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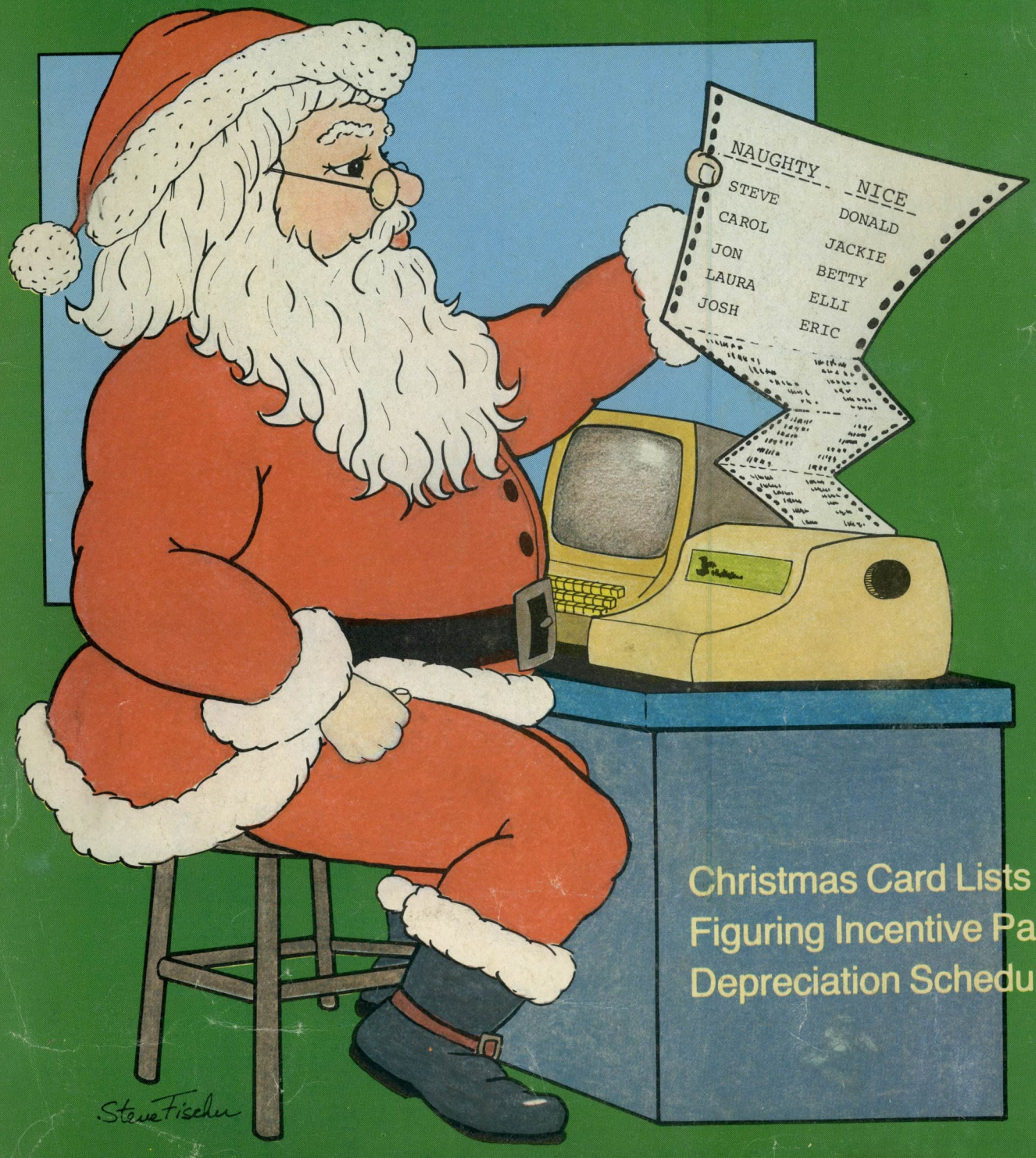
Personal Computing

For Your Home and Business



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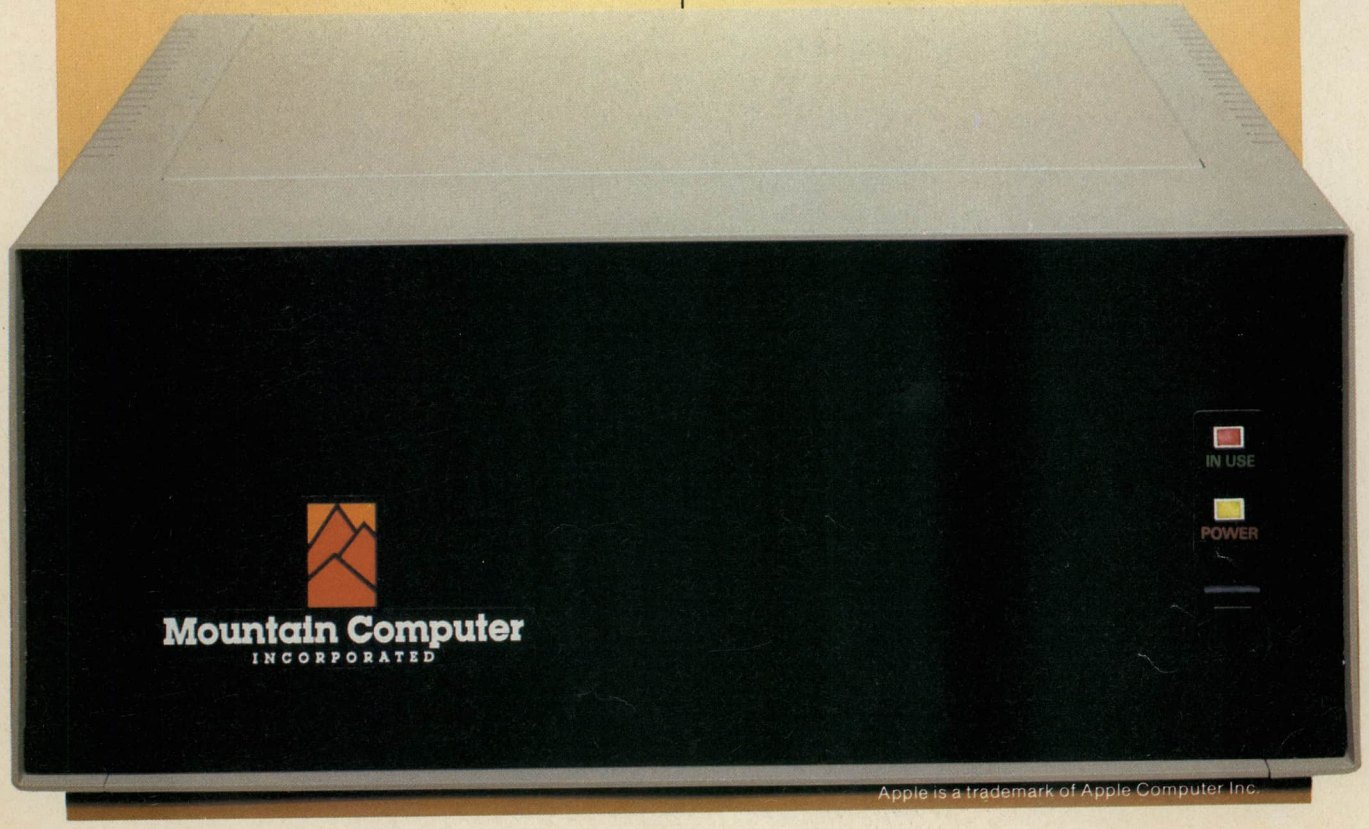

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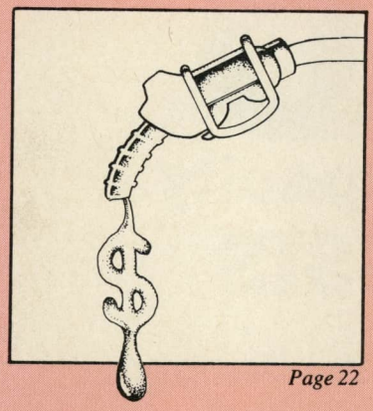
CIRCLE 3

DECEMBER 1980 VOL.IV, NO.12

Personal Computing

For Your Home and Business



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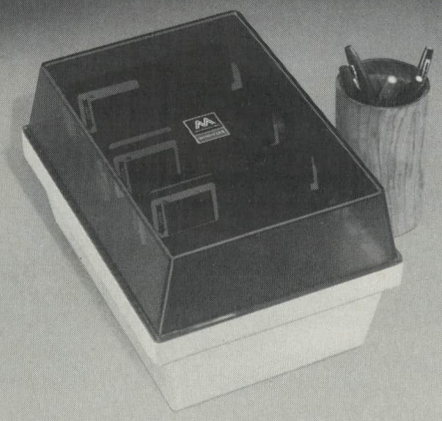

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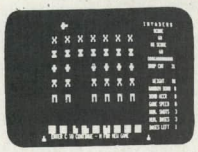

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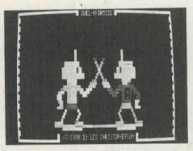

by Leo Christopherson

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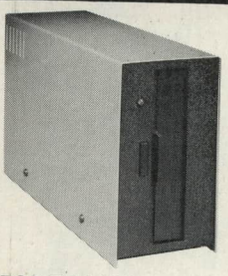

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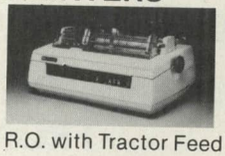

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CIRCLE 7

FEEDBACK

Atari Communications

Dear Editors:

In response to Ken Mazur's Computer Networking article in the September issue of *Personal Computing*, I would like to take a moment to explain Atari's program to bring national personal communications systems directly and instantaneously into the homes and offices of Atari personal computer owners.

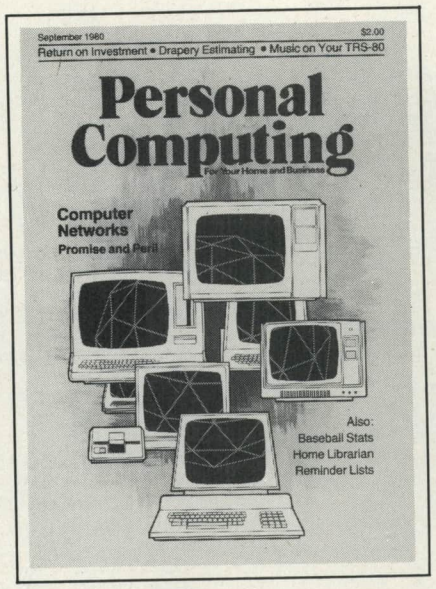
We are now delivering the components of our home information system — the Atari 830 Acoustic Modem, Atari 850 Interface Module and TeleLink I terminal emulator cartridge which can be used with either the Atari 400 or Atari 800 personal computer systems to access such major data bases as the Source or CompuServe.

The TeleLink I cartridge readily turns the Atari personal computer into a computer terminal. By dialing a local phone number and using a designated password, an Atari owner can be on line within minutes.

As a special offer to TeleLink I purchasers, Atari will provide one hour free access to the CompuServe network. After that time, the user may obtain his own subscription to the service. The data bank will also provide a customer service hotline, user news reports, dealer and sales representative hotlines for Atari users.

CompuServe offers access to information sources in a variety of areas: Up-to-date news through the AP wire service and major newspapers; financial information on stocks, bonds and options; electronic mail transfer between users; a national bulletin board; daily weather and sports information; and a wide variety of computer programs through the CompuServe System.

As well as offering services similar to CompuServe, the Source also provides such information as airline schedules, travel reservations, electronic shopping and other consumer aids, and information and educational programs.



The Source has been offering demonstration programs to dealers during daytime hours and CompuServe also plans to offer Atari dealers access to their network for demonstration purposes during the day at reduced rates.

During the month of October, Atari will mount an extensive major market newspaper campaign to draw consumers into their local computer store to see the Atari home information system demonstrated.

We are making a strong commitment to this area because we feel that data bank services are extremely useful right now and will be even more valuable to the consumer as the number and variety of applications increase, because they provide instant and relatively inexpensive communications for both business and personal use.

Ginny Juhnke
Marketing Supervisor
Atari
1265 Borregas Ave.
P.O. Box 427
Sunnyvale, CA 94086
(408) 745-2000

Cassette Labels Modified

Gentlemen:

In the July 1980 issue of *PC* I came across a very interesting and useful article by Alan Walker entitled "Cassette Tape Labels." To my surprise it was written for the Commodore Pet. According to Mr. Walker the program prints out a neat label that will fit inside the two-piece Norelco-style cassette box. It also prints out a label for each side of the cassette tape itself.

Unfortunately, when I typed in the program from the enclosed listing in the article, the results were not what Mr. Walker indicated. After fixing some mistakes, the results were still not satisfactory. The following are some of the problems I had and corrected or changed in the program:

1. The side of the cassette labels looked like they were exclamation marks (!) which I changed to the graphic symbols ◧ shifted (%) for the left side and ◨ shifted (') for the right side. This problem might be due to misinterpreting the symbols in the listing.

2. If you happen to enter more than 36 characters for program titles, a NEXT WITHOUT FOR ERROR AT 870, always occurs. Inserting line 775 to read, GOTO 500, fixes that problem.

3. The maximum number of characters in the program titles is 34 not 36 due to cassette tape labels structure. I modified all limits in program that deal with program titles.

4. When you did happen to type in too many characters for program titles, not all variables would get initialized when you tried to do it again. Changing line 505 to read, S$(I)=" ": P=0: L(I)=0, fixes the problem.

5. In printing the cassette box label, the first line sets the limit at 40 characters which is the right length. From then on, the TAB count between sides of the label or between sides of label and titles were all off by two characters. Changing all counts to make 40 characters including the sides of the label fixed the problem.

6. The same problem existed in the cassette tape label, the limit here is 36 max.

7. Finally, if a title is desired on the tape label, the maximum length is 14 characters as the program prints the title in Enhanced Mode twice as large, width wise.

I also added a couple of other fea-

Figure 1

```
10 POKE 59468,12
15 INPUT "ENTER OUTPUT DEVICE NO.";D
100 PRINT "■";TAB(8);"TAPE COVER PRINTER"
110 PRINT "■■THIS PROGRAM WILL PRINT A LABEL "
120 PRINT "■THAT WILL FIT INSIDE THE TWO-PIECE"
130 PRINT "■NORELCO-STYLE CASSETTE BOX. IT WILL"
140 PRINT "■ALSO PRINT A LABEL FOR THE CASSETTE"
150 PRINT "■TAPE ITSELF.  THE CASSETTE LABEL CAN"
160 PRINT "■BE AFFIXED VERY NEATLY WITH RUBBER"
170 PRINT "■CEMMENT."
200 PRINT "■PRESS RETURN TO BEGIN"
210 GET A$:IF A$="" THEN 210
500 FOR I=1 TO 2
505 S$(I)="":P=0:L(I)=0
510 PRINT "■PRESS ■RETURN■ WHEN COMPLETED"
520 PRINT "■ENTER THE PROGRAMS ON SIDE"I
530 PRINT:P=P+1
540 PRINT "  PROGRAM #";P;"  ■■■■";
550 INPUT A$
560 IF A$="_" THEN 620
570 IF P=1 THEN S$(I)=A$:GOTO 590
580 S$(I)=S$(I)+":"+A$
590 L(I)=LEN(S$(I))
600 IF L(I)>34 GOTO 700
610 GOTO 530
620 NEXT I
630 GOTO 800
700 REM *TOO MANY CHARACTERS
705 PRINT
710 PRINT "THE PROGRAMS YOU HAVE ENTERED FOR THIS"
720 PRINT "SIDE ARE TOO LONG. YOU MIGHT TRY USING"
730 PRINT "ABBREVIATIONS FOR ONE OR MORE OF THEM."
740 PRINT
750 PRINT "PRESS ■RETURN■ WHEN YOU ARE READY"
760 PRINT "TO REDO THEM."
770 GET A$:IF A$="" THEN 770
775 GOTO 500
800 REM
810 C$(1)=S$(1):C$(2)=S$(2)
820 FOR J=1 TO 2
830 FOR I=1 TO 34-L(J)
840 C$(J)=C$(J)+" "
850 NEXT I
860 N$(J)=RIGHT$(STR$(J),1)
870 NEXT J
1000 REM * WHICH FUNCTION *
1010 PRINT "■■■■"
1020 PRINT "1 PRINT CASSETTE BOX LABEL"
1030 PRINT:PRINT "2 PRINT CASETTE TAPE LABELS"
1040 PRINT:PRINT "3 PRINT OUT BOTH"
1050 PRINT:PRINT:PRINT "WHICH?"
1060 GET A$:IF A$="" THEN 1060
1070 IF A$<"1" OR A$>"3" THEN 1060
1080 A=VAL(A$)
1090 ON A GOTO 1100,1200,1300
1100 GOSUB 2000:GOTO 5970
1200 GOSUB 3500:GOTO 5970
1300 GOSUB 2000:GOSUB 3500:GOTO 5970
2000 REM *PRINT CASSETTE BOX LABEL*
2010 OPEN 1,D:CMD 1
2020 PRINT " /";
2030 FOR I=1 TO 38:PRINT "¯";:NEXT I
2040 PRINT "\"
2050 FOR I=1 TO 4
2060 PRINT " |";TAB(38);" |"
2070 NEXT I
2080 PRINT " |";
2090 FOR I=1 TO 38:PRINT "-";:NEXT I
2100 PRINT " |"
2110 PRINT " |  "+N$(1)+"   "+C$(1)+" |"
2120 PRINT " |  "+N$(2)+"   "+C$(2)+" |"
2130 PRINT " |";
2140 FOR I=1 TO 38:PRINT "-";:NEXT I
2150 PRINT " |"
2160 PRINT " |";TAB(38);" |"
2170 PRINT " |    ";CHR$(1)"SIDE 1:";
2180 PRINT CHR$(129);TAB(22)" |"
2190 PRINT " |";TAB(38);" |"
2200 PRINT " |  "+C$(1)+"    |"
2210 PRINT " |";TAB(38);" |"
2220 PRINT " |";TAB(38);" |"
2230 PRINT " |    ";CHR$(1)"SIDE 2:";
2240 PRINT CHR$(129);TAB(22)" |"
2250 PRINT " |";TAB(38);" |"
2260 PRINT " |  "+C$(2)+"    |"
2270 FOR I=1 TO 6
2280 PRINT " |";TAB(38);" |"
2290 NEXT I
2300 PRINT " ";
2310 FOR I=1 TO 40:PRINT "¯";:NEXT I
2330 PRINT#1:CLOSE1,D
2340 RETURN
3000 REM *TAPE LABEL*
3010 OPEN 1,D:CMD 1
3015 FOR J=1 TO 2:BL$=""
3020 PRINT " /";
3030 FOR I=1 TO 34:PRINT "¯";:NEXT I
3040 PRINT "\"
3050 PRINT " |";CHR$(1)" SIDE";J;
3060 PRINT CHR$(129);TAB(18)" |"
3070 L=34-L(J)
3080 L1=INT(L/2)
3090 FOR I=1 TO L1
3100 BL$=BL$+" ":NEXT I
3110 PRINT " |";
3120 PRINT BL$;S$(J);
3130 FOR I=1 TO L-L1:PRINT " ";:NEXT I
3140 PRINT " |"
3150 PRINT " |";
3170 FOR I=1 TO 17:PRINT "■";:NEXT I
3180 PRINT " |"
3190 PRINT " |";
3200 PRINT TAB(6)"/──────────────────────\";
3210 PRINT TAB(6)" |"
3220 PRINT " |";TAB(5)"|";
3230 PRINT TAB(22)"|";TAB(5)" |"
3240 PRINT " |";TAB(5)"|";
3250 PRINT TAB(22)"|";TAB(5)" |"
3260 PRINT " |";
3270 PRINT TAB(6)"\──────────────────────/";
3280 PRINT TAB(6)" |"
3290 REM * IDENTIFICATION *
3300 PRINT " |";CHR$(1)C$CHR$(129);" |"
3320 PRINT " |";CHR$(1)D$CHR$(129);" |"
3335 PRINT " ";
3340 FOR I=1 TO 36:PRINT "¯";:NEXT I:PRINT
3400 NEXT J
3410 PRINT#1:CLOSE 1,D
3420 RETURN
3500 PRINT "DO YOU WANT A TITLE ?":
3510 GET A$:IF A$="" THEN 3510
3520 IF A$="Y" THEN PRINT "YES":GOTO 3550
3530 IF A$="N" THEN PRINT "NO":A$="":GOTO 3560
3540 GOTO 3510
3550 PRINT "■THE TITLE CAN BE UP TO"
3555 PRINT "14 CHARACTERS LONG."
3556 INPUT A$
3560 L=LEN(A$):IF L>14 GOTO 3550
3570 B$="":IF L=0 GOTO 3590
3580 FOR I=1 TO L:B$=B$+"¯":NEXTI
3590 BL$=""
3600 GOSUB 3660
3610 C$=BL$:BL$="":A$=B$:
3620 GOSUB 3660
3630 D$=BL$:
3640 GOTO 3000
3660 L1=17-L
3670 L2=INT(L1/2)
3680 FOR I=1 TO L2
3690 BL$=BL$+" ":NEXT I
3700 BL$=BL$+A$
3710 FOR I=1 TO L1-L2
3720 BL$=BL$+" ":NEXT I:RETURN
5970 PRINT "MORE?";
5980 GET A$:IF A$=""THEN 5980
5990 IF A$="Y" THEN PRINT "YES": GOTO 500
5991 IF A$="N" THEN PRINT "NO": GOTO 6000
5992 GOTO 5980
6000 END
```

tures like asking for output device number so that we can view the labels on the CRT and see how the labels will look when they are printed. Care should be taken when viewing the labels on the CRT because all parts that call for Enhanced Mode printing will appear regular size and the right side of the label for that line will not line up properly.

Now, when finished printing one set of labels, you have the option of doing another set without leaving the program and then having to type RUN again. Also, you can type in a title (14 characters long) for your cassette labels.

See Figure 1 for my modified program and Sample Run.

Jose L Arriola
Prosser, WA

Author's note: I appreciate Mr. Arriola taking the time to revise my "Cassette Tape Labels" program. I am sorry to hear that he had problems making it work correctly.

The program that I use to create my tape labels is quite different from the one I sent in for publication and does some of my specialized needs. My attempt in the program submitted was to take my original program and make it easier for the general public to use. My big mistake was not testing it under all situations.

As Mr. Arriola pointed out, another line is needed if you enter too many characters (line 775) and the variables need initialization.

As to the TAB count between the sides of the label, it must be the difference in our printers. Mr. Arriola's change doesn't work correctly on my printer.

I thank Mr. Arriola for taking the time to remedy the problems with the program. I am afraid that my attempt to simplify the program for others may have confused them instead.

—Alan B. Walker

Folsom Prison Computerists

Dear Editors:

Several months ago a Commodore 8K Pet was sentenced to a brief stay here at Folsom Prison, and during that time it started a near riot (well, maybe not a riot, but at least a small revolution!) in the thought process of a good number of the men confined here. The Pet, which was on loan from the local school district for the summer months, was the first contact that most of the men had ever had with a microcomputer and it really stirred up a genuine interest in learning to operate and program these fascinating units. Upon the arrival of the Pet we started an informal study group and we would like to continue developing our skills with our studies in electronics and computer programming. But, we are finding it difficult to do so without additional instructional material and equipment.

This brings me to the purpose for this letter — a request! On behalf of the other men in the computer study group and myself, I would like to ask your readers if they would help us in developing our microcomputer study program. Since there are very limited educational funds available for this project, our learning efforts are coming mostly from "scratch" and we are in a real need of appropriate instructional material and just about any type of equipment.

Would any of your readers be willing to send us any computer related material that they may have sitting around and no longer have a use for? Items like back issues of microcomputing magazines, books on the Basic language or other programming aids, 6502 manuals, software, Pet programming manuals, and so forth. And if by chance, should any of your readers have any small computers or singleboard units like the AIM, KIM, or SYM that they may have laying around after upgrading, these would be a real aid to our group. We can make use of almost any workable microcomputer related material that your readers no longer have a use for.

In addition, we would appreciate receiving correspondence from other micro users, too! Letters can be addressed to me or to the computer group, but because of the strict mail regulations here at the prison, *all material or equipment must be addressed as follows or it will be returned:*

Mr. Robert E. Miller, Supervisor
Education Department - Computer Group
P. O. Box W
Folsom State Prison
Represa, CA 95671

In closing, our entire computer group sends their thanks for any assistance you may be able to offer in helping to make our project a success. And I might add, without fear of contradiction, that the limited issues of *Personal Computing* magazine which we have been fortunate enough to read were all very interesting and informative and we believe it is one of the greatest micro magazines currently being published. Keep up the good work!

Gottfried R. von Kronenberger
P. O. Box B-49542
Folsom State Prison
Represa, CA 95671

Small Point; Big Problem

Dear Sir:

This is a complaint! Not a very big one, perhaps: a complaint, never the less.

I am a Virgo. That means that I am predisposed to all forms of excess neatness and over-organization. This also means that I am in trouble when I try to organize or file away the various sizes of instruction forms which I get with many computer games and programs.

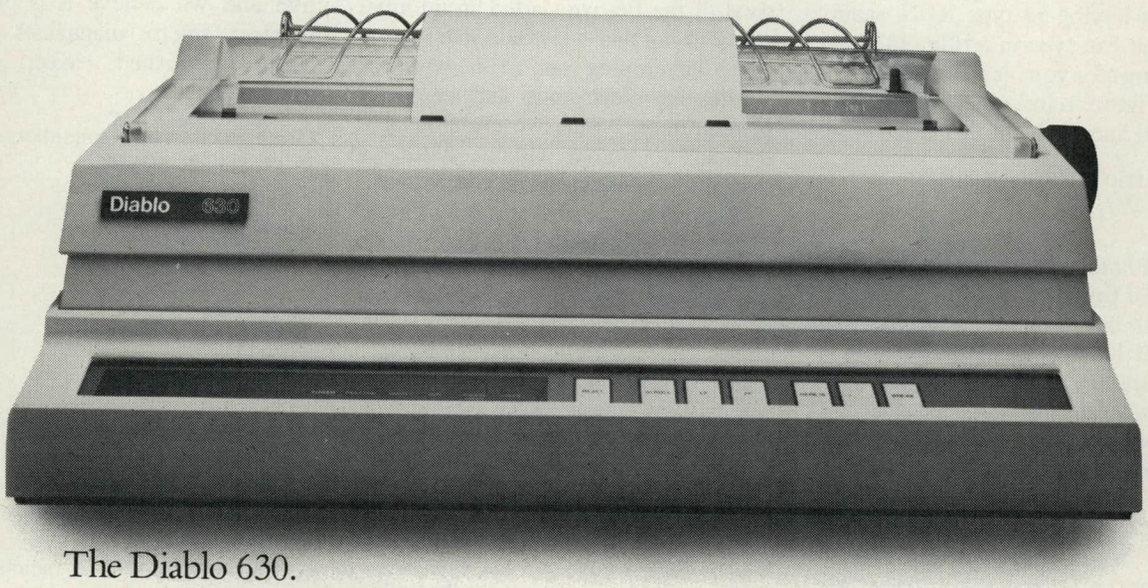
These nefarious little devils seem to come in any and every size which one cannot possibly file in any existing system. I just can't seem to accept the fact that they are not intended to be filed or retained in any form which will allow for easy retrieval at some later date.

I wonder if the others who buy such odd-ball programs have the same or similar complaints? Is anyone addressing it or trying to correct it? I have a dozen or so of these little odd-sized pamphlets relating to various purchased programs which I must retain, copy onto standard 8-1/2 × 11 paper, and/or forget. It is a problem to me and I'm sure to others.

Complaint registered . . .back to my Apple II and Fastgammon!

Robert H. Santiman
Playa del Rey, CA

If you want a choice in print wheels, there's only one choice in printers.

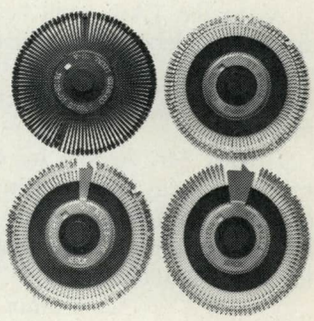


The Diablo 630.

It's the only printer that lets you use either metal or plastic print wheels. So you can choose the print wheel that's just right for the job.

The 630 works as well with a 96-character plastic daisy print wheel as it does with an 88-, 92-, or 96-character metal daisy print wheel. In over 100 different type styles.

Every 630 has fewer moving parts than competitive printers, which makes it more reliable. And it offers unsurpassed print quality. Compatibility with Diablo supplies. And bi-directional printing capability.



The 630 is the only printer in the world that uses both metal and plastic wheels.

So if you want to change your print wheels, you'll just have to change your printer.

To a Diablo 630 printer.

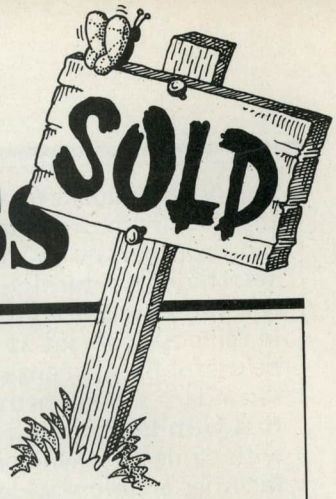
Diablo Systems

XEROX

Diablo® and XEROX® are trademarks of XEROX CORPORATION.

CIRCLE 8

RANDOM ACCESS



Personal Computing Sold to Hayden Publishing

James S. Mulholland, Jr., president of Hayden Publishing Company, Inc., has announced the acquisition of *Personal Computing,* and *Minicomputer News,* a sister publication, from Benwill Publishing Corporation of Boston, a subsidiary of Morgan-Grampian, Inc., of New York City.

Mr. Mulholland stated, "These publications are a logical extension of Hayden's current efforts in the various electronics and computer markets. Hayden's activities include *Electronic Design,* a bi-weekly; *Microwaves* and *Computer Decisions,* monthlies; *Electronic Design's Gold Book* and *Microwaves' Product Data Directory,* annuals; Hayden's electronic, computer and computer software books; and Hayden computer software and Programma International computer software.

"Both Hayden and the recently acquired Programma are leaders in publishing software. Their combined list of programs is one of the largest in the microcomputer market. We now have five publications serving segments of the microcomputer market. They are *Electronic Design, Microwaves, Computer Decisions, Personal Computing* and *Minicomputer News.* Our software and book companies combined with the five magazines provide Hayden with a commanding position in the explosively growing electronics and computer markets."

Students Learn Math Through Diagnostic Exercises and Games

The DIG (Diagnostic Instructional Gaming) Math Program, an individualized computer-aided instructional program for use with students who need remedial help in math, is being developed by the Instructional Gaming Group at the University of Michigan. The DIG Math program uses a series of diagnostic exercises and instructional games to help students learn ideas in mathematics ranging from elementary arithmetic to first-year college material, said a University spokesperson.

The DIG Math program is presented in a series of units. Each unit presents a set of interrelated mathematical ideas. In each unit, users first encounter a set of diagnostic exercises that introduce the ideas contained in the unit. These exercises are of two types: C-items, which are standard completion problems (Example: (2+3)× 4=) and R-items, which treat numerals and operation signs as resources that must be rearranged and grouped (inserting parentheses, if necessary) to form an expression equal to the goal (Example: Resources: + × 2 3 4 Goal: 20, where one of the correct answers would be: (3+2)× 4). These R-items are more difficult than the completion items; students and teachers respond correctly only about one-third as frequently on R-items as on C-items. On the basis of the user's performance on the R-items, the computer selects appropriate matches of the equations game for learners to play — ones on which they need some instruction.

The actual matches of equations played with the computer are more complex than the R-item problems. In these matches, the computer acts as a good teacher rather than as a good player; it moves to induce the player to make use of the mathematical ideas on which that player needs practice. This is usually accomplished by preventing the player from reaching an easy, more obvious solution, compelling that player to devise a more elaborate one that makes use of the appropriate mathematical idea. After the player completes a match, the computer repeats the appropriate mathematical lesson introduced in the diagnostic section, emphasizing the complete use of the idea. In general, each student is branched to ideas on which practice is needed, and such ideas are presented in a context where they will be immediately useful in playing effectively against the computer.

The program is entirely self documenting. New users are branched to explanations of the equations rules and program conventions as needed. They are also taught how to access an extensive encyclopedia of ideas about the game through a "Help" command. An important aspect of the program is the provision for user comments to be fed back to the program authors. These comments are stored in a feedback file and returned to the Instructional Gaming Group in exchange for program updates.

Developed under a grant from FIPSE (The Fund for the Improvement of Post Secondary Education), the principal initial targets of the DIG Math program are remedial mathematics students at the college level. The

Illustration by Josh Randall

highly individualized approach of the DIG Math program is particularly appropriate to adult learners, students returning to school, and those who need special help in remedial courses. It will also be useful for elementary and secondary school instruction, first with teachers and eventually with students when computing facilities are more widely available. The program, now consisting of almost 1000 matches on material from sixth-grade arithmetic through first-year college algebra, is continually being expanded.

The development of the DIG Math Program is a continuing process. The feedback files solicited from program users are a key source of assistance in the critical scrutiny continually given the program. The program has been, or is currently being mounted, by a number of different college remedial programs on their local computers. These groups have already provided extensive feedback during the design and modification of the current version of the DIG Math programs. Studies at the middle school level show that the ordinary classroom use of equations is accompanied by less absenteeism (reduced to one-third prior levels) and increased achievement in mathematics (doubling of year-to-year learning increments).

The initial software is being written in the version of Basic available on the Prime 300 time-shared minicomputer. Additional versions are being developed by the Michigan group and by others elsewhere. At present, programs are available for the following: Prime 300 (Basic), Itel (equivalent to IBM 370 Basic), CDC Cyber (Basic). Translations are being prepared for: Apple II (Pascal), Commodor Pet (Basic), HP-2000 (Basic), Prime 300 (Fortran), Plato (Pilot), Data General Eclipse S130 (Basic).

These programs are available to any interested educational institution on the following basis:

1. For a charge of $30, a tape with current version of the DIG Math program will be provided along with two updates as the program is further developed. Current plans are to make updates every four months.
2. A copy of any translation or adaptation of the program that is made for use on other computers by anyone who has received a copy of the DIG Math program will be sent back to the Instructional Gaming Group with the understanding that it will be made available to any other interested educational institution on the same basis.
3. A printout of the Feedback File that is included in the program will be sent to the Instructional Gaming Group at least once every three months. The program is designed to be an evolutionary one that is improved as it is used, and the feedback is essential for such improvement.

All that is necessary to become a cooperating participant is to indicate agreement with the three requirements in a letter to Professor Layman E. Allen. The project is being support by FIPSE.

For additional information, write to Professor Allen at Mental Health Research Institute, University of Michigan, Ann Arbor, Michigan 48109.

Antique Catalog from Computer-Based Publishing Service

An authoritative price catalog for the antiques and fine arts fields is about to become a reality with the aid of a computer-based publication service developed by InfoConversion, a division of Grumman Data Systems Corporation, a Grumman Company, Woodbury, NY.

Scheduled for release in late 1980 by Simon & Schuster Inc., *The Official Sotheby Park Bernet Price Guide to Antiques and Decorative Arts,* edited by Charles C. Colt, Jr., represents a major publishing development that is likely to have a substantial impact on the growing auction and exchange markets in antiques, fine arts, furnishings and craft collectibles, said a spokesperson for the catalog.

"This is the first price reference work of its kind," says Colt, an arts and antiques expert, " because all prices quoted, which are the result of open bidding by experts, come from one source, the world's leading auctioneer, Sotheby Parke Bernet. The book establishes current values on 32,000 fine art pieces, antiques and original decorative objects, and contains over 1,000 photos.

The book listings make it both practical and easy to use. American furniture, for instance, appears under the chapter, "Americana" and is arranged by period, then alphabetically by object within that period.

"Interest in collecting and investing in collectibles, which has been running at a very high level for so long now, actually created a demand for such a volume years ago," Colt explains. "But up until now it was neither feasible nor economical to produce a popular-priced reference work of this magnitude. Conventional editing and book-production methods were just too costly and time-consuming."

InfoConversion's computer-based publications service combined the necessary data manipulation and typesetting easier, faster and more economically than conventional methods.

The catalog is meant for dealers, collectors, appraisers, curators, insurance underwriters and adjustors, estate lawyers and investors. Price is $19.95 in hardcover; $9.95 in paperback.

The Future of Personal Computers as Problem Solvers

The microcomputer industry is struggling with an identity problem. Some of the more thoughtful leaders in the business are starting to raise questions about whether microcomputers should be sold as small business computers or as personal computers. The distinction is that a small business computer may serve the needs of people in a business, whereas the personal computer is like a typewriter or desk top calculator (one person — one computer). In a very small firm or where a financial consultant is the only one who will be using the computer, the question is irrelevant. But when the firm grows and acquires a variety of employees, and more than one or two professionals, then the personal computer will become a business computer. The professional may find that his secretary is using it for word processing or for maintaining a list of customer or prospect names, and the bookkeeper is using it for the firm's accounting and other record-keeping requirements.

Some financial consultants have purchased computers solely for use as a business computer, and have the idea that (1) they can't afford to take the time to learn how to use it, and (2) there isn't any need for them to use the computer. That is like buying a small truck to haul merchandise and walking or riding a bike to make sales calls. Professionals' time is usually worth $50 to $100 per hour, and their employees are being paid $4 to $10 per hour. While the bookkeeping and/or word processing applications are important, they should not take priority over use of the computer as a problem solving tool.

Some examples of problem solving applications include: Computing the rate of return on alternate investments; Forecasting the optimum mix of life insurance coverage; Estimating the tax impact of using a "ten year trust"; Forecasting the estate tax using alternative inflation rates; Comparing the cost of an equipment lease to a purchase; Determining the statistical reliability of a sampling selection;Calculating the theoretical value of a call option; Comparing the effect of using alternate pension funding methods; Comparing the net present value of two insurance policies; Calculating the taxable gain in a partial tax free exchange.

So far, financial consultants have been forced to become programmers in order to develop problem solving programs such as these, or they have had to pay anywhere from $25 to $50 per hour to use timesharing systems that offer such programs. There are still very few microcomputer programs available that provide professional quality programs of the type listed above. But there are two trends that we think will change the situation very quickly.

The first trend is the development of programs that help computer owners to write programs. Another development is the emergence of programs that can best be described as pre-compilers. These are general purpose programs that speed up and simplify the process of writing programs to solve problems. Some of these programs are just beginning to be available for a few specific microcomputers.

The second trend is the development of preprogrammed or "canned" programs that are developed by other computer owners for sale to their professional peers. The "bread and butter" programs such as accounting and word processing have been extensively exploited and program developers are now looking for other types of programs they can create and market. The growth of problem solving programs will be nothing less than explosive during the next few years.

Commodore International Limited has donated six of its CPM/Pet computer systems to the United Nations International School. At a ceremony held at the New York City school, Irving Gould, Chairman of the Board of Commodore, presented the systems to Mrs. Murray Fuhrman, Special Representative of the Secretary-General for the school, Robert Belle-Isle, Director of the school and Thomas Szell, head of the science department

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Talking and Listening Computers of the Future

Step into an overcrowded elevator sometime in the future, and you're likely to hear a computerized voice ask you to wait for the next one.

Buy a new car, and there will probably be voices — not "idiot lights" — telling you the oil is low or the emergency brake is on.

Buy a new washing machine designed to accept voice commands, and it will probably mind better than most kids.

Making all this possible will be currently developing capabilities of computer science known as voice synthesis and voice recognition.

"In the next few years, we will see an increase in the number of machines that talk to us and an increase in the number of machines that can understand our spoken commands," predicts Dr. George Bekey, a professor of electrical engineering and chairman of the department of electrical engineering systems at the University of Southern California.

Research in both speech processes is under way at the Speech Communications Research Lab (affiliated with USC) and in the USC departments of linguistics and electrical engineering systems.

Voice synthesis — a process that enables machines to talk to people — promises to make tape-recorded messages obsolete and to improve life in many ways, Bekey says.

Voice synthesis utilizes mathematical representations of voice signals. In the computer's memory bank, a different numerical sequence stands for each sound. Depending on the input, the computer searches its memory and comes up with the sounds it needs to synthesize appropriate words and sentences.

The numerical sequences are programmed and stored on computer chips.

Several toys, including a popular spelling aid, a chess-playing machine and language translators, already use voice synthesis, and Bekey expects other applications of the new computer technology to follow.

Recorded alarms, like the one that sounds when a passenger fails to fasten his seat belt, may soon be replaced by synthesized voices.

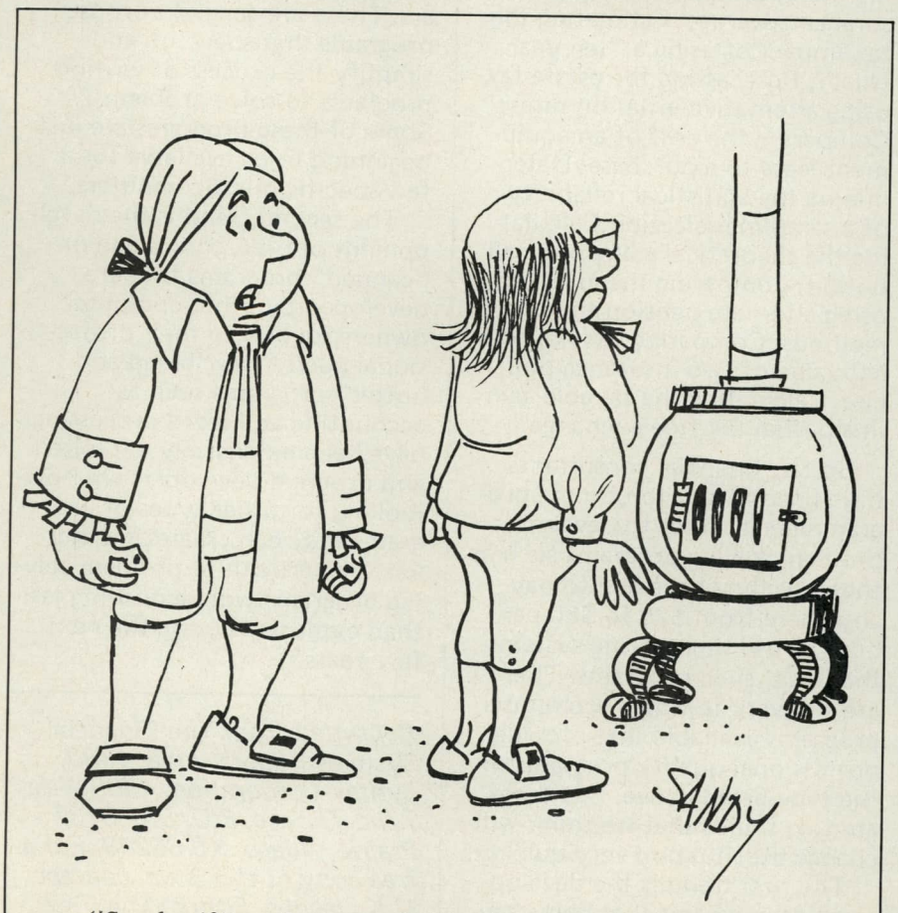
Already commercially available is a machine that enables speech-impaired people to communicate. Bekey expects that future applications of the new technology will benefit blind and other handicapped persons.

The field of voice recognition is developing more slowly. "The technology is not as advanced as voice synthesis," Bekey explains. In speech recognition, a computer must accurately "hear" and decipher human speech, then carry out the proper command.

First, each sound is converted to an electrical signal, Bekey explains. The signal is then assigned a mathematical code. The computer compares the assigned code to a stored "dictionary" of word codes and finds the best match — thus "recognizing" the word. Upon recognition, the computer produces the appropriate output.

Practical voice-controlled machines using small vocabularies have been around for several years, but the development of voice-controlled devices with larger vocabularies is far from perfected.

"Speech recognition has several problems," Bekey notes. "One is the recognition of continuous speech: most computers understand only one- or two-word commands. Other difficulties crop up because English meanings are often dependent on context or voice inflection. The computer understands neither."



"So what if it won't compute? It'll still make a good stove, Ben."

Swimming Championships Enhanced by Computer

With a memory for sports trivia even keener than Howard Cosell's, a sophisticated system of business computers and terminals provided spectators and ABC television viewers with statistics and biographical data about athletes in the 1980 U.S. Long Course Swimming Championships.

The computer system from Hewlett-Packard of Palo Alto, CA, supplied announcers in the stands and from ABC-TV with a myriad of facts on every competitor. Additonally, HP terminals were used to produce "heat sheets" (listings of swimmers, times and lanes) for preliminary and final events.

During the five-day meet held at the Heritage Park Acquatic Complex in Irvine July 29 to August 5, an HP 250 with a 7910 disk drive, connected to a Remote 250 located near the announcers in the stands, provided information on every athlete from previous records held to complete biographical rundown. This sports trivia was also made available to ABC Wide World of Sports announcers Mark Spitz and Keith Jackson, enabling them to drop bits of "did-you-know?" into their videotaped coverage of the events.

At the same time, two Hewlett-Packard CRT terminals were connected by telephone lines to an off-site DEC PDP-10 computer. Data from the preliminaries was entered into the HP 2645, while the HP 2631 produced hard copy heat sheets to be photocopied for distribution to team captains and the public.

This year's meet, in addition to the computer data handling system, had one other unique aspect. It was the setting for the selection of a 1980 Honorary Olympic Swimming Team — 35 members and two coaches who would have gone to Moscow had the world situation been different.

★★★ Announcements ★★★

NCC '81 Personal Computing Festival

A Call for Participation has been issued for the Personal Computing Festival of the 1981 National Computer Conference to be held May 4 to 7, 1981, in Chicago. The Festival will feature technical sessions, panels, tutorials as well as applications demonstrations. Program sessions will be designed around the overall theme of productivity in personal computing — with special emphasis on the applications people have for their own computers.

All individuals interested in personal computing, including hobbyists as well as computing professionals, are invited to participate in the NCC '80 Personal Computing Festival by presenting a paper, giving a talk, organizing a panel, delivering a tutorial, or demonstrating a non-commericial application.

The 1981 NCC Personal Computing Festival is being organized by Festival Chairman Sam Papa, of Data Forms, Inc., in Chicago. Festival Sessions are being organized under the direction of Personal Computing Festival Program Chairman James Gerdes, of Argonne National Laboratory. Individuals interested in participating in the Personal Computing Festival are urged to contact Mr. Gerdes at Argonne National Laboratory, 9700 Cass Avenue, Argonne, IL 60439.

Potential participants should send a letter of intent as soon as possible, but no later than December 1, 1980. The letter of intent should include an abstract and brief biography. Papers presented during the Festival Program will be published. Potential authors will be mailed a Festival Author's Kit, which contains instructions and necessary materials for preparing papers in a "camera-ready" format. *Papers submitted for consideration must be received by February 1, 1981, in the specified camera-ready format.* Papers will be reviewed and authors will be notified regarding acceptance.

Interest is mounting for a panel to discuss personal robotics and artificial intelligence interests, applications, accomplishments. If you'd like to participate and have expertise on a non-professional basis contact A. Gelles, 185 W. Houston St., New York, NY 10014. Send description of your area of interest and content of a five-minute presentation.

For additional information on the 1981 NCC Personal Computing Festival contact NCC '81 c/o AFIPS, P.O. Box 9658, Arlington, VA 22209; (703) 558-3617.

Office Automation Conference

The 1981 Office Automation Conference is scheduled for March 23 to 25, 1981 in Houston, Texas. The conference is sponsored by the American Federation of Information Processing Societies. For additional information contact the Office Automation Conference, P.O. Box 9659, Arlington, VA 22209; (703) 558-3617.

Educational Symposium

An Educational Software Symposium is scheduled for January 17 and 18, 1981, at the Holiday Inn in Bridgeport, CT. Seminars will be conducted by leaders in the educational software field. Topics will include "Educational Software

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for Elementary Schools," "Educational Software in the Mathematic Curriculum," "Educational Software in the Science Curriculum," "Computer Assisted Instruction in Foreign Languages," "Can Computers teach English and Reading?" "Simulations," "Computer Education," "Writing Educational Software" and "New Technological Developments." There will also be an exhibit hall and an opportunity to review software programs at first hand. Registration is $85 per person. Early registration is advised, as capacity is limited. Write to Monica Kantrowitz, President, Queue, 5 Chapel Hill Drive, Fairfield, CT 06432.

Computer Crime Journal

The *Computer/Law Journal* has published the first issue of a two-issue set on computer crimes. This issue contains articles from Donn Parker, Susan Nycum, John Taber, Rob Kling and Jay Becker, with a special introduction by Senator Abraham Ribicoff, author of the Federal Computer Crimes Protection Act (S.240)

Part 2 of this set will contain a documentary history of the Stanley Mark Rifkin case, a compilation and analysis of all federal an and state statutes and bills addressing computer crimes, as well as a case digest, bibliography and book reviews.

Jay Becker, Director of the National Center for Computer Crime Data, and guest editor of the two issue set, said "These volumes are the first in-depth symposium on the topic of computer crime. They present key issues that have been hitherto ignored."

These special issues of the *Journal* are available for $16 each ($32 for both issues), with an additional $1 per issue postage for orders outside of the United States and Canada. Orders including payment should be sent to Center for Computer/Law, 530 West Sixth Street, 10th floor, Los Angeles, CA.

Reader's Digest/Source

The Reader's Digest Association, Inc., Pleasantville, NY, has acquired a majority interest in Source Telecomputing Corporation of McLean, VA.

STC, a privately held company, presently has nearly 7000 subscribers. Using an assigned account number and password, subscribers can connect their personal computers or computer terminals, by telephone, to the mainframe computers of STC, where nearly 2000 programs and databases are available. These include such materials as UPI news, a wide range of financial information, airline schedules, language drills, a guide to wine buying, point-to-point electronic mail and many more services. The cost is approximately $.07 per minute.

Heathkit Supplier Directory

Heathkit computer owners can now find the hardware and software they need with the new directory of suppliers compiled by *Buss: The Independent Newsletter of Heath Company Computers. Buss* has complied over 60 suppliers from around the country specializing in hardware and software to fit Heathkit computer products and Zenith Data Systems. The suppliers, not affiliated with the Heath Company, have products aimed at specialized applications plus general interest products not yet offered by Heath.

The directory is available for $7.50. Payment must be in U.S. dollars payable on a U.S. bank. For more information contact *Buss,* 325-P Pennsylvania Ave. S.E., Washington, DC 20003.

New Club Address

The NW Pet Users Group now meets the second Tuesday of the month at 7:30 PM at the University of Washington Academic Computer Center, 3737 Brooklyn, Seattle, WA. Their new address is NW Pet Users Group, 2565 Dexter N. #203, Seattle, WA 98109.

Business and Personal Computer Sales Expo '81

The Business and Personal Computer Sales Expo '81 and the Houston Business Show will be held in the Houston Civic Center, Houston, TX, February 18, 19, 20, 1981 from 11 AM to 6 PM.

The Expo and the New York Business Show will be held in Madison Square Garden, New York, NY, on March 11, 12, 12, 1981, from 11 AM to 6PM.

For more information on these shows contact Produx 2000, Inc.; (215) 457-2300.

Workshops

Virginia Tech in Blacksburg, VA, is offering the following workshops: "Digital Electronics for Automation and Instrumentation," December 8, 9, 10, 1980; "Microcomputer Interfacing Programming and Application Using the 280/8085/8080," December 11, 12, 13, 1980; "TRS-80 Radio Shack Microcomputer Interfacing and Programming for Scientific Instrumentation," December 15, 16, 17, 1980; and "Motorola Single Chip Interfacing and Programming Using the 6801, 6809 and 6800," December 18, 19, 20, 1980.

All workshops are hands on with the participant designing and testing concepts with the actual hardware. For more information contact Dr. Linda Leffel, C.E.C., Virginia Tech, Blacksburg, VA 24061; (703) 961-5241.

Unusual Application?

If you use your computer for an interesting application, why not write up a short (500 or 1000 words) article telling us about it? Send your submission to Random Access, *Personal Computing,* 1050 Commonwealth Ave., Boston, MA 02215

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CIRCLE 9

Encoding of Voice Input for the Deaf

BY WILLIAM R. PARKS

Ear specialists, medical scientists and electronic engineers, working together as a single team, have developed a way to convert sound waves into electronic signals acceptable to our body's hearing nerves near the brain. A totally deaf person "hears" a buzzing noise when sound is transmitted.

I propose to remedy the lack of message transmission in the buzzing noises. It's really a simple idea; one that is used by ham radio hobbyists. Ham radio operators, using the Morse code, transmit encoded information in "dots" and "dashes." In fact, there are microcomputer programs available that do the encoding. All the operator has to do is type words and sentences into a microcomputer and the proper coded sequence of dots (short tones) and dashes (long tones) are transmitted to a receiver thousands of miles away — as far as the other side of the planet when atmospheric conditions are right. To add excitement to this recent development, some ham radio operators have devices and software for converting the dots and dashes back into letters which then appear as words and sentences on the CRT screens of the receiving ham radio microcomputer.

I suggest a similar system for deaf persons who are fortunate enough to at least hear a buzzing noise. We already have voice input for home microcomputers. Circuit boards permit you to enter via microphone a number of words or letters and you can program the computer to learn your voice pattern for a limited vocabulary. By adding software and the necessary output device to this already developed system, a deaf person could receive a Morse code series of buzzes in a dot-dash pattern to fit the words being spoken. A dedicated microcomputer and voice pattern detection system could be small enough to be carried in a brief case by the deaf person. Word pronounciation by family members could be learned by the microcomputer initially. Later, as research brings out more sophisticated systems, other persons' voices could be learned. Such a system could make life easier in households where deaf persons reside or could help in working environments where the deaf are employed.

The mother of a deaf person could speak or spell from the kitchen, "Dinner is ready!" The deaf person in another room would hear a transmission of more coded buzzes from the brief-case's computer indicating D-I-N-N-E-R — I-S — R-E-A-D-Y. The deaf person would actually hear the message in the form of short and long buzzes.

A message in the form of short and long buzzes may not seem appealing to a person with normal hearing. However, many ham radio operators say that with practice they can quickly translate such sounds into letters. Some of the more experienced Morse code operators tell me that after months of practice there comes a point when they stop translating letter by letter and they start hearing whole words at a time.

This, I suggest, would happen to the deaf. Initially, a deaf person would hear letters but after exposure and increasing proficiency with the code, he or she would hear whole words. In other words, a trained deaf person would not even bother concentrating on the coded signals; rather, he or she would hear familiar patterns of sound that represent whole words. This phenomenon occurs to ham radio operators after daily use. An experienced radio operator soon learns to write entire words while listening to Morse coded messages.

Experts in the hearing impaired field told me that many deaf people have trouble reading. Unimpaired persons receive reinforcement when they learn to read because they can hear the sound of words as well as see the words. With the introduction of Morse coded sound, deaf persons could learn the coded sound patterns of individual letters and/or complete words. Television stations could transmit the audio portion of a show in the code on another line and deaf persons with device implants could plug in and hear messages and dialogue without the need for subtitles which may be difficult to read.

In time, the miniaturization of memories and high density storage in small packages could permit a deaf person to carry such a translating device in much the same way as a hearing aid is carried today. As voice input programs and software become sophisticated enough to accept nearly any commonly spoken word, the idea of deafness would become a matter of history. In this way, deafness could be eliminated by medical science working with the tools of microelectronics. Smallpox has been virtually eliminated from our planet; it may be possible to eliminate deafness.

If a deaf person has such serious damage that the nerves for carrying the buzz signal to the brain do not function, an alternate means of getting the Morse coded messages is possible by substituting the sense of touch. A microcomputer would encode the Morse code by actuating pins of a device on the market today for blind persons who use the device to read text. Microcomputers are programmed to translate words and letters printed as text into pin patterns. Why couldn't these same microcomputer devices transform spoken words for a deaf person. The deaf person would hear his or her fingers at the very moment the words were spoken.

Using the ideas in this article, it would even by possible for two deaf persons to speak to each other over the telephone as long as each person's computer were programmed to recognize the other's manner of speaking. As it stands now, deaf persons need bulky teletypewriter devices to communicate by telephone. There is no reason a person could not be trained to speak and listen directly using a telephone's analog signals. Computers communicate by telephone and the machines could convert messages into a code suitable for tactile or audio input for the deaf and hearing impaired.

I can imagine a future in which a totally deaf person "hears" the phone ring, answers it and calls another member of the household, "Tom, this call is for you. Jim wants to know when you will drop by to pick him up."

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CIRCLE 10

Keeping Track of MPGs

BY ROGER W. HART

I knew when I traded in my foreign four-cylinder compact for one of Detroit's mid-size six-cylinder models that I would not enjoy the same gasoline mileage I'd been used to. However, the combination of a much larger gas tank and the rising cost of gasoline made trips to the gas station hurt a lot more than they used to. Thus it became more than a matter of idle curiosity to watch my car's mileage performance.

Part of the standard equipment in any car I've owned has been a small notebook carried in the glove compartment. In this diary I faithfully record every stop at a service station. (See Figure 1.)

I could do an approximate calculation in my head as I filled the tank each time, but I could tell that the results weren't coming out to the hoped-for 20 mpg, so I soon began making scribbled divisions on the back of an envelope.

The results were very inconsistent, as it was my practice not to fill the tank if I thought that the price was too high at that moment but I couldn't wait for a better opportunity.

Of course you can't calculate gas mileage very accurately or satisfactorily if you don't measure consumption somewhat more precisely than these partial fill-ups allowed.

I realized that in order to get a better handle on consumption, I would have to take several readings, perhaps a minimum of three. This involved adding up the gallons from the last three fillings, not including the current one, and dividing this number into the miles driven since the earliest of these three fillings. To do a better job, you should have even more readings, probably between five and ten. Beyond ten could could cover a period of several months.

Since I was interested in trends, I didn't want to look at too long a period, but a somewhat longer term than a few weeks. I decided that a three-filling average would provide a quick snapshot of how I was doing, while a ten-filling average would give a smoother, more accurate picture.

While these calculations are certainly still possible to do on the back of an envelope, I knew that my TRS-80 would do a neater, more accurate, less painful job. It would at the same time furnish a side-by-side comparison of the three-period results to the ten-period results, allow me to alter the number of periods quite easily, and provide by-product information such as a reasonability check on the price paid per gallon, and a running record of the cost per mile for gasoline.

Date	Odometer	Gals of Gas	Cost
8/23/79	41	2.9	3.00
8/24	103	4.8	5.00
8/25	133	15.0	14.50
8/31	497	4.6	5.00
9/4	550	4.6	5.00
9/6	622	16.6	16.00
9/15	901	12.4	12.00
9/26	1193	4.6	5.00
10/3	1375	15.2	15.00
10/11	1633	14.7	15.00
10/20	1788	11.5	12.00
11/1	2164	20.5	21.25
11/10	2473	14.8	15.40
11/17	2724	14.4	15.00
11/24	2929	9.6	10.00
12/4	3231	17.5	18.50
12/8	3382	10.8	11.50

Figure 1

The data statements in the program are taken directly from the notebook carried in the car. The final data statement ("END") is left in place at line 9999 to signal to the program to exit from the loop.

Comments in lieu of REM statements: Line 100 sets dimensions to allow for 100 entries; line 150 reads report heading and print image data statements; line 300 reads date and tests for last data item. If the last item has been read, it sets variable X1 to the previous value of loop counter and sets X to 100 to exit from loop.

Line 400 reads the odometer reading (mileage), gallons purchased and cost. Line 500 is a calculation of the unit cost (dollars per gallon). Lines 600, 800 and 1000 test whether X is 1, 2-3, or 4-10. If X is 1 (the first filling), then there cannot be a previous filling, so further calculations are unnecessary. If X is 2 or 3, then there cannot be three previous fillings and calculations for the value of M3 are not applicable. Similarly, if X is 10 or less there will not be a calculation for M0, the variable for the last ten fillings.

Line 700 is a calculation of M1(X) and line 900 is a calculation of M3(X) (see Variable Listing). 1100 to 1300 are a calculation of GO(X) and TC(X). The Y loop is used in lieu of spelling out (X−1) through (X−10) as in line 900 (X−1) through (X−3).

Line 1350 is a cost-per-mile calculation and conversion to cents from dollars. Line 1400 is mpg for the last ten fillings; line 2000 clears the screen and prints heading of report; line 2100 prints report items. Line 2150 acts as a counter for number of items on screen. When the counter reaches 12, the screen is full (heading and space following takes 3 lines). A prompt appears on the 16th line (ZZ$), and when <ENTER> is pushed, the heading appears again, counter is reset to zero, and information scrolls onto the screen, repeating the sequence. □

Mr. Hart is manager of Systems Planning and Procedures for the Plastics Division of a chemical company in New York.

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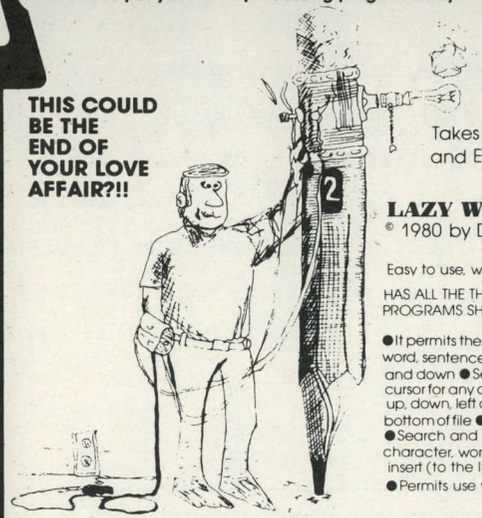

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● Will change all upper characters text to lower case or all lower case to upper, A SINGLE COMMAND ● Will capitalize the first letter of all sentences and all proper noun I's, WITH A SINGLE COMMAND ● LOADS ANY ELECTRIC PENCIL ● FILE, ASCII SAVED FILES, EDTASM FILES OR BASIC PROGRAMS SAVED ASCII ● Permits installing special control characters in your text for your printers special features, like double wide or condensed prin ● Definable screen length and definable print length to 255 characters wide ● Screen editing that is not final till your command. This means that you can edit your file on the screen and if you don't like how it reads you can cancel and leave it the way it was. ● You can append files (which means that you can put one file to the end of another file) ● No lost characters at the end of the line even for the fastest typist ● A directory of all your files is available to the user with out leaving the program ● Saving programs to disk easy enough for the non-computer user ● To save memory, not all the program modules are in memory at one time but are called from the disk as needed. ● you can set tabs positions like on a typewriter ● 10 CUSTOM COMMAND KEYS For the experienced user there is a command file that permits many special functions that are all user defined (not enough space for better explanation in ad, send for complete overview) ● Program has HELP file that is a short review of the commands that are available

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This printer module is provided for the user as a standard feature. Optional special printer routines for custom printer will be available in the near future. In this original release, it has the following printer drivers and will support the following printing devices: RS232, TRS232 AND PARALLEL printer ports. You have the following format commands: Justifies Text, Centers Text, Centers Title, Line Spacing, Line Length from 3-255 characters and Set Margins. ● Also send any ASCII code to any printer from the text.

● Save formated texted to the disk for spooling later ● Information for customer to load his own special printer driver ● Printing can be stopped and started by the user at any time and then restarted where you left off. ● You can print entire file or just print to bottom of the page.

COMMUNICATION PACKAGE

RS232 COMMUNICATION TERMINAL PROGRAM permits you to communicate with other computers. Transfer files from one machine to another. Permits dumping memory across the phone lines. Receive files from other TRS-80's and "Shake Hands" with larger computers. This is the complete system called LAZY WRITER. There is no package written for the TRS-80 that is as comprehensive. This package is available for the TRS-80 mod 1 32k or larger with at least a single disk drive. List price is from $125.95. For a more complete overview send a self addressed envelope.

SEE BOTH AT BOSTON COMPUTER SHOW - BOOTH 131

SUPER-UTILITY

by K. WATT

SUPER-UTILITY was written by Kim Watt of Breeze Computing and is the most fantastic program of its kind to be available on the market at this time. SUPER-UTILITY is a machine language, stand alone program that has its own I/O routines and does not use any ROM or DOS calls. As a result, it should also operate on "CPM" machines and does not require that the disk be in any drive after initialization of the program. This program also supports the Radio Shack lower case modification, after initialization, SUPER-UTILITY occupies all memory from 4000H to 9FFFH. (That's 24K of machine code!!)

The zap utility is a program that does everything Apparats "SuperZap" does, plus many additional enhancements. The zap utility allows the user to go to the heart of the disk and read and/or modify data regardless of whether it is a protected disk or not. The screen printout on zap is similar to SuperZap, (one sector in HEX and ASCII) but also tells user the true and relative tracks and whether sector is IBM format or not. Zap also has a search routine that locates and displays the highest or lowest track on the disk and another that locates and displays the highest or lowest sector on a given track. In addition, zap allows user to single step track to track or sector to sector and even allows user to output to the printer. Zap has dual cursors (one for ASCII and one for HEX) that move simultaneously and allows that user to modify data using hex, decimal, or ASCII input, and any changes are automatically updated on both sides of the readout. Zap also allows user to display disk sectors, file sectors, copy disk sectors, compare disk sectors, or display/modify main memory. In addition you may search memory or the disk for a specified string and have its location returned.

Purge is a utility that allows user to kill files by filespec or have the computer list them one at a time for deletion. In addition, purge will also zero out unused directory entries or zero out unused disk sectors. You may also compute passwords on files. In addition, you can kill files by naming the category of the files (example: /CMD/BAS/TXT, (I) invisible, (V) visible, etc.) and also may change the disk name, date, passwords, protection levels. Purge also contains a complete disk directory that indicates all active and non-active files on the disk and their location in the directory, and the status of all granules on the disk.

Format is a utility that allows the user to format a disk with standard format, format WITHOUT ERASING existing data, or special format (custom format your disk any way you want it). This utility also allows the user to add tracks to any disk (example: change a 35 track disk to a 40).

The disk copy utility will copy any standard disk with or without formatting. The special disk copy allows the user to make a backup of "ANY" (that's right I said ANY) TRS-80* readable disk that is presently on the market, regardless of any efforts that have been made to protect the disk from being backed up. NOTE: (the only exception is that it won't copy itself). This program's only intended use is for user to make backups of his/her legally purchased programs for his/her own use. Please do not use this utility to make "bootleg copies" for others as authors of quality programs deserve to be paid for their royalties!

The tape copy utility allows the user to make backups of "ANY" TRS-80* readable tapes currently on the market regardless of any protection attempts or baud rate.

The disk repair utility allows the user to automatically repair the HIT and GAT sectors if damaged and will also automatically repair a damaged BOOT. This utility does a complete directory check and will advise user of any errors. In addition this utility allows the user to recover killed files (if the file was killed by this utility or by NEWDOS) and user may read protect the directory. This utility also advises you of all files that are on the disk the location of each and which are presently active.

The memory utility allows user to move memory, jump to memory, test memory compare memory, zero memory, exchange memory, edit memory, load memory to/from disk, and input or output a byte to any port. Only $49.95 plus $2.50 shipping handling.

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CIRCLE 11

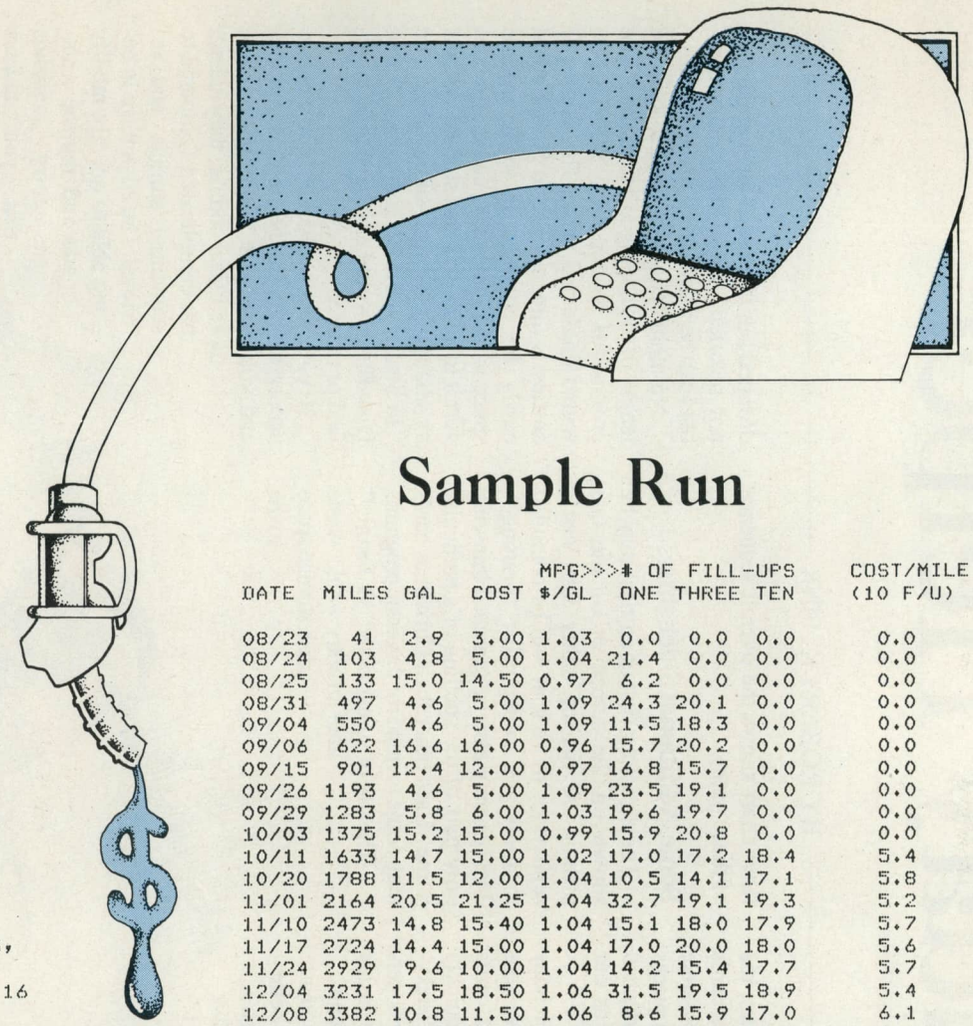
Variable Listing

X = Period designator. Defined as integer to speed reading of data and calculations.
A$(X) = String variable for date — used for reference.
M(X) = Odometer reading at time of filling.
G(X) = Gallons purchased, to one-tenth.
C(X) = Cost in dollars and cents.
UC(X) = Unit cost per gallon (calculated as C(X)/G(X)).
M1(X) = Miles Per Gallon (MPG) since last filling, calculated as gallons last filling divided by (odometer this filling less odometer last filling). Note: This will not be very accurate unless the fuel level was at the same point after each of these fillings.
M3(X) = MPG over last three fillings, calculated as the sum of gallons for the last three fillings (not including the current one), divided by (odometer this filling less odometer three fillings back). Note: This will tend to be more accurate than M1(X), but will be thrown off by fuel level differences between the starting and ending filling points.
M0(X) = MPG over last ten fillings, calculated similar to M3(X) above, using ten rather than three. Note: Differences in beginning and ending fuel levels will be spread over a larger number of fillings, thus tending to diminish their effect.
G0(X) = Intermediate variable used to represent the sum of gallons over ten periods.
TC(X) = Intermediate variable used to accumulate the sum of costs over ten periods.
CM(X) = Cost per mile shown in cents. Calculated as the sum of costs over the ten preceding periods divided by the mileage driven during those periods.
Y = Integer counter used in establishing G0(X).
H$ = Data element used to print report headings.
F$ = Data element used to establish print images.
X1 = Intermediate counter to establish number of data elements (in read/calculate loop) and to control the print loop.
CO = Counter to establish number of lines on the screen, avoiding scrolling information off the screen until the user is ready.
ZZ$ = String variable used to prompt for moving to the next screen.

Program Listing

```
50 REM  THIS PROGRAM - 'MPG' - CALCULATES GAS MILEAGE FOR
THE LAST FILL-UP, LAST 3 FILL-UPS, AND LAST 10 FILL-UPS
60 REM  IT ALSO SHOWS PRICE PAID PER GALLON       4/16/80
70 DEFINT X,Y
100 DIMA$(100),M(100),G(100),C(100),UC(100),M1(100),
M3(100),M0(100),G0(100),TC(100),CM(100)
150 READ H$,F$:ZZ$="<ENTER> TO CONTINUE"
200 FOR X=1TO100
300   READ A$(X):IF A$(X)="END" THEN X1=X-1:X=100:GOTO1500
400   READ M(X),G(X),C(X)
500   UC(X)=C(X)/G(X)
600   IF X=1 THEN 1500
5500 DATA"12/08",3382,10.8,11.5,"12/15",3585,12.5,13.25,
"12/24",3910,15.2,17,"12/29",4147,17,18.25,"01/08",4443,16.3
,17.75
5600 DATA"01/19",4811,17,19.6,"01/29",5063,17.1,20,"02/06",
5297,15.3,18,"02/15",5582,16.5,20,"02/27",5886,18.6,23,"03/0
4",6198,15.2,19.5
5700 DATA"03/09",6348,10.2,12.75,"03/17",6681,17.7,22.01,
"03/28",7016,17.7,22.25,"04/04",7197,13.1,16.5,"04/16",7549,
17.1,21.75
9999 DATA"END"
```

```
700   M1(X)=(M(X)-M(X-1))/G(X-1)
800   IF X<4 THEN 1500
900   M3(X)= (M(X)-M(X-3))/(G(X-1)+G(X-2)+G(X-3))
1000  IF X<11 THEN 1500
1100  FOR Y=X-1 TO X-10 STEP -1
1200     G0(X)=G0(X)+G(Y)
1250     TC(X)=TC(X)+C(Y)
1300  NEXT Y
1350  CM(X)=TC(X)/(M(X)-M(X-10)):CM(X)=CM(X)*100
1400  M0(X)=(M(X)-M(X-10))/G0(X)
1500 NEXT X
2000 CLS:PRINTTAB(22)H$:PRINT
2100 FORX=1TOX1:PRINTA$(X);:PRINTUSINGF$;M(X),G(X),
C(X),UC(X), M1(X),M3(X),M0(X),CM(X)
2150 CO=CO+1:IFCO=12THENPRINTZZ$;:INPUTZ1$:
PRINTTAB(22)H$:PRINT:CO=0
2200 NEXT
2300 END
5000 DATA "MPG>>>#  OF FILL-UPS    COST/MILEDATE  MILES GAL
COST $/GL  ONE THREE TEN    (10 F/U)"
5100 DATA "##### ##.# ##.## #.## ##.# ##.# ##.#     ##.#"
5200 DATA"08/23",41,2.9,3,"08/24",103,4.8,5,"08/25",133,15,
14.5,"08/31",497,4.6,5,"09/04",550,4.6,5,"09/06",622,16.6,16

5300 DATA"09/15",901,12.4,12,"09/26",1193,4.6,5,"09/29",
1283,5.8,6,"10/03",1375,15.2,15,"10/11",1633,14.7,15,"10/20"
,1788,11.5,12
5400 DATA"11/01",2164,20.5,21.25,"11/10",2473,14.8,15.4,
"11/17",2724,14.4,15,"11/24",2929,9.6,10,"12/04",3231,17.5,1
8.5
```



Sample Run

DATE	MILES	GAL	COST	MPG>>># $/GL	# OF FILL-UPS ONE	THREE	TEN	COST/MILE (10 F/U)
08/23	41	2.9	3.00	1.03	0.0	0.0	0.0	0.0
08/24	103	4.8	5.00	1.04	21.4	0.0	0.0	0.0
08/25	133	15.0	14.50	0.97	6.2	0.0	0.0	0.0
08/31	497	4.6	5.00	1.09	24.3	20.1	0.0	0.0
09/04	550	4.6	5.00	1.09	11.5	18.3	0.0	0.0
09/06	622	16.6	16.00	0.96	15.7	20.2	0.0	0.0
09/15	901	12.4	12.00	0.97	16.8	15.7	0.0	0.0
09/26	1193	4.6	5.00	1.09	23.5	19.1	0.0	0.0
09/29	1283	5.8	6.00	1.03	19.6	19.7	0.0	0.0
10/03	1375	15.2	15.00	0.99	15.9	20.8	0.0	0.0
10/11	1633	14.7	15.00	1.02	17.0	17.2	18.4	5.4
10/20	1788	11.5	12.00	1.04	10.5	14.1	17.1	5.8
11/01	2164	20.5	21.25	1.04	32.7	19.1	19.3	5.2
11/10	2473	14.8	15.40	1.04	15.1	18.0	17.9	5.7
11/17	2724	14.4	15.00	1.04	17.0	20.0	18.0	5.6
11/24	2929	9.6	10.00	1.04	14.2	15.4	17.7	5.7
12/04	3231	17.5	18.50	1.06	31.5	19.5	18.9	5.4
12/08	3382	10.8	11.50	1.06	8.6	15.9	17.0	6.1
12/15	3585	12.5	13.25	1.06	18.8	17.3	17.1	6.1
12/24	3910	15.2	17.00	1.12	26.0	16.6	17.9	5.8
12/29	4147	17.0	18.25	1.07	15.6	19.9	17.8	5.9
01/08	4443	16.3	17.75	1.09	17.4	19.2	18.5	5.7
01/19	4811	17.0	19.60	1.15	22.6	18.6	17.8	6.0
01/29	5063	17.1	20.00	1.17	14.8	18.2	17.8	6.0
02/06	5297	15.3	18.00	1.18	13.7	16.9	17.5	6.3
02/15	5582	16.5	20.00	1.21	18.6	15.6	17.9	6.2
02/27	5886	18.6	23.00	1.24	18.4	16.8	17.1	6.5
03/04	6198	15.2	19.50	1.28	16.8	17.9	18.0	6.3
03/09	6348	10.2	12.75	1.25	9.9	15.2	17.2	6.7
03/17	6681	17.7	22.01	1.24	32.6	18.1	17.5	6.7
03/28	7016	17.7	22.25	1.26	18.9	19.0	17.8	6.7

Holiday Helper

BY ROBERT K. FINK

If your household is like ours, the addressing of the Christmas cards was always put off as long as possible and out would come the bits and pieces of address books and the scratched through entries we referred to as our Christmas Card List.

Now things are simpler. I use Holiday Helper to keep track of who we sent cards to and who we received cards from, and then let my printer quickly provide a string of neatly typed "sticky-back" address labels. A little less personalized on the outside but the inside message is the sentiment that counts.

I developed this program two years ago while first using a tape cassette storage system for filing the entries. It worked OK but when my disk operating system came along, I knew it was time to take advantage of random access storage on an application such as this. The program was then modified to offer a foundation toward a universal Data File Manager and do two main jobs:

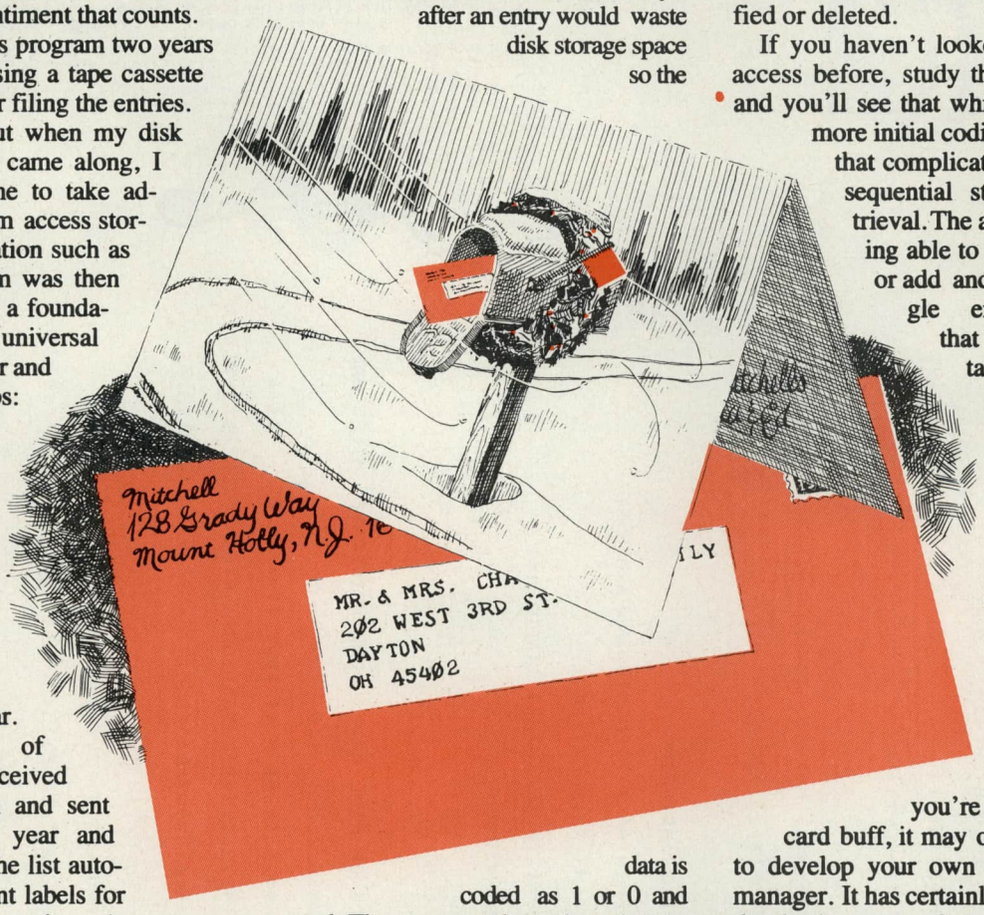
1. Keep track of people, their addresses and their marital and family status. Also, it had to easily find an entry and modify it as data changed from year to year.
2. Keep track of whether we received cards from them and sent them cards last year and allow us to cull the list automatically and print labels for just the active entries. As usual, the overriding consideration in such a home application was that it must be simple to use.

The menu method is my second choice (straight out questions and "Hit Enter" key only is my real favorite for goof-proof input choices and sequencing) but the five available choices make a simpler coding job using a menu. The flow chart shows the overall sequence of these paths.

Some Additional Sidelights

The directory (list of entries) may be shown on the screen or on the line printer. A list of either last year's senders or those sent will be compiled to allow you to begin list "pruning". The list may also be searched knowing only part of the spelling of a particular name. Uses other than Christmas cards may come to mind for this basic program.

The use of surname and "& Family" after an entry would waste disk storage space so the data is coded as 1 or 0 and stored. The computer then selects the correct "Mr. & Mrs." and the "& Family" as it prints each label.



Data input is kept from getting monotonous by using a blinking cursor and filling in a screen form after each name and address is input. The name or next year's data can easily be changed and refiled. Deletion of a name is kept simple so the number of the entry is dropped but the rest of the numbers are not resorted. The deleted entry numbers can be filled later with new names.

No alphabetizing is done to keep the length of the coding to a minimum. The program is written for a 32K TRS-80 with a single disk drive. The number of entries is dimensioned to 50 but could easily be enlarged if string storage space is available. You could also convert it to a Level II tape storage systems by changing the disk subroutines. The "In String" (INSTR) search function of Disk Basic would also have to be modified or deleted.

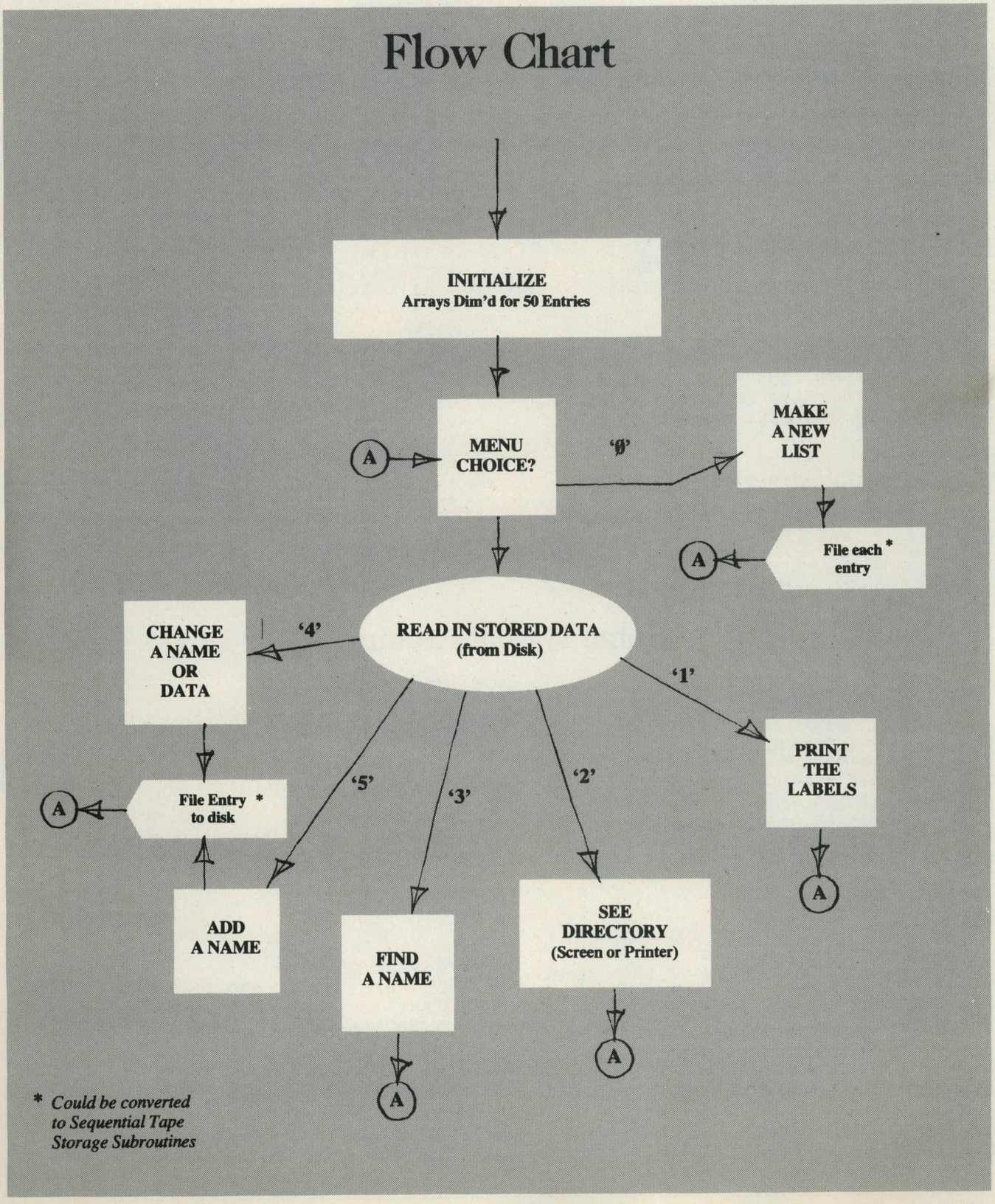
If you haven't looked into random access before, study the disk routines and you'll see that while they involve more initial coding, they are not that complicated compared to sequential storage and retrieval. The advantage in being able to quickly modify or add and replace a single entry demands that you always take advantage of random access. It opens up a whole world of "professional" techniques for the personal computer user.

There are a lot of spin-offs for such a file editor and even if you're not a Christmas card buff, it may offer you a base to develop your own application list manager. It has certainly taken some of the drudgery out of our holiday season and become a trusted holiday helper. □

Mr. Fink is a professor in the Engineering Technology department of Sinclair Community College in Dayton, OH. His previous PC articles include "Living Off the Land" (August 1980).

Illustration by Donni Richman

Flow Chart


INITIALIZE
Arrays Dim'd for 50 Entries
MENU CHOICE?
A
'Ø'
MAKE A NEW LIST
File each * entry
A
READ IN STORED DATA (from Disk)
'4'
CHANGE A NAME OR DATA
'1'
PRINT THE LABELS
A
'5'
'3'
'2'
File Entry * to disk
A
ADD A NAME
FIND A NAME
SEE DIRECTORY (Screen or Printer)
A
A
* Could be converted to Sequential Tape Storage Subroutines

Sample Run

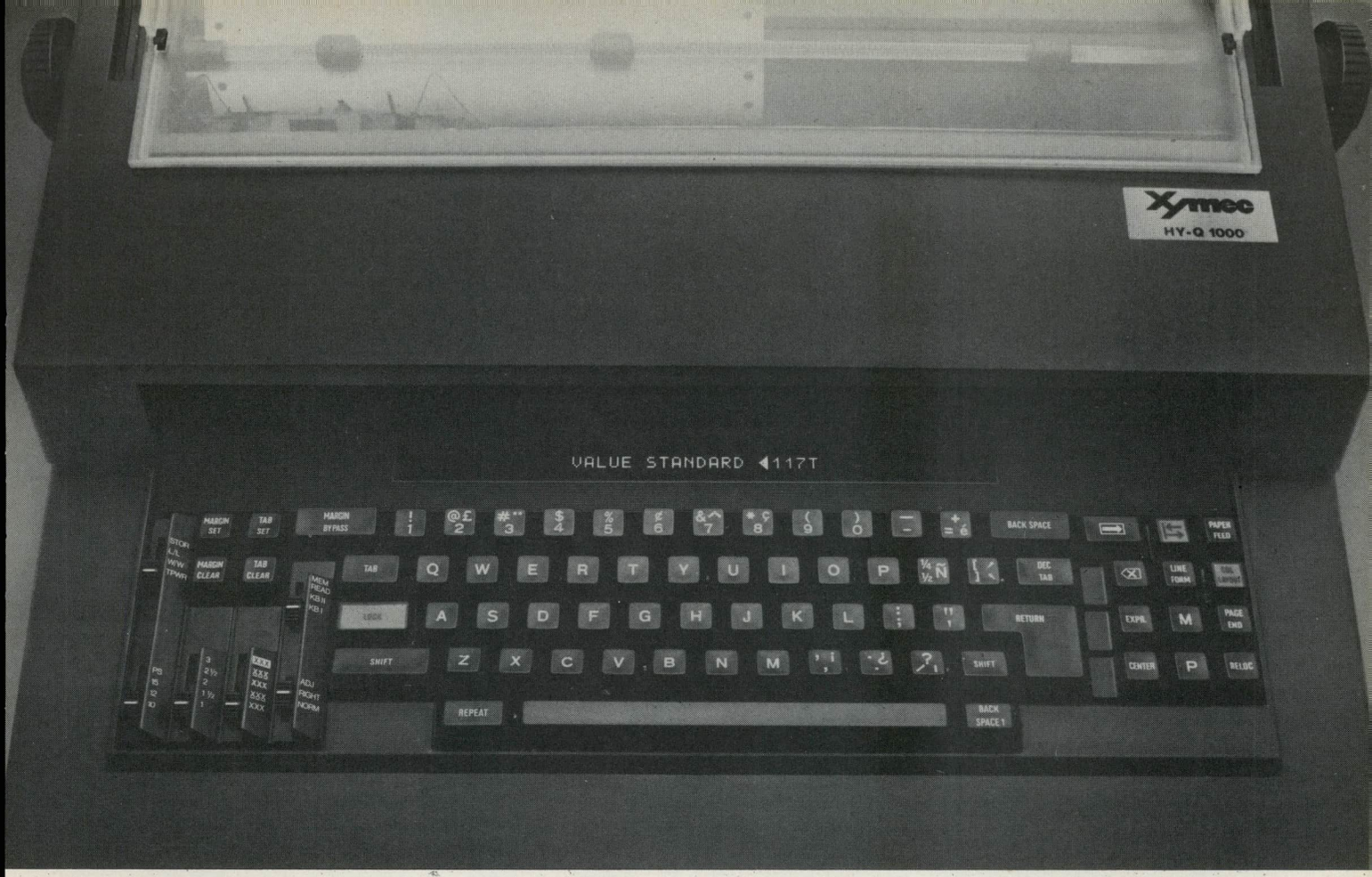
```
     EDITOR DIRECTORY ... MENU

< Ø > - BUILD A NEW LIST
< 1 > - PRINT OUT LABELS
< 2 > - SEE THE DIRECTORY
< 3 > - FIND A NAME
< 4 > - CHANGE A NAME (OR DATA)
< 5 > - ADD A NAME
<HELP>  FORMAT & INSTRUCTIONS

YOUR CHOICE....? 2

WANT EM' ON LINE PRINTER..<1>
OR ON THE SCREEN..<2>?

WANT LIST OF:
<1>  EVERYONE IN DIRECTORY
<2>  THOSE WE SENT TO LAST YEAR
<3>  THOSE WE RECEIVED LAST YEAR
? 1

 1 .  MR.& MRS. DAVE HOLL & FAMILY
 2 .  MR.& MRS. SANTA CLAUS & FAMILY
 3 .  MR.& MRS. BOB FINK & FAMILY
 4 .  MISS NATALIE ATTIRED
 5 .  MRS. SUSY LAST & FAMILY

E N D   O F   L I S T

HIT <ENTER> FOR MENU?
```

```
MAJOR SYMBOL TABLE....
H O L I D A Y   H E L P E R
+-------------------------------------+
+ NAME   .. DESCRIPTION               +
+-------------------------------------+
+ N$(I) .. NAMES (1ST & LAST)         +
+ AD$(I).. STREET ADDRESS             +
+ C$(I) .. CITY                       +
+ S$(I) .. STATE (& ZIP)              +
+ SN(I) .. SURNAME CODE               +
+ M(I)  .. MARITAL CODE               +
+ C(I)  .. FAMILY CODE                +
+ CR(I) .. CARD REC'D. CODE (LAST YR.)+
+ CS(I) .. CARD SENT CODE             +
+ SN$(I).. SURNAMES (&SUFFIX)         +
+ I      .. CLOSED LOOP COUNTER       +
+ LN     .. LAST ITEM NUMBER          +
+ PF     .. PRINTER OR SCREEN FLAG    +
+ Y$     .. INSTR. SEARCH INPUT       +
+ FL     .. NEW START FLAG            +
+ K%     .. DISK ENTRY COUNTER        +
+ PN%    .. POSITION NO. (DISKFILE)   +
+ PR%    .. PHYSICAL RECORD NO.       +
+ T      .. TIMER SEED                +
+ S      .. SCREEN CURSOR POSITION    +
+ IP$    .. INKEY$ DATA INPUT         +
+                                     +
+-------------------------------------+
```

Some typical examples

```
     EDITOR DIRECTORY ... MENU

< Ø > - BUILD A NEW LIST
< 1 > - PRINT OUT LABELS
< 2 > - SEE THE DIRECTORY
< 3 > - FIND A NAME
< 4 > - CHANGE A NAME (OR DATA)
< 5 > - ADD A NAME
<HELP>  FORMAT & INSTRUCTIONS

YOUR CHOICE....? 1

........  SHALL WE SEND TO:
<1>  EVERYONE ON THE LIST
<2>  ONLY THOSE WE RECEIVED LAST YEAR...
          ...???????
YOUR CHOICE  ?  1

READY YOUR LABELS & PRINTER

TAP ANY KEY TO STOP AND ADJUST.
HOLD ANY KEY TO RESTART PRINTING

HIT <ENTER> TO BEGIN PRINTING?
```

```
MR.& MRS. PAUL BUNYON
2314 NORTH STAR RD.
NOME
AK 99550


MR.& MRS. CHARLES EVANS & FAMILY
222 WEST 3RD ST.
DAYTON
OH 45402


MISS JANET ROUSH
APT. 61C  102 S. 3RD ST.
MIAMI
FL 33330


MR.& MRS. DUKE DONOHUE
458 HARSWOOD RD.
COLUMBIA
MO 65556
```



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CIRCLE 12

Program Listing

```
0 '  **  **  **  **  **  **  **  **  **  **  **  **  **
1 '  **          'H O L I D A Y   H E L P E R'        **
2 '  **   CHRISTMAS CARD EDITOR AND PRINTER  VER 1.1  **
3 '  **        USES RANDOM ACCESS DISK STORAGE        **
4 '  **         RK FINK  7/80     MIRACLE SOFTWARE     **
5 '  **     REMEMBER.. IF IT RUNS, IT'S A MIRACLE!!    **
6 '  **    USES 'XMASDATA/TXT' AS DISK FILE STORAGE    **
7 '  **  **  **  **  **  **  **  **  **  **  **  **  **
10 '
15 '
20 CLS:CLEAR5000:DIMN$(50),AD$(50),C$(50),S$(50),SN(50),
   C(50),M(50),CS(50),CR(50)
30 DATAMR. ,MRS. ,MISS ,MR.& MRS. ,& FAMILY
40 FORI=1TO5:READSN$(I):NEXT
50 '
60 '=-=-=-=- MENU AND PROGRAM MAINLINE -=-=-=-=-=
405 CLS:PRINT@20,"EDITOR DIRECTORY ... MENU":PRINT
406 PRINT"< 0 > - BUILD A NEW LIST"
407 PRINT"< 1 > - PRINT OUT LABELS"
408 PRINT"< 2 > - SEE THE DIRECTORY"
409 PRINT"< 3 > - FIND A NAME"
410 PRINT"< 4 > - CHANGE A NAME (OR DATA)"
411 PRINT"< 5 > - ADD A NAME"
413 PRINT"<HELP>  FORMAT & INSTRUCTIONS"
415 PRINT:INPUT"YOUR CHOICE....";Q$:Q=VAL(Q$)
416 IFQ<0ORQ>5GOTO405
417 IFQ$="HELP"GOTO2000
418 IFQ=0GOTO1500
419 IFFL=0THENGOSUB13000
440 IFQ=1GOTO850
450 ON(Q-1)GOTO500,600,700,800
497 '=-=-=-=-= SELECTION SUBROUTINES =-=-=-=-=
498 '
499 ' ***  DISPLAY THE LIST  ***
500 CLS:INPUT"WANT EM' ON LINE PRINTER..<1>
    OR ON THE SCREEN..<2>";A
510 IFA<1ORA>2THEN500
512 CLS:PRINT"WANT LIST OF:
            <1>  EVERYONE IN DIRECTORY
            <2>  THOSE WE SENT TO LAST YEAR
            <3>  THOSE WE RECEIVED LAST YEAR"
513 INPUTB
520 IFA=1THENGOSUB900
522 IFB=2THENPRINT"THOSE WE SENT TO LAST YEAR"
524 IFB=3THENPRINT"THOSE WE RECEIVED LAST YEAR"
530 PRINT" "
540 FORI=1TOLN-1
541 IFN$(I)="DELETED"THEN570
542 IFB=2ANDCS(I)=1THEN550
544 IFB=3ANDCR(I)=1THEN550
546 IFB=1THEN550
548 GOTO570
550 PRINTI;".  ";:GOSUB1000
560 G=1:GOSUB14000
2050 PRINT:PRINT:PRINT"TO DELETE AN ENTRY USE 'CHANGE'
 COMMAND, THEN"
2060 PRINT"FOR 'NAME' ENTER THE WORD 'DELETED'....":PRINT
2070 INPUT"HIT ENTER FOR MENU";A$:GOTO405
2497 '
2498 '= = = = = = = = = = = = = = = = = = = = = = = = =
2499 '  PRINT THEM LABELS!!
2500 CLS:PRINT"READY YOUR LABELS & PRINTER":PRINT:PRINT"TAP
 ANY KEY TO STOP AND ADJUST."
2510 PRINT"HOLD ANY KEY TO RESTART PRINTING":PRINT
2520 INPUT"HIT <ENTER> TO BEGIN PRINTING";A$
2530 FORI=1TOLN-1:IFN$(I)="DELETED"THEN2560
2535 GOSUB2800
2540 IFPF=2ANDCR(I)=1THEN2570
2550 IFPF=1THEN2570
2560 NEXTI:GOTO2820
2570 IFSN(I)=1ANDM(I)=1THENLPRINTSN$(4);:GOTO2590
2580 LPRINTSN$(SN(I));
2590 LPRINTN$(I);" ";
2600 IFC(I)=1THENLPRINTSN$(5) ELSELPRINT" "
2610 LPRINTAD$(I):LPRINTC$(I):LPRINTS$(I)
2620 LPRINT" ":LPRINT" ":' ADJUST THESE TO FIT YOUR LABELS
2630 GOTO2560
2800 IFINKEY$=""THEN2820
2810 FORNN=1TO200:NEXT:IFINKEY$=""THEN2810
2820 RETURN
3000 PRINTI;".  ";N$(I):PRINTAD$(I):PRINTC$(I):PRINTS$(I):
 PRINT:RETURN
3099 '   ***  FILL IN THE FORM  ***
3100 PRINT"MR. <1>   MRS. <2>   MISS <3> ...."
3110 PRINT"    MARRIED?   (Y/N)      ........"
3120 PRINT"    CHILDREN?  (Y/N)      ........"
3130 PRINT"  CARD SENT LAST YEAR (Y/N) ......"
3140 PRINT"CARD RECEIVED LAST YEAR (Y/N) ...."
3150 S=612:GOSUB11000
3160 SN(I)=IP:S=S+64:GOSUB11000
3170 IFIP$="Y"THENM(I)=1ELSEM(I)=0
3180 S=S+64:GOSUB11000
3190 IFIP$="Y"THENC(I)=1ELSEC(I)=0
3200 S=S+64:GOSUB11000
3210 IFIP$="Y"THENCS(I)=1ELSECS(I)=0
3220 S=S+64:GOSUB11000
3230 IFIP$="Y"THENCR(I)=1ELSECR(I)=0
3240 PRINT"DATA ENTRY FINISHED...";
3250 G=1:GOSUB14000
3260 RETURN
9998 '
9999 '===  INPUT NAME AND ADDRESS SUBROUTINE ===
10000 INPUT"N A M E..... (FIRST THEN LAST)";N$(I)
10010 IFN$(I)="ZZZZ"THENLN=I:RETURN
10020 PRINT:INPUT"STREET ADDRESS";AD$(I)
10030 PRINT:INPUT"CITY   (NOT STATE!.. NO COMMA)";C$(I)
10040 PRINT:INPUT"STATE (2 LETTER ABBREV.) & ZIP CODE";S$(I)
10050 CLS:GOSUB3000:A$="":INPUT"IS THIS CORRECT  (Y/N)";A$
10060 IFLEFT$(A$,1)="N"THENCLS:GOTO10000
10070 PRINT@512,CHR$(31):
```

```
570 NEXTI
580 GOSUB910:PRINT:PRINT"E N D   O F   L I S T":PRINT
590 INPUT"HIT <ENTER> FOR MENU";A$:GOTO405
598 '
599 '   ***   FIND A NAME  ***
600 GOSUB610:GOTO690
610 CLS:INPUT"ENTER NAME...(LAST NAME OR A PORTION OF IT)";Y$
620 FORI=1TOLN
650 TT=INSTR(N$(I),Y$)
660 IFTT<>0GOTO680
670 NEXTI
675 PRINT:PRINT"END OF LIST.... ENTRY NOT FOUND":GOTO685
680 PRINT:GOSUB3000:PRINT
685 RETURN
690 INPUT"HIT <ENTER> FOR MENU";A$:GOTO405
698 '
699 '   *** CHANGE A NAME OR THE ENTRY DATA ***
700 GOSUB610
710 PRINT
770 GOSUB10000:GOSUB12200:K%=I:GOSUB15000:CLOSE:FL=0:GOTO405
798 '
799 '   ***  ADD A NAME  ***
800 I=LN:LN=LN+1:CLS:GOSUB10000
810 GOSUB16000:FL=0:GOTO405
847 '
848 '
849 '  *** ADDRESSING THE CARDS  ***
850 CLS:PRINT"........  SHALL WE SEND TO:
                <1>  EVERYONE ON THE LIST
                <2>  ONLY THOSE WE RECEIVED LAST YEAR...
                          ...???????"
860 INPUT"YOUR CHOICE  ";PF:IFPF<1ORPF>2THEN850
870 GOSUB2500
880 GOTO405
900 POKE16414,PEEK(16422):POKE16415,PEEK(16423):RETURN
910 POKE16414,88:POKE16415,4:RETURN
1000 IFSN(I)=1ANDM(I)=1THENPRINTSN$(4);:GOTO1020
1010 PRINTSN$(SN(I));
1020 PRINTN$(I);" ";
1030 IFC(I)=1THENPRINTSN$(5) ELSEPRINT" "
1040 RETURN
1495 '
1496 '
1497 '=== INITIAL AND NEW DISKFILES OF DATA START HERE ===
1498 '===  CHANGE 'XMASDATA/TXT' FILE SPEC. FOR OTHER FILES ===
1499 '  ***  CONSTRUCT A NEW LIST  ***
1500 CLS:I=1:GOSUB12200
1510 GOSUB10000:K%=I:CLS:PRINT"S T O R I N G ...":GOSUB15000
1520 IFN$(I)="ZZZZ"THENLN=I:CLOSE:GOTO405
1530 CLS:PRINT"USE  ZZZZ FOR THE NAME TO END THE LIST"
1540 G=1:GOSUB14000
1550 I=I+1:GOTO1510
2000 'INSTRUCTIONS
2010 CLS:PRINT"ONLY ENTER THE NAME .. NOT SURNAME OR 'FAMILY'"
2020 PRINT"AFTER NAME ENTRY HIT ENTER,  YOU'LL BE PROMTED FOR"
2030 PRINT"THE REST.  DON'T USE COMMAS."
2040 PRINT"REMEMBER TO ADD ZIP CODE WITH STATE ABBREVIATION!!"
10080 GOSUB3100
10090 RETURN
11000 '  *** GET AN INKEY$ INPUT
11010 FORT=1TO20:FORTT=1TO3
11020 PRINT@S,CHR$(191);:NEXTTT
11030 PRINT@S," ";:NEXTT:IP$=""
11040 IP$=INKEY$:IFIP$=""THEN11040
11050 IP=VAL(IP$):RETURN
11998 ' = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
11999 ' *** THE RANDOM ACCESS DISK FILE SUBROUTINES FOLLOW ***
12000 '  **  OPEN THE FILE, FIELD THE BUFFER....ETC.       **
12200 OPEN"R",1,"XMASDATA/TXT":RETURN
12300 FIELD1,((PN%-1)*73)AS STARTHERE$,2 AS SA$,20 AS NN$,25
 AS AA$,10 AS CC$,8 AS SS$,2 AS M$,2 AS CH$,2 AS CS$,2 AS CR$
12310 RETURN
12400 LSETSA$=MKI$(SN(I))
12410 LSETNN$=N$(I)
12420 LSETAA$=AD$(I)
12430 LSETCC$=C$(I)
12440 LSETSS$=S$(I)
12450 LSETM$=MKI$(M(I))
12460 LSETCH$=MKI$(C(I))
12470 LSETCS$=MKI$(CS(I))
12480 LSETCR$=MKI$(CR(I))
12490 RETURN
12999 '  *** INPUT ENTIRE FILE FROM DISK  ***
13000 GOSUB12200:I=1
13010 FORPR=1TOLOF(1)
13020 PN%=I-3*(PR-1):IFPN%>3THEN13080
13030 GOSUB12300
13040 GET1,PR
13050 GOSUB13400
13055 IFN$(I)="ZZZZ"THENLN=I:GOTO13090
13060 I=I+1
13070 GOTO13020
13080 NEXTPR
13090 CLOSE:FL=1:RETURN
13400 SN(I)=CVI(SA$):N$(I)=NN$:AD$(I)=AA$:C$(I)=CC$:S$(I)=SS$:
 M(I)=CVI(M$):C(I)=CVI(CH$):CS(I)=CVI(CS$):CR(I)=CVI(CR$)
13410 FORJ=LEN(N$(I))TO1STEP-1:IFRIGHT$(N$(I),1)=" "THENN$(I)=
 LEFT$(N$(I),LEN(N$(I))-1)
13420 NEXTJ:RETURN
14000 FORTT=1TOG*400:NEXT:RETURN
14999 '  ***  OUTPUT TO DISK -ONE ENTRY-  ***
15000 PR%=INT((K%-1)/3)+1
15010 PN%=K%-3*(PR%-1)
15020 GOSUB12300
15025 GET1,PR%
15030 GOSUB12400
15040 PUT1,PR%
15050 RETURN
15999 '  ***  OUTPUT AN ADDED ENTRY TO DISK  ***
16000 K%=I:GOSUB12200
16010 GOSUB15000
16020 I=LN:K%=I:N$(LN)="ZZZZ"
16030 GOSUB15000
16040 CLOSE:RETURN
```

Switch Your Logic

BY GENE HECTOR

Boolean logic can be very useful in Commodore Basic programming which includes the three standard logical operators, AND, OR and NOT. This article, however, will introduce an allied concept that I refer to as Arithmetic Logic.

Boolean Logic

Before explaining Arithmetic Logic, it may be worthwhile to introduce some of the basic concepts of Boolean logic for those of you who have not yet been exposed to it.

A good way to show how the Boolean operators work is to use Truth Tables. Consider equation #1:

NT = NOT A

The Truth Table for equation #1 is:

	NOT
A	NT
F	T
T	F

Table 1

where T is *true* and F is *false*. Here we see that NT is the logical converse of A.

Although the Pet will treat zero as False and any non-zero number as true, in a logical evaluation, NOT N, where N is any number other than −1, does not return a zero (be careful of this one). NOT −1, however, returns a zero (false). Also if you run the following short program,

```
10 PRINT 4 > 3
20 PRINT 3>4
30 END
```

you will see that the Pet prints −1 and 0. Hence in the Pet, −1 is logically equivalent to true and 0 is logically equivalent to false.

Table I can now be rewritten as,

	NOT
A	NT
0	−1
−1	0

Table 1A

I will use −1 for true and 0 for false in the remaining Truth Tables.

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The equations and Truth Tables for the AND and OR operators are seen in equations #2 and #3 respectively:

AN = A AND B

	AND	
A	B	AN
0	0	0
0	−1	0
−1	0	0
−1	−1	−1

Table 2

R = A OR B

	OR	
A	B	R
0	0	0
0	−1	−1
−1	0	−1
−1	−1	−1

Table 3

The AND logic, equation #2 states that AN will be true (−1) only when both A and B are true (−1); otherwise AN is false (0).

The OR logic, equation #3, states that R will be true when either (or both) A or B is true. Since R is true when both A and B are true, this is actually an INCLUSIVE OR operator.

From this, you can then proceed with these three logical operators and construct more complex Boolean expressions as the need arises. Since there are many fine books on Boolean logic, let's continue on to the subject matter of the article.

Arithmetic Logic

In the following program,

```
10 INPUT "ENTER A"; A
20 D=A > 3
30 PRINT D: GOTO 10
40 END
```

for values of A of 3 or less, the program returns a value of D = 0, or D is false. For values of A of more than 3, the program returns a value of D = −1, or D is true. Line 20 shows how a sample term, or switch, operates to result in either a true or false statement.

In the next program,

```
100 INPUT "ENTER A,B"; A,B
110 AN = -(A>3)*(B>4)
120 PRINT AN: GOTO 100
130 END
```

AN will = −1, true, only when A is greater than 3 and B is greater than 4. Line 110 is an example of an ARITHMETIC AND statement. The negative sign is required to make sure than AN is −1 when true. Note that, in general, a negative sign is required only when an even number of terms is used. To illustrate this principle, let's introduce an additional, or third term into line 110. Let's have the third term be true when B <5.5, or when line 110 becomes,

```
110 AN = (A>3)*(B>4)*(B<5.5)
```

Now if we set A = 5 and B = 5, than AN = −1 (true).

Of course the terms can take other forms, such as A = 5, A = C, A > < B and so forth. The only restriction is that each term returns either a −1 (true) or a 0 (false).

I confine my use of Arithmetic Logic expressions to modifiers and switches in complicated equations. This results in very succinct coding even for unusual equations.

Two additional programs are included to explain and illustrate the concept. The first program introduces additional logic statement types or functions. Two separate runs are provided to show the operation of the various functions. I suggest that you put the program on your machine and try it out. The program is pretty much self-explanatory.

```
10 INPUT "ENTER A,B,C"; A,B,C
20 D = (A>3)< >(B>3): REM EXCLUSIVE OR
30 DBAR = (A>3) = (B>3): REM NOT EXCLSV. OR
40 E = SGN ((A>3)+(B>3)+(C>3)): REM OR
50 F = −(A>3)*(B>3): REM AND
60 G = C>A: REM TEST INEQUALITY
70 NG = C<=A: REM NOT G
80 PRINT " D DBAR E F G NG"
90 PRINT D;DB;TAB(7);E;F;G;NG:END


RUN
ENTER A,B,C?3,4,5
   D   DBAR   E   F   G    NG
  −1     0   −1   0  −1     0

READY
RUN
ENTER A,B,C?5,4,3
   D   DBAR   E   F   G    NG
   0     −1   −1  −1   0    −1
```

Try some additional runs with this program to see how the various functions operate. By now I am sure you have noted that the EXCLUSIVE OR function was introduced into the program although it was not discussed previously. The EXCLUSIVE OR can be constructed from the basic three logic functions, AND, OR and NOT. In this function, the output variable, D in this case, will be true only when one term is true and the other is false.

If you have stayed with me to this point, I now have something practical to show you. The next program is an example of what can be done with Arithmetic Logic. This program gives the number of days in any selected month, leap year or not.

```
100 REM NO. OF DAYS IN A MONTH
110 REM USING ARITHMETIC LOGIC
120 REM BY GENE HECTOR 16-APR-80
200 INPUT "MONTH,YEAR(MM,YYYY)";M%,Y%
210 LY% = Y%/4 = INT(Y%/4)
220 DM%   =   INT(30.501+.5*COS((M%+(M%<8))*π)
+(M% = 2)*(2+LY%)
230 PRINT"THERE ARE"DM%"DAYS IN THE MONTH."
240 PRINT: GOTO 200

RUN
MONTH,YEAR(MM,YYYY)? 2,1979
THERE ARE 28 DAYS IN THE MONTH

MONTH,YEAR(MM,YYYY)? 2,1980
THERE ARE 29 DAYS IN THE MONTH

MONTH,YEAR(MM,YYYY)? 3,1980
THERE ARE 31 DAYS IN THE MONTH

MONTH,YEAR(MM,YYYY)?
```

In line 200, the year should be given as four digits (e.g., 1980). In line 210, LY% flags a leap year for any year greater than 1900 and less than 2100. Hence, the year you enter should be in this same range. Note that LY% = −1 for a leap year and 0 otherwise. Line 220 shows how Arithmetic Logic can be employed. The two logic switches are (M%<8) and (M% = 2).

The easiest way I can think of explaining the operation of line 220 is to step you through its development. I observed that there are an average of 30.5 days in a month (slightly less in a non-leap year). Next, I noted that with the exception of February, the number of days in each month differs from the average by + or −0.5. I also noted that the series alternated, for example, January has more than average, February has less, March has more and so forth. Unfortunately, the series reverses from August on.

How then can we include these various factors to develop line 220? To answer this question, let's turn to the following program.

```
 10 PRINT CHR$(147):REM CLEAR
 20 PRINT" FO=";COS(12*π);CHR$(17)
 30 DATA 31,28,31,30,31,30,31,31,30,31,30,31
100 PRINT" M%  F1  F2  F3  F4  F5  DA  YS";CHR$(17)
110 FOR M = 1 to 12: M% = M
120 F1 = INT(. 001+COS(M%*π))
130 F2 = INT(. 001+COS((M%−1)*π))
140 F3 = INT(. 001+COS((M%+(M%<8))*π))
150 F4 = INT((. 5*COS((M%+(M%<8))*π))
          *10+5)/10
160 F5 = INT(30. 501+*COS((M%+(M%<8))*π))
170 READ F6
200 PRINT M%;TAB(5);F1;TAB(9);F2;TAB(13);F3;
TAB(17);F4;TAB(22);F5;
210 PRINT TAB(27);F6
220 NEXT:END

RUN
FO =  .999999996
```

M%	F1	F2	F3	F4	F5	DAYS
1	−1	1	1	.5	31	31
2	1	−1	−1	−.5	30	28
3	−1	1	1	.5	31	31
4	1	−1	−1	−.5	30	30
5	−1	1	1	.5	31	31
6	1	−1	−1	−.5	30	30
7	−1	1	1	.5	31	31
8	1	−1	1	.5	31	31
9	−1	1	−1	−.5	30	30
10	1	−1	1	.5	31	31
11	−1	1	−1	−.5	30	30
12	1	−1	1	.5	31	31

The COS of any even multiple of π should be +1. Line 20 shows that this is not necessarily true on the Pet. The importance of this can be shown by INT(COS(12*π)) which has a value of 0. Hence, the .001 used in line 120 is merely inserted to account for the above round-off error in the COS function.

F1 (line 120) evaluates COS(M%*π) for various months, M%. It yields an alternating series of + and −1. F2 yields the same series but with the signs reversed. Note that up through July (i.e., M%<8), F2 is high when the days in the month exceed the average and low when the days are below average. Hence, F2 has the correct polarity through July and F1 has the correct polarity from August through December.

The problem is to use F2 for M%<8 and switch to F1 at M%> = 8. F3 accomplishes this by the use of the logic switch M%<8, which has a value of −1 for M%<8 and a value of 0 for M%>=8.

F4 multiplies the function by .5 and F5 adds the monthly average of 30.5 days (plus .001 for roundoff). Note that F5 is correct for every month but February. Hence, a correction for February will complete the task.

Since F5 has a value of 30 for February, it will be necessary to subtract 2 in a normal year and subtract 1 in a leap year. As noted earlier, LY% is the leap year flag. Recall that LY% =−1 in a leap year and 0 otherwise.

This brings us to the final two terms in line 220 of the fourth program. The first of these, LY% = 2, has a value of −1 for February and 0 for other months. The other, 2+LY%, has a value of 2 for a normal year and a value of 1 for a leap year.

The final two terms, when multiplied together, give an ARITHMETIC AND statement. There are three possible results:

- 1. If M% = 2 (February) and LY% =−1 (leap year), then 1 is subtracted from F5.
- 2. If M% = 2 and LY% = 0 (normal year), then 2 is subtracted from F5.
- 3. If M%< >2 (other than February), then F5 is left as is.

I chose the "No. of days in a Month" illustration to show that this technique can be used to solve a rather complicated problem. It can also be used in more mundane places, such as a statement like the following:

```
240 IF C>5 THEN A = A+2
```

Try replacing this line with

```
240 A = A−(C>5)*2
```

I hope you find Arithmetic Logic as useful a programming tool as I do. Some benefits of Arithmetic Logic include: (1) it provides elegant solutions to some otherwise messy problems; (2) it reduces the use of READ, DATA and RESTORE statements; (3) it usually runs fast since looping is avoided; and (4) it can save on valuable R/W memory space. □

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CIRCLE 14

A Wave of the Future

BY KEN MAZUR

The technological tidal wave known as microcomputers is heading for our shores and when it crashes upon us the effect will alter our lives in ways we don't fully forsee today. This wave, which started with the merest swell in the form of the MITS Altair in 1975, gathered force and speed in 1980; the broad, deep undulation of the Altair is changing into a giant, relentless force. Momentum is building and it appears there may be little our society can do except try to understand the technological and social implications of what is occurring and what will continue to occur.

In reviewing the events and developments of the microcomputer field during 1980, *Personal Computing* talked to persons intimately involved in the industry — the surfers — individuals who have tied their careers and futures to this wave of technology; individuals who are riding the crest of the wave. We asked them to look at the currents they negotiate daily and to peer from the crest into the future to see what lies ahead.

Although these surfers are riding different parts of the wave, they all have one trait in common — they are hanging on for dear life as they find that the most common characteristic of the wave in general is change. In a strange way, change has remained a constant. New and exciting developments announced on a Monday were old hat by Friday. But no matter what the individual developments or products might have been, each added to the overall swell of the movement. Each day of 1980 saw the personal computer field grow larger and more complex. As Mike Conner of Matchless Systems says, "It's hard to keep track of where everything is going."

Events taking place in 1980 show that the personal computer phenomenon is growing. Just to take one example, Apple Computer Co. is reported to have made $75 million in 1979 and estimates for 1980 put the figure somewhere around $150 million. The firm announced that it will go public very soon.

Increasing revenues for companies like Apple are only one indication of the growth that is taking place, however. There are other signs as well. Individual trickles and eddies are combining to form major currents in the general movement. A case in point is the activity going on in the networking aspects of small computers. This year we watched as both the CompuServe Information System and The Source (consumer-oriented microcomputer communication networks) grew to meet increasing demands on their systems. We further watched while CompuServe aligned itself with Radio Shack to take advantage of that company's 7000-plus retail outlets while The Source sold a majority interest in itself to Readers Digest.

New software houses have appeared daily and microcomputer introductions tumble one upon the other until it gets hard to remember who is making what. Advertising monies, at one time confined to trade-oriented publications, are spreading out to television and general interest magazines.

Following a recent survey, International Data Corporation said, "The fast-growing area of desktop computers (the Apples, TRS-80s, etc.) — virtually nonexistent five years ago — will hit almost $2 billion in shipments this year and build to an installed base of almost 1,000,000 units. Shipments should increase over $1 billion/year for the next five years."

In a presentation called "The Future of Personal Computing" delivered at the National Information Conference and Exposition, Carol Weiszmann, editor of Autotransaction Industry Report, said, "The desktop sector contributed nearly $1.2 billion dollars to computer industry revenues in 1979, shipped well over 300,000 systems worldwide and will grow quite impressively at 30% per year or better into the mid-1980s. At that point, annual worldwide shipments will be approaching one-and-a-half million units, worth over $4.3 billion dollars, and the installed base will exceed four million machines."

Although specific figures differ depending on to whom you talk, the conclusions are the same: microcomputers become more common everyday. Systems are being sold in increasing numbers and continued growth is projected until the numbers involved are hard to envision.

Even the present economic condition of the country isn't seen as a deterrent to the growth of personal computers. In some ways, the economic climate will promote the momentum as small business owners find they can increase productivity and/or cut back overhead with the versatile machines. Economic problems may cause some of the surfers now on the crest to sink, but it's apparent that others will be ready to fill the gaps.

During the growth period of the next few years, some manufacturers will be caught in whirlpools from which it is difficult to escape. Scott Adams of Adventure International, sees one such vicious cycle, that of software availability and new machine development, already making its appearance.

"When somebody does come out with a new computer," he explains, "people don't usually buy it right away unless there's software. Usually software doesn't get developed unless people buy the computer."

Adams foresees that system manufacturers will combat this problem by approaching established software houses and offering to convert existing software to the new machines for free if the software firm will then distribute the converted products for the new computers.

Like everything else in the field, prices have undergone changes this year with experts predicting more to come. As time goes by, however, the general downward trend of the industry's price structure will change from being an overall phenomenon to one of a more selective native.

Ron Johnston of Racet Computes predicts that low-end printer prices will nose-dive again next year but said that as more powerful machines come on the market "the hard disks will come more and more into play; look for a real shortage for sources of hard disks which means they won't go down in price at least for a period of time."

Mike Conner also foresees printers continuing to drop in price because of increased demand and improved technology.

Adams thinks that he sees prices beginning to level off.

"Trends in hardware are that costs are going down but I think it's starting to bottom out. You're going to see equipment come out that has a little better design than its predecessors but with higher price tags. An example would be the Model III Radio Shack, which is basically a Model I re-packaged with some features that should have been in the Model I."

During 1980, three distinct end user markets developed: small businesses, education and private computer owners.

Grant Squires, a microcomputer consultant, watched what he considers a swing toward the business user in both systems and software development.

"I think that the TRS-80 Model II and the Apple III are good examples of this trend," he remarks. "Both of those machines are being pushed by the manufacturers as business systems. There has also been a tremendous increase in software designed to meet business needs. Last year at this time you had to hunt for a general ledger package that would run on whatever machine you were interested in using; now, you have to decide which package is closest to meeting your individual business needs. The same is true with word processing packages. There are a number of them in the field that you can choose from now. Software packages are still not created equal but the increasing number of business applications shows that the industry, or at least a portion of it, is aimed at the business market."

Squires feels that these trends will continue and will be supported by new developments in the field.

"Last year hard disks were being dreamed and talked about; now they are available. These units will make small computers more viable as business machines," he claims.

Education is receiving and will continue to receive a great deal of attention from the field. Johnston predicts that schools and the general area of education will be the largest, single future market for software houses.

"As far as types of software goes," he says, "I've maintained since I first saw the machines (personal computers) that computer-aided education was going to be the major market. It's been a little slower developing than I had expected, but I still maintain that in the long run it is going to be the largest single market."

Classroom Computer News reports that Texas Instruments claims education to be one of its four top markets, while Radio Shack states that education is second only to small business and Commodore Business Machines estimates 25% to 40% of its market for 1981 is the educational field.

Two problems during the past year in the expanding educational market have been the quality of software and the marketing strategies of software houses.

Anyone who has seen a number of educational software packages knows there is still a lot of junk floating around because programmers aren't necessarily good teachers. As more and more educators turn their skills toward microcomputers, programs will increase in quality and effectiveness. The better software, already appearing, will be further promoted as software houses learn to target material to the right audience.

"I still don't see an avenue to do a good merchandising job on educational software," Johnston admits. "The computer store doesn't handle it. A computer store isn't the right medium to get educational software out. There is a magazine or two starting up in the educational world that handles computer-related education. I think you're going to have to go to such specialty sources to target that kind of product. This is one of those things that is going to have to develop."

Systems manufacturers have been adding their weights to the problem of getting computers into educational settings by offering special packages such as cluster systems which tie a number of personal computers into a single network and special deals to schools that buy a firm's hardware.

The individual personal computer owner has also been receiving a great deal of attention this year but industry perception of who that individual is and what he or she is like has been changing.

Products are being targeted more to a "plug-in" oriented end user. Advertisements for wire wrap tools have given way to product announcements involving items that are ready to operate as soon as you plug into an existing turn-key system. The concept of ROM-based packages, the use of which requires no programming skill, and the burgeoning application software market support a trend toward the end user more interested in doing specific operations with a personal computer than in learning how to make that computer do those things.

Developments in networking further promote the non-computer oriented end user. Radio Shack is distributing a terminal that hooks up to both telephone and television to bring mainframe computing power into an individual's home without the need for a full microcomputer system.

The increasing delineation of specific markets is affecting the distribution and marketing outlets for small computers.

Scott Adams said one of the more obvious currents of the past year is the increasing number of retail outlets.

"Five years ago there was one computer store, whereas now every major metropolitan area probably has at least three or more and even a lot of the smaller locations (cities) have them. Because that is happening, there is a major distribution network starting.

"Software houses developing their own mail order channels," Adams continues, "are also starting to develop this distribution network for software and hardware. Some of the very noticeable ones are Byte Industries and Hardside and some others that are currently forming. There is a definite trend."

Software vendor activity increased dramatically this year with new names showing up in advertisments every month. All sorts of vendor approaches are being taken, with some programmers forming cottage industries, others working through existing, independent software houses and still others going through systems manufacturers.

Ron Johnston says all the activity in the software market indicates current marketing structures are not ideal. He expects new trends in software distribution.

"In 1981," he says, "some of the minor vendors are going to have tough sledding as the strong ones grow stronger and their finances grow stronger. It's going to be tougher for the small guy to make a new entry or continue if he is not growing."

Both Johnston and Adams expect software to start popping up in unusual places next year. New outlets may include record stores, stationery stores, business supply houses and possibly door-to-door sales. As more people are exposed to personal computers, computer magazines will go from strictly subscription and computer store sales to racks in general magazine stores and even the corner drug store.

New methods of distribution will also apply to hardware as professional marketing people get into the act.

"Right now there is no one effective in getting anybody's merchandise to a dealer," Johnston explains. "The dealer hears of or sees (a product) in a trade magazine and that's all he's got to go by. You're going to see consignment merchandise, rented merchandise and improved packaging. You're going to see groups that properly service the stores. By that, I mean someone will come in, stock a dealer's shelves, collect for that month, make sure that the dealer has the right merchandise rotated on his racks, exchange things that need to be exchanged and then move on to the next store."

As all of this activity takes place, consumer awareness is growing. Advertisements have gone from the trade publications to more general outlets. Articles dealing with microcomputers appear with increasing frequency in such non-computer specific publications as *Time, Newsweek,* the *New Yorker* and *Home Video* magazines. Department stores, which have been taking part in the electronic game phenomenon since last year, continue to move toward the field with such establishments as Montgomery Ward signing up to carry the Ohio Scientific Instruments "Challenger" systems.

Adams feels the whole country is computerizing as indicated by the ever-increasing use of microprocessors in the automotive and appliance industries. Scott states we will see computers being used in all kinds of sophisticated products. He goes so far as to say that there will eventually be computers in the home of such ranging capabilities that architects will design homes around a system. The system controlling the functions of a house will change in nature too, and Adams even foresees the possibility that an entire control system will shrink to the size of a single microprocessor chip that you plug into a wall outlet.

Additional indications of increasing public awareness of micros are increased numbers and sales of personal computer systems; greater numbers of books to meet the demands of a public trying to learn about the field; the appearance of more computer-oriented magazines; and the widening market of network systems like CompuServe and The Source.

A development that is sure to promote consumer awareness is the interest the business world is showing in the field. When companies like AT&T, GTE, CBS, Dow Jones, H&R Block and Readers Digest get involved, developments are bound to take new directions.

1980 will also be a milestone as the year in which technologies began to merge. Microcomputer and two-way cable television capabilities joined as of this year; and radio and microcomputer experiments are taking place on the West Coast. The home video (tape and disk systems) industry and the microcomputer field (for the most part separate technological thrusts until now) are starting to eye one another and it shouldn't be long before the best of both worlds combine to form a whole new medium. Beyond that, laser and fiber optic advancements may play a role in media development and trends.

Although the wave of microcomputers has grown with incredible advances this year, there's choppy water just ahead and while the absorption of these waters will increase the impact of the wave itself, many of the successful surfers in the industry will go under, never to surface again.

Probably the most significant problem ahead for the field itself is the entry of the Far East in the American marketplace. Microcomputer systems like the PMC-80 from the Orient started appearing late this year and they are just the tip of a wedge.

Ron Johnston predicts that the hardware to hit our shores early in 1981 will be competitive in appearance, styling and "undoubtedly in physical quality. You'll see it supported with a preponderance of US manufactured software," he adds.

Adams, Johnston and Squires all see a glut of imitator machines coming out that will be able to take advantage of the software designed for machines that have opened up the marketplace.

The effects of the Oriental systems will have both good and bad ramifications. On one hand, the Japanese entries into microcomputer technology will have a tendency to keep price structures competitive. More machines in the hands of the public mean the phenomenon will advance and more people can take advantage of the benefits small computers offer. On the other hand, the new entries may serve to fractionate the field and the gap between machines already established and those trying to break in may get wider.

Unless they've had their heads buried inside their systems, members of the American microcomputer industry can't help but know what Japanese imports did to Detroit. Hopefully, the young personal computer industry will be able to react more quickly to meet the demands of American consumers. Whatever happens, you are likely to benefit from the struggle to obtain your dollars through increased availability and promotion of reasonably-priced, easily-used, quality-made personal computers.

On the home front, Scott Adams sees a trend that will have to be dealt with in the near future — it's the lack of standardization for hardware.

"A lot of new machines coming out will fail because people won't buy a machine unless it's widespread and it can't be widespread unless people buy it," he says.

The marketplace will likely solve the problem with consumer actions determining the course of future developments.

On a more specific level, other currents have been noticed in both hardware and software developments. In hardware, there is a trend toward more powerful systems, more specialized systems and smaller, hand-held systems. Software is showing increased sophistication and some standardization.

First the hardware.

More powerful systems are on their way in the form of 16-bit machines and Ron Johnston predicts you'll see more of them being developed into turn-key systems.

While you're waiting for those systems, however, even the present-day machines are going to get more powerful, especially in the area of secondary storage although there is some disagreement as to what is going to be happening in that area.

Mike Conner says there is already movement toward high track density floppy storage. He sees the movement going from the 48 tracks per inch (tpi) like you find with the 35-track Shugart and 40-track Matchless disk systems to 96. Conner says this trend will be augmented by double-sided high tpi units designed for business and the serious user.

Adams sees not only increased storage in floppies but a trend toward bubble memory packs which he thinks will replace floppy drives within two or three years. Even the storage medium of tape recording is likely to go the route of the Exatron Stringy Floppy with data cartridges featuring higher speeds and denser recording techniques.

Johnston, on the other hand, expects to see more hard disks for micro systems. At least one firm, Irwin International, is taking advantage of both hard disk and tape technology. Irwin offers a 5 1/4-inch Winchester drive with an integral tape backup. The hard disk is capable of holding 10.02 megabytes of formated data and the built-in tape drive will copy 10-plus MBytes of data in less than four minutes. The product is marketed on an original equipment manufacturer (OEM) level but should be showing up in consumer systems in the coming year.

Whatever the ultimate form of data storage for a personal computer system, storage capacities have increased dramatically within the past year and industry leaders see no end to the trend.

You can look for two other hardware developments. There already is, and will continue to be, a movement toward color capabilities and 80-character video displays with high resolution.

Johnston predicts that color already is and will continue to be a major marketing factor and Adams says, "The systems that don't have color are going to find that they are going to be pushed to the back of the market. Also, any machine that comes out with color as an option is going to have a rough time of it because programs that will be written will be written for a basic color machine."

In addition to a movement toward more powerful machines, Johnston thinks there is a trend toward more specialized machines as well.

"Take a look at the hardware, the newly released machines are a little more specialized," he says. "The little personal microcomputer did everything but now you're seeing the TRS-80 Model II and the Apple III, as examples, and I'm sure there are a million others, that are headed strictly into the small business environment. On the other end of the scale you're seeing the Tandy release, as an example again, of Videotext, which is really just a stand alone terminal."

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CIRCLE 15

Johnston also sees a trend toward hand-held computers with the release of the Radio Shack Pocket computer, and the units offered by Nixdorf and Sharp.

On the software front, there has been increasing sophistication in software sold commercially not only in the area of applications but in a trend toward machine language programs that more fully use the capabilities of a microprocessor chip. The more popular Basic programs of the past year found their way into machine language versions rapidly.

"No longer can you get a ping pong game out by itself," Scott Adams explains. "A program has got to be at least worth the price a person pays for it."

Adams further predicts that the public will become more selective in purchasing and that it is developing a rating scale by which to judge programs.

"I think the way people judge programs is how they rate a movie. You would pay $3.50 for the average movie and it might take two or three hours. If you spend $15 for a program, which is about four times the cost of the average movie, you'd expect it to be good for at least 10 hours of play, if not more."

Adams also seeks imitative software appearing on the market daily.

"(As soon as) somebody comes out with an innovative type of program, somebody else is going to come out with an imitation of it which in many cases might even be better. It's sort of like watching a serial on television; you get spinoffs."

Adams sees Microsoft Basic as becoming a benchmark in the industry.

"I think that Microsoft has set the pace for the entire industry," he remarks. "If a computer comes out that does not have a Microsoft-compatible Basic or has a Basic that doesn't offer all the features Microsoft has, it's sudden death. I think manufacturers are going to learn that they're going to have to come out with that powerful language to be competitive."

On the future of high level languages, Adams adds, "It would be nice to say that Basic is dying out and now Pascal is going to become the main language; Pascal is a much cleaner language, a better designed language, but I think Basic has too large a foothold. (When the day arrives that you can have) your Basic interpreter and a Pascal interpreter in the same machine and have it switchable at low prices, then you'll start to see Basic disappearing."

In addition to the trends and currents discussed by some of the industry leaders, there are hundreds more. They move with fluid smoothness toward the future or swirl in confusion, each acting upon the other to create a dynamic situation that is hard to pin down except to note that the wave is coming. This technological tidal wave builds its mass day by day, and when it washes over our society it will affect us in ways we may never even guess. 1980 contributed toward the development of that wave in exciting new ways and 1981 can only add to the phenomenon.

If you thought the past year was unbelievable, wait until we get to the end of 1981. □

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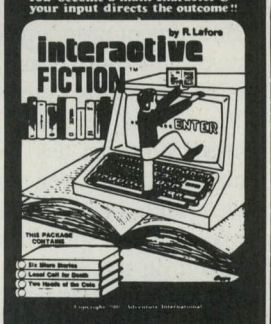

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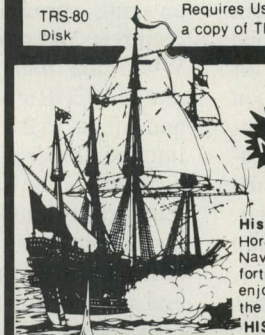

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Another Kind of Program Listing

BY DAVID D. BUSCH

How many times have you leafed through your television viewing guide at the beginning of the week, noticed several excellent programs that you wanted to make a special point of watching and then completely forgot to tune in at the appropriate time? Or, have you unwittingly made a dinner date on the evening of the re-run of the only episode you missed of "Decline and Fall of the Etruscan Empire"? If so, you fell victim to Murphy's Corollary on Promos: only the programs that you don't intend to watch will receive saturation-level promotion.

Television Guide is a disk-based data management program designed to keep track of an entire year's viewing. Television programs entered into the data files can be retrieved in one of four ways. You can ask for all programs entered for a given date, a range of dates, all to be aired after a named date or search for a specific show name.

Data on the programs is stored in a string array, PROG$(365). Each element of the array keeps information on one day of the year. Though it will work for the remainder of 1980, Television Guide does not take leap years into account. If you are still running this program in 1984, you can DIMension the array one element larger. In addition, the second DATA item in Line 1320 (currently a 3) should be changed to a 4, and each of the number pairs in lines 1350 to 1440 incremented by one.

Television Guide, written for a 48K TRS-80 one-disk system, will run on smaller Radio Shack disk-based computers, as well as other disk systems. You non-TRS-80 users will have to make appropriate changes to account for your particular methods of disk I/O, but no unusual statements — except INKEY$ — were used in this program.

In using Television Guide, you are first confronted with a menu which offers the options of entering new program choices, checking currently stored program schedules or saving program listings already entered into memory. The program will not allow you to SAVE program listings if you have not first loaded the existing sequential file. This feature prevents writing an "empty" file over an existing one with the same filename. If the variable FLAG does not equal 1 (showing that data has been read from the disk), control branches to data input, regardless of the option you selected.

Lines 1480 to 1500 allow you to bypass the input stage on the first run of the program. Obviously, a FILE NOT FOUND error message would be returned the first time the program is run. These lines can be deleted, or bypassed with a REM insertion after initialization.

Program listings are entered between lines 260 and 320. LINEINPUT allows entering program titles containing commas or other string delimiters. When the data is SAVEd, quotation marks (CHR$(34)) are inserted fore and aft to make certain the data goes into the proper place, even if it contains a comma. The strings A$, B$ and C$ temporarily store the program name, air date and time respectively. The variable B$ is taken apart and its month and day portions used to calculate the consecutive day-of-the-year equivalent in a subroutine at lines 1270 to 1330. That day number is used to tell the program which of the 365 array elements the program information will be stored in.

The added data, program name and time, are put into the array PROG$(DA) in line 310. If information has already been entered for that day, the new program listing will be added onto the end. You should note that this can mean an 8 p.m. show follows a 10 p.m. show in the data, if they were entered in that order. Energetic programmers may want to develop an elegant way around this problem. It didn't seem worth the trouble to me.

I put a small amount of effort into making the data neat on the video screen. As the strings are connected, a CHR$(26) and a CHR$(29) are tacked onto the end. The former forces a linefeed, while the latter moves the cursor to the beginning of the video line. The result: each viewing entry for a given day is shown on a separate line of your monitor, without a heavy penalty in data storage space.

Because each element of your string array PROG$(365) can be no longer than 255 characters, each day's viewing entries must be shorter than that length as well. Unless you are a truly inveterate TV addict, three or four entries totalling a hundred or so characters will be tops.

After each entry is made, control returns to the menu. You can either reselect "Enter program choices" or terminate the session by checking the existing program schedule or saving the program listings. It's not mandatory to SAVE the new entries immediately, but if you forget to do so before stopping the RUN, the updated information will be lost. The existing data file that was loaded prior to the editing session will still be available, though.

A second menu, offering the different ways of accessing program listings, is contained at lines 340 to 540. You can choose between video only or video and printer output (setting PFLAG to 1 or 2). Then, a choice is offered among the three ways of accessing by date and looking for a specific program name.

If you want to know what viewing has been chosen for a certain day, the

Sample Run

```
          T e l e v i s i o n   G u i d e


            1.) Enter program choices
            2.) Check program schedule
            3.) Save program listings

          Enter choice : 2



Enter year (YY) :? 80

Direct output to:       1.) Screen
                        2.) Screen and printer

     Enter choice : 1

Do you want to see program listings for :

          1.) A specific day
          2.) A range of days
          3.) All listings after today
          4.) A specific program

         ENTER CHOICE : 2



Enter lower date boundary   (MM/DD)? 11/01
Enter upper day boundary (MM/DD)? 12/31←



 11/ 15  :      Danny's Devils   9:00 P.M.
  The Nona Zistant Show   9:30 P.M.
  Comedy Time   9:30 P.M.

 12/ 10  :      Speaking of Ducks   9:30 P.M.

 12/ 24  :      Christmas Special   9:00 P.M.

PRESS ANY KEY TO CONTINUE

          T e l e v i s i o n   G u i d e


            1.) Enter program choices
            2.) Check program schedule
            3.) Save program listings

          Enter choice : 2
```

```
Direct output to:       1.) Screen
                        2.) Screen and printer

     Enter choice : 1

Do you want to see program listings for :

          1.) A specific day
          2.) A range of days
          3.) All listings after today
          4.) A specific program

         ENTER CHOICE : 4



Enter program name to be searched for? History of Ceylon
 11/ 5  :  History of Ceylon   8:00


Press any key to continue


          T e l e v i s i o n   G u i d e


            1.) Enter program choices
            2.) Check program schedule
            3.) Save program listings

          Enter choice : 1


Enter program name : Meet Millisan
Enter air date (MM/DD):12/23
Enter time           :10:00 P.M.1←



          T e l e v i s i o n   G u i d e


            1.) Enter program choices
            2.) Check program schedule
            3.) Save program listings

          Enter choice : 3



Enter Year  (YY) :? 80←
```

day is inputted in the MM/DD form used throughout Television Guide. This string is converted back into a consecutive day number (DA) through a subroutine at 1350 to 1460; the DA element of PROG$(365) is then displayed and control is returned to the menu.

For access to a range of dates, the conversion subroutine at 1350 to 1460 is accessed twice for the upper limit day and lower limit day, and then a loop is run printing all elements in PROG$(365) between the two numbers.

The "later than . . ." portion is similar, using today's date as a lower limit, and asking how many days worth of programs are desired as the upper limit of the loop. If you ask for more days than remain in the year, only those programs through December 31 will be displayed. Each years' viewing is kept in a separate file called PROGS80, PROGS81, etc., depending on the year.

Searching for a specific program name is only a little more complicated. You input the name of the program. Only the five left most characters are used — so if you're unsure whether the title is "Comedy Time" or "Comedy Hour," the program will find both. This causes a problem only when two separate programs with similar names are entered.

In line 990, the program consecutively looks at each element of PROG$(365) to see if the desired string is contained using the INSTR feature of Radio Shack's Disk Basic. This function returns the starting position of the searched-for string. If the value of I does not equal zero (that is, the string is located), control branches to line 1050, where each character of the MID$ of that array element beginning at point I is examined to see if it is a CHR$(26). When such a linefeed is found, the program knows that the particular listing ends at that point and prints the appropriate MIDS$ on the screen. Then, the program continues searching PROG$(365) for other occurrences of the target string.

The only other portion of the program that needs explaining is the method of naming files. You are asked to input the last two digits of the year desired, both on data input and output. The year is automatically appended to the filename, so files can be kept for as many years as you desire. If you know today the night for the 1985 Oscar presentation, you can set the evening aside now, while there's still time. □

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Program Listing

```
50 CLEAR 5000
60 DIM PROG$(365),MO(12)
70 FOR N=1 TO 12:READ MO(N):NEXT N
80 CLS
90 '------ Menu -------
100 PRINT
110 PRINT
120 PRINT "          T e l e v i s i o n   G u i d e"
130 PRINT:PRINT
140 PRINT "           1.) Enter program choices"
150 PRINT "           2.) Check program schedule"
160 PRINT "           3.) Save program listings"
170 PRINT
180 PRINT "        Enter choice :"
190 A$=INKEY$:IF A$="" GOTO 190
200 A=VAL(A$)
210 IF A<1 GOTO 190
220 IF A>3 GOTO 190
230 IF FLAG<>1 THEN GOTO 1470
240 ON A GOTO 250,340,1150
250 '------ Enter program listings ------
260 CLS:PRINT:PRINT
270 LINEINPUT "Enter program name : ";A$
280 LINEINPUT "Enter air date (MM/DD):";B$
290 GOSUB 1270
300 LINEINPUT "Enter time           :";C$
310 PROG$(DA)=PROG$(DA)+"  "+A$+"   "+C$+CHR$(26)+CHR$(29)
320 GOTO 80
330 '------ Check Program Listings ------
340 CLS:PRINT:PRINT
350 PRINT "Direct output to:       1.) Screen"
360 PRINT "                        2.) Screen and printer"
370 PRINT
380 PRINT "     Enter choice :"
390 A$=INKEY$:IF A$="" GOTO 390
400 IF VAL(A$)<1 OR VAL(A$)>2 GOTO 390
410 PFLAG=VAL(A$)
420 CLS:PRINT:PRINT
430 PRINT "Do you want to see program listings for :"
440 PRINT
450 PRINT "          1.) A specific day"
460 PRINT "          2.) A range of days"
470 PRINT "          3.) All listings after today"
480 PRINT "          4.) A specific program"
490 PRINT
500 PRINT "        ENTER CHOICE :"
510 A$=INKEY$:IF A$="" GOTO 510
520 A=VAL(A$):IF A<1 GOTO 510
530 IF A>4 GOTO 510
540 ON A GOTO 560,650,800,950
550 '------ Specific Day ------
560 CLS:PRINT:PRINT
570 INPUT "Enter day  (MM/DD) :";B$
580 GOSUB 1270
590 PRINT DA$;"   :   "; PROG$(DA):IF PFLAG=2 LPRINT DA$;
    "   :   ";PROG$(DA)
600 IF PROG$(DA)="" PRINT "No programs scheduled that day."
    :IF PFLAG=2 LPRINT "No programs scheduled that day."
610 PRINT:PRINT:PRINT"PRESS ANY KEY TO CONTINUE"
620 IF INKEY$="" GOTO 620
630 GOTO 80
640 '------ List Range of Days ------
650 CLS:PRINT:PRINT
660 INPUT "Enter lower date boundary   (MM/DD)";B$
670 GOSUB 1270:D1=DA
680 INPUT "Enter upper day boundary (MM/DD)";B$
690 GOSUB 1270:D2=DA
700 CLS:PRINT:PRINT
710 FOR N=D1 TO D2
720 IF PROG$(N)="" GOTO 760
730 DA=N:GOSUB1350
740 M$=STR$(M):D=DA-F1:D$=STR$(D):DA$=M$+"/"+D$
750 PRINT DA$;"  :    ";PROG$(N);
    IF PFLAG=2 LPRINT DA$;"    :";:LPRINT PROG$(N)
760 NEXT N
770 PRINT:PRINT "PRESS ANY KEY TO CONTINUE"
780 IF INKEY$="" GOTO 780
```

CIRCLE 17

```
790 GOTO 80
800 CLS:PRINT:PRINT
810 INPUT "Enter today's date  (MM/DD) :";B$:GOSUB 1270
820 PRINT "How many days' programs do you wish to see"; INPUT D2
830 IF DA+D2>365 THEN D2=365-DA
840 D2=DA+D2
850 CLS:PRINT
860 FOR N=DA TO D2
870 IF PROG$(N)="" GOTO 900
880 DA=N:GOSUB1350:M$=STR$(M):D=DA-F1:D$=STR$(D):DA$=M$+"/"+D$
890 PRINT DA$;"  :     ";PROG$(N)
    IF PFLAG=2 LPRINT DA$;"  : ";:LPRINT PROG$(N)
900 NEXT N
910 PRINT:PRINT"PRESS ANY KEY TO CONTINUE"
920 IF INKEY$="" GOTO 920
930 GOTO 80
940 '------ Look for specific program ------
950 CLS:PRINT:PRINT
960 INPUT "Enter program name to be searched for";S$
970 S$=LEFT$(S$,5)
980 FOR N=1 TO 365
990 I=INSTR(PROG$(N),S$):IF I>0 THEN FFLAG=1:GOTO 1050
1000 NEXT N
1010 PRINT:PRINT "Press any key to continue "
1020 IF FFLAG=0 THEN PRINT "No program by that name found."
1030 A$=INKEY$:IF A$="" GOTO 1030
1040 GOTO 80
1050 DA=N:GOSUB 1350
1060 M$=STR$(M):D=DA-F1:D$=STR$(D):DA$=M$+"/"+D$
1070 G$=MID$(PROG$(DA),I):G=LEN(G$)
1080 FOR P=1 TO G
1090 IF MID$(G$,P,1)=CHR$(26) GOTO 1110
1100 NEXT P
1110 P$=MID$(G$,1,P)
1120 PRINT DA$;"  :  ";P$:IF PFLAG=2 THEN LPRINT DA$;"  : ";P$
1130 GOTO 1000
1140 '------ Save Data ------
1150 CLS:PRINT:PRINT
1160 INPUT "Enter Year  (YY) :";Y$
1170 IF VAL(Y$)>99 THEN Y$=RIGHT$(Y$,2)
1180 F$="PROGS"+Y$
1190 OPEN "O",2,F$
1200 FOR N=1 TO 365
1210 PRINT #2,CHR$(34);PROG$(N);CHR$(34);",";
1220 NEXT N
1230 CLOSE 2
1240 GOTO 80
1250 CLS
1260 '------ Change date to numeric value ------
1270 DA=0:DA$=B$
1280 M$=LEFT$(DA$,2):D$=RIGHT$(DA$,2)
1290 M=VAL(M$):D=VAL(D$):M1=M-1
1300 IF M1=0 THEN DA=D:RETURN
1310 DA=M1*28+MO(M1)+D
1320 DATA 3,3,6,8,11,13,16,19,21,24,26,29
1330 RETURN
1340 ' ------ Change numeric value back to MM/DD ------
1350 IF DA>334 THEN M=12:F1=334:RETURN
1360 IF DA>304 THEN M=11:F1=304:RETURN
1370 IF DA>273 THEN M=10:F1=273:RETURN
1380 IF DA>243 THEN M=9:F1=243:RETURN
1390 IF DA>212 THEN M=8:F1=212:RETURN
1400 IF DA>181 THEN M=7:F1=181:RETURN
1410 IF DA>151 THEN M=6:F1=151:RETURN
1420 IF DA>120 THEN M=5:F1=120:RETURN
1430 IF DA>90 THEN M=4:F1=90:RETURN
1440 IF DA>59 THEN M=3:F1=59:RETURN
1450 IF DA>31 THEN M=2:F1=31:RETURN
1460 M=1:F1=0:RETURN
1470 '------ Read Data File -------
1480 CLS:PRINT "  Initialization ":PRINT:PRINT
1490 PRINT " If program has already been run at least once"
1500 INPUT" delete lines 1480-1500.  If not, hit enter";A$:
     FLAG=1:ON A GOTO 260,1620
1510 CLS:PRINT:PRINT
1520 INPUT "Enter year (YY) :";Y$
1530 IF VAL(Y$)>99 THEN Y$=RIGHT$(Y$,2)
1540 F$="PROG"+Y$
1550 OPEN "I",1,F$
1560 FOR N=1 TO 365
1570 INPUT #1,PROG$(N)
1580 NEXT N
1590 FLAG=1:' Shows that data has been read into memory
1600 CLOSE 1
1610 ON A GOTO 250,340
1620 CLS:PRINT:PRINT " Sorry, no program listings entered yet.
```


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CIRCLE 18

NEWDOS/80

Rolls Royce of the Disk Operating Systems

BY RONALD H BOBO

A disk operating system for the TRS-80 computer, NEWDOS, came along a while back to overshadow Radio Shack's TRSDOS 2.1, adding many corrections, enhancements and improvements in the process. Even after TRSDOS 2.1 was replaced by TRSDOS 2.3, many people preferred NEWDOS because of proven reliability.

Now Apparat, Inc., of Denver, purveyor of NEWDOS, has introduced NEWDOS/80. How good is it? Well, some ads used to proclaim that NEWDOS was the Cadillac of disk operating systems and NEWDOS+ the Ferrari. Surely, then, NEWDOS/80 must be the Rolls-Royce.

For those not familiar with NEWDOS, a brief overview will be given before discussing the new features added by NEWDOS/80.

NEWDOS is a rework of the Radio Shack TRSDOS 2.1, with the bugs eliminated and several extra features added such as keyboard debounce, Basic line renumbering and a Basic REF feature which prints out a variable cross-reference table. Other additions include the ability to use all DOS commands from Basic, automatically load and run a Basic program on power-up, add to sequential files and append files. Your line printer may also be used as a screen printer. Simultaneously pressing the JKL keys routes everything on the video screen to the printer.

COPY may be executed using a single diskette, and in LIST mode, the up and down arrows may be used to scroll the Basic program listing a line at a time.

NEWDOS+ is NEWDOS with several utility programs added. These include a disk Editor-Assembler, a Z-80 Disassembler, LMOFFSET which transfers any system tape to a disk file and relocates it at the same time. Also included is a version of Level I Basic (run your old programs) and LV1DSKSL, which saves and loads Level I programs to disk. DIRCHECK tests and lists disk directories. Probably the most spectacular of these is SUPERZAP, a Basic program which allows you to examine and modify, sector by sector, a program on diskette or in main memory. It is possible to read a sector from disk, change as little as one byte, then write the sector back to disk. It is even possible to recover a disk file which has been accidentally KILLed (providing, of course, it hasn't been written over).

NEWDOS/80 keeps all these features and adds many more.

The DOS and Disk Basic have been completely rewritten for NEWDOS/80. Since the previous version was a modification of Radio Shack's system, Apparat required users to purchase TRSDOS as a pre-condition to use of NEWDOS. This is no longer required, although purchase of TRSDOS is recommended and NEWDOS/80 users are expected to have purchased the TRSDOS and Disk Basic Reference Manual, since information contained therein is not duplicated in the NEWDOS/80 documentation. Users of the NEWDOS/80 EDTASM modules are still required to have purchased Radio Shack's Editor/Assembler.

Several new commands have been added to the DOS library. One of the more useful is BOOT, which does just what it sounds like. Typing BOOT and then pushing ENTER will reboot the system and bring up DOS. Like all library commands, this can be executed from Basic by means of the CMD function.

BREAK enables or disables the BREAK key. If, for example, BREAK,N or BREAK,OFF is entered, the BREAK key will be disabled until the next normal DOS READY, or until BREAK,Y or BREAK,ON is encountered in a program. Executing BREAK from DOS READY is useless, since the immediate return to DOS READY resets the BREAK key.

CHAIN places NEWDOS/80 in chaining mode if not already there. A demo program, CHAINTST/BAS, is included on the diskette and should be studied for methods of usage. Details are too extensive to cover in this space.

As in the original NEWDOS, NEWDOS/80 does not use the BACKUP routine, substituting a COPY mode instead. COPY has six formats for various purposes, including backing up of an entire diskette, copying a single file from one diskette to another or to the same diskette but with a different name, copy to or from a diskette containing an alien system, or copying to a diskette with no system at all (data diskette). COPY may be executed on either a single or multi-disk system.

DIR has been changed. Under TRSDOS, appending P to the DIR command results in display of password protected files. Appending P under NEWDOS/80 routes the directory information to the printer rather than the video.

The FORMAT command no longer allows the user to specify tracks to be locked out. Bad sectors may be skipped, however, and track lockout bytes may be set later using SUPERZAP. FORMAT does allow specifying several parameters, including number of tracks. The number specified may be from 1 to 96 decimal, and if no specification is made the diskette will be formatted with the default number for that drive. *Caution:* Don't try to specify more tracks than your

drive will handle or it will probably hang up trying to step to a non-existent track.

FREE displays, for each drive with a diskette mounted, the drive number, diskette name, diskette date, number of tracks, number of free file directory entries, and the number of free granules.

HIMEM is a new command which allows setting the size of protected memory while in DOS.

JKL performs the same function it did under NEWDOS, namely dumping the contents of the video display to the printer. If your printer is capable of printing graphics, the system may be configured to send graphics characters to the printer; otherwise periods are substituted.

One observation is in order here which will be of benefit to those having the Radio Shack lower case modification. As you may or may not know, this mod destroyed the JKL function in NEWDOS. With a Line Printer II, all that could be obtained were continuous line feeds when invoking JKL. Now, in NEWDOS/80 this has been corrected and JKL once again works.

Although not a library command, MINI-DOS will be covered here in conjunction with the next three library commands, MDRET, MDBORT and MDCOPY, which are directly concerned with it.

Pressing the D, F and G keys simultaneously causes the main program to be interrupted, its registers saved and MINI-DOS to be entered. MINI-DOS READY will be displayed. Don't press these keys while Disk I/O is in progress, as a fatal error to the diskette is possible.

From MINI-DOS, any of the DOS Library commands may be executed except APPEND, CHAIN, COPY, FORMAT, PDRIVE and SYSTEM. Non-library commands may not be executed from MINI-DOS.

Entering MDRET will return you to the main program and display a cursor whether or not the program was awaiting input. If not waiting on input, the program will continue running from the point where the interruption occurred, with all registers intact. This has to be tried to be fully appreciated. Fantastic!

One of the little extras Apparat has thoughtfully provided is a patch to be applied to Radio Shack's word processing program so that the MINI-DOS may be activated from SCRIPSIT. Yes, now you can look at a directory without having to dump SCRIPSIT from memory, call the DIR, then reload SCRIPSIT. One thing to watch, though. Usually, when in SCRIPSIT, depression of the three keys will cause one of them to be printed when returning to the main program. If this happens, just back up and delete it. The convenience far outweighs this minor irritation.

If you don't want to resume the main program, enter MDBORT, which terminates both the main program and MINI-DOS and the system returns to the normal DOS READY.

COPY cannot be executed under MINI-DOS but simple file copies can be done by using the DOS library command MDCOPY.

PDRIVE is a very powerful command which will seldom be used. This command is used to assign default attributes to your disk drives. NEWDOS/80 has the capability of operating with a mixture of five inch and, to a lesser extent, eight inch drives all on the same system. PDRIVE is used to tell the system what kind of drive is where.

The Omikron Mapper interface, by the way, is the only way at present to implement 8" drives with NEWDOS/80. The Lobo expansion interface is defined but not implemented and, according to Apparat, there are no present plans for implementation.

Type of drive may be either 5 inch, single density, single sided or 8 inch, single density, single sided. The five inch is already defined. Single sided does not mean that you cannot use your Pertec or Percom drives — as always, you may use both sides of a diskette in these drives.

The specification for number of tracks can be from 1 to 96. It is now possible to mix 35, 40, 77, or the new 80 track drives on the same system.

The default value for the track number at the first sector of which the directory begins may be specified. Track 17 decimal is the standard for TRS-80 Model I and should be used when a diskette may be used with a non-NEWDOS/80 system.

The number of granules alloted to the directory during FORMAT may also be altered. The standard is 2 for TRS-80 Model I, and must be used when the diskette will be used with a non-NEWDOS/80 system.

All these values are configured for the standard Radio Shack system on the NEWDOS/80 diskette. If you are using 35 track, 5 inch drives with a Radio Shack expansion interface, there will be nothing to change. If changes do have to be made, they are not activated until a RESET is done — from that point, they will be "remembered" by the system.

By means of the last library command, SYSTEM, and one of nineteen system options may be changed, which lack of space precludes listing here.

You can see that, considering the disk drive options combined with the different system options, the number of possible permutations and combinations will be high. What you will have, in effect, will be a system which can be customized to your own requirements.

Several changes have been made to the DEBUG facility, one of which will allow you to call DEBUG by simultaneously pressing the 1, 2 and 3 keys even though it has not previously been activated by the library command DEBUG.

DEBUG will also allow single-stepping through a program, with some limitations.

SUPERZAP is now SUPERZAP/CMD. Converting from a Basic program to machine language reduced the size of the program from thirteen to six grans and speeded up loading and initialization tremendously.

Two new utilities have been added. LCDVR/CMD is a lower-case driver program by Tom Price. ASPOOL/MAS is an automatic spooler program by H. S. Gentry which has been modified by Apparat to operate with NEWDOS/80. Relocation capabilities have also been added.

Prior to use, a working program module must be set up. The master program queries the user with several questions regarding type of printer, line feeds, form feeds, print formatting, and so forth. The last thing asked for will be the filespec for the working module. Do *not* respond with ASPOOL/MAS at this point — it will destory your original!

ASPOOL uses five disk files — it is possible to spool information to one file while another is being printed. All data is printed on the printer as a background task while the main task is executing, or while the system is waiting for the user to tell it what to do next.

NEWDOS/80 Disk Basic contains several enhancements not found in the Microsoft version used by Radio Shack.

To prevent accidental deletion of a Basic line, it is not possible to delete a line simply by typing in the line number. DELETE or D must first be typed.

In Basic "direct" or "command" mode, typing a period will LIST the current text line to the screen. Typing the down-arrow LISTs the next line. If there is no next line, the last line is repeated. The up-arrow, similarly, LISTs the text line before the current line, except that where the current line

is the first line in the program, it is repeated. No more trying to stop a listing at the proper place as it whizzes by! A semicolon or shift-up-arrow LISTs the first text line, and typing a slash or shift-down-arrow will LIST the last text line. For users having the newer ROM, the shift-down-arrow will not be useable. Typing a comma puts the current line into EDIT mode.

Only one such command may be used in a direct statement, and must be the first character on the line.

The commands AUTO, DELETE, EDIT and LIST may be abbreviated to A, D, E and L. To be effective, the abbreviations must be the first character on the input line, followed by a period or a line number, and the input line cannot contain the "=" (equal) sign.

Two new text editing functions make it possible to shift a line at a time in Basic. Ever get a line in the wrong place and have to retype it? DI and DU will cure this. As examples, DI 20,50 will delete line 20 and insert it as line 50. DU 20,50 would insert a duplicate of line 20 at line 50, but would not delete line 20. References to line numbers — GOTOs and GOSUBs — are not changed; if you do want a change, use RENUM to move the lines.

The Basic statement CMD has been expanded considerably. Reference to the NEWDOS/80 manual is advised, as space is too short to explain everything adequately here.

A new security mode called RUN-ONLY, has been implemented in Basic. Briefly, the BREAK key is disabled and Basic is prevented from accepting direct statements. Data may still be input.

In addition to the previous sequential and random file types, NEWDOS/80 has two added types: marked-item, which has three sub-types, and fixed-item, with two sub-types. A lengthy explanation of these files is furnished in the manual, and an appendix has been added which gives further explanation and programming examples. Thorough study of this documentation will be necessary to obtain the full benefit of these new file types, some of which may contain records up to 4095 bytes in length.

Documentation for NEWDOS/80 is far superior to that furnished with previous versions of NEWDOS. This consists of an attractive loose-leaf notebook with close to 200 pages of information. ZAP sheets are included containing several mandatory changes which should be made to your master backup copy before using the system as well as patches for some programs of other vendors to make them compatible with NEWDOS/80. Presumably, in future releases, Apparat will include the mandatory changes on the diskette prior to shipment.

Although print quality and the amount of documentation is a distinct improvement over the previous NEWDOS, one could still quibble about the clarity of some of the instructions. Although careful study will bring understanding, the abbreviations and symbols used are sometimes confusing. For example, it took me some time to get my system configured the way I wanted it using the PDRIVE command, yet it is really a very simple procedure once it is understood.

This is the fourth DOS I have checked out for the TRS-80 and NEWDOS/80 appears to be far superior to any of the others.

NEWDOS/80 carries a price tag of $149 but owners of NEWDOS or NEWDOS+ may buy NEWDOS/80, in most cases, for just the difference in price by furnishing the serial number of their system, place of purchase and purchase price. □

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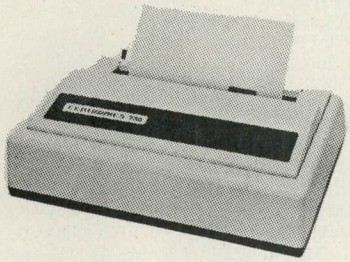

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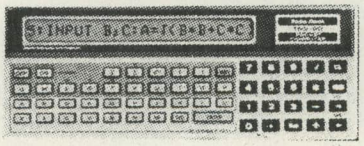

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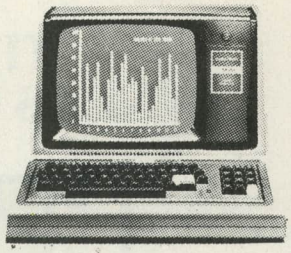

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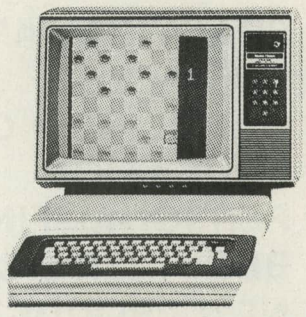

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CIRCLE 21

Depreciation Schedules

W. B. GOLDSMITH, JR.

The way many people say "depreciation," the word should only be printed in Old English typeface. To the non-accountant, depreciation signifies a holy rite. Those of us who work in accounting related fields have cloaked depreciation in a shroud of mystery. Hogwash! Depreciation is something that happens to your car, television, or computer. After you've used the item for awhile, its market value is less than the amount you paid for it. Only the marketplace can put a value on true depreciation; the buyer of your used whatchamacallit determines what it is worth when you are through using it.

For accounting purposes, depreciation must be estimated. You may use your super-belch-fire-V18 automobile for four or five years, and we can't wait until you sell it to write up annual tax returns or financial statements. By common agreement, accountants, banks and the Internal Revenue Service have standard ways to estimate the dollar amount that business tools depreciate. Depreciation Schedule is a computer program tool to help you estimate how your other tools depreciate in value. Since most of my accounting work is in the income tax field, the output of Depreciation Schedule looks like an attachment to an income tax return. (In fact, it is a fair substitute for Internal Revenue Service Form 4562, Depreciation.)

There are three basic methods to calculate the depreciation estimate: Straight Line, Declining Balance and Sum of the Years Digits. All involve dividing up the total estimated depreciation amount into yearly chunks. No one method will give you a larger total depreciation than another. Some methods allow you to spread depreciation in bigger chunks in some years and smaller pieces in other years.

Straight line depreciation is the simplest and most popular method. As the name implies, straight line depreciation estimates that an item loses value in an equal amount each time period. Calculation of straight line depreciation involves dividing the total by the number of time periods. For example, if you guess that a $500 printer will be worth nothing in five years, the straight line depreciation is $100 per year.

Three basic methods to calculate depreciation of business tools.

Declining Balance methods give you accelerated depreciaton in early years (and less depreciation in later years). The most common declining balance methods are 125%, 150% and 200% (or double declining balance). In calculating declining balance depreciation, we subtract previous depreciation from the total available before figuring the current year's amount. The computation is a little longer than straight line, but not exotic. Using our $500 five-year printer, we still divide the total by the years ($100). To find the current year depreciation, we also multiply the straight line amount by the declining balance percentage. If, in our example, we are using 150% DB, our annual depreciation amount for year #1 would be $150 (150% of $100). To compute the second year amount, we must subtract the previous depreciation ($150) from the total ($500) and start our calculation with $350. 150% of one-fifth of this total gives us our second year depreciation amount, $105.

Sum of the Year Digits (SOYD or SOD) is another accelerated method. SOD is a fun numbers game, but the result is the same as other methods: you are dividing up the total depreciation available into yearly chunks. With SOD, we use the total available depreciation for all calculations. The yearly amount is computed by making a fraction of the number of years and the year of interest. In our five year example, the denominator of the fraction is the sum of the years (5 + 4 + 3 + 2 + 1 = 15). The numerator is a single digit weighting the yearly amount. For the first year, the numerator is 5; it's 4 for the second year; 3 for the third; 2 for the fourth; and, 1 for the last year. In our $500 five-year printer example, the depreciation calculations would look like this:

Year	Fraction	Annual Depreciation
1	5/15	$167.
2	4/15	133.
3	3/15	100.
4	2/15	67.
5	1/15	33.
Total		$500.

In practice, we complicate things a bit more than the examples above would indicate. First, instead of "items" or "things," we insist on calling your tools and buildings "depreciable assets." Second, in estimating the total available depreciation, we talk about "salvage value." Salvage value is simply what your item is worth when you're through with it. (If you only keep a business automobile two years, the $5,000 you'll get for it is its salvage value.) Buildings don't have a salvage value, but the rules say that you can't depreciate land (really, as a building site, it doesn't wear out); so, real estate has a land value that is equivalent to "salvage value." We also have a special name for "total available depreciation." It's called "Depreciable

Mr. Goldsmith is enrolled to practice before the Internal Revenue Service and is an active member of the National Society of Public Accountants. His previous PC *articles include "Rental Income" (July 1980), "Installment Sales" (August 1980), "Reminder Lists" (September 1980) and "Income Statements" (October 1980).*

Sample Run

```
HOW MANY ITEMS? 8
TAXPAYER NAME? E.D.SAMPLE
TAXPAYER I.D. NUMBER? 000-00-0000
DESCRIPTION OF PROPERTY #1 ? BUILDING
DATE ACQUIRED? 1-12-65

COST OR OTHER BASIS? 50000
LAND OR SALVAGE VALUE? 10000
PREVIOUS DEPRECIATION TAKEN? 14000
METHOD (SL, DB, 1.25DB, 1.5DB, DDB, OR SOD)? SL
LIFE (IN YEARS)? 40
MONTHS IN USE THIS YEAR? 12

DESCRIPTION OF PROPERTY #2 ? DRILL PRESS
DATE ACQUIRED? 6-6-77

COST OR OTHER BASIS? 3200
LAND OR SALVAGE VALUE? 1200
PREVIOUS DEPRECIATION TAKEN? 756
METHOD (SL, DB, 1.25DB, 1.5DB, DDB, OR SOD)? DDB
LIFE (IN YEARS)? 6
MONTHS IN USE THIS YEAR? 12

DESCRIPTION OF PROPERTY #3 ? GRINDER
DATE ACQUIRED? 7-1-69

COST OR OTHER BASIS? 2550
LAND OR SALVAGE VALUE? 350
PREVIOUS DEPRECIATION TAKEN? 2180
METHOD (SL, DB, 1.25DB, 1.5DB, DDB, OR SOD)? DDB
LIFE (IN YEARS)? 10
MONTHS IN USE THIS YEAR? 12

DESCRIPTION OF PROPERTY #4 ? PLATER
DATE ACQUIRED? 7-7-78

COST OR OTHER BASIS? 1257
LAND OR SALVAGE VALUE? 257
PREVIOUS DEPRECIATION TAKEN? 79
METHOD (SL, DB, 1.25DB, 1.5DB, DDB, OR SOD)? 1.25DB
LIFE (IN YEARS)? 10
MONTHS IN USE THIS YEAR? 12

DESCRIPTION OF PROPERTY #5 ? TYPEWRITER
DATE ACQUIRED? 7-7-79

COST OR OTHER BASIS? 850
LAND OR SALVAGE VALUE? 350
PREVIOUS DEPRECIATION TAKEN? 0
METHOD (SL, DB, 1.25DB, 1.5DB, DDB, OR SOD)? 1.5DB
LIFE (IN YEARS)? 6
MONTHS IN USE THIS YEAR? 6

DESCRIPTION OF PROPERTY #6 ? TRUCK
DATE ACQUIRED? 7-1-79

COST OR OTHER BASIS? 7500
LAND OR SALVAGE VALUE? 1500

PREVIOUS DEPRECIATION TAKEN? 0
METHOD (SL, DB, 1.25DB, 1.5DB, DDB, OR SOD)? SOD
LIFE (IN YEARS)? 6
MONTHS IN USE THIS YEAR? 6

DESCRIPTION OF PROPERTY #7 ? VAN
DATE ACQUIRED? 5-10-78

COST OR OTHER BASIS? 6578
LAND OR SALVAGE VALUE? 2432
PREVIOUS DEPRECIATION TAKEN? 790
METHOD (SL, DB, 1.25DB, 1.5DB, DDB, OR SOD)? SOD
LIFE (IN YEARS)? 6
MONTHS IN USE THIS YEAR? 12

DESCRIPTION OF PROPERTY #8 ? FIXTURES
DATE ACQUIRED? 6-8-76

COST OR OTHER BASIS? 6760
LAND OR SALVAGE VALUE? 760
PREVIOUS DEPRECIATION TAKEN? 1596
METHOD (SL, DB, 1.25DB, 1.5DB, DDB, OR SOD)? DB
LIFE (IN YEARS)? 6
MONTHS IN USE THIS YEAR? 12

FOR PROPERTY #6  (TRUCK)
WHICH OF THE 6  YEARS IS
TO BE CALCULATED? 1
WHAT MONTH WAS ITEM #6
FIRST PLACED IN SERVICE
(PLEASE TYPE THE NUMBER FOR THE
MONTH WHERE JAN=1, FEB=2,ETC.)
? 7

FOR PROPERTY #7  (VAN)
WHICH OF THE 6  YEARS IS
TO BE CALCULATED? 2
WHAT MONTH WAS ITEM #7
FIRST PLACED IN SERVICE
(PLEASE TYPE THE NUMBER FOR THE
MONTH WHERE JAN=1, FEB=2,ETC.)
? 5

WHAT OUTPUT PORT NUMBER? 3
PRESS 'RETURN' TO PRINT?
```

DEPRECIATION SCHEDULE

E.D.SAMPLE 000-00-0000

DESCRIPTION OF PROPERTY	DATE ACQUIRED	COST OR BASIS	PRIOR DEPR.	METHOD	LIFE	DEPR.
BUILDING	1-12-65	40000	14000	SL	40	1000
DRILL PRESS	6-6-77	3200	756	DDB	6	815
GRINDER	7-1-69	2550	2180	DDB	10	20
PLATER	7-7-78	1257	79	1.25DB	10	147
TYPEWRITER	7-7-79	850	0	1.5DB	6	106
TRUCK	7-1-79	6000	0	SOD	6	857
VAN	5-10-78	4146	790	SOD	6	1053
FIXTURES	6-8-76	6760	1596	DB	6	861
TOTALS		64763				4859

Basis." In general, to calculate depreciable basis (sometimes just called "Basis"), subtract the land or salvage value from what you paid for the asset.

Depreciation Schedule performs the calculations needed to compute the annual depreciation on assets and prints the results in a form that income tax people can recognize. If you have depreciable business assets, run them through Depreciation Schedule and impress your tax professional.

User's Note

You don't have to be an accountant to use Depreciation Schedule. The program asks for you to enter information a piece at a time. It will allow you to calculate all the methods of depreciation discussed above, and intermix methods from asset to asset. Since most accounting uses calculate depreciation on a monthly basis, the routine asks for months in use during the year for each asset.

There are a couple "gotcha's" that you could run into with Depreciation Schedule. First, there are rules in the tax laws about depreciation methods versus useful lifetimes for assets. (For example, an asset must have a useful life greater than three years to qualify for declining balance depreciation.) The program does not check your entries to see if you conform to those rules.

Check with an accontant before using your depreciation schedules for anything serious if you are depreciating assets with any of the accelerated methods. There are tight rules on accelerated depreciation of buildings.

Some assets are eligible for a 20% bonus depreciation in the year you first use them. The program doesn't know that the bonus depreciation exists. Again, check with your accountant if you're interested in bonus depreciation.

If you are trying to use SOD depreciation on an asset for less than a full year on any year but the first, you'll get a wrong answer. You're not likely to run into this situation, but if you do be cautious.

Finally, this program is an accounting aid, not an accountant substitute. There are guidelines on selecting useful life terms and salvage values for assets that are beyond the scope of this personal computer program. Check with your accounting or tax professional for specific situation advice.

Programming Notes

Depreciation Schedule is written in SWTP 8K Basic Version 2.0. It should adapt easily to other Basic's that can handle string variables and one-dimension matrices. The program listing is fairly liberally commented (note all the REM's and asterisks on the listing) to help mark a trail through the commands.

Lines 10 through 90 are the title block and don't contribute anything to operation. Lines 100 to 150 provide some configuration preamble and format definition. The DEF FNX in line 110 provides some preliminary format-

Program Listing

```
0010 REM ********************************
0020 REM *    DEPRECIATION SCHEDULE     *
0030 REM *    BY W.B. GOLDSMITH, JR     *
0040 REM *    LAKEWOOD, CALIF 90712     *
0050 REM *       COPYRIGHT 1980         *
0060 REM ********************************
0070 REM *     ALL RIGHTS RESERVED      *
0080 REM ********************************
0090 REM
0100 REM ** DEFINE OUTPUT FORMATS ******************************
0110 DEF FNX(A)=LEN(STR$(A))
0120  Z$="----------"
0130  Y$=Z$+Z$+"------"
0140 DIGITS= 0
0150 LINE= 0
0160 REM ** DIMENSION THE VARIABLES ****************************
0170 INPUT "HOW MANY ITEMS",N
0180 DIM D$(N),M$(N),P$(N)
0190 DIM B(N),C(N),D(N),L(N)
0200 DIM M(N),S(N),T(N)
0210 DIM A$(3)
0220 REM ** HEADER INFORMATION **********************************
0230 INPUT "TAXPAYER NAME",A$
0240 INPUT "TAXPAYER I.D. NUMBER",A$(1)
0250 REM ** INPUT DATA ON DEPRECIABLE ITEMS**
0260 FOR X=1 TO N
0270 PRINT "DESCRIPTION OF PROPERTY #";X;
0280 INPUT P$(X)
0290 INPUT "DATE ACQUIRED",D$(X)
0300 PRINT
0310 INPUT "COST OR OTHER BASIS",B(X)
0320 INPUT "LAND OR SALVAGE VALUE",S(X)
0330 REM ** C(X) IS THE DEPRECIABLE BASIS ***********************
0340  C(X)=B(X)-S(X)
0350 INPUT "PREVIOUS DEPRECIATION TAKEN",T(X)
0360 INPUT "METHOD (SL, DB, 1.25DB, 1.5DB, DDB, OR SOD)",M$(X)
0370 INPUT "LIFE (IN YEARS)",L(X)
0380 INPUT "MONTHS IN USE THIS YEAR",M(X)
0390 PRINT
0400 NEXT X
0410 REM ** CALCULATION OF DEPRECIATION ************************
0420 FOR X=1 TO N
0430 IF LEFT$(M$(X),2)="SL" THEN 550
0440 IF LEFT$(M$(X),2)="DB" THEN 600
0450 IF LEFT$(M$(X),3)="1.2" THEN 700
0460 IF LEFT$(M$(X),3)="1.5" THEN 800
0470 IF LEFT$(M$(X),3)="DDB" THEN 900
0480 IF LEFT$(M$(X),3)="SOD" THEN 1000
0490 PRINT "METHOD NOT RECOGNIZED"
0500 INPUT "METHOD (SL, DB, 1.25DB, 1.5DB, DDB, OR SOD)",M$(X)
0510 GOTO 430
0520 REM
0530 REM
0540 REM
0550 REM ** CALCULATE STRAIGHT LINE DEPRECIATION ***************
0560  D(X)=INT((C(X)/L(X))*(M(X)/12)+.5)
0570 IF D(X)>(C(X)-T(X)) THEN D(X)=(C(X)-T(X))
0580 REM ** CANNOT DEPRECIATE BELOW SALVAGE VALUE ***************
0590 GOTO 2000
0600 REM ** CALCULATE DECLINING BALANCE DEPRECIATION ************
0610 GOSUB 1500
0620  D(X)=INT(R1+.5)
0630 IF D(X)>R2 THEN D(X)=R2
0640 GOTO 2000
0700 REM ** CALCULATE 1.25 DECLINING BALANCE DEPRECIATION *******
0710 GOSUB 1500
0720  D(X)=INT((1.25*R1)+.5)
0730 IF D(X)>R2 THEN D(X)=R2
0740 GOTO 2000
0800 REM ** CALCULATE 1.5 DECLINING BALANCE DEPRECIATION ********
0810 GOSUB 1500
0820  D(X)=INT((1.5*R1)+.5)
0830 IF D(X)>R2 THEN D(X)=R2
0840 GOTO 2000
0900 REM ** CALCULATE DOUBLE DECLINING BALANCE DEPRECIATION ****
```

continued

Program Listing continued

```
0910 GOSUB 1500
0920  D(X)=INT((2*R1)+.5)
0930 IF D(X)>R2 THEN D(X)=R2
0940 GOTO 2000
1000 REM ** CALCULATE SUM OF THE YEARS DIGITS DEPRECIATION *****
1010  Y=(L(X)*(L(X)+1)/2)
1020 PRINT "FOR PROPERTY #";X;" (";P$(X);")"
1030 PRINT "WHICH OF THE ";L(X);" YEARS IS"
1040 INPUT "TO BE CALCULATED",Y1
1050  Y1=INT(Y1)
1060 IF Y1>L(X) THEN Y1=L(X)+1
1070 IF Y1<2 THEN Y1=1
1080 PRINT "WHAT MONTH WAS ITEM #";X
1090 PRINT "FIRST PLACED IN SERVICE"
1100 PRINT "(PLEASE TYPE THE NUMBER FOR THE"
1110 PRINT "MONTH WHERE JAN=1, FEB=2,ETC.)"
1120 INPUT M
1130  M(X)=13-M
1140  Y2=L(X)-(Y1-1)
1150  R=C(X)*(Y2/Y)*M(X)/12
1160  R1=C(X)*((Y2+1)/Y)*(12-M(X))/12
1170 IF Y1=1 THEN R1=0
1180  D(X)=INT(R+R1+.5)
1190 IF D(X)>C(X)-T(X) THEN D(X)=C(X)-T(X)
1200 PRINT
1210 GOTO 2000
1490 REM ** SUBROUTINE FOR DECLINING BALANCE CALCULATIONS *****
1500 REM ** CALCULATE THE DEPRECIABLE BALANCE *****************
1510  R=B(X)-T(X)
1520 REM ** CALCULATE THE STRAIGHT LINE PART OF THE  *********
1530 REM ** DEPRECIATION ***************************************
1540  R1=(R/L(X))*(M(X)/12)
1550 REM ** CALCULATE AVAILABLE DEPRECIATION ******************
1560  R2=C(X)-T(X)
1570 REM ** SET THE BASIS TO COST FOR PRINTING *****************
1580  C(X)=B(X)
1590 RETURN
2000 NEXT X
2010 REM ** SELECT THE OUTPUT DEVICE ***************************
2020 INPUT "WHAT OUTPUT PORT NUMBER",P
2030 REM ** PRINT THE DEPRECIATION SCHEDULE ********************
2040 INPUT "PRESS 'RETURN' TO PRINT",A$(2)
2050 PORT= P
2060 PRINT
2070 PRINT TAB(25);"DEPRECIATION SCHEDULE"
2080 PRINT
2090 PRINT Y$;Y$;Y$
2100 PRINT A$;TAB(58);A$(1)
2110 PRINT Y$;Y$;Y$
2120 PRINT
2130 PRINT
2140 PRINT " DESCRIPTION OF -   DATE   - COST OR - ";
2150 PRINT " PRIOR  - METHOD - LIFE - DEPR."
2160 PRINT "    PROPERTY      ACQUIRED    BASIS    ";
2170 PRINT " DEPR."
2180 PRINT Y$;Y$;Y$
2190 FOR X=1 TO N
2200 PRINT
2210 PRINT P$(X);
2220 PRINT TAB(26-LEN(D$(X)));D$(X);
2230  C(X)=INT(C(X)+.5)
2240 PRINT TAB(37-FNX(C(X)));C(X);
2250  T(X)=INT(T(X)+.5)
2260 PRINT TAB(46-FNX(T(X)));T(X);
2270 PRINT TAB(55-LEN(M$(X)));M$(X);
2280  L(X)=INT(L(X))
2290 PRINT TAB(62-FNX(L(X)));L(X);
2300 PRINT TAB(71-FNX(D(X)));D(X)
2310 NEXT X
2320 REM ** GATHER THE TOTALS FOR THE SHEET ********************
2330  C=0
2340  D=0
2350 FOR X=1 TO N
2360  C=C+C(X)
2370  D=D+D(X)
2380 NEXT X
2390 PRINT TAB(28);Z$;TAB(64);Z$
2400 PRINT
2410 PRINT "TOTALS";TAB(37-FNX(C));C;TAB(71-FNX(D));D
2420 PRINT
2430 PRINT Y$;Y$;Y$
2440 PRINT
2450 PRINT
2460 REM ** GO BACK TO THE PRINT ROUTINE FOR ANOTHER COPY *****
2470 PORT= 1
2480 INPUT "ANOTHER COPY",A$(3)
2490 IF LEFT$(A$(3),1)="Y" THEN 2040
2500 END
```

ting for the print out. Lines 120 and 130 define some standard length dashed lines (Z$ is 9 dashes long; Y$ is 24) for printing the column totals (accountants call these totals "footings") and the horizontal page markers. Line 140 controls the print format of numeric variables, while line 150 disables an automatic CR LF feature of the SWTP Basic to allow program control over the output format.

Lines 160 through 210 provide a run time dimensioning of the variable matrices used to contain the depreciation schedule. A$(1), (2) and (3) are used for header information and temporary storage during program operation. Each of the other variables are sized by the number of assets to be depreciated.

Since this routine was originally written to generate attachments to income tax returns, lines 230 and 240 ask for the standard income tax form header data. If you're going to use Depreciation Schedule for a non-tax purpose, you can omit these lines and lines 2100 and 2110, the associated PRINT statements.

The main data input routine is contained in statements 250 to 0400. As data are entered, the depreciable basis is calculated for each asset and stored for later use. Since the entries for all the methods are common, a FOR/NEXT loop handles the data collection.

A FOR/NEXT is also used for the depreciation calculation. It starts with the FOR X in statement 420 and winds up with a NEXT X in line 2000. This structure allows some GOTO action to address each depreciation method.

The series of IF/THEN statements in 430 through 490 provide traffic direction. Since the steering depends on the proper character identifier of the depreciation method, operator care in answering the input prompt of statement 360 is advised. If you were a bit careless in entering the method, lines 490, 500 and 510 provide a second chance.

Depreciation calculations start in earnest in lines 550 to 590, where the straight line depreciation amount is computed. The actual calculation is performed in line 560; line 570 checks that you haven't depreciated more than allowed by subtracting previous depreciation (T(x)) from depreciable basis (C(x)) and comparing with the current year's depreciation amount (D(x)). Line 590 provides a jump to the NEXT X statement in line 2000.

All the declining balance methods start with the same depreciable basis

calculations and the same calculation of the same straight line part of the depreciation. The subroutine in lines 1490 through 1590 handles the interim calculations. The REM's are pretty explanatory in that subroutine, so no need to repeat here.

Straight declining balance depreciation (DB or 100% DB) isn't too popular. The primary reason for including it in this program is for completeness. It only costs us five lines of code, but if you won't be using it, delete 600 through 640 (and 440) to save program memory. The subroutine at 1500 does most of the work on DB, so 600 through 640 are mostly concerned with arranging the values in the proper variables.

The remaining declining balance calculations are varieties of each other. The depreciation is computed by multiplying the straight line portion calculated in the subroutine by the proper factor (1.25, 1.5, or 2.0). In each case, a check is made to insure that the asset hasn't been depreciated below salvage value. The final step is a GOTO the NEXT X.

The SOD computation is a bit more involved than the others. In calculating SOD depreciation, we must calculate the depreciation for a full year and allocate the proper portion of that year to the calendar year of interest. During the third year of use of an asset originally put in service in July, for example, we have part of a SOD second year depreciation and part of a SOD third year depreciation. The additional complication explains the large number of program steps devoted to SOD depreciation (lines 1000 to 1210). Here, also, the program requests additional operator input to specify which year is to be calculated, and what month the asset was first placed in service. By requesting that the operator input the number of the month rather than the name, we save a fairly long look-up table (to convert "JAN" to "1", etc.) with its memory appetite.

If you are shackled by program memory limitations and aren't likely to need SOD depreciation calculations often, you can forget about lines 480 and 1000 through 1210.

With the last "NEXT X" exercised, we're almost home free. Lines 2010 and 2020 let the operator select the output device. (I have a video terminal on Port 1 and a TTY for hard copy on Port 3.) If yours is a single terminal system you can omit this selection process and save some additional program memory. Line 2040 is included to give the operator one last chance to position printer paper, enable printer, and so forth, before the routine starts spewing a depreciation schedule.

The page header information is printed by the commands in statements 2060 through 2130. Lines 2090 and 2110 print three successive Y$'s to produce a 72 dash line. If your printer has other than a 72 column capability, you'll need to change these.

Lines 2140 to 2170 provide the column headings for your depreciation schedule output. Line 2180 is another 72 dash line that may need to be altered.

All of the printing work is handled by the FOR/NEXT loop of 2190 through 2310. Since our computations left things neatly arranged in the matrix variables, the printing is uncomplicated. The TAB functions may seem more complex than necessary, but they provide a justified right margin for the columns. (A straight TAB lines up the left digits and leaves the decimal points in a ragged line with my version of Basic.) If you have a different printing format in your Basic, you may be able to simplify these a bit.

For most income tax work, the "Basis" and "Depreciation" columns must be totalled. The short routine from lines 2320 to 2380 gathers the needed totals; line 2390 provides the column underlines; and, line 2410 prints the totals (right justified). Another 72 dash line is printed by statement 2430.

Since my TTY doesn't print multiple copies, the statements in lines 2460 to 2490 allow another print sequence. One change that you might like to make here is a "THEN 2020" instead of the "THEN 2040" in 2490. This change would allow a preview copy on the video terminal with subsequent runs on the hard copy device.

However you use it — straight or modified — Depreciation Schedule can take some of the drudgery out of your depreciation calculations. As a bonus, this program will generate a form worthy of being attached to your Income Tax Returns. You may even be able to subcontract the printing of depreciation forms for your local accounting and tax practitioners. While that business venture won't help you retire ten years early, it can help to ease the bite of inflation.

If nothing else, Depreciation Schedule can help you prove that you're one of the "in" crowd. You can talk about "Depreciable Basis," "Declining Balance," and "Sum of the Years Digits" with a computer printout to back you up. □

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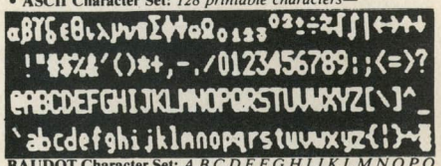

BAUDOT Character Set: *A B C D E F G H I J K L M N O P Q R S T U V W X Y Z - ? : • 3 $ # ( ) . , 9 0 1 4 ! 5 7 ; 2 / 6 8* • **Cursor Modes:** *Home, Backspace, Horizontal Tab, Line Feed, Vertical Tab, Carriage Return. Two special cursor sequences are provided for absolute and relative X-Y cursor addressing* • **Cursor Control:** *Erase, End of Line, Erase of Screen, Form Feed, Delete* • **Monitor Operation:** *50 or 60Hz (jumper selectable.*

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CIRCLE 22

Cassette Index Program

BY STEVENS E. PINNEY

This program, designed to run on a TRS-80 Level II, was originally developed to help my wife locate and load programs while I was at work. When I began using it, however, I found it would allow me to store several programs on each side of a tape and still access them easily. I had previously recorded only one or two programs on each side of a tape because of the problem of identifying and locating a particular program. Using this indexing program, I was able to reorganize my tape library and free over half my tapes for new programs.

To use the program, insert the pertinent data in lines 50170 through 50210. The data format is given in line 50160. The name of each program must be less than 20 characters long to fit the field. Note that there are two separate comment areas for each program. Each area is limited to 24 characters and they are printed one directly under the other. Using two comment fields gives more room for comments and improves readability. Be careful not to include any commas in your comments or program names.

I used the extremely high line numbers so the desired program could be loaded without having to clear the memory. If these line numbers conflict with those used in any of your programs, be sure to change one or the other. The purpose of not clearing the memory is to leave the instructions on the screen for reference.

Line 50030 begins a FOR/NEXT loop which counts to five, the maximum number of programs that can be listed without rolling one or more lines off the top of the screen.

If fewer than five programs are to be stored on a side, be sure to change line 50030 to the appropriate value. If you don't you will get an OD (out of date) error.

One possible improvement for this program would be the addition of a machine language subroutine that would automatically load the chosen program. As a spinoff idea, why not a master index program that will identify which tape a specific program is located on? Such an index should be cross referenced for both category and title. And why not go all the way and cross reference it for author or source, too? □

Mr. Pinney works as an aircraft electrician for the Naval Air Rework Facility.

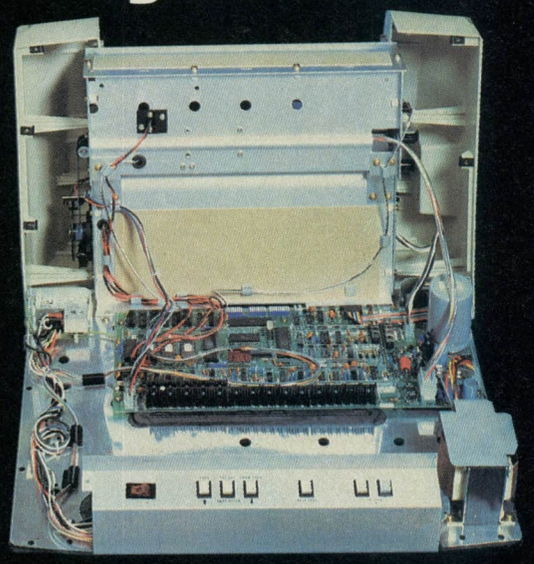
Sample Run

```
Note: All user responses are underlined.

CODE        NAME          SIZE        COMMENT

  A     Star Trek          8K     Make the galaxy safe
                                  for the good guys

  B     Pilot              4K     Shoot down enemy fighters
                                  and test your skill

  C     Checkbook          7K     Help in balancing
                                  the family checkbook

  D     Trivia             12K    Pick a category
                                  and test your smarts

  E     Hamurabi           4K     Rule ancient Sumeria
                                  if you live long enough

          What is the code of the
          program you wish to run? C

To run the program you have chosen requires three steps.

    Step 1.  Type the following statement:

                 CLOAD "C"

    Step 2.  Depress the play button on the tape recorder.

    Step 3.  Press the ENTER key and the program will load.

READY
```

Program Listing

```
50005 Rem  Index program written by S. E. Pinney, March, 1980
50010 Print "code"; Tab(15) "name"; Tab(31) "size"; Tab(47) "comment"
50020 Print
50030 For x = 1 to 5
50040 Read A$, B$, C$, D$, E$
50050 Print Tab(2) A$; Tab(8) B$; Tab(31) C$; Tab(39) D$
50060 Print Tab(39) E$
50070 Next x
50080 Print: Print
50090 Print Tab(19) "What is the code of the"
50100 Input Tab(19) "program you wish to run",AN$
50110 CLS:  Print:Print:Print"To run the program you have chosen
      requires three steps."
50120 Print Tab(5) "Step 1. Type the following statement:"
50130 Print Tab(20) "CLOAD "; CHR$(34); AN$; CHR$(34)
50140 Print Tab(5) "Step 2. Depress the play button on the tape recorder."
50150 Print Tab(5) "Step 3. Press the ENTER key and the program will load."
50160 Rem  The data format is: code, name, size, comment, comment
50170 Data A, Star Trek, 8K, Make the galaxy safe, for the good guys
50180 Data B, Pilot, 4K, Shoot down enemy fighters, and test your skill
50190 Data C, Checkbook, 7K, Help in balancing, the family checkbook
50200 Data D, Trivia, 12K, Pick a category, and test your smarts
50210 Data E, Hamurabi, 4K, Rule ancient Sumeria, if you live long enough
```

Say Ahh...



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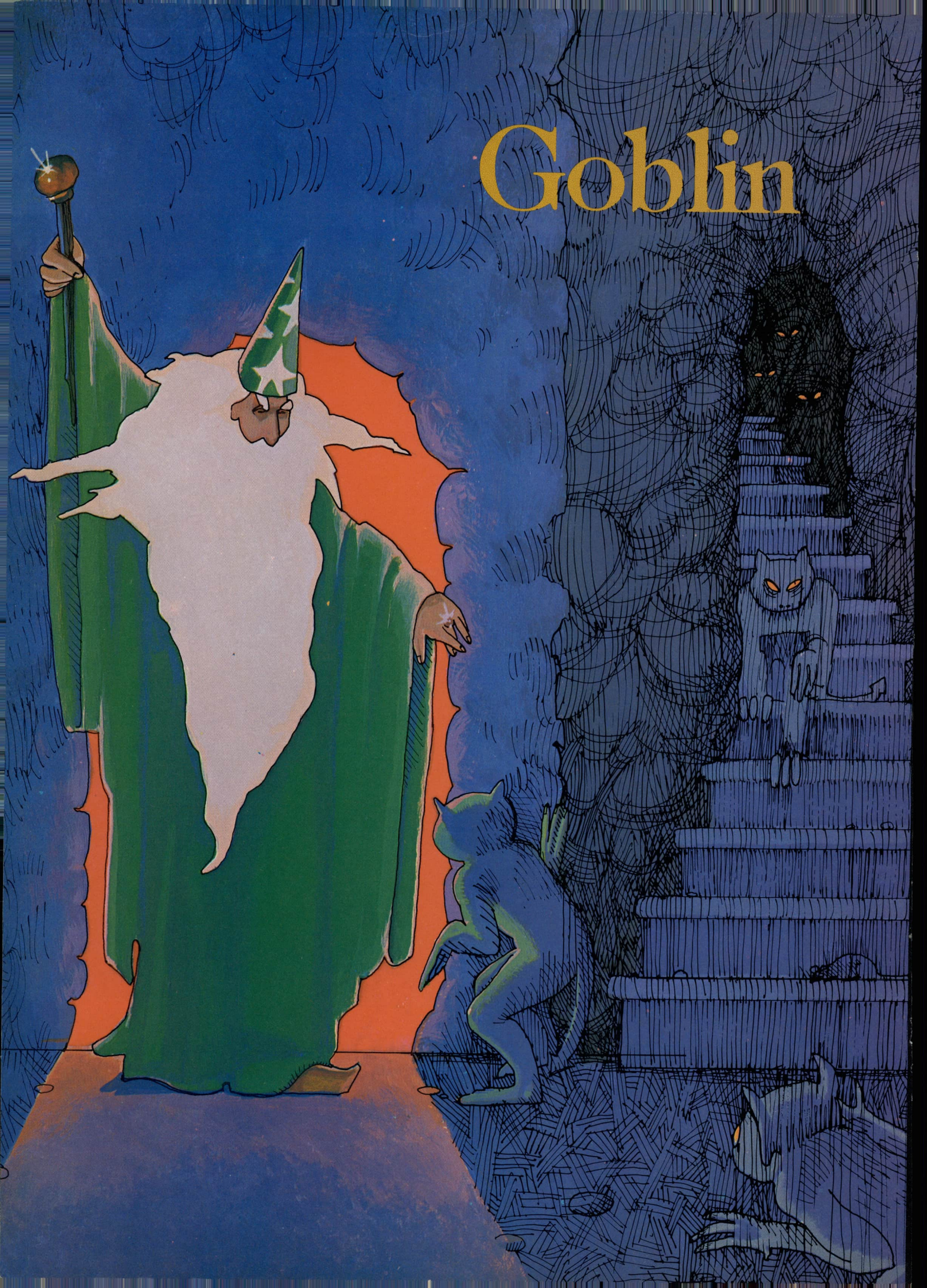
CIRCLE 24


Goblin

A Small System Fantasy Game

BY ROBERT T. NICHOLSON

Computerized fantasy simulation games have become almost as popular as their non-automated counterparts. Unfortunately, the best games, such as Adventure, Zork and Castle, all require a large amount of memory, and a disk.

Goblin is an attempt to create an enjoyable fantasy game which will operate in a fairly small system environment. Special features incorporated into the program include readable, documented and minimally 'compressed' Northstar Basic code facilitates support and modification.

Goblin operates in a 32K byte system, with no extra storage. The program accepts English-like commands, but its vocabulary is very limited and there are no synonyms. To keep the game interesting, Goblin generates a different dungeon each time the game is played. And, the program allows the player to vary the game by portraying a warrior, a thief, or a wizard.

The Sample Run shows the start of a typical game. In this particular session, the player has chosen to portray a wizard. Wizards get to use two magical spells: a ZAP spell, which causes a bolt of lightning to strike an opponent, and TELEPORT, which causes the wizard to be randomly transported to another room of the dungeon. Unfortunately, each spell can only be used once per game.

Thief characters are able to fight somewhat better than wizards (their probability of hitting an opponent is greater) and they are also able to pick locks. Warriors have no special powers, but are able to fight very well, and can withstand more damage from goblin attacks.

The goal of the game is to collect as much treasure as possible without getting killed by the nasty goblins. The dungeon may have as many as 36 rooms, up to 8 treasures and up to 5 goblins.

Mr. Nicholson has a BS in Computer Science from California State University and an MS in electrical engineering from Stanford University. He currently works for Hewlett-Packard where he specializes in human interfaces to computer systems.

Sample Run

```
WELCOME TO GOBLIN CAVE

Are you a WARRIOR, a THIEF, or a WIZARD? WIZARD

--------------------------------------------------
You are standing at the entrance of a dark tunnel.
Would you like to go in?YES

Descending the steep tunnel, you find...
You are standing in a small stone chamber.
TO THE NORTH THERE IS A LOCKED DOOR.
TO THE SOUTH THERE IS A BARE WALL.
TO THE EAST THERE IS A CLOSED DOOR.
TO THE WEST THERE IS A CLOSED DOOR.
ABOVE, THERE IS A STEEP TUNNEL.

IN THE ROOM YOU SEE:

JEWELS


COMMAND: GET THE JEWELS!
OK, got it.

COMMAND: OPEN THE EAST DOOR.
OK, it's opened.

COMMAND: EAST
You are standing in a small stone chamber.
TO THE NORTH THERE IS A CLOSED DOOR.
TO THE SOUTH THERE IS AN OPEN DOOR.
TO THE EAST THERE IS A CLOSED DOOR.
TO THE WEST THERE IS A BARE WALL.

IN THE ROOM YOU SEE:

A GOBLIN!


COMMAND: FIGHT THE GOBLIN.

The goblin is wounded but still standing.

A goblin attacks, and wounds you slightly.

COMMAND: ZAP
A sizzling blue bolt appears, and blasts a GOBLIN out
of existence!

COMMAND: LIST

You are currently carrying:

JEWELS
SWORD
```

Illustration by Jacky Brill

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When prompted with the word COMMAND:, the player selects actions from among 17 options:

NORTH, SOUTH, EAST and WEST allow the player to move in the specified direction, provided that there is an open door in that wall.

GET (object) lets the player pick up an object in the dungeon. There are no limits on what a character can carry.

DROP (object) lets the player drop an object picked up earlier.

FIGHT lets the player fight any goblins which may be in the room, provided the character is carrying the sword provided at the start of the game.

CLIMB is used only to climb up the steep tunnel out of the dungeon.

LIST lists everything which the character is currently carrying.

QUIT ends the game.

OPEN (direction) DOOR opens the door in the specified wall; for example, "OPEN NORTH DOOR."

CLOSE (direction) DOOR closes the specified door. This is useful if goblins are following.

LOOK describes the room in which the player is standing, and lists everything which is in the room.

PICK (direction) LOCK allows a thief to pick the lock of the specified door, and then open the door.

ZAP causes a sizzling blue lightning bolt to appear and strike any goblin in the room. This command is a magic spell and can be used only by wizards.

TELEPORT causes the character to be instantly transported to some other location in the dungeon. Like ZAP, this is a spell and can only be used by wizards. Be careful...once transported, a player may find that there is no way out!

HELP causes all available commands to be listed.

Goblin is fairly flexible in accepting commands: all words may be abbreviated to the first 3 letters; articles (words such as "A" and "THE") may be included; and additional words or punctuation may be added at the end of a sentence. The following commands, for example, are all acceptable:

```
NOR
NORTH.
GET GOLD!
GET THE SILVER
PICK THE EAST LOCK.
```

Listing 1 is the complete source for Goblin, written in Northstar Basic; the program should be fairly easy to modify for other Basic systems. Note that line 20 is a special access to the random number function which "randomizes" all future accesses to avoid getting the same string of values each time the program is run. Also, in Northstar Basic, substrings are specified in the form: X$(I,J), where I is the index to the first character desired, and J is the index to the last character. In other Basics, this would be converted to: MID$(X$,I,J−I+1).

For the player who wishes to experiment, several changes can be made in Goblin. In the basic game, a wizard may use the ZAP spell only once. To allow multiple uses, increase the value placed in W1 on line 200. Similarly, the value placed in W2 in line 210 determines how many times a wizard can use the TELEPORT spell.

The relative amount of damage which a character can withstand in the course of fighting can be changed by modifying the value of H. For a warrior, change H at line 110; for a thief, change H at line 150; for a wizard, change H at line 190. The amount of damage which a Goblin can withstand can be changed by altering the value placed in H0(I), in line 630. For all of these cases, the bigger the number, the more damage the character can take and deliver. Thus, by raising the warrior's H to 20, that type of character could be made nearly invincible in a fight!

Other changes may suggest themselves to more avid programmers. For those who prefer simply to play... good luck, but don't let the goblins get you! □

Program Listing

```
10 DIM C$(32),V$(10),V1$(10),N$(10),N1$(10),
   D0$(84),D(4),L1(16),H0(5)
20 T=RND(-1)
30 PRINT "WELCOME TO GOBLIN CAVE"
40 PRINT
50 PRINT "Are you a WARRIOR, a THIEF, or a
   WIZARD",
60 INPUT C$
70 IF LEN(C$)<2 THEN 60
80 PRINT
90 IF C$(1,2)<>"WA" THEN 130
100 T=.9
110 H=9
120 GOTO 270
130 IF C$(1,2)<>"TH" THEN 170
140 T=.7
150 H=7
160 GOTO 270
170 IF C$(1,2)<>"WI" THEN 230
180 T=.5
190 H=5
200 W1=1
210 W2=1
220 GOTO 270
230 PRINT "You must be a simple peasant."
240 PRINT "I'm afraid this adventure would
    be too dangerous for you."
250 STOP
260 REM *** INITIALIZE
270 FOR I=1 TO 6
280  D0$(I,I)="W"
290  D0$(I+42,I+42)="W"
300 NEXT I
310 FOR I=7 TO 36
320  I1=I+42
330  T0=RND(0)
340  T1=RND(0)
350  D0$(I,I)="W"
360  D0$(I1,I1)="W"
370  IF T0>.3 THEN D0$(I,I)="O"
380  IF T1>.3 THEN D0$(I1,I1)="O"
390  IF T0>.6 THEN D0$(I,I)="C"
400  IF T1>.6 THEN D0$(I1,I1)="C"
410  IF T0>.85 THEN D0$(I,I)="L"
420  IF T1>.85 THEN D0$(I1,I1)="L"
430  PRINT "--",
440 NEXT I
450 FOR I=37 TO 42
460  D0$(I,I)="W"
470  D0$(I+42,I+42)="W"
480 NEXT I
490 D(1)=-6
500 D(2)=6
510 D(3)=1
520 D(4)=-1
530 PRINT
540 FOR I=1 TO 15
550  L1(I)=INT(36*RND(0))+1
560 NEXT I
570 L1(8)=-1
580 L1(10)=0
590 L1(16)=0
```

```
600 L0=INT(36*RND(0))+1
610 S0=L0
620 FOR I=1 TO 5
630  H0(I)=4
640 NEXT I
650 L1(8)=-1
660 PRINT "You are standing at the entrance
    of a dark tunnel."
670 PRINT "Would you like to go in",
680 IF FNA(1)=1 THEN 720
690 PRINT "Very well.  Congratulations on
    surviving this adventure."
700 PRINT
710 STOP
720 PRINT
730 PRINT "Descending the steep tunnel, you
    find..."
740 RESTORE 3660
750 PRINT "You are standing in a small stone
    chamber."
760 FOR I=1 TO 4
770  I1=FNW(I)
780  READ N$
790  PRINT "TO THE ",N$," THERE IS A",
800  IF T$="W" THEN PRINT " BARE WALL."
810  IF T$="O" THEN PRINT "N OPEN DOOR."
820  IF T$="C" THEN PRINT " CLOSED DOOR."
830  IF T$="L" THEN PRINT " LOCKED DOOR."
840 NEXT I
850 IF S0=L0 THEN PRINT "ABOVE, THERE IS A
    STEEP TUNNEL."
860 I1=FNL(S0)
870 REM *** GET A COMMAND AND INTERPRET IT
880 GOSUB 3200
890 IF V>8 THEN 910
900 ON V GOTO 930,930,930,930,1040,1150,1230
    ,1520
910 ON V-8 GOTO 1690,1820,1920,2090,2230,
    2250,2420,2620,2740,3000
920 STOP
930 REM *** NORTH, SOUTH, EAST & WEST
940 I=V
950 I1=FNW(I)
960 IF T$="O" THEN 990
970 PRINT "Sorry, you can only go through
    open doors."
980 GOTO 880
990 IF L1(11)=S0 OR L1(12)=S0 THEN 1020
1000 S0=S0+D(V)
1010 GOTO 740
1020 PRINT "There seems to be a GOBLIN in
     the way!"
1030 GOTO 880
1040 REM *** GET
1050 IF N<1 OR N>9 THEN 2860
1060 IF L1(N)>=0 THEN 1090
1070  PRINT "You've already got it."
1080  GOTO 880
1090 IF L1(N)=S0 THEN 1120
1100  PRINT "There's no '",N$,"' here."
1110  GOTO 880
1120 L1(N)=-1
1130  PRINT "OK, got it."
1140  GOTO 2870
1150 REM *** DROP
1160 IF N<1 OR N>9 THEN 2860
1170 IF L1(N)<0 THEN 1200
1180  PRINT "You have no '",N$,"' to drop."
1190  GOTO 880
1200 L1(N)=S0
1210  PRINT "OK, you dropped it."
1220  GOTO 2870
1230 REM *** FIGHT
1240 IF N<>10 AND N<>15 THEN 2860
1250 T1=0
1260 FOR I=11 TO 15
1270  IF L1(I)=S0 THEN T1=I
1280 NEXT I
1290 IF T1>0 THEN 1320
1300  PRINT "There's nothing here to fight."
1310  GOTO 2870
1320 IF L1(8)<0 THEN 1370
1330  PRINT
1340  PRINT "You need a sword to fight
      goblins."
1350  PRINT
1360  GOTO 2870
1370 IF RND(0)<T THEN 1420
1380  PRINT
1390  PRINT "Oops, the goblin dodged out of
      your way!"
1400  PRINT
1410  GOTO 2870
1420 H0(T1-10)=H0(T1-10)-INT(H*RND(0))
1430 IF H0(T1-10)<=0 THEN 1470
1440  PRINT
1450  PRINT "The goblin is wounded but still
      standing."
1460  GOTO 2870
1470 PRINT
1480 PRINT "A mighty blow has finished off
     one goblin, which vanishes"
1490 PRINT "with a blinding flash of light!"
1495 PRINT
1500 L1(T1)=0
1510 GOTO 2870
1520 REM *** CLIMB
1530 IF S0=L0 THEN 1560
1540  PRINT "There's nowhere to climb."
1550  GOTO 880
1560 PRINT "After climbing the steep tunnel, "
1570 PRINT "you are back at the cave
     entrance."
1580 PRINT "Would you like to stop now",
1590 IF FNA(1)<>1 THEN 1660
1600  PRINT "OK.  You now have:"
1610  PRINT
1620  GOSUB 1740
1630  PRINT
1640  PRINT "CONGRATULATIONS!"
1650  GOTO 920
1660 PRINT "Alright then, it's back down the
     tunnel..."
1670 PRINT
1680 GOTO 740
1690 REM *** LIST
1700 PRINT
1710 PRINT "You are currently carrying:"
1720 PRINT
1730 GOSUB 1740
1735 GOTO 2870
1740  REM * INVENTORY LIST SUBROUTINE
1750  RESTORE 3820
1760  FOR I=1 TO 9
1770   READ N$
1780   IF L1(I)<0 THEN PRINT N$
1790  NEXT I
1800  PRINT
1810  RETURN
1820 REM *** QUIT
1830 PRINT
1840 PRINT "Are you sure you want to quit
     now",
1850 IF FNA(1)=1 THEN 1880
1860  PRINT "OK."
1870  GOTO 880
```

```
1880 PRINT "OK.  You finish the adventure
     carrying:"
1890 PRINT
1900 GOSUB 1740
1910 GOTO 920
1920 REM *** OPEN
1930 I1=FND(N)
1940 IF I1<0 THEN 880
1950 I=N-10
1960 I1=FNW(I)
1970 IF T$<>"W" THEN 2000
1980  PRINT "There's no door there."
1990  GOTO 880
2000 IF T$<>"O" THEN 2030
2010  PRINT "It's open."
2020  GOTO 880
2030 IF T$<>"C" THEN 2070
2040  D0$(I1,I1)="O"
2050  PRINT "OK, it's opened."
2060  GOTO 2870
2070 PRINT "The lock must be picked before
     the door can be opened."
2080 GOTO 880
2090 REM *** CLOSE
2100 I1=FND(N)
2110 IF I1<0 THEN 880
2120 I=N-10
2130 I1=FNW(I)
2140 IF T$<>"W" THEN 2170
2150  PRINT "There's nothing but a wall
     there."
2160  GOTO 880
2170 IF T$="O" THEN 2200
2180  PRINT "It's already closed."
2190  GOTO 880
2200 D0$(I1,I1)="C"
2210 PRINT "OK, it's closed."
2220 GOTO 2870
2230 REM *** LOOK
2240 GOTO 740
2250 REM *** PICK
2260 IF T=.7 THEN 2290
2270  PRINT "Sorry, only thieves can pick
     locks."
2280  GOTO 880
2290 I1=FND(N)
2300 IF I1<0 THEN 880
2310 I=N-10
2320 I1=FNW(I)
2330 IF T$<>"W" THEN 2360
2340  PRINT "Only miners can 'PICK' stone
     walls!"
2350  GOTO 880
2360 IF T$="L" THEN 2390
2370  PRINT "It's already unlocked."
2380  GOTO 880
2390 D0$(I1,I1)="O"
2400  PRINT "OK, the door is now unlocked
      and opened."
2410  GOTO 2870
2420 REM *** ZAP
2430 IF T=.5 THEN 2460
2440  PRINT "You're not a WIZARD!"
2450  GOTO 2870
2460 IF W1>0 THEN 2490
2470  PRINT "Sorry, you've used up that
      spell."
2480  GOTO 880
2490 W1=W1-1
2500 I1=0
2510 FOR I=11 TO 15
2520  IF L1(I)=S0 THEN I1=I
2530 NEXT I
2540 IF I1>0 THEN 2580
2550  PRINT "A sizzling blue bolt appears,
     and flashes harmlessly"
2560  PRINT "across the room."
2570  GOTO 2870
2580 L1(I1)=0
2590 PRINT "A sizzling blue bolt appears, and
     blasts a GOBLIN out"
2600 PRINT "of existence!"
2610 GOTO 2870
2620 REM *** TELEPORT
2630 IF T=.5 THEN 2660
2640  PRINT "You're not a WIZARD!"
2650  GOTO 880
2660 IF W2>0 THEN 2690
2670  PRINT "Sorry, you've used up that
      spell."
2680  GOTO 880
2690 PRINT "For a few seconds, everything
     seems to be spinning, "
2700 PRINT "and then..."
2710 W2=W2-1
2720 S0=INT(RND(0)*36)+1
2730 GOTO 740
2740 REM *** HELP
2750 PRINT "I'm afraid you're on your own
     down here."
2760 PRINT "I can only understand the
     following commands:"
2770 PRINT
2780 RESTORE 3660
2790  READ N$
2800  IF N$="//" THEN 2830
2810  PRINT N$,",  ",
2820  GOTO 2790
2830 PRINT
2840 PRINT "and the names of a few things."
2850 PRINT
2855 GOTO 2870
2860 PRINT "That's silly!"
2870 REM ***
2880 REM *** PROCESS GOBLIN ACTIONS
2890 REM ***
2900 FOR I=11 TO 15
2910  IF L1(I)<>S0 THEN 3080
2920  IF RND(0)>.2 THEN 2950
2930  PRINT "The goblin is eyeing you with a
      hungry look in his eyes.."
2940  GOTO 3080
2950  PRINT
2960  IF RND(0)>.5 THEN 2990
2970  PRINT "A goblin attacks, but you dodge
      out of the way."
2980  GOTO 3080
2990  H=H-INT(5*RND(0))
3000  IF H<=0 THEN 3030
3010  PRINT "A goblin attacks, and wounds you
      slightly."
3020  GOTO 3080
3030  PRINT "A goblin attacks!  Oh, no!
      You've just been killed."
3040  PRINT
3050  PRINT "Well, that ends this adventure.
      Better luck next time."
3060  PRINT
3070  GOTO 920
3080  IF L1(I)=S0 OR L1(I)=0 THEN 3170
3090   FOR J=1 TO 4
3100    I1=FNW(J)
3110    IF T$<>"O" THEN 3160
3120    I1=J
3130    J=4
3140    L1(I)=L1(I)+D(I1)
```

```
3150     IF L1(I)=S0 THEN PRINT "A nasty
         looking GOBLIN just ran in!"
3160    NEXT J
3170 NEXT I
3180 GOTO 880
3190 REM *** COMMAND INTERPRETER
3200 PRINT
3210 INPUT "COMMAND: ",C$
3220 C$=C$+" "
3230 J=LEN(C$)
3240 IF J=1 THEN 3200
3250 I1=FNU(1,1,J)
3260 I2=FNE(I1+1,I1+1,J)-1
3270 I0=I2+1
3280 I3=FNU(I0,I0,J)
3290 I4=FNE(I3+1,I3+1,J)-1
3300 I0=I4+1
3310 IF C$(I3,I4)="THE" THEN 3280
3320 V$=C$(I1,I2)+"   "
3330 N$=C$(I3,I4)+"   "
3340 V=FNV(V)
3350 N=FNN(N)
3360 IF V>=0 AND N>=0 THEN RETURN
3370 REM *** RETURN AN INDEX TO THE FIRST
     BLANK CHARACTER
3380 REM *** IN C$ BETWEEN J1 AND J.  IF NONE
     FOUND, RETURN J2.
3390 PRINT "I DON'T UNDERSTAND THAT."
3410 GOTO 3200
3420 DEF FNU(J1,J2,J)
3430 REM *** RETURN AN INDEX TO THE FIRST
     NON-BLANK CHARACTER
3440 REM *** IN C$ BETWEEN J1 AND J.  IF NONE
     FOUND, RETURN J2.
3450 FOR J3=J1 TO J
3460  IF C$(J3,J3)<>" " THEN RETURN J3
3470 NEXT J3
3480 RETURN J2
3490 FNEND
3500 DEF FNE(J1,J2,J)
3510 FOR J3=J1 TO J
3520  IF C$(J3,J3)=" " THEN RETURN J3
3530 NEXT J3
3540 RETURN J2
3550 FNEND
3560 DEF FNV(V)
3570 REM *** RETURN AN INDEX 'V' TO THE VERB
     TABLE ENTRY WHICH
3580 REM *** MATCHES V$.
3590 RESTORE 3660
3600 V=1
3610  READ V1$
3620  IF V1$="//" THEN RETURN -1
3630  IF V$(1,3)=V1$(1,3) THEN RETURN V
3640  V=V+1
3650 GOTO 3610
3660 DATA "NORTH","SOUTH","EAST","WEST","GET",
     "DROP","FIGHT","CLIMB"
3670 DATA "LIST","QUIT","OPEN","CLOSE","LOOK",
     "PICK","ZAP","TELEPORT"
3680 DATA "HELP"
3690 DATA "//"
3700 FNEND
3710 DEF FNN(N)
3720 REM *** RETURN AN INDEX 'N' TO THE NOUN
     TABLE ENTRY WHICH
3730 REM *** MATCHES N$.
3740 RESTORE 3820
3750 N=1
3760 IF LEN(N$)<3 THEN N$="   "
3770  READ N1$
3780  IF N1$="//" THEN RETURN -1
3790  IF N$(1,3)=N1$(1,3) THEN RETURN N
3800  N=N+1
3810 GOTO 3770
3820 DATA "GOLD","SILVER","DIAMONDS",
     "RUBIES","JADE","JEWELS","CROWN"
3830 DATA "SWORD","GARNETS","GOBLIN"
3840 DATA "NORTH","SOUTH","EAST","WEST","   "
3850 DATA "//"
3860 FNEND
3870 DEF FNA(A)
3880 REM *** GET A Y/N ANSWER FROM THE
     USER.  RETURN THE VALUE
3890 REM *** OF 'A' FOR YES, RETURN 0 FOR NO.
3900 INPUT A$
3910 IF A$(1,1)="Y" THEN RETURN A
3920 IF A$(1,1)="N" THEN RETURN 0
3930 PRINT "Y or N",
3940 GOTO 3900
3950 FNEND
3960 DEF FNW(I2)
3970 REM *** SET T$ = THE CURRENT STATE OF
     THE SPECIFIED DOOR
3980 REM *** OUT OF THE CURRENT ROOM.  THE
     DOOR IS SELECTED BY
3990 REM *** I2  (1=N, 2=S, 3=E, 4=W).  THE
     CURRENT ROOM IS S0.
4000 REM *** STATES MAY BE®  W (WALL), C
     (CLOSED), O (OPEN), OR
4010 REM *** L (LOCKED).
4020 I1=S0
4030 IF I2=2 THEN I1=S0+6
4040 T1=INT(S0/6.1)
4050 IF I2=3 THEN I1=(S0-T1*6)*6+T1+1
4060 IF I2=4 THEN I1=(S0-T1*6)*6+T1-5
4070 T$=D0$(I1,I1)
4080 RETURN I1
4090 FNEND
4100 DEF FNL(S0)
4110 REM *** LIST THE CONTENTS OF THE CURRENT
     ROOM  (S0).
4120 I1=0
4130 FOR I=1 TO 15
4140  IF L1(I)=S0 THEN I1=1
4150 NEXT I
4160 PRINT
4170 IF I1=0 THEN RETURN 0
4180 PRINT "IN THE ROOM YOU SEE:"
4190 PRINT
4200 RESTORE 3820
4210 FOR I=1 TO 9
4220  READ N$
4230  IF L1(I)=S0 THEN PRINT N$
4240 NEXT I
4250 I1=0
4260 FOR I=11 TO 15
4270  IF L1(I)=S0 THEN I1=I1+1
4280 NEXT I
4290 IF I1=0 THEN 4320
4300  IF I1=1 THEN PRINT "A GOBLIN!"
4310  IF I1>1 THEN PRINT I1," GOBLINS!"
4320 PRINT
4330 RETURN 0
4340 FNEND
4350 DEF FND(N)
4360 REM *** MAKE SURE THAT THE NOUN-INDEX,
     N, SPECIFIES A
4370 REM *** DIRECTION.  IF NOT, PRINT AN
     ERROR MESSAGE AND
4380 REM *** RETURN -1.
4390 IF N>=11 AND N<=14 THEN RETURN 1
4400 PRINT "THIS COMMAND MUST SPECIFY A
     DIRECTION: "
4410 PRINT "NORTH, EAST, WEST, OR SOUTH."
4420 RETURN -1
4430 FNEND
4440 END
```

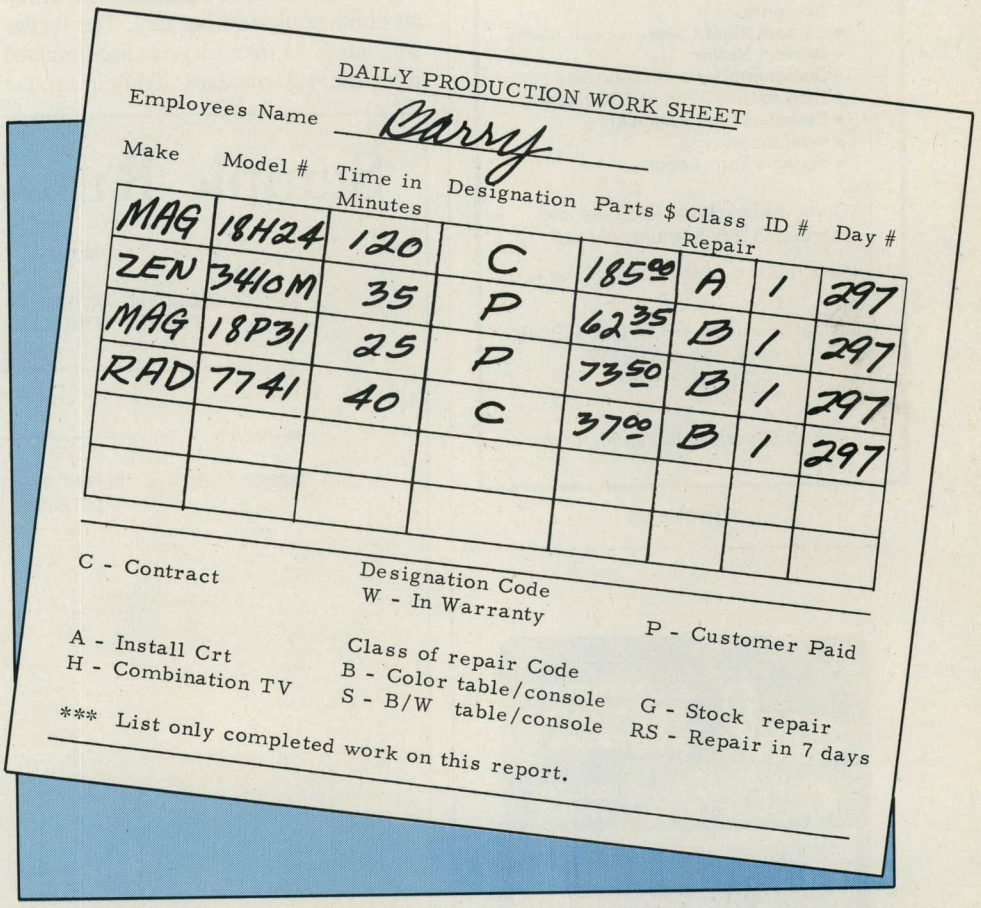
Figuring Incentive Pay

BY CLINT HENTZ

Many TV repair services offer their technicians an incentive pay policy. This program covers the record keeping of an incentive program for inside TV technicians, but could be used with minor changes in connection with inside or outside major appliance technicians, lawn mower or snow blower technicians, or in the area of office equipment repair.

People I know who have worked under an incentive program seemed to feel more comfortable if they could compare their production records to the data used in compiling the incentive pay. This program provides each employee with sufficient information to satisfy this situation, and also provides the payroll department with figures regarding money due the employee.

The program was written on a TRS-80 with 48K but will work as listed on a 16K Level 2 with a cassette recorder and printer. In business it seems a printer is mandatory in most situations. In this program the printer saves copying information from the CRT and eliminates the laborious task of typing the incentive records used by the payroll department and the employees. I save the program on a diskette, simply because in a business environment my cassette recorder seems slow. Adjusting the volume setting when loading a tape becomes frustrating at times. Of course, another plus in having the disk drives is the availability of random access.



DAILY PRODUCTION WORK SHEET

Employees Name Garry

Make	Model #	Time in Minutes	Designation	Parts $	Class Repair	ID #	Day #
MAG	18H24	120	C	185.00	A	1	297
ZEN	3440M	35	P	62.35	B	1	297
MAG	18P31	25	P	73.50	B	1	297
RAD	7741	40	C	37.00	B	1	297

Designation Code
C - Contract
W - In Warranty
P - Customer Paid

Class of repair Code
A - Install Crt
H - Combination TV
B - Color table/console
S - B/W table/console
G - Stock repair
RS - Repair in 7 days

*** List only completed work on this report.

I wrote the program without multi-line statements to make it easy to use on a computer which does not accept multi-line statements. LPRINT sends the information to the printer. LPRINT"" creates a blank line on the hard copy. On line 790 the PRINT USING statement accepts the numbers generated in line 800. Line 90 permits the designation of the days that the program is to select from the data bank. This is helpful if you have several months of data retained in a program and only want to use a specific group of days.

If you have more than three employees, change line 320 to N equals the number of employees. Then add an INPUT line after line 200 for each additional employee. Do the same after line 380. Using 16 K you should be able to handle two months of data for eight employees in memory. If you have more inside employees — say 12 to 15 — put only one month of data in a program. If you do not want to retain any employee data on tape, then memory is not a problem.

In actual use we input the complete line of information which appears on the employee's daily production sheet. A line covers make, model, total minutes to complete the repair, contract, warranty or customer paid desig-

Mr. Hentz is president of a custom furniture manufacturing and reupholstering company and operations manager for a service center which handles TV and major appliance repair, carpet handling and installation, furniture refinishing, drapery making and monograming. His previous PC *articles include "Tracking Costs in a Service Business" (October 1979), "Keeping Tabs on Service Technicians" (December 1979), "TV Registrations and Service Contracts" (February 1980), "Personalized Sales Message" (July 1980) and "Drapery Estimating" (September 1980).*

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CIRCLE 26

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CIRCLE 27

nation, dollars of parts used, employee ID number, type of repair and the date the repair was completed. This system permits the merging of one bank of data with several other programs I have written that require the use of various items in the same data bank. While it takes longer to input all of the above items for just the incentive records, I don't have to input the data again when running other programs.

The standard used for the inside TV technicians incentive program in the listed program is based on accumulating 4.8 points of completed work within an eight-hour working day. The incentive rate is $3 for each point accumulated over the 4.8 standard. To help protect the quality of the work performed, three points are deducted for each TV which requires additional service within seven days after it was returned to the customer.

Point values for repair	Merchandise
4.0	Install picture tube
2.4	Color table or console
1.4	Stock merchandise
3.0	Combination sets
2.0	B/W table or console
−3.0	Repair within 7 days

Determine your values from an in depth study of your operation! □

Sample Run

```
TO:     PAYROLL DEPARTMENT

RE:     INCENTIVE ACCOUNTING REPORT
          FOR PAY PERIOD ENDING NOV 1 1980

==========================================


APPROVED   BY ------------------------------

BARRY    ID # 1  REPORT FOR PAY PERIOD ENDING NOV 1 1980
                   CATEGORY    POINT VALUE       DATE
                     A            4              295
                     B            2.4            295
                     RS          -3              295
                     S            2              296
                     B            2.4            296
                     B            2.4            296
                     G            1.4            296
                     G            1.4            296
                     A            4              297
                     B            2.4            297
                     B            2.4            297
                     B            2.4            297
                     S            2              298
                     G            1.4            298
                     B            2.4            298
                     RS          -3              299
                     A            4              299
                   - - - TOTALS - - -
                     17           31
TOTAL INCENTIVE MONEY = $ 21.00
------------------------------------------
```

Program Listing

```
10 REM  INSIDE TV.  INCENTIVE ACCOUNTING PROGRAM
20 REM
30 REM          C L I N T   H E N T Z
40 REM           ST. LOUIS, MISSOURI
50 REM
60 PRINT"ENTER  ENDING PAY PERIOD DATE . . EX.  NOV 1 1980
70 INPUT W$
80 PRINT"WHAT DAYS DO YOU WANT FROM THE DATA LIST. "
90 PRINT "ENTER FIRST DAY NUMBER THEN LAST DAY NUMBER"
100 PRINT"      EXAMPLE 307 = NOVEMBER 5TH 1980
110 REM  FF = FIRST DAY   LL = LAST DAY
120 INPUT FF
```

```
130 INPUT LL
140 PRINT
150 PRINT"HOW MANY DAYS DURING THE PERIOD DID THE FOLLOWING EMPLOYEE WORK"
160 PRINT" ANY FRACTION OF A DAY IS TO BE COUNTED AS FULL DAY"
170 PRINT"================================================="
180 INPUT"BARRY   ID #1. ";K(1)
190 INPUT"ROBERT  ID #2. ";K(2)
200 INPUT"JAMES   ID #3. ";K(3)
210 LPRINT"TO:    PAYROLL DEPARTMENT"
220 LPRINT"  "
230 LPRINT"RE:    INCENTIVE ACCOUNTING REPORT"
240 LPRINT"         FOR PAY PERIOD ENDING ";W$
250 LPRINT "  "
260 LPRINT"================================================"
270 LPRINT"  "
280 LPRINT"  "
290 LPRINT"APPROVED   BY  ------------------------------"
300 LPRINT"  "
310 REM  N= 1 TO NUMBER OF PERSONS ON THE INCENTIVE PROGRAM
320 FOR N= 1 TO 3
330 REM   NEXT 2 LINES SET COUNTERS TO ZERO FOR START OF EACH EMPLOYEE.
340 X=0
350 J=0
360 IF N=1 LPRINT"BARRY   ID # 1";
370 IF N=2 LPRINT"ROBERT  ID # 2";
380 IF N=3 LPRINT"JAMES   ID # 3";
390 LPRINT"  REPORT FOR PAY PERIOD ENDING ";W$
400 LPRINT TAB(17)" CATEGORY    POINT VALUE       DATE"
410 REM   A= EMPLOYEE ID#   B$= CLASS OF REPAIR   D= DATE
420 REM   NEXT LINE READS COMPLETE DATA LINE
430 READ A,B$,D
440 C=0
450 IF A=-1 GOTO 730
460 REM   NEXT LINE SELECTS ONLY THE DAYS BETWEEN THE DATES REQUESTED.
470 IF (D<FF)OR(D>LL) GOTO 430
480 IF A=N GOTO 510
490 GOTO 430
500 REM   NEXT LINE.. X COUNTS NUMBER OF REPAIRS FOR EACH EMPLOYEE.
510 X= X+1
520 REM A=INSTALL CRT--B=COLOR TABLE OR CONSOLE--G=STOCK SET
530 REM H= COMBINATION--S=B&W TABLE OR CONSOLE
540 REM RS= RESHOP .. SERVICED WITHIN 7 DAYS.
550 REM
560 REM ESTABLISH DESCRIPTIVE VARIBLES.. ONE LETTER MEANS LESS
570 REM INPUT TIME.
580 REM
590 REM POINT VALUES LISTED ARE FOR DEMONSTRATION ONLY.
600 REM ESTABLISH YOURS AFTER PROPER STUDY IS MADE.
610 REM  NEXT 6 LINES SET POINT VALUES   C= POINT VALUE
620 IF B$="A" THEN C=4
630 IF B$="B" THEN C=2.4
640 IF B$="G" THEN C=1.4
650 IF B$="H" THEN C=3
660 IF B$="S" THEN C=2
670 IF B$="RS" THEN C=-3
680 REM RS= -4 POINTS...THIS HELPS TO MAINTAIN QUALITY WORK.
690 LPRINTTAB(20)B$,C,D
700 REM   NEXT LINE..  J COUNTS NUMBER OF POINTS.
710 J=J+C
720 GOTO 430
730 H=H+1
740 LPRINT TAB(18)"- - - TOTALS - - -"
750 LPRINT TAB(19)X,J
760 REM   NEXT LINE ESTABLISHES INCENTIVE POINTS OVER STANDARD OF 4.8
770 IF J=> 4.8 * K(N) THEN F=J-4.8 *K(N)
780 IF J=< 4.8 * K(N)  THEN F=0
790 AA$="TOTAL INCENTIVE MONEY = $####.##"
800 LPRINT USING AA$;F*3.00
810 LPRINT "-------------------------------------------"
820 LPRINT"  "
830 H=H+1
840 RESTORE
850 NEXT N
860 END
1000 DATA 1,A,295,1,B,295,1,RS,295,2,S,295,2,H,295,2,B,295,3,A,295,3,S,295
1010 DATA 3,B,295,3,B,295,1,S,296,1,B,296,1,B,296,1,G,296,1,G,296,2,B,296
1020 DATA 2,B,296,2,B,296,2,A,296,3,S,296,3,G,296,3,S,296,3,B,296,3,B,296
1030 DATA 1,A,297,1,B,297,1,B,297,1,B,297,2,RS,297,2,RS,297,2,B,297
1040 DATA 3,B,297,3,S,297,3,S,297,3,B,297,1,S,298,1,G,298,1,B,298
1050 DATA 2,B,298,2,S,298,3,A,298,3,H,298,1,RS,299,1,A,299,2,B,299
1060 DATA 3,H,299,3,A,299,2,H,299,-1,X,-1
1070 REM ONLY 5 DAYS OF INPUT USED... AND THREE ITEMS FROM
1080 REM THE DAILY PRODUCTION SHEET WERE USED FOR THIS
1090 REM DEMONSTRATION.
```


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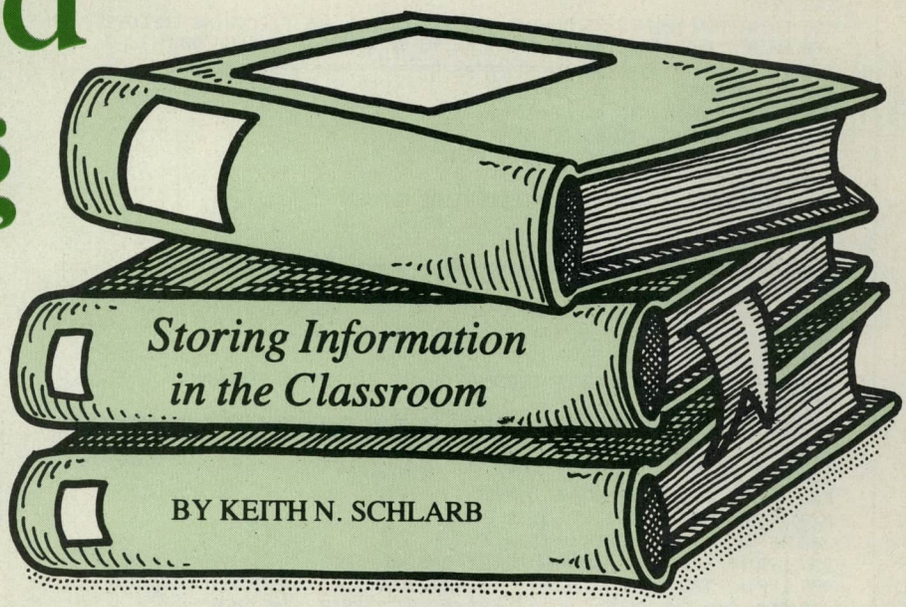
CIRCLE 28

Got an unusual application?

If you use your computer for an interesting, intriguing or unusual application (or know someone who does), our readers would like to hear about it. Why not write up a short (500 to 1000 words), original article telling us about it? Make it light and newsy, and include black-and-white photos if appropriate. Send your submission to Random Access, Personal Computing, 1050 Commonwealth Ave., Boston, MA 02215.

Required Reading



If you work in education, you know this profession requires storing vast amounts of information. Educators, however, have not had computers as an alternative method for storing information, especially those teaching below the university level. With the increased use of microcomputers in secondary education, this trend is changing.

For the past several years, I've had science students in my class read specific articles, especially from National Geographic. Students were to answer questions developed by students of previous years concerning the article. Thumbing through the file drawer to find a question list for a particular article was a real problem, not to mention time consuming.

The following program has eliminated both the storage and search problem. It also allows students to search through the subjects and titles on file for particular types of articles. When students locate an article for their use, they simply request a hardcopy of the questions through the program. Besides the benefits of saving time and space, the students enjoy searching for articles using the computer.

The program operates in turnkey fashion and requires no special commands from students, simply decisions to questions asked by the program.

The program, written in Applesoft using a 48K Apple II Plus, and Disk II, allows you to store and retrieve 100 subject names (20 characters maximum length), 100 title names (50 characters maximum length), and 5 questions for each subject/title (150 characters maximum length for each question). When entering subject and title information for an article I suggest you include the article identification number at the end, since article questions are called from the disk using this identification number. The identification numbers are given as the article information is added to the disk. For example, the first article will have an identification number of 1, while the tenth article entered has an identification number of 10. Figure 1 shows the suggested format for entering subject and title information. One important item to remember is that commas may not be used in the stored information.

A special feature of the progam is its ability to search either the subjects or titles. The searches may be done using any number of letters you wish. For example, a subject search done using the one letter C would print on the monitor all subjects which start with the letter C. If you wish to search for subjects on energy, you would specify six letters, E N E R G Y. Any subjects dealing with energy would be listed.

A title search may be performed in the same manner. If you own a printer you may receive complete subject or title lists which will be alphabetized, plus questions for any article. See Sample Run for examples of output.

Don't lose hope if you don't own a printer, since the program functions fine without one. Students could copy questions from the screen. Either way it should help solve your information storage and retrieval problem.

Following these simple procedures will allow you to initialize a disk and set up the program to work in turnkey fashion:

First, boot the system, type "NEW" and enter the initializing program. Place a new disk in the drive and initialize it using the program. Run the initializing program to set up the required files. Next enter the main program and save it under the same name as the initializing program. This will replace the initializing program with the main program. From now on the main program will load and run automatically when the system is turned on or booted with this disk in the drive.

A few changes you may have to make are the printer commands in lines 1710, 1690, 1590, 1570, 1540, 1420 and 1400. The commands, as used in the program, are:

PRINT CHR$(1)	Enhanced mode-enlarged printing
PRINT CHR$(2)	Normal mode-returns to normal size
PRINT CHR$(12)	Form feed
PRINT CHR$(28)	8.3 Characters/inch
PRINT CHR$(29)	10 Characters/inch

The PR#1 command to select the printer for output may need to be changed if your interface is not in slot 1. These commands are in lines 1390, 1530 and 1670. Deselecting the printer commands are in lines 1420, 1590 and 1860.

Line 1810 breaks the questions into strings 76 characters or less in length, depending upon where a space occurs. This is done before the questions are printed to prevent a part of a word being printed at the end of a line. If your printer is set for more or less than 80 characters per line, statement 1810 may need to be changed. Line 1790 will require a similar change. The only item which should require changing in the two statements is the number 76. □

Mr. Schlarb has taught grade school science for seven years in Worthington, OH. He is advisor to the school newspaper and photography club.

Illustrated by Josh Randall

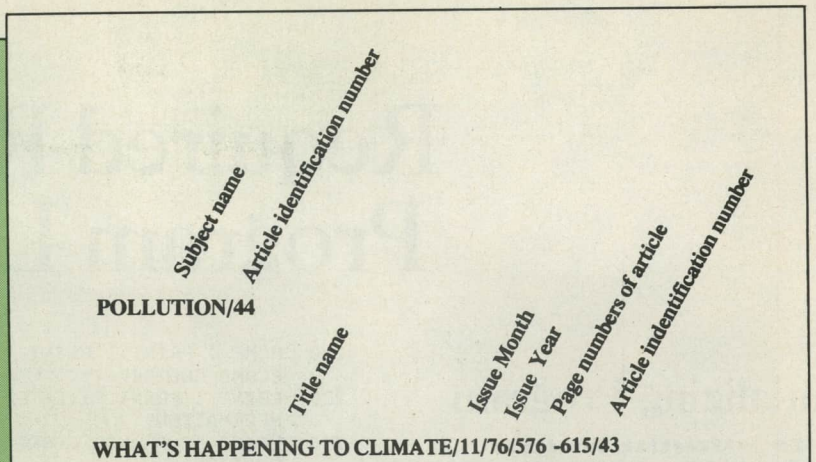


Figure 1. Examples of the format used to input subject and title names.

```
NATIONAL GEOGRAPHIC
SUBJECT LIST

AVIATION/15
CELL/41
CLIMATE/43
DESERT/16
DISEASE/2
DISEASE/22
EARTHQUAKE/47
EARTHQUAKES/17
EARTHQUAKES/3
```

Sample Run

```
LIST OF AVAILABLE NATIONAL GEOGRAPHIC
TITLES ON FILE

AMERICA'S WILDERNESS CAN WE SAVE/2/74/151-160/21
AMERICA'S WILDERNESS CAN WE SAVE/2/74/151-160/21
APOLLO 15 ON MOON/2/72/233-265/42
AWESOME WORLD'S WITHIN CELL/9/76/255-295/41
BLACK DAY FOR BRITTANY/7/78/124-135/44
CALIFORNIA'S SAN ANDREAS FAULT/1/73/??/35

NATIONAL GEOGRAPHIC ARTICLE QUESTIONS

NAME.....

SUBJECT : POLLUTION/31
TITLE : POLLUTION THREAT TO MANKIND/12/70/738-748/31

1. EXPLAIN THE PROCESSES WHICH TAKE PLACE IN UNDER WATER LIFE. MENTION USES
   OF OXYGEN/FOOD/ETC.
2. EXPLAIN THE CYCLES WHICH TAKE PLACE ON LAND. HOW DOES AIR POLLUTION HELP
   RAINFALL?
3. WHAT IS 'EUTROPHICATION'?
4. WHY IS THERE SO MUCH SMOG AND POLLUTANTS IN LOS ANGLES?
5. HOW CAN WE CONTROL WATER POLLUTION? WHAT IS THE MAIN SOURCE OF POLLUTION?
   DO YOU THINK POLLUTION CAN BE CONTROLLED? EXPLAIN WHY?
```

Examples of output available using the program. These may be output to the monitor if you do not have a printer.

Program Outline

270-420 Enter new information
460-750 Change information already on disk
980-1090 Subject search
1120-1270 Title search
1350-1420 Give monitor display or hardcopy of subjects
1490-1600 Give monitor display or hardcopy of titles
1610-1880 Give monitor display or hardcopy of questions
1940-2110 Write information to disk
2120-2230 Read in and write last article number to disk
2240-2290 Read in information from disk-name of information on disk
2300-2360 Read in all subjects
2370-2440 Read in all titles
2450-2620 Read in subject, title and questions for one article identification number
2660-2950 Alphabetize subject or title list.

Required Reading Program Listings

Initializing Program

```
1  REM  ********************
2  REM  ARTICLE INFORMATION STORA
     GE INITIALIZING AND PROGRAM
3  REM  DEVELOPED BY K.N.SCHLARB
4  REM  WORTHINGTON,OHIO  *******
     *
5  REM  ARTICLE INFORMATION INITI
     ALIZING ROUTINE
10 D$ =  CHR$ (4): REM  CTRL D
20  PRINT " ";"NOMON I,O,C"
30  HOME
33  INPUT "WHAT IS THE INFORMATIO
     N TO BE STORED ON THIS DISK
     ";NAME$
34  PRINT D$;"OPEN NAME$,L45"
36  PRINT D$;"WRITE NAME$,R1"
37  PRINT NAME$
38  PRINT D$;"CLOSE NAME$"
40  PRINT D$;"OPEN SUBJECT$,L20"
50  FOR I = 1 TO 100
60  PRINT D$;"WRITE SUBJECT$,R";I

70  PRINT " "
80  NEXT I
90  PRINT D$;"CLOSE SUBJECT$"
100  PRINT D$;"OPEN LZ,L3"
110  PRINT D$;"WRITE LZ,R1"
120  PRINT 0
130  PRINT D$;"CLOSE LZ"
140  PRINT D$;"OPEN QUESTION$,L15
     0"
150  FOR I = 5 TO 505
160  PRINT D$;"WRITE QUESTION$,R"
     ;I
170  PRINT " "
180  NEXT I
190  PRINT D$;"CLOSE QUESTION$"
200  PRINT D$;"OPEN TITLE$,L50"
205  FOR I = 1 TO 100
210  PRINT D$;"WRITE TITLE$,R";I
220  PRINT " "
230  NEXT I
240  PRINT D$;"CLOSE TITLE$"
```

Main Program

```
50  REM  ********************
55  REM  ARTICLE INFORMATION
60  REM  STORAGE MAIN PROGRAM
65  REM  ********************
100 D$ =  CHR$ (4): REM  CTRL D
110  PRINT " ";"NOMON I,O,C"
120  DIM T$(100),QUEST$(5)
130  GOSUB 2240
140  HOME : PRINT : PRINT NAME$: PRINT

150  PRINT "YOU HAVE THREE OPTION
     S"
160  PRINT  TAB( 10)"1.INPUT INFO
     RMATION"
170  PRINT  TAB( 10)"2.OUTPUT INF
     ORMATION"
180  PRINT  TAB( 10)"3.STOP WORK
     ": PRINT
190  INPUT "WHAT IS YOUR CHOICE "
     ;Z
200  ON Z GOTO 210,800,2960
210  HOME : PRINT : PRINT "YOUR S
     ECOND CHOICE"
220  PRINT : PRINT "1.ENTER NEW I
     NFORMATION"
230  PRINT "2.CHANGE CURRENT INFO
     RMATION"
240  PRINT : INPUT "WHAT DO YOU W
     ISH ";Z
250  ON Z GOTO 260,460
260  GOSUB 2120
270  HOME : PRINT : PRINT "THE LA
     ST SUBJECT ID. # ENTERED WAS
     ";A
280  PRINT : PRINT "ENTER THE SUB
     JECT OF THE NEW "
290  PRINT "ARTICLE AND ITS ID.#"

300  PRINT : INPUT SUBJECT$
310  PRINT
320  INPUT "ID.# ";A
330  PRINT : PRINT "ENTER THE ART
     ICLE TITLE,DATE,PAGE,ID.#"
340  INPUT TITLE$
350  PRINT : PRINT "ENTER ONE QUE
     STION AT A TIME": PRINT
360  FOR I = 1 TO 5
370  PRINT : PRINT I;
380  INPUT QUEST$(I)
390  NEXT I
400  GOSUB 1940
410  GOSUB 2180
420  HOME : PRINT : PRINT "DO YOU
      WISH TO ENTER INFORMATION":
      PRINT "FOR ANOTHER ARTICLE"

430  PRINT : INPUT C$
440  IF C$ = "Y" OR C$ = "YES" THEN
     270
450  GOTO 140
460  PRINT : PRINT "WHICH SUBJECT
      NUMBER DO YOU "
470  PRINT "WISH TO CHANGE"
480  INPUT A
490  GOSUB 2450
500  HOME : PRINT
510  PRINT "SUBJECT : "SUBJECT$
520  PRINT : PRINT "TITLE : "TITL
     E$
530  PRINT
540  FOR J = 1 TO 5
550  PRINT J". ";QUEST$(J)
560  NEXT J
570  PRINT "WHAT DO YOU WANT TO C
     HANGE SUBJECT (1)"
580  INPUT "TITLE (2) OR QUESTION
      (3) ";Z
590  ON Z GOTO 600,640,680
600  HOME : PRINT "ENTER NEW SUBJ
     ECT NAME AND ID.# "
610  PRINT
620  INPUT SUBJECT$
630  GOTO 720
640  HOME : PRINT "ENTER NEW TITL
     E"
650  PRINT
660  INPUT TITLE$
670  GOTO 720
680  HOME : INPUT "WHICH QUESTION
      NUMBER ";J
690  PRINT
700  PRINT "ENTER NEW QUESTION "
710  INPUT QUEST$(J)
720  PRINT "DO YOU WISH TO MAKE A
     NOTHER CHANGE"
730  INPUT " IN THIS SUBJECT ";C$

740  IF C$ = "Y" OR C$ = "YES" THEN
     570
750  GOSUB 1940
760  HOME : PRINT "DO YOU WANT TO
      CHANGE ITEMS"
770  INPUT "IN ANOTHER SUBJECT ";
     C$
780  IF C$ = "Y" OR C$ = "YES" THEN
     460
790  GOTO 140
800  REM  OUTPUT INFORMATION CHOI
     CE
810  HOME : PRINT : PRINT "ENTER
     YOUR CHOICE"
820  PRINT
830  PRINT "1.SEARCH BY SUBJECT O
     R TITLE"
840  PRINT
850  PRINT "2.RECEIVE LIST OF ALL
      SUBJECTS": PRINT "OR TITLES
     "
860  PRINT
870  PRINT "3.RECEIVE SUBJECT,TIT
     LE,AND": PRINT "QUESTION LIS
     T FOR SPECIFIC ID.#"
880  PRINT : INPUT Z: HOME : PRINT

890  ON Z GOTO 900,1300,1610
900  REM  DO SEARCH
910  PRINT "DO YOU WANT TO SEARCH
      BY SUBJECT (1) "
920  PRINT " OR TITLE (2) "
930  INPUT Z
940  ON Z GOTO 950,1120
950  REM  SEARCH BY SUBJECT
960  GOSUB 2120
970  GOSUB 2300
980  PRINT "HOW MANY LETTERS DO Y
     OU WISH TO USE": INPUT "IN T
     HE SUBJECT SEARCH ";X
990  IF X < 1 THEN 980
1000  GOSUB 2630
1010  PRINT : PRINT "WHAT ";C$(3)
     ;" THE FIRST ";X;" ";C$(4);"
      YOU"
1020  INPUT "WISH TO USE IN THE S
     UBJECT SEARCH ";B$
1030  HOME : PRINT
1040  FOR I = 1 TO A
1050  IF  LEFT$ (T$(I),X) = B$ THEN
     1070
1060  GOTO 1080
1070  PRINT T$(I),
1080  NEXT I
1090  PRINT : INPUT "DO YOU WANT
     ANOTHER SUBJECT SEARCH ";C$:
      IF C$ = "Y" OR C$ = "YES" THEN
     980
1100  PRINT : INPUT "DO YOU WANT
     A TITLE SEARCH ";C$: IF C$ =
     "Y" OR C$ = "YES" THEN 1130
1110  GOTO 130
1120  REM  SEARCH BY TITLE
1130  GOSUB 2120
1140  GOSUB 2370
1150  GOSUB 2630
1160  PRINT "HOW MANY LETTERS DO
     YOU WISH TO USE": INPUT "IN
     THE TITLE SEARCH ";X: IF X <
     1 THEN 1160
1170  GOSUB 2630: PRINT : PRINT "
     USE THE FIRST ";X;" ";C$(4);
```

```
" OF THE": PRINT "FIRST MAJO
R WORD."
1180  PRINT : PRINT "WHAT ";C$(3)
;" THE FIRST ";X;" ";C$(4);"
 YOU"
1190  INPUT "WISH TO USE IN THE T
ITLE SEARCH ";B$
1200  HOME :J = 0
1210  FOR I = 1 TO A
1220  IF  LEFT$ (T$(I),X) = B$ THEN
1240
1230  GOTO 1250
1240  PRINT T$(I): PRINT :J = J +
1: IF J = 7 THEN  PRINT "TYP
E 'Y' TO CONTINUE": GET Z$:J
 = 0: HOME
1250  NEXT I
1260  PRINT : INPUT "DO YOU WANT
ANOTHER TITLE SEARCH ";C$
1270  IF C$ = "Y" OR C$ = "YES" THEN
 HOME : GOTO 1160
1280  INPUT "DO YOU WISH TO MAKE
A SUBJECT SEARCH ";C$: IF C$
 = "Y" OR C$ = "YES" THEN 95
0
1290  GOTO 130
1300  REM  RECEIVE LIST OF ALL SU
BJETS OR TITLES
1310  HOME : PRINT : PRINT "WHAT
DO YOU WANT PRINTED"
1320  INPUT "SUBJECTS (1) OR TITL
ES (2) ";Z
1330  INPUT "DO YOU WANT HARDCOPY
 ";P$: IF P$ = "N" OR P$ = "
NO" THEN P$ = "O"
1340  ON Z GOTO 1350,1490
1350  REM  PRINT ALL SUBJECTS
1360 F$ = "SUBJECTS"
1370  GOSUB 2120
1380  GOSUB 2300
1390  IF P$ = "Y" OR P$ = "YES" THEN
 PR# 1
1400  PRINT  CHR$ (1): PRINT "NAT
IONAL GEOGRAPHIC SUBJECT LIS
T": PRINT  CHR$ (2): PRINT :
 PRINT
1410  GOSUB 2660
1420  PRINT  CHR$ (12): PR# 0
1430  HOME : PRINT : PRINT "DO YO
U WANT ANOTHER LIST OF "
1440  PRINT F$" ": INPUT C$: IF C
$ = "Y" OR C$ = "YES" THEN 1
460
1450  GOTO 140
1460  IF F$ = "SUBJECTS" THEN 139
0
1470  IF F$ = "TITLES" THEN 1530
1480  STOP
1490  REM  PRINTED LIST OF TITLES

1500 F$ = "TITLES"
1510  GOSUB 2120
1520  GOSUB 2370
1530  IF P$ = "Y" OR P$ = "YES" THEN
 PR# 1
1540  PRINT  CHR$ (1)
1550  PRINT "LIST OF AVAILABLE NA
TIONAL GEOGRAPHIC": PRINT "T
ITLES ON FILE"
1560  PRINT : PRINT
1570  PRINT  CHR$ (2)
1580  GOSUB 2660
1590  PRINT  CHR$ (12): PR# 0
1600  GOTO 1430
1610  REM  PRINT QUESTIONS ACCORD
ING TO TITLE
1620  HOME : PRINT : PRINT "WHAT
IS THE ID. NUMBER OF THE"
1630  PRINT "SUBJECT/TITLE FOR WH
ICH YOU"
1640  INPUT "WANT QUESTIONS ?";A
1650  INPUT "DO YOU WANT HARDCOPY
 ";P$
1660  GOSUB 2450
1670  IF P$ = "Y" OR P$ = "YES" THEN
 PR# 1
1680  IF P$ = "N" OR P$ = "NO" THEN
 HOME : GOTO 1750
1690  PRINT  CHR$ (28): PRINT  CHR$
(1)
1700  PRINT "NATIONAL GEOGRAPHIC
ARTICLE QUESTIONS"
1710  PRINT  CHR$ (2): PRINT  CHR$
(29)
1720  PRINT "NAME";
1730  FOR K = 1 TO 20: PRINT ".";
: NEXT K
1740  PRINT : PRINT : PRINT
1750  PRINT "SUBJECT : "SUBJECT$
1760  PRINT : PRINT "TITLE : "TIT
LE$
1770  PRINT
1780  FOR I = 1 TO 5
1790 L =  LEN (QUEST$(I)): IF L <
76 THEN 1830
1810  FOR K = 1 TO 15: IF  MID$ (
QUEST$(I),76 - K,1) = " " THEN
 C$(1) =  LEFT$ (QUEST$(I),76
 - K):L = L - (76 - K):C$(2)
 =  RIGHT$ (QUEST$(I),L): PRINT
 I;". ";C$(1): PRINT  SPC( 3)
;C$(2):K = 15
1820  NEXT K: GOTO 1840
1830  PRINT I". ";QUEST$(I)
1840  IF P$ = "Y" OR P$ = "YES" THEN
 PRINT
1850  NEXT I
1860  PRINT : PRINT : PR# 0
1870  INPUT "DO YOU WANT ANOTHER
COPY ";C$
1880  IF C$ = "Y" OR C$ = "YES" THEN
1670
1890  PRINT "DO YOU WANT A COPY O
F ANOTHER"
1900  PRINT "SUBJECT/TITLE QUESTI
ON SET ?"
1910  INPUT "NOTE:YOU MUST KNOW T
HE ID.NUMBER ";C$
1920  IF C$ = "Y" OR C$ = "YES" THEN
1620
1930  GOTO 140
1940  REM  WRITE IN INFORMATION
1950  PRINT D$;"OPEN SUBJECT$,L20
"
1960  PRINT D$;"WRITE SUBJECT$,R"
;A
1970  PRINT SUBJECT$
1980  PRINT D$;"CLOSE SUBJECT$"
1990  PRINT D$;"OPEN TITLE$,L50"
2000  PRINT D$;"WRITE TITLE$,R";A

2010  PRINT TITLE$
2020  PRINT D$;"CLOSE TITLE$"
2030 J = 0
2040  PRINT D$;"OPEN QUESTION$,L1
50"
2050  FOR I = A * 5 TO (A * 5) +
4
2060 J = J + 1
2070  PRINT D$;"WRITE QUESTION$,R
";I
2080  PRINT QUEST$(J)
2090  NEXT I
2100  PRINT D$;"CLOSE QUESTION$"
2110  RETURN
2120  REM  FIND LAST ARTICLE NO.
INPUT
2130  PRINT D$;"OPEN LX,L3"
2140  PRINT D$;"READ LX,R1"
2150  INPUT A
2160  PRINT D$;"CLOSE LX"
2170  RETURN
2180  REM  RECORD LAST ARTICLE NO
. INPUT
2190  PRINT D$;"OPEN LX,L3"
2200  PRINT D$;"WRITE LX,R1"
2210  PRINT A
2220  PRINT D$;"CLOSE LX"
2230  RETURN
2240  REM  READ DISK INFORMATION
NAME
2250  PRINT D$;"OPEN NAME$,L45"
2260  PRINT D$;"READ NAME$,R1"
2270  INPUT NAME$
2280  PRINT D$;"CLOSE NAME$"
2290  RETURN
2300  PRINT D$;"OPEN SUBJECT$,L20
"
2310  FOR I = 1 TO A
2320  PRINT D$;"READ SUBJECT$,R";
I
2330  INPUT T$(I)
2340  NEXT I
2350  PRINT D$;"CLOSE SUBJECT$"
2360  RETURN
2370  REM  READ TITLES
2380  PRINT D$;"OPEN TITLE$,L50"
2390  FOR I = 1 TO A
2400  PRINT D$;"READ TITLE$,R";I
2410  INPUT T$(I)
2420  NEXT I
2430  PRINT D$;"CLOSE TITLE$"
2440  RETURN
2450  REM  READ INFORMATION FROM
DISK
2460  PRINT D$;"OPEN SUBJECT$,L20
"
2470  PRINT D$;"READ SUBJECT$,R";
A
2480  INPUT SUBJECT$
2490  PRINT D$;"CLOSE SUBJECT$"
2500  PRINT D$;"OPEN TITLE$,L50"
2510  PRINT D$;"READ TITLE$,R";A
2520  INPUT TITLE$
2530  PRINT D$;"CLOSE TITLE$"
2540 J = 0
2550  PRINT D$;"OPEN QUESTION$,L1
50"
2560  FOR I = A * 5 TO (A * 5) +
4
2570 J = J + 1
2580  PRINT D$;"READ QUESTION$,R"
;I
2590  INPUT QUEST$(J)
2600  NEXT I
2610  PRINT D$;"CLOSE QUESTION$"
2620  RETURN
2630  REM  DETERMINE TENSE
2640  IF X = 1 THEN C$(3) = "IS":
C$(4) = "LETTER": RETURN
2650 C$(3) = "ARE":C$(4) = "LETTE
RS": RETURN
2660  REM  SORT ROUTINE ADAPTED F
ROM CEOFFREY CHASE'S HEAPSOR
T PG.233 BEST OF CREATIVE CO
MPUTING VOL.2
2670 N = A + 1
2680 N = N - 1
2690 L =  INT (N / 2) + 1
2700 N1 = N
2710  IF L = 1 THEN 2750
2720 L = L - 1
2730 A$ = T$(L)
2740  GOTO 2790
2750 A$ = T$(N1)
2760 T$(N1) = T$(1)
2770 N1 = N1 - 1
2780  IF N1 = 1 THEN 2910
2790 J = L
2800 I = J
2810 J = 2 * J
2820  IF J = N1 THEN 2860
2830  IF J > N1 THEN 2890
2840  IF T$(J) >  = T$(J + 1) THEN
2860
2850 J = J + 1
2860  IF A$ >  = T$(J) THEN 2890
2870 T$(I) = T$(J)
2880  GOTO 2800
2890 T$(I) = A$
2900  GOTO 2710
2910 T$(1) = A$
2920 J = 0: FOR I = 1 TO A: IF J =
7 AND P$ = "O" THEN  PRINT "
TYPE 'Y' TO CONTINUE": GET Z
$: HOME :J = 0
2930 J = J + 1: PRINT T$(I): PRINT

2940  IF I = A AND P$ = "O" THEN
 PRINT "TYPE 'Y' TO CONTINUE
": GET Z$
2950  NEXT I: RETURN
2960  END
```

TRS-80 Tape Duplication Utility

BY MAX CHAUVET

If you own a TRS-80 Level II computer and use machine language programs such as Editor/Assembler, T-BUG or simply the debounce routine KBFIX, you probably wish you could make backups of these valuable tapes. I became particularly worried the day I could no longer load my copy of Sargon II without trying several volume settings. Because tapes written by your own recorder will load everytime (or almost), I wrote the following program which makes duplicate copies of any tape written for Level II, whether they are System, Basic or data tapes.

The program is written in Basic but the main routine is in machine language, stored in high memory as a string variable. It performs three basic functions:

- Read data from tape and store it in memory.
- Dump memory to duplicate tape.
- Verify either the original or the duplicate tape against the contents of the memory.

Because data is stored in user RAM before it may be reproduced, the length of the tape to be duplicated is restricted by the size of the memory available. The program and variables occupy some 3K bytes so if yours is a 16K system, you will be able to copy about 13K bytes. This is sufficient for all System programs I have used and for most Basic programs.

The program, however, does not check for memory limit, so you must stop the input from tape by hitting ENTER or any of the arrow keys before the string space in high memory is destroyed. Each character is displayed on the video screen as it is read, so by the time the screen is filled for the 13th time you will know it is time to stop.

There are two small drawbacks to the input routine. First, the screen is not cleared when full. Attempts were made first to scroll and then to clear the screen but they were time consuming and prevented the execution from keeping up with the 500 Baud data transfer rate from the cassette. The second drawback is that input can be stopped only when a byte is being read; this means that the program will not respond to the ENTER or arrow keys if no data is left on the input tape. This is due to the fact the input is made by a call to a subroutine in ROM from which control is returned only after a full byte has been read. If this happens, simply rewind the tape to a location where data exists and read a few extra bytes.

Once in memory, data can be copied as many times as desired so you may make multiple backups of important tapes. The program keeps track of the memory location of the last byte so that only what was read from the original tape will be written out.

The verification routine compares the contents of memory against the cassette currently mounted so you may verify both the input and the output.

A significant feature about the program is that if your input tape contains several files, they will be stored in contiguous memory locations thus eliminating useless gaps and reducing the size of the output tape.

Mr. Chauvet has a B.S. in Computer Science from the Universite de Montreal.

Program Listing 1

```
ØØ4Ø DEFINT A-Y: CLS: CLEAR 4ØØ
ØØ5Ø PRINT "CASSETTE COPY UTILITY"
ØØ7Ø DATA CD7FØA7DDD21ØØØØFD21ØØØØ1195ØØFD19B72Ø3A21ØØ3C11FF3F3E
ØØ8Ø DATA ØØCD12Ø2CD96Ø2CD35Ø277DD77ØØDD233A4Ø38B72ØØE237CBA2ØEC
ØØ9Ø DATA 7DBB2ØE821ØØ3C18E3CDF8Ø1DD23DDE5C1FD71ØØFD7ØØ1C93DB72Ø
Ø1ØØ DATA 1BDDE53EØØCD12Ø2CD87Ø2C1ØACD64Ø221ØØØØ3ED422ØF4CDF8Ø1
Ø11Ø DATA C9DDE5E1Ø1ØØØØ3EØØCD12Ø2CD96Ø2CD35Ø2BE2ØØA23E5ED42E12Ø
Ø12Ø DATA F321ØØØØFD75Ø2FD74Ø3CDF8Ø1C9ØØØØØØ
Ø13Ø DATA END
Ø14Ø READ A$: IF A$="END" THEN 2ØØ
Ø15Ø FOR I=1 TO LEN(A$) STEP 2
Ø16Ø D=ASC(MID$(A$,I,1): D1=ASC(MID$(A$,I+1,1))
Ø17Ø IF D>57 THEN D=D-7
Ø18Ø IF D1>57 THEN D1=D1-7
Ø19Ø D=(D-48)*16+D1-48: M$=M$+CHR$(D): NEXT I: GOTO 14Ø
Ø2ØØ FST=VARPTR(M$): ZD=PEEK(FST+1)+PEEK(FST+2)*256
Ø21Ø IF ZD 32767 THEN AD=ZD-65536 ELSE AD=ZD
Ø22Ø IF PEEK(16396)=2Ø1 THEN POKE 16526,PEEK(FST+1): POKE 16527,
     PEEK(FST+2) ELSE DEFUSRØ=AD:CMD"T"
Ø24Ø POKE AD+10,PEEK(FST+1): POKE AD+11,PEEK(FST+2)
Ø25Ø BEGIN=PEEK(16548)+PEEK(16549)*256+2ØØ: D=INT(BE/256): D1=BE-D
     *256: POKE AD+6,D1: POKE AD+7,D
Ø26Ø CLS: PRINT "CASSETTE COPY UTILITY": PRINT: PRINT"1.- READ CAS
     SETTE INTO MEMORY"
Ø28Ø PRINT "2.- WRITE FROM MEMORY TO CASSETTE"
Ø29Ø PRINT "3.- VERIFY CASSETTE"
Ø3ØØ PRINT: O=Ø: INPUT "     OPTION ";O: ON O GOTO 1ØØØ,2ØØØ,3ØØØ
Ø31Ø END
1ØØØ CLS: PRINT"YOU MAY ONLY READ ABOUT ";INT((MEM/1ØØ)-2)*1ØØ;" B
     YTES"
1ØØ5 PRINT "TO STOP READING, HIT ANY OF THE ARROW KEYS"
1Ø1Ø A$="": INPUT "READY CASSETTE. (ENTER) OR END ";A$: IF A$>""
     GOTO 26Ø
1Ø2Ø CLS: Z=USR(Ø)
1Ø3Ø LAST=PEEK(AD+149)+PEEK(AD+150)*256
1Ø32 POKE AD+98,PEEK(AD+149): POKE AD+99,PEEK(AD+150)
1Ø34 POKE AD+113,PEEK(AD+149): POKE AD+114,PEEK(AD+150)
1Ø4Ø CLS: PRINT"YOU'VE READ ";LAST-BEGIN;" BYTES.  (ENTER) TO CON
     TINUE";: INPUT A$: GOTO 26Ø
2ØØØ CLS: A$="": PRINT"(WRITE)"
2Ø1Ø INPUT "READY CASSETTE.  (ENTER) OR END ";A$: IF A$>""GOTO26Ø
2Ø2Ø Z=USR(1): GOTO 26Ø
3ØØØ CLS: A$="": PRINT "(VERIFY)"
3Ø1Ø INPUT "READY CASSETTE.  (ENTER) OR END ";A$: IF A$>""GOTO26Ø
3Ø2Ø Z=USR(2): Z=PEEK(AD+151)+PEEK(AD+152)*256: IF Z=Ø THEN PRINT
     "O.K." ELSE PRINT "BAD BYTE AT ";Z
3Ø3Ø INPUT "(ENTER) ";A$: GOTO 26Ø
```

The Basic program is shown in Program Listing 1. Lines 70 to 120 contain the hexadecimal form of the machine language routine. Lines 140 to 190 convert the data to its decimal equivalent and store it in string variable M$. Variable AD contains the starting address of the routine. POKE addresses must not exceed 32767, so if you have more than 16K, the value of AD may need to be converted to its equivalent two's complement form by subtracting 65536.

Line 220 records the entry address of the routine for both cassette and disk based systems. The next two lines indicate to the routine its starting address. Memory locations 16548 and 16549 contain the starting address of the Basic program which is normally 17129. The beginning of the data storage is calculated by adding the program length (about 2000 bytes) to this starting address.

Upon completion of the reading routine, positions 149 and 150 of M$ contain the address of the last byte entered. This address is then POKEd into several instructions of the Write and Verify routines.

Finally, the verification routine returns, in positions 151 and 152 of M$, the address of the incorrect byte or zero if data has been transferred correctly.

The assembly code of the machine language routine is shown in Progam Listing 2. Calls are made to several ROM routines to turn the cassette drive on and off, read a byte, write a byte, write a data letter, find a synchronization byte and get the USR function argument. This argument indicates which portion of the routine is to be executed: 0 to Read; 1 to Write; 2 to Verify.

Because the location of the routine may vary from one system to the other, absolute addresses must be relocated prior to execution. You will note that the addresses on lines 12,13,56 and 64 are modified by the Basic program. This has a definite speed advantage over indirect addressing.

As a final recommendation, I would suggest that you find the proper volume setting by loading the input tape as you normally would, with the CLOAD or SYSTEM commands, before running the program. This will minimize the risk of reading erroneous data.

This program is a good example of the ease of use of the powerful ROM routines and of the advantages of machine language over Basic. Although Assembly coding is more demanding, the final result, as in this case, is well worth the effort. □

Program Listing 2

```
 1             VIDEO   EQU   3C00H       first pos. on screen
 2             BOTM    EQU   VIDEO+1023  last pos. on screen
 3             SYNC    EQU   0296H
 4             GET     EQU   0235H
 5             DRIVE   EQU   0212H
 6             CTOFF   EQU   01F8H
 7             LEAD    EQU   0287H
 8             PUT     EQU   0264H
 9             STOP    EQU   14400       Keyboard address for ENTER key
10  CD7F0A     BEGIN   CALL  0A7FH       Get the USR(x) parameter
11  7D                 LD    A,L         Store it in A register
12  DD210000           LD    IX,0000     IX will contain storing address
13  FD210000           LD    IY,0000     IY will contain routine address
14  119500             LD    DE,LAST
15  FD19               ADD   IY,DE       IY contains ind.addr last byte
16  B7                 OR    A           Check if parameter is zero
17  203A               JR    NZ,WRITE    No - goto Write
18  21003C     READ    LD    HL,VIDEO    Points to video display @ 0
19  11FF3F             LD    DE,BOTM     DE will indicate screen full
20  3E00               LD    A,0         Select cassette (0 or 1)
21  CD1202             CALL  DRIVE       Turn it on
22  CD9602             CALL  SYNC        Find synchronisation byte
23  CD3502     RBYT    CALL  GET         GET 1 byte - store it in A
24  77                 LD    (HL),A      Display character
25  DD7700             LD    (IX),A      Store it in memory
26  DD23               INC   IX          Increment memory counter
27  3A4038             LD    A,(STOP)    See if stop key
28  B7                 OR    A                 has been depressed
29  200E               JR    NZ,FIN      Yes - goto end of input
30  23                 INC   HL          No - increment video counter
31  7C                 LD    A,H         Check
32  BA                 CP    D                for
33  20EC               JR    NZ,RBYT             screen
34  7D                 LD    A,L                       full
35  BB                 CP    E
36  20E8               JR    NZ,RBYT     No - Get next byte
37  21003C             LD    HL,VIDEO    Yes - reset display @ 0
38  18E3               JR    RBYT              get next byte
39  CDF801     FIN     CALL  CTOFF       End - Turn cassette off
40  DD23               INC   IX          Store
41  DDE5               PUSH  IX             last byte+1
42  C1                 POP   BC                at the end
43  FD7100             LD    (IY),C               of this
44  FD7001             LD    (IY+1),B                routine
45  C9                 RET               Return to Basic
46  3D         WRITE   DEC   A
47  B7                 OR    A           Check if parameter is 1
48  201B               JR    NZ,VFY      No - Goto Verify
49  DDE5               PUSH  IX
50  3E00               LD    A,0         Turn
51  CD1202             CALL  DRIVE          cassette on
52  CD8702             CALL  LEAD        Write record leader
53  C1                 POP   BC          Store starting addr. in BC
54  0A         WRBYT   LD    A,(BC)      Load A with output byte
55  CD6402             CALL  PUT         Output byte
56  210000             LD    HL,0000     Check
57  03                 INC   BC             end
58  ED42               SBC   HL,BC               of data
59  20F4               JR    NZ,WRBYT    No - write next byte
60  CDF801             CALL  CTOFF       Yes - turn cassette off
61  C9                 RET
62  DDE5       VFY     PUSH  IX
63  E1                 POP   HL
64  010000             LD    BC,0000
65  3E00               LD    A,0
66  CD1202             CALL  DRIVE
67  CD9602             CALL  SYNC
68  CD3502     GBYT    CALL  GET
69  BE                 CP    (HL)        Compare byte in A with memory
70  200A               JR    NZ,BAD
71  23                 INC   HL          Check
72  E5                 PUSH  HL             end of
73  ED42               SBC   HL,BC               data
74  E1                 POP   HL
75  20F3               JR    NZ,GBYT
76  210000             LD    HL,0        Tape is O.K.
77  FD7502     BAD     LD    (IY+2),L    Store address of
78  FD7403             LD    (IY+3),H                bad byte
79  CDF801             CALL  CTOFF
80  C9                 RET
```

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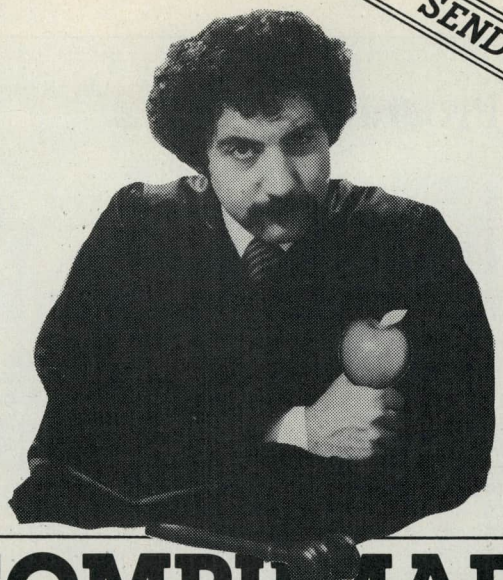

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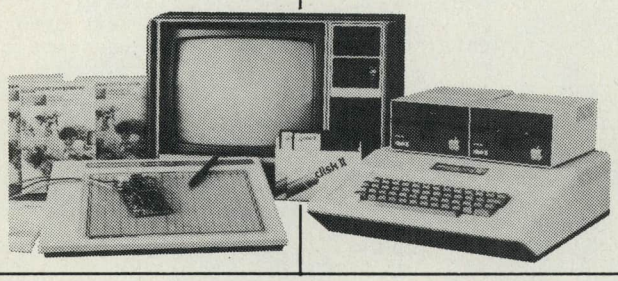

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CIRCLE 29

HARRY SHERSHOW — Dept. Editor

A Chess Program & Random Openings

During a break in the first round at the San Jose Microcomputer Chess Championships, Murray Lane, operating a powerful homebrew unit paused for a few minutes to discuss his computer and the program.

"The processor in this unit" he explained, "is Intel's 8086-1. It is a 16-bit, 10 Megaherz version of that company's 8086 chip. They've only just come out with it. Right now I'm running at 9 Megaherz.

"The program itself is TINY CHESS played at the 1979 London Microcomputer Chess Tournament. It finished 8th in a field of 9 and ran on an Intel 8086-based system.

"TINY CHESS, which was written by a Belgium programmer, has no book opening and could start a game with some unusual random-move like Knight to a3. This strange opening worked rather well for TINY CHESS in London when it was paired against VOICE CHALLENGER in one of the rounds. Challenger had no book response to such an unorthodox opening and eventually Challenger lost the game on time.

"I have modified that Belguim program and I think I've improved it somewhat. The SDK 86 hardware that I use with its 16 bits and 10 Megaherz can be purchased from Intel for about $350. When you put it to together you will have a complete computer system in the bare minimum board form. All you need to run it is an external power supply, I understand that Intel will be giving away, free, a slightly different version of this chess program when you buy an SDK 86. So, anybody who wants to develop his own chess program can start with this and keep improving TINY CHESS until he has a program he likes. Interested people can write to Intel's Marketing Department, 3065 Bowers Ave., Santa Clara, California.

"The 10 Megaherz SDK unit doesn't have much of a track record. It has only played once before, and that was in Belgium, where the chess author tested it out. What I got from Intel for my $350 was the printed circuit board, sockets, IC's and other components. I put it together myself with no problem, thanks to a very thorough instruction booklet Intel gives you. It comes with 8K of EPROM and 2 K of RAM. There actually are two monitors in use here at this tournament; one handles the keyboard, and the other handles the CRT.

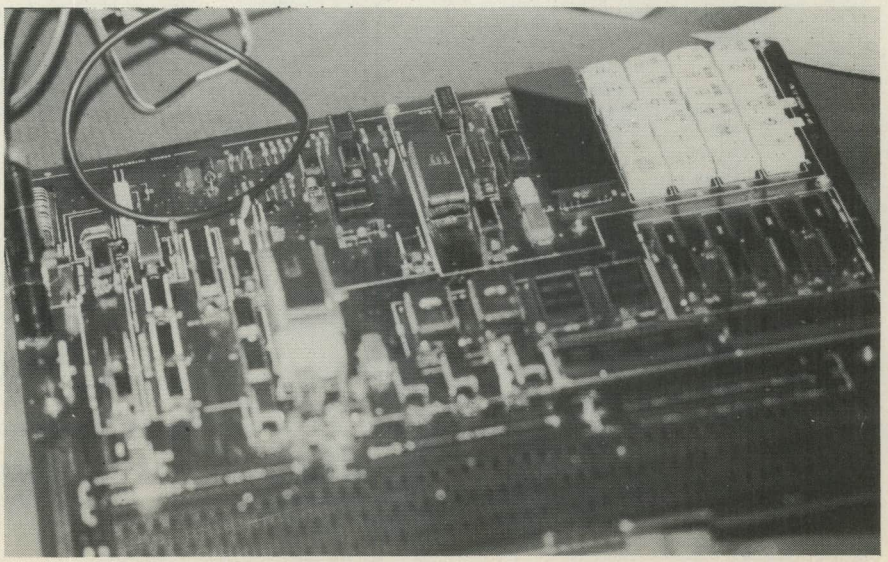
"I built this unit strictly for my own use because I could never find an opponent to play chess when I want one. I have been rated 1100 as a chess player. TINY CHESS plays at five levels. I can beat it 90% of the time at Level 1. At Level 2 I can beat it 50% of the time. I haven't played Level 3, yet. At Level 3, the program uses time consideration — how much time has been used and how much time is left. Level 3 also determines at what level to continue the game based on the amount of time left. Level 4 would take a couple of days to make its move. And at its highest Level, this program could take about five days to respond to every move. It could be another Bobby Fischer at that level but who's gonna hang around that long to find out.

"The unit has no storage memory so when you decide to shut it off, or if you get a power loss — someone has kicked out my extension cord once already — you lose the whole program. You can reload the board position, allright, but there's no way to reload the move counter. So, when there's a power failure, the time consideration routine is lost, so the computer can't calculate the time factor and cannot, therefore, adjust its playing level accordingly.

"The SDK86 is a general purpose computer. It's a good foundation on which to build a larger unit whenever

Murray Lane hooked together a homebrew unit (based on Intel's 8086-1 chip.) It was the most powerful unit at the tournament.

The Single-board-computer run by Murray Lane. (Intel's 8086-1, 16 bits, 10 MHz.)



you want. It doesn't have a CRT or a printer or anything like that. It does have 50 I/O lines, a normal RS232 port, and an expansion bus so you can hook more stuff onto it without any problem. It's got a small numeric keyboard with symbols and an LED display. Really, everything you need for a basic system. The keyboard, itself is a condensed version. You can't enter things into it in the normal fashion. That is, you can't type in BASIC programs or things like that. The way the unit is set up you can read any location in RAM and, without any difficulty, you can down-load your RAM and put your program there."

Tournament organizer George Koltanowski, happened to walk by just then checking up on things. He heard the SDK making its funny squeaking noise.

"What's wrong with your computer?" he asked.

"The computer's okay," said Murray. "It's just that the program has some limitations. For one thing it has no opening book. Just selects its moves at random. I know that the center of the board is more valuable at the beginning and I've tried to put moves in only for that purpose. To keep the initial action in the center. As far as the computer itself is concerned, it's far and away better than any other machine at this tournament."

"Well, it seems to me that the program needs a lot of work. For example being a Queen down in a game is very nice," says George "if you manage to win the game it would be considered good play. But if you lost the game you have to blame it on the Queen loss. That would then be considered bad play."

"No question about it," agreed Murray. "My program has already made several foolish moves so far."

"My criticism of your machine," said George shaking a finger at the squeaking-flashing computer board, "is not for what it does in the middle or in the end game. It probably plays allright there. But I'm criticizing the program for how bad it does in the first three moves. Don't play by book — that's allright! But, my dear fellow, play something solid! Don't let your program play wild and throw its pawns forward any-which way. If it helps you develop your pieces then that's allright — even if it's the modern style of chess playing. But if you throw the pawns out automatically as your program seems to be doing, then you ***must*** lose."

"Well, I have no opening book at all in this program," said Murray. "All random openings. The reasoning is that you need centralization. Almost all chess games are fought practically down the center. So, you need a line of centralization."

"Well," mused George, "does your machine know that the center of the board is important?"

"No."

"Then all my criticism falls by the wayside. How can you teach someone to play chess if you can't teach them about centralization? You simply must give your program a different course of action. You must tell it where to go in the beginning. Random chess is no good in the openings. What **does** your machine know anyway?"

"It simply recognizes the value of pieces. A standard evaluation. A Pawn is worth one point, for example. The Queen is worth 9 points, and so on. That's all this program recognizes."

"Now, just a minute," said George who has been defending chess all his life." There's more to chess than just knowing piece values. I mean, the point value is very good — but up to a certain point. If you base your whole game on point value alone, then that is hardly enough."

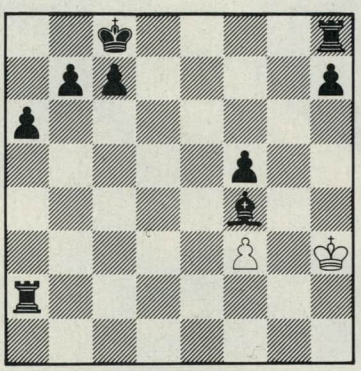
"Not really," said Murray, a point-counter from way back, "if you could look ahead as far as you wanted in the game, point evaluation is all that it would really take. As yet it's not possible to look 20 or 30 moves ahead yet. A chessmaster sees things that the computer doesn't. The chessmaster sees the board and can measure it. He knows an open file is valuable. He knows that he needs to get his pieces out and get them developed. But my machine can't do that yet. All it knows is the value of the pieces and that's all. Based strictly on that bare proposition it's doing the best it can. If it could look far enough ahead it could tell that if it went down a certain line of attack it could threaten the king."

"But tell, me," said George. "Under what basis **can** your machine win?"

"Well, I would say it's a question of trade-offs," replied Murray. "Some programs look at board positions but

White, INTEL TC 86 vs Blac, BORIS 2.5

1.	a3	Nc6
2.	h4? (A)	Nf6
3.	g3	d5
4.	Bh3	Bg4
5.	Nf3	Bxh3
6.	Rxh3	e5
7.	b3 (B)	e4
8.	Nh2	Qd7
9.	g4 (C)	Nxg4
10.	Nxg4	Qxg4
11.	Rh1	Qg2
12.	Rf1	Qh3
13.	Nc3	O-O-O!
14.	d3	Q xh4
15.	dxe4	d4
16.	Nb5?	a6
17.	Nxd4	Rxd4
18.	Bd2	Bd6
19.	Rg1	Bf4
20.	e3	Bxe3!
21.	Qg4+	Qxg4
22.	Rxg4	Bxd2+
23.	Ke2	Bc3
24.	Ra2	f5
25.	Rxg7	Rxp+
26.	Kf3	Bxg7
27.	a4	Nb4
28.	Ra3	Bb2
29.	c3	Bxa3
30.	cxb4	Rxb4



Position at end of game (36 moves) (White has no opening book.)

31.	a5	Rxb3+
32.	Kf4	Rb5
33.	f3	Bcl+
34.	Kg3	Rxp(D)
35.	Kh4	Bf4
36.	Kh3	Ra2
37.	Resigns	

(A) "I don't intend to castle King-side," says White to his opponent.
(B) Here we go again; d3 would have made more sense.
(C) Has nothing better here. The Rook on h3 has become a target.
(D) No pity. (Observations by GK)

can't look very deep. They have a close horizon. My program looks further ahead than any other program here — it has a deeper horizon — but it doesn't look at board position. There's the trade-off. Mine looks at great depth but doesn't look very thoroughly. Others look very thoroughly, but not very far."

"Hmm," snickered George, "if you look at your game now you will see that you are about to be mated in four moves."

"Indeed?" responded Murray. He glanced at the demonstration board for a few minutes, then studied his powerful open-board computer for another minute or so. "Indeed?" he said again.

Meanwhile, George moved on to the next table where another game was in progress and where he would converse heatedly with the programmers to find out what the heck they were up to. You see, when it comes to chess, George Koltanowski doesn't fool around whether the players are humans or computers.

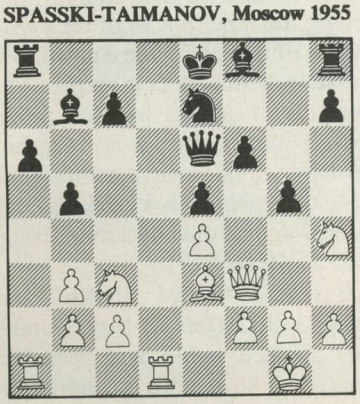
"What Chess Programs Don't Do." Part II

BY NORMAN WHALAND

As postulated in Part I, early stages of chess-game analysis provide insights that will guide the chess player in the later stages of his game. The examples that were presented barely hint at the variety of insights so gained. For example, analysis may demonstrate the immobility of a piece or it may reveal hidden defects of a move. As already noted, the learning process that goes on during analysis is one of the most striking differences between human and computer play.

In preceding examples, the goal derived from analysis could be achieved immediately in the board position. In the following example, obstacles to the achievement of the primary goal result in the setting of further goals. In addition, a somewhat more complicated kind of goal emerges, a whole pattern of pieces known to be desirable, rather than to simply control a square.

SPASSKI-TAIMANOV, Moscow 1955



Position after 14...g5

Since black has just exposed his king, the obvious try is **15 Qh5+ Qf7** (15...Ng6? 16 Nxg6). The resulting position has a familiar arrangement of pieces with combinative possibilities. The black queen is guarded only by the king, which is exposed to the check 16 Rd8+. If it weren't for the rook at a8, white could divert the king and win the queen.

White's first goal, then, is to prevent the rook from guarding d8. Clearly, this must be done before playing 15 Qh5+. Looking for a way to accomplish the goal, we again see an arrangement of pieces that is promising but not entirely satisfactory. White could exchange rooks on the a file if only the pawn weren't in the way.

Consideration of the a pawn leads us to the b pawn it guards and then to the knight that attacks the b pawn. Having toured the entire board in a counterclockwise direction, we are led finally to the move that Spasski actually played: **15 Nxb5 a6xb5.** The threat was 16 Nxc7+. The alternative 15...Rc8 would have led to a similar line of play even worse for black.

16 Qh5+ Qf7 17 Rxa8+ Bxa8 18 Rd8+ Kxd8 19 Qxf7 g5xh4 20 Qxf6 Rg8 21 f3. Material is about equal now, but black's weak pawns and general lack of mobility ensure the win for white. The value of the queen is enhanced by black's many weaknesses.

Most combinations can be discovered either by thinking forward or by thinking backward. The method actually used by the player may be impossible to determine. Certainly, the details of Spasski's thinking process might have been different. For example, he might have set the goal of diverting black's king, and only then seized upon the KR as a way of achieving the goal.

Also, he could have previously noted that the sequence 15 Nxb5 a6xb5 16 Rxa8+ Bxa8 increases the pressure on d8. Then he could have found the combination by setting only the one goal of gaining control of d8. The recall of a variation as a means of achieving a goal is another form of cross-fertilization not found in chess programs.

In any case, Spasski must have used the thinking-backward method to some extent, because the move 15 Nxb5 makes no sense until the need to increase pressure on d8 is established. There are too many forcing moves in the position for anyone but a computer to examine all of them six moves deep. Tactical goals are necessary to narrow the search tree.

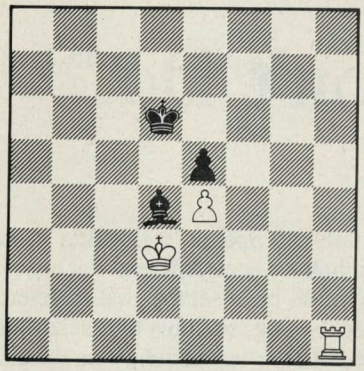
The speed of computers compensates only partially for the lack of the selectivity attained through tactical goals. The exponential explosion — the tendency of search time to increase by a constant factor for each additional move of look-ahead — places severe limits on the depth of search. The necessity for fast evaluations prevents programs from making the sophisticated positional judgments so characteristic of grandmasters.

Endgame Goals

Chess programs are generally acknowledged to be at their worst in the endgame. This weakness is partly due to

the importance of detailed knowledge in endgame play. Chess professionals excel in the endgame for the same reason. Another factor is undoubtedly the increased role of goal-directed play in the endgame. As the forces are reduced, threats to win material become less frequent. Their role in channelling analyses is replaced by threats to achieve specific positional goals.

Fine, BASIC CHESS ENDINGS, No. 486



Black moves

Here white has already accomplished his general goals (king in the center, rook on an open file), and he needs a specific plan. The correct plan can be found by a process of deduction. Since the bishop can't be prevented from guarding the black pawn, the rook will eventually have to be exchanged for the bishop and pawn.

What will happen after the exchange? The replay . . .Ke7 would produce a drawn position. Since the white king by itself can't keep the black king away from e7, the rook must perform this function. White's goal, then, is to bring both king and rook to bear on the enemy pawn in such a way that the rook cuts off the black king from e7. Therefore the rook must go to d5 or f5. Fine's analysis is easy to understand.

1 . . .Ke6 If black tries to block the king by 1 . . .Kc5, the reply 2 Rh8 forces the king to retreat to d6 to avoid being cut off at once. **2 Kc4 Kd6 3 Rh6+ Kd7 4 Kd5 Ke7** Now king and rook cooperate to push the black king from the e file. **5 Rh7+ Kf6** If the king retreats to the first rank, 6 Ke6 and 7 Rh8+ achieve the objective. **6 Kd6** The king takes over the observation of e7 so that the rook will be free to approach f5. **6 . . .Bc3 7 Rb7 Bd4 8 Rb3 Kf7 9 Kd7 Kf6 10 Rf3+ Kg6 11 Rf5** and wins.

This example illustrates several ways in which the endgame differs from the middlegame. Endgame analysis tends to be much deeper. The typical middlegame goal is pressure on a square or region of the board. Endgame goals tend to be more elaborate and to remain in effect longer. Subtle positional threats have more force in the endgame, because threats are fewer and generally weaker in the absolute sense.

Opening and middlegame positions can be evaluated reasonably well by the application of a few general principles. The evaluation of endgame positions requires detailed knowledge, since slight changes in the position can make the difference between a win and a draw. If all of the men in the diagram are moved up one rank, for example, it is unnecessary for white to drive the black king from the e file, the pawn ending being won anyway.

Computer Implementation

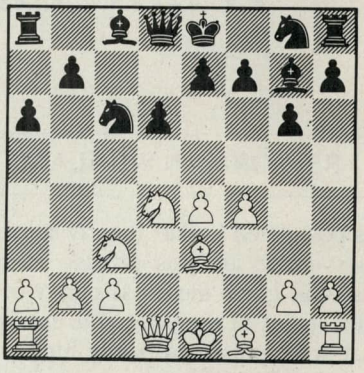
Existing programs *have* goals, even though they don't *set* goals. The goals are implicit in the evaluation and selection procedures. (Programs that perform exhaustive searches, like CHESS 4.9, don't have selection procedures.) For example, most computer programs have the goal of attacking the opponent's king. Typically, the evaluation procedure awards points for the proximity of pieces to the enemy king. Selection procedures usually include all checks in the moves to be analyzed.

To set a goal, then, is to modify the operation of the evaluation and selection procedures. The simplest way to graft goal setting onto existing computer-chess programs would be to derive parameters from static features of the board position. Analysis would then proceed with slight modifications to take the parameters into account.

Consider, for example, the parameterization of the goal of attacking the king. To choose a theater of operations, the program would determine where the opponent is weakest and specify a target square in that region of the board. The evaluation function would measure the proximity of the piece to the target square rather than their proximity to the king. The modification to the evaluation procedure is thus a minor one.

CHESS 4.9 is naturally the most interesting candidate for improvement. Since it uses exhaustive search, goal setting would affect only the evaluation procedure and would not narrow and deepen the search. Nevertheless, a modest goal-setting facility would improve the program's play noticeably. It has a tendency to make aimless moves at the transition to the middlegame. A routine to flag certain squares as particularly important would reduce this tendency by providing a definite objective.

CHESS 4.7-LEVY, TORONTO 1978



Position after 7 . . .d6

When the indicated objective is a defensive one, failure to recognize it can be disastrous. In this position, the program failed to realize the necessity of preventing black from gaining too much pressure on the dark squares. It defended them only to prevent immediate loss of material. Consequently, its game went downhill very rapidly.

8 Nxc6 bxc6. This helps black achieve *his* goal of reinforcing the pressure exerted by the KB. White is pursuing its fixed goal of inflicting weak pawns on the opponent, but safeguarding the dark squares is more important.

9 Be2. At d3 the bishop would have helped defend the dark squares, by relieving the other pieces of the eventual burden of defending the e pawn. It was probably better to first prepare to defend the b pawn, but the program doesn't mind tying down its queen to the defense of a pawn. Another idea is 9 Bd4, after which black can keep control of the diagonal only by surrendering d5 (9 . . .e5 10 fxe5 c5).

9 . . .Rb8 10 Qc1 (10 Rb1? Rxb2) **Qa5 11 Bd2 Qb6 12 Na4.** Surely 12 Nd1 at once would have been better. Capture of the b pawn is deterred by the eventual Bc3. While white moves its

knight to and fro, black strengthens his grip on the diagonal a7-g1. **12...Qa7 13 Nc3 Bd4 14 Nd1 Nf6 15 c3 Bd6 16 Qc2** The program weakens the crucial square e3 because 16 Bf3 would have impaired the mobility of the bishop. By ignoring an important specific goal in favor of a minor general goal, the program lets slip its last chance to avert catastrophe. The decision invasion of the dark squares can no longer be prevented. **16...Ng4 17 Qa4 0-0 18 Bxg4 Bxg4 19 Qxc6 Bxd1 20 Kxd1 Be3 21 b3 Bxd2 22 Kxd2.** The exchange of all the minor pieces leaves the king defenseless, and black won easily.

CHESS 4.7 applied the general rules of development, mobility, and centralization without taking account of the specific demands of the position. It lost without knowing what the game was about.

The computer program's evaluation procedure takes the control of squares into account, but it gives all of the squares the same value. Assigning weights to the squares might produce considerable improvement with a modest programming effort. Most of the strategic goals of the opening and middlegame can be so expressed, and many of the factors relevant to determining the weights are easy to compute.

This suggestion envisions no great change in the evaluation procedure, merely the adding of weights instead of the counting of squares. A more radical method of goal setting would be to compile a complete new evaluation procedure tailored to the board position. Though difficult to implement, this idea may be the only way to build master-level knowledge into CHESS 4.9 without slowing it down too much or abandoning the exhaustive-search method. Since the compilation routine would be executed only once per move, it could be made quite elaborate. The compiled evaluation procedure might be faster than the present one, because it would contain only the chess knowledge relevant to the positon.

The full potential of computer chess can probably be achieved only by the development of small-tree programs. Achieving selectivity comparable to human players' has proved difficult, though. Simple selection criteria (checks, captures, etc.) have failed repeatedly in practice. Not only are too many moves selected, but important moves are let through the net. Such a lapse need happen only once to produce a decisive blunder.

Goal setting is one way of enabling small-tree programs to select moves with more precision. For maximum effect, goal setting would be alternated with analysis. We have seen how analysis pursuant to one goal can suggest another goal. The second goal can then be the basis for another round of analysis. Another strategy would be to try various plausible goals, each evaluated by a separate round of analysis.

The use of goal setting can yield practical benefits by bringing chess programming closer to the mainstream of research in artificial intelligence. Most of the methods used in chess programs are of no value for practical problem solving. Since the role of goals in chess reasoning seems similar to their role in other kinds of thinking, chess programs with goals will bring us closer to useful artificial intelligence.

London's World Micro Chess Champions

BY KEVIN O' CONNELL
(WESTERN EUROPEAN PRESIDENT OF WORLD CHESS FEDERATION)

The first "World Microcomputer Championship" in London was treated with the full respect it deserved. It was held under the auspices not only of the ICCA (International Computer Chess Association) but also under those of FIDE (Federation Internationale des Echecs), the World Chess Federation. Held in London, as part of the Personal Computer World Show (4-6 September), it was a prestigious event and the commercial entries, seeking the publicity value of success in gaining the London title of World Champion for their program, proved this by sending top executives to oversee the humble task of operating their machines.

When the tournament got under way there were 14 competitors. There could have been more. Quite a few inquiries arrived too late. We received one entry on behalf of a very strong American program two days after the tournament ended. Originally sent in June with a 15 cent stamp, it had been returned to sender because of insufficient postage. It was put back in the mail bearing a second 15 cent stamp, just one cent short of the airmail tariff, so it travelled by sea, no doubt leaving the programmer feeling rather sick.

Once all the entries were in and the Championship ready to start, the organizing committee of David Levy and myself handed over responsibility for the smooth running of the event to Michael Clarke and Peter Morrish who were, respectively, Tournament Arbiter and Tournament Director.

The first round results would have completely justified the seeding had not Sargon 2.0 lost on time when it was more than a queen ahead on material. K. Chess IV also had an unfortunate experience — the draw gave it the white pieces, but it could only play with black! K. Chess IV lost that game by default, but some hurried modifications enabled it to complete the course.

Round 2 put a check to the aspirations of Mike Johnson, winner of the 1978 PCW tournament, and David Broughton, winner of last year's non-commercial prize. David Broughton's Vega went down to Sargon 2.0 while Mike 3.0, the only program running on special chess hardware, drew by repetition against the Modular Game System 2.5 despite being a queen up.

In the third round the two programs, (Champion Sensory Challenger and Boris) favourites, met. (CSC won). The destiny of the non-commercial first prize seemed almost sure to go to Mike Johnson and Dave Wilson when Mike 3.0 won while Vega lost again.

In round 4 "CSC" (Champion Sensory Challenger) played its most convincing game of the Championship, beating Modular Game System 2.5. Since CSC's other nearest rival at the

start of this round, Mike 3.0, also lost, CSC's lead, with just one round to go, extended to a full point.

In the last round, attention was focused on the games between Sargon 2.0 v. CSC and Rook 4.0 v. Mike 3.0, with a weather eye cast on developments in Boris Experimental's game. If Sargon 2.0 could beat CSC and Boris Experimental could defeat its opponent (which it did), there would be a tie for first place and the excitement of a play-off match. However, Sargon 2.0 had its chance but missed it and was then relentlessly ground down, so CSC finished with a clean score. The game between Rook and Mike would determine the winner of the top non-commercial prize. In the event these two programs drew there could have been a tie for all three non-commercial prizes had Vega been able to win. But Vega was having an uphill struggle to draw with the Auto Response Board 2.5.

Mike 3.0 and Rook 4.0 shared £750 for the top two non-commercial entries, the other prize of £100 going to Vega 1.7. CSC took the handsome trophy and the glory of being the first program to bear the illustrious title of London's World Microcomputer Champion.

Looking through the final score-table it seems almost to be a match tournament of Dan and Kathe Sparcklen against the rest of the world, an event that they lost by the narrowest of margins; the five programs written by them (entirely or in large part) scored 17 out of the total available 35 points.

Fidelity Electronics' representatives were rather coy about the Spracklen's involvement with the CSC program. However, there were three major give-aways: Fidelity's entry for the World Computer Championship in Linz listed the five programmers who I have listed in brackets on the results table, the program's playing style bore an uncanny resemblance to Sargon 3.0 which, in the Auto Response Board, won last year's PCW tournament, and the third point seems a clincher. All previous Challenger programs, including the brand new Sensory Voice have used a Z80 or Z80A processor while the Championship winning program, although playing in a Sensory Voice housing, used a 6502 processor, just like all the Sparcklen's other recent chess programs.

By all means rush out to your nearest store and buy a Sensory Voice Challenger, but don't expect it to play anything like as well as the CSC pro-

PROGRAM (* commercial entry)	R1	R2	R3	R4	R5	TOT	seeded
1 Fidelity's "CSC" (USA) (Dan & Kathe Spracklen, Ron Nelson, Frank Duason & Ed English) (6502 — Assembler) 20K	W12	W10	W2	W7	W5	5	5
2 BORIS EXPERIMENTAL (USA) (Programmers not named, but based on Boris 2.5 by Dan & Kathe Spracklen) (6502 — Assembler) 8K	W14	W8	L1	W3	W7	4	6
3 MIKE 3.0 (UK) Mike Johnson & Dave Wilson (6502 & chess hardware — Assembler) 48K	W10	D7	W11	L2	D4	3	3
4 ROOK 4.0 (SWEDEN) Lars Kalsson (Z8000 — Assembler) 16K	L9	D12	W10	W6	D3	3	9
5 SARGON 2.0 (USA) Dan & Kathe Spracklen (6502 — Machine language) 24K	L11	W9	W13	W12	L1	3	7
6 GAMBIET (NETHERLANDS) Wim Rens (Z-80 — Assembler) 10K	L7	W11	W8	L4	W12	3	11
7 MODULAR GAME SYSTEM 2.5 (USA) Dan & Kathe Spracklen (6502 — Assembler) 8K	W6	D3	W9	L1	L2	2-1/2	4
8 AUTO RESPONSE BOARD 2.5 (USA) Dan & Kathe Spracklen (6502 — Machine language) 8K	W13	L2	L6	W11	D9	2-1/2	1
9 VEGA 1.7 (UK) David Broughton (Z-80 — Assembler) 12K	W4	L5	L7	W13	D8	2-1/2	2
10 VIKTOR (SWITZERLAND) Herbert Bruderer (8085 — Assembler) 8K	L3	L1	L4	W14	W13	2	10
11 ALBATROSS (UK) Michael Parker (Z-80 — Assembler) 18K	W5	L6	L3	L8	W14	2	14
12 FAFNER 2 (UK) Guy Burkill & Alex Kidson (6502 — Pascal & Assembler) 16K	L1	D4	W14	D5	D6	1-1/2	12
13 PRINCHESS 1.0 (SWEDEN) Ulf Rathsman (6502 — Assembler) 12K	L8	W14	L5	L9	L10	1	8
14 K.CHESS IV (UK) Andrew Thomason (Z-80 — Machine language) 2.2K	L2	L13	L12	L10	L11	0	13

Austrian Tournament

For a free 16-page booklet listing *all* the games played at the 1st Microcomputer Chess Championship at San Jose (Sept. 5, 6 and 7, 1980) send a stamped (28 cents) self-addressed business-size envelope to George Koltanowski, 1200 Gough St., Apt. D-3, San Francisco, CA 94109. The printing and distribution of these game-booklets were made possible through grants from both Fidelity Electronics and Atari, both companies having voluntarily joined the list of sponsors of the tournament.

gram that won the Championship. No doubt, though, the CSC program will be on the market sometime next year.

The game and positions that will follow in a later article here were the most interesting played in the Championship. Readers wishing to obtain a copy of the tournament bulletin, containing the moves of all the games played, should send a large stamped addressed envelope and £1.50 to PCW (Chess Games), 14 Rathbone Place, London W1P 1DE.

PCW was happy to sponsor London's Second World Microcomputer Chess Championship. Someone else, (perhaps in the United States,) may want to sponsor it. I will be pleased to hear of any offers, which can be sent to me at the same address given for the tournament bulletin, and I will liaise with FIDE and ICCA.

World-Championship Tournament

Final results of the four-round Third World-Championship Tournament held in Austria:

Belle	3½ pts
Chaos	3½ pts
Duchess	3 pts
L'Exentrique	2½ pts
Chess 4.9	2½ pts
Nuchess	2 pts
Kaissa	2 pts
BCP	2 pts
Bebe	2 pts
Schach 2.3	2 pts
Awit	2 pts
Master	1½ pts
Ostrich	1½ pts
Mychess	1½ pts
Parwell	1½ pts
Advance 1.0	1½pt
Dark Horse	1 pt
Challenger "CSC"	½ pt

Two side-notes to the above: Ken Thompson was awarded a 50 pound aluminum cube (engraved) for winning the tournament (in a fifth round tie-breaker with Chaos.) Asked afterwards what he thought about this unusual trophy, Ken Thompson, puffing hard as he lugged the heavy object toward the airport, reportedly gasped, "Thank Goodness they didn't make it 100 pounds!" And, reminiscent of the Washington tournament two years ago, one of the participants ran into some hoodlums in a Linz street and came way with a broken arm.

Classifieds

Rates for advertising in this section: $1 per word. Minimum 15 words. Allow two months for appearance (usual publication lag). Announcement of human tournaments that are open to computers published without charge. Send all submissions for this section to COMPUTER CHESS CLASSIFIED DEPARTMENT.

BRIDGE PROGRAM

For those who would like to add my standardized bridge dealing sequence to their Duisman programs: If they will send me a check for $3 (to cover incidental costs) I shall be glad to send the code. Thomas A. Throop, 8804 Chalon Drive, Bethesda, MD 20034.

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The GAMMON CHALLENGER gives all backgammon players a battle. Has 3 levels of play. Switches sides, tests problems and stores positions in memory. Available on TRS-80 cassette for either Level 1 or Level 2. $14.95 each. The Program Store, 4200 Wisconsin Ave., NW, Washington, DC 20016.

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Intelligent OTHELLO opponent for both novice and expert. Five levels of play, neat graphical display, move selection in 30 seconds or less. TRS-80 tape ($12) requires Level II and 16K and has REAL-TIME Lunar Lander program on flip side. Apple tape ($16) requires integer BASIC and 24K and has OTHELLO for Disk system on flip side. Peter Frey, 2407 Prospect Avenue, Evanston, IL 60201.

COMPUTER-CHESS BOOK

Learn the psychological secrets of becoming a strong chess player! "How to Beat Most People and Computers at Chess." (Secrets of a Grandpatzer.) By Kenneth Mark Colby, Professor of Psychiatry and Computer Science, UCLA. Hardcover. 153 diagrams. 141 pages. Figurine Notation. For personal autographed copy, send $20 (check or money order) to MALIBU CHESS PRESS, 25307 Malibu Road, Malibu, CA 90265. (CA residents please add 6%.)

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Play an intelligent game at university level! Five Stones Software's GOMOKU program is available for North Star or CP/M in 5-1/4" single or double density disks or in 8" single density disks. Also available in cassette for TRS-80, Level II, 32K. $29.95, any choice. Visa or Mastercharge accepted. Five Stones Software, PO Box 1369, Station B, Ottawa, Canada. K1P 5R4.

WINNER WINNER WINNER

First Place prize, non-commercial, United States Microcomputer Chess Championship. Play against SFINKS, the fastest and strongest chess program ever written for the TRS-80! 32K Level II cassette and instructions $59.95. Microcomputer Software Consultants, Department 2A, 1300 S.E. 3rd Ave., Deerfield Beach, FL 33441

ENTER A GOMOKU TOURNAMENT

Do you have a GOMOKU program? Would you like to write one? Those with own programs can enter an International GOMOKU Tournament and, if #1, can take on the European champ. For more information on the GOMOKU Tournament itself, write to Dr. Shein Wang, Institute of Computer Science, U. of Guelph, Guelph, Ontario, N1E 1C8.

JOIN:

ICCA (International Computer Chess Association.) $10 annual membership includes the ICCA NEWSLETTER with computer-chess news from all over the world. (Back issues, $2 for set of three.) Send U.S. check or international money order to ICCA, c/o Ken Thompson, Room 2C423, Bell Telephone Labs, Murray Hill, NJ 07974, USA. Editorial material for the ICCA Newsletter should be sent to: B. Mittman, Editor, ICCA NEWSLETTER, Vogelback Computing Center, Northwestern University, Evanston, IL 60201, USA.

Chess at West Coast Computer Fair

During the West Coast Computer Fair Chess Tournament, held March 14, 15 and 16 in San Francisco, six computers had agreed to participate but only five showed up. Organizer, John Urwin, most knowledgeable guy in running a computer chess tournament, sent the following report:

"Five computers (out of six that had agreed to play) showed up on Friday, March 14, 1980 at Brooks Hall, San Francisco. At the last minute, George Koltanowski agreed to direct this event. In George's words: The difference between conducting a regular **human** (as computers call us) tournament and a computer one is great.

"Most machines," continues Urwin, "are geared to 40 moves in two hours of play. However, time limitations here, with two rounds in 8 hours, forced the imposition of a faster time limit. It was dropped to 40 moves in 90 minutes. Players were allowed to change the level of play just once in each game, or in the event the time schedule was to be changed. This caused a few problems along with an odd mix-up in Round 3 when the two Atari machines switched boards and ended up with Atari 4K playing the wrong opponent. The fifth round pairing was in trouble because of the third round mix-up and the Atari 6K (there are only two copies in the world) was paired against both BORIS 2.5 and MYCHESS at the same time. Fortunately, Larry Wagner, had brought along both existing 6K copies of the program to the tournament. The final standings, with names of players, of the competing micros were:

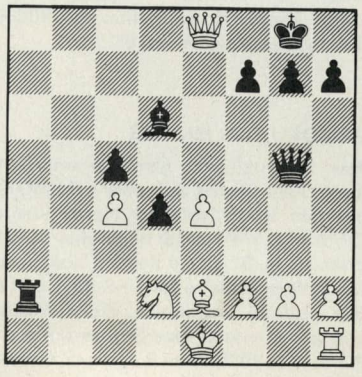
1. MYCHESS (John Urwin, San Jose, CA) 31/2 pts out of 4
2. ATARI 4K (Craig Asher, Sunnyvale, CA) 21/2 pts
3. (Tie) BORIS 2.5 (Dan Neumayer, San Ramon) 11/2 pts
4. (Tie) ATARI 6K, (Larry Wagner, Hayward, CA) 11/2 pts
5. VOICE CHALLENGER, (Jim Walker, San Jose,) 1pt.

"During a break in the action, MYCHESS challenged George Koltanowski to a game. The challenge was conveyed by myself, since MYCHESS has no voice chip in its circuitry. George accepted the challenge and also offered the following comments:

" 'I would say that computers are the up and coming thing in chess. Until recently, computers had not been taken seriously in chess circles. But new technology is mass-producing computers capable of defeating the average chess player. Think of it! Beaten by a machine! Soon, chess-playing computers will be as common as televisions are now. The computer revolution is here! However, while they can beat beginners, computers still have a long way to go to beat the best human chess players. Some experts have grave doubts that a computer will ever beat a Grandmaster (though I have seen them beat Grandmasters at rapid chess) because chess is not completely logical. There is an aspect of art and intuition which skeptics believe can never be reproduced in a computer program. Only time will tell if they are right.' "

White: MYCHESS
Black: KOLTANOWSKI

1. P-Q4	P-Q4
2. B-QB4	P-K4
3. QPxP	P-Q5
4. N-KB3	N-QB3
5. P-K4!	B-KN5
6. B-B4	N1-K2
7. N1-Q2	N-N3
8. B-N3	QNxP
9. BxN	NxB
10. Q-R4ch	B-Q2
11. Q-N3	NxNch
12. NxN	P-QB4
13. QxP	R-QN1
14. QxP	RxP
15. N-Q2	B-Q3
16. R-QN1!!	RxRch
17. NxR	O-O
18. B-K2	B-B3
19. N-Q2	Q-N4
20. Q-R4 (a)	R-R1
21. QxB	RxP
22. Q-K8ch (b) (diag)	B-B1



23. N-N3	R-N7
24. B-Q1	QxP
25. R-B1	P-R3 (c)
26. NxBP (d)	R-N8
27. K-K2 (e)	Q-N5ch
28. K-Q2	Q-N4ch
29. K-Q3	QxN
30. B-K2	R-N6ch
31. K-B2	Q-N5

32. Resigns as mate cannot be avoided (f)

Comments by Koltanowski

(a) The computer has held more than its own! I felt sure it was going to play 20. P-N3. Instead, the program evaluates a decision to win a piece. I had only counted on Q-N6.

(b) MYCHESS falls for a check! With the following moves: 22.0-0!, RxN; 23. QxB, P-R3; 24. B-B3 - White would have no trouble winning.

(c) Needs "luft."

(d) This gives Black good drawing chances.

(e) Should have played 27. N-Q7 and then hope for the draw after 27...RxBch; 28. KxR, QxRch; etc.

(f) Gee whiz! Computers have come a long way since last I played one.

Chess Computers are not Work Machines

Following the West Coast Computer Fair, John Urwin helped organize a computer-people chess tournament. It was held at Le Baron Hotel, San Jose, CA, March 21 and 22. John Urwin reports that he overheard someone say he would not play Boris 2.5, complaining that the unit would just crush him. "Human players," says John, "have a psychological misconception of 'machine chess.' Humans cannot accept the fact that the computer **thinks** when it plays chess. They tend to feel that the machine is another electronic toy which, once you have figured out how to beat it, is no longer a challenge. What they don't realize is that in computer-chess it is unlikely that any computer will repeat the same game in its lifetime. Computer chess is not another electronic toy. It **thinks** in almost the same way that man thinks (although scientists have never agreed on how man thinks). Once the human accepts the computer as a **thinking** machine, not a work machine, he will begin to enjoy computer chess a lot more. The trouble with most humans is that they put chess-computers in the same shopping-cart as sewing machines, steam engines and typewriters."

Computer-Games Directory

This directory has been assembled over a period of six months. Some inquiries sent out have never come back. Some probably have gone astray.The directory, therefore, may probably be incomplete. Omissions and errors will be corrected in the next directory upon receipt of proper information. Also, Better Business Bureaus advise not sending money before first dispatching a letter of inquiry. You may also want to know if the program will run on your machine. — Ed.

The electronic-game "industry" is beginning to boom, according to reports by knowledgeable marketing people and also according to analytical reviews appearing in The Wall Street Journal. The electronic "games" listed here have been selected mostly with a view of indicating those that depend on "intelligence" and logic (Chess, Gomoku, Othello, etc.) Other "games" have been included as a sample of what else is available.

Because we are now at the year's-end gift-giving season, selecting one of these stand-alone devices for retired, sedentary people, whether at home, confined to a bed or residing in a rest home could surely remedy an ennuied spirit. One of the last human faculties to atrophy is the human brain (G.B. Shaw started to write a play at the age of 99) and any stimulant fed to that sturdy organ is wonderful medicine.

CHESS

Chess games listed are those that have been most prominent this past year. Many other chess programs exist in cassette, disk or ROM memory for particular computers. But those are usually restricted to certain users groups and most are not for sale. The question of which is the "best" program is always debateable because the champion today gives up the title tomorrow. ("Uneasy is the head that wears the crown.")

1. "SARGON I, and SARGON II"
Description: "Dan and Kathe Spracklen's strong-playing computer chess program. Has been ranked as one of the best."
Media: Cassette and disk

INSTITUTIONAL COMPUTER DEVELOPMENT CORP.

Toll-Free Convenience

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Dept. PC-12
Valley Stream, NY 11580

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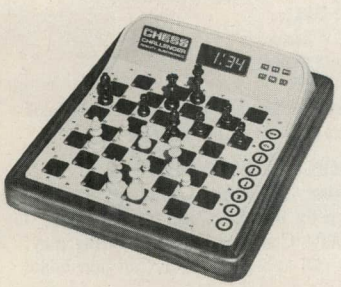
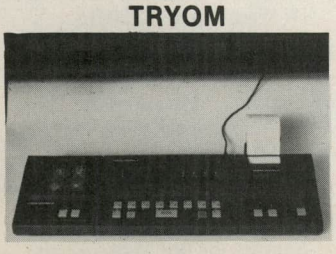


Voice Sensory
Sensory
Challenger "7"

Challenger "10"
Voice Challenger

TRYOM



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Our other incentives

1. Customer service and appreciation second to none.
2. We carry **every** major brand of stand-alone chess playing microprocessor. We test, compare, and can be counted on for a straightforward appraisal.
3. It is our firm belief that we have the world's most knowledgeable staff in the field of comparative computerized chess micros.
4. Every machine must survive a full-function series of tests before it is shipped. This process has enabled us to eliminate malfunctioning machines by up to 50%.
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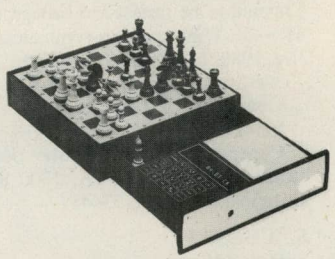
6. Your unit is completely guaranteed by I.C.D. Corp. for 14 days, and if you should have a problem or question, simply call, toll free, and your satisfaction is assured.

We also carry **bridge, backgammon,** and **checkers** minicomputers.

APPLIED CONCEPTS



2.5 Modular Game System
Borchek checker module
Las Vegas "21" module
Boris Diplomat II

A.V.E. MICROSYSTEMS

Auto-Response Board

CIRCLE 30

Computers: Apple, TRS-80 and Pet
Price: $19.95 for SARGON I; $29.95, SARGON II; $34.95, Apple Disk
Company: Hayden Book Co., 50 Essex Street, Rochelle, Park, NJ 07662

2."MYCHESS"
Description: "A strong-playing program which placed sixth at 10th ACM tournament. Plays around 1600 chess."
Medium: Disk
Computer: Cromemco, TRS-80 or any DOS using CP/M. A stand-alone-device is reportedly coming out in 1981
Price: $50 for the disk
Company: Dave Kittinger 2431 Lyvona Lane, Anchorage, AK 99502.

3."ATARI CHESS"
Description: "An inexpensive, fairly good chess program to acquire if you own the Atari system."
Medium: ROM Insertable Cartridge
Computer: A computer unit that interfaces to home TV. Has a library of various game cartridges.
Price: For price, description and dealer list, on chess cartridge and interface unit write to:
Company: Atari, Inc. 1265 Borregas Ave., Sunnyvale, CA 94086

4."MICROCHESS"
Description: "Pioneer of all microcomputer chess programs. Excellent for learning how to play chess."
Medium: Cassette
Computer: Pet, Apple, TRS-80
Price: For description of various versions, prices and dealer list, write to:
Company: Personal Software, Inc. 592 Wendell Drive, Sunnyvale, CA 94086

5."SFINKS"
Description: "Seven levels of chess play from beginner to expert. Problem-solving mode. No illegal moves. Can change colors and levels. Graphics resemble Staunton chess-piece designs. Claimed to be fastest and strongest program for TRS-80, Winner of non-commercial entry at San Jose 1980. Now available for sale."
Medium: Cassette
Computer: TRS-80
Price: $59.95
Company: Microcomputer Software Consultants, Department 2A, 1300 SE 3rd Ave., Deerfield Beach, FL 33441.

6."CHESS 8"
Description: "Program plays at 3 levels. Responses: from one minute to about an hour at top level. Can change sides. Standard chess notation."
Medium:: Disk
Computer: Heath H89 or Heath H8 with H19 terminal.
Price: $24.95
Company: Quantum Communications Systems, 13195 87th Place N, Largo, FL 33542

7."COMPUTER CHESS DEVICE"
Description: "Chess at many levels and in many models up to Chess Challenger Super System III. Has options of external memory, electronic chessboard, printer, chess clock."
Computer: Portable stand-alone-device.
Price: $49 to $400 (depending on model) For full descriptions and dealer lists write to:
Company: Tryom, Inc.,: 23500 Mercantile Road, Beachwood, OH 44122.

8."COMPUTER CHESS DEVICES"
Description: "This 'Challenger' series of computer chess offers various models with different features including voice response in different languages. Its CSC model won both San Jose and London tournaments. But the CSC model will not be available until sometime in 1981."
Computer: Portable stand-alone-device.
Price: For prices, dealer list and brochure describing all models write to:
Company: Fidelity Electronics, Ltd., 8800 NW 36th St., Miami, FL 33178

9. "COMPUTER CHESS DEVICES"
Description: "This Boris series of computer chess offers various models with different features. Modular Game System has basic Boris 2.5 module. Handroid model actually moves chess pieces. Was last year's champ. This year was runner-up to prototype which is not yet on market."
Computer: Portable stand-alone-device (MGS) with a library of insertable modules.
Price: For a brochure with prices and complete descriptions, plus list of dealers, write to:
Company: Applied Concepts, Inc., 207 North Kirby St., Garland, TX 75042

10."Z-CHESS"
Description: "Has 7 levels of play. Said to be good for beginner or for learning. Solves mate in two quickly."
Medium: Cassette
Computer: TRS-80
Price: $17.95
Company: The Software Association, PO Box 53, Houston, TX 77058

11."CHESS MASTER"
Description: "Hundreds of chess problems to solve. Mate in 1, 2, 3 and 4. Correct solving can determine your approximate USCF rating."
Computer: Wallet-sized stand-alone-device, battery operated. Has small LCD display with 14-unit keyboard.
Price: $49.50
Company: Master Distributors, Div. of Promedic Mfg. Co. Inc., 1000 16th St., NW, Washington, DC 20036

12."CYBERCHESS"
Description: "A patented, non-electronic, high-level chess playing machine which substitutes for an opponent in a pre-documented chess game. Simulates computer chess but at a fraction of cost.
Medium: A programmable arrangement of cardboard sliders and "window viewing."
Price: $39.95 plus shipping and applicable sales tax.
Company: Cyber Enterprises, 17517 Fabrica Way, Suite K, Cerritos, CA 90701

BACKGAMMON

Next to chess, backgammon has the most electronic models to offer. None of them have been evaluated. Occasional games between various computers have appeared in this department and will continue to appear from time to time. If you are a good backgammon player, test one at a department store. If you are a beginner, any one will serve you.

1."BACKGAMMON"
Description: "A good, legal, backgammon program written by Norman Wazaney, Jr."
Medium: Cassette
Computer: TRS-80 II, Pet
Price: $10.95
Company: Hayden Book Co., 50 Essex St., Rochelle Park, NJ 07662

2."FASTGAMMON"
Description: "Regulation backgammon program written by Bob Christiansen.
Media: Cassette and Diskette
Computer: TRS-80, Apple II, Sorcerer, SOL, Atari
Price: $19.95
Company: Quality Software, 6660 Reseda Blvd., Suite 103, Reseda, CA 91335.

3."BACKGAMMON"
Description: "Regulation backgammon program prepared by Commodore staff."
Medium: Cassette
Computer: Pet 2001 Series
Price: $9.95
Company: (Write for description and dealer list) **Commodore Business Machine,** 3330 Scott Blvd., Santa Clara, CA 95051

4."MICROGAMMON 1.0"
Description: "Backgammon program written by Steve Baker."
Medium: Cassette
Computer: Apple II
Price: $14.95
Company: Softape Co., 10432 Burbank Blvd., North Hollywood, CA 91601

5."GAMMON CHALLENGER"
Description: "Gammon Challenger is a program written by Ray Daly and Tom Throop. 3 Levels of play. Can change levels during play. Can specify roll in highest level. Can save board position."
Medium: Cassette
Computer: TRS-80
Price: $14.95
Company: The Program Store, 4200 Wisconsin Ave., NW Washington, DC 20016

6."BACKGAMMON PACKAGE 7"
Description: "Two skill levels for average or advanced players. 15-second responses. Plays doubles and uses international rules. Program written by Michael A. Gariepy."
Medium: Cassette and disk
For: TRS-80 Level II
Price: $12.95 (cassette); $17.95 (disk)
Company: Simutek PO Box 35298, Tucson, AZ 85740

7."GIGA"
Description: "A fast response backgammon program.
Medium: Disk
Computer: North Star
Price: $15
Company: GIGA, PO Box 1881, Chicago, IL 60690

8. COMPUTER BACKGAMMON DEVICES
Description: "GAMMONMASTER II and OMAR Series. Regulation backgammon in portable electronic devices. Five models of OMAR."
Computer: Stand-alone-devices.
Price: $38 to $149 depending on model. For descriptive literature and dealer lists write to:
Company: Tryom, Inc., 23500 Mercantile Rd., Beachwood, OH 44122.

9. COMPUTER BACKGAMMON DEVICES
Description: "BACKGAMMON CHALLENGER. Player handles dice. Uses all strategies of game running, hit and run, blocking, bear-off and doubling. Offense or defense."
Computer: Stand-alone-device
Price: For brochure with description, dealer list and prices, write to:
Company: Fidelity Electronics, Ltd., 8800 NW 36th St., Miami, FL 33178.

10."BACK-40"
Description: "Backgammon with good graphics display of an official board. Generates dice-rolls graphically. A super-teacher for beginners, a challenge to players."
Medium: Cassette
Computer: TRS-80
Price: $14.95
Company: The Software Association, PO Box 53, Houston, TX 77058

COMPUTER BRIDGE

Bridge is the most popular social game in existence. Experts reside and compete with each other in all parts of the world. Bridge columns appear every day in most large daily newspapers in the States and elsewhere. Chess usually appears only once a week. Using rough calculations on "frequency of appearance," and if it is true that 20,000,000 people play chess in the US, then 140,000,000 people play contract bridge. This could be a highly exaggerated calculation. But consider the number of bridge games going on in living rooms every night, and in social halls two or three times weekly, and at regional and national tournaments, monthly, bi-annually and annually. This huge figure could be acceptable. (What a great market awaits electronic-bridge stand-alone manufacturers!) Which is the best? You tell us!

Othello Tournament

A computer-Othello tournament takes place at University of California, Santa Cruz, Jan. 17 and 18, 1981. Entries by individuals or teams operating microcomputer-systems brought to tournament site are especially welcome. Registration deadline is Jan. 10, 1981. Four rounds on Sat. and four on Sun. Pairings by lottery on first round. Succeeding pairings of each round will be based on results of previous rounds. Contestant allowed a total of 30 minutes per game. For further information, or to register, write to Prof. Peter W. Frey, 421 Kerr Hall, Univ. of California, Santa Cruz, CA 95064. (Tel. (408) 429-4005)

1."BRIDGE 2.0"
Description: "A computer bridge program"
Medium: Diskette and Cassettes
Computer: North Star, TRS-80, Apple II
Price: $17.95
Company: Dynacomp, PO Box 162, Webster, NY 14580

2."DUISMAN BRIDGE PROGRAM"
Description: "This bridge program by Personal Software allows you, as South, to play your's and dummy's cards at a contract of your own choice. Computer will defend with East, West cards. In addition, you may input a deal of your own choice and also store deals in memory."
Medium: Cassette
Computer: TRS-80, Pet and Apple
Price: $14.95
Company: Various dealers including: **The Program Store,** 4200 Wisconsin Ave., NW, Washington, DC 20016.

3."A BRIDGE DEALING PROGRAM"
Description: "This program adds Tom Throop's standardized bridge dealing sequence to the Duisman program."
Medium: Subroutine source code
Price: $3
Author: Thomas A. Throop, 8804 Chalon Drive, Bethesda, MD 20034.

4."COMPUTER BRIDGE DEVICE"
Descripton: "Voice Bridge Player and Bridge Bidder. Device can bid and play 1, 2, 3 hands with you playing the rest."
Computer: Portable, stand-alone-device
Price: For brochure with prices, description and dealer list write to:
Company: Fidelity Electronics, Ltd., 18800 NW 36th St., Miami, FL 33178

5."COMPUTER-BRIDGE DEVICE"
Description: "Goren Bridgemaster. Plays many conventions. Has tutorial cartridge for learning to play and bid. Keeps score. Rejects illegal plays. Plays duplicate."
Computer: Stand-alone device (portable)
Price: Descriptive literature, prices and dealer list available from:
Company: Tryom, Inc., 23500 Mercantile Road., Beachwood, OH 44122.

6."A BRIDGE TEACHING PROGRAM"
Description: "CompuBridge. A tutorial series of lessons, quizzes and sample hands."
Media: Cassette and Disk
Computer: Apple II (16K, 32K or 48K)
Price: Elementary course, $19.95 (cassette); Complete course, $29.95 (cassette); or $39.95 for 48K disk.
Company: CompuBridge, Barclay Bridge, Port Chester, NY 10573

OTHELLO

Computer Othello, appears to be a newly accepted game that is rapidly increasing in popularity. This game is played on a standard 8×8 checker board. Stones, either black or white, are played in rotation. Whenever stones of one color flank one or more adjacent other-colored stones, the "entrapped" stones are changed to the captor's colors. Stones can change colors many times before all 64 squares of the board are covered, (end of game.) Requires strategy and guile to prevail. Games are currently available only on cassettes or disk for various computers. Reportedly, stand-alone-devices will be appearing in 1981. This game has become one of the most popular board games in Japan and promises to eventually become international competition.

1."OTHELLO," Apple II Cassette. $12.95, **Softape, Co.,** 10432 Burbank Blvd., North Hollywood, CA 91601

2."VIP-FLOP," RCA Cosmac Computer, $19.95, **Aresco, Inc.,** PO Box 1142, Columbia, MD, 21044

3."OTHELLO," Apple Cassette. $15, **Chen & Co.,** PO Box 353, Pine Brook, NJ 07058

4."OTHELLO," TRS-80 or Apple Cassette. $12 and $16, **Peter Frey,** 2407 Prospect Ave., Evanston, IL 60201

5."ELIMINATE," TRS-80 Cassette. $19.95. (Tape contains other games.), **Basics and Beyond, Inc.,** Pinesbridge Rd., Box 10, Anawalk, NY 10501

6."REVERSAL," Apple II disk. $34.95. (Apple Cassette $29.95 available soon.) "Finished 2nd to World Champion in recent tournament", **Hayden Book Co.,** 50 Essex St., Rochelle Park, NJ

GOMOKU

This ancient game has some features of GO. It is becoming more popular in the US, thanks to the efforts of Dr. Shein Wang, U. of Guelph, CAN., who has been directing a continuous, computer tournament of GOMOKU for the past four years at that University. The tournament is open to any program and can be carried on by telephone or correspondence. The game itself involves placing five stones of same color in a row, while the defense attempts to prevent this. No stand-alones are as yet available.

1."GOMOKU," TRS-80 Cassette. $15, **Discovery Bay Software Co.,** PO Box 464, Port Townsend, WA 98368

2."GOMOKU," Cassette for Apple and Atari., **Softape Co.,** 10432 Burbank Blvd., North Hollywood, CA 91601

3."GOMOKU," North Star Disk or TRS-80 Cassette. $29.95, **Five Stones Software,** PO Box 1369, Station B, Ottawa, Canada, K1P 5R4

CHECKERS

Although checkers is probably the most popular board game in the world, and is played in almost every country (perhaps with different rules or under different names) it has never achieved as much mass tournament appeal as has chess or bridge. Probably it's due to the fact that checkers is such an easy game to learn that not many players bother to study strategy, tactics and logic. Instead, checkers for the non-tournament player, is a game where the moves are made at random. If beginning-checkers-players learned proper openings, middle-games and endings, as in chess, they would find it as challenging as any other board game, say experts.

1. "CHECKER PACKAGE 2," TRS-80 Cassette ($12.95) or Disk ($17.95). **Simutek Co.,** PO Box 35298, Tucson, AZ 85740

2. "CHECKERS," Apple II Disk. $19.95 (Includes 3 other games.) **Williamsville Publishing Co.,** PO Box 250, Fredonia, NY 14063

3. "CHECKERS CHALLENGER," Portable stand-alone-device. For brochure and prices write to **Fidelity Electronics Ltd.,** 8800 NW 36th St., Miami, FL 33178

4. "BORCHEK," Module for portable stand-alone-device, (MGS). For price and description write to **Applied Concepts Inc.,** 207 North Kirby St., Garland, TX 75042

GO

This ancient game, played on a 19×19 board is the most popular, nationally supported game in Japan and is played there in tournaments for huge prizes. Because of its immense number of possible board positions it has appeared in computers only as a research project. One university professor has converted it to a 9×9 board and made it available to the public. Other similar 9×9 programs are sure to appear, because GO is a highly challenging game to the intellect.

1. "MICRO GO," Cassette for Pet. $18.95. **Aidcom Co.,** Box 165, Clarkson Postal Station, Mississauga, Ontario, L5J 3Y1 Canada.

CARD GAMES

Games with playing cards are becoming more popular and more varied. (See separate computer-bridge listings.) Some already on the market include:

1. "LAS VEGAS 21," The game of "Blackjack." A module for portable stand-alone-device (MGS) For price and information write to **Applied Concepts, Inc.,** 207 North Kirby St., Garland, TX 75042

2. "HEARTS 1.5," Cassette or Disk for North Star, TRS-80, Apple II. $14.95 **Dynacomp Co.,** PO Box 162, Webster, NY 14580

3. "CRAZY EIGHTS," Cassette for Apple. $12.95. **Softape Co.,** 10432 Burbank Blvd., North Hollywood, CA 91601

4. "SOLITAIRE POKER," Cassette for Apple II. $12.95. Softape Co., (Address above)

5. "DRAW POKER," Cassette or Disk for TRS-80. $25. **Jim's,** PO Box 172, Louisville, OH 44641

6. "EUCHRE," Cassette for Pet. $10. **Mike Pershing,** 873 North Monroe Drive, Xenia, OH 45385

ACTION AND DECISION GAMES

These are the pioneers of popular electronic games. They include games of Adventure, War, Travel, Sports, Puzzles, Decision-making, etc. The following is a sample of the large number of general-type games available. Many can be considered "intelligent" because they involve the process of making a logical decision.

1. "DR. CHIPS," Based on Eliza psychoanalysis program. TRS-80 Cassette $14.95. **The Software Association,** PO Box 53, Houston, TX 77058

2. "ADVENTURE BY SCOTT ADAMS," Cassette for TRS-80, Apple, Sorcerer. $14.95 **Adventure International.** Box 3435, Longwood, FL 32750

3. "MANAGEMENT SIMULATION GAME," Managing a big business. Disk for North Star. $17.50. **GIGA Co.,** PO Box 1881, Chicago, IL 60690.

4. Following games available from **Microcomputer Games Inc.,** Div. of Avalon Hill Game Co., 4517 Hartford Rd., Baltimore, MD 21214. Cassettes for Pet, Apple and TRS-80. Each are $15.

A. "B-1 NUCLEAR BOMBER"
B. "MIDWAY CAMPAIGN"
C. "NORTH ATLANTIC CONVOY RAIDER."
D. "NUCLEAR WAR."
E. "PLANET MINERS."

5. "GRIDIRON," Real-time microfootball. Cassette for TRS-80. $12.95 **Hayden Book Co.,** 50 Essex St., Rochelle Park, NJ 07662

6. "MAYDAY," Airplane-flight simulation. Cassette for Pet. $9.95. **Hayden Book Co.,** (Address above.)

7. "World of EAMON," Dungeon-fantasy program. Disk for Apple. Free under exchange program. **Apple Pi Trading Library,** Terry N. Taylor, 12319 E. Bates Circle, Aurora, CO 80014

8. "INVASION," Animated space war. Cassette for Pet. $10. **Supersoftware,** Box 115, Osceola Mills, PA 16666

9. "VALDEZ," A navigation challenge. Cassette and Disk for North Star, TRS-80, Apple II Plus. $14.95. **Dynacomp Co.,** PO Box 162, Webster, NY 14580.

10. "FLIGHT SIMULATOR," Cassette and Disk for North Star, TRS-80, Apple II Plus. **Dynacomp Co.,** (Address above.)

11. "JOURNEY," An adventure program. Cassette for Apple II $19.95. **Softape Co.,** 10432 Burbank Blvd., North Hollywood, CA 91601.

12. "WITS END," A digital decoding game. Replaceable module for stand-alone-device (MGS). For price and description write to **Applied Concepts, Inc.,** 207 North Kirby St., Garland, TX 75042.

13. "INVASION ORION," Tactical space war. Cassette or Disk for TRS-80, Pet, Apple. $19.95 (Cassette); $24.95 (Disk.) **Automated Simulations,** 1988 Leghorn St., Mountain View, CA 94043

14. "LUNAR LANDER," Extraterrestial travel. Replaceable module for stand-alone-device (MGS). For price and description write to **Applied Concepts, Inc.** (Address above.)

KING OF THE HILL!

We've taken artistic license with our illustration in order to make a point: MYCHESS is the most powerful microcomputer chess program on the market, bar none.

Proof? All you want and then some. For example, MYCHESS was the winner of the "Fifth West Coast Computer Fair". At the "Third World Computer Chess Championship" in Linz, Austria, it was the highest finishing micro... in addition to winning the special Blitz Tournament (5 to 1) against six top players. Add to this its USCF rating of 1565, and you know you're dealing with the King of the Hill.

You'll find MYCHESS is the perfect companion or opponent whether you're an advanced player, or starting your first game. For it lets you set the difficulty of the game from level 1 to 9. And, you can change levels of play as you go ... or even change sides. Want to set time limits for moves? MYCHESS can do it. Want to save a game for later? MYCHESS will store up to 6 games. And, for added interest, it will even predict the upcoming line of play.

If you're a player, you'll appreciate the MYCHESS challenge. If you're a beginner, you'll enjoy learning from a master. Either way, when it comes to superior chess, make your move ... to MYCHESS. Available for the TRS-80* with 32K, for $34.95 including disk, documentation and backing by Programma International. Apple** version coming soon.

Can **you** beat

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CIRCLE 39

TRS-80 Bridge Deals

By THOMAS A. THROOP

Let's look at a few more deals generated by the TRS-80 bridge playing program I am developing with Bob Hammon of the Dallas Aces. As I have mentioned in my articles of the past few months, this program is a playing program. You, as South, play the North and South cards at a contract suggested by the computer or at a different contract of your choice. The deals are generated by the program's pseudo random number routine which permits the regeneration of any given deal. Or, if you prefer, you may enter the cards for a deal of special interest to you and play the deal against the computer.

In a second mode of play, for some selected deals, you will play these deals against the computer in an "instructional" mode. Each time that it's your turn to play you'll be given three chances to select the recommended play. If you make an incorrect choice, you are asked to select another card. An analysis of each of these instructional deals is presented in the booklet accompanying the computer program.

I think you'll find this product most worthwhile and enjoyable. The program is expected to be available through your local TRS-80 dealer at Christmas or shortly thereafter. I hope that those of you who acquire the program will let me know about particularly interesting deals which you encounter in playing against the program. I'll look forward to discussing some of these deals in future columns.

The first deal is number 262. North and South cards are:

NORTH
(Dummy)
♠ AQ75
♥ A6
♦ A986
♣ AK6

SOUTH
(Declarer)
♠ J6
♥ QJT
♦ KT42
♣ J754

The computer program suggests 3 no trump as the final contract, which is the proper contract. Against this contract the computer, as West, leads the 5 of hearts. You play the 6 from dummy and the computer as East, plays the deuce, and you play the queen. Now, how should you play this hand?

The important point in this hand is the timing of the play of the spade and diamond suits. You must defer the spade finesse until after you have set up your third diamond trick. With West having long hearts, East is likely to have long diamonds. At trick 2 I led the deuce of diamonds from my hand, planning to go up with the ace and play a second diamond to my ten.

On the lead of the deuce of diamonds at trick 2 West made a good play of playing the queen of diamonds. I won with dummy's ace and next led the 6 of diamonds from the dummy, on which Each played the 7. Play the ten of diamonds from your hand. West wins with the jack and returns 3 of hearts, which you win with dummy's ace. Now you cash dummy's 9 of diamonds and then enter your hand with the king of diamonds, East discarding the 2 and 3 of spades, while West discards the 4 of spades on the king of diamonds.

It is now time for the spade finesse. Your hope is that either West has the spade king or that East is out of hearts. You lead the jack of spades from your hand, West plays the 9, the 5 from dummy, and East wins with the king. East is out of hearts and properly returns the ten of spades.

You now win all but the last trick, which you must lose to East's queen of clubs. You have made two overtricks, losing only one spade and one club. East could have discarded a club rather than a spade at trick 6, but then, when he wins trick 10 with the 8 of spades, he is endplayed in clubs and you still make eleven tricks.

The complete deal and the play of the cards follow. You can see that if you take the spade finesse before playing diamonds, East will return a heart to knock out dummy's ace. Then, if you now attempt to set up a third diamond trick, West gains the lead and cashes four heart tricks.

NORTH
(Dummy)
♠ AQ75
♥ A6
♦ A986
♣ AK6

COMPUTER
WEST
♠ 94
♥ K98543
♦ QJ3
♣ T9

COMPUTER
EAST
♠ KT832
♥ 72
♦ 75
♣ Q832

SOUTH
(Declarer)
♠ J6
♥ QJT
♦ KT42
♣ J754

	West	North	East	South
Trick 1	5H	6H	2H	QH
2	QD!	AD	5D	2D
3	JD	6D	7D	TD
4	3H	AH	2H	TH
5	3D	9D	2S	4D
6	4S	8D	3S	KD
7	9S	5S	KS	JS
8	9C	AS	TS	6S
9	TC	QS	8S	JH
10	4H	7S	2C	4C
11	8H	AC	3C	5C
12	9H	KC	8C	7C
13	KH	6C	QC	JC

Contract: 3 notrump

Tricks N-S: 11 Tricks E-W: 2

The second deal is quite an interesting one. North and South cards are:

NORTH
(Dummy)
♠ QT4
♥ 42
♦ AJ4
♣ A8543

SOUTH
(Declarer)
♠ K95
♥ AQ986
♦ 652
♣ K7

COMPUTER BRIDGE

The computer program suggests 2 notrump as the final contract, which is quite reasonable. Against this contract the computer, as West, opens the jack of hearts. You play the deuce from dummy, East plays the king, and you win with the ace.

Suppose you now play the king and ace of clubs, followed by a third club. On this trick the jack and queen of clubs fall, East winning the trick with the queen. At trick 5 East now returns his partner's opening suit, playing the 7 of hearts. You play the 9, and West wins with the ten.

The computer, as West, now makes the excellent shift to the ten of diamonds. You play the jack from dummy, and East plays the queen. East continues with the king of diamonds, which you should duck. East properly now drives out the ace of diamonds.

The defense now has four tricks. You must hope that the ace of spades and the thirteenth diamond are in different hands or that the computer mis-defends. Thus, at trick 9, your best try is to lead a low spade from the dummy, hoping that East, if he has both the ace and the thirteenth diamond, will play low. East, however, rises with the ace of spades and cashes the 9 of diamonds to defeat the contract.

The complete deal and the play of the cards just discussed are:

NORTH
(Dummy)
♠ QT4
♥ 42
♦ AJ4
♣ A8543

COMPUTER WEST
♠ 872
♥ JT53
♦ T73
♣ JT2

COMPUTER EAST
♠ AJ63
♥ K7
♦ KQ98
♣ Q96

SOUTH
(Declarer)
♠ K95
♥ AQ986
♦ 652
♣ K7

	West	North	East	South
Trick 1	JH	2H	KH	AH
2	2C	3C	6C	KC
3	TC	AC	9C	7C
4	JC	4C	QC	2D
5	TH	4H	7H	9H
6	TD	JD	QD	5D
7	3D	4D	KD	6D
8	7D	AD	8D	5S
9	2S	4S	AS	9S
10	3H	5C	9D	6H
11	7S	TS	3S	KS
12	5H	8C	6S	QH
13	8S	QS	JS	8H

Contract: 2 notrump

Tricks N-S: 7 Tricks E-W: 6

I have a few comments on the new Chess Champion Super System III produced by Tryom Inc. It is a very attractively designed and packaged product. The basic master unit, which does the "thinking," is available by itself. With this unit you may play chess against the computer using your own chessboard. However, you may add a LCD chess board which displays the board position to the system.

Other peripheral units are also available for the master unit. There is an electronic printer which prints out each move of the game. On request, it will print out other information, such as captured pieces, taken back moves, or a printout of the board position at any point in the game. A memory module is available, which will store a board position for up to one year. Finally, a rechargeable power pack will power the master unit by itself for approximately 5 hours or the master unit with the LCD chess board for approximately 2.5 hours.

I've played a few games against the product and think anyone interested in playing chess against a computer will find it worthwhile. At the beginning of each game you choose the playing strength of the computer by setting a time interval for its moves. You may have it take anywhere from "0" seconds to 99 hours in making its moves. While the computer is thinking, this timer is displayed on the master unit as it counts down to zero. At any time you may ask the computer to make the best move it has found so far.

I'll report further on the Chess Champion Super System III next month. Meanwhile, I'll recommend putting it on your Christmas shopping list. Tryom Inc. is also producing an electronic bridge product, the Bridgemaster, which I described in my September column. Next month I'll discuss this product.

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(No special hardware needed)

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32K Cassette $29.95
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Instruction in opening leads against notrump and suit contracts, with QUIZMAKER to deal limitless random hands.

Available from your Apple Dealer or CompuBridge Division, Barclay Bridge, Port Chester, N.Y. 10573.

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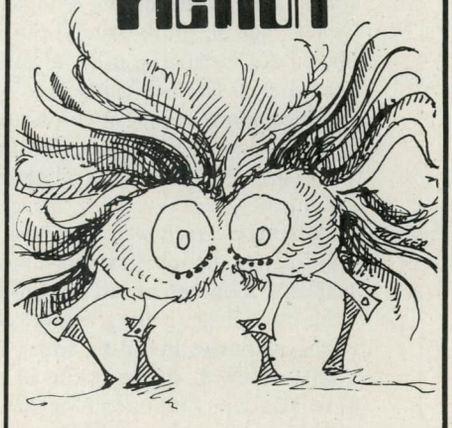
CIRCLE 31

Science Fiction



Turn your daydreams and visions of the future into cash. We're looking for short (500 to 2000 words) science fiction stories dealing with the future of microcomputers — their possible uses and their roles in society and in people's lives. Stories must be original and not published elsewhere. Submit your typed, double-spaced story to Personal Computing, 1050 Commonwealth Ave., Boston, MA 02215.

How to write for Personal Computing

You've written the programs we want to publish. You – the *Personal Computing* readers – are using your computers in businesses, homes, offices and schools. Other readers, just as software-hungry as you, are eager to try out your programs, your applications and your techniques. So why not share what you've done by submitting an article to *PC?*

It's easier than you might think. Remember: we're more interested in practical programs and useful applications than in fancy prose. And our editorial staff stands ready to help with any problems you encounter in writing your article; just give us a call at (617) 232-5470.

Here are some handy guidelines to help you get started.

First, decide what kind of article you want to write. Do you have a *business program* that will help an executive, salesman, doctor, lawyer or shopkeeper function more efficiently? Think about how businesses can benefit from microcomputers – not only in the obvious areas of inventory, accounting and payroll, but in all departments and levels right up to the president's desk. Financial and marketing analysis, time management, planning, material handling, product design and cost accounting are areas ripe for creative programming.

How do you use your computer for *home and personal applications* in your living room, kitchen, study or den? Again, think beyond the obvious areas of checkbook balancing and budgeting (though these areas are far from exhausted) to other applications. Hobbies, home management, household inventory, gardening and landscaping, personal income and expense analysis, personal mailing lists and word processing are just a few ideas to spark your imagination.

What *education programs* have you written for children, adults, professionals, businessmen and teachers? Computers can not only teach children basic subjects such as spelling, math, geography, economics, civics, grammar, literature and science, but can help adults review or sharpen skills in these areas as well. How else can computers function in or out of the classroom to aid learning? To help teachers and administrators?

Are you proficient in some programming technique or special computer area you could explain in a *tutorial article*? How do you save time, money, computer memory or frustration when programming or using your computer? Others can benefit from the same techniques you use.

Computer games, history, humor and *fiction* are other areas rich in article and story ideas.

Your second step is to write the text of the article. Remember, readers aren't familiar with your program. So explain in detail what the program does and how it does it. Include here the overall structure of your program as well as any special algorithms or routines you've used. Give suggestions for modifying or expanding the program for other applications, other businesses or other situations.

Third, prepare your supporting documentation. Include at least a program listing and one or two sample runs, and add program notes to explain any special commands used or other special features of your program. Use charts, diagrams, figures and photos if they help explain your program and its use.

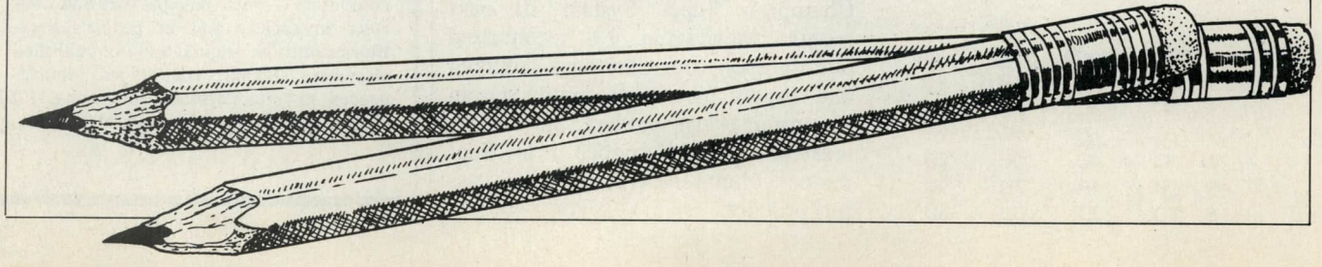
Finally, mail your manuscript. Address it to: Don Wood, Managing Editor, Personal Computing Magazine, 1050 Commonwealth Ave., Boston, MA 02215.

A few suggestions: All submissions should be original, typed (*not* all CAPS), double-spaced and neat. Please include your name and address on the first page of the article and enclose a self-addressed, stamped envelope for return of material.

Since we photograph program listings and sample runs exactly as you send them to us for publication in the magazine, please be sure you use a fresh ribbon for computer printouts. If you don't have a printer, you can type your listings single spaced; but again, be sure you use a new ribbon. (If your program relies heavily on graphics, you can photograph sample runs from your CRT. But take care to avoid distortion due to the curve of the screen.)

Feel free to call us if you have any questions or want to discuss specific ideas. We can give you feedback and suggest appropriate slants and approaches.

We're always looking for fresh, original ideas. While these guidelines will help you in preparing material for *Personal Computing*, don't assume we don't want your idea just because it's not mentioned here. Let us and our readers know what *you're* doing with your computer.



WHAT'S COMING UP

SOFTWARE

Minimax Data Communications Capability

An asynchronous communications program, called Terminal, is available for the Minimax, a turnkey microcomputer for small business, said Computhink officials.

By using this data communications option in conjunction with the Minimax, the businessperson can access, retrieve and manipulate data residing in other systems at remote locations, according to the company.

If a retailer has multiple locations, the head office could receive pertinent information — the day's sales, cash information, inventory adjustments — directly over the telephone line. The information from each location could then be combined and processed by the Minimax system at the head office, the company said.

Terminal is a software option to the Minimax, a computer system that includes both high capacity hardware and business software programs. The standard programs that are included in the system price are: Accounts Receivable, Accounts Payable, General Ledger, Payroll and Pagemate, a data base management program.

Terminal is Bell 103 asynchronous protocol compatible through the use of a modem or acoustic coupler. This allows the Minimax to communicate with terminals, computers, low-speed data networks or another Minimax. Terminal enables the user both to retrieve and to send data messages and computer programs. When communicating with another Minimax, the user can even receive and transmit executable program codes.

All communications can be immediately recorded on Minimax's disk system for future processing which, according to Magee, can substantially reduce the cost of telephone connect time.

One of the key features of Terminal is that it provides the ability to select the baud rate, allowing the user to communicate with a variety of computer networks, terminals and data bases, the company said. Terminal offers six selectable baud rates, ranging from 50 to 300.

The capability of a selectable baud rate enables users to access information such as the latest stock market prices, UPI news and airline, hotel and car rental reservation services. They can even use Terminal as part of an electronic mail system.

Other flexibilities with Terminal's configuration include a choice of either seven or eight bits per character, a selection of odd, even or no parity type and a choice of 1, 1.5 or 2-stop bits. The users can also choose either full or half duplex, which gives Terminal the capability of full error checking.

The standard Minimax system, including complete business applications software, and hardware consisting of a CPU with 108K bytes of internal memory, a video display terminal, a standard keyboard and a choice of floppy disk systems with capacities ranging from 800K to 4,8 megabytes, has a suggested retail price of under $10,000. The Terminal option is priced at $645, including the modem.

For more information contact Stephen Magee, President, Computhink, 965 West Maude Avenue, Sunnyvale, CA 94086; (408) 245-4033. *Circle No. 101*

Legal Software for TRS-80

The Lawtech Company is selling programs of interest to non-lawyers as well as lawyers.

Intoxitron estimates a subject's blood alcohol content and degree of intoxication based on sex, weight, number and strength of drinks, and time since the first drink. An occasion can be analyzed or a general chart may be produced. A printer is optional. Intoxitron is fun at parties and provides a valuable check of intoxication tests used by law-enforcement officials, the company said.

Inc. could pay for itself (and the computer) by minimizing attorney error in the complex but common area of corporate cumulative voting provisions, the company said. Inc. explains cumulative voting, performs all calculations necessary to understand and allocate shareholder voting power, and contains a checklist of pitfalls and bibliography. Non-lawyers should consult legal counsel.

These programs were written by a lawyer. Each requires a 16K (or larger) TRS-80 with Level II Basic and costs $15 plus $1 for postage and handling. Both programs are $25, which includes postage and handling. For more information contact The Lawtech Co., P.O. Box 1523, La Grande, OR 97850. *Circle No. 102*

Commercial Mailer Software Program Stores Up To 30,000 Names Per List

Stonehenge Computer Company has developed a program called Commercial Mailer which has a capacity of 30,000 names per mailing list.

Written in Applesoft for the Apple/Corvus system, Commercial Mailer can handle an unlimited number of lists, each with a 30,000 capacity for a 6 line record, which is fully adaptable to your format, the company said.

Commercial Mailer is menu driven with such features as create list, select, display, report, maintain by zip or alphabetical order, find entry, browse, change, add, delete, search and utility/code field. Lists can be located anywhere on a disk, and the system can produce 1UP, 2UP, 3UP or 4UP Cheshire or pressure sensitive labels.

Additionally, the Commercial Mailer is fully prompting and comes with a detailed user manual. Required is a 48K Apple, 80 or 132 column printer and the Corvus 11AP Hard Disk. Optional is the Corvus Mirror and Constellation.

This program is available for $250 plus $3 shipping. Additional information is available from Stonehenge Computer Company, 89 Summit Ave., Summit, NJ; (201) 277-1020. *Circle No. 103*

Automated Spelling Word Dictionary System for CP/M Users

Key Bits Inc., has announced an automated spelling dictionary system called WordSearch. The WordSearch utility can efficiently provide you with the assurance that your written material will be produced free of misspelled words, the company said.

WordSearch is easy to learn and is used for searching documents, letters, manuals or any text material for the occurrence of words that have not previously been validated and placed in the main word library, the company said. These "unknown" words are identified by WordSearch as both a list of words or in context of the original text. Words found not to be in the library by WordSearch, but identified by you to be valid, are then added to the library at your command. While WordSearch has tremendous flexibility and capability, usage is extremely simple with the built-in default parameter assignments, the company said. These defaults can be overridden at any time to achieve the desired result. Word libraries can be easily tailored to handle special vocabulary requirements.

WordSearch is distributed on an 8" single density diskette with a complete user manual, an initial spelling word dictionary, and a demonstration package for $195. Additional information can be obtained by contacting Key Bits Inc., P.O. Box 592293, Miami, FL 33159. *Circle No. 104*

Customized Accounting System

Customized accounting systems including payables, receivables, inventory control and order entry, are provided through a new data management system from Lifeboat Associates. The new Configurable Business System (CBS Version 1.1), may be set up without using any programming language.

CBS can be used to define an application, such as an inventory control system, by specifying master files to describe the inventory, customer and vendor files. Transaction files are used to describe specific activities, i.e., purchases, sales and so forth.

A simple procedure provided by the entry program is used to enter customer, vendor, inventory, sales and purchasing information, the company said. After data entry is completed, an update program processes the transactions against the master files, updating account balances and inventory data.

CBS features a report generator for producing invoice, purchase orders, re-order reports, special reports and mailing labels.

The enhanced CBS Version 1.1 improvements include the capability to produce and read ASCII data files, thus permitting external program access to file data for specialized processing and/or preparing input data for updating CBS files.

Other new features include: menu chaining to enable you to create a "menu of menus" that permits one main entry point to be used for access to all application routines and batched updating which enables you to update a master data base and create new records in master files, including updating of external data files.

Further improvements of CBS are: an "assumed" decimal point field attribute; a master file's primary key that may now be specified as only the first few characters of the key field; faster development of application systems by providing access to CBS programs from the Designer Module via the new Command Level Processor; file queries by secondary keys; and end-user modification of report selection criteria permits the application user to specify which records are to be selected for report runs.

CBS requires a 48K CP/M compatible system. A disk system with at least 200K bytes of mass storage is recommended. No support languages are required.

For clarity, the user's guide gives a step-by-step example for creating and executing an application. Lifeboat Associates supplies CBS on most disk formats with full documentation. CBS Version 1.1 costs $395 with $25 for updates. Documentation alone is $40. For more information contact Lifeboat Associates, 1651 Third Ave., New York, NY 10028; (212) 860-0300. *Circle No. 105*

Cash Register Software for the TRS-80

Computer Consultants has introduced TRS-POS which allows TRS-80 Level II microcomputer to function as a point of sale terminal system. The software was developed after over a year of research into dedicated point of sale systems, the company said.

Key features of TRS-POS are its English operator prompting and error messages, an electronic memo pad, tracking salesman's commissions and inventory. You can select from several modes of operation and customize the system to your needs by answering simple questions at powerup, the company said.

TRS-POS requires no special peripherals to operate, however, a printer is recommended. The 16K TRS-POS system allows for 50 user definable departments and a 32K system allows for a 110 departments.

Prices start at $100. For more information contact Computer Consultants, POS Software Dept., 310-312 Hoyt St., Dunkirk, NY 14048. *Circle No. 106*

Portfolio Management System

Omni Software Systems, Inc., has released a stock investors portfolio management system called The Stock Manager, a collection of programs and subroutines to help with your investment portfolio of a few stocks or as many as 300 stocks.

Designed for the non-computer expert, all programs are self-prompting and are extremely easy to use, the company said. A printer, while a great convenience, is not required in most programs as you have the option of sending the output to the screen or the printer.

There are over 24 items of information for each stock including the name of the stock, ticker symbol, broker name, amount of commission paid, Value Line ratings for timeli-

ness, safety and beta rating and many more. The Stock Manager makes several calculations such as the average cost per share, total cost, total dividends received and the automatic calculation of long or short term gain or loss for income tax purposes. Provision is also made for reinvested dividends and additional purchases of the same stock.

Error checking is used extensively and a complete inquiry feature is used. All entries are posted immediately, thereby eliminating long or complicated sorts. Errors are easily corrected and changes easily made. The subroutine to compute the current value and tax status of your portfolio can pay for the system many times over, the company said.

The Stock Manager may also be used for bonds or commodities. This collection of programs can be of benefit to the individual investor, investment clubs, stock brokers and pension funds or any other organization that has an investment portfolio, the company said. All programs have been thoroughly tested and have been in actual use for some time. Complete documentation is provided.

Written in North Star Basic, the system requires 32K of RAM and a one or two disk drive system using 5 1/4″ single or double density disks. The price of the complete system is $70. Documentation alone is $10. For additional information contact Omni Software Systems, Inc., 146 North Broad St., Griffith, IN 46319; (219) 924-3522. *Circle No. 107*

TRS-80 Model I and Model III Disk Editor Assembler

EDAS 3.4, a text editor and assembler for the TRS-80 Models I and III has just been released by Misosys. The editor provides text editing facilities for the modification of alphanumeric text files in RAM.

Command syntax is identical to the Basic editor. EDAS also provides text block move, global change with line range directive, string search and line scroll capabilities. All commands and Z-80 source can be entered in lower case. Intelligent conversion to upper case is implemented.

The assembler portion of EDAS facilitates the translation of Z-80 symbolic language from RAM or disk into machine executable code. Assembler options provide the ability to suppress source and symbol table listings, suppress object code generation and output the assembled code directly to memory or disk.

The assembler also features direct assembly from disk, 14-character symbolic labels, concatenated constant declarations for octal, decimal, hexadecimal, binary and string constants, paged listing with PAGE, TITLE, SUBTTL and SPACE pseudo-ops, sorted symbol table and direct assembly to memory.

DOS command functions, DIR, FREE, KILL and LIST, are directly executable from with in EDAS. This feature gives you the capability of displaying directories, listing or killing files and determining drive capacity.

EDAS is available for $79 plus $3 shipping and handling which includes a 72-page reference manual. For more information contact Misosys, 5904 Edgehill Dr., Alexandria, VA 22303; (703) 960-2998. *Circle No. 108*

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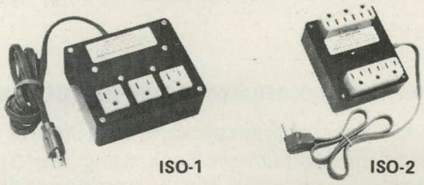

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CIRCLE 33

Apple II Based Appointment Management System

The Applointments program package from Andent allows you to manage an appointment book using the Apple II computer. Appointments may be viewed directly on the monitor screen or listed on a printer, if one is available. One day of appointments is visible on the screen which may be scrolled up or down to view the entire day.

Minimum requirements are an Apple II computer with 48K RAM, Applesoft firmware card and one disk drive. A printer is optional.

The Applointments system provides user definable starting and ending times, appointment separations and number of characters (maximum) allowed per appointment name. Adding and deleting appointments for multiple appointment slots are also system features. It can jump to any specified day in the appointment book, search by name (or partial name) for an appointee over any specified region of days in the book, scroll appointment screen up or down and move through the appointment book one day at a time, forwards or backwards. You can also activate and deactivate dates in the book at any time, add entire groups of appointments to a single day all at once, show which dates are active in the book, erase all appointments over a specified time in a given day and enter and automatically display a comment on any day in the book.

Cost is $60. For more information contact Andent, 1000 North Ave., Waukegan, IL 60085, (312) 244-0292. *Circle No. 109*

Medical Office Management System for Apple

Charles Mann & Associates, Micro Software Division, has announced a software applications package for physicians on the Apple computer. The package, called "Medical Office Mangement", provides the medical office with an easy to use system which maintains patient general information files, the total office's appointment schedule, maintains and prints the daily transactions log, prints procedure by procedure management reports, prepares and prints private patient bills, and prepares insurance claim forms, the company said.

The system maintains 10,000 active patients and can schedule up to 19,000 current and future appointments. The system can be expanded to handle multiples of 10,000 active patients in a clinic setting and can provide an appointment horizon as long as 40 months. It can handle up to about 190 patients per physician a day with up to 250 transactions.

The billing system includes a daily transactions journal or log which includes full reporting by patient by procedure. The daily report includes such management information as revenue per procedure and time spent per procedure. It also reports daily payments on account, mail payments received, cash in, credit card usage, third party payments received by patient and bank deposits made. The system puts out bills for patients having a "private only" status and for those having a "private and third party" status. It allows for monthly (or more frequent) preparation of third party claims forms and maintains and bills past due balances and prepares monthly reports suitable for collections follow up. The monthly report reports current, 30-60 day, and 60-day balances by patient and by insurance carrier.

The system prints appointment labels for appointment cards, appointment reminders and appointment changes. Active elements allow interim printing of patient account status reports, procedure lists, patient charge input forms, carrier outstanding balance reports, patient file folder labels and daily appointment schedules. The system will prepare copies of such reports as procedures performed for patient medical history files.

An online HELP function is included in addition to extensive documentation and operating manuals. The system will "remodel" itself for many different operating conditions and hardware using an exclusive automatic program modification system. The system requires either two or three disk drives, a 130 column printer, and a 48K Apple Computer with either the Language System or Applesoft in ROM.

The system is available from any of CMA's 650 dealers world-wide through January 15, 1980 for the introductory price of $359.95. The documentation alone is also available for $25 prepaid from Charles Mann & Associates, Micro Software Division, 7594 San Remo Trail, Yucca Valley, CA 92284; (714) 365-9718. *Circle No. 110*

Solar Energy Game

A new computer game called Sunmax can provide entertainment and education for children and adults.

Each player in turn is given a city selected at random from over 200 cities around the world. He or she is also given a solar energy job such as home heating, hot water heating or home air conditioning. The player guesses the tilt (in degrees) of the solar collector which will maximize the amount of solar energy collected. After each guess, the player is given the following feedback: the latitude of the location, the amount the player's estimated angle was in error and the total amount of error he or she made on all turns combined. The winner is the person with the lowest total error score.

Sunmax can be played by one to nine people. Players will learn a lot about geography as well as solar energy. Sunmax is written in TRS-80 Level II Basic and requires 16K of memory.

Sunmax costs $8. For more information contact Solartek, P.O. Box 298, Guilderland, NY 12084. *Circle No. 111*

Disk Operating System for the Apple II

Apparat, Inc., announced the introduction of a fully professional disk operating system for the Apple II. The result of two years of extensive development, Apex provides you with a complete program development and file management system. A comprehensive command set allows you to perform almost any imaginable disk operation, yet a powerful default structure eliminates the typing of frequently used file names and complex command strings.

Apex features a command structure similar to CPM and

main frame operating systems. It contains 20 command words, plus the ability to treat external programs as transient commands to the operating system. Software switches are also available to modify the effect of the basic commands. The system also has a scrolling editor compatible with Videx 80 character card. Simple communication channels are provided between Apex and your program.

Apex is capable of handling 5 inch, 8 inch and hard disks on the same system. It is fully functional on both single and multi-drive systems and includes utilities for single or multi-drive file copy. Safety features to protect against accidental data loss include backup files, a backup directory, read-after-write and size limit checks. Automatic default structure eliminates tedious typing by setting up command strings, file names and extensions.

The basic Apex package includes all of the necessary tools for a complete assembly language development system; a high speed two pass resident assembler and a powerful macro editor. The assembler generates an alphabetized symbol table, a cross reference table and is capable of assembling over 1900 lines per minute. The editor has 18 commands, 10 text buffers and is capable of performing the most complex editing tasks.

The complete Apex package comes with operating system, assembler, editor and nearly 200 pages of comprehensive documentation for $99. Also available to run under Apex are a Focal emulation line interpreter for $59 and XPLO, a block sturctured system language resembling Pascal for $79. For more information contact Apparat, Inc., 4401 S. Tamarack Pkwy., Denver, CO 80237; (303) 741-1778. *Circle No. 112*

Library of Software For North Star Users

The CP/M Users Group announced the release of its library of software on diskettes formatted for the North Star Horizon and North Star Micro Disk System.

Software in this library is now available on a format readable by users of double density CP/M version 1.4, double density CP/M version 2.2 and quad capacity CP/M version 2.2.

The 42 volumes in the exchange library, previously available only on 8″ IBM single density CP/M format, has now been transferred volume by volume to one or two diskettes per volume, depending upon the amount of software in each volume, the group said.

A catalog of the software, for users of both the 8″ single density and North Star formats, is available from the CP/M Users Group for $6 in the U.S., Canada and Mexico, $11 abroad.

The software is available for a media and handling charge of $8 per volume on 8″ diskette, $8 or $12 per volume on North Star format (depending upon whether one or two diskettes are required) in the U.S., Canada and Mexico. Overseas users may obtain the volumes for $12 and $16 respectviely. All orders must be prepaid in U.S. currency. For more information contact CP/M Users Group, 1651 Third Ave., New York, NY 10028. *Circle No. 113*

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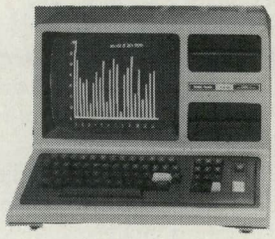

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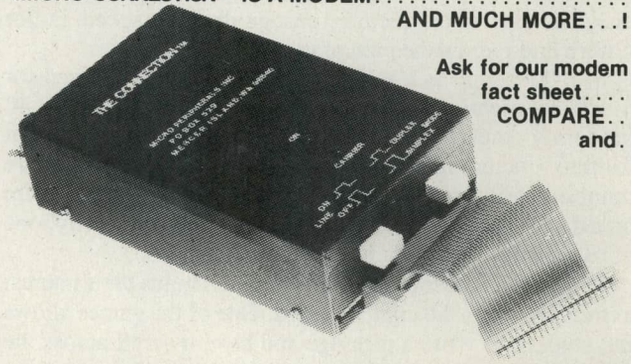

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CIRCLE 35

Payroll System for Apple

LMA, Inc. has announced the release of Version V of their Payroll System for use on Apple Plus microcomputers. The system, which was field tested for 18 months at small businesses in California, New York City, Indiana and Florida, comes in two configurations — single-disk drive and dual-disk drive, and effectively performs full payroll functions for up to 45 and 150 employees respectively, the company said.

The LMA Payroll system features user-changeable tax rates, complete source listings in Basic, fully documented file layouts for customization and a menu-drvien control system.

The system has the ability to handle payrolls in which employees have different frequencies of pay, multiple-states and complex city taxes, the company said. These features as well as the manner in which you can handle full personnel records, time card entries with overtime, 941A federal listings, W-2 forms, paychecks and paylistings, and summary reports, were incorporated into the system with the assistance of small business owners, the company said.

The LMA Payroll System is available at local computer stores for a suggested retail price of $299. For more information contact LMA, Inc., 684 Haddon Ave., Collingswood, NJ 08108; (609) 854-1333. *Circle No. 115*

Sound Programs for TRS-80

The Innovative Penguin announced two sound programs for the TRS-80 Model I, Sketch-A-Sound and Mul-Ti-Sound.

Sketch-A-Sound allows you to participate in a new art form: drawing pictures and making music simultaneously, the company said. You draw the picture, the computer adds the music and remembers the order you used when drawing the picture. The program allows non-continuous lines and error correction. It also features repeating keys and the capabilities to store and retrieve programs on cassette or diskette, add to the picture, change drawing speed and/or timbre and redraw the picture in memory.

Mul-Ti-Sound is a multiplication drill tape designed for fourth to eighth grade students. The student is given 40 randomly selected multiplication problems. Four different formats (including story problems) are used. Responses are randomly reinforced with seven different routines. Inputs are timed and if at least 37 problems are answered correctly, one of two games is played. If not, the drill restarts.

Tests with students show this program holds their interest extremely well, the company said. One of the games allows the student to write a message and have it scroll across the screen in giant letters. The program comes with instructions for accessing this routine and having the computer display a continuously moving message.

Both programs require 16K Level II or 32K DOS. Both feature imbedded machine language sound routines and imbedded high-speed graphics. Features are self-relocating which allows the same program to operate in Level II or DOS. Programs are available on cassette for $14.95 each, or both on diskette for $24.95. All are shipped postage prepaid. For more information contact The Innovative Penguin, 2320 Hampton Dr., Harvey, LA 70058. *Circle No. 116*

Aid for Classroom Teacher

T.E.S.T., an aid for the classroom teacher, is now available from TYC Software. T.E.S.T. contains two programs; a Maintenance Program and a Test and Drill Program.

The Maintenance Program allows you to create a test of up to 35 questions and save it on cassette for use today or whenever it is needed. Load in the Maintenance Program and follow the simple directions given; no programming knowledge is necessary. To produce a test, a question is typed on any topic (up to 240 characters), enter the type of question — True of False, Multiple Choice or Completion — and the correct answer. When finished, the test is saved on cassette for future use.

Test and Drill is a utility program designed to accept the test prepared by the Maintenance Program. With the Test and Drill Program students can either use the questions as a review, take a scored test, or the teacher can have the computer prepare a printed test or worksheet with answer key.

With T.E.S.T. you can build a library of tests and drills simply and cheaply, the company said. Perfect for a resource room or the classroom teacher. Two programs and complete manual are included for a TRS-80 Level II 16K, priced at $11.95.

For more information contact TYC Software, 40 Stuyvesant Manor, Geneseo, NY 14454. *Circle No. 117*

Strategy Games for Apple

Strategic Simulations Inc., has introduced two new strategy games, Computer Napoleonics and Computer Quarterback.

The first, Computer Napoleonics: the Battle of Waterloo ($59.95), is a division scale game that recreates Napoleon's famous last battle against the Duke of Wellington. Accurate historical setup of French and Prusso-Anglo-Allied cavalry, artillery and infantry units serves as the starting point in this two-player or computer-as-opponent simulation of Napoleonic warfare.

The second, Computer Quarterback ($39.95), is a real-time strategy football game. In the basic Semi-Pro version, you may play against either the computer or a second player using 18 offensive and 14 defensive plays as your weapons. The ability to call an audible and the importance of the clock are crucial ingredients that make this a realistic simulation of football. In the advanced Pro version, you draft a team that meets your playing style and specifications and then utilize 36 offenses and 24 defenses to control the gridiron.

Both games are available on disk for the Apple with 48K memory and Applesoft Basic. For information contact Strategic Inc., 450 San Antonio Rd., Suite 62, Palo Alto, CA 94306. *Circle No. 118*

PERIPHERALS

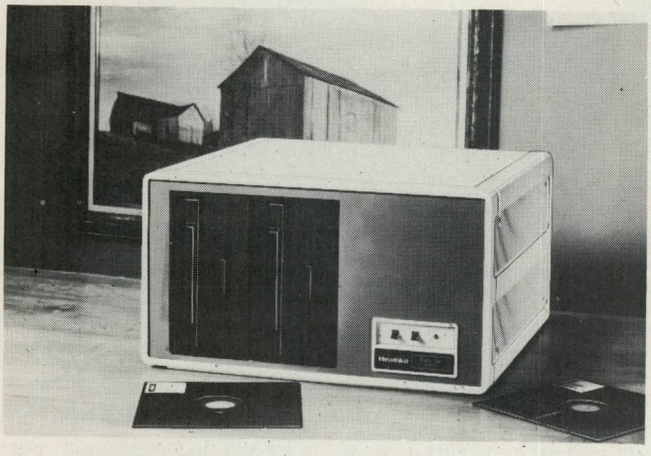
2-Megabyte Floppy Disk System

Heath Company introduced its first 8-inch, dual-sided, dual-density floppy disk system, the H-47, designed for use with Heath's H-8 and H-89 All-In-One Microcomputers. It provides up to 2½ million bytes of on-line data storage — more than 12 times the current maximum capability, the company said.

Featuring two 8″ disk drives as standard equipment, the H-47 Floppy Disk System is fully compatible with current Heath 5¼″ Disk Systems. Both Heath's HDOS Operating System and Digital Research's CP/M will be supported. Each will permit transfer of data between 5¼″ and 8″ disks.

The H-47 offers an average access time of only 176 milliseconds (including settling) — less than half of the 490 millisecond average access time of the disk systems currently available for the H-8 and H-89 computers, Heath said.

The Heath Disk Operating System (HDOS) and the Standard CP/M Operating System, as well as other software, will be designed especially for the H-47's 8-inch disk format. Most programs written for a standard CP/M system — even on other computers — will operate on Heath's All-In-One and H-8 Computers with the addition of the CP/M system, according to a Heath spokesperson.



Disk interface boards, designed especially for the H-47, are offered separately. The WH-8-47 Disk Controller Board, sold in fully assembled form for $235, provides interfacing between the H-8 Computer and the H-47, as well as two serial I/O ports, so a terminal and printer can be interfaced through the same board. The fully assembled Z-89-47 Disk Controller Board interfaces the Heath All-In-One Computer with the H-47, priced at $195.

A 40-conductor flat cable is included with the H-47, to connect the floppy disk system with the H-8 and H-89 interfaces. Panel switches are included and allow write-protection for each drive, if desired. Price is $2595. For more information contact Heath Company, Dept 350-440, Benton Harbor, MI 49022. *Circle No. 119*

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'Tiny' Pascal runs on any 16K Level II system, includes the programming structuring capabilities of full Pascal, but not data structuring.

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Tape 3, People's Pascal I $19.95

Tape 6P PASPATCH allows old Pascal II (no longer available) to use printer, floppy disk $15.00

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CIRCLE 36

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PROGRAMMER PLUS - A 16 lesson course in Applesoft II on two full disks or super-load tape which will teach you all you need to know to program in BASIC. Lessons cover all string, math and logical operations necessary for personal, scientific or business applications. Special units teach graphics and sound to add a little 'Apple Class' to your programs. Applesoft II. Item 35. Tape. $24.95. Disc. $34.95.

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CIRCLE 37

Create Advanced Computer Graphics

VersaWriter, a drawing tablet from Peripherals Plus, allows you to create high-resolution multicolor images on an Apple Computer.

VersaWriter lets Apple computer users draw freehand or trace over existing images with a simple pantograph with magnifying crosshairs. Using a menu that appears on the Apple's TV screen, the VersaWriter user can select one of six colors for lines (or 106 colors for fill-in areas), "brush" size (width of the drawing line) and magnification size. To draw straight lines, you touch two points and the computer will automatically connect them. Images can be stored on disk and called up later. They can be moved anywhere on the screen, rotated, shrunk, enlarged or put into a sequence of images for high-resolution limited animation and sound effects. Resolution is 280 × 160 pixels (points on the TV screen).

VersaWriter allows you to store any image on disk and call it up later, place it anywhere on the screen, change its size, rotate it, modify it, add to it or incorporate it in another picture. An office planner, for example, could create standard symbols for desks, walls and so forth, and use them to create a variety of office or home layouts. Or a computer-aided instruction course designer or film producer could create a set of cartoon characters that could be used in various scenes.

VersaWriter comes with two disks which include a set of common electronic schematic and logic symbols to allow designers to create electronic circuit and logic diagrams. Versawriter software also includes: Color Fill, Textwriter, Area/Distance and Shape Tables.

In Color Fill the computer automatically fills in figures, with a selection of 106 colors. This number of colors was previously available only on expensive computer graphics systems. The figures can also be reversed (white on black or black on white).

Textwriter lets you add text (letters and numbers) to an image for titling and other purposes. Upper and lower case, color, size, starting point, and direction are selectable. English and Greek alphabets are included.

Area/Distance calculates distance or area as you trace over a map route or other image. This is handy for planning a trip or laying out a plot of land, for example, the company said.

Once stored on disk, images created by VersaWriter can be called and used in any program. By storing a sequence of images with small changes, the user can achieve computer animation. VersaWriter uses the standard Apple computer "shape tables," which allows for compatibility with other programs.

Apple programmers also have the option of calling the VersaWriter program itself, which means VersaWriter can be used as an input device, for example with a form or medical chart, rather than typing in the data.

VersaWriter comes with two disks that hold the graphic programs and 8 1/2″ × 11″ drawing surface and plastic overlay. A 32K or larger Apple computer with disk and Applesoft in ROM, or Apple II Plus is required. VersaWriter connects to the paddle port on the Apple, so an extra slot on the computer is not required.

VersaWriter is available for immediate delivery for $252 postpaid in the continental U.S. from Peripherals Plus, 119 Maple Ave., Morristown NJ 07960; (800) 631-8112, in NJ, (201) 267-4558. *Circle No. 153*

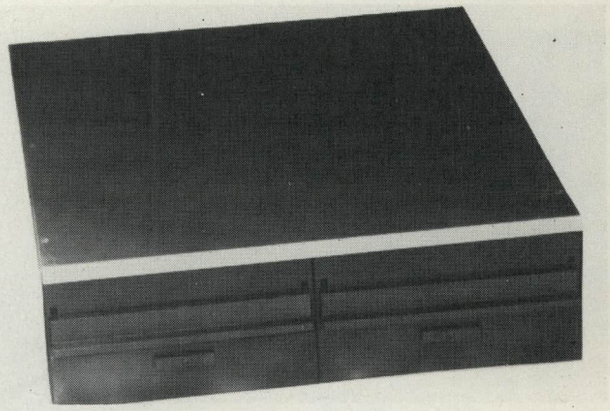
8-Inch Disk Drive for TRS-80, Apple and S-100

Matchless Systems has announced off-the-shelf availability of the latest addition to its growing product line — the MS-800. This new 8-inch disk drive is compatible with TRS-80 Models I and II, Apple II and S-100 systems.

The MS-800 has a capacity of 77 tracks, 26 sectors per track, 128 bytes per sector — for a total of 256,256 bytes. This is 2.2 times the capacity of the Apple 5 1/4-inch drive. The data transfer rate is 256,000 bits per second, 1.6 times the Apple 5 1/4-inch transfer rate. This Matchless product also has a track-to-track access time of only 10 ms., the company said.

The MS-800 does not obsolete mini-disks. Instead, it expands your system to greater capabilities, the company said. The use of four of these drives, for example, provides a storage capacity of over one million bytes on an Apple or two Megabytes on TRS-80 Model II. The drives are powered independently of the systems with which they're used.

Every drive is completely assembled and tested. Matchless is currently offering immediate delivery on individual units. The price range of $995-$1595 includes all hardware



(such as controller and CP/M by Digital Research depending on system configuration), software and documentation. For more information contact Bob Lahm, Matchless Systems, 18444 South Broadway, Gardena, CA 90248; (213) 327-1010. *Circle No. 154*

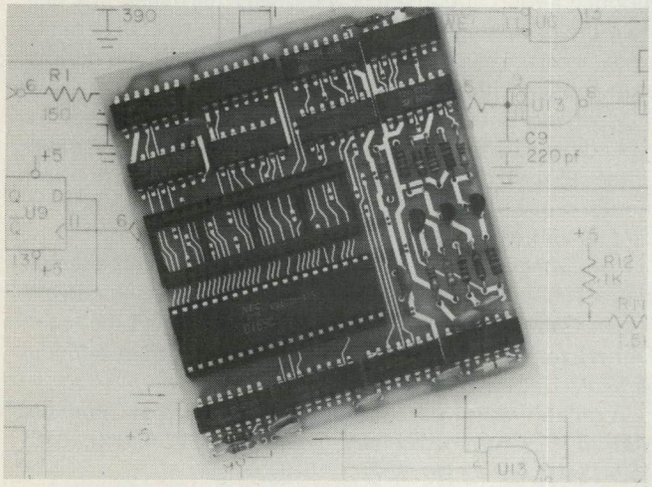
Double-Density Adapter for TRS-80

Percom Data Company announced that the company has begun production of a double-density disk controller adapter for TRS-80 Model I computers. Using the Doubler, as it is called, a TRS-80 computer owner can store almost four times more data on a five-inch disk — up to 354 formatted Kbytes — than can be stored without the Doubler. By comparison, standard eight-inch floppy disks store 256 Kbytes.

The Doubler adapter plugs into the controller chip socket of the computer expansion interface. No circuit modifications are required.

Price for the Doubler, DBLDOS, a TRSDOS compatible double-density operating system, and a utility for converting TRSDOS, Percom OS-80 and other single-density files and programs into double-density format, is $219.95.

Doubler increases mini-disk formatted storage capacity from 1-1/2 times to almost 4 times the capacity of a Tandy mini-diskette, depending on the type of drive and disk operating system used. It also has a data read/write rate which is twice as fast as single-density read/write, the company said. The adapter works with standard 5″ disk drives rated for double-density storage and reads, writes and formats either single- or double-density disks.



Proprietary design allows you to continue to run TRSDOS, NEWDOS and Percom OS-80 single-density programs without modifying either software or hardware. DBLDOS, the double-density disk operation system, is fully TRSDOS compatible. Storage is half again greater under DBLDOS operation than under TRSDOS operating.

A utility on the DBLDOS minidiskette converts files and programs from single- to double-density format and vice versa. The Doubler adapter plugs into the disk controller IC socket of the host controller. No strapping, trace cutting or other permanent circuit modifications are required, the company said. The Doubler includes high performance data separator and write precompensation circuits to ensure reliable disk read operation.

An optional double-density version of the Percom OS-80 disk operating system is also available for the Doubler. Called OS-80D, it increases formatted data storage by 80% over TRSDOS storage. The OS-80D operating system sells for $49.95 and is provided on minidiskette along with a utility which converts single-density OS-80 software to double-density format.

The Doubler adapter, DBLDOS software and OS-80D software may be purchased direct from Percom. Orders may be paid by cashier's check, certified check, money order or COD, or charged to a VISA or Master Card account. For more information contact Percom Data Company, 211 N. Kirby, Garland, TX 75042; (800) 527-1592. *Circle No. 143*

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CIRCLE 41

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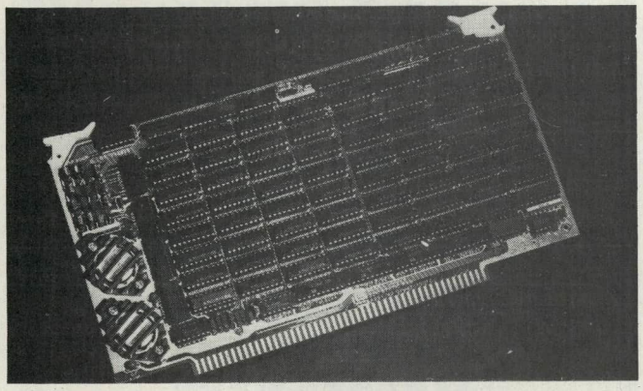
CIRCLE 42

Bank-Selectable 32K Static Memory Board

California Computer Systems' 2032 Static Memory Board provides 32K of memory for S-100 systems. Designed to meet a wide range of applications, the 2032 features a flexible bank select scheme for memory expansion up to 512K.

The 2032 is bank-selected when a bank byte indicating its bank is written to the bank port. Both the bank port address and the bank(s) in which the board will reside are jumper-selectable. The bank select scheme is compatible with Alpha-Micro, Cromemco and others.



The 32K of memory is divided into four 8K blocks which are independently jumper-addressable to any 8K boundary in 64K. Each 8K block can be made independent of bank selection, while bank-dependent memory can be jumpered to come up active on power-on and reset.

Further flexibility is provided by a jumper-selectable Phantom input, allowing byte-by-byte overlay of the 2032's memory, and an MWRITE input which allows front panel memory deposits. There are no DMA restrictions.

Available with 200, 300 or 450 nanosecond RAMs, the 2032 can operate at 4 MHz without wait states.

The 2032 Static Memory Board is guaranteed one year for parts and 90 days for labor. The board comes completely assembled, burned-in and tested for a suggested list price of $700.

For further information contact Marketing Department, California Computer Systems, 250 Caribbean, Sunnyvale, CA 94086; (408) 734-5811. *Circle No. 155*

Home Control Interface

Interface Technology's Micro Commander is a direct interface between your TRS-80 and the BSR, Ltd. X-10 system which lets you control lamps and applicances anywhere in your home wirelessly by push button command.

Micro Commander plugs directly into the TRS-80 cassette jack or any one bit TTL input and one bit TTL output port, the company said. The manual contains a 8080 source listing of the driver program and a 14K TRS-80 Basic Demo program.

Micro Commander comes assembled and tested ready to plug in. Price is $59.95. Basic program is also available on tape or disk for the TRS-80 for an additional $10 (please specify tape or disk when ordering). For more information contact Interface Technology, P.O. Box 383, Des Plaines, IL 60017; (312) 297-2265. *Circle No. 156*

Binary Video Digitizer for the Apple II

Computer Station offers a high speed binary video digitizer for the Apple II, the Dithertizer II. The peripheral board for the Apple II, utilizes a video camera with external sync to load the high resolution page of the Apple II with any image that can be captured with the video camera.

The Dithertizer II was designed as a frame grabber, DMA type, digitizer to require only one frame or 1/60th of a second to capture a binary image (140 nanoseconds per pixel).

Software is included to build dithered (psuedo gray scale via half tones) images from multiple binary images and to capture image intensity contours using image subtraction. The number of frames required to produce a dithered image is dependent on the dither matrix size. A 2×2 matrix requires 4 frames; a 4×4 matrix requires 16 frames. The software supplied allows you to select and change the matrix size and view the effects on the monitor. In addition to being able to adjust matrix size, you may also adjust contrast and density of the image with the game paddles.

Most inexpensive digitizers are of the column grabber type; these digitizers typically capture one column per video frame. Since the Apple II has 280 columns this type digitizer would require 280/60ths of a second (4-2/3 seconds) to capture an image.

The Dithertizer II requires a video camera with external sync. The Dithertizer II alone is priced at $300. The B&W Video Camera (Sanyo #VC 1610X) is $410 and the entire Dithertizer II Package Video camera (Sanyo-Model # VC1610X) costs $650.

Available from your local dealer or direct from Computer Station, 12 Crossroads Plaza, Granite City, IL 62040; (618) 452-1860. *Circle No. 157*

Bell Compatible Modem

A new design 300 baud, Bell 103A compatible modem is offered as a replacement for the acoustic coupler. The Komda HS2500 modem provides reliability and quality normally associated with expensive, high speed, direct connect units, while maintaining multiline use and modest cost, the company said.

Several significant technical breakthroughs permit the new price-performance standard. Komda is the sole licensee under a pending patent application covering the concept of a handset "plug in" modem for use with modular telephones, the company said. An automatic signal level compensating circuit, in conjunction with a high quality active filter circuit, permits reliable operation under varying and marginal conditions, including long distance connections.

The HS2500 modem and various options are specifically designed for users desiring the highest quality and reliability with their low speed telecommunications equipment. Basic price is $285. For more information contact Komda Corp., 2500 Central Ave., Boulder, CO 80301; (303) 443-5910. *Circle No. 149*

Printer/Memory Expansion Module for TRS-80

Microtek, Inc. offers a printer/memory expansion module for the TRS-80 which can add 16K or 32K of dynamic RAM to your basic 16K machine without the expense of a full-blown expansion interface, the company said. The module also contains circuitry to drive Microtek's MT-80P dot matrix printer or any other Centronics-compatible printer.

The module is housed in a grey and black aluminum case, 3 × 7 × 16.5 inches, that sits under the CRT and is available in three configurations, all assembled and tested: The MT-32A, with no RAM priced at $99.50, the MT-32B, with 16K RAM costing $159.50 or the MT-32C, with 32K RAM for $199.50. Delivery is 2 to 4 weeks ARO.

For further information, contact Daniel Obed, Director of Marketing, Microtek, Inc., 9514 Chesapeake Dr., San Diego, CA 92123; (800) 841-1081, in CA, (714) 278-0630. *Circle No. 150*

Speech Recognition Unit

A speech recognition unit, making available speech input capability was introduced by Heuristics., Inc.

The Heuristics 7000 will interface with all RS-232-C terminals to provide advantages of hands-off operation.

The 7000 will enable those who don't type, or whose hands or eyes are busy with other tasks, to enter information into their computers directly.

Key to the Heuristics unit is a spectrum analyzer that uses state-of-the-art digital filtering and pattern matching techniques to analyze audio input. The output is automatically transferred to the computer in standard ASCII format.

The unit can be trained to recognize up to 64 words or phrases, each up to three seconds in length, and is compatible with common programming languages such as Fortran, Cobol, Pascal and Basic. It can be trained or re-trained as often as necessary to accept the voice or voices of the users, and will automatically reject utterances significantly different from the vocabulary set. Rejection levels can be adjusted.

The 7000 comes with a noise-cancelling headset microphone. Other microphones are available where headsets are inappropriate. Price is about $3000. For more information contact Heuristics, Inc., 1285 Hammerwood Ave., Sunnyvale, CA 94086; (408) 734-8532. *Circle No. 146*

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CIRCLE 43

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by David Mullich

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CIRCLE 44

SYSTEMS

Time-Sharing Service Provides Real-Time Stock and Options Prices

A new computer service, providing real-time data on a time-sharing basis, has been announced by Monchik-Weber Systems Consulting, Inc. The Monchik-Weber Data Sharing Service (DSS) provides subscribers with up-to-the-second data on securities, options and bonds.

The Data Sharing Service allows you to calculate your own historical volatilities, beta's and other reference values as well as develop and execute customized theoretical value formulas. Monchik-Weber provides storage for all subscriber data and algorithms and assures the complete protection of each subscriber's stored data, the company said. Real-time position updating, risk analysis, trade evaluation, spread, selection and ranking are also made possible with DSS.

The Data Sharing Service real-time data base is continuously updated by tickers from various exchanges including the NYSE, CBOE, AMEX and The European Options Exchange.

Subscribers to DSS provide their own desk-top terminals and required communications lines. Users access the data base via easy-to-use Fortran Call Subroutines. The DSS system itself operates at Monchik-Weber's Chicago computer center on a Data General Eclipse S/130.

Both static and dynamic information on stocks, bonds and options are provided by The Data Sharing Service data base. Included among the static information for stocks are the ticker symbol, the market the security was traded on, the expected dividend amounts and dates, and volatilities. The dynamic information includes the time or date of the last trade, the accumulated volume, the high, low and last prices, and the latest bid and ask prices. Similar information on bonds and options is also available through DSS, the company said.

The main thrust of The Data Sharing Service marketing effort is to investment managers, market technicians, arbitrage traders, market researchers and market surveillance professionals. The service is also available to users of home computers.

The Data Sharing Service allows users to move beyond the environment of Monchik-Weber's Option Monitor Service, a real-time options information service, by allowing them to implement their own customized algorithms, analysis and data displays. The monthly cost of DSS ranges between $1500 and $3000.

For more information contact The Monchik-Weber Corp., 111 John St., New York, NY 10038; (212) 962-2400.

Circle No. 135

Personal Computing

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Information Service Enhancements

CompuServe Incorporated announced three major developments concerning its information service to owners of personal computers and computer terminals. The developments are: daytime access to the CompuServe Information Service, commodity market information from Commodity News Service and continually updated stock prices from major exchanges.

Starting Nov. 1 the CompuServe Information Service offered daytime service through their computers or terminals. A full range of information will be offered, which includes news from regional news publications and international news services, food information from Better Homes and Garden magazine, the MicroQuote securities information system, electronic mail, a selection of computer games and other offerings as they become available. The cost is $22.50 per connect hour with a two-hour minimum charge each month. A limited number of daytime subscriptions will be available inititally. As CompuServe's proprietary communications network is expanded, additional subscriptions will be made available.

Commodity market information from Commodity News Services, Inc., (CNS) Kansas City, also became a new daytime offering starting this fall. Information includes pricing, news and commentary on energy, metals, financial instruments and agricultural commodities. CNS will also provide commentary and statistics on futures trading from the exchange floor with updates at 10-minute intervals during the trading day.

Another daytime offering is tabulation of each day's trading on the New York and American stock exchanges. Information will be continually updated throughout the trading day and will include weekly lists. Stocks, bonds and options, U.S. Treasury bills, bonds and notes, mutual funds and NASDAQ information could be included. This service is scheduled to start in early 1981.

CompuServe offers a full line of financial products to its commercial customers as well, including products such as the Standard & Poor's CompuStat database; Value, a security database; the Qubit financial database; Acquimerge, a product of Alcar Associates, for merger and acquisition analysis; and the Value Line database.

For more information contact CompuServe, 5000 Arlington Centre Blvd., Columbus, OH 43220; (614) 457-8600. *Circle No. 136*

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EQUIPMENT & SOFTWARE BARGAINS

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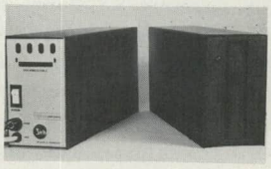

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The **SIRIUS 80+1** -a single sided, 40 track Drive. Offering 5 more tracks than the Radio Shack model, it cost $120 less. Formatted data storage is 102K/204K Bytes Single/Double Density.
SIRIUS 80+1 ..... **$379.95**

The **SIRIUS 80+2** is a dual sided, 80 track (40 per side) Disk Drive. It appears to the TRS-80* as TWO 40 track drives yet **COST LESS THAN HALF THE PRICE!** Even greater savings result since data is recorded on both sides of the media instead of only a single side. This unit may require the SS Standard cable. Formatted data storage is 204K/408K Bytes Single/Double Density.
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All 80+ Series Floppy Disk add-ons operate at 5ms track-to-track but are Expansion Interface limited to 12ms for the TRS-80*

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MPI 91 (Single Head/80 tracks)
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CIRCLE 40

COMPLEMENTS

Catalog Details Microcomputer Interfaces and Data Acquisition

A condensed, 20-page catalog by Connecticut microComputer, Inc., describes the firm's line of microcomputer interfaces and accessories.

According to the 1980 brochure, CmC interfaces allow Pet, Apple, TRS-80, Kim and other popular microcomputers to read and measure a variety of real world variables. Products covered in the literature, which also incorporates an order form and dealer listing, include the AIM16 A/D converter, BRS X-10 remote controller computer interface, addressable Pet printer adapter, Xpandr I multiple-input connector, Tempsens temperature probe and a variety of connectors.

For a free copy write 1980 Brochure, Connecticut microComputer, Inc., 34 Del Mar Dr., Brookfield, CT 06804; (203) 775-4595. *Circle No. 134*

Catalog of Software and Peripherals for the Apple II

A 102-page catalog has just been released by Rainbow Computing Inc., covering software and accessories for the Apple II computer.

Current Apple owners will find the catalog is an invaluable reference of its software, peripherals, manuals and other Apple II accouterments, the company said. This catalog shows the expandability and versatility of the Apple II computer system.

Included in Rainbow's Catalog are programs of all types including business applications, education and science, games, languages, demos and utilities. Also described are a wide assortment of accessories such as music and speech synthesis, appliance control, other interface cards, add-on memory, printers, and manuals.

This free catalog is available now from Rainbow Computing, 9719 Reseda Blvd., Northridge, CA 91324; (213) 349-5560. *Circle No. 137*

Word Processing Software

"All About Word Processing Software," a new report from Datapro Research Corporation, compares 90 software packages designed to handle a variety of word procesing tasks.

This 50-page report presents a general description of the overall capabilities of each package, plus the name of the vendor, computer model and processing requirements, operating system requirements, source language or compiler, source listing availability, master file sequencing, purchase and rental pricing, maintenance and documentation training support and the number of users.

"All About Word Processing Software," reprinted from *Datapro Reports*

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- **Northeast**: Arlene Joseph, Personal Computing Magazine, 2 Park Ave., New York, NY 10016; (212) 340-9780.
- **California**: Michael Reynolds, Hayden Publishing, 8939 S. Sepulveda Blvd., Los Angeles, CA 90004; (213) 641-6544.
- **Japan**: K. Yanigihara, International Business Corp., 10-10 Shinjuku 3-chome, Shinjuku, Tokyo, 160 Japan: (03) 350-0272.

on Word Processing, is available for $15 per copy from Datapro Research Corporation, 1805 Underwood Blvd., Delran, NJ 08075. *Circle No. 138*

Reversible Mini Flexible Disks

Dennsion Kybe Corporation announced a new, dual-sided reversible 5 1/4″ mini flexible disk compatible with TRS-80, Apple, Commodore and other computers. The new disk provides twice the storage capacity of other available disks by permitting you to record on both the front and the reverse side.

This is the first time a dual-sided reversible disk has been available in 5 1/4″ mini format, the company said. Unlike other disks designed for use on drive systems with a single record head, the new disk contains two recording surfaces as well as two sets of write enable and index holes. This enables you to record on one side and then flip the disk over to record on the reverse side.

Suggested list price is $5.95 each. The disks are certified error-free at a minimum of twice the error threshold of TRS-80, Apple, Commodore and other disk drives, the company said. This provides a wide margin of safety, virtually assuring your data integrity. In addition, the disks are rated for more than 12 million passes without disk related errors or significant wear.

For additional information, call your dealer/distributor or contact Dennison Kybe Corporation, 132 Calvary St., Waltham, MA 02154; (617) 899-0012. Outside of MA call toll-free (800) 225-8715. *Circle No. 139*

Catalog of TRS-80 Software

Racet computes has announced a new 24-page catalog of software for the TRS-80. This catalog provides detailed descriptions and technical information on Racet computes' product line.

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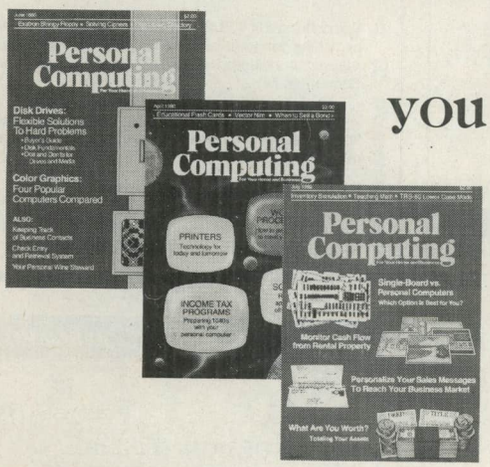

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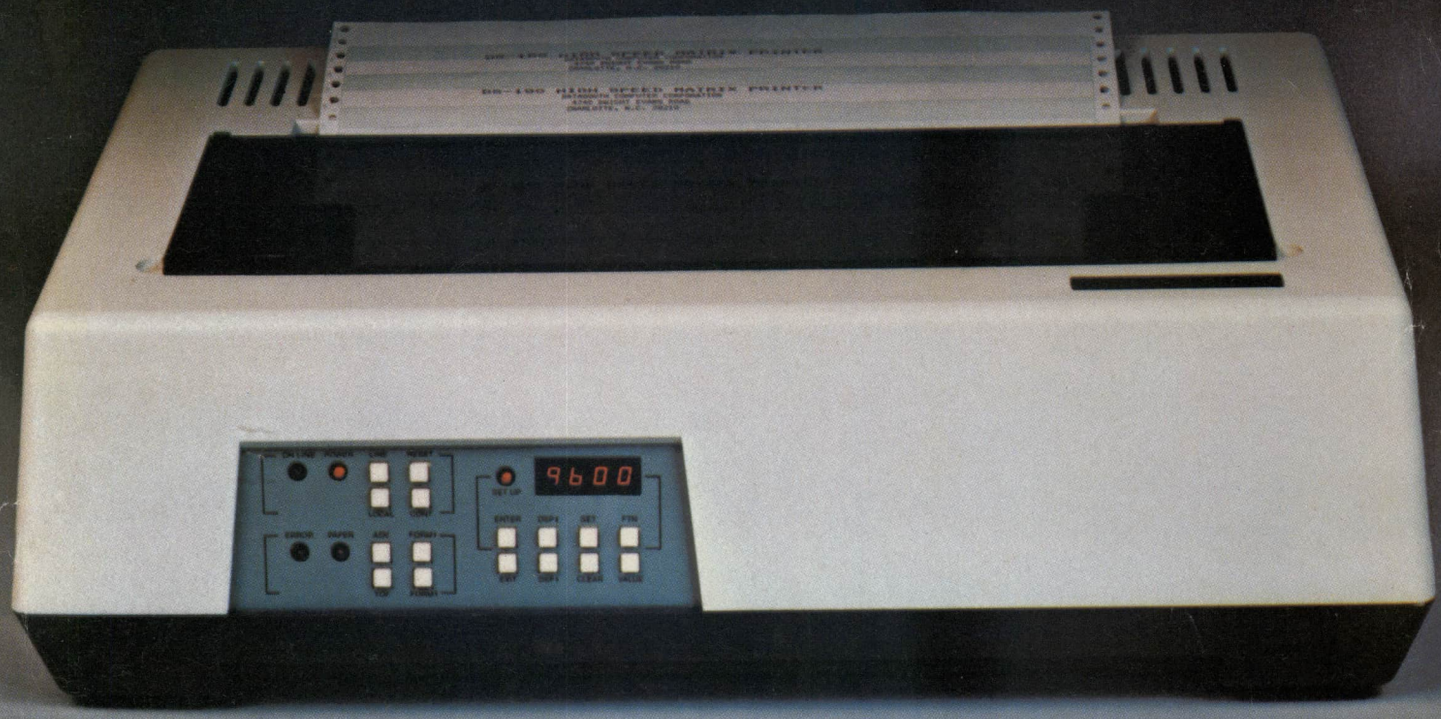

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