

Basic Computing

The TRS-80 User Journal



The
Computerized
Shrink

Heart Disease
Risk Factors

Eat and Run:
Model 100
Diet Tracking

Model 12/16
DOS Patches

Color
Computer
Graphics

TRSDOS 6.0
Review

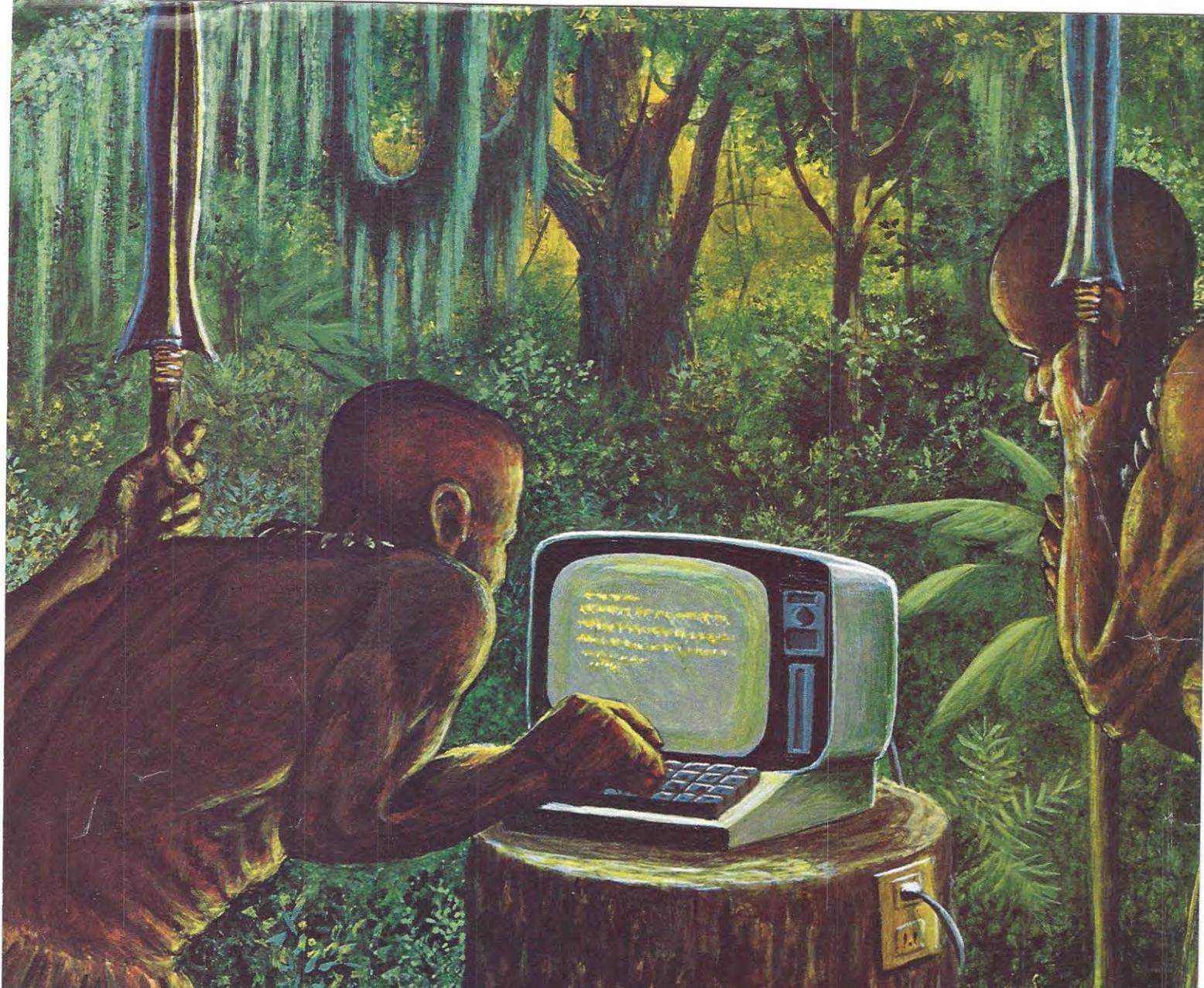
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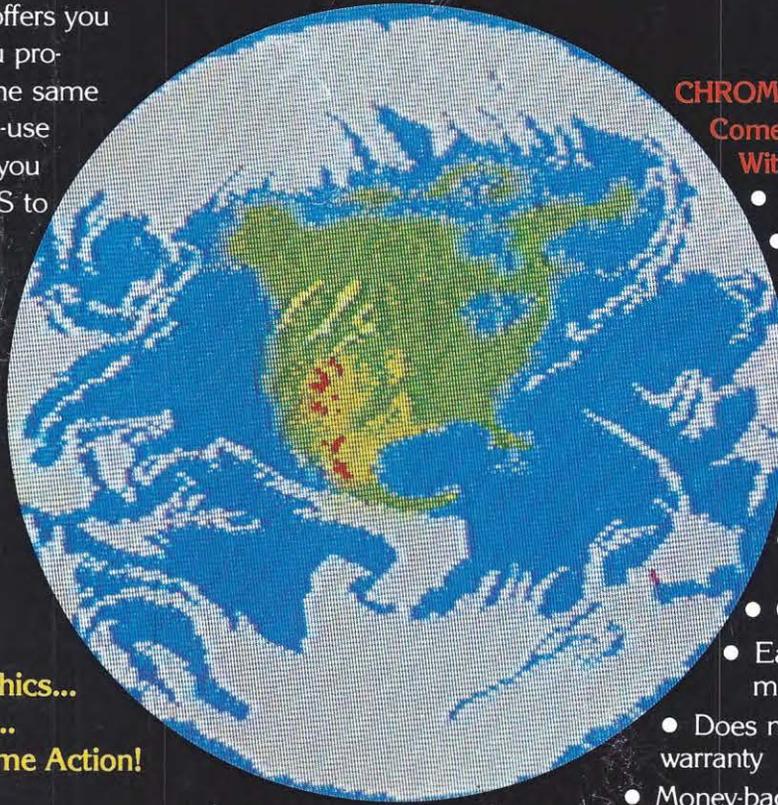


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Our cover is a stylized caduceus depicting this month's theme of microcomputers and health. The original airbrushed artwork was done by Randy "Talkas" Hoop of

Basic Computing

The TRS-80 User Journal

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Vol. VI, No. 11 — November, 1983

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Editorial

By Cameron C. Brown

Before an article gets into print it undergoes quite an ordeal. Here is the history of three articles that you never got to see.

Our acquisition of *H & E Computronics Magazine* included a number of unpublished submissions. One was on an excellent bulletin board program called TBBS. We sent the reviewer our check for his work and were awaiting his acceptance. It never came and I wish to thank him. It turns out that the reviewer sent a copy of his review to the company and they were so impressed that they hired him to write the documentation for a newer version. That placed him in the questionable position of reviewing a product from a company he worked for. Rather than cashing the check and not telling us about the ethical conflict, the author returned our money and told us why. Such behavior is commendable.

In the same week, we received an anonymous letter from a reader that pointed out someone was attempting to pirate software through a notice in *Basic Computing*. We had material on its way to the same person for review and

had to recall them. The items have been sent to other reviewers, but your chance to read them has been delayed by a few months. We were able to stop the copying before serious damage was done and our thanks to whoever that reader may be.

We made an offer to another writer for an interesting program that we thought you would enjoy. As with all our offers, we enclosed a check and an acceptance letter to be signed and returned to us. In the span of our deliberations and the mailing of the offer (one month), it was published in another magazine. We probably never would have caught it, but the author called it to our attention and returned the money.

That happened once before with a different writer. He was so chagrined that he proceeded to produce an even more in-depth and technically accurate article for us.

These are not stories of great heroics or fantastically scrupulous behavior. They are just examples of the events that have occurred recently. Much ballyhoo is made about pirates, thieves, cons and scams. From what we have seen lately, this industry is doing a nice job of

had to recall them. The items

policing itself

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The TRS-80 User Journal

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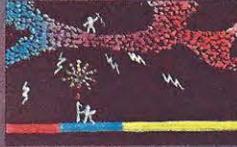
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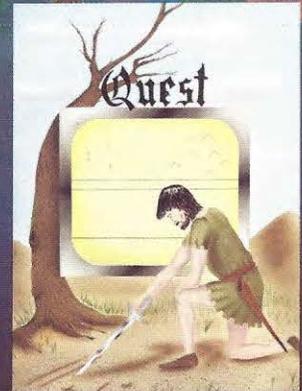
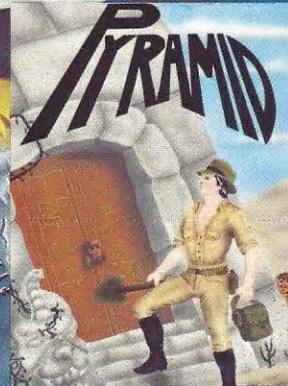
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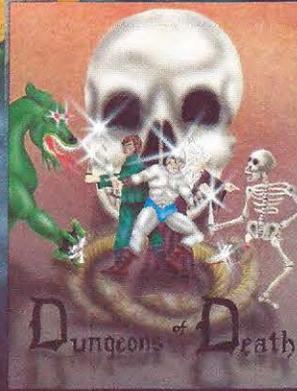
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Letters to the editor

By Cameron C. Brown

I have recently changed from a Model I 16K Level II computer to a Model III 48K Level II computer. Because of this, I have been reviewing the older issues of *80 U.S.*

Journal and have found two articles which I believe should be repeated for the benefit of Model III owners. These articles were written for the Model I to decrease the number of 256-byte leaders when saving data to tape. In addition, the data is saved and read at 1500 baud for the Model III. The articles are "Fast Array Save and Load" by Barry Geller, Jul/Aug 1980 page 24, and Sep/Oct 1980 page 10 and "Machine Language Utility Routines" by Jay G. McKinney, Jan/Feb 1981 page 34.

To run on the Model III, the first article needs the following changes: change line 320 of the assembly language listing to a RET, and change the POKE addresses in the BASIC line 30030 to be appropriate to the program ORG in line 100 of the assembly listing. The second article needs no alteration.

A very interesting application of the above utilities is their insertion into "A Cassette Library" by Roger Amidon, Jan/Feb 1980 page 64. This program originally contained a string array of 50 strings and seven numeric arrays of 50 integers each. By changing the numeric arrays to a single 50x7 array and inserting both of the above utilities, the speed for dumping and loading data is improved. There is one unusual problem. When the data is loaded from tape, the first display of data is correct. Subsequent displays of data

replace the first character of the first string with the numeric key used to call up the desired display. The new character then remains as part of the display. This error can be corrected by use of the following line immediately after the input of data from tape has been completed: 320 Q\$ = BK\$(1): BK\$(1) = Q\$. I have been unable to determine the cause of the error, but since an easy solution has been found, it is no longer a problem.

**Robert Hood
Bremerton, WA**

The articles you refer to are from issues that are no longer available, but we will be happy to send copies to any interested readers. Please enclose a stamped self-addressed envelope if you would like us to send you the article(s).--Ed.

I am writing to ask if any of your readers have experienced any problems running multi-part forms on the Radio Shack Line Printer VII. The paper becomes jammed in the mechanism because there is too little clearance. I have even had the problem occasionally with single-sheet paper.

**Dennis M. Daigle
Antioch, CA**

We don't have a Line Printer VII in-house. Perhaps a reader can help.

-Ed.

Where? Oh where is my Pascal? I

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like your magazine and I know that BASIC is a popular language, but Pascal is a much more structured language. Why don't you try to start a column dedicated to Pascal programs and to teaching good methods?

**Rob Williamson
Hacienda Heights, CA**

We will gladly run Pascal programs, as well as Lisp, FORTRAN, COBOL, or any other language if it has reader interest. Your comment on structure and good methods is not quite on the mark. Structure, that is, carefully-developed program flow, is language-independent. Good programming methods are also language independent. There is an excellent series of books from Hayden Publishers, one of which is called "BASIC with Style: Programming Proverbs". They also offer a similar book for Pascal, FORTRAN, COBOL as well. Structure is not necessarily dependent on the language, but it definitely is on the programmer.--Ed.

Please note that "Football Forecaster" (the title of an article in the September issue) is the title of a copyright-protected program from Hawg Wild Software. I just wanted your readers to be aware of the fact that a spread-predictor program by the same title was on the market for, among other machines, the TRS-80 Color Computer. Thank you, and keep up the good work on an excellent publication.

**Gary Smith, President
Hawg Wild Software
P.O. Box 7668
Little Rock, AR 72217**

We hope no readers were confused. Perhaps you could compare our forecasting with yours and let us know which one does better.--Ed.

I usually tear your magazine apart to file the articles and save space. You have begun to make this more difficult by putting adjoining articles back-to-back so that one page must be photocopied to save both articles.

**Anonymous
Louisville, KY**

How about taking out another subscription? That would make us both happy.--Ed.

Mr. Dettmann: I enjoyed your September, 1983 "Minicalc" spreadsheet program for the Model 100. I typed it in immediately and find it works fine. Thanks so much for your skill in writing the program and sharing it with us.

**Victor F. Wright
Indianapolis, IN**

Thank you for letting us know. Terry has told us the the program has been placed on the Model 100 SIG on CompuServe and it has drawn excellent response. Some users have also reported on the SIG that they have made enhancements to it for replication, double precision, and more.--Ed.

I have encountered a problem with my Model II BASIC. The manual states "The MERGE statement takes a BASIC program from disk and merges it with the resident program in RAM. MERGE also closes all files and clears all variables. Upon completion, BASIC returns to the command mode." Is there a patch available that would allow BASIC to execute the next line of the program?

**Allan G. Lebbin
Youngtown, AZ**

Racet Computes, Ltd., 1855 West Katella, Orange, CA 92267, (714) 997-4950, sells a program entitled REBAS. It is an enhanced BASIC utility that allows you to merge, load and run programs without losing variable values. The package also includes sophisticated BASIC editing options, type-ahead, screen protect and other features. It sells for \$99.95. --Ed.

I greatly enjoyed the program "Wordfind" in the August issue. I even added an angelfish printout to the graphics choices. However, I think it would make the puzzles more challenging if the words were allowed to intersect as they do in manually-created puzzles. A simple series of program alterations will permit the overlap of words. Instead of requiring an unused space at a given point, accept a letter which coincides with the current letter to be positioned. Using the sequence at lines 440 through 490 as an example, the change is:

460 IF A\$(A+J,B) = "." THEN 470

465 IF A\$(A+J,B) <> MID\$(W\$(I), J+1, 1) THEN 410
470 NEXT

Equivalent changes are needed to each of the other insertion routines.

**William M. Cooper, Jr.
Chatham, NJ**

I wish to thank the many readers of H&E Computronics who wrote concerning my series of articles entitled "COBOL Primer" in that journal. As it will not be continued, I would like to advise readers that help is available. A fine book on RM COBOL has been published specifically for the Tandy machines. While it is by no means complete, it does cover much and gets the beginner well over the initial problems. It is called TRS-80 COBOL by Robert T. Grauer, from Prentice-Hall publishers (1983). I strongly suggest that interested readers obtain this text to help them.

**Hubbard C. Goodrich
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Notes, etc.

By Cameron C. Brown

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Lobo Systems Sold

Controlling interest in Lobo

Systems has been sold to Venture Investments. Mr. Roger Billings, the founder and president of Lobo Systems, will remain on Lobo's Board of Directors. The move was precipitated by a need to raise more capital for advertising, promotion and development work. The infusion will also enable Lobo Systems to begin shipping from stock instead of as having to build and ship as orders are received.

VAL(A\$) Bug

Mr. Hal Broenkow of Edmonds, WA wrote us telling of a problem with the VAL function in BASIC. The VAL(A\$) function seems to work quite nicely to change a string representation of a number into a numeric variable, with one exception. VAL(A\$) reads the numeric value of a string variable, from left to right, until it finds the first non-numeric character. Consider this routine for accepting input in the range from 0 to 200:

```
10 LINEINPUT A$
20 IF VAL(A$) > 200 OR VAL(A$)
<0 THEN PRINT "Out of range":
GOTO 10
30 A = VAL(A$)
```

It works nicely on the Models I/III unless the program asks for a percentage and the user types in a numeral followed by a percent sign (%). For some reason, this upsets BASIC and a syntax error results. If A\$ = 863.93ALD, A = 863.93. If A\$ = JK734.81, A = 0. If A\$ = 5H36, A = 5. But if A\$ = 42.5%, you get a syntax error. The problem can be corrected in Disk BASIC by adding one test:

```
15 IF INSTR(A$, "%") THEN A$ =
LEFT$(A$, INSTR(A$, "%") - 1)
```

This line picks off the offending percent symbol and allows line 30 to recognize the numeric part of the string. Only the percent symbol seems to upset VAL. The function will work perfectly on other string characters.

Interestingly enough, the Model 100 and Model II have a similar

problem. Although the percent symbol won't provoke a syntax error, the presence of a percent symbol will cause the VAL function to disregard any fractional part of the number. On the Model II or 100: if A\$ = 38% then A = 38, but if A\$ = 38.75%, then A = 38, not 38.75 as it should. The Model 4 seems to have had a correction made in ROM and it no longer has the problem. Also, the problem does not appear to be related to variable precision designation since ! and # are accepted by the VAL function.

Corrections

"Model II Disassembler" by J. O'Loughlin, October, 1983, was missing his address. Readers who desire the program on disk should send their requests to J. O'Loughlin, 908 Salem Dr., Huron, OH 44839.

Our apologies for mislabeling the August, 1983 article entitled Command Your Printer. The code given was for Model I machines only and will not work on a Model III. Mr. Greg Neill of Wildwood Crest, NJ successfully converted it for a Model III and the needed changes are shown in Listing 1. As a bonus, he included the changes needed for the program to work with a Microline 80 printer. The codes in the original article were for a Radio Shack Line Printer VI.

For operation with a Microline also make the following changes:

```
Line 4500 LD A,1DH
Line 5000 LD A,1EH
Line 6900 LD A,42H
```

"Files and Foibles," August 1983, has a section that needs a little more explanation. The programs runs fine, but there is some confusion when entering the first record into the mail list file. When you are adding the first record, select option three (Add), and respond NO to the new file question and continue. The question "New file?" is used to recall a file from disk that is to be merged with, or replace, data that is

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currently in memory.

Our review of The Arranger program from Triple D Software in our September 1983 issue gave the wrong phone number. Triple D Software can be reached at (801) 546-2833.

The August 1983 column, BASIC bits had a program for renaming Model III TRSDOS diskettes (Listing 3, page 50). Line 30 has been giving syntax errors since the FOR . . . NEXT loop was defined using hex values. Change line 30 to be FOR N = -16656 TO -16644 and it will work just fine.

"Minicalc," a Model 100 spreadsheet program, September 1983, has a line that is causing some readers difficulty. Line 93 of the code contains F4\$=" \ \". The backslash is created on the Model 100 by depressing the graph and minus keys. Note that there are six spaces between the backslash marks.

Puzzler

Be sure to take a look at the article, "A Potpourri of Puzzlers." It gives a number of solutions to previous problems. This month, we are looking for palindromic sentences. A palindrome is defined as a word, verse, or sentence (as "Able was I ere I saw Elba") that reads the same backward or forward. Notice that upper and lowercase do not have to match, but word spacing must. Don't worry about ending periods,

but internal punctuation such as commas or apostrophes do count. Assume the phrase to be tested is A\$. Can you give a routine that will test A\$ to see if it is palindromic? Send your code to November Puzzler, *Basic Computing*, 3838 So. Warner, Tacoma, WA 98409. The winner will obtain a free six-month subscription extension.

In This Issue

Our theme is health and we have programs that keep track of your eating habits, analyze your chances of heart disease, take a look at your stress levels and more. Now that's what I call personal computing.

"Match/Bas" by Charles Edwards is so useful, we wonder why we didn't think of it before. Now you can easily compare your programs on disk and see where they differ. A great idea for those of us who can't keep track of which version is which.

Bob Snapp has made available his fixes and enhancements for Model 12/16 TRSDOS 4.2. Be sure to put them on. Color Computer owners have an easy-to-use graphics utility. It clearly shows that a "game" machine is much more than that. Model 4 owners have TRSDOS 6.0 explained and some useful hints on making the machine even better. Our regular columns and tutorials cover the gamut of skills and interests. We hope you enjoy them. Happy Thanksgiving.

Listing 1 Model III Changes for Command Your Printer

CHANGE the following lines:

```

01500 DOSBUF EQU 422CH ;DOS Command buffer
04500 LD A,1DH ;Condense command
05000 LD A,1EH ;Escape character
06900 LD A,42H ;12 lines/inch mode
10500 CLM LD HL,(4411H) ;Get Himem location
15500 ADTASK EQU 447BH ;Add to interrupt chain
15600 HIMEM EQU 4411H ;Dos high memory pointer
    
```

ADD the following lines:

```

01501 INIT EQU 0069H
01502 PRCHAR EQU 003BH
01650 CALL INIT
12850 CALL PRCHAR
    
```

DELETE Lines 5200 and 5300

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Eat and run

Graphically display the brutal truth of your eating habits

Model 100

Ron Reed, Washington, D.C.

This program is a natural application for a go-anywhere computer like the Model 100. It tallies what you eat through the course of a day and graphically shows the brutal truth about your eating habits. Besides helping you maintain a balanced diet and control of your weight, it makes nice use of bar graphics and shows how BASIC can work with .DO data files.

Here's what happens when you run the program: A bar chart is displayed showing your daily goal for each of the seven types of food. After you've eaten, you would update the file by entering the code for the type of food and the number of units of that food you consumed. For example, if you ate two apples, you'd enter F for "fruit," followed by a 2. Immediately, the computer will draw you a revised chart and save your updated consumption data onto a file called CHART.DO.

CHART.DO contains your food intake data for the past five days. To conserve memory, records are rolled off the file once they are six days old. Using the ever-present DATE\$, the program automatically creates a

new daily record the first time it is run on any given day. Thus, if you were to display CHART.DO on your screen, you'd see five rows (records) of daily data. The first two items are the month and day; the next seven fields represent your daily intake of foods from each of seven food categories.

The chart sets your daily goal at two units of dairy, three protein, three fruit, four vegetable, three carbohydrate, one oil, and one-half sweet. This corresponds to a daily intake of about 1500 calories and assures you of a proper nutritional balance. If you prefer to eat more than that, you can change your quotas by altering line 5190 of the program.

Table 1 shows what typically constitutes a "unit" for each of the food groups. The program allows decimal numbers so you can enter, say, 0.1 units of dairy to represent the cream in your coffee. Some foods, of course, are combinations. For example, a hamburger might count as one unit of protein (the meat) and one unit of carbohydrate (the bun). The main point is to account for everything you eat.

After you've typed the program, you will need to initialize a text file called CHART.DO. To do this, just go into text mode and type the following:

```
M D D P F V C O S
0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 0,
```

Table 1

The program allocates your food intake into seven categories. You should try to eat a fair share from each group, as shown by the chart. Don't overeat in any area — especially those oils and sweets! You will be asked for "units" of each food. In general, a unit is a reasonable single serving. Below are typical one-unit portions of each type.

Dairy: 1 cup milk or yogurt, 1½ oz. of cheese.

Fruit: 1 apple, orange or small banana, small glass of unsweetened juice or fruit cocktail.

Vegetable: 1 cup mushrooms, cabbage or cucumber, ½ cup broccoli, green beans, carrots or tomato juice.

Protein: 2 oz. lean pork, beef or skinless chicken, 4 oz. fish, two eggs.

Carbohydrates: 1 slice bread, 1 small potato, 1½ cups popcorn, ¾ cup cereal, ½ cup rice or noodles.

Oils and Fats: 1 tsp. butter, vegetable oil, mayonnaise, 1 slice bacon.

Sweets: 1 small serving of ice cream, cake, soft drink, pudding.

The purpose of the top line is to help you read the columns when you display CHART.DO on the screen. All those zeroes will be replaced by other numbers once you start using the program.

I hope you find this program enlightening. It demonstrates some very appropriate uses for the Model 100. With slight modifications, it can also be used to keep track of travel expenses, exercise, time allocations, or any other applications you can dream up that combine file I/O with graphics.

Program Listing for Eat and Run

```
10 OPEN"RAM:CHART.DO"FOR INPUT AS
1:DIMR(8,5):INPUT#1,T$
```



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Task	SUPER Time	dBASE II Time
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Input 100 records	50:29	1:27:50
Sort & Print Labels	6:41	4:18
Totals	1:02:30 hrs.	13:50:08 hrs.

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Eat and Run

```
40 FOR Y=0 TO 4:FOR X=0 TO 8:INPUT#1,N:
   R(X,Y)=N:NEXT X:NEXT Y:CLOSE#1
   How many additional units";N
120 MM=VAL(LEFT$(DATE$,2)):DD=VAL
   (MID$(DATE$,4,2)):R(0,5)=MM:
   R(1,5)=DD:IF DD=R(1,4) THEN Y
   2=4 ELSE Y2=5
460 R(X,Y2)=R(X,Y2)+N:IF R(X,Y2)>
   6.3 THEN R(X,Y2)=6.3
140 GOSUB 5000
470 GOSUB 5000
200 PRINT@44,"CHOOSE ONE:":PRINT
   @121,"DAIRY CARBOHYDRAT
   E":PRINT@161,"PROTEIN OIL
   AND FAT":PRINT@201,"FRUIT
   SWEET":PRINT@241,"VEGETA
   BLE QUIT":A$=INPUT$(1)
480 GOTO 200
910 OPEN"RAM:CHART.DO"FOR OUTPUT
   AS 1:PRINT#1,T$:FOR Y=Y2-4 TO
   Y2:PRINT#1,R(0,Y);", ";R(1,Y)
   ;", ";R(2,Y);", ";R(3,Y);", ";R
   (4,Y);", ";R(5,Y);", ";R(6,Y);
   ;", ";R(7,Y);", ";R(8,Y):NEXT Y
   :CLS:END
5000 CLS:PRINT@66,"D P F V C O S"
   :LINE(150,0)-(238,63),1,B:RE
   STORE 5190:X=2
5120 FOR I=152 TO 224 STEP 12:READ
   A
5130 LINE(I,63)-(I+12,63-A),1,B:L
   INE (I,63)-(I+12,63-10*R(X,Y
   2)),1,BF:IF 10*R(X,Y2)>A THE
   N LINE(I,63-A)-(I+12,63-A),0
310 IFA$="D" THEN X=2:GOTO400
5180 X=X+1:NEXT I
320 IFA$="P" THEN X=3:GOTO400
5190 DATA 20,30,30,40,30,10,2
330 IFA$="F" THEN X=4:GOTO400
5999 RETURN
340 IFA$="V" THEN X=5:GOTO400
350 IFA$="C" THEN X=6:GOTO400
360 IFA$="O" THEN X=7:GOTO400
370 IFA$="S" THEN X=8:GOTO400
380 IFA$="Q" THEN GOTO 910
390 PRINT "Please type carefully"
   :BEEP:FOR ZZZ=1 TO 200: NEXT ZZ
   Z:GOTO140
400 CLS:PRINT:PRINT" ";A$:INPUT "
```

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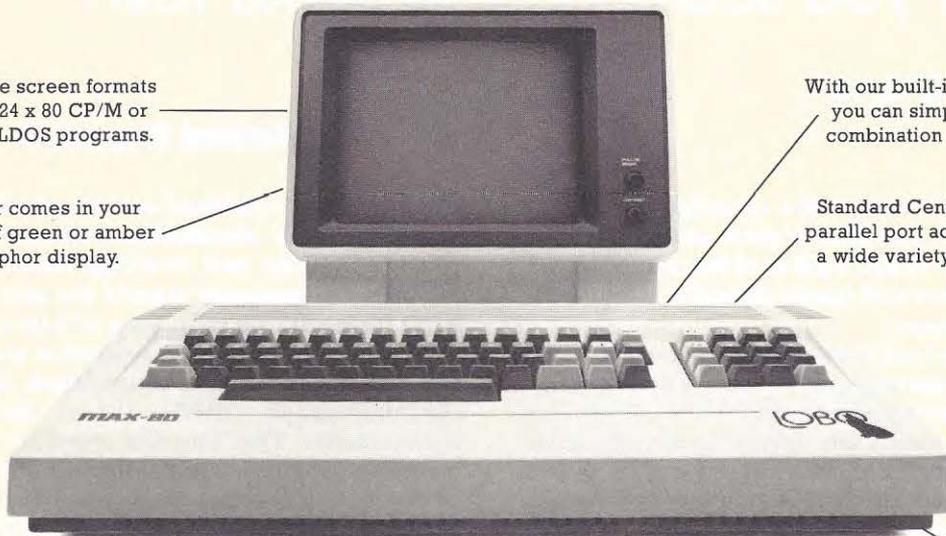
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The computerized shrink

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A black Rabbit GTI slides into a vacant parking space and becomes silent. The license plate announces that the driver is an EGO FXR, a pillar of the community, a professional marriage and family therapist, a man with a weird sense of humor!

My day begins as I call the answering service to check for messages and return calls. I wind the cuckoo clock and fire up the Prowriter and Model III since I know one of the people I'll be seeing was referred by his physician for a stress analysis. Later this afternoon, I'll use two other programs I've written. The smaller one assesses the degree and type of depression in a person, and the second compares how spouses see themselves and each other with how they would like to be and how they would like their partners to be.

If I have an hour or two free between appointments, I'll use Newscript to write a diagnostic evaluation and treatment plan for a client's attorney and plug away at my monograph-in-progress, "Interpersonal Systems: Beyond Two-dimensional Models." In the past month, I've also written three major proposals: one, to teach a post-graduate course in marital therapy for psychologists; another to establish our organization as the Employee Assistance Program provider for a local school district; and the third to request a hard disk for the Model III, a Model 100, and an auto-answer modem from Radio Shack's Educational Grants program. If that equipment is provided, we will create a major database of downloadable articles on various psychological topics (from assertive communication to zoophilia) and an "Ask the Shrink" confidential bulletin board — the first such undertaking west of Ohio.

When I finish my last session tonight, I'll sign onto CompuServe and check for new messages in the Mental Health Section of MEDSIG (Go SFP-5, for those who would like to join us). Being a regular on that service has led to some telecomputer friendships with therapists in Texas, Pennsylvania, and lesser-known places. It has enabled me to make contact with some folks who are interested in becoming licensed users of the assessment programs I've written. Since I also own a Color Computer (64K, one disk drive), I also check in at the COLORSIG (Go PCS-126) for the latest rumors, software complaints and plaudits, and to announce upcoming meetings of the SeaTac CoCo Club that meets once a month at my office.

About This Program

The STRESS SCAN-5 program (see listing at the end

of this article) combines several smaller instruments and presents a standardized stressor. After quietly posing questions and receiving responses for several minutes, the computer signals the printer to suddenly burst forth with its siren song of dots sprayed left and right down the page. The somewhat startled person is then connected to two bio-feedback instruments: an electromyograph (EMG) and a skin temperature thermometer. The baseline readings of these two measures of stress are entered on the report, a five-minute relaxation period is completed, and then new readings are taken and recorded. The finished report is discussed and given to the client for his or her future reference.

I realize that very few of you will have access to the bio-feedback instruments, but I have left those parts of the program in this listing so that you can see how they would be used. If you would like a rough measure of your skin temperature, buy a small glass tube room thermometer (I've seen some on magnetized material for under a dollar) and simply rest your fingertip on the bulb of the thermometer for several minutes.

STRESS SCAN-5 is written in BASIC for the Radio Shack Model III. It must be user-friendly, because I simply turn on the printer and computer, insert the disk, press reset, and it auto-runs with an instruction page for the user. The program as written uses printer control codes that may be unique to the C. Itoh Prowriter, but these can be removed (or changed) if your printer uses different codes for underscore, font changes, and the like. Line 1140 decodes the printer codes used.

Similarly, if you wish to convert this program to another computer, you will need to delete all POKE 16916's which scroll protect the top of the screen and reformat any strings (questions or items) that are too long for the screen width you are using.

One programming point worth mentioning is that the Events, Physiological, and Symptoms Inventories each use different algorithms to pose questions and tabulate answers. The first reads DATA statements, the second uses INPUT statements with the question imbedded as a prompt and the third uses PRINT statements and subroutines with unprompted INPUT statements. Whenever speed of execution or memory size issues are not important, BASIC usually allows several ways of accomplishing a given task.

STRESS SCAN-5 is the second computer program in a series called "Understanding People." The first program, The Love Test, was published in the July 1983

issue of *Basic Computing*. To be notified of each program as it becomes available, write to the author at Counseling and Preventive Services (CAPS), Oakhurst — Suite 121, 1851 S. Central Place, Kent, WA 98031. CAPS provides marriage, family and child counseling; preventive seminars; management consulting; and computer usage instruction. (Dr. Nugent is a Clinical Member of the American Association for Marriage and Family Therapy and an Assistant Professor of Human Behavior for Newport University. —Ed)

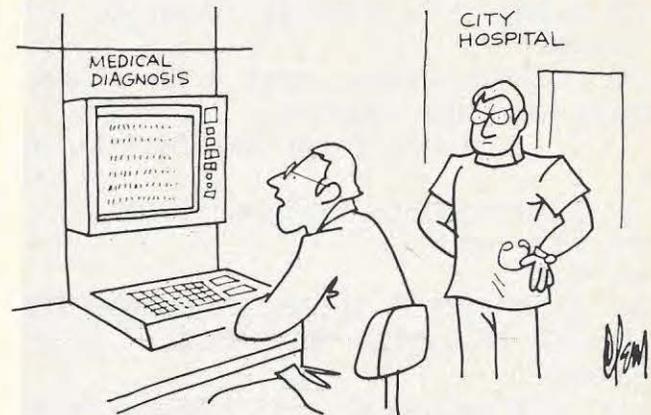
Program Listing for STRESS SCAN-5

```

10 CLS: CLEAR 1000: GOTO 90
'--STRSSCAN PGM LISTING
20 ET=ET+(R*B): RETURN
30 INPUTR: IFR=2 THEN 40 ELSE COMB=COMB+R
:CLS: RETURN
40 C2=C2+1: CLS: RETURN
50 INPUTR: IFR=2 THEN 60 ELSE PSY=PSY+R: C
LS: RETURN
60 P2=P2+1: CLS: RETURN
70 INPUTR: IFR=2 THEN 80 ELSE SM=SM+R: CLS
: RETURN
80 S2=S2+1: CLS: RETURN
90 PRINT "WELCOME!": PRINT
100 PRINT "The first part of your STRESS
SCAN-5 will be administered by this c
omputer. Your answers will generate a w
ritten report which will be given to
you when you leave. ALL ANSWERS ARE
CONFIDENTIAL.": PRINT
110 PRINT "The computer-administered port
ion has three parts: an EVENTS invent
ory, a PHYSIOLOGICAL inventory, and a SY
MPTOMS inventory.": PRINT
120 PRINT "Instructions for each section
will appear when you need them."
130 PRINT: PRINT "PRESS THE SPACEBAR WHEN
YOU HAVE FINISHED READING THIS PAGE."
140 R$=INKEY$: IF R$ <> " " THEN 140
150 CLS: R=0: ET=12: PT=0: PSY=0: SM=0: COMB=0
:P2=0: S2=0: C2=0 '--- EVENTS INVENTOR
Y
160 PRINT " *** EVENTS INVENTORY ***"
170 PRINT: PRINT "Enter the number of time
s IN THE LAST YEAR that each event has
occurred in your life. Press <ENTER> af
ter you have checked to see that the num
ber on the screen is correct. Use the <
LEFT ARROW> key to erase if you need
to."
180 PRINT: POKE 16916, 7 'SCROLL PR
OTECT
190 FOR I=1 TO 41
200 READ A$, B
210 IF B=21 THEN OE=ET
220 IF B=15 THEN WE=ET-OE
230 CLS: PRINT A$: INPUTR

```

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"Take two aspirins and dial the General Hospital data processing system in the morning!"

```

240 GOSUB 20
250 FE=ET-WE-OE
260 NEXT I
270 POKE 16916, 0: CLS '---
PHYSIO INVENTORY (CATS-SF)
280 PRINT " *** PHYSIOLOGICAL INVENTORY
***": PRINT
290 PRINT "Again, enter the numbers reque
sted and press <ENTER> when you are su
re the number on the screen is correct.
Erase with the <LEFT ARROW> key if yo
u need to.": PRINT
300 POKE 16916, 6
310 INPUT "HOW MANY CUPS OF COFFEE OR TEA
DO YOU DRINK IN A DAY"; R: PT=R
320 CLS: INPUT "HOW MANY CANS OR BOTTLES O
F COLA DRINKS DO YOU DRINK IN A DAY"; R: P
T=PT+R
330 CLS: INPUT "HOW MANY CANS OR BOTTLES O
F BEER DO YOU DRINK IN A WEEK"; R: PT=PT+R
340 CLS: INPUT "HOW MANY MIXED DRINKS DO Y
OU DRINK IN A WEEK"; R: PT=PT+R
350 CLS: INPUT "HOW MANY CIGARETTES DO YOU
SMOKE IN A DAY"; R: PT=PT+R
360 CLS: INPUT "HOW MANY MEALS ARE EATEN A
T RESTAURANTS EACH WEEK"; R: PT=PT+R
370 CLS: INPUT "HOW MANY MEALS EACH WEEK I
NCLUDE CANNED FOODS"; R: PT=PT+R
380 CLS: INPUT "HOW MANY TIMES EACH WEEK D
O YOU EAT A DESSERT OR CANDY BAR"; R: PT=P
T+R
390 CLS: INPUT "HOW MANY TIMES EACH WEEK D
O YOU PUT SUGAR ON CEREAL"; R: PT=PT+R
400 CLS: INPUT "HOW MANY MEALS EACH WEEK I

```

Shrink

```

NCLUDE FRIED FOODS";R:PT=PT+R
41Ø POKE16916,Ø:CLS '— SYMPT
OMS INVENTORY
42Ø PRINT" *** SYMPTOMS INVENTORY ***
":PRINT
43Ø PRINT"This time, enter a <Ø> if you
NEVER have this symptom,
a <1> if you SOMETIMES do, an
d a <2>
if you FREQUENTLY have it.":PRINT
44Ø POKE 16916,7
45Ø CLS
46Ø PRINT"ANXIETY IN SPECIFIC SITUATIONS
(TESTS, DEADLINES, INTERVIEWS, ETC.)"
:GOSUB3Ø
47Ø PRINT"ANXIETY IN YOUR PERSONAL RELAT
IONSHIPS":GOSUB3Ø
48Ø PRINT"ANXIETY OF A GENERAL NATURE (N
O SPECIFIC CAUSE)":GOSUB3Ø
49Ø PRINT"DEPRESSION, HOPELESSNESS, OR P
OWERLESSNESS":GOSUB5Ø
50Ø PRINT"POOR SELF-ESTEEM":GOSUB5Ø
51Ø PRINT"IRRITABILITY, ANGER, OR RESENT
MENT":GOSUB5Ø
52Ø PRINT"SPECIFIC PHOBIAS (FEARS OF ELE
VATORS, THE DARK, STRANGERS, SPEAKI

```

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NG IN PUBLIC, ETC.)":GOSUB3Ø
53Ø PRINT"DISTURBING THOUGHTS THAT WON'T
GO AWAY":GOSUB5Ø
54Ø PRINT"MUSCULAR TENSION":GOSUB7Ø
55Ø PRINT"HIGH BLOOD PRESSURE":GOSUB3Ø

56Ø PRINT"HEADACHES, NECKACHES, OR BACKA
CHES":GOSUB7Ø
57Ø PRINT"INDIGESTION, IRRITABLE BOWEL,
ULCERS, CHRONIC CONSTIPATION, OR RECTAL
HEMORRHOIDS":GOSUB7Ø
58Ø PRINT"MUSCLE SPASMS, TICS, OR TREMOR
S":GOSUB7Ø
59Ø PRINT"FATIGUED OR TIRED":GOSUB3Ø
60Ø PRINT"INSOMNIA, SLEEPING DIFFICULTIE
S":GOSUB3Ø
61Ø POKE 16916,Ø:CLS
62Ø PRINT"THANK YOU.":PRINT:PRINT"PLEASE
LET THE PERSON IN CHARGE KNOW THAT YOU
HAVE FINISHED (leave the computer on
so the report can be generated).
63Ø PRINT:PRINT"NOW PRINTING . . ."
'— REPORT PRINTING
64Ø LPRINTCHR$(27);CHR$(78);CHR$(14);
65Ø LPRINT"-----> STRESS SCAN-5 <
-----";CHR$(15)

```

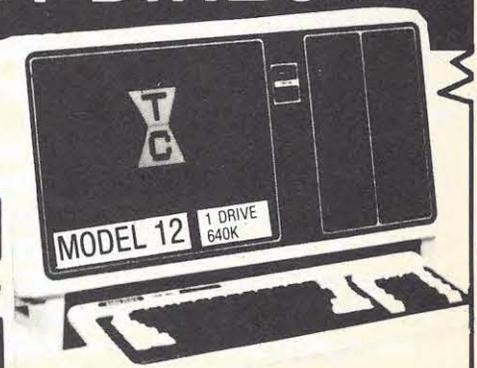
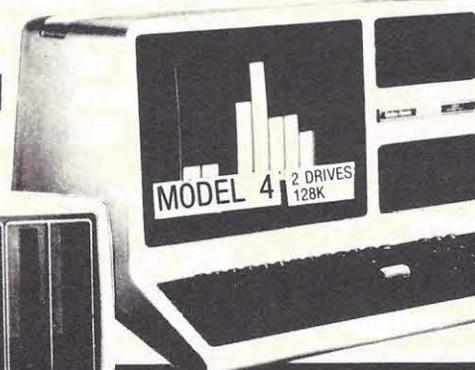
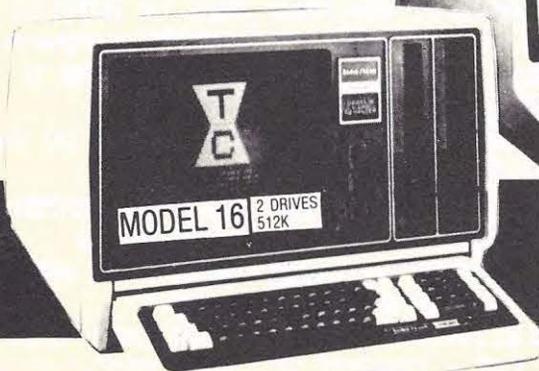
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660 LPRINT:LPRINT:LPRINTTAB(30) TIMES:LPRINT

670 LPRINT" STRESS SCAN-5 includes three inventories which are computer-administered, a frontalis electromyogram, and a cutaneous temperature analysis.":LPRINT

680 LPRINTCHR\$(27);CHR\$(88);"1. HOLMES-RAHE EVENTS INVENTORY":LPRINT

690 LPRINTCHR\$(27);CHR\$(89);" Research at the University of Washington has found that forty-two commonly experienced events (ranging from a minor violation of the law - 11 points - to death of a spouse - 100 points) contribute "

700 LPRINT"to an individual's level of stress."

710 LPRINT" As you may have noticed, many stressful events cannot be avoided and quite a few are pleasureable (vacations, for instance). The way for you to control your total exposure is to schedule those which may be "

720 LPRINT"under your control for times when 'natural' events are not occurring ."

730 LPRINT" Statistically, people with scores over 150 have a 50-50 chance of developing or aggravating a stress-related illness, and those with scores over 300 have a 90 percent chance of negative health consequences."

740 LPRINT" Your Total Score on the Events Inventory was"+STR\$(ET)+" Of that total:"LPRINTTAB(10)STR\$(FE)+" were related to marriage and the family, and":LPRINTTAB(10)STR\$(WE)+" were related to your work."

750 LPRINT:LPRINTCHR\$(27);CHR\$(88);"2. PHYSIOLOGICAL STRESSORS INVENTORY":LPRINTCHR\$(27);CHR\$(89)

760 LPRINT" An easy way to remember the primary physiological stressors is with the phrase 'CATS from San Francisco.' CATS/SF reminds us about Caffeine, Alcohol, Tobacco, Salt, Sugar, and Fats."

770 LPRINT" The lower your score, the better, since each of these substances increases the chances of stress-related illness. Scores under 10 show an appropriate awareness of the problem and a commitment to a healthy lifestyle."

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Shrink

780 LPRINT" Your score on this inventory was "+STR\$(PT)+"."

790 LPRINT:LPRINTCHR\$(27);CHR\$(88);"3. ELECTROMYOGRAM (EMG)":LPRINT CHR\$(27);CHR\$(89)

800 LPRINT" EMG sensors were placed on your forehead in order to measure tension in the muscles of the face, jaw, scalp, and neck. A baseline reading was taken and, after about five minutes of relaxing, a second reading was taken."

810 LPRINT" Researchers consider values above 5 microvolts to be extremely tense and values under 1 microvolt to be quite relaxed.":LPRINT" Your baseline was ";CHR\$(27);CHR\$(88);" ";CHR\$(27);CHR\$(89);"."

820 LPRINT" Later, the EMG registered ";CHR\$(27);CHR\$(88);" ";CHR\$(27);CHR\$(89);"."

830 LPRINT:LPRINTCHR\$(27);CHR\$(88);"4. CUTANEOUS TEMPERATURE ANALYSIS":LPRINTCHR\$(27);CHR\$(89)

840 LPRINT" Tiny muscles surrounding each blood vessel can squeeze so tightly that blood flow to the fingers and toes is greatly diminished. The resulting co-

ldness signals the presence of stress at a level not usually under conscious control."

850 LPRINT" As a measure of stress, finger tip temperature is considered 'normal' in the 85 to 90 degree (F) range, with greater stress below 85 and greater relaxation above 90."

860 LPRINT" Your baseline finger tip temperature was ";CHR\$(27);CHR\$(88);" ";CHR\$(27);CHR\$(89);"."

870 LPRINT" After a few moments of relaxation, your temperature was "CHR\$(27);CHR\$(88);" ";CHR\$(27);CHR\$(89);"."

880 LPRINT:LPRINTTAB(45)"(continued on page two)":FOR Y=1TO12:LPRINT:NEXTY:LPRINTTAB(50)"Page Two":LPRINT

890 LPRINTCHR\$(27);CHR\$(88);"5. SYMPTOMS OF STRESS":LPRINTCHR\$(27);CHR\$(89):LPRINT" The symptoms listed by the computer can be divided into three categories:

those that respond best to relaxation training (such as biofeedback), those";

900 LPRINT"that respond best to counseling, and those that respond best to a combination of the two. Any physical symptoms should be assessed by your physician, of course, to rule out the possibility of disease or injury."

910 LPRINT" Of the symptoms you reported.":LPRINTTAB(9)STR\$(SM+S2)+" respond best to relaxation training,":LPRINTTAB(9)STR\$(PSY+P2)+" respond best to counseling, and":LPRINTTAB(9)STR\$(COMB+C2)+" may require both types of intervention."

920 LPRINT STR\$(S2+P2+C2)+" were of sufficient intensity to warrant prompt attention.":LPRINT

930 LPRINTSTRING\$(80,".")

940 LPRINT:LPRINT" As is implied in the title, STRESS SCAN-5 rapidly surveys several measures of stress. It is not a definitive assessment or diagnostic tool."

950 LPRINT" It does serve an educational purpose, however, in that you have become more knowledgeable about stress, its sources, and its consequences. We will be available to work with you on any of the issues raised."

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1000 LPRINTTAB(30)"KENT, WA 98031"
1010 LPRINTTAB(30)"(206) 854-7072"
1020 FOR C1=1TO9:LPRINT:NEXT
1030 LPRINT"Copyright 1981 by Michael D.
  Nugent, Ph.D."
1040 FOR C1=1TO23:LPRINT:NEXTC1
1050 CLS:PRINT"PRESS THE SPACEBAR TO ADM
  INISTER ANOTHER STRESS SCAN-5      O
  R ANY OTHER KEY TO EXIT TO BASIC."
1060 R$=INKEY$:IF R$=""THEN 1060
1070 IF R$="" THEN RUN 10 ELSE END
1080 DATA MINOR VIOLATIONS OF THE LAW, 1
  1, VACATIONS LONGER THAN TWO DAYS, 13, A
  CHANGE IN EATING HABITS, 14, A CHANGE I
  N SLEEPING HABITS, 16, A MORTGAGE OR LOA
  N OF LESS THAN $10000, 17, A CHANGE IN S
  OCIAL ACTIVITIES, 18
1090 DATA A CHANGE IN CHURCH ACTIVITIES,
  18, A CHANGE IN RECREATION, 19, A CHANG
  E IN SCHOOLS, 20, A CHANGE IN RESIDENCE,
  20, A CHANGE IN PERSONAL HABITS, 24, A
  CHANGE IN LIVING CONDITIONS, 25, BEGINNI
  NG OR ENDING SCHOOL, 26
1100 DATA AN OUTSTANDING PERSONAL ACHIEV
  EMENT, 28, FORECLOSURE OF MORTGAGE OR LO
  AN, 30, TAKING ON A NEW MORTGAGE OF OVER

```

```

  $10000, 31, DEATH OF A CLOSE FRIEND, 37
  , A CHANGE IN FINANCIAL STATUS, 38, A PE
  RSONAL INJURY OR ILLNESS, 53
1110 DATA A JAIL TERM, 63, A CHANGE IN W
  ORK HOURS OR CONDITIONS, 21, TROUBLE WIT
  H YOUR BOSS, 23, A CHANGE IN RESPONSIBIL
  ITIES AT WORK, 29, A CHANGE TO A DIFFERE
  NT LINE OF WORK, 36, A BUSINESS SETBACK,
  39, RETIREMENT, 45, FIRED AT WORK, 47
1120 DATA A CHANGE IN THE NUMBER OF FAMI
  LY GET-TOGETHERS, 15, SPOUSE BEGINS OR S
  TOPS WORK, 26, TROUBLE WITH IN-LAWS, 29,
  SON OR DAUGHTER LEAVING HOME, 29, A CHA
  NGE IN NUMBER OF ARGUMENTS WITH SPOUSE,
  35, ADDITION OF A NEW FAMILY MEMBER, 39
1130 DATA SEXUAL DIFFICULTIES, 39, PREGN
  ANCY, 40, A CHANGE IN THE HEALTH OF A FA
  MILY MEMBER, 44, MARITAL RECONCILIATION,
  45, DEATH OF A CLOSE FAMILY MEMBER, 63,
  MARITAL SEPARATION, 65, DIVORCE, 73, DE
  ATH OF SPOUSE, 100
1140 'ON THE PROWRITER, CHR$(27);CHR$(78
  ); starts the 10-pitch font. CHR$(14);
  starts double-width, and CHR$(15); ends
  it. CHR$(27);CHR$(88); starts unders
  core, and CHR$(27);CHR$(89) ends it.

```

C - Compiler for LDOS 5.1

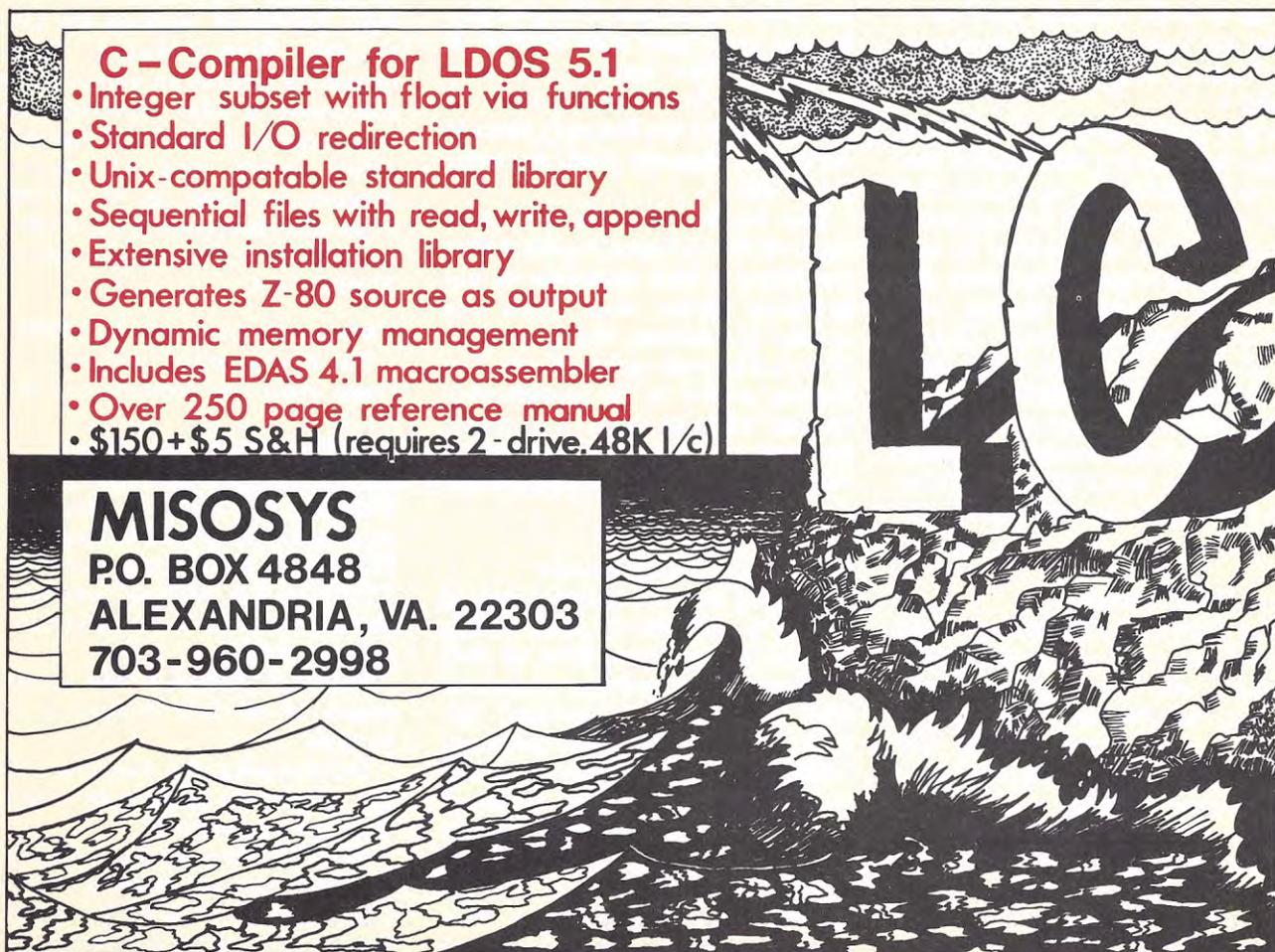
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TRSDOS 6.0

A review of the Model 4 operating system

Model 4

Jim Klaproth, Associate editor

The TRS-80 Model 4 microcomputer is being touted as the computer for Model I owners who didn't switch to a Model III. I kept hearing, "You'll be glad you waited!" from those who had gotten an early look at the 4. Well, I finally decided to make the jump from my five-year-old Model I to the new, improved Model 4.

Am I glad? Overall, I am very happy but, like any new product, the unit is not without its problems. The unit that I own has a keybounce problem. This evaluation is not about the machine, but about the new disk operating system and BASIC language that Tandy supplies with the Model 4. The DOS is officially called TRSDOS 6.0, but unofficially it is being called LDOS 6.0 because it was written by Logical Systems, Inc. and it bears a striking resemblance to earlier versions of LDOS.

New DOS Features

The DOS takes advantage of all Model 4 expanded hardware features like an 80 x 24 screen format, audible keyclick, inverse video, sound output, control and function key recognition and 4 Mhz clock speed. In spite of the higher clock speed, the DOS seems slower on most functions. The directory takes about six seconds to appear, compared to three seconds for an LDOS 5.1 disk.

The REMOVE (kill) command seems to take forever to eliminate a file. The directory command is like LDOS in that, if you do not specify a drive number, all four device directories are displayed even if only one drive is active. The inactive devices are tagged with DRIVE :X (no disk). The display will stop scrolling when the amount of information in the directory exceeds the screen capacity (until the enter key is hit).

The display is quite attractive (with its 80 x 24 format) and it makes the Model 4 look more like its big brothers. Some may fault the smaller characters, but I consider them quite crisp and readable. The display seems to be considerably dimmer when in the 80 x 24 mode, perhaps to prevent the familiar screen image burn-in so common on the Model III.

Unique DOS Commands

Some of the unique commands of TRSDOS 6.0 are CLICK, which enables the keyclick filter so that each keystroke produces an audible click; COMM, a full-featured RS-232C communications program; MEMDISK, which adds a pseudo floppy disk drive in memory; SETKI, sets the keyboard repeat values; REMOVE, same as KILL in other DOS's; SYSGEN, which creates a configuration file that stores default parameters; and

TAPE100, a utility that allows the Model 4 to read or create Model 100 tape files.

Missing DOS Commands

Missing from TRSDOS 6.0 are all of the tape I/O commands (other than TAPE100), making the DOS strictly disk-oriented. Other omissions include an online HELP command, a CLS command (the screen can be cleared with the shift-clear keys), and all system diagnostics, such as MEMTEST. Most other functions of TRSDOS 1.3 and LDOS 5.1.3 have equivalents in TRSDOS 6.0.

Commands Common to LDOS

The next group of commands are those which are common to LDOS 5.1.3.

CONV converts Model III TRSDOS diskettes to be readable by TRSDOS 6.0. (Keep in mind that application programs written under TRSDOS 1.3 will not run under TRSDOS 6.0 without extensive modification due to the structure of the new BASIC.)

DEVICE displays the current status of all I/O devices in the system.

DO compiles and executes a DO file of library commands without operator intervention.

FILTER filters or modifies data as it is read from or written to a device. (Example: CLICK/FLT modifies the keyboard to produce an audible

click.)

JCL (job control language) enables the user to construct a sequence of commands and statements to control the operating system or applications program.

JOBLOG creates a log of all commands entered or received along with a time stamp of each.

KSM/FLT is a keyboard filter that allows the use of files containing phrases to be used by hitting certain keys.

LINK connects two logical devices together. (Example: send all video output also to printer.)

MEMORY is used to reserve a portion of user memory and display the current high and low limits.

REPAIR converts Model I disks to make them readable to TRSDOS 6.0.

SET and RESET commands set or reset a driver of filter program to a device.

ROUTE routes one device to another device, to a disk file, or to nothing (NIL).

SPOOL establishes a buffer for a specified device (usually a lineprinter) so that the device does not tie up the main processor at a critical time.

SYSTEM configures the disk drives and various system options to your needs.

Documentation

The documentation consists of a disk owner's manual in a standard brown Tandy binder, a quick reference guide, a little booklet on the Model 4 disk system, and a single copy of TRSDOS 6.0. The manual is divided into three sections. The TRSDOS section, containing 160 pages, is supplemented by 129 pages in the appendices, some of which is devoted to hardware and the new Microsoft BASIC.

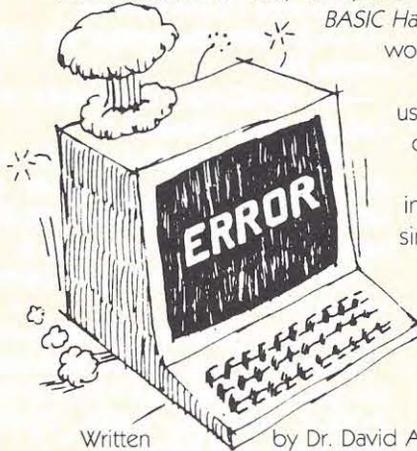
Compared to the LDOS manual, it is light and lacks some of the in-depth information that programmers and advanced hackers relish. This information is available in the Model 4 Technical Reference Manual (cat. no. 26-2110), which is not available as of this writing.

I found that most of the commands were well documented, but some of the advanced commands required skipping around to various sections in the

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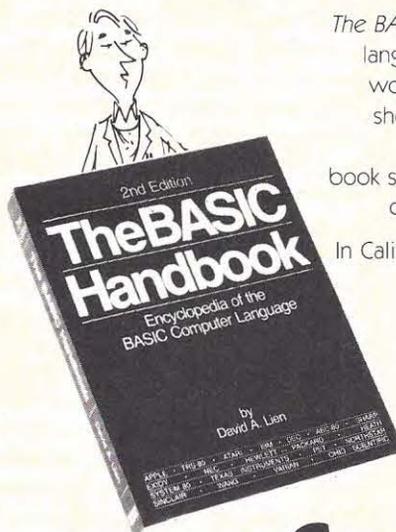
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TRSDOS 6.0

manual to retrieve necessary information. The SOUND command was totally undocumented, as were three of the logical operators (XOR, IMP, and EQV) and the integer division and modulus arithmetic that Model 4 BASIC supports. The third section covers the new BASIC that is included on the disk.

Microsoft BASIC 01.00.00

This BASIC is totally new and is nearly identical in syntax to Microsoft's BASIC-80. Perhaps this will mean that we will see a Model 4 BASIC Compiler that finally will be compatible with the interpreter BASIC. This language is totally RAM-resident (there is no BASIC in ROM as in the Models I and III) and it takes much longer to load. Once loaded, new users may be surprised to find that only 29.4K of memory is available for user programs. This limitation can be overcome by the fact that you may chain other programs or use overlays to extend the overall size of your program.

Programs can be loaded from Model III TRSDOS 1.3 disks or Model I TRSDOS disks, but they must be in ASCII format. Do not expect these programs to run unaltered unless they are totally uncompressed. This is because Basic 1.000 interprets any character string up to 40 characters as a variable name. The compressed statement, "FORM=1TO100", would be interpreted as "FORM =

1TO100", and would generate a syntax error.

Major Differences

The major differences between the new BASIC and the old are:

- No ROM calls are allowed.
- No tape I/O is allowed.
- Only 249 characters per line versus 255.
- 40 significant characters per variable name versus 2.
- When converting single- or double-precision numbers to integers, the new BASIC rounds the number, the old one truncates it.
- 20 spaces between print zones versus 16.
- All port addresses are different.
- The following BASIC keywords are not supported: CSAVE, CLOAD, POINT, CLOCK, CMD, POSN, RENAME, and VERIFY.
- All keywords must be delimited by spaces.
- Many error messages and internal codes are different.
- String space is allocated dynamically versus using a CLEAR statement.
- New rules for printing single- and double-precision numbers.
- Division by zero does not produce a fatal error, but prints an error message and keeps on trucking.
- FOR . . . NEXT loops are handled differently and are skipped under some conditions.
- Stack space must be allocated in a program if nested subroutines are used.

-The keyword THEN is required in IF . . . THEN statements.

-The statements PRINT@ and PRINT TAB have different rules and PRINT@ now supports row and column addressing.

New BASIC Keywords

The new keywords supported are: CALL transfers program control to a machine language subroutine.

COMMON reserves space for variables so they can be passed to a CHAINED program.

CHAIN loads a BASIC program and chains it to a main program, allowing any or all of the variables to be passed.

ERR\$ returns the last system error number and message.

ERASE erases one or more arrays.

HEX\$ returns the hex value of a number as a string.

OCT\$ returns the octal value of a number as a string.

OPTION BASE sets the minimum value for an array subscript to zero or one.

RENUM replaces the keyword NAME and renumbers program line numbers.

ROW returns the row position of the cursor.

SOUND sounds the internal tone generator.

SPACE\$ returns a string of specified spaces.

SPC prints a line of spaces.

SWAP exchanges the values of two variables.

WAIT suspends program execution until a specified port develops a specified bit pattern.

WHILE . . . WEND executes a series of statements as long as a given condition is true.

WRITE writes data on the display.

WRITE# writes data to a sequential-access file.

The commands that have similar names but different functions are:

NAME which now renames a filespec.

SYSTEM returns to TRSDOS or executes a TRSDOS command.

CLEAR is similar, but now reserves stack space instead of string space.

The SAVE command now includes an option for saving in an encoded binary format that cannot be listed or edited after the save.

Missing Features

Gone are all of the Model III CMD"X" functions. However, there is a SYSTEM command that allows any DOS command to be used. There is no sort function, space compression (this is unnecessary as space compression is not allowed), date format conversion, printer status check, BASIC cross-reference utility, nor any other CMD functions in BASIC. There is no BASIC * (restart BASIC with program intact). There are no abbreviated editor commands (except ".", which means "current line") as in some of the after-market DOS's. You must type "LIST 100" or "EDIT 250" (even the space must be there) to list

or edit. Programmers will also miss line move routines.

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My overall impression of TRSDOS 6.0 is that it misses the mark, even though it has some very impressive features. On the plus side, it is fairly user-friendly and somewhat forgiving of command syntax. A lot of option specs can be abbreviated and blank space placement is not as critical as in other DOS's.

The MEMDISK option appears to be useful only when the extra 64K RAM is installed because BASIC shares the same area as Bank 0 (the top half of user memory in a 64K machine). The manual recommends not using BASIC when MEMDISK is resident in Bank 0. The extra 64K option gives MEMDISK two additional 32K banks that do not conflict with BASIC. MEMDISK could have some interesting applications in future software releases when used with the full 128K machine.

Job Control Language gives TRSDOS 6.0 powerful capabilities that are found on minicomputer systems. On the minus side, it appears to be a little slower than other DOS systems, and at times the system appears to hang when doing disk I/O, even on a simple command like LIB.

The format operation appears to be quite uneven and inconsistent. TRSDOS 6.0 may not gain wide acceptance from the non-Tandy professional programmers due to the incompatibility of the new BASIC with other systems and the lack of any programmer's tools. It would mean learning a new DOS and several differences in the BASIC syntax and file structuring. Do not expect to see present Model III software converted to TRSDOS 6.0 for some time. Only time will tell what the future holds for this new DOS.

The new BASIC leaves me with mixed emotions. It is a greatly-expanded version with many new, powerful functions. The memory overhead leaves me cold, especially considering that programs cannot be compressed. Chaining is one alternative, but it slows down execution greatly. Perhaps Tandy and Microsoft will do something right and release a compiler that will be 100% compatible with Model 4 BASIC. Keep hoping.

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Color sketcher

Draw, save and load your pictures with ease

Color Computer

Glen Tapanila, Tumwater, WA

ColorSketcher lets you use the keyboard of your Color Computer to draw lines, figures, circles, and paint in the shapes. If you draw a design you like, you can save it on tape and reload it again. You can also use ColorSketcher to draw graphics for use in other programs. You need Extended Color BASIC and 16K.

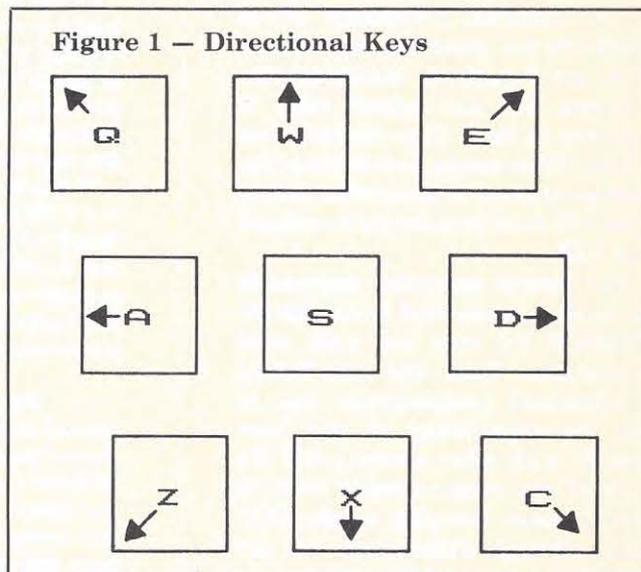
The program starts with a prompt for drawing speed. The slowest speed may be rather boring, but is necessary for detailed sketching. The fastest speed is for the well-coordinated sketcher and for creating freeform shapes where fine detail is not essential.

Lines are drawn with a nine-key pad centered around the "S" key. Direction of the line you are drawing is determined by the direction of the key from the "S" (see Figure 1). "W" is up, "E" is 45 degrees, "D" is to the right, "C" is 135 degrees, "X" is down, "Z" is 225 degrees, "A" is to the left, and "Q" is 315 degrees. Once a directional key is pressed, the line continues to be drawn until another key is pressed. The key does not have to remain depressed to continue drawing. Pressing the "S" key (or any other non-directional key) will stop all drawing.

The drawings are displayed in one of two color sets. The initial set is buff, cyan, magenta and orange. The preset background is buff and the line is cyan. The "N" key switches color set to green, yellow, blue and red. "M" returns you to the original color set. To change line color, use keys "1," "2," "3," and "4" which correspond respectively to the colors in either set. To change drawing speed after the initial prompt, use keys "6," "7," "8," "9," and "0" for slowest to fastest speeds.

Circles are drawn with the "B" key. The last point of the drawn line marks the center of the circle. When the "B" is pressed, the screen switches to prompts for circle radius and height-to-width ratio. After receiving the response, the program returns you to the graphics screen with the newly-drawn circle.

Shapes are painted with the "K" key. First, draw a shape with a single-colored line. Next, draw the line into



the interior of the shape. Pressing "K" fills the shape with the color of the line.

A shape that is not completely bordered by a drawn line causes painting problems. The PAINT command sets points on the screen to a designated color until a border of a certain color is found. Painting continues to set color to points until the entire screen is filled or a completely enclosed shape is painted.

For the ColorSketcher, the current line color is both the painting and the border color. Be careful. If the parameter of a shape is not completely drawn in with a single color, the entire screen may be painted, because the painting breaks through the border at any opening. Also, if the last dot of the line you are drawing is directly on the border of the shape to be painted when the "K" is pressed, painting spreads outside as well as inside the shape. Move the line inside the shape you want to paint.

CLONE I



CLONE III

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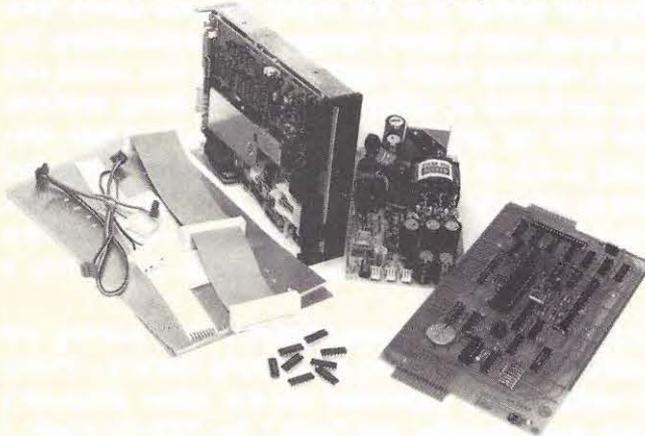


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Sketcher

There is never any problem in painting circles drawn with the "B" key (unless you change line color before painting).

Erasing a single line is tricky, but can be done. The line must be retraced exactly in the background color (key "1").

If you tire of the design, pressing the "P" key clears the screen and brings you to the speed prompt.

To save a design on cassette, ready your tape recorder and press the "Y" key. To load a previously-saved design, ready the recorder and press the "U" key.

You can sketch a design for use in other programs. Save the design on tape and include this code in your program: PMODE 3,1: PCLS: SCREEN 1,1: CLOADM "SKETCH".

Enhancements are easy to install. Just add another IF Y\$= statement after line 660 and appropriate code at the end of the program. Possible additions to the program are wide lines with stripes or patterns, and printing the screen.

How the Program Works

Key in the program, ignoring the remarks if you wish, and RUN it. Lines 110 to 250 are prompts for initial drawing speed. The graphics screen and parameters are

Table 1 — Control Keys

Directional Keys

W	Up
E	45 degrees
D	To the right
C	135 degrees
X	Down
Z	225 degrees
A	To the left
Q	315 degrees
S	Stop drawing

Color Keys

1	Buff or green
2	Cyan or yellow
3	Magenta or blue
4	Orange or red

Color Set

M	Green, yellow, blue and red
N	Buff, cyan, magenta and orange

Drawing Speed

6	Pondering portraiture
7	Automated artist
8	Speedy sketcher
9	Drawing demon
0	Computer unbound

Other Control Keys

B	Draw a circle
K	Paint a shape
Y	Save on tape
U	Load from tape

Sketcher

set up in 290-320. Speed is controlled by line 360, which acts as a pause. The FOR . . . NEXT loop is performed more times for a slower speed than a faster speed.

To draw a line, the program repeatedly performs a PSET statement (line 370) while incrementing the X and/or Y coordinates. The instructions for each command key (lines 430 to 660) are repeated until another key is pressed. When a new key is pressed, the INKEY\$ value changes and a new command begins (410 to 420).

Lines 710 to 900 change X and Y coordinates for the PSET statement and check to make sure they are not being incremented out of range of the screen. Color for the PSET statement is set in 940 to 970. Painting is done in 1010 to 1020. Speed is changed in 1060 to 1100 by changing the value of variable TM, which is used for determining the length of the pause in 360. Color set selection is done by the SCREEN statements in 1140 to 1150. Lines 1190 to 1260 perform the circle commands. The monitor switches to the prompt screen for circle radius and height-to-width ratio. The circle is drawn and the monitor goes back to the graphics screen.

The design is saved by moving the contents of the graphics memory to tape in 1400. A design is loaded from tape in 1560.

Program Listing for ColorSketcher

```

10 SC=1
20 REM *****
*****
30 REM **          Color Sketcher
**
40 REM **          By Glen Tapanila
**
50 REM *****
*****
60 REM *****
70 REM * prompt for drawing speed
80 REM *****
90 Y$="S"
100 CLS
110 PRINT " HOW FAST DO YOU WANT TO DRA
W?"
120 PRINT " "
130 PRINT " 1. PONDERING PORTRAITURE"
140 PRINT " 2. AUTOMATED ARTIST"
150 PRINT " 3. SPEEDY SKETCHER"
160 PRINT " 4. DRAWING DEMON"
170 PRINT " 5. COMPUTER UNBOUND",,,,
180 INPUT "THE SPEED WILL BE??";TM
190 IF TM > 5 GOTO 90
200 IF TM < 1 GOTO 90
210 IF TM=4 THEN TM=25
220 IF TM=3 THEN TM=50
230 IF TM=2 THEN TM=100
240 IF TM=1 THEN TM=150
250 IF TM=5 THEN TM=1
260 REM *****

```

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Sketcher

```
270 REM * set up screen parameters
280 REM *****
290 PMODE 3,1
300 PCLS
310 SCREEN 1,1
320 X=128:Y=96:C=2
330 REM *****
340 REM * pause and set color to a point
350 REM *****
360 FOR K=1 TO TM:NEXT K
370 PSET(X,Y,C)
380 REM *****
390 REM * check for inkey and branch accordingly
400 REM *****
410 A$=INKEY$:IF A$ = "" GOTO 430
420 Y$=A$
430 IF Y$="W" GOTO 710
440 IF Y$="X" GOTO 730
450 IF Y$="A" GOTO 770
460 IF Y$="D" GOTO 750
470 IF Y$="E" GOTO 790
480 IF Y$="C" GOTO 820
490 IF Y$="Z" GOTO 850
500 IF Y$="Q" GOTO 880
510 IF Y$="1" GOTO 940
520 IF Y$="2" GOTO 950
530 IF Y$="3" GOTO 960
540 IF Y$="4" GOTO 970
550 IF Y$="K" GOTO 1010
560 IF Y$="6" GOTO 1060
570 IF Y$="7" GOTO 1070
580 IF Y$="8" GOTO 1080
590 IF Y$="9" GOTO 1090
600 IF Y$="0" GOTO 1100
610 IF Y$="M" GOTO 1140
620 IF Y$="N" GOTO 1150
630 IF Y$="P" GOTO 90
640 IF Y$="B" GOTO 1190
650 IF Y$="Y" GOTO 1300
660 IF Y$="U" GOTO 1450
670 GOTO 410
680 REM *****
690 REM * change X and/or Y to move coordinates
700 REM *****
710 Y=Y-1:IF Y<1 THEN Y=1
720 GOTO 360
730 Y=Y+1:IF Y>192 THEN Y=192
740 GOTO 360
750 X=X+1:IF X>256 THEN X=256
760 GOTO 360
770 X=X-1:IF X<1 THEN X=1
780 GOTO 360
790 X=X+1:Y=Y-1:IF X>256 THEN X=256
800 IF Y<1 THEN Y=1
810 GOTO 360
```

```

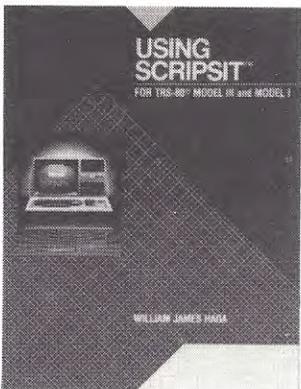
820 X=X+1:Y=Y+1:IF X>256 THEN X=256
830 IF Y>192 THEN Y=192
840 GOTO 360
850 X=X-1:Y=Y+1:IF X<1 THEN X=1
860 IF Y>192 THEN Y=192
870 GOTO 360
880 X=X-1:Y=Y-1:IF X<1 THEN X=1
890 IF Y<1 THEN Y=1
900 GOTO 360
910 REM *****
920 REM * set color
930 REM *****
940 C=1:GOTO 360
950 C=2:GOTO 360
960 C=3:GOTO 360
970 C=4:GOTO 360
980 REM *****
990 REM * paint an area
1000 REM *****
1010 IF C=1 THEN PSET (X,Y,2) ELSE PSET
(X,Y,1)
1020 PAINT (X,Y),C,C:GOTO 410
1030 REM *****
1040 REM * change speeds
1050 REM *****
1060 TM=150:GOTO 360
1070 TM=100:GOTO 360
1080 TM=50:GOTO 360
1090 TM=25:GOTO 360
1100 TM=1:GOTO 360
1110 REM *****
1120 REM * change color set
1130 REM *****
1140 SCREEN 1,0:SC=0:GOTO 410
1150 SCREEN 1,1:SC=1:GOTO 410
1160 REM *****
1170 REM * draw a circle
1180 REM *****
1190 CLS
1200 PRINT "WHAT IS THE RADIUS OF THE CI
RCLE"
1210 INPUT "???" ;RD
1220 PRINT "WHAT IS THE HEIGHT TO WIDTH
RATIO?"
1230 PRINT "DECIMALS ARE, OF COURSE, PER
MITTED."
1240 INPUT "???" ;HW
1250 CIRCLE (X,Y),RD,C,HW
1260 Y$=" ":SCREEN 1,SC:GOTO 410
1270 REM *****
1280 REM * save a sketch on tape
1290 REM *****
1300 CLS
1310 PRINT @1,"SAVE A SKETCH ON TAPE"
1320 PRINT @33,"GET RECORDER READY"
1330 PRINT @65,"PRESS PLAY AND RECORD BU
TTONS"

```

```

1340 PRINT @97,"PRESS ENTER TO BEGIN"
1350 PRINT @132,"TO AVOID TAPING, TYPE I
N"
1360 PRINT @164,"AN 'N' AND PRESS"
1370 PRINT @196,"THE ENTER KEY"
1380 INPUT XX$
1390 IF XX$="N" GOTO 1410
1400 CSAVEM "SKETCH",1536,7679,0
1410 Y$=" ":SCREEN 1,SC:GOTO 410
1420 REM *****
1430 REM * load a sketch from tape
1440 REM *****
1450 CLS
1460 PRINT @1,"LOAD A SKETCH FROM TAPE"
1470 PRINT @33,"GET RECORDER READY"
1480 PRINT @65,"PRESS PLAY BUTTON"
1490 PRINT @97,"PRESS ENTER TO BEGIN"
1500 PRINT @132,"TO AVOID READING A TAPE
,"
1510 PRINT @164,"TYPE AN 'N' AND PRESS"
1520 PRINT @196,"THE ENTER KEY"
1530 INPUT XX$
1540 IF XX$="N" GOTO 1570
1550 PMODE 3,SC:PCLS:SCREEN 1,1
1560 CLOADM "SKETCH"
1570 Y$=" ":SCREEN 1,SC:GOTO 410

```



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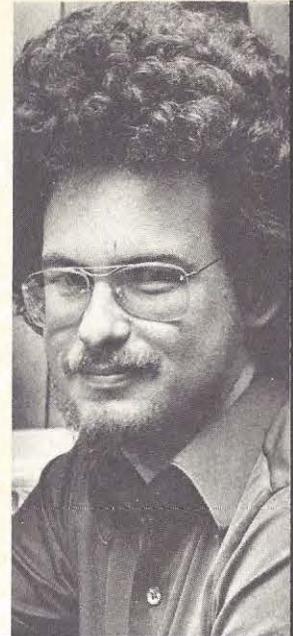
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DOS fix

A collection of repair jobs for TRSDOS-II version 4.2

Models 12/16

© 1982, Snapp, Inc., Bob Snapp, Cincinnati, OH

The material that follows is copyrighted by Snapp, Inc. but we have been given permission to reproduce it for our readers. Our thanks to Mr. Bob Snapp for making these patches and fixes available. The fixes are available on diskette as a DO file from Snapp, Inc., 3719 Mantell Ave., Cincinnati, OH 45236 (513) 891-4496 for only \$15.

These patches are only for TRSDOS-II Version 4.2 (Models 12 and 16). Some of the fixes require that the system be reset before they take effect. You should RESET the system after applying your selected fixes. Note carefully the discussion for each fix as well as the notes in the listings. In some cases a fix must be applied prior to another fix. The patches and the discussions preceding them are taken directly from a Snapp DOSFIX diskette. Please note that some DOSFIX numbers are not listed. They are no longer applicable due to changes in TRSDOS-II Version 4.2.

Readers should also note that another set of DOSFIXes that were developed just for TRSDOS 2.0 by Snapp, Inc. were published in the July/August 1982 issue of *two/sixteen Magazine*, Box 1216, Lancaster, PA, 17603.

To install the patches, you can enter them directly from TRSDOS Ready (bypassing the PAUSE statements), or build a DO file that includes the PAUSE and PATCH commands. Creating a DO file that contains the patches you desire will be very convenient for altering new system disks as they are created.

DOSFIX01

This one changes FORMAT so it will not try 10 times to format a
34 Basic Computing

track. FORMAT time is the time to find out if your diskette-surface quality is marginal and/or your drive is not in good shape. We recommend that everyone apply this fix. If you get locked-out tracks, *discard the diskette* immediately. We have found all currently available double-density certified diskettes to be of good quality. If you find yourself discarding more than roughly one percent of your diskettes, we suggest that you have your drives checked out. Our findings indicate that CDC drives in the Model II expansion bay need more frequent alignment than any other drives. If you are formatting diskettes in one of your expansion drives and get locked out tracks, we suggest that you try that particular diskette in drive zero. If it formats cleanly in drive zero, it is definitely time to get your expansion drives fixed.

DOSFIX02

It seemed that Tandy's efforts to password protect their software just wasn't providing the protection they desired, so starting with TRSDOS 2.0, they modified the operating system such that *no* password would work. This fix disables the new code and the real password KTA2 will now work.

DOSFIX03

The PATCH program in TRSDOS-II Version 4.2 contains an error which prevents the use of the A= specification under certain circumstances. This fix is an absolute prerequisite for many fixes.

DOSFIX04

Starting with TRSDOS 2.0, Tandy

decreed that machine language programs could not load on top of any part of TRSDOS. I don't know whether they were trying to prevent a programmer from accidentally destroying his operating system, or simply trying to give software houses a tough way to go. In any event, the ability to overlay TRSDOS is an absolute requirement for some Snapp, Inc. software. Put this one on for sure.

DOSFIX06

The DEBUG module checks addresses and if you would like to use DEBUG to fiddle with the 'forbidden' areas in the machine, put this one on.

DOSFIX07

It was a very poor design to put the break key right next to the back space key. Touch-typist operators are continually reaching for the back space key with their pinky and accidentally hitting the break key. We can't repair the poorly designed hardware, but we can fix the software so another key does the job. With these fixes installed, <ctrl>6 is the break key and the break key simply produces CHR\$(03). Recommended for everyone. It is required for correct operation of Snapp-IV, an Extended BASIC Mapping Support package.

DOSFIX10

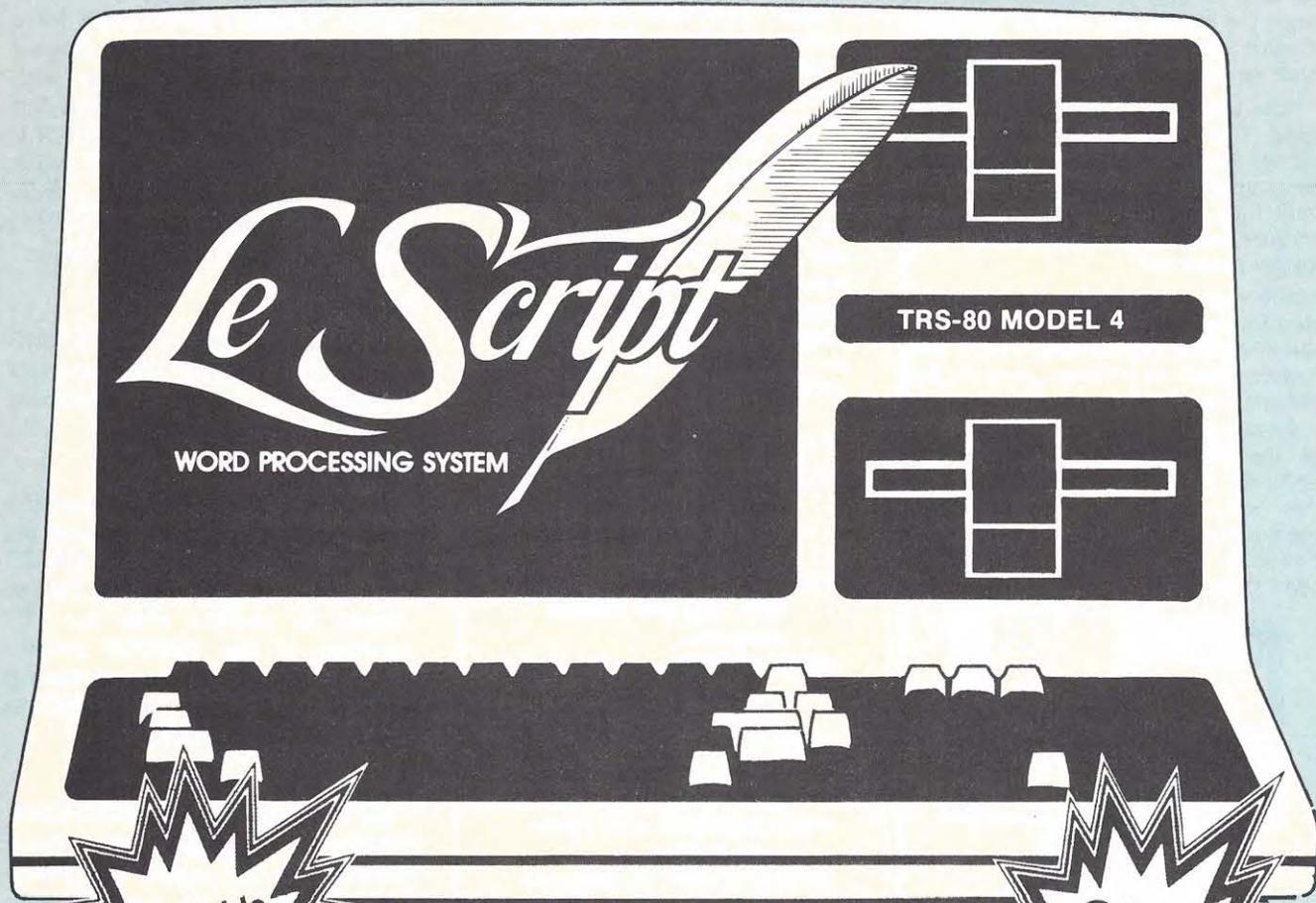
This one simply eliminates the display of the Tandy Corporation logo at boot-up time. If you like the picture, don't put this one on.

DOSFIX11

This one will eliminate the TIME

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question when you boot up.

DOSFIX12

This one will eliminate both the DATE and TIME questions when you boot up.

DOSFIX13

You may have noticed that while current versions of TRSDOS have an 80-character type-ahead keyboard, it doesn't work with BASIC. These fixes correct that, but when they are installed, the HOLD key no longer functions with BASIC. We like it with the fixes installed and don't miss the HOLD key, but you can take your choice.

DOSFIX14

In our opinion, the FORMS command harasses the computer operator with too many questions. This one eliminates them.

DOSFIX15

If BASIC LPRINTs more than 255 consecutive characters without an explicit carriage return, BASIC sends one out at that point. This is clearly in conflict with the W= function of the TRSDOS printer driver and produces confusing output. This one fixes BASIC to mind its own business.

DOSFIX17

As we mentioned in DOSFIX04, TRSDOS 'protects' itself from destruction by users programs which attempt to overlay low memory. The error produced as a result is ERROR 34, "Attempt to use a non-program file as a program." We think the message is misleading and substitute one of our own. This is kind of an inside joke and not necessary for correct operation.

DOSFIX18

This one changes the text of the message 'TRSDOS-II Ready' to 'By your command'. Another inside joke, but cute.

DOSFIX19

Some disassemblers will not correctly function on system files unless the passwords are completely removed. This one does exactly that. Not necessary for anybody.

DOSFIX20

In BASIC, if HEX (&H) constants

Refer to advertiser index for reader service number

are followed in the text by a blank space, a syntax error will normally result. This one corrects this unnecessary restriction.

DOSFIX21

This fix changes the sector interleaving on diskettes to allow much faster access. It also eliminates an unnecessary head-settle delay when the disk head does not move. In order to take advantage of this fix, you must BACKUP each of your diskettes after the fix has been applied. This fix will make

floppy disk I/O up to *three* times faster than normal. Recommended for everyone.

DOSFIX22

BASIC was performing an unnecessary function when doing a GET or a PUT with an explicit record number. Because of the (relatively) slow speed of the floppies, the additional overhead went unnoticed. On the hard disk however, the difference is *very* significant. Please note that BASIC programs which use 'implicit' record

numbering will still run quite poorly, even with this fix applied. We recommend that you re-work any BASIC programs so they do not use implicit record-numbering.

DOSFIX24

Extend Thinline drive delay for more reliable operation.

DOSFIX25

This one fixes the PRINT command so no garbage is added when the logical record length is one and there is no carriage return.

```
. PAUSE DOSFIX01: Make formatting of floppy diskettes pickier about quality.
PATCH FORMAT R=24,B=95,F=0202A8460000000000000000,C=010424130101010433130101
PATCH FORMAT R=24,B=107,F=000000000,C=0202A846
PATCH FORMAT R=37,B=74,F=020239460000000000000000,C=010424130A05010433130A05
PATCH FORMAT R=37,B=86,F=000000000,C=02023946
.. PAUSE DOSFIX02: Eliminate the 'no-password' malarkey for system files.
PAUSE After this is installed, the password KTA2 is effective.
PATCH SYSTEM/SYS R=42,B=55,F=23,C=00
.. PAUSE DOSFIX03: Correct error in PATCH which prevents use of A= specification.
PATCH PATCH R=6,B=24,F=CA3C32,C=0000000
.. PAUSE DOSFIX04: Allow machine language programs to load below 2800H
PAUSE This patch will not be effective until you reset the system.
```

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DOS fix

PAUSE You must apply DOSFIX03 prior to applying this patch.
 PATCH SYSRES/SYS A=1B12,F=30D5,C=0000
 ..PAUSE DOSFIX06: Disable address checking in DEBUG
 PATCH SYSTEM/SYS R=135,B=70,F=38F3,C=0000
 PATCH SYSTEM/SYS R=135,B=78,F=30EB,C=0000
 PATCH SYSTEM/SYS R=139,B=173,F=30CE,C=0000
 PATCH SYSTEM/SYS R=139,B=181,F=38C6,C=0000
 PATCH SYSTEM/SYS R=140,B=201,F=38,C=18
 PATCH SYSTEM/SYS R=140,B=215,F=30,C=18
 ..PAUSE DOSFIX07: Next six move BREAK key function to <CTRL>E
 PAUSE These patches will not be effective until you reset the system.
 PAUSE DOSFIX03 must be applied prior to this one.
 PATCH SYSRES/SYS A=02F5,F=03,C=7E
 PATCH BASIC A=57E7,F=03,C=7E
 PATCH BASIC A=594C,F=03,C=7E
 PATCH BASIC A=5F70,F=03,C=7E
 PATCH BASIC A=6066,F=03,C=7E
 PATCH BASIC A=6515,F=03,C=7E
 ..PAUSE DOSFIX10: Eliminate the Tandy logo at boot-up
 PATCH SYSTEM/SYS R=22,B=5,F=06,C=C9
 ..PAUSE DOSFIX11: Eliminate TIME prompt at boot-up
 PATCH SYSTEM/SYS R=25,B=62,F=21F81E,C=C3641E
 ..PAUSE DOSFIX12: Eliminate DATE and TIME prompts at boot-up
 PATCH SYSTEM/SYS R=25,B=24,F=21DF1E,C=C3641E
 ..PAUSE DOSFIX13: Update BASIC to support the 80 character typeahead buffer.
 PAUSE DOSFIX07 is a prerequisite to using this fix
 PAUSE If you elected not to install DOSFIX07, do not attempt
 PAUSE to install DOSFIX13
 PAUSE This fix may be used alone if you modify it such that both
 PAUSE occurrences of the hex code '3E7E' are replaced by '3E03' (there are two)

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PATCH BASIC A=325C,F=49,C=62
PATCH BASIC A=57DC,F=49,C=62
PATCH BASIC A=60EF,F=49,C=55
PATCH BASIC A=6049,F=0000000000000000C53E04CF,C=3A6161B728063E7EF5AF18
PATCH BASIC A=6054,F=2005F6FF78C1C9C13A6161B7,C=17C53E04CF20043C78C1C9AF
PATCH BASIC A=6060,F=C8AF3261613E7EB7,C=C1C93A6161B720E7
..PAUSE DOSFIX14: Eliminate prompts & messages from FORMS command
PATCH SYSTEM/SYS R=86,B=178,F=0E0D,C=1814
PATCH SYSTEM/SYS R=86,B=220,F=21E420,C=C3041F
..PAUSE DOSFIX15: Eliminate garbage carriage return to printer from BASIC.
PATCH BASIC A=56F8,F=CC0D572807,C=0000000000
..PAUSE DOSFIX17: Correct text of ERROR 34 message.
PATCH SYSTEM/SYS R=126,B=91,F=26D8E315FA949C,C=7426D8E3118F00
..PAUSE DOSFIX18: Change text of "TRSDOS-II Ready" message to "By your command"
PATCH SYSTEM/SYS R=4,B=43,F="TRSDOS-II Ready",C="By your command"
..PAUSE DOSFIX19: Remove passwords from ALL system files.
ATTRIB SYSTEM/SYS.KTA2 ACC=,UPD=
ATTRIB SYSRES/SYS.KTA2 ACC=,UPD=
ATTRIB APPEND.KTA2 ACC=,UPD=
ATTRIB BASIC.KTA2 ACC=,UPD=
ATTRIB BACKUP.KTA2 ACC=,UPD=
ATTRIB BUILD.KTA2 ACC=,UPD=
ATTRIB COPY.KTA2 ACC=,UPD=
ATTRIB CREATE.KTA2 ACC=,UPD=
ATTRIB DRIVE.KTA2 ACC=,UPD=
ATTRIB DUMP.KTA2 ACC=,UPD=
ATTRIB FCOPY.KTA2 ACC=,UPD=
ATTRIB FILES.KTA2 ACC=,UPD=
ATTRIB FORMAT.KTA2 ACC=,UPD=
ATTRIB HELP.KTA2 ACC=,UPD=
    
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DOS fix

```
ATTRIB LIST.KTA2 ACC=,UPD=
ATTRIB MEMTEST.KTA2 ACC=,UPD=
ATTRIB MOVE.KTA2 ACC=,UPD=
ATTRIB PATCH.KTA2 ACC=,UPD=
ATTRIB PRINT.KTA2 ACC=,UPD=
ATTRIB RECEIVE.KTA2 ACC=,UPD=
ATTRIB RESTORE.KTA2 ACC=,UPD=
ATTRIB SAVE.KTA2 ACC=,UPD=
ATTRIB TERMINAL.KTA2 ACC=,UPD=
ATTRIB ASM16.KTA2 ACC=,UPD=
ATTRIB BOOT16.KTA2 ACC=,UPD=
ATTRIB EDIT16.KTA2 ACC=,UPD=
ATTRIB IFC.KTA2 ACC=,UPD=
ATTRIB LINK16.KTA2 ACC=,UPD=
ATTRIB TRSDOS16/SYS.KTA2 ACC=,UPD=
..PAUSE DOSFIX20: Correct error in BASIC relating to hex constants.
PATCH BASIC A=39DD,F=237E,C=EF00
..PAUSE DOSFIX22: Make I/O on disk drives so much faster with BASIC
PAUSE Also updates BASIC to support 65535 logical records per file.
PATCH BASIC A=65FA,F=C5E5505913133E21CF,C=0303ED431E667EFE2C
PATCH BASIC A=6603,F=50591313E17EFE2C,C=280850593E21CF03
PATCH BASIC A=660B,F=CC09332BEF,C=1810CDDC3C
PATCH BASIC A=6610,F=C2F52EE3E5,C=2BEFC2F52E
PATCH BASIC A=661A,F=1B2323424BEB,C=424B0B110000
PATCH BASIC A=6624,F=20093E23CFC27268C1E1,C=3E2328023E2CCFC27268
PATCH BASIC A=662F,F=3E2CCFC32966,C=000000000000
..PAUSE DOSFIX24: Extend Thinline Drive Delay for more reliable operation.
PATCH SYSRES/SYS A=10D8,F=60,C=65
..PAUSE DOSFIX25: Fix PRINT so no garbage when LRL = 1 and no carriage return.
PATCH PRINT A=287A,F=AFB9C41A2806003E1DCF,C=212B2AAF9C41A280000
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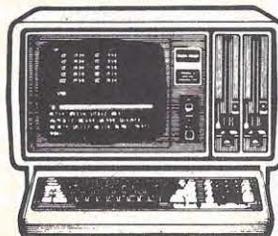
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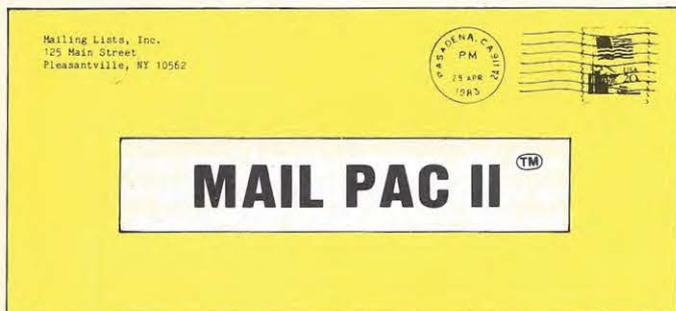
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Risko

Analyze your heart disease risk factors

Models I/II/III/4/12/16

David E. Clapp, Ph.D., Cincinnati, OH

All Americans are becoming more aware and concerned about heart disease, especially now with the increased publicity regarding this threat to health. This article (and accompanying program) is based upon an article (sponsored by the American Heart Association) which appeared in the *Cincinnati Enquirer* on February 16, 1982. A similar article may have appeared in your paper. Perhaps you scanned the article, and perhaps you even tried to compute your score to determine your basic risk of developing heart disease.

If you didn't compute your score at that time, this computer program will ease the computation of the risk score for you as well as your family and friends. The program offers some advantages over a pencil and paper computation — primarily by eliminating error and confusion in calculating the score. Beyond this, however, the program offers additional information and provides an opportunity to re-run your rating many times with a minimum of effort.

Heart Disease Risk Factors

The risk factors for heart disease appear reasonably well-known. High blood pressure is recognized as a danger signal which we all should carefully observe. Blood pressure is reported as systolic and diastolic values; or, the highest and lowest pressures in the circulatory system. Thus, when we have our blood pressure taken, a rating of 120/80 might be given relating the systolic/diastolic values. It is generally agreed that the highest value, systolic pressure, is the most threatening and this is the value used in the accompanying computer program. If the value is not

known, it is possible to estimate it from your weight (as the program does) although we all should be aware of our current blood pressure values.

Blood cholesterol level appears to have a less significant role in heart disease; nonetheless, we are all bombarded in the popular media about cholesterol and the cholesterol content of popular foods. It requires a blood test for a cholesterol reading (with a needle, ough) and many of us probably do not know our personal cholesterol level. We probably should keep personal records of this value as a part of a continuing health monitoring program. This program will estimate your cholesterol level from your weight, but you may find some interest in re-running the program at several cholesterol levels to determine the effects on your personal risk rating.

If we are to believe the warning printed on cigarette packages, none of us have any business smoking. Despite such warnings, many of us still smoke hoping that such warnings are only meant for "the other guy." If you are to believe the American Heart Association, however, smoking is a risk factor in heart disease and the accompanying computer program adjusts your risk rating depending on the quantity of cigarettes you smoke. There are some interesting observations on smoking and age which become apparent by studying the ratings used in the computer program.

This program also includes consideration for use of estrogen as a risk factor in heart disease. This factor only applies to women and is a function of length of use (more than five years of continual use) as well as

Table 1

Sex/ Age	Weight				Blood Pressure				Cholesterol				Smoking			
	A	B	C	D	119	139	159	>159	199	224	249	>249	0	<1	1	>1
Male																
<54	-2	-1	1	2	-1	0	0	1	-2	-1	0	1	-1	0	1	2
>54	-2	0	1	3	-5	-2	1	4	-1	-1	0	0	-2	-1	0	1
Female																
<54	-2	-1	1	2	-2	-1	0	1	-1	0	0	1	-1	0	1	2
>54	-2	-1	0	1	-3	0	3	6	-3	-1	1	3	-2	-1	1	4

Risko

consideration of whether estrogen is currently used.

As you are no doubt aware, there are many other factors which appear to have an effect on heart disease. Heredity, for example, is obviously a factor as well as exercise and stress. None of these factors are measured in this simple program. Perhaps this is just as well since we don't want to put physicians out of the cardiac business. It may be helpful, however, to at least focus attention on the factors included in hopes that awareness will be heightened and perhaps a person with an unrecognized risk may be more aware and seek professional help.

Program Operation

The program is exceedingly simple. Many of you reading this article could probably improve on the coding (please feel free to do so); however, the program does work. Basically, the program acquires sex, age, height, weight, and number of cigarettes smoked. The program then processes your score based first upon sex, since rating factors are different for men and women. Within each sex, the program computes a score for weight, blood pressure, cholesterol, and smoking (also, estrogen for women). It then presents a summary of the data and an overall score. The score is interpreted based upon a range of values.

Everyone begins the process with a score of 10. Additions and subtractions are computed based upon an evaluation of each factor yielding to a rating ranging from zero to over twenty. A score of zero is the perfect heart and a score over 20 spells trouble. A rating of 10 is considered moderate to high risk of heart disease; hence, an individual must be exceptional to fall into the low-risk category. Ratings and cutoff values are shown in the computer program beginning at line 1230.

Data for heights and weights are stored in data statements beginning with statement number 1410. Each triplet of values represents three weight categories for a given height; men's heights begin with 61 inches and women's begin with 56 inches. Height values are continued for each inch beyond the initial value for 18 inches (e.g., up to 78 inches for men). Thus, the program looks up the proper weight category for a height input and classifies the weight given into one of four groups. In the triplet of values there is a low, medium and high weight where those persons exceeding the high weight are classified in the fourth category.

Using the height and weight data, as well as other data discussed later, the program follows up with a comparison of actual to recommended values for each risk factor. Hopefully, this comparison will motivate the user to evaluate the most threatening factor(s) and consider action to reduce risk. The user is encouraged to re-run the program with revised data (based upon improved values) to compute the effect on an overall rating. Sometimes this exercise is surprising since there is interaction between factors, e.g., cholesterol and age.

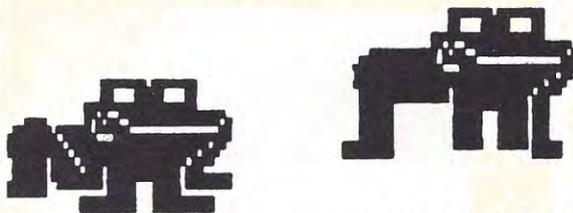
The best illustration of the program operation is a demonstration of a couple of runs. Consider, for example, a male 6 feet tall, weighing 200 pounds, age 35, smoking more than one pack a day, and whose systolic blood pressure and cholesterol levels are unknown. Inputting this data yields the following risk rating.

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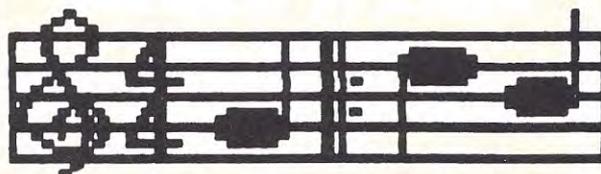


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weight	1
blood pressure	0
cholesterol	0
smoking	2
Total Rating	13

The total rating is an algebraic sum of the individual scores added to the original total of 10. A rating of 13 is considered to represent a moderate to high risk of heart disease for the age and sex specified. The computer program points out ideal levels for this individual in terms of weight (165 pounds versus the 200 pounds input), blood pressure (under 120 versus the 159 computed) and cholesterol (under 199 versus the 249 computed). It is pretty obvious that quitting smoking will help judging from the added risk rating. Using modified data, assuming the best possible values yields the following result:

weight	-1
blood pressure	-1
cholesterol	-2
smoking	-1
Total Rating	5

This is an astounding (and probably unrealistic) reduction in overall risk. While it is probably impossible to achieve such a change in all areas, the individual may be motivated to reduce voluntary factors (weight and smoking).

It is interesting to recompute a result for this same ideal individual at 57 years of age. In this case, all of the ideal values are input and only age is changed. This exercise yields the results:

weight	0
blood pressure	-5
cholesterol	-1
smoking	-2
Total Rating	2

This is another astounding result attesting to the value of maintaining good health as we age.

An illustration using a female yields equally interesting results. Here, we assume a 40-year-old woman weighing 200 pounds with unknown blood pressure and cholesterol levels, smoking more than one pack of cigarettes per day. This program yields:

weight	2
blood pressure	1
cholesterol	1
smoking	2
estrogen use	1
Total Rating	17

In this case, estrogen use was assumed resulting in an addition of 1 point. The overall score of 17 represents a high risk of heart disease. The program suggests reducing weight, blood pressure, cholesterol and smoking, as expected. It is interesting to reduce weight alone and observe the results. The recommended weight for this woman's height is 112 pounds and inputting this weight yields the result:

weight	-2
blood pressure	-2
cholesterol	-1
smoking	2
estrogen	1
Total Score	8

Risko

This is a significant reduction reflecting the fact that weight reduction typically results in a reduction in blood pressure and cholesterol. It should be recalled that these values are computed estimates and actual expected values for these factors may not reduce as dramatically as predicted here.

Analysis of Rating Factors

The rating factors used in this program were computed from data provided by the American Heart Association. This data is interesting to examine, in itself. Table 1 summarizes adjustment values for sex and age.

A number of interesting conclusions can be drawn from this data (presumably based upon some type of research). First, the age of 55 is a critical age where there is a significant change in risk factors. Also (and expectedly), there is a significant difference between male and female data. It is of interest that females do not always have the edge in cardiac affairs. Note that the highest blood pressure values (>159) show females suffering a higher penalty than males. This is also true, but less pronounced, in the high smoking category.

In a couple of cases, things get better with age. For females in the highest weight category, the penalty is lower after 55 years of age. This is more pronounced for men in the lowest blood pressure category over 55 years of age. All the men reading this should conclude that the single most important factor to control as they age is their blood pressure.

The smoking data shows some interesting results also. It can be noted that smoking less than a pack a day is really critical and penalties go up significantly after this amount. Also, if you are a male over 55 and smoke, you actually get credit! Perhaps this is due to the fact that since you have survived that long while smoking, your old ticker must be pretty strong.

Conclusion

While this program is fairly simple, it does provide some ponderable results. Of course, like any other analysis, the output is only as good as the input. We all should be more aware of our cardiac health and the attendant risk factors. As noted earlier, the risk factors here are not comprehensive and ultimately all of us should discuss our health with a qualified physician before trying to draw meaningful conclusions. However, if this program encourages a few people to check blood pressure and, perhaps, lose some weight, it is well worth it.

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ATING OF YOUR HEART"
120 PRINT TAB(18) "PROGRAMMED BY DAVE C
LAPP"
130 PRINT:PRINT
140 PRINT TAB(5) "THE RATING WAS DEVELOP
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```

ED BY THE AMERICAN HEART ASSOCIATION"
150 PRINT TAB(20) "AND PRINTED IN MANY N
EWSPAPERS":PRINT
160 PRINT "EVERYONE BEGINS THE RATING WI
TH A SCORE OF 10 AND POINTS ARE AD-DED O
R SUBTRACTED FROM YOUR SCORE BASED UPON
SEVERAL RECOGNIZED RISK FACTORS.";
170 PRINT" THE RISK FACTORS RATED HERE
ARE WEIGHT, SYSTOLIC BLOOD PRESSURE, BLO
OD CHOLESTEROL LEVEL, SMOKING, AND (FOR
WOMEN) ESTROGEN USE. ";
180 PRINT" THIS PROGRAM WILL COMPUTE YOU
R SCORE AND POINT OUT AREAS WHERE YOU SH
OULD IMPROVE.":PRINT
190 INPUT "ARE YOU READY? IF SO PRESS 'E
NTER'";Z$:CLS
200 INPUT "PLEASE INDICATE YOUR GENDER (
MALE=M,FEMALE=F)";A$:GOSUB 1510
210 PRINT"THIS PROGRAM ONLY ACCEPTS HEI
GHTS IN MEN FROM 61 TO 78 INCHES AND 56
TO 73 INCHES IN WOMEN";
220 PRINT ". ENTERING HEIGHTS OUTSIDE OF
THESE RANGES WILL GENERATE AN ERROR MES
SAGE."
230 INPUT "PLEASE ENTER YOUR HEIGHT IN I
NCHES WITHOUT SHOES";C
240 IF A$="M" AND C<61 PRINT "ERROR, OUT

```

```

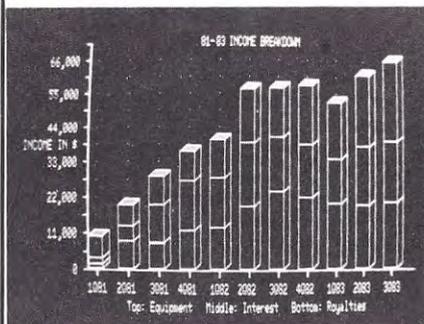
OF RANGE":STOP
250 IF A$="M" AND C>78 PRINT "ERROR, OUT
OF RANGE":STOP
260 IF A$="F" AND C<56 PRINT "ERROR, OUT
OF RANGE":STOP
270 IF A$="F" AND C>73 PRINT "ERROR, OUT
OF RANGE":STOP
280 INPUT "PLEASE ENTER YOUR WEIGHT IN P
OUNDS (ASSUMING YOU ARE WEARING OR-DINAR
Y STREET CLOTHING";B
290 INPUT "PLEASE ENTER YOUR AGE (TO THE
NEAREST YEAR)";AG
300 IF A$="F" THEN 720
310 K=C-60
320 FOR L=1 TO K
330 READ T1,T2,T3
340 NEXT L
350 IF B<T1 THEN WT=-2:P=119:CC=199:GOTO
410
360 IF B<T2 AND AG<=54 THEN WT=-1:P=139:
CC=224:GOTO 410
370 IF B<T2 AND AG>54 THEN WT=0:P=139:CC
=224:GOTO410
380 IF B<T3 THEN WT=1:P=159:CC=249:GOTO
410
390 IF AG<=54 THEN WT=2:P=160:CC=250:GOT
O 410

```

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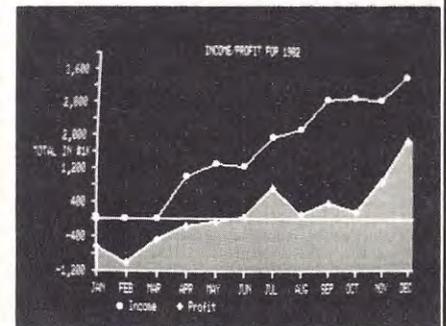
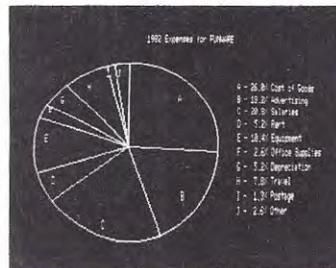


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```

400 WT=3:P=160:CC=250
410 GOSUB 1510:PRINT "YOUR SCORE ADJUSTM
ENT FOR YOUR WEIGHT IS";WT
420 INPUT "ENTER THE ACTUAL SYSTOLIC PRE
SSURE OR A '0'";Q
430 IF Q=0 PRINT "YOUR ASSIGNED BLOOD PR
ESSURE IS";P:GOTO 450
440 P=Q
450 IF P<=119 AND AG<=54 THEN BP=-1 :GOT
O 520
460 IF P<=119 AND AG>54 THEN BP=-5:GOTO
520
470 IF P<=139 AND AG<=54 THEN BP=0 :GOTO
520
480 IF P<=139 AND AG>54 THEN BP=-2:GOTO
520
490 IF P<=159 AND AG<=54 THEN BP=0 :GOTO
520
500 IF P<=159 AND AG>54 THEN BP= 1:GOTO
520
510 IF AG<=54 THEN BP=1 ELSE BP=4
520 PRINT "YOUR SCORE ADJUSTMENT FOR BLO
OD PRESSURE IS";BP
530 PRINT:INPUT"ENTER YOUR BLOOD CHOLEST
EROL LEVEL OR A '0'";Q
540 IF Q=0 PRINT"YOUR ASSIGNED BLOOD CHO
LESTEROL LEVEL IS";CC:C=CC:GOTO 560
550 C=Q
560 IF C<=199 AND AG<=54 THEN BC=-2 :GOT
O 610
570 IF C<=199 AND AG>54 THEN BC=-1:GOTO
610
580 IF C<=224 THEN BC=-1:GOTO 610
590 IF C<=249 THEN BC=0:GOTO 610
600 IF AG<=54 THEN BC=1 ELSE BC=0
610 PRINT "YOUR SCORE ADJUSTMENT FOR CHO
LESTEROL IS";BC
620 PRINT:INPUT"ENTER THE NUMBER OF PACK
S OF CIGARETTES YOU SMOKE PER DAY. '0'
IF NONE, '1' IF LESS THAN A PACK A DAY,
'2' IF EXACTLY A PACK A DAY, '3' IF MORE
THAN A PACK A DAY";S
630 IF S=0 AND AG<=54 THEN SM=-1 :GOTO 7
00
640 IF S=0 AND AG>54 THEN SM=-2:GOTO 700
650 IF S=1 AND AG<=54 THEN SM=0 :GOTO 70
0
660 IF S=1 AND AG>54 THEN SM=-1: GOTO700
670 IF S=2 AND AG<=54 THEN SM=1: GOTO 70
0
680 IF S=2 AND AG>54 THEN SM=0: GOTO 700
690 IF AG<=54 THEN SM=2 ELSE SM=3
700 PRINT "YOUR SCORE ADJUSTMENT FOR SMO
KING IS";SM
710 GOTO 1180
720 FOR L=38 TO C
730 READ T1,T2,T3

```

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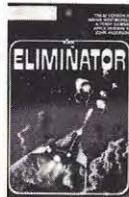
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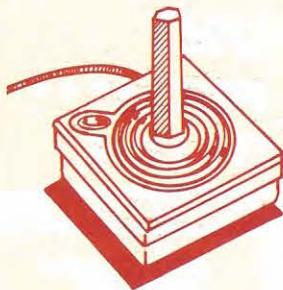
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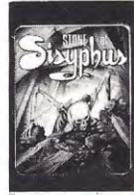
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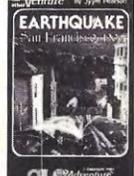
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Risko

```

740 NEXT L
750 IF B<T1 THEN WT=-2:P=119:CC=199:GOTO
810
760 IF B<T2 THEN WT=-1:P=139:CC=224:GOTO
810
770 IF B<T3 AND AG<=54 THEN WT=1:P=159:C
C=249: GOTO 810
780 IF B<T3 AND AG>54 THEN WT=0:P=159:CC
=249:GOTO 810
790 IF AG<=54 THEN WT=2 :P=160:CC=250:GO
TO 810
800 WT=1:P=160:CC=250
810 GOSUB 1510:PRINT "YOUR SCORE ADJUSTM
ENT FOR WEIGHT IS";WT
820 PRINT:INPUT"ENTER YOUR ACTUAL SYSTOL
IC BLOOD PRESSURE OR A '0'";Q
830 IF Q=0 PRINT "YOUR ESTIMATED BLOOD P
RESSURE IS";P:GOTO 850
840 P=Q
850 IF P<=119 AND AG<=54 THEN BP=-2:GOTO
920
860 IF P<=119 AND AG>54 THEN BP=-3:GOTO
920
870 IF P<=139 AND AG<=54 THEN BP=-1 :GOT
O 920
880 IF P<=139 AND AG>54 THEN BP=0:GOTO 9
20
890 IF P<=159 AND AG<=54 THEN BP=0 :GOTO
920
900 IF P<=159 AND AG>54 THEN BP=3:GOTO 9
20
910 IF AG<=54 THEN BP=1 ELSE BP=6
920 PRINT "THE ADJUSTMENT FOR BLOOD PRES
SURE IS";BP
930 PRINT:INPUT"ENTER YOUR BLOOD CHOLEST
EROL LEVEL OR A '0'";Q
940 IF Q=0 PRINT "YOUR ASSIGNED BLOOD CH
OLESTEROL LEVEL IS";CC:C=CC:GOTO 960
950 C=Q
960 IF C<=199 AND AG<=54 THEN BC=-1:GOTO
1030
970 IF C<=199 AND AG>54 THEN BC=-3:GOTO
1030
980 IF C<=224 AND AG<=54 THEN BC=0:GOTO
1030
990 IF C<=224 AND AG>54 THEN BC=-1:GOTO
1030
1000 IF C<=249 AND AG<=54 THEN BC=0 :GOT
O 1030
1010 IF C<=249 AND AG>54 THEN BC=1:GOTO
1030
1020 IF AG<=54 THEN BC=1 ELSE BC=3
1030 PRINT "YOUR ADJUSTMENT FOR CHOLESTE
ROL IS";BC
1040 PRINT:INPUT"ENTER A VALUE FOR SMOKI
NG, '0' IF NONE, '1' IF LESS THAN 1 PAC
KPER DAY, '2' IF EXACTLY A PACK A DAY, '

```

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```

ACTION ON ALL RISK FACTORS":GOTO 1280
1280 INPUT "PRESS ENTER TO REVIEW YOUR D
ATA";Z$:CLS
1290 PRINT "YOUR WEIGHT WAS REPORTED AS
";B;"THE BEST WEIGHT FOR YOU IS";T1;:PRI
NT"OR LESS"
1300 PRINT:PRINT "YOUR SYSTOLIC BLOOD PR
ESSURE WAS REPORTED AS";P;"THE BEST VALU
E FOR YOUR IDEAL WEIGHT IS 119 OR LESS"
1310 PRINT:PRINT "YOUR CHOLESTEROL LEVEL
WAS REPORTED AS";C;"THE BEST VALUE FOR
YOUR IDEAL WEIGHT IS 199 OR LESS"
1320 PRINT:PRINT "YOU REPORTED";
1330 IF S=0 PRINT " NO SMOKING, WHICH IS
GREAT";
1340 IF S=1 PRINT " LESS THAN A PACK A D
AY";
1350 IF S=2 PRINT " A PACK A DAY";
1360 IF S=3 PRINT " MORE THAN A PACK A D
AY";
1370 PRINT" CLEARLY, NO SMOKING IS THE
WAY TO GO"
1375 IF A$="M" GOTO 1400 ELSE PRINT:INPU
T"PRESS ENTER TO REVIEW NEXT PAGE";Z$:CL
S
1380 IF A$="F" AND N$="Y" PRINT:PRINT "W
HILE YOU ARE USING ESTROGEN NOW, IT'S US
E IS A NEGATIVE FACTOR IN CARDIAC HEALTH
"
1390 IF A$="F" AND E$="Y" PRINT:PRINT "W
HILE YOU HAVE USED ESTROGEN, IT'S USE CO
ULD BE A NEGATIVE FACTOR IN CARDIAC HEAL
TH"
1400 PRINT:PRINT "YOU MAY WANT TO RUN TH
E PROGRAM AGAIN WITH THE IDEAL VALUES AB
OVE TO SEE YOUR IMPROVEMENT. BEST OF ICA
RDIAC HEALTH":END
1410 DATA 123,148,173,126,152,178,129,15
6,182,132,160,186
1420 DATA 135,163,190,139,168,196,144,17
4,203,148,179,209
1430 DATA 152,184,214,157,190,221,161,19
4,227,165,199,232
1440 DATA 170,205,239,175,211,246,180,21
7,253,185,223,260
1450 DATA 190,229,267,195,235,274
1460 DATA 101,122,143,103,125,146,106,12
8,150,109,132,154
1470 DATA 112,136,158,115,139,162,119,14
4,168,122,148,172
1480 DATA 127,154,179,131,158,185,135,16
3,190,139,168,196
1490 DATA 143,173,202,146,178,207,151,18
2,213,155,187,218
1500 DATA 159,191,224,163,196,229
1510 CLS:PRINT@540, "THANKYOU":FOR M=1 T
O 500:NEXT M:CLS:RETURN
    
```

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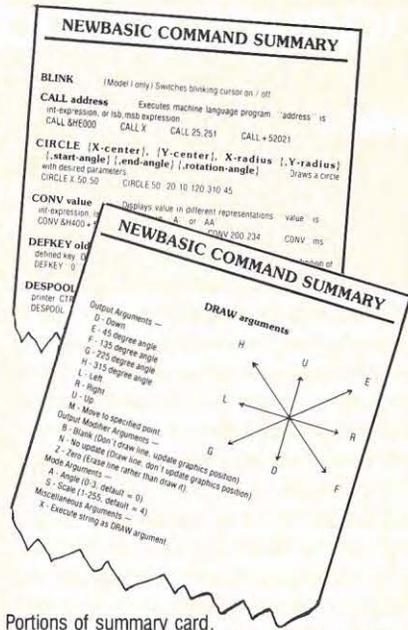
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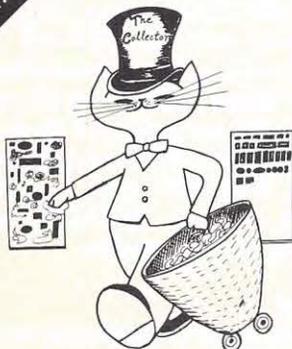
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2000	713.3	7.8	91.4

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Model 4 hints and tricks

Improvements you won't find explained in the manual: sound, speed, 128K, and a pilot light

Model 4

Al Mashburn, Gig Harbor, WA

By now, you have seen many articles about the new Radio Shack Model 4. You know that it can have 128K memory and can run CP/M as well as Model III software. It also has a few more keys and a whole list of other technical features.

If a person just plain wants to use this new machine, they have found out that the manual has more holes in it than a pound of Swiss cheese. Now, I got one of the first of the new 4's when they came out, so I expected that there might be some information left out and that I would get an update of some sort in the mail in a few weeks.

I don't know why I thought that. Now, three months down the road, I realize that the only way that the early buyers of this machine will get this information is to read it in a magazine such as *Basic Computing*. I'm going to pass along some of the things I have found out as well as a few modifications I've done to make this already good computer a little nicer.

Sound

Pick up any advertisement for the Model 4 and you will see "sound from BASIC" as one of the features. Now look in the owner's manual. Look in the quick reference guide. You might as well look in the dictionary too, because it isn't there. No, you didn't get "got," it really does have sound and it's not a state secret. (*The new manuals discuss this.* —Ed)

The syntax for sound is "SOUND T,D" where T is a number between 0

and 7 that denotes tone, and the D is duration (a 0 to 31 number). Don't forget to space after all BASIC words or you'll get a syntax error.

```
10 FOR X = 1 TO 7
20 READ T,D : SOUND T,D
30 NEXT
40 DATA 5,1,1,0,1,0,3,1,1,1,4,1,5,1
50 END
```

As long as I'm talking about BASIC, Radio Shack has provided a mail list program on the TRSDOS disk. This is a good way to show how to load and run a program in this new BASIC, but it's not good for much else, as there is no way to search for a specific name except to start at the beginning and search one-by-one until you find it. There are a few bugs too, such as in line 4170 when the operator is asked if phone numbers are to be printed. There is no check for a lowercase "n," so the numbers are printed anyway unless you happen to be in uppercase. The fix for this is to add to the end of the line: ELSE IF AN\$="n" THEN 4190.

If you exit the program at the wrong time, you will leave the data file open. The next time you try to use it, a file can be read but not written to. The fix for this is to return to DOS by typing SYSTEM and enter the command "RESET MAIL-LIST/DAT." (Don't enter the quotes or hyphen.) This will close the file. The directory will show an open file by displaying a "?" after the filename, so if you see that when doing a DIR, be sure to close that file.

One last thing . . . If you just have

to run a Model I or III program in Model 4 mode, the programs can be transferred to the new BASIC, but must be saved in ASCII before doing so. Load the program in Model III BASIC and type: ' SAVE "PROGRAM/BAS",A '. This will save the file in ASCII form. If Model III TRSDOS is being used, the CONV/CMD must be used to get the file on a TRSDOS 6.0 disk. If a Model I disk is being used, and doesn't seem to be reading well, use the REPAIR/CMD program. Make sure that you only use REPAIR on a backup disk as it may be unreadable by the Model I afterward. Of course, the BASIC program will have to be changed to meet the requirements of Model 4 BASIC, such as putting spaces between BASIC keywords and the new file modes.

Speed

There is one advantage to running Model III programs on the Model 4 in Model III mode. (This is going to be confusing.) That is the "high-speed mode." Don't hold me to blame if it doesn't always work, but in every operating system I've tried, if you enter BASIC and 'POKE &H4210,249', the system will go into the 4-Mhz mode and programs will run faster. Once this is done, the system stays fast even at the DOS level. For me, the best improvement was to Scripsit. The scrolling and cursor movements are much faster. I have also used my terminal program (MODEM80) in this way and it seems to run better with no problems to date.

128K

If you already have the upper 64K of memory installed, read on. We'll cover one use of this extra memory. If not, I'll tell you why you should.

Have you seen those spoolers advertised in the magazines? A spooler is a hardware or software device that acts as a buffer, filling up with data that is to be printed. The problem with the printer is that it can't print as fast as the computer can send it data, so the computer has to wait while the printer slowly accepts data to print. The spooler takes the data and stores it, freeing the computer to do more important things. The average spooler retails for \$149 (16K version) and more as storage goes up. 64K spoolers can cost as much as \$349 and that's a lot of green stamps.

Here comes our old friend, Radio Shack, with its upper 64K option for the Model 4 and one of the things the 64K does best is to act as a spooler. You can see what a bargain the option is for \$149. For you more handy people, I can save you even more money.

The 64K memory kit that Radio Shack installs consists of eight 4164 memory chips and a chip called a "PAL" chip. The PAL is the controller for the upper memory. The 4164's can be obtained from many suppliers listed in this magazine for about \$50 to \$60. The PAL can be ordered from Radio Shack as part #MX-5725 with the notation "26-1140 128K PAL" for \$30. You can save about \$50, plus installation. By the way, the above information came from the LDOS users group on CompuServe — a gold mine of information.

Installing the kit is easy, but remember that doing so voids the 90-day warranty. Remove the top cover by putting the computer on its side and removing the 10 screws on the bottom (don't miss the one under the warranty sticker), and then the one on the back. Set the machine right-side-up with the keys toward you and about one and one-half feet of room to the left. Remove the plug that goes to the video board, and the black ground wire.

The upper half should be free. Put it somewhere safe and out of the way. Turn the computer around, so you face the rear, and remove the

large metal shield to expose the main logic board. On the right-hand side, you will see eight empty sockets for the memory chips. Remember that the chips are marked for direction and go the same way as all the rest of the chips on the board. You also may have to push the pins a little closer together by pushing them in on a flat surface to fit the sockets.

After installing all of the memory, remove the "jumper" chip near the bottom center of the logic board and insert the PAL chip in place of it. That's it. You now have 128K total memory and, while it can't be used in BASIC, there are a lot of things it can do to make life easier.

As long as the case is open, there is something Tandy should have done that you can do now. That is a pilot light. If reset is pressed without a disk in drive zero, the screen is left blank and the computer looks like it's off. A small neon light can solve this problem. This modification will work on a Model III or Model 4. With the keyboard facing you, remove the screws that hold on the keyboard bezel. Drill a 3/16-inch (7mm) hole about 1/2-inch from the 64K emblem so that the edge of the hole just touches the base of the rolled edge where the emblem is. Insert the mini-neon pilot light (you do have a handful of R/S #272-707 pilot lights, don't you?) and tighten the nut. If you are unsure of the drill size, it's better to go a little smaller and ream the hole for a tight fit. Also, the metal part of the keyboard will have to be cut out. This can be done with a pair of dykes or a small saw, but be careful not to pull too hard on the keyboard cable.

Tin the wires of the light and solder them to the two leads of the power switch nearest you. Trial fit the bezel and keyboard back on. The light should just fit between the power switch and the cut-out you just made. If all fits, put all the screws back in the bezel, but don't tighten all the way yet. Check the reset button operation and clearance of the keys to the bezel. You may have to push the bezel a little while tightening, to get everything to line up.

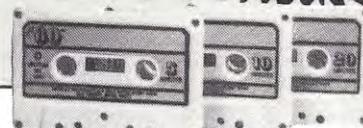
We are almost done. Just one more tip and I'll let you go for now. This one requires a canister-type vacuum

cleaner. First, go down to McDonald's and have a milkshake. Go ahead. You deserve it, but remember to save the straw. When you get back home, cut out a 2-inch-diameter piece of cardboard (something pretty stiff). Poke a hole in the center with a pencil, push the straw through it about an inch, and glue it in place.

When the glue dries, put this contraption on the end of the hose of the vacuum cleaner and turn it on. The suction will hold it in place and you now have a way to get all that dust and junk out of the inside of the computer. I work in a dusty place and have to clean the inside of the Model III every couple of months. Just stay away from the disk drives. The straw could do damage if it hit the head of your drive.

Well, that's it for now. If you have any tips of your own, be sure to write them down and send them to this magazine. There are a lot of good ideas out there and we could all use them.

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Exploring VisiCalc

DIF isn't so difficult: Part 2

Models I/II/III/4/12/16

Timothy K. Bowman, Spokane, WA

As we discovered last month, there are a number of uses for the Data Interchange Format. We used DIF to save portions of our spreadsheet and considered some of its limitations and advantages. In this second article, let's access a DIF file from BASIC and manipulate the output to overcome one of VisiCalc's formatting shortcomings.

Getting Started

I will not attempt to explain all of the fine points of DIF as others have more than adequately done that before me. I will, however, attempt to explain how to access a DIF file from BASIC and point out some of the scenic spots along the way and which trouble spots to watch out for.

In order to begin, use your VisiCalc program to create a copy of the template shown in Figure 1. It is important that it be constructed exactly as shown; the values and their locations are critical items. Once you have created the template, save it *both* in the regular VisiCalc format and the DIF format. If you are unsure how to save the template in the DIF format, review last month's article.

A DIF File Reader Program

Once you have created the above files, exit VisiCalc and enter BASIC. Type in program Listing 1.

I used liberal REM statements to make the listing as clear as possible. These REM statements can be eliminated to save typing with no detrimental effect upon the program. The program is written as a series of subroutines so portions can be easily adapted to your specific needs. It should be noted that this program is only one of many ways to access the information. A summary of the key routines follows:

Program Lines	Function
1150-1170	Initial messages and copyright notices
1240-1280	DIF file reading completion messages
1290-1450	Sample manipulation of DIF array
1480-1560	Header reader
1570-1620	Vector Analysis
1630-1690	Tuple Analysis
1700-1940	Tuple Reader
1960-1990	Data Reader
2000-2090	Housekeeping

The key to reading a VisiCalc DIF file is to recognize that it has a formal structure. Once you recognize that structure, it is relatively easy to access it. A DIF file has two principal components: header and data sections.

The header is composed of six distinct items. We only

This is the cell content of SAMPLE/VC:1: Figure 1

	A	B	C	D	E	F
1			"Sample Co	"mpany		
2		"	I	"ncome Sta	"tement	
3		"For the T	"hree Year	"s Ended D	"ecember 3	"1, 1983
4						
5				1981	1982	1983
6						
7	"Sales			45000	53950	100000
8	"Cost of S	"ales		20250	24817	42000
9	"Gross Mar	"gin		24750	29133	58000

need to be concerned with two of them. Figure 2 displays a listing of the DIF file. You can obtain a similar listing of a DIF file by loading it into your favorite word processing program.

In our sample file, the first item we are concerned about is the vector count. A vector is either a row across the page or a column down the page. This choice is determined by how the VisiCalc DIF file was originally saved. The second item, tuples count, is also either a row across the page or a column down the page but it is the opposite of the vector definition and was defined when the DIF file was originally created by VisiCalc.

Reading the respective counts in Figure 2, you can see that our vector count is nine and the tuple count is six. I intentionally kept the file small so as to not confuse you in this brief description.

The data section, as shown in Figure 2, is in the format: type indicator, value, then string.

Lines 1840 to 1980 in the BASIC program access the data portion of the file using the above format to read it. Study the listing and you'll see how the accessing subroutine works. Essentially, in our little routine, we are testing value T1 for either a zero (which indicates a numeric value in V1) or a 1 (which indicates a string value in S\$). Depending upon which value we find, we store the value in the appropriate numeric or string two-dimensional matrix D(A,B) or D\$(A,B).

Running the Program

Once you have entered the BASIC program and saved it to disk, run it and answer the filename prompt with the name of the file you saved the DIF file under at the beginning of this article. I included a number of ENTER prompts and time delays so you could view the program operating. While I composed it on a Model 4 running in Model III mode, it also should run on a Model I, II, III, 12, or 16 with little, if any, modification.

When you are completed running the program, the final screen will show the DIF file printed on the screen in a reformatted manner with commas in the appropriate spots for the numerical information (see Figure 3). One could change all of the PRINT statements to LPRINT and direct the output to a line printer. I think that you would agree that the newly-formatted output is much easier to read, especially for non-computer enthusiasts!

The key to the reformatting is found in the use of the PRINT USING statement, which is a powerful formatting tool. Simply change the format string in line 1100 to reformat. Perhaps you need a dollar sign before the numeric data. Put it in the format string. The same thing goes for decimal point alignment and cents.

Enhancements

The purpose of this article has been to demonstrate how to access and manipulate a DIF file. I am sure that you can visualize other possible manipulations. Suppose that you wanted to print the columnar data out in reverse order. All you need to do is change the string in line 1330, change lines 1360, 1390 and 1420 to read FOR B = 6 to 4 Step -1, and RUN the program. Do you see how you could rotate the display 90 degrees counter-clockwise? How about sorting?

Limitations

If you have a serious need to manipulate DIF files, a BASIC program may be your answer. For most users, however, I believe that it is far too time consuming to write the programs to manipulate the files. It's much easier to manipulate it with VisiCalc or a commercially-written "generic" DIF file reader like "Liaison" (reviewed in September, 1983, *Basic Computing*) and a word processor.

References

If you would like more technical information on DIF, I recommend that you acquire a copy of *Programmer's Guide to DIF* from your local Radio Shack Computer Center or store. It is also found in the back of your Model III enhanced VisiCalc owner's manual. Another good reference is "DIF: A Format for Data Exchange between Applications Programs" by Kalish and Mayer, *Byte*, November, 1981. If you want to view how another author described accessing DIF files, see *80-Microcomputing*, September, 1983, page 108, "What's the DIF?"

Do you have an interesting DIF application or question on this article or any VisiCalc topic? If so, write to me in care of *Basic Computing*. If you enclose a stamped envelope, I'll give a prompt personal reply. Keep exploring VisiCalc!

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Figure 2	" "	1,0	" "
	1,0	" "	1,0
	" "	1,0	" "
TABLE	1,0	" "	1,0
0,1	" "	1,0	" "
" "	1,0	" "	1,0
VECTORS	" "	1,0	" "
0,9	1,0	"ales"	-1,0
" "	"Sales"	1,0	BOT
TUPLES	1,0	"gin"	1,0
0,6	"Cost of S"	-1,0	"mpany"
" "	1,0	BOT	1,0
DATA	"Gross Mar"	1,0	"tement"
0,0	-1,0	"Sample Co"	1,0
" "	BOT	1,0	"s Ended D"
-1,0	1,0	"ncome Sta"	1,0
BOT	" "	1,0	" "
1,0	1,0	"hree Year"	0,1981
" "	" " I"	1,0	V
1,0	1,0	" "	1,0
" "	"For the T"	1,0	" "
1,0	1,0	" "	0,45000
	" "	1,0	V

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```

0,20250      V
V            -1,0
0,24750     BOT
V            1,0
-1,0        ""
BOT         1,0
1,0         ""
""          1,0
1,0         "1, 1983"
""          1,0
1,0         ""
"ecember 3" 0,1983
1,0         V
""          1,0
0,1982      ""
V            0,100000
1,0         V
""          0,42000
0,53950     V
V            0,58000
0,24817     V
V            -1,0
0,29133     EOD
    
```

Figure 3

SAMPLE COMPANY
INCOME STATEMENT
FOR THE YEARS ENDED DECEMBER 31, 1983

	1981	1982	1983
SALES	45,000.	53,950.	100,000.
COST OF SALES	20,250.	24,817.	42,000.
GROSS MARGIN	24,750.	29,133.	58,000.

Now that you can see how to reformat your VisiCalc files on the screen, remember the above PRINT statements could be changed to LPRINT to aid the reader of your VisiCalc - produced information!

Program Listing for VisiCalc

```

1000 REM      >      >
                <<
1010 REM      >      DIF File Rea
der <
1020 REM      >      BY
<
1030 REM      >      TIMOTHY K. BOW
MAN <
1040 REM      >      Created for
<
1050 REM      >      Basic Computi
ng <
1060 REM      >      8/13/83
<
1070 REM      >      Version 1.0
<
1080 REM      >      >      <
<
1090 CLEAR10000:DIM TV(10,50), D$(10,50)
    
```

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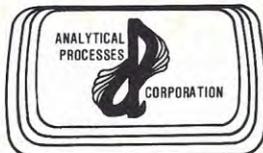
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VisiCalc

```
,D(10,50)
1100 F$="###,###,###.":' - - - Print fo
rmat String - - -
1110 DEF FN HR$(X$)=STRING$(59 - LEN(X$
))/2,">")+ " "+X$+" "+STRING$(58 - LEN(
X$))/2,"< "):' - - - HEADER - - -
1120 GOSUB 1150 :REM INITIAL
IZE
1130 GOSUB 1190 :' - - - GET STARTED - -
- -
1140 CLS:GOTO1240
1150 CLS:PRINTFN HR$("DIF FILE READER");
:PRINT @ 832,"DIF is a registered tradem
ark of Software Arts, Inc.";
1160 PRINT@896,"VisiCalc is a registered
trademark of VisiCorp."
1170 PRINT@192,"This program will read t
he contents of a DIF file and display":P
RINT"the numerical data in an easier to
read format which overcomes":PRINT"a key
shortcoming in the VisiCalc formatting
abilities."
1180 PRINT"I encourage you to experiment
with the program and use it to ":PRINT"
solve real DIF file reading and formatti
ng needs you may have. Have fun!":PRINT
```

```
:PRINT:GOSUB2090 :GOSUB2010 :RETURN
1190 GOSUB2020 :GOSUB2030 :PRINT:PRINT:L
INEINPUT"File Name Please (nnnnnnn/DIF)
"; F1$
1200 GOSUB1480 :' ----- GET T
HE HEADER -----
1210 GOSUB 1710 :' - - - - - READ THE DA
TA - - - - -
1220 RETURN
1230 GOSUB2030 :
1240 PRINT"We've now read the DIF file a
nd it exists in the arrays:"
1250 PRINTTAB(20)" TV(t,v), 'Type of da
ta indicator':":PRINTTAB(20)" D$(t,v),
'string data':":PRINTTAB(20)" D(t,v), 'n
umeric data'"
1260 PRINT:PRINT"where t and v represent
the tuple and vector locations."
1270 PRINT:PRINT"With the above informat
ion, we can re-arrange the information":
PRINT"in any way we desire.":PRINT:PRINT
"Let's do it!"
1280 GOSUB2090 :GOSUB2010
1290 ' - - - - - SCREEN PRINT ROUTINE -
- - - -
1300 CLS:PRINT TAB(20)"SAMPLE COMPANY"
1310 PRINTTAB(19)"INCOME STATEMENT"
1320 PRINTTAB(9)"FOR THE YEARS ENDED DEC
EMBER 31, 1983
1330 PRINTTAB(20)" 1981          1982
          1983"
1340 PRINT
1350 PRINT "SALES";
1360 FOR B = 4 TO 6
1370 PRINT TAB(15);USING F$;D(B,7) ;:NE
XTB:PRINT
1380 PRINT "COST OF SALES";
1390 FOR B=4 TO 6
1400 PRINT TAB(15);USING F$; D(B,8);:NEX
TB:PRINT
1410 PRINT "GROSS MARGIN";
1420 FOR B = 4 TO 6
1430 PRINT TAB(15);USING F$; D(B,9);:NEX
T B:PRINT
1440 PRINT:PRINT"Now that you can see ho
w to reformat your VisiCalc files on":PR
INT"the screen, remember the above PRINT
statements could be ":PRINT"changed to
LPRINT to aid the reader of your VisiCal
c - ":PRINT"produced information!"
1450 GOTO 1450
1460 GOTO1460
1470 REM ----- READ HEADER SUBR
OUTINE -----
1480 OPEN"1",1,F1$
1490 VN=0:TN=0:REM- INITIALIZE VECTOR AN
D TUPLE NUMBER COUNT -
```

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```

1500 INPUT #1,T$
1510 INPUT #1, TP, N
1520 INPUT #1, D$
1530 IF T$="VECTORS" THEN GOSUB 1570
1540 IF T$="TUPLES" THEN GOSUB 1630
1550 IF T$="DATA" THEN RETURN
1560 GOTO 1500
1570 REM ----- VECTOR ANALYSIS
SUBROUTINE -----
1580 VN=N
1590 GOSUB2030 :PRINT@512,F1$;" HAS ";VN
;" VECTORS."
1600 GOSUB 2090 :GOSUB2010
1610 IF VN>=50 THEN CLS:PRINT@512,F1$;"
HAS TOO MANY VECTORS TO PROCESS":CLOSE 1
:GOTO 1150
1620 GOTO 1500
1630 TN=N: ' ----- TUPLE ANALY
SIS SUBROUTINE -----
1640 ' ----- TN= TUPLE COUNT -----
--
1650 GOSUB2030 :PRINT@512,F1$;" HAS ";TN
;"TUPLES."
1660 GOSUB 2090 :GOSUB2010
1670 IF TN>10 THEN PRINT:PRINT"THIS FILE
HAS TOO MANY TUPLES" ELSE GOTO 1500
1680 CLOSE 1
1690 GOTO 1150
1700 ' - - - - - READ THE TUPLES -
- - - - -
1710 GOSUB2030 :FOR A= 1 TO TN
1720 GOSUB2030 :PRINT@128,"VALUES FOR TU
PLE # ";A;
1730 GOSUB 1850
1740 FOR C=1 TO VN
1750 GOSUB2030 :PRINT@192,"VALUE FOR VEC
TOR # ";C;
1760 GOSUB2020 :GOSUB2030
1770 IF TV(A,C)=0 THEN PRINT@512,D(A,C)
1780 IF TV(A,C)=1 THEN PRINT@512,D$(A,C)
1790 GOSUB2020
1800 NEXT C
1810 NEXT A
1820 CLOSE 1
1830 RETURN
1840 ' - - - - - GET TUPLES FROM DIF
FILE - - - - -
1850 GOSUB1970
1860 IFT1<>-1 THEN 2050
1870 IFS$<>"BOT" THEN 2050
1880 FORB=1 TO VN
1890 GOSUB1970
1900 IFT1=-1 THEN 2050
1910 IF T1=0 THEN D(A,B)=V1 ELSE D$(A,B)
=S$
1920 TV(A,B)=T1: ' - - - Save type indic
ator - - -

```

```

1930 NEXT B
1940 RETURN
1950 STOP
1960 ' - - - - - GET NEXT DATA INDICAT
OR - - - - -
1970 INPUT#1,T1,V1:' GET TYPE INDICATOR
AND VALUE IF ANY
1980 INPUT#1,S$:' - - - - - GET STRING
VALUE - - -
1990 RETURN
2000 ' - - - - - HOUSEKEEPING SECTION
- - - - -
2010 Z$=INKEY$:IF Z$="" THEN 2010 ELSE IF
Z$=CHR$(13) THEN RETURN ELSE 2010
2020 FOR TI=1 TO 50:NEXT TI:RETURN: '
TIME DELAY
2030 PRINT@192,CHR$(31);: ' - - - CLEAR
BOTTOM OF SCREEN - - -
2040 RETURN
2050 GOSUB 2030
2060 PRINT@512,"FILE FORMAT ERROR. MAKE
SURE THE FORMAT IS DIF";
2070 CLOSE 1
2080 STOP
2090 PRINTTAB(20)"Press >ENTER< to Conti
nue":RETURN

```

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Okay, let's see a show of hands. How many of you have wanted to find every line in a BASIC program where a particular string appears? Oh, my, that many? Well, how many have wanted to replace that string with another string? Goodness! Not a single hand went down. Let's find out if any of you have wanted to match two BASIC programs and find all of the differences. Boy! Based on that sea of flesh, I think we should do something about this.

Well, I have. Accompanying this article is a listing for MATCH/BAS — a utility program which provides all of these functions. Upon running MATCH/BAS, it will display a menu asking which of these functions you want. If you choose function one, which is to match two files, it will request the name of the old file, the new file, and the destination file. The destination file will be created and will contain (in ASCII format) the patches that would have to be applied to the old file in order to create the new file.

If you choose options two (finding a string) or three (replacing a string), MATCH/BAS will ask for the file to be searched, the string to search for, and the destination file to which to write the lines containing the string. If you are running option three, MATCH/BAS will also ask for the string with which to replace the search string.

For all options, the input file(s) should be in normal compressed BASIC format, not in ASCII format. MATCH will expand them itself, which saves you the extra disk space required by an ASCII file. MATCH accomplishes this by calling a machine language subroutine at line 220. This subroutine, in turn, calls a ROM routine at 2B7EH which expands the line into ASCII. This is the same routine used by the LIST and EDIT commands to expand the BASIC text. The code for the routine used by MATCH follows:

```
CALL 0A7FH ;GET THE ARGUMENT
INC HL ;MOVE THE ADDRESS
LD E,(HL) ;OF THE STRING
INC HL ;INTO DE
LD D,(HL) ;AND THEN PUT IT
EX DE,HL ;INTO HL
JP 2B7EH ;EXPAND THE STRING AND
;RETURN TO BASIC
```

The destination file produced by MATCH/BAS is in ASCII format. This way you can easily examine and

print it. You can also merge it into your source file since the merged file must be in ASCII.

Now, how many of you are still having the problems we discussed earlier? Nary a paw in the sky . . . now that's what I like to see.

Program Listing for MATCH/BAS

```
10 CLEAR10000:DEFINTA-Z:US$="////////////////"
:X!=PEEK(VARPTR(US$)+1)+256*PEEK(VARPTR(US$)+2):X!=X!+65536*(X!>32767):FORI=0TO10:
READY:POKEI+I,Y:NEXT:DEFUSR=X!:DIMTX$(2),LN(2),BR(2),BI(2),BF(2,2),BC(2),EF(2),FSS(2),TI$(99)
20 DATA205,127,10,35,94,35,86,235,195,126,43
30 CLS:PRINT" Basic File Management Utility"
1) Match Two Files
2) Find All Occurrences of a String
3) Replace All Occurrences of a String"
40 INPUT"
4) Exit
```

```
Make Selection From Menu ";MC:IFMC<1ORMC>4THEN30ELSEIFMC=1THEN100ELSEIFMC=4THENCLS:ENDELSEF=1
50 CLS:LINEINPUT"Enter Name of File: ";FSS$(1):LINEINPUT"Enter String to Search For: ";T1$:IFMC=3THENLINEINPUT"Enter String to Replace it With: ";T2$
60 LINEINPUT"Enter Name of Destination File: ";FMS$:CLS:OPEN"R",1,FSS$(1):OPEN"O",2,FMS$:FIELD1,128ASBF$(1,1),128ASBF$(1,2):BC(1)=0:EF(1)=LOF(1):BI(1)=128:BR(1)=2:BC(1)=0
70 GOSUB200:IFBC(F)=-1THENCLOSE:GOTO300ELSEI=0:GOSUB80:GOTO70
80 I=INSTR(TX$(F),T1$):IFI=0THENRETURNELSEIFMC=3THENTIS(TI)=LEFT$(TX$(F),I-1)+T2$:TX$(F)=MID$(TX$(F),I+LEN(T1$)):TI=TI+1:GOSUB80:TI=TI-1:TX$(F)=TIS(TI)+TX$(F):I
```

```
FTI>0THENRETURN
90 PRINT#2,RIGHT$(STR$(LN(F)),LEN(STR$(LN(F)))-1);TX$(F):RETURN
100 CLS:LINEINPUT"Enter Name of Old File
: ";FS$(1):LINEINPUT"Enter Name of New File: ";FS$(2):LINEINPUT"Enter Name of Destination File: ";FM$
110 CLS:OPEN"O",3,FM$:FORI=1TO2:OPEN"R",I,FS$(I):FIELDI,128ASBF$(I,1),128ASBF$(I,2):BC(I)=0:EF(I)=LOF(I):BI(I)=128:BR(I)=2:BC(I)=0:NEXT
120 F=1:GOSUB200:F=2:GOSUB200
130 IFBC(1)=-1THENIFBC(2)=-1THENCLOSE:GOTO30ELSE160ELSEIFBC(2)=-1THEN170
140 IFLN(1)<LN(2)THENPRINT#3,RIGHT$(STR$(LN(1)),LEN(STR$(LN(1)))-1);"REM *** THIS LINE HAS BEEN DELETED ***":F=1:GOSUB200:GOTO130ELSEIFLN(2)<LN(1)THENPRINT#3,RIGHT$(STR$(LN(2)),LEN(STR$(LN(2)))-1);TX$(2):F=2:GOSUB200:GOTO130ELSEIFTX$(1)=TX$(2)THEN120
150 PRINT#3,RIGHT$(STR$(LN(2)),LEN(STR$(LN(2)))-1);TX$(2):GOTO120
160 PRINT#3,RIGHT$(STR$(LN(2)),LEN(STR$(LN(2)))-1);TX$(2):GOTO120
170 PRINT#3,RIGHT$(STR$(LN(1)),LEN(STR$(LN(2)))-1);TX$(2):GOTO120
```

```
LN(2)))-1);"REM *** THIS LINE HAS BEEN DELETED":GOTO120
180 IFBC(F)=-1THENRETURNELSEIFBI(F)=128THENIFBR(F)=1THENBR(F)=2:BI(F)=1ELSEIFBC(F)=EF(F)THENBC(F)=-1ELSEBC(F)=BC(F)+1:GETF,BC(F):BR(F)=1:BI(F)=1-(BC(F)=1)ELSEBI(F)=BI(F)+1
190 RETURN
200 FI=0:FORI=1TO2:GOSUB180:FI=FI-(MID$(BF$(F,BR(F)),BI(F),1)=CHR$(0)):NEXT:IFFI=2THENBC(F)=-1:RETURNELSELN(F)=0:FORI=1TO2:GOSUB180:LN(F)=LN(F)-(255*(I=2)-1)*ASC(MID$(BF$(F,BR(F)),BI(F),1)):NEXT:TX$(F)="
210 GOSUB180:L=INSTR(MID$(BF$(F,BR(F)),BI(F)),CHR$(0)):L=L*(L>0)-(129-BI(F))*(L=0):TX$(F)=TX$(F)+MID$(BF$(F,BR(F)),BI(F),L):BI(F)=BI(F)+L-1:IFRIGHT$(TX$(F),1)=CHR$(0)THEN220ELSE210
220 L=USR(VARPTR(TX$(F))):X!=VARPTR(TX$(F)):POKEX!,255:POKEX!+1,PEEK(&H40A7):POKEX!+2,PEEK(&H40A8):L=INSTR(TX$(F),CHR$(0)):IFL>0THENTX$(F)=LEFT$(TX$(F),L-1)
230 PRINT@512,CHR$(240):PRINT@512,CHR$(23);"Reading ";FS$(F);" Line";LN(F):RETURN
```

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BASIC bits

Restoring tape Scripsit, using relational operators and other answers

Models I/III/4

Thomas L. Quindry, Contributing editor

The last question in this month's column prompted me to write a little about logical operators, sometimes called relational operators or conditional statements. The use of relational operators (I prefer the term conditional statements) appears in the Radio Shack Level II BASIC manual but it's easy to miss. There is a short cut to using conditional statements that, depending on one's application, can be quite useful. As an example, enter the statement: `X=Y=7 : PRINT X`. The results of this are quite unexpected. An error does not occur. It does not set `X=7`, nor does it set `Y=7`. Instead, it sets `X=-1` (for true) or `X=0` (for false), depending on whether `Y=7` is a true or false condition.

Many shorthand conditional statements can be entered using `=`, `<`, `>`, `<>`, `AND`, `OR`, or `NOT` symbols in any combination. I believe that every type of conditional statement listed in BASIC can be done using a shorthand method. To illustrate, a conventional BASIC program might be listed as follows:

```
10 INPUT I,A,B,C
20 IF (I=7 AND A<B) OR (I<>7
AND A>B) THEN A=B+C ELSE
A=B
30 PRINT A
```

An equivalent program can be written changing line 20:

```
20 A=B-C*((I=7)=(A<B))
```

Here, the shorthand method saves 13 bytes. Let's analyze this. Assuming that both statements, `I=7` and `A<B` are true, both inner parentheses are true and a `(-1)` is generated in each. The outer parentheses now contain `(-1=-1)` which, when analyzed, is also true; so the value of the outer parentheses is `(-1)`. When multiplied by `-C` and added to `B`, the value for `A` is `B+C`, which is the desired result from our original conditional statement. If only one of the conditions (`I=7` and `A<B`) is true, then `(-1=0)` or `(0=-1)`; either being false or a value of `(0)`. Then `A=B-C*(0)` or `A` is set equal to `B`. When both conditions (`I=7` and `A<B`) are false, `(0=0)` equates to a true condition or `(-1)` and again `A` is set equal to `B+C`.

This example, as you can see, gives identical results for both conventional and shorthand statements for line 20. Try your own shorthand statements in BASIC and see the results. Whichever way you express line 20, the placement of the parentheses is very important.

Confused? James A. Conrad gave a discussion on logical operators in the April, 1983 issue in his *Basically BASIC* column. Also see your Radio Shack Level II BASIC manual.

In the December, 1982 issue of 80-U.S. Journal, there was an article in the @News column that indicated a person could re-enter Model I cassette Scripsit when using the ESF system by typing "SYSTEM" and "/21510." Thinking it might work with a regular tape system, I tried it, but it did not work. What is the entry location for Scripsit from regular tape? —R.M., Cornwall-Hudson, NY.

Your entry point for the Model I cassette Scripsit is correct. You are neglecting to do one thing. You must reload Scripsit. At the prompt, type `"/21510"` for the Model I version and you will see the SPECIAL COMMAND message on the bottom of the screen. Hitting clear will restore your program. The reason you must reload Scripsit is to restore several bytes that are destroyed by rebooting your computer.

Model III cassette Scripsit is a little more difficult. This version includes code which overwrites some pointers in memory when you load the program again. If you try an equivalent entry point, `"/21280,"` for Model III Scripsit, you do not have the necessary pointers set in the program. What you have to do for the Model III is pre-plan.

First, load Model III Scripsit. Without going into Scripsit after the

program has loaded, enter a machine language monitor that will write to a cassette tape. Save code from 43E8H to 444BH with a transfer address of 5320H. That transfer address is the same as 21280 in decimal. Now, if you accidentally get out of Scripsit on the Model III, you can run this little restoring program which puts back the Scripsit code over the memory area that is destroyed when a reboot occurs. At the prompt, just enter "/".

If you want to make a short program like this for the Model I cassette Scripsit (on the Model I), save code from 42E8H to 434BH with a transfer address of 5406H, the equivalent of 21510 in decimal.

In the July, 1983 issue of *Basic Computing*, you discussed the use of the MID\$ statement to avoid delays caused by the garbage handling routine. I have read a couple of other articles on this technique, but none of the articles I have seen answer three questions that have occurred to me:

1. Can the LEFT\$ and RIGHT\$ statements be used in the same way as MID\$, i.e., of the form MID\$(A\$,x,y) = "..."?

2. In the case of a string array, does filling the array with blanks recover the memory it used?

3. In the case of numeric arrays, does filling an array with zeroes recover any memory? —P.B., Metairie, LA.

The answer to your three questions are: No. No. And, no. LEFT\$ and RIGHT\$ statements can only be used on the right side of the equation. The MID\$ statement can be used on both the right and the left. Since only on the left side does MID\$ redefine part of a string, that is the only place where it can prevent the garbage collection delays.

Filling a string array with blanks (or spaces) only adds to the problem of garbage collection. If you define the string array to null strings, [A\$(N)=""], you will recover string space the next time garbage collection takes place. This only provides more space for your other strings. The memory is still allotted to string usage.

Numeric arrays are allotted two, four, or six bytes for each array item, depending on whether they are integer, single- or double-precision.

This is regardless of the value assigned to them.

Could you decipher the following BASIC statement? I don't seem to find it in any of the TRS-80 manuals. $Y = CVI(I\$) - 65000 * (CVI(I\$) < 0)$. I am thrown by the term CVI and the <0 part. —F.B., New York, NY.

The following six Disk BASIC statements relate to random file disk access and are given in your TRS-80 disk manual: MKD\$, CVD, MKI\$, CVI, MKS\$, and CVS. The D, I and S stand for operations that will be done on double-precision, integer, and single-precision numbers, respectively. In order to store numeric values in a random-access disk file, they must first be converted to string values. The MK-\$ series of commands changes a numeric value to the appropriate string. Double-precision numbers become eight-byte strings using MKD\$(number). Integers become two-byte strings and single-precision numbers become four-byte strings. When you wish to use the values in their

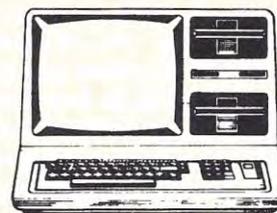
numeric form, after reading them from a disk file, you use CVD, CVI, or CVS to convert them back to numeric values.

The term, $CVI(I\$) < 0$, returns a value of minus one if the expression is true, i.e., if the numeric value of CVI(I\$) is less than zero. It returns a value of zero if the expression is false, i.e., if the numeric value of CVI(I\$) is greater than zero. Thus, if the numeric value of CVI(I\$) was equal to 1000, the above term would give $Y = 1000 - 65000 * (0)$ or 1000. Had the numeric value of CVI(I\$) been equal to minus 1000, $Y = -1000 - 65000 * (-1)$ or 64000.

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

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In the chips

Intercepting the keyboard and a step-by-step BASIC program monitor

Models I/III/4

Spencer Hall, Associate editor

Why do you want to learn machine language? The major uses for software appear to be (1) data handling (collecting, storing, retrieving, analyzing and displaying information), (2) games and simulation for recreation and/or training and, (3) real-world interfaces (measuring and recording events as they take place, controlling machinery and equipment. If neither you nor I plan to compete with the heavies who are already marketing incredible machine language programs for doing all these things, why are we talking Z80?

The answer, it seems to me, is that the above list is incomplete. To those three, add (4) operating systems (the software which makes hardware responsive to user demands and enhances the ability of man and machine to communicate with each other. Most of us settle for the system that came with our computers. Some of us buy software patches which change this system to do special things such as renumber BASIC programs or allow the merging of two programs. Actually, knowledge of machine language and our system's design makes possible any number of improvements.

As an introduction to this kind of machine language programming,

we offer a modest little program whose success depends on our knowing how the ROM scans the keyboard looking for a keystroke. We'll convert lowercase letters, when they are pressed, into graphics characters. With it, you can write single-line packed strings and see them as you write. You may find its usefulness limited, but there are still some valuable insights to be gained from studying it.

Before we examine the source code for GRAFIX, there are things to know about the TRS-80 operating system. Your computer "watches" the keyboard for a keystroke by repeatedly CALLING the machine language at 338EH (for a Model I that's 03E3H). If a key is pressed, this routine deciphers the keyboard matrix and puts the ASCII value in register A. Before each call to this scanning routine, the system tests address 4015H (decimal 16450, remember that). Finding a one there, it goes on with the scanning. If a 128 (or any other number in a Model I) is there, it goes to 4033H to get some brand-new instructions. The one is placed at 4015H when you first enter BASIC following your response to MEMORY (or MEM) SIZE. Since these two addresses are up in RAM, they can be changed. That's exactly what the subroutine PATCH in our program does.

Incidentally, this program illustrates a situation many beginners find most confusing. Without good remark statements, it can be very hard to understand the why or wherefore of this code. As the END statement says, when you execute this program, processing begins at PATCH. But it ends at the end of PATCH with a jump back to BASIC READY at ROM address 1A19H. What's the purpose of TEST? Actually, TEST is the working part of this program and its whole purpose. PATCH gets used only once. Its purpose is to install the bytes which cause the ROM to detour through TEST every time it scans the keyboard. First, it puts 128 (80H) in address 4015H (zero for Model I).

The code in lines 270 and 280 does this. For a Model I, line 270 should read XOR A. This places a zero in register A by means of the XOR command. XOR, like CP, is understood to be working on register A. On the Model I, line 270 will be XORing A with itself. This is different from OR, which we saw last time. The effect of XOR on two bytes is as follows:

If one bit is:	And the other is:	Result is:
1	1	0
0	0	0
1	0	1

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Chips

This is called the "exclusive or" and it means that when two bytes are compared bit-by-bit, the result can be 1 only if the two compared bits are different. XOR any byte with itself and it self-destructs because, in every case, both bits are the same.

After the contents of A are LD'ed into 4015H, we want a new instruction at 4033H to say, "Jump to TEST." In source code, this is JP, TEST. Object code for JP is C3H, so we put this in 4033H, using HL to point the way (lines 290 and 300). The next two addresses must contain the address of TEST. In common systems jargon, this is called the "pointer" to TEST or, if you're a complete snob, the TEST "vector." This is the first time we've seen a Z80 instruction which moves two bytes at once. In line 310, we put the address of TEST into register pair HL. Line 320 asks that the contents of HL be deposited at 4034H, which is the next byte beyond the JP code. The incredible Z80 dutifully puts the low-order byte, register L, at 4034H and the high-order byte, H, at 4035H. The patch is complete and the program returns to BASIC READY via ROM address 1A19H, which is common to both Model I and Model III computers.

Of course, when this routine is loaded, the TEST itself is also installed. Let's look at it now. The ROM was about to call 33E8H when we "kidnapped" it. Since we still want to examine the keyboard, we must take over the chore of calling 33E8H ourselves. We do this at line 170. Next, we check register A to see if a key was pressed. We use the OR A test for zero we learned last time. Zero in A means no key was pressed, so we jump (relative, if zero) to TEST (JR Z,TEST) and repeat the test. For the absolute jump (JP in line 330) you can see ROM address 1A19H written backward in the opcode. In the object code for JR at line 190 you don't see the address of TEST. The FA portion of the opcode at line 190 tells the Z80 that it must jump backward six addresses from the following address. This is worth some study.

As each byte of a machine language program is "read" by the Z80, the program counter register,

PC, is increased by one. A JR instruction asks that the program counter be changed by the amount specified in one byte (in this case, FA). To allow relative jumps both forward and backward, the Z80 treats these distance bytes as signed numbers. In a signed byte, bit number 7 (with a value of 128) is treated as the "sign byte," 0 for plus and 1 for minus.

You can easily get the negative decimal value of a signed byte (which looks like a number larger than 128 because byte seven is high) by interpreting it normally and subtracting 256 from it. This simple concept is usually taught under the name of "two's complement" notation which can be pretty complicated. Since this is one of the key concepts in electronic computing, we'll study it some more later. Now, we see that FA, which normally is 250, can be interpreted as 250 minus 256, or -6. Count back six bytes (pairs of hex digits) through the opcode from FA in line 190 and you'll arrive at the beginning of TEST.

Now, the logic of our patch is simply to detect any lowercase letter, generated in Level II by holding down the shift key! For these letters, we'll simply add a value to the ASCII large enough to turn it into a TRS-80 graphics block. Then we'll send it back to the ROM for display and perhaps inclusion in a BASIC packed string. ASCII codes for the lowercase letters, a through z, are 97 through 122 decimal. When a key is pressed, we proceed to see if it is a lowercase letter by asking, "Is it larger than 96?" To do this, we subtract 97 from it and see if the result is negative. We use CP instead of SUB A because, as we learned last time, CP only "makes believe" subtract and tells us what happened in the flag register F. Contents of the A register remain undamaged and ready for future use. If A contains ASCII for a character lower than lowercase "a," its value will be 96 or less. Subtracting 97 from it will make it negative (that is, turn on bit 7), remember? For the command CP, it only puts this 1 in the sign bit of the flag register, F. Fortunately, the

Z80 just happens to have a conditional return, RET M (return on minus), instruction. We can use it

to return to the ROM keyboard routine if the result of this test made the sign bit 1 or "minus."

If we have a lowercase letter, we now convert it to a graphics block by adding a number to it. Keep in mind that "a" equals 97 and "z" equals 122 (decimal). The last and largest graphics block is decimal 191. We can generate the last twenty-six blocks by adding the difference between 191 and 122 to whatever comes along. This is 69, which is 45H. In line 230, we do this and then return to the unsuspecting ROM. Note that byte 45H is going to be at address 7FEB (32747 decimal). You can see this in the opcode column. C6H, code for ADD A, is at 7FEB, so the next byte (45H) has to be in the next address. When you use this routine, you can change the available graphics by POKEing any number between 32 and 69 decimal into address 32748.

Remember also that it was a 128 in 4015H, 16405 decimal, which "turned on" or "enabled" this graphics generator. POKE a one back into 16405 and the graphics are turned off, leaving the logic in place. Get the graphics feature again by poking a zero into 16405. By changing the byte at 7FEB (poking something else into 32747), you can change your lowercase letters into something else.

Serendipity Note

When I began using this routine, I discovered (to my amazement) that Level II tests 4015H while it is LISTING a BASIC program and even while it is executing it. With GRAFIX enabled, you can list a BASIC program, one statement at a time, by repeatedly touching any key (except lowercase letters). You can run your program also if you're willing to touch a key continuously to nudge it along from statement to statement. To catch a tricky bug in a BASIC program, try inserting a statement which says POKE 16405,0 at the point in your balky program where you want it to stop and wait for nudges!

Program Listing for GRAFIX

This program listing is for a Model III computer. Model I owners should follow the discussion for the needed

changes. If you have a Model III, be sure to set the computer in upper-lowercase mode (shift 0) for proper execution.

After you have entered the source code, assembled it, and saved it under the name GRAFIX/OBJ, enter the following while in BASIC

```

*****
00110 ; GRAFIX
00120 ; A converted graphic character entry utility written
00130 ; to illustrate "In the Chips" for November, 1983 by
00140 ; A. S. Hall
00150 ;*****
7FE1 00160 ORG 7FE1H ;Resides beginning 32737
7FE1 CD8E33 00170 TEST CALL 338EH ;Level ii keybd. scan
00175 ;Mode I keybd. scan is at 03E3 - use it here.
7FE4 B7 00180 OR A ;Does A=0? (No key hit)
7FE5 28FA 00190 JR Z,TEST ;If so, scan again
7FE7 FE61 00200 CP 61H ;Lower ASCII than "a"?
7FE9 F8 00210 RET M ;If yes, yield control
00220 ;If not, then it's shifted alpha. Change to graphic.
7FEA C645 00230 ADD A,45H ;"Promote" by adding 69
7FEC C9 00240 RET ;Yield control of new A
00250 ;"END" pseudo-op below causes autostart here to patch
00260 ;the TEST routine using decoy at 4015H
7FED 3E80 00270 PATCH LD A,80H ;Decoy for ROM keybd scan
7FEF 321540 00280 LD (4015H),A ;IN A...thence into 4015H
7FF2 213340 00290 LD HL,4033H ;Point HL to 4033H
7FF5 36C3 00300 LD (HL),0C3H ;Write code for JP here
7FF7 21E17F 00310 LD HL,TEST ;Put TEST address in HL
7FFA 223440 00320 LD (4034H),HL ;JP now goes to TEST
7FFD C3191A 00330 JP 1A19H ;Patch done - goto BASIC
7FED 00340 END PATCH ;Autostart per above
    
```

command mode:
 >CMD"L", "GRAFIX/OBJ"
 >DEFUSR0 = &H7FED
 >X = USR(0)

The object code has now been loaded and executed and any lowercase entries will be interpreted as graphics symbols.

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Tandy topics

For all readers

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

The "transportable" Model 4P measures 16½"x13¼"x9¾", has a 9" video and built-in 5¼" disk drives. It is priced at \$1799.



Two letters came this month, telling me how much my "fantasy" column is appreciated, and calling me to task for telling you about products which didn't exist yet. My intention is not to mislead, but to give you the earliest possible information. Because of copy deadlines, I have to assume some dates,

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and that doesn't always work!

One specific complaint was the lack of Model 4-mode software available with the Model 4. Yes, we were very late with it. But, we've heard you. You're right, and from now on, we will have software available for new computers when we introduce them.

New "Transportable"

By now, you should have seen the new computer catalog, and you know about the Model 4P portable (or "transportable"). It is Model III/4 disk/software-compatible, although it doesn't have the Model III ROM's built in. Both the III and 4 languages and operating systems

Refer to advertiser index for reader service number

load from disk and there is no cassette port. We think it's a beauty! And, even if you don't need portability, but just want a smaller footprint (less desk space taken up), the 4P should be just the ticket. In case you haven't seen it, look at page two of the fall computer catalog for details.

CompuServe EMAILer

When the Model 100 was first introduced, Bill Walters and I invited Sandy Trevor with CIS (CompuServe Information Service) to visit us and preview the machine. He was as taken with it as we were! I told Sandy we'd sure like to see a special Model 100 EMAIL system.

Why not, I asked, a system where you could store multiple outgoing messages (with addresses, of course) in a file? Then, by pushing one button, the 100 would dial CompuServe, log you on, send your mail, pick up any incoming mail, store it in memory, and sign you off. And, while I was wishing, I wished we could get around that pesky "no more than 140 characters without a carriage return" restriction they have. I mean, if you're gonna wish, might as well go for broke, right?

Well, gentleman that he is, Sandy came through! We're playing with the program right now, and it is available in public access. There was some host programming required, and we thank Sandy for it. Anyone with a Model 100 and subscription to CompuServe now has access to a completely automatic, minimum on-line time, EMAIL system! I've even modified mine to call every hour and check the mail if I want it to.

The messages are easy to program. Just create a TEXT file called "MAIL.DO". Each message starts with:

TO: 70000,777 (*addressee's ID*)
 From: (*your name*)
 Subject: (*up to 32 characters*)

Then, write your text. For multiple messages, put <GRPH><f><ENTER> between them. Simple, huh?

I've given Sandy some thoughts for "version 2," if and when it comes. A big "thank you" to Sandy and the folks at CompuServe.

Speaking of the Model 100, I gave you some bad information last month. The Model 100 bar code

wand will come with two, not three, bar code drivers, "3 of 9" and UPC. "NATI" will be made available later, but will not be included in the wand package. Sorry about that, it was a late change. We would have had to delay the package by quite a spell to include NATI.

Model 100 In the Air

There have been a number of recent articles about the use of Model 100's on-board commercial airlines and I've gotten a lot of comments about the "scare tactics" contained in some of them. Well, as of this time, FAA regulations specifically permit a pacemaker, battery-powered tape recorder, hearing aid, and electric razor. In addition, any other device designated by the airline is permitted. What does this mean? It means that the Model 100 is neither permitted, nor prohibited. It's in the same boat with your pocket calculator and your electronic watch.

So, what do you do? Well, our strong recommendation is that you drop by the cockpit and ask permission to use it. After all, the crew is just as concerned as anybody about the safety of the flight. Chances seem to be about 95 out of 100 that they'll say OK.

What's the concern? Well, electronic devices are capable of emitting radio frequency waves; waves which could conceivably cause interference to navigation or communications electronics. Does it? Without testing the Model 100 (or your calculator) on every configuration of every airplane used by each airline, nobody can be absolutely certain. To my knowledge, there has been no report of known interference.

CP/M Update

One of those late items I told you about long ago (CP/M for Models 4 and 12) should be coming along around the first of November. I'm afraid we caused some of the delays ourselves. As you're no doubt aware, we now have a Model 16 with built-in hard disk. In order to fit it into the computer housing, it was necessary to rework the controller and get the electronics onto one board. This required a change in controller chips, which forced the DRI (Digital Research, Inc.) folks to redo some of their work and that, of course, caused further delay. But, as of this writing, both products look like they'll be ready around the first of November.

Well, that's the news for this month. See you!

The Model 16b, with built-in hard disk.



Making the Model 100 useful

Five short programs

Model 100

Dr. George Haller, Naples, FL

I recently acquired the Model 100 to supplement my Model III and an Osborne. I find that I am using it more and more — not only in traveling, but at home. I have connected this computer to an SCM Daisy Wheel and find that it makes a nice combination. One minor problem with this combination is that in listing a BASIC program the < and > characters are missing on the printer. A blank space is left for a penciled insertion. I have put a few short programs into the memory and will describe them.

First, is a date program which I use in many printouts and is shown in Listing 1. This program uses the BASIC statement MENU, which returns the program to the menu. You may wish to end most of your BASIC programs with this statement. To use this program from menu, merely position the cursor over DATE.BAS and hit enter. The date, day and time are printed on your document and you are returned to menu.

Another program I use quite often I have named KXXX.BA. When I write short letters, notes or memos using the Text program (and which I do not wish to save to disk), I use the filename XXX. Then I use the short program, shown in Listing 2, which uses the BASIC command MENU to return to menu. I also inserted the command BEEP merely to indicate that the KILL has been accomplished.

A third program (Listing 3) is my ENVL.BAS program which is self-explanatory. It is very handy for addressing envelopes.

My check writing program (Listing 4) is an adaptation of an article from *80-U.S. Journal*, May/June 1981. This program works very well with the SCM printer and uses the already-programmed DATE function of the computer. The formatting for your checks may need modification in lines 25, 30 and 35.

I am continually trying to improve my skill in touch-typing, so I keep a typing drill program in the computer at all times. This program is shown in Listing 5. The program requests information on the keys you wish to practice, the number of keys in a group and the number of tries. At the end of the run, your errors are noted and the percentage of correct entries are given. This program is an adaptation of a program originally published in *Byte* magazine.

These are a few programs to help you get more use from a really great little computer.

Listing 1—DATE/BAS

```
10 REM DATA.BA 05/17/83
20 LPRINTDATE$;" ";DAY$;" ";TIME$
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```

```
30 LPRINT" "
40 MENU
```

Listing 2—KXXX.BA

```
5 REM A PROGRAM TO KILL TEMPORARY
6 REM FILE NAMED XXX.DO
7 REM BY G. L. HALLER, 05/16/83
10 KILL "XXX.DO"
20 BEEP
30 MENU
```

Listing 3—ENVL.BAS

```
5 REM PROGRAM ENVL.BAS 05/16/83
10 LINEINPUT"NAME ";A$
20 LINEINPUT"STREET ";B$
30 LINE INPUT "ENTER CITY, STATE, ZIP ";
   C$
35 PRINT"PRESS ANY KEY TO PRINT"
38 H$=INKEY$:IF H$=""THEN 38
40 LPRINTTAB(30);A$
50 LPRINTTAB(30);B$
60 LPRINTTAB(30);C$
70 INPUT"ANOTHER SAME, Y/N";Y$
80 IF Y$="Y" OR Y$="y" THEN 40
90 INPUT"ANOTHER DIFFERENCT, Y/N ";N$
100 IF N$="Y" OR N$="y" THEN 10
110 MENU
```

Listing 4—Check Writer

```
1 REM A CHECK WRITER FOR THE TRS-80
2 REM BY G. L. HALLER, 1983
4 DIMT$(27)
5 PRINT"INSERT CHECK AT COLUMN ZERO AND
   INPUT "
10 LINEINPUT" PAYEE NAME ";A$
20 INPUT "AMOUNT ";A
25 LPRINTTAB(45)DATE$
30 LPRINT:LPRINT
35 LPRINTTAB(12)A$;TAB(59)USING"$$##,###
   .##";A
60 DEFDBLA
70 V$="##"
100 IF A>99999.99 THEN PRINT "NUMBER IS
   TOO BIG ":GOTO 20
120 LPRINT
130 T=INT(A)
```

```

140 B=100*(A-T)
150 T1=INT(T/1000)
160 T2=INT(T1/10)
170 T3=T1-T2*10
180 T4=T-1000*T1
190 T5=INT(T4/100)
200 T6=T4-100*T5
210 T7=INT(T6/10)
220 T8=T6-10*T7
230 RESTORE
240 DATA ONE, TWO, THREE, FOUR, FIVE, SIX
250 DATA SEVEN, EIGHT, NINE, TEN, ELEVEN
260 DATA TWELVE, THIRTEEN, FOURTEEN
270 DATA FIFTEEN, SIXTEEN, SEVENTEEN
280 DATA EIGHTEEN, NINETEEN, TWENTY
290 DATA THIRTY, FORTY, FIFTY, SIXTY
300 DATA SEVENTY, EIGHTY, NINETY
310 FOR I=1 TO 27
320 READ T$(I)
330 NEXT I
340 T$(0)=""
345 LPRINT " ";
350 IF T1=>20 THEN 410
360 IF T<100 THEN 460
370 IF T<1000 THEN 440
380 LPRINT T$(T2*10+T3)
390 GOSUB 580
400 GOTO 430
410 LPRINT T$(T2+18); " "; T$(T3);
420 GOSUB 580
430 IF T5=0 THEN 460
440 LPRINT T$(T5);
450 GOSUB 620
460 IF T6=>20 THEN 530
470 IF T6=0 THEN PRINT
480 LPRINT T$(T6); " AND ";
490 IF B=0 THEN LPRINT "NO/100 DOLLARS":
    GOTO 690
500 LPRINT USING V$; B;
510 LPRINT "/100 DOLLARS"
520 GOTO 690
530 LPRINT T$(T7+18); " "; T$(T8); " AND "
    ;
540 IF B=0 THEN LPRINT "NO/100 DOLLARS":
    GOTO 690
550 LPRINT USING V$; B;
560 LPRINT "/100 DOLLARS"
570 GOTO 690
580 LPRINT " THOUSAND";
590 IF T4=0 AND T6=0 THEN RETURN
600 LPRINT " ";
610 RETURN
620 LPRINT " HUNDRED";
630 IF T6=0 THEN RETURN
640 LPRINT " ";
650 RETURN
690 INPUT " ANOTHER CHECK "; Y$

```

```

700 IF Y$="Y" OR Y$="y" THEN 5
710 MENU

```

Listing 5—Typing Drill

```

10 REM TYPING DRILL
20 REM FOR MODEL 100
30 REM 04/29/83
40 REM FROM BYTE DEC. 79 PAGE 250
50 CLEAR 200: DIM A(50)
60 CLS
100 INPUT "WHAT CHARACERS DO YOU WANT"; C$
105 L=LEN(C$)
110 INPUT "HOW MANY IN EACH WORD "; WL
120 INPUT "DO YOU WANT AN ECHO"; A$
125 IF LEFT$(A$,1)="Y" THEN E=1
130 INPUT "HOW MANY TRIALS "; NT
150 'START HERE IF PARAMETERS ARE THE SA
    ME
155 NR=0: NW=0
160 FOR I=1 TO 25: A(I)=0: NEXT I
200 FOR T=1 TO NT
210 NP=NP+WL
220 A$=""
230 FOR I=1 TO WL
240 F=INT(L*RND(1)+1)
250 A$=A$+MID$(C$,F,1)
260 NEXT
270 CLS: PRINT@100, A$
300 FOR I=1 TO WL
310 B$=INKEY$: IF B$="" THEN 310
320 IF E=0 THEN 350
330 PRINT TAB(20) B$;
350 IF B$<>MID$(A$,I,1) THEN 500
360 NR=NR+1
370 NEXT
375 IF E=1 THEN PRINT
380 NEXT
390 CLS
400 PRINT: PRINT "YOUR SCORE IS "; INT(100*
    NR/(NR+NW)); "%"
402 IF NW=0 THEN 415
405 PRINT "ERRORS: ": FOR I=1 TO L: IFA(I)=0
    THEN 410
407 PRINT MID$(C$,I,1); A(I)
410 NEXT I
415 PRINT: INPUT "AGAIN"; A$
420 IF LEFT$(A$,1)<>"Y" THEN MENU
422 INPUT "SAME CHARACTERS ETC "; Z$
423 IF LEFT$(Z$,1)="Y" THEN 150 ELSE 50
500 FOR J=1 TO L
510 IF MID$(C$,J,1)<>MID$(A$,I,1) THEN NEX
    T
515 A(J)=A(J)+1
520 PRINT: PRINT "ERROR ON "; MID$(A$,I,1)
522 NW=NW+1: 'UP DATE # WRONG
525 PRINT "LET'S TRY THAT WORD AGAIN."
530 FOR I=1 TO 800: NEXT
540 CLS: GOTO 270

```

Basically BASIC

Arrays

For all readers

James A. Conrad, Seattle, WA

Array! The word has been known to strike terror into even the sturdiest of souls.

There's nothing inherently difficult about arrays. The primary difficulty most beginning programmers have with arrays is that they are usually used with FOR . . . NEXT loops, READ . . . DATA, or other seemingly esoteric statements. The combination of all these new concepts and techniques can appear overwhelming.

The other difficulty beginning programmers seem to have with arrays is that they can't see their value. The first time one of my beginning programming students asked, "What good are arrays?" I was so stunned that I couldn't come up with a quick answer. It should be innately apparent, I thought. "Why, they're used for everything . . . everything!" I said. "The first thing I do when I start writing a program is set up my arrays." Which is, of course, no answer. The poor student staggered away more confused than when he asked me the question.

An array is a series of related variables. It is used to store related information, like all of your checks for the month, the names in a mailing list, or an inventory.

Variables

The computer stores numeric and alphanumeric information in memory cells called variables. Each of these variables has its own name — A, A1, B, etc. String variables are differentiated by the "\$" string sign following the variable name. (For a complete discussion of variables and assignment statements, see "Basically BASIC," September, 1982).

An array is simply a list, or series, of variable cells. Each element of an array is a separate variable cell. The entire set of names which can be used to name regular variables can also be used to name arrays. Arrays are a completely different set of variables than regular variables. An array can have the same name as a regular variable (not a good idea — it won't confuse the computer, but it might confuse the programmer).

If we think of individual variables as addresses on mailboxes, we can think of arrays as apartment house mailboxes. The array has an address (variable name) and each of its units has an apartment number (subscript).

The *subscript* is the number of the array element. Think of it as a pointer to an element. Subscripts can be numbers, variables, or expressions. If a fractional value

is given or calculated, its integer will be used.

The easiest way to visualize an array is to diagram it as a series of little boxes. Here's a diagram of a four-element array named G:

Array	G	0	0	0	0
Subscript		(1)	(2)	(3)	(4)

Initially, all the array elements have a value of zero (as do all regular variables). We can assign values to the array elements just as we assign values to regular variables. Assign the value seven to the third element, G(3) (pronounced "G sub-three"), LET G(3)=7. Now, the array looks like this:

Array	G	0	0	7	0
Subscript		(1)	(2)	(3)	(4)

To prove to yourself that the value has been assigned, PRINT G(3). Try also PRINTing the other elements, e.g., PRINT G(1). Now, assign values to the other elements and PRINT them. The purpose of this little exercise is to show that each array element is an individual variable, and can be treated as such.

If this was the only way to assign and print array values, there would be no purpose for arrays. What makes arrays so valuable is that they are easy to use. Here's a little program which assigns values to the array from a single FOR . . . NEXT loop:

```
10 FOR X=1 TO 4
20 LET G(X) = X * 2
30 NEXT X
```

Now, the array looks like this:

Array	G	2	4	6	8
Subscript		(1)	(2)	(3)	(4)

To print it out, add the following lines:

```
40 FOR X =1 TO 4
50 PRINT G(X)
60 NEXT X
```

As the loop counts from one through four, using the counter variable X, line 20 assigns twice the value of the counter to the Xth element of the array. If you have

trouble understanding this, take pencil and paper and step through each iteration of the loop. (During the first run through the loop, X=1, and line 20 assigns the value of 2 (1 * 2) to G(1).) If you still have trouble, it's quite possible that your trouble lies in understanding FOR...NEXT loops (see "Basically BASIC," May, 1983).

As a test of your understanding at this point, substitute the variable Y for X in lines 40, 50 and 60. This is the point in my classes where students who think they are beginning to comprehend arrays lapse again into confusion. But when they see that their problem is really in understanding that X and Y are FOR...NEXT counters, and it doesn't make any difference what variable is used, I hear the "ah-ha's" of perception. It's all downhill from there.

The DIM Statement

Arrays of more than 10 elements must be set up before they can be used. The DIMension statement does this. Its form is:

```
linenumber DIM array name (size)
```

The DIM statement creates the array in memory and sets its size, reserving enough storage space for all of its elements. The *array name* may be the name of any valid variable. The use of a variable as an array name won't affect its use as a regular variable elsewhere in the program. The *size* indicator, in parentheses, may be a number, variable, or expression. If it contains a fractional value, its integer will be used. Dimensioning an array of 10 or fewer elements is optional.

A single DIM statement may be used to dimension several arrays, using commas to separate the arrays, e.g., 10 DIM A(29), B\$(17), C(5), ...

The ability to dimension an array with a variable comes in handy when the array will be different sizes at different times. For example, a checkbook program could begin:

```
10 INPUT "HOW MANY CHECKS THIS MONTH";
R1
20 DIM CK(R1)
```

The array CK(), which will contain the amounts of the month's checks, is dimensioned by variable R1, input by the user in line 10.

Error Messages

Once dimensioned, an array can't be redimensioned (except on a Model II). You'll get a "DD" (redimensioned array) error if you try. This error occurs most frequently when a program is written to loop back through the same DIM statement.

The other array error message, one that Siegfried, my computer, gives me frequently (except that, for some incomprehensible reason, he gives it to me while I'm writing these articles), is "BS." Actually, it stands for "bad subscript." If your computer spells out error messages, it will read "subscript out of range." This means that you have attempted to use an array element that's beyond the dimensioned size of the array, or an element with a subscript larger than 10 for an undimensioned array.

String Arrays

I was fishing one day with Jim Ryan, a British friend.

Somehow, the topic of conversation degenerated into computer programming and I mentioned string arrays. Jim said, "Oh, I hope we don't catch any of those — they're quite vicious, really." Only if you don't understand arrays, Jim. String arrays are no different from numeric arrays except that they must be given string variable names.

Here's a little program which uses a string array to make a grocery list:

```
10 INPUT "SIZE OF GROCERY LIST"; R1
20 DIM GL$(R1)
30 FOR X=1 TO R1
40 INPUT GL$(X)
50 NEXT X
60 PRINT "THE GROCERY LIST IS:"
70 FOR X=1 TO R1
80 PRINT GL$(X)
90 NEXT X
```

Conclusion

In this article, we've dealt only with single-dimensional arrays. Next month, we'll discuss multi-dimensional ones. Arrays become an integral part of almost all serious programs. It's difficult to write a program without at least one array. The major problems most people have with arrays are not in understanding them, but in coordinating the looping structures that put information into, and get information from, the arrays. That's BASIC.

Table 1

Programming Tips

1. Arrays have an element I haven't mentioned — number zero. I haven't mentioned it because I advise beginning (and many not-so-beginning) programmers not to use it. If you were to use it, you'd DIMension a 127-element array with the statement DIM A(126). Your FOR...NEXT loop would read FOR X=0 to 126... And which element contains the 43rd item? Well, let's see... I know it's not A(43)... now, is it A(42), or A(44)? Much easier to forget the "0th" element.

2. Dimension small arrays. Although this saves a few bytes of memory, the main reason is what I call "preventative debugging" — writing a program so it will generate an error message as close as possible to the actual occurrence of an error. If you dimension a five-element array and try, in error, to use the seventh element, you'll get a "subscript out of range" message where the error occurs. If you hadn't dimensioned it, you'd have to decipher your goofy output and work your way back through the program to find the error — a more difficult debugging job.

3. Dimension your arrays in an early program line. With REM statements telling what the arrays are used for, this will help document your program. It also reduces the possibility of a "redimensioned array" error.

4. Arrays use memory — two bytes per element for an integer array, four bytes for single-precision, eight bytes for double-precision, and one byte per character in a string array. If memory is tight, use integer arrays for integers. You might even consider reusing an array.

A potpourri of puzzlers

Solutions to many of this year's Puzzlers in Notes, etc.

For all readers

Basic Computing staff

We have been running the Puzzler section in the Notes, etc. column for some months now. Many of the problems required writing code to obtain a solution. We thought you might enjoy seeing some of the creative work that was submitted.

GOTO N

The January, 1983 Puzzler asked for a GOTO N routine, where you could specify the linenumber with an input value. Many of the solutions used a poking routine to actually alter the resident program and insert the linenumber into the line of code that had the GOTO in it. We got an excellent solution from Mr. Pete Carr of Port Orange, FL that does it a little differently. He sent in a BASIC program that demonstrated the use of just such a routine he had obtained from Mr. Bill Stockwell. The program will work on Models I and III. The BASIC program, Listing 1, and the assembler source code, Listing 2, need some explanation. This is what Mr. Carr had to say: "It is written for a 48K machine but can be modified. The BASIC program first pokes the code into high memory and initializes it by a USR call. After this is done, the command NAME becomes a new extended GOTO N command. At line 170 in the BASIC program, N is set to start with line 200, in increments of 10. Make sure you understand line 170 before using this routine or you could be GOTOing the wrong places. For programs with a few menu choices, this routine isn't really needed, but for those program menus where you

have a lot of choices, it is really great."

Round Numbers

The July, 1983 Puzzler defined a round number as one whose binary representation had as many ones as zeroes (ignoring leading zeroes). The question was to find out how many round numbers there were between two and 1,000 (inclusive). Many readers obtained the correct answer of 175. Listing 3 shows how we obtained the answer.

CoCo Break Disable

In April, 1983 we asked for a break key disable routine for the Color Computer. A routine was sent to us appended to, of all things, a reader questionnaire we had sent out. The code is given in Listing 4.

Upper/Lowercase Sorting

The August, 1983 Puzzler asked for a sorting method that would also take into account that lowercase letters are sorted out of order if you just rely on simple string



"For heaven's sake man, feed it some input!"

comparisons. We obtained two very good solutions. Listing 6 is for the Model II and demonstrates the use of a machine language utility to change all letters to uppercase, sort them, and then display the original entries. The solution was sent in by Mr. Dan Meyers of Newburgh, IN. The program will display the original list, the original list after sorting by "normal methods," the original list after altering caps, and the original list in "correctly" sorted order.

Listing 5 was submitted by Rolland Metzger of Dixon, IL. His program is for the Models I/III and will also print out the list sorted correctly. His code also includes a quick-sort routine that readers may like to study.

Time Difference

In September, 1983 we asked for a method of computing the difference between two time values, T1\$ and T2\$. Mr. Scott O. Perkins of Ashland, KY sent in Listing 7 which does a fine job. The program will work on any model that supports the LEFT\$, RIGHT\$, and MID\$ functions. The key part of the routine is in line 30. T1\$ must contain the starting time and T2\$ must contain the ending time. The elapsed time is returned by the subroutine as T3\$. All times are based upon the 24-hour clock and must be in the format HH:MM:SS (hours:minutes:seconds). Lines 5, 50, 55, and 60 are added to demonstrate the subroutine. You may delete them when making use

of the routine in your own applications.

Listing 1 GOTO N

```

5 ' January 83 Puzzler
10 'GOTO N Routine
15 'FOR MODELS I/III ONLY
16 'WRITTEN FOR 48K MACHIN
ES
20 'PROTECT HIGH MEMORY
30 'by Bill Stockwell: Exa
mple of use by Pete Carr
40 '
50 CLS: CLEAR 1000
60 AD%=(&HFFEA): DEFINT N
70 FOR I%=AD% TO AD%+19: R
EAD D%: POKE I%,D%: NEXT I
%
80 DEFUSR=&HFFEA
90 X=USR(X)
100 DATA 33,241,255,34,143
,65,201,229,205,13
110 DATA 38,213,255,94,35,
86,225,195,197,30
120 '
130 PRINT @25,"MENU"
140 PRINT@256,"1. ONE": PR
INT"2. TWO": PRINT"3. THRE
E"
150 PRINT: INPUT"ENTER CHO
ICE ";N
160 '
170 N=N-1: N=N*10: N=200+N
180 NAME N
190 '
200 PRINT"AT ONE": END
210 PRINT"AT TWO": END
220 PRINT"AT THREE": END
    
```

Listing 2 GOTO N

```

00010 ;GOTO N routine where N=integer variable containing
00020 ;the line# you want to branch to.
00030 ;by Bill Stockwell : Example of use by Pete Carr
00040 ;
FFEA 00050 ORG OFFEAH
FFEA 21F1FF 00060 LD HL,NAME
FFED 228F41 00070 LD (418FH),HL
FFF0 C9 00080 RET
FFF1 E5 00090 NAME PUSH HL
FFF2 CD0D26 00100 CALL 260DH
FFF5 D5 00110 PUSH DE
FFF6 E1 00120 POP HL
FFF7 5E 00130 LD E,(HL)
FFF8 23 00140 INC HL
FFF9 56 00150 LD D,(HL)
FFFA E1 00160 POP HL
FFFB C3C51E 00170 JP 1EC5H
0000 00180 END
    
```

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3. d2-d4	c5-d4	19. e3-f2	b5-b4
4. f1-b5+	c8-d7	20. c2-b3	a6-a5
5. b5-d7+	d8-d7	21. d1-d4!	b7-b5
6. f3-d4	g8-f6	22. c3-b4	a5-b4
7. b1-c3	g7-g6	23. a1-c1!	c4-b6
8. e1-g1	f8-g7	24. c1-c8+	b6-c8
9. c1-e3	e8-g8	25. b3-c4	b5-d7
10. d1-d3	a7-a6	26. c4-b4	c8-a7
11. c3-d5	b7-b5?	27. b4-b8+	f6-e8
12. d5-b6	d7-b7	28. d4-c4	a7-c6
13. b6-a8	b7-a8	29. b8-a8	c6-e5
14. f2-f3	b8-d7	30. c4-c8	g8-f8
15. f1-d1	f8-c8	31. a2-a4	e5-d3
16. c2-c3	a8-b7	32. c8-d8!	resigns



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Listing 3 Round Numbers

```

10 'July 1983 Puzzler
20 'finding all round numbers <= 1000
30 'round number defined to be a number
40 'whose binary representation has
50 'equal number of 0's and 1's
60 'written by Brad Hoza
70 '05/06/1983
80 '
90 CLS
100 HBIT = 1
110 FOR X=2 TO 1000
120 IF X < 2^(HBIT+1) THEN 140
130 HBIT = HBIT+2: X = INT(2^HBIT)
140 EVEN = 0
150 FOR P=HBIT TO 0 STEP -1
160 EVEN = EVEN + SGN(X AND 2^P)*2-1
    
```

```

170 NEXT P
180 IF EVEN = 0 THEN PRINT X,: R=R+1
190 NEXT X
200 PRINT"Total number of round numbers is :";R
    
```

Listing 4 CoCo Break Disable

```

10 'APRIL 1983 PUZZLER
20 'COLOR COMPUTER BREAK KEY DISABLE
30 FOR ADDR = &HF8 TO &HFE
40 READ HEX
50 POKE ADDR, HEX
60 NEXT ADDR
70 FOR ADDR = &H19A TO &H19C
80 READ HEX
90 POKE ADDR, HEX
100 NEXT ADDR
110 POKE &H19A, &H7E
120 GOTO 120
130 DATA &H32, &H62, &H1C, &HAF, &H7E, &HAD, &HA5
140 DATA &H39, &H0, &HF8
    
```

```

60 IF E1=0 THEN 50
70 IF HC$="H" THEN LPRINT: LPRINT
300 GOSUB 5000 'SORT ON UPPER CASE ARRAY D$(I) WITH UPPER AND LOWER CASE STRING A$(I) TIED TO ITS CORRESPONDING UPPER CASE STRING
400 REM *** PRINT OUT SORTED ARRAY
410 FOR I = 1 TO N
420 PRINT A$(I)
430 IF HC$="H" THEN LPRINT A$(I)
440 NEXT I
450 END
451 '
452 '
1000 REM READING IN DATA SUBROUTINE
1010 INPUT A$:IF A$ = "X" THEN E1 = 1:RETURN
1020 N = N + 1
1030 A$(N) = A$
1035 IF HC$="H" THEN LPRINT A$
1036 '
1037 '
1040 REM *****
*****
1050 REM THIS SECTION IS THE GUTS OF THE PROGRAM
1051 '
1060 D$(N)=" "
1070 FOR P = 1 TO LEN(A$(N))
1080 B$=MID$(A$(N),P,1) 'EXAMINE EACH CHARACTER OF THE STRING
1090 IF ASC(B$)>95 AND ASC(B$)<128 THEN B$=CHR$(ASC(B$)-32) 'IF LOWER CASE THEN CHANGE TO UPPER CASE
1095 IF ASC(B$)>31 AND ASC(B$)<47 THEN 1105 'IGNORE MANY PUNCTUATION MARKS INCLUDING PERIOD, COMMA, AMPERSAND, POSTROPHE, AND SPACE
1100 D$(N) = D$(N) + B$ 'ADD LATEST CHARACTER EXAMINED TO STRING D$(N)
1105 NEXT P
1110 REM D$(N) IS THE SAME AS A$(N) EXCEPT THAT
    
```

Listing 5 Model I/III Sort

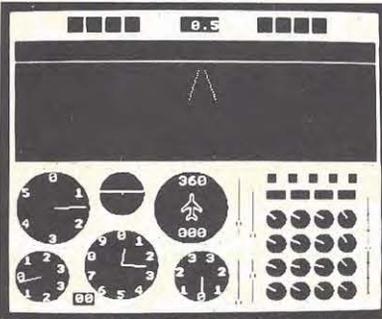
```

0 REM ROLLAND METZGER
832 N. BRINTON AVE., DIXON IL 61021
1 REM AUGUST 1983 PUZZLER - BASIC COMPUTING
2 CLEAR 1000
4 DEFINT A-Z
6 INPUT "ENTER DIMENSION NUMBER, I.E., MAXIMUM LENGTH OF LIST";DM
7 DIM D$(DM), A$(DM), STK(INT(.8*DM))
8 BOT=0:T=0:A=0:B=0:R=0:P=0:N=0:I=0
10 INPUT "IF HARD COPY IS DESIRED ENTER <H> ELSE JUST ENTER>";HC$
15 PRINT:PRINT
20 PRINT "ENTER STRINGS TO BE SORTED"
30 PRINT "IF NO MORE ARE TO BE ENTERED THEN ENTER <X>"
40 N=0:E1=0
50 GOSUB 1000 'TO ENTER DATA
    
```

```

1050 REM THIS SECTION IS THE GUTS OF THE PROGRAM
1051 '
1060 D$(N)=" "
1070 FOR P = 1 TO LEN(A$(N))
1080 B$=MID$(A$(N),P,1) 'EXAMINE EACH CHARACTER OF THE STRING
1090 IF ASC(B$)>95 AND ASC(B$)<128 THEN B$=CHR$(ASC(B$)-32) 'IF LOWER CASE THEN CHANGE TO UPPER CASE
1095 IF ASC(B$)>31 AND ASC(B$)<47 THEN 1105 'IGNORE MANY PUNCTUATION MARKS INCLUDING PERIOD, COMMA, AMPERSAND, POSTROPHE, AND SPACE
1100 D$(N) = D$(N) + B$ 'ADD LATEST CHARACTER EXAMINED TO STRING D$(N)
1105 NEXT P
1110 REM D$(N) IS THE SAME AS A$(N) EXCEPT THAT
    
```

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ALL LOWER CASE CHARACTERS
HAVE BEEN CHANGED TO UPPER
CASE AND SOME PUNCTUATION
ETC. ELIMINATED.

```
1120 RETURN
1125 '
1130 REM *****
*****
1140 '
1150 '
5000 REM QUICKSORT SUBROUTINE
5002 REM REQUIRES STACK WITH DIM STK(ABOUT 2/3 N)
5010 P = 0:R = P+P:STK(R+1
```

```
)=1:STK(R+2)=N:P = P+1
5020 IF P = 0 THEN RETURN
5030 P = P-1:R = P+P:A=STK(R+1):B=STK(R+2)
5035 REM T IS USED BECAUSE TOP CONTAINS THE RESERVED WORD "TO"
5040 Z$=D$(A):Z1$=A$(A):T=A:BOT=B+1
5050 BOT=BOT-1:IF BOT = T THEN 5090
5055 PRINT BOT,A,B,P,'R
5060 IF Z$<=D$(BOT) THEN 5050
5061 D$(T)=D$(BOT):A$(T)=A
```

```
$(BOT)
5070 T = T+1:IF BOT=T THEN 5090
5080 IF Z$>=D$(T) THEN 5070
5081 D$(BOT)=D$(T):A$(BOT)=A$(T):GOTO 5050
5090 D$(T) = Z$:A$(T)=Z1$:IF B-T>=2 THEN R = P + P:STK(R+1) = T+1:STK(R+2) = B:P = P+1
5100 IF BOT-A>=2 THEN R=P+P:STK(R+1)=A:STK(R+2)=BOT-1:P=P+1
5110 GOTO 5020
```

Listing 6 Model II Sort

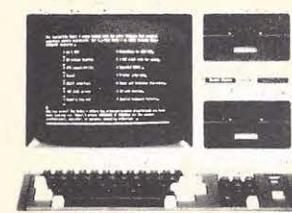
```
5 ' August 1983 Puzzler
10 'Sorting mixed upper and lowercase in to proper order
20 'This version is for Model II ONLY
30 ' by Dan Myers
40 ' 10677 Montecello
50 ' Newburgh, Indiana 47630
60 CLEAR1000:DEFINT A-Z
70 '
80 '**** Set up string arrays to hold names
90 'A$( ) holds original list, A1$( ) holds original list in sorted order, AC$( ) holds the list in sorted sorder after converted into caps, BF$( ) is a buffer array used for cap conversions and
```

```
100 'sorts. Since I used SWAP and LSET to avoid garbage collection, it is necessary to initialize the A1$, AC$, and BF$ arrays as blank strings with a length at least equal to the longest name in the list.
110 N=20' The number of names in the list
120 DIM A$(N),A1$(N),AC$(N),BF$(N),EL(N)
130 SP$=STRING$(15,32):FORI=1TON:READA$(I):A1$(I)=SP$:LSETA1$(I)=A$(I):AC$(I)=SP$:LSETAC$(I)=A$(I):BF$(I)=SP$:NEXT I
140 '
150 '
160 '**** Sort the original list
170 FORX=1TON:LSETBF$(X)=A1$(X):NEXT:GOS
```

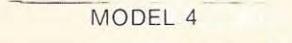
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```

UB670:FORX=1TON:LSETA1$(X)=BF$(X):NEXT
180 FORX=1TON:EL(X)=X:NEXT' Pointer array
to sort the original list in the proper
order
190 '**** Convert the AC$ array to all caps
and sort, also sorting the EL pointer
array
200 FORX=1TON:LSETBF$(X)=AC$(X):NEXT:GOSUB
UB380:GOSUB670:FORX=1TON:LSETAC$(X)=BF$(
X):NEXT
210 CLS:PRINTCHR$(2);:GOSUB780' Print heading
220 '
230 ""\" is CTRL9 key, 14 spaces then 4
spaces for format of U$
240 '
250 U$=""\
\
\
\
260 FORX=1TON:PRINTUSINGU$;A$(X),A1$(X),
AC$(X),A$(EL(X)):NEXT
270 PRINT"Hit <enter> to continue "CHR$(
1);:LINEINPUTZ$:GOTO450
280 '
290 '
300 '
310 '**** The key to sorting the list in
proper order: This subroutine looks at
each character. If its ASCII code is >96
(indicating a lowercase letter), it is converted
to uppercase by re-setting the 5th bit.
320 'Since the ASCII code of an uppercase
letter is simply the ASCII code of the
lowercase letter with the 5th bit re-set,
the character is converted to uppercase.
Once all the characters are in uppercase,
the list can be sorted in the proper order.
330 'By making sure only those characters
with an ASCII code greater than 96 are
converted, only lowercase letters are affected.
Punctuation and numeric characters are
not altered. The input routine should screen
out the
340 'entry of characters with an ASCII code
greater than 122 (the letter "z").
350 '
360 'Conversion to uppercase can be done
at the time of data entry or at the time
of sorting. The sorted list can either
be printed out in an all cap format, or
by using a pointer array, in the originally-
entered format, in a properly sorted order.
370 '
380 CLS:PRINT"I'm changing the strings t
o caps using BASIC":PRINT:FORX=1TON:FORI
=1TOLEN(A$(X)):A1=ASC(MID$(BF$(X),I,1)):
IFA1>96THENMID$(BF$(X),I,1)=CHR$(A1AND22
3)
390 NEXT:PRINTX;:NEXT:PRINT:PRINT:PRINTTAB
AB(10)"See how slow I was?";:GOSUB770:RE
TURN
400 '
410 '
420 '
430 'The conversion to caps can be done
more efficiently by a short machine code
program.
440 '
450 DIMU1(13):FORX=0TO13:READU1(X):NEXT
'Read machine language array
460 FORI=1TON:LSETA1$(I)=A$(I):LSETAC$(I
)=A$(I):NEXT 'rebuild original name arra
ys
470 '
480 J=0
490 CLS
500 '
510 '
520 '**** Sort the original list
530 FORX=1TON:LSETBF$(X)=A1$(X):NEXT:GOSUB
UB670:FORX=1TON:LSETA1$(X)=BF$(X):NEXT
540 FORX=1TON:EL(X)=X:NEXT 'Pointer array
to sort original list
550 '**** Convert the AC$ array to all caps
and sort it and EL array
560 FORX=1TON:LSETBF$(X)=AC$(X):NEXT:GOSUB
UB620:GOSUB670:FORX=1TON:LSETAC$(X)=BF$(
X):NEXT
570 CLS:PRINTCHR$(2);:GOSUB780'Print heading
580 FORX=1TON:PRINTUSINGU$;A$(X),A1$(X),
AC$(X),A$(EL(X)):NEXT
590 PRINT"Hit <enter> to end "CHR$(1);:L
INEINPUTZ$:END
600 '
610 '
620 CLS:PRINT@(6,10),"I'm changing the s
trings to caps with machine language":PR
INT:FORX=1TON:DEFUSR=VARPTR(U1(0)):J=USR
(VARPTR(BF$(X))):PRINTY;:NEXT:PRINT:PRIN
T:PRINTTAB(10)"See how fast I was?";:GOSUB
UB 770:RETURN
640 '
650 '
660 '**** Shell-Metzner sort
670 P=N
680 P=INT(P/2):IFP=0THEN RETURN
690 K=N-P:J=1
700 I=J
710 L=I+P:IFBF$(I)<BF$(L)THEN 730
720 SWAPBF$(I),BF$(L):SWAPEL(I),EL(L):I=

```

```
I-P:IFI>=1THEN710
730 J=J+1:IFJ<=KTHEN700ELSE680
740 '
750 '
760 '
770 PRINT:PRINT:PRINTTAB(10)"Hit <enter>
to print the sorted lists ";:LINEINPUTZ
$:RETURN
780 PRINT"          Original list
      List changed to  Original list
keyed to"
790 PRINT"Original list  Sorted
      Caps & sorted    Capitalized arr
ay"
```

```
800 PRINTSTRING$(79,"-"):RETURN
810 DATA Gwaltney, FAHRENKAMP, Rundio, s
cott, ReIhErZeR, gwozoa, GREULICH, Greub
el, SCHWEIKARTH, SIEBEKING, Falamarzian,
FECHTMEISTER, RIPPLEMEIER, rudkevich, R
UIZ, Schmalgemeyer, TRAUTVETTER, Tzschop
pe, MYERS, Meyers
820 '
830 '
840 '**** Machine code integer array ele
ments
850 DATA 24013,17988,24099,22051,1259,-1
4331,-386,14433,-505,12411,-6653,30559,4
131,-13839
```

Listing 7 Time Difference

```
5 CLS:CLEAR5000:GOTO50
10 T3=VAL(LEFT$(T3$,2))*36
00+VAL(MID$(T3$,4,2))*60+V
AL(RIGHT$(T3$,2)):RETURN
30 T3$=T1$:GOSUB10:T1=T3:T
3$=T2$:GOSUB10:T2=T3:T2=T2
-(T2<T1)*86400:T3=T2-T1:T1
=INT(T3/3600):T3=T3+T1*-36
```

```
00:T2=INT(T3/60)
35 T3=T3+T2*-60:T3$="" :T3$
=T3$+CHR$(INT(T1/10)+48)+C
HR$(T1-INT(T1/10)*10+48)+
"+CHR$(INT(T2/10)+48)+CHR
$(T2-INT(T2/10)*10+48)
38 T3$=T3$+" :"+CHR$(INT(T3
/10)+48)+CHR$(T3-INT(T3/10
)*10+48):RETURN
50 T1$="01:01:01":T2$="01:
```

```
02:11":PRINT"STARTING TIME
= ";T1$:PRINT" ENDING TI
ME = ";T2$:GOSUB 30:PRINT"
ELAPSED TIME = ";T3$
55 PRINT
60 T1$="23:11:59":T2$="04:
59:18":PRINT"STARTING TIME
= ";T1$:PRINT" ENDING TI
ME = ";T2$:GOSUB30:PRINT"
ELAPSED TIME = ";T3$
```

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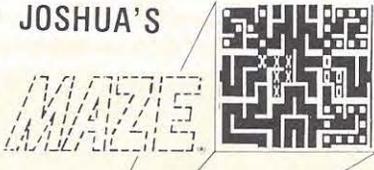
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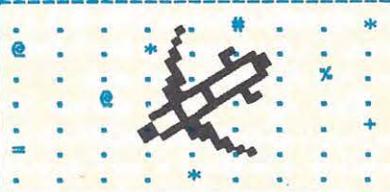
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Computer ease

What is "permanent" storage?

For all readers

Mark E. Renne, Bozeman, MT

We've been talking about input/output devices and the computer. Last month, we took a look at keyboards and screens. This month's column is all about "permanent" storage devices. We'll cover tapes, stringy floppies, diskettes and hard disks. I'll try to explain the differences and advantages of each. Since most of the confusion occurs with disk systems, I'll try to explain the differences and advantages of each.

What do I need storage for anyway? Computers would be fairly ineffective without a way to store information and programs on a permanent basis. Although information on the screen is helpful, we

wouldn't want to type in our general ledger program each time we used it. Early computers stored information, both programs and data, on punched cards. These cards were very reliable, but were impossible to change. I've written programs with cards and it's not much fun.

What's the least expensive way to go? The lowest cost storage medium on microcomputers is the cassette tape recorder. Early tape systems were slow and unreliable, but today's systems are faster and much more reliable. For example, the Model III tape system is three times faster than a Model I tape system. The real advantage to a tape system is cost. A standard cassette recorder

that you already own can be used for storage of programs and data.

Let me throw in a pitch or two for Radio Shack's methods. Some computer companies require a special recorder, usually about \$150, to work with their computer. Radio Shack's computers are built to use any standard recorder to save you the cost of buying a special recorder. Thanks, Radio Shack. Also, outside vendors sell quite a few inexpensive tape programs for Radio Shack computers. On the other hand, there are almost no programs for Apple Computer tape systems.

What's the catch to tape storage? The big problem with tape is speed. A program such as Scripsit might



Computer ease

take a minute to load on tape. You could load the same program in a few seconds from disk. The same problem occurs with data tapes. To write a hundred payroll records to tape would take hours! Also, you have no "random access." If you want to change one data record on tape, you must read in the whole tape, change the record, and write out the whole tape again. With random access, you can pull in one

If you're just starting in computers, you want a medium for storage that's reliable but cheap. Tape is just what the doctor ordered.

random access, you can pull in one specific record, change it, and output it to the same spot. Much faster, folks.

What good is tape then? Whoa! Don't misunderstand my explanation for criticism. If you're just starting in computers, you want a medium for storage that's reliable but cheap. Tape is just what the doctor ordered. The secret to building a computer system is expandability. You can start with a Color Computer tape system and build up to disk drives. If you're only writing short programs or balancing your checkbook, you don't need high speed. I often wish I could go back to using 88-cent tapes again instead of five-dollar diskettes.

Aren't Stringy Floppies tape too? Yes, they are. The difference is that the stringy moves at a very high speed and is continuous. It's not as fast as a disk drive, but it's faster than regular tape systems. Also, you can store many programs on a tape without running them in order. Let's say you have five games on a tape. You play the third one and now want to play the first one. On standard tape, you'd have to rewind and search from the beginning. The stringy allows you to simply request the first one and it wraps around and loads the first one.

The stringy floppy is also cheaper

than adding a disk drive to your computer system. It still doesn't allow random access, but it's quite a bit handier than a standard tape system. The problem with the stringy is lack of software support. Although the manufacturer does provide software, and there's a strong user's group, outside software vendors have not picked up on the idea. Standard BASIC programs are easy to put on the floppy, but machine language programs can be a problem.

Most computers use disk drives. Why? Disk drives provide a quality medium with an acceptable speed for most applications. They are inexpensive compared to a hard disk and provide users with unlimited storage by maintaining a library of diskettes. Two disk drives provide enough storage for most personal and business applications, however, most computers allow up to four drives to be attached.

What's the difference between a floppy, a diskette, and a drive? This is a constant point of confusion to first-time computer buyers. The disk drive is the part that is attached to the computer. The diskette or floppy is the part that you put into the drive. Some people use the terms disk, floppy, and diskette interchangeably. In our discussion, we'll use drive and diskette as defined above.

Explain single- versus double-density. Okay, now we've begun the journey into the deep depths of confusion. When you ask a salesman about computer systems, he'll usually spit out something like, "This unit has double-density, single-sided drives for storage." Let's attack this term-by-term. Density refers to how close together the information is packed on a diskette. Hence, double-density is packed twice as closely as single-density.

Isn't double-density less reliable? No. Some people still believe that computer wive's tale. Double-density technology has become the standard of the industry. Some very early systems had a bug or two and I think that's where the rumors began. Some computers are even beginning to introduce quad density (the information is packed twice as close as double-density). It will be

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Computer ease

interesting to see if it ever catches on.

What's this "sided" stuff all about? Most disk drives write to only one side of the diskette. Double-sided drives will write to both sides of a diskette. These are also called double-headed drives. We now have four different types of drives: single-sided single-density, single-sided double-density (the current industry standard), double-sided single-density, and double-sided double-density.

Are there only four types of diskettes? In order to make our discussion somewhat easier, I've left out a number of other factors that enter into diskette types. For example, drives can be 5¼-inch, 8-inch, or 3½-inch. This simply refers to the physical size of the drive. It's easy to see that an 8-inch diskette won't fit into a 5¼-inch drive!

There's also sectoring. Most drives use soft-sectored diskettes. This means that the computer actually lays down a software map, called **FORMATing**, to locate information on a diskette. Hard-sector diskettes use physical references to locate information. If you rotate a diskette around in its sleeve (plastic wrapper), you'll notice a hole in the diskette. If there's only one hole in the diskette, it's a soft sector. More than one hole, it's hard-sectored. *Never, never* put a hard-sectored diskette in a Radio Shack drive! It drives the whole system nuts and could damage your computer.

Can I use single-density diskettes in a double-density drive? If you mean, "Can I buy the single-density blank diskettes which are cheaper than double-density blanks?", yes and no. The drive has no way of knowing what type of diskette you're using. Since there is no physical formatting done on a diskette, the drive will attempt to format it in double-density. The problem is that the manufacturer of the diskette only tests the diskette for single-density qualities. Often, diskettes that fail double-density tests are then tested for single-density.

If you mean, "Can I read single-density diskettes in my double-density drives?", yes and no. The Radio Shack program **CONVERT**,

which allows you to convert Model I diskettes to Model III format, does just that. The drive doesn't really give a darn about the whole thing. It's the operating system that decides what will, or won't, be read. **TRSDOS** allows the Model III to read only double-density except during the **CONVERT** routine. Other operating systems do allow multiple-density reads. Next month, we'll have an in-depth discussion of different operating systems for Radio Shack computers.

What's a hard disk? A hard disk (in the microcomputer sense) is a mass storage device without any interchangeable media. One hard disk can hold as much as 30 floppy diskettes. It's also much faster than a standard floppy. For business applications, a hard disk can easily pay for itself in speed alone. They also cost about the same as 10 floppy drives.

I usually don't even mention hard drives, but they've come down drastically in price in recent years. Five years ago, they cost about \$15,000. Today, they can be found for under \$2000. I wish groceries were related to computers.

What's wrong with hard drives? Lack of software is a real problem. Not all programs written for standard floppies will work with a hard disk. Also, most are sold without a legitimate backup system. You must make backups of your files onto diskettes which takes quite a bit of time. Some systems offer a special formatting which allows an entire hard disk to be backed up onto only a few diskettes, but a high-speed tape would be much better.

Also, when things go wrong with a floppy drive, the price of repair is under one hundred dollars and you usually ruin only one diskette. Problems with hard disk failure can cost hundreds of dollars and eliminate 30 diskettes worth of data.

Send any questions you have about computers to me in care of *Basic Computing*. If you'd like an answer, please enclose a stamped, self-addressed envelope with your question. Next month, we'll take a look at a number of operating systems for Radio Shack computers and I'll also tell you how to obtain a free Christmas present. Until then, happy computing!

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Quick find

Making a faster search routine

For all readers

Jerry Latham, Midwest City, OK

There have been several good articles written lately about sorting arrays within a program in a minimum amount of time. The pros and cons of the bubble, ripple and the Shell-Metzner sorts and others have been explored and explained several times over. What seems to have been neglected were any words of wisdom about how to find data in your sorted arrays quickly once you have all of your data in order. Hopefully, this short article and the program I have written will help overcome this inadequacy.

I recently had an occasion to show off the prowess of the TRS-80 at a cross-country race at Tinker AFB, Oklahoma. After several false starts, we finally got our racers' times and numbers all matched up and started entering them into the computer. There were over 300 entrants in the race. I had written a simple search routine to get the racer's number and time. It became apparent very early in the game that those entrants with the highest numbers were causing considerable slowdown in the data input stage of the program. Because I didn't want to do a complete rewrite of the program at that point in time, we lived with the sequential search for the rest of the morning. This slowdown, caused by a poor search routine in the program, has caused all concerned some headaches.

After the race was over, I collected my thoughts and decided that, if I were invited to return next year, I would have to work on two or three areas in the program. I attacked the slow search routine first and came up with the general program shown in Listing 1 to deal with this problem.

This routine will take an ordered array and find a given value in a short time. Using the TIME\$ function of DOS BASIC as a check, I have consistently been able to find any number in a 1000-item integer array within two seconds, usually less. Without resorting to some machine language subroutine, I think this will fill most needs.

Program Analysis

Line 10 is used to set up all variables as integers and to establish a 1000-item array. By changing the value of "S" you can change the array size and all related values.

Line 20 will place an ordered set of positive integers from zero to 1000 into the array. As I stated earlier, this search routine depends on the array being in ascending order.

Line 30 asks for your input. You can put in any

number that you wish to search for. Numbers outside the range of zero to 1000 will give you a "NUMBER NOT FOUND" message. Non-integer values will be converted internally to integer before the search begins.

Line 40 is very important to the proper operation of the rest of the program because we are setting up the initial parameters for the search. Variables PH, PM and PL will be changed as the program runs, but PB and PT will remain constant as checks against going outside of the search range.

Variables PL and PB should both be set to the lowest array item that you wish to search through. PT should be set to equal the highest element in the array that you wish to examine and PH should be set equal to PT+1. Variable PM is the pointer which will move through the array and search for your elusive item. Initially PM is set to the mid-point between PL and PH.

The print statement at the end of line 40 is window dressing so that you can observe the changing values of the various pointers as the program runs. This is also the purpose of the print statement at the start of line 50.

In line 50, you perform a check to see if the array item you are searching for is also the one currently examined. If it is, you are told so and processing goes back to the input statement. You may exit the routine here without worry because this is not a FOR . . . NEXT loop. Instead, it is a simple reiterative loop.

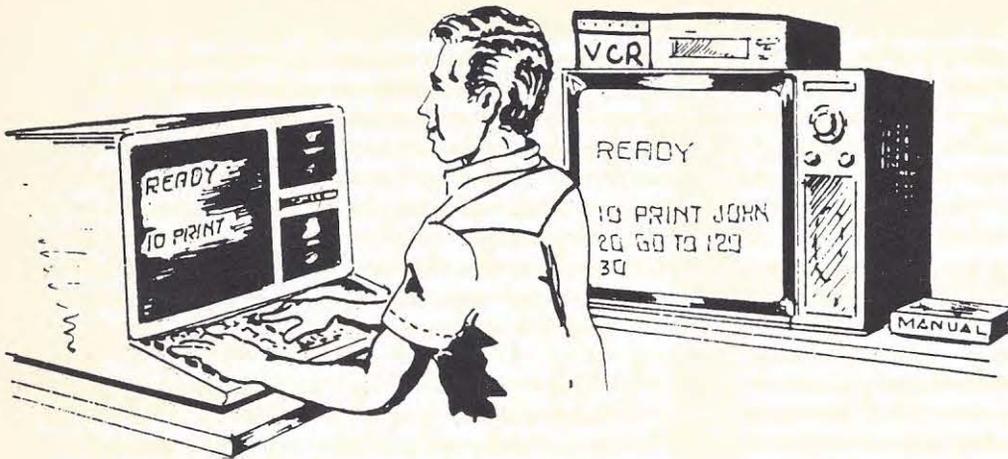
Line 60 checks the pointer to make sure that it does not exceed the bounds of the array being searched. If you are at either end of the array and haven't found the desired number, then it obviously is not in the array! If this is the case, the user is notified that the value can't be found and the current values for PL, PM and PH are displayed. You must then go to the input statement for another number.

Line 70 checks to see if the array item is greater than the search value. If this case is true, the upper limit searched for is brought down to the current location of the pointer and a new mid-point is determined. Processing then checks to see if the new value pointed at is the one we are searching to find.

Line 80 is similar to line 70 except that it checks to see if the array item is less than the searched-for value. If this is true, the lower limit is brought up to the location of the pointer and a new mid-point is found. As in line 70, processing goes back to line 50.

Line 90 is an error trap. You will never get to this line

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Quick find

unless something goes wrong. The line was included just in case you type as well (or as poorly) as I do.

The program takes about 425 bytes of memory. Quite a bit of that is window dressing. When you actually program it without the spaces, comments and extras, it will only occupy about 285 bytes of memory. This does not include the amount required to set up your true arrays and the rest of your program—just the actual search portion.

The program has two limitations—both have to do with the contents of the array. First, the array must be sorted in ascending order before the search begins. (I said that, didn't I? Must be important or I wouldn't repeat myself.) Second, there may not be duplicate items in the array. If there are two (or more) number 33s or two John Smiths in the array being searched, one of them will never be found. For finding things like contestant numbers, check numbers or any other items that are unique within an array, this routine does very well indeed.

Three of the pointers, PB, PT and PH deserve a little extra explanation. Keep in mind that all of the pointers are integer types. Your actual program should set them up as such. Because of the rounding manner of the TRS-80, it turns out that when you try to look at the top element, 1000 in our example program, you end up with PH=1000 and PL=999. In this situation, when you try to get a new PM, the formula works to $PL=(PH-PL)/2+PL$ or $(1000-999)/2+99$ or $(1)/2+999$. But $(1)/2$ is evaluated

as the item in an infinite loop. By setting PH to PT+1 (1001), you are allowed to examine that last item and PT is used to make sure you don't carry things too far.

As long as you start examining the array from item zero, no special considerations need to be given to variables PB and PL other than to set them both equal to zero. If, for some reason, you only want to examine (for example) items 150 to 1000, PL should be set to the lowest item to be examined (150) and PB should be set to PB-1 (149 in this example). For the general case, you could change line 40 to read:

```
40 PL=0: PT=S: PH=PT+1: PM=(PH-PL)/2+PL:
PB=PL-1: IF PB<0 THEN PB=0
```

Let us take a quick look at one search method to find duplicated items in an ordered list. In other words, let's figure a way to handle the John Smith syndrome of arrays.

In a list of names or ages, you could expect to find several duplicates. In an ordered array, items of equal value will be grouped together without breaks. The search routine we have been looking at will lead us to an equal element in the array, but it will stop searching at the first encountered equality. If there are three or four John Smiths listed, you won't know whether you are looking at the first, second, third or fourth occurrence of that name! What can be done about this? What about starting a sequential search and doing it both ways? Before starting to play with your program, be sure that you save what you have on tape or disk.

Let's make some changes and explain them. First, change line 20 to read as follows:

```
20 FOR X=0 TO S-4 STEP4: A(X)=Y: A(X+1)=Y:
A(X+2)=Y: A(X+3)=Y:Y=Y+1: NEXTX: A(1000)=250
```

This line fills the array with groups of four like numbers and gives a loner up in A(1000). Next, change the variable "S" in line 30 to S/4. That will notify you of the new legal limits in the array. The last change is in line 50. Change the "THEN" statement to "THEN GOSUB 100: GOTO 30." Finally, delete line 100 and add the following line of code:

```
100 IF PM=0 THEN GOTO 130
110 PM=PM-1: IF A(PM)=N THEN GOTO 100
120 PM=PM+1: IF PM>PT THEN GOTO 160
130 PRINT "MATCH FOUND AT ITEM ";PM;" ";A
(PM);"="";N
140 PM=PM+1: IF PM>PT THEN GOTO 160
150 IF A(PM)=N THEN GOTO 130
160 PRINT "NO MORE MATCHES FOUND"
170 RETURN
```

See Listing 2 for the final form of this program.

Line 50 sends you to subroutine 100 when any match is found. Line 100 checks to see if you are at the bottom of the array and sends you to 130 to print the match. Lines 140 and 150 move the pointer up the array until a non-match is found. In the event that the pointer is not at zero, line 110 starts moving the pointer down through the array to the first non-match. Line 120 moves it back up to the last match found. Then line 130 prints it and 140 increments the pointer and checks to make sure we haven't gone out of bounds on the high end of the array.

You now have a search routine which will find the exact matches in an array. Let's make sure it will work all the time. (You have been checking it as we went

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along, haven't you?) First, let's make a couple of very small changes to the existing program. Change line 10 (of listing two) to:

```
10 DEFINT A-Z: DEFSNG A,N: S=1000: DIM A(S)
```

Return line 20 to its original format and change "S/4" in line 30 to "S."

The array and variable will now be single precision values. Remember, up until now you have been working with integers only. Now RUN the program. This time, for the input requested, try a number with a decimal fraction (101.7 will be used for trial purposes). Enter it now. Go ahead. Use the BREAK key, or just watch the pretty numbers fly by for the rest of your life.

What happened? Things were going so well. What happened was that you looked for a number that was within the range of the contents of the array (zero to 1000) but was between two contiguous values, 101 and 102, in the array. Neither PH nor PL reached the upper or lower limit of the array, so you end up in another perpetual loop. If you used 101.7 as your input, then you noticed that PL and PM locked in at 101 while PH remained at 102 during the loop. This situation can occur with any variable type except integers and places limits on your ability to search for string, single precision or double precision variables.

The cure for this problem is easier to discover than you might think. Actually, there are several methods of overcoming the limitation. I will examine one that will get you out of the loop with the least amount of overhead during runtime. It is obvious from the screen display that the pointers stopped moving at some point in the middle of the array where it depended on the value you entered. The sum of the two pointers PL and PH will remain constant at that time. You will take advantage of this fact to detect the looping condition. Only three changes to our program are needed at this point to make it work.

In line 40, insert "PC=0:" at the start of the line. In line 60, between IF and PM=<PB insert "((PL+PH)=PC) OR", and finally at the start of line 70 insert "PC=PL+PH:". Of course, you *do not* insert the quotation marks in these corrections, just the data between them. The program listing should now look like listing four.

It's time to run it again, so try it now. Use any legal single precision value that you want to as input. Listing four gives the general format for a search routine that will allow you to take advantage of both the speed of a binary search and the versatility of a sequential search.

Listing 1 — Quick Find

```
5 '
6 ' JERRY L. LATHAM
7 ' 1409 EVERGREEN CIRCLE
8 ' MIDWEST CITY, OK 73110
10 DEFINT A-Z: S=1000: DIM A(S)
20 FOR X=0 TO S: A(X)=X: NEXTX
30 PRINT: PRINT"ENTER NUMBER ( 0 -"S")
   TO SEARCH FOR ";: INPUT N: PRINT TIME
   $
```

```
40 PB=0: PL=0: PT=S: PH=S+1: PM=(PH-PL)
   /2+PL: PRINT"PL", "PM", "PH"
50 PRINTPL,PM,PH: IF A(PM)=N THEN PRINT
   TIME$: PRINT"FOUND IT";A(PM);"=";N:
   GOT030
60 IF PM=<PB ORPM>=PT THEN PRINT"ITEM N
   OT FOUND": PRINT"PL", "PM", "PH": PRINT
   PL,PM,PH:GOTO 30
70 IF A(PM)>N THEN PH=PM: PM=(PH-PL)/2+
   PL: GOTO 50
80 IF A(PM)<N THEN PL=PM: PM=(PH-PL)/2+
   PL: GOTO 50
90 PRINT"ERROR! PASSED =,>, AND < CHECK
   S!": END
100 END
```

Listing 2 — Quick Find

```
5 '
6 ' JERRY L. LATHAM
7 ' 1409 EVERGREEN CIRCLE
8 ' MIDWEST CITY, OK 73110
10 DEFINT A-Z: S=1000: DIM A(S)
20 Y=0: FOR X=0 TO S-4 STEP4: A(X)=Y: A
   (X+1)=Y: A(X+2)=Y: A(X+3)=Y: Y=Y+1: N
   EXT X: A(1000)=S/4
30 PRINT:PRINT"ENTER NUMBER ( 0 -"S/4")
   TO SEARCH FOR ";: INPUT N:PRINT TIME$
40 PB=0: PL=0: PT=S: PH=S+1: PM=(PH-PL)
   /2+PL: PRINT"PL", "PM", "PH"
50 PRINTPL,PM,PH: IF A(PM)=N THEN GOSUB
   110: PRINT TIME$:GOTO 30
60 IF PM=<PB OR PM>=PT THEN PRINT"ITEM
   NOT FOUND": PRINT"PL", "PM", "PH":PRINT
   PL,PM,PH: GOTO 30
70 IF A(PM)>N THEN PH=PM: PM=(PH-PL)/2+
   PL: GOTO 50
80 IF A(PM)<N THEN PH=PM: PM=(PH-PL)/2+
   PL: GOTO 50
90 PRINT"ERROR! PASSED =,>, AND < CHECK
   S!": END
100 IF PM=0 THEN GOTO 130
110 PM=PM-1: IF A(PM)=N THEN GOTO 100
120 PM=PM+1: IF PM>PT THEN GOTO 160
130 PRINT "MATCH FOUND AT ITEM ";PM;" 2
   ;A(PM);"=";N
140 PM=PM+1: IF PM>PT THEN GOTO 160
150 IF A(PM)=N THEN GOTO 130
160 PRINT"NO MORE MATCHES FOUND"
170 RETURN
```

Listing 3 — Quick Find

```
5 '
6 ' JERRY L. LATHAM
7 ' 1409 EVERGREEN CIRCLE
```

Quick find

```
8 ' MIDWEST CITY, OK 73110
10 DEFINT A-Z: DEFSNG A,N: S=1000: DIMA
(S)
20 FOR X=0 TO S: A(X)=X: NEXTX
30 PRINT: PRINT"ENTER NUMBER ( 0-"S") T
O SEARCH FOR ";: INPUTN: PRINT TIME$
40 PC=0: PB=0: PL=0: PT=S: PH=S+1: PM=(
PH-PL)/2+PL
50 PRINT PL,PM,PH: IF A(PM)=N THEN GOSU
B 110: PRINT TIME$: GOTO30
60 IF ((PL+PH)=PC) OR PM<PB OR PM>PT
THEN PRINT"ITEM NOT FOUND": PRINT"PL"
,"PM","PH": PRINT PL,PM,PH: GOTO 30
70 PC=PL+PH: IF A(PM)>N THEN PH=PM: PM=
(PH-PL)/2+PL: GOTO 50
80 IF A(PM)<N THEN PL=PM: PM=(PH-PL)/2+
PL: GOTO 50
90 PRINT"ERROR! PASSED =,>, AND < CHECK
S!!"END
100 END
110 IF PM=0 THEN GOTO 140
120 PM=PM-1: IF A(PM)=N THEN GOTO 110
130 PM=PM+1: IF PM>PT THEN GOTO 170
140 PRINT"MATCH FOUND AT ITEM ";PM;" "
;A(PM);"="";N
```

```
150 PM=PM+1: IF PM>PT THEN GOTO 170
160 IF A(PM)=N THEN GOTO 140
170 RETURN
```

Listing 4 — Quick Find

```
10 DEFINT A-Z: DEFSNG A,N: S=1000: DIMA(S): F
ORX=0TOS: A(X)=X: NEXTX
30 PRINT: INPUT"ENTER ITEM TO SEARCH FOR
";N: PC=0: PL=0: PT=S: PH=PT+1: PB=PL-1: IF
PB<0 THEN PB=0: PRINT TIME$
50 PM=(PH+PL)/2+PL: IFA(PM)<>N THEN 120
60 IFFPM=0 THEN 90 ELSE PM=PM-1: IFA(PM)=N THE
N 60
80 PM=PM+1: IFFPM>PT THEN 110
90 PRINTA (PM): PM=PM+1: IFFPM>PT THEN 110
100 IFA(PM)=N THEN 90
110 PRINT"LAST MATCH": PRINT TIME$: GOTO 30
120 IF ((PL+PH)=PC) OR (PM<PB) OR (PM>=
PT) THEN PRINT"ITEM NOT IN ARRAY": PRIN
T TIME$: GOTO 30
130 PC=PL+PH: IFA(PM)>N THEN PH=PM: GOTO 50
140 PL=PM: GOTO 50
150 END
```

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How To Enter Our Listings

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

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

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

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

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

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

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

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

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Reviews

DMP-2100 Printer

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I just sold my daisy wheel printer in favor of a new dot matrix printer. I do a lot of word processing so I really need a letter-quality printer so magazine editors don't go blind reading my submissions (*Thank you --Ed.*). I know you're thinking, "So, what are you doing selling your daisy wheel! A dot matrix printer surely isn't letter quality!" Normally, that is the case. Dot matrix printers, on the average, use a nine-wire print head which gives that famous "computer printout look" that is easy to spot by anyone with even fair eyesight. Well, this printer has a 24-wire print head and, in the proportional word processing mode, you would really have to look hard to tell

its output wasn't done by a good quality typewriter. As an extra benefit, it prints at over twice the speed of my daisy wheel (43 versus 100 characters per second), is quieter, and smoother! In the data processing mode, which is nice looking as well, it speeds along at 160 characters per second! I think it's the best of both worlds.

My new printer is the Radio Shack DMP-2100. It has a word processing mode (correspondence or proportional) which rivals daisy wheel printers. I'm not an easy person to please, but I am sold. It also has all the features you could want from a dot matrix printer such as dot-addressable graphics with a phenomenal 32,400 dots per square inch resolution! Other print modes are boldface, expanded, standard, ten, twelve or 16.7 characters per inch,

underlining, and more. All this without having to change daisy wheels.

The DMP-2100 can be used with any size paper or labels up to 15 inches wide. I was a little disappointed that it didn't come with continuous tractor capability. The tractor feed is \$170.00 extra. The front panel control switches are touch-sensitive and respond very well. Under the front lid are a set of dip switches that allow you to set which mode you want the printer to power-up in. The case is the old standard battleship gray. It would have been nice if the printer's case color could have been matched to my Model 12's off-white/cream color.

I must say I'm very satisfied. I think this state-of-the-art printer signals the demise of the daisy wheel printer. A bold statement I know, but if a dot matrix can be made to look this good, think about next year's model. You should go take a look at this printer and get someone to demonstrate all of its different capabilities to you. I think you will be impressed. The word processing proportional mode looks great to me, but you still may prefer a true daisy wheel. I compared a sheet of text from my daisy wheel to the new DMP-2100 in the proportional mode and I liked the DMP-2100 output better. It's much quieter than the daisy wheel but it still may be a little loud for a quiet office area. In most cases, it should fit in very nicely. There is an optional single-sheet feeder that costs \$995.00 for those who want to use their own letterhead. I, personally, let the DMP-2100 draw my own letterhead. For those times when I send out form letters, I'm seriously thinking about letting it sign my name also! I like to have my cake and eat it, too.

Pete Carr

DMP-2100 Printer



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Zorlof "the Magnificent" is one of the new generation of word processors with features which would have been unobtainable, or unacceptably expensive, as recently as two years ago. Its most arresting feature, in fact, may be its price — an unbelievable \$69.95. The nearest comparable program is Newsprint, at \$126 list. Zorlof is, beyond question, a "best buy."

The price, however, may be one of the things which have slowed its acceptance on the market — that and its unfortunate name, which is bound to remind people of the sleazier kinds of "adventure," those which mix elements from six or eight irreconcilable mythologies and traditions, with no interest at all in their specific contexts or meanings. (Zorlof will probably turn out to be somebody's mother's maiden name, now that I have said all this, and I will have made yet another deadly enemy!)

Release II came out in December, 1982, and since then there have been numerous updates until 2.19H, which is the one I am using.

No program on the market offers more major features. Some minor ones, like separately-defined odd and even page headers and footers, are otherwise not to be had without CP/M and 400-odd dollars. Perfect Writer, for instance, allows them.

The program is screen-oriented, with a "live screen" correctable either by insertion or by over-typing, at any time. Special characters and such things as italics and underlining are entered on a command line preceding the line you want to modify. It is a good idea, by the way, to put in these command lines last since the program cannot justify text across their boundaries.

Zorlof supports all available types of printers and will allow such unique tricks as proportional spacing on the Epson (the result is not very attractive, but it is an interesting thing to be able to do), super- and sub-scripts, and special character-sets and diacritical marks (even user-defined ones, for those willing to take that much trouble).

What the user sees on loading Zorlof is a blank screen with two status lines. The topmost of these tells the name of the file in memory, its width in characters (these two can be altered at will), the word- and line-count, and the free space available. At power-up, working on the Lobo Max-80, I get 25,708 bytes for this last figure, and I suppose Models I and III will not vary much from this.

The second status line is for search and replace operations, to enter the

combination of characters to search (SH) and its replacement (RP). The user can perform these functions one at a time, or let the program do them automatically.

The manual tells you the command to get you into the status lines is Clear == (that is, clear-shift-hyphen, all three keys held down together). I have found it unnecessary to use the shift key. The same is true for the block delete command, Clear-*

Now, you may simply start typing, and learn how to format the text for printout later (the manual is elaborately cross-referenced and abundantly clear) or, if you have a file saved, call up the directory (Clear-D), load the file from it (Clear-G), and continue from there.

Editing functions and printer commands occupy both sides of a 66-line cheat-sheet. It would be foolish to try to summarize them here, but I must stress their comprehensiveness (almost anything you might want to do, you can) and their ease, both in use (most are single-keystroke commands using Clear for a control key) and in memorizing (the letters chosen usually have a clear mnemonic relation to the desired result: K for Kill, I for Insert — that sort of thing).

Text larger than memory can be printed via chained files, and Release II also supports editing of BASIC and EDTASM files, form-letter processing and (a remarkable convenience) what it calls "Zap-processing," which allows you to call up any file in Hex-&ASCII format, patch it to suit, and return it to disk as patched.

The program's shortcomings are few. The most important to me is that you must fix the line character-count for the whole text in advance, and cannot modify small sections at will. This means that footnotes and embedded text formatted in condensed type will be significantly shorter in inches than the main text. I can get around this by chaining files, but it is an annoyance.

The Max-80 with LDOS 5.1.3 has a print-spooling feature, and certain highly desirable user-defined keyboard characteristics. In the interest of portability, I suppose, Zorlof supports no DOS calls at all (it even has its own keyboard driver) and if you are running LDOS, you must count that a shortcoming. Even LDOS does not allow access to the Max-80's upper 64K memory bank. The provisional release of CP/M lets you use it only as a virtual disk, although CP/M 3.0 will support bank-selection of 32K blocks when it comes out — so it would be unfair to blame Zorlof because it does not.

Documentation is superb, customer support admirable. I owe Anitek's president, Peter Ray, the notice of a

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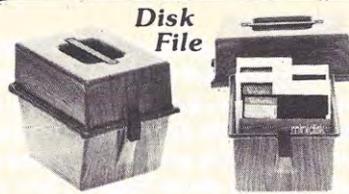
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catastrophic misprint in the current Epson manual — a misprint he mentioned in the course of a discussion of my difficulties obtaining superscripts with Zorlof. It seems Epson printed 5D for the command in question, when the correct hex numeral was 53. May this assist future strugglers!

I was able to make the program crash once, but I cannot tell you how it was done, or repeat the feat. Most of the possible mistakes will go to a thorough error-trapping routine and the potentially-catastrophic commands (to kill files, or delete memory, for instance) must be entered on a "tell me twice" basis.

I think Zorlof's most attractive feature is the way it allows multiple paths toward the same goal. There are, for example, four ways of underlining text. If one way doesn't work, or has undesirable side-effects, try another. I like that. But then, it is a likeable program.

R. W. Odlin

Zorloff Version 2.19J corrects the last little bug I had spotted and adds an exit to DOS command and interfacing with Electric Webster. A new release, called LeScript, will be out soon and will support 150-odd printers, add "10 or 12 major features" and cost about \$60 more. It will work on 80x24 videos and will be quite a buy.

Sooper Spooler

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\$444 basic unit plus serial I/O

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**\$603 basic unit with 2 serial ports
and 64K RAM**

The Compulink Corporation has released a Z-80 controlled, hardware printer/spooler for the microcomputer market. This device allows your computer to dump information out of memory into the SooperSpooler as fast as it can (up to 3,000 characters per second), without your computer having to wait for your printer to finish printing each line before the computer can send the next line of data to be printed. If you own a slow (below 55 characters per second) printer, this can mean a tremendous computer time savings of up to half an hour or more. It takes me only a few seconds to LLIST a 30K program to the SooperSpooler, and while the SooperSpooler is sending my listing to my Radio Shack Lineprinter II (which takes about 15 minutes to print it out), I can go back to programming, word processing, or even turning the computer off so I

don't have to worry about glitches!

The Compulink SooperSpooler (which I have sitting under my LP II) packs a lot of features into a small package. The physical dimensions are only 3 inches high, 10.3 inches wide and 8.6 inches deep. On the front panel are the on/off switch, the buffer reset switch, the pagination switch and the space compression switch (which, when pressed, compresses up to 256 consecutive spaces into only one byte). There is also the buffer status display. The buffer status display is a two-digit display that tells you how many kilobytes of buffer RAM are currently occupied by your text.

The pagination switch serves four purposes. Pressing it while turning the unit on selects the single-sheet feed option where the unit stops the printer after every page and waits for you to signal for the next page. Pressing it after the unit is on will enable automatic pagination and ensure that the page perforations are skipped. Pressing it while the printer is running will cause it to halt the printing until you indicate it should resume. This lets you change paper, ribbon, or whatever. Pressing it simultaneously with the space compression switch begins the SooperSpooler selftest mode.

The selftest mode of the SooperSpooler checks the 2K ROM of the Sooperspooler for defects, then checks the RAM eight times. As it is checking the RAM, the buffer status display counts from 11 to 88 in steps of eleven, as a visual indication of the RAM test progress.

On the back of the unit are the connectors for hooking up the unit to your computer and printer, the primary configuration switches and the "hard" reset switch (which resets all parameters of the unit to the default setting of a normal powerup). The primary configuration switches tell the unit what type of handshaking you want if you have the serial port option, whether you want the unit's output sent to the serial port or the parallel port, whether or not to issue a form feed or a series of line feeds to advance the printer to a new page, whether your computer outputs a carriage return and a linefeed at the end of each line or just a carriage return, and whether your printer needs a carriage return and a linefeed to go to the next line or if it needs only a carriage return.

In addition to these hardware features, there are software-selectable features: space compression, pagination, page length (1 to 127 lines), printed lines per page (1 to 127 lines), printing a header (up to 70 characters long) at the top of every page, automatic page numbering, single sheet printing, line formatting (indenting that portion of each line that

is longer than one printed line, very helpful on listings), left margin set (position 1 to 127), right margin set (print position 10 to 127), serial or parallel printer output, carriage return and linefeed set, type of form feed used by your printer, "hard" reset (these last three are the same functions as the hardware switches), redefine the default form feed character expected by the unit from your computer, redefine the default form feed character sent to your printer by the SooperSpooler, redefine the default escape character, and trigger the selftest mode of the SooperSpooler.

The parallel ports are set to the Centronics standard, using 36-pin connectors. The only problem I had with mine was a faulty cable. I used Radio Shack's Expansion-Interface to Standard Printer cable (the same one used to connect your Model I or III to the Radio Shack Daisywheel II, or Lineprinter VII or VIII). Compulink told me they sell the same cable for \$30, which is cheaper than Radio Shack's. Compulink also sells the cables that connect the SooperSpooler to the Lineprinter II and IV, and any of the Radio Shack "standard" parallel printers.

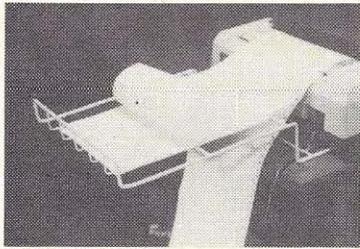
In addition to these standard features, you can also buy the SooperSpooler with RS-232 ports installed, one for input and one for output. When you add the RS-232 option, another set of configuration switches are added to the rear of the unit's cabinet. These switches control the baud rate (110, 150, 300, 600, 1200, 2400, 2800 and 9600, each port separately selectable), seven-bit or eight-bit word length, one or two stop bits, and even-, odd- or no-parity check. Through the software, you can establish handshaking, or you can use hardware handshaking with the handshaking switch.

The Compulink SooperSpooler is available in four configurations: 1) The basic unit, consisting of a 16K RAM buffer, printer controls and parallel port, which retails for \$349. 2) The basic unit plus a serial I/O port, which costs \$95 more. 3) The basic unit with 62K of RAM (there is a 2K ROM used for firmware controls of the unit), which costs \$159 more. 4) The basic unit with both serial ports and a full 64K of RAM, which retails for a total of \$603.

The Compulink SooperSpooler is very simple to set up and use. I just plugged mine into my expansion interface and to my printer, set the hardware CR/LF switch to on, and started using it.

I'm very pleased with its performance. If you decide to get one of these, I'd suggest that you get the unit with a full 62K RAM. I found out quickly that 16K is only enough for about half the printing I use it for. (Remember that a program 16K

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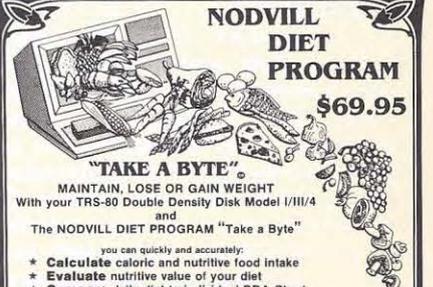
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in length in memory is stored using tokens. When LLISTing that 16K program, the tokens are expanded into full words, easily doubling the program's length.)

Terry Kepner

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Of course they weren't that impressed and neither were you. After they left, you probably proceeded to replace that intermediate excuse for a 68000 operating system with TRSDOS 2.0b, load Scripsit or Profile, then proceed to drop back into eight-bit land. In reality you had no more real power at your disposal than a three year old Model II. What I really wanted was a 68000 BASIC interpreter, but all I could do was wait and see. TRS-XENIX and the MBASIC interpreter have finally been released and I think it was worth the wait. There is a lot to XENIX and MBASIC and it would take a few weeks to really dig in and give a full blown report on both. So in order to get at least some of the good news out to you quickly, I'll keep this preliminary report focused on MBASIC.

Let's compare the new 68000 MBASIC interpreter to the standard Radio Shack eight-bit BASIC, but be prepared for some tradition-breaking and features you would never have expected from a Radio Shack computer two years ago; at least, I wouldn't have. For starters, MBASIC allows string variables to hold up to 32767 bytes as opposed to the old 255 byte maximum. Talk about having something to put MID\$ and INSTR to work on. To see just how powerful this really is, look at this MBASIC statement: `A$=LEFT$(THIS REVIEW$, (LEN(THIS REVIEW$)) : PRINT A$`

The answer would print this complete article you're reading, with enough room left over in A\$ to hold at least 20 more articles this size. Think about that for a second. In the old eight-bit Model II mode, with BASIC loaded along with a

small size program, you wouldn't even have room to fit one fully-loaded MBASIC string variable into memory. There is something that MBASIC doesn't have that we won't miss. It doesn't have the usual Microsoft string garbage collection problem. Good riddance.

Want readable programs that make sense? MBASIC allows you to use up to 40 characters for your variable names, all significant, instead of the old interpreter maximum of two. You're no longer restricted to variable names like RE#. You can now have STORE.NUMBER.ONE# and STORE.NUMBER.TWO# as separate and distinct variable names. Notice that a period can be used as a separator for readability. An underscore is also allowed. Instead of numeric variables defaulting to single precision, MBASIC numeric variables default to double precision. And MBASIC has real decimal math precision (six places for single precision, 14 for double) without the old rounding problems. It uses true BCD (Binary Coded Decimal) math.

MBASIC allows 17 open disk files at one time using buffer numbers from 1 to 255 as opposed to the previous 15-file buffer maximum. With the Z80 BASIC you were allowed to open files using blocked record lengths from one to 255. With MBASIC your records can now be blocked anywhere from one byte to 32767 bytes in length. Imagine reading into memory 32767 bytes of information using just one GET statement like "OPEN"D",95,"DATA",32767 : GET 95,1. The MBASIC manual states that you are still only allowed to access random file records with numbers up to 32767 (GET 1,32767) like Model II BASIC, but the manual might be in error. I've had reported to me a record number access of 200,000 with the limit probably being around 224K. You would have to have a bank of hard disks to store all the information this system is capable of working with, and a lot of memory cards to hold it once you read it into the computer.

The MBASIC COMMON statement used along with CHAIN allows you to pass variables from one program to another. CHAIN also permits overlaying program modules by merging new segments and deleting a range of lines from the current program module. I have used a similar feature in other systems and am delighted that it's in MBASIC. CALL replaces DEFUSR and USR for accessing machine language routines.

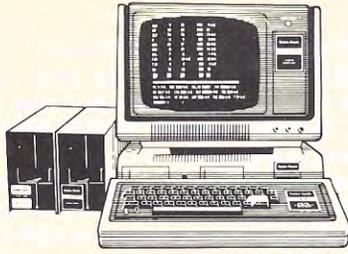
RESTORE now allows you to restore your DATA starting at the line number of your choice. PEEK and POKE are now available without having to make patches. I never understood why PEEK

and POKE were left out of Tandy's top-of-the-line computers when even the Color Computer had them. And look at this. We now have true WHILE WEND do-until loop control.

The SYSTEM command no longer permits SYSTEM "DOS Command" like TRSDOS. It just returns you to XENIX. But you're not missing anything. The new SHELL command allows you to execute a DOS command and return back to MBASIC after the command has finished. But it gets better. Another SHELL option allows you to immediately return back to BASIC to continue your program while the DOS command is being executed, making the DOS command a true background task.

Among some other nice features, a backslash allows you to split one line into several physical lines for a nicer-to-read listing. INPUT\$ has a new option which allows you to get characters from a sequential file, which could be nice for predefined data entry on the order of a DO or JCL file from within your BASIC program. LIST now allows you to list part of your program to a file like LIST 500-800, "FILENAME". Devices can now be opened and written as files like LDOS and DOSPLUS allow. OPEN"O", "SCRN:" would route data to the video screen. Of course MBASIC has all the features of the regular Z80 Model II/12/16 BASIC, except MBASIC is generally on the order of a magnitude more powerful and flexible because of the 68000 CPU's enormous memory-addressing range. One feature I wish MBASIC had was the ability to CALL BASIC program subroutines by name, with the local variable feature. (CALL"SUM";A,B,C) I really got spoiled with this feature from using the RSBASIC compiler. MBASIC is so powerful that it's hard to complain, but I was disappointed that this useful feature was left out.

I'm excited about MBASIC. It does have big guns, but be prepared to spend almost as much as our defense budget if you want to get all the equipment necessary that will allow XENIX and MBASIC to operate in the most efficient manner. The Radio Shack computer catalog states that XENIX-MBASIC can be used with only 256K of RAM, but more RAM will give you better performance. In actual use, I found the MBASIC-256K combination gave me frequent system delays that were annoying. From information I gathered, the delay problems can be relieved by adding more RAM. For best performance at least 512K was recommended to me. I personally haven't tried MBASIC with 512K or 756K RAM but I've been told to expect a dramatic speed increase from what I experienced with a 256K system. The



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Reviews

more RAM the better.

Radio Shack is said to be planning to release a single-user floppy disk version of XENIX and MBASIC. We'll have to wait and see how well it works. I hope the floppy version can be made to work efficiently because I don't really want to buy a fixed hard disk until a more flexible technology becomes available. The current Radio Shack 12 Megabyte hard drive system works just great but I'm waiting for someone to release a Model 16/12 compatible, removable cartridge disk system before I join the hard disk user fold. The removable cartridge makes so much more sense to me. It allows easy backups, different DOS and program options, and as much storage as you have cartridges to slip in the drive. Want to run a program that will run under TRSDOS 4.2 only? Just insert the 4.2 cartridge. Want XENIX and MBASIC for another application? Just insert the XENIX cartridge. It's too useful of an idea not to become popular. I can only imagine what people like Bob Snapp, of Snappware, Inc., will come up with as extensions to MBASIC. I'll sure be watching, because I know it will be good. There is a whole new world of possibilities here.

My thanks to Bob Snapp, Ray Pelzer and the Daytona Beach Radio Shack Computer Center for making available information and the system that was helpful to me in this review.

Pete Carr

**Number Cruncher
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Number Cruncher is a set of 17 multi-function menu-driven statistical analysis program operating from a single data set. It is an enormous package, requiring a minimum of two disk drives for operation. The programs, written in BASIC, fill nearly an entire disk. We tested the package on a 48K Model III.

The Number Cruncher package offers impressive value, probably the best on the market today. It includes forecasting and time series analysis (single exponential smoothing, least squares, linear trend, multiplicative trend and seasonal smoothing, and additive trend and seasonal smoothing); various univariate statistics; simple correlation analysis; multiple regression; step-wise regression; one, two, three, or four-way analysis; t-tests; eight nonparametric statistics (including sign test, Wald-Wolfowitz runs test for sequence randomness, and Friednam's block/

treatment test); cross tabulation and contingency table analysis; and a statistical function probability calculator.

In general, documentation is straightforward and complete, and the menus and prompts within the programs make reference to the documentation almost unnecessary. The one exception we found in the version we tested was in the cross-tabulation program. The documentation for generating a two-way table from raw data did not indicate that all figures are rounded to the nearest integer and that integer values must be positive. Many data sets must, therefore, be recoded, collapsing ranges of data into integer categories. A zero category is unusable for the zero is reserved for use in totalling the data.

Hintze makes extraordinarily efficient use of disk drives and computer memory. Data are recorded on the data disk after inputting is complete for each observation. As a result, a 48K Model III using the multiple or step-wise regression programs can handle an impressive 29 independent variables per observation. The number of observations is limited only by disk storage capability. Processing time is relatively short. Runs of eight variables and 67 observations are completed in a little over five minutes.

In comparison, Dynacomp, Inc.'s memory-hungry multiple-regression program takes approximately as much time to run five variables on 40 observations. The Dynacomp package cannot provide error estimates for as few as four independent variables and 50 observations. In fairness to Dynacomp, it should be added that its multiple-regression package contains nonlinear features lacking in Number Cruncher.

Radio Shack's Advanced Statistical Package (ASP) includes a multiple-regression program that handles more than 200 observations but only five independent variables. However, Radio Shack's package runs faster.

Each program contains every statistic that one normally requires. For example, the multiple-regression program presents regression coefficients, last sum of squares, F-test, R-squared, and anova. ASP produces roughly the same statistics, but Dynacomp's multilinear regression program is not nearly as complete.

All Number Cruncher programs analyze data from the same single data set. Those who have used ASP or Dynacomp will particularly appreciate this feature. For example, ASP requires new data entry from the keyboard for four categories of programs. Furthermore, data editing is easier and more convenient with Number Cruncher

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(as it is in Dynacomp's various programs). Mistakes can be corrected or new data added simply by entering the editing mode and specifying the row and column where changes are to be made.

In the ASP data files, correction of one item for an observation requires that all data in the observation be reentered. And, in some data input formats, all the data must be reentered in order to correct an error. Each Number Cruncher data file is identified by up to a six-character name, and a convenient 64-character label may be appended.

Number Cruncher permits a variety of extremely useful data file manipulations including: the merger of selected columns from two files; data columns may be added to, subtracted from, multiplied by, or divided by a constant; addition, division, subtraction, or multiplication of two columns; trigonometric and logarithmic transformations; and recoding through the use of up to ten IF... THEN statements per transformation run. None of these features are available in the ASP, and they are a separate purchase from Dynacomp.

Most Number Cruncher data displays include printer output options as part of the program, but for some, one is obliged to use the CMD "Z" function. For the scattergram which is part of the main data set program this does not work (the X and Y axes are printed along a single line), but this particular scattergram is present only for quick visual checks of a data set. A separate scattergram program does output to the printer very conveniently.

Number Cruncher costs far more than Radio Shack's ASP, but it offers much greater flexibility and power by virtually any standard. ASP's only advantage is that it comes in cassette form (which can be transferred to disk) for those lacking disk drives. Separate Dynacomp packages (also available on cassette) which might approach, but not equal, Number Cruncher are of comparable cost if a similar set of packages is purchased.

Versions of Number Cruncher are also available for the IBM Personal Computer (\$395), in CP/M 2.2 (\$395), and for the Commodore 64 and VIC-20 (\$50 on cassette). The Commodore packages do not contain all the features described above.

Carl Grafton and Anne Permaloff,
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Personalized Software Gift

Chartscan Data, Inc. has released a series of software packages called "bitCards." Designed as text-and-graphic adventures whose themes relate to a specific holiday or event, the unique feature of the bitCard is that it can be ordered custom-programmed with several personal references. The first bitCard, "A Christmas Adventure," will be available in early October for Christmas gift-giving. It will be programmed to deliver a personal holiday greeting to the recipient in whatever words the sender wishes. \$16.95, all versions. Available for TRS-80 Models I/III and Color Computer. Orders and information: bitCards, 120 South University Drive, Suite F, Plantation, FL 33317, (305) 473-4741.

Model 100 Bar Code Reader

Bi-Tech Enterprises, Inc. has announced the availability of bar code readers for the TRS-80 Model 100 and the Epson HX-20 portable computers. The bar code reader allows users to read industry standard "3 of 9" code and store the results in their computer's memory, features a push-to-read switch and a scanner rate of up to 76 cm/sec. It will read lines as small as 0.3 mm. The unit is totally self-contained and requires no additional hardware or software to operate.

Refer to advertiser index for reader service number

Each unit comes complete with software and reader. It is available at \$279.95 by contacting Thomas Vande-Stouwe, (516) 567-8155.

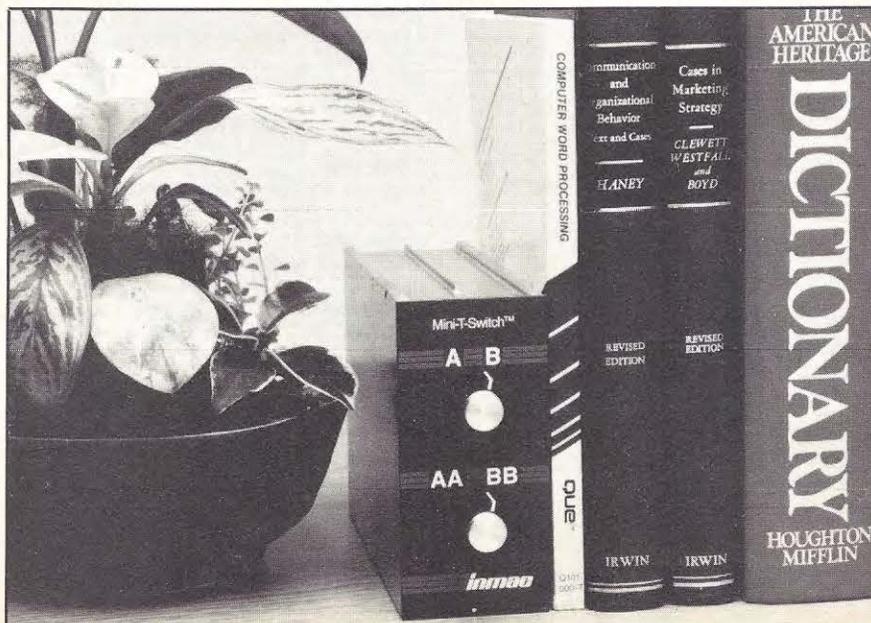
Computer Periodical for Physicians

A new medical newsletter, *Physician Computer Monthly*, provides information to the growing number of doctors who use micro- and minicomputers in their practices. This 12-page, independent periodical covers computer appli-

cations for practice management, patient care, continuing medical education, and communications. Written in non-technical language, *Physician Computer Monthly* emphasizes practical uses of computers by physicians.

One-year subscription is \$95. A sample issue will be provided free to physicians upon receipt of letterhead request; non-physician samples \$2 each. Write *Physician Computer Monthly*, 67 Peachtree Park Dr., Atlanta, GA 30309.

Mini-T-Switch



For immediate release

Algorithms Chart

The "Basic Algorithms" Micro Chart® from Micro Logic is two-sided, 8½x11-inches, made of credit-card-type plastic, and has useful algorithms written in BASIC, including four ways to sort. Each algorithm is accompanied by its function, advantages, speed, and

method. The program "cores" are designed for easy translation to other languages, including assembly language. A 3x5 dot matrix character set is also included in both visual and encoded form. The cards are \$5.95 each plus \$1 postage from Micro Logic Corp., P.O. Box 174, 100 Second St., Hackensack, NJ 07602, (201) 342-

6518.

Algorithms chart



WordStar for TRS-80 and MAX-80

Logical Systems, Inc. has released WordStar on Smal-LDOS for the TRS-80 computers, without CP/M or hardware modifications. All WordStar features (except background printing) are available. In addition, MicroPro's MailMerge can be added to produce a text-processing system. Document size is limited only by available disk space, text formatting and justification are shown on the screen, and there are adjustable levels of on-screen help.

WordStar is for the following computers: Radio Shack TRS-80 Models I/III/4 (in the Model III mode); Lobo Systems MAX-80 (MAX-80 LDOS required). At least two double-density disk drives are required. WordStar introductory price is \$249 plus \$5 s/h. MailMerge introductory price is \$149 plus \$4 s/h. Introductory prices will be in effect until December 31, 1983. For

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Cost is \$4 for each back issue ordered. Use the reply card, or you may write/phone Basic Computing, 3838 South Warner St., Tacoma, WA 98409-4698, (206) 475-2219.

additional information, catalog, or ordering, contact Logical Systems, Inc., 8970 N. 55th St., P.O. Box 23956, Milwaukee, WI 53223, (414) 355-5454.

CP/M for Model 4

Montezuma Micro announced implementation of Digital Research's CP/M 2.2 operating system for the Model 4 computer. Included is an "Interchange" utility that is said to read, write or copy over 20 popular diskette formats including IBM, Kaypro, Osborne, and Xerox. The system functions completely in either a 64K or 128K Model 4. Configuration for 35-, 40-, 77- and 80-track single- or double-sided drives, and a format utility that will build over 52 different diskette formats is built-in. The operating system comes complete with all utilities and 300-page user manual for \$199.95. Montezuma Micro, Redbird Airport Hangar #8, Dallas, Texas 75232, (800) 527-0347, or in Texas (800) 442-1310.

64-column Model I/III Emulator for Color Computer

Spectrum Projects introduces a 64-column Model I/III emulator program which allows the Model I/III SET, RESET, POINT, PRINT@, CHR\$ and CLS commands to work the same on a Color Computer as on a Model I/III. The program does not add the DEFDBL, DEFSNG, DEFINT, or fix the other differences in the languages. This routine merely allows a person to type or load a Model I/III BASIC program on the Color and not have to change the graphics statements. The emulator requires 64K and costs \$19.95 (tape or disk) plus \$3 shipping. From Spectrum Projects, 93-15 86th Drive, Woodhaven, NY 11421, (212) 441-2807.

Model 100 Color Graphics

High-resolution color graphics for charts, games, etc., full-sized color text can be displayed on any size color monitor or color TV with modulator. Four modes of operation are: Text (24 lines, 40 characters per line, 6x8 matrix, 256 user-definable characters), Multicolor (64x48 color graphics), Graphics 1 (256x192 color graphics, 24 lines, 32 characters, 8x8

matrix, 2 colors per character), and Graphics 2 (same as Graphics 1 except 15 colors plus transparent per character). Sprites are active in all but text mode, 32 prioritized 3-D planes. Comes with sample programs and instructions. No hardware modifications are necessary (plugs into expansion socket) and on-board RAM uses no system memory space. Manual only \$5, \$235 assembled and tested, or \$195 for kit with instructions. Andreasen's Electronics Research and Development, Inc., 1548 Monterey St., San Luis Obispo, CA 93401, (805) 541-6398.

LISP for Models I/III/4

This machine language system was designed to satisfy the needs of virtually any user, so it has features such as pixel graphics and floating point routines in addition to a full range of LISP functions. The manual contains an introduction to the fundamentals of LISP, in addition to sections detailing the use of the interpreter, the structurally-oriented editor, the differentiator and algebraic simplifier, and the poker player which comes with the system. Diskette and manual sell for \$79.95 from Artificial Intelligence Technologies, 2121 NE 152nd, Redmond, WA 98052, (206) 644-3068.

Mini-T-Switches™

A new Mini-T-Switch™ enables computer users to reduce the number of modems and printers required. This module consists of two T-switches in one. Each switch could enable two peripherals to share a common third component or a CPU I/O port. The Mini-T-Switch can function either as a desktop unit or in a 19-inch rack. No tools are required. Each module has an interlock for quick installation. The Inmac T-Switch™ is PC board-constructed instead of hardwired. Its rotary switch is rated at a 10,000-operation life expectancy. The device is available for a risk-free, 45-day trial period in versions compatible with either coaxial or EIA RS-232 connectors and is guaranteed for one year. Inmac, Department 127, 2465 Augustine Drive, Santa Clara, CA 95051, (800) 547-5444, or (800) 547-5447 for California residents.

For immediate release

Beginners Programming Book

Howard W. Sams & Co., Inc. offers computerists of all ages an introduction to working with and programming TRS-80 computers. *TRS-80® for Kids from 8 to 80*, Volume 1, by Michael P. Zabinski, is available for \$9.95 at participating Sams dealers and bookstores nationwide. This is a self-paced guide for beginners, offering exposure to programming concepts, commands, logic, disk storage, printing and more. It's easy to use with a generous number of illustrations. This book is suited for either individual or classroom use.

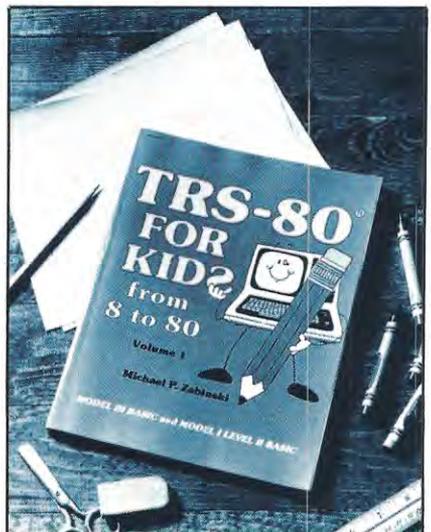
Model 100 color graphics



Bar code reader



Beginner's programming book



For immediate release

For further information, contact Howard W. Sams & Co., Inc. 4300 West 62nd St., Indianapolis, IN 46268, (317) 298-5400.

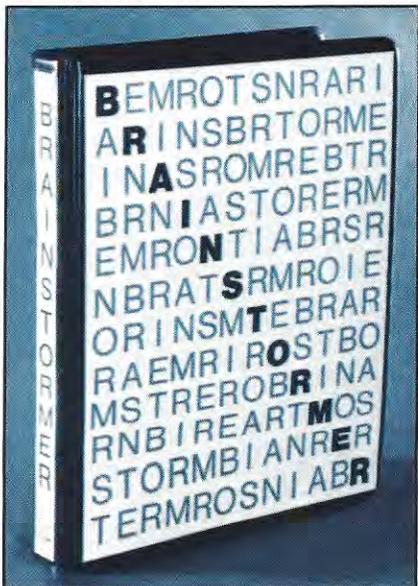
Video Library Organizer

Readers who want to organize their video libraries can do so quickly and easily with Prosoft's new "Video Tape Tracker." The program can store and manage over 1,000 titles, and print quick-reference lists by tape number and/or movie title. It can search through the list by tape, title or performer, and print numbered, titled labels. Tape Tracker is available at the introductory price of \$29.95. It runs on any TRS-80 Model I/III with two disks and 48K. Order from Prosoft, Box 560, North Holly-

VisiCalc tutorial software



Problem solver software



wood, CA 91603, (213) 764-3131.

Business Graphics

Sweet-Plot 80, a business graphics software package to be used with the Sweet-P Personal Plotter from Enter Computer, Inc., provides turnkey capabilities to users of CP/M-based single- and multi-user micro-computers. Together, the two products yield high-quality hardcopy graphics generated from spreadsheet (numbers only) programs and DIF files. Multi-colored graphics can be plotted on any type of paper or overhead transparency (from 8½x11 inches up to 10 feet long) with characters ranging in size from one-eighth inch to 20 inches in height. Sweet-P's high-resolution plotting provides 250 line segments per inch, drawn at the speed of 6 inches per second. The software package can be used with any CP/M operating system computer containing at least 64K. Sweet-Plot 80 retails for \$350. The Sweet-P Personal Plotter retails for \$795. Enter Computer, Inc., 6867 Nancy Ridge Dr., San Diego, CA 92121, (619) 450-0601.

Lazy Writer for Model 4

AlphaBit Communications, Inc. has a new version of their Lazy Writer word processing system. The Model 4 version makes use of the better screen display on the Model 4 by displaying text in 80x24 characters. Text created with this version is fully compatible with text created on the 64x16 character version used on the Models I/III. The Model 4 version is two sets of programs for use on any Model III DOS and for TRSDOS 6. Current Lazy Writer users can purchase the Model 4 programs for \$39.95. The price to new buyers is \$175. AlphaBit also produces a special version of Lazy Writer for the Lobo MAX-80, which also has the 80x24 character display and works with the LDOS operating system. This version is \$175 to new buyers or \$39.95 as an upgrade to current users. AlphaBit Communications, Inc., 13349 Michigan Ave., Dearborn, MI 48126, or from dealers.

VisiCalc Tutorial Software

Little, Brown and Co., have entered the software field with the

publication of *VisiCalc® Programming: No Experience Necessary* by Shaffer and Shaffer Applied Research and Development, Inc. The self-instructional disk-and-guide should allow new users to master the VisiCalc electronic spreadsheet quickly. A series of exercises provide hands-on experience from basics through advanced functions. Suggested price is \$59.95 and versions are available for the IBM PC; Apple II/II+/IIe; Atari 800, Atari XL/XLD series, and TRS-80 Model III. Available at computer retail outlets or Little, Brown and Company, Order Dept., 200 West Street, Waltham, MA 02154, (800) 343-9204, or (617) 890-0250 in Massachusetts.

Free FORTH Reference Card

The "FORTH Handy Reference Card" is available free from the FORTH Interest Group (FIG). Functioning as a pocket programming aid, the card lists and describes the major commands of the FORTH computer language. For further information and a free reference card, call the FIG Hot Line at (415) 962-8653, or write the FORTH Interest Group, P.O. Box 1105, San Carlos, CA 94070.

Problem Solver Software

Brainstormer is a software tool for generating potential solutions to complex problems. It works by building a description of a problem in terms of the themes and variations which affect its solution. Brainstormer is available for TRS-80 Models I/III/4, and for CP/M 80-column monitor machines including Apple II, Osborne I, and Kay-Pro II. All systems require MBASIC, two drives (5¼ SS or SD only) and 48K. This package, with user's guide and example files, sells for \$50 if used on a single machine. Available from Soft Path Systems, c/o Cheshire House, 105 N. Adams, Eugene, Oregon 97402, (503) 342-3439.

Edit-protect Model I

Glenn/Cliff Associates offers a machine language program which makes listings impossible to read by masking them. Editing of masked lines produces "trash" (when "run"). It takes approximately one

second to mask or unmask programs. Performance is not affected and there is no increase in program length. Masque 1 (X=USR1(0)) masks programs temporarily. Masque 2 (X=USR2(0)) unmasks programs masked with USR1. Masque 3 (X=USR3(0)) calls upon the permanent "Masque." Requires Model I, 48K and disk drive. Shipped on formatted diskette and operates with all popular DOS systems. Masque 1 (USR1 and USR2) \$24.95, Masque 2 (USR3) \$29.95, Masque 3 (USR1, USR2 and USR3) \$39.95. Contact Glenn/Cliff Associates, 8301 East Montebello, Scottsdale, Arizona 85253, (602) 941-0609.

Custom Testing Package

TestRite is a curriculum management software package which stores test items and generates customized tests. It is suitable for all levels from middle elementary through university and technical schools. It maintains curricula-referenced test item files. Every test question may be printed in any of four formats: multiple choice, true/false, matching or completion. Numbering options, customized titles and user-edited test taking instructions give the program flexibility. Priced at \$139, TestRite may be used on Apple II+ or IIe with 48K RAM, 1 disk (min.) and printer, or TRS-80 Model III or 4 with 2 disk drives and printer required. Class 1 Systems, 17909 Maple St., Lansing, IL 60438, (312) 474-4664.

Pocket Computer PC-3

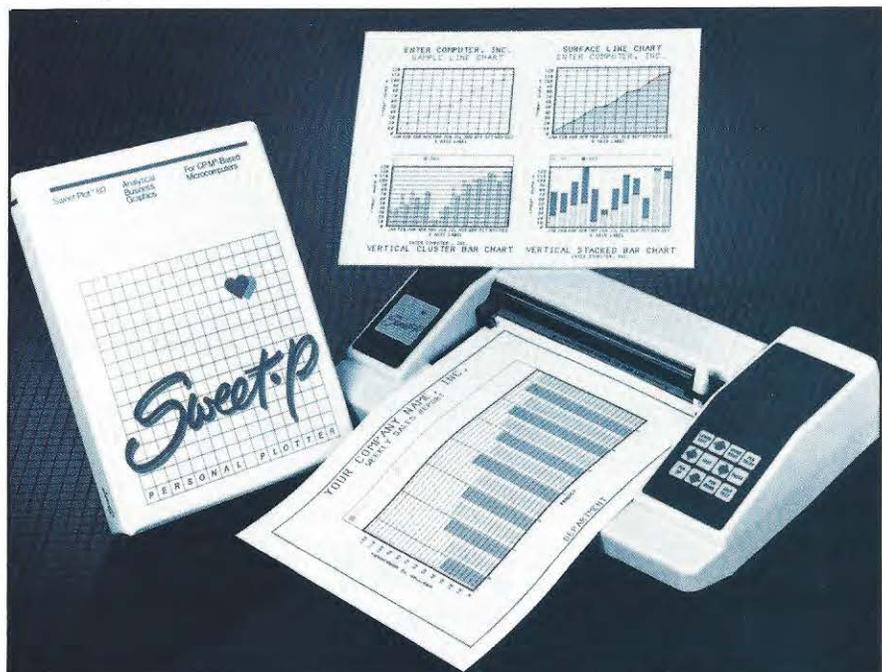
The PC-3 is small enough to fit into a shirt pocket. It can be programmed to solve problems in BASIC, provides 16 arithmetic and 8 string functions, features a 24-character liquid crystal display with accuracy up to 10 digits, and 1.4K memory. It can be used as a direct-key entry calculator. The PC-3 is compatible with Radio Shack's existing library of software for the PC-1. The PC-3 (26-3590) is available for \$99.95 at Radio Shack computer centers, stores and dealers, and comes complete with batteries and manual. The PC-3 Printer/Cassette Interface (26-3591), is available for \$119.95.



Lisp for Models I/III/4



Business graphics



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MODEL III DISK SYSTEMS

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5 games and educational software programs for sale. Asking \$15 each program. Send for free list. For use on TRS-80 Models I/III/4. Includes documentation. Contact Steve Rapp, Jr., 150 Dogwood Lane, Bloomfield, Indiana 47424-0311, (812) 384-8735.

Line Printer VI for only \$400. Fast, 15" with tractor and friction, multiple fonts, graphics. Cover, new ribbon. S. Lenkowsky, 284 Highland, S. Norwalk, CT 06854, or (203) 838-1155 after 7 p.m. EST. Will ship.

For sale: MT-32 Microtek Expansion 32K \$80. Set of 32K chips \$25. Software —mostly games and at least 1/3 off. Send SASE for list. Tom Wright, 602 Lee Ct. Waukesha, WI 53186.

Dearborn (MI) TRS-80 Users Group meets 1st Saturday of each month at Bryant Library in Dearborn, MI. For further details, contact the president: Paul Sockow, (313) 459-9787 (voice), (313) 459-8375 (modem), or vice president: Dale Fox (313) 261-5757 (voice), (313) 261-0885 (modem).

LOCO-COCO— new users group for the COCO, in Louisville, KY. For more information, call (502) 458-6690 or (502) 458-0649.

Would like to correspond with other Stringy-Floppy users: exchange ideas and programs. Also, I have for sale several Stringy-Floppy utilities and a (rather fancy) mailing list program (very reasonable prices). Send SASE for more information. Wayne King, Box 579, New York, NY 10040, (212) 695-6802 or 567-3395.

Mint condition Model II with 1 drive, DWP-410 printer, Scripsit, accounting system package plus extras for \$6800. G. Gandara, 2142 Evangelina St., West Covina, CA (213) 912-0631.

Model I Breadboard Interface. Includes power supply, cable and applications/tutorial book (TRS-80 Interfacing Book I by Jonathan Titus, Book II is available). The interface was designed to supplement the book. It's an excellent trainer and practical interface. \$125, John Spitale, 1144 Keats Dr., N. Canton, Ohio 44721, (216) 494-3754.

Refer to advertiser index for reader service number

Club address update: Southern Maine TRS-80 Users Group, 82 Wellington Rd., Portland, ME 04103.

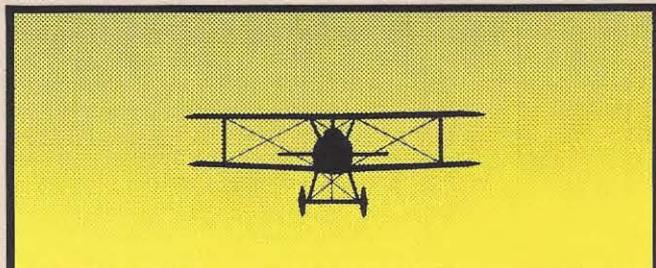
Ventura County Color Computer Club (VC4) meets the third Wednesday of each month at the Oxnard Community Center on Habson Way in Oxnard, CA. Set-up time is 6:30 p.m. and the meeting starts at 7:00 p.m. Anyone interested can join us or, for more information, call Carol Simpson at (805) 499-3055.

Need Smart80(E) terminal program for use on TRS-80 with ESF. Am using cassette version, but have upgraded to ESF and need that version. The program supports the buss decoding Microconnection modem. If you can help, write Fred Krautwurst, 4321 Delmar Dr., Montgomery, AL 36109.

Fifth Annual Northeast Computer Show and Software Exposition Thursday-Saturday, November 17-19, 1983, at Boston's Hynes Auditorium. Show hours: 10:30 a.m. to 5:30 p.m. daily. For more information, call or write Northeast Expositions, 822 Boylston St., Chestnut Hill, MA 02167, (617) 739-2000 (Massachusetts).

Brazilian Color Computer Club seeking anyone interested in exchange programs and/or experiences and information. Will answer 100%. TRS-80 Color Club, P.O. Box 2951, Rio de Janeiro, RJ, Brazil, CEP: 20000.

For sale: Radio Shack Printer Interface cable (cat. no. 26-1411) for Model I. Runs printer without expansion interface. Used with Epson printer for one year. \$20 or best offer. Matthew Schlawin, 722 East Frances St., Appleton, Wisconsin 54911, (414) 731-5951.



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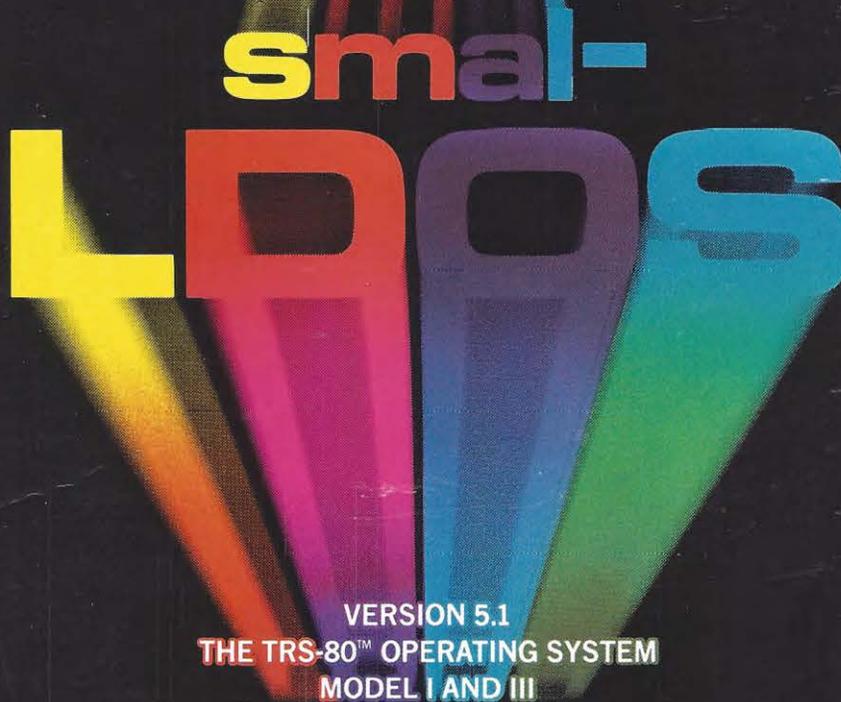


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