VIC-20 C64 PET C64 VIC-20

The **COMMODORE** Computer Users' Monthly Journal

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COMMANDER

SPECIAL GAME ISSUE

OCTOBER 1983

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- LAUNCH YOUR PET INTO OUTERSPACE
- VIC-EVADERS ACTION GAME
- EDUCATION AND THE VIC-20
- VIC-20 GRAPHIC COMMANDS IN FORTH
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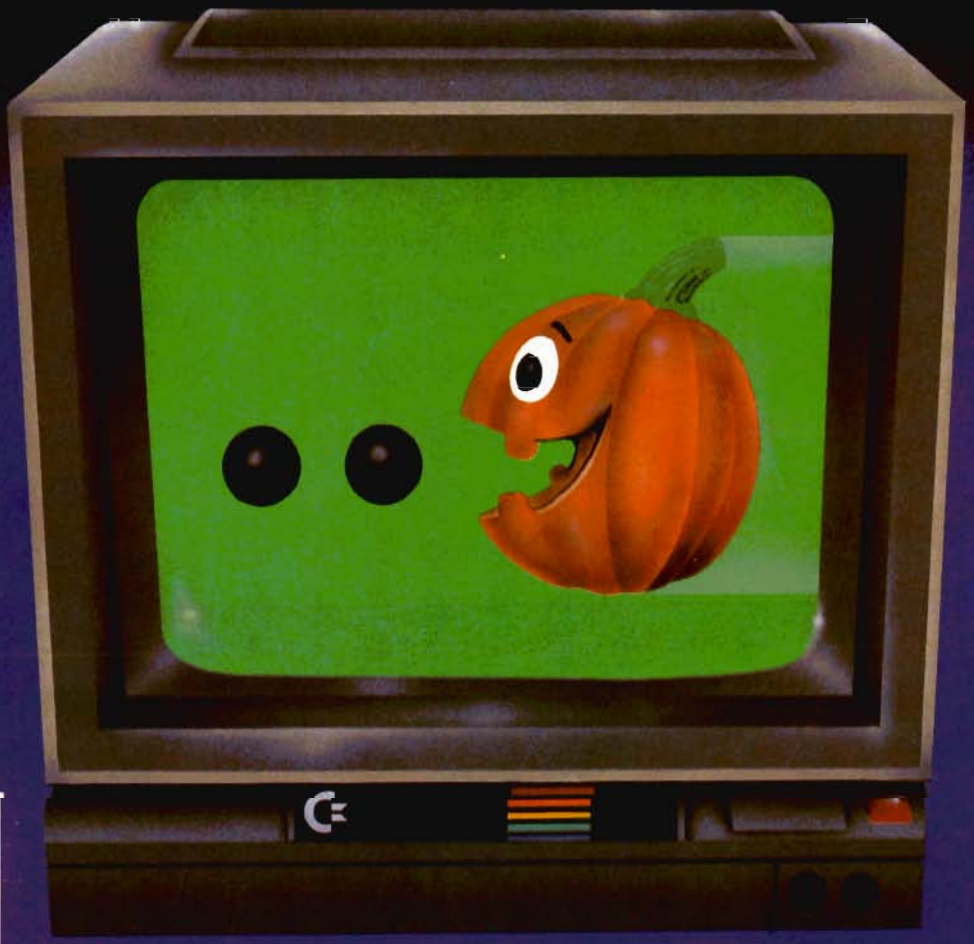

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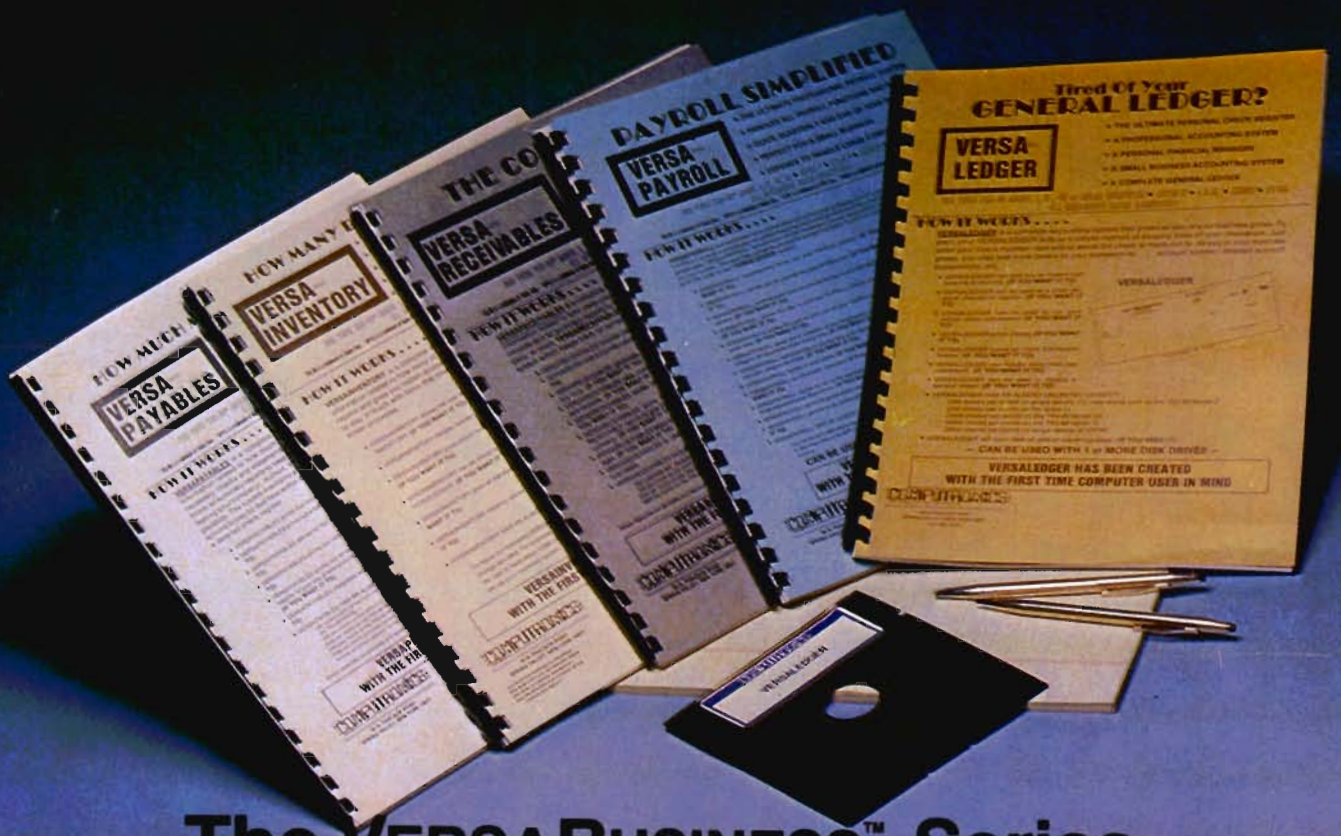

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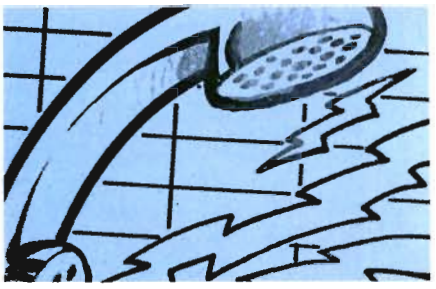

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Gaming . . .
Don't fight it--just control it

School is back in session and all the kids are back at the old grind again. The old school house has a new coat of paint and some of the faculty is even new. What other surprises are in store for the rows of eager and receptive (eager and receptive--who am I kidding?) faces staring back at teacher from the other side of the desk? Hark! What strange tunes come wafting our way from the nether room? It sounds like a quartet preparing for their opening night at the Met. Are we surprised when we peer around the corner and find out it's really Johnny playing Beethoven at a brand new C-64. Christmas came early at the school this year. The voters approved funding for a new computer lab and the staff had the wisdom to stock it with C-64s.

In the ensuing rush for the nine vacant seats in the lab, Jack trips over the power cord for Johnny's orchestra and the lilting strains of *Moonlight Sonata* abruptly halt. Bill can't understand why his computer won't work—"Plug it into the wall", cries Phil. "Try channel 3", shouts Sue. "Turn up the brightness", suggests Tim. After an exhaustive session of trial and error and actually glancing at the instructions once, Bill flips the TV to channel 3. It works; Bill will never hear the end of it--he is captain of the football team.

After the dust had settled, a common hue and cry arose, "What software is there?" The faculty trotted out the obligatory word processor, spelling checker, math drill, whose-it filer, etc. etc., and the euphoria began to dull somewhat. After all, computers are supposed to be fun aren't they? Somehow the kids just couldn't get "up" for the learning software with the hard-to-read-and understand instructions.

Johnny found the solution to the problem. "Alien Attack". Before you knew it, everyone was shooting down alien invaders and vying for the highest score in their class. The educational software was forgotten and the game library was begun. When the mean old teacher saw what was going on, a quick halt was put to the gaming orgy and the learning hats were put back on, but the computer lab had been stocked with the requisite game programs which any respectable lab should have. After all, how many times have we heard of the director of a large government or university computer center finding his system programmers playing Chess or Star Trek on his mainframe. Games were some of the first programs written on computers and will always be right at the top of the popularity list. Don't fight it--just control it.

Letters

Dear Donald,

I read your article on downloading programs for the VIC 20 in the July 1983 Commander Magazine and found it quite interesting. I have recently purchased C64 and VIC Modem and am wondering if you might know of a program for downloading and uploading programs for the 64. The only telecommunications program I have right now is the 64 Term program that comes with the modem.

Sincerely, Richard Crescitelli

Dear Donald:

I have been following your articles in the *Commander* magazine on "Telecommander." I have a C-64 computer complete with printer, disk drive, modem, etc.

I have a problem though, and am writing to see if you can help me. As you know the modem only makes your terminal a "dumb" terminal and I have been searching high and low for a program to be able to download what is received on the screen.

I have several friends from whom I could obtain small programs but I have no method to be able to get a copy from what they can send me over the modem. I can go to their house and get a copy that way but it would be very convenient if I could just call them on the phone and have them send it to me.

You may not be able to help but any help you can give me would be appreciated. I have even written to Commodore but never have received a satisfactory answer. They say they expect to have something someday but will not give a possible time span.

Thanking you for time and consideration, I am Respectively yours

Frederic E. Hoffmanns

Dear Gentlemen:

Thanks for your letter!

The solution to your problem is called a "smart terminal program". About the only one that I have seen advertised is:

Super Term
Midwest Micro Inc.
311 West 72nd St.
Kansas City, MO 64114

I have not had the opportunity to use this program, but if it is anything like their Terminal-40 (for the VIC-20), it should be superb.

As soon as I can set my hands on a C64 with disk, I plan to publish a smart terminal program in Commander. It will be slow (written in BASIC), but the price will be right!

With Best Regards, Don Stoner

OUR APOLOGIES

The review of Word Pro 3 Plus carried in last month's *Commander* inadvertently listed Steve Punter as the author of the review. Actually, Mr. Punter is the author of Word Pro 3 Plus; and Eric Giguere, one of our regular reviewers, was the author of the review. We sincerely apologize for any inconvenience which this caused our readers, Professional Software, Inc., or Mr. Punter.

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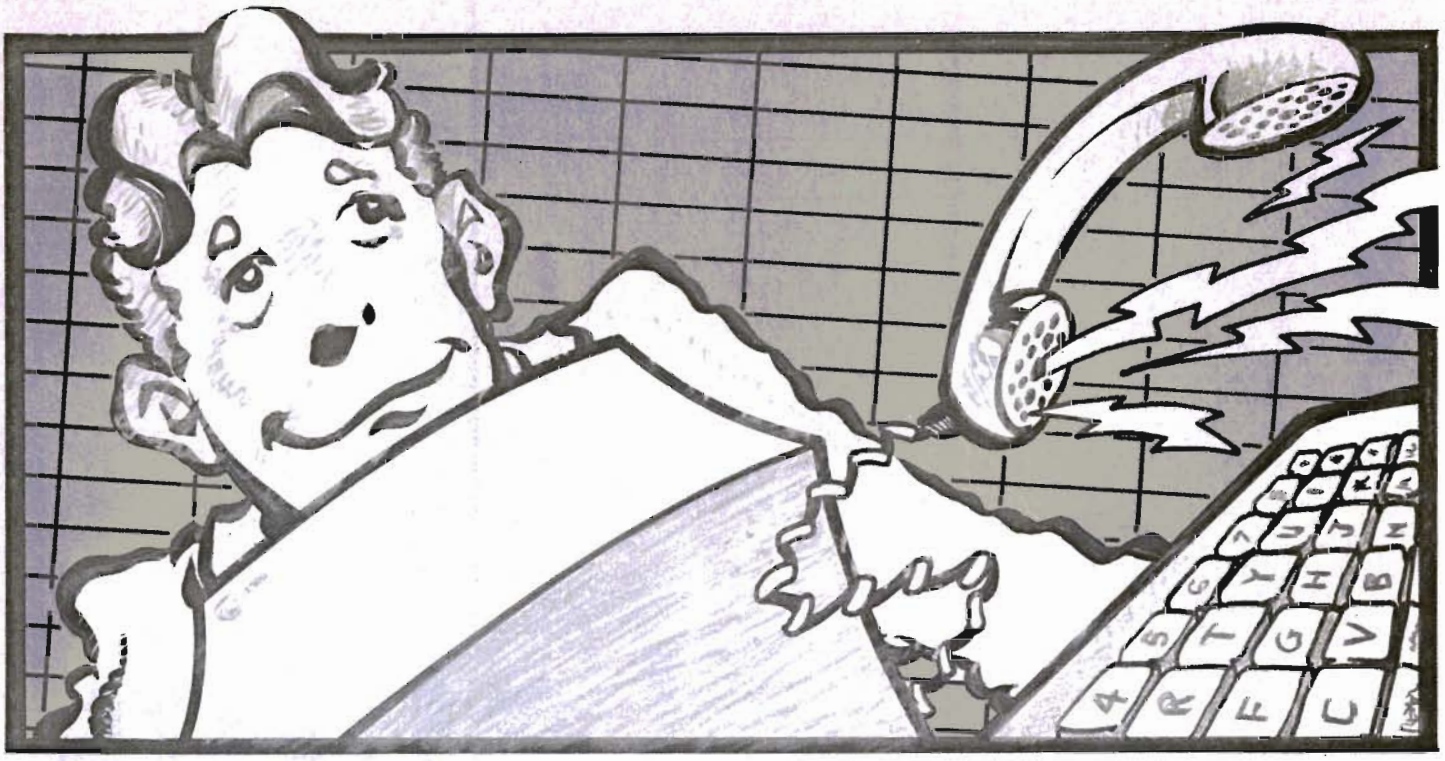


TELECOMMANDER

by Donald Stoner

I've always looked upon "phone phreaks" with disfavor. I am basically a "law and order guy" and to me, making long distance calls without paying for them is stealing. Some are able to rationalize it as just the phone company and therefore, the theft of services is alright. Others look upon it as a protest against big business.

But recent events have affected my opinion. Most are aware that, some time ago, the Federal Commumications Commission made the decision that "Ma Bell" was too big. The government then proceeded with an action to "break up" American Telephone and Telegraph based on the notion that anything big had to bad for the American public. When phone bills start to arrive in January 1984, the public may decide big old AT&T may not have been so bad after all!

After vigorous government antitrust action, the court decreed that AT&T must divest itself of its various operating companies. These are the individual telephone companies such as Northwest Bell, New England Bell and so on. The OC's have been forced by the government to become independent of AT&T and each other.

It appears that the operating companies are using the AT&T divestiture as an excuse to reach out and touch our pocketbooks! Back in the 70's before personal computers became popular, there was no such thing as personally owned modems. The telephone companies had total control over distribution, installation and use of modems. If you needed data communications, you needed the telephone company. It was illegal to connect or couple anything into the telephone line unless the company supplied and installed it.

Then a company called Carterphone invented a device that would couple the audio to and from two-way mobile radios into the telephone line. Anyone with a radio in his vehicle could make a telephone call simply by contacting the Carterphone operator. She would then dial the number desired and lay the handset down on a microphone/speaker arrangement. The sounds from the radio equipment could then be heard by the person at the other end of the telephone circuit. Conversely, the other person's voice in the earphone of the telephone, was coupled to the microphone of the two-way radio equipment. There was no electrical coupling into the telephone line; a speaker simply replaced the human vocal cords. This is the same principle that is used by the acoustic coupled data modem.

The telephone company was enraged by the introduction of the Carterphone device, even though there was only acoustic coupling between the external device and the telephone line. They recognized the Carterphone unit represented a leak in their dike of total control. As a result, they sued Carterphone to desist from advertising, selling or using the acoustic coupler.

Rather than capitulate, Carterphone Corp. decided to fight back. They argued there was no difference between using their device and a human talking directly into the telephone. They provided powerful arguments that no damage or degradation to the telephone network could possibly occur.

The court agreed and settled the suit in favor of Carterphone, saying not only was the Carterphone device legal but there must be a means whereby the public could connect personally owned equipment and devices into the telephone network. The repercussion from their attack on little Carterphone was enormous.

The court decision opened the "floodgates" for interconnection of many devices (i.e., modems, telephone answerers, dialers, etc.) to the telephone line. It then became possible to purchase a telephone, rather than rent one (at inflated prices) from the telephone company.

Even though it was protested vigorously by AT&T, the court's decision turned out to be a "blessing in disguise" for the telephone company. Use of the telephone network has increased significantly since the Carterphone decision. Millions of privately owned extension telephones have been connected. There are hundreds

of ingenious low cost accessories which can be connected to simplify and speedup use of the telephone system. Data communications has exploded. Today there are hundreds of thousands of people increasing use of the telephone network by making long distance calls with modems.

Now, with the AT&T divestiture, the various operating companies are looking for new ways to increase their revenues. They will no longer receive rebates from AT&T when people make long distance calls. The easiest way to compensate for this loss of revenue is to request rate increases (Higher phone bills). The operating companies are now doing this.

A particularly enterprising operating company, Southwestern Bell, has found an ingenious way of extracting money from an unsuspecting public. They have decreed that anyone with a modem connected to the telephone line must pay an extra $50 per month. They justify the cost as a charge for providing a data grade telephone line. This is an incredible feat of electronic wizardry. Simply by connecting a modem to your common "garden variety" telephone line, it now becomes a compensated and equalized telephone line with none of the "clicks and pops" that we are accustomed to. There is only one applicable word for the action of Southwestern Bell – extortion!

I know what may be going through your mind. The instruction manual that accompanies your modem states you are required by law to advise the telephone company you have a modem connected to your telephone line. If you do not tell them, the only way the telephone company will know you have a modem is to hear you using it. If these unjustified charges prevail, those who are into telecommunications are being encouraged to break the law. Certainly no one, in his right mind, is going to give the telephone company a "license to steal".

Analogous to this is what occurred on the Citizens Band. The FCC passed a series of stupid rules, some years ago, and the public rebelled. Rather than get caught breaking the law, the CB users simply stopped using their government assigned call letters. "Let them find me, if they can", the public said. The government spent millions of taxpayer dollars trying to do exactly that. Recently, The FCC gave up and abandoned any effort to regulate use of the Citizens Band.

This same flaunting of the law can occur in connection with data communications. When user registrations are a small fraction of the number of modems being sold, the operating companies will realize the public is not reporting modem installations. In order to find out who is using a modem, the telephone company will employ surveillance taps to listen for the telltale sounds that modems generate. Most of the taps will intercept voices and conversations rather than modem tones. This idea seriously bothers a lot of folks. Obviously, the situation could rapidly get out of hand.

The action of Southwestern Bell may be an isolated instance of trying to increase revenues, or, the various operating companies may plan to institute this "modem fee" as a general policy. I prefer to assume the latter and will stay alert to any attempt to pass this change on to the telecommunicating public.

What can you do if your local OC decides to reach out and touch you? As a matter of fact, there are quite a few things you can do. Since the operating companies are monopoly utilities, they are regulated by a Public Utility Commission (PUC) in each state. Generally these commissions are rubber stamp organizations. As a monopoly, the utility is not required to be competitive or efficient. When the OC's costs go up, for whatever reason, they present estimates of rates that will be required to maintain an adequate profit and return for the stockholders. If the numbers look reasonable (to the commission, at least) and if there is no significant opposition, the rate increases are usually approved as submitted. A tariff for modem users might consist of nothing more than a paragraph buried in hundreds of pages of submitted documents. It could simply state that it costs X dollars more to maintain a data grade line and therefore a surcharge of, say, $50.00 per month is justified. "Stamp-stamp" and it's approved. Once it is approved by the PUC, it will be extremely difficult to get the tariff reduced or removed.

What can be done to prevent this from happening in *your* operating company area? Assign someone in your computer club the task of monitoring rate increase applications. If one of your members happens to be an attorney, he or she is an ideal candidate! Write the telephone company an official letter, asking that you be advised of any matters to be brought before the PUC. Specifically request notice of any actions relative to data communications.

In the event your OC decides to "sock it to you" for owning a modem, the first step should be to contact your local newspaper. Many reporters use a personal computer or terminal to file their stories from home or in the field. Point out the effect of the telephone company action on the computer public. Stress that it will affect not only those who presently own modems, but others who might consider purchasing one in the future. Would you have purchased a modem if you knew it cost $50.00 extra each month to use? Mention that even the reporter's costs for filing a story will increase. The reporter will certainly contact the telephone company for more information on why this action is necessary. A good reporter knows when he or she is getting a "snow job" from a public relations department. Most operating companies despise unfavorable publicity. If there is enough fuss, the matter may be dropped by the OC before it is ever presented to the PUC.

If not, your club should turn out en masse for the PUC meeting where the matter will be discussed. Prior to the meeting, write the PUC to advise them that a number of your group wish to address the Commission. You can point out to the Commission that modems are only occasionally connected to the telephone line and their use is only incidental to voice communication. This may be illustrated by demonstrating how a modem is attached to an existing telephone instrument and so on. Also stress that you do not want a data grade line since data communications involves only about 2.74% of the time the telephone line is used.

Frankly, your group has the numbers and clout to totally paralyze a PUC meeting. It is very likely that the Commission will have a number of complex issues before it and will not be inclined to spend time on a mundane matter like modem tariffs.

Above all, be alert to rate increases that effect your modem communications. As soon as your local operating company has installed its new automatic billing equipment, you will be paying by the minute and by distance for all telephone calls. In the coming years, you will be paying a lot more for telephone communications, whether voice or data. This is inevitable and probably the price you have to pay for believing that "big is bad". However, when you are asked to pay extra for what is said (or more correctly, how it is said) on the telephone, then it is time to "raise a ruckus".

A Space Game for Pet

By Mark Daily

Attention all space game fanatics, here's one for the Pet that's loads of fun. Your object is to destroy the enemy (as usual) with your torps. This three part program will let you move in four directions and fire in six different directions. Also, you can watch a demo of the computer firing at various debris in space. Included are the instructions, demo, and the game itself.

Upon completion of the game you will be ranked according to your score and invited to play again. This game is for the upgrade Rom Pet. Not many are making the software for the upgrade as much as for the ROM 4.0. Now you ROM 2.0 users can add another program to your collection. If you don't want to type it all in send $4.00 dollars (to cover shipping) and a tape or disk (2040 format) to:

Mark Daily
Box 163
Sylvan Beach
New York 13157

Pet Space Game Notes

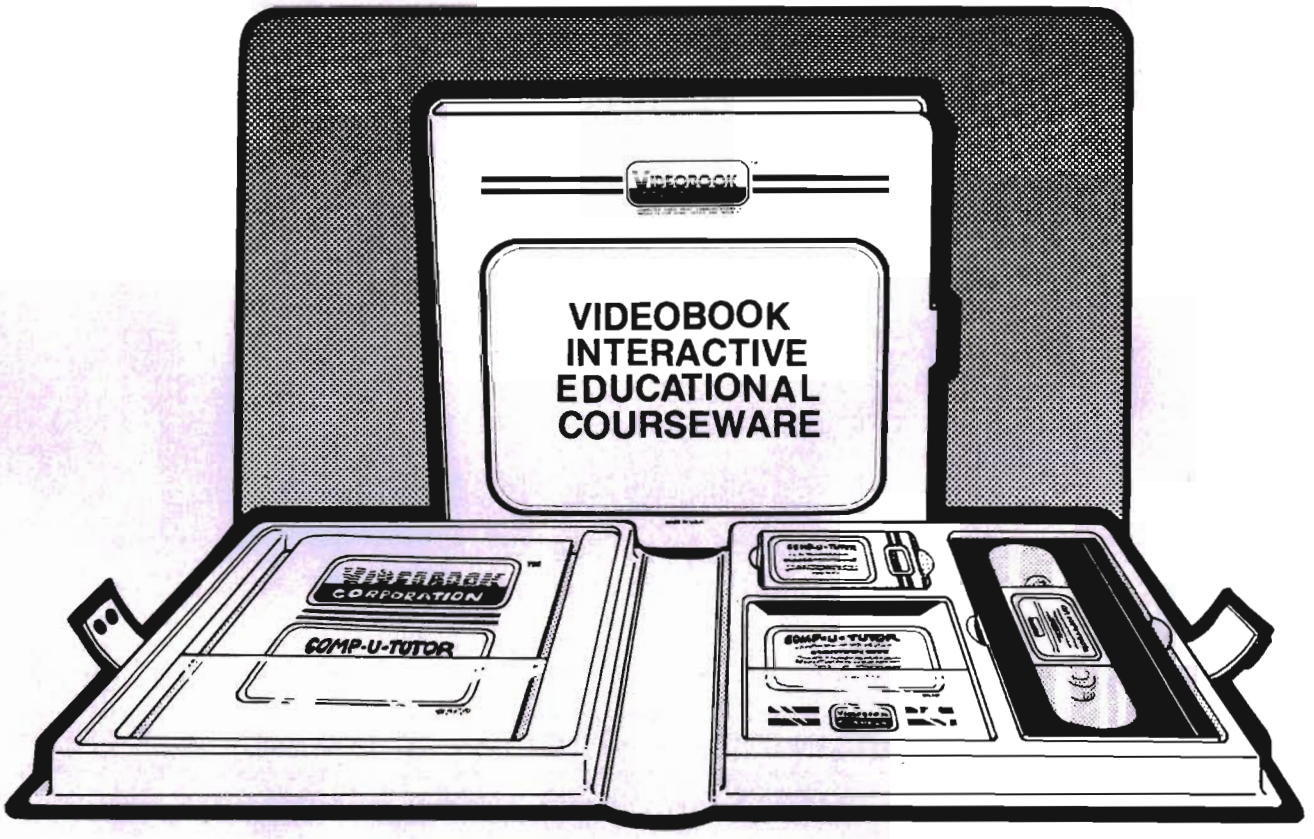
1) Be sure to save the demo as "PET SPACE DEMO".
2) Be sure to save the game as "SPACE GAME".
3) The game has sound, so poke out the sound ports before saving the game or it won't be there later.
4) To slow the game playing time list 55; to slow the game divide E by anything greater than 10 and less than 100: to speed the game up divide E by greater than 1 and less than 10.

Figure 1

```
90 REM LOADER -- MARK DAILY
100 E$=CHR$(34):Q$(1)="8":Q$(2)="1"
110 PRINT"<CLR><DWN><DWN><DWN>"
120 PRINTTAB(08)"SPACE GAME"
130 PRINTTAB(08)"< UP><RON>SPACE GAME<RO
F>< UP>":IU=IU+1:IFIU<50THEN120
135 PRINT"<HOM><DWN><DWN><DWN><DWN><DWN>
<DWN><DWN>":IU=0
140 PRINTTAB(17)"     BY     "
150 PRINTTAB(17)"< UP><RON>     BY     <RO
F>< UP>":IU=IU+1:IFIU<50THEN140
155 PRINT"<HOM><DWN><DWN><DWN><DWN><DWN>
<DWN><DWN><DWN><DWN><DWN><DWN>":IU=0
160 PRINTTAB(26)"MARK DAILY"
170 PRINTTAB(26)"< UP><RON>MARK DAILY<RO
F>< UP>":IU=IU+1:IFIU<50THEN160
180 FORA=1TO550:NEXT:PRINT"<CLR>"
190 PRINT"THIS GAME COMES WITHIN THREE P
ROGRAMS"
200 PRINT"THE FIRST PROGRAM IS THE INTRO
DUCTION-"
210 PRINT"INSTRUCTION ONE.  THIS PROGRAM
."
220 PRINT"THIS GAME DISPLAYS THE GRAPHIC
 "
230 PRINT"POSSIBILITIES OF THE PET."
240 PRINT"THE DEMO PROGRAM INCLUDES..."
250 PRINT"A SHIP BLOWING UP VARIOUS SPAC
E SHIPS."
```

Continued on page 12

THE INTERACTIVE EDUCATIONAL REVOLUTION COMES HOME.



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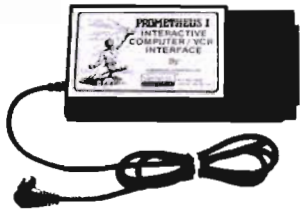

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Continued from page 10

```
260 PRINT"LIKE, ASTEROIDS,METEORS,STARS,
AND MOONS"
270 PRINT"IF THE SHIP VERS OFF THE TOP-L
EFT OR"
280 PRINT"BOTTOM RIGHT CORNERS OF THE SC
REEN A "
290 PRINT"GALACTIC RESET IS PREFORMED."
300 PRINT"AND ALL PREVIOUS BLOW-UPS ARE
NULLIFIED"
310 PRINT"<DWN>HIT <RON>RETURN<ROF> TO C
ONTINUE."
320 GETR$:IFR$=CHR$(13)THEN340
330 GOTO320
340 PRINT"<CLR>THE DEMO CANNOT BE CONTRO
LLED"
350 PRINT"IT IS ALL RANDOM."
360 PRINT"YOU ARE TOLD NOT TO HIT A KEY,
BUT IF"
370 PRINT"YOU ARE ONE OF THOSE PERSISTAN
T"
380 PRINT"PEOPLE! HIT ONE"
390 PRINT"HIT <RON>RETURN<ROF> TO CONTIN
UE"
400 GETR$:IFR$=CHR$(13)THEN420
410 GOTO400
420 PRINT"<CLR>THE GAME ITSELF"
430 PRINT"IN THIS GAME YOU ARE TO BLOW-U
P THE "
440 PRINT"OTHER GUY.  EACH TIME YOU MOVE
,HE MOVES"
450 PRINT"IF YOU FIRE AND MISS , HE MOVE
S"
460 PRINT"IF YOU TAKE TO MUCH TIME THINK
ING OR "
470 PRINT"TRYING TO THINK, HE WILL MOVE"

480 PRINT"OCCASIONALLY HE WILL LAND ON Y
OU AND "
490 PRINT"BLOW YOU UP. IF YOU RUN INTO A
 STAR YOU"
500 PRINT"BLOW YOURSELF UP."
510 PRINT"YOU CAN MOVE IN FOUR DIRECTION
S,HERE'S"
520 PRINT"THE KEY IN MOVING."
530 PRINT"     8       8=UP
540 PRINT"     <221>       4=LEFT
550 PRINT"  4<192><219><192>6     6=RIGHT

560 PRINT"     <221>       2=DOWN
570 PRINT"     2
580 PRINT"<DWN>HIT <RON>RETURN<ROF> TO C
ONTINUE."
590 GETR$:IFR$=CHR$(13)THEN610
600 GOTO590
```

```
610 PRINT"<CLR>YOU CAN FIRE IN SIX
DIFFERENT DIRECTIONS"
620 PRINT"     R  T  Y
630 PRINT"      <205> <221> <206>
640 PRINT"       <205><221><206>
650 PRINT"        <166>
660 PRINT"       <206><221><205>
670 PRINT"      <206> <221> <205>
680 PRINT"     F  G  H
690 PRINT"<DWN>R=UP-LEFT::T=UP::Y=UP-RIG
HT"
700 PRINT"F=DOWN-LEFT::G=DOWN::H=DOWN-RI
GHT"
710 PRINT"<DWN>EACH FIRE TAKES 100UNITS
OF ENERGY IF"
720 PRINT"YOU MISS.  STARS WILL BLOCK YO
UR FIRE."
730 PRINT"<DWN>WHICH PROGRAM DO YOU WISH
 TO RUN"
740 PRINTTAB(15)"1) DEMO"
750 PRINTTAB(15)"2) GAME"
760 INPUT"<DWN>YOUR CHOICE";A$:IFA$>"2"O
RA$<"1"THENPRINT"ERROR IN YOUR CHOICE:":
GOTO780
770 GOTO800
780 FORRE=1TO400:NEXT:PRINT"< UP>
                  ":PRINT"< UP>< UP>
                "
790 PRINT"< UP>< UP>< UP>":GOTO760
800 PRINT"ARE YOU USING DISK OR CASSETTE
"
810 INPUT"1=DISK:2=CASSETTE";S$
820 IFA$="1"THENPRINT"LOAD"E$"PET SPACE
DEMO"E$","Q$(VAL(S$)):GOTO840
830 IFA$="2"THENPRINT"LOAD"E$"SPACE GAME
"E$","Q$(VAL(S$)):GOTO840
840 PRINT"< UP>< UP>
          < UP>< UP>"
```

Figure 2

```
10 REM PROGRAM BY MARK DAILY
20 REM PET SPACE DEMO
30 PRINT"<HOM><CLR><DWN><DWN><DWN><DWN><
DWN><DWN><DWN><DWN><DWN><DWN><DWN><RHT><
RHT><RHT><RHT><RHT><RHT><RHT><RHT><RHT><
RHT><RHT><RHT><RHT><RHT><RHT><RHT>WORKIN
G."
35 EZ=1:IFPEEK(57345)AND2THENEZ=3
36 IFEZ=3THEN43
37 POKE144,49:GOTO50
43 POKE144,88
50 AD=826:J=32768:AX=1000
55 READBY:IFBY=-1THEN105
56 GETA$:IFA$<>""THENGOSUB700
```

Continued on page 14

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All programs will load and run on any Commodore computer; all support tape, disk, and printer.

Prices include documentation and shipping; Calif. residents add 6%. Please specify hardware configuration when ordering. Sorry, no games available.

William Robbins, Box 3745, San Rafael, CA 94912

Circle No. 21

Continued from page 13

```
 60 POKEAD,BY:AD=AD+1:GOTO55
 70 DATA160,0,162,0,189,0,128,24,105,128,
 157,0,128,232,224,0,208,242,238,64,3
80 DATA238,70,3,173,64,3,201,132,208,229
,169,128,141,64,3,141,70,3,96,-1
105 SC=826:GOSUB900:MU=59464:POKEMU+3,16
:POKEMU+2,15:POKEMU,0:SZ=859
110 PRINT"<HOM><CLR>";:MN=0:GOSUB950:GOS
UB350
120 X=INT(RND(TI)*AX+.5):X=X+J:GOSUB956:
SYSSC:IFMN=0THENMN=128:GOTO140
127 MN=0
140 POKEX-1,107+MN:POKEX,81+MN:POKEX+1,1
15+MN:Z=X:GOSUB400:GOSUB230
145 GETA$:IFA$<>""THENGOSUB700
146 TV=TV+350:IFTV>AX*18THENS1=0:M1=0:A1
=0:M2=0:TV=0:GOTO110
147 FORE=1TO5:GOSUB954:POKEUB(E),G(E):GO
SUB400:UN(E)=DI:UB(E)=UB(E)+UN(E)
148 IFUB(E)<JORUB(E)>J+AXTHENAZ=AZ+1:GOT
O150
149 POKEUB(E),43+MN
150 NEXTE:A=INT(RND(TI)*3+.5):B=X+A:IFAZ
=5THENAZ=0:GOSUB956
151 C=INT(RND(TI)*3+.5):IFC=1THENB=B+41:
D2=1
152 IFC=2THENB=B-41:D2=-1
153 FORES=JTOJ+AXSTEP40:IFB=ESORB+1=ESOR
B-1=ESTHENB=B+(2*SGN(D2))
154 NEXT
155 IFB/5<>INT(B/5)THEN166
156 FORES=1TO5:IFG(ES)<128ANDMN=128THENG
(ES)=G(ES)+MN
157 NEXT:GOSUB350:SYSSC:IFMN=0THENMN=128
:GOTO166
165 MN=0
166 GETA$:IFA$<>""THENGOSUB700
170 IFB<JORB>J+AXTHEN110
175 AW=INT(RND(TI)*AX+.5):AW=AW+J:IFPEEK
(AW)<>MN+32THENPOKEAW,32+MN:GOTO180
176 IFINT(AW/13)=AW/13THENPOKEAW,42+MN:P
OKEUM,42:POKEMU,0:GOTO180
177 IFINT(AW/11)=AW/11THENPOKEAW,87+MN:P
OKEUM,87:POKEMU,0:GOTO180
178 POKEAW,46+MN:POKEMU,82:POKEMU,0
180 POKEX-1,32+MN:POKEX,32+MN:POKEX+1,32
+MN:X=B:GOTO140
230 FOREW=1TO15:Z=Z+DI:IFZ>J+AXORZ<JTHEN
Z=X:GOTO300
231 Q$=STR$(Z):IFRIGHT$(Q$,1)="8"ORRIGHT
$(Q$,1)="7"THEN235
232 GOTO240
235 IFSD=93THEN240
236 FORT=JTOJ+AXSTEP40:IFZ=TTHENZ=X:GOTO
```

Continued on page 16

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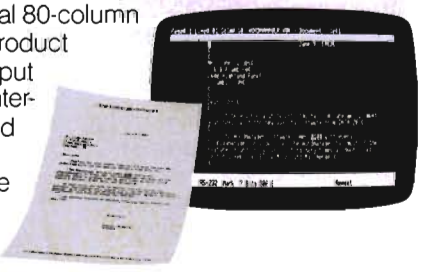

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Continued from page 14

```
300
237 NEXTT
238 GETA$:IFA$<>""THENGOSUB700
240 IFPEEK(Z)=46+MNTHENAC=92:S1=S1+1:GOS
UB500:GOTO300
241 IFPEEK(Z)=42+MNTHENAC=84:A1=A1+1:GOS
UB500:GOTO300
242 IFPEEK(Z)=87+MNTHENAC=174:M1=M1+1:GO
SUB500:GOTO300
243 IFPEEK(Z)=43+MNTHENAC=120:M2=M2+1:GO
SUB500:GOTO300
247 IFPEEK(Z)<>32+MNTHENPOKEMU,SD/5:POKE
Z,PEEK(Z):POKEMU,0:GOTO250
248 POKEMU,SD/5:POKEZ,SD+MN:POKEMU,0
250 NEXTEW:Z=X
300 FOREW=1TO15:Z=Z+DI:IFPEEK(Z)<32+MNTH
ENPOKEZ,PEEK(Z):GOTO303
301 IFPEEK(Z)=45+MNORPEEK(Z)=99+MNTHENPO
KEZ,PEEK(Z):GOTO303
302 POKEZ,32+MN
303 IFZ>J+AXORZ<JTHEN350
310 GETA$:IFA$<>""THENGOSUB700
340 NEXTEW
350 IFMNTHEN360
351 GOSUB610:PRINT"<HOM>STARS="S1TAB(31)
"MOONS="M1:PRINTTAB(8)"< UP>ASTEROIDS="A
1;
352 PRINTTAB(13)"METEORS="M2:PRINT"<HOM>
<DWN><DWN><DWN><DWN><DWN><DWN><DWN><DWN>
";
353 PRINTTAB(12)"PET :SPACE DEMO"
354 PRINTTAB(11)"<DWN>BROUGHT TO YOU BY:
"
355 PRINTTAB(8)"<DWN>WHO ELSE-BUT-MARK D
AILY"
356 PRINTTAB(8)"<163><163><163><163><163
><163><163><163><163><163><163><163><163
><163><163><163><163><163><163><163><163
><163><163>":RETURN
360 GOSUB600:PRINT"<HOM><RON>STARS="S1TA
B(31)"MOONS="M1:PRINTTAB(8)"<RON>< UP>AS
TEROIDS="A1;
361 PRINTTAB(13)"<RON>METEORS="M2:PRINT"
<HOM><DWN><DWN><DWN><DWN><DWN><DWN><DWN>
<DWN>";
362 PRINTTAB(12)"<RON>PET :SPACE DEMO"
```

```
363 PRINTTAB(11)"<RON><DWN>BROUGHT TO YO
U BY:"
364 PRINTTAB(8)"<RON><DWN>WHO ELSE-BUT-M
ARK DAILY"
365 PRINTTAB(8)"<RON><163><163><163><163
><163><163><163><163><163><163><163><163
><163><163><163><163><163><163><163><163
><163><163><163>":RETURN
400 DI=INT(RND(TI)*6+.5)
410 IFDI=1THENDI=39:SD=78:RETURN
411 IFDI=4THENDI=-39:SD=78:RETURN
420 IFDI=2THENDI=40:SD=93:RETURN
421 IFDI=5THENDI=-40:SD=93:RETURN
422 IFDI=6THENDI=-41:SD=77:RETURN
430 DI=41:SD=77:RETURN
500 POKEZ-39,78+MN:POKEZ-41,77+MN:POKEZ+
39,78+MN:POKEZ+41,77+MN:POKEZ,32+MN
510 POKEMU,AC:POKEMU,AC/2:POKEZ-39,32+MN
:POKEZ-41,32+MN:POKEZ+39,32+MN
520 POKEZ+41,32+MN:Z=X:POKEMU,0:GOTO300
600 IFS1<10ANDA1<10ANDM1<10ANDM2<10THENR
ETURN
605 PRINT"<HOM><RON>
                <ROF>":RETURN
610 IFS1<10ANDA1<10ANDM1<10ANDM2<10THENR
ETURN
```

Continued on page 18

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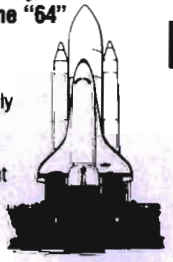

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Circle No. 40

Continued from page 17

```
615 PRINT"<HOM>
                ":RETURN
700 POKESZ,174:RETURN
900 PRINT"<HOM><CLR><DWN><DWN><DWN><DWN>
<DWN><DWN><DWN><DWN><DWN><DWN><DWN><RHT>
<RHT><RHT><RHT><RHT><RHT><RHT><RHT><RHT>
";
910 PRINT"DO NOT HIT ANY KEY !"
920 PRINT"<DWN><RHT><RHT>IT MAY BE DETRI
MENTAL TO THE PROGRAM."
930 FORA=1TO950:GETA$:IFA$<>""THENGOSUB7
00
940 NEXT:PRINT"<HOM><CLR>":RETURN
950 PRINT"<HOM><DWN><DWN><DWN><DWN><DWN>
<DWN><DWN><DWN><DWN><DWN><DWN><DWN><RHT>
<RHT><RHT><RHT><RHT><RHT><RHT><RHT><RHT>
<RHT><RHT><RHT>GALACTIC RESET."
951 FORES=1TO10:FORSE=1TO225:NEXTSE:SYSS
C:POKEMU,(ES*24)+ES*1.5:NEXTES:PRINT"<CL
R>"
952 POKEMU,0:RETURN
954 IFMN=128THENG(E)=160:RETURN
955 IFMN=0THENG(E)=32:RETURN
956 FORES=1TO5:UB(ES)=0
957 UB(ES)=INT(RND(TI)*AX+.5):UB(ES)=UB(
ES)+J:IFUB(ES)>J+AXTHEN957
958 IFPEEK(UB(ES))<>32+MNTHEN957
959 GOSUB400:UN(ES)=DI:NEXTES:RETURN
```

Figure 3

```
0 REM MARK DAILY
1 REM SPACE GAME
2 PRINT"<CLR>YOU ARE '<<209>>' AND THE E
NEMY IS '<<218>>'     <RON>GOOD LUCK":FOR
GZ=1TO2000:NEXT
3 PRINT"<CLR><167><RON>
                    <ROF> <165>":CLR:R=32
808:E=100:GOSUB513
4 QS=515:IFPEEK(49152)THENQS=151
5 SZ=1:IFPEEK(50000)THENSZ=2
6 GOSUB5999:POKECD+1,16:POKECD,15:POKECB
,0:L=33186:SD=18:POKECD+2,12:POKEQS,0
7 SW=11:J=40:GOSUB6000:POKE900,0
8 FORD=1TO21:POKER+D*J,E+3
9 POKE32846+D*J,E+1:NEXT:FORW=1TO37:POKE
(R+W+(D*J)),E-1:NEXT:
10 IFPEEK(L)<>32THENL=L+1:GOTO10
15 EG=2000:S1=3:TM$="000000":K=32:P=46:G
OSUB4000:GOTO5005
20 POKEM,K:POKEM+1,K:POKEM-1,K:POKECB,0:
GOSUB4000
21 POKEL,C:POKEL+1,RS:POKEL-1,LS
23 GOSUB7355:IF(VAL(RIGHT$(STR$(D),1)))=
7THEN35
25 IFD>33649THEN35
26 IFPEEK(D)=PTHENPOKED,K
```

Continued on page 20

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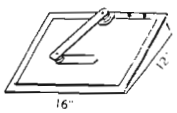

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Continued from page 18

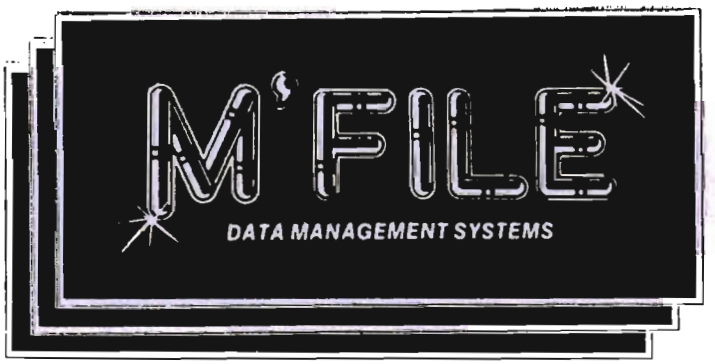
```
    27 IFPEEK(D)=KTHENPOKED,P
    35 TI$=TM$:GK=TI
    40 KB=PEEK(QS):IFTI-GF>85GOTO20
    41 IFKB=V0THENJ=80:GOTO5000
    42 IFKB=V1THENJ=-2:GOTO5000
 43 IFKB=V2THENJ=2:GOTO5000
 44 IFKB=V3THENJ=-80:GOTO5000
 45 IFKB=V4THENG=1:GOTO100
 46 IFKB=V5THENG=2:GOTO100
 47 IFKB=V6THENG=3:GOTO100
 48 IFKB=V7THENG=4:GOTO100
 49 IFKB=V8THENG=5:GOTO100
 50 IFKB=V9THENG=6:GOTO100
 55 EG=EG-E/10:GOSUB5500:GOTO40
 100 Z=L:FORQ1=1TO15:POKEZ,K:Z=Z+FR(G):GO
SUB200
 102 IFZ>33644ORZ<32850THENEG=EG-E/2:J=0:
GOTO5005
 103 IFZ=MORZ=M+10RZ=M-1THEN1000
 104 IFPEEK(Z)<>KTHEN107
 105 FORD=ET00STEP-50:POKECB,D:NEXT:POKEZ
,FF(G):FORD=1TO2:NEXTD,Q1:POKEZ,K
 107 EG=EG-E:J=0:GOTO5005
 200 IFPEEK(Z)=PTHENPOKEZ,K:POKECB,P:FORW
=1TO5:NEXT:POKECB,0:GOTO107
 201 RETURN
 513 FORWO=1TO20:GOSUB7355:TE=VAL(RIGHT$(
STR$(D),1)):IFTE=7THEN517
 514 IFD>33649THEN517
 515 IFPEEK(D)=PTHENPOKED,K
 516 IFPEEK(D)=KTHENPOKED,P
 517 NEXT:RETURN
 1000 POKECD,KB:POKEM,K:POKEM+1,K:POKEM-1
,K
 1004 FORD=1TO3:POKEM-41,EX(D):POKEM+41,E
X(D):POKEM+39,EX(D):POKEM-39,EX(D)
 1005 POKECB,EX(D):NEXT:POKECB,0:POKE9*E,
PEEK(9*E)+1:POKECD,15:GOTO5005
 4000 M=0:M=INT(RND(TI)*719+.5):GOSUB7000

 4010 M=M+32929:IFM>33649THEN4000
 4040 M=M+2:IFPEEK(M)<>KTHEN4000
 4041 IFPEEK(M+1)<>KTHEN4000
 4042 IFPEEK(M-1)<>KTHEN4000
 4045 IFM/P=INT(M/P)THENM=L:GOTO4500
 4050 POKEM,CC:POKEM+1,RR:POKEM-1,LL:RETU
RN
 4500 POKEM,K:POKEM+1,K:POKEM-1,K:POKEL,K
:POKEL-1,K:POKEL+1,K
 4510 IFGX=1THENL=L+J:GX=0
 4515 FORDD=1TO3:IFDD=1THENFV=77:VF=78:GO
TO4525
 4520 IFDD=2THENFV=C:VF=C:GOTO4525
 4523 FV=K:VF=K
 4525 FORDO=1TO2:POKEL+ZM(DO),FV:POKECB,V
F*2:NEXT
```

```
4530 FORDO=3TO4:POKEL+ZM(DO),VF:POKECD,1
33:POKECB,VF*2:NEXTDO,DO:POKECB,0
4540 IFGT<>2THENGT=GT+1:GOTO4500
4552 GT=0:FORDD=1TO900:NEXT:S1=S1-1:GOTO
5005
5000 IFL+J>33768ORL+J<32848THEN20
5001 IFPEEK(L+J)=PORPEEK(L+J-1)=PORPEEK(
L+J+1)=PTHENGX=1:GOTO4500
5002 GOSUB5250:POKEL,K:POKEL+1,K:POKEL-1
,K
5003 L=L+J:POKEL,C:POKEL+1,RS:POKEL-1,LS
:EG=EG-10
5005 PRINT"<HOM>"SPC(34)"<RON>     <ROF>"

5006 PRINT"<HOM><167><RON>HITS="PEEK(9*E
)"<ROF>":PRINT"<HOM>"SPC(26)"<RON>ENERGY
="EG"<LFT><ROF>"
5007 IFEG<=0THENF=5:GOTO60000
5010 PRINT"<167>";:FORD=1TO36:PRINT"<166
>";:NEXT:PRINT"<166><165>":GOSUB7000
5016 PRINT"<HOM><RON>"SPC(14)"SHIPS="S1:
:IFS1=<0THENF=7:GOTO60000
5017 GOTO20
5250 IFJ=2ANDSD+2<38THENSD=SD+2:RETURN
5251 IFJ=-2ANDSD-2>0THENSD=SD-2:RETURN
5252 IFJ=80ANDSW+2<=23THENSW=SW+2:RETURN
```

Continued on page 22



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Continued from page 21

```
5253 IFJ=-80ANDSW-2)2THENSW=SW-2:RETURN
5254 GOTO5005
5500 PRINT"<HOM><RHT><RON>HITS="PEEK(9*E
)"<ROF>":PRINT"<HOM>"SPC(26)"<RON>ENERGY
="EG"<ROF>"
5501 GOSUB7000:IFEG<=0THEN60000
5502 RETURN
5999 CB=59464:CD=CB+2:C=81:LS=40:RS=41:C
C=90:LL=60:RR=62:RETURN
6000 FORD=1TO6:READFR(D),FF(D):NEXT:EX(1
)=81:EX(2)=86:EX(3)=32:FORD=1TO4
6020 READZM(D):NEXT:IFSZ=2THEN6040
6030 V0=18:V1=42:V2=41:V3=50:V4=46:V5=38
:V6=39:V7=62:V8=55:V9=54:RETURN
6040 V0=50:V1=52:V2=54:V3=56:V4=71:V5=72
:V6=70:V7=84:V8=82:V9=89:RETURN
6200 DATA 40,93,41,77,39,78,-40,93,-41,7
7,-39,78,41,-41,39,-39
7000 POKECB,KB:POKECB,0:RETURN
7355 D=INT(RND(TI)*1000+.5):D=D+32768:RE
TURN
60000 WS=525:IFQS=151THENWS=158
60001 POKEWS,0:CLR:H=PEEK(900):CB=59464:
CD=59466
60002 F=PEEK(827)
60003 FORS=1TO3:FORW=1TO3:FORX=20TO200ST
EP7:POKECB,X:POKECD,X+55:NEXT
60004 FORX=255TO100STEP-3.5:POKECB,X:POK
ECD,X:NEXTX,W:FORX=0TO110STEP-5
60005 POKECB,X:POKECD,X:NEXTX,S:POKECB,0
:POKECD,15:PRINT"<CLR>"
60010 IFH<=2THENA$="CABIN BOY":GOTO62000

60020 IFH>2THENA$="PRIVATE"
60030 IFH>4THENA$="CAPTAIN"
60040 IFH>6THENA$="MAJOR"
60050 IFH>8THENA$="ADMIRAL"
60060 IFH>10THENA$="GENERAL"
60065 IFH>12THENA$="*GENERAL*"
60066 IFH>14THENA$="**GENERAL**"
60067 IFH>16THENA$="*PRESIDENT*"
60070 GOTO62000
60910 PRINT"<DWN>PLAY AGAIN (1=YES)";
60915 FOREX=1TO500:NEXT:CLR
60920 GETTT$:IFTT$=""THEN60920
60930 IFTT$="1"THENRUN
60940 POKECB,0:POKECD,0:POKECD+1,0:CLR:E
ND
62000 PRINT"<DWN>YOU GOT ";H;" ENEMY SHI
P(S) !."
62010 PRINT"YOU DID WELL ";A$:IFH>4THEN6
0910
62020 PRINT"BUT YOU NEED SOME PRACTICE,
YOU SHOULD  PLAY AGAIN":GOTO60910
READY.
```

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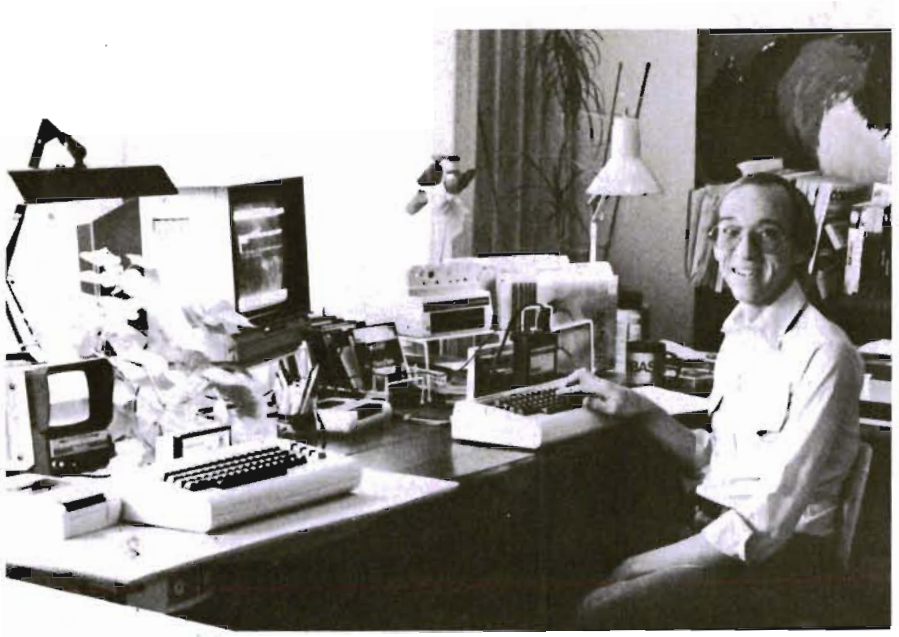

Living With Flex File 2.1

by Colin F. Thompson

REVIEW PROFILE

Title . . . . . Flex File 2.1
Format . . . . . Disk Only
Price $110.00
Language . Basic and Machine Language
Model VIC/64/PET
Audience . . . . . Business or heavy duty home use
Summary . . . . ISAM Data Base Manager
Source . . . . . Webber Software
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Warranty . . . . . Disk replacement for $20, anytime

The subject of the following review is so extraordinary I felt it deserved more space than usual. This month, the entire column will be devoted to a discussion of a database program called Flex File 2.1. Flex File uses programming techniques which, for the first time, show the real power of the VIC 20. It is the first useful program I've seen that will run on the Pet, C-64 or VIC. The same program will run on all three computers with exactly the same results. There is no loss of computing power when used on the C-64 or VIC, unlike most other "hand-me-downs" from the Pet world.

This review is going to be a little more technical than usual. If you can't follow the terminology or concepts, don't worry too much about it. Just remember that a file is a collection of records. Records have data fields, like Name and Address. Records are like 3 x 5 cards, and files are the boxes that hold the cards. Flex File is designed to be used by an inexperienced person, but it requires some organization before you begin. After this step is completed, FF is easy (and fun) to use.

Typical uses for Flex File would be Personnel Records, Mailing List, Inventory Control, Statistics or anything else that requires organization or arithmetic functions.

HARDWARE REQUIREMENTS

Although the review will be presented from the VIC's point of view, most comments are relevant for the C-64 and the Pet. The only difference between the three are the way the screen is formatted. With this in mind, let's look at what equipment you need to use Flex File.

The VIC needs 16-24k of memory expansion, one or two 1540 disk drives and just about any kind of printer. 24k is recommended. The C-64 requires one or two 1541 disk drives and a printer. Pet users may use any drive (4040, 8050 or 8250).

Although a printer is not an absolute requirement, it is assumed that you would want a hardcopy of your data.

USER REQUIREMENTS

Should you race out and buy a copy of Flex File? That depends. FF's strong points are capacity, speed and flexibility. It will store up to 5000 small records on a single disk. Typical file sizes allow 500 to 1500 records per file (disk).

If your current database has a random access file structure, it will be limited to about 500-800 records on the disk. If the file structure is sequential, the maximum number of records will be limited by how much memory your computer has free. That will usually equate to a few hundred records.

If you need more records per file, then FF is going to be useful. FF uses ISAM based random access file structure. It is not really necessary to know how this works but you should know that all your records are stored on the disk, not in the computer's memory. This means that you don't have to load all of the records into memory just to make a change to one of them.

How many records can you have in an FF file? That depends on the size of each record. The maximum number of characters in one record is 254. This would be a very large record size. The normal size (if there is a normal) would be about half that, or 127 or less. Figure one (page 30) shows an estimate of file sizes by how many characters are in the record. (Keys will be explained later). As you can see from the figure, the 800 record limit of other databases can be greatly exceeded with FF.

THE KEY TO POWER

Flex File is what ad copy writers like to call a "full feature" program. In this case I would agree with that tag. FF does everything a database program is expected to do. It imposes no unreasonable limits on the user. This is a serious business program for the serious user. If you are using your computer to keep track of a few dozen names in a mailing list, this is not the program you need. If, instead, you use the computer in what would be considered a "business environment", handling hundreds or thousands of records, this is the one I

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recommend. I would also recommend it to the serious "home" user (hacker). In short, FF beats the pants off anything available for the VIC.

How good is it on the C-64? It's as good as anything out there. M'File is functionally identical and also very powerful, but both have unique features. Since I don't have a Pet (do parakeets count?) I can't rate it on that machine. The original Flex File has been a best seller for the Pet for a long time.

THE 97K VIC

Flex File flexes its muscles by using a programming technique not normally used on the lowly VIC: overlays. Your VIC has a maximum of 28,159 bytes of memory available for BASIC programs. No amount of PEEKing and POKEing is going to change that (well, almost). So how do you squeeze a 97K program like FF into the VIC? Not with a big shoehorn, but with a pair of scissors. FF is cut up into several program modules, each small enough to fit into VIC's 28K memory.

Each module performs a specific task. Figure 2 lists the modules. You should get an idea of what the program can do by reading the list of modules. As new modules (overlays) load into memory, critical information like variables, pointers and other necessary data are saved and protected. Except for four short M/L routines, FF is written in BASIC. It's very easy to break into any module, make changes and save the changed module again. The manual gives exact instructions on how to do this.

22 COLUMN WOES

The first time I ran FF I found it was not formatted for a 22 column screen. Amazingly, the author, Mike Riley, had never seen a VIC. He wrote the original Flex File 1.0 for the Pet three years ago. Aside from the screen format, everything else worked. I broke into each module and added some color and reformatted the print statements so they looked good on the VIC. Although it's not necessary to modify the program, you may find it a stimulating way to sharpen your programming skills. This is a truly universal program; the VIC screen format is a small price to pay for Pet software.

FLEXING

As with any database program, some paperwork is necessary before you start keying in the data. You must also read some of the manual before beginning. I recommend you read the section called "Read This First". Its a good place to begin.

Since this program will run on the VIC, 64 or Pet, you must customize your copy. The program has to be told exactly which disk drive you have, how many and finally which printer and how many columns are on the screen and the printer. If you don't use a Commodore printer, you may define your printer's requirements. FF's interface to the printer is fairly well thought out. It works fine with NEC 8023A and The Connection. I've also tested the Microworld Electronix MW-302 and MSD's CPI parallel interfaces. Switch settings vary between the three, but all will work. Of course the VIC 1515/1525 is compatable. FF forces them into cursor down mode automatically.

SETTING IT UP

Read the manual first. This is not the usual "quick and easy to learn" VIC program we've seen in the past. After you are reasonably familiar with the Customize procedure, go ahead and customize your diskette. If you make a mistake, it can always be corrected.

Now comes the only hard part: setting up the file structure. It's only difficult the first time. You should already have the file structure written down on paper. You will need to know the size of the largest record in your new file, how many fields are needed and the name of each. FF does not ask how long each field will be. It doesn't care. As long as each record fits into the length limit that you set, the fields can be any size. This is a powerful feature. The only time FF asks for a field length is for page formatting.

A USEFUL EXAMPLE

On page 11 of the July issue the VIC 20 Product Suppliers' List is found. The VIC List makes a fine example of the power of Flex File. For the last year the VIC list was done on TOTL LABEL. It was held in three files of about 110 records each. Any changes to the list required me to load one of the files into memory. Printing the list was a long slow process. TOTL LABEL was the wrong piece of software for the job. TL is a fine label program but not adequate as a database manager. The list is now in FF.

Maintenance of this file is now a lot easier. All 333 records are on one disk, in one file, with room for the addition of another 667 records. File maintenance is also substantially faster. FF requires five seconds to find any record on the disk, whether there are 5 or 5000 records in the file. Not four seconds, or six seconds, but five seconds to find, add or change any record.

This speed is due to the ISAM random access file structure of the program. The way it is implemented makes it much faster than any random access program I've used on the VIC. Sequential file programs like Mini Jini or TOTL LABEL are faster when the file is empty but slow down as the file is filled up. They also require you to load the entire file into memory before you can change a record. I've stressed the speed factor because you shouldn't spend all your time waiting for the program to work.

FF requires a few disk changes and about two minutes from power-up to get to the File Maintenance module. If you have two disk drives the time is reduced to about one minute, with no diskette changes.

KEYED UP

Look at the VIC list on page 11 of the July issue. The file is defined as 8 fields. The field names are printed just above the dotted line. I declared the total record length as 127 characters. When FF calculated the maximum file size it came up with 1000 records.

The list is sorted alphabetically, as you can see, by Name. What you can't see is that if two companies had the same name, FF would sort the two by the data in the Type column. If two records had the same Name and Type, FF would separate them by Zip code. This is an example of using Key Fields. FF requires you to declare which fields are going to be Key Fields. This is the order that FF sorts on. If your records are names and addresses, you would make the Key Fields Last name, First name, and perhaps Zip code. This will allow all the Smiths to be listed alphabetically by their First names. Two John Smiths would be listed in Zip code order.

The VIC list can be re-sorted to Zip code order in less than one second. Although it would take longer, the List can be sorted on any field, whether it's a Key Field or not. Always use key fields conservatively. Every key used will decrease the amount of records that can be stored on the disk. FF does not limit the number of key fields you might want to use. Each key may be split to encompass two or more fields. It's a good feature, but must be used wisely.

An unusual, and powerful feature is the ability to change the number of fields after the file is declared. It's a simple matter to add fields to an existing file. For example, in another version of the VIC List I added a ninth field for Contact Name.

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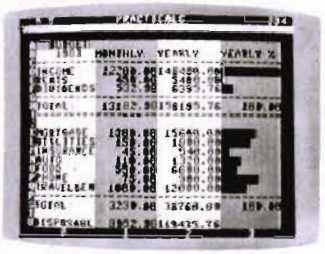

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This is accomplished by converting the data on the disk to a sequential file on tape, then reading that data tape back into a newly defined file.

If you have some knowledge of sequential files you can load tapes from other programs into FF. This saves a lot of typing.

CALL THE KEY OPERATOR, PLEASE

After your new file has been set up using the "Open a New File" module, it's time to try entering some dummy records. Never, never assume the file is set up correctly. Test everything before you add real data. All file maintenance is done from - you guessed it - the Direct File Maintenance module. The menu for this module has 15 options, which are listed in Figure 3. This is the familiar Add, Change, Delete menu with 12 extra options. The options are accessed by a single keystroke.

The Add records option is very straightforward. The first field name appears with the cursor following it. FF uses a variation of the INPUT command to get Keystrokes. Therefore the comma, colon and quote marks can't be used. Be careful not to hit the CLR HOME key. After all fields have been entered you get a chance to correct any errors. Corrections can be made by using the cursor control keys, as usual. You don't have to re-key an entire field. FF performs the Add and Change functions very smoothly. It almost makes Key entry a pleasure (almost).

The five second wait for a record to be Added may be improved by adding records in the Batch Entry mode. This allows fast typists to key in records with no wait. After all the records are keyed in, FF writes them to the disk while the typist is free to do other things.

After each record is entered, it is displayed at the top of the screen. Any record in this position may be changed or deleted. From the menu you may find and display a record by entering part of the primary key, or its record number, if known. For example, to find the first record on the VIC list, (3G Company) you only need to enter 3 or 3G, because those characters are unique. If the letters you enter are not unique to one record, the first record that matches will be found. N for Next will bring up the next record and P for Previous will find the record before the one on the screen.

It's a good system. I've used it extensively and my only complaint is screen formatting on the VIC. Wrap-around never bothered me until I got a 40/80 column card. Now I'm ruined for life. Flex File is fantastic with 80 columns on the VIC. It's even better with 40 columns. My Data 20 card just paid for itself. 40 columns on the VIC is much better than 40 columns on the 64. The letters are clear, clean and much more legible. The Data 20 device and Flex File seem to be made for each other.

PRINT POWER

Assuming you set up the file correctly, a printer test is in order. Here's where the fun begins. Once a database has been established, the data can be printed just about any way you like. Labels are a snap to print. This is the best label printing program I've ever used. The VIC list is printed from the Report module. The column titles are defined by you. You may load any column with data from any field. Up to 20 columns may be printed, and up to 20 Header lines may be entered. The Header lines are centered on the page automatically, but are limited to 80 characters each.

You may define different report formats. This will let you print many different reports from the same data. Each report format is saved on the disk with its own name. My previous experience with DB Master on the Apple had taught me just how difficult a database program could be. DB Master did everything that FF does, but was inflexible. Changing a report format on DB Master was an all day event. With FF it takes just a few seconds.

IT ADDS UP

I'm not going into great detail on the math operations FF can do. I have not tried all of them, but since everything else worked, I would be amazed if the functions did not work. Briefly, all relational operations may be performed with an ingenious method I have never before seen. Instead of specifying records to be printed or math to be performed on columns by the usual less than, equal to or divide by symbols, FF lets you write an equation in English. When you are specifying the math to be performed on each column, FF puts a complete list of "English equations" on the screen to help you. This section of the program was written for idiots. I had no difficulty, therefore, understanding it. When I tried it, I found it to be very easy to learn. The file calculations you define are stored on the disk for later recall just like report formats. Mathematical whizzes may define high level functions not normally supported by FF. Anyone interested in statistics should be able to make Flex File sing.

TWIN SINGLES

If you have two disk drives attached to your VIC (doesn't everyone?), FF will use both of them. Since FF is most efficient when the programs and data are on two different disks, FF's operation gets less complicated with twin singles. It also gets much faster. You need only to put the program disk in drive 8 and the data disk in drive 9. I've seen FF and two 1540's working together with fairly good results.

I say "fairly good" because the serial bus can become confused and cause one or both of the drives to deselect. FF's author is working on a software cure for the twin single problem. It may have been solved by the time you read this. I see no reason the VIC could not use the Commodore 4040 disk drives with the appropriate IEEE interface installed. The 4040 is not subject to the "lock up" problem of twin singles. I'll be testing the new MSD disk drive for the VIC this fall. Perhaps this drive will not be affected by the bus timing problem.

SPECIFICATIONS

Flex File has so many options and functions that the normal human being would never use them all. I hope this is the direction that software authors will take in the future. The VIC and 64 responds well to the overlay concept. Byte for dollar, this is the least expensive VIC program on the market. FF is dongle protected, which means you can make as many backup copies of the disk as you like, but can only use it on a computer with the dongle plugged in. If the program disk is damaged in use, it will be replaced for a small fee. You should back up all data disks, using the 1541 backup program found on the diskette that comes with the 1541. This is very important. A disk drive failure, at the wrong moment, could result in data loss.

The user's manual should get an inexperienced user up to speed in one or two days. An experienced user will breeze through it. My manual is a pre-release copy, but it is 76 pages long.

If this is your first run-in with Pet software, I guarantee you will be impressed. It's a delight.

Flex File 2.1 is $110. Available from Webber Software, Box 9, Southeastern PA 19399. (215) 687-5607.

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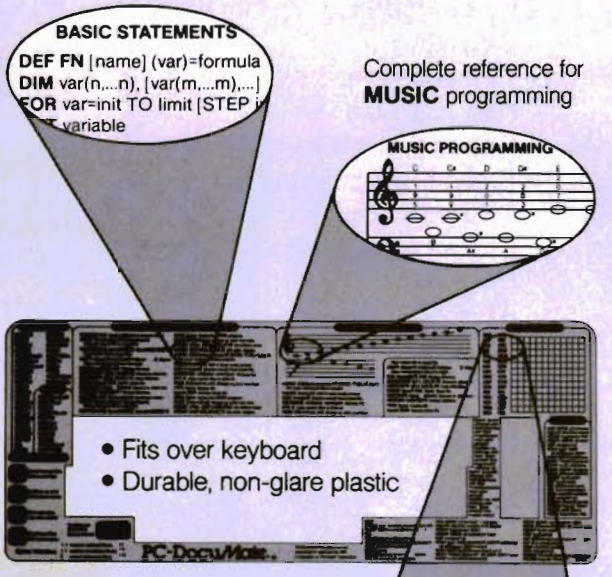

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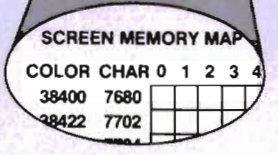

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Circle No. 38

Continued from page 28

Flex File Figure 1 - Maximum Records

Maximum Records on 1540, 2031, 4040:

Chrs/Rec:	31	50	84	127	254
1 Key:	3876	2571	1608	1095	560
2 Keys:	3360	2333	1512	1050	547
3 Keys:	2726	2135	1426	1008	536

Flex File Figure 2 - Major Program Modules

```
Disk Menu
File Menu
Start File
Direct
Mail Labels
Report Writer
Print Report
Change Form
Create Seq File
Load Seq
Alpha Order
Calc File
Make Calcs
Backup FF
Update
Batch Entry
Word Proc
Do update
```

Flex File Figure 3 - Direct File Maintenance Menu Options

```
Add
Replicate
Change
Delete
Next
Previous
Goto
Find
Browse
Key
User
Limit
Snapshot
Wipe
Return
```

Double Vision

By Colin F. Thompson

FREE MEMORY? A 40/80 COLUMN CARD TIP

Yes, I know that last month I promised you a nice long list of software that works with the 80 column card. Further research has revealed that most VIC software will work, and many programs are actually easier to use on the expanded screen. The only list I'm compiling is a very short one: programs that don't work. Generally speaking, games and autostart cartridges won't work. I'll expand on that next month.

Recently I received a tip from a reader in Virginia that solved a problem that has bedeviled me for over a year. In his letter, Joel Crabbe hinted the VIC could be fooled into believing it had 31K of uninterrupted memory available for BASIC program storage. I'm sure you have all seen advertisements for the fabled "32K RAM VIC". Snicker, snicker. The VIC's magical moving screen really limits the RAM storage to a maximum of 28,159 bytes free. So much for the 32K VIC.

PLAY BALL!!

However, with the introduction of the 80 column card, it's a whole new ballgame. Mr. Crabbe's letter reminded me that the VIC's screen RAM is no longer used (or needed) while the 80 column card is operating. This means that BASIC programs may be loaded into what is normally a reserved section of memory: screen RAM. All that is necessary to use the screen RAM is to POKE the beginning of BASIC pointer to the start of page 1, decimal 1025. This is 3,584 bytes lower than the normal start of BASIC.

Next we must fill the hole in memory between 1024 and 4096 with a 3K RAM card. The result is:

****CBM BASIC V2****

31743 BYTES FREE

READY

At last, the real 31K VIC is here. To get this "expanded VIC", you will need some hardware. I used Cardco's CARD/3s expansion card. This is a smart card. It lets each of the three slots be seen by the VIC in a different way. Plug in the Data 20 card in the last slot, a 24K card in the middle slot and a 3K card in the first slot. A bank of DIP switches on the CARD/3s will allow each slot to be seen as Block 5, Block 3, both, off or any slot as a source of RAM, regardless of block location.

This arrangement works for me. Select slot 3 to be seen as Block 5 (Data 20 only). Select 2 to be OFF. Select slot 1 to be OFF. Select the "RAM" switch (7) to find any RAM on the bus. Press the reset switch, transfer to the 40/80 column screen and type in the following commands in the immediate mode, on one line:

POKE 642, 4:SYS 58232 (ret)

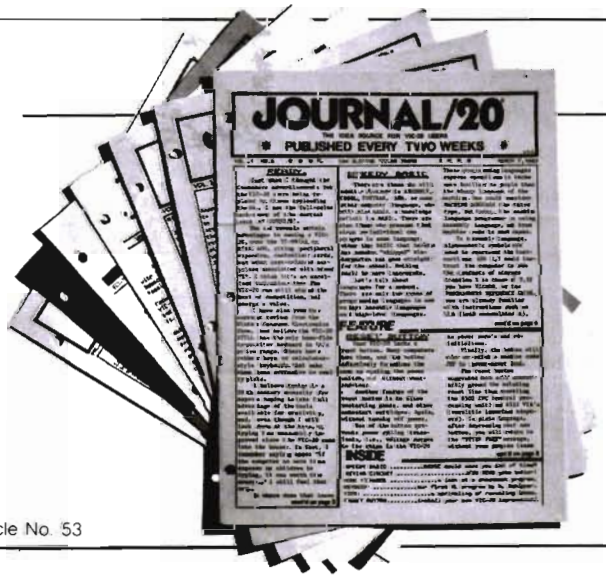
The screen should display 31743 BYTES FREE. Test your work by loading and running a long program. The above arrangement will work with a "dumb" expansion card, as long as your Data 20 card has no on-board RAM.

Don't have a 3K card? I don't either. However, my Super Expander, with its 3K of RAM will work perfectly. Data 20's use of the Video Pak 64K will work in place of a 24K card. This set-up works with a 16K or 8K card in place of the 24 card. It will result in an extra 3584 BYTES FREE. For example, your 16K VIC will now have 23551 BYTES FREE.

What can you do with the extra memory? Plenty. I use TOTL LABEL for a lot of different applications. Many of my TL files are completely filled up. I can now add an additional 3K of data to each file. In general, any program that uses sequential files will benefit.

Next month we will trick the VIC into yielding up another 196 bytes for our use. I'll leave you with something to try:

Plug in your monitor to the 80 column board. Plug in a TV set to the normal VIC video port. Fire up the VIC and switch to 40 or 80 columns. Watch what happens to the TV. Now you know why I call this Double Vision.



Circle No. 53

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A Slot Machine for the C-64

By George Gaukel

One of the useful functions of a computer is the simulation of systems. I have chosen for this article the slot machine, a mechanical system.

The programs are designed for disk use. Listing 1 generates a binary file containing the sprites and machine code. If you do not have a disk, the program can be modified to poke the data statements to memory. Once the data statements are poked to memory, a machine language monitor can be used to save memory 12800-14100 ($3200-$3714). There are two checksums for ease in identifying incorrect data statements. The checksum will not detect the transposition of two statements or offsetting errors.

USING THE PROGRAM

LOAD and RUN the program 'SLOT. BOOT'. This program moves the bottom of BASIC up and loads the 'SLOT.DATA' and 'SLOT' programs. Once the title screen has appeared, continue by using the Space-Bar or PORT-1 Joystick (for those who must pull a handle when playing slots). You start with 100 coins and the counter rolls back to zero at + /-1000 coins. Once you are in the main program loop, the only way to stop is to press the 'Q' key or turn the computer off.

PROGRAMMING NOTES

The sprites are available for editing as screens 200-209, using the sprite editor. Screens 210-220 contain the machine code and should not be altered. The program has also reserved memory area

LISTING 2 SLOT-BOOT

```
100 REM 'SLOT.BOOT' LISTING 2
110 IFX=0THENX=1:LOAD"SLOT.DATA",8,1
130 POKE 53280,0:POKE 53281,0
140 PRINTCHR$(147)CHR$(5)"NEW"
150 PRINTCHR$(17)CHR$(17)"LOAD";
160 PRINTCHR$(34)"SLOT"CHR$(34)",8"
170 POKE198,9 : POKE53265,27
180 DATA19,13,13,32,32,82,85,78,13
190 FORI=1TO9 :READX:POKE630+I,X:NEXT
200 POKE44,64:POKE16*1024,0:POKE56,126
210 CLR:NEW
```

LISTING 1 SLOT DATA

```
100 REM 'SLOT-DATA' LISTING-1
110 :
120 A=0 : FOR I=12800 TO 13439
130 READ DA : A=A+DA : NEXT
140 :
150 B=0 : FOR I=13440 TO 14099
160 READ DA : B=B+DA : NEXT
170 :
180 IF A=64847 AND B=78055 THEN 260
190 PRINT"CHECKSUM ERROR: ";
200 IF A=64847 THEN 220
210 PRINT"SPRITE DATA(64847)"A
220 IF B=78055 THEN 240
230 PRINT "CODE DATA(78055)"B
240 END
250 :
260 PRINT"CHECKSUM OK" : RESTORE
270 :
280 REM KILL OLD FILE -IF ANY
290 OPEN15,8,15,"S0:SLOT.DATA"
```

Continued on page 34

IS GRIDRUNNER UNBEATABLE?

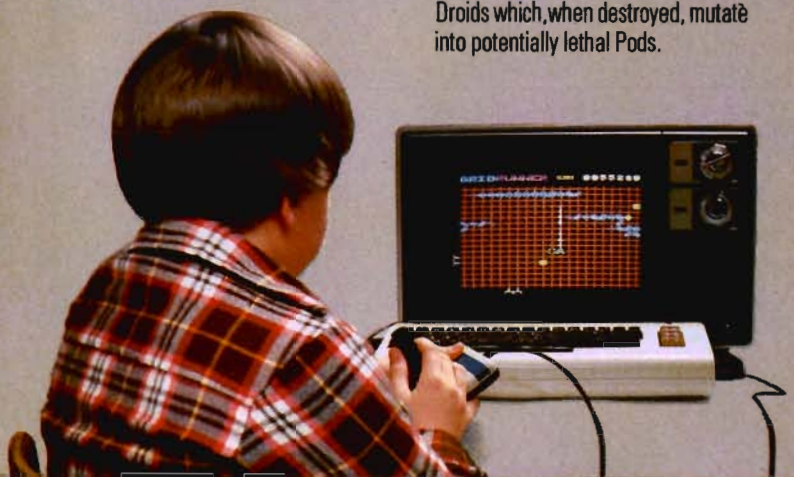
No one, not even the author, has ever achieved the last Grid. It is an extremely fast-paced arcade-quality game designed to test your coolness under fire and challenge your reflexes.

As the pilot of the Gridrunner, a combat ship, you must annihilate the various enemies traveling along the "Grid". High scores are possible only through the mastery of the patterns of the X/Y Zappers and the Gridsearch Droids which, when destroyed, mutate into potentially lethal Pods.

Gridrunner has 31 levels of difficulty (20 levels in the VIC 20 version).

Can you beat Gridrunner? See your local computer or games dealer and find out.

Gridrunner is available for VIC 20, Commodore 64 and Atari 400/800.



Recent High Scores

VIC 20:
Cam Pahr-376,330 level 17
from Plymouth, Wisconsin

Commodore 64:
Edward Pollard-1,231,510 level 30
from Hacienda Heights, California

HesWare™

Human Engineered Software, Inc.
150 North Hill Drive
Brisbane, California 94005

which represents sprites 190-199. If you are converting to cassette, remember that some form of boot is necessary to move the bottom of BASIC up to protect this area.

SLOT MACHINE THEORY

The reels are set up to pay back about 95%. This program was modeled after the Twenty-One Bell three reel machine. The chances of hitting a jackpot (19 different combinations) are 1 in 421. A complete description of this specific machine is contained in 'SCARNE'S NEW COMPLETE GUIDE TO GAMBLING' by John Scarne. If you would like to change the reel pattern (but are not sure how this would change the payout percentage) then this book would be of help as it gives the procedure for computing the total payout for all possible winning combinations. The top, middle and bottom line indicates that the odds of hitting any specific combination are 8000 to 1 (20*20*20). You are no closer to getting three sevens on the 7999th pull than you were on the first pull, due to the random features built into the slots. It is the random nature of these machines and the control of the payout combinations that assures the house of their 'fixed' income percentage.

Continued from page 32

```
300 CLOSE15
310 :
320 OPEN8,8,8,"0:SLOT.DATA,P,W"
330 REM WRITE LOAD ADDRESS
340 PRINT#8,CHR$(0);
350 PRINT#8,CHR$(50);
360 REM WRITE DATA
370 FOR I = 12800 TO 14099
380 READ DA : PRINT#8,CHR$(DA);
390 NEXT : CLOSE 8
400 END
410 :
420 REM SPRITE DATA
430 :
440 DATA   0,   0,   0,   0,   0,   0
450 DATA   0, 126,   0,   3, 255, 192
460 DATA  15, 255, 240,  31, 255, 248
470 DATA  63, 255, 252,  60, 255,  60
480 DATA 124, 255,  62, 252, 255,  63
490 DATA 255, 231, 255, 127, 231, 254
500 DATA 119, 231, 238,  59, 255, 220
510 DATA  60,   0,  60,  30,   0, 120
520 DATA  15,   0, 240,   3, 255, 192
530 DATA   0, 126,   0,   0,   0,   0
540 DATA   0,   0,   0,  13,   0,   0
550 DATA   0,   0,   0,   0,   0,   8
560 DATA   0,   0,  55,   0,   0, 252
570 DATA 128,   1, 254,  64,   3, 255
580 DATA   0,   3, 255,   2,   3, 254
590 DATA   4,   4, 252,   8,   8, 120
600 DATA  16,  12,   0,  48,  63,   0
610 DATA 252, 127, 129, 254, 255, 195
620 DATA 255, 255, 195, 255, 127, 129
630 DATA 254,  63,   0, 252,  30,   0
640 DATA 120,   0,   0,   0,   0,   0
650 DATA   0, 255,   0,   0,   0,   0
660 DATA   0,   0,   0, 126,   0,   3
670 DATA 255, 192,  15, 255, 240,  31
680 DATA 255, 248,  63, 255, 252,  63
690 DATA 255, 252, 127, 255, 254, 127
700 DATA 255, 254, 127, 255, 254, 127
710 DATA 255, 254, 127, 255, 254,  63
720 DATA 255, 252,  63, 255, 252,  31
730 DATA 255, 248,  15, 255, 240,   3
740 DATA 255, 192,   0, 126,   0,   0
750 DATA   0,   0,   0,   0,   0,  13
760 DATA   0,   0,   0,   0,   0,   0
770 DATA   0,   0,   0,   0,   0,   0
780 DATA   3, 252,   0,  15, 255,   0
790 DATA  63, 255, 192, 127, 255, 224
800 DATA 255, 255, 240, 255, 255, 254
810 DATA 255, 255, 255, 255, 255, 243
820 DATA 127, 255, 224,  63, 255, 192
830 DATA  15, 255,   0,   3, 252,   0
840 DATA   0,   0,   0,   0,   0,   0
850 DATA   0,   0,   0,   0,   0,   0
```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```
860 DATA   0,   0,   0,  13,   0,   0
870 DATA   0,   0,   0,   0,   0, 255
880 DATA   0,   1, 231, 128,   7, 255
890 DATA 224,   6, 102,  96,   7, 255
900 DATA 224, 255, 255, 255, 240, 193
910 DATA   7, 247,  93, 119, 240,  65
920 DATA   7, 247,  93, 111, 240, 221
930 DATA 119, 255, 255, 255,  25, 153
940 DATA 152,  63, 255, 252, 102, 102
950 DATA 102, 127, 255, 254,   0,  62
960 DATA   0,   0,   0,   0,   0,   0
970 DATA   0, 255,   0,   0,   0,   0
980 DATA   0,   0,   0,   0,   0,   0
990 DATA   0,   0,   0,   0,   0, 255
1000 DATA 255, 255, 192,   0,   3, 255
1010 DATA 255, 255, 225, 130,  15, 238
1020 DATA 186, 239, 224, 130,  15, 224
1030 DATA 130,  15, 238, 186, 223, 225
1040 DATA 186, 239, 255, 255, 255, 192
1050 DATA   0,   3, 255, 255, 255,   0
1060 DATA   0,   0,   0,   0,   0,   0
1070 DATA   0,   0,   0,   0,   0, 255
1080 DATA   0,   0,   0,   0,   0,   0
1090 DATA   3, 255, 192,   7, 255, 224
1100 DATA  14,   0, 112,  28,   0,  56
1110 DATA  56, 126,  56,  56, 255,   0
1120 DATA 113, 195, 128, 113, 129, 128
1130 DATA 113, 129, 128, 113, 129, 128
1140 DATA 113, 195, 128,  56, 255,  14
1150 DATA  56, 126,  28,  28,   0,  56
1160 DATA  14,   0, 112,   7, 255, 224
1170 DATA   1, 255, 192,   0,   0,   0
1180 DATA   0,   0,   0,  13,   0,   0
1190 DATA   0,   0,   0,   0,   7, 255
1200 DATA 224,   7, 255, 224,   6,   0
1210 DATA 224,   6,   0, 224,   0,   1
1220 DATA 192,   0,   1, 192,   0,   3
1230 DATA 128,   0,   3, 128,   0, 127
1240 DATA 224,   0, 127, 224,   0,  14
1250 DATA   0,   0,  14,   0,   0,  28
1260 DATA   0,   0,  28,   0,   0,  56
1270 DATA   0,   0,  56,   0,   0,  56
1280 DATA   0,   0,   0,   0,   0,   0
1290 DATA   0, 255,   0,   0,   0,   0
1300 DATA   0,   0,   0,   0,   0,   0
1310 DATA   0,   0,   0,   0,   0, 255
1320 DATA 255, 255, 192,   0,   3, 255
1330 DATA 255, 255, 195,   0, 195, 195
1340 DATA  60, 195, 243,  39, 243, 231
1350 DATA  39, 231, 231,  60, 231, 231
1360 DATA   0, 231, 255, 255, 255, 192
1370 DATA   0,   3, 255, 255, 255,   0
1380 DATA   0,   0,   0,   0,   0,   0
1390 DATA   0,   0,   0,   0,   0, 255
1400 DATA   0,   0,   0,   0,   0,   0
```

Continued on page 116

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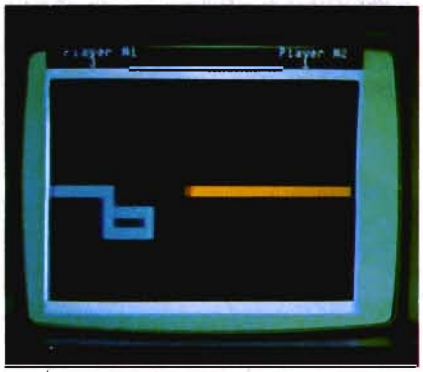
Think Fast

Eric Giguere

Think Fast! is a two-player game I created for the Commodore 64. Requiring two joysticks, the object is to be the first to gain five points and so win the game. Each player controls a trail-leaving "snake" with his joystick and gains points by forcing his opponent to hit either: 1) your trail, 2) his trail or 3) the wall. Of course, your opponent will at the same time be doing likewise, trying to force *you* to crash. Think Fast! is both a game of strategy and of reflexes.

RUNNING THE PROGRAM

Type in the program listing following this article. Be sure to save a copy as soon as you are finished because an error in the data statements may cause the computer to "hang up," so to speak. Once accomplished, get a friend and plug in the two joysticks. Now type RUN and hit RETURN. The screen will clear and the title will appear. After a momentary pause the title will literally disappear to be replaced by the game screen. Player #1 controls the cyan-colored snake on the left while player #2 controls the pink one on the right. Controlling the snakes is done by moving the joysticks in the desired directions. If no direction is chosen (the joystick stays in the middle) then the snake will continue to move forward in the last direction. NOTE: The program prevents you from moving backwards so as not to disqualify yourself accidentally. This means that if you were heading left and suddenly moved right the computer would keep moving you left.



Once a player collides with something his snake is cleared off the screen and a point is given to his opponent. If neither player has reached five points yet, the screen clears and another game screen is drawn with both players starting over. Points for each player are indicated at the top of the screen. In the event that both players simultaneously collide with either each other or the walls, a draw is called and both players start again with a new screen.

A player wins when he reaches five points before the other. The screen is cleared, final scores are given and you are asked if you wish to play again. At this time be careful not to move the joystick as this will be interpreted by the computer as a "no". If this happens the 'READY.' message will appear. Simply type RUN and hit RETURN to restart the game.

STRATEGY

The basic strategy in this type of game is to trap your opponent in an area so that he has no way to get out and will be forced to crash. One must also watch that your opponent doesn't manage to do this to you as well. If he does, then probably the best thing to do is surprise him by making an unexpected move to try and cut him off. If he's quick enough he'll move away, giving you a chance to escape. Otherwise he will crash and you'll gain a point. Of course, be careful that you don't crash into him.

MACHINE LANGUAGE ROUTINES

Think Fast! uses two machine language routines to speed it up. The first, located at 832 ($0340) reads both joysticks, putting their X and Y values in locations 830 & 831 (Joystick 1) and 828 & 829 (Joystick 2), respectively. A 1 for the X-value indicates to the right while 255 indicates to the left. A 1 in the Y-value indicates down and 255 indicates up. This greatly speeds up the game where otherwise it would take up a large amount of time.

The second routine, located at 886, is really there only for creating that special "disappearing" effect. It goes through color memory and changes all locations with a certain color into another. The color you want changed is POKEd into location 251 and the color you want it changed to is POKEd into 252. For example, if you wanted to change all the white to orange you would poke 251 with a 1 (white) and 252 with 8 (orange) and call the routine

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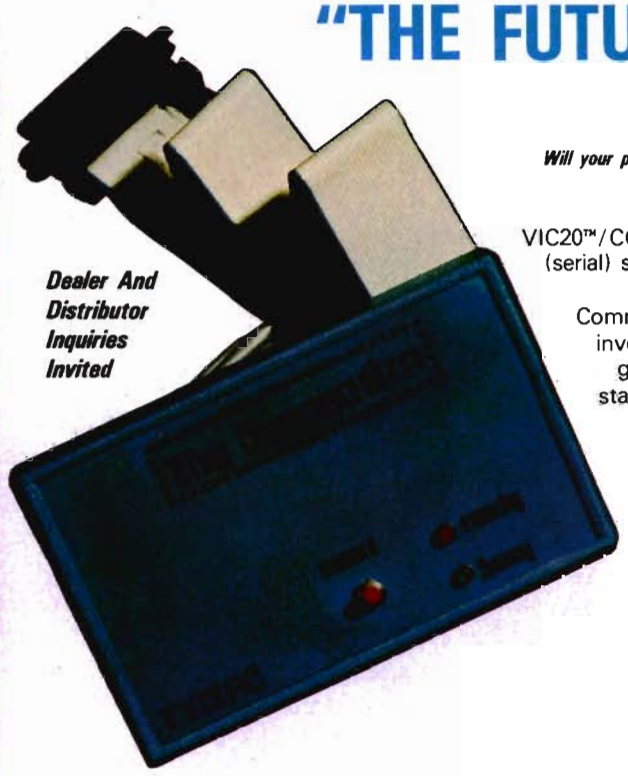

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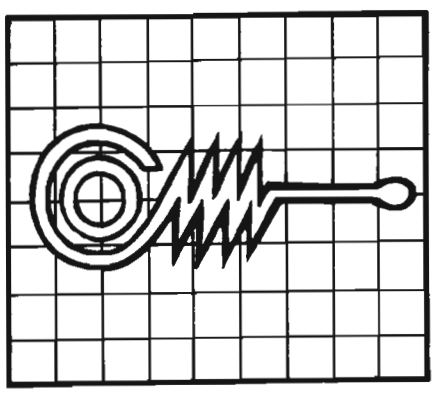
with a SYS 886 (do this only when the machine code is loaded). All characters in white would instantaneously be changed to orange. The program uses this routine to change a certain color back and forth between green and itself and then changes it to black, making it invisible against the black background, thus making us believe it has disappeared.

FINAL NOTES

This program really doesn't have much in the way of extras. The graphics and sounds are not very sophisticated, mainly because they don't have to be and would only serve to slow down the program. Yet the game is still quite hectic and fun. It's amazing to see how both players react to playing it, now laughing aloud at their pleasure in defeating the opponent, now grumbling on their lack of reflexes. I think this is so because it is one of a few games that allows two people to play simultaneously against each other. Instead of just playing the computer you're playing another human being, one who can really challenge you with new strategy (and one who can also have two left thumbs, just like you). This head to head action turns the game into a really enjoyable experience. It would be nice to see more of these kinds of games around.

For anyone who doesn't want to type the program in I'll be glad to send you a copy. Simply send a disk or cassette along with a self-addressed mailer (no stamps please) and $3.50 to:

Eric Giguere
Box 901
Peace River, Alberta
Canada T0H 2X0



```
    10 rem ***************
    12 rem *             *
    15 rem * think fast! *
    17 rem *             *
    20 rem ***************
22 rem
25 rem (c) 1983 by
27 rem
30 rem eric giguere
32 rem
50 clr:bc=53280:sc=bc+1:pokesc,0:pokebc,
5
55 printchr$(14);"▼▼▼▼▼▼▼▼"tab(13);"◣R
          "
60 printtab(13);"R Think Fast! "
65 printtab(13);"R             "
70 print"▼▼"tab(14)"authored by▼"
75 printtab(14)"R           "
80 printtab(14)"R E.Giguere "
85 printtab(14)"R           "
90 ifpeek(832)=162then100
95 fori=832to918:readа:pokei,a:next
100 x2=828:y2=x2+1:x1=y2+1:y1=x1+1:jyrd=
832:chnge=886
105 sm=1024:cm=55296-sm:se=2023:c=40:n1=
256:vo=54296:v=54272:wv=129
110 fori=vtovo:pokei,0:next
115 pokev,125:pokev+1,10
120 pokev+5,160:pokev+6,243:pokevo,15
125 forx=1to2:gosub500:next
150 print"▼  ▼Player #1"tab(29)"Player #
2"
155 print"▼▼▼▼"s1;tab(31)s2
160 fori=0to39:pokesm+c*2+i,160:pokesm+c
*2+i+cm,1
165 pokese-i,160:pokese-i+cm,1:next
170 fori=0to20:pokesm+(i+3)*c,97:pokesm+
(i+3)*c+cm,1
175 pokese-(i+1)*c,225:pokese-(i+1)*c+cm
,1:next
180 p1=sm+13*c+1:d1=1:p2=p1+37:d2=-1:e1=
d1:e2=d2
200 pokev+4,33:pokep1+cm,3:pokep1,160:po
kep2+cm,10:pokep2,160:pokev+4,0
210 sys(jyrd):xa=peek(x1):ya=peek(y1):xb
=peek(x2):yb=peek(y2)
220 ifxa=0then230
225 d1=xa+n1*(xa=255):goto240
230 ifya=0then240
235 d1=c*(ya+n1*(ya=255))
240 ifxb=0then250
245 d2=xb+n1*(xb=255):goto260
250 ifyb=0then260
255 d2=c*(yb+n1*(yb=255))
```

Continued on page 40

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Circle No. 56

Continued from page 38

```
260 ifd1=-e1thend1=e1
265 ifd2=-e2thend2=e2
270 e1=d1:e2=d2:x=0:p1=p1+d1:ifpeek(p1)<
>32thenx=x+1
275 p2=p2+d2:ifpeek(p2)<>32thenx=x+2
280 ifx=3then325
285 ifxthen300
290 goto200
300 gosub500
305 print"■■■■■■■■■■■■■■■Player #"x"has b
een Defeated!":fori=1to2000:next
310 ifx=1thens2=s2+1:ifs2=5then360
315 ifx=2thens1=s1+1:ifs1=5then350
320 goto150
325 print"■■■■■■■■■■■■■■■■■■■■■■■■Nobody
Wins!"
330 x=1:gosub500:x=2:gosub500
335 fori=1to2000:next:goto150
350 print"▼■■■■■■■■■Player #1 has won thi
s game!":goto370
360 print"▼■■■■■■■■■Player #2 has won thi
s game!"
370 print"■■■■"tab(10)"***Final Score***
"
375 print"■■"tab(13);"Player # 1:"s1
380 print"■"tab(13);"Player # 2:"s2
385 print"■■■■■■■■Do you wish to try agai
n? (y/n)":poke198,0
390 x=peek(197):ifx=64then390
395 poke198,0:ifx=25then50
399 end
500 poke252,5:poke251,3:ifx=2thenpoke251
,10
505 fori=2to15:pokev+4,wv:sys(chnge):z=p
eek(251):poke251,peek(252):poke252,z
507 pokev+4,0:pokevo,i:next
510 poke252,0:poke251,3:ifx=2thenpoke251
,10
515 sys(chnge):fori=1to750:next:return
600 data 162, 2, 134, 251, 189, 255, 219
, 160, 0, 162, 0, 74, 176, 1
610 data 136, 74, 176, 1, 200, 74, 176,
1, 202, 74, 176, 1, 232, 142
620 data 60, 3, 140, 61, 3, 198, 251, 20
8, 1, 96, 173, 60, 3, 141
630 data 62, 3, 173, 61, 3, 141, 63, 3,
166, 251, 208, 206
640 data 169, 216, 133, 254, 169, 0, 133
, 253, 168, 177, 253, 41, 15, 197
650 data 251, 208, 4, 165, 252, 145, 253
, 200, 208, 241, 230, 254, 165, 254
660 data 201, 220, 208, 233, 96
```

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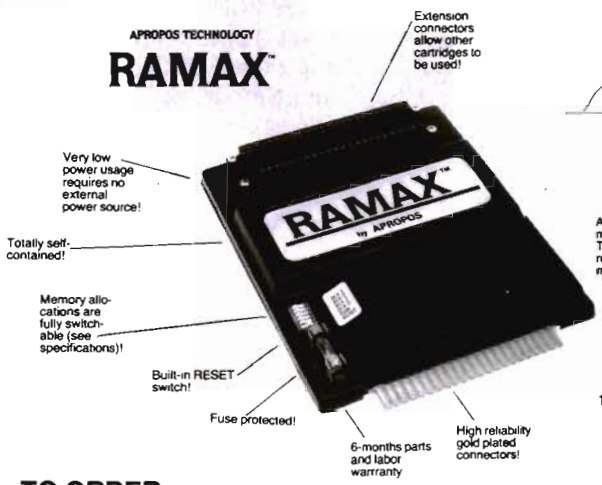

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Circle No. 37

Vic-20 Graphic Commands in Forth

By Thomas Henry

The VIC-20 is capable of many exotic and wonderful graphic displays, but it's not always the easiest thing in the world to accomplish them. For example, to change the border/background colors you have to enter something like:

POKE 36879, 53

And in general, whether you are changing border/background colors, creating high resolution graphics, or generating a new character set, you will have to deal with many ghastly numbers like the ones above. Wouldn't it be simpler if you could just tell the computer:

BLUE BORDER

and have it change the color at once? Or how about POKE a character at row 12, column 5? Of course, with the Super Expander Cartridge you can perform commands similar to these, but there are two drawbacks here. First, there is the initial expense in purchasing the cartridge. But more importantly, once you have the cartridge, there is no way to change it should some command need to be modified for any reason. What we really need is a general purpose way to enter color and graphics commands into the VIC-20 with a minimum of hassle, a maximum of flexibility and a low initial outlay of cash.

I think I have found the answer; FORTH! FORTH is the ideal language for creating color and graphics on the VIC-20. New commands can be created and added to the language in a flash, and the possibility for modification of these commands always exists. The cost of adding FORTH to your VIC-20 is quite reasonable, too. Several software houses now supply FORTH on cartridge for under sixty dollars, which is about the same price as the Super Expander. Considering that FORTH is good for many applications besides graphics and animation, it starts to look like a real bargain. And, as if this weren't enough, FORTH runs much faster than BASIC, so animated displays take on a new level of realism. Finally, and perhaps most importantly, FORTH is fun! Although some of the constructs seem strange at first, after awhile you will find yourself whipping up very complicated programs while really enjoying yourself.

Several new color and graphics commands are detailed here to get you started. These new commands, contained in the program to be described, are simple but produce very startling results. As such, if you're just beginning FORTH, you will find this program an excellent way to get your feet wet. If you don't currently program in FORTH, you may want to look the listing over anyway, since it will give you an idea of the power of the language.

Before examining the program, let's look at the new commands and how they are used. First, there are two border/background commands for laying down the basic color of your video display. To change the border to red, for example, you would simply type:

RED BORDER

To change it to purple, type:

PURPLE BORDER

It's as simple as that!

The word BKG is used as an abbreviation for "background". So, to change the background to orange, just type:

ORANGE BKG

Note that the border may only be one of eight possible colors, but that the background may be any of sixteen colors.

What makes BORDER and BKG such neat commands is that there are no numbers to memorize. You simply type the color you want, followed by one of the two commands. Another interesting feature is that the color of the background may be changed independently of that of the border. And best of all, BORDER and BKG become just as much a part of the FORTH language as any other word and may be used in future programs at will!

What about peek and poke type commands? Once again, if you are programming in BASIC you will often have to resort to rather long-winded numbers to accomplish peeks and pokes. But in FORTH we can replace these somewhat arbitrary numbers with meaningful words. For example, to poke the letter "A" to the tenth row and nineteenth column, we can type:

1 10 19 POKEV

POKEV is the command which pokes a character to the video display, 1 is the screen code for the letter "A" and the 10 and 19 refer to the row and column. Thus, we can poke to the screen using coordinates instead of screen memory addresses. If you're like me, you will find it ever so much easier to think in terms of rows and columns.

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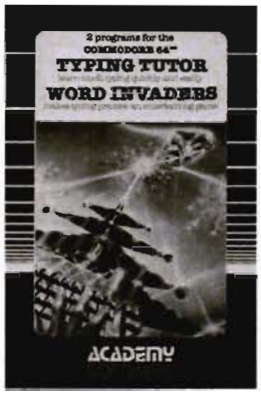

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Circle No. 36

Likewise, you can change the color of a character on the screen, simply by specifying the new color desired and the row and column. For example, to change the character at row five and column two to yellow, simply type:

YELLOW 5 2 POKEC

We've seen two poke type commands now: POKEV, which pokes to the video display and POKEC which pokes to the color RAM. By the way, as usual with schemes of this sort, the rows and columns are numbered starting with zero. Hence, the rows go from zero to twenty-two and the column from zero to twenty-one.

We can accomplish peeks to the screen with equal ease. To peek at the seventh row and ninth column, type:

7 9 PEEK

The screen code of the character found at this location is deposited on the stack where it can be further modified or tested. This command is excellent for detecting "collisions" in game programs. Or for another neat application, how about peeking the character, toggling the eighth bit and re-poking it to the screen? The net effect is that the character will now appear in reverse mode. Since FORTH runs so fast, you can cause many parts of the screen to flash on and off in this manner and thus create an amazingly active display!

Having described the basic function of the commands, let's see how they are implemented in FORTH. Figure One shows the four "screens" which comprise this program. Screen 51 gets things started by creating all of the needed constants. Note how each of the sixteen registers of the VIC chip is assigned a name, VCR0 through VCR15. We actually only need VCR2, VCR5, and VCR15 for most graphics applications, but it is as well to name all of the registers now since you may want to add sound and character set commands later on (which require other registers).

Each of the colors is associated with its appropriate number. There are sixteen colors total, although only the first eight may be used with the BORDER and POKEC commands. Any of the sixteen may be used with the BKG command though.

Screen 52 sets up the home addresses of video and color RAM. Since these can change with differing amounts of memory added to the VIC-20, the addresses must be computed. The comments in the listing should make it clear how this is done. First VM1, the home address of the video RAM, is computed. Next CM1, the home address of the color RAM is set up. By doing things in this manner, you can be sure that any program you write will run on all VIC-20s regardless of the amount (if any) of extra memory which has been added.

Screen 53 defines the word BORDER and BKG. Notice the use of ANDs and ORs to toggle the various bits of VCR15. By thinking in terms of the bits which make up this register, it is possible to change the colors of the background and border independently of one another. Once again, the comments should make it clear how this is accomplished.

The last screen, Screen 54, shows how the peek and poke type commands are implemented. The word CALC will be of less utility to you than to the system, but you may feel free to apply it to any other programs you have in mind. Its duty is to calculate the memory address offset, based upon the desired row and column. Note that PEEK, POKEV and POKEC all call upon this word.

PEEK simply calculates the correct address in screen RAM and fetches the screen code for the character found there. You specify the row and column and the screen code found is left on the stack for further examination.

POKEV pokes a character to video RAM, based upon the desired row and column. Note how VM1, the calculated home address of video RAM, is used in the definition. As mentioned above, this insures that your program will run on VIC-20s with any amount of extra memory.

POKEC works in much the same way as POKEV. The home address of color RAM, CM1, is used to calculate the correct address to be poked. This word expects a color number, the row and the column on the stack before being executed. For example:

BLUE 5 6 POKE

changes the color of the character at the fifth row and sixth column to blue.

These, then, comprise the new color and graphics commands which may be added to your VIC-20 through FORTH. By putting them to good use, along with a few DO . . .LOOP's and so on, you will find yourself creating very complicated and fast displays with a minimum of effort. Of course, these commands are just the start. Try adding some of your own, using the same principles as exploited in this program. How about some sound effects commands? Or some high resolution graphics? These programs and many others are easy to swing off with FORTH.

If you've just started programming in FORTH, you will no doubt have some ideas of your own and are probably anxious to get cracking on them! If, on the other hand, you've been wondering what FORTH is all about, perhaps the simple commands described in this article have given you some idea of the power of the language and will encourage you to think about adding FORTH to your system. One thing's for sure: FORTH and graphics make an excellent combination in general. But when the VIC-20 is thrown in as the host computer, you've got a combination which can't be beat!

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Circle No. 114

Continued from page 44

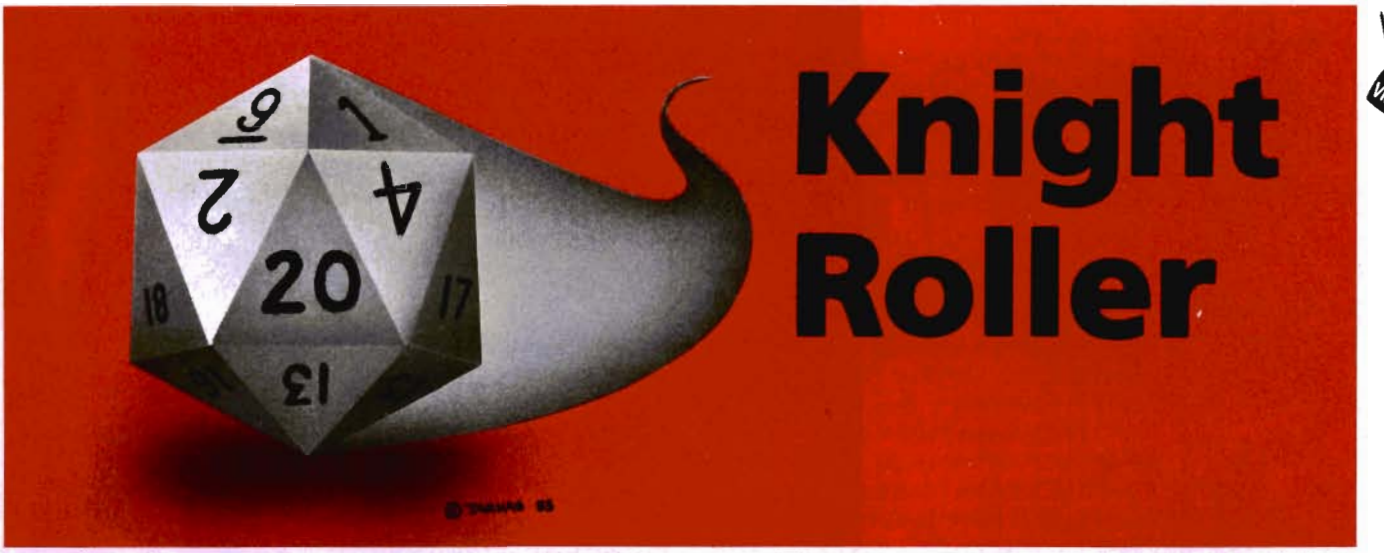
```
SCR # 51
  0 ( VIC-20 GRAPHICS COMMANDS --- PART 1                              )
  1 HEX
  2 : CO CONSTANT ;  ( USE 'CO' FOR CONSTANT TO SAVE SPACE.            )
  3
  4 ( ASSIGN A NAME TO EACH VIC CHIP REGISTER.                         )
  5 9000 CO VCR0     9001 CO VCR1     9002 CO VCR2   9003 CO VCR3
  6 9004 CO VCR4     9005 CO VCR5     9006 CO VCR6   9007 CO VCR7
  7 9008 CO VCR8     9009 CO VCR9     900A CO VCR10  900B CO VCR11
  8 900C CO VCR12    900D CO VCR13    900E CO VCR14  900F CO VCR15
  9
 10 ( ASSIGN COLOR CODE CONSTANTS.                                     )
 11 0 CO BLACK      1 CO WHITE       2 CO RED       3 CO CYAN
 12 4 CO PURPLE     5 CO GREEN       6 CO BLUE      7 CO YELLOW
 13 8 CO ORANGE     9 CO LT.ORANGE   A CO PINK      B CO LT.CYAN
 14 C CO LT.PURPLE  D CO LT.GREEN    E CO LT.BLUE   F CO LT.YELLOW
 15 -->


SCR # 52
  0 ( VIC-20 GRAPHICS COMMANDS --- PART 2                              )
  1
  2 ( SET UP CONSTANTS GIVING HOME ADDRESS OF VIDEO AND COLOR RAM,     )
  3 ( TAKING INTO ACCOUNT ANY EXTRA RAM CARTRIDGES.                    )
  4
  5 VCR2 C@ 80 AND 4 *          ( USING VIC CHIP REGISTERS #2 AND      )
  6   VCR5 C@ 70 AND 40 *       ( #5, COMPUTE HOME ADDRESS OF          )
  7   OR                        ( VIDEO RAM AND ASSIGN TO THE          )
  8   CONSTANT VM1              ( CONSTANT VM1.                        )
  9
 10 VCR2 C@ 80 AND 4 *          ( USING VIC CHIP REGISTER #2,          )
 11   9400                      ( COMPUTE THE HOME ADDRESS OF          )
 12   OR                        ( COLOR RAM AND ASSIGN TO THE          )
 13   CONSTANT CM1              ( CONSTANT CM1.                        )
 14
 15 -->


SCR # 53
  0 ( VIC-20 GRAPHICS COMMANDS --- PART 3                              )
  1
  2 : BORDER          ( COLOR --- / CHANGE COLOR OF BORDER.            )
  3   07 AND          ( BORDER MAY ONLY BE ONE OF EIGHT COLORS.        )
  4   VCR15 DUP C@    ( GET VIC CHIP REGISTER #15 CONTENTS AND         )
  5   F8 AND          ( MASK OFF CURRENT BORDER COLOR.                 )
  6   ROT OR          ( 'OR' IN THE NEW BORDER COLOR AND               )
  7   SWAP C! ;       ( STORE BACK IN REGISTER.                        )
  8
  9 : BKG             ( COLOR --- / CHANGE COLOR OF BACKGROUND.        )
 10   10 *            ( SHIFT COLOR NUMBER TO THE LEFT FOUR TIMES.     )
 11   VCR15 DUP C@    ( GET VIC CHIP REGISTER #15 CONTENTS AND         )
 12   0F AND          ( MASK OFF CURRENT BACKGROUND COLOR.             )
 13   ROT OR          ( 'OR' IN THE NEW BACKGROUND COLOR AND           )
 14   SWAP C! ;       ( STORE BACK IN REGISTER.                        )
 15 -->


SCR # 54
  0 ( VIC-20 GRAPHICS COMMANDS --- PART 4                              )
  1 DECIMAL
  2 : CALC              ( ROW, COLUMN --- MEMORY ADDRESS OFFSET.       )
  3   SWAP 22 * + ;     ( 22 * ROWS + COLUMNS = MEMORY OFFSET.         )
  4
  5 : PEEK              ( ROW, COLUMN --- CHARACTER FOUND THERE.       )
  6   CALC VM1 + C@ ;   ( CACLULATE VIDEO RAM ADDRESS AND PEEK IT.     )
  7
  8 : POKEV             ( CHAR, ROW, COLUMN --- / POKE CHARACTER.      )
  9   CALC VM1 +        ( CALCULATE VIDEO RAM ADDRESS THEN             )
 10   C! ;              ( POKE CHARACTER TO SCREEN.                    )
```

Figure 1



Colin F. Thompson

KNIGHT ROLLER

The most popular and imaginative role playing game ever devised is called Dungeons & Dragons® . D&D, as it is called by its followers, was invented by Gary Gygax and company almost ten years ago. The game is a source of endless creativity to its players and equally endless misunderstanding to the uninitiated.

If you play D&D, you know there is a lot of dice rolling. Dice having 4, 6, 8, 12 and 100 sides are used extensively. To relieve the tedium of rolling up a new character, I've written the accompanying program. Knight Roller (KR) will roll up a player character or NPC in from 1 to 8 seconds.

Each characteristic, like Strength or Wisdom, is rolled using a RND statement emulating a total of three die six (3d6). This results in a number between 3 and 18. Many D&D groups use other combinations of dice to get the same numbers. The best three of 4d6 is common, so I've included that algorithm as an alternate.

DETAILS

KR allows the user to select a Character Type (class), Race, and Experience Level. After these variables have been selected, KR rolls the character, its hit points and constitution bonus points, if any. The results are displayed on the screen. This final screen allows 3 options:

A - Roll the same character Again.
N - Roll a New Character.
P - Print the results to your printer.

I've written Knight Roller with the VIC novice in mind. Only the simplest BASIC commands are used. All modules of the program are REMed. KR will fit into a bare VIC (barely). If you elect to use the 4d6 method, you will have to remove the REMs to make everything fit. If you don't have a printer, remove the print routine starting at line 100. Knight Roller was written for you to modify to your own rule variations.

KR may be modified easily. For example, most games allow Paladins and Monks to be human only. If your game allows non-human Monks, just change line 590. With so many restrictions on Class, Race and Sex, I had to draw the line somewhere. The minimum attributes for each Class are built in, but not the maximum (see figure 2). Fighters, for example must have a minimum of 9 Strength and 7 Constitution to be a legal character. Race modifiers are also built in. Both modifiers are easily changed. I used the same modifiers found in the first few pages of the Player's Guide.

Since KR was written to be modified, I've included a flowchart to help you follow the program flow (see figure 1). Inside each block of the flowchart is the line number starting each module.

HIT POINTS

First level characters are given full hit points. If you select a character higher than 11th level, it will not show the proper hit point totals because these high level types usually get only one or two HP per level. KR keeps giving them a full die. There was not sufficient RAM to make this accurate. Constitution Bonus Hit Points are added to the hit point total, and then displayed alone. Rangers pose a special problem because they get 2d8 at first level. Line 5075, 5080, 8100 and 8260 handle the Ranger.

Lines 2000-2030 generate each 3d6 characteristic number. Figure 4 lists a different way to roll up the numbers. This module rolls four 6 sided dice and discards the lowest. This method will roll up stronger characters.

CLASSES

The Fighter and Fighter subclasses are allowed 18.+ strength. Lines 2500-2530 check this. Illusionists roll as Magic Users and Assassins as Thieves. KR will not generate a Multi-Classed Adventurer. If, for example, your Dungeon Master doesn't allow Half-Orc Magic Users, you can trap that combination out by adding this line:

```
675 IF CH = 5 AND RA = 7 THEN 500
```

USING IT

My D&D group has found three uses for KR. Our crazed Dungeon Master (aren't they all?) can roll up an NPC or randomly encountered character in just a few seconds. Or he can roll up an army, print each one on paper and have them waiting for us in some dark alley. Our players like to roll up first level player characters on the computer. We all have fun rolling up outrageous characters. (It takes four and one half hours to roll up a 1,000,000th level Cleric). Just think of the possibilities.

I have more D&D programs for the expanded VIC. If you would like to see them in Commander, please write and let me know.

Colin F. Thompson
Knight Roller
Box 98827
Tacoma, WA 98498

Continued on page 48

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Continued from page 47

```
1 REM KNIGHT ROLLER - 5K VIC OR 64
2 REM BY COLIN THOMPSON FOR COMMANDER
3 REM 3D6 VERSION PUBLIC DOMAIN
4 REM
5 DEF FNA(X)=INT(RND(1)*X)+1
10 POKE36879,8:P=4:GOTO500:REM START
20 IFCH=1THENTY$="FIGHTER"
21 IFCH=2THENTY$="PALADIN"
22 IFCH=3THENTY$="RANGER"
23 IFCH=4THENTY$="CLERIC"
24 IFCH=5THENTY$="MAGIC USER"
25 IFCH=6THENTY$="THIEF"
26 IFCH=7THENTY$="MONK"
27 IFRA=1THENRA$="HUMAN"
28 IFRA=2THENRA$="HALF-ELVEN"
29 IFRA=3THENRA$="GNOME"
30 IFRA=4THENRA$="DWARVEN"
31 IFRA=5THENRA$="ELVEN"
32 IFRA=6THENRA$="HALFLING"
33 IFRA=7THENRA$="HALF-ORC"
34 RETURN
100 OPENP,4: REM PRINT ROUTINE
110 PRINT#P,RA$,TY$,"LEVEL"LE
115 IFTY<4ANDSS>0THENPRINT#P,"STR-"S;SS:
GOTO130
120 PRINT#P,"STR-"S
130 PRINT#P,"DEX-"D
140 PRINT#P,"CON-"C
150 PRINT#P,"WIS-"W
160 PRINT#P,"INT-"I
170 PRINT#P,"CHR-"CR
180 PRINT#P,"CB--"CB
190 PRINT#P,"HP--"HP:PRINT#P
200 CLOSEP:GOTO6000
500 PRINT"<CLR><CYN><RON>CHARACTER TYPE<
YEL><DWN>":REM*CHAR MENU
515 PRINT"   1  FIGHTER"
520 PRINT"   2  PALADIN"
525 PRINT"   3  RANGER"
530 PRINT"   4  CLERIC"
540 PRINT"   5  MAGIC USER"
550 PRINT"   6  THIEF"
560 PRINT"   7  MONK"
570 INPUT"<DWN><DWN><CYN><RON>SELECT";CH
580 IFCH>7ORCH<1THEN500
590 IFCH=7ORCH=2THENRA=1:GOTO700
600 PRINT"<CLR><GRN><RON>CHARACTER RACE<
YEL><DWN>":REM*RACE MENU
615 PRINT"   1  HUMAN"
620 PRINT"   2  HALF-ELVEN"
625 PRINT"   3  GNOME"
630 PRINT"   4  DWARF"
635 PRINT"   5  ELF"
640 PRINT"   6  HALFLING"
645 PRINT"   7  HALF-ORC"
670 INPUT"<DWN><DWN><CYN><RON>SELECT";RA

680 IFRA>7ORRA<1THEN600
700 REM*LEVEL
710 PRINT"<DWN><DWN><DWN><RED><RON>LEVEL
<YEL><DWN>""
720 INPUT"<DWN><DWN><CYN><RON>SELECT";LE
```

```
<HOM> = HOME
<CLR> = CLEAR HOME
<DEL> = DELETE
<INS> = INSERT
< UP> = CURSOR UP
<DWN> = CURSOR DOWN
<RHT> = CURSOR RIGHT
<LFT> = CURSOR LEFT
<BLK> = BLACK
<WHT> = WHITE
<RED> = RED
<CYN> = CYAN
<PUR> = PURPLE
<GRN> = GREEN
<BLU> = BLUE
<YEL> = YELLOW
<RON> = REVERSE ON
<ROF> = REVERSE OFF
<STP> = STOP
< F1> = F1
< F2> = F2
< F3> = F3
< F4> = F4
< F5> = F5
< F6> = F6
< F7> = F7
< F8> = F8
```

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Continued from page 48

```
725 IFLE<1THENLE=1
730 GOSUB20
735 PRINT"<CLR><YEL><RON><DWN><DWN><DWN>
PLEASE WAIT FOR YOUR"
740 PRINT"<RON>";TY$" TO BE ROLLED"
1000 REM CHR#GEN
1010 GOSUB2000:S=N
1040 GOSUB2000:D=N
1070 GOSUB2000:C=N
1100 GOSUB2000:W=N
1130 GOSUB2000:I=N
1160 GOSUB2000:CR=N
1200 ONCHGOTO3000,3100,3200,3300,3400,35
00,3600
2000 REM RND#GEN
2005 XX=INT(RND(1)*6)+1
2010 YY=INT(RND(1)*6)+1
2015 ZZ=INT(RND(1)*6)+1
2020 N=XX+YY+ZZ:REM3D6
2025 XX=0:YY=0:ZZ=0
2030 RETURN
2500 IFS<18THENRETURN
2510 S=18:SS=INT(RND(1)*100)+1
2520 IFSS>99THENSS=00
2530 RETURN
3000 REM*FIGHTER
3010 X=10:IFS<9THENGOTO1000
3015 IFC<7THENGOTO1070
3020 IFRA>3THENGOSUB4000
3030 GOSUB2500:GOTO5000
3100 REM*PALADIN
3110 X=10:IFS<12THENGOTO1010
3120 IFC<9THENGOTO1070
3130 IFW<13THENGOTO1100
3140 IFI<9THENGOTO1130
3150 IFCR<17THENGOTO1160
3170 GOSUB2500
3180 GOTO5000
3200 REM*RANGER
3220 X=8:IFS<13THENGOTO1010
3230 IFC<14THENGOTO1070
3240 IFW<14THENGOTO1100
3250 IFI<13THENGOTO1130
3255 IFRA>3THENGOSUB4000
3260 GOSUB2500:GOTO5000
3300 REM*CLERIC
3310 X=8:IFW<9THENGOTO1100
3320 IFRA>2THENGOSUB4000
3330 GOTO5000
3400 REM*M/U
3410 X=4:IFI<9THENGOTO1130
3420 IFD<6THENGOTO1040
3430 IFRA>2THENGOSUB4000
3440 GOTO5000
3500 REM*THIEF
3510 X=6:IFD<9THENGOTO1040
3520 IFRA>2THENGOSUB4000
3530 GOTO5000
3600 REM*MONK
3610 X=4:IFS<15THENGOTO1010
3620 IFC<11THENGOTO1070
3630 IFD<15THENGOTO1040
3640 IFW<15THENGOTO1100
3660 GOTO5000
4000 REM*RACE MODS
4010 ONRAGOTO1,1,4330,4100,4200,4300,440
0
4100 C=C+1:IFC>18THENC=18:REM*DWARF
4120 CR=CR-1:IFCR<3 THENCR=3
4130 RETURN
4200 D=D+1:IFD>18THEND=18:REM*ELF
4230 C=C-1:IFC<3THENC=3
4240 RETURN
4300 S=S-1:IFS<3THENS=3:REM*HALFLING
4320 D=D+1:IFD>18THEND=18
4330 RETURN
4400 S=S+1:IFS>18THENS=18:REM * H/ORC
4420 C=C+1:IFC>18THENC=18
4430 CR=CR-1:IFCR<3THENCR=3
4440 RETURN
5000 GOSUB8000:PRINT"<CLR><CYN><RON>FINI
SHED CHARACTER<DWN><YEL>"
5005 IFS<18ORCH>3THENPRINT"STRENGTH.....
."S:GOTO5015
5010 PRINT"STRENGTH......"S;:PRINT"<LFT>
";SS
5015 PRINT"DEXTERITY....."D
5020 PRINT"CONSTITUTION.."C
5030 PRINT"WISDOM........"W
5040 PRINT"INTELLIGENCE.."I
5050 PRINT"CHARISMA......"CR
5055 PRINT"<DWN><DWN><GRN>"
5060 PRINTSPC(1)RA$;:PRINT" ";:PRINTTY$
5065 PRINT"<DWN><CYN> LEVEL:"SPC(7)LE
5070 PRINT"<DWN><PUR> HIT POINTS:  "HP
5075 IFCH=3THENPRINT"<DWN><WHT> CONS BON
US:  ";
5080 IFCH=3THENPRINT(CB*(LE+1)):GOTO5095

5090 PRINT"<DWN><WHT> CONS BONUS:  "(CB*
LE)
5095 PRINT"<DWN><DWN><RON><CYN>N<GRN>EW/
<CYN>A<GRN>GAIN/<CYN>P<GRN>RINT";
6000 GETA$:IFA$=""THEN6000
6010 IFA$="N"THENRUN
6020 IFA$="A"THEN730
6030 IFA$="P"THEN100
6040 GOTO6000
8000 HP=0:CB=0:REM CON BONUS & HP
8010 IFCH>3THEN8050
8015 IFC=15THENCB=1
8020 IFC=16THENCB=2
8025 IFC=17THENCB=3
8030 IFC=18THENCB=4
8035 GOTO8100
8050 IFC=15THENCB=1
8055 IFC>15THENCB=2
8100 IFCH=3ANDLE=1THENHP=16+CB+CB:RETURN

8110 IFLE=1THENHP=X+CB:RETURN
8200 FORAA=1TO(LE-1):REM HIT POINTS
8220 HP=HP+FNA(X)
8230 NEXT
8240 HP=HP+X
8250 HP=HP+(CB*LE)
8260 IFCH=3THENHP=HP+X+CB:REM RANGER 2D8

8290 RETURN
```

Continued on page 52

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Continued from page 50

Figure 1

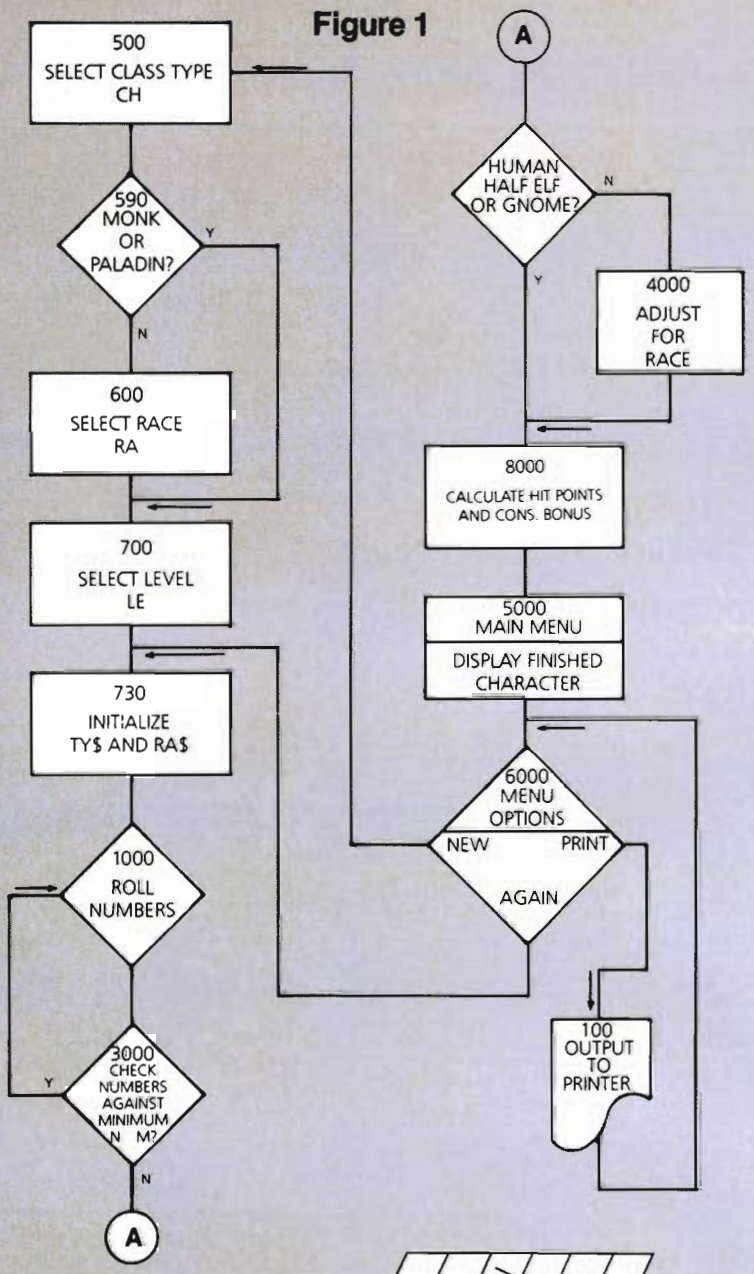

Figure 3

CH	CHARACTER TYPE (CLASS)
RA	CHARACTER RACE
LE	LEVEL
RA$	RACE NAME
TY$	TYPE NAME
HP	HIT POINTS
SS	SUPER STRENGTH
XX, YY, ZZ	3d6 NUMBERS
N	TOTAL 3d6
X	HIT POINT DIE
P	PRINTER FILE #
CB	CONSTITUTION BONUS
S	STRENGTH
D	DEXTERITY
C	CONSTITUTION
W	WISDOM
I	INTGELLIGENCE
CR	CHARISMA

LIST OF VARIABLES FOR CHAR-GEN

Figure 2

CHARACTER CLASS	STRENGTH	DEXTERITY	CONSTITUTION	WISDOM	INTELLIGENCE	CHARISMA
FIGHTER	9		7			
PALADIN	12		9	13	9	17
RANGER	13		14	14	13	
CLERIC				9		
MAGIC USER		6			9	
THIEF		9				
MONK	15	15	11	15		

MINIMUMN VALUES BUILT IN-VARIABLE M

Figure 4

```
2000 J=0:N=0:D1=0:D2=0:D3=0
2005 FORJ=1TO4
2010 Y(J)=INT(RND(1)*6)+1
2015 ONJGOTO2020,2025,2035,2050
2020 D1=Y(J):NEXT
2025 IFY(J)>D1THEND2=D1:D1=Y(J):NEXT
2030 D2=Y(J):NEXT
2035 IFY(J)>D1THEND3=D2:D2=D1:D1=Y(J):NEXT
2040 IFY(J)>D2THEND3=D2:D2=Y(J):NEXT
2045 D3=Y(J):NEXT
2050 IFY(J)>D3THEND3=Y(J)
2055 N=D1+D2+D3:RETURN
```

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Circle No. 69

VIC Evaders

By Eric Giguere

Evaders 1.2 is a frustrating game I created for the VIC-20. It is a BASIC game and demonstrates the use of programmable characters. But before you run off to type it in, one note of warning: DO NOT type in any of the REM statements, any line with simply a colon (":") or the lines 1000-1175. These lines are only there to clarify the program in case you wish to examine it but at the same time they increase the memory space taken by the game. To work in a normal 5K VIC these lines must be deleted (don't worry, the program will run fine without them). Also, the program should not be run with the SuperExpander cartridge in place as the programmable characters will be replaced by garbage. Any other 3K expander will work.

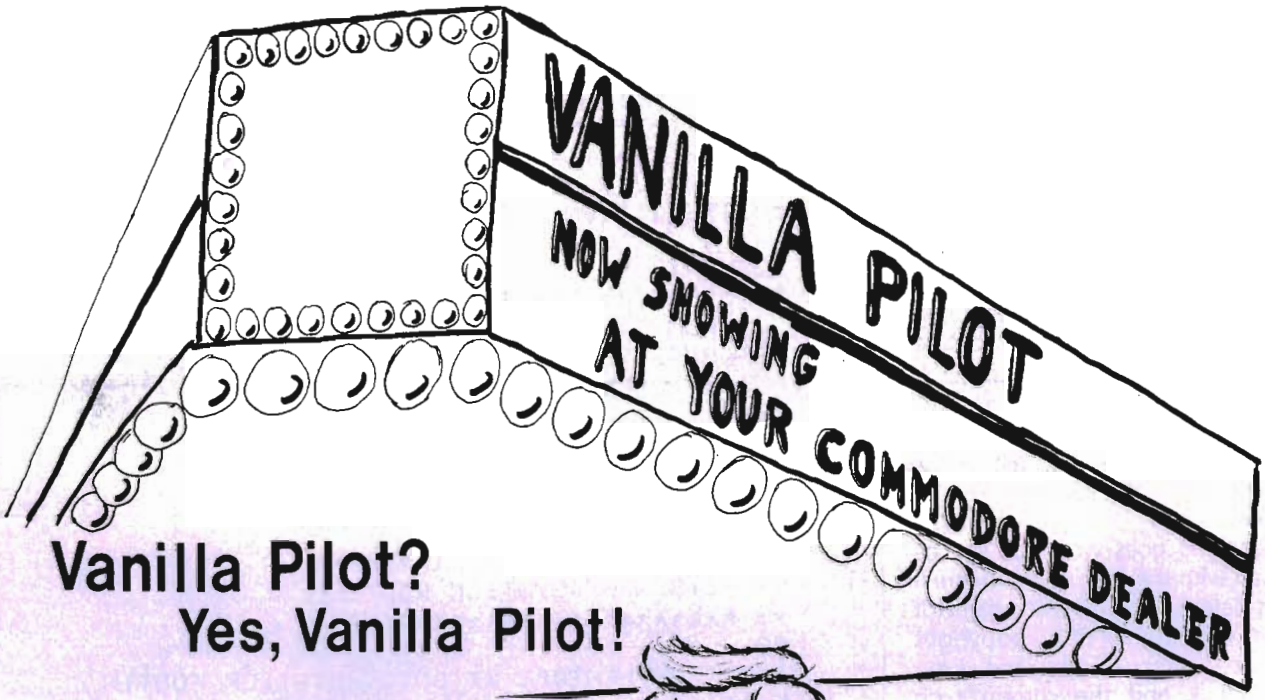
THE GAME

Evaders 1.2 is your basic shoot the aliens game. You control a laser gun along the bottom of the screen and try to gun down as many of the aliens moving above you within one minute. It sounds simple, but in reality it isn't. The reason? Generally, they keep moving in one direction but sometimes they will move back one space or not move at all. This usually happens, for some unknown reason, just as your shot was about to blast him (or her-can't be sexist) off. It's almost as if they had enough intelligence to evade your shots! (Which is why I call the aliens Evaders.) It's really frustrating to see a perfectly timed shot suddenly miss because the alien didn't move ahead. Instead of being a test of speed this game manages to become a test of your "sixth" sense. Or of your luck.

```
0 GOTO700: REM ** SUBROUTINES FOLLOW **
1 F=P-22:POKEF,2:POKEF+A,7:POKEO,32:POKE
P,0:POKEP+A,B:GOSUB500:RETURN
2 POKEF,32:F=F-C:IFF<S+2*CTHENF=0:RETURN

3 IFPEEK(F)=8THEN5
4 POKEF,2:POKEF+A,7:RETURN
5 FORJ=0TO3:IFF=E(J)THENPOKEE(J),32:GOSU
B25:J=4
6 NEXT:RETURN
7 :
8 REM GET NEW ALIEN POSITION
9 :
10 X=FNR(18)+2:E(I)=S+B+X*C:D(I)=B:Y=RND
(1):IFY<.5THENE(I)=E(I)+19:D(I)=-B
11 RETURN
22 :
23 REM ALIEN 'POP'
24 :
25 X=E(J):IFPEEK(X-B)=BTHENX=X+B:GOTO27
26 IFPEEK(X+B)=BTHENX=X-B
27 POKEX-B,3:POKEX-B+A,B:POKEX,4:POKEX+A
,B:POKEX+B,5:POKEX+B+A,B:GOSUB502
28 POKEX-B,32:POKEX,32:POKEX+B,32:E(J)=0
:F=0:SC=SC+10:RETURN
30 :
31 ***********
32 MAIN ROUTINE
33 ***********
34 :
35 GOSUB100 :REM MOVE SHIP
36 :
40 FORI=0TO3:IFFTHENGOSUB2: REM MOVE LAS
ER BEAM
42 IFE(I)=0THENGOSUB10:E(I)=E(I)+D(I): R
EM GET NEW POSITION FOR ALIEN
```

Continued on page 56



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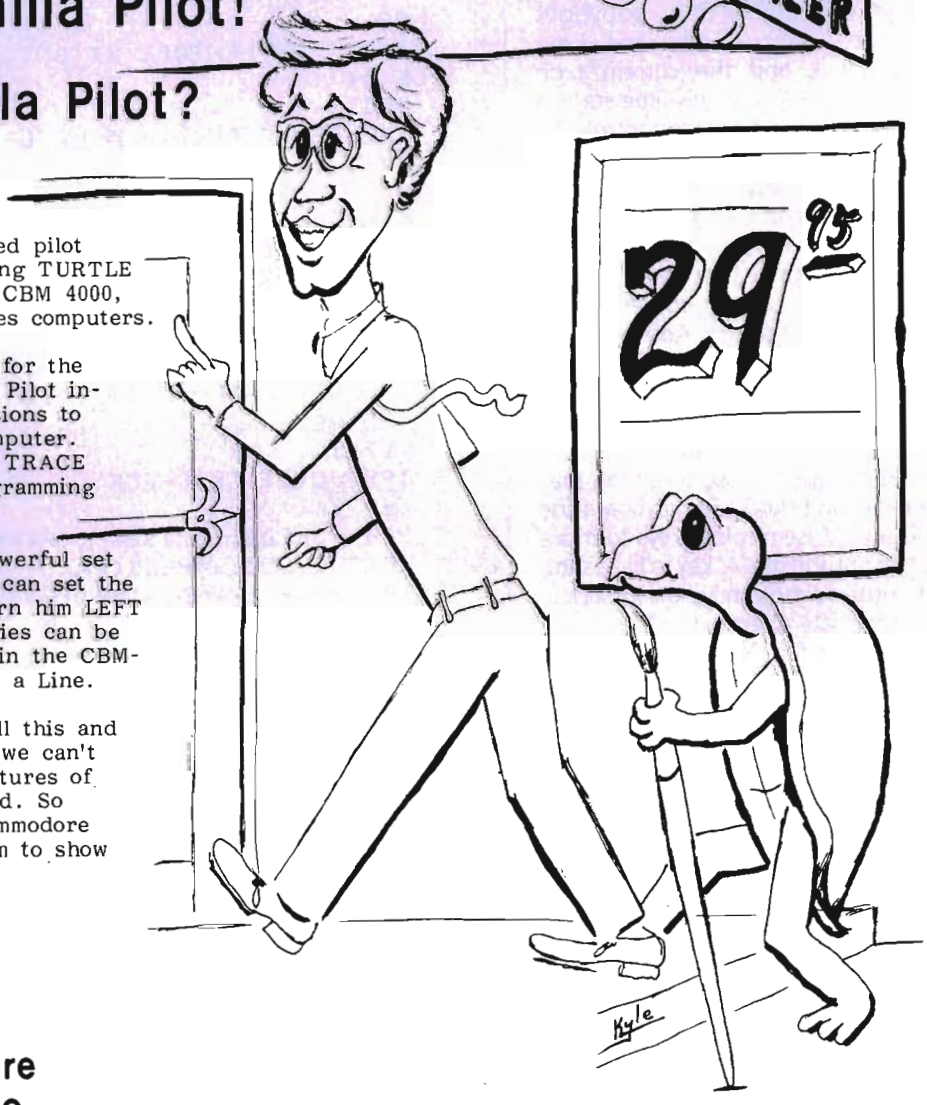

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Circle No. 42

PLAYING THE GAME

After typing in the Program (without REMs) be sure to save it in case you made a mistake. Then RUN your Program. There should be a momentary pause as the Program loads the character set into memory or, if already loaded, it proceeds directly to the instructions. If you were using programmable characters before loading the program you probably won't see the proper characters during the game. In this case simply type the following before running the program:

POKE 56, 30 (RETURN)

This resets a pointer and allows the game to load the proper set of characters.

If everything goes well, you will be presented with the instruction screen. It appears before and after each game. It displays the game title, copyright message, instructions for keyboard/joystick and the current high score. Hitting a key at this time starts a game using the keyboard to control your gun. Pressing the fire button on the joystick will give you joystick control. To get out of the game hit RUN/STOP and RESTORE simultaneously.

If you start a game the screen will clear and a top and bottom border will be drawn across the screen. Above the top border the score and time remaining are displayed. Your ship will appear on top of the bottom border, in the middle, and the aliens will appear in random locations on both edges of the screens. You may now move and shoot. For keyboard use the 'L' and ';' (semicolon) keys to move left and right and the 'A' key to fire a shot. Joystick users simply move the joystick in the appropriate direction and press the red button to fire. You may move anywhere along the bottom border and will be stopped when you reach either edge. When the minute of time is over the message "THE END" will be displayed and you will be returned to the instruction screen.

Points are scored by hitting aliens, despite their evading. Only one shot at a time is allowed, so if you miss you must wait until it disappears off the screen before you can shoot again. If hit, an alien expires with a 'POP' and will reappear somewhere else along the edge of the screen. Each alien is worth 10 points and high scores are hard to get. If you're lucky you should be able to get in the high 100's.

```
44 NEXT:GOSUB100
46 FORI=0TO3:IFFTHENGOSUB2: REM FOLLOWIN
G LINE MOVES ALIEN & CHECKS FOR HIT
48 IFE(I)THENPOKEE(I),32:X=FNR(5)-B:Z=SG
N(X):E(I)=E(I)+Z*D(I):IFPEEK(E(I))=BTHEN
E(I)=0
50 IFE(I)THENPOKEE(I),8:POKEE(I)+A,FNR(8
)
52 NEXT
54 GOSUB100:PRINT"<HOM><WHT><RON>SCORE:"
SC"<HOM><RHT><RHT><RHT><RHT><RHT><RHT><R
HT><RHT><RHT><RHT><RHT><RHT><RHT><RHT><R
HT><RHT><RHT>"MID$(TI$,4,B)":"RIGHT$(TI$
,2)
56 IFVAL(TI$)>59THEN400: REM IS THE MINU
TE UP YET?
58 GOTO35
95 :
96 **************************
97 KEYBOARD/JOYSTICK ROUTINE
98 **************************
99 :
100 IFJYTHEN200: ** GOTO JOYSTICK ROUTIN
E **
101 :
102 REM PEEK(Q)=VALUE OF KEY PRESSED
103 :
105 X=PEEK(Q):IFX=C-BTHENP=P-B:IFP<8143T
HENP=P+B: REM ** MOVE LEFT **
110 IFX=CTHENP=P+B:IFP>8162THENP=P-B: RE
M ** MOVE RIGHT **
115 IFX=C-5ANDF=0THENGOSUB1: REM ** FIRE
 **
120 POKEO,32:O=P:POKEP,0:POKEP+A,B:REM *
* PLACE SHIP IN POSITION & ERASE OLD **
125 RETURN
197 :
198 JOYSTICK CHECK
199 :
200 POKEDD,127:S3=-((PEEK(PB)AND128)=0):
POKEDD,255:X=PEEK(PA)
205 S2=-((XAND16)=0):FB=-((XAND32)=0):IF
JY=0THENRETURN
210 IFS2THENP=P-B:IFP<8143THENP=P+B: REM
 ** MOVE LEFT **
215 IFS3THENP=P+B:IFP>8162THENP=P-B: REM
 ** MOVE RIGHT **
220 IFFBANDF=0THENGOSUB1: REM ** FIRE **

230 GOTO120 :REM RETURN TO KEYBOARD ROUT
INE
395 :
396 **********
397 END ROUTINE
398 **********
399 :
400 PRINT"<HOM><DWN><DWN><DWN><DWN><DWN>
<DWN><DWN><DWN><DWN><DWN><RHT><RHT><RHT>
<RHT><RHT><RHT><RHT><RON><WHT>THE END":F
ORI=1TO2000:NEXT:POKE198,0:IFSC>HSTHENHS
=SC
405 FORI=1TO2000:NEXT: POKE198,0: REM WA
```

```
IT A BIT AND CLEAR KEYBOARD BUFFER
410 IFSC>HSTHENHS=SC: REM CHECK FOR NEW
HIGH SCORE
415 GOTO 600: REM GO BACK TO OPENING DIS
PLAY
495 :
496 ***************
497 SOUND EFFECTS
498 ***************
499 :
500 POKEV,15:FORL=1TO3:FORM=250TO240STEP
-1:POKEV1,M:NEXT:FORM=240TO250:POKEV1,M:
NEXT
501 POKEV1,0:NEXT:POKEV,0:RETURN:REM **
FIRING **
502 POKEV,15:POKEV1,220:FORL=1TO5:NEXT:P
OKEV1,0:FORL=1TO50:NEXT:POKEV1,200:FORL=
1TO5
503 NEXT:POKEV1,0:FORL=1TO100:NEXT:POKEV
,0:RETURN:REM ** BLIPS **
595 :
596 ****************
597 OPENING DISPLAY
598 ****************
599 :
600 POKEK,25:POKEK-10,242: REM SET WHITE
 SCREEN & LOWERCASE LETTERS
605 PRINT"<CLR><BLU><197><214><193><196>
<197><210><211> 1.2":PRINT"<YEL><192><19
2><192><192><192><192><192><192><192><19
2><192><192><192><192><192><192><192><19
2><192><192><192><192><RED>(C) 1983 BY <1
97>. <199>IGUERE<BLK>"
610 PRINT"<DWN><DWN><RON><204><ROF> - LE
FT":PRINT"<DWN><RON><193><ROF> - FIRE":P
RINT"<DWN><RON>;<ROF> - RIGHT":PRINT"<DW
N><207>R USE JOYSTICK."
615 PRINT"<DWN><DWN><BLU><208>RESS A KEY
 FOR KEY-  BOARD OR THE FIRE BUT-TON FOR
 JOYSTICK."
620 PRINT"<DWN><GRN><192><192><192><192>
<192><192><192><192><192><192><192><192>
<192><192><192><192><192><192><192><192>
<192><192><PUR><200>IGH <211>CORE:"HS:PR
INT"<GRN><192><192><192><192><192><192><
192><192><192><192><192><192><192><192><
192><192><192><192><192><192><192><192>"
:JY=0
640 GOSUB200:GETA$:IFA$=""ANDFB=0THEN640
: REM WAIT FOR KEYPRESS OR FIRE BUTTON
645 IFFBTHENJY=1: REM IF FIRE BUTTON THE
N SET FOR JOYSTICK
647 :
648 REM INITIALIZE POINTERS & SETUP SCRE
EN
649 :
650 P=8152:O=P:F=0:FORI=0TO3:E(I)=0:NEXT

660 PRINT"<CLR>":POKEK-10,255:POKEK,8:FO
RI=0TO21:POKES+C+C*I+A,0:POKE8185-C*I+A,
0
665 POKE8185-C*I,0:POKES+C+I+A,5:POKES+C
```

Continued on page 60

PROGRAM DETAILS

Frankly, there isn't much to say about how the program works. The program itself is fairly well commented and should be almost self-explanatory, especially with the variable table at the end. If you desire to change the time limit of the game simply substitute the new time in place of the 59 in line 56. Two minutes and thirty seconds would be placed as 229 (always one less), and 34 seconds would be 33. The joystick routine is an abbreviated version of the one found in the VIC-20 Programmer's Reference Guide (pp. 247) and the character set is read in using a standard method. The rest of the program is simply a bunch of properly arranged BASIC statements!

CLOSING NOTES

I hope you have fun playing the game. If you don't feel like typing it in you can send me a cassette or diskette in a self-addressed mailer (no stamps please) along with $3.50 to the address below and I'll send you a copy of the program.

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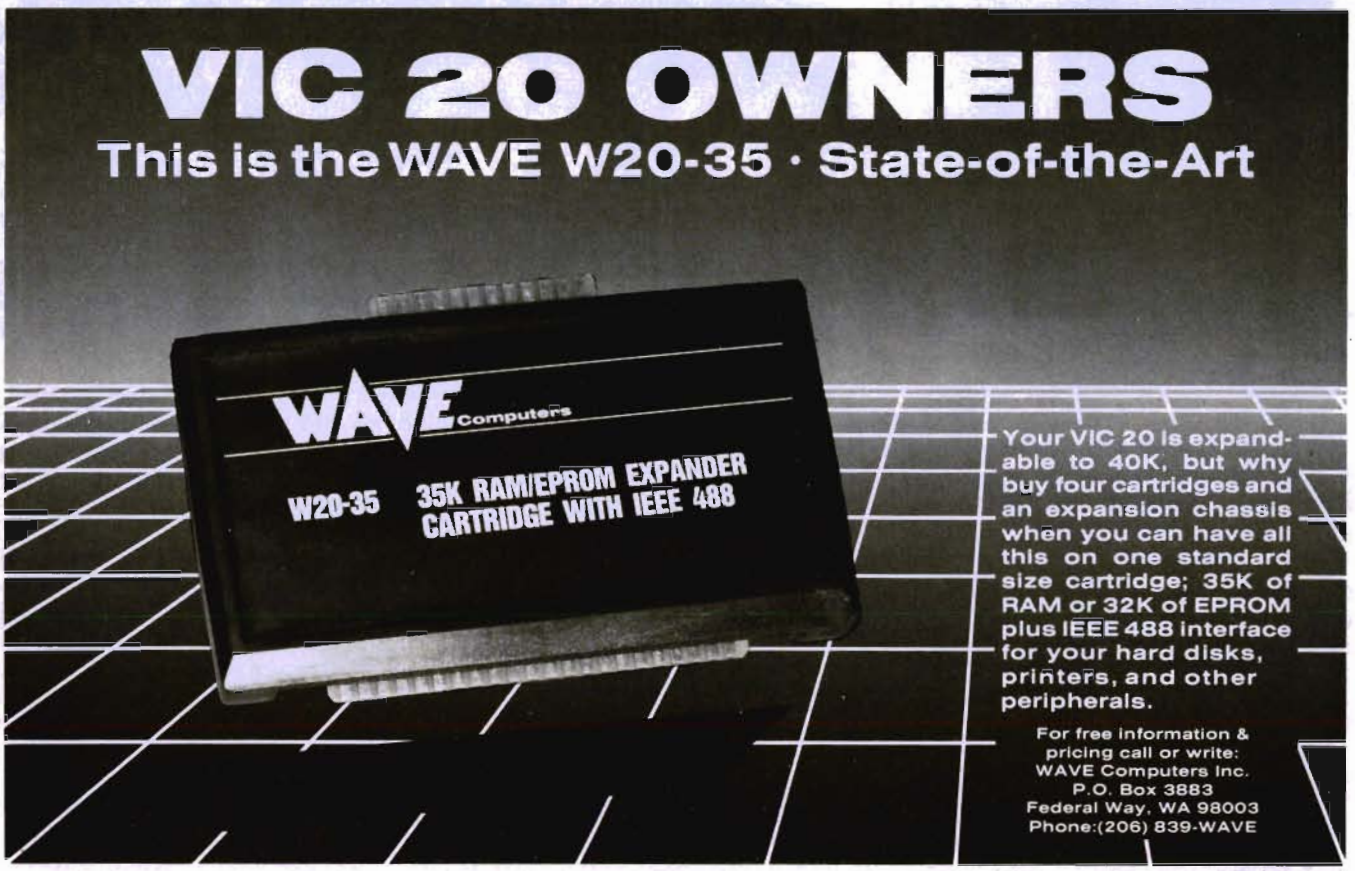
Circle No. 18

Continued from page 57

```
+I,1:POKE8185-I+A,5:POKE8185-I,1:NEXT
670 TI$="000000":GOTO35
695 :
696 ***********************
697 SET UP MAIN VARIABLES
698 ***********************
699 :
700 IFPEEK(56)<>28THEN720: REM LOAD DATA
 IF NECESSARY
701 :
705 A=30720:B=1:S=7680:K=36879:Q=197:V=K
-1:V1=K-3:DD=37154:PA=37137:PB=37152
710 DEFFNR(Z)=INT(RND(1)*Z):C=22:DIME(3)
,D(3):POKE37139,0:GOTO600
715 :
716 ***********************
717 LOAD IN CHARACTER DATA
718 ***********************
719 :
720 POKE52,28:POKE56,28:POKE51,PEEK(55):
CLR
730 READX:IFX<0THEN705
740 FORI=XTOX+7:READJ:POKEI,J:NEXT:GOTO7
30
750 DATA7232,0,0,126,219,255,126,0,0,717
6,255,255,255,255,255,255,255,255
760 DATA7168,0,24,24,60,24,24,126,255,71
84,0,0,24,24,24,24,0,0
770 DATA7192,128,79,41,239,40,72,136,0,7
200,0,60,36,36,36,36,60,0
780 DATA7208,1,242,148,247,132,130,129,0
,7248,73,36,145,0,74,16,126,255
790 DATA7424,0,0,0,0,0,0,0,0,-1
997 :
998 END
999 :
1000 ***************************
1005 * EVADERS 1.2 (VIC-20) *
1010 ***************************
1015 :
1020 (C) 1983 BY ERIC GIGUERE
1025 :
1030 :
1035 :
1040 ** VARIABLE LIST **
1045 :
1050 A  = OFFSET TO COLOUR MEMORY
1055 B  = CONSTANT (1)
1060 C  = CONSTANT (22)
1065 DD = DATA DIRECTION REGISTER FOR JO
YSTICK
1070 D()= DIRECTIONS OF ALIENS
1075 E()= POSITIONS OF ALIENS
1080 F  = FLAG & PRESENT POSITION OF LAS
ER BEAM
1085 FB = STATUS OF FIRE BUTTON (1=PRESS
ED)
1090 HS = CURRENT HIGH SCORE
1095 I  = CURRENT ALIEN (0-3)
1100 JY = FLAG FOR JOYSTICK (1) OR KEYBO
ARD (0)
1105 O  = PREVIOUS SHIP POSITION
1110 P  = PRESENT SHIP POSITION
1115 PA = JOYSTICK INPUT REGISTER A
1117 PB = JOYSTICK INPUT REGISTER B
1120 Q  = KEYBOARD MATRIX
1125 S  = START OF SCREEN MEMORY
1130 SC = CURRENT SCORE
1135 S2 = JOYSTICK VARIABLE (LEFT)
1137 S3 = JOYSTICK VARIABLE (RIGHT)
1140 V  = VOLUME
1145 V1 = VOICE 1
1150 :
1155 FNR() = RANDOM NUMBER GENERATOR
1160 :
1165 MISC. VARIABLES: J,L,M,X,Y,Z
1170 :
1175 ** REMEMBER: DO NOT TYPE IN REM STA
TEMENTS OR THE LINES 1000-1175 **
READY.
```

Circle No. 53

Command Post

Logical Operations Part Two

By Jim Grubbs

This month we will continue with our Morse code receive program and actually get it hooked up to our receiver. In the process, we will look at the basics of getting signals into and out of the VIC and the C-64.

Since the first COMMAND POST appeared, I have obtained a C-64. Thank you, Commodore, for the price breaks! I'd like to make a few observations for those of you who either haven't bought a machine yet, or like myself are contemplating the purchase of a second unit.

The C-64 takes a little bit of getting used to, but for VIC users, it is a very easy transition in most areas. To clear up an area of confusion, you can take a VIC-20 program and load it directly into the C-64 without any special procedure or hardware. BASIC programs will list properly. If you have a program that uses no PEEKS and POKES, it will run without modification on the C-64. What does happen is that any graphics, including regular print statements may end up looking very strange on the expanded 40 column screen! A little bit of time spent cleaning up the program will correct that problem and it certainly beats retyping the whole thing.

The programs with PEEKS and POKES like COMMAND POST RX (the RX is an abbreviation for receive) will take a bit more time. the programmer's reference guides for both machines are a must for conversion. For those of us who are used to the layout of the VIC-20 reference guide, the format for the C-64 guide seems a bit odd. It gives a bit more information for each of the listed memory locations and registers, but gives fewer specific examples.

The other major change I found necessary in converting several of my own programs was the method of generating sound. Ultimately you are going to love the sound capabilities of the C-64, but for our amateur radio applications, where we want something simple like a side tone for a CW (Morse) Keyboard, it seems like a long way to go just to make noise. In the VIC we poke our tone value in one register, and then turn the volume on and off to create sidetone. In the C-64 we must select our tone value (two values if we want to set the tone precisely), the attack time, the decay time, the sustain time, volume, and a waveform! That's not the limit . . . we can also choose to use a high pass, low pass or bandpass filter, or combinations of these. We can for example create a notch filter by using a combination of the low and high pass filters. We will go into this a lot more in coming installments, but for now let me make one other major point. Unlike the VIC where we turn the volume on and off, with the C-64 we turn the waveform on and off. This caused me a lot of consternation until I looked at the sample sound programs in the reference guide and discovered a footnote that said the tone values must be set before setting the attack and decay values. If you don't follow these warnings, you may get the desired note but at the very reduced volume level.

You will really like the way the 40 column by 25 line display looks on the screen. Somehow you feel a bit more like you are talking to a real computer. You can actually get an entire short sentence on one line! I am experiencing the widely reported "sparkles" with my machine, and the characters don't seem as sharp as I would like using my $69 black and white TV set for a monitor. All in all, for the under $200 price it is available for in most areas, it is a superb machine. I think more and more of them will be showing up in the ham shack, particularly about Christmas when I'm sure the price wars will start again. As for myself, I have always envisioned owning multiple computers. I want to do too many things to try and get it all out of one machine, unless I could afford a main frame and a bunch of terminals. Now my VIC-20 enjoys full time residency in the ham shack where it is used for Morse code reception and sending, propagation prediction, generation of graphics for amateur television, satellite tracking and a lot of other things. The C-64 handles the business end of things, writing this column, keeping up the business mailing list, accounting and so on. It is also used for program development. I still have plenty of room for another machine or two. I never dreamed it might be economically possible for me to have a machine with the power of the C-64 in the ham shack and elsewhere

at the same time. My VIC 20 is till my workhorse, and a good one it is. I foresee energy management and repeater control applications for it at my house and no doubt other things I haven't yet envisioned.

VIC LISTENS TO THE WORLD

Our main discussion this month is a continuation of a CW (that is, Morse code) receive program. I hope you have enjoyed amazing all your friends by having your computer decode the morse characters you sent with your joystick. Now it's time to hook it up to the receiver. Our discussion will be pertinent to both the VIC-20 and the C-64. The outboard connections will be identical, but we will have to deal with different addresses for each machine. A listing for both machines is included. The VIC-20 version requires no memory expansion and of course the 64 version fits with all kinds of room left over.

This might be called lesson number one in how to make your Commodore talk and listen to the outside world. The VIC and C-64 have two magic data registers for this purpose. They are bi-directional registers, meaning that each individual bit in the register can be used for inputting (receiving) or outputting (transmitting). If you have played any game that used a joystick or paddles, you have used these registers and didn't even know it. In fact, when you played with COMMAND POST RX, that is how we made the program "see" the code being sent by the firebutton.

There are two values we have to set in memory in order to make the registers do what we want them to. First of all we must tell the computer whether we want it to listen or talk. We do this with the data direction register or DDR. It is not as simple as just telling it to do this with a simple command, we must POKE the correct value into this register. The data direction registers are located at 37139 for register A and 37138 for register B in the VIC and 56322 for register A and 56323 for register B in the C-64. Next we have to select which bit we want within that register.

1 + 1 = 1 !

It's binary arithmetic time! Stop right there. I see you turning to the next article or leaving the room to raid the refrigerator. This isn't even going to be painful. We can select one of eight bits in our register. The register is laid out in binary form. Starting on the right with the least significant bit (LSB) we have bits 0 through 7. Remember that we always start numbering bits from right to left and start with bit 0.

A quick review of grade school math – in decimal the right most digit is the "units" column. We can represent the numbers 0 to 9 using this column. As you may remember, any number raised to the zero power is one (1). We multiply the number in this column by this value, one. Our next column, the second from the right is the "tens" column. Really, this is ten raised to the first power, or 10. Again we multiply the value in this column by our ten to the first power value of ten. The next one is the "hundreds" or ten to the second power, 100 and so on. Now lets switch to binary.

The same rules apply, but we only have two values to use, 0 and 1. The first place will be 2 raised to the zero power-once again a one. Any value in this position is multiplied by one. Next, 2 raised to the first power is 2. Any value here is multiplied by 2. And finally, 2 raised to the second power, or 4 and so on...8, 16, 32, 64, 128, 256, 512, 1024. Ever wonder why a 3k memory expansion actually has 3072 bytes? The reason is that 3072 is an even multiple of one of the powers of two (1024) and since our computer "speaks" binary it can most efficiently address a binary related number of bytes.

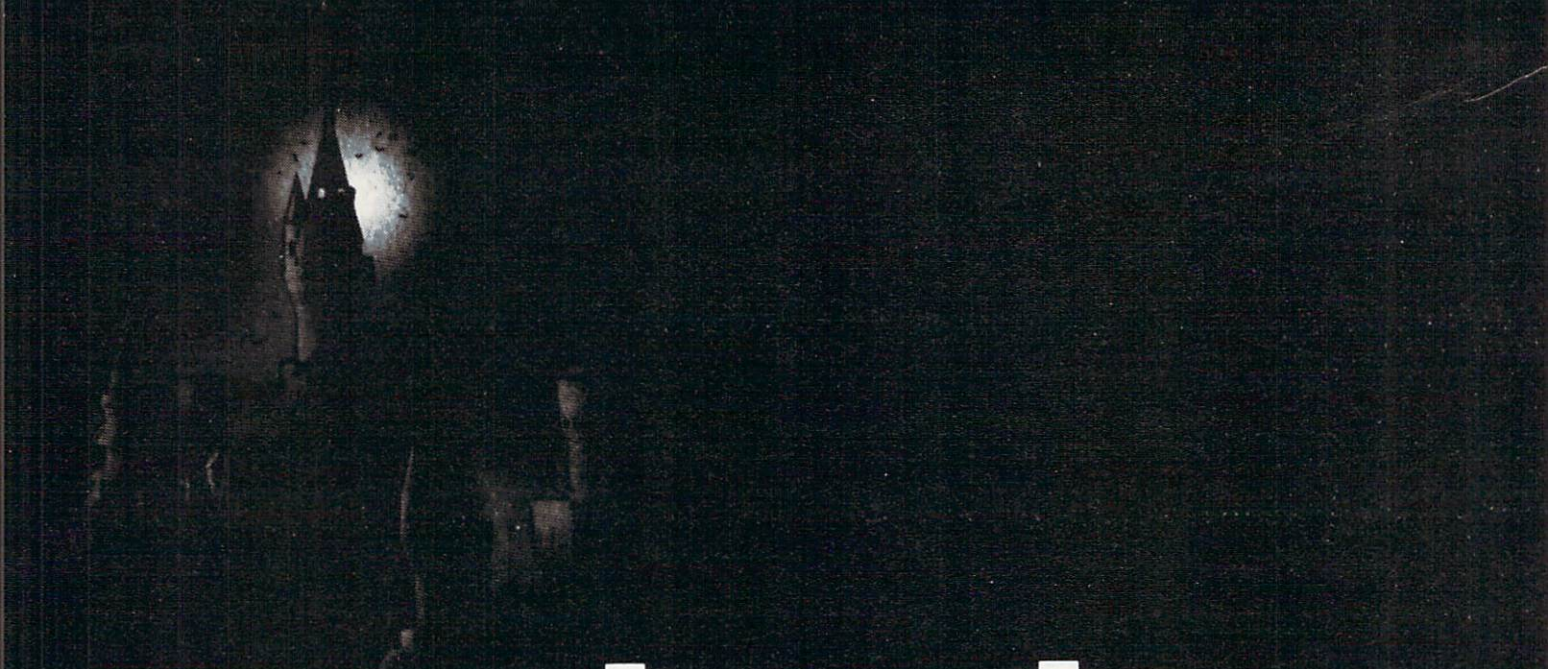
Why did we do all of this arithmetic? We need it to figure out what value to poke into the DDR to set it for send or receive. Let's say that we want bit 2 to receive data using PORT A. The programmer's guide tells us that to receive data, that bit must be poked to zero in the PORT A DDR. Since the DDR is normally set up to receive data, we don't really have to do anything in this case. Suppose we wanted to transmit on this same bit. The DDR must be set to a one to transmit. We want bit 2 so we raise 2 (our base) to the power equal to the bit we wish to select. So in this case we would POKE 37139,4. If we wanted bit 3 it would be 2 raised to the third power or 8. Remember POKEs are always done in decimal. If we wanted to transmit on both bits 2 and 3 we just add the decimal values together for a value of 12 (POKE 37139,12).

The battle is now half won. Depending on whether we are sending or receiving data we need to PEEK or POKE the data register at the appropriate bit(s). The data registers are located at 37137 for PORT A and 37138 for PORT B on the VIC, and 56320 for PORT A and 56321 for PORT B on the C-64. To do this we need to talk

COMMAND POST RX

```
100 dim rx$(85)
200 js=37137:x=0:y=0:z=0:r=4:dr=37139
210 for n=1to84:read rx$(n):next
240 poke dr,0
250 print "command post rx:":print
260 poke js,0
280 jr=peek (js) and r:if jr<>r then380
290 goto 280
300 s=0
310 jr=peek (js) and r:s=s+10
320 if jr=r then z=((5*z)+(2*s))/6:y=(2*y)+1:x=(2*x):goto 380
330 if s <.60*z then 310
340 y=(2*y):x=(2*x)+1
350 jr=peek (js) and r:s=s+10
360 if jr<>r then 350
370 z=(4*z+s)/5
380 s=0
390 jr=peek (js) and r:s=s+10
400 if jr<>r then 300
410 if s<.60*z then 390
420 gosub 470
430 jr=peek (js) and r:s=s+10
440 if jr<>r then 300
450 if s<(2*z) then 430
460 print" ";:goto 280
470 x=(2*x):p=x+y:if p>84 then p=84
480 print rx$(p);:x=0:y=0:return
500 data e,t,i,a,n,m,s,u,r,w,d,k,g,o,h,v,f,-
505 data 1,-,p,j,b,x,c,y,z,q,-,-,5,4,-,3,-,-,-,2,-,-,-
510 data -,-,-,-,1,6,-,/,-,-,-,-,-,7,-,-,-,8
515 data -,9,0,-,-,-,-,-,-,-,-,-,-,-,?,-,-,-,-,-,-,-
520 data -,.,-
ready.
```

NOTE: $\frac{1}{4} = <$ $\frac{1}{2} = >$



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about "masking". If we simply read (PEEK) the register, we will get the entire contents. Perhaps we want to check only one bit. By placing a mask over the register so that we can "see" only one bit, we can check to see if it is a 1 or a Ø. In instruction terms that our 6502 processor can understand we accomplish this with a logical AND function. This is demonstrated in COMMAND POST RX. In line 280 for example we do such a test.

If you are interested in reading more about the DDR and Data registers, I suggest pages 176, 219, 229 and 280 in the VIC-20 Programmers Reference Guide.

IT'S JUST GOING THROUGH A PHASE

We are ready to get COMMAND POST RX working with our receiver. We need a TTL logic compatible signal to keep our VIC or 64 happy. That means we will represent a 1 with 5 volts positive, and a Ø with ground, or near zero volts. The simple circuit in Figure One is designed to do this. I hope you found the 567 integrated circuit and a connector. The 567 phase locked loop is a very popular device for locking onto tones and using them to control things. The circuit is almost directly from the Signetics applications handbook and has been discussed many times. Basically we feed it audio from the receiver (it doesn't take much) and we feed the output to the VIC or 64. Depending on which connector you are using you will either connect to the user port or the joy stick port. A word of caution. MAKE ALL CONNECTIONS TO THE VIC OR 64 WITH THE POWER OFF!! PULL THE PLUG! The computer will not tolerate any abuse at all at these connections. The ports are not buffered. Make sure before you hook up the interface that you are seeing a normal 5 volt output on pin 8 of the 567 and that it goes to Ø when it detects a tone. You can power the interface from the VIC if you wish, but again extreme caution must be used. Connec-

Figure 1

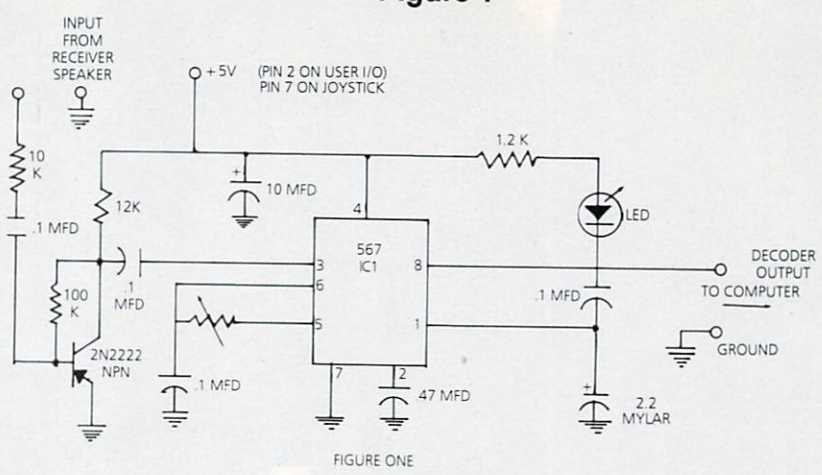

FIGURE ONE

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Figure 2

Pin	
1	Ground
2	+5 volts
3	Reset
4	Joy Ø
5	Joy 1
6	Joy 2
7	Light Pen/Firebutton
8	Cassette Switch
9	Serial ATN In
10	+ 9 volts
11	+ 9 volts
12	Ground
A	Ground
B	CB1
C	PBØ (bit 0)
D	PB1
E	PB2
F	PB3
H	PB4
J	PB5
K	PB6
L	PB7
M	CB2
N	Ground

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tions are indicated in figures two and three.

You want to tune the variable resistor so that when you have a Morse code signal tuned in on your receiver, the LED flashes along with the received code. COMMAND POST RX will tolerate no noise, so pick a good strong interference free signal. Back off the RF gain control on the receiver if you have one to reduce the background noise. It will take some practice, but you will soon find the most effective combination for your set up.

This program (and most other CW receive programs) will not tolerate poorly sent code. It will print exactly what is sent to it.

GAME I/O

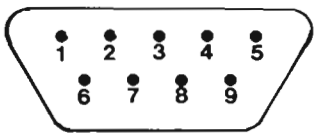

Figure 3

Pin	
1	Joy Ø
2	Joy 1
3	Joy 2
4	Joy 3
5	Pot Y
6	Light Pen/firebutton
7	+ 5 volts
8	Ground
9	Pot X

VIC WINS THE SWEEPSTAKES

The biggest contest of the year comes in November. Every year thousands of amateur radio operators compete in the annual November Sweepstakes. You can be right in there with the leaders using a simple (it will fit nicely on the unexpanded VIC) CW keyboard that will allow you several preprogrammed messages and automatically generate your contest exchange for you and let you send directly from the keyboard! We will be using the same connectors again for this project and an even simpler transmitting interface. A 2N2222 transistor and a small 5 volt relay should do the trick.

Thanks for your cards and letters. As always you can reach me at PO Box 3042, Springfield, Illinois 62708. If a reply is requested please send an SASE and allow time for the answer. 73 (Best Wishes) for now.

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Getting Down to Business With the Business Man

PART TWO

By Kirk G. Anderson

In our time together last month we took a rather condensed look at accounting within a general ledger recordkeeping system for the purpose of assisting our evaluation of "The BusinessMan™" by Southern Solutions. As mentioned the program is a general ledger recordkeeping system designed for use on the Commodore 64 computer. The program comes ready to run using a 1541 disk drive, 1525 printer, and a C2N cassette drive for making backup or historical copies of your files. However, you can easily change the program to accommodate different configurations of equipment. The program allows for these changes through a separate file used as a depository and reference bin for system information. This file is called the "General Information File" and is accessed through the program menu. If you don't have the configuration of equipment the program comes initially set up for, the general information file is probably the first place you will want to go once you have read the manuals and logged on to the program.

I strongly stress the importance of the order here. Access the program AFTER you have read the program manual. Southern Solutions has put together a very informative and well written manual that walks you right through the program making it relatively easy to understand how to work within the Business Man™ much more rewarding and much less aggravating.

THE GENERAL INFORMATION FILE

The first thing that happens when you run the program is nothing new. You gaze at the title page and then a copyright notice. After these formalities are out of the way your computer will begin to ask you some questions. (These questions are called "prompts" by most computer enthusiasts.) The first two prompts appear only when you start up the program at the beginning of each session. The first prompt asks you to enter the date, whereas the second prompt displays your entry and asks for confirmation. After you enter a date the program stores that date in the general information file. As previously mentioned this file is the depository for information used by the program in processing the information you add to the system. This file is a good place for us to first gain some understanding of the capabilities of the BusinessMan™. The file includes the following:

1) NAME
2) DATE FOR REPORTS
3) PROFIT ACCOUNT NUMBER
4) SCREEN COLOR CODES
5) DISK DRIVE MODEL NUMBER
6) FILE BACKUP METHOD
7) PRINTER TYPE
8) RS232 PRINTER CODES
9) EXPANDED PRINT CODES
10) PRINTER DEVICE NUMBER
11) PRINTER CASE CODE

The first line item, "NAME" refers to the name of the organization or individual that you want used on all financial reports printed by the program. As with all of the items in the general information file, you need not enter and re-enter this parameter each time you run the program because it is stored permanently in the file until you decide to change it. To effect any changes you access the general information file through the main program menu and follow the prompts. The manual provides excellent guidance for this exercise.

The second item, "DATE FOR REPORTS", is the location your response to the first two program prompts is stored. This date appears on all reports generated by the program.

The third item, "PROFIT ACCOUNT NUMBER", flags the appropriate account which you have designated to represent your net profit or loss. The resulting profit or loss represented after your entries are posted will then be properly stored, and the profit picture updated by the BusinessMan™.

The fourth item, "SCREEN COLOR CODES", allows you to choose and change the screen, border, and print color combinations used during program execution. Therefore, you can easily change the way your screen looks by accessing the general information file from the main menu. If you happen to get tired of working in one color combination as easily as I do, this will save you the trouble

of exiting from the program to change the appropriate statement. I liked this simple feature of the BusinessMan™ because it saved time. An even more important need this capability addresses is the fact that some screens just don't look good with certain color combinations. This way, you can set what looks best on *your* equipment.

The fifth item, "DISK DRIVE MODEL NUMBER" affords you the opportunity to customize the program to your own disk drive. The program will accept any Commodore disk drive model number as input for this section.

The sixth item, "FILE BACKUP METHOD", designates to which peripheral storage mechanism, disk or tape, you are planning to store backup files. There are four options available:

1) Backup files to tape.
2) Backup files to a separate disk unit.
3) Backup files to drive #1.
4) Duplicate entire disk.

Option #3 requires a dual disk drive and option #4 requires two single drives at your disposal.

The seventh item, "PRINTER TYPE" allows you to designate which printer and/or interface you are using. The options are a 1525/1515 printer (if you have a parallel interface which makes your printer "look" like a Commodore printer use this mode), a printer served by an RS232 interface or an IEEE interface, and a final option for a Mannesmann Talley 8024 printer. In my experience with the BusinessMan™ I had trouble generating a line feed immediately after the printed date of each report on a few of my runs. Line feed on the rest of the report functioned inadequately also when this occurred. The BusinessMan™ allows for user determined spacing between lines on printed reports. What happened on a few reports was indiscriminate single spacing between each printed line. This problem was an inconvenience when it popped up but wasn't consistent enough to locate any problem with the software itself. The equipment used was a Gemini-15 printer with a parallel interface which duplicated the functions of the Commodore printers. This seemed to work fine selecting the 1525/1515 option for printer type, with the only exception being the unpredictable problems with line feed on printed reports. (I have recently learned this problem has been addressed and the problems with the 1525 resolved.)

The next item, "RS232 PRINTER CODES", is only to be used if you have an RS232 interface. This option allows you to enter the necessary character codes for opening a channel to the printer.

The ninth item of the file, "EXPANDED PRINT CODES", allows you to enter the character code to set your printer for printing double width characters, as well as the code to return things to normal. Thus you can achieve expanded width characters for report headings and the like.

The tenth option, "PRINTER DEVICE NUMBER", allows you to compensate for using a printer with a device number other than four (4) which is the Commodore standard. You may enter here the appropriate device number for your printer, which, along with the previous printer codes you entered, makes possible use of a wide variety of peripheral

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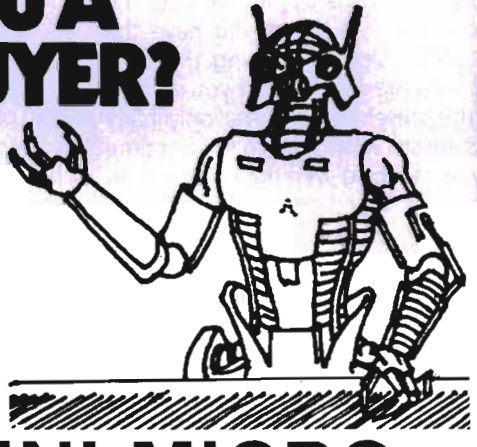

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equipment with your Commodore 64 and The BusinessMan™.

The last item in the general information file, "PRINTER CASE CODE", simply allows you to be sure your characters print in upper case.

THE MENU

The BusinessMan™ program menu system is well organized, simple, and easy to follow. The main program menu appears on your screen after you have answered the first two prompts. It would look like this on your screen:

ENTER PROGRAM NUMBER *
1) CASH JOURNAL
2) GENERAL JOURNAL
3) FINANCIAL REPORTS
4) POSTING UPDATE
5) END OF MONTH
6) ACCOUNT FILE MAINTENANCE
7) GENERAL INFORMATION FILE
8) EXIT PROGRAM

Some listed categories have a mini-menu which controls your options once you've accessed the selected part of the program. Let's take a few moments to examine your choices.

THE JOURNALS

As you remember, from our last discussion a cash journal is the location you record your transactions involving either receipts or disbursements of cash. In a manual system you may have both a cash receipts and payments journal. With the BusinessMan™ in effect you have the same thing. Upon accessing the cash journal you are first asked if you wish to erase the present cash journal only if any entries are still existing from the last time you were working with the program. (In other words, if you choose not to erase the cash journal after each work session you will have to make the decision when you start up the program for another work session.) I feel it is a good idea to keep a running cash journal until the end of the month. Then make your final months' historical copy of the files and erase the cash journal for the next months' entries. If you are making entries each time you disburse cash or receive it, it is still a good idea to make a copy of your files after each work session. The merits of this are well addressed by Southern Solutions in the program manual. One big mistake that can be made with a computer recordkeeping system is not keeping a copy of your work somewhere safe. A second big mistake you can easily make is to start pumping all your data into the computer records and not continue to maintain your manual set of books until you are positive the problems are worked out of your computer system. It is a good idea to define your system first; then shop for one; then set up a manual "mirror" system to run parallel with it for awhile before dropping manual recordkeeping and relying fully on the computerized version. This may sound like additional work for something you spent money on to make your life easier. But you will create more work and disorder if you don't design and perform some manual checks on your computerized system.

Eventually, you will end up with a error-free system that saves you a tremendous amount of distress and work.

THE POSTING CYCLE

An easy overview of the way in which you may use the BusinessMan™ cash journal would be as follows:

First you assign any new accounts you have need of. For example, you went to the office equipment store and purchased a copier for your business. You purchased the copier totally on credit with a payment plan spread over the next six months. You may want to set up the office equipment store in your account ledger to keep track of the balance owing, your payments made and invoices received. You would use the general journal to record the purchase: debit (left side) office equipment and credit (right side) equiment store for the amount of the purchase price.

Next, you would record the payments. Next, print out a trial balance to check the accuracy of all your entries, run a posting update to actually post the entries to the account balances of the accounts you have affected. Print your desired reports and then make a copy of all work so you can have it as backup.

If this seems like a lot of work, you should try it in a manual system. The BusinessMan™ performs the manipulation of the account ledgers; therefore, the whole process takes about an hour for a typical months' closing. Of course this depends upon your volume of transactions and postings, but compare it for a day or two to a manual system and you begin to see the advantages of computerized recordkeeping.

A final few notes on the BusinessMan™ journals before moving on. The number of entries is limited only by available disk space. If you run out of disk space you will have to print out either the cash or general journal and then erase the entries from the disk to provide more space.

THE FINANCIAL REPORTS

The BusinessMan™ will generate a trial balance summarizing all postings made, an income statement recapitulating income and expenses, a balance sheet providing a synopsis of financial position, and lastly, a budget analysis report available for income and expense account tracking.

Budget amounts are assigned during the process of setting up the account in the "account file maintenance" program. Account file maintenance is accessed through the main BusinessMan™ menu. You can access the "financial reports" program from two different places in the BusinessMan™. The obvious location is from the program menu, while the other is from the "end of month" program.

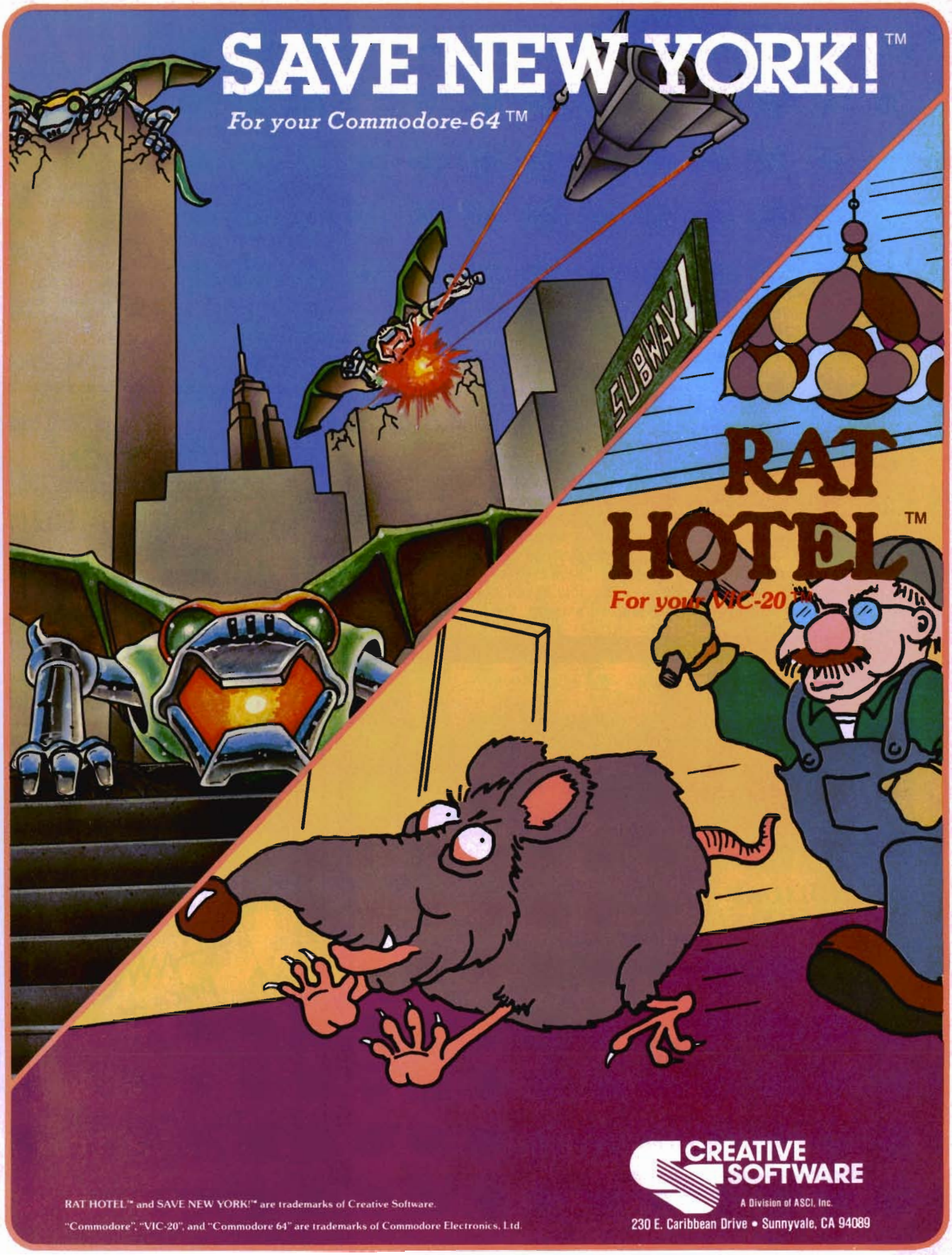
You have the option of telling the BusinessMan™ how many copies of the reports you wish to have printed. You can also halt the printing of any report for whatever reason and restart the process by typing "C" for "continue". If you want to completely halt the printing, you can kill the entire process by pressing RETURN to halt the report and then "S" to stop the processing completely. You also have the option to print accounts in the reports with or without account numbers.

With the income statement, you always receive year to date information on the printed report. It is not, shall we say, optional equipment. You do, however, have choice of month-to-date and quarter-to-date information to be presented on any income statement you process. In comparing your expense accounts to budgeted amounts, you can also manipulate your budget report to account for month-to-date, quarter-to-date or year-to-date comparison.

All in all, the flexibility available with the printed reports is fairly good. I feel the reports are probably one of the greatest advantages the BusinessMan™ has to offer in that they are user defined and formatted.

ACCOUNT FILE MAINTENANCE

You will initially spend the majority of your time with the BusinessMan™ in account file maintenance. In this section of



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the program you perform add, change, and delete functions to your account ledger along with clearing all account balances. The following information is provided on the screen when you call up an account:

1) ACCOUNT NUMBER
2) ACCOUNT TYPE
3) LINE ADVANCE
4) NORMAL BALANCE
5) INCOME ACCOUNT
6) POSTINGS
7) MONTH TO DATE
8) QUARTER TO DATE
9) YEAR TO DATE
10) ANNUAL BUDGET

The account name is strictly your choice. There is a set field within which to fit the chosen name; however, the length of this field is enough to accommodate a bit of creativity on your part. The type of account refers to "regular", "title", "heading", or "total". A regular account is the only type to which you can make entries. The others are for use in designing reports. A title account example would be "asset" or "liability". These appear in expanded print on the report if you desire. Heading accounts are simply designators of specific areas of concentration. For example, "cash" would head up the regular accounts of "petty cash", "cash in bank", etc. . . .A "total" account simply tells the BusinessMan™ to print the total of the column numbers preceding it. During printing, the program maintains a running total of accounts. When it encounters a "total" account the total is simply printed on the report. In this way you can total your cash, savings accounts, and your assets, liabilities, and equity. You as the user decide placement of these accounts and therefore control the way your financial statements are presented.

CONCLUSION

I definitely feel the BusinessMan™ by Southern Solutions is a good general ledger recordkeeping system program. Processing time with the program was quick and doesn't bore you. The layout is functional. As mentioned in part One it assumes a knowledge of basic accounting rules in order to function in the program.

I wish that I could have a summary of all postings to each account, rather than have to look through journal printings to find all postings for the account I'm examining. The information is there, but not summarized for faster, easier access.

Keeping all the transactions around would take up more disk space, which is at a premium on the 1541. A small microcomputer (and attendant, small capacity disk drive) make programming accounting concepts a challenge at best. This package takes the challenge well and provides fast access and maximum storage, recognizing the realities of the equipment typically used.

I enjoyed working with the program and was impressed by its flexibility and straightforward approach. I would presume Southern Solutions has many exciting new developments ahead for us and I look forward to them becoming available.

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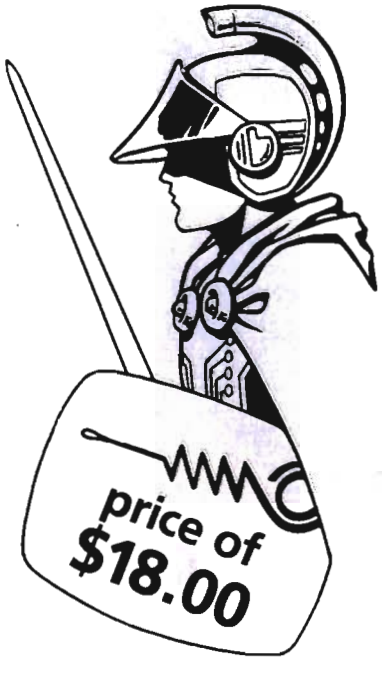

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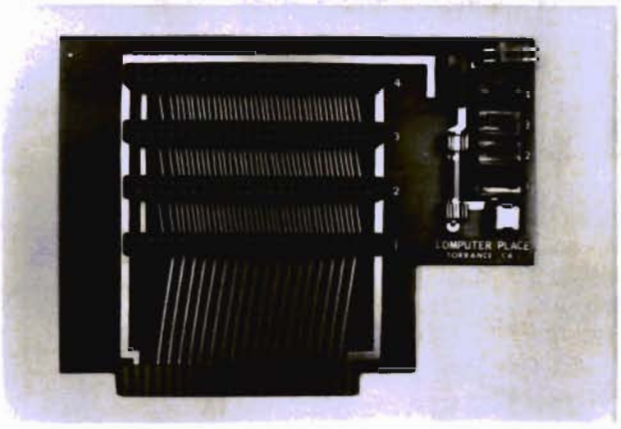

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Introduction to Assembly Language Programming

LOGICAL OPERATIONS Part X

by Eric Giguere

This month we deal with the logical instructions AND, ORA and EOR (no, they aren't conjunctions). These instructions operate on individual bits instead of the whole byte, so we'll have to reorganize our thinking. The first thing we must do, then, is get a little background information.

WHY ARE THEY CALLED LOGICAL?

In the context of assembly language "logical" refers to following a precise, orderly path of action. This probably confuses you. In simple terms it means that for any given situation there will always be a certain, predictable reaction. For example: if one bit is 1 and another is Ø, the resulting bit could be Ø, depending on the operation. The result will only be Ø if one bit is 1 and the other is Ø. If both were 1 then a different result would appear. This logic is shown in what is called a *truth table*. A truth table shows all the possible combinations of bits and their results for a certain operation. The following example is part of the AND truth table:

Bit	A	B	resultant
	Ø	Ø	Ø
	Ø	1	Ø

Bits A and B are the bits being operated on; in this case they are being ANDed together. 'Resultant' is the bit resulting from this operation. From the table it is easy to see that if both bit A and bit B are Ø the result is Ø. Truth tables make the logic behind an instruction easier to follow.

Another point should be stressed before discussing the operations themselves. The logical operations AND, ORA and EOR all work on the accumulator. The value you want to operate on is loaded into the accumulator and then ANDed, ORAed, or EORed, bit by bit. The result will also reside in the accumulator, which means you lose whatever was there previously. Example:

```
LDA #129    (%10000001)
AND #1      (%00000001)
(result of 1 is
 now in acc.) (%00000001)
```

From now on I will refer to the value to be operated on as the Initial Value. The second byte used in the operation (the one that operates on the Initial Value) will be called the Selector, for reasons that will become apparent soon. The result will be called the Resultant. Finally, it should be noted that when using a truth table bit A comes from the Initial Value byte and bit B comes from the Selector byte, in the same position as bit A. This means that if bit A is taken from bit 7 of the Initial Value then bit B must be taken from bit 7 of the Selector.

THIS AND THAT

The most commonly used logical instruction is probably the AND function. His format is:

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AND (data)

Where (data) can be a memory location or an immediate value. If you understand the BASIC AND statement then you also understand assembly language instruction as both are identical in operation. Basically, the logic behind the AND statement is "if and *only if* both Bit A *and* Bit B equal 1 then the resultant bit will be 1". The AND truth table is as follows:

bit A	bit B	resultant
0	0	0
0	1	0
1	0	0
1	1	1

When an Initial Value is ANDed the Selector acts as a gate, allowing only the bits selected to show through. Example:

```
    %10101011 Initial Value
AND %10000101 Selector
    %10000001 Resultant
```

Three bits in the Selector were on, meaning that only these three bits of the Initial Value could show through (the rest would be zero). Bit 7 of the Initial Value and Bit 7 of the Selector are on, so Bit 7 of the Resultant is on. Bit 3 of the Selector is also on, but because Bit 3 of the Initial Value is off Bit 3 of the Resultant remains off (only 1 AND 1 results in 1). Finally, Bit 1 of both the Selector and the Initial Value is on so Bit 1 in the Resultant is the same. The result of all of this? By using the Selector byte we were able to check on the status of certain bits in Initial Value. This is the main reason for using the AND operation. Say you needed to know the status of bit 6 in memory location $03FE and had to branch to somewhere else in the program if it was 0. You could do 6 LSRs (logical shift rights - remember?) but why not use the AND instruction. You could code it as such:

```
LDA $03FE
AND #64
BEQ NEWCODE
. . .
. . .
```

The accumulator is first loaded with the value we want to check. It is then ANDed with 64 (%01000000). If bit 6 of $03FE is off then the Resultant byte will be %00000000 and it will branch to NEWCODE (BEQ = Branch if Equal to Zero). Otherwise it will keep on going as if nothing had happened. This is the reason I call the second byte the Selector, because it selects which bits you want to check and only lets these through into the result. The others are ignored or 'masked out' (ANDing a byte is usually called 'masking a byte'). You'll probably find it particularly useful for keeping tabs on video chip pointers which oftentimes use single bits as flags and pointers.

THIS OR THAT

The ORA instruction has the same format as the AND instruction:

ORA (data)

The truth table is a bit different, though:

bit A	bit B	resultant
0	0	0
0	1	1
1	0	1
1	1	1

Following the logic we can see that if Bit A *or* Bit B (or both) equal 1 then the resultant will be 1. If both are 0 then the resultant is 0. A sample ORA (for OR the Accumulator) instruction could be used like this:

```
LDA #32          (%00100000)
ORA #5           (%00000101)
(acc. now holds  ----------
 resultant)      (%00100101)
```

The result of ORing 32 with 5 is 37. All we did was turn on two more bits, in the same way that AND can turn them off. As before the Selector byte is used to select which bits are to be ORed into the byte. You'll find this is a useful instruction for turning on certain bits in a byte without disturbing the rest. As an example we can turn on bit 0 of location 36867 ($9003) on the VIC to set double height characters:

```
LDA $9003
ORA #1
STA $9003
```

We simply load the accumulator from $9003, ORA it with 1 to turn on bit 0 and the store it back in $9003. As you can see, it isn't that hard at all.

EOR

The last of the logical operations is EOR (it has the same format as the other two). EOR stands for Exclusive OR and is related to the OR function. Here is its truth table:

bit A	bit B	Resultant
0	0	0
0	1	1
1	0	1
1	1	0

What's happening? If Bit B is 0 then the resultant is an *unchanged* Bit A. But if Bit B is 1 then Bit A is *reversed* (or 'flipped') -1 becomes 0 and vice-versa. And as before the Selector byte is used to determine which bits to flip. An example:

```
LDA #1           (%00000001)
EOR #254         (%11111110)
(result is in    ----------
 acc.)           (%11111111)
```

The Initial Value of 1 was EORed with 254 and resulted in an answer of 255. Notice that only the bits which were EORed with 1 were flipped. Bit 0 was left unchanged. This is what makes EOR useful for flipping in-between certain states.

SCREEN TRICKS

An interesting use of the logical instructions is to create some neat screen effects. In this respect EOR is used more often, but the other two can be used as well. To show you this I am presenting to you a small assembly language program called "Screen Tricks" for both the C64 and the VIC. Type in the BASIC loader programs for your machine and RUN them. First the screen is loaded with a bunch of garbage. When ready you may press a key and . . . Oops! Can't tell you that! But let it suffice to say that it is a good demonstration of assembly language speed. For those interested I have also provided the assembly listing so that you can see how it works.

NEXT MONTH

Next month we explore the mysterious world of the Decimal Mode. In the meantime, if you have any questions feel free to contact me at:

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P.S.: A note to Mr. T. J. Mikiel of Nova Scotia. I received a letter from you a while back but I don't have your address. Could you please drop me a note with it? I'd like to answer your questions but I can't without your address.

```
1 REM * SCREEN TRICKS *
2 REM
3 REM VIC-20 BASIC LOADER
4 REM
5 REM (C) 1983 BY ERIC GIGUERE
```

Continued on page 80

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Continued from page 76

```
 6 :
 7 :
 8 :
 9 :
 10 FOR I=828 TO 940: READ A: POKE I, A:
NEXT: REM READ DATA
 15 :
 20 PRINT "<CLR>": POKE 36879, 8: REM CHA
NGE SCREEN COLOUR
 25 :
 30 SYS 828: REM ACTIVATE ROUTINE
 35 :
 40 END
 45 :
 95 *DATA FOR ROUTINE*
 99 :
 100 DATA 162, 0, 138, 32, 130, 3, 232, 2
 08, 249, 32, 143, 3, 162, 0
 110 DATA 32, 126, 3, 73, 128, 32, 130, 3
 , 232, 208, 245, 32, 143, 3
 120 DATA 162, 0, 32, 126, 3, 41, 63, 32,
  130, 3, 232, 208, 245, 32
 130 DATA 143, 3, 162, 0, 32, 126, 3, 9,
 64, 32, 130, 3, 232, 208
 140 DATA 245, 32, 143, 3, 169, 147, 32,
 210, 255, 96, 189, 0, 31, 96
 150 DATA 157, 0, 30, 157, 0, 31, 234, 23
 4, 234, 234, 234, 234, 96, 162
 160 DATA 0, 189, 162, 3, 240, 6, 32, 210
 , 255, 232, 208, 245, 32, 228
 170 DATA 255, 240, 251, 96, 19, 72, 73,
 84, 32, 65, 32, 75, 69, 89, 0
READY.
```

Figure 2

```
1 REM *  SCREEN TRICKS  *
2 REM
3 REM COMMODORE 64 BASIC LOADER
4 REM
5 REM (C) 1983 BY ERIC GIGUERE
6 REM
7 REM
8 :
9 :
10 FOR I=828 TO 940: READ A: POKE I, A:
NEXT: REM READ DATA
15 :
20 POKE 53281, 1: PRINT "<CLR>": POKE 53
281, 0: REM CHANGE SCREEN COLOUR
25 :
30 SYS828: REM ACTIVATE ROUTINE
35 :
40 END
45 :
95 * DATA FOR MACHINE LANGUAGE ROUTINE *

99 :
100 DATA 162, 0, 138, 32, 130, 3, 232, 2
08, 249, 32, 143, 3, 162, 0
110 DATA 32, 126, 3, 73, 128, 32, 130, 3
, 232, 208, 245, 32, 143, 3
120 DATA 162, 0, 32, 126, 3, 41, 63, 32,
 130, 3, 232, 208, 245, 32
130 DATA 143, 3, 162, 0, 32, 126, 3, 9,
64, 32, 130, 3, 232, 208
140 DATA 245, 32, 143, 3, 169, 147, 32,
210, 255, 96, 189, 0, 5, 96
150 DATA 157, 0, 4, 157, 0, 5, 157, 0, 6
, 157, 0, 7, 96, 162
160 DATA 0, 189, 162, 3, 240, 6, 32, 210
, 255, 232, 208, 245, 32, 228
170 DATA 255, 240, 251, 96, 19, 72, 73,
84, 32, 65, 32, 75, 69, 89, 0
READY.
```

Figure 3

USE CHANGES ON LINES 9, 10, 60, 61 FOR THE VIC-20

```
LINE LOC.    CODE      LABEL  OP. OPERAND        COMMENTS
---- ----    ----      -----  --- -------        --------
0001 033C              ********************************
0002 033C              * SCREEN TRICKS (C64 VERSION) *
0003 033C              ********************************
0004 033C              *
0005 033C              * BY ERIC GIGUERE   JULY 13/83
0006 033C              *
0007 033C                     ORG $033C      ;CASSETTE BUFFER
0008 033C              *
0009 033C              SCREEN EQU $0400      ;SCREEN MEMORY ($1E00 FOR VIC)
0010 033C              SCRN2  EQU $0500      ;($1F00 FOR VIC)
0011 033C              SCRN3  EQU $0600      ;(NOT NEEDED ON VIC)
0012 033C              SCRN4  EQU $0700      ;(NOT NEEDED ON VIC)
0013 033C              ;
0014 033C              PRINT  EQU $FFD2      ;PRINT ROUTINE
0015 033C              GETIN  EQU $FFE4
0016 033C              ;
0017 033C A2 00               LDX #0         ;INITIALIZE POINTER
0018 033E 8A           LOOP   TXA            ;PLACE X INTO ACC.
0019 033F 20 82 03            JSR STORE
0020 0342 E8                  INX
0021 0343 D0 F9               BNE LOOP
0022 0345              ;
0023 0345 20 8F 03            JSR PRMESG     ;PRINT MESSAGE & WAIT
0024 0348              ;
0025 0348 A2 00               LDX #0         ;RE-INITIALIZE POINTER
0026 034A 20 7E 03     LOOP2  JSR GET        ;GET SCREEN CHARACTER
0027 034D 49 80               EOR #$80       ;FLIP BIT 7
0028 034F 20 82 03            JSR STORE      ;PLACE IT BACK ON SCREEN
0029 0352 E8                  INX
0030 0353 D0 F5               BNE LOOP2
0031 0355              ;
```

Continued on page 87

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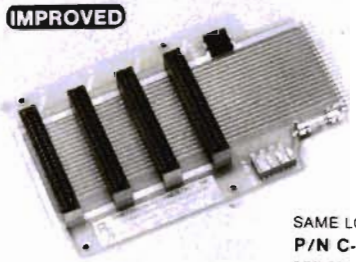

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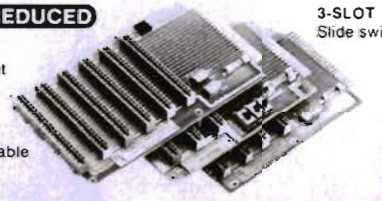

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BITS & PIECES

Dear Editor:

I chanced on the June issue of COMMANDER in a local newspaper shop, and purchased a copy out of curiousity. I am very pleased with it and, although I really don't need another magazine coming into the house, yours is an exception. My compliments to you and your associates.

The article by Eric Giguere, "A Comprehensive Editor/Assembler For The Vic-20", is of special interest to me. I have several machine language utilities, such as HESMON, VICMON, SUPER VICMON2, and find Mr. Giguere's Editor to be easily the most powerful. He has done a fine job on it and deserves to be complimented.

There is a serious error in the published listing, however. Line 310 appears to have been accidentally over-written by a duplicate of line 440. The following correction is needed:

310 PRINT#3,L

Without this correction it is impossible to load files from disk.

I would also appreciate Mr. Giguere's comments on line 1000. What is the meaning of "CLOSEK"? It seems to me line 1000 could be written simply as:

1000 INPUT IN : PRINT:RETURN

These remarks notwithstanding, the author has done a fine job and I am looking forward enthusiastically to Part II of his article with the Assembler listing.

Sincerely, W. B. Offutt

Dear Editor:

I read with interest the letter from Jerry Fellows in the August issue. In light of that, it seems to me that the time has come to reveal to the world the easy method of listing Commodore 64 programs on the 8032. The following routine, which must be performed in the order listed, will cause a 64 program to list on an 8032.

1. Type this line of BASIC: 1 rem (goes in at $0401).
2. Load your 64 program (loads at $0801).
3. Type "sys1024" (enter ML monitor).
4. Type ".m 0400 0400" (displays 8 bytes starting $0400).
5. Change bytes 2 and 3 from "07 04" to "01 08" (forwd. line ref.).
6. Type ".x" (exit to BASIC).
7. Type "clr" (you know what this does).
8. Type "list" and the program will list.

Note: If your program has a line 1, don't worry, the "1 rem" you type in step 1 will not affect it. You may see two lines 1, but typing "1 (RETURN)" will get rid of the first one. The program will still list and can be worked on with Basic-aid or whatever. I use this method a lot, and it works for me. Try it. It seems much easier than your undoubtedly good program.

Keep up the good work,

Horace Brock
Chattanooga, Tennessee

The following program listing will initialize the character generator set in the game titled "Crazy Scaler", featured on page 146 of the August 1983 issue.

This listing was erroneously omitted from the article when published. We apologize for any inconvenience this error may have caused you.

The Editor

```
10 PRINT"[CLEAR]":POKE51,160:POKE52,28:
POKE55,160:POKE56,28
18 PRINT"[DOWN][DOWN][DOWN][DOWN][DOWN]
**********************"
19 PRINT"*                      *"
20 PRINT"*    CHARACTER         *"
21 PRINT"*  INITIALIZRTION       *"
22 PRINT"*                      *"
```

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Continued from page 82

```
23 PRINT"********************"
30 FORI=7328TO7591:READA:POKEI,A:NEXT
70 FORI=7592TO7637:READA:POKEI,A:NEXT
110 FORI=7638TO7673:READA:POKEI,A:NEXT
130 PRINT"[CLEAR][DOWN][DOWN][DOWN][DOW
N][DOWN]***************"
131 PRINT"*              *"
132 PRINT"* LOADING.... *"
133 PRINT"*              *"
134 PRINT"***************"
140 CLR:POKE631,131:POKE198,1:END
200 DATA16,56,16,232,83,23,104,8
201 DATA255,255,126,126,126,60,60,60
202 DATA157,157,189,141,157,137,126,70
203 DATA90,90,90,70,126,36,165,195
204 DATA255,62,28,28,28,28,62,255
205 DATA0,0,7,63,255,63,7,0
206 DATA0,240,224,240,254,241,226,240
207 DATA126,2,20,24,16,16,32,0
208 DATA0,0,84,84,4,8,48,0
209 DATA0,40,40,40,40,42,76,0
210 DATA56,56,16,56,84,16,40,108
211 DATA0,0,44,18,16,16,16,0
212 DATA0,0,0,0,0,0,0,0
213 DATA15,14,28,56,56,28,12,28
214 DATA240,112,56,28,28,56,48,56
215 DATA192,224,195,199,103,103,51,49
216 DATA0,0,3,7,7,7,195,225
217 DATA0,0,3,7,7,7,3,1
218 DATA31,31,15,15,7,7,7,7
219 DATA207,207,223,223,247,119,7,7
220 DATA15,31,55,55,103,103,103,231
221 DATA3,7,195,227,230,230,204,140
222 DATA0,0,192,224,224,224,195,135
223 DATA0,0,192,224,224,224,192,128
224 DATA248,248,240,240,224,224,224,224
225 DATA243,243,251,251,239,238,224,224
226 DATA240,248,236,236,230,230,230,231
227 DATA255,128,191,191,183,183,183,183
228 DATA255,0,255,255,71,110,109,109
229 DATA255,1,253,253,61,221,253,253
230 DATA183,178,184,189,191,191,128,255
231 DATA109,109,238,199,255,255,0,255
232 DATA253,253,237,29,253,253,1,255
240 DATA162,255,189,228,150,157,250,150
241 DATA202,208,247,162,229,189,255,149
242 DATA157,21,150,202,208,247,96
243 DATA162,0,189,22,150,157,0,150
244 DATA232,208,247,162,24,189,250,150
245 DATA157,228,150,232,208,247,96
250 DATA234,9,230,13,227,11,223,11,231,
11,234,11,236,11,238,11,239,0
251 DATA198,9,198,13,213,1,213,9,221,13
,227,1,221,9,227,13,234,0
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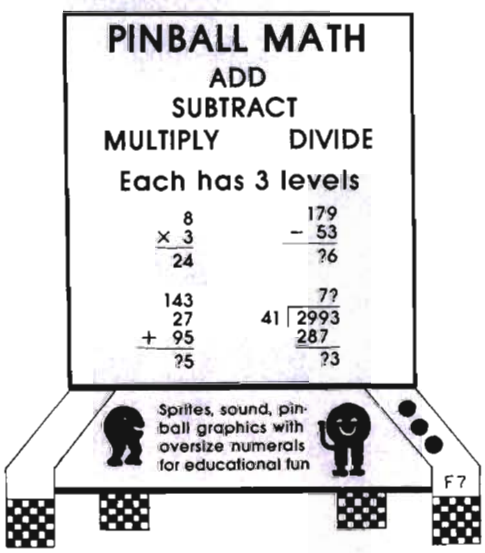

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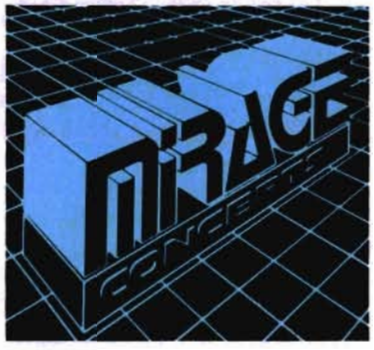

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Continued from page 80

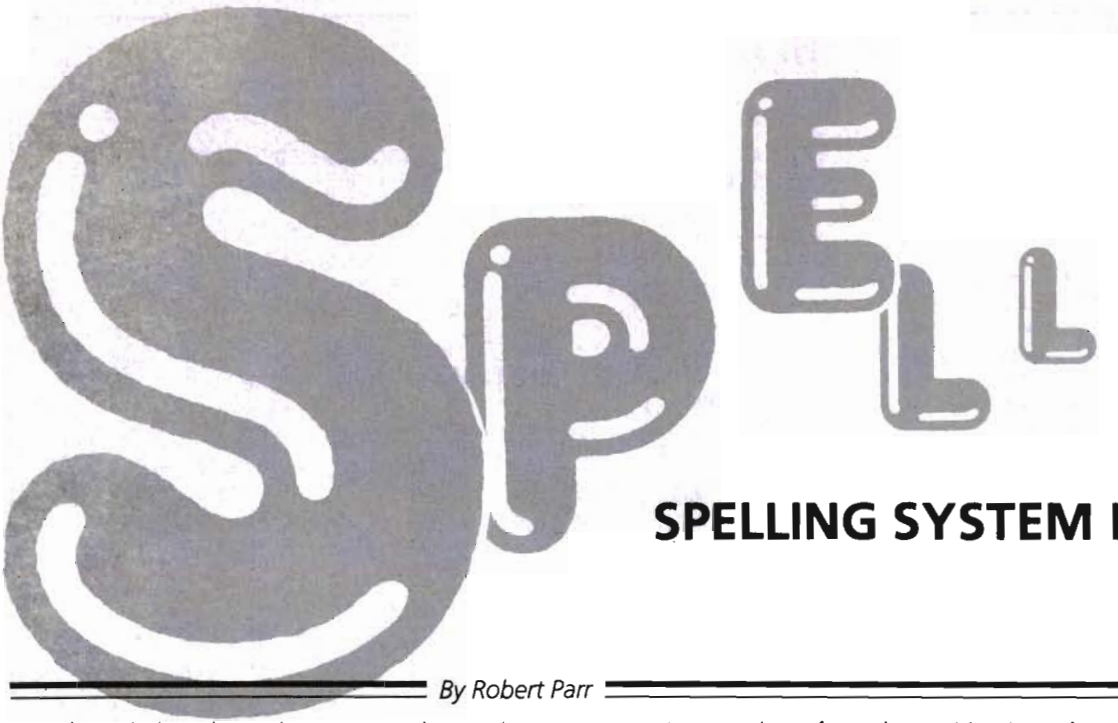
```
0032 0355 20 8F 03          JSR PRMESG
0033 0358                   ;
0034 0358 A2 00             LDX #0
0035 035A 20 7E 03  LOOP3   JSR GET
0036 035D 29 3F             AND #63         ;CONVERT TO UNREVERSED LETTERS
0037 035F 20 82 03          JSR STORE
0038 0362 E8                INX
0039 0363 D0 F5             BNE LOOP3
0040 0365                   ;
0041 0365 20 8F 03          JSR PRMESG
0042 0368                   ;
0043 0368 A2 00             LDX #0
0044 036A 20 7E 03  LOOP4   JSR GET
0045 036D 09 40             ORA #64         ;CONVERT ALL TO GRAPHICS
0046 036F 20 82 03          JSR STORE
0047 0372 E8                INX
0048 0373 D0 F5             BNE LOOP4
0049 0375                   ;
0050 0375 20 8F 03          JSR PRMESG
0051 0378 A9 93             LDA #147        ;CLEAR SCREEN CHARACTER
0052 037A 20 D2 FF          JSR PRINT
0053 037D 60                RTS
0054 037E                   ;
0055 037E BD 00 05  GET     LDA SCRN2,X
0056 0381 60                RTS
0057 0382                   ;
0058 0382 9D 00 04  STORE   STA SCREEN,X
0059 0385 9D 00 05          STA SCRN2,X
0060 0388 9D 00 06          STA SCRN3,X     <-- REPLACED BY NOPS
0061 038B 9D 00 07          STA SCRN4,X     <-- IN VIC VERSION
0062 038E 60                RTS
0063 038F                   ;
0064 038F A2 00     PRMESG  LDX #0
0065 0391 BD A2 03  GETCHR  LDA MESSGE,X
0066 0394 F0 06             BEQ WAIT
0067 0396 20 D2 FF          JSR PRINT
0068 0399 E8                INX
0069 039A D0 F5             BNE GETCHR
0070 039C 20 E4 FF  WAIT    JSR GETIN
0071 039F F0 FB             BEQ WAIT
0072 03A1 60                RTS
0073 03A2                   ;
0074 03A2 13        MESSGE  BYT 19
0075 03A3 48 49 54          ASC .HIT A KEY.
         20 41 20
         4B 45 59

0076 03AC 00                BYT 0
0077 03AD                   ;
0078 03AD                   ********************************
0079 03AD                   * PROGRAM NOTES:
0080 03AD                   *
0081 03AD                   * GET - ROUTINE THAT GETS A CHARACTER
0082 03AD                   *        FROM THE SCREEN
0083 03AD                   *
0084 03AD                   * STORE - ROUTINE TO STORE ONE CHARACTER
0085 03AD                   *          THROUGHOUT SCREEN
0086 03AD                   *
0087 03AD                   * PRMESG - PRINTS MESSAGE & WAITS FOR KEYPRESS
0088 03AD                   *
0089 03AD                   * PROGRAM FIRST FLIPS CHARACTERS, THEN
0090 03AD                   * CONVERTS THEM TO UNREVERSED LETTERS
0091 03AD                   * AND THEN TO GRAPHIC SYMBOLS
0092 03AD                   *

ASSEMBLY COMPLETE.

SYMBOL TABLE:

SCREEN-$0400   SCRN2--$0500   SCRN3--$0600   SCRN4--$0700   PRINT--$FFD2
GETIN--$FFE4   LOOP---$033E   LOOP2--$034A   LOOP3--$035A   LOOP4--$036A
GET----$037E   STORE--$0382   PRMESG-$038F   GETCHR-$0391   WAIT---$039C
MESSGE-$03A2
```



SPELLING SYSTEM DRILL

By Robert Parr

As knowledge about the way people think and learn increases, it becomes more and more evident that many of our traditional methods of teaching are not best suited for *all* students. In order to broaden their teaching methods, many schools and parents are turning to computers for assistance in instruction.

Because computers are highly adaptable, they can be programmed to teach the basic concepts of almost any subject. Spelling is one that lends itself well to computerized drill. The following spelling program is designed to allow a parent or educator to take a list of spelling words to be mastered, store them in a file, and then turn the program over to their children to use. Students who are very young or who are "concrete" learners (i.e., learn by touching or by doing something) are apt to have more success learning to spell with this type of drill than with some of the more traditional methods.

If you have a child who enjoys computers or is doing poorly with spelling, then you might find this program beneficial.

PROGRAM DESIGN

The first thing that the user will see after loading the program is the Main Menu. There are four options available from this menu, and I will explain the purpose of each choice in order.

The first selection ADD A SPELLING FILE is the mainstay of the program. This subroutine allows the parent or instructor to prepare a new spelling lesson for the child as he progresses. Any number of words can be included in a file, but I don't recommend a file of more than 30 words, as the loading time becomes prohibitive.

There are essentially three steps involved in defining a word file. First, you must tell the computer how many words you intend to include in the file. The computer will then prompt you for each word until all of the spelling lesson has been entered.

Because typing errors are bound to happen, I have included a routine (contained in lines 2020-2060) to allow you to proofread your entries and correct them if they contain mistakes. This routine is not vital to program execution, but I found it very nice to have.

Once you have made your entries and ascertained there were no spelling mistakes, then it is time to save the file to cassette. The computer will prompt you to give the file a name, and then remind you to insert the cassette to be used. Once that is all taken care of, the computer commands you to press play and record on the recorder, saves the file, and then returns to the Main Menu.

The second selection RUN SPELLING PRACTICE allows the student to review the words and practice spelling them until he feels he knows the lesson. After he has retrieved the appropriate file, the computer will print the first word on the screen. The student then types over the word until he has spelled it correctly. As each correct letter is entered, it is printed in inverse mode, and the cursor advances one character. If an incorrect letter is typed, the computer signals the error with a buzz from the speaker. When the word is correctly entered, the computer rewards the student by flashing the screen and sounding a series of random notes, and then goes on to the next word. When all of the words in the lesson have been successfully spelled, the user is returned to the Main Menu.

The input of this routine is designed so that the student must eventually spell the word correctly. This reinforces the positive spelling of the words, and insures that the child receives some praise for his accomplishments—an important aspect of learning.

When the student feels that he knows the words, he can then select the third option from the menu RUN SPELLING TEST. In this routine, the words from the lesson are flashed on the screen for a brief period of time. The student must then spell each word from memory. If he makes a mistake, he can move the cursor back until it is over the incorrect letter and then re-enter the remaining characters by pressing the left arrow key next to the "1". When he thinks the word is spelled correctly, the child presses the RETURN key. If the word is indeed correct, the computer uses the flashing screen and random sounds to praise the student. If it isn't, then the computer buzzes and goes on. When all of the words have been tested, both the number and percentage of words correct are printed on the screen.

Once you are through running the program, selecting the fourth option EXIT PROGRAM will return you to BASIC.

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Circle No. 34

```
10 REM ************
11 REM *          *
12 REM * SPELLING *
13 REM *  SYSTEM  *
14 REM *          *
15 REM *    BY    *
16 REM *  ROBERT  *
17 REM *   PARR   *
18 REM *          *
19 REM * 07-15-83 *
20 REM *          *
21 REM ************
100 CLR:PRINT "<CLR>";    :REM CLEAR SCRE
EN
110 POKE 53280,8:POKE 53281,15:PRINT CHR
$(5);
120 PRINT TAB(10)"<RON>THE SPELLING SYST
EM";:PRINT
130 FOR Z=0 TO 39 STEP 2:PRINT"<RON>  ";
:NEXT:PRINT
140 PRINT TAB(1);"<RON>1<ROF>-ADD A SPEL
LING FILE"
150 PRINT TAB(1);"<RON>2<ROF>-RUN SPELLI
NG PRACTICE"
160 PRINT TAB(1);"<RON>3<ROF>-RUN SPELLI
NG TEST"
```

Continued on page 92

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Circle No. 34

Continued from page 90

```
170 PRINT TAB(1);"<RON>4<ROF>-EXIT PROGR
AM"
200 PRINT:PRINT:INPUT "WHICH ";M$
210 IF M$="1" THEN 2000
220 IF M$="2" THEN 1000
230 IF M$="3" THEN 300
240 IF M$="4" THEN PRINT "<CLR>":END
250 GOTO 100
300 INPUT "<CLR><RON>NAME OF FILE<ROF> "
;N$
310 PRINT "<DWN><DWN>INSERT DATA CASSETT
E AND PRESS RETURN";
320 GET M$:IF M$<>CHR$(13) THEN  320
330 OPEN 1,1,0,N$
340 INPUT#1,A:IF A=>10 THEN DIM W$(A+1)
350 FOR ZZ=1 TO A:INPUT#1,W$(ZZ):NEXT
360 CLOSE 1
500 DIM P$(40):S=0:FOR ZZ=1 TO A
510 PRINT "<CLR><RON>";N$:PRINT "<RON>SP
ELLING TEST"
520 PRINT "<DWN><DWN><DWN><DWN> ";W$(ZZ)
;"<RON>"
530 FOR PAUSE=1 TO 1000:NEXT
540 PRINT "<CLR><RON>";N$:PRINT "<RON>SP
ELLING TEST"
550 PRINT "<DWN><DWN><DWN><DWN> <RON>"
560 XX=1
570 PRINT TAB(XX-1);" <196>< UP><LFT>";
580 GET P$(XX):IF P$(XX)="" THEN 580
590 IF XX=40 OR P$(XX)=CHR$(13) THEN 640

600 IF P$(XX)<>"_" OR XX=1 THEN 620
610 XX=XX-2:PRINT "<DWN> <LFT><LFT><LFT>
< UP>";
620 PRINT P$(XX)
630 XX=XX+1:GOTO 570
640 T$="":FOR Q=1 TO XX-1:T$=T$+P$(Q):NE
XT
650 IF T$<>W$(ZZ) THEN GOSUB 1900:NEXT Z
Z
660 IF T$=W$(ZZ) THEN GOSUB 1800:S=S+1:N
EXT ZZ
670 PRINT "<CLR><RON>";N$:PRINT "<RON>SP
ELLING TEST"
680 PRINT "<DWN><DWN><DWN><DWN>";
690 PRINT "YOUR SCORE WAS ";S;" OUT OF "
;A
700 PRINT "PERCENTAGE CORRECT = ";(S/A)*
100
710 PRINT:PRINT "PRESS RETURN TO CONTINU
E"
720 GET M$:IF M$<>CHR$(13) THEN 720
730 GOTO 100
1000 INPUT "<CLR><RON>NAME OF FILE<ROF>
";N$
1010 PRINT "<DWN><DWN>INSERT DATA CASSET
TE AND PRESS RETURN";
1020 GET M$:IF M$<>CHR$(13) THEN 1020
1030 OPEN 1,1,0,N$
1040 INPUT#1,A:IF A=>10 THEN DIM W$(A+1)

1050 FOR ZZ=1 TO A:INPUT#1,W$(ZZ):NEXT
1060 CLOSE 1
1500 DIM P$(40):FOR ZZ=1 TO A
1510 PRINT "<CLR><RON>";N$:PRINT "<RON>S
PELLING PRACTICE"
1520 PRINT "<DWN><DWN><DWN><DWN> ";W$(ZZ
);"<RON>"
1530 FOR XX=1 TO LEN(W$(ZZ))
1540 PRINT TAB(XX-1);" <196>< UP><LFT>";

1550 GET P$(XX):IF P$(XX)="" THEN 1550
1560 IF P$(XX)<>MID$(W$(ZZ),XX,1) THEN G
OSUB 1900:GOTO 1550
1570 PRINT "<RON>";P$(XX)
1580 NEXT XX
1590 GOSUB 1800:NEXT ZZ
1600 PRINT:PRINT " VERY GOOD!":FOR PAUSE
 = 1 TO 1400:NEXT
1610 GOTO 100
1800 FOR L=54272 TO 54296:POKE L,0:NEXT
1810 POKE 54296,15:POKE 54277,64:POKE 54
276,64
1820 FOR Q=1 TO 15 STEP 2:POKE 53281,Q
1830 FO=INT(RND(1)*250)+1:FM=INT(FO/.060
97):FH=INT(FM/256):FL=FM-(256*FH)
1840 POKE 54273,FL:POKE 54272,FH
1850 POKE 54276,33
1860 FOR T=1 TO 50:NEXT
1870 POKE 54276,32
1880 NEXT Q
1890 FOR L=54272 TO 54296:POKE L,0:NEXT:
RETURN
1900 FOR L=54272 TO 54296:POKE L,0:NEXT
1910 POKE 54296,15:REM MAX VOLUME
1920 POKE 54277,136:POKE 54278,40:REM A/
D/S/R
1930 POKE 54273,251:POKE 54273,4:REM H/L

1940 POKE 54276,33:REM PULSE WAVE
1950 FOR T=1 TO 150:NEXT
1960 POKE 54276,32:REM STOP PULSE
1970 FOR L=1 TO 9:GET Q$:NEXT
1980 FORL=54272TO54296:POKEL,0:NEXT
1990 RETURN
2000 PRINT "<CLR>TOTAL # OF WORDS ";:INP
UT A:DIM W$(A)
2010 FOR ZZ=1 TO A:PRINT "WORD # ";ZZ;"
";:INPUT W$(ZZ):NEXT
2020 FOR ZZ=1 TO A:PRINT "<CLR>":PRINT Z
Z;"- ";W$(ZZ):PRINT
2030 PRINT "<RON>CORRECT (Y/N) <ROF>";:I
NPUT M$
2040 IF LEFT$(M$,1)="Y" THEN 2070
2050 INPUT "<RON>CORRECT SPELLING <ROF>"
;W$(ZZ)
2060 ZZ=ZZ-1:NEXT
2070 NEXT:PRINT "<CLR>"
2080 INPUT "NAME OF FILE ";N$
2090 PRINT "<DWN><DWN>INSERT DATA CASSET
TE AND PRESS RETURN"
3000 GET M$:IF M$<>CHR$(13) THEN 3000
3010 OPEN 1,1,1,N$
3020 PRINT#1,A
3030 FOR ZZ=1 TO A:PRINT#1,W$(ZZ):NEXT
3040 CLOSE 1
3050 GOTO 100
READY.
```

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The Pro Gram

By Jerry B. Byrd

Editor's Note:

The following article is written by Mr. Jerry B. Byrd, President of Southern Solutions. His philosophy and expertise developed from six years of programming experience have provided the foundation for the growth of his company to its status as a major software firm located in Texas.

This monthly feature is aimed at providing those readers with programming knowledge the ability to organize and utilize their skills to the maximum capacity. Each month I will discuss philosophy and practical application involved with good programming skills.

Few would disagree with the probability that writing programs represents the largest potential "cottage industry" of this decade. As the CEO of a major software house and a former retailer, I can testify that the burning question in the mind of most potential programmers is "How can I really learn to program like the pros?"

Many try to learn by signing up for "schools" run by a computer retailer (I have held these myself), some take college, junior college or community classes; while still others muddle along with a personal, home computer with no clear direction for learning or implementing professional-level methods that are required if a program or package is to be viable in the marketplace.

While I would hesitate to speak disparagingly about any of these methods, I am convinced that a better alternative exists: learn by doing, and learn from someone who has walked down the path before.

This "gram" from a professional will try to help you learn by doing and learn from mistakes that I have made, or have observed from others. The column will be divided into 2 parts: philosophy and practical suggestions.

The section on philosophy will *not* be a soapbox to ride my "hobby horses". The kind of issues to be addressed will be personal organization, program structures, to flow-chart or not-to-flow-chart, file use and management, copyrights, getting programs sold, protection, planning complete systems, what programs to write, problem solving, and planning the big move to full-time, professional programming.

I'd like for this to be more like a conversation around the table at a coffee break. I think most of us would confess, that's where we have learned the most. Please ask questions; help to direct the "conversation". Remember, however, the column will not be so much a "how to" column, but more of a "why to" approach.

We'll look at some specific techniques and routines to fit some particular needs. These will be general in application, but I will try to give some very specific examples. The assumption will be made that you know just a little bit about BASIC, and are ready to be better.

Enough introduction; let's get serious. Our first installment will look at getting organized. Our practical part will deal with justifying data and rounding numbers.

"I believe the programs reflect a basic lack of organization by the programmer."

PHILOSOPHY: Organization

I see lot of programs. Most look like the car we had in high school where the patches had patches. I believe that the programs reflect a basic lack of organization by the programmer. It's not that the programs won't work, or that organization will make them work better. But the structures (or lack of it) mean that the programs will be harder to enhance, debug, fix and/or use later.

Although we release a new package from our software house about every 5 weeks, we seldom write totally original code. No, Virginia, we don't steal it, except from ourselves. There is just not enough time to write from scratch, notwithstanding the probability that more errors will be induced in raw code versus good, old tested stuff that is already known to be clean code.

Let's pretend that you have written a set of programs to manage a Christmas card list. After several weeks of hard, tedious programming, maybe you stumble upon the ideal screen layout for the entire set! (Why all the best ideas are stumbled upon, I don't know, but I'm convinced it's true.) When you go back to enhance that first program, you may realize you have forgotten more than you remember. It may well take longer to find exactly where and how the screen was laid out than it does to make the changes. Even then, you may not find it all.

The solution is very simple. Almost all software houses have established house standards. No big deal. It just means that most, or all, of the programs are basically laid out the same way. There are generally 6 parts to a program: initialization of variables, screen layout, file beginnings, process management, file closing, and subroutines.

Subroutines should be used primarily for repetitious operations. Actually, a subroutine is really just a program within a program to do a specific, consistent operation. Most of the time, subroutines are best located at the beginning of the program. (Just put in a line at the beginning to jump around the subroutines.)

How do you set up standards? Easy. Just elect yourself the president of Sooper Software (that's you). Set policy. Announce to all who work in your shop (that's probably just you again) that they will henceforth follow the standards.

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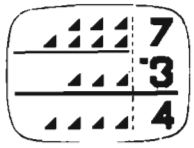

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Then do it. Self-discipline. Make it happen. I will give you a possible outline of standards. You can develop your own. Remember, the more detailed, the better.

Line #'s	Section
0-999	Subroutines
1000-1999	Initialization
2000-2999	Screen layout
3000-3999	File beginnings
4000-4999	Process management
5000-5999	File closings

What about old programs? I think you should change them. That's a tough decision, and I confess we don't always follow that advice in our own house. Eventually, we hope to go through all old programs and bring them into our current standards. In the long run, it is time well spent.

In our next installment, we will look at building a routine file.

PRACTICAL APPLICATIONS: Justifying and Rounding

One of the things you inevitably will need to do in your program is justify information. Justification simply means "lining up". Basically, there are just 2 possibilities: left justification, where the leftmost character lines up vertically, and right justified, where the rightmost characters are aligned as tiny tin soldiers.

Most Commodore printers, as well as some others, provide a format command to do all this for you automatically. The new Commodore B128 and B256 computers have a "print using" command to help when you are printing to the screen. These capabilities ignore the need of program portability and hardware universality. Here is a universal method of justification that works on the screen or printer. (By the way, I know there are a hundred ways to do anything, and most of them are better than the way I am showing here. Some of the "look" to these methods are to make them clearer.)

Let's look at an example that is general enough to be used for things other than our example, yet is sufficiently specific to really work. Here is the need: input a list of 10 names of students and the grade of each on a test. The names are stored in an array named na$(x). The grades are in an array named *gr(x)*. After everything is input print a nice looking screen.

```
1000 for i =1 to 22:sp$ = sp$ +
     " ":next
3000 for i =0to 9
3010 input"name,grade";na$,(i),gr(i)
     :next
3020 print left$("Student Name"+sp
     $,15);right$(sp$+"Grade",7)
3030 for i =0to 9
3040 print left$(na$(i)+sp$,18); right$
     (sp$+str$(gr(i),3)
3050 next
```

Line 1000 is part of our variable initialization.

It creates a string of spaces to be used to pad out our names and grades to make them a uniform length.

Line 3000 counts the input cycle and line 3010 prompts for the name and grade, then returns to line 3000 via the next to get another name and grade. Line 3020 gives a nice title to our display.

Line 3030 counts the names during printing. Line 3040 first prints the leftmost 18 characters of the name plus part of those 22 spaces. If a name is short, like Jerry B. Byrd, it will be printed along with 5 blanks for a uniform printing width of 18 characters. If a name is long, like Anistazio Fredric Joseph Jackson, only the first 18 characters, "Anistazio Fredric", will be printed. Then the grade is printed with spaces in front so that only the right most 3 characters are printed. If the grade is 9, then 2 spaces are printed before the 9. If a grade is 87.75, it will be printed as .75, obviously not exactly correct.

I chose to print 18 and 3 characters so that this exercise will work on a VIC, 64, PET or any CBM: Universality. (I occasionally practice what I preach.) But what about that grade that didn't print correctly? Now comes our little subroutine to round a number. This one will work with any number of decimal places you want, up to the limits of the number handling capabilities of the computer.

```
100 if dp < 0 then dp =2
110 n$ = mid$(str$(int(n*10 ↑ dp
    +.5)),2)
120 iflen(n$) <dp+1thenn$ = right
    $("0000000000"+n$,dp+1)
130 n$ = left$(n$,len(n$)-dp)+"."
    +right$(n$,dp)
140 ifn <0thenn$ = "-"+n$
150 dp=-1:n=val(n$):return
```

The variable *dp* is the number of decimal places to be used. *n* represents the number to be rounded and *n$* is number rounded and formatted with zeros as necessary to present a uniform display. Line 100 sets the default number of decimal places to 2, as in dollars and cents.

Line 110 does several things. Start deepest inside the parentheses and follow as we work our way out.

10 ↑dp sets the number 1 plus as many zeros as you have decimal places (i.e., 2 decimal places gives 100, 1 plus two zeros). (Notice that 10 ↑ 0 = 1.) *+.5* rounds the number to the next higher number if the next number in line after the decimal places is 5 or greater. The *int(* strips off any remaining decimals and gives us a whole number. *str$(* gives a string representation of the number and *mid$(. . . ,2)* will set *n$* to equal that string, but only starting with the second

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character, effectively cutting off the —, if *n* is a negative number, or the blank, if *n* is a positive number.

Line 120 make certain that there are enough zeros at the front of *n$* to allow a decimal to be inserted in the proper place. If the number is less than 1, there will be a zero before the decimal (e.g. 0.34).

Line 130 inserts the decimal in the proper place and line 140 puts on the minus sign, if needed. Line 150 does a little housecleaning. It first resets the decimal place variable *(dp)* to the default position. Then it sets *n* to be the value of *n$*, so that *n* is now rounded too. The return sends us back to the place in the program from whence we came, which, in the case below, will be line 3030.

The program lines shown before now look like this:

```
10 goto 1000
100 if dp    0 then dp = 2
110 n$ = mid$(str$(int(n*10 ^ dp
    + .5)),2)
120 iflen(n$)   dp + 1thenn$ = right$
    ("0000000000") + n$,dp + 1)
130 n$ = left$(n$,len(n$)-dp) + "." +
    right$(n$,dp)
140 ifn   0thenn$ = "-" + n$
150 dp = 11:n = val(n$): return
1000 for i = 1 to 22:sp$ = sp$ + " ":
    next:dp = -1
3000 for i = 0 to 9
3010 input"name, grade";na$(i),gr(i):
    next
3020 print left$("Student Name" + sp$,
    15);right$(sp$ + "Grade",7)
3030 for i = 0 to 9:n = gr(i):dp = 0:
    gosub100
3040 print left$(na$(i) + sp$,18); right$
    (sp$ + n$,3)
3050 next
```

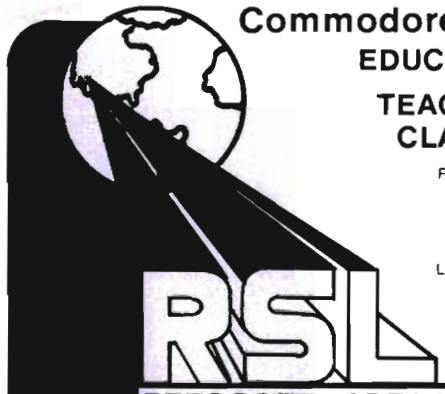
Line 10 was added to jump around the subroutine at 100. Line 1000, in the initialization section, now initializes *dp* to its default value. Lines 3000, 3010 and 3020 are the same as before.

Line 3030 has some code added. In addition to counting, it now sets *n* to be equal to each grade, sets the desired decimal places to 0, then goes to the subroutine to have the grade rounded.

Line 3040 now prints *n$* in the place of the *str$(gr(i)*. Line 3050 is unchanged.

Why don't you add the necessary code to average the grades and print the average at the bottom? The average ought to be accurate to 2 decimal places. I will show you how I'd do that in the next installment.

Next time we also will look at storing these names on a tape or disk and also retrieving them once again. Until then, may the Lord keep the bugs from the program of your life. Numbers 6:25



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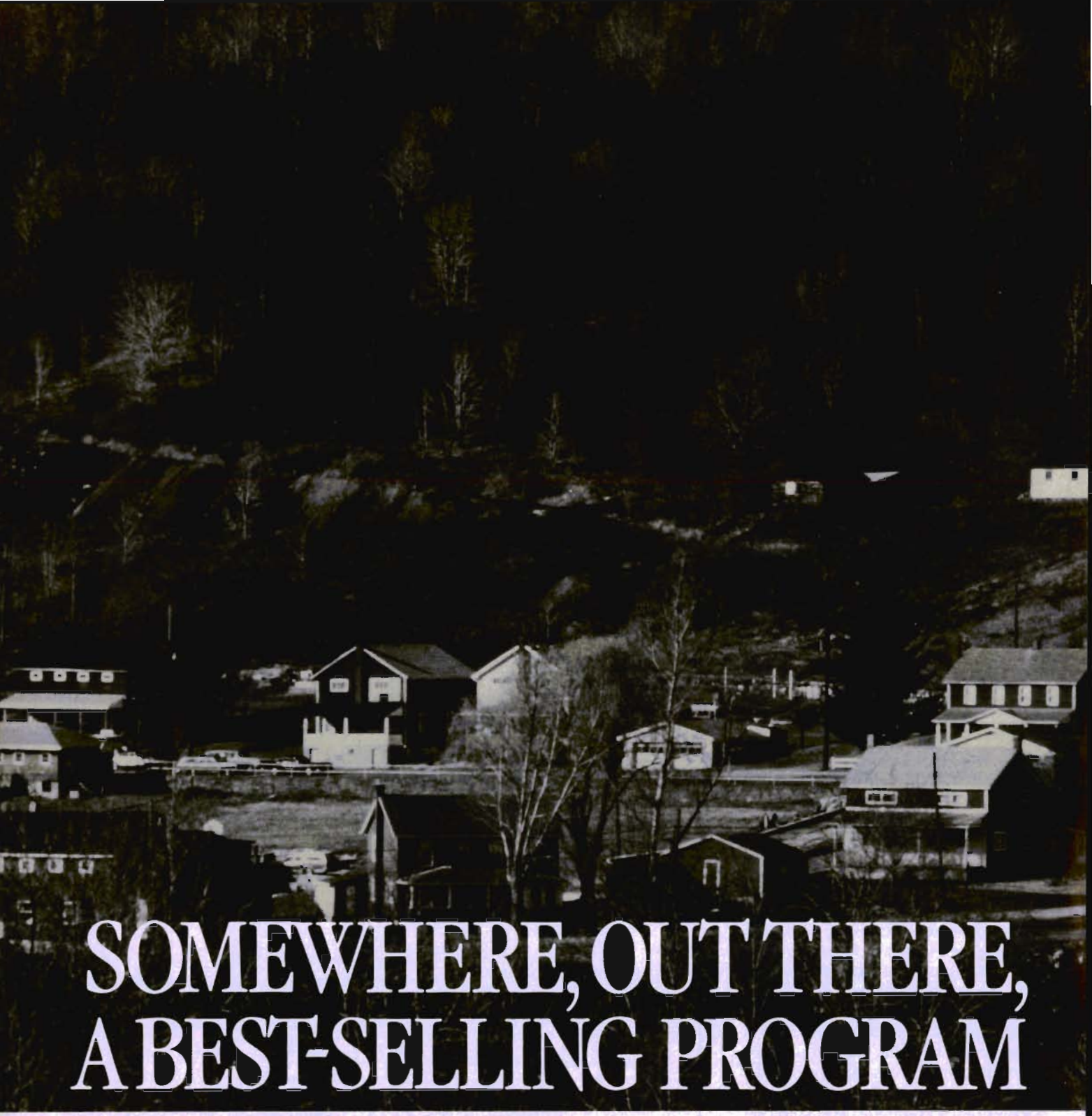

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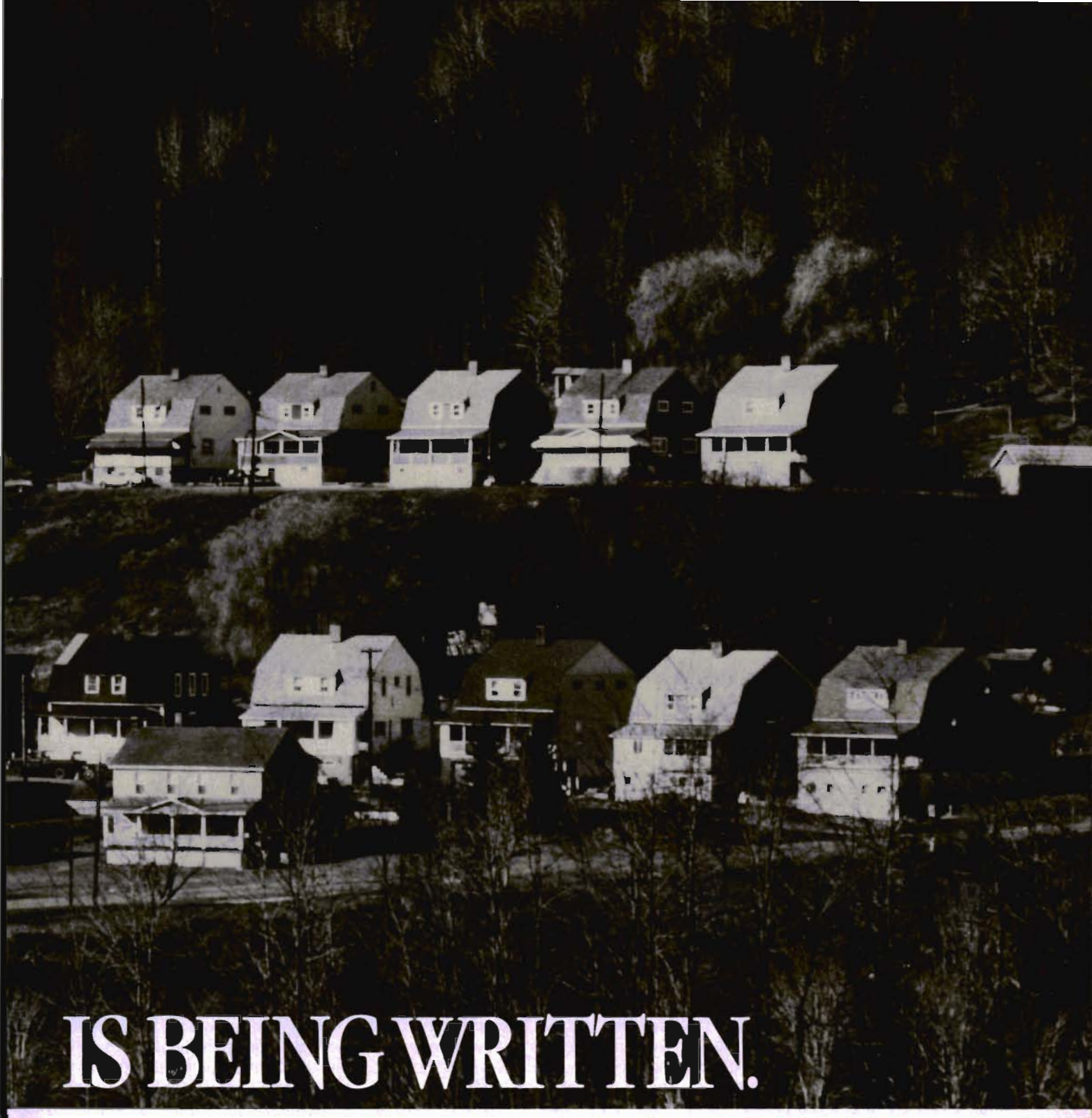

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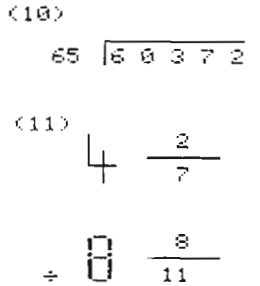
A Working Computer Laboratory

By Alfred D'Attore

In 1975, Honeywell Information Systems situated in Phoenix, Arizona, contributed four terminals and a bunch of computer time to a neighboring school. As one of the affected teachers, I became from that day forward deeply involved with computers and their possible uses in education. From the vantage point of eight years of experimentation and in-school use, involving all types of computers and educational programming, I should like to expound a bit upon the attributes of a successful high school computer laboratory. Who knows? It might serve as a model for other schools in developing similar facilities.

Dysart High School in Peoria, Arizona, began using personal computers in 1980. Since our programming was largely in place, the selection of an appropriate computer system was based solely upon utility and cost. The choice seemed obvious. At the time, only Commodore had a complete, fully integrated system, i.e, one which included a mass-storage device and a printer. Their system was inexpensive, easy to use, and most important of all—since our most useful programming was of the printed variety—it featured key-actuated graphics directly transferable to its printer. Integers, for example, in our mixed number exercises, were to to be printed three times normal size. (See figure 1.) Line-to-line "connectors" (division problem) had to be "connected". Arithmetic operators were to appear substantially as found in class room exercises. To produce such graphics with specialized codes (if in fact, they were even available), was more work than I personally cared to do.

Figure 1



The conversion from time-share to the Commodore system was swift and relatively simple. In those cases where substantive programming changes were made, they were invariably improvements. In fact, all of our programming benefited. Computer assisted instruction (CAI) was especially enhanced. When we acquired our first disk-drive, the CBM 2040, our program for test-item storage and test generation was simplified and made more practical. With a viewscreen and our new graphics capability, teacher aids became abundant.

We did abandoned "author" programming. I'm not sure exactly why. The programs were developed early on the Honeywell system. But having neither color nor sound for enhancement, the output—lessons and exercises—was significantly devoid of frills. Perhaps that was it. Otherwise, the programs worked quite well and were easy to use.

That was three years ago. The school still has its first computer system, but it has been augmented considerably. Recently, we added a complete computer laboratory. It is primarily the laboratory I wish to discuss.

We have nine CBM 8032 computers, one CMB 8050 disk-drive, one CBM 4022 dot-matrix printer and one CBM 8300 typewriter-quality printer. Tying it all together is a MUPET II multiplexer system. This latter proved easy to install and even easier to tailor to our particular needs.

Standing in the wings and reproducing the printed CAI, the computer-generated tests, and the mountain of explanatory notes, is a heavy-duty Xerox copier. In truth, it serves the whole school. But for the laboratory, it is indispensable. Indeed, now that we have that machine, it is difficult to imagine how we ever managed without it. Desk-top copiers, incidentally, are now available to schools for less than $2,500.

Dysart has upward of a thousand "educational" programs, most of which were obtained in the public domain. The few that were purchased are, for the most part, unprotected and capable, therefore, of being used in a multiplexed computer environment. One exception is "Wordpro 4 plus." Residing in the number 1 machine, this word processor is used for special projects. It's quite expensive, so one copy was all we purchased. For instructional purposes, we use "Papermate", Mike Riley's excellent and very affordable program. It has been enhanced, however, through the use of "Petspeed."

Petspeed is another of our "protected" programs. Fortunately, only one copy is ever required. An optimizing compiler,

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Two machine language routines reside at the top of Basic. As far as we would determine, they are devoted to key-definition and applying "quotes" where necessary, prior to printing. For the CBM 8032, key definition is not required. As to the restoration of quotes, that was easily accomplished in Basic using a simple search and change routine. With a few delays built in for screen editing (Petspeed speeds that up too), the program was ready for "compiling."

Results were astonishing. Formatting and printing speed increased significantly. Except for underlining — most important for manuscripts since underlined words convert to italics in publishing — Papermate now compares very favorably with Wordpro 4 Plus. In fact, in most respects, I like it better. It is certainly easier to use. I sometimes wonder why Mr. Riley never put his program entirely into machine language

Getting back to Petspeed, however, it is now our constant companion. Considering the number of public domain programs that are available, many of which can benefit greatly through speed enhancement, a dependable compiler seems to be a necessity.

T'Aide Software Company now markets our CAI used for mathematics remediation (arithmetic). Explicit permission is granted all schools within a district-of-purchase to copy and disseminate freely. As indicated above, the programming produces a printed output, so one disk serves an entire school. The computer-produced exercises are nearly perfect and have proven very valuable over the past three years. Most important of all — they impact in no way with other, more orthodox computer uses.

The same can be said of the school's test-item storage and test-generation program. Newly rewritten, it is now based loosely upon Commodore's "Random Example", first modified and augmented for coding and printing questions, then later subjected to Petspeed. It provides a really exemplary classroom aid. Test items are limited to about 250 characters of course, but this is quite sufficient for most purposes. Using a four-character key, up to 500 questions can be accommodated.

Using Random Example once more, adding a few cosmetic touches, a sort and a second key; we managed to produce a relatively advanced, menu-driven, data management system. This too can be **"Petspeeded," but it is used for instructional purposes only, and we never found that necessary.**

It is understood that program modifications of this type indicated above are not especially simple. But the average high school offers complete programming. One can assume the instructor is at least competent in Basic. That's all it really takes. That and a bit of work, of course. The public domain programming is there, ready to be used. Through moderate revision and the judicious use of Petspeed, they can provide the base upon which a useful and affordable library can be built.

Our mathematics department has custodial responsibility for the computer laboratory. They teach core programming, and disk and file managament procedures. A course in advanced algebra with programming is also offered. It contains a computer enrichment of approximately 20 percent. Machine and symbolic language level programming is offered too, but on an individual basis only. We have two assemblers to assist us in this task (including MAE), and that is more than sufficient. In fact, since our students first efforts tend to be short, most often "Micromon" (a public domain program) is used for coding. It is convenient and always right at hand.

In order to limit disk access, we found it expedient, recently, to put Basic Aid (also in the public domain) on an erasable ROM and place it in our computers above user memory. The question arises, naturally, can we do the same for ROM-protected software? Of course we can. As programming competence increases in the public schools, such capability will inevitably arise. But I don't think it will ever be a large problem. We at Dysart have not pirated anything, and we never will. Schools that engage in that sort of undertaking (I'm sure they exist) have as part of their curriculum a course of instruction they hadn't really intended.

Our business department uses the lab to teach computer literacy (a naive Basic), word-processing and data-systems management. Their classes are by far the largest. They also make the greatest use of peripherals and expendables. The students are most enthusuastic and their courses attract a great many girls.

Our greatest success overall has been in the use of the computer as a teacher's aid. I'm not speaking of its role as clerk or administrative aid: I still regard the grade book as superior to any programmed spread-sheet I ever saw or used. But if the computer system is employed as indicated above, i.e., for test-item storage and test-generation, to produce exercises for remediation and enrichment, and as a word-processor for the forms, letters and reports that are increasingly a teacher's lot — it very quickly pays for itself.

The really nice part about the uses discussed above, is that they take so little of the computers' time. A five page test in algebra is prepared in five minutes. An arithmetic exercise — including the answers — takes about a minute. (The Xerox reproduces it.) Word-processing, by its very nature, takes a good bit longer. But with all three — whether user time is brief or extended — only one computer is employed.

It's worth considering. To help the teacher is to help the student.

Using the multiplexer correctly took us awhile. And although problems still abound — particularly when using the system with relative files — the alternative seemed to us altogether unacceptable. We would have had to purchase one printer and one disk drive for each computer. Presently, a certain "care" is required for successful, full-class operation. Most problems, however, are trivial and relate almost exclusively to operator-induced errors. It's annoying, but we find we can live with it. With training — and that included teacher-training — such difficulties can be minimized. The MUPET is the best multiplexer available. Of that, we are absolutely sure. Like the equipment it regulates, it is "intelligent", and conflicts in no way with the host of programs and aids available to Commodore computers. We find this indispensable.

We purchased a maintenance contract from the vendor for the first year. This seemed indicated, anticipating the problems that normally beset a new installation. But our equipment has proven dependable, despite a very heavy usage. After the first year, I recommend that all such contracts be cancelled. Arrangements for repairs should then be made only as required. A school would be money ahead, that way.

There you have it. One school's attempt at accommodating the "computer revolution." Our equipment is the best; the programming is excellent (and almost free of charge — about $1,000 spent to date), utilization is high, and results have been altogether gratifying. At Dysart High, computers have become an important part of our total school capability.

(Review)

Wizards and Lightning Bolts Teach Typing Skills

D. James Kuchera, senior pastor at First Lutheran Church, Columbus, Ind., recently had a revelation.

For months he had encouraged his eleven-year-old son, Peter, to share his passion for personal computing, but Peter had a problem many people run into when they first sit down in front of a computer terminal. He didn't know how to type.

"I could sense his discouragement," said Kuchera. "Learning to program in a computer language is an exercise in frustration to a person new to the keyboard."

He wondered how to make the computer keyboard less of a trial for Peter. The thought of putting him through grueling typing drills crossed his mind, but he wasn't ready to inflict that kind of misery on his son.

"Then I heard about a new trend in educational software," he said. "Several companies were beginning to market software packages that were claimed to be innovative breakthroughs in typing instruction. Always interested in new software, I bought a few of them for Peter."

However, once he pulled off the cellophane and put the games into his computer, he found that Peter would not stay with them. "Dad, they're boring," he groaned.

The wind blew in from a new direction when Kuchera first saw MasterType demonstrated in a local computer store. "This video game's whole concept of teaching typing was new," he explained. "It integrated both arcade games and classroom educational software, mixing computer animation with a specific skill. Not only was the idea behind it good; the game itself was both challenging and instructive."

"At five o'clock one evening last September, I booted up MasterType on the computer," he remembered. "Peter sat down, peered into the playfield, positioned his hands over the keyboard and didn't stop typing until seven-thirty."

Peter's progress was amazing. "In 2½ hours he had successfully memorized two rows of the typewriter, and he wasn't even looking down at his fingers," said Kuchera. "And because of the program's design, Peter had to work hard for that speed and accuracy."

A wizard shoots laser beams on a color screen to destroy missiles, meteors and satellites that are launched by enemy words from the planet Lexicon. "The player must keep his eyes off the keyboard and on the screen to destroy the space objects. The path to victory is typing the correct word on the screen," said Kuchera.

Developed by Bruce Zweig, president and founder of Lightning Software, MasterType is available for the Commodore Vic. The package contains an instruction manual for running the program, descriptions of seventeen preprogrammed lessons, directions for customization, tips on winning the game and fingercharts for the VIC.

Kuchera's knowledge of recent software trends and personal computing expertise began in his early seminary days when he managed a stereo store. His electronic retailing background bred an interest in computers.

He admitted that one usually doesn't imagine the typical "man of the cloth" spending as much time as he does in front of his computer. "Yet the truth of the matter is that I use the computer for both church and home matters," he pointed out. "It's a tool for filing, budget management, general ledger, not to mention word processing. It's even used in our Bible education classes."

Parishioners of First Lutheran Church witness the familiar sight of their head pastor faithfully lugging his computer through the doorway. The machine makes a regular trek from home to church to home almost daily.

For Peter, who is now following in his father's footsteps, MasterType was a bridge that led to advanced computer skills. Within two weeks Peter mastered the typing keyboard and was ready for his first lessons in BASIC computer language.

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Circle No. 95

"He graduated from joystick to computer keyboard," said his father. "MasterType helped him to acquire two new skills - computing and typing. Both skills will no doubt help him in school as well."

Peter's eight-year-old brother, Ben, plays MasterType just for the excitement of the space war game, but Kuchera notes the game is teaching him inductive logic. "When the time comes, Ben will be more than ready to develop expertise in a computer language," he said.

"My wife has always maintained an injured air about the computer ranging from 'Ho hum' to 'Can't you ever turn that thing off?' " he said. "Curious about all the attention MasterType was getting, she told me to slide over so she could try it."

• VIC-20 REVIEW •

By Robert Fostor

VIC RABBIT

TITLE: VIC Rabbit
FORMAT: Cartridge
PRICE: $39.99
MODEL: VIC, PET, CBM, C-64
AUDIENCE: Programmers without a disk drive
SUMMARY: VIC Rabbit is a high speed cassette load.
SOURCE: Eastern House Software
RATING: Excellent
PERFORMANCE: Excellent
DOCUMENTATION: Explanation was adequate and easily understood

What an amazing piece of hardware! What is a VIC Rabbit, you ask? The VIC Rabbit is a cartridge which plugs simply into the back expansion port of the VIC-20 computer.

No tools are required since it just plugs in. The VIC Rabbit contains software which provides for high-speed LOAD and SAVE on the VIC cassette deck. For example, the VIC cassette takes 2 minutes, 40 seconds to LOAD/SAVE an 8,000 byte program, and the VIC disk drive takes about 22 seconds. VIC Rabbit requires just 32 seconds! Incredible isn't it! I've found that for the "fun of it" programmer without a disk drive, it is a dream come true.

No, it won't load your pre-recorded cassettes, it's not meant for that. The Rabbit does contain a connector on one end so you can simultaneously use expansion memory or another cartridge.

VIC Rabbit is made by Eastern House Software, and the cost is $39.99. You'll wonder, as I did, how you got along without it. See the ad on page 17.

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Circle No. 70

Educational Reviews

by Maryanne Dodd

With the arrival of October and Fall, we have more time to spend inside with the computer. So dust off the computer, and remove the summer cobwebs and start computing.

Some of you may have gotten a bit rusty with keyboard skills. If so, I have two typing reviews for you. Both typing programs are Computer Assisted Instruction (CAI) drills. TOUCH TYPING/WORD INVADERS from ACADEMY is a CAI typing instruction program and a word drill game. TOUCH TYPING TUTOR from TAYLORMADE is a CAI program and drill for those not desiring a game format or for the more mature person who wishes to learn typing or brush up on his typing skills.

If you know anyone who is having difficulties with fractions then you may be interested in FUN FRACTIONS from TAYLORMADE. FUN FRACTIONS is a CAI program for young people from fourth grade through junior high school.

Also included is WORD FEUD from UMI. WORD FEUD is a word game that the whole family can enjoy together. It's the kind of game that makes you want to pop a bowl of popcorn and gather around the computer for an evening of competitive family togetherness.

TITLE: **FUN FRACTIONS**
FORMAT/PRICE
Cassette $19.95
Diskette $24.95
MODEL: VIC 20 + 8k
AUDIENCE: Fourth to Ninth Grade Students
SUMMARY: Computer Assisted Instruction in addition, multiplication, sub traction and division of fractions.
SOURCE: TAYLORMADE SOFTWARE
8053 E. Avon Lane
P.O. Box 5574
Lincoln, NE 68505
(402) 464-9501

When are fractions fun? How about when you and the teacher take turns doing the problems. Does that sound like fun? O.K., consider FUN FRACTIONS from TAYLORMADE.

FUN FRACTIONS is a CAI program designed to tutor students in the four basic operations (addition, subtraction, multiplication and division) involving fractions.

ELEMENTARY OR JUNIOR HIGH

After loading FUN FRACTIONS, the student is asked to type in his name. Then the computer says "Hi" and the fraction menu appears. The first selection is the choice of elementary or junior high school problems. The elementary level contains positive numbers, whereas the junior high level contains a mixture of positive and negative numbers.

The next step is choosing the type of operation you wish to perform—addition, subtraction, multiplication or division. The last option is the difficulty level—easy, medium or hard.

During the easy and medium levels the computer displays a problem. Then it breaks the problem into parts and works the problem on the screen. The student is given a chance to study the example and press return when he is ready to try a problem. After the student presses return indicating he is ready, the computer displays a similar problem on the screen blackboard below the computer worked problem. The computer then starts to break the problem into parts and leaves one space blank. The student enters a response and if correct the computer starts the next step of the problem.

PARACHUTE JUMPER

At the start of each problem a little person begins falling on the left hand side of the screen. When a correct response is entered a parachute opens and the person falls gently making a safe landing with musical tones and "GOOD" or "THAT'S RIGHT" appears at the bottom of the screen. If an incorrect response is entered "WRONG, TRY AGAIN" appears at the bottom of the screen. After three incorrect responses, the computer gives the correct answer. The speed of the parachute jumper is dependent upon the previous responses. If correct responses are given, he starts to fall faster until the time allowed to answer is six seconds. Each incorrect answer will slow the parachute jumper down.

Fraction problems continue to be presented until the student touches "s" for stop. A summary is then given of the percentage correct, number of times the computer helped, and the responses the student had correct. During the hard level, the computer clock gives the time taken to do the problems. If the student decides to continue he can reenter the program with any type of problem at any difficulty level.

REDUCED TO LOWEST TERMS

In all instances FUN FRACTIONS breaks each problem into the conventional steps taught in most schools. The easy levels of addition and subtraction uses like denominators and the medium level introduces finding the least common denominator. The division problems are solved by inverting and multiplying. Fractions are reduced to the lowest terms during all operations.

The sixteen page manual included with FUN FRACTIONS gives excellent support to the program. Each type of operation is explained and hints are given in the areas that mistakes are most often made.

FUN FRACTIONS is a very good CAI program. It is designed to help students gain complete mastery of fractions. The program would be good to use as remedial

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work since the computer, at the easy and medium levels, will work an unlimited number of examples.

The sound and graphic rewards are sufficient to motivate the students, but they are not overpowering.

I feel that FUN FRACTIONS is an educationally sound program that could be used effectively either at home or in the classroom.

TITLE: **TYPING TUTOR/ WORD INVADERS**
FORMAT/PRICE/MODEL:
VIC 20 Cassette $21.95
Commodore 64 Cassette/Diskette $24.95
AUDIENCE: All Ages
SUMMARY: CAI typing drill and game
SOURCE:
ACADEMY SOFTWARE
P.O. Box 9403
San Rafael, CA 94912
(415) 499-0850

TYPING TUTOR/WORD INVADERS are two programs contained in one software package. TYPING TUTOR, as the name implies, is a tutor that starts from beginning assuming no keyboard knowledge and advances the learner to full familiarity of the key board. WORD INVADERS is a space game that practices the skills learned during TYPING TUTOR.

TYPING TUTOR for the Commodore 64 contains eight levels. The first level introduces the home keys. Each successive level automatically advances teaching new characters and procedures as you type. Level three teaches the use of the shift key and level seven introduces numbers. Level eight is a review lesson that utilizes all the procedures taught in TYPING TUTOR.

LEVEL CHOICE

After the program is loaded a color coded keyboard facsimile is projected onto the screen. Underneath the keyboard are numbers indicating correct finger placement. The typist is asked to choose the level that he desires to start. Then a page of text containing three lines is displayed on the page. To advance to the next page the three lines must by typed at a minimum of ten words per minute with less than five errors. A score is displayed containing words per minute and a rating is given. The ratings are: 0 errors, excellent; 1 error, very good; 2 errors, good; 3 errors, fair, 4 errors, passing; and 5 errors or more, try again. All errors are highlighted in inverse video at the end of the page. There is no provision for backspacing or correcting errors. Attempting to correct errors counts as another error.

POMP AND CIRCUMSTANCE

Page nine is the exam page. If successfully completed, a few bars of "Pomp and Circumstance" are played and "CONGRATULATIONS! YOU HAVE ADVANCED TO THE NEXT LEVEL" is displayed. If the typist is not successful, he is told "TOO MANY ERRORS–AUTOMATIC REVIEW". The lesson automatically returns to page five of the level.

At any time during the levels F7 will return the typist to the screen keyboard for finger placement, reference and options. The options are: return to current page, select new page, or select new level.

At the end of level eight a final exam is given. To pass the final exam, the typist must type at least twenty words per-minute and have less than five errors. Then the computer once again plays "Pomp and Circumstance" and declares "CONGRATULATIONS! YOU HAVE GRADUATED."

TYPING TUTOR is an ingenious way to learn touch typing. I feel it would particularly appeal to the young students. It is an example of programmed Computer Assisted Instruction (CAI) at its best. If the student follows the program correctly, without cheating by skipping levels, the computer will pace him according to his speed of learning. It will not advance the program until each level is mastered. The pages of each level are not randomized so the drill is always the same. Eventually the student will memorize some of the sentences but the memorization may increase the words per minute score of the individual.

DOCUMENTATION

The program is well documented by the accompanying manual. The finger placement for each level is explained along with some tips on good typing habits, i.e., posture, curvature of the fingers, placement of elbows, etc. The skills learned simulate authentic typing situations. The shift and return keys are utilized and correct spacing after punctuation is used. The method of scoring is the same as that used in most first year typing classes.

TYPING TUTOR would be good for any beginning typist. It could be used by itself as a self teaching program or it could be used for at home practice for a student taking first year typing.

WORD INVADERS

WORD INVADERS is a space game designed to drill typing words. There are four levels of difficulty that are based on the knowledge of the keyboard. Each level is correlated with its companion level of TYPING TUTOR. There is also a speed option. To succeed at the lowest speed you must type at least twelve words per minute and to succeed at the highest speed you must type at least thirty-five words per minute.

The game opens with a spaceship appearing in the sky. The player is asked to choose the level and speed that he desires. Then the game pauses for invaders to board the ship. While the invaders are boarding, the computer is randomly picking words from a word bank.

BLAST INVADING WORDS

Once the invaders are aboard, the ship starts dropping word bombs on the base station on the ground. The object of the game is to blast the invading words out of the sky before the base is destroyed. If an incorrect character is typed, the spaceship gets an extra burst of energy and the screen flashes. If the letters reach the base, it is destroyed. If the typist blasts all the letters, he saves the bases and "CONGRATULATIONS! YOU WON!" appears on the screen.

At the end of each game, words per minute and the number of errors are given. There is also a score given and a previous high score. The scores are weighted so the higher difficulty levels and higher speed options receive the most points.

During the game, the shift and return keys are not used. Otherwise, all of the procedures and characters learned in the TYPING TUTOR are used.

The sounds, color, and graphics used in WORD INVADERS are very well done. The game format would appeal to most young people. I think it is an excellent accompaniment to TYPING TUTOR.

VIC 20 VERSION

The VIC 20 version of TYPING TUTOR/WORD INVADERS is essentially the same as the Commodore 64 version. The levels of TYPING TUTOR are identical except the ratings are "GOOD" and "O. K.".The VIC 20 version is available only on cassette tape and the loading of different levels of TYPING TUTOR is accomplished by using the counter on the cassette player. The graphics are simpler on the VIC 20 version, but they are still very good. The screen keyboard is not displayed for finger placement during TYPING TUTOR and the screen for WORD INVADERS does not have scenery. Without sacrificing quality, the VIC 20

version accomplishes the same objectives and produces the same educational results as the Commmodore 64 version.

TITLE: **TOUCH TYPING TUTOR**
FORMAT/PRICE:
Cassette $19.95
Diskette $24.95
MODEL: Commodore 64
SUMMARY: CAI TYPING DRILL
SOURCE:
TAYLORMADE SOFTWARE
8053 E. Avon Lane
P. O. Box 5574
Lincoln, NE 68505
(402) 464-9501

TOUCH TYPING TUTOR by TAYLORMADE is a set of Computer Assisted Instruction (CAI) drills. It is menu driven with the choice of three types of instruction: lessons, practice or text.

KEYBOARD CHARACTERS

The first option, lessons, consists of keyboard practice. Upon loading lessons you are presented with a graphic representation of the Commodore 64 keyboard on the screen. Each key is color coded to indicate which finger should be used. For example, "Z, A, Q, and 1" are all lavender because the fourth finger of the left hand is used. There is also a choice of whether or not to have the characters on the screen keyboard flashing as they are presented in the lessons. The next option in the lesson section is the selection of characters to be practiced.

There are nineteen preprogrammed lessons. Lesson one starts with the home keys and new keys are gradually introduced with each subsequent lesson. Each lesson contains 50 responses. If an incorrect key is touched, a siren noise wails until the correct key is touched. At the end of the lesson, a percentage correct is given. There is no timing involved. The manual accompanying the program gives a synopsis of each lesson so you can become acquainted with characters introduced before each lesson. You may also go back and practice any difficult characters that are giving you trouble later.

PSEUDO WORDS

After the keyboard lessons are mastered, there is a practice option on the menu. After loading Practice, you are asked to choose the color combinations you prefer. Next, you decide whether you want all letters or a mixture of letters, numbers and punctuation marks. Then you are given a choice of either five letter words or random length words. During Practice you are given pseudo words in which the letters occur at the same frequency as they occur in the English language. After typing four lines of pseudo words, you are given a summary listing the errors, percentage correct, and your words per minute.

ENGLISH TEXT

The last option on the menu is Text. During Text, you practice typing English phrases. A clock is displayed in the upper left hand corner so you can measure time in minutes and seconds as you type. When an incorrect response is made, a sound emits until the next correct key is touched. There is no provision for backspacing or correcting mistakes. The phrases will continue appearing in random order as long as you wish to type. After exiting the session, you are given the percentage you typed correctly and a words per minute score.

TOUCH TYPING TUTOR has all the ingredients of a good preprogrammed CAI typing drill. It has the sophistication to appeal to adults, but could also be used by children. I found the color coded keyboard particularly innovative. Having the keys on the screen color coded makes learning correct fingering an easy exercise. Also, an added bonus is the clock during the text option. Since the clock is

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TITLE: **WORD FEUD**
FORMAT/PRICE/MODEL
VIC 20 Cartridge $34.95
Commodore 64 Diskette $24.95
AUDIENCE: All ages
SUMMARY: Computerized horizontal wordsearch puzzle.
SOURCE:
UMI
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While glancing through the instructions for some software and trying to decide what looked good, I came across this blurb, "The Surgeon General is worried about your health." (He's entitled to—after all, that's his job!) He worries video games are interfering with children's education—that video games are causing people to withdraw into themselves and not communicate with other members of the human race. Somebody should do something about it! Somebody has. UMI unleashes WORD FEUD for those "who demand action and not just words". Now who wouldn't fall for this promotional? First off, I didn't know the Surgeon General is concerned about me, but since he is, I wanted to see what UMI was doing about his concern. So, I immediately headed for the computer, loaded up WORD FEUD and gave it a try. I wasn't disappointed. Soon I had a whole group of people standing around and offering suggestions and wanting to play.

COMPUTERIZED WORD SEARCH

WORD FEUD is a versatile computerized horizontal word search puzzle. It may be solved by one or two players using the keyboard or joysticks. There are three levels of difficulty: word given, four letter words and three and four letter words.

Word given is the easiest level and could be played by young children just beginning to learn how to read. During word given, a three or four letter word is displayed at the top of the puzzle and somewhere within the colored block of letters the word is hidden twice. The player must move the cursor window to outline the word and push his fire button. If a correct choice is made, one point is given in the form of a man doing "jumping jacks" at the bottom of the screen. Ten men are required to complete the game.

WHAT IS THAT WORD???

During the "four letter word" option, a "?" appears at the top of the puzzle. The player must find the four letter word that is hidden in the puzzle twice. Just to make it more difficult, the words must have exactly the same color letters. Also, there are decoy words and four letter words that occur randomly. The score is one man for a correct response. If the player guesses and chooses the wrong word, he loses two men. Therefore, it is a gamble with the odds against the player if he finds one four letter word and guesses that another one matches it.

The last difficulty level option is hidden "three and four letter words". It is very similar to the "four letter word" level except the cursor window is open at the right side so the player must decide whether the matching pair is part of a three or four letter combination. Also, to trick the player, many three letter words are contained within a four letter word.

The words in all three levels of play are randomly drawn from a data bank of over seven hundred words. Therefore, it would be impossible to memorize the words or their sequence.

The "f5" key controls the number of players' options: one player, player vs. Frog/Butterfly, or two players.

The one player game is a non-competitive word search with no time limit. The game ends after the player has scored ten men.

THE FROG ATE IT

The Player vs. Frog/Butterfly option introduces some competition. The frog or butterfly randomly gobbles letters. The object is to zap the word before the frog or butterfly gets both copies. There is a time limit involved since the frog or butterfly scores one point for every letter he eats.

MOM, SHE TRICKED ME!!

The third option is two players. This may be played using the keyboard and two joysticks. Each player gets a man for each word he finds. The winner is the player who gets ten men first. The two player game is truly competitive. Remember, opponents lose two men for a wrong answer. So strategies can be developed to bluff opponents. For example, the cursor window could be moved near a decoy word in hopes that an opponent would panic and choose the decoy.

G RATED ENTERTAINMENT

WORD FEUD is a game that the whole family can enjoy. The young children who are just beginning to read can practice visual and perceptual discrimination while developing their word recognition skills. During the "word given" level they must not only recognize the word, but also remember it while searching. In fact, the game started out as an exercise to help the author's daughter who was having trouble with distinguishing between "b's" "p's" and "d's". At first glance, the young reader often confuses letters and sees some of them inverted (M and W) or reversed (b and d, q and p).

An older child would enjoy playing against the computer. Often it is those little three and four letter words that give children the most problems. After the correct patterns are mastered in the short words, long words of multisyllables just come naturally.

The two player option opens up all sorts of possibilities for interaction. Often a computer game is a solitary activity or a spectator game with one person playing and others observing. WORD FEUD is different in that everyone can become involved. The strategy during the two player option can be as sophisticated as the ability of the players. The authors, Michael and Barbara Crick, suggest teams could be formed with one person from each side controlling the joystick. If you really want to get competitive, two screens back to back could be attached to the computer. Then team members could run their fingers over the screen without the opponents having a clue of their activity.

The color and graphics in WORD FEUD are used very effectively. While searching for a word, drums beat as the action intensifies. When the word is found, music plays and the word flashes.

The instructional pamphlet accompanying WORD FEUD gives clear, concise directions and offers some tips for strategy.

VIC 20 FEUD

The VIC 20 version differs from the Commodore 64 version in that there is no cursor window. Instead, an arrow points to the first letter of the word. Also, since the VIC 20 has only one joystick port during the two-player option, one player uses the joystick while the other player uses the computer keyboard.

I feel that WORD FEUD is a refreshing change. It is nonviolent, yet still stimulating and competitive. It would be great for parties or when several people want to use the computer. It can be played by children and also enjoyed by adults at the same time—it offers something for everyone.

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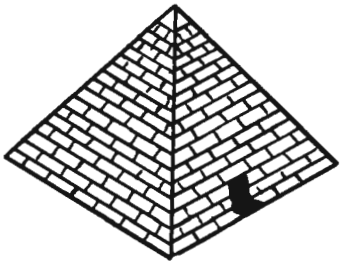

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The Basics of Basic Part III

NUMBERS, LOGIC, AND TRUTH TABLES

by Tim Parker

Last column, we looked at an overview of the functions available in most BASIC versions. In this column, we will conclude the overview with a glance at the types of variables available, Boolean operators and Boolean truth tables. After this section, we can then begin to concentrate on Commodore specific BASIC functions and how they are used. However, an overall view of the subject to be studied in detail helps place the entire thing in perspective, so first, finish off the true basics of BASIC.

BASICs usually support a few types of variables. (A variable, as used in this column, is simply a label attached to some number or character sequence to allow fast identification. Variable names, as pointed out in the first installment of this series, should be named in such a way as to help understand their purposes, and be somewhat descriptive. Unfortunately, many BASICs, Commodore's included, only recognize the first two letters of a variable name. Therefore, two variables called TIME and TITLE, although expressing completely different concepts, will be addressed as the same thing by the BASIC.)

Integers, as most people are aware, are simply whole numbers, and have a special purpose in BASIC programs. In terms of space used up in a computer, the integer uses the least of any number, due to its inherent simplicity. (To be specific, integers require only two bytes for storage, while floating point numbers, for example, use five bytes.)

Integers do not have a decimal attached to them, and are usually restricted to a specific range. Commodore BASIC uses integers in the range of -32768 to +32767. (The reasons for these limits are due to the method of storing numbers in a computer. For those interested, see an earlier article in Commander entitled "Bytes, Bits and Decimals", and an upcoming series on computer memory systems and operations.) As may be assumed from the ranges above, integers can be either positive or negative, and have any value between the ranges specified. It is perhaps ironic that most BASICs convert integers to floating point numbers before using them for arithmetic processes.

When writing a program, integers are designated with a special sign after them. Comomodore BASICs use the percent sign (%). Any variable with the percent sign following it is recognized by the processor as an integer, and is assigned to the two byte sequence for that variable.

The next form of variable is the floating point. These are similar to integers, except they have a decimal value associated with them. In Commodore BASICs, these numbers can have up to ten digits associated with them (again, to be technical, ten significant figures, not ten digits . . .this cannot be explained in ten words or less!). The ten digits can be spread before and after the decimal point which is desired by the programmer. If the numbers are shorter than ten digits, they will be padded by the processor with zeros. Although ten digits are used to keep track of values by the processor, only eight or nine digits are ever displayed by the computer. The last digit is used to aid in rounding off to the nearest number. (If the last digit is required, simply multiply by ten to look at it, but remember it may not be accurate!)

As with integers, floating point numbers can be positive or negative. One common error with floating point numbers is to add commas as separators (such as 24,876.09). BASICs commonly used do not recognize the comma as a separator, and will reply with a syntax error. Similarly, for the Europeans who write numbers with a comma instead of a decimal (i.e., 657.98 is written 657,98), a syntax error again results, except in the more advanced implementations.

A form of floating numbers is scientific notation, where powers of ten are used. These numbers are stored in the form X.XXXXXXXX EXX, where X represents a digit from zero to nine, and the E shows the exponent, or multiple of ten. As with the previously discussed variable types, floating point numbers can be either positive or negative. (Actually, both the exponent, or part after the E, and the mantissa, or part before the E, can be both positive and/or negative.)

Scientific notation is not really a new type of variable. It is a form of floating point, that is stored in a similar way. As mentioned earlier, both floating point and scientific notation require more space than an integer variable, but where accuracy is required, there has to be a sacrifice. There are limits on the value of the number after the E (or exponent) in floating point numbers. The exponent cannot be larger than 38, or smaller than

-39. Any number over these limits will result in an overflow error.

When writing a program, it is always a question as to which variable types to use. Most programmers use floating point as a matter of course because they are easy to write; the percent sign doesn't have to be tacked on all the variable names. This, of course, is rather a silly approach! Perhaps the reason most programmers don't worry about integers is more fundamental: the constricted space of some micros is rarely encountered on larger systems. The difference between using five bytes and two bytes per variable doesn't begin to have any significance until the memory is down to the last dregs. Then, it really becomes important!

It is well worth considering at the start of a program's development whether an integer variable will be suitable or not. It helps when programming to be able to keep track of the variable types, and integers are usually easy to spot. When a machine such as the Commodore VIC-20 is being used, then the significance of the memory savings is worth some thought.

The other class of variables that has to be considered is the character oriented variables. These contain alphanumerics (i.e., either numbers, letters, or other characters). The character variables are sometimes referred to as "strings", because they are a sequence of characters strung together. In most BASIC implementations, a character or a string variable is signified by having a dollar sign following the variable name.

It is worth taking a slight detour here to look at a slightly more advanced BASIC implementation. In some BASICs, the character variables are of two types: string and character.

While in the paragraph above, we have defined them as the same thing, some BASICs allow a CHARacter variable to be a variable with only one element in it, such as a single letter or number. A STRING variable contains a series of letters or numbers, and can be thought of as a series of CHARacter variables added to each other. Also, not all BASICs require a variable to be defined in a separate statement before it is used. These BASICs are usually the faster, compiled BASICs however, and are not likely to show up on a Commodore machine.

String variables can usually be up to 255 characters long, although some machines such as the VIC-20 only allow 88 characters to be input at a time, due to the screen limitations. However, strings can be added to each other quite easily, up to the limit. Again, the variables usually have only the first two characters significant in the name.

A special consideration that must be brought to a programmer's attention is that in many BASICs, Commodore's included, a variable cannot have a "reserved" word embedded in it. A reserved word is a word that is recognized by BASIC as a command, such as RUN, CLEAR, STOP, etc. Thus the variables TLSTOP or RUNITNOW could not be used, as BASIC would misunderstand their function.

Finally, while on the subject of variable names, remember that although long descriptive names are nice and serve an excellent purpose in helping understand a program, all the extra characters after the first two significant ones take up memory. If a VIC-20 in its unexpanded mode is being used, don't use ten character long variable names too often in a long program, or the infamous OUT OF MEMORY message will appear.

Most people are acquainted with the usual mathematical operators such as multiply, divide, add or subtract, and most know the purpose of the exponential function (↑). A second class of operators that tends to confuse people is the "Boolean" operators. They are quite simple actually: most people get scared by the name.

A Boolean operator is a logic operator. (A logic operator is one that performs a logical function on a variable!) Simply stated, examples of Boolean operators are AND, OR, and NOT. When one of these statements is encountered, two variables are specified. If an AND is being performed, then if both conditions specified are true (or valid) then a defined function is executed. An example: suppose a program contains the following line:

```
IF X=10 AND Y=10 THEN PRINT
  "TRUE!"
```

The AND signifies that if both the value of X is ten, and the value of Y is ten, then the computer is to print the mesage "TRUE!". If either of the two relational operators is false (i.e., if X is not equal to 10, or Y is not equal to 10) then the computer is not to print the message. Also, if both conditions are false, the computer does nothing.

If the AND in the above line was replaced by an OR, then if either or both of the conditions was true or valid, then the computer would print the message. Only if both the conditions were false, would it do nothing.

The final Commodore Boolean operator commonly used is NOT. This is a little more difficult to understand. The NOT command is used in a program as follows:

```
IF NOT X THEN PRINT "HI!"
```

Here, the variable X is tested by the computer to find out whether it is true or not. This brings up yet another subject: logical variables! A logical variable is either "true" or "false", but has to be one or the other. This sort of concept is stored by the computer in one of two ways. Some languages allow the logical variable to be defined in terms of True or False, as in:

```
STORE T TO X
```

In this command (not BASIC, obviously), the variable X is assigned the specific value of TRUE. However, Commodore BASIC doesn't understand True or False as such, but uses numbers. If a variable is False, it assigns the value of zero to it. If it is True, it assigns the value of 1. (Note that some BASICs use a value of −1 if True.) Thus, in the statement:

```
IF NOT X THEN PRINT "HI!"
```

If the value of X is false (equal to zero), then the computer prints the message "Hi!". If X is not zero, but is some other number (such as 1, or 56483), then the computer ignores the command. The above line can be thought of as being written as:

```
IF X=O THEN PRINT "HI!"
```

The reason it isn't written like that is the NOT command is much more versatile than hinted at here. The NOT command is really the logical negation of the variable. In the expression:

```
NOT Q
```

if Q is true, then NOT Q is false, and vice versa.

These Boolean operators can be used in series with each other, as in the following examples:

```
IF NOT X AND Y = 1Ø THEN PRINT
  "OK".
IF (X= 1Ø AND Y= 1Ø) OR (X=1Ø
  AND Y=2Ø) THEN PRINT "OK".
```

In the first, if both the (NOT X) command (i.e. X=Ø) and the value of y is ten are true, then the computer prints the message. In the second, the brackets take priority, and the two expressions are evaluated. In the first bracket, if both x and y are equal to 1Ø, then the first bracket has the value True. In the second bracket, if both X=1Ø and y=2Ø, then it is True. The OR command then considers the true brackets. If either of them is True,

then the computer prints out the message. Many variations are possible on these operators, as can be realized by looking at the permutations of the above two program lines.

Another variation on Boolean operators involves a command lines such as:

IF X AND Y THEN PRINT "GREAT!"

Where no values are specified. In a case such as this, a default value of zero is tested for. The above line is actually interpreted by the computer as:

IF (X AND Y) < > 0 THEN PRINT "GREAT!"

Where the < >signifies "not equal to". Thus, the values of x and y are compared, and neither of them is zero, then the computer prints "GREAT!". If x was equal to 5463, and y was equal to 3, then instruction (X AND Y) means that a "logical AND" is performed. In the example in question, the (X AND Y) command will result in the value 3 being used, so the line above actually reads:

IF 3< >0 THEN PRINT "GREAT!"

and as three does not equal zero (unless you have a defective processor), the message will be printed.

Booleans can be used to give other variables Boolean values. (Don't get too worried, it'll soon be over.) A command such as:

X = X>53

is interpreted by the computer in such a way that if x is greater than 53 (i.e. a relational operation is performed), then a value of -1 is assigned (True), or if x is less than 53, then a value of zero (False) is assigned to X. End of the weird part!

When discussing Boolean operators, the term "truth table" is sometimes encountered. Instead of being an insidious device from the Spanish Inquisition, the truth table is simply a table that shows the behavior of Boolean operators. The AND operator, as we said above, is True only if both conditionals are true:

if x = 10 AND Y>45 THEN PRINT "TRUE!"

Will be True (assigned a value of 1 or -1, depending on the BASIC) if both x equals ten, and y is greater than 45. If either of the conditions is not met, then the expression is False, and assigned a value of zero. A Truth Table illustrates this relationship in a tabular form, for all of the Boolean operators. In the case of the AND statement, which is represented in logic theory by the ampersand (&), the truth table between two variables A and B shows what happens for each possible permutation of A and B and how it relates to A & B (i.e. A AND B). (In logic theory, the term "conjunction of A and B" is used, and A and B are the conjuncts of A & B!)

The A AND B Truth Table looks like this:

A	B	I	A&B
T	T	I	T
F	T	I	F
T	F	I	F
F	F	I	F

As can be seen, all four combination of True and False are displayed, and the respective value of A & B (or A AND B) is shown to the right. Using AND in a formula, then, shows that the formula is true only when both parts are true, as was expected. It may seem that a Truth Table is pretty useless! That is quite correct at this stage of the game, but when some of the other Boolean operators are considered, then they can become useful.

The OR Truth table for variables A and B is shown with the "disjunction" A V B (The "V" symbolizes "OR" in logic theory):

A	B	I	AVB
T	T	I	T
F	T	I	T
T	F	I	T
F	F	I	F

so the OR command is False only when both parts of the variable conditional are false, as was expected!

The truth table for NOT, in terms discussed above, doesn't really matter, as it can be shown in two lines:

NOT 0 = 1

NOT 1 = 0

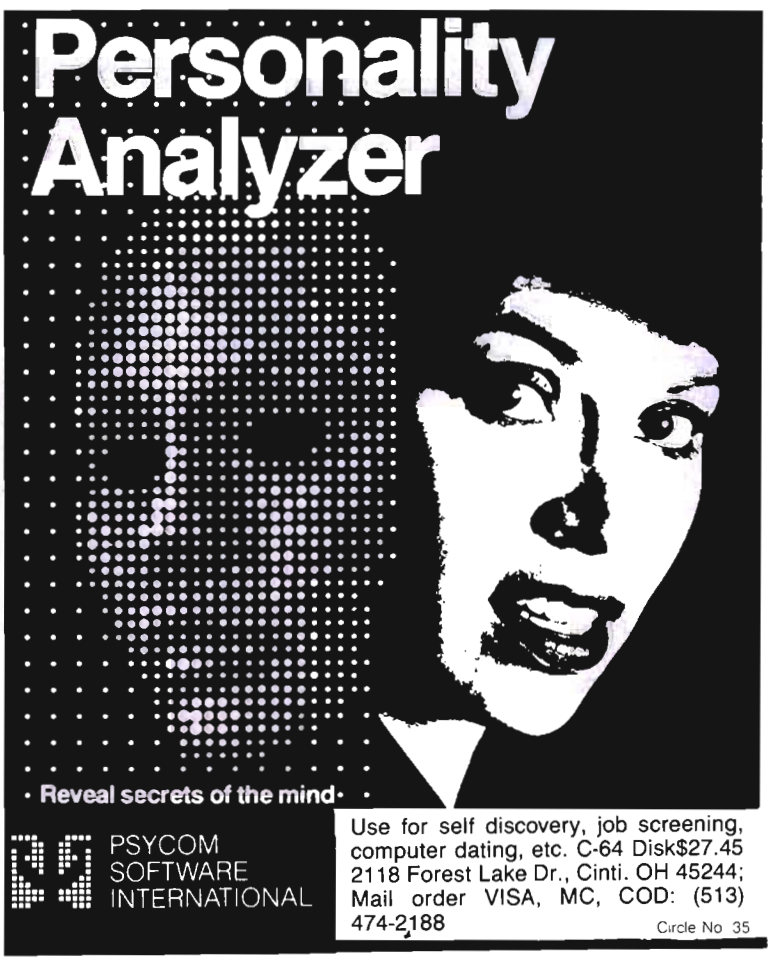
Where if the value of the variable is zero, then the expression is true. (Getting confused? It's over now!)

Luckily for most people, the above three Boolean operators are all they will encounter in Commodore BASIC.

However, for those who have masochistic tendencies, there are BASICs available with all the "missed" Booleans. These include such things as XOR (logical exclusive OR), IMP (or logical implication) and EQV (or equivalent).

(For a full discussion of Boolean and logical operators, a good text book to consult is "Deductive Logic", by Leblanc and Wisdom, published by Allyn And Bacon.)

Now that Booleans, truth tables, and variables are out of the way, we can begin in the next part of this series to look at some of the BASIC commands found on Commodore machines in more detail. Until then, don't forget to READ COMMANDER AND ENJOY PROGRAMMING!



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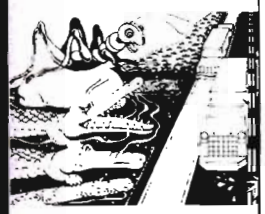

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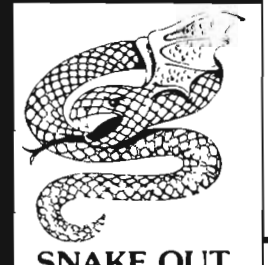


SNAKE OUT

TARGET COMMAND - The whole West Coast is being bombarded and only you can save it. You are at the controls of the missile launcher and hold the destiny of our country in your hands. It takes a cool head, not hand and fast reflexes to zap those missiles right out of the air. Get ready to pulverize — atomize and vaporize them. Oh, my God, those warheads are heading right for our ammo dumps. They are everywhere. NO ONE CAN SAVE US — EXCEPT YOU. You must move your laser into position and fire as fast as you dare. Time limit with arcade style excitement. Protect your ammo at all costs. 10 levels of play. **$14.95**

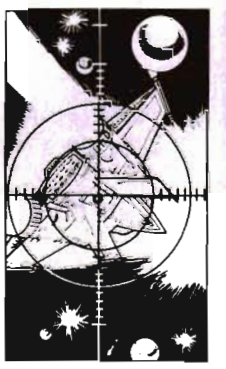
SNAKEOUT - Slip your snake into position and score by chomping the blocks. Watch the way you slither because your escape routes get smaller. 2 Bonus games included. **$14.95**

HEAD-ON - Please do not buy this game if you are the type that says "I'll play it just one more time". Players have been known to start playing HEAD ON at 8:30 p.m. and at 2 a.m., wonder where the time went? Have you ever tried to explain to someone why you played a game for five and a half hours. We know of no remedy for the addiction to HEAD ON except to beat the VIC on level 9. No one has done it, YET, will you? We think not. Move your car as fast as you can dare around the tracks. You get 3 cars and MUST avoid the computer car. Points for the most dots covered. Bonus cars, nine levels of play. **$14.95**

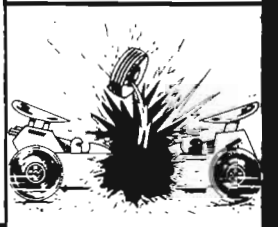
BUG BLAST

TARGET COMMAND

COSMIC CRUZER



SPACE PAK



HEAD ON

ComputerMat • Box 1664B • Lake Havasu City, AZ 86403 Circle No. 12 ***Add $1.00 For Shipping***

Continued from page 35

```
1410 DATA   0, 255,   0,   1, 231, 128
1420 DATA   3, 231, 192,   7, 231, 224
1430 DATA  15, 255, 240,  15, 255, 240
1440 DATA  15, 255, 240,  14, 102, 112
1450 DATA  15, 255, 240,  15, 255, 240
1460 DATA  15, 255, 240,  15, 255, 240
1470 DATA  25, 153, 152,  63, 255, 252
1480 DATA 102, 102, 102, 127, 255, 254
1490 DATA   0,  62,   0,   0,   0,   0
1500 DATA   0,   0,   0, 255
1510 :
1520 REM CODE DATA -IRQ AND ROLL
1530 :
1540 DATA  76, 137
1550 DATA  52,  76, 182,  52,  76, 141
1560 DATA  53, 173,  20,   3, 141,  46
1570 DATA   3, 173,  21,   3, 141,  47
1580 DATA   3, 162, 181, 160,  47,  56
1590 DATA  32, 141, 255, 120, 169, 202
1600 DATA 141,  20,   3, 169,  52, 141
1610 DATA  21,   3, 162,   0, 142,  18
1620 DATA 208, 232, 142,  26, 208, 142
1630 DATA  25, 208,  88,  96, 120, 162
1640 DATA 181, 160,  47,  24,  32, 141
1650 DATA 255, 162,   0, 142,  26, 208
1660 DATA 202, 142,  25, 208,  88,  96
1670 DATA 173,  25, 208,  41,   1, 208
1680 DATA   3, 108,  46,   3,   9, 128
1690 DATA 141,  25, 208, 173, 180,  47
1700 DATA 205, 165,  47, 240,  13, 205
1710 DATA 166,  47, 240,  47, 205, 167
1720 DATA  47, 240,  81,  76,  99,  53
1730 DATA 162,   2, 160,  11, 189, 131
1740 DATA  47, 157, 251,   7, 189, 143
1750 DATA  47, 157,  42, 208, 189, 155
1760 DATA  47, 153,   0, 208, 136, 136
1770 DATA 202,  16, 233, 173, 166,  47
1780 DATA 141,  18, 208, 141, 180,  47
1790 DATA  76, 135,  53, 162,   2, 160
1800 DATA   5, 189, 134,  47, 157, 248
```


BATTRAM Permanent RAM for your VIC-20

Not Just Another Memory Expansion Board

"BATTRAM" is a battery "backed up" memory expansion system that allows you to save your programs into permanent memory for instant loading (faster than a disk drive).

User Friendly Features Include:

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VIC-20 is a trade mark of Commodore Business Machines.

Circle No. 121

```
1810 DATA   7, 189, 146,  47, 157,  39
1820 DATA 208, 189, 158,  47, 153,   0
1830 DATA 208, 136, 136, 202,  16, 233
1840 DATA 173, 167,  47, 141,  18, 208
1850 DATA 141, 180,  47,  76, 135,  53
1860 DATA 162,   2, 160,  11, 189, 137
1870 DATA  47, 157, 251,   7, 189, 149
1880 DATA  47, 157,  42, 208, 189, 161
1890 DATA  47, 153,   0, 208, 136, 136
1900 DATA 202,  16, 233, 173, 164,  47
1910 DATA 141,  18, 208, 141, 180,  47
1920 DATA  76, 135,  53, 162,   2, 160
1930 DATA   5, 189, 128,  47, 157, 248
1940 DATA   7, 189, 140,  47, 157,  39
1950 DATA 208, 189, 152,  47, 153,   0
1960 DATA 208, 136, 136, 202,  16, 233
1970 DATA 173, 165,  47, 141,  18, 208
1980 DATA 141, 180,  47, 104, 168, 104
1990 DATA 170, 104,  64, 141, 168,  47
2000 DATA 142, 169,  47, 140, 170,  47
2010 DATA 169, 255, 141, 176,  47, 141
2020 DATA 177,  47, 173, 171,  47, 141
2030 DATA 152,  47, 141, 153,  47, 141
2040 DATA 154,  47,  32, 204,  54,  32
2050 DATA 229,  54,  32, 254,  54,  96
2060 DATA 173, 157,  47, 141, 178,  47
2070 DATA 173, 176,  47, 240,   5, 162
2080 DATA   0,  32, 217,  53, 173, 177
2090 DATA  47, 240,   5, 162,   1,  32
2100 DATA 217,  53, 162,   2,  32, 217
2110 DATA  53,  32, 230,  53, 240, 226
2120 DATA  96, 254, 152,  47, 254, 155
2130 DATA  47, 254, 158,  47, 254, 161
2140 DATA  47,  96, 173, 154,  47, 205
2150 DATA 178,  47, 240,  10, 174, 175
2160 DATA  47, 234, 234, 234, 202, 208
2170 DATA 250,  96,  32,  28,  54,  32
2180 DATA  64,  54,  32, 100,  54, 169
2190 DATA   0,  24, 109, 172,  47, 109
2200 DATA 173,  47, 109, 174,  47, 141
2210 DATA   1, 212,  56, 169,  62, 237
2220 DATA   1, 212, 141,   8, 212, 169
2230 DATA   1,  96, 173, 176,  47, 240
2240 DATA 250, 206, 172,  47, 208,   5
2250 DATA 169,  20, 141, 172,  47, 162
2260 DATA   0,  32, 131,  54, 174, 172
2270 DATA  47, 189, 254,  47, 141, 128
2280 DATA  47, 189,  23,  48, 141, 140
2290 DATA  47,  96, 173, 177,  47, 240
2300 DATA 214, 206, 173,  47, 208,   5
2310 DATA 169,  20, 141, 173,  47, 162
2320 DATA   1,  32, 131,  54, 174, 173
2230 DATA   1,  96, 173, 176,  47, 240
2240 DATA 250, 206, 172,  47, 208,   5
2250 DATA 169,  20, 141, 172,  47, 162
2260 DATA   0,  32, 131,  54, 174, 172
2270 DATA  47, 189, 254,  47, 141, 128
2280 DATA  47, 189,  23,  48, 141, 140
2290 DATA  47,  96, 173, 177,  47, 240
2300 DATA 214, 206, 173,  47, 208,   5
2310 DATA 169,  20, 141, 173,  47, 162
2320 DATA   1,  32, 131,  54, 174, 173
2330 DATA  47, 189,  62,  48, 141, 129
2340 DATA  47, 189,  87,  48, 141, 141
2350 DATA  47,  96, 206, 174,  47, 208
2360 DATA   5, 169,  20, 141, 174,  47
2370 DATA 162,   2,  32, 131,  54, 174
2380 DATA 174,  47, 189, 126,  48, 141
2390 DATA 130,  47, 189, 151,  48, 141
2400 DATA 142,  47,  96, 189, 158,  47
```

Continued on page 118

Commodore 64
and
VIC-20

SuperTerm

$99.95

Telecommunications
with a difference!

Unexcelled communications power and compatibility, especially for professionals and serious computer users. Look us over; **SuperTerm** isn't just "another" terminal program. Like our famous Terminal-40, **it's the one others will be judged by.**

- **UP/DOWNLOAD FORMATS**—CBM, Xon-Xoff, ACK-NAK, etc.
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Program options are selected by menus and function keys. For maximum convenience, an EXEC file sets options on start-up. SuperTerm may be backed-up for safety. Software on disk or cassette, with special cartridge module.

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P.S. Trade in your original Terminal-40 or '64 Terminal and deduct $10.00.

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Circle No. 25

Continued from page 117

```
2410 DATA 157, 161,  47, 189, 155,  47
2420 DATA 157, 158,  47, 189, 152,  47
2430 DATA 157, 155,  47, 189, 134,  47
2440 DATA 157, 137,  47, 189, 131,  47
2450 DATA 157, 134,  47, 189, 128,  47
2460 DATA 157, 131,  47, 189, 146,  47
2470 DATA 157, 149,  47, 189, 143,  47
2480 DATA 157, 146,  47, 189, 140,  47
2490 DATA 157, 143,  47, 173, 171,  47
2500 DATA 157, 152,  47,  96, 141, 179
2510 DATA  47,  32, 180,  53, 206, 179
2520 DATA  47, 208, 248,  96, 169,  20
2530 DATA  32, 192,  54,  32, 180,  53
2540 DATA 173, 172,  47, 205, 168,  47
2550 DATA 208, 245, 169,   0, 141, 176
2560 DATA  47, 141, 152,  47,  96, 169
2570 DATA  10,  32, 192,  54,  32, 180
2580 DATA  53, 173, 173,  47, 205, 169
2590 DATA  47, 208, 245, 169,   0, 141
2600 DATA 177,  47, 141, 153,  47,  96
2610 DATA 169,  10,  32, 192,  54,  32
2620 DATA 180,  53, 173, 174,  47, 205
2630 DATA 170,  47, 208, 245, 169,   0
2640 DATA 141, 154,  47,  96
```

LISTING 3

```
100 REM 'SLOT'
110 :
120 GOSUB3650 :REM LOG ON
130 GOSUB2270 :REM INITALIZE
140 GOSUB1040 :REM COIN COUNT
150 GOSUB1780 :REM LAYOUT
160 GOTO240
170 :
180 REM *** MAIN LOOP ***
190 :
200 GOSUB1230 :REM POP COIN
210 GOSUB350  :REM SPIN
220 GOSUB1290 :REM TEST WIN
230 GOSUB530  :REM COUNT & SOUNDS
240 POKE198,0
250 IN=PEEK(KEY):IFIN=255THEN250
260 IFIN<>191 THEN200
270 :
280 SYS IQ+3 :REM SPRITE IRQ OFF
290 GOSUB3650 :REM QUIT
300 POKE198,0
310 PRINTCHR$(147) :END
320 :
330 REM *** SPIN REELS ***
340 :
350 X=FRE(0)
360 RA=INT(RND(1)*20)+1 :POKE780,RA
370 RB=INT(RND(1)*20)+1 :POKE781,RB
380 RC=INT(RND(1)*20)+1 :POKE782,RC
390 GOSUB460
400 SYS IQ+6 :REM SPIN REELS
410 GOSUB590
420 RETURN
430 :
440 REM *** VOICE ON ***
450 :
460 POKE V0+24,4
470 POKE V1+5,240 :POKEV2+5,240
480 POKE V1+3,17 :POKEV2+3,17
490 RETURN
500 :
510 REM *** WIN & SOUNDS ***
520 :
530 IFWIN=0THENRETURN
540 IFWIN>18THEN790
550 POKE BG,C1(RA)
560 FOR XX=1 TO WIN
570 GOSUB620 :GOSUB1240 :NEXT
580 POKE BG,6
590 FOR X=1TO24 :POKEV0+X,0 :NEXT
600 RETURN
610 :
620 POKE V0+24,15
630 POKE V1,24  :POKE V3,25
640 POKE V1+4,9 :POKE V3+4,9
650 POKE V1+5,9 :POKE V3+5,9
660 IF WIN>18THENGOSUB730
670 POKE V1+3,17 :POKE V3+3,17
680 FOR X=1TO40 :NEXT
690 POKE V1+3,16 :POKEV2+3,16
700 POKE V2+3,16
710 FORI=1TO100 :NEXT :RETURN
720 :
730 POKEV2,20 :POKE V2+4,9
740 POKEV2+5,9
750 POKE V2+3,17 :RETURN
760 :
770 REM *** BIG WIN ***
780 :
790 GOSUB 900: FORI=1TO400:NEXT
800 FORXX=1 TO WIN/10
810 POKEH6,XX:POKEH7,XX:POKEH8,XX
820 GOSUB620 :GOSUB1250 :NEXT
830 FOR X=1TO24:POKEV0+X,0:NEXT
840 POKEH6,C1(RA) :POKEH7,C2(RB)
850 POKEH8,C3(RC)
860 RETURN
870 :
880 REM *** SIREN ***
890 :
900 POKE V0+14,5 :POKE V0+18,16
910 POKE V0+3,1  :POKE V0+24,143
920 POKE V0+6,240 :POKE V0+4,65
930 FR=5389
940 FOR I=1 TO WIN :POKE BG,I
950 HZ=FR+PEEK(V0+27)*6
960 FH=INT(HZ/256):FL=HZ-FH*256
970 POKE V0,FL:POKE V0+1,FH
980 NEXT :POKE BG,6
990 GOSUB590
1000 RETURN
1010 :
1020 REM *** PRINT COINS ***
1030 :
1040 PRINT LEFT$(VT$,18)
1050 PRINT CHR$(152)TAB(26);
1060 IFCASH=1000 THEN CASH=0
1070 IFCASH=-1000THEN CASH=0
1080 CASH$=STR$(CASH)
1090 CASH$=RIGHT$(CASH$,LEN(CASH$)-1)
1100 CL=LEN(CASH$)
1110 IFCASH<0 THEN PRINTNU$(11);
1120 IFCASH>-1THEN PRINTNU$(10);
1130 IFCL<3 THEN PRINT NU$(10);
1140 IFCL<2 THEN PRINT NU$(10);
1150 FORI=1 TO CL
1160 AC$=MID$(CASH$,I,1):AC=ASC(AC$)
1170 PRINTNU$(AC-48);
1180 NEXT
1190 RETURN
1200 :
1210 REM *** COIN COUNT ***
1220 :
```

```
1230 CASH=CASH-1:GOSUB1040:RETURN
1240 CASH=CASH+1:GOSUB1040:RETURN
1250 CASH=CASH+10:GOSUB1040:RETURN
1260 :
1270 REM *** TEST WIN ***
1280 :
1290 WIN=0 : ZA=R1(RA)-200
1300 ZB=R2(RB) : ZC=R3(RC)
1310 ON ZA GOTO1340,1380,1460,1530,
     1580,1640,1710
1320 RETURN
1330 REM CHERRY 201
1340 WIN=2
1350 IF ZB=201 THEN WIN=WIN+3
1360 RETURN
1370 REM ORANGE 202
1380 IF ZB=202 THEN 1420
1390 IF ZB=199 THEN 1420
1400 IF ZB=198 THEN 1420
1410 RETURN
1420 IF ZC=202 THEN WIN=10
1430 IF ZC=198 THEN WIN=10
1440 IF ZC=208 THEN WIN=10
1450 REM PLUM 203
1460 IF ZB=203 THEN 1490
1470 IF ZB=197 THEN 1490
1480 RETURN
1490 IF ZC=203 THEN WIN=14
1500 IF ZC=208 THEN WIN=14
1510 RETURN
1520 REM BELL-BAR 204
1530 IF ZB<>209 THEN 1580
1540 IF ZC=209 THEN WIN=18
1550 IF ZC=208 THEN WIN=18
1560 RETURN
1570 REM BAR 205
1580 IF ZB=205 THEN 1610
1590 IF ZB=197 THEN 1610
1600 RETURN
1610 IF ZC=208 THEN WIN=100
1620 RETURN
1630 REM LOGO 206
1640 IF ZB=206 THEN 1670
1650 IF ZB=198 THEN 1670
1660 RETURN
1670 IF ZC=198 THEN WIN=100
1680 IF ZC=208 THEN WIN=100
1690 RETURN
1700 REM SEVEN 207
1710 IF ZB<>199 THEN RETURN
1720 IF ZC=208 THEN WIN=200
1730 RETURN
1740 :
1750 :
1760 REM *** LAYOUT ***
1770 :
1780 PRINTLEFT$(VT$,18);
1790 PRINT R$CHR$(158);
1800 PRINT N4$" "N4$N4$"18 "
1810 PRINT R$N4$" "N4$N5$"18 "
1820 PRINT R$CHR$(156);
1830 PRINT N3$" "N3$N3$"14 "
1840 PRINT R$N3$" "N3$N5$"14 "
1850 PRINT R$CHR$(129);
1860 PRINT N2$" "N2$N2$"10 "
1870 PRINT R$N2$" "N2$N5$"10 "
1880 PRINT R$CHR$(150);
1890 PRINT N1$" "N1$NO$" 5 "
1900 PRINT R$N1$" "NO$NO$" 2 ";
1910 :
```

Continued on page 120

Commodore 64 and VIC-20

Graphics

"ELF" from Picture Library

DRAW
with your joystick!

Now, you can create **high-resolution pictures** on-screen with your joystick as a "pen." Design critters, objects, pie-charts — whatever your imagination wishes! **SAVE your creations to tape or disk, and PRINT them on a VIC printer.** Educational and fun!

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Continued from page 119

```
1920 FORI=1TO17 : PRINTLEFT$(VT$,I)R$;
1930 PRINTCHR$(154)B$LEFT$(HT$,7)B$;
1940 PRINTLEFT$(HT$,7)B$LEFT$(HT$,7)B$
1950 NEXT
1960 :
1970 PRINTCHR$(19); : FORI=1TO24
1980 PRINTTAB(25)R$LEFT$(BL$,14)
1990 NEXT
2000 PRINTTAB(25)R$LEFT$(BL$,14);
2010 PRINTLEFT$(VT$,21)
2020 PRINTTAB(26)LEFT$(BL$,12);
2030 :
2040 PRINTCHR$(19)R$CHR$(154);
2050 PRINTLEFT$(BL$,8);
2060 :
2070 PRINT"COMMANDER FRUIT*BELL CO"
2080 PRINT
2090 PRINTTAB(25)R$"     COLOR      "
2100 PRINT
2110 PRINTTAB(25)R$"  COMPARATOR   "
2120 PRINT:PRINTCHR$(5)
2130 PRINTTAB(25)R$"<< *JACKPOTS* "
2140 PRINTTAB(25)R$"<< SEVENS 200 "
2150 PRINTTAB(25)R$"<<  BARS  100 "
2160 PRINTTAB(25)R$"<<  LOGO  100 "
2170 PRINT:PRINTCHR$(154)
2180 PRINTTAB(25)R$"  COLOR MATCH "
2190 PRINTTAB(25)R$"      BONUS     "
2200 PRINTTAB(25)R$"     PAYOUTS    "
2210 FORI=0TO 1000 STEP40
2220 POKE 1023+I,160 :POKE 55295+I,14
2230 NEXT :RETURN
2240 :
2250 REM *** INITALIZE ***
2260 :
2270 DIM R1(21),R2(21),R3(21)
2280 DIM C1(21),C2(21),C3(21)
2290 DIM NU$(15)
2300 :
2310 REM INITALIZE REEL ARRAY AND
2320 REM POKE COPY FOR SYS CALLS
2330 :
2340 X=192*64:Y=193*64:Z=194*64
2350 XX=X+25:YY=Y+25:ZZ=Z+25
2360 RESTORE:FOR I=0TO21
2370 READ R1(I):POKEX+I,R1(I)
2380 READ C1(I):POKEXX+I,C1(I)
2390 READ R2(I):POKEY+I,R2(I)
2400 READ C2(I):POKEYY+I,C2(I)
2410 READ R3(I):POKEZ+I,R3(I)
2420 READ C3(I):POKEZZ+I,C3(I)
2430 NEXT
2440 I=19
2450 POKEX-1,R1(I):POKEXX-1,C1(I)
2460 POKEY-1,R2(I):POKEYY-1,C2(I)
2470 POKEZ-1,R3(I):POKEZZ-1,C3(I)
2480 IQ=13440  :BG=53280
2490 IRQ=56334 : KEY=56321
2500 REM 190*64=12160=SPRITE BUFFER
2510 S0=12160 : S1=S0+1  : S2=S0+2
2520 S3=S0+3  : S4=S0+4  : S5=S0+5
2530 S6=S0+6  : S7=S0+7  : S8=S0+8
2540 S9=S0+9  : SA=S0+10 : SB=S0+11
2550 H0=S0+12 : H1=H0+1  : H2=H0+2
2560 H3=H0+3  : H4=H0+4  : H5=H0+5
2570 H6=H0+6  : H7=H0+7  : H8=H0+8
2580 H9=H0+9  : HA=H0+10 : HB=H0+11
2590 A0=S0+24 : A1=A0+1  : A2=A0+2
2600 A3=A0+3  : A4=A0+4  : A5=A0+5
2610 A6=A0+6  : A7=A0+7  : A8=A0+8
2620 A9=A0+9  : AA=A0+10 : AB=A0+11
2630 BK=AB+1
2640 :
2650 POKE53277,255 : POKE53271,255
2660 :
2670 REM SET SPRITE X VALUES
2680 Z=36  :REM COLUMN1(X)
2690 POKE 53248,Z : POKE 53254,Z
2700 Z=100 :REM COLUMN2(X)
2710 POKE 53250,Z : POKE 53256,Z
2720 Z=164 :REM COLUMN3(X)
2730 POKE 53252,Z : POKE 53258,Z
2740 :
2750 REM SET RASTER INTERUPT VALUES
2760 POKE BK,230  : POKEBK+1,0
2770 POKE BK+2,95 : POKE BK+3,137
2780 :
2790 REM SET SPRITE Y VALUES
2800 Z=17 :REM Y0
2810 POKEBK+7,Z
2820 POKE A0,Z :POKE A1,Z :POKE A2,Z
2830 Z=59 :REM Y1
2840 POKE A3,Z :POKE A4,Z :POKE A5,Z
2850 Z=101 :REM Y2
2860 POKE A6,Z :POKE A7,Z :POKE A8,Z
2870 Z=143 :REM Y3
2880 POKE A9,Z :POKE AA,Z :POKE AB,Z
2890 :
2900 RA=7:RB=4:RC=15 :REM SEVENS
2910 POKEBK+8,RA
2920 POKEBK+9,RB
2930 POKEBK+10,RC
2940 POKEBK+11,190 :REM SPIN SPEED
2950 :
2960 REM INITALIZE SPRITE BUFFER
2970 :
2980 POKE S0,R1(RA-2):POKE H0,C1(RA-2)
2990 POKE S1,R2(RB-2):POKE H1,C2(RB-2)
3000 POKE S2,R3(RC-2):POKE H2,C3(RC-2)
3010 POKE S3,R1(RA-1):POKE H3,C1(RA-1)
3020 POKE S4,R2(RB-1):POKE H4,C2(RB-1)
3030 POKE S5,R3(RC-1):POKE H5,C3(RC-1)
3040 POKE S6,R1(RA)   :POKE H6,C1(RA)
3050 POKE S7,R2(RB)   :POKE H7,C2(RB)
3060 POKE S8,R3(RC)   :POKE H8,C3(RC)
3070 POKE S9,R1(RA+1):POKE H9,C1(RA+1)
3080 POKE SA,R2(RB+1):POKE HA,C2(RB+1)
3090 POKE SB,R3(RC+1):POKE HB,C3(RC+1)
3100 :
3110 REM COPY DUPLICATE SPRITES
3120 REM WHICH HAVE DIFFERENT COLORS
3130 X=197*64:Y=205*64
3140 FORI=0TO191
3150 POKEX+I,PEEK(Y+I)
3160 NEXT
3170 :
3180 SYS IQ :REM SPRITE IRQ ON
3190 :
3200 CASH=100 : LA=RA : LB=RB : LC=RC
3210 R$=CHR$(18) : POKE 53269,255
3220 VT$=CHR$(19) : B$=CHR$(32)
3230 FORI=1TO25:VT$=VT$+CHR$(17):NEXT
3240 BL$=CHR$(32)
3250 FORI=1TO40:BL$=BL$+B$:NEXT
3260 HT$=CHR$(29)
3270 FORI=1TO40:HT$=HT$+CHR$(29):NEXT
3280 PT$=CHR$(164)
3290 FORI=1TO40:PT$=PT$+CHR$(164):NEXT
3300 V0=54272
3310 V1=54273:V2=54280:V3=54287
```

Continued on page 122

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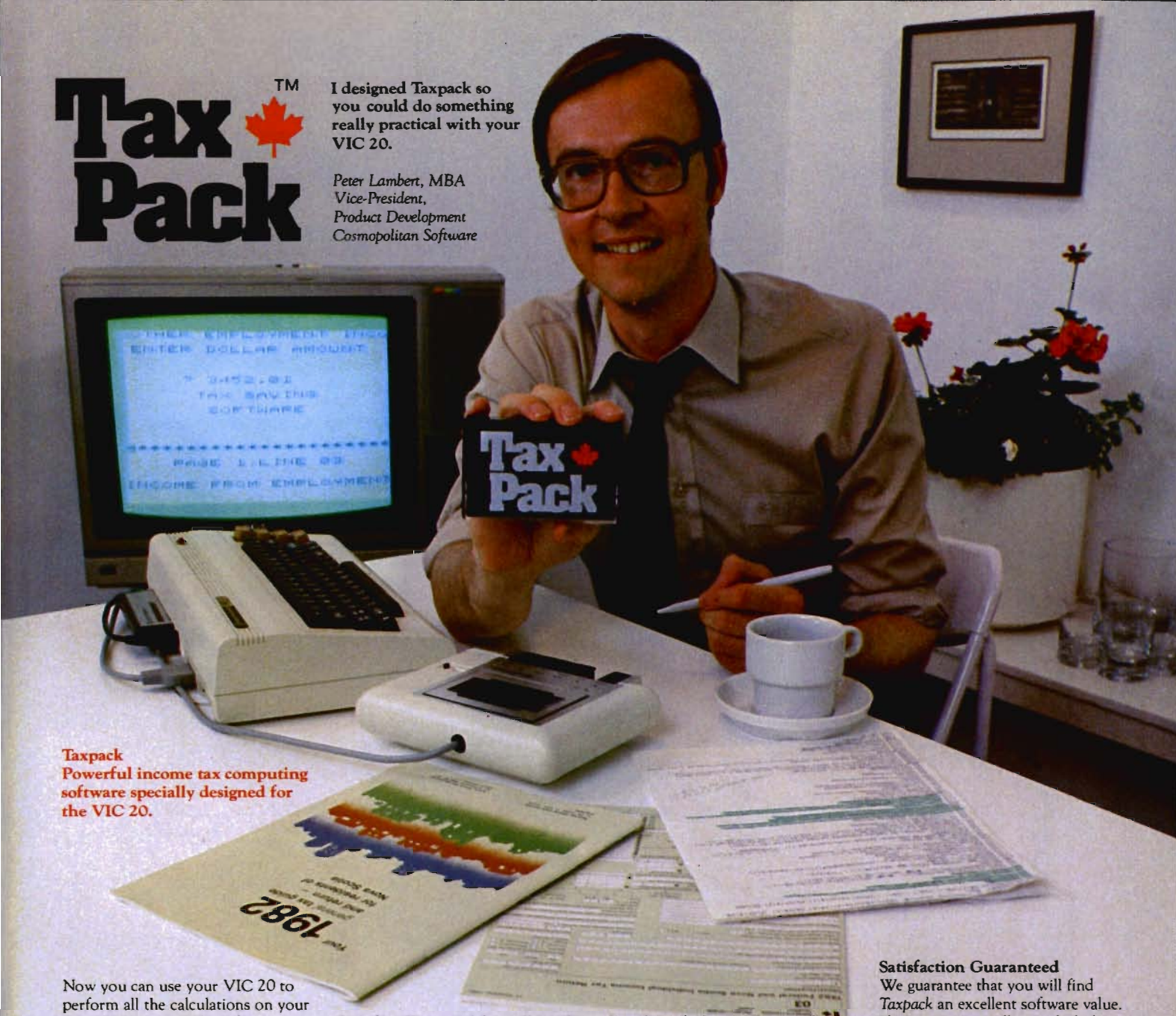
Product Development
Cosmopolitan Software



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Continued from page 120

```
3320 :
3330 NO$="---     "
3340 N1$="CHERRY  "
3350 N2$="ORANGE  "
3360 N3$="PLUM    "
3370 N4$="BELL    "
3380 N5$="BAR     "
3390 N6$="SEVEN   "
3400 :
3410 REM SET BIG NUMBER ARRAY
3420 LT$=CHR$(145)+CHR$(145)
3430 LF$=CHR$(17)+CHR$(157)+CHR$(157)
3440 LF$=LF$+CHR$(157)
3450 FORX=0 TO11
3460 FORI=1 TO3
3470 READ DA : NU$(X)=NU$(X)+CHR$(DA)
3480 NEXT I
3490 NU$(X)=NU$(X)+LF$
3500 FORI=1 TO3
3510 READ DA : NU$(X)=NU$(X)+CHR$(DA)
3520 NEXT I
3530 NU$(X)=NU$(X)+LF$
3540 FORI=1 TO3
3550 READ DA : NU$(X)=NU$(X)+CHR$(DA)
3560 NEXT I
3570 NU$(X)=NU$(X)+LT$
3580 NEXT X
3590 REM NORMAL IRQ OFF
3600 POKE IRQ,PEEK(IRQ)AND254
3610 PRINTCHR$(147):RETURN
3620 :
3630 REM *** START & END
3640 :
3650 POKE53280,6 :POKE53281,0
3660 POKE53265,27 :REM RASTER WRITE
3670 POKE IRQ,PEEK(IRQ)OR1
3680 POKE53271,0:POKE53277,0
3690 X=RND(-RND(0)) : POKE53275,255
3700 PRINTCHR$(147)CHR$(5);
3710 FORI=0TO7:POKE2040+I,200+I:NEXT
3720 POKE53269,255 : POKE 53264,0
3730 FORI=0TO7:POKE53287+I,I+1:NEXT
3740 FORI=0TO14 STEP2:POKE53248+I,40+11*I:NEXT
3750 FORI=0TO14 STEP2:POKE53249+I,70+11*I:NEXT
3760 PRINT:PRINTTAB(20)" THE COMMANDER"
3770 PRINT:PRINTTAB(20)"      COLOR"
3780 PRINT:PRINTTAB(20)"   COMPARATOR"
3790 PRINT
3800 PRINT:PRINTTAB(20)"        BY"
3810 PRINT:PRINTTAB(20)"GEORGE R. GAUKEL"
3820 PRINT:PRINTTAB(20)" COPYRIGHT 1983 "
3830 GOSUB3890
3840 GETIN$ :IFIN$="" THEN3830
3850 POKE 53269,0
3860 FORI=53248TO53264 :POKEI,0
3870 NEXT
3880 RETURN
3890 FORI=0TO7
3900 X=INT(RND(1)*8) :REM 0-7
3910 XX=INT(RND(1)*15) :REM 0-14
3920 Y=INT(RND(1)*8) :REM 0-7
3930 YY=INT(RND(1)*10) :REM 0-9
3940 POKE53287+X,XX+1 : POKE2040+Y,200+YY
3950 RETURN
3960 :
3970 REM *** DATA ***
3980 REM SPRITE : COLOR
3990 REM 200=HAPPY LIME:LT GREEN
4000 REM 201=CHERRY:RED
4010 REM 202=ORANGE:ORANGE
4020 REM 203=PLUM:PURPLE
4030 REM 204=BAR/BELL:YELOW
4040 REM 205=BAR:WHITE
4050 REM 206=LOGO:GREEN
4060 REM 207=SEVEN:WHITE
4070 REM 208=BAR/SEVEN:WHITE
4080 REM 209=BELL:YELLOW
4090 :
4100 REM DUPLICATE SPRITES
4110 REM 199=SEVEN/ORANGE:ORANGE
4120 REM 198=LOGO/ORANGE:ORANGE
4130 REM 197=BAR/PLUM:PURPLE
4140 :
4150 REM COPY OF ROW20
4160 DATA 203, 4, 206, 5, 200, 13
4170 :
4180 DATA 202, 8, 201, 2, 209, 7
4190 DATA 206, 5, 203, 4, 202, 8
4200 DATA 203, 4, 201, 2, 203, 4
4210 DATA 201, 2, 199, 8, 209, 7
4220 DATA 203, 4, 201, 2, 202, 8
4230 :
4240 DATA 202, 8, 209, 7, 200, 13
4250 DATA 207, 1, 197, 4, 209, 7
4260 DATA 204, 7, 209, 7, 198, 8
4270 DATA 202, 8, 201, 2, 209, 7
4280 DATA 201, 2, 202, 8, 203, 4
4290 :
4300 DATA 205, 1, 209, 7, 200, 13
4310 DATA 203, 4, 198, 8, 209, 7
4320 DATA 202, 8, 203, 4, 203, 4
4330 DATA 203, 4, 209, 7, 209, 7
4340 DATA 206, 5, 201, 2, 208, 1
4350 :
4360 DATA 203, 4, 205, 1, 200, 13
4370 DATA 202, 8, 202, 8, 209, 7
4380 DATA 203, 4, 201, 2, 198, 8
4390 DATA 205, 1, 209, 7, 209, 7
4400 DATA 203, 4, 206, 5, 200, 13
4410 :
4420 REM COPY ROW1
4430 DATA 202, 8, 201, 2, 209, 7
4440 :
4450 REM BIG NUMBERS
4460 DATA  32, 175,  32, 182,  32
4470 DATA 181, 182, 185, 181 :REM0
4480 DATA  32,  32,  32,  32, 182
4490 DATA 181,  32, 182, 181 :REM1
4500 DATA  32, 185,  32,  32, 185
4510 DATA 181, 182, 185,  32 :REM2
4520 DATA  32, 185,  32,  32, 185
4530 DATA 181,  32, 185, 181 :REM3
4540 DATA  32,  32,  32, 182, 185
4550 DATA 181,  32,  32, 181 :REM4
4560 DATA  32, 185,  32, 182, 185
4570 DATA  32,  32, 185, 181 :REM5
4580 DATA  32, 185,  32, 182, 185
4590 DATA  32, 182, 185, 181 :REM6
4600 DATA  32, 185,  32,  32,  32
4610 DATA 181,  32, 182,  32 :REM7
4620 DATA  32, 185,  32, 182, 185
4630 DATA 181, 182, 185, 181 :REM8
4640 DATA  32, 185,  32, 182, 185
4650 DATA 181,  32,  32, 181 :REM9
4660 DATA  32,  32,  32,  32,  32
4670 DATA  32,  32,  32,  32 :REMBL
4680 DATA  32,  32,  32,  32, 185
4690 DATA 185,  32, 184, 184 :REM-
```

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FOM has been produced for the *Commodore 64; PET Commodore (2000 and 4000 Series).*

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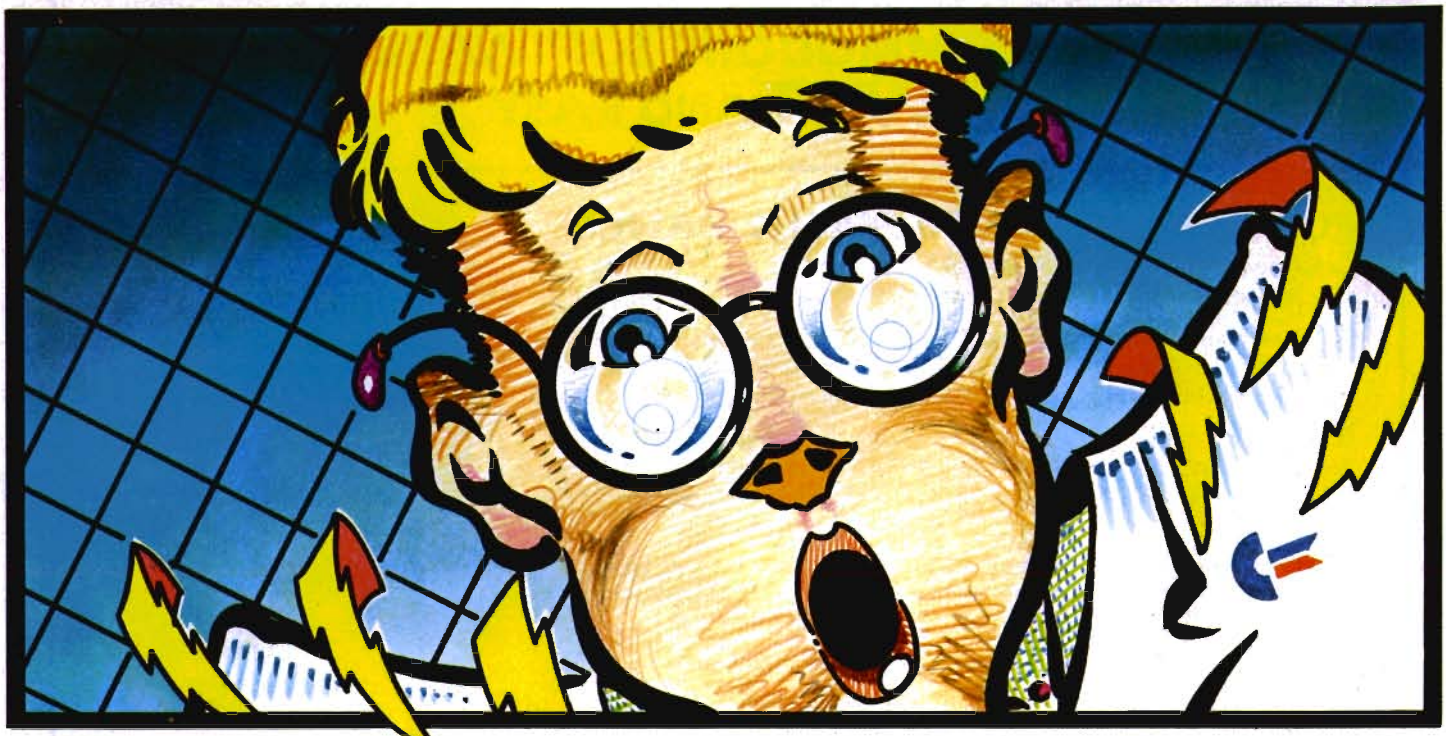

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The game features an eye-attracting demo mode with a spectacular animated karate match in a twilight temple garden setting. The suggested retail price is $34.95. Contact:

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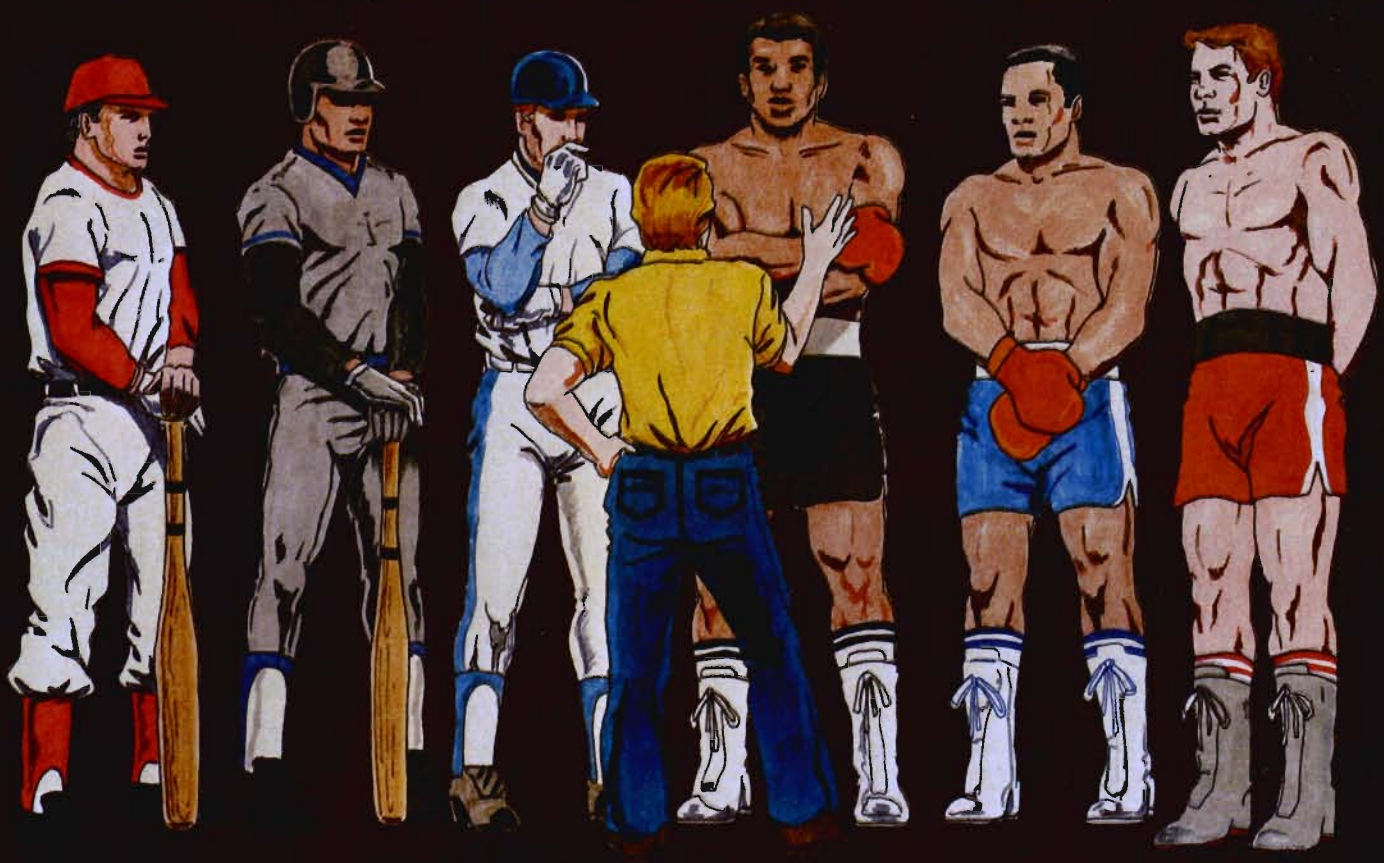

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This two-player and computer-as-opponent game also allows you to make up your own fighters by rating them for style, speed, aggressiveness, strength and a dozen other factors.

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RECEIVE ONLY MODEM OPERATES AT 4800 BAUD

Redmond Wa.—The Microperipheral Corp. has unveiled a new receive only modem which is designed for reception of computer data from commercial radio stations. The modem is unique in two respects. First, the modem is very inexpensive. It retails for less than $70.00. Second, the modem is compatible with Bell 103 (300 baud) signals and will also operate at much higher speeds. Using a method of generation and recovery, on which Microperipheral has filed a patent, the modem operates at speeds up to 4800 baud. The concept works at speeds up to 9600 baud, which permits downloading a complete video game in approximately 4 seconds.

The device is extremely simple to install. One cable plugs into the audio output jack of the radio. Another cable, terminated in a DB-25 connector, plugs into the serial port of the computer. Power is supplied by a common 9 volt transistor radio battery.

The modem's introduction is predicated on the licensing of radio stations and cable operations around the country to follow the lead of KMPS in Seattle, which has been downloading computer programs by radio since March. The material is broadcast in time periods when the listenership of stations is naturally low. The computer user may record the radio station's main audio channel (not subcarrier) and play that tape into Micro's high speed receive only modem or directly receive data into the computer via the modem. The information can then be processed. Mike Darland, President of Microperipheral says, "The advantage of the system is that anyone with a radio, or high-speed downloader and a computer may receive the transmissions. The system eliminates the need for telephone lines and main frame host computers."

While radio stations are one exciting market, cable television is another. Unlike commercial stations, which might choose to put computer transmissions on the air at off hours, the commercial cable operator would be able to pick an unused FM channel location and continuously download data into the home.

For additional information, contact Michael Darland, President, The Microperipheral Corporation, 2565 152nd Ave., N.E., Redmond, Wa. 98052, Telephone (206) 881-7544.

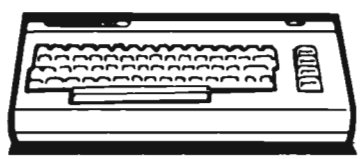
MICROSPEC RELEASES ACCOUNTS RECEIVABLE PROGRAM

Microspec, Inc. of Plano, Texas, recently introduced a new Accounts Receivable program for the Commodore 64.

Supporting up to 150 customers per diskette, the program is a balance forward system that accommodates 18 transactions per customer for each posting period. Mailing labels and up-to-date statements can be easily generated.

The program tracks financial charges and selectively posts them to the appropriate customer's account. It also will accumulate and post sales tax and shipping charges. Aging reports are generated and automatically posted to MicroSpec's General Ledger program.

Retail price of the program is $99.95.



MICROBASE, MICROTERM 64 AND BALDOR'S CASTLE RELEASED

Afron Micro announces the release of three outstanding new programs for the VIC-20 and Commodore 64: MicroBase, Microterm 64, and Baldor's Castle.

MicroBase is a data base and mailing label/report generator for the VIC-20 and Commodore 64. MicroBase is RAM resident and user-configurable. It allows up to 12 fields per record, up to 80 characters per field, and up to 176 characters per record. Program allows you to sort by any field using any of seven different alpha, numeric, or character match parameters. With MicroBase you will be able to print mailing labels, reports, inventories, and more. Program is available on tape or disk. Suggested retail prices are $29.95 for cassette and $34.95 for disk.

Microterm 64 is a terminal communications program for the Commodore 64. This program allows file transfer under ASCII and Commodore protocols. With Microterm 64 you will be able to download incoming files to disk, tape, or printer, and upload and transmit files from tape or disk. Program lets you menu select baud rate, word length, stop bits, parity, duplex/half duplex, and other parameters. Microterm 64 is available on cassette or disk. Suggested retail prices are $39.95 for cassette and $44.95 for disk.

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Baldor's Castle is a fast-moving real time graphic adventure for the VIC-20. Can you fight off nine different types of monsters with just your bare hands, or will you need bow and arrow, magic sword, potions and more to steal Baldor's gold? The castle contains more than 70 rooms on three levels. Fast on-screen graphics make this the adventure of a lifetime (if you live!). Program is on cartridge and is more fun with a joystick. Suggested retail price is $49.95. An advanced version for the Commodore 64 is scheduled for release in the fall of 1983 and will have more than 250 rooms with 10 levels and the option of designing your own castle. It will be available on disk.

Programs may be ordered directly from Arfon Micro, 111 Rena Drive, Lafayette, LA 70503, (318) 988-2478. Dealer inquiries are welcome.

FINANCE FOR C-64

SOUTH BEND, IN—Bytemark introduces four new programs for C-64!

PER FIN 64 is a personal finance package which provides entry, records, and analysis of income and expense items. Utilizing the Commodore 1541® disk drive, entries (on a screen designed to look just like a check or deposit slip) are recorded in monthly files. Part-I provides the data entry and recording routines, as well as statistics for individual and cumulative entries for the monthly file "on board." Part-II provides analysis of income and expenses by month, quarter, year or category. The categories are assigned automatically each time a new one is entered, so no account list need be created. All reports may be output to the VIC-1525® printer.

Marklist 64 is a database mailing list which will manage up to 200 entries of seven fields in each file. Features include edit, delete, search, sort and print. Print routines allow output to screen or printer of an alphabetical directory or zip sorted labels. This "user friendly" program manages files on the Commodore 1541® disk drive.

BAR CHART 64 accepts data in up to 18 user-defined categories. If monthly analysis is selected, labels are assigned automatically, beginning with any month. Or user may enter labels of any type. Once data and category labels are entered a colorful horizontal bar chart is generated on the screen. The chart may be edited or updated and redisplayed. Charts may also be output to a printer and saved on tape.

HI RES ED is a utility program for generating, testing and editing sprites, the "moveable object blocks" programmable on the Commodore 64® . A sprite is "drawn" on a 21 by 24 grid by moving a cursor around and placing or erasing dots on the grid to form a "screen-size" replica of the sprite. Striking a key causes the actual sprite to be generated, which appears on the screen after a few seconds. It may then be tested, or saved on tape or disk. In the "test" mode, the sprite may be moved around the grid, expanded or contacted both horizontally and vertically, displayed in any of 16 colors, and displayed either in front of or behind the background. When changes are required, a sprite already in memory may be edited, or one may be loaded from disk or tape. The sprite to be edited need not have been created by HI RES ED.

All Bytemark programs are single-key menu driven and extremely user friendly. PER FIN 64 and MARKLIST 64, at $34.95 each, are provided on disk. BAR CHART 64 and HI RES ED, at 19.95 each, are on tape. They are available from Commodore dealers or directly from Bytemark, 710 Lincolnway West, South Bend, IN 46616-(219)232-4662. Inquiries of all kinds are invited.

FUNDAMENTALS OF MATH FOR THE C-64s

Sterling Swift Publishing Company has announced the release of FUNDAMENTALS OF MATHEMATICS for the Commodore 64.

For grade levels 3-12, FUNDAMENTALS OF MATHEMATICS was developed by Byron Craig, a mathematics supervisor, and tested for three years in a large Texas school district. James Wells programmed the materials.

The FOM learning system consists of 89 lessons/programs—tutorial and drill-and-practice—on disk, worksheets which directly parallel the lessons, plus documentation. The 444 worksheets, plus pretest and post-test for each lesson, may be reproduced by the teacher.

The program may be purchased as a 6-disk set, containing programs 1-89, or as separate sets for 3rd, 5th, and 9th grade levels, with the programs correlated with essential mathematics objectives for testing purposes.

A "Hands-On Preview" disk with sample documentation is available.

FOM has also been produced for the Commodore PET.

Order from: Sterling Swift Publishing Company, 7901 South IH-35, Austin, TX 78744, phone (512) 282-6840.

Price: 6-disk set - $249.95, 3rd grade level only (2 disks) - $69.95, 5th grade level only (2 disks) - $69.95, 9th grade level only (3 disks) - $99.95, Worksheets for Lessons/Programs 1-89 - $29.95, "Hands-On Preview" disk - $9.95.

NEW BOOKS FROM ELCOMP PUBLISHING, INC.

Two new books about the Commodore-64.

1. MORE on the 64

Very important subroutines in 6502 machine language for your Commodore-64 by H.C. Wagner.

This is a collection of very powerful ready-to-run workhorse programs in machine language. Disk and cassette handling, input/output, how to interface different printers, tricks and tips for the advanced C-64 user.

128 pages. Order No. 183. Retail price $9.95

2. The Great Book of GAMES, Vol. I

Games for the Commodore-64.

How to get the most out of your powerful C-64. This book explains to you step by step how to program your own games, sound, graphics, animation and a lot more programs.

128 pages. Order No. 182. Retail price $9.95

Three more books on the Commodore-64 will follow until the end of the year.

1. How to program your C-64 in 6502 machine language, 128 pages. Order No. 184. Retail price $12.95

2. Tune up your 64

How to expand your Commodore-64 and build your own external hardware devices. 148 pages. Order No. 285. Retail price $12.95

3. Small Business Programs for your C-64
148 pages, Order No. 187. Retail price $12.95

For more information contact ELCOMP Publishing, Inc., 53 Redrock Lane, Pomona, CA 91766, Phillips Ranch, (714) 623-8314

COMMUNICATING HOME COMPUTER IS FAMILY'S BEST FRIEND

If you already have a personal computer or word processor, the chances are that your family is not getting the most out of the investment unless you have equipped it for communications. If you are considering buying one, you may be happy to learn that you can find a computer and all the basic equipment to make it communicate for as little as $350.

A buyer's and user's guide, THE COMPLETE HANDBOOK OF PERSONAL COMPUTER COMMUNICATIONS by Alfred Glossbrenner shows how a communicating computer will save you time and money whether you're planning a vacation or selling your home, writing a term paper or shopping and saving at home.

An example of the kinds of valuable tips that are sprinkled through the book is a complete rundown on CompuServe. Through this single database, food-coupon clippers can acquire the latest update on special deals, style-setters can receive the most current fashion notes, and the health-conscious can obtain a personalized nutrition program - all at a cost of 9 cents per minute. Other services that Mr. Glossbrenner describes, with addresses and telephone numbers, allow you to bank via computer or to barter your knitting skills for an idyllic vacation.

"Keyboard commerce," this handy paperback points out, is an extraordinary new type of electronic convenience shopping. Available through several databases and by direct subscription, Comp-U-Card offers nearly 50,000 items-including major appliances, cameras and stereo equipment-for sale to computer users. "Typical prices are 10 to 40 percent off suggested manufacturer's retail. But the service," Alfred Glossbrenner observes, "offers many monthly specials with potentially even larger savings."

Bartering, a practice that dates back to the caveman, is given a modern twist when home computers are "plugged in" to electronic networks that are in opera-

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Circle No. 26

tion today. A unique database called TradeNet is the channel through which a host of goods and services are swapped every day. You may be able to trade any skill you have-from repairing a car to stuffing envelopes-for something you really want, perhaps a vacation condo or a car.

When the student in the house sits down to do homework, the computer becomes as essential as a typewriter or a dictionary. In fact, it can replace them, and do more. THE COMPLETE HANDBOOK OF PERSONAL COMPUTER COMMUNICATIONS shows that the research power available to home computers is vast and easy to access, with three separate encyclopedic databases delivering a wealth of facts-and fast. Such hard-to-find items as names and phone numbers from some 4800 U.S. telephone directories are instantly available, along with a daily index of 2,000 news stories and a magazine index that will search through 600,000 citations from 370 popular periodicals to deliver needed information to your home. CompuServe currently delivers the entire contents of the *World Book Encyclopedia* with a plus: a chance to type in questions and comments to the World Book Staff.

For the college-bound student, The Source has a catalog of available financial aid programs and CompuServe gives online advice about preparing for the SATs and selecting the right college.

As THE COMPLETE HANDBOOK OF PERSONAL COMPUTER COMMUNICATIONS makes brilliantly clear, there's much more to a personal computer than a crack at Pac-Man. Your computer can improve your whole life. Contact Mab Grey at (212) 674-5151 ext. 711.

SSD INTRODUCES ITS DENTAL MANAGEMENT SYSTEM

Software Systems Design, a south Florida based software development firm, proudly announces its Dental Management System software product now available for Commodore users. The Dental Management System was written by our professional software staff with the constant aid and assistance of an active dental practice.

Finally, a quality software product, with thorough documentation written with the layperson in mind, and with virtually no limitations. And no special chips or security!!

Our Dental Management System package supports 9,999 patient records, procedure codes and appointments and has the ability for an unlimited number of monthly receipts/adjustments transactions. The Dental Management System also provides automatic posting, excellent insurance forms handling, walkout statements & receipts, a daily income sheet with receipts and billing analysis, automatic account aging, an accounts receivable report to keep you on top of your outstanding monies, and a patient recall report that makes sure you'll not miss seeing anyone!

The Dental Management System also provides an excellent link to WordPro IV that allows the user to selectively choose information from their patient files and create form letters using this information.

Our next version will even be better! Reduced sorting requirements and a practice analysis are just two of the improvements scheduled.

And the price, only $750.00 retail (dealer participation welcome). We also provide all software update notices and a national telephone support line to provide personal assistance. And the first six months software maintenance is on us! Additional six month software maintenance contracts are also available.

Coming soon—our Legal Time Management System, another fine software product by Software Systems Design.

For further information, please write or call:

Software Systems Design
P.O. Box 4670
Fort Lauderdale, Florida 33338
(305) 523-2290

NEW SOFTWARE FOR HIGH RESOLUTION DRAWING ON VIC AND C-64.

New software for high-resolution drawing on the VIC-20 and Commodore 64 has been announced by Midwest Micro, Inc. *Designer Screens* enables the user to draw high-resolution pictures with a joysitck, make printed copies in two sizes, and save the pictures to tape or disk for repeated use. The pictures may also be used in other programs without the need to reload *Designer Screens*.

With these powerful features, the user can draw single points, narrow or wide lines, or curvy or straight lines. Additional features include automatic line-plotting; text mode to add captions; defining background patterns; controlling colors for border, background, and image; reverse image; circle-plotting routines for "pie" charts; and horizontal/verticle axis expansion of the printed image.

Included in the program is a large "picture library" that may be used as is or modified by joystick drawing. *Designer Screens* is captivating enough for teenage game addicts, powerful enough for serious adult use, and yet easy enough for children to use.

Versions supplied for the Commodore 64, 5K VIC-20, and expanded VIC-20 (full features on the VIC-20 require 8K minimum memory expansion). supports VIC 15/1525 and popular parallel dot-addressable printers: Epson FX-80, Gemini-10; Microline 84; C. Itoh Prowriter, and others. Requires joystick; printer and disk drive are optional; on disk or cassette. The retail price is $29.95, plus $1.50 shipping and handling.

Contact:
Midwest Micro, Inc.
311 West 72nd Street
Kansas City, Missouri 64114
(816) 333-7200

SPEED READER

Davidson & Associates announces that their software SPEED READER II will be released for the Commodore 64. The program contains six stimulating activities designed by reading specialists to increase speed and build comprehension.

A Timed Reading Test electronically computes the user's reading speed in words per minute and then tests comprehension. Warm-up exercises strengthen eye muscles to enlarge eye span and sharpen perception. Lessons in eye movement, column reading, and text reading train the user to become more efficient, more effective, more productive reader. These activities access a data disk containing 35 reading selections.

Also included are an editor which allows the user to enter additional reading material and a grade level analyzer which measures the reading level of the material entered.

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COMMODORE - 64 / VIC-20

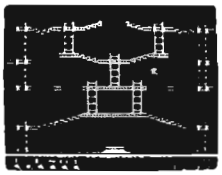
Buy Any Two Epyx Games From Protecto And Send The Proof Of Purchase Seals To Epyx And Epyx Will Send You A Free Game.

JUMPMAN
If you like Donkey Kong, you'll love Jumpman. Over 30 different screens with 8 speeds and 5 skill levels make this the fastest action game in the country. You must leap girders, climb ropes, and scale ladders to reach and diffuse bombs while avoiding robots, birds, bullets, explosives, crumbling walls, vanishing escape routes, and many other obstacles. (Truly a fantastic game!)
List $39.95 **Sale $27.95**

TEMPLE OF APSHAI (computer game of the year)
This is the standard by which other adventure games are judged. Full color graphics portray the temple and all its contents - magic, monsters, doomed cities and damsels in distress. Do battle in real time with over 20 monsters, expansion modules will keep your adventure alive in the future.
List $39.95 **Sale $29.95**

SWORD OF FARGOAL
Search for the wondrous sword in the depths of an ever changing dungeon. Make yourself invisible, teleport to a new location, drink a healing potion or use enchanted treasures, but watch out for traps and hideous creatures who will try to stop you. (Fantastic dungeon adventure)
List $29.95 **Sale $21.95**

CRUSH CRUMBLE & CHOMP (Computer game of the year nominee)
Choose one of six monsters or create your own, and use your monster to destroy one of four unsuspecting cities. The cities aren't totally defenseless, they call on police, national guard, and even a mad scientist, complete with helicopter, to save humanity from the relentless threat.
List $29.95 **Sale $21.95**



JUMPMAN JUNIOR
The devilish ALIENATORS are back! And they have overrun the Jupiter Command Substation. In this cartridge format sequel to the best-selling Jumpman, players must leap through 12 all new screens featuring electrocution traps, moving walls, hellstones, and dangers much too bizarre to be believed. How many screens can you master? Twelve different screens, 8 speeds.
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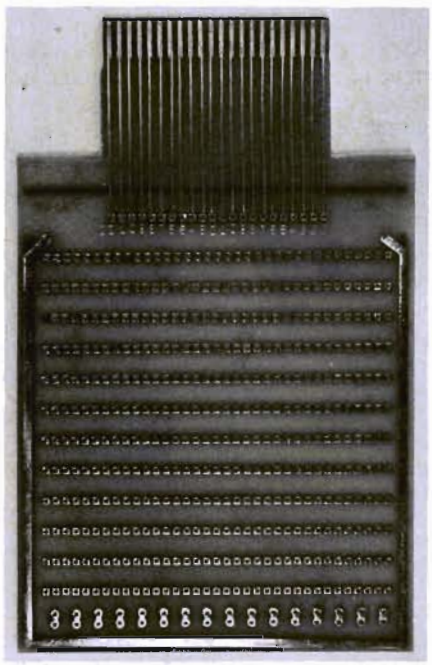
Circle No. 34

SPEED READER II was developed and tested in the classroom. Thousands of students have successfully used it to become faster, more efficient, more productive readers.

SPEED READER II is designed for adult, high school and college students. Additional data disks for junior high and upper elementary students can be purchased from Davidson & Associates. The two-disk package contains a 60 page instructional manual with a course outline. The suggested retail price is $69.95.

EXPANSION-BOARD FOR THE COMMODORE 64®

For those who want to expand their C-64, HOFACKER developed a practical and very useful prototyping board. The board plugs right into the expansion board on the backside of your C-64. All connectors are easy to access and a special layer for ground is provided throughout the board. The board is drilled and through-contacted for easy soldering and construction of your specific application.



For more information contact ELCOMP Publishing, Inc., 53 Redrock Lane, Pomona, CA 91766, Phillips Ranch, (714) 623-8314
Order No. 4970
Retail price: $9.95

DATABASE MANAGER

Fresno, CA -Mirage Concepts, Inc., a California-based software manufacturer, is proud to announce the introduction of two packages for the Commodore 64 personal computer. The DATABASE MANAGER and the WORD PROCESSOR are general purpose programs with an unlimited number of possible applications in home, school, and business settings.

The DATABASE MANAGER is the most powerful, yet easy-to-use database management system currently available for the Commodore 64 computer. It will instantly and accurately do just about anything a user wants done with the information he files; store, search, sort, retrieve, display, calculate, and print reports, lists, and even mailing labels.

The DATABASE MANAGER features free form design and input, the ability to sort on any fields/any level, calculated fields, and maximum system parameters which are large enough to handle even the toughest of file functions; 65,535 records per file, 2,000 characters per record, 200 fields per record, and 250 characters per field.

Mirage Concepts' WORD PROCESSOR, makes writing easier than ever before. Best of all, it is the ONLY word processor available for the Commodore 64 which produces an 80 COLUMN SCREEN DISPLAY WITHOUT THE NEED FOR ANY ADDITIONAL HARDWARE. The text displayed on the screen may be formatted exactly as it will eventually appear on the printed page. Although a hi-res monitor of some type is recommended, there is no need to spend hundreds of extra dollars on costly hardware modification.

Even disregarding the 80 column feature, Mirage Concepts' WORD PROCESSOR still ranks with the leader among text processing programs available for the Commodore 64. A partial listing of highlights includes true word wrap, printed page/line/character counters, over 70 single keystroke commands, search and replace operations, block functions, and the ability to interface to a myriad of different printers with its macro implementation.

Both of these two new MIRAGE programs are written in 100% machine language, giving them lightning speed in all functions. Each comes packaged in an IBM-standard grey vinyl notebook which includes 200 pages of typeset documentation divided into Introduction, Tutorial, Reference, and Index sections. The programs interface easily with one another, as well as most of the database and word processing packages currently available for the Commodore 64 computer.

The DATABASE MANAGER and WORD PROCESSOR programs list for $99.95 each, and are available at quality computer and software dealers throughout the country. Contact Mirage Concepts, 2519 W. Shaw, No. 106, Fresno, CA 93711

Circle No. 45

COMMODORE USERS

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Circle No. 10

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"The graphics are so clear. Musicomp is the most amazing musical program I have ever seen." W.S. Bach, Eisenach, Germany

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- SAVE your doodle on a disk. LOAD it in to doodle some more.
- PRINT your doodle on many popular printers.

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TRANSTAR ANNOUNCES $599 LETTER QUALITY PRINTER

Bellevue, Wa.—Transtar, the peripherals supplier fast becoming known for setting new industry standards for price/performance, today introduced a daisywheel printer listing at under $600.

The new printer, called the Model 120, offers all the sophisticated word-processing features found on units costing hundreds of dollars more. Its specifications include compatibility with major word-processing software using existing Diablo (tm) routines for boldface, underscore, superscript and subscript printing; letter quality print at 14 characters per second (Shannon text); and dip-switch selectable spacing at 10, 12 and 15 cpi with a choice of plastic daisywheels.

In addition, the 120 includes the automatic paper loading system first introduced last year on Transtar's higher-speed Model 130 daisywheel printers. The unique autoload design allows cut sheet paper to be loaded to one of four positions with just the touch of a button. The switch-selectable printing positions were designed specifically for common printing applications such as correspondence on business stationery and multi-page reports.

The printer uses an inexpensive and easy-to-change cartridge ribbon which is Olivetti (tm)-compatible and available in single-strike film or multi-strike fabric.

The first units, to be shipped in July, will offer a Centronics-compatible 8-bit parallel interface. A serial version of the 120, to be introduced at a later date, will support the DTR protocol as standard and ETX/ACK or XON/XOFF under switch control. Six transmission rates from 300 to 9600 baud will be switch-selectable on the serial printer.

The 120P parallel model will carry a suggested retail price of $599. A bidirectional forms tractor is available as an option.

Built in Japan by the manufacturer of the popular Transtar 130, the new 120 carries a six-month warranty on parts and labor.

In addition to the models 120 and 130, Transtar's product line includes the Model 140 40 cps daisy wheel, and the Model 315 color matrix printer featuring the four-hammer head technology developed by Seikosha.

More informatin on the Model 120 can be obtained from Transtar, Box C-96975, Bellevue, Washington 98009 or by calling (206) 454-9250.

and The Alien said..."Let Commodore Speak... and Sing!"

Yes, the VOICE BOX™ from The **Alien** Group, the world's ONLY *singing* speech synthesizer, now grants the power of speech to the VIC 20™ and the Commodore 64™. A commented, all-BASIC demo program gets the VOICE BOX talking right away, and, since it can be "taught" to say anything, the VOICE BOX has an unlimited vocabulary! The voice speaks with natural speech inflection controlled either from the program or from the precise, built-in Pitch control. *No other speech synthesizer has this feature!*

Want to add speech to a new or existing BASIC program! The VOICE BOX has FOUR ways to do it on VIC 20's of any memory size and on any Commodore 64: entirely from BASIC, or using one of the three machine language programs readily added to other programs – English text-to-speech, the same with the lip-synch "Alien" face added, or use of the 64 basic phonemes as input. A challenging spelling quiz that accepts new words (expanded memory required with VIC 20) is provided on the cassette supplied.

The VOICE BOX plugs directly into the computers user port, comes with built-in speaker. Volume and Pitch controls and lots of instructions from The **Alien** Group, the people who got Atari® and Apple® to speak!

Available at leading computer stores everywhere, or order direct by sending $95.00 to: The **Alien** Group, 27 W. 23rd St., NY, NY 10010. Specify whether for VIC 20, Commodore 64 cassette or Commodore 64 disk. Programs for a high-res talking human face and a comprehensive music and singing system available on separate cassette for $25.00 (expanded RAM necessary when used on VIC 20). Extra main cassette for either computer available for $19.00.

Vic 20 and Commodore 64 are trademarks of Commodore Electronics Ltd VOICE BOX is a trademark of The **Alien** Group

Circle No. 101

"VIC GAMES"

"VIC Games" is a collection of 36 arcade-style, strategy, and educational word games for the Commodore VIC-20 microcomputer.

Written by Nick Hampshire and published by the Hayden Book Company, Inc. of Rochelle Park, New Jersey, the book features sound, music, graphics, and utility programs.

Included in the book are action games such as Racer, Car Race, Spacewar, and Space Pirates; word games such as Hangman and Find the Word; educational games such as Do-Ray-Me, U.S.A. Song and Sketching 1 and 2; and utility games such as VIC-VIC, Sound Effects, and Joystick Test.

VIC is a trademark of Commodore Business Machines.

MOSES™

THE ASSEMBLER OF THE AGES
for the VIC 20™

Why MOSES?

Programs written with **MOSES** run fifty to several hundred times faster than programs written in BASIC. A program that takes two minutes to execute in BASIC, will only take two seconds (or less) to execute when written with **MOSES.**

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MOSES is written in **MACHINE LANGUAGE! MOSES** assembles dozens of times faster than assemblers written in BASIC.

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MOSES makes **3 PASSES,** not just one or two like most other assemblers.

ULTRA-FRIENDLY

On screen menu of **EASY-TO-USE COMMANDS.**

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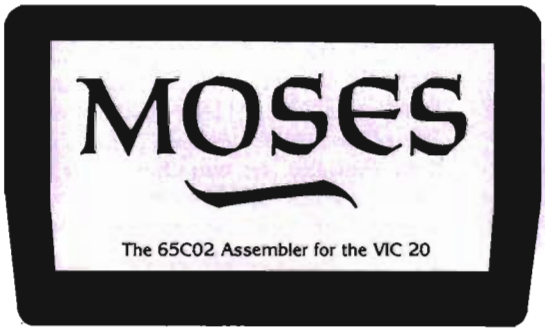
Comes in a **CARTRIDGE** with sturdy plastic case. **MOSES** is easy to learn and powerful. As you enter each line, **MOSES** verifies syntax, and partially assembles the line thereby reducing debugging time and conserving memory. This means an even faster assembly. Also included with **MOSES** is a machine language MONITOR with 34 powerful commands to help you debug your programs. Whether you program for fun or profit, or both, you need **MOSES.** You'll love the ability to program where imagination is your only limit.



SPECIAL OFFER!

For a limited time, we will include a free kit to upgrade your VIC 20's outdated 6502 to the new, enhanced 65C02A microprocessor. The 65C02A is totally compatible with all VIC 20 software and hardware, uses 99% less energy, and has 27 new instructions to make programming easier and faster. And, of course, **MOSES** takes advantage of all 27 instructions. This is a $24.95 value, but is included free while quantities last.

8K • 16K
RAM EXPANSION

A high quality memory expansion cartridge housed in a sturdy plastic case. This product has an easily accessible dip switch which gives you memory block switching ability. Use one 8K and one 16K for 24K memory or two 16K cartridges for a total of 32K memory.
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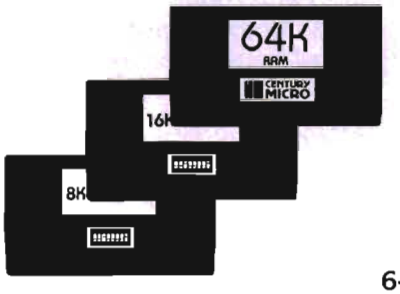

64K
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It's finally here. This highly versatile ram cartridge allows you to store or write programs in two separate 32K banks that are bank selectable with software — NO SWITCHES. This product is power stingy using less than 200 mA current. A must for programmers.
6-Month Warranty.

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MOSES	$59.95*
MOSES with 8K RAM expansion	99.95*
8K RAM Cartridge	$46.95*
16K RAM Cartridge	69.95*
64K RAM Cartridge	169.95*

*Manufacturer's suggested list price

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CENTURY MICRO

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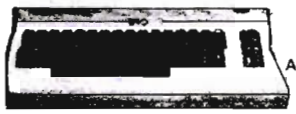

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MICRODIGITAL INTRODUCES GRIDDER FOR THE VIC-20

Microdigital announces the availability of GRIDDER for the unexpanded VIC-20, by Reg Stevens.

GRIDDER is an arcade-style, grid-chase game. With a joystick or the keyboard, the player controls a lonely painter whose job is to completely paint an increasingly complex maze of squares in a grid. Points are scored for the number of squares painted and for how quickly each grid is completed. The first few grids have a single chaser that has the power to kill the painter. The painter has three lives to start with, but left over lives are accumulated with each new grid of squares. The painter can hide from a chaser, or can outmaneuver it, or lose it by dropping "holes" in the grid. GRIDDER has three difficulty levels. The first level has one chaser. The second level has two chasers. The third level also has two chasers but the painter cannot hide from them.

GRIDDER features high-resolution graphics, sound, exciting colors, and it is programmed 100% in machine language—it is a real joystick cruncher. The suggested retail price for GRIDDER is $19.95 for cassette, and $24.95 for diskette.

Microdigital is dedicated to publishing quality consumer software products for the VIC-20 and CBM 64 at affordable prices. Its offices are located at 752 John Glenn Boulevard, Webster, NY 14580. Telephone (716) 872-0518 inside NY or 1-800-833-7384 toll-free outside NY.

GRIDDER has been chosen as the game contest for the August and September issues of Commander. See game contest page for details!

COMPUTER BASEBALL ON C-64

SSI has released a new version of a great game. COMPUTER BASEBALL is now available for the Commodore 64 computer.

COMPUTER BASEBALL lets you manage your own team or a historical major league team. Each manager has a variety of offensive plays to choose from, including a suicide squeeze, bunting, stealing a base, and running the bases conservatively or aggressively, to name a few. Defensively, he may choose between a number of ways to play his infield and outfield, choose whether or not to pitch to power hitters, and he can even go to his bullpen for a relief pitcher. The relief pitcher won't be worth much on the mound, though, if the manager has not given him sufficient time to warm up. The computer can act as manager of one team for solitaire play, or it can manage both teams at once.

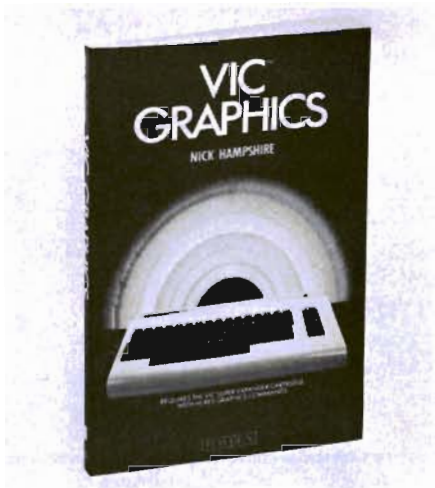
Computer Baseball works on the Commodore 64 computer using one disk drive. The game comes with rulebooks, World Series Math-Up book, data card and disk for $39.95.

Contact Strategic Simulations Inc. 883 Stierlin Road, Bldg. A-200. Mountain View, CA 98043-1983. (415) 964-1353

"VIC™ GRAPHICS"

VIC Graphics is a detailed explanation of the high-resolution-graphics capabilities of the Commodore VIC-20 microcomputer.

Written by Nick Hampshire and published by the Hayden Book Company, Inc.



of Rochelle Park, New Jersey, the book includes 38 complete graphics programs for the VIC. All program listings are in VIC BASIC and have been tested and are annotated for easy reference and modification.

The programs' applications range from art to games to educational simulations in math, science, and business. Programs include color plotting, drawing maps, rainbows, geometric figures, pie charts and line graphics, character and shape design, and moving shapes on the screen. The programs build to reveal the techniques of three-dimensional drawing, including adding perspective, shading, and color to achieve stunning results in high-resolution graphics.

Programs in this book require the use of the VIC Super-Expander cartridge with high-resolution graphics commands. Book sells for $12.95 - Contact Bill Madaras on (201) 843-0550 for more information.

VIC is a trademark of Commodore Business Machines, Inc., and is not affiliated with the Hayden Book Company, Inc.

MICRODIGITAL INTRODUCES SNAKMAN FOR THE COMMODORE 64

Microdigital announces the availability of SNAKMAN for the Commodore 64, by Peter Glaze.

You've seen SNAKMAN on the VIC 20; it's been on every VIC 20 top-ten software list since October 1982. Now it is available for the Commodore 64. SNAKMAN for the Commodore 64 makes full use of the 64's sprite graphics and music capabilities. It has fast joystick response, super smooth token movement, and it is 100% machine-language programming. It's what you've been waiting for.

SNAKMAN for the Commodore 64 features three difficulty levels, so it will be a long joystick-wrenching time before you get this one mastered. At the start of the game, SNAKMAN moves faster than the gremlins, but as the score builds, the gremlins pick up speed. At the highest difficulty level, the gremlins, all four of them, easily outrun SNAKMAN. It's sheer suicide for the player that breaks a million points.

SNAKMAN for the Commodore 64 also features the famous SNAKMAN warble, and, new for the 64 version, several tunes to reward players for capturing gremlins and prizes, and a funeral dirge when SNAKMAN bites the dust. The suggested retail price for SNAKMAN for the Commodore 64 is $24.95, tape or diskette.

Microdigital is located at 752 John Glenn Boulevard, Webster, NY 14580. Telephone (716) 872-0518 inside NY or 1-800-833-7384 toll-free outside NY.

ZORLOK NEW ADVENTURE GAME FOR THE VIC 20(**)

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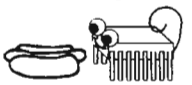

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MACROFIRE-EDITOR/ASSEMBLER FOR COMMODORE 64

This is a most powerful machine language tool.

The system consists of two parts:

1. A very powerful editor, almost as our wordprocessor BLIZTEXT

2. A very fast Assembler (10k of source code will be translated in approx. 5 seconds).

Both programs are in memory at the same time and from the editor you can start the assembly by just pressing two keys. After assembly the editor takes over the control again. There are 24 commands available in the editor. The Editor/Assembler is available on cassette or disk (please specify). It stands to reason that the MACROFIRE has full macro capability. An include function allows you to assemble files greater than the amount of memory.

Order No. 4963

Retail Price: $89.00

For more information contact ELCOMP Publishing, Inc., 53 Redrock Lane, Pomona, CA 91766, Phillips Ranch, (714) 623-8314

MICRODIGITAL INTRODUCES PINBALL WIZARD FOR THE VIC 20

Microdigital announces the availability of PINBALL WIZARD for the unexpanded VIC 20, by Steve Rogers and Jerry Isenga.

PINBALL WIZARD is an action-packed pinball game that looks and operates just like the real thing. Game features include 1 or 2 players, realistic gravity and ball speed decay, extra balls, chutes, bumpers, and super pinball sounds. The game comes to life when you pull back the plunger, flip the flippers, light the lights and rack up the points. But watch out, if you're not careful, you can also TILT.

PINBALL WIZARD features high-resolution graphics, exciting colors, and it's programmed 100% in machine language. The suggested retail price for PINBALL WIZARD is $19.95 for cassette, and $24.95 for diskette.

Microdigital is located at 752 John Glenn Boulevard, Webster, NY 14580. Telephone (716) 872-0518 or 1-800-833-7385 toll-free outside NY.

Commander's Toll Free Subscription Number is 1-800-426-1830

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It makes good business sense to get this valuable control that most businesses do not have. Available from CLOCKWORK COMPUTERS, INC., 4612 Holly Ridge Rd., Rockville, MD 20853, (301) 924-5509. The price is under $4000 and can be bought on a lease/purchase plan, or can be charged to your American Express Credit Card.

MICRODIGITAL INTRODUCES SKRAMBLE! FOR THE VIC 20

Microdigital announces the availability of SKRAMBLE! for the unexpanded VIC 20 by Reg Stevens.

SKRAMBLE! is an arcade-style, air-strike game in which the player guides a galactic fighter craft through eight different and increasingly difficult enemy defenses. With the keyboard or a joystick, the player maneuvers the fighter craft while lasering and bombing enemy helicopters fuel tanks and rockets.

Excitement mounts when the fighter encounters obstacles in its path. As the fighter moves overland, enemy rockets are launched to try to stop the fighter from entering the wiggy tunnel. Once in the tunnel, creatures called wiggys further attempt to destroy the fighter craft. Past the tunnel, the fighter encounters the twisty caverns, meteor showers, a rocket city, a city maze, and finally, the homing slot.

SKRAMBLE! is a colorful game filled with exciting high resolution graphics and life-like sound, programmed in

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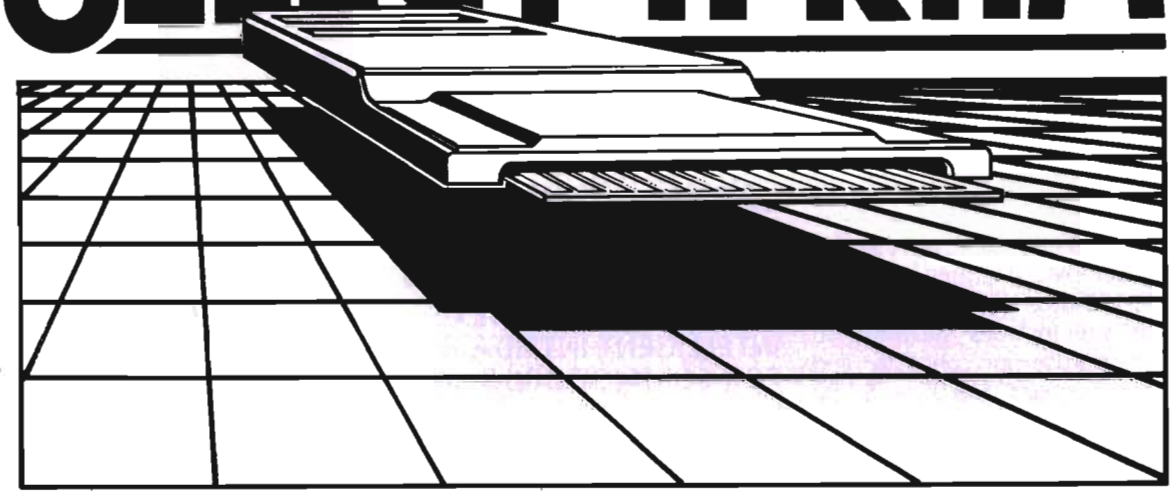

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100% machine language. The new game has a suggested retail price of $19.95 for cassette and $24.95 for diskette.

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INTERPOD™ PROVIDES INTELLIGENT INTERFACE FOR COMMODORE SYSTEMS.

PALO ALTO, CA Limbic Systems, Inc. has announced INTERPOD™, a free-standing, intelligent 6502-based transparent multiple interface that gives serial and parallel capabilities to VIC-20™ and Commodore 64™ microcomputers.

"With INTERPOD, users are no longer limited by the serial bus,", Limbic vice president Lisa L. Carley said.

"Simply by attaching INTERPOD, the Commodore 64 is converted into a powerful system with business computer capabilities," Carley said.

Developed by Oxford Computer Systems, INTERPOD is a 6502-based multiple interface that provides four microprocessor-controlled connectors. It allows the computer to communicate with all Commodore serial IEEE and IEEE-488 devices, as well as all RS232 devices.

INTERPOD uses none of the memory within the computer. As a standalone unit, INTERPOD is entirely transparent to the user. It functions without affecting the computer in any way.

In addition, use of the various I/O ports, including the cartridge slot, is not restricted by INTERPOD.

This capability enables users to choose from a wide range of inexpensive IEEE and RS232 dot matrix or formed character printers.

The device provides the systems with capability to access from 1/3MB to 10MB mass storage capacity on floppy and hard disk formats.

Plugging INTERPOD into the serial port also allows users to compile basic programs on the Commodore 4040 or 8050 drives using Oxford's PETSPEED™.

Access to the Commodore 1541 disk drive is enabled through a serial port on the INTERPOD.

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For only $12.95 each, our **CURSOR 64** tapes are your best buy for the Commodore 64. They take advantage of the color, sound, and sprites that make the 64 such a delight to use. Most of our packages include three excellent Basic programs on one cassette tape. The programs are not copy protected, so you can look at the source code, and learn how to make the 64 do its tricks.

We don't have room to describe all 25 of our **CURSOR 64** programs here. As a sample, you may want to order tape 64-5 with the exciting **Godzilla** program. You'll be challenged as you try to save Tokyo from from the rampaging Godzilla. Or try tape 64-3 with the popular **Miser** text adventure that will take you hours to solve (even if you cheat and read the program source).

We have super programs for the VIC 20, such as **Dungeon** ($12.95), a visual adventure for 16K VICs. Our **VIXEL** programs are also popular with VIC owners. And, we still sell all 30 of the original **CURSOR** cassettes for the original PET and CBM.

Call or write for a catalog today. Be sure and tell us whether you have a 64, a VIC, or a PET. We welcome credit cards, and ship most orders the same day they are received. Dealer inquiries invited.

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The VIC-20 version only charts 26 bi-weekly periods rather than 52 weekly periods.

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tions programs can be executed on any INTERPOD-equipped VIC-20 and Commodore 64." Carley said.

Up to 30 IEEE devices, and any RS232 printer or modem can be accessed by the system, simply by plugging INTERPOD into the serial port.

INTERPOD also gives the VIC-20 and Commodore the capability to communicate with such IEEE-based instruments as voltmeters, plotters and other IEEE analog/digital peripherals.

Provided with serial bus in and serial bus out connectors, INTERPOD may be placed anywhere in the serial chain. If an addressed device is not found on the serial bus, INTERPOD will search for it on the parallel bus.

INTERPOD is priced at $180, quantity one. For OEM, distributor and dealer quantity prices contact Lisa L. Carley, vice president, Limbic Systems, Inc. 1056 Elwell Court, Palo Alto, CA 94303 (415) 964-8788.

"TRICKS FOR VIC's"

A great book for the VIC-20 user.

Ready to run programs, programming in machine language, hardware projects and input/output programming.

Beside a complete listing for a word-processor you will find lots of game programs as well as a machine language monitor for the VIC.

The section about machine language programming gives you a short introduction with some very interesting sample programs. The input/output part tells you how to control external devices such as stereo equipment or household appliances via your computer. Complete schematics, construction information and printed circuit board layouts are included.

Other subjects which are covered in the book are Memory Expansion, how to hook two more joysticks to your VIC and much more.

For further information contact ELCOMP Publishing, Inc., 53 Redrock Lane, Pomona, CA 91766, Phillips Ranch, (714) 623-8314.
Suggested Retail Price: $9.95

FLIGHT 64!

FANTASY COMPUTERWARE INC. announces release of software for COMMODORE 64.

FLIGHT 64 is an IFR flight simulator whereby the computer screen becomes your flight panel with full color graphic displays including radar, altimeter, artificial horizon, vertical speed indicator, and other instruments. Topography changes with every flight. For use with keyboard or joystick. Price $15.95.

DATAFILE is a data-base management program which lends itself well to address lists, collections, and general record keeping. 200 five field records can be SORTED, FOUND, EDITED, UPDATED, SAVED, and LOADED. DATAFILE information can be transferred from cassette to disk and dumped to printer in regular or mailing-label format. Price $15.95.

SPELLATHON is a unique spelling tutor for all ages. After studying, play a round of WORDATHON, a letter scramble game included in the package. This software is extremely user-friendly and allows you to build and save your own word lists to disk or tape. Hard copy can be obtained using the printer option. Price $19.95.

FANTASY offers seven other titles including COMPHELLO, GUNSLINGER, LOAN CALCULATOR, SPACE CADET, CRUNCHER, DISK MASTER, and SPRITE GENERATOR. Prices listed are suggested retail for programs supplied on computer-grade cassettes. Disks are $2 additional.

It is the goal of FANATASY COMPUTERWARE to provide a variety of home and entertainment software at a low cost. FANTASY products are available now at computer and software stores nationwide. To receive a free catalog, write to FANTASY COMPUTERWARE INC., P.O. BOX 451, SIOUX FALLS, SD 57101 (605) 335-7684.

NEW BOOK EVALUATES EDUCATIONAL SOFTWARE FOR POPULAR COMPUTERS

Carlsbad, CA—Software Reports, an updated reference manual that reviews educational software programs for five popular computer brands, is now available nationwide, announced Publisher Phillip H. Kessler.

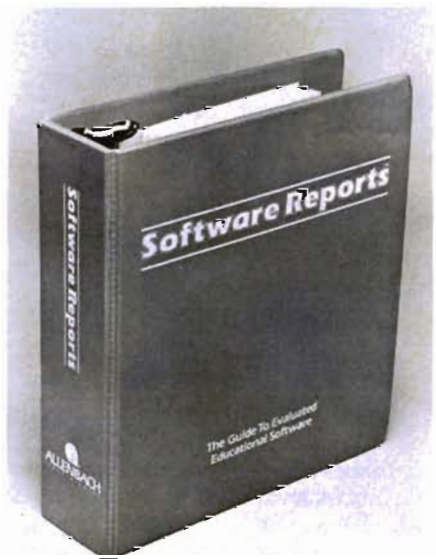
"The manual was designed for educators and home owners who needed brief, current and objective evaluations of the hundreds of educational software programs available," Kessler said.

The first addition reviews almost 400 educational programs for computers.

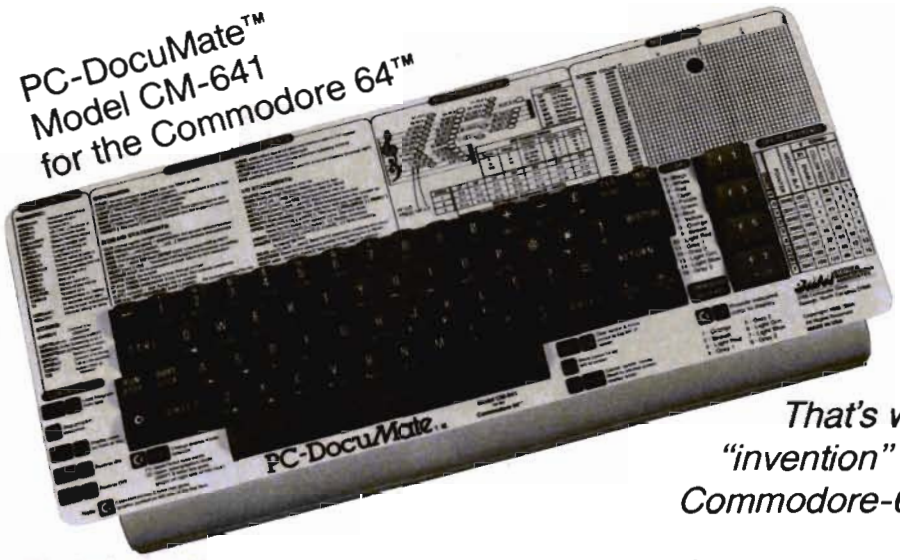
Programs in 20 subject areas are evaluated for students in preschool through college. Educational software for adults, school administrators and special education students is also reviewed.

Regular updates will review approximately 100 additional educational programs. Updates will fit into Software Reports' three ring binder.

"The updates really differentiate Software Reports from other books," said Editor Bonnie J. Dudley. "The binder was chosen so that information could be neatly inserted and deleted. This means the materials in Software Reports will always be current."



An independent software review board, the Evaluation Committee, spent more than 1000 hours researching and evaluating the 382 programs incuded in Software Reports. The TEC board developed the structured point scale that teachers, parents and students used to rate the programs.



EUREKA!

That's what we said when our new "invention" solved all our VIC-20™ and Commodore-64™ programming problems

We had a problem. So we invented PC-DocuMate™ to solve it. The problem was how to quickly master the VIC-20 and CBM-64 keyboards and easily start programming in BASIC on our new personal computers. First we went through the manuals.

INCONVENIENT MANUALS

The user's guide was a nuisance and the programmer's reference manual was just plain inconvenient to use. We found the control key combinations confusing and the introduction to BASIC to be too "basic" for our needs. We needed a simple solution to our documentation problems.

So we decided to surround the keyboard of each PC with the information we wanted. We decided to print whatever we needed on sturdy **plastic templates** which would fit the keyboard of either the VIC-20 or Commodore 64.

SIMPLE SOLUTION

This was the simple solution to our problem. Now we could have the essential information right at our fingertips.

On the left side and top of the templates we put **BASIC** functions, commands, and statements. On the lower left we used **key symbols** to remind us of how to use SHIFT, RUN/STOP, CTRL and the "Commodore" key. Over on the bottom right side we put some additional keys to help remember about CLR/HOME and RESTORE. But we were still a little confused.

STILL CONFUSED

We found we were confused about music programming, color graphics, and sprites. On both the VIC-20 and the CBM-64 templates we carefully organized and summarized the essential reference data for **music** programming and put it across the top—showing notes and the scale. All those values you must POKE and where to POKE them are listed.

Then to clarify **color graphics** we laid out screen memory maps showing character and color addresses in a screen matrix. (We got this idea from the manuals.)

For the VIC-20 we added a complete memory address map for documenting where everything is in an expanded or unexpanded VIC.

For the Commodore 64 we came up with a really clever summary table for showing almost everything you ever need to know for **sprite** graphics.

GETTING EASIER

Now we had organized the most essential information for our VIC and 64 in the most logical way. BASIC, music, color graphics, and sprites all seemed a lot easier. Our initial problem was solved by PC-DocuMate™.

But we have a confession to make.

WE CHEATED

We had solved this kind of problem before. In fact, many times before. You see, we at SMA developed the original PC-DocuMate for the IBM PC. We've made templates for IBM BASIC and DOS, for WORDSTAR™, VISICALC™ and other best-selling software packages for the IBM PC.

So we knew we could invent another PC-DocuMate™ to solve our problems with the VIC-20 and Commodore 64. Now our solution can be yours and you can join the thousands of satisfied users of our template products.

Take advantage of our experience and success with PC-DocuMate templates. Get one for your personal computer.

SOME SPECIFICS

Our templates for the VIC and 64 are made from the same high quality **non-glare** plastic as the more expensive IBM PC versions.

The templates are an attractive **gray** color and are imprinted with a special black ink which bonds permanently to the plastic. They are precision **die-cut** to fit your keyboard.

Unlike some other products we've seen in this category, PC-DocuMate templates are professionally and expertly designed. And they are fully guaranteed.

OUR GUARANTEE

We guarantee your satisfaction. **You must be satisfied** with your PC-DocuMate for your VIC-20 or CBM-64. Try it for 10 days and if for any reason you are not satisfied return it to us (undamaged) for a full refund. **No risk.**

SOLVE YOUR PROGRAMMING PROBLEMS WITH PC-DocuMate™

Order your PC-DocuMate today (by phone or mail) and solve your VIC-20 or CBM-64 programming problems. Send only **$12.95** and specify which computer you have. We pay for shipping and handling. Use the coupon below or call **919-787-7703** for faster service.

YES! Please RUSH me _____ VIC-20 templates and/or _____ CBM-64 templates at $12.95 each. I have enclosed $_____ by:

Check ___ Money order ___ MC/VISA ___

Name _____

Address _____

City _____ State _____ Zip _____

Card # _____ Exp. _____

Signature _____

Foreign orders (except Canada) add $5.00 US

Mail to: **Systems Management Associates**
3700 Computer Drive, Dept. I-1
P.O. Box 20025
Raleigh, North Carolina 27619

Canadians: Please send $18.95 CDN for each template to:

Systems Management Associates
55A Westmore Dr., Dept. I-1
Rexdale, ONTARIO M9V3Y6

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Dealer inquiries invited.

RAVINGS OF A MADMAN

by Tim Parker

USER'S GROUPS, TALKING VICS, AND READING MATERIAL

There has of late been a proliferation of computer clubs aimed at the VIC-20 and VIC-64 user. While many of the clubs are founded with excellent intentions, a few are not, and most do not fulfill their purposes. There are a number of "clubs" that were created not to help the computer users, but to fill the pockets of the originators. That certainly should not be a motive for such a necessary group.

First, let's consider why user's groups are needed. They fulfill two major needs. The first is for the neophyte computer user. The poor first time computer user who has invested several hundred bucks in the unit generally looks through the manual, and then utters the immortal words "HUH?" (In a decade and a half in the computer industry, the one thing I've found that scares people off the most is manuals. The vast majority are written either as technical manuals by someone well acquainted with the product, and thus written over the first time user's head, or are written in such a sloppy manner as to be unintelligible to the general public. Software manufacturers take note: write manuals that make sense!) It is useful for a first time user to be able to converse with people who have confronted the same problems they are encountering, and who have mastered the difficulties, or on the other hand, are currently in the same situation, allowing perhaps not a solution to the problem, but at the very least, commiseration.

The first time user is without doubt the most important reason for a user's group. The second reason arises from the first. Once the new user has mastered his machine, there is usually a willingness to share the information acquired. The experienced veteran then helps another new user, and the circle regenerates itself. But besides the gratification that brings, a user's group allows experienced programmers to discuss in some detail their machine and its capabilities, and the programs for it. Usually, the amount that is learned at user group meetings is well worth the attendance, even for the most experienced pro.

User's groups exist in many cities, most sponsored by a local store, or larger computer group. Many computer groups aimed at higher level CP/M users offer 6500 family, or Commodore splinter groups, and these benefit from the larger group's affiliations.

Although some user groups offer free membership, by far most require payment of some sort. When this is due to the group being located in another city, it is only common sense to recover the mailing costs. As mentioned above, most of the user's groups are honest: many are non-profit organizations run to promote the machines in use. Some, however, shed a bad name on user's groups. Outlandish membership fees are charged by some, which do not reflect the benefits received by members. This sort of group should be avoided like the plague. It is intent on fleecing the unsuspecting. Some others act on the "vacuum cleaner principle". A low membership fee gets you in, but the spin-off sales amount to big bucks. Be careful!

So how should a user who wants to join a club proceed? Most important is to look for a local group. Being able to talk face-to-face about some of the problems is much better than reading about them in a magazine. Also, help is much more forthcoming on a personal level.

If local groups do not exist, or are unappealing, then one of the numerous clubs advertised should be considered. Look for one that has a reputation behind it, and try and talk to other members. A large number of clubs simply fail to deliver promised goods. Many fold due to lack of time, motivation, or money. Listen to the street talk, and talk to local computer users and distributors.

Manufacturers such as Commodore have their own user groups. Although it may seem like a good idea, the offer

should be read with care. some manufacturers use the user groups to push their own merchandise, and don't offer any real support. Commodore's Computer Club (P.O. Box 69, Wood Dale, IL 60191) has recently been doing a lot of advertising. I have not yet gotten any first hand experience with them, so I'll reserve judgment. Another well known group is the Toronto Pet User's Group (Dept. D, 1912A Avenue Road, Suite 1, Toronto, Ontario M5M 4A1) has been helping Commodore owners for years, and has a reputation of solid gold.

Most magazines offer a list of clubs currently in business, and these should be consulted. Try and arrange to talk to another member: first hand experience is better than wasted money.

One interesting thing to me is the new voice synthesizers that are appearing for the VIC. Although some are low grade, a few are based on the powerful Votrax chip (which gained popularity in Apple II applications). This chip supports phoneme based speech (details too lengthy for this column . . . .an upcoming article will explain it all) that sounds rather good with the VIC. Although limited memory is a problem with the 20, it can be overcome with some programming tricks.

Voice synthesizers are rather old hat in the micro business, but coupling one to a VIC produced some unique effects. Here at the funny farm, my VIC-20 acts as a clock system for various activities, including cooking, darkroom functions, taping while out, and burglar system. With the voice synthesizer, I no longer have to rely on a screen (which mucks up the darkroom) or a series of tones over speakers (which mucks up music). Now, a message can be relayed in legible tones to announce whatever needs announcing. (At the moment, I'm trying to get it to speak in German . . . .)

Recent excursions into the local computer book store have shown an explosion in the number of VIC-20 oriented books. Seems like only a few months ago the attitude was "VIC-20 . . . No one writes about that!" Now, there are books aimed at almost every aspect of the VIC.

Several deal with graphics, either using the Super Expander graphics cartridge, or alternative approaches such as machine language, as the basis for graphing routines. While some of the books appear to be cashing in on the market, most are written very well, and offer useful information to the reader. Knowing how to access the graphic capabilities of a machine like the VIC-20 should be an essential part of each VIC owner's learning. And graphics means more than simply drawing circles on the screen.

Some of the books deal with games, always a guaranteed winning item. Again, there is a wide spectrum of choices. Some of the games are so simple, even an idiot could write them (how many versions of hangman must we put up with?), but others are higher quality.

Note, however, two philosophies. The first is that if the game was really that marvelous, why publish it in a book when it could earn a fortune on the software market? That cannot be followed too carefully; however, some writers do not care to bother with markets, and do have a touch of the philanthropist in them. Not too many do.

The second approach is to republish games that have appeared in magazines previously. Almost all game writers do this (myself included), as a means of gaining revenue. Considering the fact that a truly well designed game when published in a magazine does not recover more than a tiny fraction of its development cost, it makes sense to get all one can for the product. Although games are usually written by a "hacker" for the fun of it, even "hackers" like to eat.

So, for game books, look them over, and see if they are at all interesting, and then check the listings to see that they are of suitable detail. Remember, those things have to be typed in!

Some technically oriented books are appearing for the advanced user. These approach the VIC as a tool, and offer ways to incorporate either the VIC into some other systems, or other systems into the VIC. If the VIC is to be used other than as it came in the box, a book like this can be useful. Take care to identify the Technical Manual As A Detailed Explanation Of Your Machine Versus the Interface Manual For The VIC and The Outside World, and choose the one that suits your requirements.

Finally, general VIC books are appearing as a guide to the initial user. These mostly rewrite what is said in the machine's manuals and in magazines such as Commander. For this type of book, only the user can judge the applicability. If you really do not understand the manuals that accompanied the machine, perhaps another writer's approach will make more sense. Again look for a good writing style; one that suits your needs. And do look . . . you shouldn't buy that sort of book through the mail.

★★★★★★★★★★★★★★★★★★★★★★★★

COMMAND-BOARD

Show us how you command your favorite computer game. We want you to put your best effort on record in the COMMAND-BOARD. To show the Commodore world your best score send your entries to:

COMMAND-BOARD
P.O. Box 98827
Tacoma, WA 98498

SCORE	PLAYER
KEY QUEST	
74,798	★Darrell Eastman, Tacoma, WA
24,962	Nick Blenkush, Santa Monica, CA
VIDEO VERMIN	
10,164,437	★Richard Seemayer, Fresh Meadows, N.Y.
2,150,836	Darrell Eastman, Tacoma, WA
GRIDDER	
45,678	★Nick Blenkush, Santa Monica, CA
FROGGEE	
65,425	★Keith Floyd, Belt, MT

All entries must be received by the first of the month to be eligible for the following month.

★★★★★★★★★★★★★★★★★★★★★★★★

Continued from page 142

Programs were awarded overall letter grades based on ratings for: educational usefulness, ease of use, instructional techniques, content and documentation.

Each review includes: a summary of the product's features, a brief description of the program and a graded evaluation.

Each subject sections begin with a reference chart that summarizes information about each program to make software comparison simple.

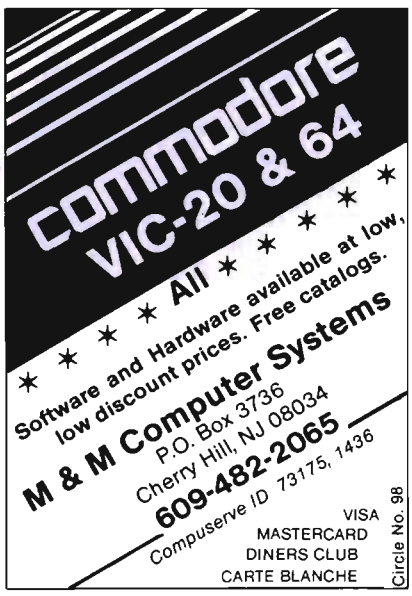
Materials are indexed by: subject, program title and computer brand. A glossary explains the computer terms used in the book.

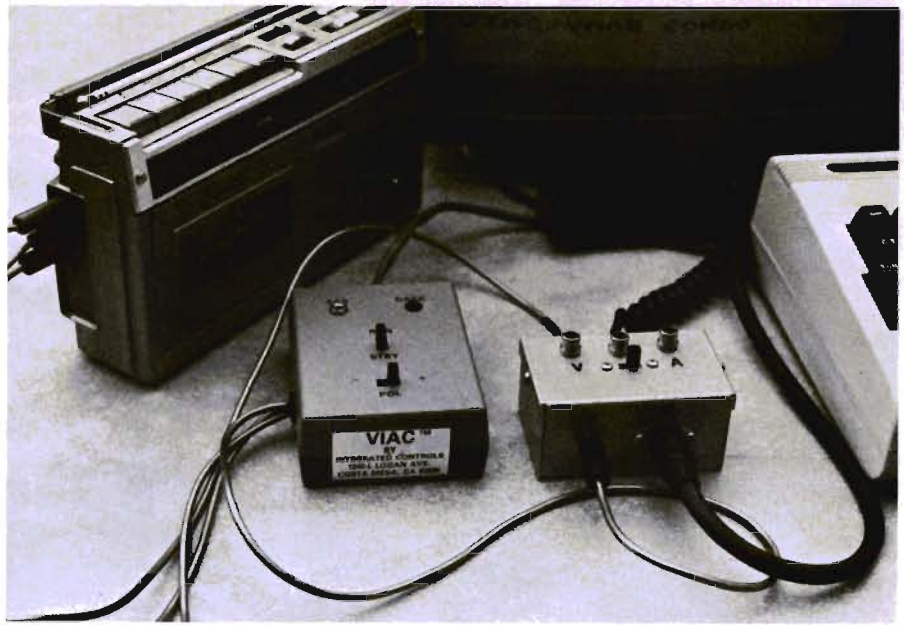
According to Kessler, "The indexes, tabs, binder and reference charts were designed to make Software Reports easy to use and reader friendly."

Complete software ordering instructions are included in an alphabetical vendor listing along with specific information about guarantees, back-up policies, volume discounts and replacement policies.

Software Reports sells for $39.95 plus $3.00 shipping and handling.

Software Reports will be sold nationwide in computer and book stores. Orders can also be placed by phone or mail through Allenbach Industries, 2101 Las Palmas Drive, Carlsbad, CA 92008. To charge an order by phone, call 800-854-1516 or in California call 619-438-2258 collect. Checks, VISA and Master Charge are accepted. Purchase orders requesting net terms should be submitted with a list of three credit references.





AUDIO & VIDEO INTERFACE

Integrated Controls has announced the VIAC/VAAB Combo. This system, comprised of the Vic Interface to Any Cassette and Video/Audio Adapter Box, will allow the VIC-20 and Commodore 64 users to connect Audio & Video equipment to their computer for expanded capabilities. You can create and run programs integrated with voice or any audio source for playback through the TV or monitor speaker under program control. The VIAC/VAAB Combo package is priced at $64.95.

The VIAC allows the Commodore user to interface any audio cassette recorder to Load/Save progams and make backup duplications of program tapes with another cassette recorder and is priced individually at $44.95.

The VAAB provides for easy connection, with standard RCA plugs, to external audio/stereo system, video monitor or video recorder. The VAAB is available for $24.95 or comes in a Kit for $15.95 and Plans only are $5.95.

Contact: Integrated Controls, 1240-L Logan Ave., Costa Mesa, CA 92926. (714) 641-0181.

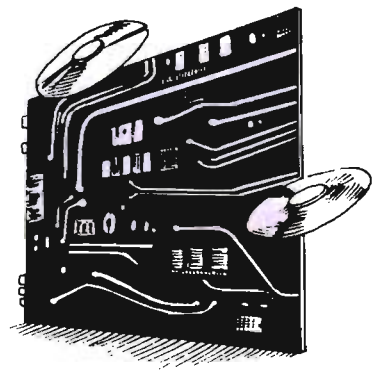
TAX COMMAND PREPARES INDIVIDUAL TAX RETURNS!

Brookfield, Wis., —TAX COMMAND, a Federal Income Tax calculation program, is now in its second year of publication. It provides a line by line method of calculating income tax for federal tax forms, including form 1040, income averaging, Schedule A-itemized deductions (including medical), capital gains and losses and contains all tax tables for every filing status. On computers with over 48K, Tax Command includes numerous other schedules as well.

Tax Command is easy to use. It does all mathematical calculations automatically, contains built-in tax tables that calculate your tax refund or payment, and tells when to income average. While the program does not print on the actual form, in most versions it does print (or list if you do not have a printer) each entry needed on your tax form.

Being in its second year of distribution, all known "bugs" on Tax Command have been eliminated, and the program has been extensively tested and marketed. Users of last year's program liked the control it gave them over the tax preparation process, especially the ability to make changes and test options.

Suggested retail is $24.95. Tax Command has been developed for the Commodore 64 and the VIC-20. Tax Command is available for dealer and distributor sales and also for individual sales.



Take COMMAND by patronizing our advertisers who support the wide selection of products for the Commodore computer line. COMMANDER Magazine would appreciate you mentioning our name when dealing with these organizations.

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News Releases

NEW COMPUTER NEWSLETTER LAUNCHED

Rapidly expanding microcomputer hardware and software industries have created a steadily increasing need for information and instruction on the part of computer users. Hundreds of magazines, newsletters, manuals, newspapers and books containing thousands of how-, where- and what-to articles are published every month to satisfy that need. The few general interest publications do an excellent job of providing broad, background, introductory information. Most material, however, is included in the wide selection of special purpose publications designed to satisfy the needs of segments of the computer market. Published for narrow interest groups such as owners of specific computers, home computerists, business managers, children, educators and other professionals, game players, etc., the number of titles in this category is large and growing rapidly as the number of computers in use increases.

Because of the vast amount of material being published, serious microcomputer users, professionals and hobbyists alike, are finding that locating up-to date information is not easy. Most libraries make available only a few of the more popular titles and computer dealers and news stands can offer only relatively small selections for sale.

Recognizing that this situation was interfering with the full and efficient use of their computers and that many others were having the same problem, two avid microcomputerists from Cleveland, Ohio decided to do something about it. Drawing on over fifty years of combined engineering experience, their accumulated business related know-how and more than ten years association with computers they decided to solve the problem by designing an easily usable tool for microcomputer users.

The product of this effort is *The Computer NEWSletter*, a guide to microcomputer information. Published ten times per year, each issue is a directory to the recent periodical literature listing major articles from over fifty publications. The first issue of *The Computer NEWSletter*, just published, references over 1300 articles from over eighty individual periodicals including *COMMANDER*.

Each reference includes significant information about the article being described such as: 1) title and author, 2) name, volume, date of periodical, 3) pages on which the article appears, 4) description of contents (including short abstract when necessary), 5) name of the computer language involved and 6) a signal indicating the presence of program listings. To make the material readily accessible, listings are divided under general headings such as Tutorials and Utilities, Games, Software Reviews, Hardware Reviews, etc. And each edition carries listings under two broad categories: 1) articles relevant to a specific computer or group of computers and 2) articles of probable interest to all computerists.

The first issue has been published in six editions for microcomputers, including Commodore computers.

The Computer NEWSletter is available by subscription ($17.50 for ten issues) from MHN Services Inc., Dept. D7, P.O. Box 975, Cleveland, OH 44120 or ask for it at your local computer store. Be sure to include the name and model of your computer when subscribing.

SOUND SHARPER CREATES NEW INSTRUMENTS

A new Sound Shaper™ has been developed to create new sounds from computer-generated instruments as well as music that resembles popular musical instruments such as piano, xylophone, and banjo. It also enables users to test 2 million various combinations of sound produced by the synthesizer chip at the touch of a single key.

The Sound Shaper, invented by Mark Stewart exclusively for Quality Computer in Ventura, California, is designed for the Commodore 64 personal computer. The Sharper's visuals include bar charts and digital displays of the sound being employed.

In addition, the Sound Shaper allows for three independent "voices" to be adjusted separately for attack, decay, sustain levels and waveforms. Sync and ring modulation can also be adjusted.

Stewart believes the Shaper will prove invaluable. "I believe its greatest advantage is that anyone can use it, from novice to advanced programmer. Plus the fact that information can be printed or saved to Datasette or disk is a real asset."

The Sound Shaper is available through most Commodore dealers or directly from Quality Computer.

Contact Ed Roth at (213) 501-4179 for further details.

HAYDEN AND COMMODORE ANNOUNCE DISTRIBUTION AGREEMENT

The Hayden Book Company will have four VIC-20 titles distributed to mass merchandising retail stores in July. Commodore Business Machine's software division will serve as the distributor.

The agreement is the first of its kind between Hayden and Commodore and the first such agreement known between a publisher and microcomputer manufacturer. The four titles include VIC REVEALED, VIC GRAPHICS, and VIC GAMES by Nick Hampshire and STIMULATING SIMULATIONS FOR THE VIC by C.W. Engel.

The books will be published by Hayden, packaged by Commodore, and available to 20,000 retail outlets such as Sears, K-Mart, J. C. Penney, Caldor, and any other stores carrying Commodore products.

"We are very pleased with this historic agreement between Hayden and Commodore. Commodore came to us first . . . that shows our level of quality," said David Edwards, general manager of the Hayden Book Company, Inc. "Hayden was one of the first publishers to enter the field of microcomputer book publishing. Now we are the first to have our books distributed by a micro manufacturer. We look forward to such distribution since our ultimate goal is allowing the consumer greater access to our books," said Edwards.

Sig Hartman, president of Commodore Software, said Commodore and Hayden Book Company had teamed up to provide one of the best book packages in the industry . . . at a price any VIC owner can afford.

"We set a unique pricing standard when we introduced the VIC-20 . . . now we're introducing similar standards for computer books, starting with this excellent four-book package from Hayden Books," Hartmann said. Commodore has not yet released the price of the book package.

MSA ANNOUNCES ACQUISITION OF EDU-WARE SERVICES, INC.

Atlanta, GA–MSA (Management Science America, Inc.) today announced the acquisition of Edu-Ware Services, Inc. of Agoura Hills, California. Edu-Ware is a leading supplier of educational microcomputer software for school and home use.

John P. Imlay, Jr., chairman of the board and chief executive officer of MSA, said, "This acquisition is MSA's first step into the rapidly growing field of consumer-oriented educational micro software. Analyst Portia Isaacson of Future Computing Incorporated projects that the market for home and school educational software will grow over 70 percent per year and will reach nearly $1 billion in 1987."

Edu-Ware was founded in 1979 by current Chairman of the Board Sherwin A. Steffin and President Steven W. Pederson, and it has grown to become one of the largest independent educational software publishers. The company ended fiscal 1983 with revenues of $1.6 million.

"Edu-Ware's strong point has always been the application of professional course design and innovative educational strategies to computer-assisted teaching," Steffin said. "Our association with MSA will provide the financial, marketing, and production resources needed at the top of our field."

Edu-Ware offers four product lines:

1. The Science of Learning (tutorial instruction)
2. Interactive Simulation (models of real world situations)
3. Interactive Fantasies (intellectually challenging entertainment)
4. Dragonware (informal educational games)

The products are geared for specific age groups, ranging from preschool to adult.

Edu-Ware products are available for use on major Commodore computers. Retail prices are generally between $25 and $80 per product. Complex subjects such as algebra are offered in a series of independent instructional systems which can be purchased individually.

Contact MSA, 3445 Peachtree Rd. NE, Atlanta, GA 30326 for further information.

GLOUCESTER COMPUTER

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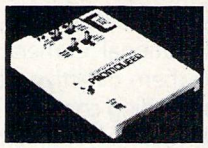
PROMQUEEN Write code for most common 8-bit microprocessors, test it in circuit, and burn it on EPROM with this all-in-one micro development system cartridge. Powerful machine code editor provides comprehensive ROMware development support. Ideal for robotics, process control, game development. Commodore VIC-20 host computer. Programs 2716, 2732, 2758 EPROMS and similar EPROMS. $199.00



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Circle No. 19

KAPRI EXPANDS PRODUCT LINE

Kapri International of Sun Valley, California, an exclusive distributor of Commodore 64 and VIC-20 software has expanded its product line to include hardware and books.

Explains Chris Soular, President, "We have been devoting many hours of advice towards hardware and books for the mass chains like Fedco, HW Computers, and National Camera. But we had to send them directly to the manufacturer or publishing company which, obviously, took a lot of their time. Therefore, to show our commitment to our dealers, we have included hardware and books to our extensive software line. Everything is for the Commodore computers."

Such products will include printers, modems, cables, 80 column boards, memory expansion modules, interfaces, and joysticks from such well known companies as Cardco, Data-20, and Human Engineered Software. The books will range from how to choose a home computer to microcomputer dictionaries. Contact R. Tuffly on (213) 765-2774 for further information.

Sid says: Circle No. 27

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COMPUTER SOFTWARE ASSOCIATES PLANS "PRACTICAL" FAMILY OF PRODUCTS

In keeping with its series of spreadsheet programs (PractiCalc, PractiCalc Plus, Practicalc 64 and "PS, the Programmable Spreadsheet"), Computer Software Associates of Randolph, Massachusetts, has announced plans for a full line of "Practical" products to be developed over the next year.

Most significantly, each "Practical" product will be complementary to other "Practical" family members, greatly increasing and enhancing users' options that will result in extremely powerful and flexible programs.

Robert Shapiro, Marketing Vice President of Micro Software International, commented, "The addition of a 'Practical' family of products is the result of the natural outgrowth of the PractiCalc series. Our studies show that once users get beyond games for their VIC-20s and Commodore 64s, which seems to be happening with more frequency and rapidity, they look for software that is going to expand the usefulness of their machines."

Shapiro foresees three basic categories of software for the serious home market: spreadsheets, word processing and database managers. Computer Software Associates' initial entries outside the realm of spreadsheet programs will be PractiWord™ and PractiBase™, a word processing program and database manager, respectively.

PractiWord will be available for both the VIC and Commodore 64 microcomputers in both tape and disk formats. Shapiro projects that it will be priced in the $50-$75 category. "Users aren't willing to spend more for a program than their machines cost," he notes. "PractiWord, like PractiCalc, will be written in machine language, will be extremely fast, powerful and user-friendly." PractiWord will feature basic editing commands, tab, justification and centering of text with an 80-character per line expansion capability.

PractiBase, a relational database manager, will also be written for both the VIC-20 and Commodore 64. Shapiro forsees that the planned disk version will be the preferred customer choice because of its speed. PractiBase will contain password protection, alpha- numeric sort and select, "add," "change" and "delete" functions, error checking routines, as well as other key functions.

"Once we have the three basic programs," Shapiro continued, "we plan to develop modules to accompany them." Contemplated programs include PractiPlot™, enabling the user to create histograms, pie graphs and wedges, cylinders, etc., for preparing reports, making presentations, and other situations where high and low-resolution graphics are called for.

Contact Robert Shapiro at 50 Teed Drive, Randolph, MA. 02368, (617) 961-5700 for further information.

COMMODORE DONATES MICROCOMPUTERS FOR TEACHER TRAINING

Commissioner of Education Gordon M. Ambach announced today that Commodore International has donated 60 microcomputer systems to the State Education Department to be used for teacher in-service training in computer literacy. The Commissioner said that some of the microcomputer systems will be located in the Education Department's Center for Learning Technologies and that one system will be distributed to each of the State's 42 Boards of Cooperative Educational Services (BOCES) for local in-service programs.

Commissioner Amback explained that Commodore had developed a training program to be used by the Learning Technologies Center which will enable all BOCES staff to become familiar with the system, to receive repair and maintenance training, and to use the system for providing local in-service education across the State.

Greg Benson, director of the Center, said that discussions were underway with the New York State Educational Communications Directors Association to help in planning the BOCES staff training and system distribution program scheduled for next fall.

Commissioner Ambach expressed gratitude to Commodore International for the gift and acknowledged the value of business cooperation in a State level effort to enhance the use of learning technologies. He added that the willingness of Commodore to work with the Education Department increases the potential impact of the program. "It will enable public and private agencies to cooperate in making the wisest use of available resources to resolve the overwhelming needs for teacher in-service training, while keeping in mind the complex dimensions of equitable access and delivery of training."

Contact to Publish - Greg Benson (518) 474-2563

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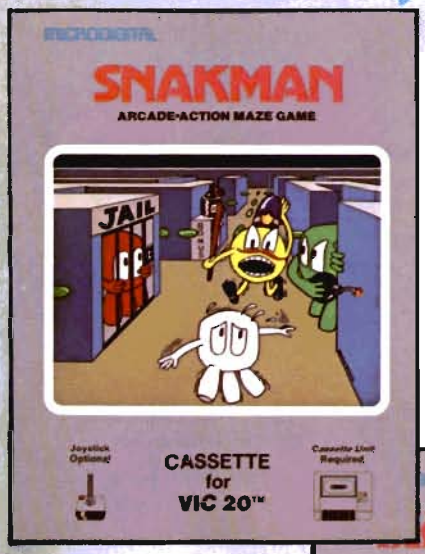
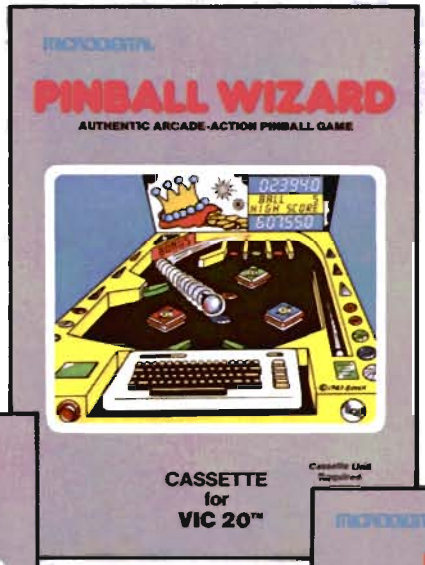


WATCH OUT!

Your mission, should you decide to accept it, is to capture tokens and keep a sharp eye peeled for the gremlins that are chasing you. A fast, action-packed maze-and-chase game with high-resolution graphics and excitement-building sound.

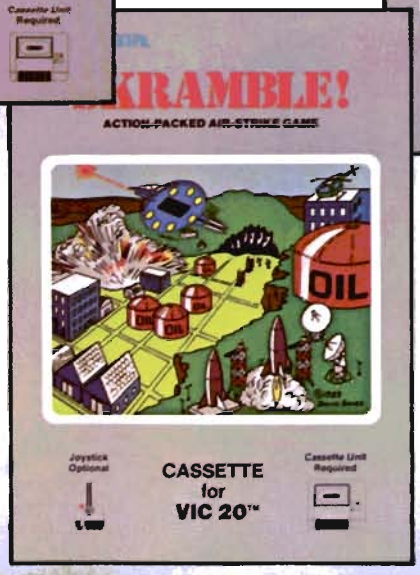


JUST LIKE THE REAL THING!

An action-packed pinball game featuring 1 or 2 players, realistic gravity, flippers, high-resolution graphics, and super pinball sounds. You pull the plunger, flip the flippers, light the lights, and rack up the points. But watch out, you can TILT!

FANTASTIC! THRILLING!

A space game filled with exciting graphics and life-like sound! You've got to land your galactic fighter craft beyond the defenses of a hostile enemy while lasering and bombing through tunnels, caverns, and a city maze, and out-maneuvering rockets, wiggies, and meteor showers.



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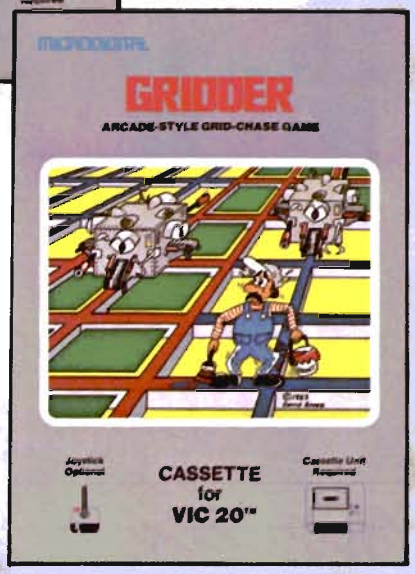

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MICRODIGITAL Games are available from your local retailer, or directly from:

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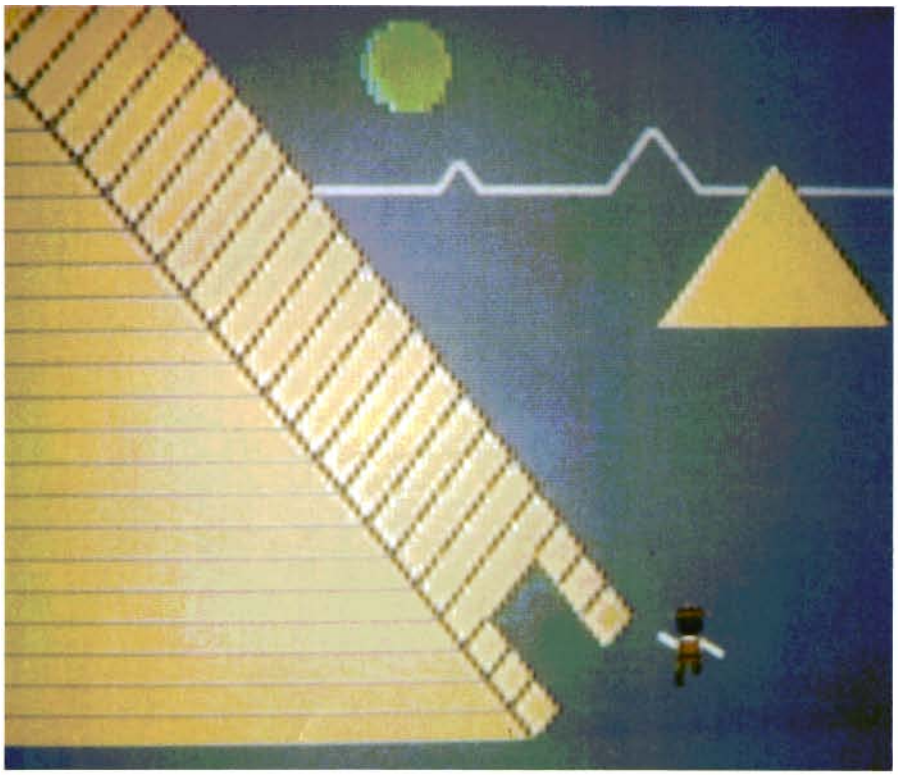
Circle No. 112

GAME CONTEST



The Game Contest is a continuing feature of Commander Magazine aimed at providing entertainment for and promoting competition among our readers. TIMEWORKS has graciously provided us with this Game Contest.

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The contest will run until November 30.

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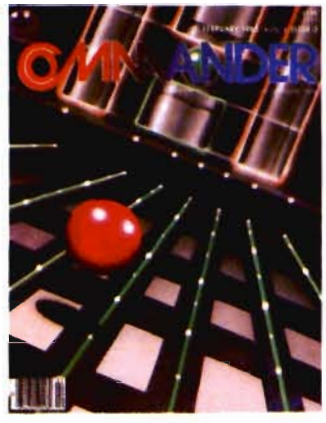

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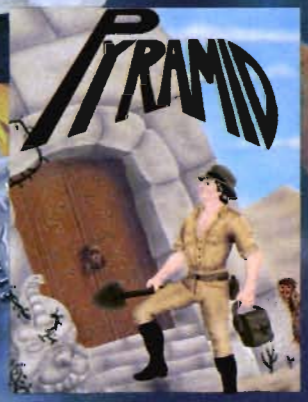

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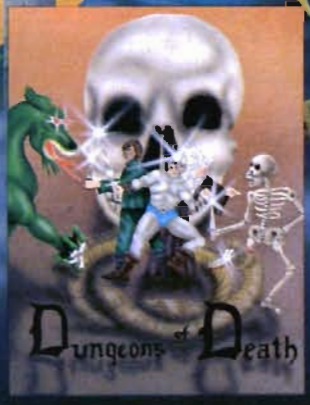

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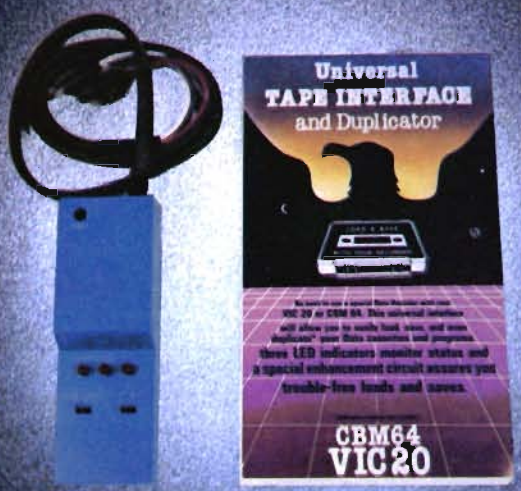

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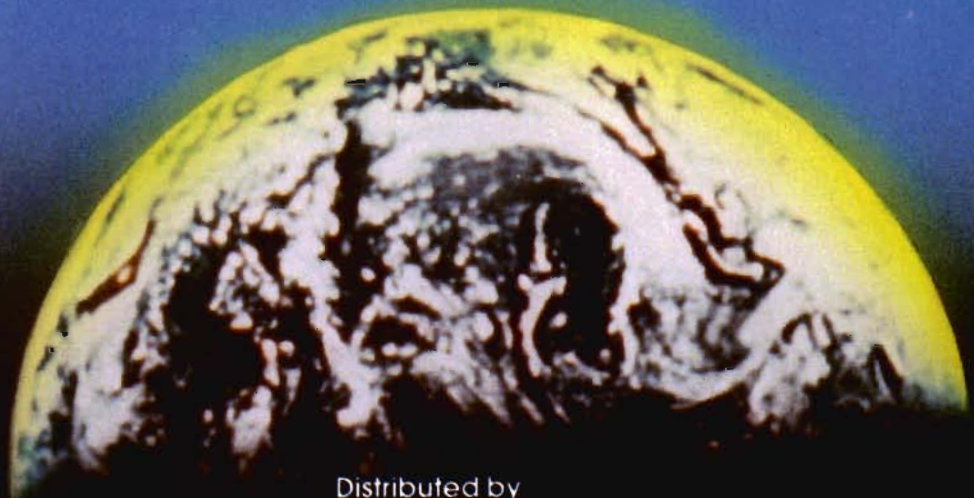

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