsius. Simulated walnut case. AC wall adapter included. Size: 6¾"L x 3½"H x 1⅝"D.

JE300 . . . . . **$39.95**

BOOKS
NATIONAL SEMICONDUCTOR — INTERSIL — INTEL

30001	**National CMOS Data Book (1981)** (640 pages) 74C, CD4000, and A/D Converters	$6.95
30002	**National Interface Data Book (1980)** (704 pages) DP, DS8000, DS3600, DS5700, etc.	$6.95
30003	**National Linear Data Book (1982)** (1378 pages) LM, LF, ADC, DAC, LH Series	$11.95
30004	**National Series 80 — Board Level Computer (1980)** (224 pages)	$4.95
30005	**National TTL Logic Data Book (1981)** (624 pages) 7400, S, L, H, S, and DM8000 Series	$9.95
	30006 Above (3) 30001,3,5 as set . .	**$24.95**
30008	**National Memory Data Book (1980)** (464 pages) RAMs, ROMs, PROMs, EPROMs Series	$6.95
30009	**Intersil Data Book (1983)** (1356 pages) Complete line	$9.95
30010	**National Audio/Radio Handbook (1980)** (240 pages) Pre-Amps, AM, FM & FM Stereo, Power Amps	$5.95
30011	**National Linear Application Handbook (1980)** (736 pages) Application Notes, Linear Briefs, etc.	$15.95
30012	**National PAL Data Book (1982)** (176 pages) Data Sheet, PAL Design	$5.95
30013	**Zilog Data Book (1983)** (641 pages) Microprocessors and Support Chips	$7.95
010400	**Intel Component Data Book (1982)** (1405 pg.) Full data sheets for Intel's products not mem devices, microproc., periph. & ind./mil. products	$14.95
205810	**Intel Peripheral Design Handbook (1981)** (828 pages) Full data sheets, application notes for Intel peripheral device components	$9.95

Universal Computer Keyboard Enclosures



DTE Blank Desk Top Enclosures are designed for easy modification. High strength epoxy molded end pieces in mocha brown finish. Sliding rear bottom panel for service component access. Top, bottom panels .060" thick alum. alodine type 1200 finish (gold tint color) to best paint adhesion after modification. Vented top & bottom panels for cooling efficiency. Rigid construction provides unlimited applications. Assembly instructions included.

DTE-8 Panel Width 7.5" **$24.95**
DTE-11 Panel Width 10.13" **$27.95**
DTE-14 Panel Width 13.5" **$29.95**
DTE-20 Panel Width 19.25" **$34.95**

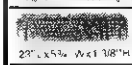
KEYBOARDS — POWER SUPPLIES



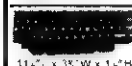
DATANETICS 73-KEY KEYBOARD (ASCII) *Apple Compatible*
Data Entry Keyboard uses MM5740 BEE/N encoder chip (included). 73-Key Keyboard features 11-key numeric keypad. SPST switching. 24-pin edge card connection. Includes pin-out.
17⅜"L x 6"W x 1⅝"H
Part No. KB261 (Fits DTE-20 Enclosure) **$49.95 each**



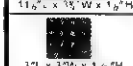
MICRO SWITCH 69-KEY KEYBOARD
Data Entry Keyboard. Encoded Output. 8-bit Parallel. EBC DIC. Switching: Hall Effect. 24-pin Edge Card Connection. Complete w/Pin Connection. Can easily be modified to ASC code.
10⅜"L x 5¼"W x 1⅝"H
Part No. KB69SD12-2 (Fits into DTE-20 Enclosure) **$19.95 each**



MICRO SWITCH 85-KEY KEYBOARD
Word Processing Keyboard. 26 Pin Edge Card Connection. Supply Voltage +5VDC. Main Keyboard is QWERTY. Additional Key Pads for Cursor and word processing functions.
23"L x 5¾"W x 1 3/8"H
Part No. 85SD18-1 **$29.95 each**



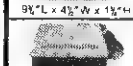
HI-TEK 58-KEY KEYBOARD
SPST switching, mechanical, monolithic housing, charcoal grey keycaps. Keyboard is not mounted on circuit board (each key is individually accessible).
11⅞"L x 7⅝"W x 1⅝"H
Part No. K-58 (Fits DTE-14 Enclosure) **$19.95 each**



HI-TEK 14-KEY NUMERIC KEYPAD
SPST switching. Charcoal grey keycaps, matches HI-TEK K-58 Keyboard (above). Mounted on printed circuit board.
3"L x 3"W x 1½"H
Part No. K-14 **$9.95 each**



ALPS 29-KEY CALCULATOR KEYBOARD
Features one 8-position decimal select switch, one 3-position switch, and two 2-position switches, mechanical, SPST switching. 22-pin edge card connection. Pin-out included.
9¾"L x 4⅞"W x 1⅝"H
Part No. KB297040 (Fits DTE-11 Enclosure) **$4.95 each**



POWER SUPPLY +5VDC @ 1 AMP REGULATED *Transaction Tech*
Output +5VDC @ 1A (also +30VDC) reg. Input 115VAC 60Hz. 2-tone (black/beige) self-enclosed case. 6 ft., 3 cond. black power cord. 6½"W x 7"D x 2¾"H. Wt. 3 lbs. Data sheet incl.
Part No. PS51194 **$19.95 each**



POWER SUPPLY +5VDC @ 3 AMP REGULATED *Deltron*
Input 115VAC 47-440Hz. Output 5VDC Adjustable @ 3 amp, 6VDC @ 2.5 amp. Adjustable current limit. Ripple & Noise 1MV rms, 5MV p-p — 2 mounting surfaces. UL recognized. Size: 4"W x 4½"L x 2 7/16"H. wt. 2 lbs. Data sheet included.
Part No. QPS-1 **$29.95 each**



POWER SUPPLY +5VDC @ 7.5 AMP, 12VDC @ 1.5 AMP SWITCHING
Input 115VAC 50-60Hz @ 3 amp/230VAC 50Hz @ 1.6 amp. Fan volt. power supply select switches (115v/230VAC). Output 5VDC @ 7.6 amp, 12VDC @ 1.5 amp. 8 ft. blk. pwr. cord. 11½"W x 13¾"D x 3¾"H. Wt. 6 lbs.
Part No. PS94V0 **$49.95 each**



POWER SUPPLY 4-Channel Switching Power Supply
Microprocessor, mini-computer, terminal, medical equipment and process control applications. Input: 90-130VAC 47-440Hz. Output: +5VDC @ 5A, -5VDC @ 1A, +12VDC @ 1A, -12VDC @ 1A. Line reg. ±0.2%. Ripple: 30mV p-p, load reg. ±1%. Overcurrent protection. Adj. 5V main output ±10%. 6-3/8"L x 1 7/8"W x 4-15/16"H. Wt. 1½ lbs.
Part No. FCS-6D4A **$69.95 each**



POWER SUPPLY Adjustable Switching 4-24VDC to 5 Amps
Adj. 4-24VDC 5VDC @ 5A, 6VDC @ 4.8A, 9VDC @ 4.1A, 12VDC @ 3.3A, 16VDC @ 1.9A, 24VDC @ 2.5A. Overvoltage Protection. Input: 115VAC 50/60Hz. Output variations within 20mV. 8.25"L x 4.25"W x 2.25"H. Wt. 3.25 lbs.
JE224 Kit **$79.95 each**
JE224A Assembled & Tested . . **$99.95 each**



84-Key Keyboard
CA153A **$69.95**

CONTROL DATA
Data Entry Keyboards
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SPST Switching
ASCII OUTPUT
30" Interface Cable
Attractive Case



104-Key Keyboard
CA148 . . . . . **$99.95**



95-Key Keyboard
CA154A **$79.95**



80-Key Keyboard
CA150C **$89.95**

Color: keycaps: black, blue, red • cover: black w/beige base. 21½"x9"x3½". 6lbs.

BUG BOX™ — 30 individual compartments • Stores 60 8 pin or 30 14 or 16 pin DIPs • Bug rugs not included • Clear plastic cover slides & locks • Cover marked w/numbers 1-30 • Compartment size: 1"x3.75"x 5" deep • Box size: 4.9"x3.3"x 6" • Weight: 1.75 oz.

BUG BOX™
Please specify color code: (B) Blue, (R) Red, (W) White, (Y) Yellow

Part No./Color Code		QTY	PRICE
BGX-001-( )		1	$ 2.29
BGX-010-( )		10	19.99
	ANTI-STATIC		
BGX-001-( )AS		1	$ 3.29
BGX-010-( )AS		10	28.89

BUG CAGE™ — 12 locations store Bug Boxes & Bug Boxes or Bug Trays • Modular and interlocking • Heavy duty injection molded plastic • Each cage has 6 slots on locations • 2 cages per pkg. • Cage size: 5-1/8" x 5" x 3-7/8" • 4 colors available, please specify color code: (B) Blue, (R) Red, (W) White, (Y) Yellow

Part No./Color Code	Price
BGC-001-( )2 Cages (6 loc. ea.)	$11.95/pkg.

BUG TRAY™ — Stores in Bug Cage • Molded plastic • Three styles. Open: 1 compartment 3.05"x 4.6"x 6"L. Vert cal (5 compartments 5" x 4.6" x 6"L) and Horizontal (8 compartments 4" x 3.95" x 6") • Ideal for tools, hardware, components, etc. • Tray size: 3.55" x 5.05" x 6" • Black color only

PART NO.	DESCRIPTION	PRICE
BTH-001	Horizonta Bug Tray	$1.95
BTV-001	Vertical Bug Tray	1.95
BTO-001	Open Bug Tray	1.95
BTX-003	1 of each Bug Tray (3)	4.98

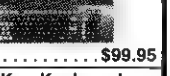
BUG RUG™ — Static discharge protection for CMOS and MOSFET devices • Pre-cut to dimensions of BUG BOX 1" x 35")

Part No.	Description	Price
BRG-030	30 foam rectangles for Bug Box	$1.98
BBR-036	6 foam rectangles for LSI Big Bug Box	1.98

CAGE KEEPER™ — Pins column of Bug Boxes in Bug Cage

	Price
CKP-005 5 inch	$4.98/pkg
CKP-010 10 inch	9.98/pkg

BUG BOX™ STORAGE SYSTEMS



BUG CAGE™ (BGC-001) with Bug Boxes

LSI BIG BUG BOX™ — Designed to store large ICs, Resistors, Capacitors and Diodes • Divided into three compartments measuring 1" x 4.15" x 5" deep • Three vertical and three horizontal dividers included • Bug Rugs not included • Box size: 4.9" x 3.3" x 6" • Weight: 1.75 oz.

LSI BIG BUG BOX™
Please specify color code: (B) Blue, (R) Red, (W) White, (Y) Yellow

PART NO./COLOR CODE		QTY	PRICE
BLX-001-( )		1	$ 3.29
BLX-010-( )		10	28.79
	ANTI-STATIC		
BLX-001-( )AS		1	$ 4.29
BLX-010-( )AS		10	37.89

BACK PACK™ — Self-adhesive labels in the back of ICs • Shows exact internal logic orientation to IC pins • 532 labels in each package (including several blank labels) • Each package for 8, 14, 16, 24, 28 and 40-pin ICs • Combo package includes 1,068 labels for TTL and CMOS ICs • Microprocessor package contains 744 labels

Part No.	Description	Price
BPT-012	TTL	$7.95
BPC-012	CMOS	8.95
BPM-012	Combo	14.95
BPJ-012	Microprocessor	9.95

BUG TAGS™ — Self-adhesive, easy-to-read labels for marking Bug Box and LSI Big Bug Box • Most popular components

PART NO.	DESCRIPTION	QTY	PRICE
BTT-200	TTL	200	$4.98
BTC-200	CMOS	200	4.98
BTK-200	LS Schottky	200	4.98
BTS-200	Special	200	4.98
BTM-800	Mixed	800	*13.95

MORE BUG TAGS AVAILABLE!

★ ★ ★ **BUG BOX SYSTEMS INTRODUCTORY SPECIAL** ★ ★ ★

Your choice: regular or anti-static • Includes 2-Bug Cages (12 locations) • 6-Bug Boxes • 3-LS Big Bug Boxes • 1-Horizontal Bug Tray • 1-Open Bug Tray, 1-Vertical Bug Tray, 1 package Bug Rug for regular Bug Boxes, 1 package Bug Rug for LSI Big Bug Boxes • 1 package Mixer Labels (800 each) Color: Bug Boxes and Cages: Blue, Bug Trays: Black

SP-BUG Regular (Retail value $59.45) *Sale Price $49.95*
SP-BUG-AS Anti-Static (Retail value $67.45) *Sale Price $59.95*

$10.00 Minimum Order — U.S. Funds Only
California Residents Add 6½% Sales Tax
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Send S.A.S.E. for Monthly Sales Flyer!

Spec Sheets — 30¢ each
Send $1.00 Postage for your *FREE 1983 JAMECO CATALOG*
Prices Subject to Change

Call for Quantity Discounts

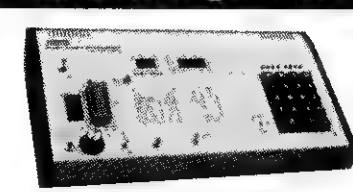
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4/83 ***PHONE ORDERS WELCOME — (415) 592-8097 Telex: 176043***

8K, 16K, 32K, 64K EPROM Programmer



2708,2716,2732 & 2764 EPROM Programmer

JE664 EPROM PROGRAMMER
8K TO 64K EPROMS — 24 AND 28 PIN PACKAGES
Self-Contained — Requires No Additional Systems for Operation

• Programs, validates and checks for properly erased EPROMs • Emulates PROMs or EPROMs • RS232C Computer Interface for editing/program loading • Loads data into RAM by keyboard • Changes data in RAM by keyboard • Loads RAM from an EPROM • Compares EPROMs for content differences • Copies EPROMs • Power Input: 115VAC 60Hz, 10W power consumption • Enclosure: Color-coordinated, light tan panels w/molded mocha brown end pieces • Size: 15-5/8"L x 8¾"D x 3⅜"H • Wt.: 5¾ lbs.

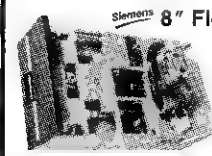
JE664-A EPROM Programmer **$995.00**
Assembled & Tested . . . includes JM16A Module

JE665 — RS232C INTERFACE OPTION — The JE665 RS232C Interface Option implements computer access to the JE664's RAM. Sample software written in BASIC provided for TRS-80® Model . . . level II. Computer: Baud rate: 9600. Word length: 8 bits, odd parity. Stop bits: 2. Option may be adapted to other computers.

JE664-ARS EPROM Prog. w/JE665 Option **$1195.00**
Assembled and Tested . . . includes JM16A Module

EPROM JUMPER MODULES — The JE664's JUMPER MODULE (Personality Module) is a plug-in Module that pre-sets JE664 for proper programming features to the EPROM & configures EPROM socket connections for that particular EPROM.

Part No.	EPROM	EPROM MANUFACTURER	PRICE
JM08A	2708	AMD, Motorola, National, Intel, TI	$ 4.95
JM 8A	2716 TMS25 6	Intel, Motorola, National, NEC, T	$ 4.95
JM 8B	TMS2716	Motorola, TI (+5,+12 +12)	$ 4.95
JM32A	TMS2532	Motorola, T	$ 4.95
JM32B	2732	AMD, Fujitsu, NEC, Hitachi, Intel	$14.95
JM64A	MCM68764 MCM68L764	Motorola	$14.95
M64B	2764	Intel	$14.95
JM64C	TMS2564	T	$14.95



8" Floppy Disk Drive

- Shugart 801R compatible
- Single-Sided
- 77 Tracks
- 400/800K Bytes Capacity
- Industry Standard

The FDD100-8 8" Floppy Disk Drive (Industry Standard) features single or double density Recording mode, FM or single, MFM double density. Transfer rate: 250K bits/sec. single density, 500K bits sec. double density. The FDD100-8 is designed to work with the single sided soft sectored IBM Diskette 1 or equ. disk cartridge. Power: 115VAC @ 50-60Hz, +24VDC @ 1.7 amps max., +5VDC @ 1.2 amps max. Unit as pictured above (does not include case, power supply, & cables). Size: 8.65"W x 14"L x 4.5"H. Weighs 12 lbs. incl. 96-pg. manual.

Part No.		Price
FDD100-8	Buy 1 for . .	$269.95 each
FDD100-8	Buy 2 for . .	$259.95 each
FDD100-8	*Buy 10 for*	*$249.95 each*

5¼" Mini-Floppy Disk Drive



FOR TRS-80 MODEL I (Industry Standard)
Features single or double density Recording mode. FM single, MFM double density. Power: +12VDC +0.6VDC 1.6A max., +5VDC (+0.25V) 0.8A max. Unit as pictured (does not include case, power supply, cables). 30-pg. data book incl. Wt. 3½ lbs. Size: 5¾"W x 8"D x 3¾"H.

Part No.	*Limited Quantity!*	Price
FD200	Single-sided, 40 tracks, 250K bytes capacity	$179.95
FD250	Double-sided, 35 tracks, 438K bytes capacity	$199.95

EXPAND YOUR MEMORY

TRS-80 to 16K, 32K, or 48K

**Model 1 =	From 4K to 16K Requires (1) One Kit
Model 3 =	From 4K to 48K Requires (3) Three Kits
Color =	From 4K to 16K Requires (1) One Kit

**Model 1 equipped with Expansion Board up to 48K Two Kits Required — One Kit Required for each 16K of Expansion

TRS-16K3 *200ns for Color & Model III $12.95
TRS-16K4 *250ns for Model I $10.95

TRS-80 Color 32K or 64K Conversion Kit

Kit comes complete with 8 each 4164 2 (200ns) 64K dynamic RAMs and conversion documentation. Converts TRS-80 color computers with D and E circuit boards, and all new color computers to 32K. Minor modifications of 32K memory will allow the use of a 64K of the dynamic RAM.

TRS-64K2 . . . . . **$54.95**



Sprite-style Fan

- 36cfm free air delivery
- 3.125" sq. x 1.665" depth
- 10 yrs. cont. duty at 20°C
- 115V 50/60Hz

*Metal Frame

PWS2107U Cleaned & tested (used) $ 9.95 ea.
***PWS2107F** New $14.95 ea.



Muffin-style Fan

- 105cfm free air delivery
- 4.68" sq. x 1.50" depth
- 10 yrs. cont. duty at 20°C
- Impedance protected; ambients to 70°C
- 115V 50/60Hz 14W. Wt. 17 oz.

*Metal Frame

MU2A1-U Cleaned & tested (used) $9.95 ea.
***MU2A-1N** New $14.95 ea.



Mostek DC/DC Converter
+5 VOLTS TO -9 VOLTS
Input: +5V. Output: -9V (regulated) @ 30mA. Printed circuit mount rig. Special cations inc.
DC10 $2.95 ea. or 2/$4.95

✓See List of Advertisers on Page 387

Listing 1 continued

```
REE.":PRINT@H,G$;:GOSUB210
1710 SOUNDQ,1:PRINT@P,W$:PRINT" 1- SNEAK BACK TO HOSTAGE AREA  A
ND USE PELLET.                  2- ESCAPE AND RETURN WITH      R
EINFORCEMENTS.                  3- CAPTURE DR. NON, USE HIM TO B
ARGAIN FOR THE GIRL AND FREEDOM."
1720 PRINT" 4- FAKE HIS DEATH BY TURNING   MIRROR BACK INTO SUN.
           5- USE MIRROR AS A WEAPON."
1730 INPUTN:CLS:IF N<1 OR N>5 THEN1730:SOUNDR,1
1740 ON N GOTO1750,1760,1770,1780,1820
1750 PRINT@P,"HARRY SNEAKS BACK BUT RUNS INTOA SECURITY TEAM.":P
RINT@H,G$;:GOSUB210:GOTO1230
1760 PRINT@P,"HARRY MAKES IT OUT OF THE AREA OF THE HUTS BUT WIT
HOUT THE SLEDHE PERISHES IN THE DESERT.":PRINT@H,G$;:GOSUB210:GO
TO2230
1770 PRINT@P,"FOR THIS PLAN HARRY NEEDS SOME SORT OF WEAPON. HE
SNEAKS BACK  TO THE SLED AND REMOVES A LASER CANNON. HE CONFRONT
S DR. NON ANDA SECURITY TEAM.":GOSUB230:PRINT:PRINT" UNFORTUNATE
LY HARRY'S LASER    FAILS TO OPERATE.":PRINT@H,G$;:GOSUB210:GO
1780 PRINT@P,"NO ONE WILL BE LOOKING FOR HIM NOW.
            SHOULD HE: 1)ESCAPE                              2)TRY TO
 CAPTURE DR. NON.       3)GET THE GIRL.
1790 INPUTN:CLS:SOUNDR,1:ON N GOTO1800,1810,1800
1800 PRINT@P,"HARRY DASHES THROUGH THE HUT   AREA BUT STEPS ON A
 SONIC ANTI- PERSONNEL MINE.":PRINT@H,G$;:GOSUB210:GOTO1230
1810 GOTO1770
1820 PRINT@P,"HARRY TURNS THE MIRROR ON THE  INSTALLATION AND DE
STROYS IT.   DR. NON, HOWEVER, ESCAPES IN HISPERSONAL SHUTTLE.
             SHOULD HARRY: 1)GO AFTER DR.NON.                2)GE
T THE GIRL."
1830 INPUTN:CLS:SOUNDR,1:ON N GOTO1840,1850
1840 PRINT@P,"WITH HIS HEAD START DR. NON HASEASILY ESCAPED PURS
UIT. HARRY   HAS WASTED VALUABLE HOURS AND   BY THE TIME HE RESC
UES THE GIRL,WAR HAS BROKEN OUT WITH SIRA.   HARRY HAS FAILED HI
S MISSION!":GOSUB220:PRINT@H,G$;:GOSUB210:GOTO2230
1850 PRINT@P,"HARRY MAKES HIS WAY BACK TO THEHOSTAGE STORAGE ARE
A. BUT, BY   NOW DR. NON HAS RADIOED FOR HELPFROM KRUEL REINFORC
EMENTS.":PRINT@H,G$;:GOSUB210
1860 SOUNDQ,1:PRINT@P,W$:PRINT" 1- STUDY THE STORAGE SYSTEM.
2- FREE EVERYONE BY DISABLING  LOCK MECHANISM.
3- EXAMINE THE FILES.          4- CALL UEC ON SLED RADIO.
5- GET MECHANISM TO MAKE MORE  PELLET KEYS."
1870 INPUTN:IF N<1 OR N>5 THEN1870 ELSECLS:SOUNDR,1
1880 ON N GOTO1890,1900,1950,1960,2000
1890 PRINT@P,"THIS SYSTEM HAS THREE PARTS:-   FILES
             PELLET PRODUCER                  LOCKING MECHANISM"
:PRINT@H,G$;:GOSUB210:GOTO1860
1900 PRINT@P,"TAMPERING WITH THE LOCK STARTEDA BASE DESTRUCTION
SEQUENCER.   HARRY HAS 60 SECONDS TO DECIDE  WHETHER TO: 1)ABAND
ON THE BASE.              2)TRY TO ABORT THE  SEQUENCE."
1910 INPUTN:CLS:IF N<1 OR N>2 THEN1910:ELSESOUNDR,1
1920 ON N GOTO1930,1940
1930 PRINT@P,"HARRY LIVES, BUT THE MISSION ISLOST.":GOSUB220:PRI
NT@H,G$;:GOSUB210:GOTO2230
1940 PRINT@P,"HE ALMOST HAD IT ... THEN":GOSUB230:FORTM=1 TO4:PL
AY"T240;V30;O2;DDDEEDFEFFDDDDD":NEXTTM:PRINT" B O O M ":PRINT@H,
G$;:GOSUB210:GOTO1230
1950 PRINT@P,"THERE ARE MANY FILES. SINCE THEGIRL WAS JUST TAKEN
, SHE SHOULD BE AMONG THE LAST ENTRIES. BUT  HARRY HAS ONLY ONE
PELLET..... WHICH ONE IS THE RIGHT ONE?":PRINT@H,G$;:GOSUB210:G
OTO2010
1960 PRINT@P,"HARRY FINDS THAT THE SLED'S    RADIO IS BROKEN.
            SHOULD HE: 1)TRY TO FIX IT.                      2)GO BAC
K TO STORAGE AREA."
1970 INPUTN:IF N<1 OR N>2 THEN1970 ELSECLS:SOUNDR,1:ON N GOTO198
0,1990
1980 PRINT@P,"HARRY GETS IT TO RECEIVE, BUT  HE CAN'T TRANSMIT."
:PRINT@H,G$;:GOSUB210:GOTO1860
1990 GOTO1860
2000 PRINT@P,"BY ATTEMPTING TO BYPASS THE    PELLET TIMER, HARRY
 SETS OFF A  SIGNAL WHICH ERASES ALL OF THE  FILES! THE MISSION
IS A FAILURE.":GOSUB220:PRINT@H,G$;:GOSUB210:GOTO2230
2010 SOUNDQ,1:PRINT@P,W$:PRINT" 1- LOAD UP THE FILES AND TAKE  T
HEM TO UEC.                     2- DISABLE LOCK MECHANISM.
3- TAKE A GUESS.                4- GET MECHANISM TO MAKE MORE  P
ELLETS."
2020 PRINT" 5- CUT OFF POWER TO THE STORAGECOMPUTER.
           6- GO BACK TO SHIP AND USE THE RADIO."
2030 INPUTN:CLS:SOUNDR,1:IF N<1 OR N>6 THEN2030
2040 ON N GOTO2050,1900,2060,2000,2070,2110
2050 PRINT@P,"WHEN HARRY ATTEMPTS TO REMOVE APANE FROM IT'S HOLD
ER, THE FILE DISSOLVES. THE GIRL AND ALL OF  THE OTHER HOSTAGES
ON THE PANE  ARE DESTROYED. THE MISSION HAS  FAILED!":GOSUB220:P
RINT@H,G$;:GOSUB210:GOTO2230
2060 PRINT@P,"BAD ODDS! HARRY'S PELLET FREES A HUNGRY GORGON WOL
F MAN.":PRINT@H,G$;:GOSUB210:GOTO1230
2070 PRINT@P,"WITH THE POWER OFF THE SYSTEM  BECOMES TOTALLY INO
PERATIVE.    SHOULD HARRY: 1)TURN POWER ON.                  2)EXA
MINE WITH THEPOWER ON.
2080 INPUTN:CLS:SOUNDR,1:ON N GOTO2090,2100
2090 GOTO2010
2100 PRINT@P,"A SECONDARY POWER CIRCUIT SNAPSON WHILE HARRY IS S
TUDYING THE  CONNECTIONS. HE IS ELECTROCUTED.":PRINT@H,G$;:GOSUB
210:GOTO1230
2110 PRINT@P,"HARRY DRIVES BACK TO THE SHIP  CALLS UEC. COMPU-CE
N SUGGESTS   TAKING MICRO-PHOTOS USING THE   MEAD CELL AND ANALY
ZING THEM ON THE SHIP'S COMPUTER."
2120 PRINT" IN ADDITION, UEC IS SENDING A  TASK FORCE TO SECURE
THE BASE.":PRINT@H,G$;:GOSUB210
2130 PRINT@P,"HARRY RETURNS TO THE STORAGE   AREA, AND FOLLOWING
 COMPU-CEN'S ADVICE, IS ABLE TO IDENTIFY THE GIRL'S FILE."
2140 PRINT" HE SLIPS THE PELLET IN AND A   HOLOGRAPHIC IMAGE APP
EARS.       IT IS KURVY CALLEASE. THE IMAGEFILLS AND SHE IS MAGI
CALLY      BEAUTIFUL! SHE COMES TO LIFE BUTIMMEDIATELY FAINTS.":
PRINT@H,G$;:GOSUB210
2150 PRINT@P,"HARRY CATCHES HER AND TENDERLY CARRIES HER TO THE
SLED. THEY   SPEED OVER THE YELLOW SANDS TO  HIS SHIP. ABOVE, TH
E SKY FLASHESWITH RED AND BLUE LASER STROBES AS UEC AND KRUEL FO
RCES BATTLE  IT OUT."
2160 PRINT" THE GIRL AWAKENS. A TEAR IN HEREYE REFLECTS THE FLAS
HES ABOVE.":PRINT@H,G$;:GOSUB210
2170 PRINT@P,"'WHO ARE YOU'":PRINT@H,G$;:GOSUB210
2180 PRINT@P,"'HARRY FLYNN FROM UEC AT YOUR  SERVICE.'":PRINT@H,
G$;:GOSUB210
2190 PRINT@P,"SHE PRESSED CLOSE TO HIM AND   WITH HER HEAD ON HI
S SHOULDER   MURMERED:' TAKE ME HOME HARRY.'":PRINT@H,G$;:GOSUB2
10
2200 PRINT@P,"'YOU'RE AS GOOD AS THERE.'":PRINT@H,G$;:GOSUB210
2210 CLS8:FORTM=1 TO5:SOUNDQ,2:SOUNDR,2:NEXTTM:CLS2:PRINT@160,"
C O N G R A T U L A T I O N S !";
2220 PRINT@229,"MISSION ACCOMPLISHED!";:FORTM=1 TO160:NEXTTM:PR
INT@428," E N D ";:FORTM=1 TO900:NEXTTM:CLS:END
2230 CLS:PRINT@Q,"TRY AGAIN (Y/N)";
```

Listing 1 continues

Listing 1 continued

```
2240 INPUTD$:IFD$="Y" THEN540
2250 IFD$="N" THEN2270
2260 IFD$<>"Y" OR D$<>"N" THENCLS:PRINT@161,"PLEASE ANSWER WITH
'Y' OR 'N'";:GOTO2240
2270 CLS0:PRINT@160," YOU'D BETTER GO BACK TO THE";:PRINT" UECOF
FICER ACADEMY FOR A";:PRINT" REFRESHER ";:PRINT@235," COURSE.";:
FORTM=1 TO1800:NEXTTM:CLS:END
```

Program Listing 2

```
10 '***************************
20 '*       ASSIGNMENT 46
30 '* V.T.ALBINO -80 MICRO 8/82
40 '* VERSION FOR TRS-80C,32K
50 '*     BY:B.B.WITHAM JR.
60 '* VIRGINIA BEACH, VA.  7/82
70 '***************************
80 CLS:P=33:F=65:L=97:Q=200:R=220:W=150:W$="WHAT SHOULD HE DO?":
H=484:H$="HIT <ENTER> TO CONTINUE":GOTO120
90 IFINKEY$<>CHR$(13) THEN90 ELSECLS:SOUNDQ,1:RETURN
100 SOUNDP,10:RETURN
110 FORT=1 TO1800:NEXT:RETURN
120 CLS8:GOSUB1520:SOUNDW,1:PRINT@168," ASSIGNMENT 46 ";:GOSUB11
0
130 SOUNDW,1:PRINT@195," A HARRY FLYNN ADVENTURE ";:GOSUB110:CLS
3
140 SOUNDW,1:PRINT@257," YEAR: 2154 ";:GOSUB110
150 SOUNDW,1:PRINT@321," PLACE: A SANDY BEACH ON MON ";:PRINT@35
3," KARLO...THE PLEASURE PLANET ";
160 GOSUB110
170 SOUNDW,1:PRINT@449," TIME: 3:20 PM ";:GOSUB110:GOSUB110:CLS:
SOUNDW,1:SOUNDW,1
180 PRINT@35,"COMMANDER  HARRY  A.  FLYNN,  UNITED  EARTH  COMMA
ND  (UEC),  LIES ON  THE  SAND. PENSIVE AS  HE WATCHES  THE REFL
ECTION  Of  THE  HOT SUN DANCE ON HIS RUBY  LASER  RING. . . . .
";
190 GOSUB110:FORTM=1 TO6:SOUND230,5:NEXT:PRINT"SUDDENLY,  A  SI
GNAL  BLARES OUT  AS  HIS  COMMUNICATOR SWITCHES ON.":PRINT@H,H$
;:GOSUB90
200 PRINT@P," HELLO HARRY. THIS  IS  SECTOR  CHIEF CHRONOS SPEAK
ING.  SORRY  TO HAVE TO INTERRUPT YOUR WELL  EARNED VACATION, BU
T  WE  JUST  RECEIVED INFORMATION  THAT THE  RING CITY OF PILA I
S IN DANGER."
210 PRINT"  THE CITY ENCIRCLES  THE  PILA  STARGATE WHICH IS THE
 ONLY WAY  TO THE  SPACE STATIONS IN  THE  GALAXY  OF  ANDROMEDA
.":PRINT@H,H$;:GOSUB90
220 PRINT@P," WE ARE PARTICULARLY CONCERNED  BECAUSE A  PLUTONIU
M FREIGHTER  HEADED  FOR  PILA  DISAPPEARED  YESTERDAY. THERE'S
 MORE  THAN  ENOUGH  MATERIAL  ABOARD  THAT  SHIP TO  VAPORIZE T
HE CITY AND  DESTROY THE STARGATE.
230 PRINT:PRINT"  SINCE  YOU  ARE  ON VACATION,  A  VISIT TO  TH
E  FAMOUS  PILA  CASINO  SHOULD  NOT AROUSE ANY  SUSPICION.":PRI
NT@H,H$;:GOSUB90
240 PRINT@P,"YOUR MISSION  IS  TO  PROTECT  THE  RING  CITY AND
 THE  PILA  STARGATE. PASSAGE HAS  ALREADY  BEEN BOOKED FOR YOU
ABOARD THE  LUXURY LINER 'QUEEN ZIRA'.":PRINT:PRINT"       GOOD L
UCK, COMMANDER"
250 PRINT@449,"UEC TERMINATES AT 3:34PM -OUT.":PRINT@H,H$;:GOSUB
90
260 E$="(ENTER YOUR SELECTION)":E=193
270 PRINT@P,"IT WAS LATE WHEN HARRY BOARDED THE GIANT LINER. HE
WENT DIRECT TO HIS CABIN AND FELL ASLEEP.":PRINT:PRINT" ONLY  HA
LF  AWAKE,  HARRY FELT THE COOLNESS OF THE SLIME TRAIL AS  THE
TRI-LIZARD, WHICH  HAD BEEN  PLACED IN  HIS BED,";
280 PRINT" BEGAN CRAWLING UP HIS LEFT ARM.":PRINT@H,H$;:GOSUB90
290 PRINT@P," HARRY  OPENED  HIS  EYES  AND STARED AT  THE  TRIP
PLE  HEADED POISONOUS REPTILE, WHICH HISSED SOFTLY, AS IT'S  THR
EE  TONGUES DARTED IN  AND OUT,  SLITHERING UP TOWARD HARRY'S TH
ROAT.":PRINT:PRINT" ONE BITE WOULD BE FATAL!"
300 PRINT@H,H$;:GOSUB90:PRINT@P,W$:L=0
310 PRINT@L," 1-BRUSH IT OFF WITH OTHER HAND  2-JUMP OUT OF BED
             3-REMAIN PERFECTLY STILL        4-PUSH ATTENDANT C
ALL BUTTON    5-TURN ON THE READING LIGHT     6-SCREAM . . LOUDL
Y!"
320 PRINT@H,E$;:INPUTN
330 CLS:SOUNDQ,1:IFN<1 OR N>6 THEN320
340 ON N GOTO350,350,360,350,450,440
350 PRINT@F,"THE  LIZARD  STRIKES  WITH THE SPEED OF LIGHTNING!"
:GOSUB110:GOTO1450
360 PRINT@F,"HARRY FREEZES."
370 PRINT@129,W$:PRINT" 1-USE PILLOW TO KNOCK LIZARD.   2-TURN O
VER ..QUICKLY.          3-REMAIN STILL"
380 PRINT@H,E$;:INPUTM
390 CLS:IF M<1 OR M>3 THEN380
400 ON M GOTO350,350,410
410 PRINT@F,"HARRY STILL DOESN'T MOVE.":GOSUB110:L=L+1
420 CLS:IFL=1 THEN370 ELSE430
430 PRINT@P,"THE LIZARD IS TIRED OF WAITING ....IT BITES.":GOSUB
110:GOTO1450
440 PRINT@F,"THE CREATURE IS FRIGHTENED AND ....BITES.":GOSUB110
:GOTO1450
450 PRINT@F,"THE TRI-LIZARD IS  A NOCTURNAL CREATURE. IT IS BLIN
DED BY  THE HIGH  INTENSITY  READING LIGHT. HARRY  PULLS OUT HIS
  LASER AND BLASTS IT.":PRINT@H,H$;:GOSUB90
460 PRINT@P,"THE 'ZIRA' ARRIVES AT PILA, ANDHARRY HEADS  FOR THE
   RING CITYCASINO. LEO DRACONE, THE  CASINOOWNER, HIS ARMADILLA
N  BODYGUARDAT HIS SIDE. (THE ARMADILLAN  ISA LARGE, HUMANOID HU
LK WITH GREYARMORLIKE SKIN.)"
470 PRINT" SINCE  DRACONE  HAS  REPORTEDLYBEEN  LINKED  TO  K.R.
U.E.L.     (KIDNAPPING,REVOLT,USURPATION,  EXTORTION LEAGUE), HA
RRY WONDERSWHETHER TO RISK SHOOTING A HOMERDART INTO THE HEEL OF
 THE CASINOOWNER'S SHOE.";:PRINT@H,H$;:GOSUB90
480 PRINT@P,"IF HE HITS IT, HE WILL BE ABLE TO MONITOR DRACONE'S
 MOVEMENTS. IF HE MISSES AND DRACONE  FEELS THE DART, THEY WILL
BE  ALERTED TO HIS PRESENCE.":PRINT@E,W$
490 PRINT@289,"1-FIRE THE DART                2-DON'T FIRE THE
DART          3-WAIT, TO FIRE THE DART IN A  LESS PUBLIC PLACE.
":PRINT@H,E$;:INPUTN
500 CLS:IF N<1 OR N>3 THEN490
510 ON N GOTO520,530,540
520 CLS:PRINT@P,"THE DART HITS PERFECTLY.":D$="D":GOSUB110:GOTO5
50
530 CLS:PRINT@P,"HARRY FORGETS  ABOUT USING THE DART.":GOSUB110:
GOTO550
540 CLS:PRINT@33,"UNFORTUNATELY,  HARRY  DOESN'T GET ANOTHER OPP
ORTUNITY TO FIRE THE DART.":GOSUB110
550 PRINT:PRINT" JUST THEN, HARRY FEELS A TAP ONHIS SHOULDER AND
  TURNS TO SEE ABEAUTIFUL  BLONDE WOMAN IN A REDPLASTO-MOLD JUMP
 SUIT.          SHE SMILES AND SAYS,          'HELLOOO  HANDS
OME !'":PRINT@H,H$;:GOSUB90
```

Listing 2 continues

Listing 2 continued

```
560 PRINT@P,"'WELLLL,  HELLO  THERE, ' HARRYANSWERS,' AND WHAT'S
 YOUR NAME?'":GOSUB110:PRINT:PRINT" 'I'M HONI POTT. I  WORK HERE
.  YOU'RE  NEW ON PILA, AREN'T YOU.WOULD YOU LIKE ME  TO  SHOW Y
OU AROUND?'":PRINT@H,H$;:GOSUB90
570 PRINT@P,"MUCH TO HIS REGRET, HARRY FINDSHIMSELF SAYING,":PRI
NT" 'SORRY HONI, MAYBE  SOME OTHER  TIME.'";:PRINT"      THEN HE
 LEAVES THE CASINO.":PRINT@H,H$;:GOSUB90:PRINT@P,W$
580 PRINT@L," 1-CHECK OUT OBSERVATION DOME.   2-TRY TO FIND THE
PLUTONIUM     3-GAMBLE IN THE CASINO          4-GET A DRINK AT T
HE BAR        5-GO BACK TO HONI POTT":PRINT@H,E$;:INPUTN
590 CLS:IF N<1 OR N>5 THEN580
600 ON N GOTO610,650,660,660,670
610 CLS:PRINT@P,"AT THE DOME HARRY WATCHES THE  SHIPS GO THROUGH
 THE STAR GATE.":PRINT@97,W$:PRINT" 1-STAY AND LOOK FOR CLUES
    2-EXPLORE MORE OF THE CITY":PRINT@E,E$;:INPUTN
620 IF N<1 OR N>2THEN610
630 ON N GOTO640,650
640 PRINT:PRINT" HARRY HAS WASTED TOO MUCH TIME.":GOSUB110:GOTO1
460
650 CLS:PRINT:PRINT" HARRY EXPLORES PILA.":GOSUB110:CLS:GOTO860
660 CLS:PRINT:PRINT" IT SEEMS  THAT  HARRY  HAS BEENCAUGHT UP IN
 THE  SPIRIT OF  THERING CITY AND  LOST SIGHT OF HISGOAL.":PRINT
@H,H$;:GOSUB90:GOTO1460
670 CLS:PRINT:PRINT" HARRY DECIDES THAT  HONI MIGHT BE USEFUL. S
HE IS  HAPPY TO SEE HIM AND  ASKS  WHERE  HE  WOULD LIKE TO GO O
N PILA.":PRINT@H,H$;:GOSUB90:PO$="PO":NU=0
680 NU=NU+1:IFNU>2 THEN720 ELSEPRINT@P," WHERE SHOULD HE GO?
       1-OBSERVATION DOME              2-ASTRO PARK
       3-ENTERTAINMENT COMPLEX         4-LOADING DOCKS
       5-ALIEN ENVIRO-CENTER           6-FUSION GENERATORS"
690 PRINT" 7-HONI'S APARTMENT":PRINT@H,E$;:INPUTN
700 CLS:IF N<1 OR N>7 THEN690
710 ON N GOTO730,740,750,800,760,790,770
720 CLS:PRINT@P,"HE FINDS NOTHING ON HIS TOUR.":GOSUB110:GOTO640
730 PRINT@P,"HARRY WATCHES AS SEVERAL SHIPS APPROACH  AND  WITH
 GREAT CARE PASS THROUGH THE  STARGATE, BUT HE SEES NO TRACE OF
THE MISSING FREIGHTER.":GOTO780
740 PRINT@P,"THE  PARK  IS BEAUTIFUL  UNDER THE  ARTIFICIAL  SUN
, BUT HARRY FINDS NO CLUES.":GOTO780
750 PRINT@P,"HARRY REALLY ENJOYS THIS PLACE BUT HE FINDS NOTHING
, AND  TIME IS QUICKLY RUNNING OUT.":GOTO780
760 PRINT@P,"HARRY AND HONI PEER AT STRANGE ALIEN LIFE FORMS THR
OUGH  THICK GLASS  WALLS, BUT  THERE  IS NO ABNORMAL  RADIATION
 HERE  OR.. ANY OTHER SIGNALS  OR  EVIDENCE THAT  WOULD  INDICAT
E  THAT THE MISSING PLUTONIUM WAS HERE.":GOTO780
770 PRINT@P,"ALAS, HARRY HAS EVIDENTLY MADE THE DECISION THAT HI
S  PERSONAL OBJECTIVES  ARE MORE  IMPORTANT THAN HIS MISSION
     ..... A VERY UNWISE CHOICE UNDER  THE PRESENT CIRCUMSTANCE
S.":.PRINT@H,H$;:GOSUB90:GOTO1460
780 PRINT@H,H$;:GOSUB90:GOTO680
790 PRINT@P,"HARRY'S  WRISTBAND  TRI-CORDER DETECTS RADIATION BU
T IT'S ONLY FROM THE FUSION GENERATORS.":PRINT@H,H$;:GOSUB90:GOT
O680
800 PRINT@P,"HARRY'S  WRISTBAND  TRI-CORDER PICKS  UP  RADIATION
,  BUT  THE DOCKS ARE HUGH AND CAVERNOUS.":PRINT@H,H$;:GOSUB90
810 PRINT@P,W$;:PRINT@97," 1-CHECK OUT EACH WAREHOUSE      2-ASK
 HONI                      3-USE THE TRI-CORDER            4-CAL
L U.E.C. FOR ASSISTANCE    5-SNOOP AROUND SOME MORE":PRINT@H,E$;
:INPUTN
820 CLS:IF N<1 OR N>5 THEN810
830 ON N GOTO840,850,640,84■
840 PRINT@P,"THERE ARE TOO  MANY  WAREHOUSE PODS TO EXPLORE.":PR
INT@H,H$;:GOSUB90:GOTO640
850 PRINT@P,"SINCE  THE  FREIGHTER WAS JUST REPORTED MISSING ONL
Y YESTERDAY HARRY ASKS HONI WHERE THE CARGO IS  FIRST  RECEIVED.
 SHE POINTS TO THE MASTER INVENTORY CONTROL CENTER.  HARRY  EXCU
SES HIMSELF AND LEAVES HER.":PRINT@H,H$;:GOSUB90
860 PRINT@P,"USING  HIS  TRI-CORDER,  HARRY LOCATES  THE MISSING
  PLUTONIUM CONTAINERS, BUT THEY ARE EMPTY. ONLY RESIDUAL RADIAT
ION REMAINS BEHIND."
870 PRINT@H,H$;:GOSUB90:PRINT@P,W$
880 PRINT" 1-CALL U.E.C. AND REPORT        2-KEEP LOOKING AROUND
":PRINT@E,E$;:INPUTN
890 CLS:IF N<1 OR N>2 THEN880
900 ON N GOTO930,910
910 PRINT@P,"HARRY FINDS NOTHING......HOURS HAVE PASSED":INPUT"
SHOULD HE KEEP LOOKING (Y/N)";Q$
920 IFQ$="Y" THEN640 ELSE CLS:GOTO910
930 PRINT@P,"HARRY RUNS TO  HIS HOTEL  ROOM TO U.E.C. THAT THE P
LUTONIUM IS ON PILA. BUT BEFORE HE CAN CALL HIS  ROOM  IS  JETTI
SONED  INTO SPACE, AND  A VOICE  COMES OVER A SPEAKER. IT IS LEO
 DRACONE.":PRINT@H,H$;:GOSUB90
940 PRINT@P,"'HELLO COMMANDER FLYNN.  SORRY TO HAVE  HAD TO  EVI
CT  YOU  SO FORCEFULLY  FROM  PILA, BUT YOU WERE BECOMING MEDDLE
SOME.'":PRINT@H,H$;:GOSUB90
950 PRINT@P,"'JUST WHAT DO YOU PLAN TO DO ATPILA,' QUESTIONED HA
RRY.":PRINT@H,H$;:GOSUB90
960 PRINT@P,"'QUITE SIMPLE  COMMANDER. WITH THE  PILA  STARGATE
 GONE,  THE ONLY  MEANS  OF TRADE WITH  THE GALAXY  OF  ANDROMED
A  WILL  BE THROUGH A NEW GATE THAT WE HAVE DISCOVERED. ...K.R.U
.E.L.  WILL CONTROL  ALL  INTER-GALACTIC    TRANSPORTATION."
970 PRINT" IT WILL  BE WORTH  BILLIONS OF GALACTIC CREDITS ANNUA
LLY.       I MUST LEAVE YOU NOW AND  MAKE FINAL PREPARATIONS FOR
 THE MOST UNFORTUNATE  CATASTROPHY  ABOUT TO TAKE PLACE.'":PRINT
@H,H$;:GOSUB90
980 PRINT@P,"'I ESTIMATE THAT YOU HAVE ABOUT10 MINUTES OF  AIR
LEFT IN YOURROOM.'":PRINT:PRINT"    'GOOD BYE COMMANDER!'":PRINT
@H,H$;:GOSUB90
990 PRINT@P,W$:PRINT@97," 1-RADIO FOR HELP                  2-LEAV
E THE ROOM POD             3-TRY TO FLY THE POD             4-BREA
THE SLOWER                 5-WAIT TO BE RESCUED":PRINT@H,E$;:INPU
TN
1000 CLS:IF N<1 OR N>5 THEN990
1010 ON N GOTO1020,1030,1040,1050,1060
1020 PRINT@P,"THE RADIO NO LONGER FUNCTIONS!":GOSUB110:GOTO1450
1030 PRINT@P,"ARE YOU C R A Z Y !":GOSUB110:GOTO1450
1040 PRINT@P,"HAVE  YOU  EVER  TRIED TO  FLY A HOTEL ROOM???":GO
SUB110:GOTO1450
1050 PRINT@P,"THIS GIVES HARRY ABOUT  5 MORE MINUTES... BEFORE H
E DIES.!!":GOSUB110:GOTO1450
1060 IFPO$="PO" THEN1070 ELSEPRINT@129,"HARRY HAS  NO FRIENDS  O
N PILA TO HELP HIM.":PRINT@H,H$;:GOSUB90:GOTO1450
1070 PRINT@129,"IT'S  A GOOD THING  HARRY MADE FRIENDS WITH HONI
. SHE  WAS  ON HER WAY TO HIS ROOM WHEN IT WAS JETTISONED. SHE P
ICKS HIM UP IN A SERVICE SHUTTLE. ONCE  ABOARD THE SHIP HE SPEED
S BACK TO PILA.":PRINT@H,H$;:GOSUB90
1080 PRINT@P,"HE  MUST  STOP  DRACONE  FROM  SETTING THE BOMBS
AND  MAKING  GOOD HIS ESCAPE.":PRINT@H,H$;:GOSUB90
1090 IFD$="D" THEN1100 ELSEPRINT@P,"BUT PILA IS A LARGE PLACE WI
TH SHIPS  ARRIVING  AND  DEPARTING CONTINUOUSLY. HARRY  CAN'T FI
ND DRACONE IN TIME.":PRINT@H,H$;:GOSUB90:GOTO1460
1100 PRINT@P,"LUCKILY, THE  HOMER  DART  IN  DRACONE'S SHOE IS T
ILL WORKING. AS SOON AS HE DOCKS, HARRY SETS OUT AFTER HIM.":PRI
NT@H,H$;:GOSUB90
```

Listing 2 continues

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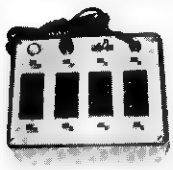
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Listing 2 continued

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1110 PRINT@P,"BUT OUT OF  THE  SHADOWS LEAPS THE ARMADILLAN. HE
 GRABS HARRY IN A VISE-LIKE GRIP!!!":PRINT@H,H$;:GOSUB90:AR=0
1120 AR=AR+1:IFAR>2 THEN1170 ELSEPRINT@P,W$
1130 PRINT@L," 1-USE KARATE                    2-BITE HIM
              3-CRY FOR HELP                   4-BREAK FREE
              5-SOCK HIM                       6-STEP ON HIS FOO
T             7-TRY TO BRIBE HIM"
1140 PRINT" 8-PRETEND TO FAINT":PRINT@H,E$;:INPUTN
1150 CLS:IF N<1 OR N>8 THEN1140
1160 ON N GOTO1180,1180,1180,1180,1190,1180,1180,1180
1170 CLS:PRINT@129,"HARRY HAS RUN OUT OF CHANCES.  HE DOESN'T GE
T PAST THE POWERFULARMADILLAN.":PRINT@H,H$;:GOSUB90:GOTO1450
1180 PRINT@P,"SUCH ACTION IS USELESS WHEN IT COMES TO FIGHTING A
N ARMADILLAN.":PRINT@H,H$;:GOSUB90:GOTO1120
1190 PRINT@P,"HARRY  JABS AT  THE CREATURE'S JAW. HIS  LASER  RI
NG FLASHES A RUBY  RED  PULSE, .....AND  THE ARMADILLAN FALLS TO
 THE FLOOR.":PRINT@H,H$;:GOSUB90
1200 PRINT@P,"HARRY  LOCATES  DRACONE  IN  A LARGE AIRLOCK  WITH
  A DOZEN OR SO GUARDS. THEY ARE STUDYING  A LARGE CHART  SHOWIN
G  THE  PILA AIR CONTROL SYSTEM,......WITHIN WHICH DRACONE  HAS
 HIDDEN  THE BOMBS.":PRINT@H,H$;:GOSUB90
1210 PRINT@P,W$
1220 PRINT@L," 1-CALL FOR HELP                 2-BLAST THEM WITH
 HIS LASER     3-EXAMINE THE AIR LOCK          4-USE MINI-NUKE S
HIRT BUTTON      GRENADE TO BLOW THEM OUT"
1230 PRINT@H,E$;:INPUTN
1240 CLS:IF N<1 OR N>4 THEN1230
1250 ON N GOTO1260,1270,1290,1280
1260 PRINT@P,"IT'S TOO LATE FOR THAT NOW!":GOSUB110:GOTO1210
1270 PRINT@P,"THERE'S TOO MANY OF THEM..... YOU LOOSE.":PRINT@H
,H$;:GOSUB90:GOTO1450
1280 PRINT@P,"THE  GRENADE  IS TOO POWERFUL. IT BLOWS OUT  A SEC
TION  OF THE CITY AND THIS SETS  OFF  ONE OF DRACONE'S BOMBS.":P
RINT@H,H$;:GOSUB90:GOTO1450
1290 PRINT@P,"HARRY  LOCATES  THE  AIR  LOCK CONTROLS, SHUTS THE
 INNER DOORS AND  PUMPS  OUT  THE AIR  UNTIL EVERYONE IN THE CHA
MBER  PASSES OUT. HE  THEN  STARTS  TO  CALL U.E.C. TO HAVE DRAC
ONE, AND HIS MEN, PICKED UP WHEN..."
1300 PRINT:PRINT"   ******** B O O M ********":PRINT@H,H$;:GOSUB
90
1310 PRINT@P,"HARRY LOOKED  THROUGH  THE AIR LOCK WINDOW. DRACON
E  HAD  BEEN WEARING AN  ENVIRONMENTAL SUIT, AND  HE HAD  BLASTE
D  A HOLE IN THE OUTER WALL. HE  HAD  KILLED HIS GUARDS, BUT GAI
NED  HIS OWN FREEDOM. HARRY WAS FURIOUS.":PRINT@H,H$;:GOSUB90
1320 PRINT@P,W$
1330 PRINT@P," 1-GET AN ENVIRONMENTAL SUIT       AND GO AFTER HI
M             2-GET A SHIP AND GO AFTER HIM   3-SEE IF THE HOME
R DART          IS STILL TRANSMITTING"
1340 PRINT@E,E$;:INPUTN
1350 CLS:IF N<1 OR N>3 THEN1340
1360 ON N GOTO1370,1380,1390
1370 PRINT@P,"TOO MUCH  TIME  IS LOST  WHILE HARRY TRIES TO GET
A SUIT..... DRACONE GETS AWAY.":PRINT@H,H$;:GOSUB90:GOTO1460
1380 PRINT@P,"HARRY  WASTES  TOO MUCH  TIME  TRYING TO GET A SHI
P.  DRACONE  GETS AWAY.";PRINT@H,H$:GSUB10:GOTO1460
1390 PRINT@P,"HARRY  PICKS UP THE SIGNAL. IT LEADS  TO  THE  EXE
CUTIVE SUITE ABOVE THE CASINO. LASER  GUN IN HAND, HARRY KICKS O
PEN THE DOOR AND FINDS IN THE MIDDLE  OF THE ROOM.....":GOSUB11
0
1400 PRINT@230,"DRACONE'S SHOES":GOSUB110:PRINT:PRINT" SUDDENLY
THE LIGHTS GO OUT  AS HARRY IS STRUCK FROM BEHIND.":PRINT@H,H$;:
GOSUB90
1410 PRINT@P,"DRACONE RUNS TO THE LAUNCH BAY AND  CLIMBS  INTO
HIS  PRIVATE SHUTTLE. HARRY STAGGERS TO  HIS FEET AND RUNS DOWN
THE CORRIDOR AFTER  HIM. AS  DRACONE'S  SHIP LEAVES  THE  BAY,
HARRY  FIRES SEVERAL QUICK BURSTS...":PRINT@H,H$;:GOSUB90
1420 PRINT@P,"ONE..TEARS INTO AND  VAPORIZES THE SHUTTLE'S  STAB
ILIZER UNIT. THE SHIP BUCKS ONCE,THEN AGAIN. PEOPLE IN THE OBSER
VATION  DOME SCREAM  AS THEY  SEE  THE  SHIP ENTER THE STARGATE
AT THE WRONG ANGLE. IN AN INSTANT  THE  SHIP VANISHES..."
1430 PRINT" FOREVER LOST SOMEWHERE  IN THE FABRIC OF SPACE AND T
IME.":PRINT@H,H$;:GOSUB90
1440 CLS:FORTM=1 TO4:SOUNDQ,1:SOUNDR,1:NEXT:PRINT@P,"      CONGR
ATULATIONS              MISSION   ACCOMPLISHED!!":GOSUB110:PRINT@
417,"NOW LET'S SEE ...........WHERE  IS HONI'S APARTMENT?":GOSUB
110:CLS2:GOSUB1520:PRINT@172,"THE END";:GOSUB110:END
1450 CLS0:GOSUB100:PRINT@168,"good";CHR$(128);"bye";CHR$(128);"h
arry";:PRINT@H,H$;:GOSUB90
1460 CLS:PRINT@132,"THE MISSION IS A FAILURE.":PRINT@194,"PILA H
AS BEEN BLOWN TO ATOMS,":PRINT@270,"AND":PRINT@322,"THE STARGATE
 IS LOST FOREVER."
1470 PRINT@H,H$;:GOSUB90
1480 PRINT@161,"WANT TO TRY AGAIN? (Y/N)";
1490 INPUTD$:CLS:IFD$="Y" THEN260
1500 IFD$="N" THEN1510
1510 PRINT@162,"NOW THE FORCES OF K.R.U.E.L.     WILL TRIUMPH UN
OPPOSED!":PRINT@267,"THE END";:GOSUB110:END
1520 XX=63:FORX=1024 TO1055:POKEX,XX:POKEX+480,XX:NEXT:FORX=1024
 TO1504 STEP32:POKEX,XX:POKEX-1,XX:NEXT:RETURN
```

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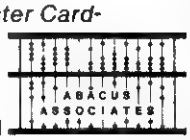
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Lisp: Basically Speaking—Part II

by Randy Beer

Learn how you can use Lisp's LAMBDA, NLAMBDA, and DEFINE atoms in the second installment of this tutorial.

In Lisp, programs are written by defining functions. Once defined, a function has all the power of a predefined function, but is executed more slowly because it is interpreted. In standard Lisp systems, this difference in speed is almost unnoticeable for average-length functions; in Basic Lisp this difference is more obvious.

In defining a simple function that computes miles per gallon of gasoline when given the number of miles a car has driven and the number of gallons used, the following line is not particularly readable: (DEFUN MPG (MILES GALLONS)(DIV MILES GALLONS)). The same function can be written by using an indented form called pretty-printing. It is entered by typing the first line, hitting return, spacing over, and typing the second line. Thus, the same function would appear as:

```
(DEFUN MPG (MILES GALLONS)
  (DIV MILES GALLONS))
```

The interpreter would be happy with either form, but entering functions with indentations makes them easier to read, and also helps you keep track of parentheses.

There are several important parts to a function definition. A definition begins with the atom DEFUN, which signals that a function is being defined. This is followed by a function name, a parameter list, and a function body, which may be composed of any number of s-expressions. The value of the last s-expression in the body will be returned as the value of the entire function call.

The parameter list is a list of local variables that are to be used in the function body. When a function is called, any old values of the atoms that appear in the parameter list are saved and the atoms are bound to the values of the arguments to the function call.

The atoms in the parameter list are called the "formal" parameters and the values that they are assigned are called the "actual" parameters. There must be one formal parameter for each actual parameter. Then the body of the function is evaluated one s-expression at a time with the new values, the formal parameters are returned to their original values, and the value of the last s-expression in the body is returned.

Let's go through a sample call on MPG. Assume that the value of MILES is 10 and the value of GALLONS is (ONE QUARTER TANK) before the function call. To compute the miles per gallon achieved by a car that traveled 100 miles on four gallons of gas, you would call your new function with the above values: (MPG 100 4).

When the interpreter runs across a call on MPG, the first thing it does is go to its parameter list and save the values of all the atoms that appear there. Then the arguments to the call are assigned to the formal parameters one by one: The first argument is assigned to the first formal parameter, and so on.

In this case, the values 10 and (ONE QUARTER TANK) are saved and MILES and GALLONS are bound to 100 and 4, respectively. Then the single s-expression in the body is evaluated. (DIV MILES GALLONS) means divide 100 by 4. Finally, MILES and GALLONS are reassigned their old values and 25 is returned and printed on the screen.

One problem with Basic Lisp is that if, in the midst of a user-defined func-

tion call, the interpreter comes across an error, it returns immediately with an error message, with the formal parameters still bound to the values assigned to them within the function.

Unfortunately, their old values are lost forever. This can be used to advantage since their values inside the function can be examined and possibly aid in determining the cause of the error. Standard Lisp systems usually allow the old values of the formal parameters to be recovered.

To see your function definition pretty-printed, the PRINTF function is provided: (PRINTF MPG). The LAMBDA that appears when a function is pretty-printed will be explained later. Note that PRINTF does not evaluate its single argument, so there is no need to quote it.

A predefined function that evaluates its arguments is called a SUBR and one that doesn't is called an NSUBR. Table 1 contains a complete list of all predefined functions in Basic Lisp, along with their types. Some of these functions have not yet been introduced and will be described shortly.

Predicates and Branching

A predicate is a function that performs a test and returns either T or NIL depending on whether the test is true or false. The predicate ATOM, for instance, tests to see if its single argument is an atom. Another predicate, NUMBERP, tests whether or not its argument is a number.

EQ is a predicate that tests whether its first argument is exactly the same as its second. It returns T when both arguments are the same atom, for example. However, when comparing two lists, EQ will return T only if they are represented by the same memory cells—that is, only if they are identical, which is usually not the case.

Normally you would only use EQ to compare atoms. When you want to see if two lists are equivalent, use the function EQUAL. Though this predicate isn't predefined in Basic Lisp, you will see how to define it yourself, shortly.

The remaining predicates are GREATERP and LESSP. They both take a variable amount of numbers as arguments. GREATERP tests whether its arguments are in descending order (if the first is greater than the second, the second greater than the third, and so on). LESSP checks to see if its arguments are in ascending order (the first is less than the second, and so on). Figure 1 contains some examples of these predicates in use.

The functions AND and OR allow compound tests to be made. AND evaluates its arguments from left to right until a NIL is encountered, at which point it returns NIL, leaving the rest of its arguments unevaluated. If no NIL is encountered, AND returns the value of its last argument.

In contrast, OR evaluates its arguments from left to right until something other than NIL is encountered, then its value is returned, leaving the remaining arguments unevaluated. Otherwise, OR returns NIL.

The function NOT logically negates its argument. (NOT T) is NIL and (NOT NIL) is T. Examples of the use of AND, OR, and NOT can also be found in Fig. 1.

You now need some type of branching mechanism, so that various s-expressions can be evaluated depending on the results of a test. The Lisp function COND lets you do exactly that. A COND expression is made up of the atom COND followed by a number of lists, each of which contains a test to perform, and s-expressions to evaluate if the test returns a non-NIL result. Each of these lists is called a clause.

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If none of the tests succeed, NIL is returned. Often, the last test in a COND is simply the atom T, which is always non-NIL. This final clause can be thought of as an "if all else fails do," because it prevents the COND from failing to find any non-NIL tests and simply returning NIL.

To show how a COND might be useful, I'll define a function that returns the absolute value of a number. The function definition of ABS is given below.

```
(DEFUN ABS (X)
  (COND
    ((LESSP X 0) (MINUS X))
    (T X)))
```

Note that ABS makes use of another function called MINUS, which negates its argument. This function isn't predefined in Basic Lisp, but you can easily define it yourself as:

```
(DEFUN MINUS (N)
  (SUB 0 N))
```

When a call is made on ABS, the previous value of X is saved and X is bound to the value of its single numerical argument. Then the clauses in the COND are evaluated one at a time. The first clause tests to see if the number is less than zero. If it is, its negation is returned and the function call is finished. If it isn't, the second clause is evaluated and, since T appears, the original number is simply returned. Try a few calls on ABS to assure yourself that it works.

Looping and Recursion

To write any useful functions, you must have some type of looping mechanism available that lets you repeat a set of s-expressions a given number of times. Basic Lisp provides two looping functions called DOWHILE and DOUNTIL. These functions are similar to WHILE loops in Pascal in that they are a form of structured looping without a GOTO. Standard Lisp provides another kind of looping mechanism that allows GOTOs, but it will not be covered in this series.

The syntax of DOWHILE and DOUNTIL loops is simple. A DOWHILE loop consists of the atom DOWHILE, a test to be performed, and a series of s-expressions to evaluate. DOUNTIL is similar except that the s-expressions are evaluated only if the test fails. They can be read as "DOWHILE some condition is true" and "DOUNTIL some condition is true," respectively.

A DOWHILE loop returns NIL when it is finished and a DOUNTIL loop returns T, thus the s-expressions in them can only be evaluated for their side-effects. To return a value from a DOUNTIL loop, substitute a COND expression for the test. Then, when the loop is finished, the COND will return the value in the second half of its clause.

A COND cannot be used to return a value from a DOWHILE loop. This returned value must not be NIL in a DOUNTIL loop or the interpreter will think that the test hasn't succeeded and will continue to loop forever.

Figure 2 contains examples using these loops, as well as an example using a COND to return a value. DO loops aren't a standardized Lisp construct, so the operation of DOWHILE and DOUNTIL are peculiar to Basic Lisp.

Let's define a function that uses looping to find the factorial of a number. The factorial of any number is found by multiplying the given number times that number minus one, times that number minus two, and so on until one is reached. (The factorial of 5, written as 5!, is $5\times4\times3\times2\times1 = 120$.) The function FACT, defined below, loops around, decrementing the number N and multiplying it into the temporary variable X until N equals zero, then it returns X, whose value will be the factorial of N.

```
(DEFUN FACT (N)
  (SETQ X 1)
  (DOUNTIL (COND
             ((EQ N 0) X))
    (SETQ X (MUL X N))
    (SETQ N (SUB N 1))))
```

Since X does not appear as a formal parameter in the parameter list, its old value will not be saved when FACT is called. X is known as a global or free variable, while N is called a local or

Function	Type*	Number of Arguments
AND	FSUBR	variable
ADD	SUBR	variable
APPEND	LSUBR	variable
ATOM	SUBR	1
CAR	SUBR	1
CDR	SUBR	1
COND	FSUBR	variable
CONS	SUBR	2
DEFUN	FSUBR	variable
DELETE	SUBR	2
DIV	SUBR	2
DOUNTIL	LSUBR	variable
DOWHILE	LSUBR	variable
EQ	SUBR	2
EVAL	SUBR	1
GREATERP	LSUBR	variable
LESSP	LSUBR	variable
LIST	LSUBR	variable
LOAD	-	0
MUL	LSUBR	variable
NOT	SUBR	1
NUMBERP	SUBR	1
OR	FSUBR	variable
PATOM	SUBR	1
POWER	SUBR	2
PRINT	SUBR	1
PRINTF	NSUBR	1
QUOTE	NSUBR	1
READ	-	0
SAVE	-	0
SET	SUBR	2
SETQ	FSUBR	variable
SUB	SUBR	2
%	-	0

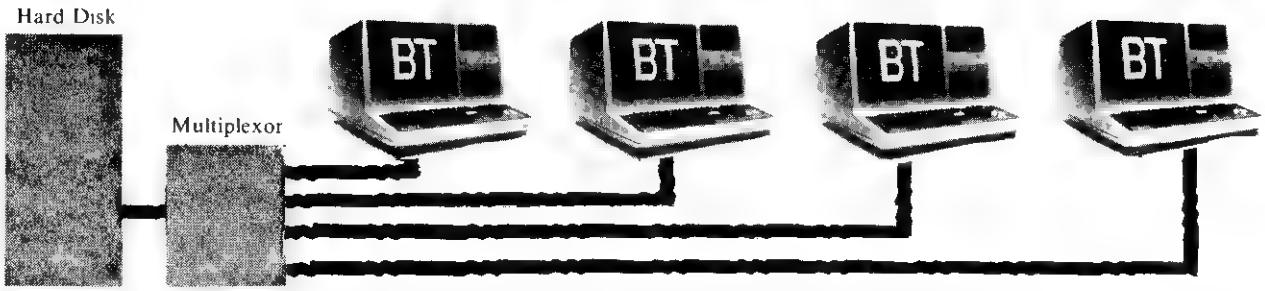
*A SUBR takes and evaluates a fixed number of arguments, a FSUBR takes a variable number of arguments (of which any number may be evaluated, from one to all), a LSUBR takes a variable number of arguments that are all evaluated, and an NSUBR takes a fixed number of unevaluated arguments. For simplicity, the text makes no distinction between a SUBR, FSUBR, or LSUBR because they all evaluate at least some of their arguments.

Table 1. Predefined Functions in Basic Lisp

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bound variable. This is an important distinction because the value of the free variable X is permanently altered within FACT, while the value of N is not.

```
$ (EQ 1 2)
NIL

$ (EQ NIL '( ))
T

$ (ATOM 5)
T

$ (ATOM '(A B C))
NIL

$ (ATOM 'HELLO)
T

$ (NUMBERP 5)
T

$ (GREATERP 5 1    10)
T

$ (LESSP 6 0)
NIL

$ (LESSP 0 6)
T

$ (AND (EQ 'A 'A) (ATOM 'A))
T

$ (AND (NUMBERP 'A) T)
NIL

$ (OR (NUMBERP 'A) T)
T

$ (NOT (EQ 1 2))
T

 $ (AND 6 (EQ 1 1) (ADD 2 2))
4
```

Fig. 1. Predicates

Basically, any atom that does not appear in a function's parameter list is free, while any atom that does appear there is bound with respect to that function. A demonstration of the difference between free variables and bound variables appears in Fig. 3.

Lisp is especially suited to the task of writing recursive functions. A recursive function is one that solves a problem by repeatedly simplifying it and calling itself on the simplified problem until the problem has been reduced to a trivial case, whose solution is obvious. Consider the following definition of the factorial function:

```
$ (SETQ N 0)
0

$ (DOWHILE (LESSP N 5)
        (SETQ N (ADD N 1)))
NIL

$ N
5

$ (DOUNTIL (EQ N 0)
        (SET Q N (SUB N 1)))
T

$ N
0

$ (DOUNTIL (COND
                ((GREATERP N 10) N))
        (SETQ N (ADD N 2)))
11
```

Fig. 2. Looping with DOWHILE and DOUNTIL

if n = 0: factorial (n) = 1
if n □ 0: factorial (n) = n*factorial (n – 1)

Think about the above definition until it makes sense. The second line may appear to be circular at first, but notice that each time factorial is called, n is decremented by one. Eventually, n will equal zero and no more recursion will be necessary because the factorial of zero is defined to be one.

It is important to have at least one trivial case in any recursive definition so that the recursion will eventually stop when this case is reached. Otherwise, an infinite recursive loop will result in much the same way as a regular infinite loop can occur in Basic.

The above recursive definition of the factorial function can be translated almost directly into a recursive Lisp function. Each line of the definition becomes one clause in a COND in the function FACT shown below. Compare this definition with the iterative one previously given.

```
(DEFUN FACT (N)
  (COND
    ((EQ N 0) 1)
    (T (MUL N (FACT (SUB N 1))))))
```

It has been proven that any recursive function can be rewritten as a loop, and vice versa, but a recursive definition is often shorter and more elegant for certain types of problems.

I'll run through a sample call on FACT, namely (FACT 1). When the function is called, the old value of N is saved and N is bound to 1. Since (EQ N 0) is false, the second clause is evaluated: (MUL N (FACT (SUB N 1))).

Continues on p. 261



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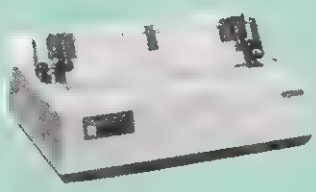


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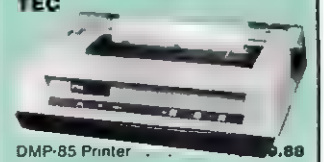
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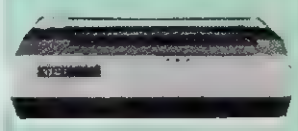
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Continued from p 258

FACT is called again, with the old value of N (which was 1) saved and N bound to the result of (SUB N 1) or 0.

This time, the first clause succeeds and the second call on FACT ends by restoring N to 1 and returning 1. Now the first call on FACT can finish by multiplying N by (FACT (SUB N 1)), both of which equal 1, in this case, and returning the result as the answer.

If you find recursion confusing, run through a deeper call on FACT such as (FACT 3) to see how the problem is simplified each time that FACT calls itself. Though difficult to grasp at first, recursion is an important concept in Lisp.

As further practice in the use of recursion, I'll define the function EQUAL mentioned earlier, as shown below.

```
(DEFUN EQUAL (X Y)
  (COND
    ((ATOM X) (COND
                ((ATOM Y) (EQ X Y))
                (T NIL)))
    ((ATOM Y) NIL)
    ((EQUAL (CAR X) (CAR Y))
     (EQUAL (CDR X) (CDR Y)))
    (T NIL)))
```

To understand how EQUAL works, examine the clauses in the COND one by one.

The first clause can be read as "if X is an atom then if Y is an atom then see if they are EQ, else return NIL." It is perfectly legitimate to nest CONDs. If the first clause fails, but the second one succeeds (that is, if Y is an atom, but X is not) then NIL is returned because an atom can never be equal to a nonatom. If this clause also fails, then neither X or Y are atoms and recursion must be used to dissect them until a trivial case is reached in which either X or Y or both are atoms.

If (EQUAL (CAR X) (CAR Y)) is true, then (EQUAL (CDR X) (CDR Y)) is evaluated. Otherwise, NIL is returned. By applying successive CARs and CDRs to the values of X and Y, they will eventually be reduced to the trivial case (where at least one of them is an atom) and the recursion will terminate.

LAMBDAs and NLAMBDAs

Whenever you pretty-print a function that you've defined, you'll probably notice that the atom LAMBDA has been stuck in by the interpreter, along with an extra level of parentheses. When a function is defined, the atom for which the function is named gets bound to a list containing the atom LAMBDA, the parameter list, and the function body.

When the interpreter later evaluates a call on that function, the presence of LAMBDA tells it that the rest of the list is a user-defined function to be evaluated. In addition, LAMBDA tells the interpreter that the arguments to the function call are to be evaluated before they are bound to the formal parameters. This makes LAMBDA expressions, as they are called, the user-defined equivalent of SUBRs.

"Lisp is suited to the task of writing recursive functions."

As you would expect, there is also a way to define functions that do not evaluate their arguments. These are called NLAMBDA expressions. An NLAMBDA expression has only one formal parameter and, after having its old value saved, is bound to a list of all the unevaluated arguments to the function call.

Suppose that TEST is an NLAMBDA expression whose single formal parameter is N. Then a call like (TEST THREE) would result in N being bound to the list (THREE).

A similar function defined as a LAMBDA expression would result in N being bound to the value of THREE (presumably 3). Also, since the arguments to an NLAMBDA expression are never evaluated, a call like (TEST THREE 1 (A B)) would be just as valid, with N now being bound to the list (THREE 1 (A B)). With a LAMBDA expression, the number of formal and actual parameters must always be equal, but an NLAMBDA expression can take any number of arguments.

```
$ (SETQ BOUND 10)
10

$ (SETQ FREE 10)
10

$ (DEFUN TEST (BOUND)
        (SETQ BOUND 0)
        (SETQ FREE 0))
TEST

$ (TEST 1)
0

$ BOUND
10

$ FREE
0
```

Fig. 3. Free and Bound Variables

To see one case in which an NLAMBDA expression might be useful and to demonstrate the power of the atoms LAMBDA and NLAMBDA, I'll define a function that defines LAMBDA expression in much the same way as DEFUN does. DEFINE is defined below.

```
(DEFUN DEFINE (NLAMBDA (L)
    (SET (CAR L) (CONS
                   'LAMBDA
                   (CDR L)))
    (CAR L)))
```

Note the difference in syntax in defining NLAMBDA expressions. This syntax is at least partially peculiar to Basic Lisp.

Presumably, the only thing that makes something a function is the presence of either the LAMBDA or the NLAMBDA atoms. This would lead you to believe that you could make any list into a function simply by adding LAMBDA as its first element. In fact, this is how DEFINE works.

This is how it is possible in Lisp for one function to write or modify another, or even itself. A function is simply an ordinary list with LAMBDA or NLAMBDA as its first element. It can be dissected, modified, and reassembled just as any other list. To see how this idea can be put to use, go through a sample call on DEFINE, as shown below.

```
(DEFINE ADD1 (X)
  (ADD X 1))
```

In this example, L will be bound to the list (ADD1 (X) (ADD X 1)). Notice also that any function defined with DEFINE is still pretty-printed with DEFUN, because the pretty-printer assumes that all functions are defined using DEFUN.

I've come a long way from a simple function like MPG to a function-defining function like DEFINE. There is no limit to how far this idea can be carried. Functions can be written that write long and complex programs, a well as perform more traditional tasks, using the concepts introduced here. ■

Contact Randy Beer at 911 Lex-Ontario Road, Mansfield, OH 44903.

A nearly universal EPROM programmer.

OMNIPROM

Bob Hart
2946 Merriman Road
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Most early EPROM programmers were designed for one job and one type of EPROM. Even when the programmer evolved into a plug-in accessory to a microcomputer, it was seldom possible to program more than a couple of types. Now, because of the similarity of the available devices, the programmer itself can easily be programmed to accommodate most varieties of EPROMs.

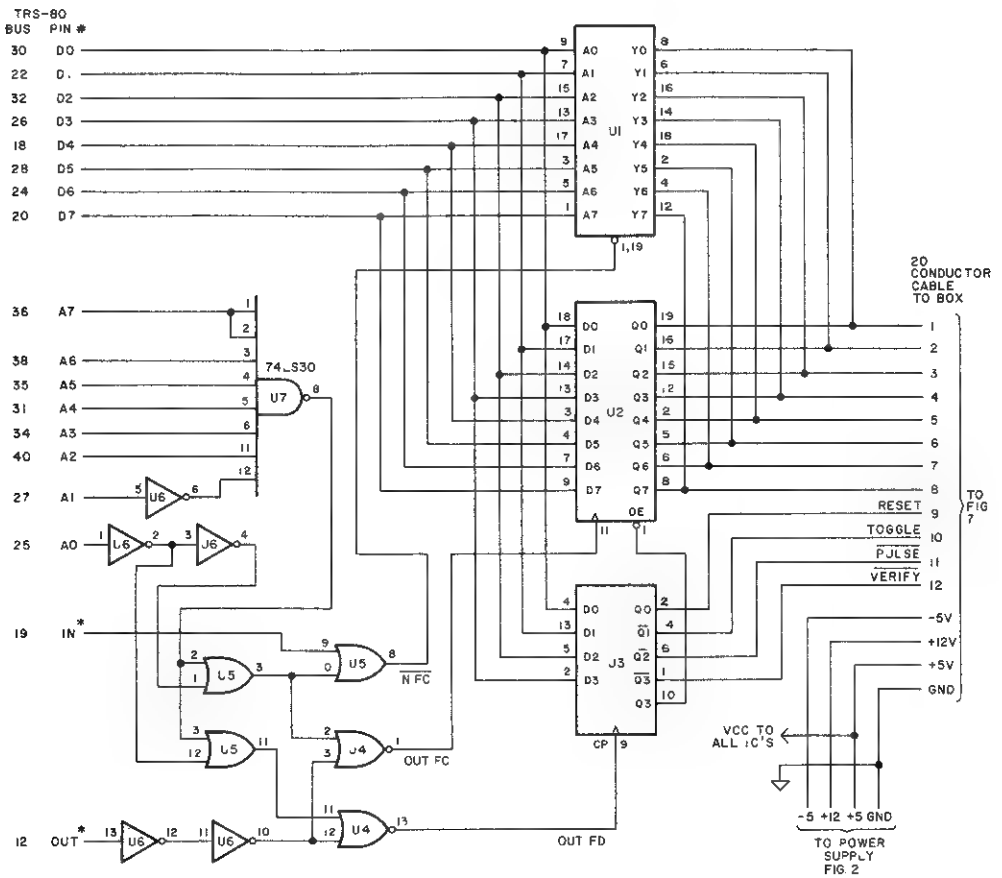
The System

OMNIPROM consists of three parts: a Z80-based computer, a control program, and a hardware interface for the EPROM. It can program 2704, 2708, 2716 and 2732 types, and should also work on 2764, TMS2716, 2532 and 2564 types. (I have not tried those.)

The system will verify that the EPROM is erased, copy data from another ROM or EPROM, program from any memory location, verify programming, and program the above chips. To connect the device to your computer you need one 8-bit input port, an 8-bit output port, and a 4-bit output port. These ports connect to a programming box that contains a 25-volt power converter (12 volts in, 25 volts out), an address counter, various control circuits, and a socket for the EPROM. The separate programming box allows you to work where it is convenient rather than trying to grope behind the computer to wherever the port interface is plugged in.

Input and Output

To write to the EPROM, eight bits of data have to be extracted from the computer's bus and presented to the EPROM's data pins. Alternately, to read the chip, the data on those same pins must be made available to the computer bus. For these



# TYPE	5V PIN	GROUND
U1 - 8ILS97	20	10
U2 - 74LS374	20	10
U3 74LS175	16	8
U4 - 74LS02	14	7
U5 74LS32	14	7
U6 - 74LS14	14	7
U7 - 74LS30	14	7

*INPUT AND OUTPUT BYPASS +5 VOLTS WITH 0.1μF DISK CAPACITORS.

Fig. 1. Input and Output

The Key Box

Model I
32K RAM
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functions we need an 8-bit output port (for writing) and an 8-bit input port (for reading).

The largest EPROMs use 13 address lines. Rather than run all 13 back to the computer bus (through two additional output ports), I use a 12-stage counter in the programming box to provide address information. Only two controls are needed for this counter: Reset (start at address zero) and Toggle (go to next address). The toggle line provides the thirteenth address. Two additional controls complete the system: Program/Verify and Pulse. A 4-bit output port handles all control functions.

Circuit details for the interface board are shown in Fig. 1. Rather than stealing power from the computer, I provided the interface with its own source of +12 volts, +5 volts and −5 volts. The 8-bit input port (for reading) is U1 and the 8-bit output port is U2 (for writing). The control port is implemented using U3. The rest of the circuit is used for decoding the port addresses. In this case, the 8-bit input/output port is at address 252 (FC hex) and the control port is at 253 (FD hex). All connections to the programming box are made through a 20-conductor ribbon cable. This cable carries power as well as data to the programming box.

Programming Box

The other end of that cable connects to a small plastic box (see the photo and Fig. 7) containing the rest of the circuitry for EPROM reading and programming. All components are attached to the cover, allowing easy disassembly and repair. (You might want a slightly larger box—the parts are crowded into this one.)

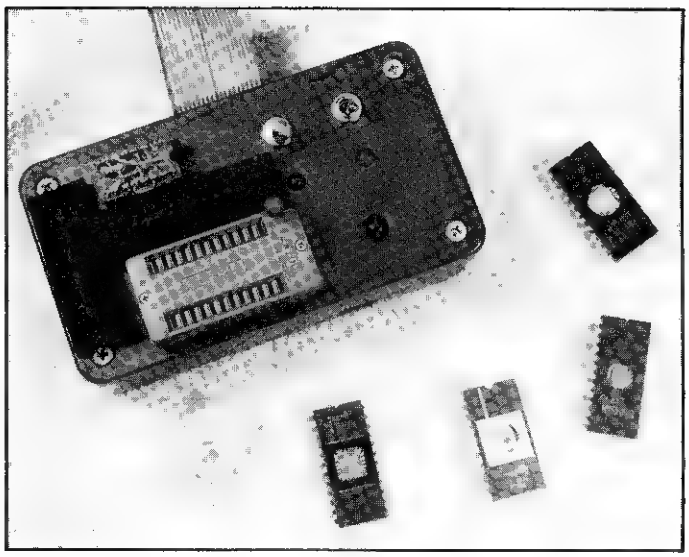
Programming EPROMs requires a 25 or 26-volt power supply. To avoid building one more ac supply, I decided to construct a dc-to-dc converter. It runs on +12 volts and puts out a regulated +25 volts. From experience with other low power dc-dc converters, I was prepared for marginal operation at best. I was surprised. This circuit, adapted from National Semiconductor Application Note AN-183, is a winner. Using an inductor in a flyback circuit, as much as 60 volts at 100 ma can be produced. That's why a regulator circuit holds the output to the desired 25 volts. Although I am using 12 volts as the input to the converter, 5 volts would also work. This is especially handy if you use nothing but 5-volt supply EPROMs (anything but 2704, 2708 and TMS2716). In that case, only 5 volts need be supplied to the programming box.

The address data for the EPROM is supplied by a 12-stage CMOS counter (U10) and the Toggle input from the port board. Every time the Toggle signal returns to "one," the counter advances by one. This combination gives a total of 8,192 different addresses, sufficient for the largest EPROMs now available.

The rest of the contents of the box can be classified as control circuitry. A transistor switch controls the 25-volt programming signal to the EPROM (Q2-4). Control signals from the port board are buffered by Schmitt input inverters (U8) to help prevent noise problems. The buffered control signals are sent to a 16-pin IC socket. This socket is not for the EPROM but for a module that programs the programmer for a particular EPROM type. The modules, diagrammed in Fig. 3, are built on 16-pin headers. You don't have to build all of them. Find out which EPROMs you will be programming and assemble only the ones you need. I'll go over the design of new modules in a later section.

There are two switches and two indicator lamps on the box. The first switch (S1) controls the low voltage power to the programming socket. The second (S2) enables the high voltage (25 volts). Both prevent damage to the EPROM as you insert and remove it from its socket. The indicator LEDs show which switches are on.

The last item on the box is a zero insertion-force socket. A 49-cent socket would probably work in its place, but would make it easier to bend a pin or break an expensive EPROM. The more expensive socket (about $10) is a pleasure to use. You just drop the chip in place and flip a lever to make a secure connection to all 24 pins. Moving the lever back up allows you to lift the device out—no strain on your nerves or on that EPROM.



The programming box with a programming module in place (2732). The dark areas are pieces of foam for extra modules.

Testing

Once you have the programmer assembled, check it for correct operation. Since this is a computer peripheral, the computer can do most of the checking. First, apply power to the unit (don't connect it to the computer yet) and make all the usual power supply and mis-wiring checks. When everything appears fine, connect the programmer to the expansion bus and run the program in Listing 1.

The program first checks the address counter. Turn on the programming box power switch. The power indicator should be on (see Fig. 4). A logic probe or scope should show all address lines toggling from logic high to logic low with each succeeding line switching at a lower rate (A0 is fastest and A12 is slowest). If there is no change on any line, check the interface address decoder and the wiring to the address counter. If some appear out of sequence, the fault is in the wiring from the EPROM socket to the counter. Press X and the program resets all address lines to zero (check them) and proceeds with a test of the data lines.

The computer is merely reading port 252 and displaying the decimal equivalent on the screen. With all data lines floating, the screen fills with 255s. Connect one end of a jumper to ground (EPROM socket pin 12) and the other end to each data line in sequence. If everything is normal, the screen displays the numbers in Table 1.

If you see nothing but 255, check that the jumper wire is tied to ground. It could also mean the address decoding circuit or the input latch (U3) is not operating. If the displayed num-

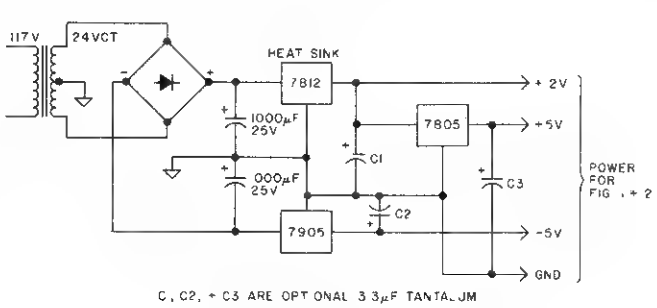


Fig. 2. Typical Power Supply

bers change but are incorrect, check the data line wiring at the input gate and to the programming box for shorts, opens or transpositions. Press X when you are satisfied everything is all right.

The next test checks data output. The computer is writing to port 252 (output) and reading port 252 (input). If it reads what it wrote, it keeps on checking. This automatic test stops if it finds an error. If you put your logic probe on the EPROM socket data lines you will see all data lines switching (01 fastest and 08 slowest). Hold X to abort this test.

Ground Pin	Display
9 (D0)	254
10 (D1)	253
11 (D2)	251
13 (D3)	247
14 (D4)	239
15 (D5)	223
16 (D6)	191
17 (D7)	127

Table 1

The last test sequence verifies the operation of the rest of the control signals (half were checked when we clocked and reset the address counter). Prepare a programming module for a 2708. Plug it into the programming box and turn on both switches. Both indicator LEDs should be on. Using a voltmeter with a 25-volt range, measure pin 7 on the module. It should be 12 volts. Press and hold 3 (verify) on the keyboard and the voltage should drop to zero. The same signal should be present on pin 20 of the EPROM socket.

Now shift the voltmeter probe to pin 5 of the module. It should read zero. Press and hold 2. The voltage should rise to 25 volts. Adjust R1 if this terminal is not at 25 volts. The signal is also present at pin 18 of the EPROM socket. For the last test, press 2 and 3 at the same time. Both pin 5 and pin 7 on the module should be at zero volts. You might check the rest of the EPROM socket pins for the correct supply voltages for a 2708 type. Any discrepancy would indicate a wiring error from the module socket to the EPROM socket.

If you've made it this far, you have a potentially functional EPROM programmer. For my peace of mind, I usually run the tests before each programming session. All tests are done to make sure the programming software can properly control the programmer. Without control, the hardware has the capability of turning an EPROM into slag. For this reason, do not plug a device into the programming socket unless the control software is running and the programmer box checks out.

Line Numbers	Function	USR Calls
10	Jump to machine-language loader	
20-320	Initialize memory and variables	
330-440	Function menu	
450-510	Type selection	
520-650	Read EPROM	USR0 uses Basic variables S and L
660-760	Move memory	USR1 var. S, E, F
770-830	Verify EPROM	USR2. var. L
840-950	Error codes	
960-1020	Check for erased	USR3· var. L
1030-1090	Program EPROM	USR4· var. L
1100-1110	DOS exit	
1120-1210	Hex to decimal	
1220-1310	Decimal to hex	
1350 1460	Modify memory	
1470-1560	Disk read	USR5: var. S, E, F
60000-end	Machine-language loader and data	

Table 2. Basic Line Number Map

```
10 'EPROM PROGRAMMER EXERCISER PROGRAM
20 CLS:PRINT"EXERCISE EPROM PROGRAMMER"
30 PRINT"TEST COUNTER - 'X' TO STOP
40 OUT (253),2
50 OUT (253),0
60 X$=INKEY$:IFX$="X"THEN70ELSE40
70 PRINT"READ DATA BUSS -- APPLY GROUND TO SOCKET PINS"
80 PRINT"PRESS 'X' FOR NEXT TEST"
90 OUT253,9:'VERIFY ON AND RESET
100 PRINTINP(252);
110 X$=INKEY$:IFX$="X"THEN120ELSE90
120 PRINT"TEST DATA BUSS - HOLD 'X' TO STOP"
130 OUT253,0:'VERIFY OFF, RESET
140 FORI=255TO0STEP-1
150 OUT252,I
160 OUT253,(IAND2)OR1:'TOGGLES COUNTER TO CHECK INTERFERENCE WIT
H DATA LINES
170 X=INP(252)
180 IFX<>ITHENPRINT"I/O ERROR":STOP
190 NEXT
200 X$=INKEY$:IFX$="X"THEN210ELSE140
210 PRINT"TEST CONTROL LINES --
PRESS 3 FOR VERIFY AND 2 FOR PROGRAM PULSE"
220 OUT253,1:'RESET EVERYTHING
230 X=PEEK(14352):IFX=4THENPRINT"PULSE ";ELSEIFX=8THENPRINT"VERI
FY ";ELSEIFX=12THENPRINT"BOTH ";ELSE230IFX=0THEN230
240 OUT253,X
250 X$=INKEY$:IFX$=""THEN250ELSE220
```

Program Listing 1

Controlling the Box

I started writing the control program in machine language, but quickly came to the conclusion that most functions could be more easily and efficiently done in Basic. So the program has two parts: a Basic program that interacts with the user, and a machine-language program that interacts with the EPROM programmer hardware. The machine-language part, shown in Program Listing 2, is only there if you care to find out how it runs. The Basic program (Listings 3 and 4) actually contains the machine-language code and will load it in high memory and set memory size to protect it. Program Listing 3 starts with line 60000 and is the relocating machine-language loader. Type Listing 3 into the computer first. Use the same line numbers as listed and run it once. If all is normal, a message directs you to delete several lines. After you have done this, immediately save this program segment. Do not save it in ASCII form; a regular disk save will do just fine. This procedure is necessary to initialize the relocating machine-language loader and will only be done once. Now you are free to add Program Listing 4 to what is left of Listing 3. The only restriction is that line 20 has to remain as line 20. The rest of the line numbers can be anything less than 60000. (Lines greater than 60000 are deleted by the loader.)

Program Features

The data statements starting at line 210 define each type of EPROM to the software. The first statement tells the program how many types have been de-



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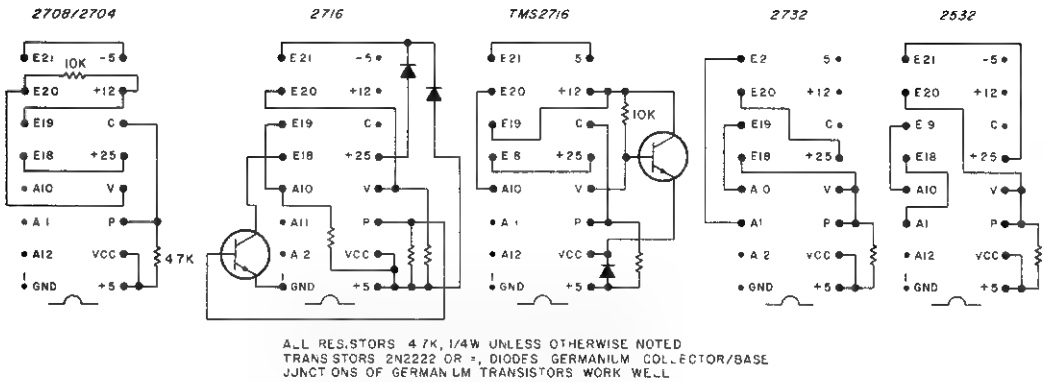


Fig. 3. Programming Modules for OMNIPROM

Program Listing 2

```
                00100 ;EPROM PROGRAMMER DRIVER
                00110 ; 10/04/81 REVISED 3/3/82
                00120 ;DRIVES OMNIPROM
                00130 ;STANDARD BUFFER AT END--ROOM FOR 8K
                00140 ;TO BE USED WITH EPROM/BAS -- THIS ROUTINE DOES
                00150 ;ACTUAL  MEMORY MASSAGING
DC9F            00160           ORG     0DC9FH  ;48K START-LEAVE ROOM FOR 8K AT BUFS
T
0A9A            00170 ERROR     EQU     0A9AH   ;USR RETURN
                00180 ;
DC9F 1160EA     00190           LD      DE,60000;START LINE # OF LOADER
DCA2 CD2C1B     00200           CALL    1B2CH   ;GET START LINE # ADDR
DCA5 AF         00210           XOR     A       ;CLEAR ACCUM
DCA6 02         00220           LD      (BC),A  ;MARK END OF BASIC PGM
DCA7 03         00230           INC     BC      ; DOES DELETE OF LOADER
DCA8 02         00240           LD      (BC),A
DCA9 03         00250           INC     BC
DCAA ED43F940   00260           LD      (40F9H),BC;SET END OF PST
DCAE 21B4DC     00270           LD      HL,LNE20;TRANSFER BACK TO BASIC
DCB1 CDA91E     00280           CALL    1EA9H   ;DO 'RUN20'
DCB4 32         00290 LNE20     DEFM    '20'
DCB6 00         00300           DEFB    0       ;STRING TERMINATOR
                00310 ;JUMP TABLE FOR USR INPUTS
DCB7 C3B2DD     00320 USR0      JP      READ
DCBA C3DCDD     00330 USR1      JP      MEM
DCBD C315DE     00340 USR2      JP      VERIF
DCC0 C321DE     00350 USR3      JP      ERAS
DCC3 1810       00360 USR4      JR      PGM
DCC5 C398DE     00370 USR5      JP      DISK
                00380 ;BASIC VARIABLE NAME TABLE
DCC8 4C00       00390 VARL      DEFW    'L'
DCCA 5000       00400 VARP      DEFW    'P'
DCCC 5200       00410 VARR      DEFW    'R'
DCCE 5300       00420 VARS      DEFW    'S'
DCD0 4600       00430 VARF      DEFW    'F'
DCD2 4500       00440 VARE      DEFW    'E'
DCD4 00         00450 CKSUM     DEFB    0       ;CHEKCSUM STORAGE
                00455 ;
DCD5 CD5BDE     00460 PGM       CALL    TGET    ;GET 'T' PARAMETERS:BC=LENGTH,
                00470                           ;D PULSE LENGTH, E=REPROGRAM COUNT
                00480                           ;HL=BUFST
DCD8 3E2D       00490           LD      A,2DH   ;'-"
DCDA 323F3C     00500           LD      (3C3FH),A;PUT ON SCREEN
DCDD 7B         00510           LD      A,E     ;REPROGRAM COUNT
DCDE D9         00520           EXX             ;ALT REGS
DCDF 47         00530           LD      B,A     ;PUT COUNT IN B'
DCE0 CB3F       00540           SRL     A       ;DIVIDE
DCE2 CB3F       00550           SRL     A       ;  BY 4
DCE4 4F         00560           LD      C,A     ; REPROGRAM COUNT
                00570                           ; AFTER GOOD VERIFY
DCE5 D9         00580 PGM3      EXX             ;NORM REGS
DCE6 CD1CDD     00590           CALL    PPGM    ;DO PROGRAM LOOP
DCE9 CD48DD     00600           CALL    VERIF1  ;CHECK DATA
DCEC B7         00610           OR      A       ;SET FLAGS
DCED 280B       00620           JR      Z,NOERR ;JUMP IF DATA OK
DCEF FE02       00630           CP      2       ;ERASE ERROR?
DCF1 2823       00640           JR      Z,ERR1  ;YES, EXIT
DCF3 D9         00650           EXX             ;ALT REGS
DCF4 10EF       00660           DJNZ    PGM3    ;REPEAT PROGRAMMING
DCF6 3E03       00670           LD      A,3     ;WON'T PROGRAM
DCF8 181C       00680           JR      ERR1    ;EXIT
DCFA D9         00690 NOERR     EXX             ;ALT
DCFB 78         00700           LD      A,B     ;REMAINING PROGRAM COUNT
DCFC A1         00710           AND     C
DCFD 280C       00720           JR      Z,V1    ;IF EITHER COUNT 0, THEN QUIT
DCFF 78         00730           LD      A,B
DD00 B9         00740           CP      C       ;IF B<C THEN USE B
DD01 3801       00750           JR      C,PGM1
DD03 41         00760           LD      B,C     ;C IS SMALLER
DD04 D9         00770 PGM1      EXX             ;NORM
DD05 CD1CDD     00780           CALL    PPGM    ;PROGRAM LOOP
DD08 D9         00790           EXX             ;ALT
DD09 10F9       00800           DJNZ    PGM1    ; DO LOOP FOR B COUNT
DD0B CD48DD     00810 V1        CALL    VERIF1  ;COMPARE DATA
DD0E B7         00820           OR      A       ;SET FLAGS
DD0F 2005       00830           JR      NZ,ERR1 ;ERROR, EXIT
DD11 CD78DD     00840           CALL    VERIF2  ;CKSUM
DD14 1800       00850           JR      ERR1    ;EXIT, ERROR OR NOT
DD16 6F         00860 ERR1      LD      L,A     ;ERROR CODE IN L
DD17 2600       00870           LD      H,0
DD19 C39A0A     00880           JP      ERROR   ;RETURN TO BASIC
```

Listing 2 continues

fined. Set it accordingly.

The first data entry is the type name (2708 or TMS2716, for example). The next number is the size of the EPROM in bytes minus one. Following that is the length of the programming pulse in 500-microsecond increments. Last is the loop count, the number of times the system will program each EPROM byte (more on this later). By adding data statements (and also constructing a new programming module) new types can be easily introduced.

All EPROMs are programmed from a fixed-location buffer in RAM memory. Included in the controlling software are functions to move information to this buffer. The size of the buffer is great enough to allow the largest EPROM to be programmed in one pass.

There is some disagreement between EPROM manufacturers about the length of the programming pulse. For the 2732 in particular, Intel claims a 50-ms pulse is required for each address. Motorola says only 2 ms are necessary. I have compromised. My programming algorithm uses the shorter pulse width, but then does a data verify after all bytes have been programmed. If the verify fails, the EPROM is programmed again (and verified). This continues until the EPROM is correctly programmed or the total pulse time for each address is greater than the longer specified time. If the latter is the case, an error is returned (Won't Program). Using this technique, I have programmed various types much quicker than normal.

I have done some tests on data retention and found there is no difference in erase times whether the short or the long programming pulse is used. To set up the system for short-pulse interactive programming (of the 2732), set the pulse width to four and the loop count to 25. If you desire long-pulse programming, set pulse width to 100 and loop count to one. In any case, the product of the two numbers should equal twice the maximum pulse width in milliseconds. Caution: Some EPROM types (for example,

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Listing 2 continued

```
                    00890 ;
                    00900 ;
DD1C CD5BDE         00910 PPGM      CALL    TGET    ;RESTORE PARAMS IF NEEDED
DD1F 3E01           00920           LD      A,1     ;RESET COUNTER, VERIFY OFF
DD21 CDA1DD         00930           CALL    CNTRL
DD24 CD50DE         00932           CALL    DLY     ;HOLD ON A MOMENT
DD27 7E             00940 PPGM2     LD      A,(HL)  ;GET DATA
DD28 D3FC           00950           OUT     (252),A ;SEND TO EPROM
DD2A E5             00960           PUSH    HL      ;10 US DELAY
DD2B E1             00970           POP     HL
DD2C CD2C02         00980           CALL    022CH   ;BLINK ROUTINE
DD2F 3E04           00990           LD      A,4     ;PROGRAM
DD31 CDA1DD         01000           CALL    CNTRL
DD34 CD50DE         01010           CALL    DLY     ;PROGRAM PULSE DELAY
DD37 AF             01020           XOR     A
DD38 CDA1DD         01030           CALL    CNTRL   ;END PULSE
DD3B 23             01060           INC     HL      ;SOURCE ADDR
DD3C 0B             01070           DEC     BC      ;LENGTH COUNT
DD3D 78             01080           LD      A,B     ;CHECK FOR ZERO
DD3E B1             01090           OR      C
DD3F C8             01100           RET     Z       ;QUIT IF END
DD40 3E02           01102           LD      A,2     ;PULSE COUNTER
DD42 CDA1DD         01104           CALL    CNTRL
DD45 18E0           01106           JR      PPGM2   ;AND LOOP
DD47 00             01110           NOP
                    01120 ;
                    01130 ;
DD48 3E08           01132 VERIF1    LD      A,8     ;VERIFY (READ)
DD4A CDA1DD         01134           CALL    CNTRL
DD4D CD50DE         01136           CALL    DLY     ;WAIT
DD50 3E09           01140           LD      A,9     ;RESET COUNTER
DD52 CDA1DD         01150           CALL    CNTRL
DD55 CD5BDE         01160           CALL    TGET    ;GET PARAMS
DD58 3E08           01170 VER1      LD      A,8     ;VERIFY ON
DD5A CDA1DD         01180           CALL    CNTRL
DD5D CD48DE         01190           CALL    INPRO   ;READ PROM
DD60 AE             01200           XOR     (HL)    ;COMPARE WITH SOURCE
DD61 200C           01210           JR      NZ,ERR2 ;PROGRAMMING ERROR
DD63 3E0A           01220           LD      A,10
DD65 CDA1DD         01230           CALL    CNTRL   ;PULSE COUNTER
DD68 23             01240           INC     HL      ;SOURCE
DD69 0B             01250           DEC     BC      ;LENGTH
DD6A 78             01260           LD      A,B
DD6B B1             01270           OR      C       ;CHECK FOR 0
DD6C 20EA           01280           JR      NZ,VER1 ;CHECK ALL BYTES
DD6E C9             01290           RET
DD6F A6             01300 ERR2      AND     (HL)    ;CHECK FOR 0'S THAT SHOULD BE 1'S
DD70 2803           01310           JR      Z,ERR3
DD72 3E02           01320           LD      A,2     ;ERASE ERROR
DD74 C9             01330           RET
DD75 3E04           01340 ERR3      LD      A,4     ;NOT PROGRAMMED ERROR
DD77 C9             01350           RET
DD78 CD5BDE         01360 VERIF2    CALL    TGET
DD7B 3E09           01370           LD      A,9     ;RESET  COUNT
DD7D CDA1DD         01380           CALL    CNTRL
DD80 1E00           01390           LD      E,0     ;CLEAR CKSUM REGISTER
DD82 3E08           01400 CKSM3     LD      A,8     ;VERIFY
DD84 CDA1DD         01410           CALL    CNTRL
DD87 CD48DE         01420           CALL    INPRO   ;READ PROM
DD8A 83             01430           ADD     A,E     ;COMPUTE CKSUM
DD8B 5F             01440           LD      E,A     ;SAVE
DD8C 3E0A           01450           LD      A,10    ;PULSE COUNTER
DD8E CDA1DD         01460           CALL    CNTRL
DD91 0B             01470           DEC     BC
DD92 78             01480           LD      A,B
DD93 B1             01490           OR      C
DD94 20EC           01500           JR      NZ,CKSM3
DD96 3AD4DC         01510           LD      A,(CKSUM)       ;GET OLD SUM
DD99 BB             01520           CP      E       ;COMPARE WITH NEW
DD9A 2002           01530           JR      NZ,ERR4 ;NOT SAME,JUMP
DD9C AF             01540           XOR     A       ;SUCCESS
DD9D C9             01550           RET
DD9E 3E01           01560 ERR4      LD      A,1     ;CHECKSUM ERROR
DDA0 C9             01570           RET
                    01580 ;
                    01590 ;
DDA1 D9             01600 CNTRL     EXX             ;ALT REGS
DDA2 CB47           01610           BIT     0,A     ;TEST FOR RESET
DDA4 2001           01620           JR      NZ,CNTRL1;JUMP IF RESET
DDA6 AA             01630           XOR     D       ;GET OLD TOGGLE STATE
DDA7 D3FD           01640 CNTRL1    OUT     (253),A ;SEND CONTROL NYBBLE
DDA9 E60E           01650           AND     0EH     ;SAVE VERIFY STATE &TOGGLE STATE &PU
LSE STATE
DDAB D3FD           01660           OUT     (253),A ;SEND AGAIN
DDAD E602           01670           AND     02      ;SAVE ONLY TOGGLE
DDAF 57             01680           LD      D,A     ;PUT IN D'
DDB0 D9             01690           EXX             ;NORM REGS
DDB1 C9             01700           RET
                    01710 ;
                    01720 ;
DDB2                01730 READ      EQU     $       ;READ EPROM ROUTINE
DDB2 CD5BDE         01740           CALL    TGET    ;GET LENGTH(BC),BUFFER(HL)
DDB5 3E09           01750           LD      A,9     ;RESET EPROM
DDB7 CDA1DD         01760           CALL    CNTRL
DDBA 3E08           01770 RD1       LD      A,8     ;VERIFY ON
DDBC CDA1DD         01780           CALL    CNTRL
DDBF CD48DE         01790           CALL    INPRO   ;READ PROM
DDC2 77             01800           LD      (HL),A  ;PUT IN BUFFER
DDC3 23             01810           INC     HL
DDC4 3E0A           01820           LD      A,10    ;PULSE COUNTER (VERIFY)
DDC6 CDA1DD         01830           CALL    CNTRL
DDC9 0B             01840           DEC     BC
DDCA 78             01850           LD      A,B
DDCB B1             01860           OR      C
DDCC 20EC           01870           JR      NZ,RD1  ;READ WHOLE PROM
DDCE CD48DD         01880           CALL    VERIF1
DDD1 B7             01890           OR      A       ;CHECK FOR ERROR
DDD2 C216DD         01900           JP      NZ,ERR1 ;EXIT IF COMPARE ERROR
DDD5 CD02DE         01910           CALL    CKSM1   ;DO CHECKSUM ON BUFFER
DDD8 AF             01920           XOR     A       ;NO ERROR
DDD9 C316DD         01930           JP      ERR1    ;RETURN
                    01940 ;
                    01950 ;
DDDC                01960 MEM       EQU     $
DDDC CD7FDE         01970           CALL    MGET    ;PARAMS: START (BC) END (HL) OFFSET
```

Listing 2 continues

2708) require multiple passes. Long-pulse, single-pass programming will destroy these types!

The verify function makes two different checks of data validity. It first makes the usual comparison check of RAM data to EPROM data. If that works out, a checksum is done over the entire contents of the EPROM. The checksum is then compared to one originally made when data was last moved to the buffer. If there is a problem with the checksum, one or more of the bytes in the buffer changed and you must reload the buffer and reprogram the EPROM.

"Some EPROM types require multiple passes. Long-pulse, single-pass programming will destroy these types!"

A map of the Basic program (Table 2) gives the range of line numbers for various functions and also shows the USR links to the machine-language portion.

When the program starts, it displays a menu of functions. When any function is completed, you are prompted to return to the menu. The functions in order of their appearance are:

- Set Type—Until you specify the type of EPROM, none of the other functions will operate. It's just as well. Without knowing the type, the program doesn't know what to do.
- Erased—Reads EPROM and checks that each location is 0FFH. You usually want to start with an erased chip before programming. They don't always come that way from the factory.
- Read PROM to Buffer—This function reads the data from the device plugged into the box and places it into memory. The program will ask for the memory location of the buffer. Answer with a hex address or just hit enter. If you do the latter,

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--- One program adapts to any system configuration and hardware.
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- COMPLETE instruction manual.
- SIMPLE commands, easy to use.

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- RELOCATE object programs.
- READ and WRITE object tapes in SYSTEM format.
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- CREATE SYMBOLIC CASSETTES of disassembled output for use as input to EDTASM program (MON-3 only).
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Monitor #5 adds the following features:

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TRS-80 Model 1/3 Disk Version $49.95
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Based on Dome Bookkeeping Record #612, this program keeps track of income, expenditures, and payroll for a small business. Receipts and expenditures can be entered on a daily, weekly, or monthly basis. Program computes monthly, through last month, and year to date summaries. Payroll section (included in disk version only) keeps record of employees and paychecks with up to six categories of payroll deductions. Computes employee payroll records and year-to-date payroll totals. Complete instructions for customizing to suit your own business.

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Listing 2 continued

```
(DE)
DDDF C5        01980          PUSH    BC       ;START
DDE0 AF        01990          XOR     A
DDE1 ED42      02000          SBC     HL,BC    ;SUBTRACT START FROM END
DDE3 E5        02010          PUSH    HL       ;LENGTH
DDE4 C1        02020          POP     BC       ;LENGTH IN BC
DDE5 2100E0    02030          LD      HL,BUFST;BUFFER LOCATION
DDE8 19        02040          ADD     HL,DE    ;ADD OFFSET
DDE9 EB        02050          EX      DE,HL    ;DEST IN DE
DDEA E1        02060          POP     HL       ;SOURCE
DDEB 09        02070          ADD     HL,BC    ;ADD LENGTH TO SOURCE
DDEC DF        02080          RST     18H      ;COMPARE TO DEST
DDED 300C      02090          JR      NC,MEM1  ;IF >=DEST THEN DO LDDR
DDEF 3F        02100          CCF              ;RESET CARRY
DDF0 ED42      02110          SBC     HL,BC    ;RESTORE SOURCE
DDF2 EDB0      02120          LDIR             ;MOVE DATA
DDF4 CD02DE    02130 MEM2     CALL    CKSM1    ;CKSUM ON BUFFER
DDF7 AF        02140          XOR     A        ;ZERO A REG (NO ERROR)
DDF8 C316DD    02150          JP      ERR1     ;RETURN
DDFB EB        02160 MEM1     EX      DE,HL    ;DEST IN HL NOW
DDFC 09        02170          ADD     HL,BC    ;ADD LENGTH
DDFD EB        02180          EX      DE,HL    ;BACK TO NORMAL
DDFE EDB8      02190          LDDR             ;MOVE DATA
DE00 18F2      02200          JR      MEM2     ;RETURN
DE02 CD5BDE    02210 CKSM1    CALL    TGET     ;GET EPROM PARAMS
DE05 1600      02220          LD      D,0      ;RESET SUM
DE07 7E        02230 CK2      LD      A,(HL)   ;GET DATA
DE08 82        02240          ADD     A,D
DE09 57        02250          LD      D,A      ;SAVE SUM
DE0A 23        02260          INC     HL
DE0B 0B        02270          DEC     BC
DE0C 78        02280          LD      A,B
DE0D B1        02290          OR      C
DE0E 20F7      02300          JR      NZ,CK2
DE10 7A        02310          LD      A,D
DE11 32D4DC    02320          LD      (CKSUM),A;SAVE DATA CHECKSUM
DE14 C9        02330          RET
               02340 ;
               02350 ;
DE15           02360 VERIF    EQU     $
DE15 CD48DD    02370          CALL    VERIF1   ;DO DATA COMPARE
DE18 B7        02380          OR      A
DE19 2003      02390          JR      NZ,ERR6  ;RETURN IF ERROR
DE1B CD78DD    02400          CALL    VERIF2   ;CHECKSUM
DE1E C316DD    02410 ERR6     JP      ERR1     ;RETURN
               02420 ;
               02430 ;
DE21           02440 ERAS     EQU     $
DE21 CD5BDE    02450          CALL    TGET     ;GET LENGTH(BC),BUFFER(HL)
DE24 3E09      02460          LD      A,9      ;RESET COUNTER
DE26 CDA1DD    02470          CALL    CNTRL
DE29 3E08      02480 ERAS1    LD      A,8      ;VERIFY ON
DE2B CDA1DD    02490          CALL    CNTRL
DE2E CD48DE    02500          CALL    INPRO    ;READ PROM
DE31 FEFF      02510          CP      0FFH     ;CHECK FOR ERASED
DE33 200E      02520          JR      NZ,ERR7  ;NOT ERASED,EXIT
DE35 3E0A      02530          LD      A,10     ;PULSE COUNTER
DE37 CDA1DD    02540          CALL    CNTRL
DE3A 0B        02550          DEC     BC
DE3B 78        02560          LD      A,B
DE3C B1        02570          OR      C
DE3D 20EA      02580          JR      NZ,ERAS1;READ WHOLE PROM
DE3F 3E0A      02590          LD      A,10     ;ERASED MESSAGE
DE41 1802      02600          JR      ERAS2    ;EXIT
DE43 3E08      02610 ERR7     LD      A,8      ;NOT ERASED
DE45 C316DD    02620 ERAS2    JP      ERR1
               02630 ;
DE48 1601      02640 INPRO    LD      D,1
DE4A CD50DE    02650          CALL    DLY
DE4D DBFC      02660          IN      A,(252)
DE4F C9        02670          RET
               02680 ;
DE50           02690 DLY      EQU     $
DE50 C5        02700          PUSH    BC       ;SAVE
DE51 42        02710          LD      B,D      ;# OF .5 MS
DE52 0E37      02720 DLY1     LD      C,55
DE54 0D        02730 DLY2     DEC     C
DE55 20FD      02740          JR      NZ,DLY2
DE57 10F9      02750          DJNZ    DLY1
DE59 C1        02760          POP     BC
DE5A C9        02770          RET
               02780 ;
               02790 ;
DE5B           02800 TGET     EQU     $        ;GET PARAMS FOR PROGRAMMING
DE5B 21C8DC    02810          LD      HL,VARL;GET LENGTH
DE5E CD77DE    02820          CALL    VARGET   ;FIND POINTER
DE61 D5        02830          PUSH    DE       ;SAVE LENGTH
DE62 21CADC    02840          LD      HL,VARP
DE65 CD77DE    02850          CALL    VARGET
DE68 D5        02860          PUSH    DE       ;SAVE PULSE WIDTH
DE69 21CCDC    02870          LD      HL,VARR  ;GET REPROGRAM COUNT
DE6C CD77DE    02880          CALL    VARGET
DE6F E1        02890          POP     HL       ;GET    PULSE WIDTH
DE70 55        02900          LD      D,L      ;PUT IN D
DE71 C1        02910          POP     BC       ;GET LENGTH
DE72 03        02920          INC     BC       ;ADJUST LENGTH
DE73 2100E0    02930          LD      HL,BUFST;LOAD BUFFER START
DE76 C9        02940          RET
DE77 CD0D26    02950 VARGET   CALL    260DH    ;VARPTR
DE7A EB        02960          EX      DE,HL    ;POINTER IN HL NOW
DE7B 5E        02970          LD      E,(HL)   ;GET LSB
DE7C 23        02980          INC     HL
DE7D 56        02990          LD      D,(HL)   ;GET MSB
DE7E C9        03000          RET
               03010 ;
               03020 ;
DE7F           03030 MGET     EQU     $        ;GET MEMORY TRANSFER PARAMS
DE7F 21D0DC    03040          LD      HL,VARF  ;GET OFFSET FROM BUFFER START
DE82 CD77DE    03050          CALL    VARGET
DE85 D5        03060          PUSH    DE       ;SAVE OFFSET
DE86 21CEDC    03070          LD      HL,VARS  ;MEM START (SOURCE)
DE89 CD77DE    03080          CALL    VARGET
DE8C D5        03090          PUSH    DE
DE8D 21D2DC    03100          LD      HL,VARE  ;MEM END (SOURCE)
```

Listing 2 continues

programming and verifying will be done from the standard buffer. If you specify an address, it must be within the limits displayed on the screen.

- Move Memory to Buffer—specify the start and end locations in hex. The EPROM offset allows you to modify the buffer starting at any location. Zero offset loads to the beginning of the buffer. The offset can also be used to string data together from several memory locations. Move one batch at a time, setting the offset for the next group to one greater than the length of the previous group. Most of the time you'll be providing all of the data from one location, so the offset will usually be zero.
- Modify Memory—Usually used to manually enter data to the buffer. Specify a start location (in hex) and press enter. The memory location is displayed (in decimal) followed by the byte at that location (in hex). Enter the new byte value in hex and terminate the entry with enter or skip over the location by just pressing enter. Exit this mode by pressing X. If you want hex addresses and are not worried by how long it takes, hold the shift key while you press enter.
- Disk Read—This function reads an object file from disk and loads it to any place in memory. Be extremely careful about the destination in memory. The free areas are displayed but there is nothing to prevent you from loading to an otherwise occupied area (you could overwrite DOS or Basic). Both starting and ending addresses have to be entered in case the disk file is longer than you expected. If there is an error in accessing the disk, a number is displayed. That number is the DOS error code listed in the TRSDOS manual.
- Program—When all data in the buffer is correct, get your EPROM ready and follow the prompts. During the programming routine, a symbol in the upper right of the screen will change. This lets you know that something is going on. After the function is complete you can program another EPROM without reloading the buffer, since nothing in the buffer is changed by the program function.

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2	ANNU1	Annuity computation program
3	DATE	Time between dates
4	DAYYEAR	Day of year a particular date falls on
5	LEASEINT	Interest rate on lease
6	BREAKEVN	Breakeven analysis
7	DEPRSL	Straightline depreciation
8	DEPRSY	Sum of the digits depreciation
9	DEPRDB	Declining balance depreciation
10	DEPRDDB	Double declining balance depreciation
11	TAXDEP	Cash flow vs. depreciation tables
12	CHECK2	Prints NEBS checks along with daily register
13	CHECKBK1	Checkbook maintenance program
14	MORTGAGE/A	Mortgage amortization table
15	MULTMON	Computes time needed for money to double, triple, etc.
16	SALVAGE	Determines salvage value of an investment
17	RRVARIN	Rate of return on investment with variable inflows
18	RRCONST	Rate of return on investment with constant inflows
19	EFFECT	Effective interest rate of a loan
20	FVAL	Future value of an investment (compound interest)
21	PVAL	Present value of a future amount
22	LOANPAY	Amount of payment on a loan
23	REQWITH	Equal withdrawals from investment to leave 0 over
24	SIMPDISK	Simple discount analysis
25	DATEVAL	Equivalent & nonequivalent dated values for oblig.
26	ANNUDEF	Present value of deferred annuities
27	MARKUP	% Markup analysis for items
28	SINKFUND	Sinking fund amortization program
29	BONDVAL	Value of a bond
30	DEPLETE	Depletion analysis
31	BLACKSH	Black Scholes options analysis
32	STOCVAL1	Expected return on stock via discounts dividends
33	WARVAL	Value of a warrant
34	BONDVAL2	Value of a bond
35	EPSEST	Estimate of future earnings per share for company
36	BETAALPH	Computes alpha and beta variables for stock
37	SHARPE1	Portfolio selection model-i.e. what stocks to hold
38	OPTWRITE	Option writing computations
39	RTVAL	Value of a right
40	EXPVAL	Expected value analysis
41	BAYES	Bayesian decisions
42	VALPRINF	Value of perfect information
43	VALADINF	Value of additional information
44	UTILITY	Derives utility function
45	SIMPLEX	Linear programming solution by simplex method
46	TRANS	Transportation method for linear programming
47	EOQ	Economic order quantity inventory model
48	QUEUE1	Single server queueing (waiting line) model
49	CVP	Cost-volume-profit analysis
50	CONDPROF	Conditional profit tables
51	OPTLOSS	Opportunity loss tables
52	FQUOQ	Fixed quantity economic order quantity model
53	FQEOWSH	As above but with shortages permitted
54	FQEOQPB	As above but with quantity price breaks
55	QUEUECB	Cost-benefit waiting line analysis
56	NCFANAL	Net cash-flow analysis for simple investment
57	PROFIND	Profitability index of a project
58	CAP1	Cap. Asset Pr. Model analysis of project
59	WACC	Weighted average cost of capital
60	COMPBAL	True rate on loan with compensating bal. required
61	DISCBAL	True rate on discounted loan
62	MERGANAL	Merger analysis computations
63	FINRAT	Financial ratios for a firm
64	NPV	Net present value of project
65	PRINDLAS	Laspeyres price index
66	PRINDPA	Paasche price index
67	SEASIND	Constructs seasonal quantity indices for company
68	TIMETR	Time series analysis linear trend
69	TIMEMOV	Time series analysis moving average trend
70	FUPRINF	Future price estimation with inflation
71	MAILPAC	Mailing list system
72	LETWRT	Letter writing system-links with MAILPAC
73	SORT3	Sorts list of names
74	LABEL1	Shipping label maker
75	LABEL2	Name label maker
76	BUSBUD	DOME business bookkeeping system
77	TIMECLCK	Computes weeks total hours from timeclock info.
78	ACCTPAY	In memory accounts payable system-storage permitted
79	INVOICE	Generate invoice on screen and print on printer
80	INVENT2	In memory inventory control system
81	TELDIR	Computerized telephone directory
82	TIMUSAN	Time use analysis
83	ASSIGN	Use of assignment algorithm for optimal job assign
84	ACCTREC	In memory accounts receivable system-storage ok
85	TERMSPAY	Compares 3 methods of repayment of loans
86	PAYNET	Computes gross pay required for given net
87	SELLPR	Computes selling price for given after tax amount
88	ARBCOMP	Arbitrage computations
89	DEPRSF	Sinking fund depreciation
90	UPSZONE	Finds UPS zones from zip code
91	ENVELOPE	Types envelope including return address
92	AUTOEXP	Automobile expense analysis
93	INSFILE	Insurance policy file
94	PAYROLL2	In memory payroll system
95	DILANAL	Dilution analysis
96	LOANAFFD	Loan amount a borrower can afford
97	RENTPRCH	Purchase price for rental property
98	SALELEAS	Sale-leaseback analysis
99	RRCONVBD	Investor's rate of return on convertable bond
100	PORTVAL9	Stock market portfolio storage-valuation program

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● Verify EPROM—Compares data in buffer with EPROM data. If they don't match an error message is returned. If all data matches the routine returns with "Function Complete." This routine is performed automatically after (and during) programming.

● Exit to DOS—You might want to change this to exit to your favorite machine-language monitor. I wanted quick access to DOS to do dumps of EPROM data. To return to the EPROM programmer, load and run the software again.

Listing 2 continued

```
DE90 CD77DE   03110          CALL    VARGET
DE93 13       03120          INC     DE        ;ADJUST LENGTH
DE94 EB       03130          EX      DE,HL     ;END IN HL
DE95 C1       03140          POP     BC        ;START ADDR
DE96 D1       03150          POP     DE        ;OFFSET OR DCB ADDR
DE97 C9       03160          RET
              03170 ;
              03180 ;
DE98 CD7FDE   03190 DISK     CALL    MGET      ;GET DISK LOAD PARAMS
DE9B C5       03200          PUSH    BC        ;MEM START
DE9C E5       03210          PUSH    HL        ;MEM END
DE9D D9       03220          EXX
DE9E D1       03230          POP     DE        ;MEM END
DE9F E1       03240          POP     HL        ;MEM START IN ALT REGS
DEA0 D9       03250          EXX               ;NORM REGS
DEA1 2100DF   03260          LD      HL,DBUF   ;DISK BUFFER LOCATION
DEA4 CD2444   03270          CALL    4424H     ;OPEN DISK FILE-DE POINTS TO DCB
DEA7 204A     03280          JR      NZ,DERR   ;JUMP ON ERROR
DEA9 CDE0DE   03290 DISK1    CALL    BYTRD     ;GET BYTE
DEAC B7       03300          OR      A
DEAD 280C     03310          JR      Z,DISK2   ;SKIP CODE
DEAF FE01     03320          CP      01
DEB1 2811     03330          JR      Z,DISK3   ;READ FOLLOWING BYTES
DEB3 FE02     03340          CP      02
DEB5 283A     03350          JR      Z,DERR1   ;END OF FILE
DEB7 FE20     03360          CP      20H
DEB9 3032     03370          JR      NC,DERR2;IF>1FH IS WRONG TYPE OF FILE
DEBB CDE0DE   03380 DISK2    CALL    BYTRD
DEBE 47       03390          LD      B,A       ;# OF SKIP BYTES
DEBF CDE7DE   03400          CALL    SKIP
DEC2 18E5     03410          JR      DISK1     ;GET NEXT BYTES
DEC4 CDE0DE   03420 DISK3    CALL    BYTRD     ;GET # OF BYTES TO READ
DEC7 47       03430          LD      B,A
DEC8 CDE0DE   03440          CALL    BYTRD     ;SKIP NEXT 2 BYTES
DECB 05       03450          DEC     B         ; BUT COUNT EM
DECC CDE0DE   03460          CALL    BYTRD
DECF 05       03470          DEC     B
DED0 CDE0DE   03480 DISK4    CALL    BYTRD     ;GET BYTE
DED3 D9       03490          EXX               ;ALT
DED4 77       03500          LD      (HL),A    ;SAVE BYTE
DED5 23       03505          INC     HL        ;BUMP MEM PTR
DED6 DF       03510          RST     18H       ;CHECK FOR END OF MEM
DED7 D9       03520          EXX               ;NORM
DED8 3E41     03530          LD      A,65      ;END OF MEM ERROR
DEDA 2817     03540          JR      Z,DERR    ;JUMP IF END
DEDC 10F2     03550          DJNZ    DISK4     ;ELSE GET NEXT BYTE
DEDE 18C9     03560          JR      DISK1     ;READ NEXT GROUP
DEE0 CD1300   03570 BYTRD    CALL    013H      ;READ BYTE FROM DISK
DEE3 C8       03580          RET     Z         ;IF NO ERROR
DEE4 C1       03590          POP     BC        ;ELSE DISCARD RET ADDR
DEE5 180C     03600          JR      DERR      ;AND JUMP TO ERROR RETURN
DEE7 CDE0DE   03610 SKIP     CALL    BYTRD     ;SKIP # OF BYTES IN B REG
DEEA 10FB     03620          DJNZ    SKIP
DEEC C9       03630          RET
DEED 3E42     03640 DERR2    LD      A,66      ;WRONG FILE TYPE
DEEF 1802     03650          JR      DERR
DEF1 3E40     03660 DERR1    LD      A,64      ;END OF FILE REACHED
DEF3 F5       03670 DERR     PUSH    AF        ;SAVE ERROR CODE
DEF4 CD2844   03680          CALL    4428H     ;CLOSE FILE
DEF7 CD02DE   03685          CALL    CKSM1     ;DO CHECKSUM ON BUFFER
DEFA F1       03690          POP     AF        ;GET ERROR CODE
DEFB F680     03700          OR      80H       ;SET MSB (DISK ERROR)
DEFD C316DD   03710          JP      ERR1      ;JUMP TO NORMAL ERROR RET
0100          03720 DBUF     DEFS    256       ;DISK SECTOR BUFFER
E000          03730 BUFST    EQU     $         ;BUFFER START
0000          03740          END
00000 TOTAL ERRORS
```

"I wanted quick access to DOS..."

I have skipped cassette data sources. If you need one, first transfer it to a disk file. If you need that function, it could be added—four USR calls are left.

Transferring data from one type of EPROM or ROM to another can also be done. The easiest method is to set the type for the first ROM and then read it into the standard buffer. Reset the type to the other and program. Resetting the type will not affect the data in the buffer, but you will get a checksum error after programming if the EPROM lengths are different. To avoid the error, load the source EPROM to free memory and then change the type. Do a memory move to the standard buffer and program the destination EPROM.

Most of OMNIPROM's functions are self-prompting and allow you to bail out to the menu at the last moment. To reduce the effects of the sweaty palm syndrome, let your first EPROM be an inexpensive one (2708s are good).

Programming the Programmer

One problem associated with building a piece of equipment such as this is the certainty of obsolescence. The EPROM itself is now semi-obsolete since new Read Mostly Memories can be electrically written in circuit and retain data with the power off. CMOS RAMs can be kept alive for months with a 2-volt battery. Despite these newcomers, the EPROM is still the simplest (at least in the read mode) and least expensive way to retain semi-permanent data. Any programmer for EPROMs must be flexible enough to forestall the day when it too must be thrown in the junk bin. How useful do you think 1702 programmers are today? Programming the programmer is a way to gain this flexibility.

Programming is done by plugging a specially wired DIP (Dual Inline Package) header into the module socket. You can wire one of those in Fig. 3 or design your own. The design requires that you know the function of the module pins and the requirements of your EPROM. Let's cover the module pins first.

Most pins to all 25xx and 27xx series EPROMs have the same functions. The five pins that have different uses on different devices are brought out to five pins on the programming module (E18, E19, E20, E21 and E24). The rest of the module pins provide control signals and power supply voltages. All this is shown in detail in Table 3.

The V pin is a transistor switch that goes to ground

Pin Number	Name	Explanation
1	Gnd	Signal and power ground
2	A12	Address 12 from counter
3	A11	Address 11 from counter
4	A10	Address 10 from counter
5	E18	From pin 18 of EPROM socket
6	E19	From pin 19 of EPROM socket
7	E20	From pin 20 of EPROM socket
8	E21	From pin 21 of EPROM socket
9	−5	Negative 5 volt source
10	+12	Positive 12 volt source
11	C	Ground this pin to turn on 25 volts
12	+25	Programming voltage source
13	V	Goes low for Verify
14	P	Goes low to program
15	Vcc	To pin 24 of EPROM socket—usually Vcc
16	+5	Positive 5 volt source

Table 3. Programming Module Pins

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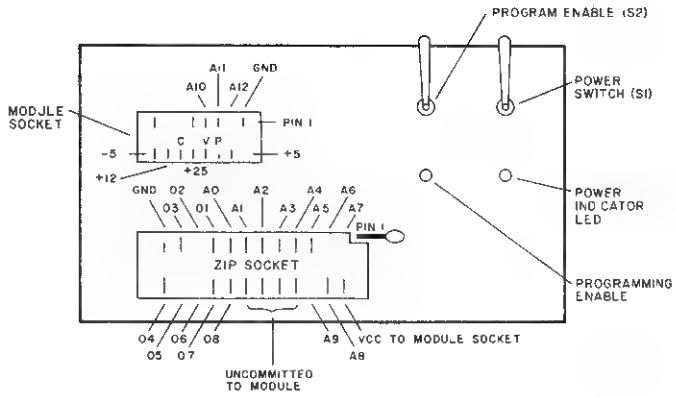


Fig. 4. Programming Layout and Permanent Pin Wiring

		PIN 18	PIN 19	PIN 20	PIN 21	POWER	NOTE
2704 (512 × 8)	READ	0	+2	0	-5	±5, +2	1
2708 (1K × 8)	WRITE	±26 500µS 0	+2	+2	-5		
2716 (2K × 8)	R	0 - CE	A10	0 - $\overline{OE}$	+5	+5	1
	W	±5 2-50mS 0	A10	+5	+25		
TMS2716 (2K × 8)	R	0 - $\overline{CE}$	+2	A10	-5	+5, +12	2
	W	±26 500µS 0	+2	A10	-5	+12 TO VCC PIN	
2532 (4K × 8)	R	A11	A 0	0 - $\overline{CE}$	0	+5	2
	W	A11	A 0	+5 2-50mS 0	+25		
2732 (4K × 8)	R	0 - $\overline{CE}$	A10	0 - $\overline{OE}$	A 1	+5	1
	W	+5 2-50mS 0	A10	+25	A11		
2764 (8K × 8)	R	A1	A10	0 - $\overline{CE}$	A12	+5	2
	W	A1	A10	+25 2mS +5	A12		
2564 (8K × 8)	R	INFO NOT	AVAILABLE				
	W						
2758 (1K × 8)	R	0 CE	0	0 - $\overline{OE}$	+5		2
	W	+5 50mS 0	0	+5	+25		

NOTES - DEVICE HAS BEEN PROGRAMMED ON OMNIPROM USING THIS DATA

2- INFO EXTRACTED FROM VARIOUS MANUFACTURES SPEC SHEETS HAS NOT BEEN VERIFIED IN USE

Fig. 5. EPROM Parameters

whenever the control program sets verify true (we want to read the EPROM). The P pin is a similar switch that goes to ground whenever the computer requires a program pulse. If the C pin is pulled to ground (perhaps by the P pin) and at the same time verify is off (we want to write), 25 volts are switched to the 25V pin. The rest of the module pins include three additional address sources (A10, A11 and A12) and the three power supplies (+5 volts, +12 volts and −5 volts). The only problem remaining is how to interconnect all this stuff.

Pin E24 is the easy one. In most cases, it is the Vcc supply pin and will connect to +5 volts. In the TMS2716, +12 volts is connected there during programming. Connecting the other four E pins is somewhat more complicated. To start, prepare a chart similar to Fig. 5 listing the state of pins 18–21 in the read and program modes, the power requirements, and any other relevant information. It's a good idea to use the manufacturer's spec sheet for each

Continues on p. 278

Form **1040A** Department of the Treasury—Internal Revenue Service **U.S. Individual Income Tax Return** **1982** (0) OMB No. 1545-0085

Use IRS label. Otherwise, please print or type.	Your first name and initial (if joint return, also give spouse's name and initial)	Last name	Your social security number
	Present home address (Number and street, including apartment number, or rural route)		Spouse's social security no.
	City, town or post office, State and ZIP code	Your occupation ▶ / Spouse's occupation ▶	

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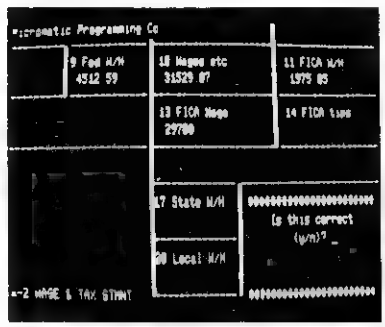
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Continued from p 274

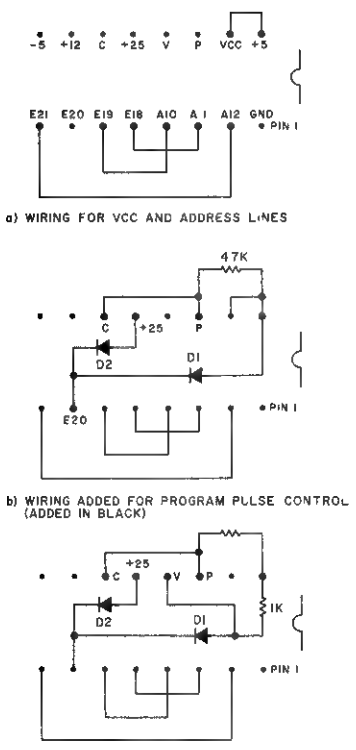


Fig. 6. Developing a programming module for the 2764. Use only after checking with manufacturer's specs. This circuit has not been tested.

```
60000 CLS:Z1=PEEK(16562)*256+PEEK(16561):PRINT"OLD MEM=";Z1
60010 Z1=Z1-9056:POKE16562,INT(Z1/256):POKE16561,(Z1-INT(Z1/256)*256):CLEAR 125
60020 A$="..................................................."
60030 Z1=PEEK(16562)*256+PEEK(16561):PRINT"NEW MEM=";Z1
60040 Z2=Z1+ 0
60050 Z3=PEEK(VARPTR(A$)+1)+256*PEEK(VARPTR(A$)+2)
60060 FORX=Z3TOZ3+121:READY:POKEX,Y:CK=(CK+Y)AND255:NEXT
60070 IFCK=26THENPRINT"LOADER CHECKSUM OK....DELETE LINES 60060-60090 AND 60190-
60270."ELSE60090
60080 PRINT"SAVE THIS PROGRAM.  AFTER SAVE RUN AGAIN.":STOP
60090 PRINT"LOADER CHECKSUM ERROR.  PROGRAM LOAD DISCONTINUED.":STOP
60100 MO=Z1-( 56479)
60110 IFMO<0THENMO=65536+MO
60120 POKEZ3+3,INT(MO/256):POKEZ3+2,MO-(INT(MO/256)*256)
60130 POKEZ3+6,INT(Z1/256):POKEZ3+5,Z1-(INT(Z1/256)*256)
60140 POKEZ3+34,INT(Z2/256):POKEZ3+33,Z2-(INT(Z2/256)*256)
60170 DEFUSR0=Z3:X=USR(0):PRINT"BAD REM DATA AT LINE";X:END
60190 DATA 217,1,1,1,17,1,1,217,42,230,64,175,35,190,32,252
60200 DATA 43,35,126,254,32,40,250,183,32,24,6,1,35,126,35
60210 DATA 182,202,1,1,35,94,35,86,35,126,183,40,230,254,147
60220 DATA 32,247,35,126,254,32,40,250,254,88,40,16,254,83
60230 DATA 40,47,35,237,111,126,217,18,19,217,128,71,24,199
60240 DATA 35,126,35,237,111,126,217,111,217,128,71,35,126
60250 DATA 254,32,40,250,35,237,111,126,217,103,9,235,115,35
60260 DATA 114,35,235,217,128,71,24,164,35,126,35,237,111,126
60270 DATA 184,40,155,235,195,154,10
60280 REM AA @F JN ML LB KA OJ B@ C@ B@ C@ MN CD IO @D AB XDK LM ML IJ NA BC @C
@@ CL XBK MM CL XLM MM CL XEA NM CL XAB NM SOG
60290 REM HA @A CL XHI NM LD @@ @E @@ BE @@ CE @@ FD @@ ED @@ @@ ML XKE NM NC MB
 BC OC LC KG IM GD KL OC KL OC OD IM ML XLA MM SIN
60300 REM ML XHD MM GK HB K@ NO B@ HB CB IM @A ON NC C@ HA LA IM HG AJ HB L@ HG
IK HC A@ AD IM ML XLA MM IM @A IO ML XHD MM SIK
60310 REM GK @B E@ ML XHG MM HA @@ OF FB @@ CL JI J@ ML XKE NM NC A@ ML XAJ MM M
L X@E NM NG CM LO EN AN ML LB B@ NC D@ ML SKK
60320 REM XAJ MM ML X@E NM OJ ML XAJ MM CB K@ HG AK HL NC B@ ML XAJ MM HA @N @@
NC H@ ML XAJ MM ML X@E NM NC I@ ML XAJ MM SDC
60330 REM ML XKE NM NC H@ ML XAJ MM ML XHD NM NJ @B L@ NC J@ ML XAJ MM CB K@ HG
AK @B JN IL FJ HB C@ NC B@ IL NC D@ IL ML SDM
60340 REM XKE NM NC I@ ML XAJ MM NA @@ NC H@ ML XAJ MM ML XHD NM CH OE NC J@ ML
XAJ MM K@ HG AK @B LN JC XDM LM KK @B SHN
60350 REM B@ OJ IL NC A@ IL IM KL GD @B A@ JJ CM MO FN N@ CM MO FN B@ GE IM IL M
L XKE NM NC I@ ML XAJ MM NC H@ ML XAJ MM ML SDJ
60360 REM XHD NM GG CB NC J@ ML XAJ MM K@ HG AK @B LN ML XHD MM GK BL XFA MM ML
XB@ NM OJ CL XFA MM ML XOG NM EL OJ SBJ
60370 REM MN BD EN AL AB X@@ @N IA KN AN I@ OM @C L@ OC MN BD MN @K ML XB@ NM OJ
 CL XFA MM KN I@ KN MN HK HA BO ML XKE NM SAI
60380 REM FA @@ NG BH GE CB K@ HG AK @B GO JG BC XDM LM IL ML XHD MM GK @B C@ ML
 XHG MM CL XFA MM ML XKE NM NC I@ ML XAJ MM SMC
60390 REM NC H@ ML XAJ MM ML XHD NM NO OO @B N@ NC J@ ML XAJ MM K@ HG AK @B JN N
C J@ HA B@ NC H@ CL XFA MM FA A@ ML X@E NM SAO
60400 REM KM LO IL EL BD N@ GC M@ @B MO @A IO AL IL AB XHL LM ML XGG NM EM AB XJ
L LM ML XGG NM EM AB XLL LM ML XGG NM SO@
60410 REM AN EE AL C@ AB X@@ @N IL ML M@ FB KN NE CB FE IL AB X@M LM ML XGG NM E
M AB XNL LM ML XGG NM EM AB XBM LM ML SBG
60420 REM XGG NM CA KN AL AM IL ML XOG NM EL EN IM AM AN IM AB X@@ OM ML DB DD @
B JD ML X@N NM GK HB L@ NO A@ HB AA NO B@ SDC
60430 REM HB JC NO @B @C BC ML X@N NM GD ML XGN NM HA EN ML X@N NM GD ML X@N NM
E@ ML X@N NM E@ ML X@N NM IM GG CB OM SCA
60440 REM IM NC AD HB GA @A BO HA IL ML CA @@ HL AL HA L@ ML X@N NM @A KO IL NC
BD HA B@ NC @D EO ML HB DD ML XB@ NM AO FO @H SAL
60450 REM CL XFA MM BG DO CL BI BD EG MF @G DF EN @E CI GD EF DG GF AF DG CF DO
DE CI CD HF DF NF AF MF EN BG CI @E EG DG NF MF SEA
60460 REM DF DO BB DI JE EG NF EG CG EN IC DI DD IF BG LF IF CG DO LG DI AD LF I
F NF EN HA EI MD OF DF FF IG DF IF BO @C EI MD OF SFJ
60470 REM DF KF IF LF LN OK EI @E EG DG BF AF KF DF BO BF FI KD IF LF LF IF DO D
J FI KD IF LF LF GO BN FI BE EF CG DG OF BG IF DO SDI
60480 REM LN FI CD LF EF AF BG EG NF CO KB GI JE EF BG FF IF LF EN BD GI BE CG I
G CG DO AE GI GD EF DG EF NF DG BG IO NB HI BE @G SCA
60490 REM AF CG CG GO @E HI CD LF BG FF IF LF EF HO NI HI MD AF KF EF GF AF DO K
N HI AD LF LF OF CF AF DG EN FE II DE OF @G GF BG SCG
60500 REM AF NN IJ II MD AF KF EF HF IF DO IL II HD AF CG HN KB JI @E EG DG HF I
F DO DD JI DD IF CG KF FF BG EF EN EI JI KD IF LF SHM
60510 REM LF CF AF DG GN @L JI FD IF GF DG BG AF KF CO @K KI CD OF MF @G SKG
```

Program Listing 3

EPROM to prepare the chart. Once you have the information and you know it is accurate, you can make up the module wiring configuration. To show you how this is done, let's take the information on the 2764 (see Fig. 5) and design a programming module.

The 2764 is an 8K by 8 memory device and as such requires three more address lines (the programmer's permanently connected address lines will only address 1K). From Fig. 5 you see that A10, A11 and A12 are connected to pins 19, 18 and 21 respectively. So on the module, connect A10 to E19, A11 to E18, and A12 to E21. Also since this chip uses 5 volts for power, connect +5 to Vcc.

See Fig. 6—it appears all controls have to act on pin 20. To read the chip, pin 20 must be at ground (0 volts). To program a location, a +25 volt pulse is applied to the same pin. Between programming pulses, pin 20 must be at +5 volts to keep it in the write mode.

We should first generate that ground signal will cause 25 volts to appear at pin 25V. To keep EPROM pin 20 at +5 volts between pulses, a diode connects it (pin 20) to +5 volts. Another diode is used to isolate the 25-volt switch. As it is right now, when the program commands a program pulse, 25 volts appears at 25V, goes through D2, and appears at pin 20. When there is no program pulse, 5 volts is applied through D1 and appears on the same pin (see Fig. 6b).

To read the chip, we need some way to pull pin 20 to ground. The verify command causes pin V to go to ground. So we connect V to E20, but if V goes to ground it shorts the 5-volt power supply through D1. To avoid such complications as extra switching transistors, relays, or other gimmicks, I'll just put a 1k ohm resistor in series with D1 to limit the short-circuit current. And there you have it (Fig. 6c). Because the diode is in series with the programming voltage, adjust the 25-volt supply for 25 volts at E20.

"The only problem remaining is how to interconnect all this stuff."

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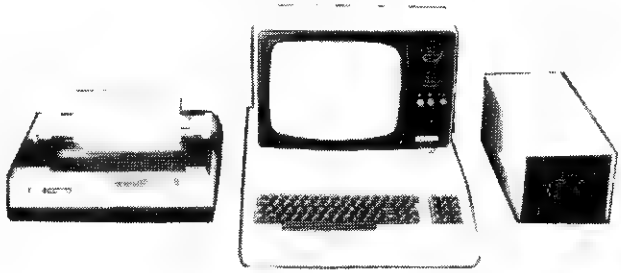
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ter line 250: DATA"2764",8191,4, 25. Increment the number in line 210. We have just told the program that type 2764 has been added and that it is 8,191 bytes long (this is one less than the actual number of bytes—the computer starts from zero). The last two numbers indicate that the system should try to program each location a maximum of 25 times using 2-millisecond pulses (four times 500 microseconds). Incrementing the number at line 210 tells the system that there is one more device added to its repertoire.

Other EPROMs are more difficult to adapt to than the 2764. By comparing the data in Fig. 5 with the module schematics in Fig. 3, you should be able to see methods for producing most kinds of control signals.

An especially tricky device was the 2732. The only difference between programming and reading is the 25 volts applied to pin 20 during a program cycle. To switch from program to read without destroying the 2732, the 25 volts had to be removed before the chip enable pin was brought low. Because of this, the programmer box was modified to always shut off the 25 volts just before the V pin goes low. If the control program requests a read (verify true and pin V at ground), the 25-volt programming supply is always shut off. While this is a requirement with the 2732, it makes for safer operation with other types.

Before using the system on a real live EPROM, test the signals at the EPROM socket pins with the programming module in place. Use an oscilloscope to verify that all signals are within specification and that the control program works properly. This tests the new programming module and verifies that the entire system works as well.

Now What Do I Do With It?

If you've made it this far you probably have some pretty good ideas about uses for EPROMs. One of the most popular notions is to connect an EPROM containing a machine-language monitor or printer driver at the unused address space just above the Level II ROMs. Anoth-

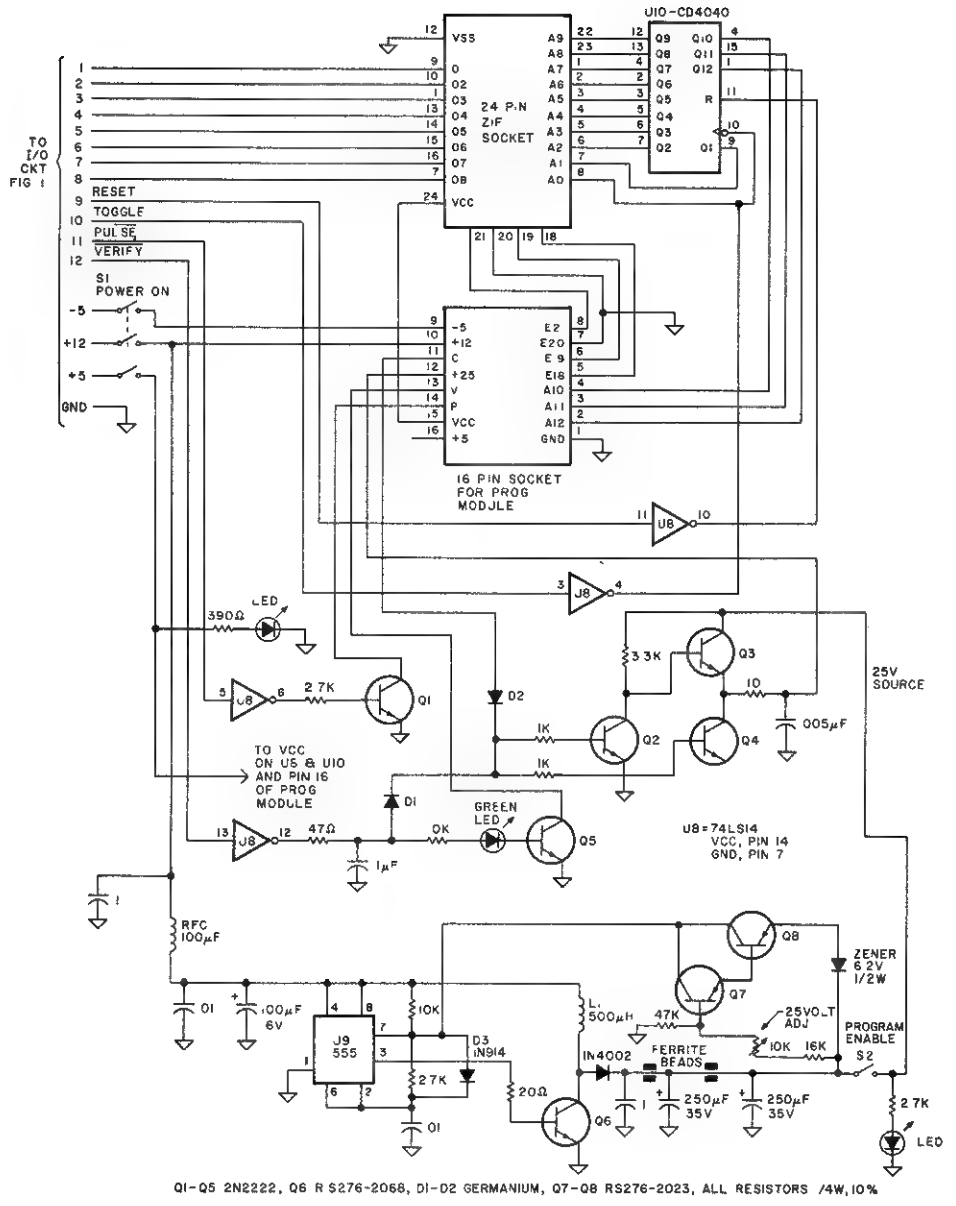


Fig. 7. Programming Box

Program Listing 4

```
2 'TEXT ENTRY AND CONTROL PROGRAM FOR EPROM/CMD
5 '10/10/81 REVISED 3/3/82
10 GOTO60000:'JUMP TO MACHINE CODE LOADER
20 Z1=PEEK(16561):Z2=PEEK(16562):'GET MACHINE CODE START
30 PRINT@385,STRING$(63,">")
40 PRINT@520,"O M N I P R O M  E P R O M  P R O G R A M M E R"
50 PRINT@595,"BY BOB HART MEDFORD, OREGON"
60 PRINT@641,STRING$(63,"<")
70 POKE16408,Z1:POKE16409,Z2:'SAVE START AT KBD DCB
80 Z1=Z2*256+Z1+500-MEM:'SET MEM TO MINIMUM FOR BASIC
90 POKE16562,INT(Z1/256):POKE16561,(Z1-INT(Z1/256)*256):CLEAR200
100 DEFINTA-Z
110 H$="0123456789ABCDEF"
120 Z1!=PEEK(16409)*256+PEEK(16408):'GET MACHINE CODE START
130 IFZ1!>32767THENZ1!=Z1!-65536
140 Z2!=PEEK(16561)+PEEK(16562)*256
150 IFZ2!>32767THEN2Z!=Z2!-65536:'MEM SIZE
160 DI!=Z1!-1:GOSUB1220:B1$=HO$:'END OF FREE MEMORY
170 DI!=Z2!:GOSUB1220:B2$=HO$:'BEGINNING OF FREE MEM
180 DI!=Z1!+865:GOSUB1220:B3$=HO$:'STD BUFFER START
190 CMD"T
200 READN:FORI=1TON:READ T$(I),L(I),P(I),R(I):NEXT
210 DATA4
220 DATA"2704",511,1,180
230 DATA"2708",1023,1,180
240 DATA"INTEL 2716",2047,10,10
250 DATA"AM 2732",4095,10,10
260 DEFUSR0=Z1!+24
270 DEFUSR1=Z1!+27
280 DEFUSR2=Z1!+30
```

Listing 4 continues

Listing 4 continued

```
290 DEFUSR3=Z11+33
300 DEFUSR4=Z11+36
310 DEFUSR5=Z11+38
320 OUT253,9:'RESET EPROM COUNTER
330 CLS
340 PRINT"NO TYPE SELECTED"
350 PRINT:PRINT"EPROM PROGRAMMER":PRINT:PRINT"SELECT OPTION:  1 - SET TYPE"
360 PRINTTAB(16)"2 - CHECK EPROM FOR ERASED CONDITION"
370 PRINTTAB(16)"3 - READ PROM TO BUFFER"
380 PRINTTAB(16)"4 - MOVE MEMORY TO BUFFER"
390 PRINTTAB(16)"5 - MODIFY MEMORY"
400 PRINTTAB(16)"6 - READ DISK FILE"
410 PRINTTAB(16)"7 - PROGRAM EPROM"
420 PRINTTAB(16)"8 - VERIFY EPROM WITH BUFFER"
430 PRINTTAB(16)"9 - EXIT TO DOS"
440 X$=INKEY$:IFX$=""THEN440ELSEIFX$<"1"ORX$>"9"THEN440ELSEX=VAL(X$):ONXGOTO460,
970,530,670,1360,1480,1040,770,1110
450 '*** TYPE SELECTION ***
460 TN=0:CLS:PRINT:PRINT"TYPES AVAILABLE:";
470 FORI=1TON:PRINTTAB(18)I;". ";T$(I):NEXT
480 PRINT:INPUT"ENTER TYPE NUMBER";TN
490 IFTN<1ORTN>NTHENCLS:PRINT"TYPE NOT AVAILABLE":GOTO340
500 L=L(TN):P=P(TN):R=R(TN)
510 CLS:PRINT"TYPE ";T$(TN);" SELECTED":GOTO350
520 '*** READ PROM ROUTINE ***
530 CLS:ONERRORGOTO0:IFTN=0THEN340
540 CLS:PRINT:PRINT"READ PROM":ST$=""
550 GOSUB1460
560 INPUT"BUFFER START (PRESS ENTER FOR STD BUFFER)";ST$:IFST$=""THENST$=B3$
570 I$=ST$:GOSUB1120:S=DO:'HEX TO DEC CONVERSION
580 PRINT:PRINT"DEVICE WILL LOAD TO ";ST$;"H - ";:DI!=FIX(S+L):GOSUB1220:PRINTHO
$;"H"
590 GOSUB1320
600 GOSUB640:IFX$="X"THEN510
610 X=USR0(0):PRINT"READ COMPLETED."
620 PRINT"PRESS ANY KEY TO RETURN TO MENU"
630 X$=INKEY$:IFX$=""THEN630ELSEGOTO510
640 PRINT:PRINT"PRESS 'G' TO CONTINUE, 'X' TO ABORT";
650 X$=INKEY$:IFX$=""THEN650ELSE IFX$="X"THENRETURNELSEIFX$="G"THENPRINTCHR$(29)
;CHR$(30):RETURNELSE650
660 '*** MEMORY SOURCE ***
670 CLS:IFTN=0THEN340ELSEPRINT:PRINT"MEMORY DATA SOURCE"
680 GOSUB1460
690 PRINT"TAKE CARE THAT THE END IS NOT SMALLER THAN THE START AND
700 PRINT"THE EPROM OFFSET IS NOT GREATER THAN ";:DI!=L:GOSUB1230:PRINTHO$;"H"
710 PRINT:INPUT"START OF MEMORY BLOCK";ST$:I$=ST$:GOSUB1120:S=DO
720 PRINT:INPUT"END OF MEMORY BLOCK";EN$:I$=EN$:GOSUB1120:E=DO
730 PRINT:INPUT"EPROM OFFSET (0 =START OF EPROM)";OF$:I$=OF$:GOSUB1120:F=DO
740 GOSUB640:IFX$="X"THEN510
750 X=USR1(0):PRINT"FUNCTION COMPLETED."
760 GOTO620
770 '*** VERIFY FUNCTION ***
780 CLS:IFTN=0THEN330
790 PRINT:PRINT"VERIFY EPROM WITH BUFFER CONTENTS"
800 GOSUB1320
```

Listing 4 continues

er use is to provide the program for dedicated microprocessor controllers (burglar alarms, model railroad controllers, printers, solar heat control, electronic mail box, packet radio controllers). If you are tired of the character set on the screen of your computer, you could make a new character-generator ROM from a 2708 or 2716. And have you ever thought about modifying Basic in ROM? The old three-chip set for the Model I used 32K ROMs that are pin-compatible with 2532 EPROMs. Armed with enough information and stamina you might be able to convert your faithful Model I to a Model III (or better).

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Listing 4 continued

```
810 GOSUB640:IFX$="X"THEN510
820 IFX>127THEN920
830 X=USR2(0)
840 IFX=1THENPRINT"CHECKSUM ERROR - CHECK RAM DATA"
850 IFX=2THENPRINT"BAD DATA - ERASE EPROM"
860 IFX=3THENPRINT"BAD DATA - WON'T PROGRAM"
870 IFX=4THENPRINT"BAD DATA - SOME BITS NOT PROGRAMMED"
880 IFX=6THENPRINT"READ ERROR - REPEAT FUNCTION"
890 IFX=0THENPRINT"FUNCTION COMPLETE - EPROM DATA OK"
900 IFX=8THENPRINT"NOT ERASED"
910 IFX=10THENPRINT"EPROM ERASED"
920 IFX=192THENPRINT"REACHED END OF DISK FILE"
930 IFX=193THENPRINT"REACHED END OF MEM BLOCK"
940 IFX=194THENPRINT"WRONG FILE TYPE"
950 IFX<190ANDX>127THENPRINT"DISK ERROR #";X-128:GOTO620ELSE620
960 '*** CHECK EPROM FOR ERASED CONDITION ***
970 CLS:IFTN=0THEN330
980 PRINT:PRINT"CHECK EPROM FOR ERASED CONDITION"
990 GOSUB1320
1000 GOSUB640:IFX$="X"THEN510
1010 X=USR3(0)
1020 GOTO840
1030 '*** PROGRAM EPROM ***
1040 IFTN=0THEN330
1050 CLS:PRINT:PRINT"PROGRAM MODE"
1060 PRINT:PRINT"PLACE ";T$(TN);" IN SOCKET. TURN PROGRAMMER POWER ON."
1070 PRINT"TURN ON PROGRAM ENABLE."
1080 PRINT:GOSUB640:IFX$="X"THEN510
1090 X=USR4(0):GOTO840
1100 ' *** EXIT TO DOS ***
1110 CMD"S
1120 'HEX TO DECIMAL
1130 DO!=0
1140 I$=RIGHT$("0000"+I$,4)
1150 FORJ=1TO4
1160 X=INSTR(H$,MID$(I$,J,1))
1170 IFX=0THENPRINT"ERROR"
1180 DO!=DO!+(X-1)*FIX(16[(4-J)+.5)
1190 NEXT
1200 IFDO!>32767THENDO!=DO!-65536
1210 DO=FIX(DO!):RETURN
1220 'DECIMAL TO HEX
1230 IFSGN(DI!)=-1THENDI!=DI!+65536
1240 HO$="":IH=1
1250 FORJ=3TO0STEP-1
1260 IH=INT(DI!/16[J)
1270 HO$=HO$+MID$(H$,IH+1,1)
1280 IFIH=0THEN1300
1290 DI!=FIX(DI!-IH*16[J)
1300 NEXT
1310 RETURN
1320 PRINT:PRINT"PLACE ";T$(TN);" IN SOCKET. TURN PROGRAMMER POWER ON.
1330 PRINT"LEAVE PROGRAM ENABLE TURNED OFF!!"
1340 RETURN
1350 '*** MEMORY MODIFY ***
1360 IFTN=0THEN330
1370 ONERRORGOTO1450
1380 CLS:PRINT:PRINT"MEMORY MODIFY   ENTER 'X' TO ABORT":ST$=""
1390 GOSUB1460
1400 INPUT"ENTER ADDRESS (IN HEX)";ST$:IFST$=""THENS=SBELSEIFST$="X"THEN510ELSEI
S=ST$:GOSUB1120:S=DO
1410 PRINTUSING"######";S;:PRINT" D:";
1420 D=PEEK(S):DI!=D:GOSUB1230:PRINTRIGHT$(HO$,2);" ";:IFD>31ANDD<127THENPRINT"'
";CHR$(D);"' ";
1430 I$="":INPUTI$:I$=RIGHT$(I$,2):IFI$=""THEN1440ELSEIFI$="X"THEN1380ELSEGOSUB1
120:POKES,DO
1440 S=S+1:IF PEEK(14464)=1THENDI!=S:GOSUB1230:PRINT"  ";HO$;" H:";:GOTO1420ELSE
1410
1450 S=-32768:RESUMENEXT
1460 PRINT:PRINT"STD BUFFER STARTS AT 0";B3$;"H....MEMORY FREE FROM 0";B2$;"H TO
 0";B1$;"H":PRINT:RETURN
1470 '*** DISK READ ***
1480 CLS:IFTN=0THEN340ELSEPRINT"READ DISK FILE":PRINT:GOSUB1460
1490 ST$="":EN$="":INPUT"MEMORY START (HEX)--HIT ENTER FOR STD BUFFER";ST$:IFST$
=""THENST$=B3$:GOTO1510
1500 INPUT"MEMORY END (HEX)--HIT ENTER FOR EPROM LENGTH";EN$
1510 I$=ST$:GOSUB1120:S=DO!:IFEN$=""THENE=S+L:DI!=E:GOSUB1220:EN$=HO$ELSEI$=EN$:
GOSUB1120:E=DO!
1520 PRINT:PRINT"DISK FILE WILL LOAD AT 0";ST$;"H TO 0";EN$;"H":LINEINPUT"ENTER
NAME OF DISK FILE: ";F$:IFF$=""THEN1520
1530 F$=LEFT$(F$+STRING$(32," "),32)
1540 F!=PEEK(VARPTR(F$)+1)+256*PEEK(VARPTR(F$)+2)
1550 IFF!>32767THENF=F!-65536ELSEF=F!
1560 PRINT:GOSUB640:IFX$="X"THEN510ELSEX=USR5(0):GOTO840
```


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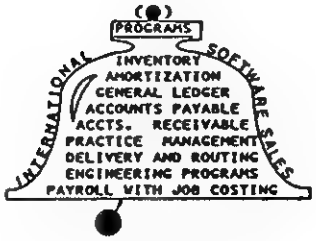
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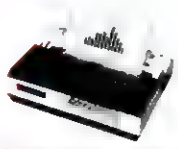
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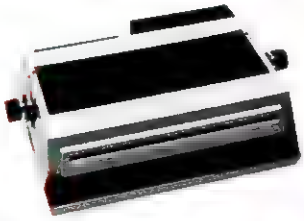


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Color Disk Directory

by Gerald Sprouse

After opening my second box of disks, it became obvious that I needed a quick method for locating frequently used Color Computer programs and files. I also needed to determine whether a back-up copy was available for each program. This master disk directory program is the answer to my needs.

This master directory will help you categorize and quickly locate programs and files.

Program Features

The Program Listing allows for the following options: add a disk to the master directory; delete a disk from the master; find the location of a specific program file; print the master directory or the directory for a specific disk; and update the master directory for a specific disk.

As configured, the program allows 30 entries per disk and up to 250 entries in the master directory. (Both of these limits can be increased by changing the variable dimensions in line 30.)

The two-character code used by this program for each disk satisfies my needs. I use a single letter and a single number code for each disk. The letter indicates a particular box of disks, while the number (0–9) indicates the specific disk in that box. The disk code XX is used in the program and should not be used.

Variable	Description
A$, B$, C$, D$, E$	Input from disk sector
AA$, AB$	Print using formats
F$, F$( ), F1$, F1$( )	File formats
K	File record number
L$, L1$, L1$( )	Number of granules for file
L$( )	Number of first granule in file
L2$	Granule assignments
L( )	Table of granule assignments in ASCII code
L1( )	ASCII code
LL	Granule counter
M$, M$( ), M1$, M1$( )	File extension
M	File record number
N$, N$( ), N1$, N1$( )	File name
NN$	Part of file name for comparison
N5$	First byte of file name
N	File record number
P$, P1$, P2$, P3$, P6$, P1$( )	Disk code
PP$	Sort variable
V( )	File record number
W$	Print menu selection
X$	Main menu selection
Y$	Input program name
Y	Length of Y$

Table 1. List of Program Variables

A typical master directory is displayed in Fig. 1. From this output it is easy to find a program that has not been backed up. This output can be annotated with notes about the status of each program. As noted before, the find option will find the location of a specific program. If you forget the exact name, just enter the first letters and the screen will display all the programs or files starting with those letters. Entering a blank program name will give you the entire master directory on the screen.

Program Description

The disk-directory data file is opened and closed frequently. Since my system has only drive 0, this is necessary when exchanging disks in the drive to avoid confusion and file errors. If you have two or more drives, change lines 1080 and 1130 to use drive 1 and put the disk to be read in drive 1.

The program is organized in sections. For reference, Table 1 lists the program variables.

Lines 10–150 present the main menu and allow selection of the desired option.

Lines 160–270 find a specific program. The length (Y) of the input program name (Y$) is used to control the string comparison in line 240. Variable J counts the number of entries on the screen and allows a pause when the screen is filled.

Lines 280–490 add a directory to the master directory file. The first step is to enter the disk to be added to the master file; line 320 inputs the disk code. The subroutine called in line 340 actually reads the directory and stores it in mem-

The Key Box

Color Computer
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MASTER DIRECTORY

DISK	NAME	EXTENSION	FORMAT	GRANULES
A2	ASUM	DAT	ASC	1
A3	ASUM	DAT	ASC	1
A2	BSUM	DAT	ASC	1
A3	BSUM	DAT	ASC	1
A2	CHECK	DAT	ASC	3
A3	CHECK	DAT	ASC	4
A2	DEPOSIT	DAT	ASC	2
A3	DEPOSIT	DAT	ASC	2
A0	DIAG32	BIN	BIN	2
A1	DIAG32	BIN	BIN	2
A0	DIRLIST	BAS	BIN	1
A1	DIRLIST	BAS	BIN	1
A0	FINCH	BAS	BIN	4
A1	FINCH	BAS	BIN	4
A2	FINSUM	BAS	BIN	7
A3	FINSUM	BAS	BIN	7
B2	FINSUM3	BAS	BIN	5
A2	FINSUM4	BAS	BIN	7
A3	FINSUM4	BAS	BIN	7
B2	FINSUM4	BAS	BIN	7
B2	FINSUM5	BAS	BIN	7
A0	FINYES	BAS	BIN	3
A1	FINYES	BAS	BIN	3
A0	FINYES1	BAS	BIN	3
A1	FINYES1	BAS	BIN	3
A0	GEUSE	BAS	BIN	2
A1	GEUSE	BAS	BIN	2
A0	INTER	BAS	BIN	1
A1	INTER	BAS	BIN	1
A0	MAIL	BAS	BIN	3
A1	MAIL	BAS	BIN	3
A0	MAILDISK	BAS	BIN	4
A1	MAILDISK	BAS	BIN	4
A0	MAILLIST	DAT	ASC	3
A1	MAILLIST	DAT	ASC	3
A0	MLIST	DAT	ASC	4
A1	MLIST	DAT	ASC	4
A0	MPGCHEV	BAS	BIN	2
A1	MPGCHEV	BAS	BIN	2
A0	MPGDAT	BAS	BIN	4
A1	MPGDAT	BAS	BIN	4
A0	MPGHOND	BAS	BIN	1
A1	MPGHOND	BAS	BIN	1
A2	PLEDGE	DAT	ASC	1
A3	PLEDGE	DAT	ASC	1
A0	POINTF	DAT	ASC	1
A1	POINTF	DAT	ASC	1
A0	POINTL	DAT	ASC	1
A1	POINTL	DAT	ASC	1
A0	TOPFORM	BAS	BIN	1
A1	TOPFORM	BAS	BIN	1

Fig. 1. Sample Program Output

Program Listing

```
10 REM MASTER DISK DIRECTORY
20 CLEAR 5000
30 DIM L(70),P1$(30),N1$(30),M1$(30),F1$(30),L1$(30),PP$(250),V(
250)
40 AA$="   %%  %       %   % %      % %        %  %"
50 AB$="%% %      %% %   % %     %  %"
60 CLS:PRINT" MASTER DISK DIRECTORY":PRINT
70 PRINT"FOLLOWING OPTIONS ARE AVAILABLE:  <A>DD DIRECTORY FOR A
 DISK"
80 PRINT"  <D>ELETE DIRECTORY FOR DISK     <F>IND SPECIFIC PROGR
AM"
90 PRINT"  <P>RINT MASTER DIRECTORY        <U>PDATE DIRECTORY FO
R DISK"
100 PRINT"  <E>XIT PROGRAM":PRINT
110 PRINT"PLEASE KEY IN YOUR OPTION"
120 X$=INKEY$:IFX$="" THEN 120
130 ON INSTR("FADPUE",X$) GOTO 160,280,500,620,780,150
140 GOTO 60
150 END
160 CLS:PRINT"TO FIND A SPECFIC PROGRAM ENTER NAME":PRINT
170 LINE INPUT" PROGRAM NAME ";Y$:Y=LEN(Y$)
180 IF Y>8 THEN PRINT"TOO LONG, ONLY ENTER 8 LETTERS":GOTO 170
190 GOSUB 1000
200 K=1:J-1
210 CLS:PRINT"DISK NAME  EXT FORMAT GRANULES"
220 IF K>!(1) THEN CLOSE#1:GOTO 270
230 GET#1,K:GOSUB 1040:NN$=LEFT$(N1$,Y)
240 IF Y$<>NN$ THEN K-K+1:GOTO 220
```

Listing continues

ory as a string array.

After putting the master disk back in the drive, line 370 then stores the new directory entries in the data file. The program then reads the entire data file (line 400) and sets up a sort using the variables PP$( ) and V( ). PP$( ) contains the program name (N$) and the disk code (P$). The actual sort is in lines 410–450. Lines 460–490 copy the directory entries from the original file into a temporary file where the entries are in alphabetical order. This temporary file is then renamed as the directory data file (line 490).

Lines 500–610 delete entries for a specific disk. At line 510 the user inputs the code for the disk to be deleted. Line 530 opens two files, and lines 540–580 copy all directory entries from the data file to a temporary file (except those entries to be deleted from the master directory). Line 590 then renames this temporary file as the data directory file.

Lines 620–770 print the directory either for all entries, or just for a specific disk. Lines 630–680 allow for selection of the two print options. If you want all entries printed, then P6$ = "XX". If you want a specific disk directory printed, P6$ equals the disk code. Lines 690–760 actually select and print the directory entries.

Lines 780–800 update the entries for a disk. The first step (line 790) is to delete the previous entries for this disk using lines 510–610. (Note that line 600 returns the program to line 800, which then sends the program to lines 290–490.) At this point the program adds the revised data entries to the master file. The test for X$ in line 310 bypassed part of the program because the user already has entered the disk code.

Lines 1000–1340 provide several subroutines. Lines 1000–1070 support the disk data files. The subroutine that actually reads the individual disk directories is contained in lines 1080–1340. The key to reading a disk directory lies in the disk input command DSKI$.

Lines 1090–1100 and 1270–1290 determine the number of granules used by each file. Lines 1120–1200 read the table entries and convert them to a form for later use. Lines 1230 and 1240 test the first byte of each file name. If zero, the file has been deleted, and if 255, the entry has not been used. Lines 1250 and 1260 check if the file is in binary or ASCII format. The final step (lines 1300–1310) store the directory entries in an array for later use by the program. ■

Gerald Sprouse can be reached at 9977 S. Chirimolla, San Diego, CA 92131.

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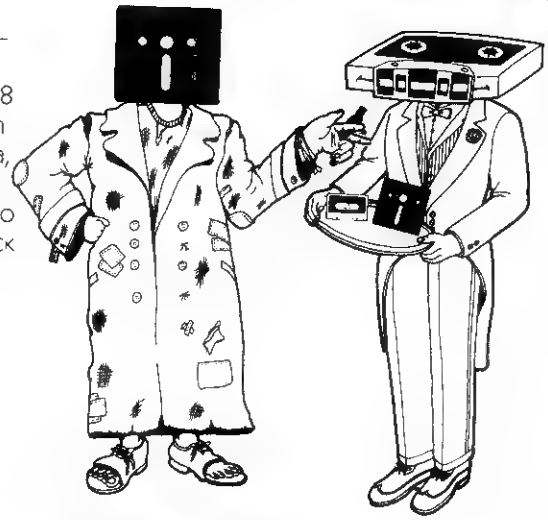
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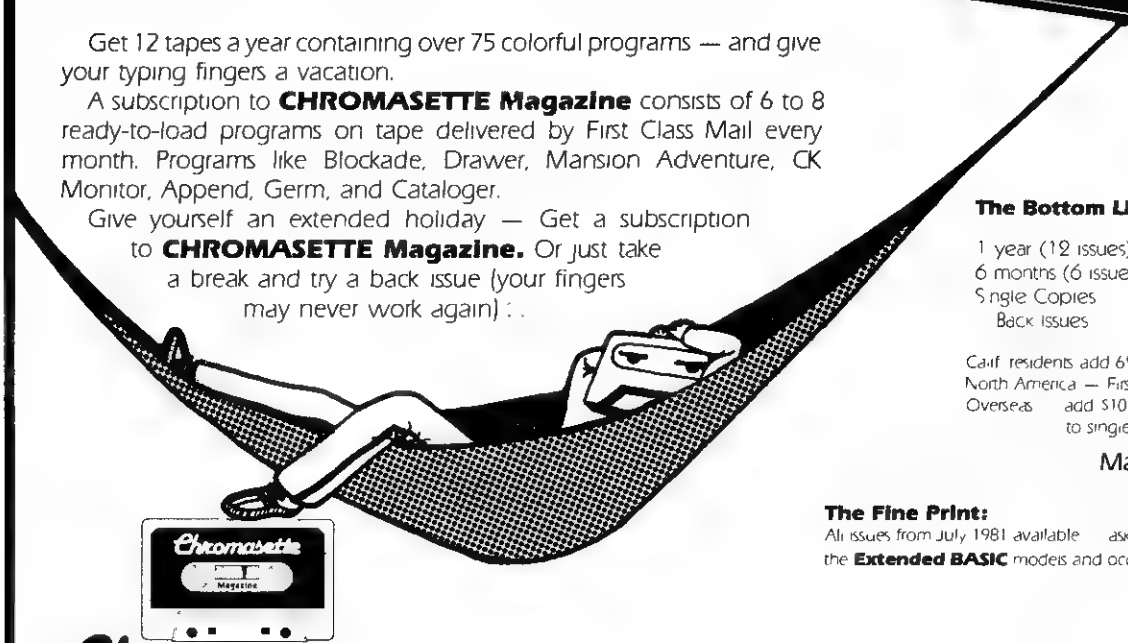
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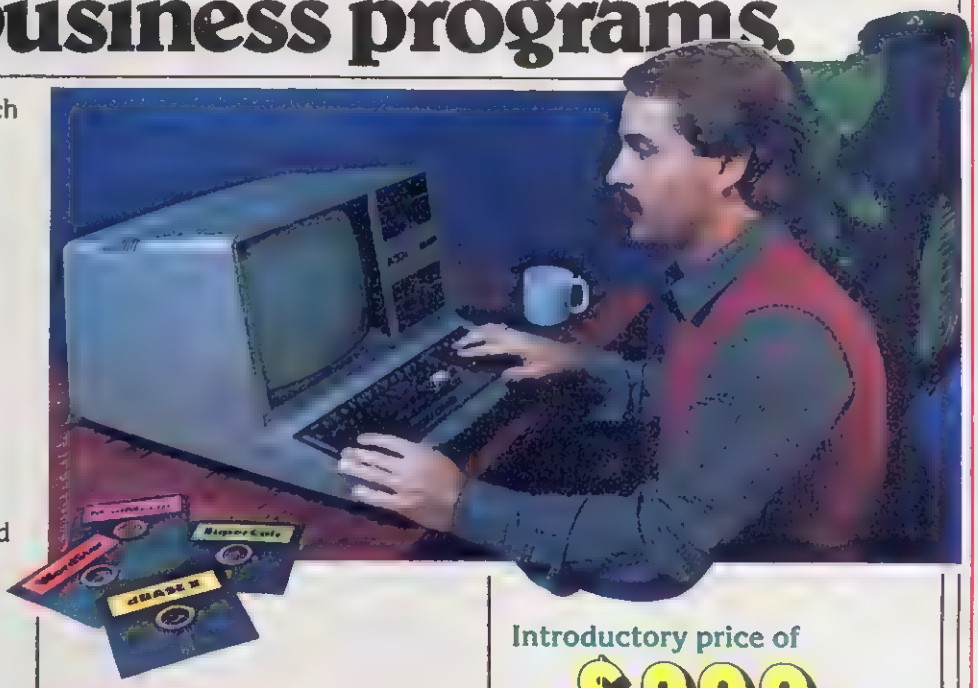
```
250 PRINT USING AB$;P1$;N1$;M1$;F1$;L1$:J=J+1:IF J<14 THEN K=K+1
:GOTO 220
260 LINE INPUT"KEY <ENTER> TO CONTINUE";Z$:K=K+1:J=1:CLS:GOTO 21
0
270 LINE INPUT"TASK COMPLETE, KEY <ENTER> TO   RETURN";Z$:GOTO 6
0
280 CLS:PRINT"TO ADD THE DIRECTORY FOR A DISK THE PROGRAM WILL P
ROMPT WHEN TO"
290 PRINT"INSERT THE DISK":PRINT:SOUND128,10
300 PRINT"REMOVE MASTER DISK AND INSERT   SUBJECT DISK"
310 LINE INPUT"KEY <ENTER> TO CONTINUE";Z$:IF X$="U" THEN 340
320 LINE INPUT"INPUT DISK NAME, USE CODE LIKE  A0,A1,ETC.";P2$
330 IF LEN(P2$)<>2 THEN PRINT" JUST TWO CHARACTERS, REENTER":GOT
O 320
340 GOSUB 1080:PRINT"REMOVE DISK AND PUT IN MASTER   DISK":SOUND
128,10
350 LINE INPUT"KEY <ENTER> WHEN DONE";Z$:GOSUB 1000:N=!(1)
360 FOR K=1 TO M
370 GOSUB 1060:PUT#1,K+N:NEXTK
380 CLOSE#1:GOSUB 1000:K=1
390 IF K>!(1) THEN CLOSE#1:GOTO 410
400 GET#1,K:PP$(K)=N$+P$:V(K)=K:K=K+1:GOTO 390
410 FOR P=1 TO K-2
420 J=P
430 IF PP$(V(J))<=PP$(V(J+1)) THEN 450
440 T=V(J):V(J)=V(J+1):V(J+1)=T:J=J-1:IF J<>0 THEN 430
450 NEXTP
460 GOSUB1000:GOSUB1020
470 FOR J=1 TO !(1)
480 GET#1,V(J):GOSUB 1040:GOSUB 1050:PUT#2,J
490 NEXTJ:CLOSE:!"DIR/DAT":! "TEMP/DAT" TO "DIR/DAT":GOTO 60
500 CLS:PRINT"TO DELETE A DISK DIRECTORY FROM MASTER FILE ENTER
DISK CODE"
510 INPUTP3$
520 IF LEN(P3$)<>2 THEN PRINT"REENTER WITH JUST TWO CHARACTERS":
GOTO 510
530 GOSUB 1000:GOSUB 1020:I=1
540 FOR J=1 TO !(1)
550 GET#1,J:GOSUB 1040:IF P3$<>P1$ THEN 570
560 GOTO 580
570 GOSUB 1050:PUT#2,I:I=I+1
580 NEXTJ
590 CLOSE:!"DIR/DAT":!"TEMP/DAT" TO "DIR/DAT"
600 IF X$="U" THEN 800
610 GOTO 60
620 CLS:PRINT"TO PRINT A DIRECTORY TWO OPTIONSARE AVAILABLE:"
630 PRINT:PRINT"  <A>LL ENTRIES IN MASTER        DIRECTORY"
640 PRINT"  <S>PECIFIC DISK ONLY":PRINT:PRINT"KEY IN CHOICE"
650 W$=INKEY$:IFW$="" THEN 650
660 IF W$="A" THEN P6$="XX":GOTO 690
670 IFW$="S" THEN LINE INPUT"DISK CODE?";P6$
680 IF LEN(P6$)<>2 THEN PRINT"JUST TWO LETTERS":GOTO 670
690 PRINT#-2,"      MASTER DIRECTORY":PRINT#-2,""
700 PRINT#-2,"  DISK  NAME   EXTENSION  FORMAT   GRANULES":GOSUB
 1000
710 FOR K=1 TO !(1)
720 GET#1,K:GOSUB 1040
730 IF P6$="XX" THEN 750
740 IF P1$<>P6$ THEN 760
750 PRINT#-2,USING AA$;P1$;N1$;M1$;F1$;L1$
760 NEXTK
770 CLOSE:GOTO 60
780 CLS:PRINT"TO UPDATE DIRECTORY FOR DISK    FIRST ENTER DISK C
ODE"
790 GOTO 510
800 P2$=P3$:GOTO 290
1000 OPEN"D",#1,"DIR/DAT",20
1010 !#1,2!P$,8!N$,3!M$,3!F$,4!L$:RETURN
1020 OPEN"D",#2,"TEMP/DAT",20
1030 !#2,2!P2$,8!N2$,3!M2$,3!F2$,4!L2$:RETURN
1040 P1$=P$:N1$=N$:M1$=M$:F1$=F$:L1$=L$:RETURN
1050 !P2$=P1$:!N2$=N1$:!M2$=M1$:!F2$=F1$:!L2$=L1$:RETURN
1060 !P$=P1$(K):!N$=N1$(K):!M$=M1$(K):!F$=F1$(K):!L$=L1$(K)
1070 RETURN
1080 ! 0,17,2,A$,B$
1090 FOR I=1 TO 68
1100 L2$=MID$(A$,I,1):L(I-1)=ASC(L2$):NEXTI
1110 M=0
1120 FOR X=3 TO 11
1130 ! 0,17,X,C$,D$
1140 E$=C$+LEFT$(D$,127):N$(0)=LEFT$(E$,8)
1150 M$(0)=MID$(E$,9,3):F$(0)=MID$(E$,13,1)
1160 L$(0)=MID$(E$,14,1):L1(0)=ASC(L$(0))
1170 FOR K=1 TO 7
1180 N$(K)=MID$(E$,1+K*32,8):M$(K)=MID$(E$,9+K*32,3)
1190 F$(K)=MID$(E$,13+K*32,1):L$(K)=MID$(E$,14+K*32,1)
1200 L1(K)=ASC(L$(K)):NEXTK
1210 FOR K=0 TO 7
1220 N5$=LEFT$(N$(K),1)
1230 IF ASC(N5$)=0 THEN 1320
1240 IF ASC(N5$)=255 THEN 1320
1250 IF ASC(F$(K))=0 THEN F$(K)="BIN":GOTO 1270
1260 IF ASC(F$(K))=255 THEN F$(K)="ASC"
1270 LL=1:E=L1(K):IF L(E)>68 THEN 1300
1280 LL=LL+1:E=L(E):IF L(E)>68 THEN 1300
1290 GOTO 1280
1300 M=M+1:P1$(M)=P2$:N1$(M)=N$(K):M1$(M)=M$(K):F1$(M)=F$(K)
1310 L1$(M)=STR$(LL)
1320 NEXTK
1330 NEXTX
1340 RETURN
```

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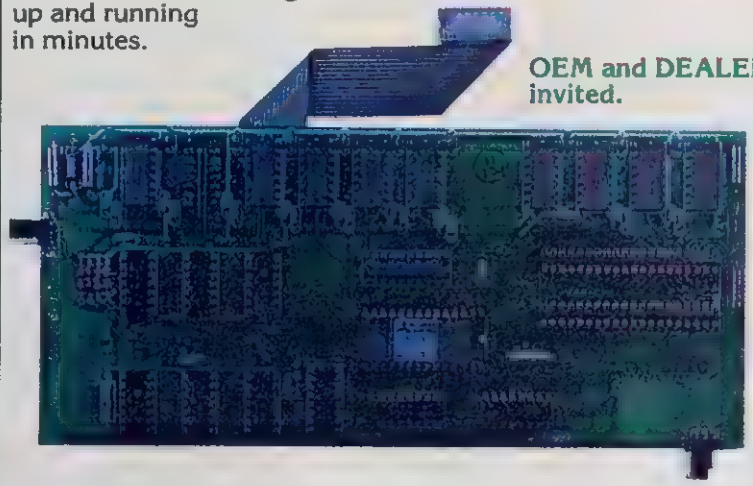
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The Magic Matrix—Cryptology, Part III

by Karl Andreassen

Learn the background of secret ciphers and explore polyalphabetic code with Andreassen's latest article about cryptographic programs.

The first article in this series (*80 Micro*, Anniversary 1983, p. 530) presented a Basic program for enciphering a message, intimating that more secure ciphertexts could be produced as easily. Assuming that a message could fall into your hands from a source or sources undetermined, the second of the series (February 1983, p. 244) featured a program designed to assist in the analysis of that message.

The Basic Crypto Program of Quick Crypto used a simple substitution cipher with an alphabet of "interleaved" letters. This is a short step above the basic kind of substitution, and special attention must be paid to it in order to interpret it with Cryptanalyst's Aide No. 1 in the second article of the series. The latter program turns the spotlight on a simple one-to-one substitution through its 51 variations.

There is a way to use that program as an aid in solving the Quick Crypto type of message key. If, instead of entering all of the letters from a ciphertext out of the Basic Crypto program, every other letter is entered, one of the 51 variations should reveal some condensed plaintext. Then, by entering the other series of every-other letters, the balance of the condensed message will be revealed.

The two condensed plaintexts would then be interleaved. How would you know, however, that the ciphertext was created with an every-other-letter key? Might the originator have used a three-letter interleaving cipherkey? Okay, try both types.

Purists in the world of cryptanalysis would snort at this suggestion, since intellectually there are better ways to approach the problem. However, I believe there is a new world of cryptology aborning as a direct result of the proliferation of home computers. These may not conform to the old tried-and-true procedures, but results count. At any rate, the procedure suggested would reveal the key that, when applied to the whole message, will open it to full inspection.

As you become more and more practiced at cracking ciperhtexts, you begin

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A	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
B	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A
C	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B
D	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C
E	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D
F	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E
G	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F
H	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G
I	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H
J	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I
K	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J
L	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K
M	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
N	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
O	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N
P	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Q	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
R	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
S	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
T	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
U	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
V	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
W	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
X	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Y	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Z	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y

Fig. 1. Magic Matrix

to recognize certain patterns. You can eye a fresh message and your educated instincts will guide you to the most likely procedures for discovering the key. There are "hills and valleys" in the letters and two-letter combinations (digraphs) of the text that fairly shout "substitution cipher," or "bi- or trilevel substitution."

These approaches are much more likely to bear fruit quickly than pouring every variation of cipertext through a batch of hospital-like routine tests.

The Magic Matrix

Figure 1 looks simple, doesn't it? A

```
10 PRINT "ALPHABET MATRIX"
20 BY KARL ANDREASSEN
30 CLEAR 10000 :DIM A$(26,26)
40 LPRINT "   ";
50 FOR X=1 TO 26
60 LPRINT CHR$(X+64)" "; :NEXT X
70 LPRINT :LPRINT
80 Z=26 :Y=1 :T=1 :S=1
90 FOR L=1 TO 26
100 LPRINT CHR$(S+64)"  "; :S=S+1
110 FOR X = Y TO 26
120 LPRINT CHR$(X+64)" ";
130 NEXT X
140 Z=Z-1
150 Y=Y+1
160 T=1:       :V=Z : W=25
170 IF Y=1 OR Y=2THEN 230
180 FOR U=1 TO Y-2
190 LPRINT CHR$(T+64)" ";
200 T=T+1
210 IF T=26 THEN END
220 NEXT U
230 LPRINT
240 :
250 NEXT L
```

Program Listing 1

About Secret Codes

One or two generations past there were books and young folks who read those books. Some were of lasting worth and survive into the present; who has not at least heard of *The Gold Bug*, even if he hasn't read it for himself? It is a masterpiece of adventure fiction, all about pirates and buried treasure and walking the plank.

Central to the story is a gold bug that is dropped through the eye of a weather-whitened human skull that was found nailed to a branch of a tall tree. "Dig here," the directions read, but not in "plaintext." The boss pirate had left directions on how to find the treasure couched in the most abstruse fashion, in secret code. A generation grew into adulthood with a taste for secret ciphers and codes, buried treasure, and dreams of finding it.

While cryptology existed long before that book was written, it was never so widely popular until *The Gold Bug* was published. Thereafter, every newspaper had its cryptogram corner.

Because of its basic purpose, the secrecy of communications, the finer points of the cryptographic art are seldom noised about, particularly by the professionals who are paid handsomely for their know-how. One of the rules of the game is that even knowledge of the existence of a coded dispatch must be kept quiet as long as possible.

Why, for instance, do Swiss banks use numbers instead of names for customers' accounts? Why does the TRS-80 have provision for a password on its magnetic documents? It has long been said that a lock is for keeping honest people honest; there is no such thing as a lock that is safe from a picklock, although some of them are not particularly easy to master.

The most-used and best-known cipher system carries the name of a man born in 1525 near Paris, Blaise de Vigenere. His contribution to the art and craft of cryptology was the autokey, an advanced type of cipher even to this day. Tradition, however, has saddled him with the relatively simple polyalphabetic substitution cipher, one step removed from the simple monoalphabetic cipher.

Among cryptologists, his name is linked to cryptanalysis and codes because of his *Traicte des Chiffres*, a book written in 1585 corraling

Continues on p. 294

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Continued from p. 292

most of the work done to that time. One of the descriptions therein details the manner of creating a polyalphabetic cipher that begins with one letter know to the sender and the receiver. Each succeeding letter is the key to the next, a fairly secure code that has been incorporated into modern crypto machines, which have been replaced by computers.

Aladdin learned a master mystic word that opened a passageway into the side of a mountain, revealing treasures within, and the password was born. There is a lesson for those of us interested in opening secret documents for the fun of it, as well as for our livelihood: A secret door or message must be easy to enter for those who hold the key. Enciphered messages that require the addressee to be a master of cryptology in order to fathom their meaning are virtually worthless as communications. A cipher must be immediately readable by the addressee and "impossible" for anyone else to read.

The computer has renewed popular interest in the challenge of cryptanalysis because the routine of counting letters, repetitions, and digraphs can be handled via keyboard and electronic memory. Further, generating an enciphered message is now as easy as writing a letter. If you and your addressee have the same program, returning your missive to its original plain-language (plaintext) form is as easy as enciphering it was for you.

Obviously, even if you don't indulge in cryptography, every time you keyboard a plaintext letter with your word processor, you are encoding that letter into the ASCII language, which in turn is translated to machine language. Perhaps the 000's and 111's of your computer memory could be mailed to a faraway recipient who inserts the message into his "black box" for reconstruction to plain language. Isn't that exactly what happens when you mail a computer disk to someone? ■

```
10 CLS
20 PRINT "TRI-ALPHABET CIPHER
30 PRINT "by Karl Andreassen
40 PRINT "@ July 1982" :PRINT
50 CLEAR 5000
60 FOR X=1 TO 26
70 A$=A$+CHR$(X+64) '==Generate basic alphabet
80 NEXT X :PRINT :PRINT
90 INPUT "ENCIPHER OR DECIPHER <EN/DE> ";E$
100 IF E$="EN" THEN 120
110 IF E$="DE" THEN 160ELSE 10
120 B$=RIGHT$(A$,25)+"A" '==First encipher alphab.
130 C$=RIGHT$(B$,25)+"B" '==2nd encipher alphabet
140 D$=RIGHT$(C$,25)+"C" '==3rd encipher alphabet
150 GOTO 190
160 B$="Z"+LEFT$(A$,25) '==First decipher alphabet
170 C$="YZ"+LEFT$(A$,25) '==2nd dec. alph.
180 D$="XYZ"+LEFT$(A$,25) '==3rd dec. alph.
190 CLS :PRINT "KEYBOARD READY" :W=0
200 PRINT :PRINT "Enter plaintext or cipher, using space bar and
210 PRINT "<ENTER> but no punctuation or numerals." :PRINT:PRINT
220 I$=INKEY$ :IF I$="" THEN 220
230 IF I$="*" THEN 350
240 IF ASC(I$)=32 THEN PRINT " "; :GOTO 220
250 IF ASC(I$)=13 THEN PRINT " " :PRINT :GOTO 220
260 PRINT I$;
270 A=ASC(I$)-64 '==Get ASCII number of input letters
280 W=W+1 :IF W=4 THEN W=1
290 V=V+1 '==Character counter
300 ON W GOTO 310,320,330
310 F$=F$+ MID$(B$,A,1) :GOTO 220
320 F$=F$+MID$(C$,A,1) :GOTO 220
330 F$=F$+MID$(D$,A,1)
340 GOTO 220
350 IF E$="EN" THEN PRINT :GOTO 370
360 IF E$="DE" THEN PRINT :PRINT F$ :END
370 FOR X=1 TO V
380 PRINT MID$(F$,X,1);
390 Y=Y+1 :IF Y=5 THEN PRINT " "; :Y=0
400 NEXT X
410 IF Y=1 THEN PRINT "ZNEF"
420 IF Y=2 THEN PRINT "NFZ"
430 IF Y=3 THEN PRINT "AK"
440 IF Y=4 THEN PRINT "L"
450 END
```

Program Listing 2

A—ASCII number for MID$
W—Three-way toggle
A$—Straight alphabet
B$—First alternate alphabet
C$—Second alternate alphabet
D$—Third alternate alphabet
E$—Menu variable
F$—Text string
I$—INKEY$, plain- & ciphertext

Table 1. Variables for Listing 2

square, 26 by 26 letters, each succeeding alphabet slid one letter to the left, and the hung-over letter tacked on to its own tail. The top and left side lines are straight alphabets. Can you envision the rich possibilities that lie in this matrix?

Suppose that each time you enter one letter of plaintext, each succeeding alphabet is engaged serially. What kind of ciphertext would appear? Would it be easy to crack? Certainly as a single, short message it would be difficult. It might be easier if you knew what method the originator used.

This is called polyalphabetic keying, from two to any greater number. Imagine each of these alphabets as horizontally movable strips of paper, each with two alphabets in series in the form discussed in the previous article. You could set up your alphabet strips such that your plaintext appears vertically down through the strips, and select any other resulting vertical line to right or left as your ciphertext.

You have, in effect, 25 cipherkeys at your disposal. Each of 25 messages could be sent with differing keys without need for indication of which line would be used, because the plaintext reconstruction would appear on one of the 25 lines. Do you think this would be an easy, or a difficult, cipertext to break? Suppose you use the Magic Matrix as your aid in discovering the cipherkey. How would you go about it?

The approach described is known as a strip cipher. It is, despite its complex appearance, too simple as stated above to be a reliable system of secret communication. In practice the alphabets

```
UJHSG DSGIP WUBPG TKAUA ZBAVP HFPPV UTXDV LOIWS KEBNO BAVBP
GJHBP WOPQN DCUFH XMNBB VWIGP BVUJZ BPWFB PQPVE VVVFG PPUWB
NOPHW IGPXJ DUYRV NGUJH DKSIG UUGAU THWGD MKIZQ XVUHE MHZYR
SFVBD RWGWI GVUTD JIKUC OQJDC GWMKQ FZNEF

ABCAB WIKQL KQPVK FTFBV HHQUJ GVBOR TVSSQ YPEDU KYFUW BVHNG
QUYKF PDQRO JGGUQ WIGWX GQUAV JZEZV ZFPWZ ULYOD UTLYJ RXODO
AGJHI FTHOV ZBAVN KJIVB PWXTG WIGPB VUJZL
```

Fig. 2. Enter these two samples of ciphertext from the In-Alphabet program through the DE menu prompt to read their plaintext message.

were not only used as strips of printed paper, but the strips were glued to wheels to form a machine. The letters were rotated on the strips by 90 degrees, so that the text would read from left to right rather than vertically. But from this basic form came some rather interesting and much-used machines.

Do you think you could program your TRS-80 to pick one letter each from one alphabet after another, selecting the correct letter in that alphabet in such manner that another routine in the program could decipher the resulting ciphertext? The program Tri-Alphabet Cipher (Program Listing 2) does this with three lines. Let's not tackle all 25 lines to start with, keeping in mind that what works for three lines can be the genesis of a program that will handle 25 lines.

The resulting ciphertext becomes more difficult to crack, unaided by foreknowledge, than a simple one-to-one substitution, and yet the ciphertext is no more difficult to restore to plaintext, provided you and your addressee have the program.

Suppose instead of straight alphabets, though slid left one letter each, you introduce interleaved alphabets such as those in the first program in this series. The difficulty in discovering the key becomes even greater, but then you introduce a "fly in the ointment," the fact that the person addressed must have a copy of the key on hand or be able to reconstruct the matrix easily.

Cipherkeys lying around are like the keys to your automobile left in the ignition while you take that short run into the post office: subject to loss not only of the key but of the automobile. It is laudable to introduce added complexity into the originating system, but impractical if it reflects a too-great burden on the addressee of the message.

Another suggestion: Suppose that you write a keyword repetitively for 26 letters just above the top index line of the Magic Matrix. Now, instead of diving directly for the enciphering letter from the springboard of the straight index alphabet, you detour and touch the keyword letter directly above it. Then, with that alternate letter in mind, go down the left vertical index alphabet and from the level at which that same letter is found, go across until you intersect the vertical line where the letter originated. The letter at the point of intersection is the letter you use in your ciphertext.

What level of secrecy do you think will be afforded now? And can this be programmed so you won't have to use pencil and paper and hours of routine time to create a ciphertext or restore a plaintext? Could the month in which the message was written be used as a keyword? That would be "asking for it" as far as a clever analyst is concerned. It is too common to use with confidence.

How about "Rumpelstiltskin?" Too many old timers might use that one. But you and your addressee have something in common that no one else is privy to (you hope). Use the word or 26-letter sentence that describes it.

Alphabet Matrix (Program Listing 1) is included so you can print out Magic Matrix with a minimum of effort. Who says the home computer isn't changing the world of crypto? Ever try to type such a matrix on your typewriter—without mistakes? And if you become inspired as to how to put the matrix to good use, take off from the core program as written to write a cipher-generating program using the matrix.

Tri-Alphabet Cipher

Note Fig. 2, the two ciphertexts produced by Listing 2. Compare the arrangement of letters to the arrangement of those in the first article in this series, produced by the interleaved alphabet key. Study them side by side for a while, until a subtle pattern appears. Like looking at a psychologist's color acuity testing patterns, the pattern is more apparent to some persons than to others.

The two in this article are not quite identical, either, although produced by the same program: The first one started out with its message from the first plaintext letter, while the second used a tiny subterfuge, that of first entering a few odd letters of garbage to set the program's tri-cycle on a different beginning sequence. Otherwise, they are identifically produced.

The Tri-Alphabet ciphertext-generating and plaintext-restoring program may seem a bit complex, but on the whole it is just 45 lines of Basic at work. The standard alphabet is laid out in A$, lines 60–80. From this is generated three enciphering alphabets, lines 120–140, and three deciphering alphabets, lines 160–180. Note how simply this is done: the use of RIGHT$ and LEFT$, adding in the hung-over letters on the end in one case, and slipping them in at the beginning in the other case.

The keyboard-entering routine is standard, accepting spaces and carriage returns to make entry easier. These are not transmitted to the ciphertext, however, for reasons previously mentioned.

Control is directed cyclically to lines 310, 320, and 330 by the ON W GOTO statement of line 300, which gets its W in serial order from line 280. The ciphertext is tailed out to a five-character group by lines 410–440. You would want to use a random letter selection here in deadly serious practice, if more than one message were to be transmitted in this same cipherkey. Having the same tail on each message would be a source of information to the analyst into whose hands you must assume it will fall.

I keep two filed versions of each program. The first is for screen only; in the second all Print statements have been changed to LPRINT. With P or L as one letter of the otherwise identical filespec, it's easy to pick the one you want to use at any particular session.

The program of the previous article, designed to aid in cracking ciphers, can be used to advantage with ciphertexts from this program, if you keep in mind the three-tier nature of the cipherkey. There are other helpful program aids to come.

One of the most useful aids to a practicing amateur or professional analyst is graphic display of letter frequencies in the ciphertext under study. This is upcoming, as is a means for determining the percentage that those frequencies reflect relative to the whole. Also, there are digraphs and their frequencies.

Have you found a copy of *The Codebreakers* that I mentioned in the previous article? ■

Contact Karl Andreassen at 24750 Chianti Road, Cloverdale, CA 95425.

Moving Window

by Ken M. Williams

Page through the random-access memory of your Color Computer with this nifty little utility.

Color Computer users can allocate any area of random access memory for use as video RAM. This flexibility is needed primarily for the various graphics modes, which require differing amounts of memory. However, by simply altering the start address of the normal "text screen" video page, one can "page" through the entire area of RAM, including not only user RAM, but portions of RAM used by the Basic ROM (read only memory) for system functions, scratchpad registers, string storage, and program pointers.

The one hitch in this scheme is the somewhat tedious method of telling the computer where to start the video RAM. The page is selected by means of a page-select register. This is not a register in the usual sense, as it is not a regular memory location. Rather, it consists of seven pairs of addresses.

Each pair of addresses controls one bit in the page select register. POKEing any value to the odd-numbered address sets the corresponding bit in the page select register, while POKEing any value to the even address resets the same bit. The value that you need to POKE into the PSR is, in effect, the page number on which you wish to start video RAM.

A page, as used here, consists of 512 consecutive bytes of memory, which must begin on a 512-byte boundry (0, 512, 1024, and so on). To obtain the offset of our video RAM from address 0, divide the desired start address by 512. This value, in binary, is POKEd into the PSR. While Extended Color Basic has very handy hexadecimal operators, as well as allowing octal input, it has no provision for binary conversions.

The heart of the program presented here is a routine that calculates the page offset and converts it to hexadecimal form. The hex offset is then converted to a binary number, using a string table that contains the binary bit patterns for each of the 16 hexadecimal digits. Line 400 first checks to see if the offset is a one-digit number, in which case the high nibble (4 bits) of the binary number is set to zero. For each nibble, X is the decimal value of the hex digit, used as the index for the binary bit pattern.

Line 415 concatenates the two nibbles into one byte. Lines 420–450 load the individual bits into the array P. The subroutine at line 500 then POKEs these bits into the correct page-select register positions, and returns to the keyboard-scan routine at line 300.

I put the data statement at line 455, so I would have the bit patterns handy to the routine which isolated the individual bits when I was writing the program.

The decision to use hexadecimal input was purely subjective, and those more comfortable with decimal addresses need only modify lines 240 and 250. In order to provide complete access

Program Listing

```
10 ' A MOVING VIDEO WINDOW
20 ' FOR THE TRS-80 COLOR COMPUTER
30 ' REQUIRES 16K WITH EXTENDED BASIC.
40 'COPYRIGHT 1982
50 ' BY KEN M. WILLIAMS
60 ' 4-1-82
70 DIM BP$(15)
90 H$="&H"
100 REM LOAD BINARY PATTERN ARRAY
110 FOR X= 0 TO 15: READ BP$(X):NEXT
120 CLS(5):PRINT@38,"* MOVING VIDEO WINDOW*";
130 PRINT@102," CONTROL KEYS: ";
140 PRINT@166," <A>: RESTART";
150 PRINT@198," <Q>: QUIT";
160 PRINT@230," <^>: NEXT PAGE";
170 PRINT@262," <DN. ARROW>:LAST PAGE";
180 PRINT@326,"PRESS <A> TO BEGIN";
190 IF INKEY$<>"A"THEN 190
200 CLS(5):PRINT@ 99,"INPUT START ADDRESS IN HEX";
210 PRINT@ 130," MUST BE A 512 BYTE BOUNDARY";
220 PRINT@160," ANY ADDRESS OF $8000 OF GREATER WILL PRODUCE AN
ASCII SCREEN"
230 PRINT"DUMP OF THE BASIC ROM"
240 INPUT S$
250 S=VAL(H$+S$): IF S/512<>INT(S/512) THEN 200
260 IF S>32767 THEN GOTO 600
270 IF S<0 THEN S=0
280 OFST=S/512:K$=HEX$(OFST)
```

Listing continues

The Key Box

Color Computer
16K RAM
Extended Color Basic

Listing continued

```
290 GOSUB 400
300 I$=INKEY$:IF I$=""THEN 300
310 IF I$=CHR$(94) THEN S=S+512:GOTO260
320 IF I$=CHR$(10) THEN S=S-512:GOTO260
330 IF I$="Q" THEN END
340 IF I$="A" THEN 120
350 GOTO300
400 IF LEN(K$)<2 THEN BH$="0000":GOTO410
405 X=VAL(H$+LEFT$(K$,1)):BH$=BP$(X)
410 X= VAL(H$+RIGHT$(K$,1)):BL$=BP$(X)
415 BN$=BH$+BL$
420 P(6)=VAL(MID$(BN$,2,1))
425 P(5)=VAL(MID$(BN$,3,1))
430 P(4)=VAL(MID$(BN$,4,1))
435 P(3)=VAL(MID$(BN$,5,1))
440 P(2)=VAL(MID$(BN$,6,1))
445 P(1)=VAL(MID$(BN$,7,1))
450 P(0)=VAL(RIGHT$(BN$,1))
455 DATA 0000, 0001,0010,0011,0100,0101,0110,0111,1000,1001,1010
,1011,1100,1101,1110,1111
500 REM SET PAGE-SELECT REGISTER
510 FOR X=0 TO 6
520 IF P(X)=1 THEN POKE 65479+(X*2),0 ELSE POKE 65478+(X*2),0
530 NEXT
540 RETURN
600 REM SPECIAL ROM READ ROUTINE
610 CLS
620 FOR Z=S TO (S+511):PRINTCHR$(PEEK(Z)); :NEXT
630 GOTO 300
```

to all internal areas of the computer, I included the ASCII dump routine at line 600.

The window routine only works on RAM because the highest possible seven-bit binary number (0111111) is decimal 63. At 64 ($8000) you run out of RAM; set at the start of the Extended Basic ROM, without the dump routine, the program would just recycle back to page 0. The ASCII dump works the same as the rest of the program, a page of memory at a time.

To use the program, type Run. When the menu appears, type A and a prompt will appear asking you to input the start address. Try 0 first; this puts you on page 0, and as you will see, that is a busy area indeed.

Toward the lower right of the screen, notice the line of seven pink squares. Press any key and see what happens. These squares represent the location of the keyboard roll-over table, which is used in part to resolve simultaneous keystrokes.

Pressing the up arrow moves you upward through RAM, one page at a time. As you page upwards, you will encounter various parts of the program in storage. At page 3, you are seeing the regular video memory. In the pages that follow, if you have used a graphics mode since power up, you will find sequences of characters representing the graphics screen information. Above this is regular user RAM.

Address $8000 or greater puts you into the Basic and Extended Basic ROMs. The ASCII dump reveals the startup messages and various Basic keywords. The program could be expanded to allow additional functions, such as changing memory locations directly, and producing both ASCII and hexadecimal printer listings of the screen contents. ■

Ken Williams can be reached at 12540 N. Kalama Circle, Marana, AZ 85238.

BP$	Binary Bit-Pattern Array
BH$	4 Most-Significant Binary Digits
BL$	4 Least-Significant Binary Digits
H$	Hexadecimal Designator
I$	INKEY$
K$	Offset of Video Page from Base Page (In Hexadecimal)
S$	Start Address of Video Page (In Hexadecimal)
X	Index of Binary Bit Pattern
S	Decimal Value of S$
P	Individual Binary-Bit Array

Fig. 1. Variable List

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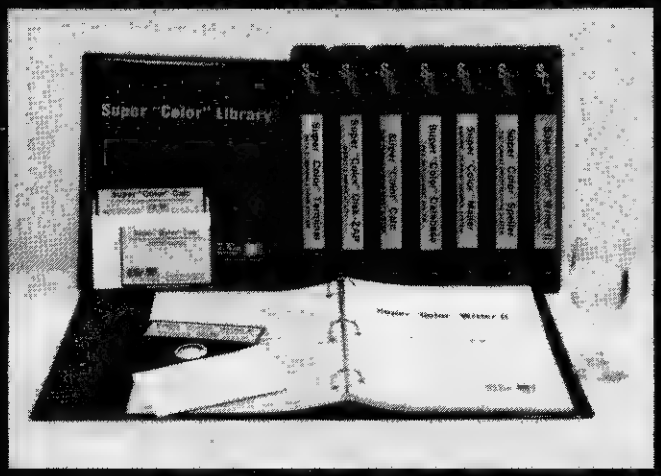
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The Murphy Box

by Sam Conviser

When your acoustic coupler gives you trouble, use this device to diagnose the problem.

In my work as a technician, I've come across various problems associated with acoustic couplers, sometimes terminal caused, sometimes caused by the coupler itself.

Break-out boxes or black boxes are commercially available for the analysis of RS-232 signals between components, but these little gems can be costly, ranging in price from $125 to $1,000. I invented a device that analyzes these signals and leaves my savings account relatively untouched. I call the device the Murphy Box—named for every technician's patron saint.

The Murphy Box uses tricolored LEDs. They light red when polarity is forward, green when reversed, and yellow on ac, and they show data direction flow. Knowing the proper color combinations of the LEDs during normal operation lets you determine whether trouble is in your terminal or coupler. The Murphy Box also checks the continuity of your interface cable.

Construction

The Murphy Box construction should take about 6–8 hours and cost less than 30 dollars. Except for the SP8T switch, you can purchase all the parts from Radio Shack.

Figure 1 shows wiring for a terminal using the standard RS-232 lines 1–8 and 20 (see Table 1). Not every system uses all nine lines. For example, if you own a Radio Shack Color Computer, you'll only have to wire your Murphy Box with four LEDs and an SP4T switch (see Table 2). The switch is used with the cable test feature on the Murphy Box.

To build your Murphy Box, you'll need an appropriate enclosure. Base its size on the number of lines you'll be monitoring. Plan on using 1.5 inches per LED, or just get the largest plastic box available from Radio Shack (I used a 7¾-by-4⅜-by-2⅜-inch box). Drill LED holes in the metal box top and use LED sockets. The LEDs will actually be mounted on a piece of breadboard, not in the sockets.

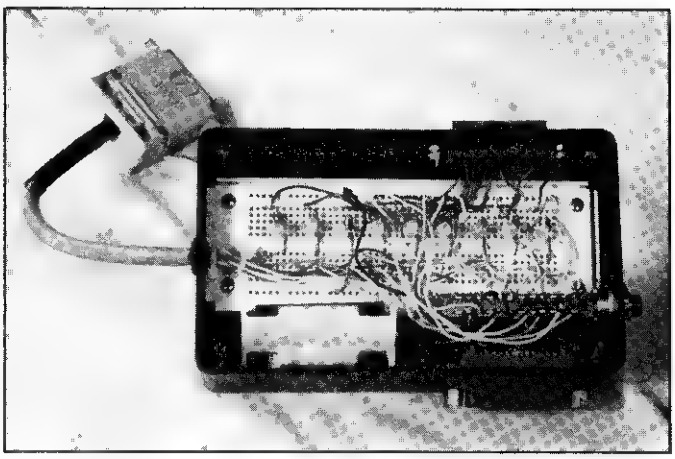


Photo 1. Inside the Murphy Box

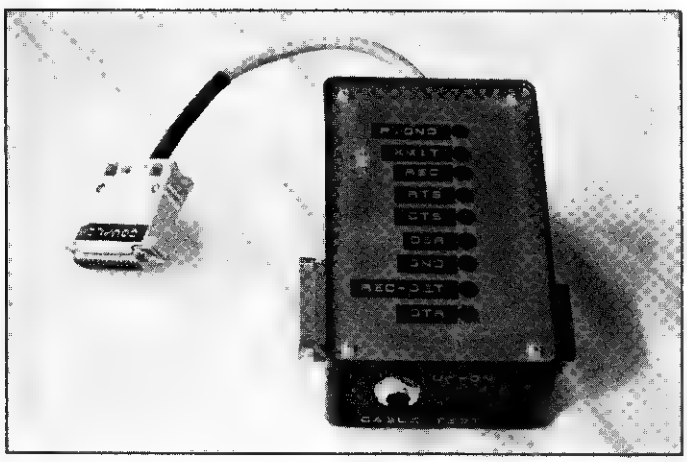


Photo 2. Finished Box

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Place a piece of shrink tubing (about 1 inch) over the sockets on the inside of the cover and shrink only the top so they hold to the sockets. They will be used as tunnels for your LEDs. Then, put the metal cover aside and tackle the box itself.

Mount the breadboard, battery holder, switch, and connectors inside the box. (Refer to Fig. 2 as you read further.) Connector A is a male DB-25. Regardless of your system, this connector must be a DB-25 because it will connect to the modem.

I built my Murphy Box with about 1 foot of cable on connector A, which makes using the box easier. Telephone cable works well for the wiring, but almost any wire will do. Connector B is a female DB-25. It's only used for cable testing. I mounted mine on the box so the leads can easily reach the breadboard.

Connector C should be the same type of connector that your computer uses to interface with your modem. If you have a Radio Shack Color Computer, you'll be using a four-pin DIN plug. This connector is used for cable testing as well as actual in-line diagnosis. Connector C also mounts on the box.

Mount the breadboarding so its center is directly under the LED sockets and shrink tubing on the lid. I also elevated my breadboard about ½ inch with ¼-by-1-inch wood stock.

The switch activates the cable test. Use a switch with as many contacts as you have LEDs. Once you've mounted the breadboard and LED sockets, mount the switch wherever you have extra room; actual positioning isn't important. Drill a hole in the box for connector A's cable, but don't install the cable yet. The last component to install is the battery pack. I used four AA batteries. All you need is 6 volts, and any battery combination will do, but I found it easier to use a battery holder.

Now all that is left to do is wire your Murphy Box. First, mount each 330-ohm resistor and LEDs on the breadboard. Be sure the LEDs are directly under the tubing tunnels in the lid. Feed the cable attached to connector A through the hole you've drilled. Wire according to the schematic.

Start the wiring where connector A lines attach to the breadboard and wire to the switch. Each line must go to a different switch terminal. Wire all pins on connector B together as well as the unwired side of the switch. Connect connector B to the plus side of the battery. Connector C's lines go to the cathode end of the LEDs. Be sure you connect the proper pins to the proper LEDs. Then connect the gang-wired side of the switch to the battery's negative side.

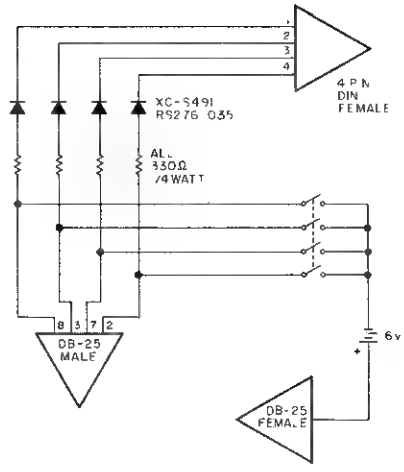


Figure 1

Testing

Test all connections by placing 6 volts between connector A and connector B. Do it pin by pin. Then reverse polarity and do it again. These tests determine continuity and determine if all LEDs are working.

If an LED lights the wrong color, turn it around. Check the cable test feature by activating the test switch and jumpering pin by pin. Do not use an external 6-volt supply for this test; your 6-volt battery source will be plenty.

Pin	Function	
1	Protective Ground	(PGND)
2	Transmit Data to Coupler	(TXD)
3	Receive Data from Coupler	(RXD)
4	Request to Send Data to Coupler	(RTS)
5	Clear to Send Data from Coupler	(CTS)
6	Data Set Ready from Coupler	(DSR)
7	Signal Ground	(GND)
8	Data Carrier Detect from Coupler	(DCD)
20	Data Terminal Ready to Coupler	(DTR)

Table 1. Functions of Pins

DB-25 pins	Function	4-pin DIN
2	Transmit Data	4
3	Receive Data	2
7	Signal Ground	3
8	Data Carrier Detect	1

Table 2. Color Computer Signals

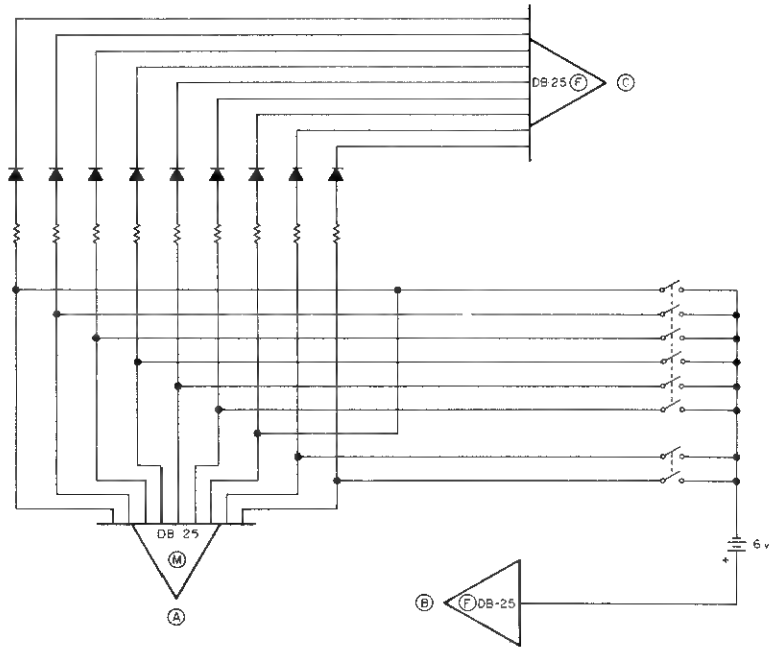


Figure 2

Again, all LEDs should light the same color, and only one at a time. If two or more LEDs light, you have a crossed connection somewhere.

Beyond the Murphy Box

Problems associated with acoustic couplers or modems can be complicated. The Murphy Box can assist you if the problems are in the coupler or terminal.

If you're having problems and the Murphy Box doesn't help, try changing phones. A bad telephone microphone or ear speaker can spell trouble, and phone-line problems can give you a headache.

What the LEDs Show

To analyze the signals, I put together three tables showing my three modes of operation and their corresponding color sequences. You should make up your own color sequence tables for your specific system. Be sure to do this before you have system trouble. I used the following modes of operation:

- Mode 1—Prephone insertion.
- Mode 2—Phone-inserted, contact made with host's tone.
- Mode 3—Working mode, communicating with host.

"Make up your own color sequence tables for your system."

It's easy for you to see the proper light sequences. A variation in the sequences in any mode might spell trouble. Table 1 shows the origin of the various signals. For example, if your transmit-data LED does not light, the trouble is probably in your terminal. A dead receive LED points to the coupler. In the working mode, the transmit and receive LEDs flash red to green (if your system is 300 baud). This is normal and again can be used to diagnose trouble.

The Murphy Box is inexpensive to build and easy to use. Don't pay someone else to diagnose your modem problems when you can do it yourself. ■

Sam Convisor can be reached at 1714 Robinhood Road, Durham, NC 27701.

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Graphics on the Line Printer VII

by Thomas Tinsley

Vector coordinates, windowing and divide-and-conquer translation add up to spirals, sine waves, cartoons, and more for LP VII artists.

The Line Printer VII lets you control all printable points—480 points horizontally and 693 vertically on an 8½-by-11 page. This is pretty good resolution for an inexpensive printer; the problem is how to produce a printable graphics image. For that page size, bit-mapping an area of memory to the printer would require well over 40K. In fact, since the printer uses only 7 bits for graphics, the actual map might fill a 48K machine.

Also, graphics are often full of surprises. It's desirable to check an image for accuracy on the display before committing it to the printer. This presents some additional problems, since the printer's resolution is much better than the display's.

The solution to both the memory-requirement puzzle and the different graphics outputs turned out not to be too difficult or demanding of memory. The graphics routine (print buffer included) only requires about 1.6K and the display and printer use the same processing routines.

General Design

The component that makes the process work is the vector. A vector is a set of X,Y coordinates giving the starting and ending points of a line. Coordinate values are limited only by the range of integer numbers and therefore do not represent any graphics hardware constraint.

The concept that allows vectors to be drawn on a specific device is that of windowing. A window describes the ranges into which the coordinates of vectors must fall to become part of the graphics output. The ranges are given as a low and a high for both the X and Y coordinates.

By altering the window location, all or part of a picture can be shown. For example, a complicated diagram might be difficult to view on the display due to its relatively low number of addressable points, but be perfectly clear when printed. By altering the window, you can zero in on part of the diagram and, in a sense, magnify it for clearer viewing.

You can then use this magnifying process to effectively allow the display to present partial outputs in the same resolution as the printer. The process also lets you produce large printed outputs by setting the window parameters and magnifying one section of a picture at a time.

Using the window parameters and knowing the display and printer resolution, ratios are computed and each vector coordinate is adjusted to fit on the target device. For the printer, a sub-window concept is used, with each print line viewed as a window within a page. In this way, you need a buffer the size of only one print line. This is only 480 characters for the Line Printer VII.

Three entry points are provided to give a Basic program the ability to easily control graphics outputs. Entry is by standard USR calls.

One entry passes the parameters necessary to control the window and provide other control information. In all listings, this is given as USR1. The passed parameter must be the first element of a seven-entry array. The entries are as follows:

1 Low X of window
2 Low Y of window
3 High X of window
4 High Y of window
5 Display background control:
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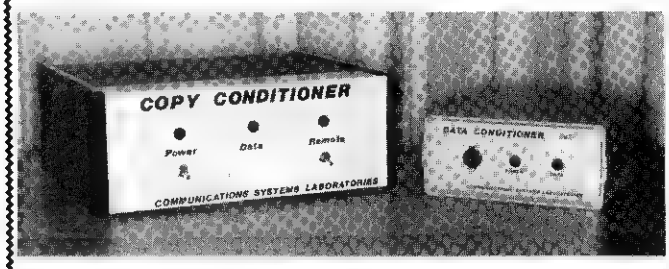
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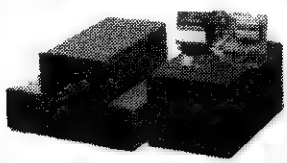
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6 Lines per printed page
7 Characters per line (may not exceed 80 for Line Printer VII)

Parameters 1–4 control the window, parameter 5 controls the display background (which does not affect the printed output), and parameters 6 and 7 describe the physical aspects of the printer.

The remaining two entry points output the diagram, one to the display and the other to the LP VII. Both of these points require the same input, an integer array defining all vectors. A vector requires a minimum five elements: the starting X and Y coordinates, the ending X and Y coordinates, and a negative number to indicate the vector end. This last number keeps things understandable when the last coordinates of a vector are the first coordinates of the next one.

"...you need a buffer the size of only one print line."

Usage

Circles are always a good way to test the quality of a graphics device. Figure 1 (Program Listing 1) shows the printer capability by drawing a spiral on an 8½-by-11 sheet of paper. Note that the range on the X and Y axes is 0–2,000. This resolution is greater than the printer's and partially accounts for the quality of the output.

My son helped me with Fig. 2, since we were reproducing one of his favorite characters. Program Listing 2 shows how this was done; what it does not show is the effort required to draw the picture on a sheet of graph paper and then extract the individual coordinates. Since this process was prone to error, it was very convenient to focus on specific parts such as the head, hand or foot to verify accuracy on the display before committing to printer output.

Figures 3 and 4 show a simple technique for mixing graphics and printed output. The trick is to change the window on an iterative basis so you have program control of each line printed. This provides a simple way to print the scale on the Y axis. (Note that the Y coordinate is the opposite of normal graphics, with the zero position in the upper left corner and the maximum value in the bottom left.)

Listings 3 and 4 are almost identical except for their titles and the code used to generate the vectors. In the first sine-wave figure, the curve is generated as a single vector. In the second, each point is drawn as a vector to the X axis.

Program Structure

Program Listing 5 contains all that is needed. Though a Model I program, it uses no ROM routines and should be easy to adapt to a Model III.

A divide-and-conquer technique translates vectors into the required bit patterns. The main logic for this technique exists in the DRW, or draw, routine. Vectors are adjusted according to the defined window and then tested for visibility. If they are not within the window, they are discarded.

```
1 ' SPIRAL GRAPHICS
10 DEFUSR1=&HB000: DEFUSR2=&HB003: DEFUSR3=&HB006
20 DIM P%(4000),PARM%(7)
30 PARM%(1)=0
40 PARM%(2)=0
50 PARM%(3)=2000
60 PARM%(4)=2000
70 PARM%(5)=0
80 PARM%(6)=6*10
90 PARM%(7)=7*10
100 X=USR1(VARPTR(PARM%(1)))
110 X=1: R=1000
120 FOR N=1 TO 15
130 FOR A=0 TO 2*3.19 STEP .1
140 P%(X)=1000+(R*(COS(A))):X=X+1
150 P%(X)=1000+(R*(SIN(A))):X=X+1
160 R=R-1
170 NEXT A
180 NEXT N
190 P%(X)=-1:X=X+1:P%(X)=-1
200 INPUT "P FOR PRINT, S FOR SCREEN";A$: IF A$="S" THEN X=USR2(
VARPTR(P%(1))) ELSE IF A$="P" THEN X=USR3(VARPTR(P%(1))) ELSE GO
TO 200
210 GOTO 210
```

Program Listing 1

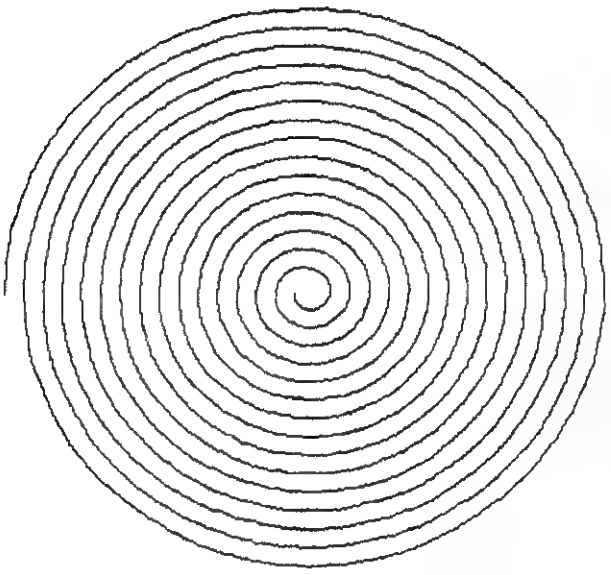


Figure 1



Figure 2

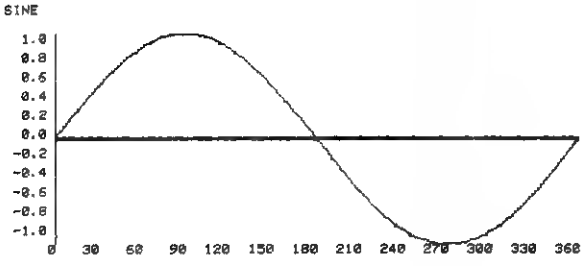


Figure 3

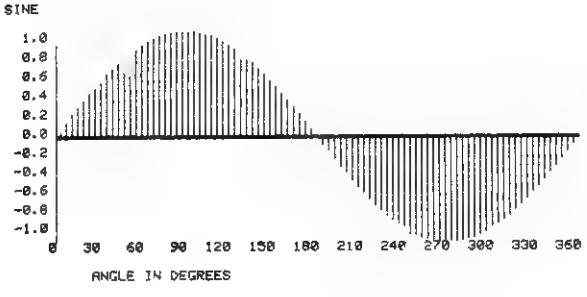


Figure 4

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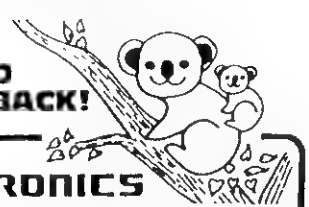
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Vectors inside the window are processed through successive division until both their from and to coordinates are identical. When a vector is divided by 2, half the vector is pushed onto the stack as a new vector and the other half is tested for further processing. Vectors are then popped from the stack and individually processed until all vectors are reduced to single points.

Since some vectors will be only partially within the window, the divide-and-conquer technique provides a simple method of identifying the included and excluded parts. This technique might appear slow, but, as the printer is buffered and operates much more slowly than the processor, the approach

```
10 DEFUSR1=&HB000: DEFUSR2=&HB003: DEFUSR3=&HB006
20 DIM PARMS%(7)
30 PARM%(1)=0
40 PARM%(2)=0
50 PARM%(3)=82
60 PARM%(4)=82
70 PARM%(5)=0
80 PARM%(6)=6*10
90 PARM%(7)=7*10
100 X=USR1(VARPTR(PARMS%(1)))
110 DIM P%(1000)
120 FOR X=1 TO 1000
130 READ P%(X)
140 IF (D%<0)AND(P%(X)<0) THEN GOTO 170
150 D%=P%(X)
160 NEXT X:STOP
170 INPUT "ENTER P FOR PRINT, S FOR SCREEN";A$
180 IF A$="S" THEN X=USR2(VARPTR(P%(1))): GOSUB 270
190 IF A$<>"P" THEN GOTO 170
200 LPRINT CHR$(31);"              DO GRAPHICS COME IN"
210 LPRINT
220 LPRINT          "                  FLAVORS?"
230 LPRINT
240 LPRINT CHR$(30)
250 X=USR3(VARPTR(P%(1))): CLS
260 GOTO 170
270 A$=INKEY$: IF A$="" THEN GOTO 270  ELSE RETURN
280 DATA 27,19,30,24,32,22,33,20,33,18,33,16,32,14,30,12,29,11,2
8,10,25,9,25,6,24,4,23,3,22,4,21,7,20,10,20,7,21,5,22,4,-1
290 DATA 20,7,19,4,17,4,16,4,14,5,13,6,11,10,10,14,8,15,7,16,6,1
7,5,19,4,23,5,27,6,30,8,31,12,33,17,33,20,32,22,30,24,27,-1
300 DATA 17,4,15,6,14,8,13,13,13,14,13,17,15,19,16,20,17,20,19,2
0,21,19,22,18,23,16,23,14,22,12,21,11,19,10,17,10,14,12,13,14,-1

310 DATA 24,15,23,16,23,17,24,17,25,16,24,15,26,15,27,13,27,12,2
6,10,24,9,22,9,20,10,-1
320 DATA 16,19,27,12,-1,26,13,26,14,25,14,-1,21,16,21,17,20,17,-
1
330 DATA 28,20,29,20,31,19,31,16,30,13,28,13,26,15,-1
340 DATA 28,16,28,17,27,18,25,17,-1
350 DATA 24,18,24,20,23,23,22,24,21,24,20,23,-1
360 DATA 17,20,16,22,16,24,18,26,21,26,22,25,-1
370 DATA 30,12,28,12,27,10,25,9,-1,29,11,29,9,31,8,32,8,-1,28,10
,28,9,29,8,30,7,-1,27,9,28,7,29,6,-1
380 DATA 10,14,12,17,6,17,8,20,11,21,8,23,4,24,7,26,10,25,12,24,
11,26,9,30,9,31,12,29,15,26,14,29,14,32,15,33,16,31,18,28,19,31,
20,32,20,27,23,28,-1
390 DATA 7,16,5,15,2,15,-1,6,17,4,16,2,17,-1,5,19,3,19,1,20,-1
400 DATA 32,22,33,22,35,21,38,21,44,21,49,22,53,24,55,26,-1
410 DATA 33,22,35,17,35,16,34,14,33,12,33,10,34,8,36,6,39,6,40,7
,41,9,40,11,39,11,37,10,-1
420 DATA 36,6,38,3,40,1,42,1,43,2,43,3,42,5,41,7,-1,42,5,43,5,44
,6,44,9,43,10,42,10,41,9,-1,44,7,45,6,46,7,46,9,45,10,44,10,43,1
3,42,16,39,17,38,21,-1,40,11,40,12,39,14,-1
430 DATA 15,33,12,38,11,41,12,43,15,45,17,46,18,48,20,48,21,47,2
2,49,23,50,24,50,25,49,25,47,24,45,-1,25,49,26,49,27,48,27,46,26
,44,25,43,-1,27,47,28,46,28,45,27,43,26,42,23,41,19,41,18,40,17,
38,-1
440 DATA 54,34,53,31,52,30,51,29,49,28,46,29,44,30,41,32,44,33,4
4,31,45,30,47,32,48,29,50,29,50,33,53,31,51,36,53,35,54,36,-1
450 DATA 54,37,54,30,55,27,57,25,59,25,61,25,62,26,62,27,61,28,5
9,29,-1,59,25,60,24,62,24,63,25,63,26,62,28,61,28,-1,61,29,61,31
,60,33,59,35,59,37,-1
460 DATA 62,24,63,23,64,24,64,26,63,27,64,28,64,32,62,37,60,41,5
9,49,58,50,54,50,52,47,51,47,50,44,49,40,47,44,44,48,42,43,42,41
,41,43,36,48,-1
470 DATA 36,48,35,47,35,41,31,45,27,48,37,48,46,48,51,47,-1
480 DATA 64,24,66,22,67,23,68,25,-1,65,24,67,24,68,25,68,26,66,2
8,66,31,65,34,63,38,62,40,-1
490 DATA 62,37,62,43,63,45,71,45,76,46,80,48,82,50,82,53,81,55,7
8,55,78,51,73,52,71,48,66,50,63,47,59,49,66,50,73,52,78,55,-1
500 DATA -1
```

Program Listing 2

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```
10 'SINE PLOT EXAMPLE 1
20 DEFUSR1=&HB000: DEFUSR2=&HB003: DEFUSR3=&HB006
30 DIM P%(4000),PARM%(7)
40 PARM%(1)=0
50 PARM%(2)=0
60 PARM%(3)=360
70 PARM%(4)=1100
80 PARM%(5)=0
90 PARM%(6)=1
100 PARM%(7)=60
110 X=USR1(VARPTR(PARM%(1)))
120 'GENERATE PLOT POINTS
130 I=1
140 FOR X=0 TO 360 STEP 2
150 P%(I)=X: I=I+1: P%(I)=550-(SIN((X/360)*2*3.1416)*550): I=I+1
160 NEXT X
170 P%(I)=-1: I=I+1
180 'GENERATE Y AXIS
190 P%(I)=0: I=I+1: P%(I)=0: I=I+1
200 P%(I)=0: I=I+1: P%(I)=1100: I=I+1
210 P%(I)=-1: I=I+1
220 'GENERATE X AXIS
230 P%(I)=0: I=I+1: P%(I)=549: I=I+1
240 P%(I)=360: I=I+1: P%(I)=549: I=I+1
250 P%(I)=-1: I=I+1
260 P%(I)=-1
270 INPUT "P FOR PRINT, S FOR SCREEN";A$: IF A$="S" THEN X=USR2(
VARPTR(P%(1))): GOTO 510  ELSE IF A$<>"P" THEN GOTO 270
280 LPRINT CHR$(31);"          SINE WAVE EXAMPLE 1"
290 LPRINT
300 LPRINT CHR$(30)
310 LPRINT "SINE"
320 LPRINT
330 PARM%(2)=0: PARM%(4)=49: PARM%(6)=1
340 FOR Y=1 TO -1 STEP -.2
350 N=USR1(VARPTR(PARM%(1)))
360 LPRINT USING "###.# ";Y;
370 FOR S=1 TO 2
380 IF S<>1 THEN LPRINT "       ";
390 N=USR3(VARPTR(P%(1)))
400 PARM%(2)=PARM%(2)+50: PARM%(4)=PARM%(4)+50
410 N=USR1(VARPTR(PARM%(1)))
420 NEXT S
430 NEXT Y
440 LPRINT "     0";
450 FOR A=30 TO 360 STEP 30
460 LPRINT USING "  ###";A;
470 NEXT A
480 LPRINT: LPRINT
490 LPRINT "          ANGLE IN DEGREES"
500 GOTO 40
510 A$=INKEY$: IF A$="" THEN GOTO 510  ELSE GOTO 270
```

Program Listing 3

Program Listing 4

```
10 'SINE PLOT EXAMPLE 2
20 DEFUSR1=&HB000: DEFUSR2=&HB003: DEFUSR3=&HB006
30 DIM P%(4000),PARM%(7)
40 PARM%(1)=0
50 PARM%(2)=0
60 PARM%(3)=360
70 PARM%(4)=1100
80 PARM%(5)=0
90 PARM%(6)=1
100 PARM%(7)=60
110 X=USR1(VARPTR(PARM%(1)))
120 'GENERATE PLOT POINTS
130 I=1
140 FOR X=0 TO 360 STEP 4
150 P%(I)=X: I=I+1: P%(I)=550-(SIN((X/360)*2*3.1416)*550): I=I+1
152 P%(I)=X: I=I+1: P%(I)=550: I=I+1: P%(I)=-1: I=I+1
160 NEXT X
180 'GENERATE Y AXIS
190 P%(I)=0: I=I+1: P%(I)=0: I=I+1
```

Listing 4 continues

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Listing 4 continued

```
200 P%(I)=0: I=I+1: P%(I)=1100: I=I+1
210 P%(I)=-1: I=I+1
220 'GENERATE X AXIS
230 P%(I)=0: I=I+1: P%(I)=549: I=I+1
240 P%(I)=360: I=I+1: P%(I)=549: I=I+1
250 P%(I)=-1: I=I+1
260 P%(I)=-1
270 INPUT "P FOR PRINT, S FOR SCREEN";A$: IF A$="S" THEN X=USR2(
VARPTR(P%(1))): GOTO 510  ELSE IF A$<>"P" THEN GOTO 270
280 LPRINT CHR$(31);"          SINE WAVE EXAMPLE 2"
290 LPRINT
300 LPRINT CHR$(30)
310 LPRINT "SINE"
320 LPRINT
330 PARM%(2)=0: PARM%(4)=49: PARM%(6)=1
340 FOR Y=1 TO -1 STEP -.2
350 N=USR1(VARPTR(PARM%(1)))
360 LPRINT USING "###.# ";Y;
370 FOR S=1 TO 2
380 IF S<>1 THEN LPRINT "       ";
390 N=USR3(VARPTR(P%(1)))
400 PARM%(2)=PARM%(2)+50: PARM%(4)=PARM%(4)+50
410 N=USR1(VARPTR(PARM%(1)))
420 NEXT S
430 NEXT Y
440 LPRINT "     0";
450 FOR A=30 TO 360 STEP 30
460 LPRINT USING "  ###";A;
470 NEXT A
480 LPRINT: LPRINT
490 LPRINT "          ANGLE IN DEGREES"
500 GOTO 40
510 A$=INKEY$: IF A$="" THEN GOTO 510  ELSE GOTO 270
```

Program Listing 5

```
                00100 ;         TITLE   GRAPHICS SUBROUTINES
4049            00200           ORG     4049H
4049 FFAF       00300           DEFW    0AFFFH
B000            00400           ORG     0B000H
                01910 ;
                01920 ;GRXUSR - USR ENTRY
                01930 ;
B000 C309B0     01940 USR1      JP      STR     ;STORE PARAMETERS
B003 C315B0     01950 USR2      JP      DSP     ;DISPLAY
B006 C31CB0     01960 USR3      JP      PRT             ;PRINT
                01970 ;
                01980 ;STORE PARAMETERS
                01990 ;
B009 CD7F0A     02000 STR       CALL    0A7FH   ;GET PARM LIST ADDR
B00C 110EB6     02010           LD      DE,PARMS        ;STORE LOCATION
B00F 010E00     02020           LD      BC,14   ;CNT=7 INIT PARMS
B012 EDB0       02030           LDIR
B014 C9         02040           RET
                02050 ;
                02060 ;DISPLAY DIAGRAM
                02070 ;
B015 CD97B0     02080 DSP       CALL    SCI     ;INITIALIZE FOR DISPLAY
B018 CD5BB0     02090           CALL    DIA     ;DRAW DIAGRAM
B01B C9         02100           RET
                02100 ;
                02200 ;PRINT DIAGRAM
                02300 ;
B01C CDD2B0     02400 PRT       CALL    PRI     ;INITIALIZE
B01F ED4B18B6 02500             LD      BC,(LP) ;COUNT=LINES/PAGE
B023 0B         02600           DEC     BC      ;COUNT-1
B024 78         02700 PRT1      LD      A,B     ;COUNT<0?
B025 17         02800           RLA
B026 3E2D       02900           JR      C,PRT2  ;YES
B028 C5         03000           PUSH    BC      ;SAVE COUNT
B029 3E80       03100           LD      A,80H   ;CLEAR CHAR
B02B 21D1B2     03200           LD      HL,PRTBUF       ;BUFFER ADDR
B02E 77         03300           LD      (HL),A  ;CLEAR FIRST CHAR
B02F 11D2B2     03400           LD      DE,PRTBUF+1     ;NEXT ADDR
B032 ED4B00B6 03500             LD      BC,(MXP)        ;MAX LENGTH
B036 EDB0       03600           LDIR            ;CLEAR
B038 3A4038     03700           LD      A,(3840H)
B03B CB57       03800           BIT     2,A     ;BREAK?
B03D C1         03900           POP     BC
B03E C0         04000           RET     NZ      ;YES
B03F C5         04100           PUSH    BC
B040 CD5BB0     04200           CALL    DIA     ;DRAW DIAGRAM
B043 CD7FB2     04300           CALL    PRL     ;PRINT LINE
B046 2A0CB6     04400           LD      HL,(CYL)        ;COMPUTED LOW + MAX Y
B049 ED4B02B6 04500             LD      BC,(MYP)
B04D 09         04600           ADD     HL,BC
B04E 220CB6     04700           LD      (CYL),HL
B051 C1         04800           POP     BC      ;COUNT
B052 0B         04900           DEC     BC      ;COUNT-1
B053 18CF       05000           JR      PRT1
B055 3E1E       05100 PRT2      LD      A,30    ;END GRAPHICS
```

Listing 5 continues

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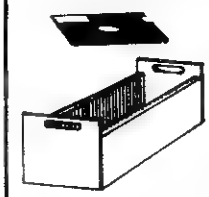


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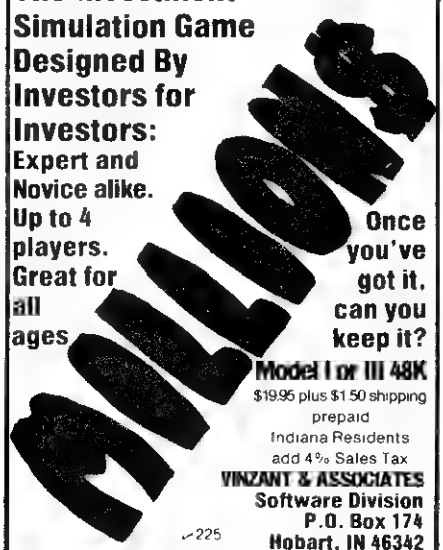
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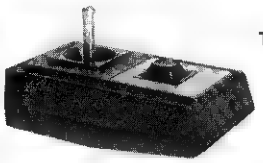


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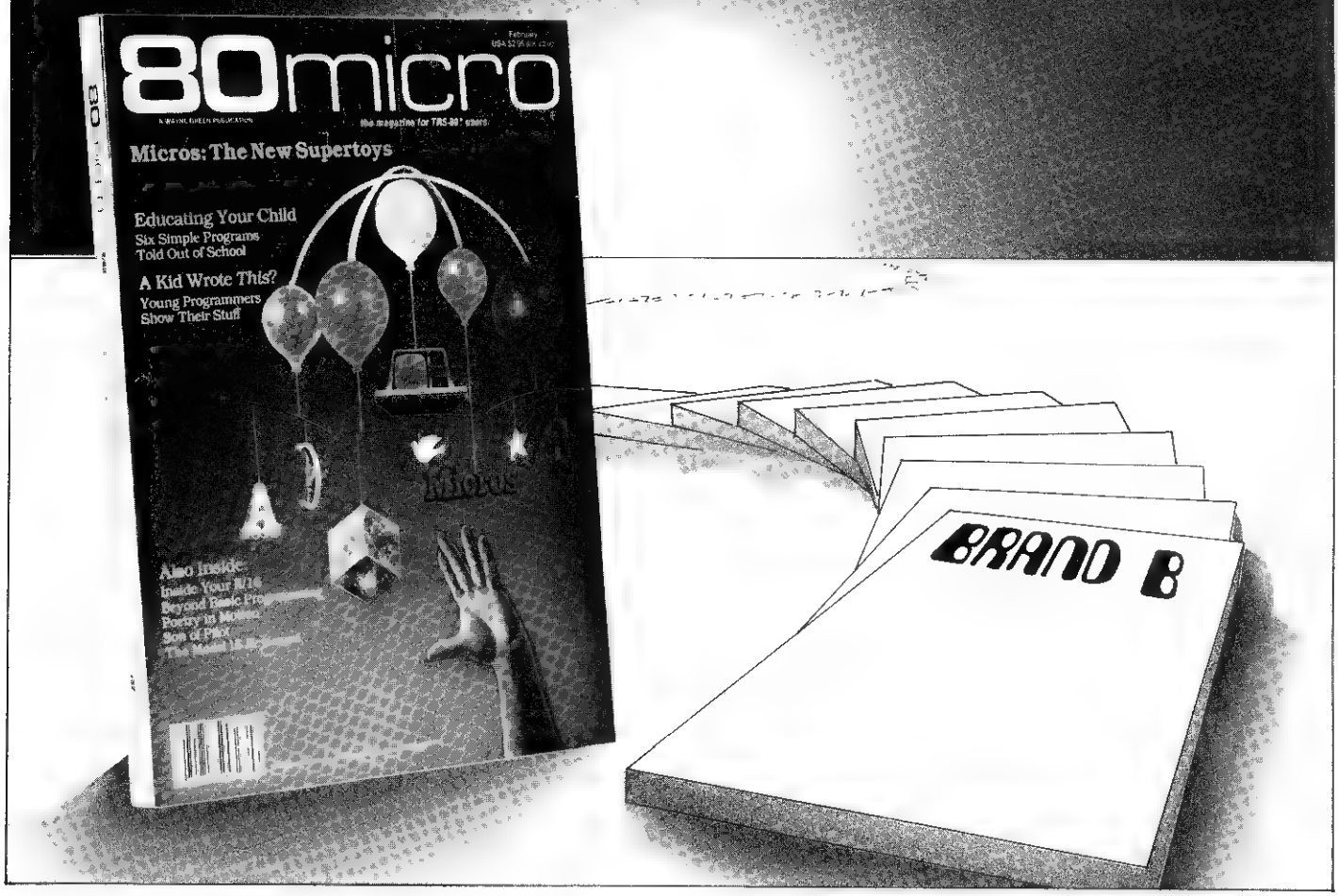
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Listing 5 continued

```
B057 CDAEB2   05200          CALL    PRC      ;PRINT CHAR
B05A C9       05300          RET
              05310 ;
              05320 ;GRXDIA - DRAW DIAGRAM FROM USR VECTORS
              05330 ;
B05B CD7F0A   05340 DIA      CALL    0A7FH    ;GET VARPTR ADDR
B05E 11F8B5   05350 DIA1     LD      DE,FX    ;TO ADDR
B061 010800   05360          LD      BC,8     ;CNT=8
B064 EDB0     05370          LDIR
B066 E5       05380          PUSH    HL       ;SAVE VARPTR
B067 DD21F8B5 05390          LD      IX,FX    ;FROM COORDINATES
B06B CDACB1   05400          CALL    ADJ      ;ADJUST TO WINDOW
B06E 3AFDB5   05410 DIA2     LD      A,(TX+1)         ;TX NEGATIVE?
B071 07       05420          RLCA
B072 3816     05430          JR      C,DIA3   ;YES
B074 DD21FCB5 05440          LD      IX,TX    ;TO COORDINATES
B078 CDACB1   05450          CALL    ADJ      ;AJUST TO WINDOW
B07B CDF2B4   05460          CALL    DRW      ;DRAW LINE
B07E E1       05470          POP     HL       ;GET VARPTR
B07F 11FCB5   05480          LD      DE,TX    ;TO ADDR
B082 010400   05490          LD      BC,4     ;CNT=4
B085 EDB0     05500          LDIR
B087 E5       05510          PUSH    HL       ;SAVE VARPTR
B088 18E4     05520          JR      DIA2
B08A 3AFFB5   05530 DIA3     LD      A,(TY+1)         ;TY NEGATIVE?
B08D 07       05540          RLCA
B08E 3805     05550          JR      C,DIA4   ;YES
B090 E1       05560          POP     HL       ;VARPTR-2
B091 2B       05570          DEC     HL
B092 2B       05580          DEC     HL
B093 18C9     05590          JR      DIA1
B095 E1       05600 DIA4     POP     HL       ;RESTORE HL
B096 C9       05600          RET
              05610 ;
              05620 ;GRXSCI - INITIALIZE FOR DISPLAY
              05630 ;
B097 218000   05640 SCI      LD      HL,128   ;MAX X SCREEN PIXELS
B09A 2200B6   05650          LD      (MXP),HL
B09D 213000   05660          LD      HL,48    ;MAX Y SCREEN PIXELS
B0A0 2202B6   05670          LD      (MYP),HL
B0A3 210000   05680          LD      HL,0     ;SET COMPUTED Y LOW
B0A6 220CB6   05690          LD      (CYL),HL
B0A9 CD07B1   05700          CALL    CRR      ;COMPUTE RANGE RATIOS
B0AC 06C6     05710          LD      B,0C6H   ;SET B,(HL) INSTRUCTION
B0AE 0E80     05720          LD      C,80H    ;CLEAR CHAR
B0B0 3A17B6   05730          LD      A,(FMT+1)        ;GET FORMAT CONTROL
B0B3 17       05740          RLA              ;NEGATIVE?
B0B4 3004     05750          JR      NC,SCI1 ;NO
B0B6 0686     05760          LD      B,86H    ;RES B,(HL) INSTRUCTION
B0B8 0EBF     05770          LD      C,0BFH   ;CLEAR CHAR
B0BA 78       05780 SCI1     LD      A,B      ;CHANGE FOR SET/RES
B0BB 32F0B5   05790          LD      (SETINS),A
B0BE 21C1B5   05800          LD      HL,SET   ;SET FOR SCREEN OUTPUT
B0C1 224EB5   05810          LD      (DRWPT),HL
B0C4 79       05820          LD      A,C      ;CLEAR CHAR
B0C5 21003C   05830          LD      HL,3C00H         ;START ADDR
B0C8 77       05840          LD      (HL),A   ;CLEAR FIRST CHAR
B0C9 11013C   05850          LD      DE,3C01H         ;NEXT ADDR
B0CC 01FF03   05860          LD      BC,1023  ;LENGTH
B0CF EDB0     05870          LDIR             ;CLEAR
B0D1 C9       05880          RET
              05890 ;
              05900 ;INITIALIZE FOR PRINT
              05910 ;
B0D2 2A1AB6   05920 PRI      LD      HL,(CL)  ;CHARACTERS/LINE
B0D5 54       05930          LD      D,H      ;CL * 6
B0D6 5D       05940          LD      E,L
B0D7 0605     05950          LD      B,5
B0D9 19       05960 PRI1     ADD     HL,DE
B0DA 10FD     05970          DJNZ    PRI1
B0DC 2200B6   05980          LD      (MXP),HL         ;SET MAX X PIXELS
B0DF 2A18B6   05990          LD      HL,(LP)  ;LINES/PAGE
B0E2 54       06000          LD      D,H      ;LP * 7
B0E3 5D       06010          LD      E,L
B0E4 0606     06020          LD      B,6
B0E6 19       06030 PRI2     ADD     HL,DE
B0E7 10FD     06040          DJNZ    PRI2
B0E9 2202B6   06050          LD      (MYP),HL
B0EC CD07B1   06060          CALL    CRR      ;COMPUTE RANGE RATIOS
B0EF 210700   06070          LD      HL,7     ;SET MAX Y PIXELS
B0F2 2202B6   06080          LD      (MYP),HL
B0F5 210000   06090          LD      HL,0     ;SET COMPUTED Y LOW
B0F8 220CB6   06100          LD      (CYL),HL
B0FB 3E12     06110          LD      A,18     ;GRAPHICS MODE
B0FD CDAEB2   06120          CALL    PRC      ;PRINT
B100 21BBB2   06130          LD      HL,PRS   ;SET FOR PRINT OUTPUT
B103 224EB5   06140          LD      (DRWPT),HL
B106 C9       06150          RET
              06160 ;
              06170 ;GRXCRR - COMPUTE RANGE RATIOS
              06180 ;
B107 2A12B6   06190 CRR      LD      HL,(XH)  ;HIGH X
B10A ED5B0EB6 06200          LD      DE,(XL)  ;LOW X
B10E AF       06210          XOR     A
B10F ED52     06220          SBC     HL,DE    ;COMPUTE RANGE
B111 23       06230          INC     HL
B112 ED5B00B6 06240          LD      DE,(MXP)         ;MAX X PIXELS
B116 CD3AB1   06250          CALL    DIV      ;COMPUTE RATIO
B119 2204B6   06260          LD      (XRH),HL         ;RATIO HIGH
B11C ED5306B6 06270          LD      (XRL),DE         ;RATIO LOW
B120 2A14B6   06280          LD      HL,(YH)  ;HIGH Y
B123 ED5B10B6 06290          LD      DE,(YL)  ;LOW Y
B127 AF       06300          XOR     A
B128 ED52     06310          SBC     HL,DE    ;COMPUTE RANGE
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Listing 5 continues

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Listing 5 continued

```
B12A 23          06320          INC     HL
B12B ED5B02B6    06330          LD      DE,(MYP)          ;MAX Y PIXELS
B12F CD3AB1      06340          CALL    DIV     ;COMPUTE RATIO
B132 2208B6      06350          LD      (YRH),HL          ;RATIO HIGH
B135 ED530AB6    06360          LD      (YRL),DE          ;RATIO LOW
B139 C9          06370 CRRX     RET
                 06380 ;
                 06390 ;GRXDIV - DIVIDE WITH REMAINDER
                 06400 ;
                 06410 ;        ENTRY:  (HL)= DIVISOR
                 06420 ;                (DE)= DIVIDEND
                 06430 ;        EXIT:   (HL)= QUOTIENT HIGH
                 06440 ;                (DE)= QUOTIENT LOW (FRACTION)
                 06450 ;
B13A E5          06460 DIV      PUSH    HL        ;SAVE REGS
B13B D5          06470          PUSH    DE
B13C 21A3B1      06480          LD      HL,DIVK1          ;CLEAR AREAS TO ZERO
B13F 11A4B1      06490          LD      DE,DIVD1
B142 010800      06500          LD      BC,8
B145 EDB0        06510          LDIR
B147 E1          06520          POP     HL        ;SWAP REGS
B148 D1          06530          POP     DE
B149 22A6B1      06540          LD      (DIVD2),HL        ;STORE DIVIDEND
B14C 0620        06550          LD      B,32      ;BIT COUNT=32
B14E C5          06560 DIV1     PUSH    BC        ;SAVE COUNT
B14F DD21A4B1    06570          LD      IX,DIVD1          ;ROTATE DIVIDEND
B153 AF          06580          XOR     A         ;CLEAR CARRY
B154 DDCB0216    06590          RL      (IX+2)    ;ROLL 2 WORDS
B158 DDCB0316    06600          RL      (IX+3)
B15C DDCB0016    06610          RL      (IX+0)
B160 DDCB0116    06620          RL      (IX+1)
B164 DD21A8B1    06630          LD      IX,DIVQ1          ;ROTATE QUOTIENT
B168 AF          06640          XOR     A         ;CLEAR CARRY
B169 DDCB0216    06650          RL      (IX+2)    ;ROLL 2 WORDS
B16D DDCB0316    06660          RL      (IX+3)
B171 DDCB0016    06670          RL      (IX+0)
B175 DDCB0116    06680          RL      (IX+1)
B179 2AA4B1      06690          LD      HL,(DIVD1)        ;HIGH OF DIVIDEND
B17C AF          06700          XOR     A
B17D ED52        06710          SBC     HL,DE     ;HIGH-QUOTIENT
B17F 3817        06720          JR      C,DIV2    ;BYPASS IF TOO SMALL
B181 22A4B1      06730          LD      (DIVD1),HL        ;SAVE HIGH OF DIVIDEND
B184 010100      06740          LD      BC,1      ;INCREMENT=1
B187 2AAAB1      06750          LD      HL,(DIVQ2)        ;QUOTIENT+1
B18A 09          06760          ADD     HL,BC
B18B 22AAB1      06770          LD      (DIVQ2),HL
B18E D298B1      06780          JP      NC,DIV2 ;ANY CARRY?
B191 2AA8B1      06790          LD      HL,(DIVQ1)        ;YES - ROLL UPWARD
B194 23          06800          INC     HL
B195 22A8B1      06810          LD      (DIVQ1),HL
B198 C1          06820 DIV2     POP     BC        ;RESTORE COUNT
B199 10B3        06830          DJNZ    DIV1      ;NEXT BIT
B19B 2AA8B1      06840          LD      HL,(DIVQ1)        ;RETURN QUOTIENT
B19E ED5BAAB1    06850          LD      DE,(DIVQ2)
B1A2 C9          06860 DIVX     RET
                 06870 ;
                 06880 ;        WORKAREAS
                 06890 ;
B1A3 00          06900 DIVK1    DEFB    0
B1A4 0000        06910 DIVD1    DEFW    0
B1A6 0000        06920 DIVD2    DEFW    0
B1A8 0000        06930 DIVQ1    DEFW    0
B1AA 0000        06940 DIVQ2    DEFW    0
                 06950 ;
                 06960 ;GRXADJ - ADJUST COORDINATES TO WINDOW
                 06970 ;
B1AC ED5B0EB6    06980 ADJ      LD      DE,(XL) ;PASS X LOW
B1B0 2A04B6      06990          LD      HL,(XRH)          ;PASS X RATIO
B1B3 2214B2      07000          LD      (AJRH),HL
B1B6 2A06B6      07010          LD      HL,(XRL)
B1B9 2216B2      07020          LD      (AJRL),HL
B1BC 210000      07030          LD      HL,0      ;SET LOW PIXEL
B1BF 2218B2      07040          LD      (AJLW),HL
B1C2 DD6601      07050          LD      H,(IX+1)          ;PASS FROM X
B1C5 DD6E00      07060          LD      L,(IX+0)
B1C8 CDF7B1      07070          CALL    AJO     ;ADJUST
B1CB DD7401      07080          LD      (IX+1),H          ;STORE FROM X
B1CE DD7500      07090          LD      (IX+0),L
B1D1 ED5B10B6    07100          LD      DE,(YL) ;PASS Y LOW
B1D5 2A08B6      07110          LD      HL,(YRH)          ;PASS Y RATIO
B1D8 2214B2      07120          LD      (AJRH),HL
B1DB 2A0AB6      07130          LD      HL,(YRL)
B1DE 2216B2      07140          LD      (AJRL),HL
B1E1 2A0CB6      07150          LD      HL,(CYL)          ;SET X PIXEL LOW
B1E4 2218B2      07160          LD      (AJLW),HL
B1E7 DD6603      07170          LD      H,(IX+3)          ;PASS FROM Y
B1EA DD6E02      07180          LD      L,(IX+2)
B1ED CDF7B1      07190          CALL    AJO     ;ADJUST
B1F0 DD7403      07200          LD      (IX+3),H          ;STORE FROM Y
B1F3 DD7502      07210          LD      (IX+2),L
B1F6 C9          07220 ADJX     RET
                 07230 ;
                 07240 ;ADJUST ONE VARIABLE
                 07250 ;
B1F7 AF          07260 AJO      XOR     A                 ;COMPUTE COORDINATE-LOW
B1F8 ED52        07270          SBC     HL,DE
B1FA 44          07280          LD      B,H     ;PASS DIFFERENCE
B1FB 4D          07290          LD      C,L
B1FC 2A14B2      07300          LD      HL,(AJRH)         ;PASS RATIO
B1FF ED5B16B2    07310          LD      DE,(AJRL)
B203 DDE5        07320          PUSH    IX      ;SAVE COORDINATE ADDR
B205 CD1AB2      07330          CALL    MUL     ;DIFF*RATIO
B208 60          07340          LD      H,B     ;MOVE RESULT TO HL
B209 69          07350          LD      L,C
```

Listing 5 continues

Listing 5 continued

```
B20A ED4B18B2 07360          LD      BC,(AJLW)       ;LOW PIXEL
B20E AF       07370          XOR     A
B20F ED42     07380          SBC     HL,BC   ;ADJUST TO SUB WINDO
B211 DDE1     07390          POP     IX      ;RESTORE COORDINATE ADDR
B213 C9       07400 AJOX     RET
              07410 ;
              07420 ;ADJUST WORKAREAS
              07430 ;
B214 0000     07440 AJRH     DEFW    0       ;RATIO HIGH
B216 0000     07450 AJRL     DEFW    0       ;RATIO LOW
B218 0000     07460 AJLW     DEFW    0       ;SUB WINDOW LOW
              07470 ;
              07480 ;GRXMUL - MULTIPLY
              07490 ;
              07500 ;        ENTRY:  (HL)= HIGH MULTIPLICAND
              07510 ;                (DE)= LOW MULTIPLICAND
              07520 ;                (BC)= MULTIPLIER
              07530 ;        EXIT:   (BC)= PRODUCT
              07540 ;
B21A 2277B2   07550 MUL      LD      (MULM1),HL      ;STORE MULTIPLICAND
B21D ED5379B2 07560          LD      (MULM2),DE
B221 210000   07570          LD      HL,0    ;ZERO PRODUCT
B224 227BB2   07580          LD      (MULP1),HL
B227 227DB2   07590          LD      (MULP2),HL
B22A 78       07600          LD      A,B     ;GET MULTIPLIER SIGN
B22B 17       07610          RLA
B22C F5       07620          PUSH    AF      ;SAVE SIGN
B22D CD6DB2   07630          CALL    MUL4    ;PROCESS NEGATIVE MULTIPLIER
B230 CB38     07640 MUL1     SRL     B       ;ROTATE MULTIPLIER
B232 CB19     07650          RR      C
B234 3017     07660          JR      NC,MUL2 ;BYPASS ADD
B236 2A7DB2   07670          LD      HL,(MULP2)      ;ADD MULTIPLICAND
B239 ED5B79B2 07680          LD      DE,(MULM2)      ;  TO PRODUCT
B23D 19       07690          ADD     HL,DE
B23E 227DB2   07700          LD      (MULP2),HL
B241 2A7BB2   07710          LD      HL,(MULP1)
B244 ED5B77B2 07720          LD      DE,(MULM1)
B248 ED5A     07730          ADC     HL,DE
B24A 227BB2   07740          LD      (MULP1),HL
B24D 78       07750 MUL2     LD      A,B     ;MULTIPLIER ZERO?
B24E B1       07760          OR      C
B24F 2817     07770          JR      Z,MUL3  ;YES
B251 AF       07780          XOR     A       ;CLEAR CARRY
B252 DD2177B2 07790          LD      IX,MULM1        ;SHIFT MULTIPLICAND
B256 DDCB0216 07800          RL      (IX+2)
B25A DDCB0316 07810          RL      (IX+3)
B25E DDCB0016 07820          RL      (IX+0)
B262 DDCB0116 07830          RL      (IX+1)
B266 18C8     07840          JR      MUL1
B268 ED4B7BB2 07850 MUL3     LD      BC,(MULP1)      ;RETURN PRODUCT
B26C F1       07860          POP     AF      ;GET MULTIPLIER SIGN
B26D D0       07870 MUL4     RET     NC      ;NOT NEGATIVE
B26E AF       07880          XOR     A       ;CLEAR CARRY
B26F 210000   07890          LD      HL,0    ;0 FOR SUBTRACT
B272 ED42     07900          SBC     HL,BC   ;REVERSE SIGN
B274 44       07910          LD      B,H     ;RETURN
B275 4D       07920          LD      C,L
B276 C9       07930 MULX     RET
              07940 ;
              07950 ;        MULTIPLY WORKAREAS
              07960 ;
B277 0000     07970 MULM1    DEFW    0       ;MULTIPLICAND
B279 0000     07980 MULM2    DEFW    0
B27B 0000     07990 MULP1    DEFW    0       ;PRODUCT
B27D 0000     08000 MULP2    DEFW    0
              08010 ;
              08020 ;GRXPRL - PRINT ONE LINE
              08030 ;
B27F ED4B00B6 08040 PRL      LD      BC,(MXP)        ;PRINT SIZE
B283 21D0B2   08050          LD      HL,PRTBUF-1     ;BUFFER ADDR-1
B286 09       08060          ADD     HL,BC   ;LAST CHAR ADDR
B287 3E80     08070          LD      A,80H   ;GRAPHIC ZERO
B289 EDA9     08080 PRL1     CPD             ;ZERO TEST
B28B E291B2   08090          JP      PO,PRL2 ;BUFF END? YES
B28E 28F9     08100          JR      Z,PRL1  ;ZERO? YES
B290 23       08110          INC     HL      ;NEXT CHAR
B291 23       08120 PRL2     INC     HL      ;NEXT CHAR
B292 3E0D     08130          LD      A,13    ;INSERT RETURN
B294 77       08140          LD      (HL),A
B295 CDB2B4   08150          CALL    SQZ     ;SQUEEZE REPEATS
B298 21D1B2   08160          LD      HL,PRTBUF       ;START ADDR
B29B 0600     08170          LD      B,0     ;SET PREV=0
B29D 7E       08180 PRL3     LD      A,(HL)  ;LOAD CHAR
B29E CDAEB2   08190          CALL    PRC     ;PRINT
B2A1 23       08200          INC     HL      ;ADDR+1
B2A2 78       08210          LD      A,B     ;GET PREV
B2A3 41       08220          LD      B,C     ;PREV=CUR
B2A4 FE1C     08230          CP      28      ;PREV A REPEAT?
B2A6 28F5     08240          JR      Z,PRL3  ;YES
B2A8 79       08250          LD      A,C     ;GET CUR
B2A9 FE0D     08260          CP      13      ;CUR=RETURN?
B2AB 20F0     08270          JR      NZ,PRL3 ;NO
B2AD C9       08280 PRLX     RET
              08290 ;
              08300 ;PRINT ONE CHARACTER
              08310 ;
B2AE 4F       08320 PRC      LD      C,A     ;SAVE CHAR
B2AF 3AE837   08330 PRC1     LD      A,(37E8H)       ;PRINT CONTROL
B2B2 CB7F     08340          BIT     7,A     ;BUSY BIT SET?
B2B4 20F9     08350          JR      NZ,PRC1 ;YES
B2B6 79       08360          LD      A,C     ;GET CHAR
B2B7 32E837   08370          LD      (37E8H),A       ;PRINT
B2BA C9       08380 PRCX2    RET
              08390 ;
              08400 ;SET PRINT PIXEL
              08410 ;
```

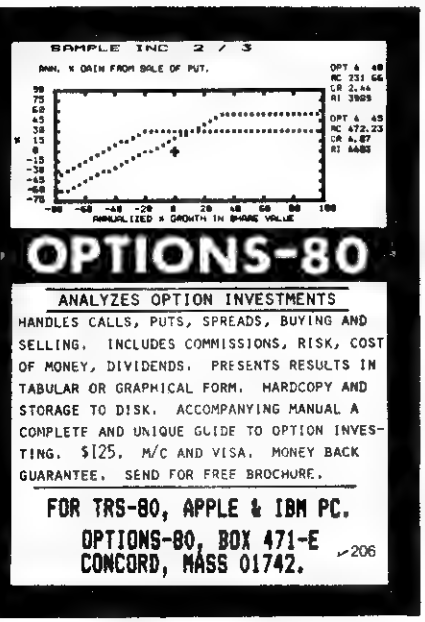
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```
B2BB 2AF8B5   08420 PRS     LD      HL,(FX) ;FROM X
B2BE 01D1B2   08430         LD      BC,PRTBUF       ;BUFFER ADDR
B2C1 09       08440         ADD     HL,BC   ;CHAR ADDR
B2C2 3AFAB5   08450         LD      A,(FY)  ;FROM Y (0-7)
B2C5 07       08460         RLCA            ;Y * 8
B2C6 07       08470         RLCA
B2C7 07       08480         RLCA
B2C8 06C6     08490         LD      B,0C6H  ;SET INSTR CODE
B2CA B0       08500         OR      B       ;OR TO BIT
B2CB 32CFB2   08510         LD      (PRS1+1),A      ;MODIFY INSTR
B2CE CBC6     08520 PRS1    SET     0,(HL)  ;SET BIT
B2D0 C9       08530 PRSX    RET
01E1          08540 PRTSIZ  EQU     481     ;MAX X PIXEL + 1
01E1          08550 PRTBUF  DEFS    PRTSIZ  ;PRINT BUFFER
              08560 ;
              08570 ;GRXSQZ - SQUEEZE OUT REPEATED CHARACTERS
              08580 ;
B4B2 21D1B2   08590 SQZ     LD      HL,PRTBUF       ;GET BUFF ADDR
B4B5 7E       08600 SQZ1    LD      A,(HL)  ;GET FIRST CHAR
B4B6 FE0D     08610         CP      13      ;CR?
B4B8 C8       08620         RET     Z       ;YES
B4B9 0601     08630         LD      B,1     ;COUNT=1
B4BB E5       08640         PUSH    HL      ;SAVE ADDR
B4BC 4F       08650         LD      C,A     ;SAVE CHAR
B4BD 23       08660 SQZ2    INC     HL      ;ADDR+1
B4BE 7E       08670         LD      A,(HL)  ;GET CHAR
B4BF B9       08680         CP      C       ;CHAR=FIRST?
B4C0 2007     08690         JR      NZ,SQZ3 ;NO
B4C2 04       08700         INC     B       ;COUNT+1
B4C3 78       08710         LD      A,B     ;COUNT=256?
B4C4 B7       08720         OR      A
B4C5 2808     08730         JR      Z,SQZ4  ;YES
B4C7 18F4     08740         JR      SQZ2    ;REPEAT
B4C9 78       08750 SQZ3    LD      A,B     ;COMPUTE ACTUAL COUNT
B4CA D604     08760         SUB     4       ;MUST BE AT LEAST 4
B4CC 4F       08770         LD      C,A     ;SAVE IT
B4CD 381F     08780         JR      C,SQZ8  ;COUNT<4? YES
B4CF E1       08790 SQZ4    POP     HL      ;GET FIRST CHAR ADDR
B4D0 3E1C     08800         LD      A,28    ;SET TO REPEAT
B4D2 77       08810         LD      (HL),A
B4D3 23       08820         INC     HL      ;NEXT POSITION
B4D4 70       08830         LD      (HL),B  ;SET REPEAT COUNT
B4D5 23       08840         INC     HL      ;BYPASS REPEAT
B4D6 E5       08850         PUSH    HL      ;SAVE ADDR
B4D7 23       08860         INC     HL      ;BYPASS REPEAT CHAR
B4D8 78       08870         LD      A,B     ;COUNT=256?
B4D9 B7       08880         OR      A
B4DA 2005     08890         JR      NZ,SQZ5 ;NO
B4DC 01FD00   08900         LD      BC,253  ;SET TO 253
B4DF 1803     08910         JR      SQZ6
B4E1 0600     08920 SQZ5    LD      B,0     ;BC CONTAINS ACTUAL COUNT
B4E3 03       08930         INC     BC      ;ALWAYS ONE MORE
B4E4 54       08940 SQZ6    LD      D,H     ;TO ADDR
B4E5 5D       08950         LD      E,L
B4E6 09       08960         ADD     HL,BC   ;FROM ADDR
B4E7 7E       08970 SQZ7    LD      A,(HL)  ;GET CHAR
B4E8 EDA0     08980         LDI             ;OVERLAY ONE CHAR
B4EA FE0D     08990         CP      13      ;LAST=CR?
B4EC 20F9     09000         JR      NZ,SQZ7 ;NO
B4EE E1       09010 SQZ8    POP     HL      ;RESTORE ADDR
B4EF 23       09020         INC     HL      ;NEXT CHAR
B4F0 18C3     09030         JR      SQZ1
              09040 ;
              09050 ;GRXDRW - DRAW ONE LINE SEGMENT (FX,FY) - (TX,TT)
              09060 ;
B4F2 E5       09070 DRW     PUSH    HL      ;SAVE DUMMY TO X
B4F3 E5       09080         PUSH    HL      ;SAVE DUMMY TO Y
B4F4 2AFCB5   09090         LD      HL,(TX) ;SAVE FROM X AS TO
B4F7 E5       09100         PUSH    HL
B4F8 2AFEB5   09110         LD      HL,(TY) ;SAVE FROM Y AS TO
B4FB E5       09120         PUSH    HL
B4FC 210100   09130         LD      HL,1    ;STACK COUNT=1
B4FF 221CB6   09140         LD      (DRWCNT),HL
B502 CD6CB5   09150 DRW1    CALL    TST     ;SEGMENT IN RANGE?
B505 3849     09160         JR      C,DRW4  ;NO
B507 2AF8B5   09170         LD      HL,(FX) ;FX=TX?
B50A ED5BFCB5 09180         LD      DE,(TX)
B50E AF       09190         XOR     A
B50F ED52     09200         SBC     HL,DE
B511 200C     09210         JR      NZ,DRW2 ;NO
B513 2AFAB5   09220         LD      HL,(FY) ;FY=TY?
B516 ED5BFEB5 09230         LD      DE,(TY)
B51A AF       09240         XOR     A
B51B ED52     09250         SBC     HL,DE
B51D 282E     09260         JR      Z,DRW3  ;YES
B51F ED4BFCB5 09270 DRW2    LD      BC,(TX) ;PARM1=TX
B523 C5       09280         PUSH    BC      ;TX TO STACK
B524 2AFEB5   09290         LD      HL,(TY) ;TY TO STACK
B527 E5       09300         PUSH    HL
B528 ED5BF8B5 09310         LD      DE,(FX) ;PARM2=FX
B52C CDA2B5   09320         CALL    CMP     ;COMPUTE MIDDLE
B52F C5       09330         PUSH    BC      ;PUSH MIDDLE X
B530 ED53FCB5 09340         LD      (TX),DE ;TX=MIDDLE
B534 ED4BFEB5 09350         LD      BC,(TY) ;PARM1=TY
B538 ED5BFAB5 09360         LD      DE,(FY) ;PARM2=FY
B53C CDA2B5   09370         CALL    CMP     ;COMPUTE MIDDLE
B53F C5       09380         PUSH    BC      ;PUSH MIDDLE Y
B540 ED53FEB5 09390         LD      (TY),DE ;TY=MIDDLE Y
B544 2A1CB6   09400         LD      HL,(DRWCNT)     ;STACK COUNT+1
B547 23       09410         INC     HL
B548 221CB6   09420         LD      (DRWCNT),HL
B54B 18B5     09430         JR      DRW1
B54D CDC1B5   09440 DRW3    CALL    SET     ;SET POINT
B54E          09450 DRWPT   EQU     $-2     ;CALL ROUTINE ADDR
```

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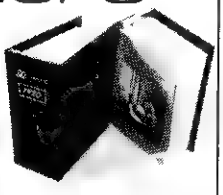
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B550 E1        09460 DRW4    POP     HL      ;NEXT IN STACK
B551 22FAB5    09470         LD      (FY),HL ;SET FY
B554 E1        09480         POP     HL
B555 22F8B5    09490         LD      (FX),HL ;SET FX
B558 E1        09500         POP     HL
B559 22FEB5    09510         LD      (TY),HL ;SET TY
B55C E1        09520         POP     HL
B55D 22FCB5    09530         LD      (TX),HL ;SET TX
B560 2A1CB6    09540         LD      HL,(DRWCNT)     ;STACK COUNT-1
B563 2B        09550         DEC     HL
B564 221CB6    09560         LD      (DRWCNT),HL
B567 7C        09570         LD      A,H     ;STACK COUNT=0?
B568 B5        09580         OR      L
B569 2097      09590         JR      NZ,DRW1 ;NO
B56B C9        09600         RET
               09610 ;
               09620 ;GRXTST - TEST LINE SEGMENT FOR IN RANGE
               09630 ;
               09640 ;       EXIT:   CARRY = NOT IN RANGE
               09650 ;               NOCARRY = IN RANGE
               09660 ;
B56C 2AF8B5    09670 TST     LD      HL,(FX) ;PASS FROM X
B56F ED5BFCB5  09680         LD      DE,(TX) ;PASS TO X
B573 ED4B00B6  09690         LD      BC,(MXP)        ;PASS MAX X PIXELS
B577 CD89B5    09700         CALL    TST1    ;TEST FOR IN RANGE
B57A 2AFAB5    09710         LD      HL,(FY) ;PASS FROM Y
B57D ED5BFEB5  09720         LD      DE,(TY) ;PASS TO Y
B581 ED4B02B6  09730         LD      BC,(MYP)        ;PASS MAX Y PIXELS
B585 CD89B5    09740         CALL    TST1    ;TEST FOR IN RANGE
B588 C9        09750 TSTX1   RET
               09760 ;
               09770 ;TEST FROM AND TO FOR IN RANGE
               09780 ;
B589 7C        09790 TST1    LD      A,H     ;TEST FROM
B58A 17        09800         RLA             ;NEGATIVE?
B58B 3005      09810         JR      NC,TST2 ;NO
B58D 7A        09820         LD      A,D     ;TEST TO
B58E 17        09830         RLA             ;NEGATIVE?
B58F 380F      09840         JR      C,TST6  ;YES
B591 C9        09850         RET             ;NO - ALL OK
B592 ED42      09860 TST2    SBC     HL,BC   ;FROM<LIMIT?
B594 3808      09870         JR      C,TST5  ;YES
B596 7A        09880 TST3    LD      A,D     ;TEST TO
B597 17        09890         RLA             ;NEGATIVE?
B598 3804      09900         JR      C,TST5  ;YES
B59A 62        09910 TST4    LD      H,D     ;HL=TO
B59B 6B        09920         LD      L,E
B59C ED42      09930         SBC     HL,BC   ;TO<LIMIT?
B59E 3F        09940 TST5    CCF             ;REVERSE FLAG
B59F D0        09950         RET     NC      ;RETURN BOTH<LIMIT
B5A0 E1        09960 TST6    POP     HL      ;BYPASS CALL RETURN
B5A1 C9        09970 TSTX2   RET
               09980 ;
               09990 ;GRXCMP - COMPUTE FROM & TO
               10000 ;
               10010 ;       ENTRY:  (BC)= TO (PARM1)
               10020 ;               (DE)= FROM (PARM2)
               10030 ;       EXIT:   (BC)= X OF (X,FROM)
               10040 ;               (DE)= Y OF (TO,FROM)
               10050 ;
B5A2 62        10060 CMP     LD      H,D     ;HL=PARM2
B5A3 6B        10070         LD      L,E
B5A4 09        10080         ADD     HL,BC   ;HL+PARM1
B5A5 CB2C      10090         SRA     H       ;HL/2
B5A7 CB1D      10100         RR      L
B5A9 E5        10110         PUSH    HL      ;SAVE Q
B5AA E5        10120         PUSH    HL
B5AB 62        10130         LD      H,D     ;HL=PARM2
B5AC 6B        10140         LD      L,E
B5AD AF        10150         XOR     A       ;PARM2>PARM1?
B5AE ED42      10160         SBC     HL,BC
B5B0 E1        10170         POP     HL      ;RESTORE Q
B5B1 2801      10180         JR      Z,CMP1  ;IF PARM1=PARM2
B5B3 23        10190         INC     HL      ;Q+1
B5B4 E5        10200 CMP1    PUSH    HL      ;SAVE Q OR Q+1
B5B5 1F        10210         RRA             ;CARRY TO A
B5B6 A8        10220         XOR     B       ;REVERSE ON PARM1 NEG.
B5B7 AA        10230         XOR     D       ;REVERSE ON PARM2 NEG.
B5B8 17        10240         RLA             ;SET CARRY
B5B9 3803      10250         JR      C,CMP2  ;NO
B5BB D1        10260         POP     DE      ;PARM2=Q+R
B5BC C1        10270         POP     BC      ;PARM1=Q
B5BD C9        10280 CMPX1   RET
B5BE C1        10290 CMP2    POP     BC      ;PARM1=Q+R
B5BF D1        10300         POP     DE      ;PARM2=Q
B5C0 C9        10310 CMPX2   RET
               10320 ;
               10330 ;GRXSET - SET ONE POINT
               10340 ;
B5C1 3AF8B5    10350 SET     LD      A,(FX)  ;GET X
B5C4 5F        10360         LD      E,A
B5C5 3AFAB5    10370         LD      A,(FY)  ;GET Y
B5C8 06FF      10380         LD      B,0FFH          ;-1
B5CA 04        10390 SET1    INC     B               ;DIVIDE BY 3
B5CB D603      10400         SUB     3
B5CD F2CAB5    10410         JP      P,SET1
B5D0 C603      10420         ADD     A,3             ;YQ IN B, YR IN A
B5D2 CB27      10430         SLA     A               ;YR*3
B5D4 4F        10440         LD      C,A             ;SAVE YR*2
B5D5 68        10450         LD      L,B             ;HL=YQ
B5D6 2600      10460         LD      H,0
B5D8 0606      10470         LD      B,6             ;CNT FOR MULT BY 64
B5DA 29        10480 SET2    ADD     HL,HL           ;YQ*2
```

Listing 5 continues

Listing 5 continued

```
B5DB 10FD     10490          DJNZ    SET2
B5DD 1600     10500          LD      D,0             ;DE=X
B5DF CB3B     10510          SRL     E               ;XQ
B5E1 3001     10520          JR      NC,SET3         ;GO IF XR NE 1
B5E3 0C       10530          INC     C               ;C NOW HAS YQ*2+XR
B5E4 19       10540 SET3     ADD     HL,DE           ;HL NOW HAS YQ*2+XQ
B5E5 11003C   10550          LD      DE,3C00H        ;START OF DISPLAY
B5E8 19       10560          ADD     HL,DE           ;HL NOW HAS DISPLACE
B5E9 CB21     10570          SLA     C               ;ALIGN TO FIELD
B5EB CB21     10580          SLA     C
B5ED CB21     10590          SLA     C
B5EF 3EC6     10600          LD      A,0C6H          ;SET INSTR
B5F0          10610 SETINS   EQU     $-1             ;SET/RESET INSTR
B5F1 81       10620          ADD     A,C             ;SET FIELD
B5F2 32F6B5   10630          LD      (SET4+1),A      ;STORE
B5F5 CBC6     10640 SET4     SET     0,(HL)          ;SET POINT
B5F7 C9       10650          RET
              10660 ;
              10670 ;GRXWKA - GRAPHIC WORK AREAS DATA BLOCK
              10680 ;
B5F8 0000     10690 FX       DEFW    0       ;FROM X
B5FA 0000     10700 FY       DEFW    0       ;FROM Y
B5FC 0000     10710 TX       DEFW    0       ;TO X
B5FE 0000     10720 TY       DEFW    0       ;TO Y
B600 0000     10730 MXP      DEFW    0       ;MAXIMUM X PIXELS
B602 0000     10740 MYP      DEFW    0       ;MAXIMUM Y PIXELS
B604 0000     10750 XRH      DEFW    0       ;X RATIO (HIGH)
B606 0000     10760 XRL      DEFW    0       ;X RATIO (LOW)
B608 0000     10770 YRH      DEFW    0       ;Y RATIO (HIGH)
B60A 0000     10780 YRL      DEFW    0       ;Y RATIO (LOW)
B60C 0000     10790 CYL      DEFW    0       ;COMPUTED LOW Y
              10800 ;
              10810 ;PARAMETERS PASSED THROUGH USR1
              10820 ;
B60E          10830 PARMS    EQU     $
B60E 0000     10840 XL       DEFW    0       ;LOW X
B610 0000     10850 YL       DEFW    0       ;LOW Y
B612 0000     10860 XH       DEFW    0       ;HIGH X
B614 0000     10870 YH       DEFW    0       ;HIGH Y
B616 0000     10880 FMT      DEFW    0       ;SCREEN FORMAT(<0 WHITE,>=0 BLACK)
B618 0000     10890 LP       DEFW    0       ;LINES/PAGE
B61A 0000     10900 CL       DEFW    0       ;CHARACTERS/LINE
              10910 ;
              10920 ;DRAW STACK COUNT
              10930 ;
B61C 0000     10940 DRWCNT   DEFW    0       ;COUNT OF SEGMENTS
0000          10950          END
00000 TOTAL ERRORS
```


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The Key Box

Color Computer
16K RAM
Extended Color Basic
Joysticks

Soccer Anyone?

by Wayne D. Riggs

Weather rotten outside? Why not fire up your Color Computer and challenge someone to a game of soccer? This Extended Color Basic game places you as the player or coach of either the blue or red soccer teams. Your opponent controls the other team.

After displaying the credits and playing music for the opening ceremonies, your computer announces that it is time for the coin toss. The winner of the coin toss elects to kick off or receive the ball.

The soccer field with the red and blue teams then appears on the screen in high-resolution, four-color graphics. The ball is in the middle of the center circle blinking at you. Move your joystick in the direction you want your forward line players to move. If a player reaches the ball and you don't press the joystick button, the ball bounces off the player's foot as if he had simply dribbled it. If you attempt to have a player kick the ball without being properly aligned with it, the ball moves across the field diagonally.

If you're a soccer fan, you'll love the action in this two-person Color Computer game.

The computer acts as the referee and makes calls such as "blue team kick." When you score a goal, music sounds and the scoreboard flashes on with your score. When a kick goes wide of the goal, the referee's whistle blows and the computer directs a goalie kick after repositioning the players.

The Program

The first few lines of the Program Listing set up graphics and clear enough string space for all the string variables. P$ defines the string that draws each individual player.

Lines 35–50 display the title and credits. Notice how I eliminated the green screen by using the Screen function at the end of line 45. Lines 55–145 get the computer into four-color graphics and run the musical pregame show.

Lines 150–190 provide the graphics for the coin toss. Rather than use an arithmetic function to determine the coin's path, I simply plotted the path I wanted it to take and used the Read statement with the appropriate data. This allowed the shape of the coin to be varied by changing the height-to-width ratio of the Circle function, giving the coin the appearance of tumbling. Lines 195–215 announce the results of the coin toss.

The main program loop begins at line 230. The joysticks are read, and the clock timer is started to keep time throughout the half. The joystick functions are formed and limited by lines 250–275. The player positions are then modified by the joysticks but are not directly coupled to them to provide realistic player movement. In other words, a player can't stop instantly; he will run past the ball if he has too much momentum.

Line 280 includes subroutines to draw the playing field and the two teams. Lines 290–350 check to see if the ball has been touched by a player and, if

Program Listing

```
5 REM REQUIRES 16K EXTENDED COLOR BASIC + JOYSTICKS
10 TIMER=0
15 SCREEN 0,1
20 PCLEAR 4:CLEAR 400
25 P$="D2;N;R3;N;L3;D2;N;F3;G3"
30 CLS:H=1
35 A$=STRING$(32,"*"):PRINT @0,A$
40 PRINT@102,"COMPUTER SOCCER 1982"-PRINT@175,"BY":PRINT@233,"WAYNE D RIGGS"
45 PRINT@358,"PRESS ENTER TO BEGIN":PRINT@416,A$:SCREEN 0,1
50 A$=INKEY$:IF A$=CHR$(13) THEN55 ELSE 50
55 CLS:PMODE 3,1:PCLS:SCREEN 1,0
60 X=56:Y=42:FOR S=1 TO 5:FOR A=1 TO 6:CIRCLE(X,Y),2,2-X=X+12
65 NEXT A:X=56.Y=Y+10:NEXT S
70 X=62:Y=47:FOR S=1 TO 4:FOR A=1 TO 5:CIRCLE(X,Y),2,2:X=X+12
75 NEXT A:X=62:Y=Y+10:NEXT S
80 DRAW "C2;BM50,188;U150;R155;D80;L155;BU32;R70;U48;D7;R85;D5;L85;D7;R85,D5;L85
;D7;R85;D5;L85;D7;R85;D5;L155;D7;R155;D5;L155;D7;R155;D5;L155;D7;R155;D5;L155"
85 PAINT (62,040),3,2-PAINT(130,40),4,2.PAINT(130,46),2,2:PAINT(130,52),4,2
90 PAINT(130,58),2,2-PAINT (130,64),4,2:PAINT(130,72),2,2:PAINT (130,76),4,2
95 PAINT(130,84),2,2:PAINT(130,88),4,2:PAINT(130,96),2,2 PAINT(130,100),4,2
100 PAINT(130,108),2,2:PAINT(130,112),4,2:PAINT(130,120),2,2
105 PLAY "T4;L4.;C;L8;D;E;F;L2;G;L8;C,D;L4.;E;L8;F;L4;D;L2;C"
110 PLAY "L8.;01;G;L16;E;L4;C;E;G;02;L2;C;L8.;E;L16;D;L4;C;01;E;F#;L2;G;L8,G,G"
115 PLAY "02;L4 ;E;L8;D;L4;C;01,L2;B;L8;A;B;L4;02;C;C;01;G;E,C,L8.;G,L16,E"
120 PLAY "L4;C;E;G;02;L2;C;L8.;E;L16;D;L4;C;01;E;F#;L2;G;L8;G;G"
125 PLAY "02;L4.;E;L8;D;L4;C;01;L2;B;L8;A;B;02;L4;C;C;01;G;E;C;02;L8;E;E"
130 PLAY "L4;E;F;G;L2;G;L8;F;E;L4;D;E;F;L2;F;L4;F"
135 PLAY "L4.;E;L8;D;L4;C;01;L2;8;L8,A;B;L4;02;C;01,E,F#;L2;G;L4;G;"
140 PLAY "02;L4;C;C;L8;C;01;B;L4;A;A;A;02;D;L8;F;F;D;C;L4;C;01;L4 ;8;L8,G,G"
145 PLAY "02;L4.;C;L8;D;E;F;L2;G;L8;C;D;L4.;E;L8;F;L4;D;L2;C"
150 CLS(1):PRINT @195,"PRESS ENTER FOR COIN TOSS";:LINEINPUT A$
155 PMODE 3,1:PCLS:SCREEN 1,0
160 S=RND(10):IF S>5 THEN TS=3 ELSE TS=4
165 DATA 30,150,.4,40,120,.75,50,95,1,64,68,.75,85,50,.5,110,40,.1,140,40, 25,16
8,58,.5,185,78,.75,193,100,.8,202,132,.7,210,150,.4
170 FOR A=1 TO 12:READ X,Y,S:PCLS
175 CIRCLE (X,Y),20,2,S
```

Listing continues

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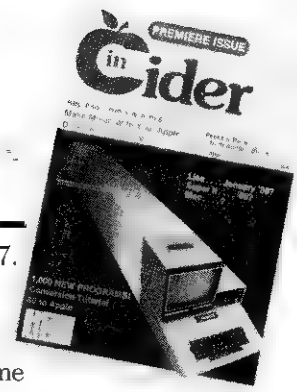
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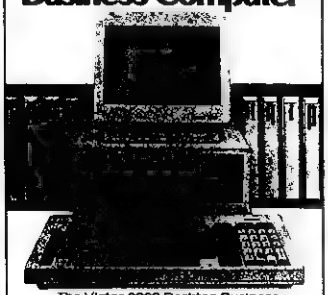
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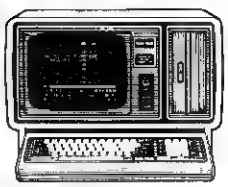
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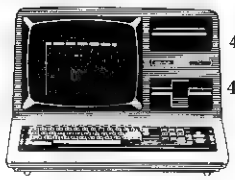
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Listing continued

```
180 N=13-INT(Y/10-3):P$="L120;"+STR$(N):PLAY P$:NEXT A
185 PAINT (X,Y),TS,2:FOR A=1 TO 1000:NEXT
190 IF TS=3 THEN 195 ELSE 205
195 CLS(3):PRINT @192,"     BLUE TEAM WON THE TOSS"
200 PRINT @256,"      BLUE TEAM KICK OFF":GOTO 215
205 CLS(4):PRINT @192,"     RED TEAM WON THE TOSS"
210 PRINT @256,"      RED TEAM KICK OFF"
215 FOR A=1 TO 2000:NEXT
220 BX=124:BY=96
225 CLS(1)
230 PMODE 3,1:PCLS:SCREEN 1,0
235 HX=60:HY=96:VX=191,VY=96
240 JX=JOYSTK(0):JY=JOYSTK(1):XJ=JOYSTK(2):YJ=JOYSTK(3)
245 T=10-INT(TIMER/3600):IF T<=0 THEN 920
250 HX=HX+INT((JX-31)/3):HY=HY+INT((JY-31)/3)
255 VX=VX+INT((XJ-31)/3):VY=VY+INT((YJ 31)/3)
260 IFHX<38THENHX=38ELSEIFHX>200THENHX=200
265 IFVX<48THENVX=48ELSEIFVX>217THENVX=217
270 IFHY<44THENHY=44ELSEIFHY>135THENHY=135
275 IFVY<44THENVY=44ELSEIFVY>135THENVY=135
280 GOSUB435:C=3:GOSUB470:C=4:GOSUB540
285 C=1:GOSUB 605
290 IFPPOINT(BX-3,BY)=3THENGOTO320
295 IFPPOINT(BX-3,BY-2)=3THENBY=BY+10:GOTO320
300 IFPPOINT(BX-3,BY+2)=3THENBY=BY-10:GOTO320
305 IFPPOINT(BX,BY-3)=3THENBY=BY+5:GOTO320
310 IFPPOINT(BX,BY+3)=3THENBY=BY-5:GOTO320
315 GOTO330
320 GOSUB630
325 GOTO365
330 IFPPOINT(BX+3,BY)=4THENGOTO360
335 IFPPOINT(BX+3,BY-2)=4THENBY=BY+10.GOTO360
340 IFPPOINT(BX+3,BY+2)=4THENBY=BY-10:GOTO360
345 IFPPOINT(BX,BY+3)=4THENBY=BY-5:GOTO360
350 IFPPOINT(BX,BY-3)=4THENBY=BY+5:GOTO360
355 GOTO365
360 GOSUB695
365 IFBX<=4THEN375ELSE370
370 IFBX>=250THEN375ELSE410
375 IFBY>86THEN380ELSE400
380 IFBY<106THEN385ELSE400
385 IFBX<=4THENGOSUB765
390 IFBX>=248THENGOSUB805
395 GOTO220
400 GOSUB845:REM GOALY KICK
405 GOTO225
410 REM NO GOAL
415 C=1:GOSUB470
420 GOSUB540
425 C=2:GOSUB605
430 GOTO240
435 DRAW"C2;BM 124,96;U90;L120;D184;R120;U184;R124;D184;L124;U90"
440 CIRCLE(124,96),20,2,.9
445 DRAW"C2;BM4,55;R35;D81;L35;U18;R15;U44;L15"
450 DRAW"C2;BM248,55;L35;D81;R35;U18;L15;U44;R15"
455 DRAW"C4;BM 6,86;L5;D20;R5"
460 DRAW"C3;BM 249,86;R5;D20;L5"
465 RETURN
470 REM DRAW BLUE TEAM
475 C$="C"+STR$(C)+";"
480 P$="D2;N;R3;N;L3;D2;N;F3;N;G3;"
485 FH$=STR$(HX+50)+","+STR$(HY)+";"
490 BM$="BM"+FH$+";"
495 DRAW C$+BM$+"BU48;"+P$+"BD30;"+P$+"BD28;"+P$+"BD30;"+P$
500 DH=HX+10
505 IFDH>120THENDH=118
510 BM$="BM"+STR$(DH)+","+STR$(HY)+";"
515 DRAW C$+BM$+P$+"BU48;"+P$+"BD88;"+P$
520 IF HX>85  THEN GH=53 ELSE GH=HX-36
525 BM$="BM"+STR$(GH)+","+STR$(HY)
530 DRAW C$+BM$+P$+"BU42;BR5;"+P$+"BD78;"+P$+"BR15;BU50;"+P$
535 RETURN
540 REM DRAW RED TEAM
545 C$="C"+STR$(C)+";"
550 FV$=STR$(VX-45)+","+STR$(VY)+";"
555 BM$="BM"+FV$+";"
560 DRAW C$+BM$+"BU48;"+P$+"BD30;"+P$+"BD28;"+P$+"BD30;"+P$
565 DV=VX-10
570 IFDV<128THENDV=130
575 BM$="BM"+STR$(DV)+","+STR$(VY)+";"
580 DRAW C$+BM$+P$+"BU48;"+P$+"BD88;"+P$
585 IF VX<171 THEN GV=203 ELSE GV=VX+32
590 BM$="BM"+STR$(GV)+","+STR$(VY)+";"
595 DRAW C$+BM$+P$+"BU42;BL5;"+P$+"BD78;"+P$+"BL15;BU50;"+P$
600 RETURN
605 C$="C"+STR$(C)+";"
610 IFBX<2THENBX=2ELSE IFBX>253THENBX=253
615 IFBY<3THENBY=3ELSEIFBY>188THENBY=188
620 DRAW C$+"BM"+STR$(BX)+","+STR$(BY)+";BU2;F2;G2;H2;E2"
625 RETURN
630 P=PEEK(65280)
635 IF P=126 OR P=254 THEN 650
640 BX=BX+5:SOUND 150,2
645 GOTO 685
650 FOR S=12 TO 1 STEP -1
655 IF PPOINT (BX+4,BY)=4 THEN BX=BX-5:SOUND 150,2:GOTO 685
660 BX=BX+3:C=2
665 IF BX>252 THEN BX=252
670 GOSUB 605
675 PLAY "L255;O3;"+STR$(S):C=1:GOSUB 605
680 NEXT S
685 IF BX>252 THEN BX=252
690 RETURN
695 P=PEEK(65280)
700 IF P=125 OR P=253 THEN 715
705 BX=BX-5:SOUND 150,2
710 GOTO 755
715 FOR S=12 TO 1 STEP -1
720 IF BX<4 THEN BX=4 ELSE IF BY<3 THEN BY=3
725 IF PPOINT (BX-4,BY)=3 THEN BX=BX+5:SOUND 150,2:GOTO 755
```

Listing continues

Listing continued

```
730 BX=BX-3:C=2:IF BX<4 THEN BX=4 ELSE IF BY<3 THEN BY=3
735 IF BY>188 THEN BY=188
740 GOSUB 605
745 PLAY "L255;O3;"+STR$(S):C=1:GOSUB 605
750 NEXT S
755 IF BX<4 THEN BX=4
760 RETURN
765 REM RED SCORE
770 VS=VS+1:CLS(4)
775 PRINT @165,"BLUE TEAM SCORE ",HS
780 PRINT @262,"RED TEAM SCORE ";VS
785 PRINT @359," BLUE KICK OFF"
790 PRINT @64,T;"MINUTES REMAINING HALF";H
795 GOSUB 965
800 RETURN
805 REM BLUE TEAM SCORE
810 HS=HS+1:CLS(3)
815 PRINT @165,"BLUE TEAM SCORE ";HS
820 PRINT @262,"RED TEAM SCORE ";VS
825 PRINT @359," RED TEAM KICK"
830 PRINT @64,T;"MINUTES REMAINING HALF";H
835 GOSUB 965
840 RETURN
845 FOR S=1 TO 300:NEXT S
850 PLAY "L050;O4;T4;B;B;B
```

Return to the Castle

by James Wood

Here's the excitement of dragons, dungeons, princesses and treasures for the Color Computer.

The program in this article is the result of my frustration at not being able to play "Swords & Sorcery II" (Barry Adams, *80 Micro*, August 1980) on my Color Computer.

I have used several of Mr. Adams' ideas and added a couple of my own. Some of the 12 high-resolution scenes have animation corresponding to keyboard entries. The pictures are being generated on graphics pages while the player is reading his statistics, such as gold coins, strength, and water. After the picture is completed it is flashed to the screen. This keeps the game moving more quickly.

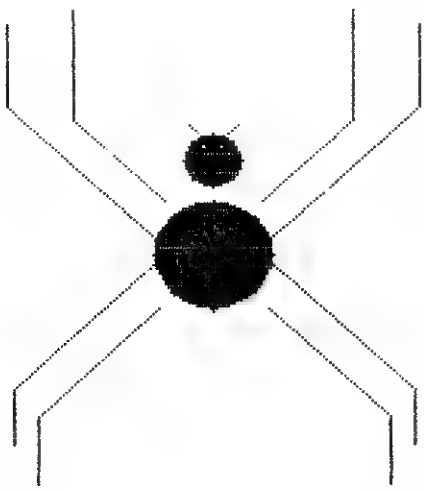


Fig. 1. Spider

The object of the game is to get to the castle with enough gold coins to win the princess. As your journey progresses there are many decisions to be made and reactions that are necessary to increase your strength, distance and number of gold coins. At the pool of water, press "d" to take a drink. The water may be poison, but that will only weaken you. If a fish appears in the water, push "f" to catch it. Spending the night under the open sky will drain your strength, but a night at the tavern takes several valuable coins. At crossroads you must press the left or right arrow to proceed. Gold coins along the path can be picked up by pressing "g."

Animals may come your way. Snakes and spiders are easy to slay, just press "s" before you are bitten. Rats can't be killed, they just slow you down. The most powerful animal is the dragon. Killing a dragon with your sword (use left and right arrows) will increase your strength and distance traveled. If he burns your foot your strength will decrease; a burn anywhere else will kill you. You can choose to retreat from the dragon and be farther from the castle. There are also strangers in the wilderness. You can attack, run, or barter.

This game does leave room for improvement. One possible improvement would be to add additional scenes. To add another scene change RND(10) to RND(11) in line 40 and add a comma and one more line number at the end of the line: 16000 would be good. Lines 16000–16999 can be used to draw another high-resolution picture similar to the ones for the pool, dragon, and rats. Be sure to include a Return at the end of your subroutine. If available memory becomes a problem, you can delete line 5 and type RENUM 1,10,2 to shorten the five-digit line numbers in the GOTO and GOSUB commands.

Another improvement for the program would be to generate a map for the player to decipher while looking for the castle. The snakes, dragons, rats and spiders can show up anywhere because they are mobile, but the tavern, crossroads, and pools will have definite locations. You could have the computer spin up these locations in an array, but 16K might not be sufficient memory.

Now go forth into the wilderness and try to win your princess. ■

James Wood is a teacher whose hobbies include photography and ham radio. He lives at 424 N. Missouri, Atwood, IL 61913.

Program Listing

```
5 ' JAMES W. WOOD,424 N. MISSOURI,ATWOOD, IL, 61913, MAY-1982
10 CLS:PRINT@262,"RETURN TO THE CASTLE":FORTI=1TO400:NEXTTI:PRIN
T@295,"AND WIN A PRINCESS!"
11 W=RND(3)+2:S=40+RND(3)*10:RC=10+RND(50)
12 DC=100+RND(50)
13 FORTI=1TO500:NEXTTI:CLS:PRINT@42,"INSTRUCTIONS";:PRINT@65,"AT
 POOL- <D> TO DRINK";:PRINT@97,"IF FISH APPEARS- <F> TO CATCH";:
PRINT@161," <S> TO ESCAPE SNAKE OR SPIDER";
14 PRINT@225,"AT ";CHR$(34);"Y";CHR$(34);" IN ROAD, AND AT DRAGO
N-";:PRINT@257,"USE LEFT AND RIGHT ARROWS.":PRINT@321,"PRESS <G>
```

Listing continues

The Key Box

Color Computer
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Listing continued

```
 TO PICK UP GOLD";
15 PRINT@480,"  PRESS <ENTER> TO CONTINUE";
16 A$=INKEY$:IFA$=""THEN16
17 CLS
20 TIMER=0:D=D+1
21 GOSUB11000
25 CLS:PRINT@160," UNITS WATER",W:PRINT@192,"    STRENGTH",S:P
RINT@224,"  GOLD COINS",TC:PRINT@258,"DAY NUMBER",D:PRINT@292,
"DISTANCE",DI
26 IFP=1THENPRINT@40,"POISON WATER":P=0
27 IFYW=1THENPRINT@419,"YOU MADE IT HOME!!":GOTO20010
28 IF YD=1THENPRINT@417,"THE FOREST'S ANIMALS ARE TRICKY":PRINT@
455,"YOU'RE DEAD":GOTO20010
29 IF SB=1 THENPRINT@40,"YOU TAKE A BITE":SB=0
30 IFS<0THENPRINT@419,"YOU DIE OF EXHAUSTION!":GOTO20010
39 IFTIMER>5000THENGOTO2000
40 ON RND(10)GOSUB1000,3000,4000,6000,7000,8000,9000,10000,12000
,13000
42 IFDI>DC THENGOSUB5000
50 IFW<0THENW=0:S=S-5
60 IF RND(30)=1 THEN CLS:PRINT@232,"WRONG WAY":FORTI=1TO400:NEXT
TI:DI=INT(DI/2)
900 GOTO25
1000 PMODE3,1:PCLS3:DI=DI+3
1010 CIRCLE(100,130),80,1,.3
1020 COLOR1,3:LINE(0,100)-(255,100),PSET
1030 PAINT(2,102),1,1
1040 COLOR4,1:LINE(0,0)-(255,191),PSET,B
1050 COLOR2,1:LINE(190,110)-(200,60),PSET,BF
1060 CIRCLE(195,45),30,1,.5
1070 PAINT(195,45),1,1
1080 SCREEN1,0:FORTI=1TO700:NEXTTI:IFINKEY$="D"THENW=W+1:S=S+2:I
FRND(10)=1THENP=1:S=S-10:W=W-1
1085 F=RND(5):IFF=1 THENDRAW"BM"+STR$(RND(40)+80)+",139R5E2D1G1D
1F1D1H2L5"ELSERETURN
1086 FORTI=1TO200:NEXTTI:IFINKEY$="F"THENS=S+5:CLS:PRINT@460,"GO
OD FISH !"ELSEPRINT@460,"MISSED"
1087 FORTI=1TO600:NEXTTI:RETURN
2000 PMODE3,1:PCLS:S=S-5
2010 FORA=1TO30:PSET(RND(255),RND(130),RND(3)+1):NEXTA:PMODE4,1:
SCREEN1,1
2015 FORTI=1TO900:NEXTTI
2020 GOTO20
3000 PMODE3,1:PCLS:S=S-3:W=W-1:DI=DI+RND(6)
3010 COLOR3,1:LINE(0,0)-(255,80),PSET,B
3020 PAINT(2,2),3,3
3030 COLOR2,1:LINE(110,191)-(110,170),PSET:LINE-(20,80),PSET:LIN
E-(30,80),PSET:LINE-(120,155),PSET:LINE-(220,80),PSET:LINE-(230,
80),PSET:LINE-(130,170),PSET:LINE-(130,191),PSET:LINE-(110,191),
PSET
3040 PAINT(120,180),2,2
3050 COLOR4,1:LINE(0,0)-(255,191),PSET,B
3060 SCREEN1,0
3070 IFPEEK(343)=247 OR PEEK(344)=247THENRETURNELSE3070
4000 PMODE1,1:PCLS:DI=DI+RND(5)
4010 COLOR3,1:LINE(0,0)-(255,90),PSET,BF
4020 COLOR2,1:LINE(0,170)-(255,191),PSET,BF
4040 GC=RND(6):FORA=1TOGC:PSET(50+6*A,150):NEXTA
4050 COLOR4,1:LINE(0,0)-(255,191),PSET,B
4060 SCREEN1,0:FORTI=1TO600:IFINKEY$="G"THENTC=TC+GC:RETURN ELSE
NEXTTI
4061 RETURN
5000 PMODE3,1:PCLS3:CLS:SCREEN0,0:PRINT@200,"LOOK, THE CASTLE!"
5010 COLOR2,3
5020 DRAW"BM28,164U80R4D4R4U4R4D4R4U4R4D12R24U44R4D4R4U4R4D4R4U4
R4D4R4U4R4D4R4U4R4D16R40U56R4D4R4U4R4D4R4U4R4D84R36U12R4D4R4U4R4
D4R4U4R4D4R4U4R4D80L204"
5030 DRAW"BM28,152L12G4D24R234U24H4L8"
5040 DRAW"BM0,140R28":DRAW"BM232,140R22"
5050 PAINT(30,160),2,2
5060 PAINT(0,190),1,2
5070 COLOR4,1:LINE(112,164)-(132,134),PSET,BF
5080 COLOR4,1:LINE(0,0)-(255,191),PSET,B
5090 SCREEN1,0:FORTI=1TO1000:NEXTTI:YW=1:IFTC>RC THEN GOTO15000
ELSECLS:PRINT@196,"SORRY,YOU'RE TOO POOR":PRINT@260,"YOU CAN'T W
IN A PRINCESS!":GOTO20010
6000 PMODE3,1:PCLS
6010 DRAW"BM132,144U4R4U4R4U12E24U28L4D4L16U12R20E2F2E2F2R4D8L4D
32F12E8F4E8F4E8F4E8F4E8D6G32R10D4R4D6R4D4L16U4R4U4L8D4L4D4L44U4L
4U8L8D8R4D4L18"
6020 PAINT(134,142),4,4:AA=50:B=140
6025 PSET(156,70,2):PSET(158,70,2)
6030 DF=RND(5):IFDF=1THENFORA=144TO80STEP-1:PSET(A,220-A,2):NEXT
A:PLAY"L255V31O2ABC":ELSE6032
6031 IF AA=66 THENS=S-10ELSEIF AA>66 AND AA<91 THEN YD=1:PLAY"O1
```

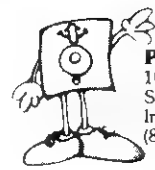
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™TRS80 color

From the January 1981 issue of the CSRA Computer Club newsletter

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

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Listing continued

```
L64ABDBDCA":S=0:RETURN
6032 LINE(AA,B)-(AA+24,B-22),PRESET,BF
6033 IFAA<11 THENCO=1:S=S-5:RETURN ELSEIF AA>115 THEN KD=1:S=S+5
:DI=DI+10:RETURN
6034 IFPEEK(344)=247THENAA=AA+8ELSEIFPEEK(343)=247THENAA=AA-8
6035 DRAW"BM"+STR$(AA)+",140C4E8U8L6R6U2L1H1U1E1R2F1D1G1L1D2R6C2
R8L8C4L6D8F8"
6040 IFDF=1THENFORA=144TO80STEP-1:PRESET(A,220-A):NEXTA
6900 SCREEN1,0
6901 GOTO6030
7000 GOSUB11000:CLS:PRINT@268,"RATS":FORTI=1TO400:NEXTTI:PMODE3,
1:PCLS:SCREEN1,0
7010 COLOR2,1
7020 FORA=230TO20STEP-16
7030 A$=STR$(A)
7040 DRAW"BM"+A$+",100R8G4E4D4U4R8D4U4F4H4R4E2R6L6H2L12H2G2L2D2G
2"
7050 PCLS
7060 B$=STR$(A-8)
7070 DRAW"BM"+B$+",100R8D4U4F4H4R8G4E4D4U4R4E2R6L6H2L12H2G2L2D2G
2"
7080 PCLS
7085 PLAY"O4L255V31AB"
7090 NEXTA:RETURN
8000 PMODE3,1:PCLS3
8010 CIRCLE(130,100),20,2,1.5
8020 CIRCLE(130,65),10,2
8030 COLOR2,3
8040 DRAW"BM146,80E30U40"
8050 DRAW"BM114,80H30U40"
8060 DRAW"BM112,95H50U30"
8070 DRAW"BM148,95E50U30"
8080 DRAW"BM 112,120G40D25"
8090 DRAW"BM148,120F40D25"
8100 DRAW"BM146,100F50D20"
8110 DRAW"BM114,100G50D20"
8120 DRAW"BM126,60U4H4"
8130 DRAW"BM134,60U4E4"
8150 PAINT(130,65),2,2
8160 PAINT(130,100),2,2
8170 CIRCLE(130,120),8,4:COLOR4,3:PAINT(130,120),4,4
8180 PSET(127,60,1):PSET(133,60,1)
8190 SCREEN1,0
8200 GOSUB20000:RETURN
9000 PMODE3,1:PCLS
9010 COLOR2,1
9020 CIRCLE(70,50),20,2,.5
9030 CIRCLE(110,58),40,2,1,.25,.5
9040 CIRCLE(110,58),30,2,1,.25,.5
9050 DRAW"BM110,98R100"
9060 DRAW"BM110,88R100"
9070 CIRCLE(210,118),30,2,1,.75,1
9080 CIRCLE(210,118),30,2,.7,.75,1
9090 PAINT(114,92),2,2
9100 PAINT(70,50),2,2
9110 DRAW"BM40,55NR20G4E4H4F4"
9120 PSET(60,45,3)
9130 COLOR4,1:DRAW"BM54,56R10"
9135 PLAY"L255O1V31DEFGFED"
9140 SCREEN1,0:GOSUB20000:RETURN
10000 PMODE3,1:PCLS3:DI=DI+5
10010 COLOR1,3:LINE(0,112)-(255,191),PSET,BF
10020 COLOR2,3:LINE(100,191)-(115,112),PSET:LINE-(135,112),PSET:
LINE-(150,191),PSET:PAINT(104,198),2,2
10030 COLOR4,1:LINE(0,0)-(255,191),PSET,B
10100 SCREEN1,0:FORTI=1TO400:NEXTTI:RETURN
11000 FORTI=1TO900:NEXTTI:RETURN
12000 IFRND(4)<4THENRETURNELSEPMODE3,1:PCLS3
12005 COLOR2,3:LINE(0,110)-(255,130),PSET:PAINT(10,120),1,2
12015 LINE(40,80)-(200,140),PSET,BF:LINE(40,80)-(120,40),PSET:LI
NE-(200,80),PSET:PAINT(60,75),4,2
12030 COLOR4,2:LINE(60,100)-(90,140),PSET,BF
12040 DRAW"BM100,120R10L5D15L6":DRAW"BM120,120D15R8U15L8":DRAW"B
M140,120R8L8D7R6L6D8R6":DRAW"BM160,115D6":DRAW"BM180,120L8D7R8D8
L8":SCREEN1,0
12045 PLAY"O2T6V31L8CP32FP32FP32CP32CP32CP32FP32FP32FP32L4FP32L8
FP32GP32GP32DP32DP32DP32L4GP32L8P32EP32EP32L4EP32L8EP32EP32EP32L
4EP32L8CP32CP32CP32DP32DP32EP32FP32FP32FP32L4F"
12048 CLS:PRINT@134,"WELCOME TO ";CHR$(34);"JOE'S";CHR$(34);:PRI
NT@194,"(R)EFRESHMENTS  5 GOLD COINS";:PRINT@226,"ROOM & (B)OARD
  10 GOLD COINS";:PRINT@290,"(N)EITHER";
12050 A$=INKEY$:IFA$=""THEN12050
12052 IFA$="R"THEN IF TC>4 THEN TC=TC-5:S=S+15:RETURN ELSE GOTO1
2058
12056 IFA$="B" THENIF TC>9 THEN TC=TC-10:S=S+20:D=D+1:TIMER=0:RE
```

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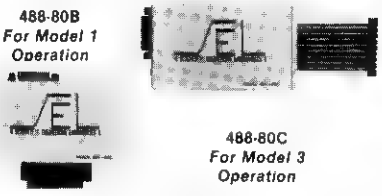
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Listing continued

```
TURN ELSE GOTO12058
12057 IFA$-"N"THEN RETURN ELSE GOTO12050
12058 CLS:PRINT@264,"YOU'RE TOO POOR!":FORTI=1TO400:NEXTTI:RETUR
N
13000 FORTI=1TO500:NEXTTI:CLS:PRINT@40,"SOMEONE'S COMING!":FORTI
=1TO400:NEXTTI
13010 PRINT@100,"(A)TTACK":PRINT@132,"(T)RADE":PRINT@164,"(R)UN"
13020 IK$-INKEY$
13030 A$=INKEY$:IFA$="A"THENGOTO13040ELSEIFA$="T"THENGOTO13050EL
SEIFA$="R"THEND1=DI-2:RETURNELSEGOTO13030
13040 CLS:SS=20+RND(30):IFSS-S>30THENPRINT@200,"HE KILLED YOU!!"
:END
13042 IFSS-S>15THENS=INT(S/2):PRINT@200,"YOU TAKE A BEATING":FOR
TI=1TO500:NEXTTI:IFRND(3)=1THENPRINT" HE TAKES YOUR GOLD!":TC=0:
FORTI=1TO500:NEXTTI:RETURN ELSE RETURN
13044 IFSS-S>3THENPRINT@200,"PICKED ON THE WRONG GUY!":FORTI=1TO
500:NEXTTI:S=S-10:RETURN
13046 IFS-SS>9THENPRINT@200,"HE GOT AWAY!":FORTI=1TO400:NEXTTI:I
FRND(5)=1 THEN PRINT" HE DROPPED HIS GOLD!":TC=TC+RND(6):FORTI=1
TO500:NEXTTI:RETURN ELSERETURN
13048 PRINT@200,"KILLED HIM!":GC=RND(9):PRINT"  TOOK";GC;"GOLD C
OINS FROM":PRINT"HIS COIN POUCH":TC=TC+GC:FORTI=1TO500:NEXTTI:RE
TURN
13050 CLS:ON RND(3) GOTO 13060,13070,13080
13060 CLS:PRINT@192,"HE HAS NOTHING WORTH TRADING!":FORTI=1TO900
:NEXTTI:RETURN
13070 CLS:PRINT@193,"HE WILL SELL FOOD AND DRINK"
13072 FC=RND(3):WC=RND(2)
13073 PRINT"FOOD COSTS";FC;"GOLD COINS":PRINT"WATER COSTS";WC;"G
OLD COINS":PRINT:PRINT"(W)ATER, (F)OOD, OR (B)OTH?"
13074 A$=INKEY$:IFA$="W"THEN IF WC>TC THENGOTO13200ELSE TC=TC-WC
:W=W+1:GOTO13300
13076 IFA$="F"THENIFFC>TCTHENGOTO13200ELSETC=TC-FC:S=S+7:GOTO133
00
13078 IFA$="B"THENIF FC+WC>TC THENGOTO13200ELSETC=TC-FC-WC:S=S+7
:W=W+1:GOTO13300
13079 GOTO13074
13080 PRINT@192,"HE OFFERS 2 GOLD COINS FOR WATER"
13082 PRINT@233,"(S)ELL OR (R)EFUSE"
13083 A$=INKEY$:IFA$=""THEN13083
13084 IFA$="R"THENRETURNELSEIFA$="S"THEN13090ELSE 13083
13090 IF W<1 THEN CLS:PRINT@197,"YOU DON'T HAVE WATER!!":FORTI=1
TO400:NEXTTI:RETURN ELSE TC=TC+2:W=W-1:RETURN
13200 CLS:PRINT@200,"YOUR TOO POOR!":FORTI=1TO500:NEXTTI
13300 RETURN
15000 PMODE3,1:PCLS:CLS:SCREEN0,0:PRINT@193,"BECAUSE YOU HAVE SH
OWN SUCH":PRINT"SKILL AND BRAVERY, YOU HAVE WON":PRINT"THE HAND
OF THE KING'S DAUGHTER."
15001 FORTI=1TO900:NEXTTI
15002 COLOR2,1
15010 CIRCLE(136,56),12
15020 DRAW"BM132,66D4L4G2L3G2L3G2D2G2D4G2F2D3F3D3F4R2F3D6R22U6E3
L2E4U3E3U3E2H2U4H2U2H2L3H2L3H2L3U4"
15030 DRAW"BM124,80R1F2D2G2L1H2U2E2"
15040 DRAW"BM146,80R1F2D2G2L1H2U2E2"
15045 PAINT(132,80),2,2:PAINT(136,56),2,2
15046 COLOR3,1
15050 CIRCLE(132,90),8,3
15060 CIRCLE(141,90),8,3
15061 PAINT(144,90),3,3:PAINT(130,90),3,3
15062 LINE(120,72)-(133,88),PSET
15063 LINE(148,72)-(141,88),PSET
15070 PSET(132,52,3):PSET(140,52,3)
15072 DRAW"BM132,60F2R4E2"
15080 LINE(124,110)-(150,110),PSET
15082 LINE-(168,172),PSET:LINE-(108,180),PSET:LINE-(124,110),PSE
T
15090 PAINT(134,120),3,3
15091 COLOR2,1:DRAW"BM128,179D12F2D2L16U2E2R4E2U7R6":PAINT(126,1
81),2,2
15092 DRAW"BM148,175D14G2R16U2H2L4H2U10L4":PAINT(150,177),2,2
15100 COLOR4,1:LINE(128,48)-(124,20),PSET:LINE-(144,46),PSET:LIN
E-(128,48),PSET:PAINT(130,30),4,4
15110 COLOR3,1:LINE(124,20)-(100,64),PSET:LINE-(108,68),PSET:LIN
E-(116,72),PSET:LINE-(124,20),PSET:PAINT(104,60),3,3
15999 SCREEN1,0:PLAY"O3V31T4L4FP32;11;P32L8;11;P32L4;11;P32FP32O
4L4CO3P32L8AP32L4;11":FORTI=1TO600:NEXTTI:CLS:PRINT@200,"LUCKY W
INNER!":GOTO20010
20000 FORTI=1TO100:IFPEEK(341)=251 THEN S=S+2:RETURN
20001 NEXTTI:SCREEN1,1:FORTI=1TO50:NEXTTI:SCREEN1,0
20002 FORTI=1TO200:IFPEEK(341)=251 THEN S=S-10:SB=1:RETURN
20003 NEXTTI
20004 YD=1:S=0:RETURN
20010 IK$=INKEY$
20020 PRINT@482,"PLAY AGAIN (Y/N)"
20030 A$=INKEY$:IFA$="Y"THENRUNELSEIFA$="N"THENENDELSE20030
```

Table on p. 331

10	Title
11	Randomizes beginning water, strength, coins to win princess
12	Randomizes distance to castle
13–16	Instructions
20	Timer for length of day
25	Prints adventure's statistics
26	Randomizes poison water
27–28	Check for loss or win of game
29	Check for snake bite
30	Check for strength remaining
39	Check for end of a day
40	Goto random scene
42	Check if adventurer has gone far enough to be at castle
50	Reduce strength if water gone
60	Random "wrong way"
900	Back to top of loop
1000–1087	Draw pool and fish
2000–2020	Night sky
3000–3070	Crossroads
4000–4061	Gold coins along path
5000–5090	Castle
6000–6901	Dragon
7000–7090	Rats
8000–8200	Spider
9000–9140	Snake
10000–10030	Straight road
12000–12058	Tavern
13000–13300	Someone on road
15000–15999	Princess
20000–20004	Scans keyboard for "s" to slay spider or snake

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From the moment you answer the "Are you ready?" query and indicate your choice of skill level from a scale of one to nine, you are challenged to repeat a random letter sequence. The letters are flashed in the center of a box in enlarged size, one at a time. When the question mark appears, you try to keyboard the letters in the same sequence. If you succeed, a notation to this effect appears, and an arbitrary percentile rating is assigned to the score. For comparison, the letters as sequenced by the program are listed directly above the letters recorded as your response.

Program Listing

```
10 CLS:CLEAR 500 :A=0 :P=0 :RANDOM
  :PRINTCHR$(02)
20 A1=30:B1=30:C1=25:A2=12:B3=7:C3=11
  :A4=9:C4=56
30 GOSUB 450
40 PRINT@(08,35),"MEMORY EXERCISER"
50 PRINT@(09,35),"BY WALDO T. BOYD"
60 PRINT@(10,42),"1982"
70 FOR X=1 TO 2500:NEXT
80 CLS: PRINT@246,"Test your memory for
  letter sequences.  It's easy.
90 PRINT "A series of letters is
  presented at randam at screen center,
  fol-
100 PRINT "lowed by a question mark.
  When the question mark appears,
  keyboard
110 PRINT "the letters in the identical
  sequence in which they were
  presented.
```

Listing continues

The sequence length is determined by your selection of the 1–9 option; the square of the number chosen is the number of letters sequenced for that run. Thus, if you choose to attempt skill level 4, 16 letters will be presented in random order, one letter at a time, increasing by one letter with each response made following the appearance of the question mark. If an error is made, the sequence ends and the comparisons are shown for feedback.

If the sequence is correctly echoed from the keyboard, the percentile rating increases in a positive direction; if entered incorrectly, the rating can decrease into the nether regions. As the rating increases, it influences the speed at which letters are presented and wiped from the screen. Also, the higher the skill number chosen for each run (from 1–9), the more quickly the letters will sequence.

The percentile rating will increase dramatically after the first few successful runs. However, your echo can be made at any speed without influencing the program by its rate of entry.

The Program

Following the usual opening statements, the GOSUB command places a border around the title; since a box is needed later, the box parameters use variables to permit altering box size for each use. These variables are valued in line 20 for the title box, and revalued in line 180 for the letter-function box. The blinking cursor is turned off with

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Listing continued

```
120 PRINT "Each run of letters will be
  one letter longer than the previous
  run.
130 PRINT:PRINTTAB(6) "Are you ready?
  (Y/N)"
140 A$=INKEY$:IF A$="" THEN 140ELSE IF
  A$="N" THEN END ELSE IF A$="Y" THEN
  150
150 PRINT :PRINT "There are 9 degrees
  of challenge.  Choose, 1-9: "
160 A$=INKEY$:IF A$="" THEN 160ELSE
  A=VAL(A$)
170 B=0:C=0:A$="":B$="":S$="":SS$=""
  :A=A*A
180 A1=08:B1=16:C1=5:A2=12:B3=9:C3=11
  :A4=09:C4=22:PRINTCHR$(02)
190 CLS:PRINT CHR$(31):GOSUB 450
200 D=1 :FOR X=1 TO 1000-(A*100):NEXT X
210 C=RND(25)+65:B$=B$+CHR$(C)
220 FOR Q=1 TO LEN(B$)
230 PRINT@859, MID$(B$,Q,1)
240 FOR X=1TO500-(P*20):NEXT X
250 PRINT@859," "
260 FOR X=1 TO 50:NEXT X
270 NEXT Q
280 PRINT@859,"?":SS$=""
290 FOR X=1 TO LEN(B$)
300 S$=INKEY$:IFS$=""THEN300
310 SS$=SS$+S$
320 NEXT X
330 IF B$=SS$AND D<A THEN D=D+1:GOTO210
340 IF B$=SS$ THEN 370
350 CLS :PRINT@520,"SEQUENCE TRY AT
  LENGTH" A "NOT MIRRORED.":E=E+(E+A)
360 PRINT :PRINT@717-LEN(B$), B$
  :PRINT@797-LEN(B$),SS$:PRINT:GOTO 390
370 CLS:PRINTCHR$(23):PRINT@524,
  "SEQUENCE OF"A"MIRRORED CORRECTLY. "
380 PRINT :PRINT@717-LEN(B$),B$:PRINT@
  797-LEN(B$),SS$:PRINT:F=F+(F+A)
390 P=(F-E)/100:PRINT@925,P"PERCENTILE
  STANDING"
400 LINEINPUT "TOUCH <ENTER> TO END
  STUDY OF RESULT.";Q$
410 PRINTCHR$(30):GOTO 420
420 PRINT"TRY AGAIN,Y/N"
430 A$=INKEY$:IFA$="" THEN 430ELSE IF
  A$="Y" THEN 150ELSE END
440 END
450 PRINT@(A1,B1),CHR$(128)
  STRING$(C1,150)CHR$(129);
460 PRINT@(A2,B1),CHR$(131)
  STRING$(C1,150)CHR$(130);
470 FOR A3=B3 TO C3:PRINT@(A3,B1),
  CHR$(148); :PRINT@(A3,C4), CHR$(148);
  :NEXT A3
480 PRINTCHR$(02):RETURN
```

CHR$(02) during this and subsequent points in the program to eliminate unnecessary distraction that might affect concentration. This is especially important during letter-sequence presentation.

The INKEY$ function is strategically used to eliminate unnecessary use of the enter key, and to enhance the overall program action.

CHR$(31) in line 190 increases the letter size as the program begins the letter-sequencing routine. This enhances the user's ability to recognize the letters, acting somewhat like field glasses for a close-up view during the action portion. The enlargement is turned off in line 410, with CHR$(30), restoring the smaller letter size for the option sequences that follow.

Line 10 includes the Random command, which reseeds the random generator for each use of the program. Later, in line 210, numbers are selected randomly from 1-25 and converted to letters via their ASCII equivalents (+65). Only capital letters are used. These are collected in the variable B$, the last letter selected for presentation by the MID$ function in line 230, and printed in the center of the box with the PRINT@ function. Then the keyboard echo input is collected singularly in S$, and serially in SS$ in line 310. The letter sequence presented by the random generator is compared to the keyboard sequence in lines 330 and 340 and the results directed to either the mirrored or failed-to-mirror subroutines for screen viewing in enlarged format.

An option to continue the exercise appears, allowing for a go, no-go choice; if the continue choice is made, a subchoice is offered for selection of skill level, 1-9. If the negative choice is made, the program ends. A go choice will allow the percentile variable P to collect additional data; a negative choice will cause the data to be lost when the program is restarted with Run.

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Waldo Boyd is self-employed and can be reached at P.O. Box 86, Geyserville, CA 95441.

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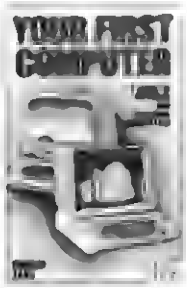
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AN INTRODUCTION TO MICROCOMPUTERS, VOL. 0 — The Beginner's Book—Written for readers who know nothing about computers—for those who have an interest in how to use computers—and for everyone else who must live with computers and should know a little about them The first in a series of 4 volumes, this book will explain how computers work and what they can do Computers have become an integral part of life and society During any given day you are affected by computers, so start learning more about them with Volume 0 BK1130 $12.50 *

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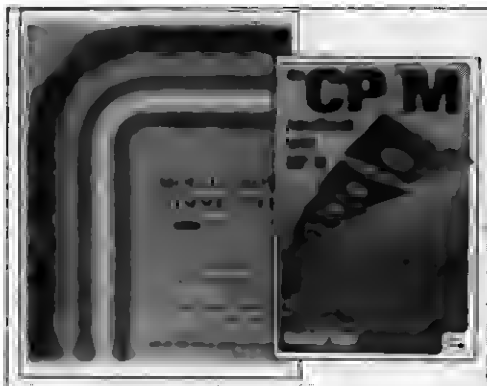


SOME OF THE BEST FROM KILOBAUD/MICROCOMPUTING –A collection of the best articles that have recently appeared in Kilobaud/MICROCOMPUTING, included is material on the TRS-80 and PET systems, CP/M, the 8080/8085/Z80 chips, the ASR-33 terminal Data base management, word processing, text editors and file structures are covered too. Programming techniques and hardcore hardware construction projects for modems, high speed cassette interfaces and TVTs are also included in this large format, 200 plus page edition BK7311 $10.95.*

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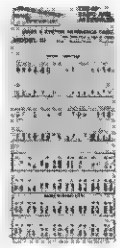
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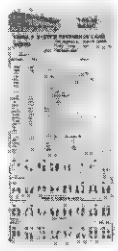
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Z80

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TEXTEDIT—A Complete Word Processing System in Kit Form—by Irwin Rappaport. TEXTEDIT is an inexpensive word processor that you can adapt to suit your differing needs—from form letters to lengthy texts. Written in TRS-80 Disk BASIC, the system consists of several modules, permitting the loading and use of only those portions needed. A disk is also available which provides the direct loading of the modules, however, the book is required for documentation. For Model I and III with TRSDOS CONVERT., one disk drive (2 disk drives or copy utility needed to transfer to system disk). Runs under TRSDOS 2.2/2.3. May not function under other systems. BK7387 $9.97 Disk DS7387 $19.97

Disk is manufactured by Instant Software, a division of Wayne Green Inc.

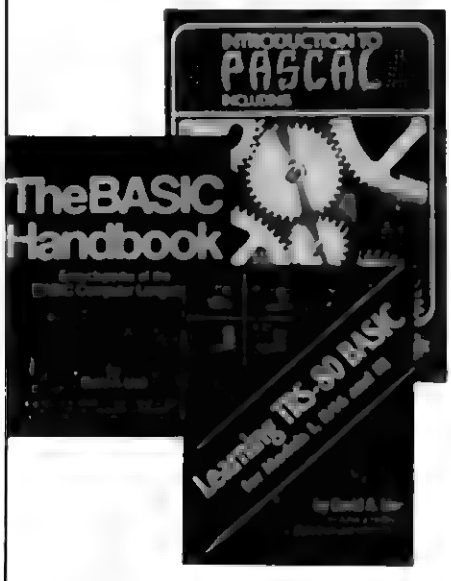
THE NEW WEATHER SATELLITE HANDBOOK—by Dr. Ralph E. Taggart WB8DQT. Here is the completely updated and revised edition of the best-selling *Weather Satellite Handbook*—containing all the information on the most sophisticated and effective spacecraft now in orbit. Dr. Taggart has written this book to serve both the experienced amateur satellite enthusiast and the newcomer. This book is an introduction to satellite watching, that tells you how to construct a complete and highly effective ground station. Not just ideas, but solid hardware designs and all the instructions necessary to operate the equipment are included. An entire chapter is devoted to microcomputers and the Weather Satellite Station, and for the thousands of experimenters who are operating stations *The New Weather Satellite Handbook* details all the procedures necessary to follow the current spacecraft. Weather Satellite contains Operation Satellite Systems, Antenna Systems, Weather Satellite Receivers, A Cathode Ray Tube (CRT) Monitor for Satellite Picture Display, A Direct-Printing Fascimile System for Weather Satellite Display, How to Find the Satellite, Test Equipment, Microcomputers and the Weather Satellite Station, Station Operations. **BK7383 $8.95.***

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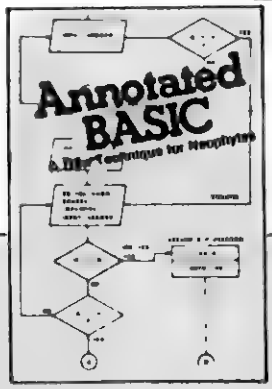
INTRODUCTION TO PASCAL—By Rodney Zaks. A step-by-step introduction for anyone wanting to learn the language quickly and completely. Each concept is explained simply and in a logical order. All features of the language are presented in a clear, easy-to-understand format with exercises to test the reader at the end of each chapter. It describes both standard PASCAL and UCSD PASCAL, the most widely used dialect for small computers. No computer or programming experience is necessary. BK1189 $15.95

THE BASIC HANDBOOK—SECOND EDITION—by David Lien. This book is unique. It is a virtual ENCYCLOPEDIA of BASIC. While not favoring one computer over another, it explains over 250 BASIC words, how to use them and alternate strategies. If a computer does not possess the capabilities of a needed or specified word, there are often ways to accomplish the same function by using another word or combination of words. That's where the HANDBOOK comes in. It helps you get the most from your computer, be it a "bottom-of-the-line" micro or an oversized monster. BK1174 $19.95 *

LEARNING TRS-80 BASIC—by David A. Lien. Dr. Lien, who is the author of THE BASIC HANDBOOK and the original Radio Shack LEVEL I USER'S MANUAL, has compiled a tutorial which includes portions of the original USER'S MANUAL, and most of LEARNING LEVEL II along with extensive additions. It will completely cover the TRS-80 Models I, III, and 16 (sorry, not the color or pocket computers). It is, of course, written in the easy learning style which readers of Dr. Lien's books have come to enjoy. BK1175 $19.95.

9ASIC BASIC (2ND EDITION)—by James S. Coan. This is a textbook which incorporates the learning of computer programming using the BASIC language with the teaching of mathematics. Over 100 sample programs illustrate the techniques of the BASIC language and every section is followed by practical problems. This second edition covers character string handling and the use of data files. BK 1026 $11.50 *

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Annotated BASIC deals with the hows and whys of TRS-80 BASIC programming. How's a program put together? Why's it written that way? By observing the programs and following the annotation, you can develop new techniques to use in your own programs—or modify commercial programs for your specific use.

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Business

SMALL COMPUTERS FOR THE SMALL BUSINESSMAN—By Nicholas Rosa and Sharon Rosa. Here is an excellent guide for businessmen who are interested in finding out what a computer can do for their business, but are not interested in becoming computer nuts. The authors are consultants who assess the computer needs of businessmen and who touch base with everything necessary to consider before purchasing a computer. The authors tell readers how and where to shop successfully for a computer, what to expect their computer to do for them, how large a computer to consider, how to select software; whether or not to use a consultant, how to introduce the computer to the staff, and much more. Specific topics addressed include accounting records, warehousing, light factory operation and parts inventories. BK1223 $12.95*

SO YOU ARE THINKING ABOUT A SMALL BUSINESS COMPUTER—by Richard G. Canning and Nancy C. Leeper. For a well-organized manual on the process of selecting the right computer system for your small business, this text can't be excelled. Designed to introduce the novice in data and word processing to the real benefits of computerization, the book is filled with money- and time-saving tips, photos of equipment, lists of suppliers, prices, explanations of computer terminology, and helpful references to additional sources of information. Everyone contemplating a first computer installation should have this book. BK1222 $14.00*

USING MICROCOMPUTERS IN BUSINESS—By Stan Veit. Written by the owner manager of one of the country's largest computer stores selling systems to small businesses, this book is an essential background briefing for any purchaser of microcomputer systems or software. In a fast-moving style, without the usual buzz words and technical jargon, Veit answers the most often asked questions. CONTENTS: How a computer can help your business. Data base management to advance your business; Effective use of word processing; How to use a computer without disrupting your business; Buying your system; Computer languages; What are the limitations of the microcomputer. Software: where to find it, how to judge it. What to do when the computer goes down. BK1225 $9.95*

BUSINESS SYSTEM BUYER'S GUIDE—By Adam Osborne with Steven Cook. When you enter the marketplace of small business computers, you face a bewildering array of products, prices, features and fables. This guide cuts through the jargon and unravels the task of buying the right computer system. This book provides solid information on how to determine your needs, how to choose software and hardware for all business applications, what to expect from vendors, what to avoid, and what questions you must ask. It also provides a wealth of detailed information on products, manufacturers, retailers and the whole microcomputer market. BK1229 $9.95

Games

CAPTAIN 80 BOOK OF BASIC ADVENTURES—by Robert Liddil. This book contains 18 of the most popular Adventure programs available today; all in one easy to read book with listings ready to be keyed in to your computer. This unique book also contains an ADVENTURE GENERATOR program, not available from any other source. This generator program will actually write another BASIC ADVENTURE PROGRAM! Although specifically written for the TRS-80 Model I & III, these programs are adaptable to other computers using Microsoft BASIC. BK 1240 $19.95.

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MORE BASIC COMPUTER GAMES—Edited by David H. Ahl. More fun in BASIC! 84 new games from the people who brought you *BASIC Computer Games*. Includes such favorites as Minotaur (battle the mythical beast) and Eliza (unload your troubles on the doctor at bargain rates). Complete with game description, listing and sample run. BK1182 $7.50 *

WHAT TO DO AFTER YOU HIT RETURN—PCC's first book of computer games...40 different computer games you can play in BASIC. .programs, descriptions and many illustrations. Lunar Landing, Hammurabi, King, Civel 2, Qubic 5, Taxman, Star Trek, Crash, Market, etc. BK1071 $16.50*

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NEWS THIS MONTH

DISNEYWARE

Mickey Mouse and the rest of Disney's gang enter micro gamedom.

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MORE THAN A TOY

A Canadian lexicographer uses a souped-up Model I to put together the *New York Times Everyday Dictionary.*

PAGE 342

HIGH SPEECH, LOW MEMORY

Peachtree Software introduces SPeachware—low-cost, low-memory hardware with superior voice quality.

PAGE 344

BUSINESS

The Vegas CEO

More than 70,000 people ogled at gadgets galore at the Consumer Electronics Show in Las Vegas.

BY ROBERT G. FISHER

SPECIAL TO 80 MICRO

By any standard of measurement, the 1983 Winter Consumer Electronics Show in Las Vegas was a resounding success. And, for anyone involved with the distribution, marketing, retailing or use of TRS-80 products, it was mind-boggling.

Visiting the 1,050 exhibitors were, by official count, 78,126 attendees during the four-day event, breaking all records for the semi-annual show as well as for Las Vegas, which considers itself the convention capital of the world.

Actually, the number of visitors was far in excess of the official tally; convention officials explained local businesses and guests were not included in their count. And, because access passes for the show were limited, daily badge tags were freely passed around by official delegates to friends and "groupies" who wanted to see what the future has to offer in the exploding world of electronics.

Persons looking at TRS-80-related products soon became numbed by the sheer quantity and complexity of what will be in store for that microcomputer system during 1983, including software, hardware, peripherals, furniture and accessories.

By far the largest group of software exhibitors at the show were producers of home video games, many of which are TRS-80 compatible.

Datasoft Inc. had one of the largest such displays, once again showing its expertise in adapting its software not only to the TRS-80, but to a dozen other microcomputer systems as well.

New from Compro Electronics Inc. of Costa Mesa, CA, was its Videoplexer, an electronic game selector with finger-tip command permitting game selection for a variety of products including the Tandyvision One.

A new WICO Corp. Command Control joystick, first seen at the show and interfacing with the TRS-80 Color Computer and other personal computers, is being made available. Equipped with a modified grip handle with two fire buttons and a selection switch for centering/non-centering option, it will retail in Radio Shack stores nationwide for $49.95.

Star Micronics Inc. of Dallas introduced its new thermal printer priced to retail for $199.

Brother International displayed its new electronic compact typewriter line, the Correctronic 50, that offers triple pitch typing (10, 12, and 15), a full one-line correction memory, a one-touch interchangeable cassette-daisy-wheel, cassette-ribbon system, automatic paper setting, and a host of other features. The machine can double as a micro-

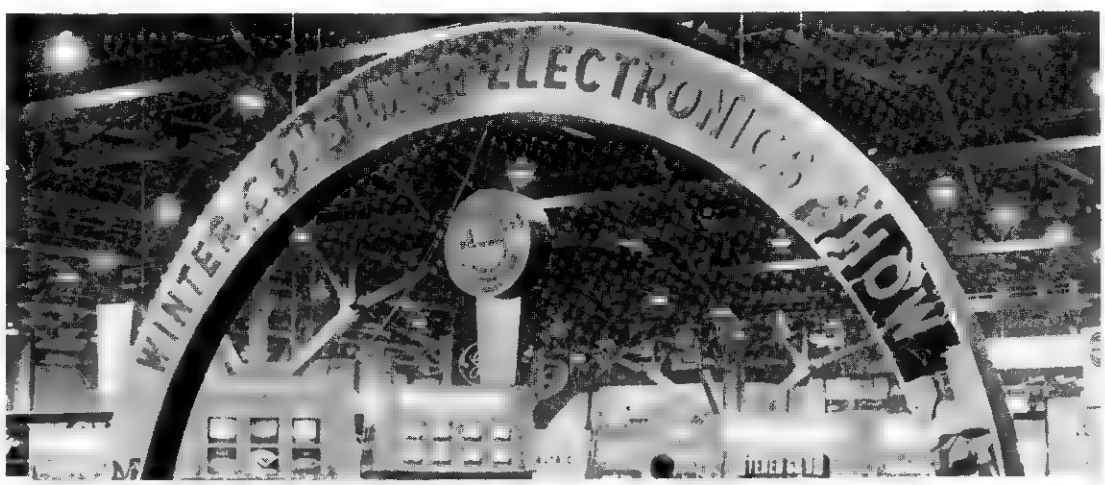


photo by Robert Fisher





photos by Robert Fisher

A model and masseur (above, left) promote a videotape course on massage at CEO-Las Vegas, while another model (above, right) hawked "blue" videotapes. Maxell displayed its micro-disk drives (below, left), and a giant Pac-Man (below, right) entertained younger CEO patrons.

computer printer terminal by using a built-in interface port.

Discwasher of New York introduced a pair of cleaners designed for computer cassette-drive systems. The Discwasher head cleaner slips directly into the recorder and cleans the head drive in 15 seconds. The cleaner is nonabrasive and uses no alcohol or fluids. A cassette mechanism cleaner clears all contamination from pinch rollers to maintain top performance. Both are sold together as a Discwasher Computer Cassette Drive Careset.

Discwasher also introduced a disk-drive cleaner, designed to remove all debris and keep disk drives working at optimum capacity. It, too, is nonabrasive and utilizes a unique fiber grid cleaning system and "perfect path" technology to thoroughly dislodge and collect foreign matter from sensitive drives. It is available in 5¼-inch and 8-inch formats.

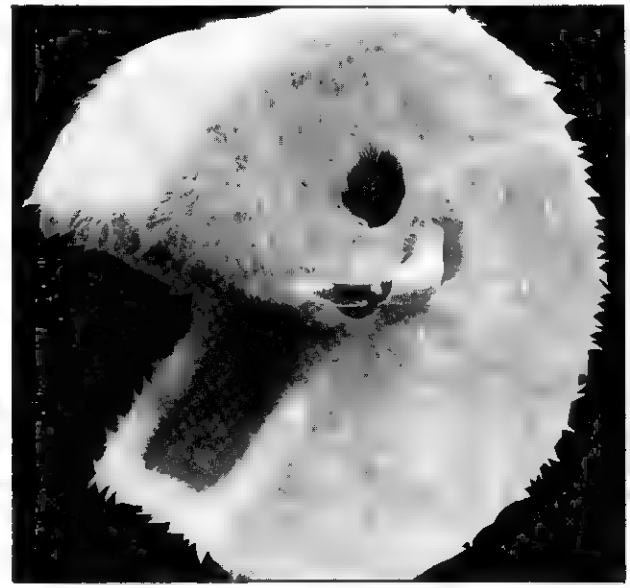
Both Maxell and BASF competed with other tape manufacturers at the show for segments of the tape and floppy disk market. The BASF Qualimetric FlexyDisks, first introduced in October 1982, are claimed to be the first 100-percent, error-free floppy disks with a lifetime warranty.

Maxell Corporation delegates were proud to demonstrate their revolutionary 3-inch Compact Floppy Disk (CFD), along with their compatible (and same recording capacity) 5¼-inch double-density, mini-floppy disk.

At a computer seminar during the show, leading industry spokesmen noted that, while computer and computer-related sales were up over the preceding year, they were not up as much as originally projected, due in great part, they said, to the faltering economic situation.

Nevertheless, most executives foresee an economic turnaround and, even as the show was drawing to a close, were making plans for what they expect to be an even bigger and better show in Chicago next June.■





SOFTWARE

Disneyware

The heirs to Mickey's maker hope to crack the software market.

BY ROBERT G. FISHER
SPECIAL TO 80 MICRO

Perhaps it was inevitable the gigantic communications industry bearing the name of its creator, the late Walt Disney, should extend itself into still another area—microcomputer software.

Just coming onto the market is the first of more than 50 planned home computer programs developed by the Walt Disney Telecommunications and Non-Theatrical Co. for TRS-80, Texas Instruments, NEC Electronics of Chicago, and Panasonic systems.

Titled "Mickey in the Great Outdoors" and divided into two parts, "Mickey Goes Hiking" and "Mickey Goes Exploring," it is initially available for Atari microcomputer use.

Announcement of the new venture was made by Jim Jimorro, president of the Disney Telecommunications/Non-Theatrical Co., at the 1983 Winter Consumer Electronics Show in Las Vegas.

Disney's Jimorro explained the new venture:

"Two and a half years ago, our company saw in the video phenomenon a need to put all Disney activities in this area under one umbrella: video cassettes, discs, a new pay TV system and now, personal computer software.

"The basic Disney resources obviously lend themselves so well to the new technology. The characters we have, the plots we have, scenes and symbols—all lend themselves to development of software. . . .

"Another reason: in a very real sense, Disney is a company that has always understood the relationship between film, communication and entertainment on the one hand and education on the other. The way to reach people is to give them educational learning in a way that is highly motivational and highly entertaining."

"It's the old Walt Disney spoonful of sugar," he added.

At the same press conference, Fred Simon, vice president of Disney's computer software division, stressed the new programs—all of them, incuding those under development—emphasize learning as well as entertainment.

"There will never be a Disney software that does drill and practice. There will never be a Mickey Mouse adding two and two to make four," he said.



Jimorro: Everything we have lends itself to software. photos © Walt Disney Productions

"We plan adventure games and simulations," Simon explained.

He noted all products have characters drawn from Disney's vast movie library, and added each has learning objectives that will stimulate students to want to play the games over and over again.

The new Disney microcomputer software, manufactured on cartridge, disc, and cassette tape, will vary in price from manufacturer to manufacturer.

Similar Disney software for schools will be sold in larger packages and contain teacher preparation material.



Simon: "There will never be a Mickey Mouse adding two and two to make four."

It was pointed out Disney will not actually manufacture any of the software products.

"We're in the communications business," Jimorro explained. "Although all the software development is being done in-house, with the staff creating all the ideas and concepts of the programs, outside contract programmers will actually produce the programs, cut to Disney specifications.

"Subsequently," he said, "each hardware manufacturer will become the exclusive distributor for his respective Disney product. Disney," he added, "will retain all additional markets, including the school market."

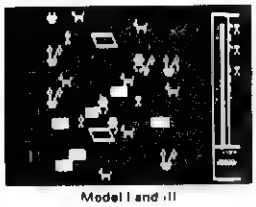
Asked by a reporter about software piracy, Jimorro agreed it would be a problem, but noted Disney will use its technological, legal, and business resources to prevent such theft.

At the same press conference, it was announced Disney was expanding its videocassette tape and videodisk offerings by including—for the first time—non-Disney products, including three releases from "Muppet Home Video" and five titles from wildlife film producer Bill Burrud's "Amazing Animal World."

Several Disney film titles, withdrawn from the market in November 1982, will again be released to the public in 1983, spokesmen noted. ■

COMP-U-GAMER SOFTWARE

GAS ATTACK

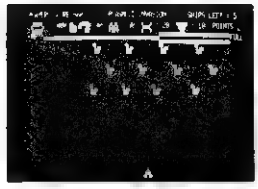


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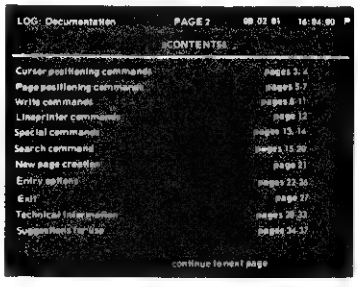
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One year old and a proven success! LOG for the TRS-80 (R) is still the only program on the market that addresses one very obvious problem. Despite data-base managers, word processors, and a dozen brands of spreadsheets, the fact is that most of the information people handle on a day-to-day basis just won't fit into fields, files, and codes.

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DOCUMENTATION

85,000 words on a Mod I

Thomas Paikeday put together a first-class dictionary using a Tandy dinosaur.



Paikeday: "Ideally, we should have 500 million words on line."

Next time you encounter someone calling your TRS-80 a toy, run the detractor down to your local bookstore and show him *The New York Times Everyday Dictionary*.

That reference work, which has sold 25,000 copies since September, was published by Times Books and compiled by Canadian-based lexicographer Thomas M. Paikeday with a TRS-80 Model I, four 5¼-inch, 80-track, double-density disk drives, and a 1200-baud modem.

"The Model I was a prototype machine for me," Paikeday told *80 Micro*. "Now it's a question of expanding the storage."

"Ideally," he said, "we should have 500 million words on line, but that's a little too much to ask. I think the average micro we should use should be 14 megabytes."

Since writing the dictionary, he said, his system has been upgraded to a Model III and he hopes to boost his capabilities further by getting a Model 16 this year.

According to *InfoWorld*, the drudgery of collecting dictionary citations led Paikeday to explore electronic alternatives.

The newspaper noted the grind of sifting and collecting evidence on the meaning and usage of words from current sources is so labor-intensive and costly only a handful of major publishers bother producing a comprehensive English dictionary. And for independent lexicographers like Paikeday, *InfoWorld* said, the cost of hiring readers, clerks and typists to assist with the job poses a severe restraint.

"What I saw happening around me," Paikeday told the computer industry weekly, "was an electronic revolution that had created new modes of delivering information. Teletext and videotext services, such as The Source and CompuServe, provided a new source of vocabulary and usage.

"I saw that, via telephone lines, I could tap the living language of newspapers such as *The New York Times* and *The Washington Post* in almost every field of activity, from the arts and sciences to sports, entertainment, fashion, and finance. What I needed was a means of storing this information and later analyzing it."

The lexicographer told *80 Micro* he extensively used CompuServe and the *Toronto Globe and Mail* to compile his dictionary. He said the *Globe and Mail* was the first newspaper in North America to load the full text of its daily editions into a data base. That data base, Paikeday said, is now larger than *The New York Times* On Line.

After buying his Tandy hardware, *InfoWorld* reported, Paikeday hired a machine-language expert to write programs for sorting millions of words on line, creating citations, and making sophisticated linguistic analyses.

Paikeday told *80 Micro* it takes his system eight minutes to search a megabyte of text.

InfoWorld noted the lexicographer uses his micro to increase his stockpile of words at a rate of 1,000 words a minute. With the system, he can stay current in the use of words like bells and whistles, computerist, vertical integration, videotext, and xenocurrency. He can also search out related phrases such as get it together, get it all together, and get one's act together.

Paikeday's system, *InfoWorld* said, also allows him to do specialized searching, such as lining up all words beginning with hyper or containing a specific stem such as gram or suffix such as -ble. This helps him examine variations in usage, such as expandible as opposed to expandable and expansible.

The system can alphabetize millions of words or list words in descending order of frequency. By checking frequency lists, he can decide which of two words, like bibliographic and bibliographical, is more common.

According to *InfoWorld*, two of the largest dictionary makers, Merriam Webster and Oxford University, were less than enthusiastic about Paikeday's achievement.

"There's the question of the whole apple cart being upset," Paikeday explained to *80 Micro*. "Webster and Oxford have been working with the traditional method for over a hundred years. Now to change to something that's almost unexplored as far as they are concerned—that's a forbidding thought.

"Eventually, I am sure they will come around to the new technology and exploit it to its fullest extent because they are the most monied of the dictionary publishers."

Paikeday said his next project is an electronic dictionary. "I'm thinking of something you can tap into like CompuServe or The Source," he said. "I think a reference book like the dictionary, next only to the Bible in popularity, should be available through the telephone using a keyboard and modem." ■

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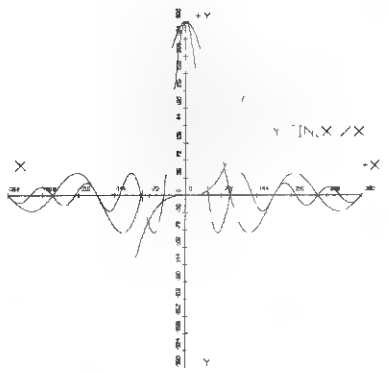
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SOFTWARE

Speaking without tongues

From Peachtree Software comes a voice box that sounds human and is economical on memory.

BY ROBERT G. FISHER
SPECIAL TO 80 MICRO

Making a floppy disk behave like a tape recorder to reproduce human speech is not new. But doing it with thrift—using only one-eighth of the amount of computer memory required by most existing systems—is.

Just such a major breakthrough was introduced by Peachtree Software Inc. at the COMDEX/Fall '82 convention in Las Vegas in early December.

Named, appropriately enough, SPeachware, the new system combines low-cost hardware with superior voice-quality software for all microcomputer applications, according to Ben Dyer, Peachtree's president.

Most persons who see a demonstration of SPeachware for the first time are amazed at the fidelity of stress and inflection produced even by moderately-priced speakers.

It even does sound effects. During a COMDEX demonstration, it faithfully delivered the sound of a horse's galloping hooves.

SPeachware is manufactured for Peachtree by Centigram Corporation of Sunnyvale, CA. The system, priced at about $400, is an add-on board that is initially being produced for the IBM Personal Computer and will be available in most areas by March 1.

Compatible SPeachware packages are presently in the design stage for Radio Shack's TRS-80, Apple II and other personal microcomputers. Those packages will be made available later in 1983, company officials said.

At a press conference on the opening day of COMDEX, Peachtree's Dyer explained SPeachware's major advantage:

"In this particular design, we can store a very large amount of speech in a limited amount of disk space. There is a lot of technology around for recording speech on disk, but it requires very expansive storage to have just a few words. In the case of SPeachware, we have an efficient enough operation that we can do many useful things on a reasonable size computer."



Dyer: A large amount of speech in a small amount of disk space.

A company spokesman noted requirements to store synthesized speech normally run about 32 kilobits for each second of speech.

SPeachware uses a mere 4,000 bits for each second of voice reproduction—about an eight-to-one improvement ratio over most existing systems. Thus the new product would be particularly significant in IBM and similar personal computers, where user memory is restricted.

Uses for SPeachware include:

- Reminding users of appointments and chores. It has a calendar system that automatically announces, in pleasing, well-modulated tones, an impending appointment, an important telephone call, or the office coffee machine should be turned off;
- Helping users needing assistance or additional information to execute a program by giving them the information verbally, eliminating the need to go to a second screen and return to the initial screen display;
- Providing a novice with a patient,

COMDEX masses converge on Tandy booth at the show. photos by Robert Fisher



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FORMAT,1=40,*  DATA  *,12/27/82.PASSWORD<ENTER>
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                                or
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Which drive contains the diskette to be formatted ? 1
Name of diskette to be formatted (default "* DATA *")?
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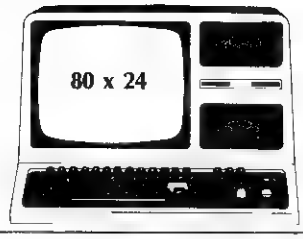
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warm, friendly supervisor during training sessions—someone looking over his or her shoulder, offering suggestions, advice and direction, eliminating the need to research through a printed manual; and

- Providing the user with what amounts to a complete, random-access tape recorder.

Dyer noted the options for SPeachware uses are almost limitless. "Although we are treating this as a software product," he said, "it is a piece of hardware that makes our software much more saleable, demonstrable and useful."

"The added voice capability makes the software even easier to use, shortening learning time and improving training aspects associated with the use of microcomputers and software," he added.

SPeachware will be used to market Peachpaks, Peachtree's software systems that include: PeachCalc, an electronic spreadsheet for modeling, analysis and row/column calculations; business graphics systems; telecommunications, permitting computers access to commercially available data bases; PeachText, permitting the addition of footnotes to mainframe reports and including a spelling proofreader, dictionary and thesaurus; and list management, featuring inquiry, sorting and label printing, among others.

Thus, Dyer said, Peachpaks, combined with specific SPeachware functions, will be set up in dealer showrooms where they will run continuously, executing Peachpak functions while verbally explaining features and applications to prospective users.

SPeachware uses regular digital files that can be created, edited and accessed just like any other file.

The system achieves its thrifty efficiency via a proprietary coding technique called parametric waveform coding (PWC) by the Centigram Corporation, Peachtree's SPeachware manufacturer. Using PWC, the system digitizes and compresses analog waveforms.

Analysis of the waveform is done at variable-length intervals with frame rates determined by the voiced and unvoiced events in the original speech. The result is a synthesized waveform that is uncanny, nearly identical to the original and highly recognizable.

Unlike most voice synthesizers—which sound contrived and mechani-



Jan Lawrence, SPeachware project manager, and Peachtree Vice President Steve Mann chat about their firm's new software. photo by Robert Fisher

cal—SPeachware is smooth, clear, and even duplicates regional accents, depending on the original voice, of course.

Because of low bit rates, hardware costs are reduced significantly, effectively minimizing requirements on size and power of the host computer, as well as radically reducing the amount of mass storage or disk space needed to hold messages.

"The high-quality speech that the system produces," Dyer said, "coupled with our ability to create and edit speech files in real-time, is what makes SPeachware such a viable tool."

SPeachware produces vocabularies in a matter of hours, rather than the several-week turnaround required by other vocabulary development techniques.

Voice output is accomplished via Centigram's SYBIL synthesizer board, designed exclusively for Peachtree. Compatible with the IBM personal computer, SYBIL has been designed around the General Instrument SP0250 synthesizer chip and a microprocessor to implement PWC speech, providing a powerful speech peripheral with an interface as simple as a printer.

Peachtree also announced several other new products at the computer dealers' exposition, including:

- An Authorized Warehouse Distributor Program, a network of major microcomputer distributors organized by Peachtree to offer one-stop shopping for microcomputer retailers throughout the United States and Canada;
- A Job Cost System, designed to keep track of operating costs in user-defined categories such as labor, materials, outside services and overhead;
- A Calendar Management System, providing a complete appointment-scheduling and time-management system for both individuals and large organizations; and
- A Fixed Assets Accounting System, available in early 1983, that will provide capital-intensive businesses and public accountants with an ability to enhance and expedite tax return filings. The system can produce depreciation and supporting schedules for one or more companies.

Additionally, Peachtree announced the signing of a license agreement whereby the PeachText word processor and four other software packages—a spelling proofreader, a data list manager, the PeachCalc electronic spreadsheet and telecommunications—will be distributed by Epson America Inc. for its new microcomputer, the QX-10.

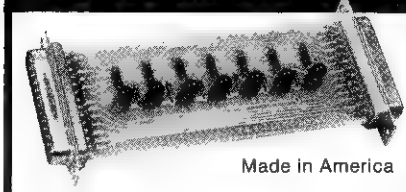
Headquartered in Atlanta, Peachtree Software Inc. is a wholly-owned subsidiary of Management Science America Inc., the world's largest independent producer of financial accounting software for mainframe computers.

Peachtree products are available through some 300 authorized software centers, as well as from major microcomputer hardware manufacturers in the United States and abroad. ■

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PULSE TRAIN

Color Computer games from folks at Sesame Street



The people that brought you Sesame Street will be bringing games to your Color Computer next month.

Starting in late May or early June, the Tandy Corporation will be marketing 10 Color Computer games made by the Children's Computer Workshop of New York City.

Judy Marlow, a spokesperson for the workshop, declined to give details about the games to *80 Micro*.

She noted the workshop will also be marketing next month five games for Atari systems. Those games, she explained, will use Sesame Street characters and the TV program's ideas on educating children.

Six "activities" for the Color Computer will also be made by the workshop, Marlow added. The activities are aimed at schools, she said, and Color Computers with 32K RAM.

"We find most Color Computer owners don't own more than 16K," she said.

According to some promotional material from the workshop, its games differ from games already on the market.

"Much of the presently available software is produced in a haphazard fashion," the workshop claimed.



Children's Television Workshop: We know what kids want.

"Many new games are rushed into production without consideration of their teaching values."

At the workshop, teams of experts develop its games. "They know how children behave and what they like," the workshop stated. "They have created visual forms superior to anything currently on the market.

"And the creative process involves repeated testing at schools and day-care facilities at every stage of development."

The workshop explained how the teams produce a game:

- A creative manager writes the activity, works with artists to design the screen, and consults with musicians about music and sound effects;
- An educational developer determines if the game is appropriate, appealing, comprehensible, and accessible children; and
- A programmer writes the program code, gives advice on a microcomputer's capabilities, and formulates solutions to problems related to the creative use of the medium.

The workshop said its games "promote interactivity and positive relationships among players."

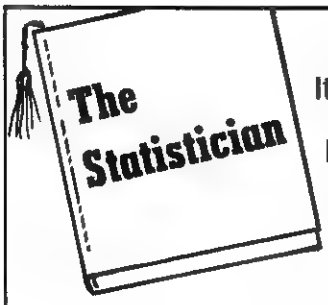
"Many of our games are designed so that children play together with the machine," Workshop President Paul Firstenberg said in a statement. "Cooperation is emphasized. And while kids have fun, they also learn important social skills."

Nuke war author teaching on Network Nation



A Southern California school in the vanguard of Network Nation education announced the author of two books on nuclear war has joined the institution's faculty.

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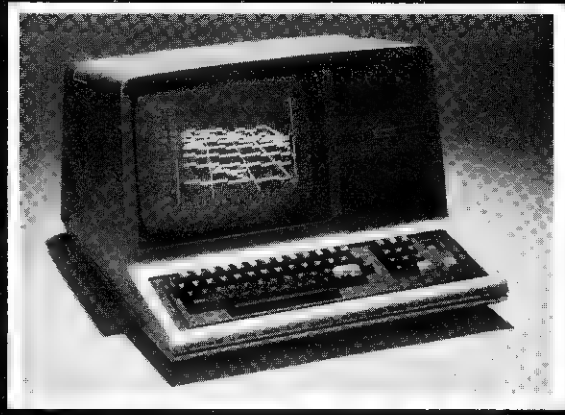
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PULSE TRAIN

October 1982, p. 376) stated Herman Kahn, author of *On Thermonuclear War* and *Thinking About the Unthinkable*, is working with other members of the school's faculty teaching a segment of a course on the management of scarcity and abundance.

The course is the third in a series of four in a two-year curriculum taught almost entirely by teleconferencing.



The curriculum is aimed at helping policy-level executives from corporations, government, and non-profit institutions deal with the leadership requirements of the coming decades. The courses hope to do that by bringing together the executives and the institute's faculty of leading scholars and scientists.



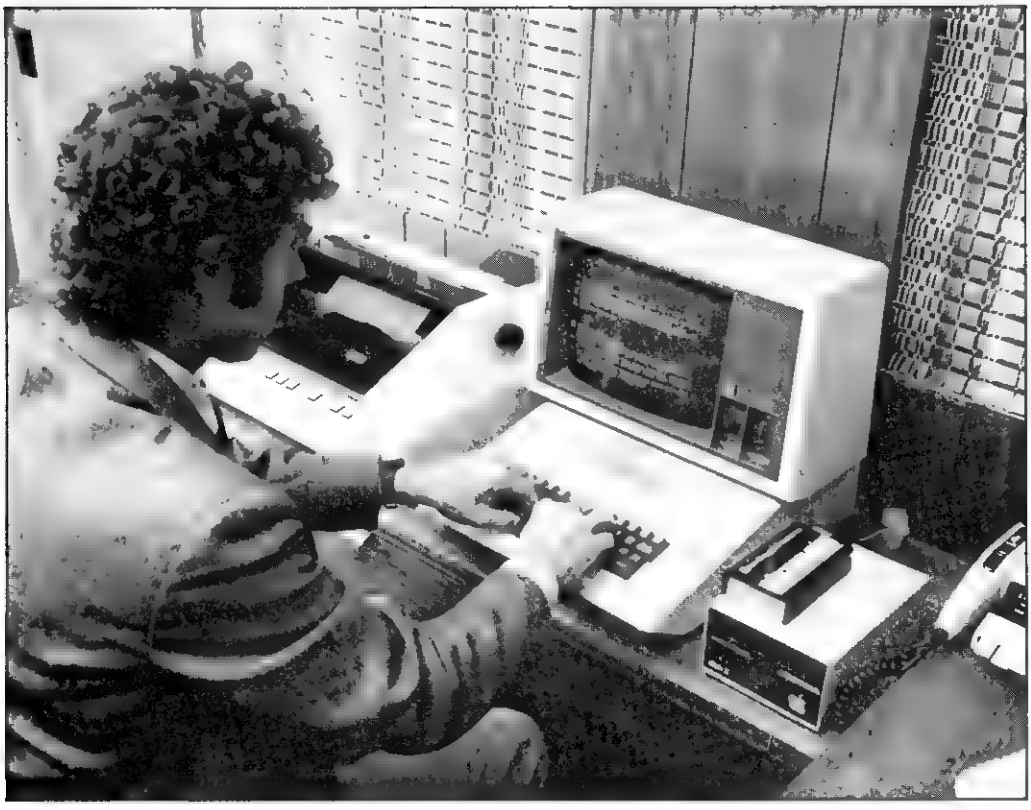
"Computer teleconferencing," the institute's president, Richard Farson, explained in a statement, "is not a replacement for face-to-face meetings. In fact, we have designed the format of the school so that all faculty members and course participants may first become acquainted in an initial one-week seminar and meet again in face-to-face seminars at six-month intervals.

"Between these encounters, however, they have the unique opportunity to communicate with each other in a manner which is at the leading edge of human communication, even as it shares some characteristics of the richness and detail of nineteenth-century letter writing."

Faculty members teaching other segments of the course include:

- Mary Douglas, Avalon Professor of Humanities at Northwestern University and author of *Risk and Culture*;
- C. Jackson Grayson, chairman of the Price and Wage Stabilization Commission under President Richard M. Nixon;
- Stewart Brand, originator of *The Whole Earth Catalog* and co-editor of the *Co-Evolution Quarterly*; and
- Rosabeth Moss Kanter, professor of Sociology and Organizational Management at Yale University and author of *Men and Women of the Corporation*.

Students taking Managing Scarcity and Abundance make the Network Nation their classroom.



Tech writers no longer afterthought



Technical writing is no longer an afterthought career or the place for a technician ready to retire, according to a report in *Computerworld*.

Up until 10 years ago, you typically found a "retread engineer" managing a publications group, the industry weekly reported. But that's changed with the increasing numbers of undergraduate and graduate students specializing in technical writing.

Technical writers no longer seem to be people with a technical orientation, but people with a strong writing ability and a knack for technical communications.

A good aspect of this, the weekly noted, is technical writers have been removed from the "tyranny of the technical point of view." Its bad side is it's eliminated the technical writer's ability to question specifications.

Today technical writers don't even know what questions to ask, one computer professional told the newspaper.

Programs combining an undergraduate degree in science and a graduate degree in technical writing are going to be very attractive to prospective employers, one freelance technical writer said.

But do technical writers share the status of other com-



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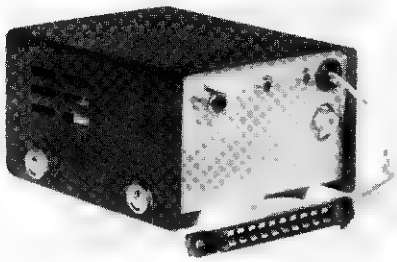
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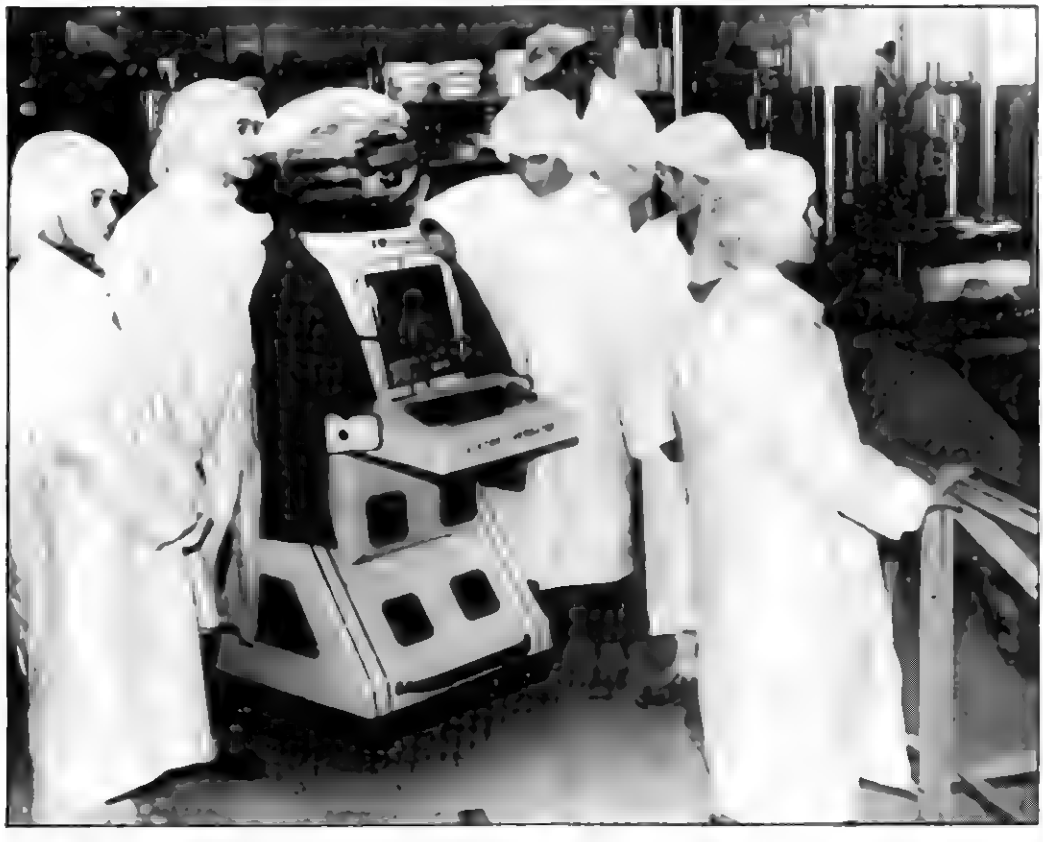
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PULSE TRAIN

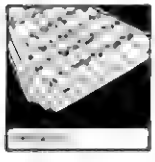


EDUCATION DAY AT VERBATIM. Some 1200 students toured the floppy-disk manufacturing plant of Verbatim corporation guided by a robot. Tour was part of Verbatim's national program to enhance computer literacy in the schools.

puter professionals?

Amy Kaufman, a technical writer with Advanced Management Inc., said yes. She told *Computerworld*: "Companies are realizing now that without a good writer, they can't sell their product. You can have the best designed system in the world, but unless it is documented, no one is going to know how good it is."

Another Rubik robot



Another Rubik's Cube robot (*80 Micro*, February 1983, p. 358) has been designed by engineers at Battelle Pacific Northwest Labs in Richland, WA.

According to *High Technology*, the engineers endowed their robot with color vision, adaptive intelligence, and mechanical dexterity to solve the pesky puzzle.

The magazine said the robot's application might be frivolous, but its mechanics are a technological *tour de force*.

A bright light illuminates the cube to let color-filtered detector arrays examine each face, three squares at a time. Using this starting-position data, a Z80 microprocessor calculates the shortest sequence of moves that will solve the puzzle.

The program runs in a minute, then Cubot's two orthogonal mechanical claws take turns rotating and twisting the cube until each face is a single color. The robot does not rethink its course of action—all moves are decided at the outset, based on the optically-read starting positions. The feat is usually over in less than three minutes.

Cubot's designers, *High Technology* said, found their greatest challenge not in the glamorous technologies of optics and computers, but in making the mechanical system work.

A solenoid powers the claw grip.

A stepping motor rotates the claw in 1.8 degree increments. A second microprocessor governs the motor. That chip is always mindful of the maximum acceleration the cube can withstand and the possibility of face slippage.

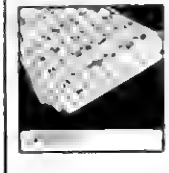
An optical encoder, mounted on the stepping motor drive shaft, verifies the claw position.

And to reduce the required number of motions, the engineers gave both claws mobility.

Cubot's not going to bolster industrial productivity or provide a key to stopping the arms race, the magazine observed.

But the engineer who led the team designing the machine, Robert Dyer, believes the robot shows vividly what might be possible by thoughtful combination of existing technologies. Dyer told *High Technology* Cubot's underlying technology can be extended to product inspection, sorting, and assembly.

Are fat pay checks solution to teacher shortage?



While experts wail about the increasing shortage of math and science teachers and the negative impact it will have on the nation's high-tech future (*80 Micro*, October 1982, p. 382), several cities are attempting to cure

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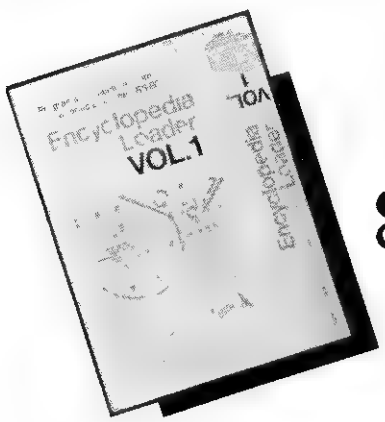
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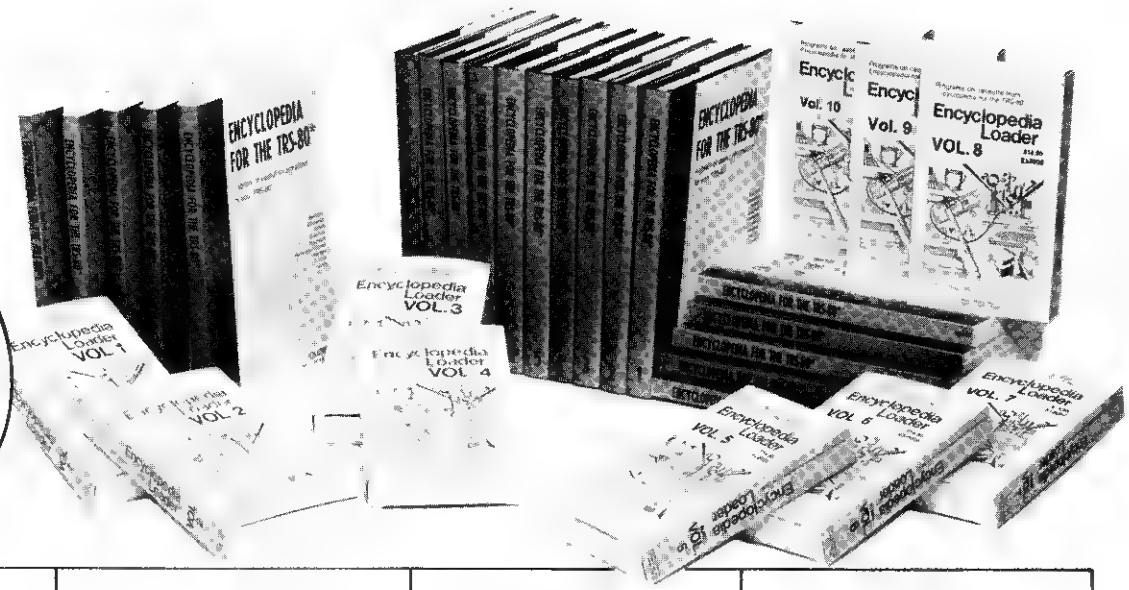
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the problem by fattening paychecks.



In Houston, teachers with critical skills, like math and science, get their annual salaries topped with a $2,000 bonus. If they agree to teach in one of burg's poorer neighborhoods, they get an additional $2,000. And if they're absent less than five days during the year and teach in a school where test scores rise above the anticipated norm, they receive another $1,300.

In Richmond, VA, math and science teachers receive a $1,500 bonus.

Oklahoma City has reported its vacancy problems improved after offering math and science teachers $500 and $100 for each credit hour they teach.



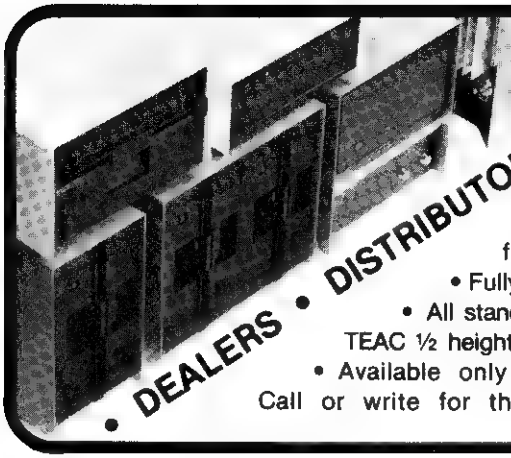
However, according to *The Wall Street Journal,* Houston's incentives outdistance all other systems. A skilled veteran teacher in Houston, who collects all possible bonuses, *The Journal* said, can collect $30,000 in one year. And within three years, that figure will rise to $40,000, more than twice the national average for teachers.

The already serious shortage of math and science teachers will get worse, the business daily reported. At teaching colleges 10 years ago, an average class had 20 students preparing to be math teachers and 18 to teach science. Now the average is four math, seven science.

Even during the current recession, teachers are drift-



Houston Union Official: "You can't buy Socrates for $18,000 a year."



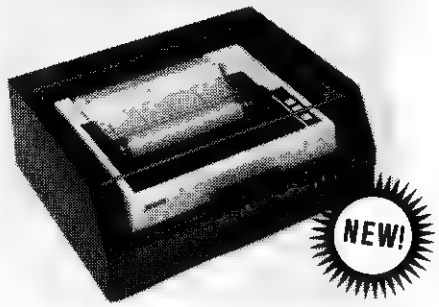
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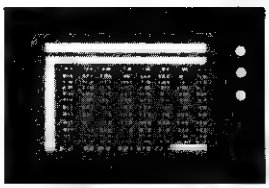
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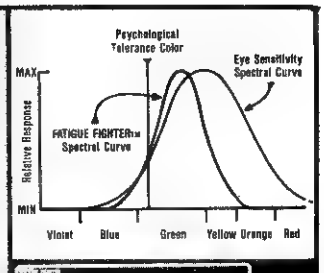
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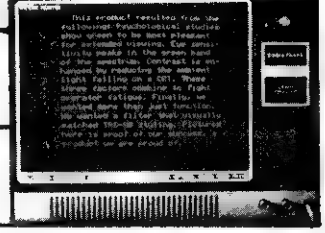


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ing toward jobs in industry. And when economic recovery opens up more jobs there, even more of them will be leaving to reap rewards in industry, Harry Tunis, research director for the National Council of Teachers of Mathematics told *The Journal*.

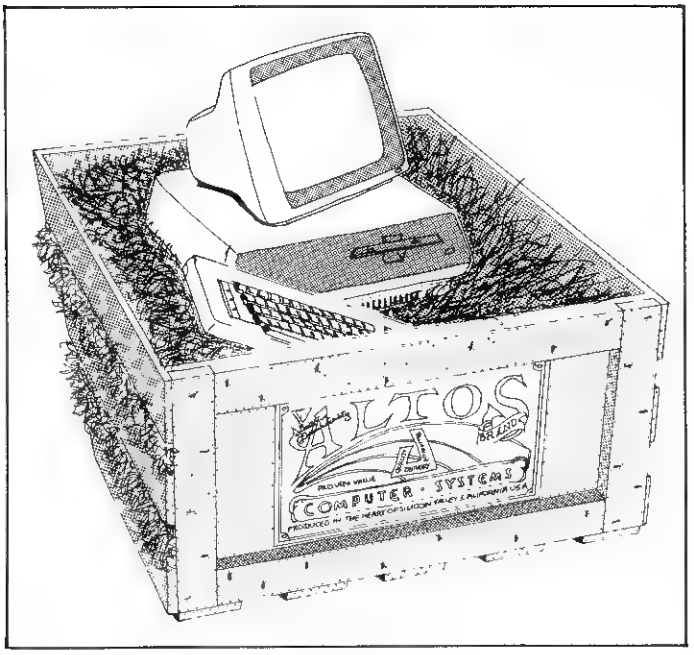
Houston's salary largesse is considered by some educators a radical solution to shortage problems. But Billy Reagan, general superintendent of the Houston Independent School District, believes even more radical solutions might be in the wings.

He told *The Journal* Russian and Japanese students get at least two more years of math than American students. Japanese students attend school six days a week, 11 months a year.

"The American people should have the courage to change our school system to a year-round system," he said. "The big problem in this country is productivity, but the base of that is in education, and unless the school system is turned around, I don't think you are going to turn around productivity to any major degree."

One critic of Reagan's approach to shortages is John O'Sullivan, the president of the 2,000-member Houston local of the American Federation of Teachers. He told *The Journal* Reagan was an "egomaniac" who "charges ahead regardless of the consequences."

Unless all teachers' salaries are increased, he claimed, the school system will still be confronting a fundamental problem: "You can't buy Socrates for $18,000 a year."



Altos: 14,164 percent increase in sales in 5 years.

Altos hottest of hot privates



Among *INC.* magazine's 500 fastest growing companies in the United States are 100 high fliers whose sales during the last five years vaulted 1,100 percent. And at the top of that list is Altos Computer Systems.

From 1977 to 1981, Altos sales climbed 14,164 percent, from $150,000 to $21.3 million.

Like Apple, Altos began in a California basement. And like Apple, Altos is identified with fruit. Located in an apricot orchard, the corporation's slick packaging theme features fruit-packing crates labeled with "Altos Brand" contents. But the similarity stops there.

While Apple went after the lower end of the microcomputer market, Altos went after the high end. It began making business processing and communications systems that didn't demand the full power of minicomputers.

Altos's recent introduction—a single-board, 16-bit micro that can be networked with as many as 800 individuals—challenges many minicomputer systems.

And that challenge isn't going unnoticed by computer heavies like IBM, DEC, Wang, Data General, and Apple. But Altos founder David Jackson told *INC.* many big companies suffer from self-defeating stubbornness.

He explained that while Altos makes only one board for its machine and buys everything else from outside vendors, some biggies insist on making their own peripherals, which glut inventory during slow times.

Many big companies also impose their operating systems on users, he added. He likened that to every record company making records at different RPMs.

Other companies in the hot 100 include CompuShop, a chain of computer retail stores based in Richardson, TX; Charles River Data Systems of Natick, MA; and the Yankee Group, a high-tech market analysis firm in Boston.

Video games: cognitive-mapping exercise



Video games teach children more than hand-eye coordination, contends the director of the Project in Science and Mathematics Education at Bank Street College in New York City.

Sam Gibbon, in an interview appearing in *Classroom Computer News* maintained arcade games "require a whole new set of skills that children haven't been asked to engage before.

"Pac-Man, for example, is an astonishingly complicated maze game in which it's necessary simultaneously to have some sort of image or gestalt of the entire field of play to learn over a period of time what the particular patterns of movement of the

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ghosts are so that they can be escaped, and to develop a strategy for negotiating the maze and avoiding danger—all at increasing speed.

"Now, that's considerably more than an exercise in hand-eye coordination.

"It is, I think, a cognitive-mapping exercise of considerable complexity. I think many of the other games make similarly complex demands on kids' cognition, not just on their sensory motor skills.

"Of course, these games do also carry social value, and I'd like to see many more peaceful games developed. But, I guess I don't share the cataclysmic view that an entire generation of children is damned because of the time that they spend in front of those arcade games."

Gibbon told the magazine arcade games weren't transforming kids into delinquents.

"I find it curious," he said, "that a great deal of the criticism of arcades and arcade games is made in ignorance of what life is like in a game arcade, or what in fact those games are like.

"My own observation of what goes on in the computer game arcades I've visited is that children often behave with one another in a pro-social way. They learn from each other." ■



Victor: 16-bit boo-boo.

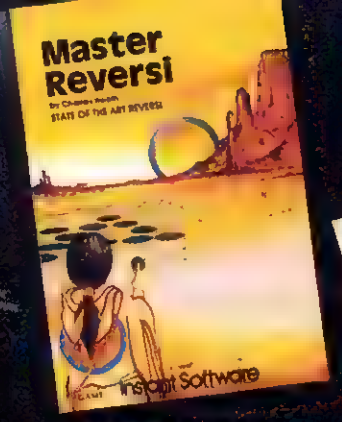
Stoned heads crash

END BYTES

For two years the **NEW YORK PUBLIC LIBRARY** computer system was snake bit. The four digital Equipment Corporation RM03 drives had a constant error rate and two of the drives had to be replaced within a year after they were installed. But the rest of the institution's PDP-11/70 system worked like a charm—a situation that baffled DEC engineers until last summer. The source of the problem: one of the building's more lasting and enviable architectural features—its marble floors. Their inflexibility caused the drives' head assemblies to shake apart. After jacking up the units and installing rubber castors, the problem disappeared. ■**BOBBY TAYLOR** made a gaffe when he chose Intel's 8088 chip as the central microprocessor for the **VICTOR 9000**. The thinking behind the move: 64K RAM chips cost too much. The 8088's more powerful brother, the 8086, needed 16 chips ($320), while the 8088 needed only eight ($160). Experts predicted a $5 price drop at the most for the chips, so going with the 8088 seemed like a good idea. But with chips now selling for $6 to $8 each, Victor is a little red-faced. New 9000s will have 8086s. ■Remember **MISSION IMPOSSIBLE**, the TV program that made self-destruct a household word? Well **PORTWARE INC.**, a Minnesota-based software company has brought self-destruction to the micro business. A potential buyer can use Portware software on a trial basis to see if he likes it. But he has to make up his mind after five preliminary practice uses. After that, the software self-destructs. ■Two new newsletters and a report on videotext are available to microcomputer users. The **MICROCOMPUTER SOFTWARE LETTER**, edited for business users, will be published monthly in New York City. Each issue will focus on four areas: trends and productivity tips, software reviews, summaries of articles in 45 microcomputer publications, and resource listings. A subscription costs $124.49 a year. **FUTURE COMPUTING INC.** of Richardson, TX, is offering VIEWS, a news publication offering data and analysis on product and company trends. Subscription: $325. And if you're interested in videotext applications in the business sector, you can learn about it for $1,285 in a study done by **INTERNATIONAL RESOURCE DEVELOPMENT INC.** of Norwalk, CT. ■For readers interested in the gastronomy-computer connection, **KAMSTRA COMMUNCATIONS INC.** of St. Paul, MN, offers this tidbit. A survey conducted at the Minneapolis Applefest last year showed three out of four IBM PC owners prefer pepperoni pizza, but less than 50 percent of Apple owners like the sausage on their Italian pie. ■In the 'tis the season to be jolly department: A harried Christmas shopper phoned *80 Micro* three days before Christmas frantically looking for Level II ROM chips. He wanted to give them to his daughter for Christmas. ■Speaking of offspring: An *80 Micro* staffer has suggested a warning be included on each issue stating it may be hazardous to one's health. His pre-school child knocked one of the 400-plus page issues off his coffee table. The magazine landed on the kid's foot and sent the child on a crying jag. ■

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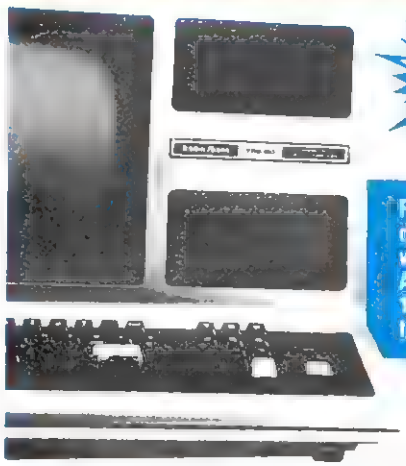
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FUN HOUSE

by Richard Ramella
Author of *Computer Carnival*

Lirpa Loof Tomfoolery

Instead of having a Fun House column this month, we're all going to drill and drill until we know the multiplication tables up to 12 times 12.

Hey, where did all the kids go? Come on back. That was just an April Fools' joke.

In case you forgot, April 1 is April Fools' Day. From the moment you get up until you go to sleep that night, you're fair game for the harmless practical jokes that mark the day. Your friends, parents, and teachers can play them. And in the spirit of the day, you have the right to play some tricks of your own.

Here are four programs that will make your computer a prankster on April 1. They will all work in either Level II or on the Color Computer. The program called A Little Bet will run in good old-fashioned Level I if you change the commands to Level I format.

The Key Box

Model I and III
Color Computer
4K RAM
Basic

A Little Bet

```
100 REM * A LITTLE BET * LEVEL I, II OR COLOR COMPUTER
110 CLS
120 A$="TAP ENTER TO CONTINUE"
130 PRINT "JUST ABOVE MY SCREEN IS A CONTAINER"
140 PRINT "WITH UNITED STATES MONEY IN IT."
150 PRINT
160 PRINT "I'M GOING TO HAVE YOU DO SOME FIGURING"
170 PRINT "AND THE ANSWER YOU COME UP WITH WILL BE"
180 PRINT "THE AMOUNT OF MONEY IN THE CONTAINER."
190 PRINT
200 PRINT "WE'LL BET A NICKEL..."
210 PRINT "BUT DON'T WORRY. I'LL GIVE YOU A CHANCE"
220 PRINT "TO CALL OFF THE BET LATER."
230 PRINT
240 PRINT A$
250 INPUT X
260 CLS
270 PRINT "NOW, DON'T USE ME TO DO THE FIGURING."
280 PRINT "YOU DON'T WANT ME TO KNOW YOUR NUMBER."
290 PRINT "USE A PENCIL AND PAPER."
300 PRINT
310 PRINT A$
320 INPUT X
330 CLS
340 PRINT "WRITE ANY WHOLE NUMBER FROM 1 TO 1 MILLION AND "
350 PRINT A$
360 INPUT X
370 IF X<1 OR X<>INT(X) THEN PRINT "NO FRACTIONS OR DECIMALS..."
: PRINT: GOTO 340
380 CLS
390 PRINT "ADD 2 TO YOUR NUMBER AND ";A$
400 INPUT X
410 CLS
420 PRINT "MULTIPLY THAT NUMBER TIMES 2 AND ";A$
430 INPUT X
440 CLS
450 PRINT "SUBTRACT 1 FROM THAT NUMBER AND ";A$
460 INPUT X
470 CLS
480 PRINT "DIVIDE THAT NUMBER BY 2 AND ";A$
490 INPUT X
500 CLS
510 PRINT "SUBTRACT 1 FROM THAT NUMBER AND ";A$
520 INPUT X
530 CLS
540 PRINT "SUBTRACT THE NUMBER WITH WHICH YOU STARTED ";
550 PRINT A$
560 INPUT X
570 CLS
580 PRINT "EXCUSE ME WHILE I DO SOME FIGURING"
590 FOR T=1 TO 1000
600 NEXT T
610 CLS
620 FOR X=1 TO 50
630 PRINT RND(50);
640 A=RND(4)
650 IF A=1 THEN PRINT "DIVIDED BY";
660 IF A=2 THEN PRINT "TIMES";
```

Listing continues

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Listing continued

```
670 IF A=3 THEN PRINT "PLUS";
680 IF A=4 THEN PRINT "MINUS";
690 PRINT RND(10);
700 PRINT "IS";
710 PRINT RND(50)
720 PRINT "AND";
730 NEXT X
740 CLS
750 PRINT "OKAY, I GOT IT. THE ANSWER IS..."
760 FOR T=1 TO 1000
770 NEXT T
780 PRINT
790 PRINT
800 PRINT "1/2 CENTS."
810 PRINT
820 PRINT "NOW YOU MAY DOUBLE THE BET (1)"
830 PRINT "OR YOU MAY CALL IT OFF (2)
840 INPUT "ENTER 1 OR 2";X
850 PRINT
860 PRINT "THE BET IS FOR ";
870 IF X-1 THEN PRINT "A DIME." ELSE PRINT "NOTHING."
880 PRINT "THAT THE MONEY EQUALS 1/2 CENTS."
890 PRINT
900 PRINT A$
910 INPUT X
920 CLS
930 PRINT "OPEN THE CONTAINER TO SEE WHO WINS."
940 FOR T=1 TO 3000
950 NEXT T
960 PRINT "APRIL FOOL ";
970 GOTO 960
980 END
```

Card Trick

```
100 REM * CARD TRICK / LEVEL I, II OR COLOR COMPUTER *
110 CLS
120 A$="TAP ENTER TO CONTINUE"
130 PRINT "GET A DECK OF CARDS AND I WILL DO A TRICK."
140 PRINT
150 PRINT A$
160 INPUT X
170 CLS
180 PRINT "LAY OUT A ROW OF CARDS"
190 PRINT A$
200 INPUT X
210 CLS
220 PRINT "LAY OUT ANOTHER ROW BELOW THE FIRST"
230 PRINT "WITH THE SAME NUMBER OF CARDS AS THE FIRST."
240 PRINT A$
250 INPUT X
260 CLS
270 PRINT "REMOVE ONE CARD FROM THE BOTTOM ROW."
280 PRINT AS
290 INPUT X
300 CLS
310 PRINT "FROM THE TOP ROW, REMOVE AS MANY CARDS"
320 PRINT "AS YOU WANT BUT NOT ALL OF THEM."
330 PRINT "ENTER THE NUMBER YOU REMOVE."
340 INPUT Z
350 Z=Z-1
360 CLS
370 PRINT "FROM THE BOTTOM ROW REMOVE AS MANY CARDS"
380 PRINT "AS THERE ARE IN THE TOP ROW."
390 PRINT A$
400 INPUT X
410 CLS
420 PRINT "REMOVE ALL THE CARDS IN THE TOP ROW."
430 PRINT A$
440 INPUT X
450 CLS
460 PRINT "AND NOW THERE ARE..."
470 PRINT "H";
480 FOR T=1 TO 30
490 PRINT "M";
500 FOR G=1 TO 30
510 NEXT G
520 NEXT T
530 PRINT
540 PRINT Z;"CARD";
550 IF Z>1 THEN PRINT "S"
560 PRINT " LEFT."
570 PRINT
580 PRINT "I'M NEVER WRONG WITH THIS MAGIC TRICK."
```



Now for some tricks you might have other people try on the big foolishness day.

A Little Bet

I know you've all heard of the number trick that has you think of a number, do a few mathematical operations on it, and come up with an answer that the trick player can name even though you haven't said it.

Pretty boring, huh?

That's what your victim will think. But there is a surprising twist to this program.

At the start, the computer says there is a container—an envelope, match box, whatever—resting on top of it. There is, because you put it there.

The computer says the container has United States money in it. That's also true. Then the computer has the victim think of a number and go through the mathematical steps.

With a nickel bet riding on the outcome, the computer appears to do some figuring and then says the U.S. money in the container totals .5 (one-half) cent. It gives the victim a chance to call off the bet or double it to a dime.

The victim thinks the program has gone haywire and probably will double the bet to take advantage of this. The computer accepts and says the container can now be opened.

Inside the container is one-half of a penny. You win. My advice is to forgive the victim



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FUN HOUSE

the bet and let him or her join in the laughter.

Oh yes, how do you get half a penny? You saw a whole penny in half. A hacksaw blade will do it. Be sure to get someone with hacksaw-blade experience to help you.

When I wrote this program, it occurred to me that it might be illegal to saw a U.S. penny in half. I wrote a letter to the U.S. Department of the Treasury, U.S. Mint, San Francisco. An expert wrote back: "It is not illegal to saw a U.S. penny in half."

It's a load off my mind that none of us will have to do time in a federal prison over an April Fools' joke.

Card Trick

It turns out that the TRS-80 can do dandy card tricks as long as it isn't asked to shuffle a real deck of cards. This is a very neat trick. It is only necessary to follow instructions and it works every time.

Since all the instructions are in the program, I'll be quiet so you can try it. Then try it on someone else.

Porky—The Porcine Dictionary Project

I suppose no one expected me to get serious this month, but now I have a program that is a fantastic breakthrough in the computer's ability to translate languages.

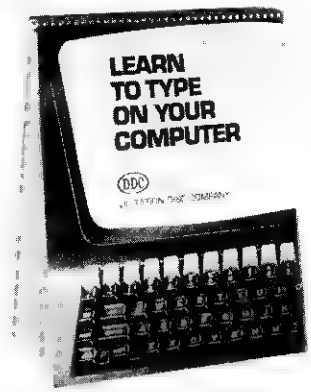
Computer and language experts have worked for years on translation programs—English to French, Russian to Spanish,

Porky—The Porcine Dictionary Project

```
100 REM * PORKY - THE PORCINE DICTIONARY PROJECT *
110 REM * LEVEL II OR COLOR COMPUTER *
120 CLS
130 CLEAR 1000
140 PRINT "NO PUNCTUATION PLEASE..."
150 PRINT "256 LETTERS OR FEWER..."
160 PRINT "ENTER ENGLISH PHRASE FOR TRANSLATION"
170 PRINT
180 INPUT A$
190 PRINT
200 A$=A$+" "
210 FOR H=1 TO LEN(A$)
220 B$=MID$(A$,H,1)
230 IF B$<>" " THEN C$=C$+B$
240 IF B$=" " GOSUB 300
250 NEXT H
260 PRINT
270 PRINT
280 PRINT "TRANSLATION (ORTSNAY!) IS COMPLETE."
290 END
300 D$=LEFT$(C$,1)
310 IF D$="A" OR D$="E" OR D$="I" OR D$="O" OR D$="U" GOSUB 410:
 RETURN
320 FOR B=1 TO LEN(C$)
330 D$=MID$(C$,B,1)
340 IF D$<>"A" AND D$<>"E" AND D$<>"I" AND D$<>"O" AND D$<>"U" T
HEN E$=E$+D$ ELSE GOTO 360
350 NEXT B
360 E=LEN(C$)-B+1
370 PRINT RIGHT$(C$,E);E$;"AY ";
380 E$=""
390 C$=""
400 RETURN
410 PRINT C$;"WAY ";
420 C$=""
430 RETURN
440 END
```



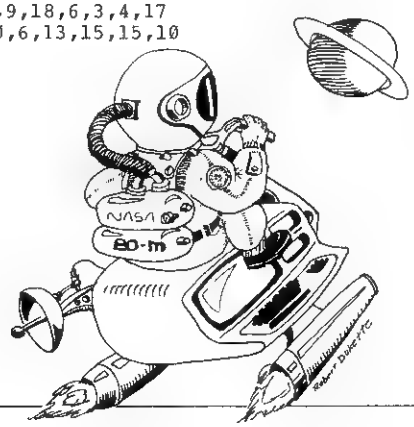
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Space Travel Using Only a Computer

```
100 REM * SPACE TRAVEL USING ONLY A COMPUTER *
110 REM * LEVEL II OR COLOR COMPUTER *
120 CLS
130 CLEAR 100
140 DATA 12,15,3,2,6,18,8,15,5,6,9,18,6,3,4,17
150 DATA 9,5,11,6,7,6,16,1,2,9,10,6,13,15,15,10
160 DIM B$(32),B(32)
170 A$="PRUNE -HILDYFLOATS"
180 FOR A=1 TO 32
190 READ B(A)
200 B$(A)=MID$(A$,B(A),1)
210 C$=C$+B$(A)
220 NEXT A
230 PRINT "HEY ..."
240 PRINT
250 PRINT
260 FOR T=1 TO 1500
270 NEXT T
280 PRINT C$
290 GOTO 280
300 END
```



and the like. These programs are not totally successful. Word for word, they do well, but in all languages groups of words can have a meaning that just cannot be translated.

In Porky—The Porcine Dictionary Project, I have overcome that problem with some programming techniques that are both simply magnificent and magnificently simple.

Porky asks you to enter an English word, phrase, or sentence of 256 letters or fewer. No periods, commas, or stuff like that, please.

Then Porky automatically translates your English words into the ancient and honorable language of Pig Latin!

Space Travel Using Only a Computer

I wish to remain serious as we examine the fourth and final program.

Space Travel has a hidden message that will amaze you. Please be sure to enter the value of A$—PRUNE -HILDYFLOATS—exactly as it is given. This is very, very important!

I am honored to be able to share this secret with you.

Watch next month for The Maze. ■

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CALENDAR

April

4–8 IEEE Computer Society, Silver Spring, MD. **Tutorial Week East '83** Orlando, FL.

4–8 National Computer Graphics Association, Washington, DC. **Computers/Graphics in the Building Process '83** Convention Center, Washington, DC.

6–7 Hewlett-Packard, Palo Alto, CA. **Productivity '83** Adam's Mark, Philadelphia, PA.

6–8 IEEE Computer Society, Silver Spring, MD. **1983 International Optical Computing Conference** Cambridge, MA.

8–9 New Hampshire Association for Computer Education Statewide, Durham, NH. **Computers in Education** New Hampshire Highway Hotel, Concord, NH.

10–13 Association for Computing Machinery (ACM)/SIGAPL, Washington, DC. **APL83** Sheraton Washington Hotel.

17–22 **Infocom '83** Town & Country, San Diego, CA.

18–20 American Production and Inventory Control Society, Falls Church, VA. **APICS Spring Seminar** Hilton Riviera Hotel, Palm Springs, CA.

19–21 Hewlett-Packard, Palo Alto, CA. **Productivity '83** Michigan Inn, Detroit, MI.

21–23 The Interface Group, Framingham, MA. **Computer Showcase Expo** St. Louis, MO.

25–27 IEEE Computer Society, Silver Spring, MD. **1983 Symposium on Security and Privacy** Claremont Hotel, Oakland/Berkeley, CA.

26–29 **Comdex/Spring '83** World Congress Center, Atlanta, GA.

27–29 IEEE Computer Society, Silver Spring, MD. **Workshop on Laboratories for Reliable Systems Research** NASA Langley Research Center, Hampton, VA.

28–30 National Council of Teachers of Mathematics, Reston, VA. **Teaching Math With Microcomputers** Hyatt Regency O'Hare, Chicago, IL.

May

3–5 Hewlett-Packard, Palo Alto, CA. **Productivity '83** Sheraton O'Hare, Chicago, IL.

4–6 **Rocky Mountain Data Processing Expo** Currigan Hall, Denver, CO.

5–7 National Council of Teachers of Mathematics, Reston, VA. **Teaching Math With Microcomputers** La Guardia Marriott Hotel, E. Elmhurst, NY.

10–12 **Northcon/83** and **Mini/Micro-NorthWest/83** Portland, OR.

16–19 American Federation of Information Processing Societies, Arlington, VA. **1983 National Computer Conference** Anaheim and Disneyland Hotel Convention Centers, Anaheim, CA.

18–19 Hewlett-Packard, Palo Alto, CA. **Productivity '83** Breckenridge Concourse Hotel, St. Louis, MO.

23–26 **ATE East Conference** Hynes Auditorium and Sheraton-Boston Hotel, Boston, MA.

24–25 Hewlett-Packard, Palo Alto, CA. **Productivity '83** Radisson South Hotel, Minneapolis, MN.

June

1–2 Hewlett-Packard, Palo Alto, CA. **Productivity '83** Grand Hyatt Hotel, New York, NY.

1–4 **Sunbelt Educational Computing Conference** Texas Tech University, Lubbock, TX.

6–8 IEEE Computer Society, Silver Spring, MD. **National Educational Computer Conference** Convention Center, Baltimore, MD.

13–16 **PC '83/International Printed Circuits Conference** New York Hilton, New York, NY.

14–16 Electronic Conventions Inc., El Segundo, CA. **Ohmcon/83 Electronic Show and Convention** Detroit, MI.

14–16 Hewlett-Packard, Palo Alto, CA. **Productivity '83** Constellation Hotel, Toronto, Canada.

19–23 IEEE Computer Society, Silver Spring, MD. **Conference on Computer Vision and Pattern Recognition** Crystal City Hyatt, Arlington, VA.

26–29 IEEE Computer Society, Silver Spring, MD. **Design Automation Conference** Fontainebleau Hotel, Miami, FL.

26–30 National Computer Graphics Association, Fairfax, VA. **NCGA '83** McCormick Place, Chicago, IL.

27–28 Hewlett-Packard, Palo Alto, CA. **Productivity '83** Sheraton Boston Hotel, Boston, MA.

Coming Next Month

If you like computer graphics, you'll love *80 Micro*'s May issue. We'll tell Color Computerists how to build a light pen and we'll also show them how to create symmetrical graphics. We'll have two programs for Model I/III owners with Epson MX-80 printers with Graftrax addition—one generates hundreds of figures and the other produces computer-plotted surfaces.

But the most earth-shaking article of the month describes a $150 conversion that turns the Model I/III into a color machine! Just add a special chip (and use a color monitor), and color is yours.

Other articles of special interest include a graphics program that helps children learn to count, a color revision of Bob Boothe's "A Turn of the Screw," and a program that lets you figure expense accounts and small budgets in Basic. Another treat is an article that explains how Model I/III owners can use a Dvorak keyboard with Scripsit.

And don't forget our new monthly buyer's guides. The hardware topic will be printers and plotters, and the software guide covers graphics. ■

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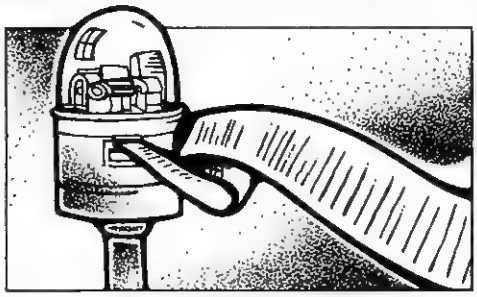
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ART 1981 - DON DIXON

MONEY DOS

by J. M. Keynes



Finding a good discount broker

Prior to May 1975, the commission rates brokers charged were fixed. Investors got a break when negotiated commissions became a reality. You can now save up to 75 percent depending on the brokerage firm you select.

Some major firms objected to negotiated rates, fearing that their profits would decrease. The truth is that the Merrell Cinches, E.F. Muttons, Scheme Witters, and so on have set all-time record earnings. Did commission-cutting hurt them? No, because when confronted with the ability to set their own commission schedule, they decided to revise their commissions...*higher* ...as much as 28 percent!

Don't misunderstand me—although a large firm's commissions are higher, they spend millions each year on such things as research, advertising, retirement and profit-sharing plans, and many other areas peculiar to the giants. The smaller firms have no such expenses. Even though it charges much more, the net profit for the major firm is a small percentage of the gross commissions. Its operating expenses are substantial. Many of the discount firms have salaried brokers. Their paychecks are unrelated to the number of orders they take.

The primary advantages of major firms are:

- They do extensive research and give specific advice.
- They offer conveniences such as a money-market fund complete with checking account. The charge for this excellent service is from $20–$100 per year. (This advantage has recently been negated with the advent of the NOW accounts available at banks and savings and loans. Although money markets can feature higher interest rates, NOW accounts are government-insured. The money-market funds are not.)
- They offer additional services such as insurance, annuities, and tax shelters.

For many investors, doing business with a full-service firm makes sense. For others, it amounts to throwing money away. If you have done well with your broker's advice, don't even think of changing. The commissions you pay are of little importance if the *bottom line* looks good. However, if you haven't seen your portfolio increase consistently (since August 1982 you should have made a bundle), you should consider a change.

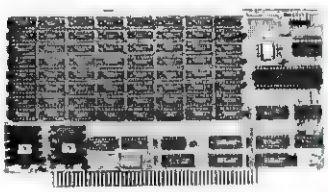
You should judge a discount brokerage firm by the following criteria.

- Each account should be insured up to $500,000 at no cost to you.
- The firm must be registered with the Division of Securities for all the states it does business with. The ideal firm is registered in *all* states. Further, the broker taking your order must be registered in your state. If you are a "snow bird," make sure the firm can do business in the states of your residence.
- The firm must, in my judgment, be a clearing member of all major stock, option, and, if you trade commodities, commodity exchanges. Many of the discount firms are not members of any exchange, and many who are members have their trades cleared by another firm.

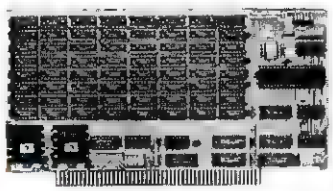
What this means is that orders will likely go through several hands before they hit the exchange floor. At times, such delays can be costly. Furthermore, when mistakes are made, I think it far more expeditious to be dealing with the firm that made the error than going through a middleman.

I have heard some sad stories about the time a person waited for funds to be paid or a correction to be made to his account. This reminds me of a friend who is a bail bondsman in Los Angeles. It says right on his business card, "I'll get you out if it takes 20 years!"

- The longer they have been in business the better. Some firms that have been around for 100 years have gone discount which, one may deduce, indicates a greater likelihood of them staying in business. There have been a number of failures recently. If your firm does go belly-up, it is unlikely that you will lose any money, but your account may be frozen for months while things get



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- Ideally, they are *market makers* in many over-the-counter stocks. Over-the-counter stocks are traded broker-to-broker rather than on the floor of an exchange. The market maker will always buy or sell the stock; e.g., Today De-Beers (DBRSY) closed Bid 6 1/8, offered at 6¼ (I recommended it in last September's MONEY DOS at 3¼ . . .) If your broker is a market-maker, he may be able to buy it at 6 1/8. The non-market-maker must pay 6¼. A potential additional savings to you.
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"Don't expect the discount firm to give advice or send research reports. . . "

I'm still getting calls about the commodities article in the September 1982 issue wherein I offered to bet anyone $50,000 that the system would prosper in one year. So far, I'm glad no one bet as the system is behind by about $5,000 (blush). The markets have not had many sustained trends that are vital to the success of the system. Being a courageous soul, I'll still bet the 50 G's. . . . Any takers?

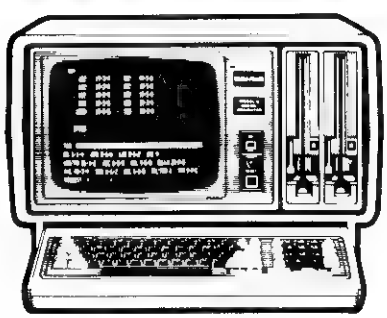
Computerized systems are proliferating like gerbils, which may prove that when everyone knows something, nobody knows nuthin'. A young math mastermind I know has developed a system that is designed to feed off the short-term price aberrations caused by computer buying. All his trades are posted on the MONEY DOS BBS when made, and an ongoing record is kept on the BBS under the "Short Term Trader" section. So far, he is cleaning up, but perhaps he is just lucky.

The MONEY DOS BBS (see the February 1983 issue) has received thousands of calls. I'm flattered that you like old J. M.'s advice. If you haven't accessed it, be a big spender and pay Ma Bell 18 cents per minute. It's a free service operating 24 hours per day (305-744-0190). Remember, you must have a modem. The parameters are: 300 baud, 7-bit words, even parity, 1 stop bit. ■

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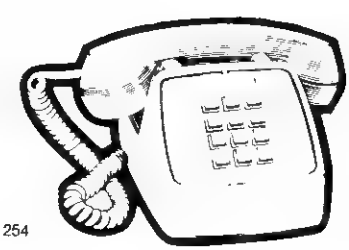
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Big Al here.....Me and the boys got sick and tired of listening to all the excuses from my representatives about power problems on their computers. Being in the Book Business, this can get expensive... losing customer records of purchases and payoffs payables.
To remedy this and to keep our agents' heads above the water (so to speak) we got us a truckload of **MAYDAYS** from SUN RESEARCH.
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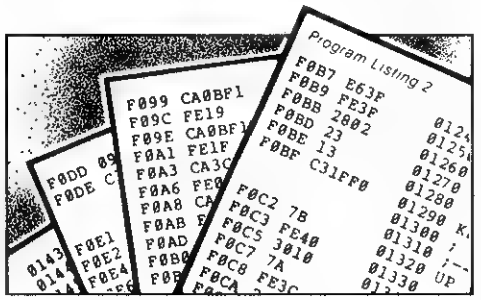
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FEEDBACK LOOP SPECIAL: SuperScripsit

by Terry Kepner



Input and response

With identical equipment as outlined by G.O. of Phoenix, AZ (January 1983, p. 407), I offer this solution for the SuperScripsit/Epson MX-80FT printing problem:

See "Editing the printer codes" on page 111 of the SuperScripsit manual. At ! let the sequence be 27 64. When starting any new document type <CLEAR> <SPACE>! at the very beginning. As the document gets printed, the first command to the MX-80FT is a master reset.

G.L.
Anaheim, CA

...I discovered that the printer works fine if I answer the open-document options with Printer Type: LP4 and Pitch: 10. If there's any problem, try clearing the printer by shutting it off and turning it back on again before opening a document.

I've made use of all the Epson special features by programming them as SuperScripsit user print codes (p. 108 et seq of the reference manual). For example, underlining is programmed as the sequence 27 45 0. Be sure that the units for the printer codes are zero, so that they take up no space on your tab line.

D. G.
Staten Island, NY

Using any of the printer drivers with P in the pitch field causes spaces to be suppressed in the printed text. I solved the problem by using the LP4 driver and 10 pitch. I've used this successfully with both the Epson MX-100 printer and the IBM Personal Computer printer. By setting user-definable print codes I can control all the features of the Epson, and the features supported on the IBM printer. G.O. can't expect to use the Radio Shack standard print codes to control underlining and boldface.

Radio Shack's printers are reset to normal print with CHR$(15). Unfortunately for Epson users, this is the code used to select compressed print. If G.O. can't find a combination that works, he might try modifying the DW2 driver to generate a CHR$(18) instead. The source code is in the manual, line 1610, from 06 0F to 06 12.

F.G.
St. Petersburg, FL

Leaving the spacing set for P results in no spaces being placed between any of the letters.

I'm using SuperScripsit and an Epson MX-80 printer with Graftrax 80 and I'm getting most of the special fonts I want. I use 1–0 for engaging various special features, and !–@ for disengaging them.

Graftrax 80 doesn't have an underline, but one can be faked by setting one print command to backspace and print six dots with pin 1. The only difficulty involves both the condensed and expanded print fonts fouling up the (monospaced) proportional spacing, and having to use a block command to set the printer for multiple line spacing.

R.M.
New Port Richey, FL

When I first tried SuperScripsit with my Epson printer, I experienced the same problem as G.O. On the advice of a Radio Shack sales representative I changed from the DW2 to the LP4 printer type, which works fine.

In order to obtain the special print features, enter the System Setup utility, select the printer codes option, and enter these codes:

Code	Units	Sequence	Comments
0	0	27 71	Double-strike on
1	0	27 72	Double-strike off
2	0	27 45 1	Underline on
3	0	27 45 0	Underline off
4	0	27 83 0	Superscript on
5	0	27 83 1	Subscript on
6	0	27 52	Italics on
7	0	27 53	Italics off

To turn off superscript or subscript, use the off sequence of double-strike. The sequences for other print styles can be found in the Epson manual.

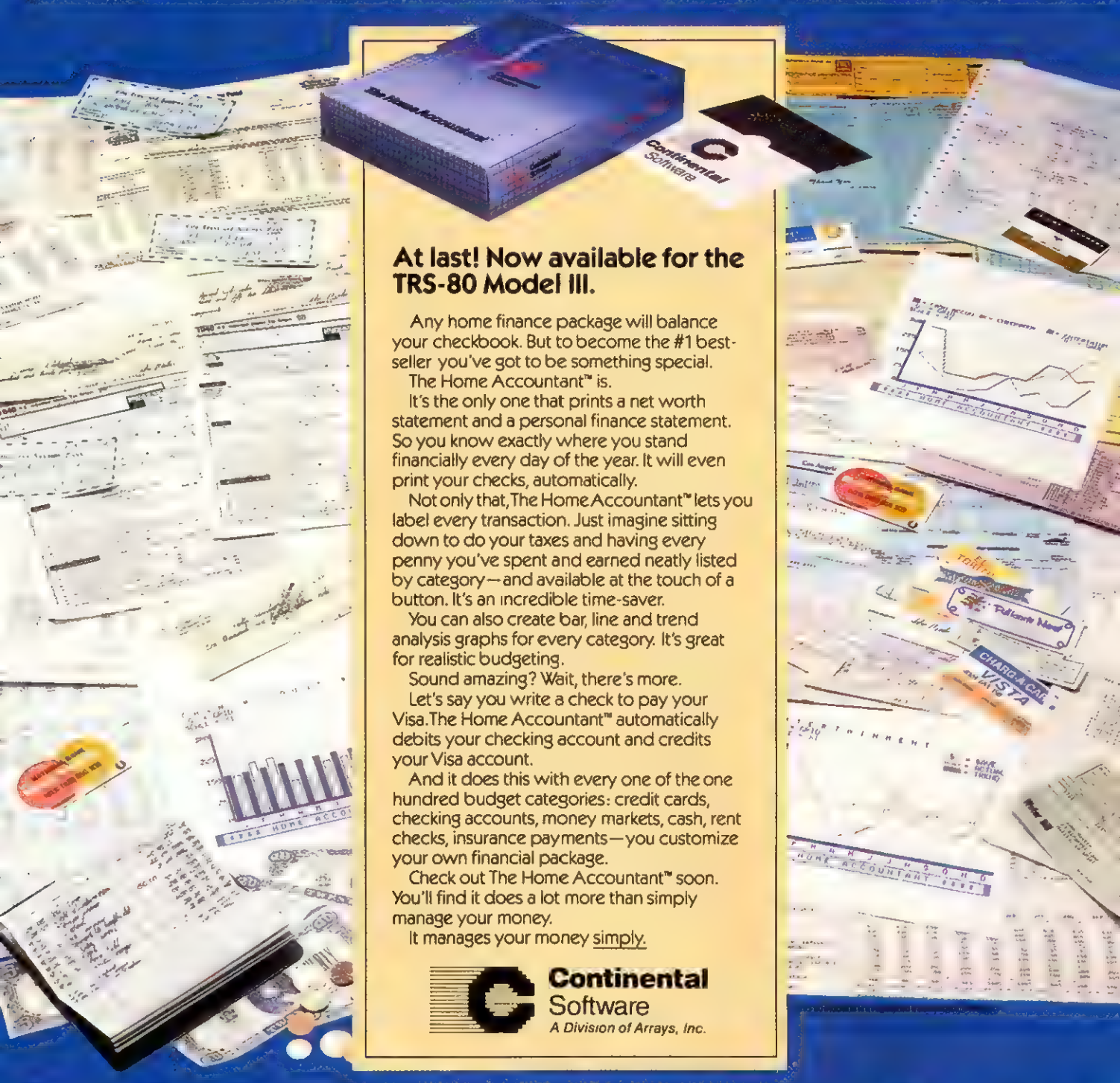
I've been using this system for several months and haven't had any problems.

Program Listing

```
                00100 ;PRINTER DRIVER FOR NEC PC-8023A-C PRINTER
                00110 ;TO BE USED WITH SUPER-SCRIPSIT
                00120 ;ADAPTED FROM SAMPLE PROGRAM PROVIDED IN
                00130 ;SUPER-SCRIPSIT MANUAL
                00140 ;ADAPTED BY DANIEL J. FOX
BAB5            00150 PRTERR  EQU     0BAB5H
BAB8            00160 PRPAUS  EQU     0BAB8H
BABB            00170 PRSTOP  EQU     0BABBH
BAD3            00180         ORG     0BAD3H
BAD3 A0         00190 INCSIZ  DEFB    160       ;# PROPORTIONAL UNITS/INCH
BAD4 0E         00200 PITCH0  DEFB    14        ;AVERAGE PITCH
BAD5            00210 WIDTBL  EQU     $         ;CHARACTER WIDTH TABLE
                00220 ;VALUES EXTRACTED FROM PROPORTIONAL CHARACTER CODING
                00230 ;TABLE IN PRINTER MANUAL
BAD5 07         00240 WIDSPC  DEFB    7         ;SPACE
BAD6 07         00250         DEFB    7         ;!
BAD7 0A         00260         DEFB    10        ;"
BAD8 0E         00270         DEFB    14        ;#
BAD9 0C         00280         DEFB    12        ;$
BADA 10         00290         DEFB    16        ;%
BADB 0D         00300         DEFB    13        ;&
BADC 07         00310         DEFB    7         ;'
BADD 07         00320         DEFB    7         ;(
BADE 07         00330         DEFB    7         ;)
BADF 0C         00340         DEFB    12        ;*
BAE0 0C         00350         DEFB    12        ;+
BAE1 07         00360         DEFB    7         ;,
BAE2 0C         00370         DEFB    12        ;-
BAE3 07         00380         DEFB    7         ;.
BAE4 0C         00390         DEFB    12        ;/
BAE5 0C         00400         DEFB    12        ;0
BAE6 0C         00410         DEFB    12        ;1
BAE7 0C         00420         DEFB    12        ;2
BAE8 0C         00430         DEFB    12        ;3
```

Listing continues

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Telephone (213) 417-3003

Listing continued

```
BAE9 0C       00440          DEFB    12      ;4
BAEA 0C       00450          DEFB    12      ;5
BAEB 0C       00460          DEFB    12      ;6
BAEC 0C       00470          DEFB    12      ;7
BAED 0C       00480          DEFB    12      ;8
BAEE 0C       00490          DEFB    12      ;9
BAEF 07       00500          DEFB    7       ;:
BAF0 07       00510          DEFB    7       ;;
BAF1 0C       00520          DEFB    12      ;<
BAF2 0C       00530          DEFB    12      ;=
BAF3 0C       00540          DEFB    12      ;>
BAF4 0C       00550          DEFB    12      ;?
BAF5 0E       00560          DEFB    14      ;@
BAF6 10       00570          DEFB    16      ;A
BAF7 0F       00580          DEFB    15      ;B
BAF8 0E       00590          DEFB    14      ;C
BAF9 10       00600          DEFB    16      ;D
BAFA 0E       00610          DEFB    14      ;E
BAFB 0E       00620          DEFB    14      ;F
BAFC 0E       00630          DEFB    14      ;G
BAFD 10       00640          DEFB    16      ;H
BAFE 0A       00650          DEFB    10      ;I
BAFF 0E       00660          DEFB    14      ;J
BB00 10       00670          DEFB    16      ;K
BB01 0E       00680          DEFB    14      ;L
BB02 12       00690          DEFB    18      ;M
BB03 10       00700          DEFB    16      ;N
BB04 10       00710          DEFB    16      ;O
BB05 0E       00720          DEFB    14      ;P
BB06 0E       00730          DEFB    14      ;Q
BB07 0F       00740          DEFB    15      ;R
BB08 0C       00750          DEFB    12      ;S
BB09 0E       00760          DEFB    14      ;T
BB0A 10       00770          DEFB    16      ;U
BB0B 10       00780          DEFB    16      ;V
BB0C 12       00790          DEFB    18      ;W
BB0D 10       00800          DEFB    16      ;X
BB0E 10       00810          DEFB    16      ;Y
BB0F 0A       00820          DEFB    10      ;Z
BB10 0C       00830          DEFB    12      ;LEFT BRACKET
BB11 0C       00840          DEFB    12      ;BACK SLASH
BB12 0C       00850          DEFB    12      ;RIGHT BRACKET
BB13 0C       00860          DEFB    12      ;CIRCUMFLEX
BB14 0C       00870          DEFB    12      ;DIVISION SYMBOL
BB15 07       00880          DEFB    7       ;@
BB16 0C       00890          DEFB    12      ;a
BB17 0C       00900          DEFB    12      ;b
BB18 0A       00910          DEFB    10      ;c
BB19 0C       00920          DEFB    12      ;d
BB1A 0C       00930          DEFB    12      ;e
BB1B 0A       00940          DEFB    10      ;f
BB1C 0C       00950          DEFB    12      ;g
BB1D 0C       00960          DEFB    12      ;h
BB1E 08       00970          DEFB    8       ;i
BB1F 06       00980          DEFB    6       ;j
BB20 0C       00990          DEFB    12      ;k
BB21 08       01000          DEFB    8       ;l
BB22 10       01010          DEFB    16      ;m
BB23 0C       01020          DEFB    12      ;n
BB24 0C       01030          DEFB    12      ;o
BB25 0C       01040          DEFB    12      ;p
BB26 0C       01050          DEFB    12      ;q
BB27 0A       01060          DEFB    10      ;r
BB28 0C       01070          DEFB    12      ;s
BB29 0A       01080          DEFB    10      ;t
BB2A 0C       01090          DEFB    12      ;u
BB2B 0C       01100          DEFB    12      ;v
BB2C 10       01110          DEFB    16      ;w
BB2D 0C       01120          DEFB    12      ;x
BB2E 0C       01130          DEFB    12      ;y
BB2F 0A       01140          DEFB    10      ;z
BB30 0A       01150          DEFB    10      ;left brace
BB31 07       01160          DEFB    7       ;:
BB32 0A       01170          DEFB    10      ;right brace
BB33 0C       01180          DEFB    12      ;tilde
BB34 00       01190          DEFB    0       ;not used
BB35 00       01200          DEFB    0       ;NO LINE FEED AFTER C.R.
BB36 00       01210          DEFB    0       ;SEND 4 NULLS AFTER C.R.
BB37 C376BB   01220          JP      PRINIT  ;INITIALIZE PRINTER HARDWARE
BB3A C37DBB   01230          JP      SETPCH  ;INITIALIZE PRNTR TO PROPER PTCH
BB3D C3B9BB   01240          JP      PRTCHR  ;OUTPUT 1 CHAR TO PRINTER
BB40 C3E1BB   01250          JP      PRTSPC  ;OUTPUT UNIT SPACE TO PRINTER
BB43 C316BC   01260          JP      BACKSP  ;BACKSPACE
BB46 C31BBC   01270          JP      TOGFEA  ;TOGGLE SPECIAL PRINT FEATURE
BB49 C38EBC   01280          JP      EXFEA   ;EXECUTE SPEC PRINT FEATURE
BB4C C3A1BC   01290          JP      HAFFOR  ;PRINT FORWARD HALF-LINEFEED
BB4F C3CBBC   01300          JP      HAFREV  ;PRINT REVERSE HALF-LINEFEED
BB52 C3E6BC   01310          JP      RDYTST  ;TEST FOR PRINTER READY CONDITION
BB55 C3F1BC   01320          JP      SETTBL  ;INITIALIZE CHAR WIDTH TABLE
001B          01330          DEFS    1BH     ;RESERVE 27 BYTES
BB73 42BD     01340          DEFW    END0    ;NEXT AVAILABLE ADDRESS
BB75 0A       01350 MODSTO   DEFB    10              ;CURRENT PICA MODE
BB76 CDE6BC   01360 PRINIT   CALL    RDYTST  ;CHECK FOR PRINTER READY
BB79 C2B5BA   01370          JP      NZ,PRTERR
BB7C C9       01380          RET
              01390 ;
BB7D          01400 SETPCH   EQU     $
BB7D C5       01410          PUSH    BC
BB7E CDA1BB   01420          CALL    MODCHK
BB81 0650     01430          LD      B,80
BB83 B7       01440          OR      A
```

Listing continues

Aside from the LP4 suggestion, the procedures come directly from the SuperScripsit reference manual.

Finally, I'd like to commend Radio Shack on another super program. Although I was frustrated by the delay in availability, I feel it was worth it.

A.K.
Memphis, TN

I have a TRS-80 Model III and the Epson printer with Graftrax 80 modification. I set up the program for the LP8 driver, M justification, 10 pitch, and the printer control codes as shown in the Epson manual. I do have to use the printer code 27 52 to go into italic print and the code 27 53 to get out (and that code isn't in my Graftrax manual). I can then put in the printer codes as I type a document and get the print in any way I want it.

If this doesn't work for someone else, the problem may be in the settings of the printer switches. I use the settings specified in the Graftrax modification manual.

D.M.
Sun City, AZ

Regarding an Epson printer driver for SuperScripsit, I have an excellent one available that accommodates all the most popular Epson Graftrax Plus features including: underlining; expanded, compressed, and mixed print sizes; italics; emphasized and double-strike; multipitch (10, 5, 17, 9); and special characters/symbols.

For further information, send a SASE to: K.C. Heyda, 14 Cooke Road, Lexington, MA 02173.

K.C.H.
Lexington, MA

Holmes Engineering (3555 South 3200 W. Salt Lake City, UT 84119, 801-967-2324) has an Epson printer driver for use with SuperScripsit. It supports all the features of SuperScripsit except Top of Form. The Epson user gets: superscripting, subscripting, underlining, double-underlining, double-strike, and emphasized print. Graftrax PROM owners can use italics.

The driver is available for $24.95.

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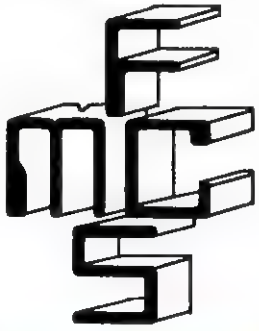
Some of the features of the letter processor are: Ease of use (built in help command available during editing). Automatic word spillover correction. Automatic centering and margins. Left and/or right justification. Page numbering and headers. Columnar math functions within the word processor. Memory remaining report. Character, line, and block insertion/deletion. Continuous or pause between sheet printing. Written in basic with embedded machine code routines. (Gives both ease of modification and machine language speed.)

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TM Micro Systems Software TM Tandy Corporation TM LNW Research

Listing continued

```
BB84 280E      01450          JR      Z,SETMOD        ;YES, SET PITCH
BB86 0645      01460          LD      B,69            ;12 PITCH MODE
BB88 FE0C      01470          CP      12              ;12 PITCH REQUESTED?
BB8A 2808      01480          JR      Z,SETMOD        ;YES, SET PITCH
BB8C 0651      01490          LD      B,81            ;CONDENSED TYPE
BB8E FE11      01500          CP      17
BB90 2802      01510          JR      Z,SETMOD
BB92 064E      01520          LD      B,78            ;10 PITCH DEFAULT MODE
BB94           01530 SETMOD   EQU     $
BB94 3E1B      01540          LD      A,27            ;ESC
BB96 CDB9BB    01550          CALL    PRTCHR
BB99 3804      01560          JR      C,ABORT0
BB9B 78        01570          LD      A,B
BB9C CDB9BB    01580          CALL    PRTCHR
BB9F C1        01590 ABORT0   POP     BC
BBA0 C9        01600          RET
BBA1           01610 MODCHK   EQU     $
BBA1 FE0C      01620          CP      12
BBA3 280F      01630          JR      Z,EXIT2
BBA5 FE0A      01640          CP      10
BBA7 280B      01650          JR      Z,EXIT2
BBA9 FE11      01660          CP      17
BBAB 2807      01670          JR      Z,EXIT2
BBAD B7        01680          OR      A
BBAE 32B8BB    01690          LD      (MODFLG),A
BBB1 2801      01700          JR      Z,EXIT2
BBB3 AF        01710          XOR     A
BBB4 3275BB    01720 EXIT2    LD      (MODSTO),A
BBB7 C9        01730          RET
BBB8 00        01740 MODFLG   DEFB    0
               01750 ;
BBB9           01760 PRTCHR   EQU     $               ;PRINTING ROUTINE
BBB9 CDBBBA    01770          CALL    PRSTOP          ;OK TO PROCEED?
BBBC D8        01780          RET     C               ;NO, ABORT & QUIT
BBBD D5        01790          PUSH    DE              ;SAVE REGISTERS
BBBE FE20      01800          CP      32              ;SPACE?
BBC0 2015      01810          JR      NZ,PRINT        ;NO -- GO TO PRINT
BBC2 57        01820          LD      D,A             ;XFER 32 TO D REGISTER
BBC3 3A75BB    01830          LD      A,(MODSTO)      ;GET PITCH MODE VALUE
BBC6 B7        01840          OR      A               ;IS IT PS MODE?
BBC7 7A        01850          LD      A,D             ;PUT 20H BACK INTO A
BBC8 200D      01860          JR      NZ,PRINT        ;NOT PS, SO PRINT IT
BBCA C5        01870          PUSH    BC              ;PS, SO SAVE REGS
BBCB 3AD5BA    01880          LD      A,(WIDSPC)      ;GET PS SPACE WIDTH
BBCE 4F        01890          LD      C,A
BBCF 0600      01900          LD      B,0             ;CLR MSB
BBD1 CDE1BB    01910          CALL    PRTSPC          ;ADVANCE SPACE
BBD4 C1        01920          POP     BC
BBD5 1808      01930          JR      PRDONE          ;DONE WITH SPACING
BBD7 CDE6BC    01940 PRINT    CALL    RDYTST
BBDA 20FB      01950          JR      NZ,PRINT
BBDC D3F8      01960          OUT     (248),A
BBDE AF        01970          XOR     A
BBDF D1        01980 PRDONE   POP     DE              ;RESTORE REGISTERS
BBE0 C9        01990          RET                     ;PRINT COMPLETE
               02000 ;
BBE1 C5        02010 PRTSPC   PUSH    BC              ;SAVE REGISTERS
BBE2 E5        02020          PUSH    HL
BBE3 D5        02030          PUSH    DE
BBE4 3AD5BA    02040          LD      A,(WIDSPC)
BBE7 60        02050          LD      H,B             ;TRANSFER WIDTH VALUE
BBE8 69        02060          LD      L,C             ;       TO HL
BBE9 0600      02070          LD      B,0             ;TRANSFER SPACE WIDTH
BBEB 4F        02080          LD      C,A             ;       TO BC
BBEC 7C        02090 LOOP0    LD      A,H             ;CHECK FOR MORE
BBED B5        02100          OR      L               ;       SPACES
BBEE 2822      02110          JR      Z,SPDONE        ;FINISHED
BBF0 ED42      02120          SBC     HL,BC
BBF2 300E      02130          JR      NC,FULLSP
BBF4 09        02140          ADD     HL,BC           ;ADD BC BACK
BBF5 3E1B      02150          LD      A,27            ;ESC CODE
BBF7 CDB9BB    02160          CALL    PRTCHR
BBFA 3816      02170          JR      C,SPDONE
BBFC 7D        02180          LD      A,L             ;VALUE OF SPACE
BBFD CDB9BB    02190          CALL    PRTCHR
BC00 1810      02200          JR      SPDONE          ;FINISHED
BC02 CDBBBA    02210 FULLSP   CALL    PRSTOP          ;OK TO PROCEED?
BC05 380B      02220          JR      C,SPDONE        ;NO - QUIT
BC07 CDE6BC    02230          CALL    RDYTST          ;PRINTER READY?
BC0A 20F6      02240          JR      NZ,FULLSP       ;NO - TRY AGAIN
BC0C 3E20      02250          LD      A,32            ;SPACE
BC0E D3F8      02260          OUT     (248),A         ;SEND SPACE
BC10 18DA      02270          JR      LOOP0           ;CONTINUE
BC12 D1        02280 SPDONE   POP     DE              ;RESTORE REGISTERS
BC13 E1        02290          POP     HL
BC14 C1        02300          POP     BC
BC15 C9        02310          RET                     ;RETURN TO PROGRAM
               02320 ;
BC16           02330 BACKSP   EQU     $               ;BACKSPACING ROUTINE
BC16 3E08      02340          LD      A,8
BC18 C3B9BB    02350          JP      PRTCHR
               02360 ;
BC1B C5        02370 TOGFEA   PUSH    BC
BC1C E5        02380          PUSH    HL
BC1D D5        02390          PUSH    DE
BC1E 062D      02400          LD      B,'-'           ;UNDERLINE
BC20 B8        02410          CP      B
BC21 280D      02420          JR      Z,UNDER
BC23 062B      02430          LD      B,'+'           ;BOLDFACE
BC25 B8        02440          CP      B
```

Listing continues

drivers for SuperScripsit: the Okidata Microline 82 ($49); Okidata Microline 83; Okidata Microline 84 ($59); Bytewriter; Epson MX-80 and MX-100 ($59); Smith-Corona TP-1 ($49); and Radio Shack LPV ($49). Soon to be released are drivers for: C. Itoh F-10; C. Itoh Prowriter; NEC Daisywheel; and the Brother HR-1. For more information, write: ALPS, 23 Angus Road, Warren, NJ 07060, 201-647-7230.

G.K.
Warren, NJ

I had the same type of problem as G.O., except it was with my NEC PC-8023A-C printer. After much work and several headaches, I wrote the enclosed driver (the Listing). I don't know if it will work with an Epson, but it works fine on my NEC. I suspect that some control codes are different, but mine

"I don't know if it will work with an Epson, but it works fine on my NEC."

will work with proportional, elite, condensed, and pica print styles. I set user-defined codes to switch to incremental mode for such special characters as strike through and super/subscripts, otherwise the logic-seeking mode works fine at higher speeds.

I still have a problem with underlining: If an underlined segment extends past one line, the left margin of the next line is underlined. I take care of this by turning off the underline at the end of a line and turning it back on at the start of the next line.

Can anyone advise me how to set up SuperScripsit for NEWDOS80 2.0? Every time I try, it locks up after the file is opened.

D.F.
Columbus, IN

WOW! What a response for G.O. of Phoenix. As you can see, there are several methods for solving the incompatibility between SuperScripsit and the

SUPERSCRIPSIT PRINTER DRIVERS MODEL I / III

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Smith-Corona TP-1 / Bytewriter

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Okidata Microline 82, Microline 83

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Okidata Microline 84

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```
BC26 2839      02450          JR      Z,BOLD
BC28 063D      02460          LD      B,'='           ;DOUBLE UNDERLINE
BC2A B8        02470          CP      B
BC2B 2803      02480          JR      Z,UNDER
BC2D AF        02490          XOR     A
BC2E 18E2      02500          JR      SPDONE
BC30 3A60BC    02510 UNDER    LD      A,(ULSTAT)
BC33 FE01      02520          CP      1
BC35 2815      02530          JR      Z,ULOFF
BC37 3E1B      02540          LD      A,27            ;ESC
BC39 CDB9BB    02550          CALL    PRTCHR
BC3C 38D4      02560          JR      C,SPDONE                ;ABORT
BC3E 3E58      02570          LD      A,58H           ;START UNDERLINE
BC40 CDB9BB    02580          CALL    PRTCHR
BC43 38CD      02590          JR      C,SPDONE
BC45 3E01      02600          LD      A,1
BC47 3260BC    02610          LD      (ULSTAT),A      ;SAVE INDICATOR
BC4A 18C6      02620          JR      SPDONE
BC4C 3E1B      02630 ULOFF    LD      A,27            ;ESC
BC4E CDB9BB    02640          CALL    PRTCHR
BC51 38BF      02650          JR      C,SPDONE
BC53 3E59      02660          LD      A,59H           ;STOP UNDERLINE
BC55 CDB9BB    02670          CALL    PRTCHR
BC58 38B8      02680          JR      C,SPDONE
BC5A AF        02690          XOR     A
BC5B 3260BC    02700          LD      (ULSTAT),A
BC5E 18B2      02710          JR      SPDONE
BC60 00        02720 ULSTAT   DEFB    0
BC61 3A8DBC    02730 BOLD     LD      A,(BOLDST)
BC64 FE01      02740          CP      1
BC66 2012      02750          JR      NZ,BOLDON
BC68 3E1B      02760          LD      A,27            ;ESC
BC6A CDB9BB    02770          CALL    PRTCHR
BC6D 38A3      02780          JR      C,SPDONE
BC6F 3E22      02790          LD      A,22H           ;CANCEL ENHANCEMENT
BC71 CDB9BB    02800          CALL    PRTCHR
BC74 AF        02810          XOR     A
BC75 328DBC    02820          LD      (BOLDST),A
BC78 1898      02830          JR      SPDONE
BC7A 3E1B      02840 BOLDON   LD      A,27            ;ESC
BC7C CDB9BB    02850          CALL    PRTCHR
BC7F 3891      02860          JR      C,SPDONE
BC81 3E21      02870          LD      A,'!'           ;START ENHANCEMENT
BC83 CDB9BB    02880          CALL    PRTCHR
BC86 3E01      02890          LD      A,1
BC88 328DBC    02900          LD      (BOLDST),A
BC8B 1885      02910          JR      SPDONE
BC8D 00        02920 BOLDST   DEFB    0
BC8E 062F      02930 EXFEA    LD      B,'/'           ;STRIKE THROUGH
BC90 B8        02940          CP      B
BC91 2802      02950          JR      Z,STRTHR
BC93 AF        02960          XOR     A
BC94 C9        02970          RET
BC95 3E08      02980 STRTHR   LD      A,8
BC97 CDB9BB    02990          CALL    PRTCHR
BC9A D8        03000          RET     C
BC9B 3E2D      03010          LD      A,'-'           ;SLASH
BC9D CDB9BB    03020          CALL    PRTCHR
BCA0 C9        03030          RET
               03040 ;
BCA1           03050 HAFFOR   EQU     $               ;FORWARD 1/2 LINEFEED
BCA1 3E1B      03060          LD      A,27            ;ESC
BCA3 CDB9BB    03070          CALL    PRTCHR
BCA6 D8        03080          RET     C
BCA7 3E54      03090          LD      A,'T'
BCA9 CDB9BB    03100          CALL    PRTCHR
BCAC D8        03110          RET     C
BCAD 3E31      03120          LD      A,'1'
BCAF CDB9BB    03130          CALL    PRTCHR
BCB2 D8        03140          RET     C
BCB3 3E32      03150          LD      A,'2'
BCB5 CDB9BB    03160          CALL    PRTCHR
BCB8 D8        03170          RET     C
BCB9 3E0A      03180          LD      A,10
BCBB CDB9BB    03190          CALL    PRTCHR
BCBE D8        03200          RET     C
BCBF 3E1B      03210          LD      A,27
BCC1 CDB9BB    03220          CALL    PRTCHR
BCC4 D8        03230          RET     C
BCC5 3E41      03240          LD      A,'A'
BCC7 CDB9BB    03250          CALL    PRTCHR
BCCA C9        03260          RET
BCCB 3E1B      03270 HAFREV   LD      A,27
BCCD CDB9BB    03280          CALL    PRTCHR
BCD0 D8        03290          RET     C
BCD1 3E72      03300          LD      A,'r'
BCD3 CDB9BB    03310          CALL    PRTCHR
BCD6 D8        03320          RET     C
BCD7 CDA1BC    03330          CALL    HAFFOR
BCDA 3E1B      03340          LD      A,27
BCDC CDB9BB    03350          CALL    PRTCHR
BCDF D8        03360          RET     C
BCE0 3E66      03370          LD      A,'f'
BCE2 CDB9BB    03380          CALL    PRTCHR
BCE5 C9        03390          RET
               03400 ;
BCE6           03410 RDYTST   EQU     $               ;PRINTER CHECK
BCE6 C5        03420          PUSH    BC              ;SAVE REGISTER
BCE7 47        03430          LD      B,A             ;SAVE CHARACTER
BCE8 DBF8      03440          IN      A,(248)         ;GET PRINTER STATUS
BCEA E6F0      03450          AND     0F0H
```

Listing continues

Epson printer. Most of the solutions are aimed at using the special printer codes to get at the special features of the Epson printer. Since I don't have an Epson printer, I can't check these suggestions to see if you do get ALL the features of the Epson used with SuperScripsit, but it sure sounds like it.

Three people wrote in to say they had drivers available for the Epson, but you'll have to write to them directly to get more information.

Finally, Mr. D.F. sent in a driver routine he wrote for the NEC 8023 printer (Listing 1). Those of you familiar with machine language might be able to write your own Epson driver by comparing his driver with the one in the back of the SuperScripsit manual and then improvising.

As for D.F.'s problem with NEWDOS80 2.0, I suggest calling or writing Apparat and asking if they have any patches for using SuperScripsit on NEWDOS 2.0.

Much to my sorrow, I've discovered that the Epson MX-80FT printer isn't compatible with SuperScript. I bought SuperScripsit, Profile III Plus, and VisiCalc as an interactive program package that seems to satisfy my personal computing needs. Now I find that none of the Radio Shack printer drivers are compatible with the MX-80. For superscript, subscript, underline, and several other SuperScripsit functions to print correctly, the MX-80 must receive carriage returns without line feeds. Additionally, the superscript and MX-80 control codes are different.

By disconnecting the 14-pin wire within the printer cable and changing the DIP switch settings in the MX-80 I solved the CR/LF problem. Now line feeds can only be transmitted to the printer by software, or by resetting the DIP switches. I've also attempted to solve the control code incompatibility by using Peggytronics Software's MAXPRINT printer driver, which supports many of SuperScript's printing commands. I discovered that the problem is with the Profile III Plus and VisiCalc programs, which require line feeds with carriage returns.

Can you offer a solution other than reconfiguring the DIP switches every time I send line feeds with carriage returns?

L.T.
State College, PA

I think you're looking at the problem from the wrong point of view. The control codes of SuperScript are designed to operate with Radio Shack printers only. If you want to use any other printer, you must redefine these control codes to match your printer. For more information on the Epson printer problem, read the letters at the beginning of this column. They'll show you how to use your printer without having to mess with the DIP switches.

I recently purchased SuperScripsit and I'm pleased, except for one thing: Radio Shack continues to ignore non-Radio Shack printers!

The program is designed to operate Radio Shack printers and the documentation states that if you don't have a Radio Shack printer, you'll have to write your own printer driver. An appendix in the manual attempts to address this issue, but being an inexperienced computer programmer, I'm at a loss as to how to write a driver for my C. Itoh 8510 printer. Help!

W.B.
Vacaville, CA

I suggest that you write to both ALPS and Holmes Engineering and ask if either of them has a driver available for your printer. If that fails, examine the source code listing in Listing 1, compare it with the one in the Radio Shack manual, and then see if you can learn enough to write your own driver. Failing that, does anyone have a driver for the C. Itoh 8510 printer?

I'm writing, not with a question, but with a more correct answer for H.J. from Skokie, IL (January 1983, p. 406).

To use the special features of the Epson printer with the Model II, use Scripsit 2.0. It has the capability of defining special print codes for your printer. For example, to turn on the emphasize mode within a document, enter a user-defined print code at the position you want the action to take place. This code would be entered with CTRL-X followed by the selected code letter (let's pick E). You then have to tell Scripsit what to print when it sees the CTRL-XE, which in this case is 1B45 (ESCAPE-E in hex). Once defined, it can be used anytime. Remember to define a code to turn off the emphasize mode.

If you want to always print in the emphasize mode you can have Scripsit 2.0

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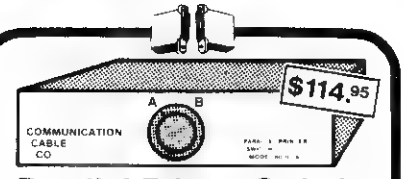
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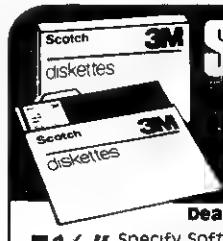
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BCEC FE30      03460          CP      30H             ;READY?
BCEE 78        03470          LD      A,B             ;RESTORE CHARACTER
BCEF C1        03480          POP     BC              ;RESTORE REGISTER
BCF0 C9        03490          RET
               03500 ;
BCF1           03510 SETTBL   EQU     $               ;SET UP WIDTH TABLE
BCF1 B7        03520          OR      A               ;PS MODE?
BCF2 C8        03530          RET     Z               ;YES, TABLE OK AS IS
BCF3 32D4BA    03540          LD      (PITCH0),A      ;STORE MODE VALUE HERE
BCF6 E5        03550          PUSH    HL              ;SAVE REGISTERS
BCF7 C5        03560          PUSH    BC
BCF8 D5        03570          PUSH    DE
BCF9 47        03580          LD      B,A             ;XFER MODE VALUE TO B
BCFA 3AD3BA    03590          LD      A,(INCSIZ)      ;GET UNITS/INCH VALUE
BCFD 6F        03600          LD      L,A             ;       AND XFER IT TO L
BCFE 2600      03610          LD      H,0             ;CLEAR MSB
BD00 CD15BD    03620          CALL    CALC0           ;CALCULATE UNITS/CHAR
BD03 7D        03630          LD      A,L             ;WIDTH GOES TO A
BD04 21D5BA    03640          LD      HL,WIDSPC       ;POINT TO WIDTH TABLE
BD07 77        03650          LD      (HL),A          ;INSERT CALCULATED VALUE
BD08 54        03660          LD      D,H             ;XFER TABLE START
BD09 5D        03670          LD      E,L             ;       TO DE
BD0A 13        03680          INC     DE              ;POINT TO START +1
BD0B 015F00    03690          LD      BC,005FH        ;95 COUNT
BD0E EDB0      03700          LDIR                    ;FILL TBL WITH STD VALUE
BD10 D1        03710          POP     DE              ;RESTORE REGISTERS
BD11 C1        03720          POP     BC
BD12 E1        03730          POP     HL
BD13 AF        03740          XOR     A
BD14 C9        03750          RET
               03760 ;
BD15           03770 CALC0    EQU     $               ;DIVIDE ROUTINE
BD15 D5        03780          PUSH    DE
BD16 C5        03790          PUSH    BC
BD17 50        03800          LD      D,B
BD18 78        03810          LD      A,B
BD19 B7        03820          OR      A
BD1A 2814      03830          JR      Z,JUMP8
BD1C 0610      03840          LD      B,10H           ;16 COUNT
BD1E AF        03850          XOR     A
BD1F 29        03860 LOOP4    ADD     HL,HL
BD20 17        03870          RLA
BD21 3803      03880          JR      C,JUMP9
BD23 BA        03890          CP      D
BD24 3802      03900          JR      C,JUMP10
BD26 92        03910 JUMP9    SUB     D
BD27 2C        03920          INC     L
BD28 10F5      03930 JUMP10   DJNZ    LOOP4
BD2A 47        03940          LD      B,A
BD2B AF        03950          XOR     A
BD2C 78        03960          LD      A,B
BD2D C1        03970 EXIT1    POP     BC              ;RESTORE REGISTERS
BD2E D1        03980          POP     DE
BD2F C9        03990          RET
BD30 3E01      04000 JUMP8    LD      A,1
BD32 B7        04010          OR      A
BD33 18F8      04020          JR      EXIT1
               04030 ;
BD35           04040 CALC1    EQU     $               ;CALCULATE SPACE INC
BD35 57        04050          LD      D,A             ;PUT AMOUNT IN D
BD36 79        04060          LD      A,C             ;GET SPACE WIDTH
BD37 92        04070          SUB     D               ;GET DIFFERENCE
BD38 4F        04080          LD      C,A             ;       & PUT IT IN C
BD39 C3E1BB    04090          JP      PRTSPC          ;DO THE INCREMENTAL SPC
BD3C 00        04100          NOP
BD3D 00        04110          NOP
BD3E 00        04120          NOP
BD3F 00        04130          NOP
BD40 00        04140          NOP
BD41 00        04150          NOP
BD42           04160 END0     EQU     $
0000           04170          END
00000 Total Errors
```

xA	11	A3	Hi Hor Line	xN	00		
xB	00			xO	10	0E	Double width
xC	00			xP	10	14	Off Double
xD	11	B7	Top Left Corner	xQ	10	1b	"escape"
xE	11	AB	Top Rt. Corner	xR	10	45	Emphasize On
xF	00			xS	10	46	Off Emphasize
xG	00			xT	11	B0	Left low dot
xH	00			xU	10	0F	Compressed
xI	00			xV	10	12	Off Compressed
xJ	11	CA	Rt. Vertical Line	xW	00		
xK	11	B5	Left Vertical Line	xX	00		
xL	11	A0	Space	xY	10	47	On Double Strike
xM	11	CB	Middle Rt. Corner	xZ	10	48	Off Double Strike

Table 1. Sample Epson/Scripsit 2.0 Control Codes

do the set-up for you. To do this, type Auto Startup 1B45 at the TRSDOS Ready prompt, and then press enter. From then on, when you boot the Scripsit disk, the Startup routine will send the codes 1B and 45 to the printer, initializing it in emphasize mode.

If you'd rather do it yourself, press Hold as you are entering the date or time, type Startup 1B45, and then press enter.

D.F.
Keller, TX

Regarding the letter from H.J. of Skokie, IL... notice that my letterhead uses graphics, and that this entire letter is printed in emphasized mode! Scripsit has printer control codes which are easily changed (see Table 1 for the printer control codes).

Note that the escape code you mentioned is needed for some modes, but double width and compressed are excluded from this. However, compressed does need to be turned off.

This is not to say that I'm happy with the system. In fact, my attempts to solve some of the frustrations have fallen on deaf ears at both Radio Shack and Epson. The editors of the Epson manual (Compusoft) finally sent a nice letter, but it didn't help.

W.S.
Vermilion, OH

...double width characters make nice titles, but they foul up Scripsit's space counting so they should be kept in a separate and very short "paragraph." If H.J. of Skokie, IL, has the old version of Scripsit, he should upgrade to version 2.0.

S.L.
Urbana, IL

Thanks to all of you for supplying this information. ■

Terry Kepner is a free-lance writer and programmer, and the vice president of Interpro. He's been writing about microcomputers since 1979.

Addendum:

SoftERware of Pacific Palisades, CA, has drivers for several printers, including the NEC 8023 printer. Further information can be found in the New Products section of this issue.—*Eds.*

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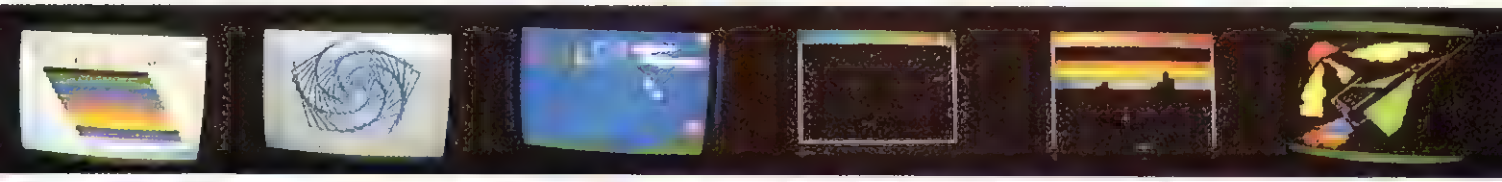
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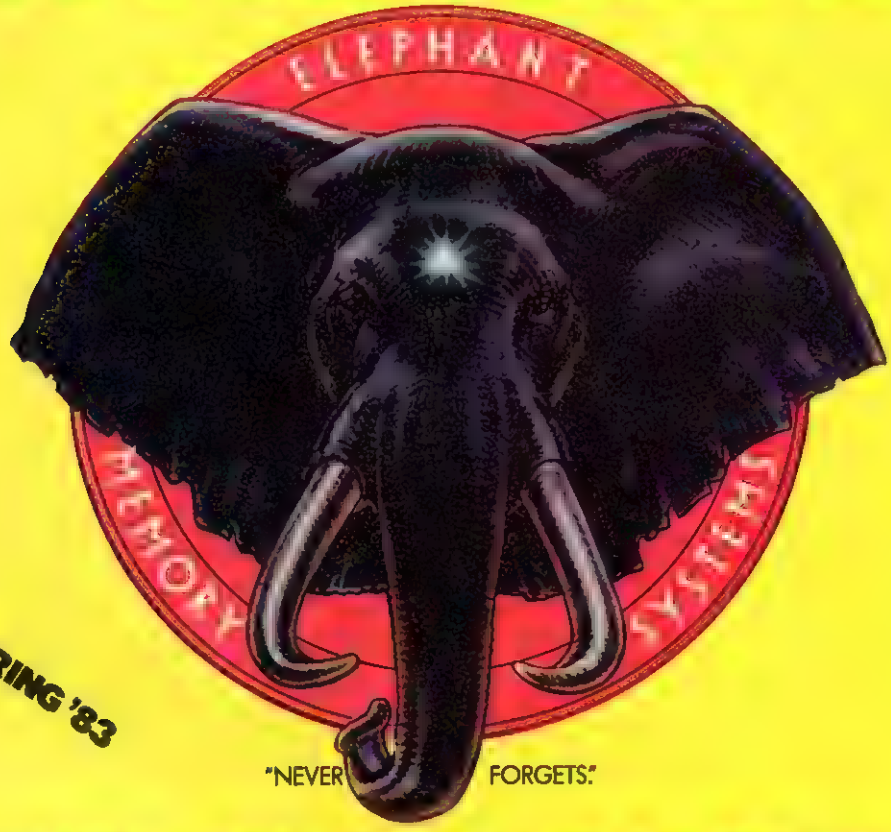
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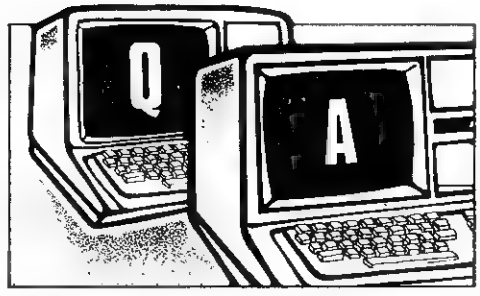
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FEEDBACK LOOP

by Terry Kepner



Problems and solutions

Send any questions or problems dealing with any area of TRS-80 microcomputing to Feedback Loop, 80 Micro, *80 Pine St., Peterborough, NH 03458.*

Having no success in finding software for a blind friend, I wrote an Assembly-language driver for the Votrax synthesizer that allows it to speak or spell with all the punctuation marks spoken. This driver works with both Model I and Model III operating systems, but not with word processors.

The why is simple: My driver intercepts characters headed for the normal screen driver using the device control bytes (DCBs) and sends a duplicate to Votrax (with modifications for spelling and punctuation). Most word processors don't use the DCBs, but instead use direct PEEKing and POKEing at video memory.

A Basic word processor would work with the synthesizer driver, but my attempts at writing one have only served to point out the difficulties of string handling in Basic.

P.L.
Gansevoort, NY

Sounds to me like you should contact IJG Computer Services (1260 W. Foothill Blvd., Upland, CA 91786, 714-946-5805) about adapting your driver to Electric Pencil, or Prosoft (Box 839, North Hollywood, CA 91603, 213-764-3131) about the compatibility of your driver and their extremely fast Basic/machine-language word processor.

If either of these companies could use your driver, many handicapped people would be in your debt.

N.K. of Forked River, NJ (December 1982, p. 440), probably won't be able to locate anyone selling a complete system for the blind, but she may be able to put together an adequate system without too much trouble.

To patch a synthesizer into the TRS-80 without rewriting all the software, link the synthesizer to the second cassette output of the expansion box, using an RS-232 interface. A short system program can be loaded at boot-up time that would link the video output DCBs to the cassette port in addition to the normal video display driver. The software should patch the keyboard scan to check for a special sequence (such as 123) that would send the contents of the screen to the talker, a disable pattern to allow normal cassette I/O, and an enable pattern to turn the talker back on. The program should also protect itself in high memory and would be invisible in most programs.

This would handle most Basic and user programs, but the better text editors carry their own video and keyboard I/O routines and would require alteration by a machine-language programmer. The 80 Micro *series on Model I Scripsit provides all the addresses necessary to patch this particular program. Also, every computer club has a hacker or two who would love to get such a system up and running.*

I hope the advice is of some help.

L.W.
Orlando, FL

Your advice is good, and doesn't require the purchase of an RS-232 board to make it practical.

I would like to update my Model I to Level II; however, Radio Shack wants $150 plus installation ($15) to make the conversion. I would appreciate your advising the part numbers required and if there are any other modifications needed to make this work other than just switching ROMs.

J.M.
Maria Stein, OH

You didn't quite give all the information for upgrading a Level I to Level II in your answer to L.H. of Cortland, NY (December 1982, p. 438). You advised him to order the Level II ROM set from RS National Parts. Unfortunately, you neglected to mention that the conversion is not simply a matter of plugging in the chips. The Level II chips use a different decoding scheme than Level I.

Anyone wishing to upgrade Level I to Level II has two alternatives: Order the complete upgrade kit, which includes ROMs, manuals, DIP shunt, jumpers, and so on, or order only the parts you actually need for the conversion. The complete kit order number is 262-1120 for A, D, and E revision keyboards, and 263-1120 for the revision G keyboard. The complete kit includes Blackjack/Backgammon games, a data conversion program, and other items.

Buying the parts is much cheaper. First, buy the service manual (#MS-260-1120). The manual guides you through each step of the installation process. Next, buy the ROMs mounted on the satellite board (#AXX-0007). The manual costs $1.49 and the ROMs with board are $100.38. Shipping is $1.50 for each part number.

In addition, you need a 24-pin DIP jumper cable (RS#8709011), a 220 ohm resistor, and an eight-position DIP switch. These are available from most mail order houses at a cheaper price than Radio Shack.

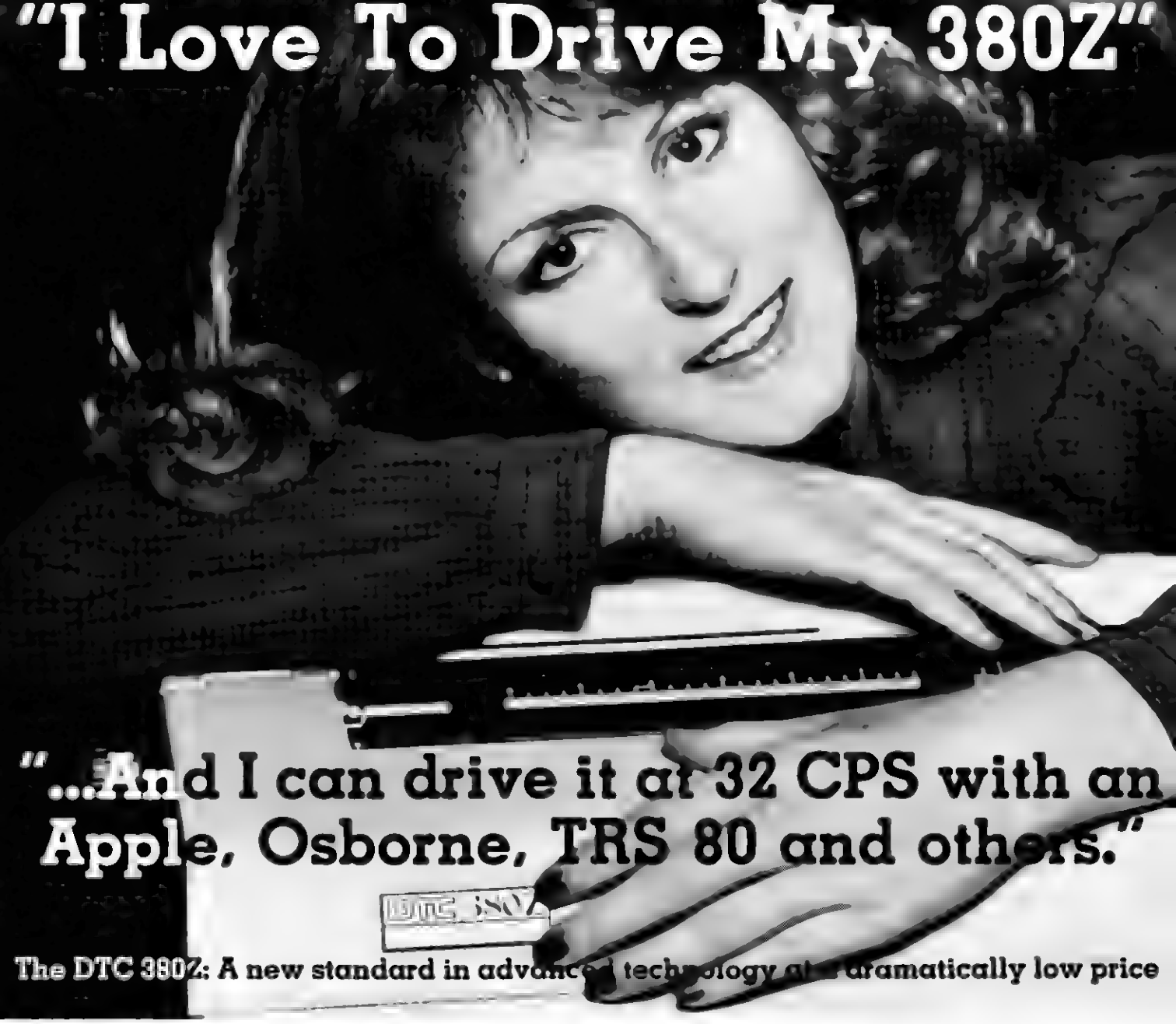
The installation process itself is straightforward: one etch cut, and soldering one resistor and six wires from the satellite board. Working slowly and carefully, the whole shebang takes about an hour.

M.C.
New York, NY

The procedures and numbers you give are for keyboards A, D, and E revisions. The newer G revision boards require that you just plug the chips directly into the keyboard, replacing the Level I ROMs. The resistor, etch cut, and 24-pin cable are not needed, but the eight-segment DIP switch is.

The resistor is wired into place across your cassette port. Its purpose is to protect the cassette port electronics in case you accidentally plug the power supply into the wrong socket. You'll smell the resistor frying long before the cassette port electronics are damaged. The etch cut you mention is to disable the 5-volt line from going out the expansion port.

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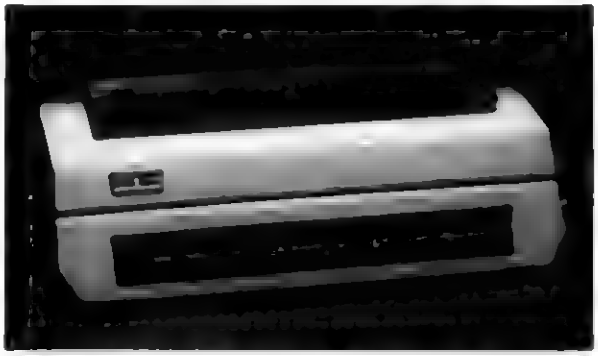
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Too many people were trying to use the keyboard 5-volt line supply to drive outside devices, which resulted in overloading and then burning up the power supplies. The DIP switch bank is used to tell the keyboard which Level ROM set you're using and the available memory in your keyboard (4K, 8K, or 16K). The 24-pin ribbon cable is used only to connect the satellite ROM board to the Level I ROM socket.

If you have the revision A, D, or E keyboard, you'll need the following: Installation Manual (#MS-260-1120, $1.49), Satellite ROM board with ROMs (#AX-0007, $100.38), 24-pin DIP jumper cable (#AW2252, $7.17), and an eight-switch DIP switch bank (#275-1301, $1.99). The 220-ohm resistor (#271-015, $.19 for 2) is optional.

If you have a revision G keyboard, you'll need: an Installation Manual (#MS-260-1120, $1.49), A-B Level II chip (#AX3031, $41.58), C Level II chip (#AX3030, $15.15), and an eight-switch DIP switch bank (#275-1301, $1.99).

Which way you go (complete kit, or ordering separate parts) is up to you. The complete kit is exactly what the Radio Shack technician would order and install. The two-chip version (for G revision keyboards) is number 263-1120, and the satellite board version, as well as all the other revision boards, is 262-1120. Both cost $150. At that rate, you might as well have the Radio Shack technician do the work ($15 labor charge), and have it guaranteed.

I've been using the enclosed subroutine to read the video RAM, load it into a string, and then output it to a printer. My problem is that I recently had the Radio Shack lowercase modification added to my keyboard. Since then my routine prints blank lines instead of what's on the screen.

I would like to modify the routine slightly to print graphics instead of an asterisk (*). Do you know where I can find articles about the Line Printer VII?

```
10 REM CHANGE LINES 20040 AND 20080
TO PRINT
20 REM LPVII GRAPHICS INSTEAD OF AN*
20000 IF PEEK (14312) < > 63 THEN
RETURN
20015 LPRINT CHR$(15)
20020 FOR N = 15360 TO 16383 STEP 64
20030 Q = PEEK (N)
20040 IF Q > = 127 AND Q < = 191 THEN Q
= 45
20050 A$ = CHR$(Q)
20060 FOR Q = 1 TO 63
20070 ZZ    PEEK (N + Q)
20080 IF ZZ < = 127 AND ZZ <   191 THEN
ZZ = 45
20090 B$ = CHR$(ZZ)
20100 A$    A$ + B$
20110 NEXT Q
20115 IF PEEK (14312) < > 63 THEN
RETURN
20120 LPRINT A$ :LPRINT CHR$(14)
:LPRINT :LPRINT
20130 NEXT N
20140 RETURN
```

J.M.
Port Richey, FL

Your programming problem is obvious. The Level II ROMs were designed to take advantage of the fact that lowercase was not available in video RAM. The unmodified Model I has bit video RAM fixed with bit six permanently set to a 1. Thus, to print the letter A on the screen, the ROM only has to supply ASCII code 1. Bit six makes all video RAM act as if it had ASCII code 64 already stored in it. Adding ASCII code 1 and ASCII code 64 gives you ASCII 65, the letter A.

Radio Shack uses this fact to save space in ROM. When you add lowercase, bit six is no longer frozen as a one, but is instead either a 1 or zero. Now when the ROM sends an ASCII 1 to the screen, the screen sees only ASCII 1, not ASCII 65. The result: nothing on the screen. This left Radio Shack with a choice—they could either reprogram the ROM to send ASCII 65 to the screen when it wanted to print an A, or fix the video character generator so that ASCII 1 was equivalent to ASCII 65. Since it is much easier and cheaper to reprogram a character generator, that's what they did. When they modified your Model I, they changed the character generator chip, and added RAM to the video RAM.

All Radio Shack did to the character generator was define the first 26 characters in the chip as being the same as the 26 characters starting at position 65 in the same chip. The result is that the new generator chip has two sets of uppercase letters, located in positions 1–26 and 65–90.

If you want to test this out, try running this: 10 FOR I = 1 TO 191 : PRINT I; CHR$(I); : NEXT.

The graphics problem is one of degree, the bit six again. First, modify line 10 above to count to 255, change the PRINT to LPRINT, and then run it. This should give you all the characters your LPVII can print. Next, run it with a PRINT, and compare the two results (paper to video). The offset you use in your program (45) might need to be changed.

Lines 20040 and 20080 need to be changed next. Your mistake is in using Q the way you are. If Q is between 127 and 191, add 45 to Q, then save it as a string in A$. The same goes for ZZ. What your program is doing is storing ASCII 45 in the string instead of storing graphics.

You may have another problem. I'm not sure if the graphics characters of the LPVII are the same as the screen graphics of the Model I/III. The June 1981 issue of the Tandy *TRS-80 Microcomputer News* (p. 18) has a short program that does a screen print of Model I/III graphics.

For more information on the LPVII, check the back issues of Radio Shack's computer newsletter. You can have all the 1981 issues, bound into one volume, for only $9.95 (#26-2240). Also, you can check the back issues of *80 Micro* for related articles.

In your reply to R.C. of Hyattsville, MD (December 1982, p. 438), you suggested buying a new keyboard to replace the keyboard with the broken I key. I had a similar problem.

On the advice of Radio Shack Computer Customer Service, I was about to replace the keyboard, but while talking to National Parts before placing the order, I asked them about it. They told me I could order just the key switches (#AS-2762) at $1.04 each. It was a little difficult to remove the old switch and replace it, but I was successful.

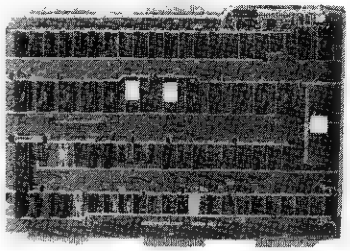
Total cost—$3.58 (two switches at $1.04 each, plus $1.50 shipping).

F.J.
North Haven, CT

An excellent solution if you're good with a soldering iron. Besides, you have nothing to lose by experimenting with the broken board, since the worst that can happen is that you'll have to replace the keyboard, which you were going to do anyway!

I own a Model III with 48K of memory, and recently purchased Radio Shack's Editor/Assembler Series I. Looking through it, I see that it talks about 8- and 16-bit arithmetic functions. I've heard that Tandy replaced

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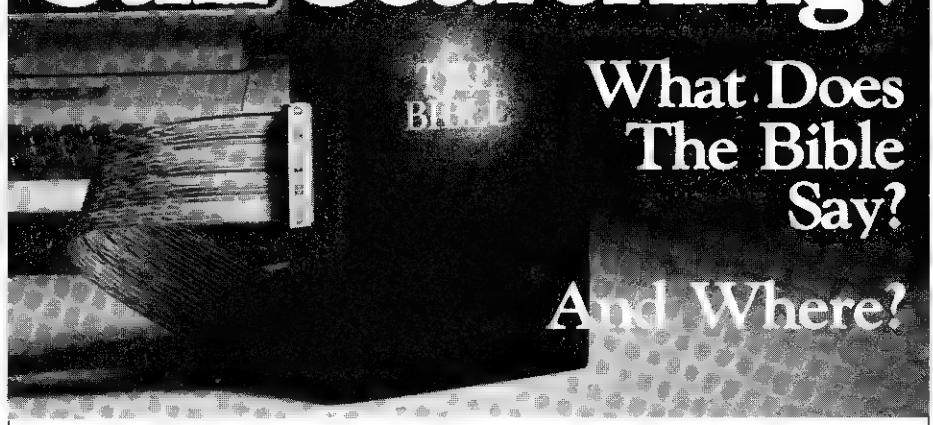
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the 8-bit computers with 16-bit. Is my Model III an 8-bit or 16-bit computer? I bought it in 1980.

My Editor/Assembler is giving me problems. When I use the insert command, it doesn't work right. For example, if I have two lines, 100 and 110, and I want to insert line 105, I type: I, 105 (enter). The result I get is:

```
00100 ; This is a remark
00100 ; This is line 105
00110 JP  RET   ;A short program
```

Is there a patch to the program?

Do you know where I can get Radio Shack disk drives at a discount? And if so, is the installation easy? Also, where can I find books that make learning Assembly language easy? And what is your comment on Radio Shack's technical manual?

M.H.
Citrus Heights, CA

Don't have many questions, do you? First, all Model I/II/III computers from Radio Shack are 8-bit computers. The phrases 8-bit and 16-bit as applied to computers refer to the size of the data bus address lines. The internal architecture of the Z80 computers moves data in and out of the Z80 registers in 8-bit chunks. So both the data addresses and the data itself are stored as 8-bit.

The 16-bit computers have an interior architecture of 16-bit words. Arithmetic operations are performed in chunks of 16-bits. The address lines are 32 bits wide. True 16-bit computers store data in memory chunks of 16 bits and use a 32-bit address bus.

The 8086 chip, used in the IBM PC computer, is a 16-bit hybrid computer. Internal architecture and address lines are set up to handle chunks of 16 bits, but the data bus is only 8 bits wide, so every time data is put in or taken out of the CPU, two data locations are used for each 16-bit number. Addresses require three 8-bit memory locations each. Thus the IBM PC has an 8-bit data bus and a 24-bit address line bus capable of addressing over a million memory locations.

The Z80 computers let you perform some operations in 16-bit mode, but for the most part they are restricted to 8-bit operations of data because it uses an 8-bit data bus and a 16-bit address bus (limited to 65535 addressable locations).

Before I can answer the Editor/Assembler problem, I have to ask if the renumbering routine works. If it does, you have a problem in the text buffer memory: a bit isn't working right. You'll need to run an extensive memory check program to trap the defective bit.

If the resequencing program fails to work, the problem is a bad bit somewhere in the RAM occupied by the Editor/Assembler program, again requiring a memory check program.

If the memory passes as OK, the problem has to be with your copy of the program. Take it to a friend's house and try it on his computer. If the program exhibits the same problems as on your computer, you have a defective program. Go to Radio Shack, explain the problem, and ask for a replacement. So far, no one I have talked to has reported having your problem with their copy of the Series I Editor/Assembler.

There was an article published in *80 Micro* that explains how simple it is to install your own disk drives ("Do-It-Yourself Disks," January 1982, p. 172). As to which drives to buy, that's not something I can go into. A large number of our advertisers sell upgrade kits (both build-it-yourself and assembled). If I were to try to mention prices, they'd be outdated by the time you received your answer.

For books on Assembly language, try a B. Dalton bookstore. They have a large selection of books on the subject. The one I like best is *TRS-80 Assembly Language* by Hubert S. Howe Jr. (Spectrum Books, Prentice-Hall Inc., Englewood Cliffs, NJ 07632, ISBN #0-13-931121-1, Cat. No. S-810, $9.95). Hubert presents the information in the most comfortable and easy-to-learn format of any other book on machine-language programming.

Finally, the Radio Shack technical manual. What can I say? It tells all the details of how the TRS-80 works. If you're not technically minded, you don't need the book. It was written for the knowledgeable electronics person who wants to muck around with his computer.

Is there a program for making a printer act like a typewriter: printing a character each time you press a key, then saving the results on tape or disk? It would simplify filling out forms, and modifying and changing the wording on them. Once a form was filled out, the spacing would be automatic.

I have an MPI 99G printer that is Centronics-compatible like the Epson. Would programs made for the Epson work on my MPI 99G? It's bidirectional, dot-addressable, and very fast.

W.M.
Redwood City, CA

Programs are available that will do what you want. Well, sort of. Most printers won't print characters until either the internal buffer is filled or until a carriage return is received. Thus, simply sending a character to the printer each time you press a key doesn't necessarily result in that character being immediately printed.

You can write your own simple program by using an INKEY$ routine to load characters into a string variable as you type them in. When you press enter, the entire string variable would be sent to the printer, and also sent to a tape recorder or disk file.

If you want to allow for retyping the line, make the line input routine a subroutine and have it return control to the master program when enter is pressed. After the line is printed you can have the master program ask if the line was correctly printed. If not, the string variable is set equal to null (double quotes) and you are sent to the input routine to redo the line. If it is correct, the string is stored on tape or disk; as you want. Another simple program could be written which would simply input each stored line from the tape and send it to the printer.

According to the MPI people, their printer uses different control codes than the Epson, so programs that drive the Epson dot-addressable graphics won't work with their printer. Sorry about that.

Concerning D.P.'s question about a renumbering program for his cassette Model III (December 1982, p. 437), Cottage Software (614 N. Harding, Wichita, KS 67208, 316-683-4811) sells a program called Packer.

This program is amazing! It can renumber, move blocks of lines, pack a program into a minimal amount of space, unpack a program (each command put into a separate line number), and remove REM statements and unneeded spaces. It sells for $29.95, and works on 16K, 32K, and 48K machines, and in Disk Basic.

W.A.
St. Louis, MO

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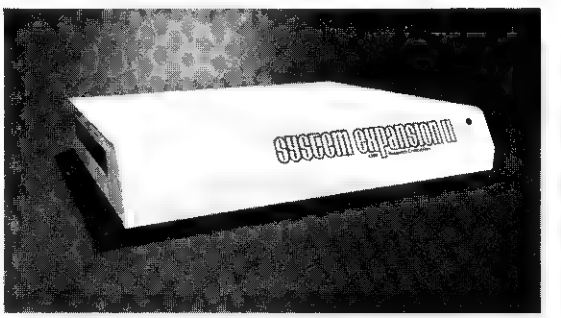
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Thanks for your input. It should help out several readers.

I saw a demonstration of a program at a computer user's group meeting that retrieved information from a bad disk. The disk itself wasn't damaged, but sectors on the disk contained bad information that prevented the disk from operating correctly. The demonstration wasn't on a Radio Shack computer.

Are there any utility programs, or books available that contain programs, that will retrieve information from disks that appear to be bad?

J.N.
Freedonia, WI

Since you don't mention what computer you have, I assume you want information for the Model I/III. Your first step should be to get Super Utility Plus (Powersoft, 11500 Stemmons Fwy, Suite 125, Dallas, TX 75229, 800-527-7432, $74.95). This is the most comprehensive disk repair utility that I know of, and includes both Model I and Model III versions on the same disk.

In addition to the program, you should also get *Inside Super Utility Plus* by Paul Wiener (available from Powersoft, $19.95). The book gives extensive explanations on how to use Super Utility (SU+ includes a manual, but it isn't easy to understand).

Next you'll need technical data on the disk layout. At the moment I don't know of any books that give this information for the Model III, but there is *TRS-80 Disk and Other Mysteries* (IJG, 1953 West 11th St., Upland, CA 91786, 714-946-5805, $22.50) for the Model I which tells you all you need to know to recover information damaged disks. Most of the information is also applicable to the Model III, but it can get confusing trying to follow the book if you're on a Model III.

I'd like to comment on the letter from B.B. of San Jose, CA, and his problems with EDTASM 1.0 and 1.1 (December 1982, p. 437). I, too, had problems with tape EDTASM, and at the same point: the object code output from the assembly. In my case, six months, numerous trips to my local RS store, telephone calls to Fort Worth, four tape copies, three versions, four letters written, and four letters in response resulted in a refund, but not in a working program.

It seems incredible to me that Radio Shack could produce a program with such a bug. Radio Shack denied the problem, and I've no way of contacting other purchasers of the product to get their impressions. I would appreciate hearing from other people who've also had this problem.

A.L.
Studio City, CA

It definitely sounds as if the program is at fault, but I find it hard to believe that a program would have such a bug without an outcry from every purchaser. No company would sell a program that every user would return as defective.

Does anyone else have anything to offer in the way of comment or advice?

I have an Okidata Microline 83A printer, and I want to do underlining with it. I called Okidata and the person I talked to told me that it isn't possible to do underlining. However, in making a printout of the ASCII codes, I noted that ASCII code 95 is the underline character.

How can I implement this in a program to get underlining? It seems that I must somehow backup and underline, or print the same line twice.

W.S.
Short Hills, NJ

What you need to do is to find out if your printer responds to the back-space character (08). Try this: LPRINT "A";CHR$(08);CHR$(95) <enter>. If it works, you can use this technique to underline or double-strike any character. If it doesn't work, I'm afraid you're out of luck.

The only other choice is to use the DIP switch settings to turn off the automatic line feed on carriage return in your Microline 83A. This will, however, foul up using the printer normally with Basic and other programs.

I need information on how to rewrite Hewlett-Packard Basic to run on my Model I. Specifically, I'm trying to modify the program CIVIL2, and some of the program statements such as Mat Read, Mat Zero, GOTO A of 440 (line 440 is a data statement), and Restore 3440 have me stumped. Can you help?

SSG R.L.
APO New York, NY

What you need is *The Basic Handbook* by David Lien (Lien wrote the original Model I Basic manual). This book is the encyclopedia of the Basic computer language, and provides a comprehensive cross-reference of 19 different versions of Basic, including Hewlett-Packard Basic. All you do is look up the Basic command in question, read the definition, and type in and run the sample program. If your computer supports the command, no problem. But if it doesn't, the book provides a simple program substitution that does the same thing as the Basic command in question, if possible. Anyone translating programs from one computer to another should have this book.

For your needs: Mat Read is used to read values from a data statement and assign them to an array; Mat Zero sets all elements of the array to zero, or lets you re-dimension an array in your program; GOTO A of 440 is used as a multiple branching technique where A is an integer which passes program control to line 440 if A = 1, or allows the program to fall through to the next line if A = 0 (similar to the On X GOTO Line Number, Line Number statement of Model I/III Basic); and Restore 3440 is used to restore the data pointer back to the first piece of data in line 3440 (Model I only allows a total restore of all data).

The Basic Handbook is available from CompuSoft Publishing (1050-E Pioneer Way, El Cajon, CA 92020-9990, 800-854-6505, ISBN #0-932760-05-8, $19.95). Foreign distributors are located in England, Australia, The Netherlands, Sweden, France, and Kowloon.

In a recent column you gave advice to someone whose disk drives would not back up, but which performed all other functions. I had the same problem when I first upgraded to disk drives. It's a hardware timing problem with many of the early expansion interfaces. The fix is to change R15 in the E.I. from 200 ohms to 270 ohms. It has cured my problem completely.

What signal to what address causes the Percom doublers to switch from single-density to double-density?

R.J.
Ellensburg, WA

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Now that you mention it, I remember that the first Model I disk system I worked on (1978) couldn't back up a disk either. Since that was also TRSDOS version 1.0, release number 1, I always thought it was a software problem (the unit came back from the repair center with TRSDOS 1.0, release number 2, and the Backup operation worked fine).

The address is a memory-mapped address, 37EC, the FD1771 controller status/command register. You have to load the command register with the proper bit set to select single or double density. That information you'll have to get directly from the Percom people. For more information on doing your own disk drive I/O routines, I suggest that you look at either *Disk Interfacing Guide* by William Barden Jr. (80 Northwest Publishing, 3838 South Warner St., Tacoma, WA 98409, $5.95), or *Machine Language Disk I/O & Other Mysteries* by Michael J. Wagner (IJG, 1953 West 11th St., Upland, CA 91786, 714-946-5805, $29.95). The latter provides information on both the Model I and Model III disk controllers.

N.K. of Forked River, NJ, asked about audio medium for the blind (December 1982, p. 440). We have enclosed a machine-language program that loads first and then sounds out in Morse code the letters as they appear on the screen.

If N.J. doesn't know Morse code but wants to learn it, there's a short tutorial program on the other side of the cassette. It's easy to learn, and very fast and accurate. One blind person we know is quite comfortable at 60–70 words per minute.

The Morse code program we sent is written for using the TRS-80 as a computer, not as a word processor, and doesn't recognize lowercase. In fact, it won't run if you load a lowercase driver.

If N.J. is interested, we'll modify it to recognize lowercase, and we'll even send an elementary, unfancy-but-easy-to-use Morse code word processor if she wants it.

N.H. and B.D.
Michigan State University
East Lansing, MI

I've forwarded the materials you sent to N.K. If anyone else is interested, send me a SASE and I'll forward it to N.H. and B.D.

Microcomputers are just getting started here, and there are a number of manufacturers that would like to become the Apple of this country.

For various reasons it's difficult to buy an imported micro, and although the local product is about three times the price of similar merchandise in the United States, the choice seems to be to buy local.

Enclosed is a review, from the only local micro magazine published here, of the CPU-500. A salesman told me the computer is functionally like a Model III. To prove it, he put in a disk with what appeared to be Radio Shack programs: Dancing Demon and others. This compatibility would be a real advantage because software here is limited and expensive.

Please give me your reaction to the micro and tell me if you see any traps. As many people have said, "It's a jungle out there (here)," and I want to know what I'm buying, if possible.

B.H.
Brazil, South America

This is the first that I've heard of the CP-500 (Z80 CPU, cassette, two disk drives, printer interface, modem interface, 48K of RAM, and 16K of ROM. The operating system is compatible with CP/M and TRS-80 Model III). The specifications sound remarkably similar to the Model III, but then any Z80, two drive, 48K RAM computer sounds similar to the Model III.

Your problem is not simple. Just because the salesman has Radio Shack programs that operate on his computer doesn't mean that the computers are compatible. For example, I have programs on one of my disks that were originally on the Apple computer. Just because I can load that disk on my TRS-80 doesn't mean my TRS-80 is compatible with the Apple computer.

If you want to test the salesman's word, buy a Model III disk program from Radio Shack, put it in the machine, and boot it up. If you can load the disk and run the program, there's a good chance that the machine is compatible with the Model III. If the disk doesn't boot, or the program doesn't work right once it's loaded, then the machines aren't as compatible as the salesman wants you to think.

Even if you do get the program to work, that's no guarantee that the machines are compatible. They could be compatible on only 95 percent of the Model III programs (or only 50 percent). If you can afford it, buy several different types of programs for the Model III (Basic programs, machine-language programs, games, and serious programs). It's possible that only Basic programs are compatible between the two machines, or perhaps that all the programs are compatible.

In the final analysis, the only way to determine how compatible the machines are is to buy Radio Shack Model III programs and try them out on the CP-500. If all the programs work, the machines are very compatible. If not, the machines aren't as compatible as you might want.

Good luck, and let us know what happens.

Here's an awful riddle. Question: When is a Model III TRSDOS Create command like a DOSPLUS Restore command? Answer: When you know the number of sectors and the logical record length.

You can restore the file if you haven't written to the disk since you've killed the file.

K.A.
Chicago, IL

Sounds like an interesting solution, but how do you know what the number of sectors is?

Here's one for you: How many programmers does it take to change a light bulb? None. That's a hardware problem.

I just purchased a used Model I with Level I Basic. Can I convert this to Level II Basic myself, or do I have to go to Radio Shack?

If I can do it myself, can you supply a source of information on how to do this?

F.B.
Milwaukee, WI

That's an easy one. See the letter at the beginning of this column for the information you need. ■

Terry Kepner is a free-lance writer and programmer, and the vice president of Interpro. He's been writing about microcomputers since 1979.

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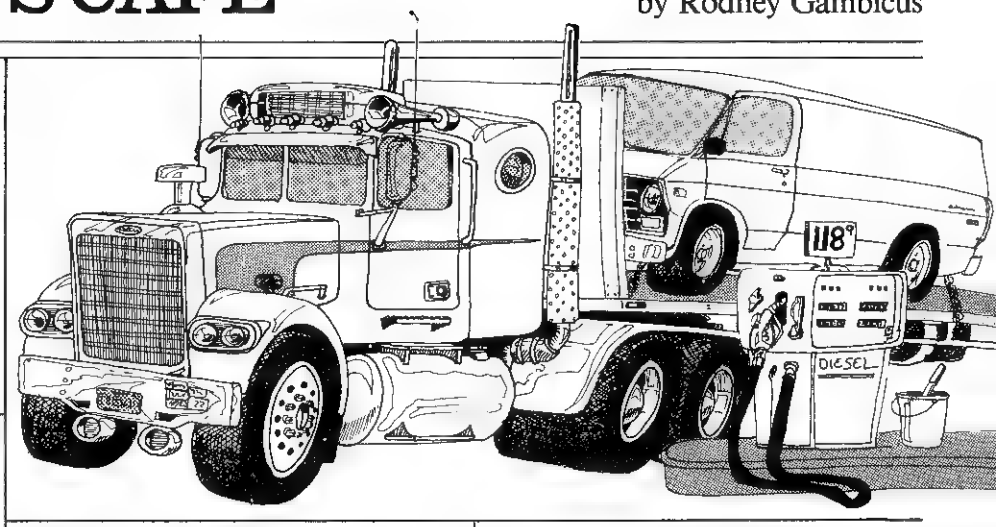
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The GAMER'S CAFE

by Rodney Gambicus

Low octane and high scores



Little America sprawls across the Wyoming landscape like the biggest gas station in the world, which it is. You haven't seen a service island until you've seen Little America.

It's a great place to go if you need gas, which we did, but depressing if you don't have the money to buy any, which we didn't. We were sitting in front of the restaurant admiring the big rigs and wondering if we'd have to hitch to Iowa City when Mercedes started jumping up and down.

"Well, hey, I mean, like, really!"

Of course. The day was warm and the sky was blue. Why didn't we set up the Gamer's Cafe?

We immediately started hauling out the card tables and Model Is and IIIs and PMCs, and even the Sol-20 we bought for $5 at a pawn shop in Salt Lake City.

Before long, a crowd of truckers had gathered about, staring quizzically at the computers, touching them gingerly with their great hairy paws.

"Geez, this is like the beginning of *2001*," Mercedes whispered.

We booted some of our favorite games, but none seemed to capture our audience's fancy until we got Frogger up and running. A mad scramble for the keyboards followed, and while Mad Max held the brutes off with a smoked salami, Mercedes and I read the mail.

* * * * *

In Gamer's Cafe world news, Canada has regained the trophy for Eliminator. Quebecois Karl Boule held the original record, only to be toppled by Nick Fazio's 117,300 points. Now Dean Mitchell of Edmonton, Alberta, sends a screen dump and photo showing an incredible 271,300 points. It's a good thing we locked Winthrop up in that home in Las Vegas, or he'd go crazy.

We've got a number of new entries for the scoreboard, including a couple of Pac-Man clones: Ellen Lackey of Forest, MS, has scored 296,310 on the Cornsoft Group's Scarfman, while Andy Lehtola of Mound, MN, has racked up 56,235 on Pac Attack for the Color Computer.

Andy adds: "P.S.: Is Mad Max still with you?" Of course he is; he's the guy over there with the smoked salami stuffed up his nose.

We've also got some entries from New Zealand. Halfdan Hansen sends in a new high score for Cosmic Fighter, and scores for Super Nova, Chicken, and Outhouse. Matthew Holmes submits scores for Caterpillar, Attack Force, and Laser Defense. And John Kane places entries for Defense Command, Robot Attack, Ghost Hunter, and Missile Attack.

Ellen Lackey, by the way, isn't content with being on our scoreboard; she wants to start her own. Players should send high scores and stamped, self-addressed envelopes to her at Box 434, Forest, MS 39074, and she'll send an updated record of all results. The Cafe board, of course, remains definitive.

Kane, Holmes, and Hansen aren't starting a scoreboard, but they have a comment on ours: that anyone could recreate a high-score page with Set, POKE, or CHR$ commands.

"We know no one would stoop to such depths to increase his status in the gaming world, but we think it illustrates our view that one shouldn't have to go to the trouble of photographing the screen to be credited with one's right and proper high score. Instead, a friendly letter should be all that is needed."

Mercedes says we'll take the suggestion under consideration, and since she owns the van, I won't argue.

One last comment: Mad Max has 467,240 on Galaxy Invasion Plus, but I hate to erase Winthrop's 1 million on the original Invasion. One ought to remember old friends, at least until they get knocked off the board.

* * * * *

Helpful Hints Dept.: Bob Retelle, author of Aardvark-80's Quest adventure (see Reviews, December 1982, p. 48), writes that a family of customers (Mercedes wonders if a family of customers is like a pride of lions) discovered a feature he hadn't thought of. By using the Save Game option, Mom, Pop, Dick, Jane, and Spot can all have separate Quests going at the same time, each warrior with a different tape. Since the plot and map change with every game, no one repeats another's adventure.

Speaking of adventure games, has anyone figured out how to last for more than 30 seconds in Quest for the Key of Night Shade, which ran in the February 1983 issue of *80 Micro*?

* * * * *

Along with her Johns Hopkins alumni magazine, Mercedes got a postcard from Gordon Monier of Computer Shack. The Shack (not to be confused with the Big Guys in Fort Worth) has a couple of TRS-80 releases due this spring.

Dig Out is based on Dig Dug, except that a fellow drops bombs instead of breathing fire while you try to dig a hole. Dragon Rider, written by Dungeon Escape and Cyborg verteran Bill Dunlevy, is a one- or two-player Joust-alike involving a knight on a flying dragon. The object is to win dragon dogfights.

"Didn't want to overdo the dragon motif," Max said.

* * * * *

By the time we finished the mail, we had truckers lined up all the way back to the freeway ramp. They were having a

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heck of a time, but unfortunately we hadn't made enough money for a cup of coffee.

"Hey, leave this to me," Mercedes said as she sauntered over to a trucker who was carefully circling our Sol-20. I didn't like his looks—he had an STP decal stuck to his forehead and overalls made of old mud flaps—but he and Mercedes seemed to strike it off. After a few minutes, Mercedes strolled on back with the trucker in tow.

"This is Buzz," she said. "We've made an agreement."

"Oh-oh," moaned Max.

"He's gonna load the van in the back of his semi and take us to Iowa City, and I'm gonna install the Sol-20 in his rig and teach him Assembly language," she said.

"I'd like to learn machine language, too, but I've got to get this load of frozen pizzas to Jersey by Friday," said Buzz.

And so, despite no gas, the Gamer's Cafe was on the road again. I don't know how we do it. In fact, I don't think I want to know. ■

The Big Board

Gamer's Cafe readers are invited to submit their high scores for these and other TRS-80 games. We'll print unvalidated scores, but validated scores will, of course, rank higher in prestige. To validate a score, send a photo of the game screen.

Armored Patrol	Winthrop	81,000*
Attack Force	Matthew Holmes	145,750
Bable Terror	Mad Max	5,734
Caterpillar	Matthew Holmes	95,644
Chicken	Halfdan Hansen	8,922
Cosmic Fighter	Halfdan Hansen	199,440
Defense Command	John Kane	102,490
Demon Seed	Mad Max	67,320
Eliminator	Dean Mitchell	271,300
Galaxy Invasion	Winthrop	1,000,000**
Ghost Hunter	John Kane	41,190
Laser Defense	Matthew Holmes	199,490
Missile Attack	John Kane	41,430
Outhouse	Halfdan Hansen	26,650
Pac Attack (CC)	Andy Lehtola	56,235
Robot Attack	John Kane	12,990
Scarfman	Ellen Lackey	296,310
Sea Dragon	Mad Max	147,910 +
Super Nova	Halfdan Hansen	316,110
Swamp Wars	Winthrop	39,200
Time Runner	Mad Max	85,865

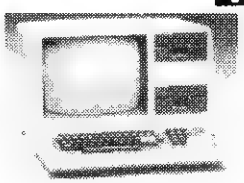
*Method 1 Winthrop racked up 281,000 using Method II

**Winthrop still had six ships left, but he got bored.

+Novice mode. Max got 69,480 in the expert mode.

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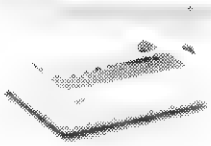
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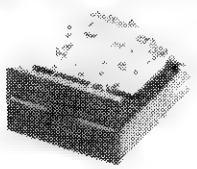
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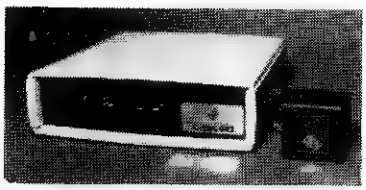
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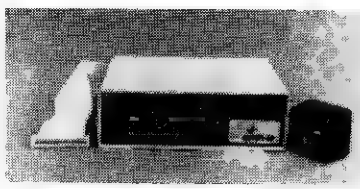
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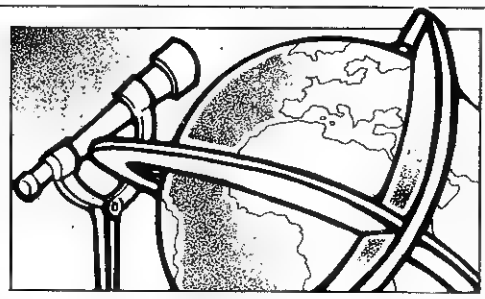
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COPERNICA MATHEMATICA

by Bruce Douglass



Pascal for scientific programming

Microsoft Basic is a powerful programming language. Easy error-trapping and interfacing with machine language, powerful string and formatting commands, and more make it suitable for many programming tasks.

One day, I had to write a pair of file manipulation and data-base management programs (each about 40K, uncompressed and with comments). The programming for these file manipulators was not difficult. Each separate task had a routine that called other routines that called even more routines. Alone, each task was easy, but putting hundreds of these Basic routines together boggled my mind. I began to wonder about other methods of programming.

Pascal presented itself, and at first I was most impressed with its pedantry. You've got to declare all variables at the top of the program, and all subroutines before the main routine. Standard Pascal also lacks random-access files, and error trapping.

But now, I've done a complete about-face, particularly with two excellent implementations of Pascal for the TRS-80: Alcor Pascal and Pascal-80. Both have enhanced features, making them more powerful than standard Pascal.

I believe that Pascal is a better language than Microsoft Basic for scientific programming. A number of features have, at best, limited counterparts in Basic. These include global and local variables, more flexible looping constructs, dynamic variables, and true recursion.

Loops

The Basic program in Listing 1 results in an infinite loop. The program altered the value of the looping variable in the subroutine at 1010 because Basic's variables are all global. The variable can be examined or changed anywhere in the program. These errors can be very difficult to track down in large programs with many levels of nested subroutines.

In Pascal (Program Listing 2) the looping variable is passed to the procedure DECPRINT, but the value is protected from alteration. Even though the subprogram (in this case a procedure) can be passed the value, and this value can be manipulated and altered, the value of the original variable in the calling routine remains unchanged. Running Program Listing 2 will simply produce 0 1 2 3 4 5 6 7 8 9.

The variable I is local, not global. Global and local variables are a great asset to programming large tasks because you can protect a variable's value from inadvertent change. Of course, you can pass the variable so its global value can be changed as well, but since you must make a point of it, this error is much less likely to occur.

Pascal has three types of looping constructs: For...Next, While, and Repeat...Until. The looping variable in Pascal's For loop must be an integer, hence the number of iterations produced by the loop can be known exactly. This is not necessarily the case with Basic's For...Next loop, which allows single and double precision variables as the looping variable. Floating point always breeds some error, normally small. However, there is a chance that floating point round-off error will end the loop early or late. For example, in the loop FOR I = 1 TO 10 STEP .001, if the last step is I = 10.000001 instead of 10.0000, the loop will end one iteration too early. By restricting the For loop to integers, you can eliminate this error.

If you want to loop while some condition is true, use the While loop. If you want to loop until some condition is true, the Repeat...Until loop is better. Basic can mimic these, but Pascal makes the programmer's job of translating an algorithm into a working program that much easier.

Consider a program to evaluate SIN (X) from 0 to pi/2. In Basic, you could use the code in Program Listing 3. This can be written in Pascal using the While loop or the Repeat...Until loop (see Program Listings 4 and 5).

The While and Repeat...Until loops are different. Similar to Basic's For...Next loop, Repeat...Until loops will always execute at least once, since the comparison comes at the end of the loop. The While loop will only execute when the condition is true. If it is not true on the first iteration, then it won't loop at all.

Other Features

Pascal supports dynamic variables, structured variable types, and full recursion. (Dynamic variables can be created

```
 10   FOR I=1 TO 10
 20        GOSUB 1000
 30        NEXT I
 40        END
1000       DECREMENT I AND
       PRINT IT
1010       I=I-1
1020       PRINT I
1030       RETURN
```

Program Listing 1. Basic Infinite Loop

```
PROGRAM EXAMPLE;
VAR
    I : INTEGER
PROCEDURE DECPRINT(I : INTEGER);
    BEGIN
      I := I - 1;
      WRITE(I);
    END
BEGIN
    FOR I := 1 TO 10 DO
      DECPRINT(I);
END.
```

Program Listing 2. Pascal Local Variables

```
100   FOR I -0 TO 1.5707963 STEP .01
110       X=SIN(I)
120       PRINT I;X,
130       NEXT I
```

Program Listing 3. Basic For...Next Loop

```
      I := 0
      WHILE I<1.5707963 DO
          BEGIN
            X := SIN(I);
            WRITE(I,X);
            I := I + 0.01
      END;
```

Program Listing 4. Pascal While Loop

and deleted at will during the execution of the program. They are referenced by a special variable type called a pointer, which points to the variable in memory.)

Pascal also supports a structured variable type called Record, which is like a generalization of the type Array. An array requires that all elements be of the same type, real or integer. A record can have mixed types, such as strings, real numbers and pointers making up different fields within the record. By allowing one field of the record to be the type Pointer, you can create a dynamic linked list, where each record points to the next. More complex data types, such as double-linked lists, can be easily created as well.

Pascal lacks dynamic array dimensioning, which Microsoft Basic does allow. In Basic, you can say DIM A(N,M), where N and M are variables. In Pascal, you can use a type Record with a doubly-linked list with the fields value (Real), row pointer (Pointer), row number (Integer), column pointer (Pointer), and column number (Integer).

The value is the value of the array element. The row points is a pointer variable to the next element in the row, and the column pointer points to the next element in the column. The trouble with this scheme is that you cannot access any element immediately; you must search through the records until you find the proper row and column numbers. In fact, I am interested enough in this problem that I will send a copy of my forthcoming book *Numerical Basic* (on computation mathematics for microcomputers) to the best solution of this problem—dynamic array allocation in Pascal.

With the type Record, it is easy to create and manage complex data types that would be difficult in Basic. Pascal also supports full recursion. I have been unable to come up with a good example of recursion in numerical mathematics. Generally, recursion is taught with ill-suited examples, such as factorials and Fibonacci numbers, which have better iterative than recursive solutions. There are good examples in artificial intelligence applications, such as backtracking as a scheme in the theory of general problem solving, and solution to the Towers of Hanoi problem. Lisp is better suited to these problems than Pascal even though both support recursion. Can someone find a good application of recursion in numerical mathematics that is not better solved by an iterative process?

Pascal is a procedure-oriented language (POL). Pascal makes it easy to write modules that perform specific functions. The subprogram building blocks, procedures and functions, are like programs themselves. Thus, Pascal makes it very easy to design and test programs in a modular fashion. In Basic, a modular approach can be attempted, but without local variables, parameter passing and all the other goodies of Pascal, it is only an attempt. ■

```
I;=0;
REPEAT
    X:= SIN(I);
    WRITE(I,X);
UNTIL I>1.5707963
```

Program Listing 5. Pascal Repeat. . . Until Loop

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RELOAD 80

by Art Huston

Machine language is the native language spoken by computers. To us these instructions are simply strings of numbers, but to the machine they are codes that say things like "store this value in that location."

Different computers have different CPUs, and therefore speak different versions of machine language. The Models I, II, III, and 12 use the Z80, and therefore speak Z80 machine language; the Color Computer has a MC6809; and the Model 16 has a MC68000 and Z80.

Assembly Language

The earliest programmers wrote only in machine language. They translated each operation into the correct sequence of numbers, a tedious process known as hand-assembling.

Assembly language was developed in the early 1950s to automate this process. Each machine-language instruction was given an easy-to-remember mnemonic, so that programming became closer to English.

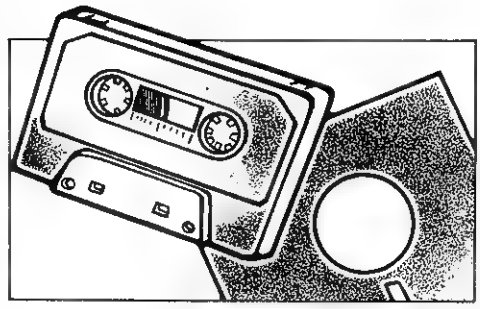
Such a program is said to be written in "source code;" the resulting machine-language program is "object code." Programs called editor/assemblers let you write programs in source code and then assemble it into object code.

Programming took another giant leap with the development of high-level languages like Cobol, Fortran, and Basic. These languages are actually machine-language programs that use words to represent functions, allowing you to write programs quickly and easily. They serve as a link between you and the CPU, translating your work into thousands of machine-language instructions. The result is a program much easier to write than Assembly language, but one that runs many times slower.

Load 80 Assembly Language

About 10 percent of the listings published in *80 Micro* are written in Assembly language, ready to be typed into an editor/assembler. Load 80 also publishes them in this form, rather than as machine language. This means you can easily modify them; however, you must own an editor/assembler to run them.

To assemble a program, load the editor/assembler, then use it to load the Assembly-language program. Most editor/assemblers use some variation of the L command.



To assemble a program you usually type A and then assign a file name to the machine-language that will be generated.

Which Editor/Assembler?

Color Computer owners have very little choice about which editor/assembler to buy; there's Radio Shack's CC EDTASM+, Microworks' Macro-80C or SDS80C or Eigen Systems' CCEAD.

There are nearly a dozen Model I/III editor/assemblers on the market, and many have adopted different source-code formats. Simply put, they only load source code that they generated.

The most-used disk format is derived from Apparat's NEWDOS patch to Radio Shack's cassette editor/assembler. This patched program became the first disk editor/assembler, and quickly became the standard. When Radio Shack introduced the Series I Editor/Assembler they ignored Apparat's lead and chose a different format.

The Apparat format now makes up 80 percent of the Assembly-language listings send to *80 Micro*; because of this Load 80 has adopted it as the standard. Editor/assemblers that use this format include EDAS from MISOYS, ASSEM/ZSIM from Instant Software and MZAL from Computer Applications Unlimited. The later two provide functions to convert Apparat source code to their own.

Program	Title	Page	Comments
1	COPYRGHT/BAS	-	None
2	GOLF/BAS	108	None
3	BASEBALL/BAS	130	None
4	CALCS3/BAS	168	None
5	MAPS3/BAS	168	None
6	MERGE3/BAS	168	None
7	BOWLSTAT/BAS	218	None
8	LP7GRFX/BAS	306	None
9	LP7GRFX/SRC	306	Needs EDTASM
10	L80TORS/BAS	404	None

April Load 80 Directory

LOAD 80

Program Listing

```
10 '***** LOAD80 SOURCE CODE TO RADIO SHACK SOURCE CODE *****
20 '***** Initialize *****
30 'Calc. string space
40 CLS:CLEAR0:M=MEM-1000:IFM>32767THENM=32767
50 CLEAR M:DEFINTB-Z:DEFSTRA:ONERRORGOTO5000
60 'Calc. max# of lines in program
70 R0=FRE("")/256:R1=(MEM-50)/3
80 IFR0>R1THENMR=R1ELSEMR=R0 'Max # recs.
90 DIM A(MR-1)
100 GOTO1000
200 '********* Subroutines **********
210 'Makecaps
220 IFA=""THEN270
230 FORX=1TOLEN(A)
240  X1=ASC(MID$(A,X,1)):IFX1>96ANDX1<123THENX1=X1-32
250 MID$(A,X,1)=CHR$(X1)
260 NEXT
270 RETURN
280 '*** Press Any key ***
290 PRINT"Press ANY key ";
300 A$=INKEY$
310 IFINKEY$=""THEN310
320 RETURN
1000 '********** Main program Starts Here **********
1010 'Display header
```

Listing continues

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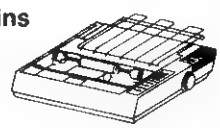
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Listing continued

```
1020 PRINT" CONVERT LOAD80 SOURCE CODE TO RADIO SHACK'S EDTASM D
ISK FORMAT "STRING$(64,140);
1030 PRINT"   The same Operating System must be kept in Drive 0
for this":PRINTTAB(18)"program to work correctly !!"
1040 '** Loop here for each file **
1050 R1=0 'Read  totals = 0
1060 W1=0 'Write totals = 0
1070 EF=0 'EOF is false
1080 PRINT@320,CHR$(31);
1090 'Get Source File
1100 PRINT@320,CHR$(30);:LINEINPUT"LOAD 80 FILE ? (QUIT to quit)
 ";SF$
1110 IFSF$=""THEN1100
1120 A=SF$:GOSUB210:SF$=A 'Make caps
1130 IFSF$="QUIT"THEN1560
1140 'Get Destination File
1150 PRINT@384,CHR$(31)"DEST. FILE ?
(<Enter> = "SF$", QUIT to Quit ";:PRINT@414,;:LINEINPUTDF$
1160 IFDF$=""THENDF$=SF$
1170 A=DF$:GOSUB210:DF$=A 'Make caps
1180 IFDF$="QUIT"THEN1560
1190 'Get Source Disk
1200 X=INSTR(SF$,":"):IFX=0THENX=LEN(SF$)+1
1210 X=X-1:SD$=RIGHT$(SF$,LEN(SF$)-X)
1220 'Get Dest. Disk
1230 X=INSTR(DF$,":"):IFX=0THENX=LEN(DF$)+1
1240 X=X-1:DD$=RIGHT$(DF$,LEN(DF$)-X)
1250 '** Loop here for each set of read/writes **
1260 'If Source disk<>Dest. disk, don't Prompt
1270 IFR1>0ANDSD$<>DD$ANDSD$<>""ANDDD$<>""THEN1290
1280 PRINT@960,CHR$(30)"Insert LOAD80 disk, ";:GOSUB280:PRINT@96
0,CHR$(30);
1290 IFR1=0THENOPEN"I",1,SF$:IFEOF(1)THEN1560 'lst time thru
1300 PRINT@512,"Reading";:R2=0 '# records read this pass
1310 FORX=0TOMR-1 'Fill array to MR (Max#Recs)
1320  IFEOF(1)THENEF=-1:CLOSE#1:X=MR-1:GOTO1410 'EOF - Goto writ
e
1330  R1=R1+1:R2=R2+1:PRINT@520,USING"#####";R1'Inc read totals
1340  LINEINPUT#1,A:PRINT@640,A;CHR$(31) 'Get line
1350  IFR1>1THEN1380 'Check for not first record
1360  'lst line - take off D3H and Progname
1370  A=RIGHT$(A,LEN(A)-7)
1380  'Store line in array
1390  A(X)=A
1400  IFASC(A)=26THENEF=-1:CLOSE#1:X=MR-1 'EOF marker found
1410 NEXT X 'Get next line
1420 '** Done with read - begin write **
1430 'First time thru, always prompt
1440 IFR1=R2THEN1470
1450 'If Source disk<>Dest. disk, don't prompt
1460 IFSD$<>DD$ANDSD$<>""ANDDD$<>""THEN1480
1470 PRINT@960,CHR$(30)"Insert DESTINATION disk, ";:GOSUB280:PRI
NT@960,CHR$(30);
1480 IFW1=0THENOPEN"O",2,DF$ 'lst time thru
1490 PRINT@512,"Writing";
1500 FORX=0TOR2-1 'Write last R2 records
1510  W1=W1+1:PRINT@520,USING"#####";W1 'Inc write totals
1520  A=A(X):PRINT@640,A;CHR$(31):PRINT#2,A 'Print it
1530 NEXT X
1540 'Done this read/write - If NOT EOF, Get next block
1550 IFNOTEFGOTO1250
1560 '** All done copying file **
1570 CLOSE
1580 PRINT@960,CHR$(30)"DONE.  Do you have another file to conve
rt ? (Y/N) ";:A=INKEY$
1590 A=INKEY$:IFA=""THEN1590
1600 GOSUB210:IFASC(A)>31THENPRINTA;
1610 ONINSTR("YN",A)GOTO1040,1620:GOTO1580
1620 '** Exit **
1630 CLOSE:PRINT@960,;:CLEAR50:END
4970 'Handle disk close after disk full error
4980 CLOSE 'Another disk full should occur
4990 GOTO5020 'If not, continue with error-trap
5000 '******** Onerrorgoto ********
5010 ER=ERR/2+1:IFER=62THENRESUME4970 'Handle closing after a di
sk full error
5020 CLOSE:PRINT@960,CHR$(30);
5030 IFER=53PRINT"AT LEAST ONE BUFFER MUST BE OPEN !";:GOTO5100
5040 IFER=54PRINT"LOAD 80 FILE NOT FOUND !";:GOTO5100
5050 IFER=58PRINT"DISK IO ERROR !";:GOTO5100
5060 IFER=62PRINT"DEST. DISK FULL !";:GOTO5100
5070 IFER=65PRINT"BAD FILE NAME !";:GOTO5100
5080 IFER=9ORER=14PRINT"FILE TOO LARGE !";:GOTO5100
5090 PRINT"ERROR"ER"IN"ERL;
5100 PRINT"  ";:GOSUB280:RUN
```

Cassette Load 80 uses the Radio Shack tape format, as do most editor/assemblers.

Load 80 to Radio Shack

The Program Listing converts Load 80 source code to load into the Radio Shack Series 1 Editor/Assembler for the Model I and III. The program will be on this month's Load 80 tape and disk, and will be available in the future if you send a formatted disk to the Load 80 Technical Editor and ask for the LD80TORS program.

To use it from the disk supplied with Load 80, type BASIC L80TORS/BAS -F:2. If you specify the same drive number for the Load 80 and destination file, or do not specify a drive number, you will be prompted to insert the correct disk at the start of each block read/write, giving you the option of a single-drive copy. Note that the same operating system must be kept in drive 0 throughout the entire process, and that the file names must be different if they are to be on the same disk. ■

A$	DEFSTR statement used. All-purpose variable for keyboard and disk I/O.
A$(	DEFSTR statement used. Stores array of Assembly-language source code read in.
DD$	Destination Drive. Drive that will store the new file.
DF$	Destination File. The new file that will be written.
EF	A flag to test for end-of-file. Returns logical true (-1) or false (0).
M	Used during initialization to clear string space up to memory capacity.
MR	Maximum number of records that can be read into one block.
R0	Maximum number of 255-byte records that will fit into string space. Used to determine MR.
R1	During initialization, maximum size of array that can fit into memory. Used to determine MR. During reading/writing, total number of lines read.
R2	Number of lines read in this block.
SD$	Source Drive. Drive that contains the Load 80 file.
SF$	Load 80 file.
W1	Number of lines written to the new file.
X	All-purpose counting variable
X1	Used during capitalization routine to hold temporary ASCII value.

Table 1. Variables

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We use over two dozen Model I and III TRS80 microcomputers in our business. We use the Model I and III exclusively, because our business is built around providing after-the-sale support for those machines. Every week we are testing dozens of peripheral items for Models I and III, trying new software products for the first time, developing new software products and making products easier to use. We're learning tons, as you might imagine.

Much of this learning is recorded in **The Alternate Source Programmer's Journal**. It's a bimonthly journal of information about the Model I and III TRS-80. Exclusively. That's the only machine we use and support. We've been doing this for over three years, and from our recent growth, it looks like we'll be doing so long after other vendors have "dropped" the TRS-80 market.

We invite you to subscribe to the Journal. There are all sorts of interesting programs and articles coming up in the next year, for both programmers and users. All for the Model I and III TRS-80. We provide the software support that lets YOU tell your TRS-80 what to do. Some things are more complicated than others. We frequently get testimonials from people going back to past issues with new understanding. And the best is yet to come. We're getting into "applications." New things to do. New languages. New features that can be added to your system with just a few bytes of code. All for the Model I and III.

Plus, unless you request otherwise, you will be placed on our product mailing list. We are constantly updating our line of TRS-80 products. Many we market ourselves. Many from other vendors. We offer an unconditional money-back guarantee, both on the Journal and software products.

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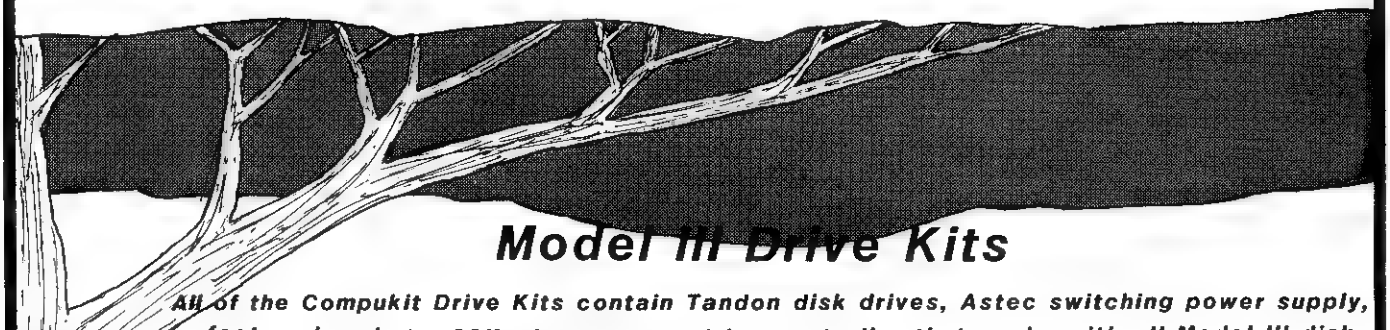
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Model III Drive Kits

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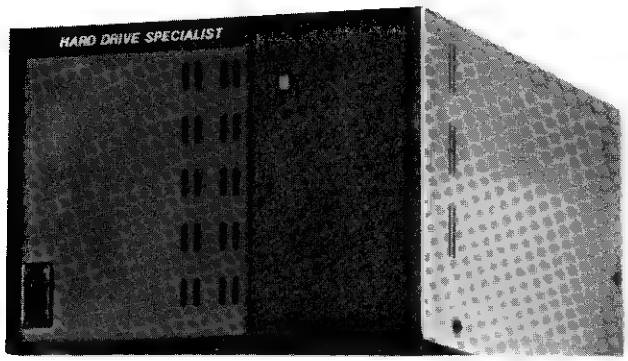
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All hard drives for the Model III are compatible with DOSPLUS 4.0, LDOS, and NEWDOS 80.

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NEW PRODUCTS

edited by Eric Grevstad

InfoStar for CP/M

InfoStar is a data-base management system for micros with 48K or more memory operating under CP/M. It is the first DBMS that doesn't require users to learn a programming language; instead, screen menus in English guide each step of data entry form design and report generation. Four levels of help menus are provided, as is an index from the help screens to the reference manual.

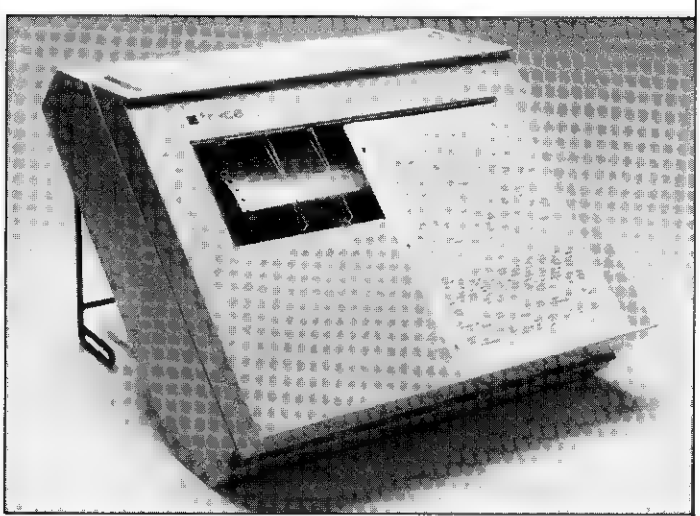
By simply selecting the data desired, users can generate a pre-formatted "quick report" in about 60 seconds, or generate custom reports four times faster than with other systems. Instead of using commands and coordinates, forms are drawn on the screen with a cursor.

InfoStar provides up to nine control breaks, arithmetic calculations within the report, and incorporation of data from multiple files. Print formats include underlining and boldface.

Its sorting facility is five to six times faster than other systems, sorting on up to 32 key fields at a time at up to 560 records per minute. InfoStar supports variable-length records with up to 65,535 records per file; files can be integrated with those from the CalcStar spreadsheet and WordStar word-processing programs.

Price is $495 from MicroPro International, 33 San Pablo Ave., San Rafael, CA 94903, 415-499-1200.

Reader Service ✓565



InfoStar

Economic Forecasting Program

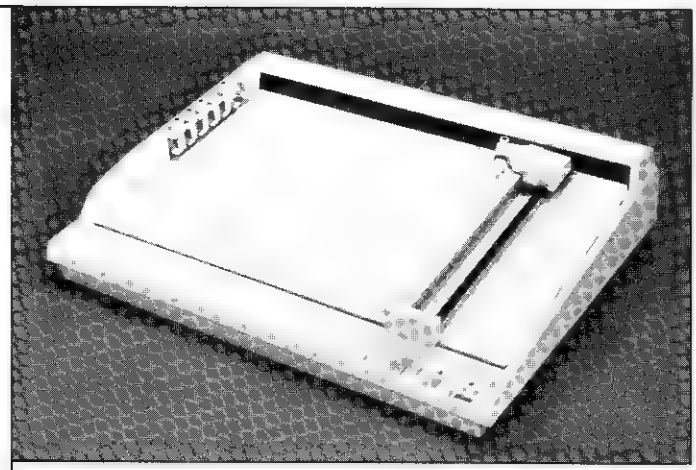
A program for the 48K Model III by Michael L. Tindall, professor of economics at the University of Texas at San Antonio, uses current data and users' hypotheses to forecast the state of the national economy for several quarters into the future.

Given current figures (the user edits and updates the data each quarter) and assumptions about the money supply and price of energy, the $500 program predicts key economic variables such as current- and constant-dollar Gross National Product, the GNP Deflator price index for goods and services, the price index for plant and equipment, the average hourly wage rate, and the unemployment rate. It also forecasts interest figures such as the prime rate and rates for three-month treasury bills and bank certificates of deposit.

A second program ($250) recommends changes in or creates new common stock portfolios, letting investors diversify their portfolios according to industry classification and riskiness of assets. The user supplies a list of up to 100 stocks, giving name, price per share, dividend, and risk and industry classifications; the program assembles portfolios based on the user's desired percentages of stock in each industry and risk sector.

For more information, contact Michael L. Tindall, University of Texas at San Antonio, Department of Economics, San Antonio, TX 78285, 512-699-8627.

Reader Service ✓555



Amplot II

Amplot II

The Amplot II six-color plotter features high speed, automatic pen retrieval, and .002-inch resolution for fast, accurate plots. It receives ASCII commands; built-in software permits additional alpha-character commands. Both parallel and RS-232C operation is standard.

Its effective plotting range is 10 by 14 inches. The $1,290 price includes six fiber-tip pens, chart hold-downs, and dust cover.

The plotter is sold by Amdek Corp., 2201 Lively Blvd., Elk Grove Village, IL 60007, 312-364-1180.

Reader Service ✓563

Drivers for SuperScripsit

Drivers are now available for several non-Radio Shack printers to support the SuperScripsit word-processing program. The drivers are offered for the Epson MX-80 and MX-100, Qume 5 Series, Brother HR-1, NEC 8023, TECwriter, and C. Itoh Starwriter (F10), ProWriter (8510), and Printmaster (F10 55 cps).

For more information, contact softERware, 16007 Miami Way, Pacific Palisades, CA 90272, 213-459-3414.

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Nobody Does It Better

A unique 7-bit CPU and the SPECTRE 2.0 operating system are highlights of the Model 007, a new British micro aimed at the professional and (secret) service markets.

Available in 48K, 64K, or

DOES STRING COMPRESSION HAVE YOU TIED UP IN KNOTS?

LET TRASHMAN CLEAN UP THE MESS!

TRASHMAN is a machine language utility for the TRS-80 Models I and III. It was written by Glenn Tesler, the author of FASTER, and can reduce BASIC's string compression time by 95% (see table below).



# STRINGS	SECONDS DELAY NORMAL	TRASHMAN	PERCENT IMPROVEMENT
250	11.8	0.7	94
500	45.8	1.6	96.5
1000	179.6	3.5	98
2000	713.2	7.8	98.9

WHAT'S STRING COMPRESSION?

When a BASIC program changes a string (words, names, descriptions), it moves it to a new place in memory, and leaves a hole in the old place. Eventually, all available memory gets used up and BASIC has to push the strings together to free up some space. This takes time. Lots of time. The computer stops running for seconds or minutes, and you may even think it's "crashed". The keyboard won't work, and until all the strings have been collected, you just have to sit and wait. Then things run for a while, until string compression is needed again. And again.

If you're using your computer for business, that wastes your money. If you're using it personally, it wastes your time.

WHAT'S THE SOLUTION?

As soon as you start using TRASHMAN, those delays almost disappear. It uses less than 600 bytes of memory, plus 2 bytes for each active string. It works with other machine language programs and with all major operating systems. It's easy to use, comes with complete instructions, and can be copied to your own disks.

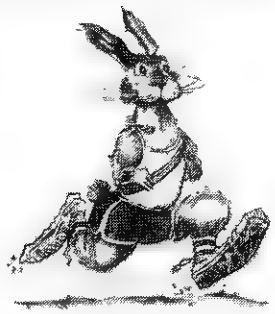
WHAT'S THE CATCH?

If a BASIC program uses only a few strings, very little time is wasted in string compression, and TRASHMAN won't be helpful. But, if hundreds of strings, including large string arrays, are used, TRASHMAN is just what you need.

TRASHMAN is available on disk for just $39.95.

(All timings done on TRS-80 Model I. Model III 15% faster, but pct. improvements identical. Listing of timing program available on request.)

SAVE TIME WITH FASTER



"FASTER" speeds up most TRS-80 BASIC programs by 20-50%. It's helped hundreds of satisfied people and it can help you. Detailed instructions make it easy to use. FASTER analyses your BASIC programs *while they run*, then displays a simple change, usually one line, that sequences program variables so the ROM will find them faster.

You can use FASTER to speed up programs you've bought, as well as programs of your own. Since it isn't a compiler, your BASIC programs can be read and changed afterwards. FASTER works on business programs, models, and games. The more complex your program, the better the results.

Does FASTER really work? Yes! Just check the reviews in *Personal Computing*, May, 1981, p. 116: **"FASTER is effective and easy to use"**; *80 U.S. Journal*, April, 1982, p. 106: **"I recommend FASTER to everyone"**; and *80 MICRO* (April, 1982, p. 40): **"If you...would like a significant increase in the run-time speed, then buy FASTER."**

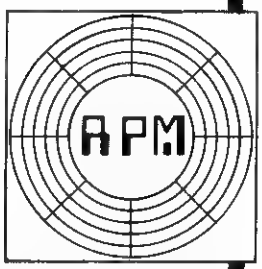
FASTER runs on the TRS-80 Models I and III, 16-48K tape or disk, and all major operating systems. **$29.95**

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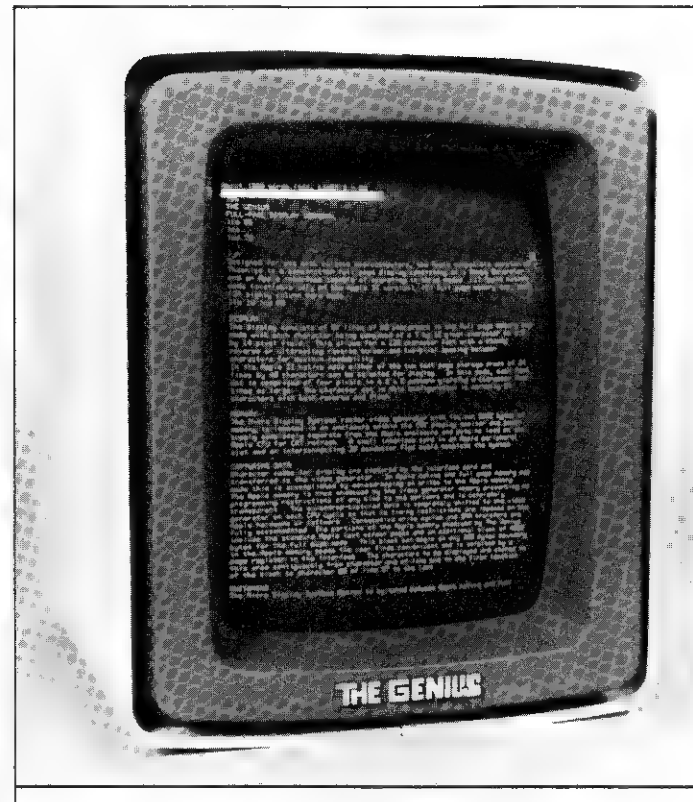
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NEW PRODUCTS



The Genius Display

Walther PPK configurations, the Model 007 accepts commands only from the Mode M control peripheral. A powerful feature of the SPECTRE DOS, Thunderboot, loads programs at remarkable speed. Programs for your use only cannot be backed up; for others, such as the Moneypenny accounting and general ledger package, you only load twice. Files on disk cannot be deleted without a license to kill, and can be recovered even then with the List and Let Die option.

In previous assignments, the Model 007 has helped a scientist experimenting with rare materials for disk storage ("The Man With the Golden Grans") and successfully corrected flawed Soviet programs ("From Russia With Bugs"). It is available with options including hard disk, printer, rocket launcher, and undersea-use kit from Q Branch, Universal Export, Regents Park, London, England.

Full-Page Display

The Genius high-resolution display connects to any computer with an RS-232 port, showing a full page of text (57 lines by 80 characters). It uses an interchangeable 128-character ASCII generator, with the U.S. set standard and German, French, or International European sets optional.

The display is available with white, green, or amber phosphors and provides reverse video and flashing attributes. The RS-232 interface transmits data at 19.2K baud, controlled by a Z80 microprocessor. An 8K buffer duplicates the screen in the microprocessor; the video generator has another 8K memory, allowing a screen update speed of less than three seconds.

The unit is 13 inches high, 16 inches wide, and 17 inches deep. It sells for $1,595 (60 Hz) or $1,712 (50 Hz) from Micro Display Systems Inc., P.O. Box 455, Hastings, MN

55033, 612-437-2233.
Reader Service ✓553

End CP/M Anxiety

Jack Dennon's *CP/M Revealed* describes in detail the full potential of Digital Research's popular microcomputer operating system.

The 180-page paperback explains the technical aspects of CP/M, including the console monitor, system manager, input/output driver package, and the data structure of the CP/M disk. Topics discussed include booting up, logging in, changing memory size, mapping disk space, file handling, and interfacing techniques. CP/M utilities and other information let you handle the system effectively.

The book sells for $13.95 from Hayden Book Co., 50 Essex St., Rochelle Park, NJ 07662, 201-843-0550.
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A Steady Current

The CMP-905 voltage monitor and surge suppressor protects microcomputers from power surges and EMI/RFI noise pollution. It prevents logic errors, memory loss, program glitches, and system failure caused by voltage transients.

A fast-action, high-capacity metal oxide varistor diverts surges before damage can occur, while a two-pole LC filter reduces noise pollution to well below danger levels. The LED monitor glows green, yellow, or red depending on incoming voltage levels; should the unit ever be incapable of suppressing voltage transients, the LED changes to an on-off warning blink.

The CMP-905's Lexan housing has one outlet; it can be used with a multi-outlet bus strip. It is available for $159 from Nortronics, Recorder Care Division, 8101 Tenth Ave. North, Minneapolis, MN 55427, 612-545-0401.
Reader Service ✓557

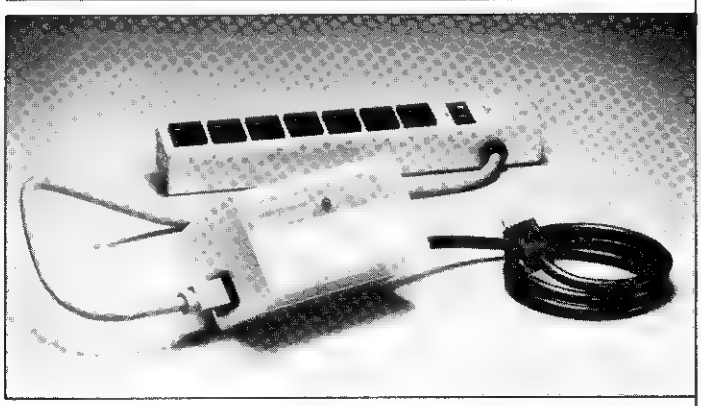
Model III to II Transfer

Cobol Utility Program II is a two-program package to transfer Model III Cobol source programs to the Model II. A Basic program transfers files to the Model II, where ASCII files created by TRSDOS's terminal program are reformatted into variable-length Cobol source files.

The utility costs $49.95 from Absecon Software Associates, 550 Fourth St., Absecon, NJ 08201, 609-646-4608.
Reader Service ✓566

Such a Deal

Mel the Memory Mogul has released several new items designed to enhance your memory capacity for cheap. His 5 1/4-foot, double-sided, double-density



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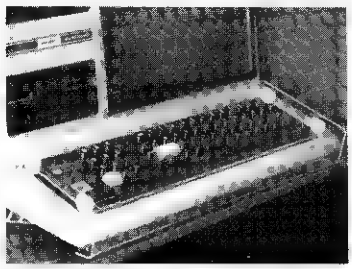
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SoundTrap

floppy disk will give you 4 megabytes of storage without the expense of a hard disk. The disks are designed to run on a modified cement mixer, also available from Mel.

If you prefer tape, Mel offers it in bulk on three-foot cable spools. You mount the spool on a pottery wheel and run it with an old Volkswagen engine. Each spool holds 165 miles of high-quality data tape.

The disks ($24.95 for a box of 12) and tapes ($1 per mile) are sold by Mel the Memory Mogul, Rural Delivery #1, Coupon, PA 15629.

Hush Your Printer

SoundTrap, an acoustic housing, reduces printer noise by up to 29 decibels and sound energy by up to 800 percent. Besides permitting normal conversation in the area around the printer, the unit with its optional stand can serve as a data holder and simplify paper storage and feeding.

The housing weighs 12.8 pounds and measures 7.3 by 18.5 by 17.7 inches. For more information, contact Trace Systems Inc., 1928 Old Middlefield Way, Mountain View, CA 94043, 800-248-7223.

Reader Service ↙564

Cyberchess

Not a chess-playing program but an improvement device for the serious player, Cyberchess is an analysis system that lets you play classic games against the masters. Games are selected according to your level of expertise; Cyberchess' instruction mode analyzes and gives mathematical ratings of your moves. There are two speed-chess modes, and two modes of timed play for tournament drill.

The $29.95 program pack includes the required system program, four fully analyzed games (two professional and two amateur), and instructions. A library of additional games and problems is planned.

Cyberchess requires a 32K Model I or III with one disk drive. It is available from IJG, 1953 West 11th St.,

Upland, CA 91786, 714-946-5805.

Reader Service ✓567

Basic Graphics Software

Picture This Inc. has come out with a very-low-resolution graphics package for the TRS-80 Model I Level I with 4K. It features an 8 × 2 graphics tablet that lets you draw vertical or horizontal lines in any combination. Vertical lines can be drawn from left to right or right to left, and horizontal lines from top to bottom or bottom to top.

A special Geometreat program lets you draw rectangles, cubes, and three-sided boxes. If you want to save a figure, you simply copy it with a pencil on a piece of graph paper.

For more information, contact PTI, RR1, POB A, NY, NY 20013.

The Singing DOS

One of the dullest parts of microcomputing, sitting and waiting for a disk backup or repair utility to do its work, has been made entertaining by MUZAKDOS, the first musical disk operating system.

Broadcasting through the cassette port, MUZAKDOS replaces bland "Reading... Writing...Verifying" messages during backup with selections from the great Rodgers and Hammerstein musicals. Formatting and zap utilities become easy listening with such tunes as "The Impossible Dream" and "Bibbidi-Bobbidi-Boo"; killing files from disk brings the exciting "Theme From Shaft."

In addition to the standard models, users can purchase specialized systems—SINATRADOS, for fans of the Chairman of the Board; XMASDOS, with your favorite Christmas carols; and ABBADOS, featuring the pop hits of the Swedish foursome.

MUZAKDOS and its variations are $199 each from Elevator Music Microcomputing, 4/4 Mantovani Drive, Living Strings, LA 70821.

Model II Mind Tools

Mind Tools are templates created for use with VisiCalc on the Model II that save the time and energy required for spreadsheet set-up. The first template, Real Estate I, provides calculations for 17 functions including compound interest, internal rate of return, wrap-around mortgage, and break-even analysis.

Other packages in the series include Real Estate II, Personal Finance I and II, Small Business Accounting, Data Analysis, and Math Analysis. Mind Tools come with a documentation manual and quick-reference guide; users are asked to register their packages with the producer, entitling them to upgrades at a nominal cost.

Real Estate I costs $69.95. It and the other templates are available from Howard W. Sams and Company Inc., 4300 W. 62nd St., Box 7092, Indianapolis, IN 46206, 800-428-3696.

Reader Service ✓551

Baseball-Stat

Baseball-Stat is a package of 10 programs designed to keep statistics for a baseball or softball team or league. It can support up to 50 teams, each with up to 45 hitters and 20 pitchers.

For hitters, 11 statistical categories (such as games, at bats, hits, runs, and stolen bases) are pre-defined, as are 13 categories for pitchers (such as wins, losses, innings, walks, and strikeouts). Users can define three categories for batters and one for pitchers.

Other programs print or display standings, team to-

Data-Writer™

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Data-Writer 2.0 uses a powerful file access method called "two-level sequential direct access." While it sounds complicated, what it does is simple: It permits access to any record in your data base (up to 10,000 records) in one second flat.

Data-Writer is a powerful data base manager. Use it with a word processor or by itself as a complete system for managing textual and numeric data.

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FILE ACCESS: Once your data base file is created, use Access to review existing records, make changes and add new records. Access any record in your data base in just one second.

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For the TRS-80 Models I, III (48K, 2 disk drives, lower case required). Available at your favorite software store or order from **Software Options,** 19 Rector Street, New York, NY 10006. (212) 785-8285. **Toll-free order line: (800) 221-1624.** Price $145 (plus $3 per order shipping and handling). New York State residents add sales tax Visa/Mastercard accepted.

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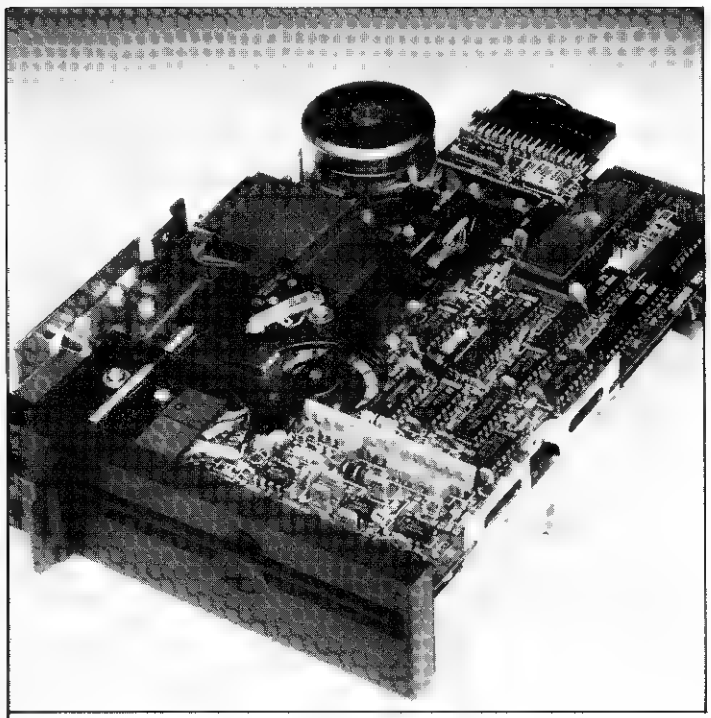
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NEW PRODUCTS



Tandon TM55 Drive

tals, and league leaders. Provisions are made for players traded during a season.

The system runs on the 32K, two-disk Models I and III. It sells for $99.95 from Microsport Software, 120 W. 38th St., Wilmington, DE 19802, 302-762-9693.

Reader Service ✓571

Half-Height Tandon Drives

Tandon Corp.'s TM55 Thinline 5 1/4-inch disk drive equals the performance of a full-sized drive, but measures only 1 5/8 by 5 3/4 by 8 inches. The half-height drive features an onboard microprocessor, a brushless, dc-type spindle motor, a track-to-track access time of 3 milliseconds, and an average access time of 90 milliseconds.

Two models are offered. The TM55-2 is a 48-tpi drive with 0.5-megabyte capacity; the 96-tpi TM55-4 can store up to one megabyte. Both are double-sided, and can read and write in single- or (using MFM or other recording techniques) double-density format. The transfer rate is 250K/second.

Price is under $200. For more information, contact Tandon Corp., 20320 Prairie St., Chatsworth, CA 91311, 213-993-6644.

Reader Service ✓552

Game Power for Phonics

Game Power for Phonics is a cassette program designed to improve students' reading skills. Any structural or phonetic part of a word can be practiced through a special game called to the CRT screen; each game focuses on a single skill and can be played seven ways, with emphasis on word recognition, verbal and nonverbal responses, comprehension, sentence improvisation, articulation, and spelling.

Accompanying the cassette is a manual with 1,280 language games. Price is $28.50 from Spin-a-test Co., 404 Old Orchard Court, Danville, CA 94526, 415-837-4532.

Reader Service ✓558

VSS-80

The VSS-80 Viewgraph Processor is a 48K Model I/III Fortran program that lets you design, edit, and produce artwork and text for overhead-projector transparency presentation.

Special graphics features include circles, rectangles, triangles, and clouds, with four shading levels available. The program allows up to 20 lines of text with three different character sizes; output from one of many supported 80-column printers is ready for transparency generation.

Price is $79.95 from Future Project Corp., P.O. Box 11, Hawleyville, CT 06440, 203-775-3062.

Reader Service ✓550

Watching the Market

SMAS is an investment-adviser program that uses a sophisticated moving average system and a data base containing 196 common stocks and five market indexes. The data-base disk is up-to-date so that SMAS gives useful guidance the first week it is used; afterwards, a few hours' input each week provides unambiguous buy, hold, and sell signals and price ranges for taking important actions.

The menu-driven program is written for investors seeking long-term capital gains. Utilities for correcting input errors and adjusting the data base for stock dividends and splits are provided.

SMAS runs on the 48K Models I and III with two disk drives; it is compatible with TRSDOS, NEWDOS80, LDOS, and DOSPLUS. Price is $169.95 from Spiral Enterprises, 308 Crown Road, Willow Park, TX 76086, 817-441-8901.

Reader Service ✓561

DataQwik

The $650 DataQwik unit connects to almost any RS-232 terminal and adds 16,000 characters of "smart" memory. It is suitable for store-and-forward communications, off-line text editing, form-letter generation, and dialing up of CRT screen formats or commonly used text.

A command menu makes use easy. Any data can be quickly retrieved and forwarded to the terminal, computer, or both; data can pass between the two ports at switch-selectable rates from 75 to 9,600 baud. Parity and duplex are also switch-selectable, and extensive text-editing capacity is provided.

For more information, contact Western Telematic Inc., 2435 S. Anne St., Santa Ana, CA 92704, 714-979-0363.

Reader Service ✓562

Model II/16 Menu

Custom Software Services' programmable menu for the Models II and 16 reads and displays menu selections created with TRSDOS's Build command. Multiple menus are supported, with up to nine selections for each, and any menu can call any other.

Built-in functions allow setting the system date, displaying a sorted directory for any drive, and performing a printer top-of-form. The machine-language program costs $50 from Custom Software Services, P.O. Box 150, Porterville, CA 93258, 209-784-7966.

Reader Service ✓556

Keynes Fan Club

The first in a series of *80 Micro* Starhacker promotional packages from Wayne Green Inc., the J.M. Keynes Fan Club gives members exclusive souvenirs and information of the popular MONEY DOS columnist and financier.

A $20 charter membership includes autographed photo, wallet card, button, secret MONEY DOS handshake, and map of the 15-bedroom mansion in Palm Beach. Fans will receive "Pseudonym," the quarterly bulletin of J.M. gossip and goings-on, as well as discounts on future MONEY DOS pro-



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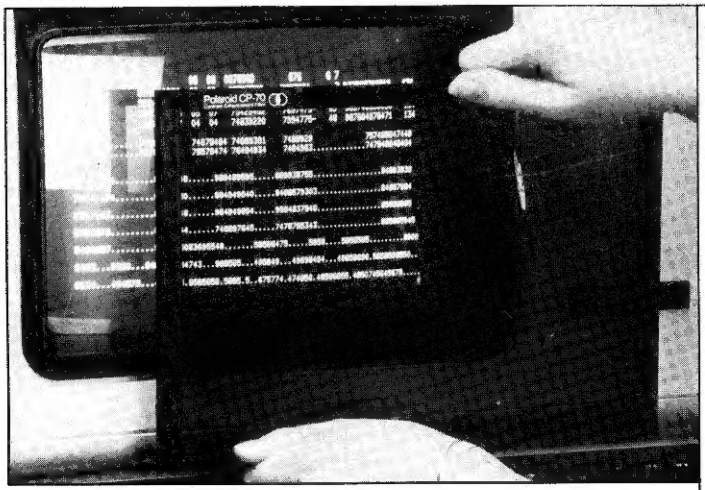
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Glare Sentry

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In addition to the Keynes Fan Club, forthcoming Starhacker offers will include Terry Kepner After Dark, the Jake Commander Poster Calendar, and the full-color "Best of Fun House" collector's book. Devotees of the regular staff can look forward to WGI/Columbia's Christmas 1983 release, "80 Micro: The Movie," presented in Third Anniversary 3-D with Basic subtitles. Soundtrack album on Verbatim disks and tapes.

Glare Sentry

Originally developed for air traffic controllers' video displays, the Glare Sentry screen uses a Polaroid filter to trap glare and sharpen the image of your CRT.

The Glare Sentry consists of a two-stage circular polarizer laminated between two layers of optical glass. Room light is rotated 45 degrees as it passes through the polarizer; bouncing off the screen, it is rotated another 45 degrees and cannot penetrate the second stage of the polarizer to reach your eyes.

Meanwhile, light from the CRT is rotated only once, creating increased contrast and a clearer image. Other screen filters, such as fine mesh or film coatings, subdue some glare but dim the image.

The $139 filter attaches with 1/4-inch-wide Velcro strips and removes easily for housekeeping. For size and other information, contact Inmac, 2465 Augustine Drive, Santa Clara, CA 95051, 408-727-1970.

Reader Service ✓568

VisiCalc on Paper

While VisiCalc and other spreadsheet programs let the user solve problems without learning a computer language, some users forget that they are still dealing with a programming environment. CalcPad, a spreadsheet simulator, eases planning and documentation of VisiCalc templates and teaches attention to global variables, defaults, and template logic before the computer is turned on.

The front of the 11 by 17-inch CalcPad sheet is a reproduction of the VisiCalc layout, with space for variable values, row and column numbers, and cell formats. The reverse side delineates report printing areas, reminding you or telling someone else how to use your report, and includes a grid that can be used to sketch out the template's overall plan.

"We are not unaware of the irony that in moving from the computer screen to CalcPad we have come full circle," say the producers of the $10.95, 50-sheet ledger (Padware Limited, P.O. Box 14856, Chicago, IL 60614, 312-248-5004). "But we believe that with VisiCalc, as with any computer programming language or operating environment, advanced planning is necessary for optimum efficiency."

Reader Service ✓560

Begin With $1,000,000

Million$ is an investment simulation game that will challenge experts and entertain amateurs. Starting with $1 million, players buy and sell assets and borrow funds, with prices and economic indicators changing after every play. The cost and current value of each player's portfolio is displayed, as is a graph of the last six months' prices and indicators. Surprise bonuses and penalties test investors' strategies.

Short, long, and intermediate versions of the game may be played, with a different economy each time. Million$ is available on tape or disk for the 48K Model I or III. Its price is $19.95 plus $1.50 shipping and handling (Indiana residents add 4 percent sales tax) from Vinzant & Associates, P.O. Box 174, Hobart, IN 46342.

Reader Service ✓569

Printer Innovations

Mobius Ribbon Inc., makers of the Bowdler 500, the first printer that automatically censors distasteful passages, has introduced two new machines for use when a daisy-wheel printer isn't good enough.

The Manu-Script 60 ($2,279) is a plotter modified to actually write your copy in longhand, generating personal messages at a sincere 1.5 characters per second. It accepts any of Mobius' Compu-Quill pens; interchangeable program cartridges allow 11 different styles of handwriting, from Backslant Cramped to Schoolgirl Prep (i's dotted with little circles).

Business users who want better than letter-quality output will appreciate the Gutenberg 2000 ($19,795), a printer that physically sets type. A mechanical arm picks letters from a rack and arranges them in the press, replacing them and starting again after each line is printed. The office-sized unit weighs no more than an Oldsmobile Cutlass; it sets and prints an average business letter in less than a day.

Both printers are RS-232 compatible and feature 1K buffers to store text while the computer does other work. They are available from Mobius Ribbon Inc., 30 Pica Drive, Hardcopy, PA 15230.

Two-Speed Copier

Kopy is a Model I/III program that copies single-part machine-language programs from tape in or out at 500 or 1,500 baud. The utility shows the object name of the program being copied, the starting address, the entry point, and the total number of bytes. Written in machine language itself, Kopy takes 1,306 bytes of memory.

Price is $5.95. For more information, write The Software Exchange, 1615 Compton Road, Cleveland Heights, OH 44118.

Reader Service ✓570

February's New Products section gave the wrong phone number for Micro-Design, manufacturers of the MDX disk upgrade for the Model III. The correct number is 800-531-5002.



ARE YOU STILL LETTING YOUR PRINTER TIE UP YOUR COMPUTER?

While your printer is running, your computer is tied up. You can't use it for processing, computing, data entry. Nothing. All you *can* do is twiddle your thumbs until the program is finished.

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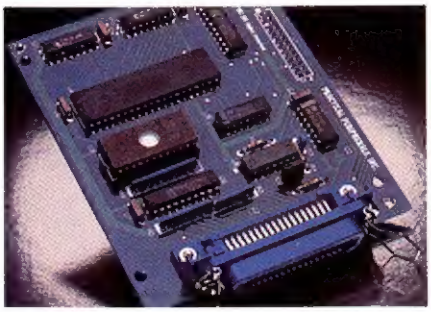
You just dump your printing data directly to Microbuffer, whoosh!, and continue processing. No waiting.

Microbuffer accepts data as fast as your computer can send it. It stores the data in its own memory buffer then takes control of your printer.

It's that easy.

THERE IS A MICROBUFFER ESPECIALLY FOR YOUR EPSON.

Microbuffer/E (just one in the full line of Microbuffers) is designed to be specifically compatible with an Epson printer. An intelligent interface card with on-board RAM for data buffering, Microbuffer/E supports all standard Epson commands, including GRAFTRAX-80 and GRAFTRAX-80+. The serial version comes with 8K or 16K (upgradable to 32K) and features both hardware handshaking and XON-XOFF software handshaking at baud rates up to 19,200. The Berg jumper allows selectable UART settings. The parallel version has 16K or 32K (upgradable to 64K) and features a very high data transfer rate — over 4,000 characters per second. All models have a power-efficient low-consumption design. Prices range from $159 to $279.



Microbuffer/E is simple to install — it easily mounts in the exisiting auxiliary slot directly inside the Epson.

Other Microbuffer models include Microbuffer II for Apple II computers and a stand-alone, in-line Microbuffer to untie virtually any computer/printer combination.

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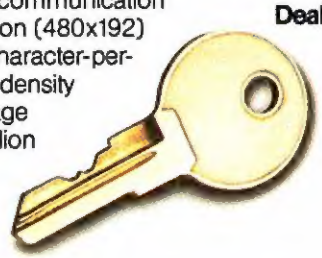


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