VIC-20 C64 PET C64 VIC-20

The COMMODORE Computer Users' Monthly Journal

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COMMANDER

NOVEMBER 1983

INSIDE:

- NEW COMMANDS FOR THE C-64
- VIC/64 LOADER FOR THE PET
- MULTIPLICATION FACTS ON THE VIC-20
- VIC LETTER QUALITY PRINTING ON A BUDGET
- BOXED IN! FAST ACTION "MONEY GRABBING" GAME.
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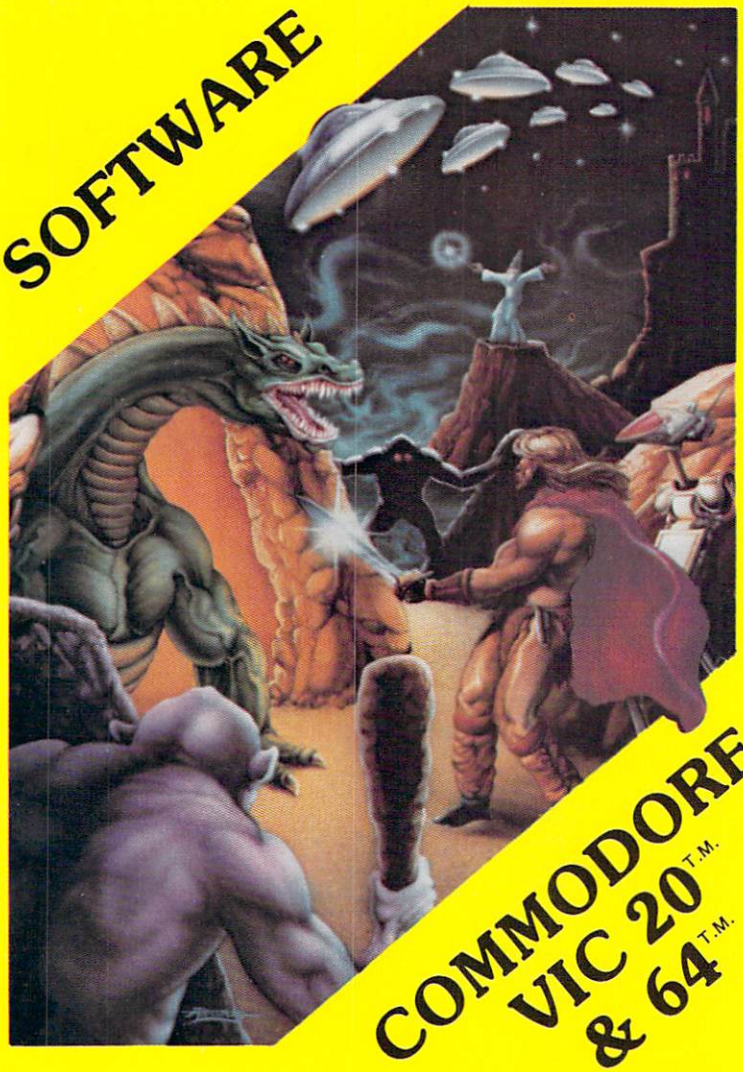

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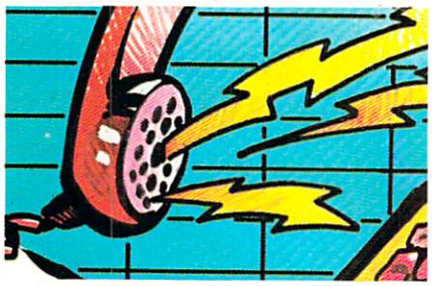

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COVER BY: Randy "Tarkas" Hoar

This seasonal cover depicts the use of Printers and Graphics. As computer technology advances it is inevitable that some "hardware" will obviously become the proverbial "turkey" of history.

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The Shakeout Continues

The microcomputer industry is beginning to emerge from its infancy and assume a respected position in the business world. The glitter of the Apple success story has begun to fade and the reality of life in the fast lane has cut into the income of Bill Cosby and George Plimpton as Texas Instruments and Mattell post whopping losses of 120 million and 160 million dollars respectively in the first half of 1983. Only the Federal government can absorb losses like that on a continuing basis and stay in business. Even solid-as-a-rock Atari has been beset by financial problems and has been forced to send its assembly operations offshore.

Commodore itself has been forced to do some fast cost-cutting and streamlining of its operations but still seems to be the healthiest of the companies competing for the low end of the personal computer market. I discount Tandy Corporation because their share has dropped substantially since they depend on their captive distribution chain for their entire market.

The tremendous success of the IBM PC computer has caused many people to re-think their position in the computer marketplace since the PC is an expensive personal computer ($1,500) which has grabbed more than 20% of the total personal computer market. What will happen if IBM takes a shot at the low end of the market? We may soon find out when the $600 IBM Peanut hits the streets and completes the transition of the personal computer market from infancy to adolescence. It would not be surprising to see IBM end up with 50% of the market.

Of all the competitors of IBM, Commodore is in the best position to threaten the ascendency of IBM to King of Personal Computers. The pricing structure, marketing prowess and quality products which Commodore produces, puts it in a strong position to challenge IBM. Commodore weathered the Christmas 1982 price wars better than the competition and is the odds-on favorite to come out on top again in 1983.

Commodore will assert its dominance of the low end personal computer market this Christmas and should give IBM a stiff run for its money in the mid range market when they introduce their 16 bit Z8000 machine. Any further price wars should only strengthen Commodore's position and shakeout some more 100 million dollar losers.

Letters

Dear Editor:

I have a DMP-200 Printer (Radio Shack), a Commodore 64 computer, CPI-Serial to parallel Interface (Micro Systems Development, Inc.), and a WordPro-64 program (Professional Software, Inc.). What type of Interface (or Program Codes) do I need to "make it all" work?

Very truly yours,

Dennis Jackson

Dear Dennis:

I cannot give you specific answers to your questions, as I do not have all the hardware, software and manuals sitting in front of me.

First, we determine if the printer and interface are compatible. If the plug does not fit, then you have a re-wiring job on your hands (best done by a technician). A call to my local Radio Shack Computer Center has provided the information that your printer is Centronics compatible. As this is the "standard" for parallel interfaces, your configuration should work.

Most printers have switch selectable options as does the CPI interface. You will need to check the set-up portions of both your printer and interface manual to assure the switches for both devices are properly set. Once you think you have the printer and interface properly set up, then run the CPI self-test. The self-test will tell you if you have a valid configuration. If the self-test seems OK, then list a small basic program (containing graphic characters and DATA statements) using the different ASCII and LIST options of the CPI by doing the following:

```
OPEN4,4:CMD4
LIST
PRINT#4,CLOSE4
```

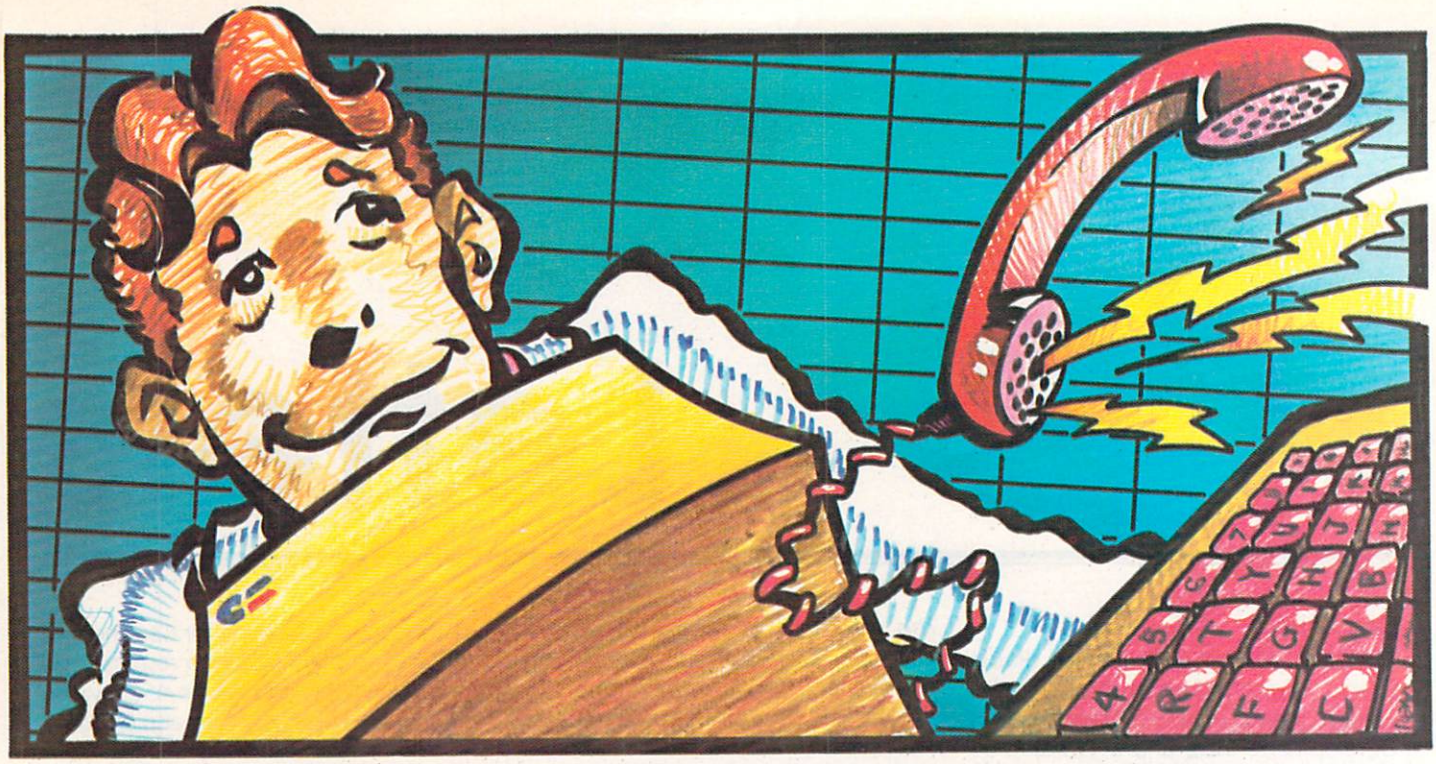
This will give you an idea of how the various options look, and note the ones you like for listing basic programs.

Once you have the hardware controls switches set, then you need to look at the software controls required for the various printer options (I did not say it would be simple). You may need to run a small program before your application to set line lengths, character fonts and whatever. You can print these control codes from BASIC using strings that contain the control code and any necessary data. Here is the first area we may encounter software incompatibility. The CPI may pre-empt some control characters for its own use. Check the CPI manual to see if this occurs. If so, then that code cannot be used for printer control unless you are in the NORMAL CPI mode. As this is the mode you will want to use for word processing, you should still be OK.

You are now ready to try your word processor. Most good word processors will have a command that allows formatting and passing printer control commands. This command will give you direct control over all your printer features, and you will want to become very familiar with it. There may also be special printer control words in your word processor for the Commodore printers. In many cases, these commands will cause something different to happen on your printer. A table made of your printer control codes and of the Commodore control codes (borrow a manual) will show which commands may have a direct correspondence and which will be translated to something else.

Some word processors have a printer option menu at the start of the program. You will still want to select the serial option as your interface is connected to the serial port. If it asks you for Commodore ASCII or normal ASCII, your response will depend on how you set the ASCII switch of your interface. You may also be asked about linefeed option and again your response will depend on how you set up the printer and interface default modes. As everyone tries to make their products as universal as possible, the problem is the multitude of options and duplications at the various levels. If you set your printer and interface to be compatible with BASIC, then your printer will probably operate with the word processor. You should only have to set the printer up once. After that, the interface board switches and software options should be the ones getting all the use.

I hope I have got you started in the right direction. There are many resources if you are still having problems. The local sales/technical staff of your computer stores may be of some help. If there is a computer club in your area, you may find some aid there. The producer of these items may also be of help in resolving your specific problems. Normally, the device's manuals contain very specific technical data as to interface requirements. These can be intimidating to a non-technical person who purchased a system for word processing or business uses. If this is the case, then you may have to impose on a friend or pay someone to do the set-up. If you purchased the items locally at a computer store, then the staff will usually be very helpful. There are advantages to paying a little more at a good computer store. Also, perhaps one of your more technically inclined readers in your area will contact you to see if you still need help after press time. □



TELECOMMANDER

By Donald L. Stoner

One of the questions frequently asked by readers goes something like this, "I'm getting a lot of 'garbage' when I go on-line with my XYZ modem. What causes it?" Unfortunately, there is no stock answer which I can supply. Like most problems, one must look at it logically, sift through the clues, and try to eliminate variables in order to determine the cause of the problem.

First, let's define the problem. Simply stated, "garbage" means that the characters on the screen are not correct. However, when you are on-line there can be two forms of "garbage". The first form is incorrect characters typed. The second case is incorrect characters that the host (the computer you are "talking" to) is sending. In severe cases, everything you see is "garbage".

Let's say you want to send the letter A. First, you obviously press the A key. The terminal program must translate the Commodore code for the letter A to the standard ASCII code for the letter A. It is possible for the terminal program to scramble characters, particularly during a development stage. However, if the program has been working in the past, it isn't very likely that the culprit is software.

The computer sends the code for the letter A in the form of a serial data stream to the modem. This can be the first likely source of distortion or "garbage". If the modem is misadjusted, the tones it sends out over the phone line may be interpreted by the host computer as some other character.

By the same token, if the receiving section of your modem is out of adjustment, it may translate the incoming characters to something other than that which the host sent. Fortunately, there is a relatively easy way to sort out exactly what is going on.

To help you understand and analyze the program, there is one technical aspect of on-line communications you should understand. When you press a key to send a character, what you see on the screen is not the character you sent, even when things are working right. How can this be, you ask?

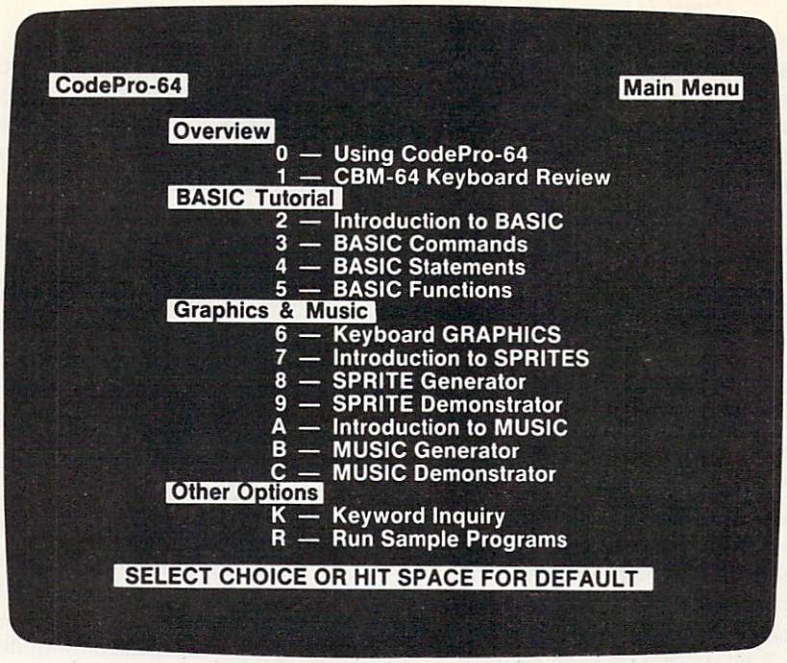
In most cases you are operating in full duplex. Here's what happens. The character you send is received by the host computer modem. It transfers the character it believes you sent to the host computer. The computer does something with the character, of course, but it also sends it back to the modem which retransmits the character to you. Thus when you send a character, it makes the complete round trip to the host and back and then appears on your screen.

This makes a very simple but effective form of error correction. When you send an A, you should see an A on your screen. If you do not, you know that some sort of error has occurred.

If you understand the above explanation, you can see how the various forms of errors occur. It is a common problem for the user to see "garbage" characters that he or she has typed yet, at the same time, to see correct characters that the host originates (such as Please Enter Your Name). Here's how this can happen. Assuming the host equipment is O.K. (and this may not always be a correct assumption) there is usually only one explanation. The sending portion of your modem is the culprit. It is actually sending the wrong characters and the host is simply echoing what it receives.

If some of the characters you send, as well as some of the host-originated characters are garbage, it could either be caused by the receiving section of your modem or it could be the result of an extremely poor telephone line. How do you resolve this conflict?

The answer is by substitution. In this situation, you must have a friend or acquaintance who also has a telecommunication setup. Take your modem to the friend's house and try it on his in



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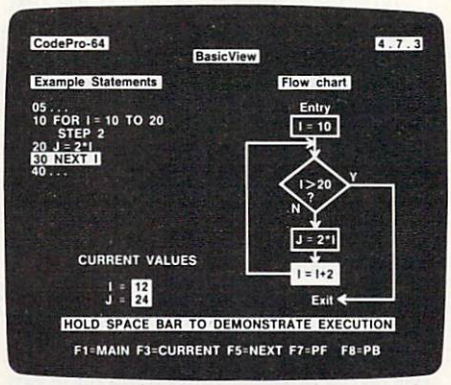

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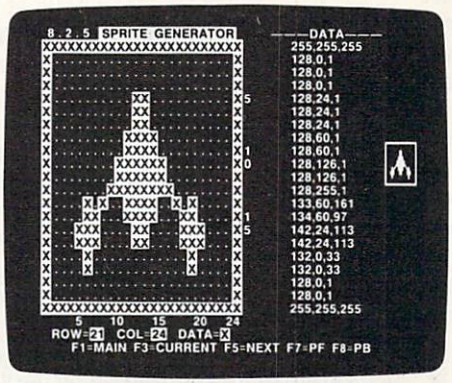

We also help you learn to program with sprites by giving you a **sprite demonstrator** so you can see the effect of changing register values. You can experiment by moving your sprite around in a screen segment, change its color or priority, and see the effects of your changes. You learn by visual examples.

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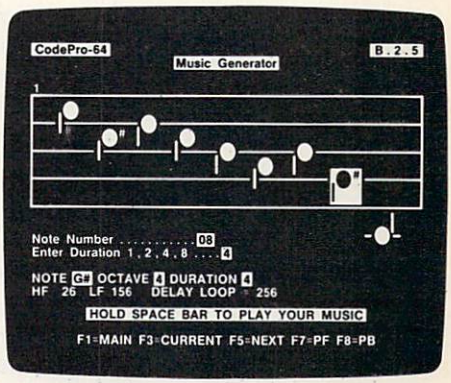

Our music demonstrator **lets you experiment** with various combinations of music programming parameters and hear the results. You can **quickly modify any of the SID register values** to hear the effects of the change. For example, you could easily change waveform and attack/decay values while holding all other SID values constant. By seeing your input and hearing the result you quickly learn how to create new musical sounds and special sound effects.

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transmission. For example, even at 300 baud, it is difficult to use Sprint and MCI lines for data communication.

Obviously, if you still have "garbage", the culprit is the modem. If the friend's modem works with the same equipment, telephone line and software and yours does not, there cannot be any question where the fault lies. At this point, your next problem solving exercise is to figure out how to get the modem repaired. This may prove to be the toughest problem of all!

In most cases, you cannot get a schematic of the modem. It is usually necessary to send the modem back to the manufacturer for repair. The Federal Communications Commission holds the manufacturer responsible for the correct operation of the modem. Thus, most manufacturers are quite sensitive about who is poking around the "innards" of their device.

Auto Print Modem–The Microperipheral Corporation has just introduced a new product that will be of interest to those of you who do not already have a modem. The device, called an Auto Print Microconnection will allow your VIC or C-64 to autodial or autoanswer the telephone. The most unusual feature is a printer port that will allow your computer (via the modem) to interface with any common Centronics compatible printer such as the Oki, Epson, Star, Banana and so on. In the on-line mode, the printer will type out whatever appears on the screen without the need for buffers, etc. Off-line the interface will allow one to "dump" text or listings to the printer.

The program shown in Figure 1 was found in the manual for the Auto Print Microconnection. It permits the VIC-20 or C-64 owner to "dump" text from their computer to a printer, via the Auto Print Microconnection.

The program is very basic but it does illustrate how the data is routed to the printer and how the handshaking feature works. There are also a couple of clever routines that may be of interest to Commodore owners, even if they do not own an Auto Print modem. These routines can certainly be adapted to other programs.

By the way, handshaking may be a new and unfamiliar term. It is a relatively common term in connection with printers. There are times when a printer has received all the characters it can handle and does not want any more. If the computer continues to send characters, they will cause the printer buffer to overflow. Generally, this condition is indicated by a few missing characters at the beginning of a print line. One obvious case is when the print head is moving from right to left (the carriage return, as it is called). During this period, the printer is said to be "busy". The printer will not accept characters at this time and they will be lost from the print line.

The printer must signal the busy condition to the computer in order to tell it to stop sending characters. This is done over a wire from the printer by means of handshaking. When the printer is no longer busy, the handshaking or busy wire signals the computer to resume sending characters to it.

The program shown in Figure 1 works in the following manner. Line 5 opens and initializes the port to the modem. The (40) sets the baud rate to 1200 and the (96) enables a 7 bit word with even parity. If you care to take the time, you can see how these numbers were arrived at by looking up the section on RS-232 in the Commodore Programmers' Manual. The (14) switches the computer to upper/lower case mode. The dimension statement permits 50 lines of text to be entered. This number may have to be decreased. If you are entering a lot of long lines you could run out of memory. By the same token, the dimension statement can be increased if you have more memory than is available in an unexpanded VIC. A GOSUB, at the end of line 5 jumps to the translation table initialization at line 1000. The table converts the Commodore character set to standard ASCII.

Lines 100-140 generate a simple menu which permits selection of generation (prepare), revision (preview) and printout (print). Text entry takes place between lines 200 and 230. The strange symbol in line 220 is the up arrow key (not the cursor control) on the Commodore.

The text which you have entered can be reviewed and/or corrected in lines 300-390. Finally, lines 400 to 460 do the actual printout.

Variable N, in line 400, selects the string which represents each line of text. Thus the first for-next loop runs through the text lines. The second for-next loop selects each successive character of the string. Line 410 designates this character as T$. Lines 430 and 440 are very important. This is the handshaking provision that was mentioned earlier. The two lines check to see if the printer is ready to accept a character. Here's how it works. The Auto Print Microconnection sets the most significant bit if the printer is busy. Line 430 assigns this bit to variable H. If it is not set (the printer is ready for a character), the value will be zero and the program passes through the line 430-440 loop. If the printer is busy, the program will loop around these two lines.

If the printer is not busy, the program proceeds to line 445 and sends the character out to the modem for printing.

The for-next loops are completed in line 450 where each character and each line is printed in turn. For example, the NEXT P takes the program back to line 410 where the next character in the string is selected for printing.

To use the program, select #1 at the menu. Enter the text when you see the cursor. Note particularly that the printout portion of the program does not do any formatting. Thus, the lines will be printed just the way you enter them. However, with a little use you can become quite proficient with this program. For example, let's say you wish to printout a letter. By entering text that is approximately two screen lines before you press the RETURN key, your letter will be approximately 44 characters per printed line. You can set the left margin by the way you position the paper in the printer.

Once you have completed entering the text, press the up arrow and the RETURN keys. This will take you back to the menu.

Selection #2 will permit you to review the lines of text. If the line is O.K. simply press the RETURN key. If there is a typo in the line, or if you wish to revise it for any reason, press any other key and you will be permitted to enter a new replacement line.

When you are satisfied with the text, and are ready to print it, make sure the printer is connected and select #3. The lines of text will immediately start appearing on the printer.

You can adapt the program to drive a serial printer connected directly to the user port. In other words, you do not need to have the Auto Print Microconnection to use the program. If the printer has a handshaking line, it should be wired to pin L of the user port connector. If the serial printer has no handshaking, it will be necessary to reduce the baud rate (and therefore the printing speed) below that which causes the printer to drop characters. This is accomplished by reducing the CHR$(40) in line 5 to a 38 (for 300 baud) or lower.

If you would like additional information on the Auto Print Microconnection, contact Ms. Noreen Scott, Marketing Director, The Microperipheral Corp., 2565 152nd Ave. N.E., Redmond, Wa. 98052□

Figure 1

NOTE that lines 5 and 1030 are continuous. They have been printed here to produce the listing in columnar form.

```
5 OPEN2,2,3,CHR$(40)+CHR$(96)
  :PRINTCHR$(14):DIMB$(50):GOSUB1000
10 C$=CHR$(147):PRINTC$+" MINI-WORD"
100 PRINTSPC(7)"1- PREPARE"
110 PRINTSPC(7)"2- PREVIEW"
120 PRINTSPC(7)"3- PRINT"
130 INPUT"SELECTION";X
140 ONXGOTO200,300,400
200 PRINTC$:FORM=1TO50
210 INPUTB$(M)
220 IFB$(M)="^"THENM=M-1:GOTO10
225 B$(M)=B$(M)+CHR$(13)
230 NEXTM
300 FORN=1TOM
310 PRINTC$+B$(N)
320 PRINT:PRINT"RETURN FOR NEXT LINE"
330 GETA$:IFA$=""THEN330
340 IFA$=CHR$(13)THEN380
350 INPUT"NEW LINE";B$(N)
380 NEXTN
390 GOTO10
400 FORN=1TOM:FORP=1TOLEN(B$(N))
410 T$=MID$(B$(N),P,1)
430 H=PEEK(37136)AND128
440 IFH<>0THEN430
445 PRINT#2,CHR$(0%(ASC(T$)));
450 NEXTP:NEXTN
460 GOTO10
1000 DIM0%(255)
1020 FORZ=32TO64:0%(Z)=Z:NEXT:0%(13)=13:0%(20)=8
1030 FORZ=65TO90:Y=Z+32:0%(Z)=Y:NEXT
     :FORZ=91TO95:0%(Z)=Z:NEXT
1040 FORZ=193TO218:Y=Z-128:0%(Z)=Y:NEXT:RETURN
```

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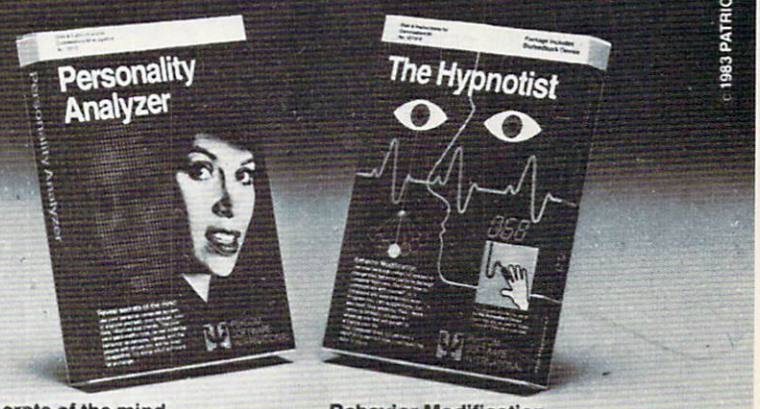

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Circle No. 35

That Troublesome Times Table

by Dennis G. Smith

ELECTRO FLASH 9

I originally wrote this program for a few kids in my 7th grade math class who were having trouble with the multiplication and division algorithms. Most kids know the multiplication facts well by the 7th grade, but there are always some who do not. I wanted to create a program that could maintain their interest while it was drilled into them.

This has been my most popular program. Even kids who have mastered the multiplication facts choose this program to race the VIC clock or become the daily champ. Of course there are always kids who play it to find out how many different tunes it can play or to see the extent of its name-calling. I have given this program to other teachers and even parents who have heard about it from the kids. It is the best method I know to inject the multiplication facts into willing or stubborn brains.

I call this program ELECTRO FLASH 9, and it runs on the unexpanded VIC. ELECTRO FLASH 9 teaches and reinforces the

```
1 REM DENNIS G. SMITH
5 V=36878:S3=36876:R=60:CH$="HERB SOWBEL
LY"
6 CO=30720:SB=36879
9 POKESB,175:S2=36875
10 T$(1)="2286228522512253221320969990"
11 T$(2)="209220912092209120922091209320
75209121569990"
12 T$(3)="219321922191219121712191221321
92219121522151215121212151219320939990"
13 T$(4)="232122812212221222122151209122
112252219122139990"
14 T$(5)="209620322012209222122252228822
189990"
15 T$(6)="203221522214221422142214221622
9222169990"
16 T$(7)="1878201420942156201221589990"
17 T$(8)="209220122094209220122094209220
12209321512092201220939990"
19 PRINT"▼▯▯▯▯                          ■";
20 PRINT"▯ MULTIPLICATION FACTS ■";
25 PRINT"▯                      ■";
30 PRINT"▯   ELECTRONIC FLASH   ■";
31 PRINT"▯        CARD          ■";
35 PRINT"▯                      ■"
36 PRINT"▯▯      ▯1X1 TO 9X9■   "
40 PRINT"▯▯▯▯▯▯▯▯▯     PRESS ANY KEY"
50 GET M$:IF M$=""THEN 50
51 POKE36879,28: PRINT"▼▯▯  TYPE IN YOUR
 NAME,"
52 PRINT" AND PRESS 'RETURN'.▯"
53 INPUTNA$
```

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learning of multiplication facts (times table) from 1 × 1 to 9 × 9. Randomly chosen problems are flashed to the screen one at a time. Answers are typed in from the top row of numerical keys only (no "return" needed), so the faster a problem is answered the faster a new problem appears. The user is timed for 25 problems. A wrong response interrupts the game to call the user a name (chosen randomly from 9) and then yields the correct answer. The program automatically records the person with the fastest time as the champ. A familiar tune is played (chosen randomly from 8) at the completion of 25 problems.

You can grade players according to the following table:

Seconds	Grade
34 or less	champion material
35 to 44	excellent
45 to 49	good
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61 or more	more practice needed

MULT FACTS QUIZ

I wrote the complementary, MULT FACTS QUIZ, for myself. I use it to find out which students need more work with multiplication facts. This program is a teacher's classroom tool for testing and recording retention of the multiplication facts. Problems are flashed to the screen and answers are entered as in ELECTRO FLASH 9, but the computer's responses to user input are replaced by data display for the teacher. When a student completes a set of 25 randomly generated problems, the program stores the student's name, time (seconds), and number correct in a list which can be viewed by the teacher at any time during the run. About 58 names can be stored on each run of the program. The program allows the quiz results to be displayed by a printer or on the screen. With this program a teacher can give a test, correct it, and record student performance simply by allowing each student a turn at the computer. MULT FACTS QUIZ also runs on the unexpanded VIC. □

```
60 POKE36879,27
61 PRINT"■■■      R DIRECTIONS ■"
70 PRINT"■ TYPE IN THE ANSWER TO";
75 PRINT"EACH PROBLEM"
80 PRINT"■ THE COMPUTER WILL"
85 PRINT"TIME HOW LONG IT TAKES";
90 PRINT"YOU TO DO 25 PROBLEMS"
95 PRINT"■■■ THE TIMER STARTS WHEN";
100 PRINT"YOU PRESS 'RETURN'"
110 PRINT"■■■■      GOOD LUCK"
120 GETM$:IFM$=""THEN120
130 TI$="000000"
140 PRINT"■"
150 W=0:P=0
159 POKES8,250
230 A=INT(1+9*RND(1))
240 B=INT(1+9*RND(1))
250 AC=A*B:P=P+1
360 IF P=26 THEN 719
383 POKEV,15
384 FORL=240TO250STEP.7:POKES3,L:NEXTL:P
OKEV,0:POKES3,0
387 PRINT"■"
388 PRINT TAB(5)"■■■■■■■■";A;"X";B;"= ?"

389 IF AC<10 THEN 440
390 GET T$:IFT$=""THEN390
400 IF VAL(T$)<>INT(AC/10) THEN 461
410 GET N$:IF N$="" THEN 410
420 IF(AC-VAL(N$))/(10*VAL(T$))=1 THEN 2
30
421 GOTO 461
440 GET N$:IF N$="" THEN 440
450 IF VAL(N$)=AC THEN 230
461 POKEV,15:POKES3,160
462 FOR L=1 TO 430:NEXT L
463 POKEV,0:POKES3,0
464 POKE36879,26
470 PRINT"■■■   YOU MISSED IT"
480 X=INT(1+9*RND(1))
490 ON X GOTO 500,510,520,530,550,560,57
0,580,581
500 PRINT"■    BEAN BRAIN":GOTO 590
510 PRINT"■    DIP STICK":GOTO 590
520 PRINT"■    HORSE BREATH":GOTO 590
530 PRINT"■    TURKEY LIPS":GOTO 590
550 PRINT"■       BOZO":GOTO 590
560 PRINT"■       BIMBO":GOTO 590
570 PRINT"■     BULWINKLE":GOTO590
580 PRINT"■     FOOLISH FROG":GOTO590
581 PRINT"■    TWINKLE TOES":GOTO590
590 PRINT"■■■■■     ";A;"X";B;"=";AC
600 PRINT"■■■■TYPE 'Y' FOR 25 MORE."
605 PRINT"■TYPE 'C' TO CHANGE":PRINT"PLA
YERS."
```

Continued on page 16

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Circle No. 131

Continued from page 14

```
610 PRINT"■TYPE 'Q' TO END THE":PRINT"PR
OGTRAM."
620 GET M$:IF M$="" THEN 620
630 IF M$="Y" THEN 60
635 IFM$="C"THEN51
640 IF M$="Q" THEN810
641 GOTO620
700 M=INT(RND(1)*8+1):N=0:T=40
702 N2=VAL(MID$(T$(M),4*N+1,3))
703 NB=VAL(MID$(T$(M),4*N+4,1))
704 IFN2=999THEN780
705 POKEV,15:POKES2,N2
706 FORI=1TONB*T:NEXTI
708 POKES2,0
709 N=N+1:GOTO702
719 D=TI/60:IFR>DTHEN785
720 POKES8,185:PRINT"■■■ YOU HAVE ANSWER
ED 25"
721 PRINT"PROBLEMS CORRECTLY AND";
722 PRINT"IT TOOK YOU EXACTLY":PRINT
732 PRINTD;" SECONDS"
750 PRINT "■■TODAY'S RECORD IS..."
760 PRINT R;" SECONDS"
765 PRINT"■ TODAY'S CHAMP IS..."
766 PRINT CH$:GOTO700
780 PRINT"■■■■■■■■■PRESS 'RETURN'."
781 GETM$:IFM$=""THEN781
782 PRINT"■":GOTO600
785 R=D:CH$=NA$
786 PRINT"■■    CONGRATULATIONS"
787 PRINT"■■■ YOU HAVE SET A NEW"
788 PRINT"RECORD..."
789 PRINT"■■";R;" SECONDS"
791 PRINT"■■■■■■■■■■■■■PRESS 'RETURN'.":G
OSUB900
795 GETM$:IFM$=""THEN795
799 PRINT"■":GOTO600
800 REM END PROGRAM
810 POKE36879,27:PRINT"■"
820 PRINT"■■■■    ■THE END■"
830 PRINT"■■■■■■■ELECTRO FLASH 9"
840 PRINT"      BY"
845 PRINT"  D.G.SMITH"
850 END
900 POKEV,15
910 FOR L=1TO10
920 FOR M=180TO 235 STEP 2
930 POKES3,M
940 FORN=1 TO 10:NEXTN
950 NEXT M:POKES3,0
960 FORM=1TO100:NEXTM
970 NEXT L:POKEV,0
980 RETURN
READY.
```

Continued on page 18

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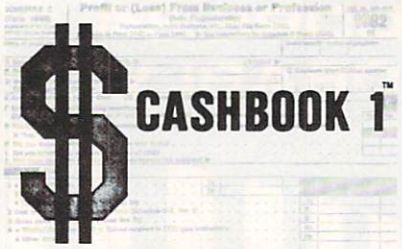

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Circle No. 143

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Copycalc is an affordable electronic spread-sheet which turns your video screen into a window on a matrix of numbers. Cursor around the matrix, enter numbers; the totals reflect the changes. You can save the matrix to disk or tape, or print it or your printer. For $20 ($15 with another program), this program might justify the cost of your computer. Requires 6k RAM; smaller version available for a standard VIC.

Word Processor Plus was not designed to be an expensive toy; it was designed solely to facilitate correspondence, for a wide range of personal and business uses, quickly and easily, with a minimum of training and frustration on the part of its user, and at the least possible cost, both in hardware and software. The most thoroughly tested, useable word processor available at anywhere near the price, $25; 10k RAM, printer req'd.; RS-232C version available for VIC and 64.

Also available: **Baseball Manager,** a sports-documentation program; and **Inventory,** a perpetual inventory control program for a small retail business (various reports, multiple vendors); $30 each; 10k RAM req'd., printer suggested.

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 16

```
4 DIMS$(60),RI(60),DR(60)
5 V=36878:S3=36876:S=0
6 CO=30720:SB=36879
19 POKESB,175:PRINT"▼▫▫▫R
      ■";
20 PRINT"R MULTIPLICATION FACTS ■";
25 PRINT"R                      ■";
30 PRINT"R   ELECTRONIC FLASH   ■";
31 PRINT"R        CARD          ■";
35 PRINT"R        QUIZ          ■"
36 PRINT"▫▫     R1X1 TO 9X9■   "
40 PRINT"▫▫▫ STUDENTS, PRESS 'S'."
41 PRINT"▫ TEACHER, PRESS 'T'."
44 GETM$:IFM$=""THEN44
45 IFM$="T"THENPRINT"▼":GOTO630
51 POKE36879,28:PRINT"▼▫▫  TYPE IN LAST
NAME,"
52 PRINT" AND PRESS 'RETURN'.▫"
53 INPUTS$(S)
54 IFS$(S)=""THEN53
55 IFFRE(0)<20THENPRINT"▼▫OUT OF MEMORY.
":PRINT"▫▫INFORM TEACHER.":GOTO630
60 POKE36879,27
61 PRINT"▼▫▫     R DIRECTIONS ■"
70 PRINT"▫ TYPE IN THE ANSWER TO";
75 PRINT"EACH PROBLEM"
80 PRINT"▫ THE COMPUTER WILL"
85 PRINT"TIME HOW LONG IT TAKES";
90 PRINT"YOU TO DO 25 PROBLEMS"
95 PRINT"▫▫▫ THE TIMER STARTS WHEN";
100 PRINT"YOU PRESS 'RETURN'"
110 PRINT"▫▫▫▫     GOOD LUCK"
120 GETM$:IFM$=""THEN120
130 TI$="000000"
140 PRINT"▼"
150 RI=0:P=0
159 POKESB,250
230 A=INT(1+9*RND(1))
240 B=INT(1+9*RND(1))
250 AC=A*B:P=P+1
360 IF P=26THEN719
383 POKEV,15
384 FORL=240TO250STEP.7:POKES3,L:NEXTL:P
OKEV,0:POKES3,0
387 PRINT"▼"
388 PRINTTAB(5)"▫▫▫▫▫▫▫▫";A;"X";B;"= ?"
389 IFAC<10THEN440
390 GETT$:IFT$=""THEN390
400 IFVAL(T$)<>INT(AC/10)THEN461
410 GETN$:IFN$=""THEN410
420 IF(AC-VAL(N$))/(10*VAL(T$))=1THENRI=
RI+1:GOTO230
421 GOTO461
440 GETN$:IFN$=""THEN440
450 IFVAL(N$)=ACTHENRI=RI+1:GOTO230
```

```
461 GOTO230
600 PRINT"■■STUDENT    SEC.   RIGHT ■"
610 FORI=0TO60
611 IFS$(I)=""THEN630
612 FORM=1TO600:NEXTM
615 PRINTS$(I);TAB(10)DR(I);TAB(17)RI(I)

620 NEXTI
630 PRINT"■■ PRESS 'S'TO DISPLAY":PRINT"
RESULTS ON THE SCREEN."
632 PRINT"■ PRESS 'P' TO DISPLAY":PRINT"
RESULTS WITH PRINTER."
633 PRINT"■ PRESS 'R' TO RESUME":PRINT"Q
UIZ."
635 PRINT"■ PRESS 'Q' TO QUIT."
640 GETM$:IFM$=""THEN640
641 IFM$="S"THEN600
642 IFM$="P"THEN650
644 IFM$="R"THEN19
645 IFM$="Q"THEN810
648 GOTO640
650 OPEN1,4
651 PRINT#1,"          MULTIPLICATION FA
CTS"
652 PRINT#1,"                    TEST":PRI
NT#1
658 PRINT#1,"STUDENT";CHR$(16)"17SECONDS
";CHR$(16)"34RIGHT/25":PRINT#1
660 FORI=0TO60
661 IFS$(I)=""THEN675
665 PRINT#1,S$(I);CHR$(16)"19";DR(I);CHR
$(16)"37";RI(I)
670 NEXTI
675 CLOSE1
680 PRINT"■":GOTO630
719 DR(S)=INT(10*(TI/60)+.5)/10:RI(S)=RI

720 POKESB,185:PRINT"■■■ YOU HAVE ANSWER
ED";RI(S)
721 PRINT"PROBLEMS CORRECTLY AND";
722 PRINT"IT TOOK YOU ABOUT":PRINT
732 PRINTDR(S);"SECONDS"
740 PRINT"■■■■■  YOU ARE FINISHED":PRINT
"WITH THIS QUIZ."
742 PRINT"■■■■    PRESS ANY KEY."
745 GETM$:IFM$=""THEN745
746 S=S+1
747 GOTO19
810 POKE36879,27:PRINT"■"
830 PRINT"■■■■■■■MULT FACTS QUIZ"
845 PRINT"  D.G.SMITH":END
READY.
```


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Circle No. 116

16K Expansion

Multiple Mailings Made Easy On A Vic-20

By Noel Biles

This is a MAILING AID Program. It will not help you compose letters to your Aunt Sally or business associates; however, it will speed up and make easier, the mailing of form letters, advertising circulars, club newsletters or even just the multiple mailing of a notice of the Church's upcoming Bingo Night. I imagine there are a lot of computer enthusiasts out there who are volunteering their own time and computer's use for the good of their organization or informal group to which they may belong. In my own case, necessity being the mother of invention, and being naturally lazy and having been raised by a Scotch stepmother who taught me the value of a penny, I wrote this program to aid in the mailing of my monthly 'Ham Club' newsletter.

Besides your VIC-20, you will require a 16K memory expansion unit, a cassette recorder, and, of course, a printer to use and enjoy this program.

Have you ever wondered how that advertising flyer you just received, had your name and address so nicely printed on a self stick label or even a computer print-out on an envelope? You should know that selling Mailing Lists is big business. You can buy lists of names from almost anyone who does business by mail (except the IRS, they don't need the extra income).

The next time you receive an unsolicited bit of mail, check the format including any mistakes against the mailing labels on your subscription magazines, Electric Light Co. bills, credit card billings, DMV mailings, etc., and you can find out where they picked up your name. If you live in the USA it is safe to assume your name is on hundreds of active lists. Now you can assemble your own lists free, just by starting with a small list, and adding names as you go along.

HOW YOU CAN USE THIS PROGRAM:

One of the major uses of this program is the direct printing of mailing labels if desired, or the printing of the name and address on the reverse side of newsletters etc. The best feature is the permanence of the list itself, which if filed properly may be used indefinitely, as often as required and is as easy as loading a five minute tape. Changes, additions, and or deletions may be made to any file to keep the mailing list updated. Additionally there is no limit to the number of names that may be saved, because if any given file becomes full, a new file may be started to continue the listing. Each 10 minute cassette tape will hold approximately 100 name and address listings per side, which of course, should be backed up on the reverse side.

It is very simple to use and all instructions are contained within the program itself. The only chore after entering this mail program is the entering of the personnel list. If a mistake is made during this entering process, or it's noticed after completion of the list, it is a simple matter to make corrections as the Menu offers such choices as ENTER the names on the list, FIND a name on the list and print out all the pertinent facts, SAVE a file on tape, LOAD a file from tape, PRINT labels for names of the same specialty code, PRINT mailing labels, PRINT a complete list of names in the file, MAKE corrections to the list, and PRINT mailing address on the back of the page.

This last feature saves the expense of buying labels if desired, and it will allow the printing of mailing addresses directly on the reverse side of a club newsletter simply by leaving all the newsletters printed in a continuous string of paper and when finished printing the required number of copies, tear off the total printing and turning the paper over, rethread it into your printer, positioning it to the correct place for the first name , then selecting number 12 from the menu, print the mailing address on the reverse side of each copy of the letter. Lines 1465 & 1470 take care of stepping the printer down to the correct position on the following page. This position is based on using a standard 11 inch page on a VIC 1525 printer or similar type that prints 6 lines/in.

PROGRAM DETAILS

Lines 10 through 100 are pretty well self explanatory: your MENU of choices. Lines 140 through 240 are for entering the first group of names and lines 360 through 390 are for adding names to the list, while lines 1200 through 1340 are for making corrections or deletions to any

entry on the list. The 'Specialty Code' is for inputting a personal identifier, so you may print groups of labels for selective mailings such as Doctor, Lawyer, Indian Chief, etc. This saves the manual sorting of these names.

Lines 600 through 680 are for saving the FILE of names onto a cassette tape. Be very careful when entering line 650, copy it exactly because any mistake made here can cause the program to abort and return to Basic. If this happens and you reenter the program with a RUN, the FILE of names you have just laboriously entered with dancing fingers will disappear. They will be cleared by the automatic clearing of the variables, which is one of the great features of the VIC-20. Returning to the program with GOTO30 will avoid this automatic clearing feature, but won't help if there is something wrong in line 650 that causes a Bad Subscript Error and you have to return to Basic and do extensive modifications to this line. When first testing the filing feature of this program, enter only three or four names in answer to the questions posed by the #1 selection on the Menu, then type the #6 selection on the Menu and check for correct action on the cassette recorder, being sure to follow the screen instructions in order of presentation.

Lines 700 through 830 take care of loading the FILE tape into the computer in response to Menu selection #7. Again be very careful to enter line 750 correctly. Line 760 will display the names as they are received in the computer memory, scrolling them upward as new ones are entered.

During this loading process, you will note the computer will accept 2 and sometimes 3 listings at a time. This happens because there are 191 bytes reserved as a 'Data File' input buffer and the VIC will input tape data strings up to this limit. Some of your entries on the list may have short names and addresses and therefore may crowd 3 entries of up to 63 characters each before the buffer overflows and dumps the data to memory.

Lines 900 through 995 are for printing mailing labels for selected 'Specialty' groups, while lines 1000 through 1080 are for printing labels for numerically selected groups throughout the file, as few as 1 and as many as the complete file presently in the computer.

Lines 1100 through 1180 call for a printer listing of names, again selected by numbers from 1 to the top of the file presently in memory.

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Circle No. 95

Lines 1200 through 1340 allow the correcting or changing of listings which when corrected, should be followed up with a 'Save to tape' (menu selection #6) to update the FILE presently on the tape.

Lines 1400 through 1490 are for addressing the reverse side of a string of printed pages which would then be separated, folded, stapled, stamped and mailed.

The above line function descriptions sound complicated when read for the first time, but are invaluable if you have to modify any part of the program.

Self-stick labels may be obtained from any Radio Shack store that sells computer supplies. They are 15/16x3&1/2 inches in size mounted on a continuous fan fold, sprocket feed backing. Ask for P/N 206-1404. □

```
1 REM  *PRINT"□" IS A CLEAR SCREEN COMMAND*
3 PRINT"□":PRINT" MAILING AID PROGRAM
5 PRINT"    BY NOEL G BILES
7 PRINT"    SAN ANDREAS, CA.
10 DIMA(101),N$(101),M$(101),A$(101),C$(101)
15 DIMD$(101),Z$(101),P$(101),S$(101)
20 PRINT:PRINT"    ** MAIL FILE **"
30 PRINT:PRINT"  CHOOSE A SELECTION ":PRINT
35 PRINT"1 ENTER NAMES ON LIST"
40 PRINT"2 FIND A NAME ON LIST"
45 PRINT"3 ADD A NAME TO LIST"
50 PRINT"4 NR OF NAMES ON LIST"
55 PRINT"5 LIST NAMES ONE CITY"
60 PRINT"6 SAVE A FILE ON TAPE"
65 PRINT"7 LOAD FILE FROM TAPE"
70 PRINT"8 LIST SAME SPECIALTY"
75 PRINT"9 PRINT MAIL LABELS"
80 PRINT"10 PRINT PAPER LIST"
85 PRINT"11 MAKE CORRECTIONS"
90 PRINT"12 PRINT MAIL ADDRESS"
95 PRINT"    ON BACK OF PAGE"
100 INPUTX:ONXGOTO140,250,360,400,500,600,700,900,1000,1100,1200,1400
140 PRINT"□":PRINT:PRINT"TYPE++AFTER LAST ENTRY"
150 FOR A=1TO101
160 PRINT"#";A ;
170 INPUT"LAST NAME";N$(A)
180 IF N$(A)="++"THEN PRINT"□":GOTO30
190 INPUT"FIRST NAME&INIT.";M$(A)
200 INPUT"STREET ADDRESS";A$(A)
210 INPUT"CITY,STATE";C$(A),D$(A)
220 INPUT"ZIP CODE";Z$(A)
230 INPUT"PHONE #";P$(A)
235 INPUT"SPECIALTY CODE";S$(A)
240 NEXT A
250 PRINT"□":PRINT:PRINT " NAME WANTED"
260 INPUT" LAST NAME";N$
270 INPUT" FIRST NAME &INIT.";M$
280 FOR A=1TO101
290 IF(N$=N$(A))AND(LEFT$(M$,4)=LEFT$(M$(A),4)) THEN320
300 NEXT A
310 PRINT"□":PRINT:PRINT"  NOT FOUND ON LIST":GOTO 30
320 PRINT"□":PRINT"#"A
330 PRINTM$(A);" ";N$(A):PRINTA$(A):PRINTC$(A);" ";D$(A);" ";Z$(A)
335 PRINTP$(A);" ";S$(A)
340 PRINT:PRINT:INPUT"HIT <RETURN> TO LIST";GG:PRINT"□":GOTO30
360 PRINT"□":INPUT"HOW MANY NOW ON FILE";L
370 PRINT"TYPE++AFTER LAST ENTRY"
380 FOR A=L+1TO101
390 GOTO160
```

Continued on page 24

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Circle No. 144

16K Expansion

Continued from page 22

```
400 PRINT:A=0
410 FOR K=1TO101
420 IFN$(K)="++"THEN460
430 A=A+1
440 NEXTK
450 IFA=101THENA=0
460 PRINT"□":PRINT:PRINT" THERE ARE";A;"NAMES ON  THE LIST":PRINT:GOTO30
500 PRINT"□":PRINT:PRINT"  TURN ON PRINTER":INPUT" NAME OF CITY";C$
510 FOR A=1TO101
520 IF C$=C$(A)THEN550
530 NEXT A
540 PRINT:PRINT"NO MORE FOUND ON LIST":INPUT"HIT <RETURN> TO LIST";GG
545 PRINT"□":GOTO30
550 PRINT"#";A;" ";M$(A);" ";N$(A):PRINTA$(A):PRINTC$(A);" ";D$(A);" ";Z$(A)
560 OPEN2,4
570 PRINT#2,M$(A);" ";N$(A);" ";A$(A);" ";C$(A);" ";D$(A);" ";Z$(A);
575 PRINT#2," ";P$(A);" ";S$(A)
580 PRINT#2:CLOSE2:GOTO530
600 PRINT"□":PRINT:PRINT"   PREPARE CASSETTE     PUSH PLAY & RECORD":PRINT
610 PRINT:INPUT" NR OF NAMES ON LIST";N
620 PRINT:PRINT"  SAVING MAIL FILE #"
630 OPEN1,1,1:FOR A=1TON:PRINTA;
640 E$=CHR$(13)
650 PRINT#1,A;E$;M$(A);E$;N$(A);E$;A$(A);E$;C$(A);E$;D$(A);E$;Z$(A)
655 PRINT#1,P$(A);E$;S$(A)
660 NEXTA
670 PRINT#1:CLOSE1
680 PRINT"□":PRINT:PRINT"   MAIL FILE SAVED":PRINT:GOTO30
700 PRINT"□":PRINT:PRINT"  PREPARE CASSETTE,     PUSH PLAY BUTTON"
710 PRINT:INPUT" NR OF NAMES ON LIST";N
720 PRINT:PRINT"  MAIL FILE LOADING":PRINT:
730 OPEN1,1,0
740 FOR A=1TON
750 INPUT#1,A,M$(A),N$(A),A$(A),C$(A),D$(A),Z$(A),P$(A),S$(A)
760 PRINT"#"A;" ";M$(A);" ";N$(A);" ";A$(A);" ";C$(A);" ";D$(A);" ";Z$(A)
770 PRINTP$(A);" ";S$(A):PRINT
780 NEXT A
790 CLOSE1
800 PRINT"□":PRINT:PRINT"   MAIL FILE LOADED":PRINT
810 INPUT"HIT <RETURN> TO LIST";GG:PRINT"□":PRINT:GOTO30
900 PRINT"□":PRINT:PRINT"  PREPARE PRINTER TO     PRINT LABELS AND
905 PRINT"    TURN ON PRINTER
910 PRINT:INPUT"   ENTER DESIRED         SPECIALTY CODE   ";S$
915 FOR A=1TO101
920 IF S$=S$(A)THEN945
930 NEXT A
940 PRINT:PRINT"NO MORE FOUND ON LIST":INPUT"HIT <RETURN> TO LIST";GG
942 PRINT"□":PRINT:GOTO30
945 PRINTM$(A);" ";N$(A):PRINTA$(A):PRINTC$(A);" ";D$(A);" ";Z$(A):PRINT
950 OPEN2,4
960 PRINT#2,M$(A);" ";N$(A)
965 PRINT#2,A$(A)
970 PRINT#2,C$(A);" ";D$(A);" ";Z$(A)
975 PRINT#2,"
980 PRINT#2,"
995 PRINT#2,:CLOSE2:GOTO930
1000 PRINT"□":PRINT:PRINT"  PREPARE PRINTER TO    PRINT LABELS AND
1005 PRINT"  TURN ON PRINTER
1010 PRINT:PRINT"  SEPARATE NUMBERS      WITH A COMMA"
1015 INPUT"  START NR., END NR.";N,M
1020 OPEN2,4
```

Continued on page 26

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BP-4	Programming in BASIC	VIC-20

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Circle No. 70

Continued from page 24

16K Expansion

```
1030 FOR A=NTOM
1040 PRINT#2,M$(A);" ";N$(A)
1045 PRINT#2,A$(A)
1050 PRINT#2,C$(A);" ";D$(A);" ";Z$(A)
1055 PRINT#2,"
1060 PRINT#2,"
1065 PRINT#2,"
1070 NEXTA
1080 PRINT#2:CLOSE2:PRINT"□":PRINT:PRINT:GOTO30
1100 PRINT"□":PRINT:PRINT"   TURN ON PRINTER":PRINT
1110 PRINT"   SEPARATE NUMBERS       WITH A COMMA"
1115 INPUT"  START NR., END NR.";N,M
1120 OPEN2,4
1130 FORA=NTOM
1140 PRINT#2,M$(A);" ";N$(A);" ";A$(A);" ";C$(A);" ";D$(A);
1150 PRINT#2," ";Z$(A);" ";P$(A);" ";S$(A)
1160 PRINT#2,"
1170 NEXT A
1180 PRINT#2:CLOSE2:PRINT"□":PRINT:PRINT:GOTO30
1200 PRINT"□":PRINT:PRINT" ENTRY TO BE CHANGED"
1210 INPUT" LAST NAME";N$
1220 INPUT" FIRST NAME &INIT.";M$
1230 FOR A=1TO101
1240 IF(N$=N$(A))AND(LEFT$(M$,4)=LEFT$(M$(A),4)) THEN1270
1250 NEXT A
1260 PRINT"□":PRINT:PRINT"  NOT FOUND ON LIST":PRINT:GOTO 30
1270 INPUT"NEW LAST NAME";N$(A)
1280 INPUT"FIRST NAME&INIT.";M$(A)
1290 INPUT"STREET ADDRESS";A$:A$(A)=A$
1300 INPUT"CITY,STATE";C$,D$:C$(A)=C$:D$(A)=D$
1310 INPUT"ZIP-CODE";Z$:Z$(A)=Z$
1320 INPUT"PHONE NR.";P$:P$(A)=P$
1330 INPUT"SPECIALTY CODE";S$:S$(A)=S$
1340 PRINT:PRINT" IF O.K.":PRINT:INPUT"HIT <RETURN> TO LIST";QQ
1345 PRINT"□":GOTO30
1400 PRINT"□":PRINT:PRINT"   TURN ON PRINTER":PRINT
1410 PRINT"   SEPARATE NUMBERS       WITH A COMMA"
1415 INPUT"  START NR., END NR.";N,M
1420 OPEN2,4
1430 FOR A=NTOM
1435 PRINTM$(A);" ";N$(A):PRINTA$(A):PRINTC$(A);" ";D$(A);" ";Z$(A)
1440 PRINT#2,"                              ";M$(A);" ";N$(A)
1450 PRINT#2,"                              ";A$(A)
1460 PRINT#2,"                              ";C$(A);" ";D$(A);" ";Z$(A)
1465 PRINT#2,"
1470 FORU=1TO31:PRINT#2,CHR$(13):NEXT U
1480 NEXT A
1490 PRINT#2:CLOSE2:PRINT"□":PRINT:PRINT:GOTO 30
9990 END
```


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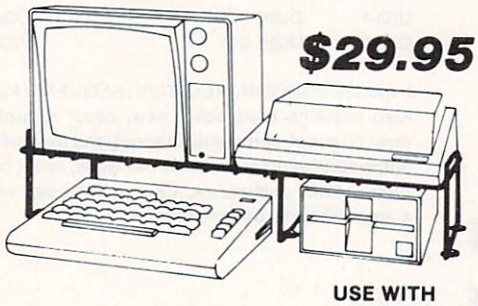

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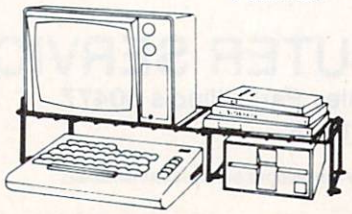

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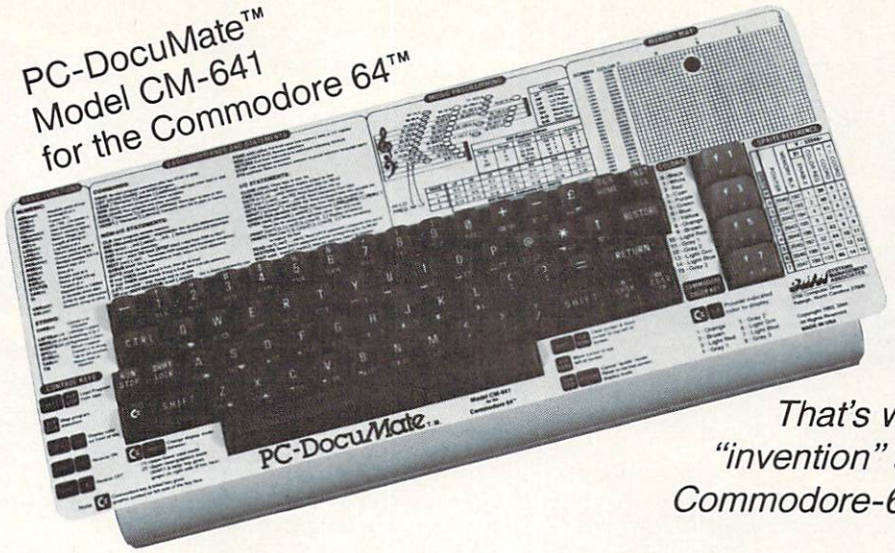

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We had a problem. So we invented PC-DocuMate™ to solve it. The problem was how to quickly master the VIC-20 and CBM-64 keyboards and easily start programming in BASIC on our new personal computers. First we went through the manuals.

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.

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Circle No. 61

Firebutton Inputs

James Pellechi

Eventually, a programmer in his quest to design the ultimate home video game, must solicit "INPUTS" from the user. Typically, these inputs set variables for various "Modes-Of-Play" such as: skill level, number of players, or maybe (after posting high score), "Your Initials".

The following program, written for the VIC (yet easily adapted to other computers), demonstrates "one way" a programmer can use a joystick firebutton to make selections without having to resort to the keyboard.

A breakdown of the program, line for line, follows:

LINE 90 Sets variable "CD$" equal to cursor-control commands. This variable, when used in conjunction with "MID$" is very effective at positioning the cursor on any row.

LINE 100 Clears the screen.

LINE 110-140 Prints menu on the screen.

LINE 180 Increments variable "LOOP" and compares "LOOP" with the number 45. If test succeeds, LOOP is reset to "ONE".

LINE 200-220 Tests "LOOP" variable and prints menu choice in reverse on screen. For example; If LOOP = 15, then line 200 fails; the program continues to line 210. As long as the value of "LOOP" is between 15 and 29, line 210 will be executed. This results in the letter "B" appearing in reversed print. If "LOOP" is between 30 and 44, line 220 will be executed and the letter "C" will appear in reversed print.

```
90 CD$= "<HOM><DWN><DWN><DWN><DWN><DWN><
DWN><DWN><DWN><DWN><DWN><DWN><DWN><DWN><
DWN><DWN><DWN><DWN><DWN><DWN><DWN><DWN><
DWN>"
100 PRINT"<CLR>":FB=0
110 SPEED=0:PRINTMID$(CD$,1,3)SPC(5)"SEL
ECT SPEED"
120 PRINTMID$(CD$,1,9)"A)SLOW"
130 PRINTMID$(CD$,1,13)"B)AVERAGE"
140 PRINTMID$(CD$,1,17)"C)FAST"
145 :
150 REM  MORE CHOICES CAN
155 REM  BE ENTERED IF
160 REM  YOU WANT
165 :
180 LOOP=LOOP+1:IFLOOP=45THENLOOP=1
200 IFLOOP<15THENPRINTMID$(CD$,1,9)"<RON
>A":SPEED=1:GOTO300
210 IFLOOP<30THENPRINTMID$(CD$,1,13)"<RO
N>B":SPEED=2:GOTO300
220 IFLOOP<45THENPRINTMID$(CD$,1,17)"<RO
N>C":SPEED=3:GOTO300
230 :
240 REM  IF MORE SELECTIONS
250 REM  WERE ADDED BETWEEN
260 REM  LINE'S 140-180,
270 REM  YOU WOULD ADD ADD'L
280 REM  LOOPS HERE
290 :
300 FB=0:GOSUB390:IFFB=1THENFORX=1TO1000
:NEXT:PRINT"<CLR>":GOTO320
310 GOTO110
```

Continued on page 30

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Circle No. 63

LINE 300 Sets firebutton variable "FB" equal to zero and then GOSUBS to the firebutton test routine. If the firebutton test succeeds, a small delay loop stops the flashing on the screen for a moment, allowing you to see what you've entered, then the screen clears and the program jumps to line 320.

LINE 310 If the firebutton test fails, the program returns to line 110 and reprints the menu on the screen with no reversed characters which is why menu choices appear to flash on the screen.

LINE 320-350 Reconfirms, by printing to the screen, the choice entered when the firebutton was depressed.

LINE 360 Screen displayed instructions used in conjunction with line 370.

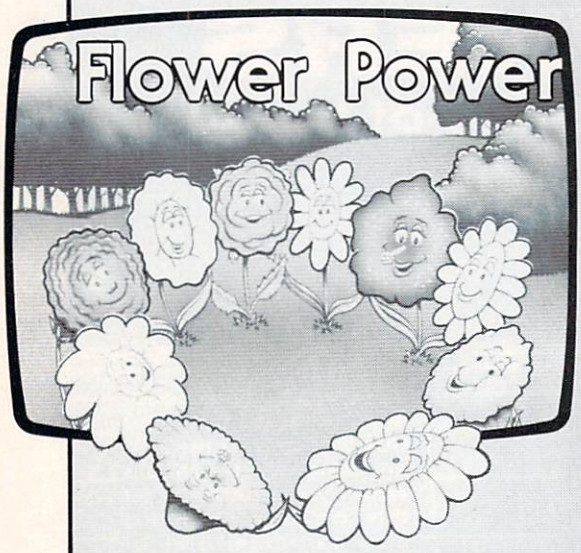
LINE 370 Program waits for firebutton to be pressed.

LINE 380 Sends program into a closed loop for demonstration purposes only. You would normally have this routine jump to the next stage of your program–possibly a routine to select "Number of players", etc.

LINE 390-410 Routine to read the firebutton. This routine is for demonstration purposes only. Your program would GOSUB to the firebutton portion of your own joystick routine. □

Continued from page 28

```
320 PRINTSPC(5)"YOU SELECTED":PRINTMID$(
CD$,1,4):PRINTSPC(8);
325 ONSPEEDGOTO330,340,350
330 PRINT" SLOW":GOTO360
340 PRINT"AVERAGE":GOTO360
350 PRINT" FAST"
360 PRINTMID$(CD$,1,17)SPC(3)"PRESS FIRE
BUTTON"SPC(30)"TO CONTINUE"
370 WAIT37137,32,32
380 GOTO100
390 REM TEST FIREBUTTON ROUTINE
395 POKE37154,127
400 IF(PEEK(37137)AND32)=0THENFB=1
410 RETURN
READY.
```

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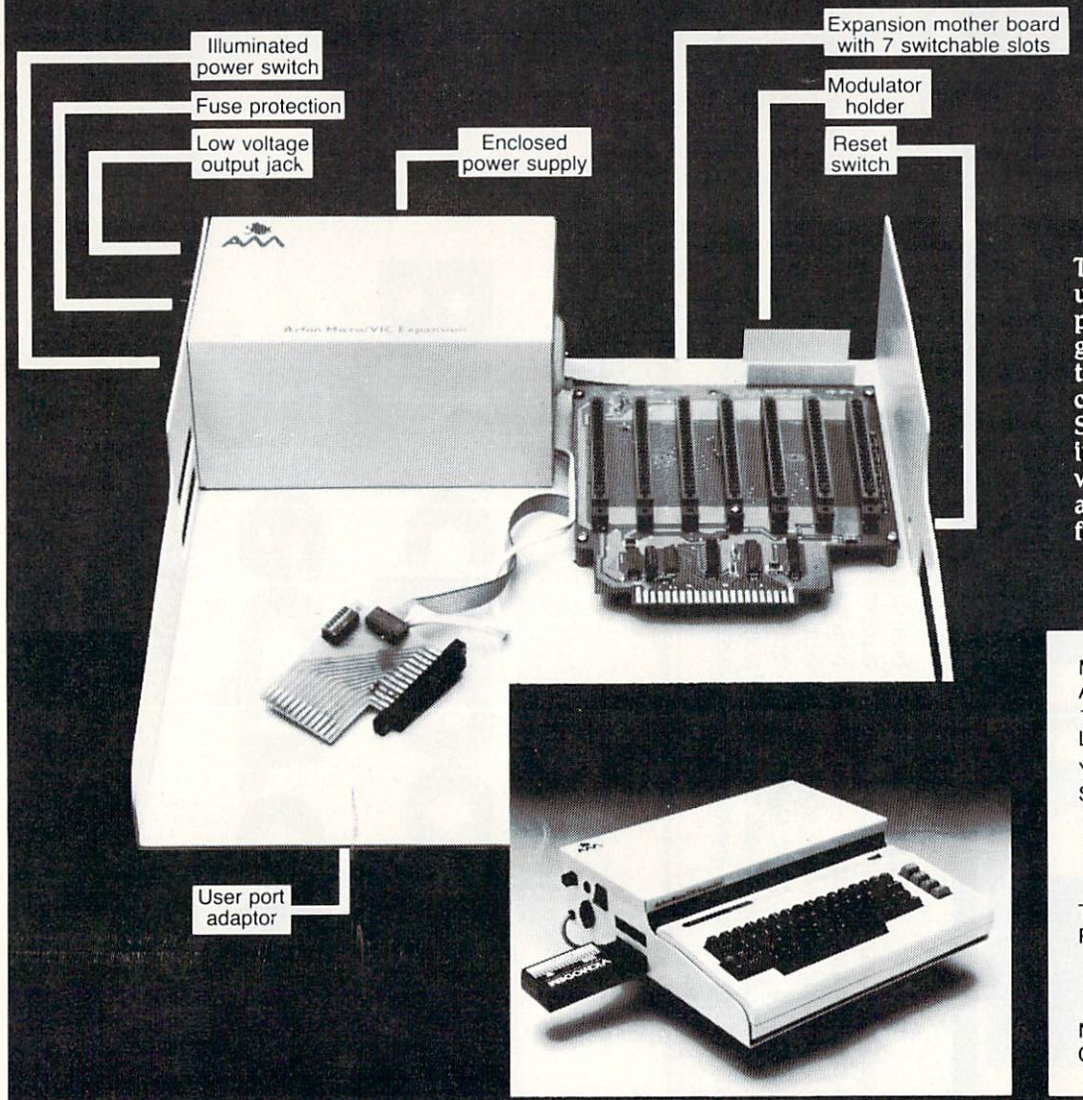
Circle No. 102

New VIC Superchassis II



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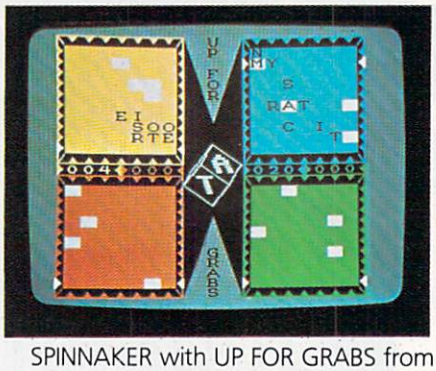
Electronic Blackboard

by Maryanne Dodd

Often when we think of educational computer usage, our first thought is Computer Assisted Instruction (CAI) using drills, rote learning and memorization. Another facet of educational software is programs that do not teach skills but apply skills already mastered to analyze problems and develop strategies. A good educational game will assist students in the development of logical reasoning abilities and deductive thinking skills. Lastly, an educational game while it's doing all of the above must always have one more quality. It has to be FUN or the kids will never stay with it long enough to derive any benefits.

The software reviewed this month fill all of the previously mentioned criteria. The games are not CAI, but they are educational in that they apply skills and require the players to analyze and synthesize information and they are all fun and entertaining.

The book, COMPUTER PLAYGROUND by M.J. Winters at DATAMOST as its name implies creates a place to play with the computer and learn fundamental BASIC concepts at the same time.



SPINNAKER with UP FOR GRABS from their new family learning series takes a traditional word game and updates it in a manner that will surely establish family word game competition in the computer age.

HEY DIDDLE DIDDLE from SPINNAKER takes Mother Goose nursery rhymes and presents them in a delightful program that I would describe as a computerized book for the young set.

SPACE RESCUE from HES uses the dog Benji to create an adventure simulation that teaches factual knowledge about our solar system.

TITLE: ***UP FOR GRABS***

FORMAT: Cartridge
PRICE: $34.95
MODEL: Commodore 64
AUDIENCE: Ages eight through adult
SUMMARY: Computerized SCRABBLE variation
SOURCE: SPINNAKER SOFTWARE
215 First Street
Cambridge, MA 02142

How many generations have enjoyed SCRABBLE year after year as a family activity? UP FOR GRABS, by Ken Madell from SPINNAKER, is a variation of that old familiar board game that will provide just as much, if not more, challenge and keep everyone from junior to gramps thumbing through the dictionary.

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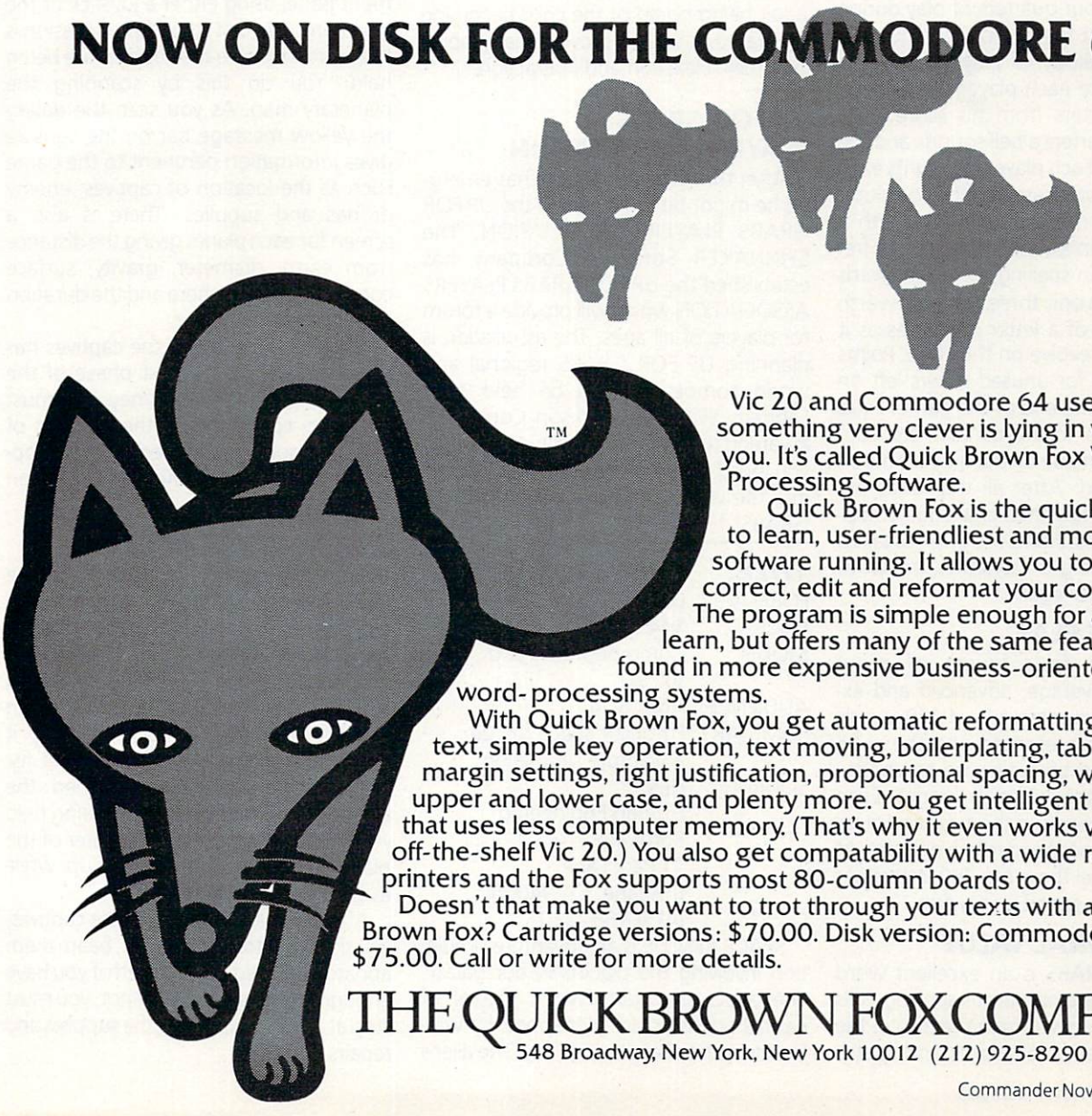

Vic 20 and Commodore 64 users, something very clever is lying in wait for you. It's called Quick Brown Fox Word Processing Software.

Quick Brown Fox is the quickest, easiest to learn, user-friendliest and most versatile software running. It allows you to write, correct, edit and reformat your copy instantly. The program is simple enough for a child to learn, but offers many of the same features found in more expensive business-oriented word-processing systems.

With Quick Brown Fox, you get automatic reformatting of edited text, simple key operation, text moving, boilerplating, tab and margin settings, right justification, proportional spacing, word wrap, upper and lower case, and plenty more. You get intelligent software that uses less computer memory. (That's why it even works with an off-the-shelf Vic 20.) You also get compatability with a wide range of printers and the Fox supports most 80-column boards too.

Doesn't that make you want to trot through your texts with a Quick Brown Fox? Cartridge versions: $70.00. Disk version: Commodore 64 only, $75.00. Call or write for more details.

THE QUICK BROWN FOX COMPANY
548 Broadway, New York, New York 10012 (212) 925-8290

SCORE CARDS

At the start of the game there are four score cards on the screen. An alphabet cube is revolving in the middle. From one to four people can play using either joysticks or paddles. The object of the game is to grab letters from the cube and place them on your score card to make words. Words, as in SCRABBLE, may be formed either horizontally or vertically and may be connected. To grab a letter you push the button on either the joystick or paddle to stop the cube from revolving, then you push again to choose one of three letters. You then use either the paddle or joystick to position the letter on the scorecard. Once positioned, the letter cannot be moved. While you are positioning your letter the other players are grabbing letters, so timing and quick thinking are critical.

FOUR QUARTERS TO PLAY

There are four quarters of play during each game. At the end of each quarter, while the melody is playing and the screen is white each player can remove unwanted letters from his score card. After four quarters a bell sounds and the game is over. Each player highlights each word on his score card and the computer tallies the score. Each letter is worth a number of points depending upon its frequency used in spelling common words (i.e., *a* is worth only three while *x* is worth 9). The value of a letter decreases as it continues to revolve on the cube. Points are deducted for unused letters left on the screen at the end of the game. Extra value is given to words that are connected or are made on the gray blocks on the score card. After all the tallies are done players may then challenge an opponent's words. Points are given or taken away depending on whether the word challenged was legal.

LEVELS OF PLAY

There are four levels of play: youngsters, average, advanced and expert. At the youngster level 120 words per game are presented and the cube speed and the time allowed to choose and remove the letters is longer. Each higher level speeds up the cube and gives less time to choose and remove letters. At the expert level there are 360 letters per game and the speed is very fast.

EDUCATIONAL VALUE

UP FOR GRABS is an excellent word game. There are numerous spelling skills involved. Players will gain practice in the rapid visualization of words and spatial relationships. Astute players will recognize the importance of setting up consonant vowel patterns and the necessity of recognizing exceptions to spelling rules. Children will increase their vocabularies and learn to spell new words through challenges. A certain amount of hand-eye coordination and small motor dexterity is required to quickly place the letters on the score card so that the maximum number of letters may be grabbed. Therefore, young players may find paddles easier to manipulate than joysticks.

The pamphlet accompanying UP FOR GRABS gives very clear, concise directions and presents some useful strategies. The color and sound used during the game are added attractions and are tastefully done so that they appeal to any age level. I feel that UP FOR GRABS is an excellent choice for family computer fun and learning. It is one of those games that can be played by either adults and/or children without the adult being bored or the child becoming frustrated. It should provide many hours of family relaxation and interaction.

UP FOR GRABS PLAYERS ASSOCIATION

After the family champion has emerged he might be interested in the UP FOR GRABS PLAYERS ASSOCIATION. The SPINNAKER Software Company has established the UP FOR GRABS PLAYERS ASSOCIATION which will provide a forum for players of all ages. The association is planning UP FOR GRABS regional and world competitions to be held each February with the Markson Cup to be awarded to the world champion. So all of you word game enthusiasts start practicing, the world championship is UP FOR GRABS.

TITLE: SPACE RESCUE

FORMAT: Diskette
PRICE: $44.95
MODEL: Commodore 64 and VIC 20
AUDIENCE: Ages 8-14
SUMMARY: Futuristic space rescue adventure simulation
SOURCE: HES
Human Engineered Software
71 Park Lane
Brisbane, CA 94005
(415) 468-4110

SPACE RESCUE is an adventure simulation involving the planets in our galaxy. The adventure starts when several of earth's scientists are kidnapped by warlike aliens from another galaxy. The aliens have hidden the scientists on planets in our galaxy. Your mission is to rescue the scientists. To assist in rescuing the scientists you have at your disposal the spaceship STAR WOOF and the famous dog Benji, who will train you for the mission.

CHOOSE YOUR RANK

At the beginning of the game you choose one of eight ranks (levels of difficulty) from pilot officer to fleet marshal. Then you are told the number of scientists being held and the number of star days that you have to rescue them. The lower levels have fewer scientists and more days.

COMPUTER CONSOLE

After getting your assignment you are beamed aboard STAR WOOF and the rescue begins. Your computer screen becomes the instrument console to the space ship. You may control the instrument panel using either a joystick or the keyboard. The first step of your mission is to ascertain where the captives are being held. You do this by scanning the planetary map. As you scan the galaxy the yellow message bar on the console gives information pertinent to the game such as the location of captives, enemy drones and supplies. There is also a screen for each planet giving the distance from earth, diameter, gravity, surface conditions, atmosphere and the duration of a local day and year.

After the location of the captives has been discovered the next phase of the rescue is to plan your journey. You must take into consideration the amount of fuel and supplies needed and the optimum speed to accomplish the mission in the time allowed.

INTERPLANETARY TRAVEL

After the proper preparations are made the journey begins. You signal the engine room and set the course. Instantly, you are zooming through the galaxy. You may or may not encounter asteroid fields left by the enemy. Asteroid fields can damage the STAR WOOF making it necessary to stop at another planet for repairs. Once you have reached the planet where the captives are being held you must get within one diameter of the planet to beam the captives up while avoiding enemy drones.

After you have found all of the captives, you signal the transport room, beam them aboard and head back to earth if you have enough supplies and fuel. If not, you must stop at another planet for the supplies and repairs if needed.

MISSION ACCOMPLISHED

If you successfully return all the captive scientists to earth "CONGRATULATIONS" flashes across the screen and you are given a score and another mission. If you run out of time or are unsuccessful, a message flashes that the automatic emergency status envelope has been activated and help has been summoned.

During the adventure there are the expected space sounds. The screen console resembles a typical instrument panel which you can access with either a joystick or the keyboard. When you are traveling in space there is the illusion that you are looking out of the port of the ship. The graphics used on the planet map screens are excellent. The planets are all differently colored and resemble pictures found in a good atlas or book about planets.

EDUCATIONAL VALUE

While playing SPACE RESCUE, children will learn accurate facts about our solar system. All of the data presented about the planets is accurate and up to date. At the higher levels players will develop an understanding of relative distance and order of the planets and use the newly learned information to develop strategies. To succeed at the higher levels, players must plan ahead and use conceptual skills to deal with multiple variables.

I feel that SPACE RESCUE is an innovative way to learn facts about the solar system. HES picked the space game medi um that most youngsters enjoy and integrated into it an adventure packed with factual information. The younger child will enjoy the Benji theme and the idea of the space adventure while the older kids will find the multiple levels and increased control of the game challenging and maybe even equal to arcade games.

TITLE: HEY DIDDLE DIDDLE

FORMAT: Diskette
PRICE: $29.95
MODEL: Commodore 64
AUDIENCE: Ages 3 to 10
SUMMARY: Mother Goose nursery rhymes and game
SOURCE: SPINNAKER SOFTWARE
215 First Street
Cambridge, MA 02142

Mother Goose rhymes have long been a favorite of children. Most of us remember them as our first introduction to books and poetry. Dale Disharoon and Robin Bush from SPINNAKER have taken these rhymes and incorporated them into HEY DIDDLE DIDDLE, a learning program for children. The program is menu driven and contains three different selections: Storytime, Storybook and Rhyme Game.

STORYTIME

During Storytime the computer automatically presents the program just as though it were turning the pages of a book for the child. The first four lines of a rhyme are flashed on the screen then the computer begins to draw an illustration. After the illustration is finished, a short lilting melody is played and the next four lines are flashed on the screen. This sequence continues until all of the rhymes are presented.

STORYBOOK

The Storybook option introduces interaction between the child and the computer. As in Storytime, the first four lines appear, followed by a picture, then a short tune is played. To see the second four lines the child must press either the joystick button or the space bar to continue. There is no time limit involved. Therefore, a young child can take all the time he wants to look at the picture and point out details or a beginning reader can take as much time as he needs to finish reading the selection.

RHYME GAME

The last selection–Rhyme Game for young readers is an exercise in sequencing. The player has a choice of two levels. In the first level he is given four scrambled lines of a rhyme which he must put in the correct order by moving them up and down on the screen. If correct, he wins the game. "YOU DID IT" flashes on the screen and the entire rhyme and picture appears. The second level requires that all eight lines of the rhyme be arranged in correct sequence. The game may be played by two players with each one taking a twenty second turn. There are also options for playing without having the picture displayed and turning the time off for a one player game. The computer scores the number of games won by each player.

HEY DIDDLE DIDDLE contains over thirty of the most popular Mother Goose rhymes. The authors very faithfully used the traditional wording in the rhymes that the majority of people are familiar with and illustrated each rhyme in a unique setting. The scenes are outstanding. Each scene is very intricate and displays the same motif that one expects to find in a Mother Goose book. In fact, the scenes are so exceptional that I have used this program to demonstrate to people the color and character graphics capabilities of the Commodore 64.

EDUCATIONAL VALUE

The Storytime and Storybook options will enchant the young nonreaders. They will be introduced to the computer in a friendly manner as they learn the poetic rhythm of rhymes. Most young children will want to watch the program again and again as they memorize the verses and learn to recognize the rhyme as the picture starts to appear.

Beginning readers will enjoy having the rhymes randomly presented as they read each verse and practice their new reading skills.

The Rhyme game will help young readers learn how to think in a logical manner as they arrange each line of the verse in the proper sequence.

I feel that HEY DIDDLE DIDDLE will be remembered by children as a classic. It will occupy the same place in their lives as the tattered Mother Goose nursery rhyme book occupied in their parents' childhood.

TITLE: COMPUTER PLAYGROUND

PRICE: $9.95
MODEL: VIC 20 and Commodore 64
FORMAT: Book
AUDIENCE: GRADES 5-6
SUMMARY: A book designed to introduce BASIC to young computerists
SOURCE: DATAMOST
8943 Fullbright Avenue
Chatsworth, CA
91322-2750
(213) 709-1202

COMPUTER PLAYGROUND is a book designed to. introduce the elementary age child to Basic using a laboratory workbook format. M. J. Winters, a professor of mathematics at Michigan State University has compiled activities that she has used in classes and computer camps into a fun-packed book that will intrigue children from grades two through six.

Since children can often perform without understanding "why" COMPUTER PLAYGROUND does not start by presenting programming theory. Instead, the deductive method of instruction is used with the student discovering what happens when he enters data into the computer. Then he is given suggestions for variations and observations.

Continued on page 43

Command Post

By Jim Grubbs

The nip of fall is in the air. Electromagnetic waves seem to travel better when the air is crisp and clean. Amateurs everywhere begin to finish their antenna projects before the winter sets in. Each year at this time one of the most popular annual contests takes place on the amateur bands. I think the attraction of the November "Sweepstakes" is that you don't have to have a big powerful station in order to be competitive. What it takes is good operating. My first attempt at the Sweepstakes was in November of 1961 using a couple of dipoles, about 50 watts input and two crystals! I don't recall my score, it would probably be embarrassing. What I do recall is making hundreds of QSOs (two way contacts) in nearly every state and province in the USA and Canada.

Over the years the competition has become more intense and split second timing has become more important. The advent of the electronic keyer and later the memory keyer led the way to today's computerized contest operation, particularly in the single operator category. With a Morse code memory keyer, the operator can send a pre-programmed CQ message and catch up on the logbook, or can be checking the"dupe" sheet while his or her contact exchange is being generated by the keyer. Incidentally, "duping", or checking to see if you have already talked with a particular station has become nearly impossible to do by manual methods. In the months ahead we will address that problem using our VICs and 64s, but be forewarned, start planning on some memory expansion for the VIC and the possible addition of a disk drive for both. File storage of alphanumeric data uses up a lot of memory!

VIC TO THE RESCUE

Until the last year or so, a full featured memory keyer (NOT keyboard) cost better than $100; a keyboard goes for about twice that price or more. Enter the VIC-20 at $80–a simple program, and an even simpler interface and you have a keyboard Morse code generator with as many memories as you care to include! The same goes for the 64. The program is virtually the same with the appropriate PEEKS and POKEs altered.

Our CW (Morse code) transmit program comes at a very opportune time. We started discussing input and output to the real world from our computer last month. The discussion centered mainly on getting a signal into our machine. This month we want to go the other direction.

In brief, recall that we have two data registers on the VIC and the 64. Each one has eight bits. Additionally, we have a register set aside for each one called a data direction register or DDR for short. Each bit in each register can be used for sending or receiving depending on whether the DDR contains a 1 or 0 in that bit position. A zero is used to allow our machine to receive data. A "one" in the DDR lets us send data to the outside world.

LISTEN MOM, VIC SAID DAH-DAH

Command Post TX is the perfect vehicle to test our theory about outputting signals from the VIC and 64. The program itself is very straightforward and compact. It will fit in the unexpanded VIC with all kinds of memory left over! It is based on a program by Rick Myers, WB5AYD. It is presented here specifically modified to illustrate our discussion about getting signals out of the VIC and 64 and to provide a message generator for the sweepstakes contest. Lines 50-70 are initialization. Note that lines 51 and 62 are only needed for the C-64. I absolutely cannot stand the "standard" screen and border combination of the C-64. The POKEs in line 51 will give you white letters on a solid black background. You may make these colors any of your choosing. Line 62 is necessary for the C-64 to give it all the information it needs to turn on the SID chip (sound generator) in order to provide a "sidetone" or monitor for our CW keyboard. Note also that when we are using the C-64, we are actually turning the wave form on and off (values V and P) rather than the tone. Yes, it really does take all of those POKEs to accomplish a single tone! A chart has been provided to show the proper values for both machines, and the alternate values to be used if you wish to use the joystick port on the VIC-20 rather than the user port.

In the next part of the program, lines 72 through 180, we define the function

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keys as stored messages. That is, if we press the F1 key, command Post TX will send the CQ message. The F7/F8 keys have been programmed to generate the sweepstakes contest exchange. The exchange consists of a sequential number, which the computer will generate for you, a precedence-A for under 200 watts, B above 200 watts, your call, the year you were first licensed, and your ARRL section. Substitute your information in lines 170 and 180. Every time you use the F7 key, the serial number will be incremented by one. In situations where you need to repeat the last message, you may do so by pressing the F8 key. The serial number will not be incremented until the next time you use F7. The program has also been designed so that in case you accidentally try to send an F2, F4, or F6 message, it will substitute the message stored in F1, F3, or F5. If you feel you need additional stored messages you can modify line 72 and add additional messages.

The actual sending part of the program is contained in lines 4 to 24. The back arrow key in the upper left hand corner of the keyboard will allow you to return to the change speed prompt. The code itself is stored as a matrix called M$. Lines 200 through 204 provide the necessary data for this look up table.

Command Post TX will generate nearly perfect CW at speeds up to about 50 wpm on the VIC-20. Rick emphasizes that nothing should be placed ahead of the program code between lines 4 and 24. It is the tightness of this portion of the program that keeps the spacing from rapidly deteriorating as the speed increases. My experiments over the last several months show that the C-64 is even more prone to these problems. This is something to keep in mind if you are writing a BASIC program that contains critical timing functions.

After typing in the program and running it, you will be prompted to enter the desired speed between 5 and 80 words per minute. Simply pressing the return key will cause the unit to send at 20 wpm. You can test the program by pressing one of the function keys, or typing in a message on the keyboard. Turn up the volume on your TV set or monitor and you will hear the code coming from the speaker. Keep in mind that you will be limited to the 10 character buffer built into the keyboard. If you try to type ahead more than 10 characters, some will be lost.

Some possible additions for Command Post TX could include a random number generator to produce code practice, a tune position to give you a steady key down signal for testing your transmitter, a 24 hour clock as an operating aid, or many other possibilities limited only by your imagination. Keep in mind, though, that as the program gets longer, the timing loops all slow down. Up to a point you can correct for this problem in lines 58 and 64, modifying the formulas for "T", "ES", "WS", and "DL".

Interfacing Command Post TX to your transmitter is easy. A simple circuit as shown in Figure Two will do the job nicely. Information on pin locations for the VIC and C-64 are available in last month's column, or in the programmer's reference guides.

The technique illustrated here for outputting a signal from the VIC and having it operate a relay offers many possibilities. How about an automatic telephone dialing routine for your terminal program? It sure beats having to remember the number for your local BBS (computer bulletin board). An automatic telephone dialer with virtually an unlimited number of entries could be easily programmed. You've seen the ads for the appliance control programs. They use the same technique and make use of the internal clock in your computer. Later on we will be using this method to generate RTTY (radio teletype) and ASCII. In reality, the RS-232 port and the software inherent in our machines will do most of the hard work for us, but the technique is still the same.

OUT IN THE OZONE

In last month's column, the value of the variable resistor was left out. It should be a 20K (20,000 ohm) unit.

Our first column discussed Command Post RX and posed the question of why the matrix or look up table is designed as it is. We had concluded that the shorter Morse characters came first, with the longest characters at the end. What about A (ditdah) and N (dahdit), though? They are the same "length", just reversed. As you hopefully concluded, the position of the element as well as its "weight" (larger for dahs, less for dits) determines which letter will come first in the table. Since this receive program is a BASIC interpretation of a machine language algorithm, who among you will be the first to overcome the inherent speed problems in BASIC and develop the machine code for us?

ENERGY SOURCES

Our computers feed on programs, and programs come from ideas. Mike Forsyth at Kantronics was kind enough to send along a publication called "Computers and Amateur Radio" that he edits. The sample copies I received were eight pages, tabloid sized with all kinds of interesting information about using computers in amateur radio. Of particular interest was a brief article on sending programs "over the air" and some ideas on how to accomplish this.

"Computers and Amateur Radio" is available for $8.00 for a six issue subscription (one year) from Computers and Amateur Radio, 1202 East 23rd Street, Lawrence, Kansas, 66044. Kantronics owners in particular will find the information of interest, but it has something for everyone.

IT'S BEGINNING TO LOOK A LOT LIKE CHRISTMAS

A jolly man who drives a big brown truck has recently taken to leaving me mysterious boxes. Further investigation shows that Christmas has indeed come early for K9EI and next I'll take a look at some of the products that are currently on the market for users of the VIC-20 and C-64s in their Ham Shack. In the meantime, look for me on the 40 and 20 meter bands on CW, RTTY, ASCII and AMTOR testing these products. If the names AEA, Kantronics, MFJ, and Microlog strike a note of interest, be sure to look for next month's column. Truthfully, I'm about to bust with the good news I have to share about new products, including some good news for our SWL (short wave listener) readers, but I'll keep you wondering until next month. Get your red pencil and scissors ready so you can be sure to mark the goodies you want and leave a "suggestion" in a conspicuous place for your favorite elf or elves to find.

What would you like to see discussed in these pages? Drop me a note at PO Box 3042, Springfield, Illinois, 62708, with your suggestions. Until next month, CU in the Sweepstakes!

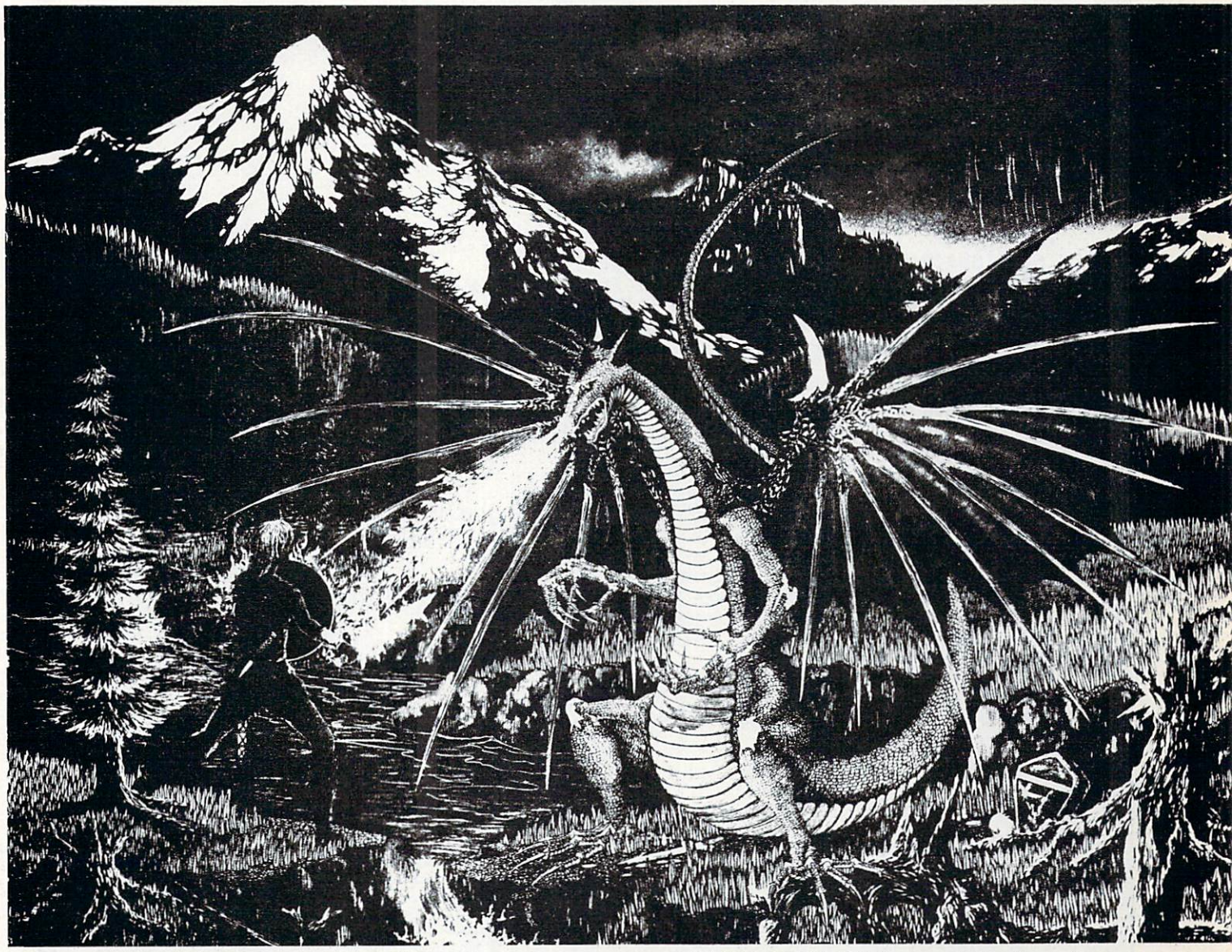
An addition needs to be made in order for COMMAND POST TX to work on the C-64. This addition can be noted either at the bottom of page 11, figure one, or on page 13, figure three. It should read as follows:

For the C-64 line 56 in the program listing should be changed. Substitute POKE 54296,15 for POKE 36878,15. This turns on the volume for the SID chip in the C-64.

That is the only correction needed. Sorry for the oversight! □

Continued on page 40

If you like adventure you will love Gothmog's Lair



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Circle No. 18

Continued from page 38

Figure 1

```
2 SN=1:GOTO50
4 FORL=ITOLEN(M$(A)):S$=MID$(M$(A),L,I):M=T:IFS$="-"THENM=DL
6 POKEV,P:POKEW,K:FORD=ITOM:NEXT:POKEV,Z:POKEW,U:FORD=ITOES:NEXT:NEXT
8 FORD=ITOT+T:NEXT
10 IFB$<>""THEN 18
12 GETK$:IFK$=""THEN12
14 IFK$=CHR$(QQ)THENB$="":GOTO52
16 B$=K$:PRINT B$;
18 A=ASC(B$):B$=RIGHT$(B$,LEN(B$)-I):IFA>LLTHEN72
20 IFA=SPTHENFORD=ITOWS:NEXT:GOTO10
22 A=A-FF:IFA<ITHEN A=I
24 GOTO4
50 DIMM$(51):FORL=1TO51:READM$(L):NEXT:S=20
51 REM FOR C-64 ONLY:POKE 53280,0:POKE 53281,0:PRINT"■"
52 PRINT"■■■■SPEED (5 TO 50)■■"S"■■■■■";
54 INPUTS:IFS<5ORS>80THEN52
56 PRINT"■":POKE36878,15:V=36876:P=230:Z=0:W=37136:K=64:U=0
58 T=2300/S↑1.25
60 POKE W,U:DR=37138:D1=64
62 REM FOR C-64 ONLY:POKE 54273,75:POKE 54277,0:POKE 54278,128:POKE V,0
64 ES=7500/S↑2:FF=39:LL=90:SP=32:WS=3*T:DL=3*T:IFS>30THENDL=4*T
66 I=1:QQ=95
68 POKE DR,D1
70 PRINT"■■COMMAND POST TX:■":PRINT:GOTO12
72 IFA>132ANDA<141THENA=A-132:ON A GOTO 110,130,150,170,110,130,150,180
110 K$=" CQ SS CQ SS CQ SS DE K9EI K9EI K9EI K ":GOTO16
130 K$=" QRZ QRZ? DE K9EI K9EI K ":GOTO16
150 K$=" QSL GL DE K9EI K ":GOTO16
170 K$=" NR"+STR$(SN)+" A K9EI 61 ILL BK ":SN=SN+1:GOTO16
180 K$=" NR"+STR$(SN-1)+" A K9EI 61 ILL BK ":GOTO16
200 DATA ........,.-.-.,-...-.-,-.--.,--..--,...-.-,.-.-.-,-..-.
201 DATA -----,.----,..---,...--,....-,.....,-....,--...,---..,----.
202 DATA ---...,-.-.-.,<,-...-,>,..--...,-...
203 DATA .-,-...,-.-.,-.....,.-.,--.,.....,.,.---,-.-,.-..,--,-.,---,.--.
204 DATA --.-,.-.,...,-,..-,...-,.--,-..-,-.--,--..

READY.
```

Figure 2

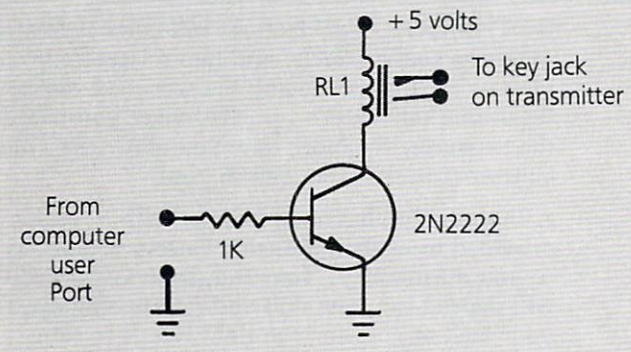

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Figure 3

VIC		C-64
Joystick Port	User Port	User Port
V = 36876 P = 230 W = 37137 DR = 37139 D1 = 32 K = 32	V = 36876 P = 230 W = 37136 DR = 37138 D1 = 64 K = 64	V = 54276 P = 17 W = 56577 DR = 56579 D1 = 64 K = 64
Pin 6-output Pin 8-ground	Pin K-output Pin A-ground	

Note: No joystick connection is shown for the C-64 since this port is handled differently from that on the VIC-20.

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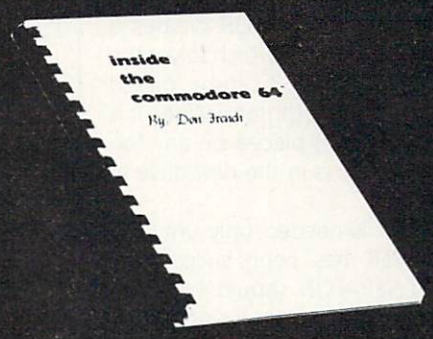

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Circle No. 17

Dos 5.1 Wedge

By Larry Curran

The 64Wedge provides many useful disk commands for the Commodore 64. It is especially useful for reading the error channel and for listing the directory without disturbing a BASIC program in memory.

Unfortunately, since it is a machine language program, it cannot be easily copied without some form of machine language monitor. Since most BASIC programmers have little use for machine language monitors, another solution is needed.

The program GENERATOR creates a program WEDGE SAVER which solves the problem. WEDGE SAVER can be loaded and run like a BASIC program. When it is run, the 64Wedge is placed on any formatted disk which is in the disk drive at that time.

GENERATOR is needed only until the WEDGE SAVER has been successfully created. GENERATOR should be saved prior to attempting to run it. since under some error conditions it might be lost in memory. It is especially important that the DATA statements be keyed in accurately since they are used to create machine language instructions in WEDGE SAVER. Note that line 20 checks that the sum of the numbers in the DATA statements total to the correct number.

After GENERATOR has been run successfully, the program WEDGE SAVER will be on your disk. WEDGE SAVER can be loaded and saved onto other disks like any BASIC program.

To use WEDGE SAVER, load it into memory. Then place the disk on which you want to place the 64Wedge and RUN the program. The disk can then be removed and replaced with another disk and the program rerun.

If you have problems with this program or have ideas for improvements, please write to me at the below address. To obtain a copy of WEDGE SAVER without keying in the program GENERATOR, send a standard formatted floppy disk, a self-addressed stamped mailer and $3 to:

Larry Curran, 6049 W. Glen Ct.
Franklin, WI 53132 □

```
10 FORI=4096TO4328:READAD:CTR=CTR+AD:POK
EI,AD:NEXT
20 IFCTR<>24320THENPRINT"TYPING ERROR IN
 DATA STAEMENT":END
30 PRINT"MOUNT DISK WHICH CONTAINS WEDGE
 PROGRAM (DOS 5.1). THEN HIT RETURN"
40 GETA$:IFA$<>CHR$(13)THEN40
50 OPEN15,8,15:OPEN5,8,5,"0:DOS 5.1,P,R"

60 FORI=4329TO5187:GET#5,A$:J=ASC(A$+CHR
$(0)):POKEI,J:NEXT
70 CLOSE5:CLOSE15
90 PRINT"MOUNT DISK ON WHICH WEDGE SAVER
 IS TO BESAVED. THEN HIT RETURN"
100 GETA$:IFA$<>CHR$(13)THEN100
110 POKE832,PEEK(45):POKE833,PEEK(46)
120 POKE44,16:POKE45,68:POKE46,20:POKE47
,68:POKE48,20:POKE49,68:POKE50,20
130 SAVE"@0:WEDGE SAVER",8
140 POKE44,8:POKE45,PEEK(832):POKE46,PEE
K(833):
150 POKE47,PEEK(832):POKE48,PEEK(833):PO
KE49,PEEK(832):POKE50,PEEK(833)
200 DATA 0,11,8,0,0,158,50,49,49,48,0,0,
0,0,0,0,64,48,58,68,79,83,32,53,46
210 DATA49,44,80,44,87,144,18,87,69,68,7
1,69,32,83,65,86,69,82,146,66,89
220 DATA32,76,65,82,82,89,32,67,85,82,82
,65,78,69,78,68,32,68,229,169,6,141,32
230 DATA208,169,12,141,33,208,162,1,160,
12,24,32,240,255,160,0,185,30,8
240 DATA32,210,255,200,192,13,208,245,16
2,3,160,10,24,32,240,255,160,0
250 DATA185,43,8,32,210,255,200,192,16,2
08,245,169,15,162,8,160,15
260 DATA32,186,255,169,14,162,16,160,8,3
2,189,255,169,5,162,8,160,5,32,186,255
270 DATA32,192,255,162,5,32,201,255,169,
8,141,161,8,160,0,185,233,12
280 DATA32,210,255,200,240,7,192,91,240,
9,76,159,8,238,161,8,76,159,8
290 DATA173,161,8,201,11,240,3,76,159,8,
169,5,32,195,255,169,15,32,195,255
300 DATA32,204,255,162,5,160,16,24,32,24
0,255,160,0,185,59,8
310 DATA32,210,255,200,192,3,208,245,162
,6,160,0,32,240,255,96
READY.
```

Continued from page 35

FORTY TWO PROBLEMS

Each of the forty two lessons is presented as a problem. The student enters the data and then he predicts or discovers which element made what happen. For example, in the first problem "PRINT" is spelled "PRIMT" in one line. What does this do to the program?

Most of the problems focus on what the author correctly observes to be children's natural interests–word games and graphics. What young person wouldn't enjoy learning to do invisible writing on the computer (white letters on a white background) that magically becomes visible when the cursor color is changed? Or how about making a green worm with a purple head that moves across the screen. If those don't motivate the student a computerized crystal ball or a program designed to calculate the number of hours spent sleeping during a year will surely captivate even the most blase' youngster.

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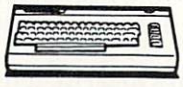

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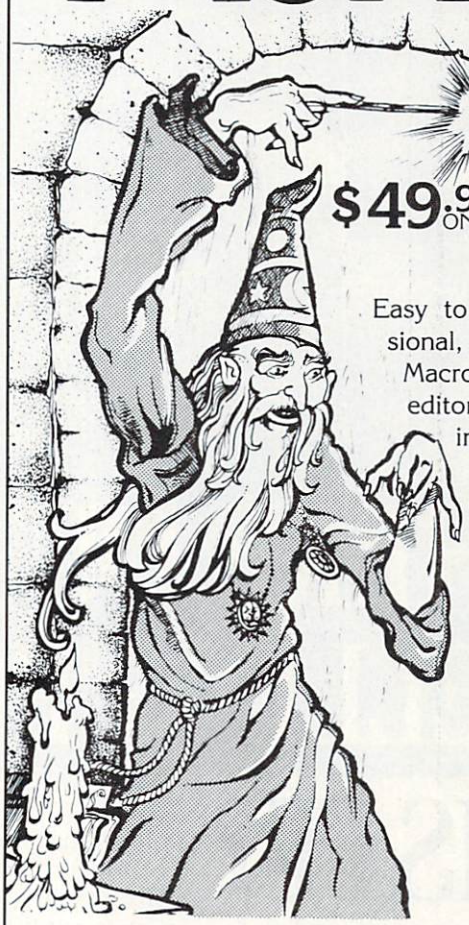

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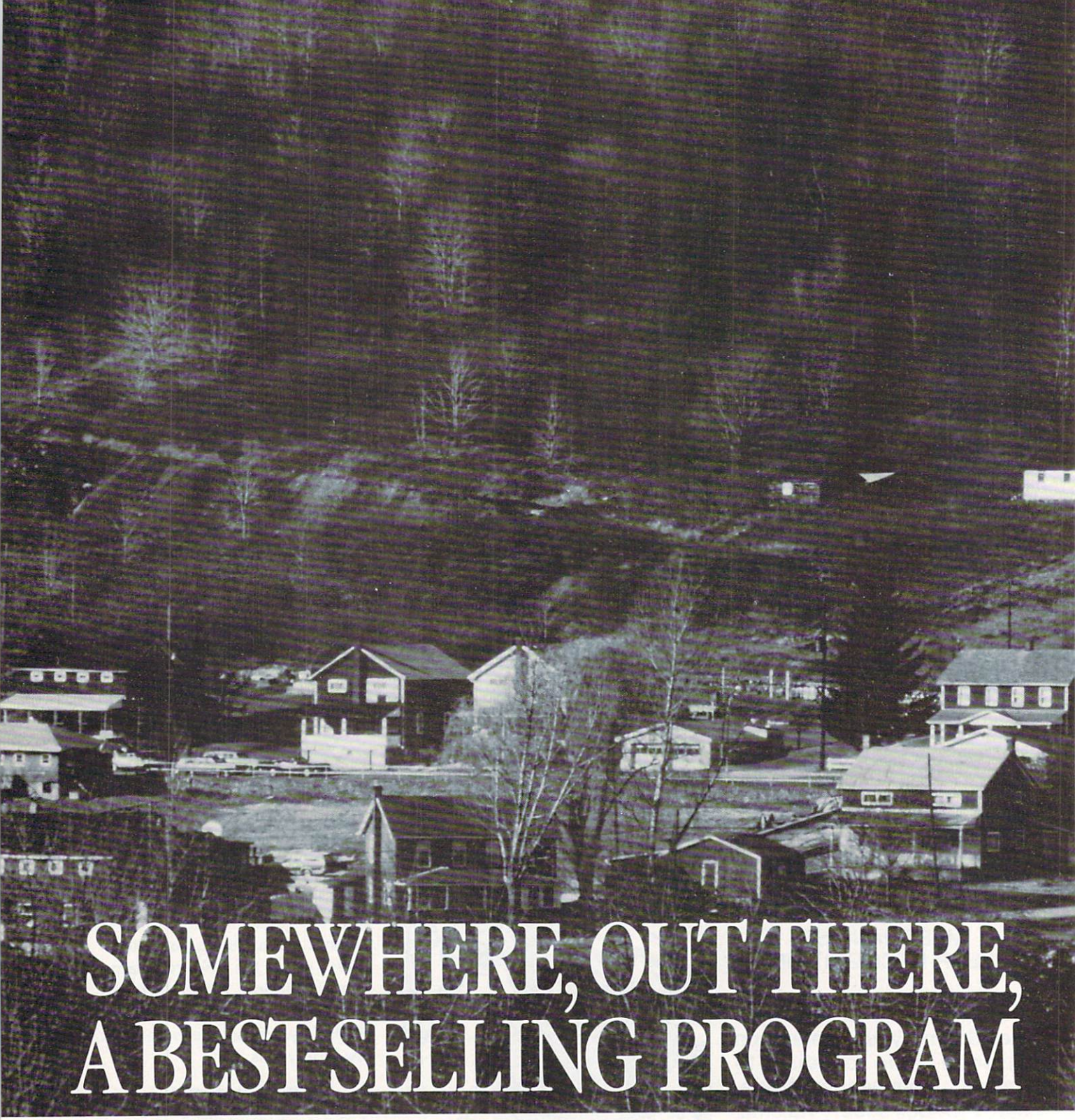

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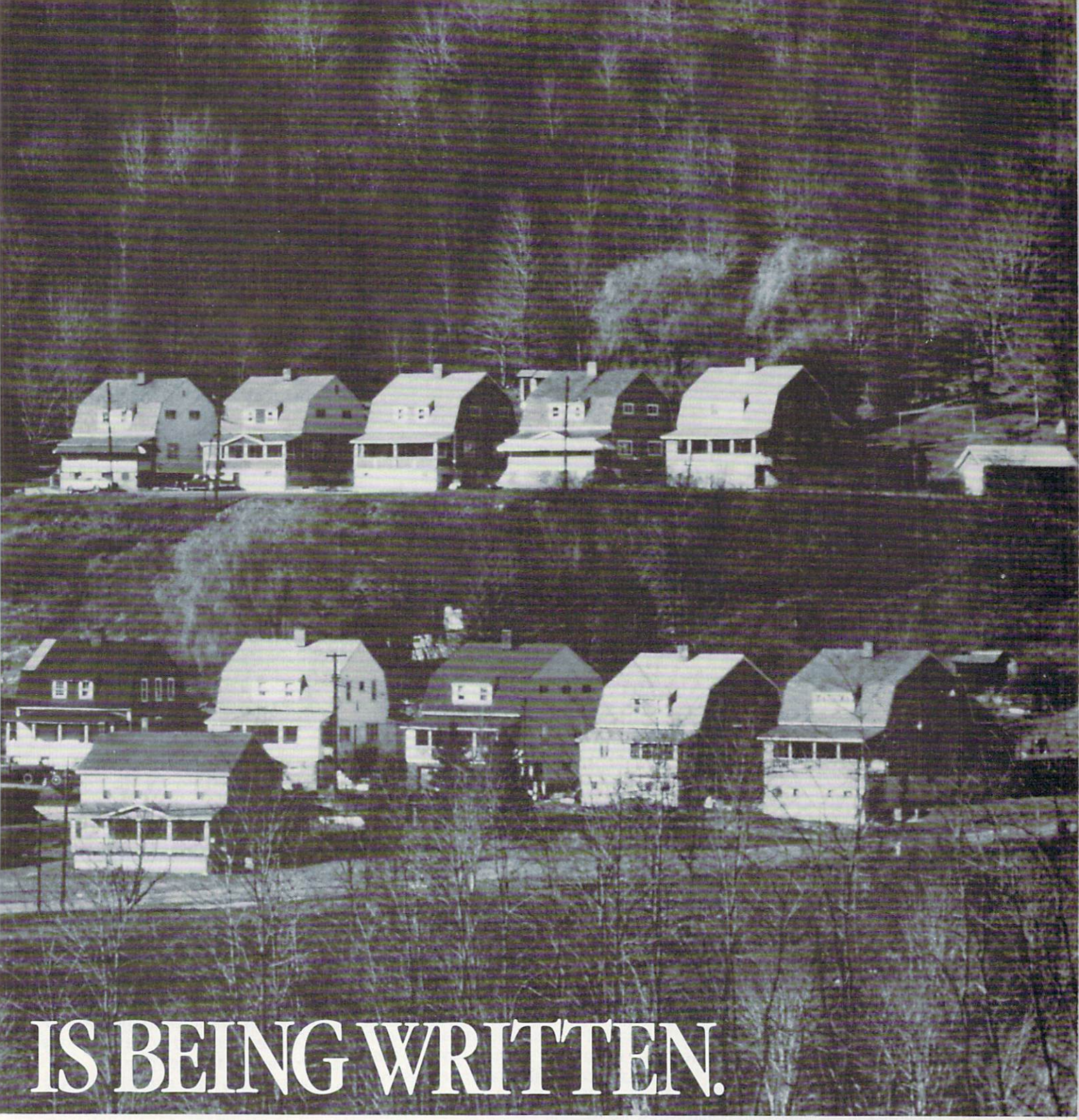

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How Time Flies Part II: It's Alarming

By Ian Adam

ABSTRACT

Personal computing can be an engrossing task, to the point that one loses track of time. The August issue of Commander included a program to provide a continuous time display on the screen of the Commodore 64. This update adds a programmable alarm that is extremely accurate and easy to use. Although the program is in machine language and interrupt-driven, no special skills are required to set it up or use it.

Time is on my side. Or so goes the saying, anyway. That was also the name of a song by Mick Jagger and the Rolling Stones, which was a hit in the 1960's. But time marches on (another saying!), and Mick Jagger has celebrated his fortieth birthday (time leaves no Stone unturned?)

Enough of that. The world has changed a great deal in the intervening years. Home computers were a distant dream in the 1960's . . . today they are a reality. By freeing you of routine calculations and other chores, computers have the potential of freeing up much of your time for other purposes. They can also educate and entertain you in your new-found leisure time. The other side of that coin, however, is that computers can consume a great deal of your valuable time in programming, telecommunicating, or whatever.

To help keep track, I presented a method in the August issue of displaying the time continuously on the screen of your Commodore 64. That program takes advantage of one of the unique features of the C-64, its pair of built-in clock/interface chips. At that time, I also promised to let you know how to use the programmable alarm feature, so here it is. Like the time display, the alarm program is extremely easy to use . . . the only skill required is to type it in (and I'm at best a two-fingered typist!). The display should get your attention. If you're a rolling stone yourself, it would even make a great travel alarm with the potential for two time zones . . . if you have room in your suitcase for the computer!

TO RECAP

If you had the opportunity to read the August article, then you are familiar with the advantages of this type of time display; you will also have much less typing to do now. In that case, just skip to the next section.

For those of you who didn't see the first article, here is a recap:

- the time is displayed continuously in the upper-right-hand corner of the C-64's screen, even when other programs are running.
- The time is extremely accurate, to within tenths of a second per day. In contrast; the TI$ clock has an error of a half hour per day!
- the program is in machine language and uses an interrupt drive, but no knowledge of machine language is required to use it.
- the time is generated from one of the two 6526 complex interface adapter chips which are a unique built-in feature of the C-64. Two time zones would also be possible.
- caution should be used when editing at the top of the screen, lest the displayed time be incorporated into the program you are working on.

ACCESSING THE ALARMS

Commodore packed a lot of action into four registers on each of the chips. Each register serves four separate functions: to set the time initially; to freeze the time for read-out; to keep time even when the read-out is frozen; and, to set the alarm. These seemingly impossible tasks are controlled by the order in which you address the registers, and by the value in the control register for each chip.

These are the main registers involved:

Function	Chip A
Hours & am/pm	56331 ($DC0B)
Minutes	56330 ($DC0A)
Seconds	56329 ($DC09)
Tenths	56328 ($DC08)
Interrupt	56333 ($DC0D)
Alarm Control	56335 ($DC0F)

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Function	Chip B
Hours & am/pm	56587 ($DD0B)
Minutes	56586 ($DD0A)
Seconds	56585 ($DD09)
Tenths	56584 ($DD08)
Interrupt	56589 ($DD0D)
Alarm Control	56591 ($DD0F)

We will be using chip A for the alarm, but the same process applies to chip B. To set the time, values must be POKEd into the four time registers. Lines 9090 and 9110 take care of this. Because the data is stored in binary-coded decimal format (BCD), some conversion is necessary, and lines 9070 and 9100 handle this. The time does not start running until a value is POKEd into the tenths-of-a-second register. Reading the time is also very simple, and is taken care of by the machine language routine. As soon as the hours register is read, the time read-out is frozen, and does not resume until the tenths register is read. This permits a consistent reading without 'rollover' of any digits. Only the display is frozen, and the registers continue to keep accurate time internally.

So how do we set the alarm? By exactly the same process as setting the time...by poking values into the same four registers! Only difference is, we first have to set bit 7 of the control register to a one. This signals to the chip that we want to set the alarm time instead of the clock time. The multiple use of these registers does keep things simple–honest! Lines 9160 and 9170 of the program take care of the BCD conversion. Line 9175 sets the control register, POKEs in the desired values, then resets the control register to its normal value.

Once the alarm has been set, it cannot be read. When the prescribed time is reached, this is signalled by setting bit 2 of the interrupt register. The program must recognize this, and proceed to alarm the operator in whatever way is specified. Don't worry, it won't bite. All of this may sound complicated, but the program takes care of the details.

A QUIRK IN THE CHIP

Help; there's a quirk on the loose!

In programming the alarm, I came upon a most unusual feature. I got the alarm all set up, and (after a lot of hit-and-miss changes) finally got it to work well. Eureka! The only trouble was, the alarm would mysteriously sound for a second time, exactly one minute later. Really had me stumped for a while. After a sleepless night, however, it came to me what the problem was. Say the alarm is set for 8:30:00.0, and sounds at that time. One minute later, at precisely 8:30:59.9, the tenths-of-a-second register rolls over, giving an instantaneous time reading of 8:30:60.0. This immediately rolls over again to 8:31:00.0, but it is apparently sufficient to trigger a second alarm (sometimes).

There are three or four ways to program around this quirk, once you know it exists. I decided the easiest way to solve the problem would be to POKE a 1 into the tenths register (i.e. setting the alarm time in our example to 8:30:00.1). This removes the alarm from the vicinity of the rollover, and seems to have banished the quirk to another world. If this should ever return to haunt you, please let me know; maybe we'll try an exorcist.

USING THE PROGRAM

Having covered the theory, let's get down to business. Type in the listing as shown; type the DATA statements carefully, since they contain the machine language program. Any error in that portion can crash the computer. If you have already typed in the previous program, then you only have to change or add lines 70 to 90, 9015, 9020, 9140 to 9210, and 9290 to the end. The rest of the lines are ok as they were previously.

When you've finished typing, SAVE a copy of the program before you run it. This will avoid having to retype the whole thing in the event of a fatal typographical error. Then go ahead and RUN it. First, the program will READ the machine language DATA and store it in memory. The variable CH is a checksum to guard against errors in the data. If the program stops and indicates a data error, then double-check everything. Assuming that is OK, the program will then ask you to enter the correct time. Give the AM/PM and the hour; when asked for the minute, check an accurate time source, and type in the number of the next minute (e.g. if it's 8:30 type in 31), then wait until that minute arrives to press 'RETURN'. Pressing return starts the clock.

After the instructions, you will be prompted for the time you want the alarm to be set to. When the alarm matches the clock time, it will be announced by:

–the border of the screen flashing;
–a buzzing sound; and,
–the word 'ALARM' flashing above the time.

If that isn't enough to attract your attention, then perhaps you're in a time warp! In any event, you can turn off this display simply by pressing the 'F1' key.

BORING DETAILS

When properly loaded, the program will run just like clockwork. It will supply you with the instructions, but for your reference I'll repeat them here:

SYS 832:	recall time display to screen;
SYS 994:	turn off time display (still runs internally);
POKE 982,n:	change colour, where n = 0 to 15;
GOSUB 9140:	set or reset alarm time;
F1:	stop alarm display.

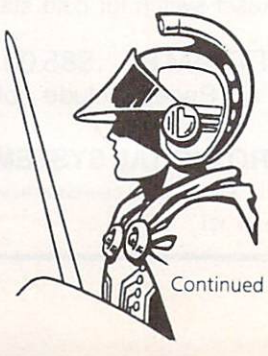
As before, the operating part of the program is in subroutine form, so you can include it in other programs as you wish (for non-commercial purposes only, please). The commands listed above can also be used within a program, since the time is correctly set. To stop the alarm display under program control, just use POKE 197,4.

If the F1 key is not convenient for stopping the alarm; for example, if your program uses it for some other purpose, then it can be changed. After the data has been loaded, POKE location 727 with the keyboard value of the key you would like to use. This is NOT the ASCII value; it's the value that appears in memory location 197 when the key is pressed.

The main program is stored in the cassette buffer, while the alarm portion occupies an unused area of page 2 memory as well. Thus, they may conflict with other programs that use these areas for machine language or sprites. The program would also be destroyed by any tape load or save activities. If these cautions create a problem, then the routine should be relocated to a different area of memory. This is a straightforward task, but does require a basic knowledge of machine language.

SO . . . enter the program, and I hope you find it useful. Load and run it whenever you're using your C-64–it'll help you manage your time more effectively. Then you'll have plenty of time on your hands.

NEXT TIME . . . we'll look at a few ways to speed up Commodore BASIC. □



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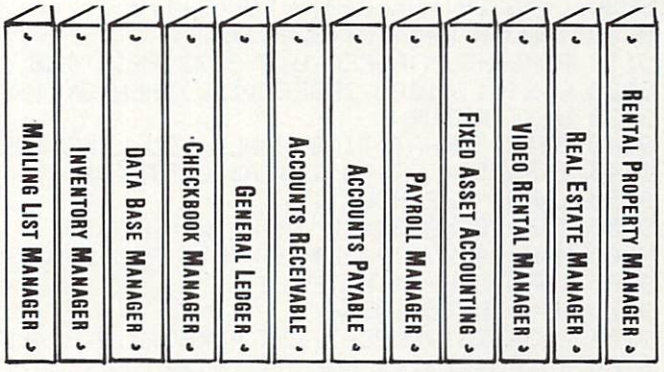

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Circle No. 28

Continued from page 48

```
0 REM ** IT'S ALARMING!           **
1 REM
2 REM ** CLOCK DISPLAY WITH ALARM **
3 REM     FOR COMMODORE 64
4 REM
5 REM     BY IAN ADAM
6 REM     VANCOUVER, B. C.
7 REM
10 GOSUB9000
20 PRINT"■■■■** TIME WAITS FOR NO MAN  **■"
30 PRINT"CLOCK INSTRUCTIONS:■"
40 PRINT"SYS 832:     TURN ON DISPLAY
50 PRINT"SYS 994:     TURN OFF DISPLAY
60 PRINT"POKE 982,N:  CHANGE COLOUR
70 PRINT"GOSUB 9140:  RESET ALARM
80 PRINT"F1:          TURN OFF ALARM
90 GOSUB9140:END:     REM SET OR RESET ALARM
8990 REM BALANCE OF PROGRAM IS SUBROUTINES THAT CAN BE USED INDEPENDENTLY
9000 CH=0:FORI=832TO1008
9010 READA:POKEI,A:CH=CH+A:NEXT
9015 FORI=679TO744:READA:POKEI,A:CH=CH+A:NEXT
9020 IFCH-23614THENPRINT"■WHOA...DATA ERROR":STOP:NOTE CHECKSUM
9030 INPUT"■■■■■■ IS IT AM OR PM";A$:INPUT"■ AND THE HOUR";H
9040 PRINT"■■ ENTER THE MINUTE WHEN YOU WISH TO START
9050 PRINT" PRESS 'RETURN' TO START THE CLOCK:■
9060 IFH>12THENA$="P":H=H-12:GOTO9060
9070 IFH>9THENH=H+6  :REM CONVERSION TO BCD
9080 IFLEFT$(A$,1)="P"THENH=H+128
9090 C=56328:POKEC+3,H:POKEC+1,0
9100 INPUTM:M=M+INT(M/10)*6
9110 POKEC+2,M:POKEC,0:SYS832:PRINT"■■ IF NOT OK, PRESS ANY KEY
9120 FORI=1TO1000:IFPEEK(198)THENPOKE198,0:SYS994:GOTO9030
9130 NEXT:RETURN
9140 PRINT"■WHAT TIME WOULD YOU LIKE THE ALARM?■"
9145 INPUT"AM OR PM";A$:A$=LEFT$(A$,1)
9150 INPUT"THE HOUR";H
9155 IFH>12THENA$="P":H=H-12:GOTO9155
9160 H=H-6*(H>9)-128*(A$="P"):REM CONVERT TO BCD AND ADD AM/PM INDICATOR
9165 INPUT"THE MINUTE";M
9170 M=M+INT(M/10)*6
9175 C=56328:POKEC+7,136:POKEC+3,H:POKEC+2,M:POKEC,1:POKEC+7,8 REM  ALARM
9180 POKE54273,99:POKE54278,240:POKE54276,21
9185 POKE54287,2:POKE54290,17:REM  SOUND
9190 RETURN
9200 DATA 120,173,20,3,162,89,234,234,234,142,20,3,173,21,3
9210 DATA 162,3,234,234,234,142,21,3,88,96,173,11,220,170,41
9220 DATA 15,24,105,48,141,67,4,138,16,4,162,16,16,2,162,1,142
9230 DATA 77,4,162,32,41,16,240,2,162,49,142,66,4,173,10,220
9240 DATA 170,41,15,105,48,141,70,4,138,74,74,74,74,24,105,48
9250 DATA 141,69,4,173,9,220,170,41,15,105,48,141,73,4,138,74
9260 DATA 74,74,74,24,105,48,141,72,4,173,8,220,105,48,141,75
9270 DATA 4,169,32,141,65,4,141,76,4,141,79,4,162,14,157,24
9280 DATA 4,202,208,250,169,58,141,68,4,141,71,4,169,46,141,74
9290 DATA 4,169,13,141,78,4,169,1,162,13,157,65,216,202,208,250,76,167,2
9300 DATA 120,169,49,234,141,20,3,169,234,234,141,21,3,88,96
9310 DATA 173,13,220,41,4,240,3,141,227,2,173,227,2,240,42,173,162,0
9320 DATA 106,106,106,41,12,141,32,208,41,4,141,24,212,240,11,162,5,189
9330 DATA 227,2,157,33,4,202,208,247,173,197,0,201,4,208,6,142,227,2
9340 DATA 142,24,212,76,49,234,0,1,12,1,18,13
9350 COPYRIGHT  IAN ADAM  VANCOUVER B.C.
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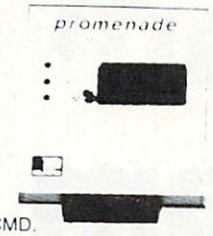

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The Program

By Jerry Byrd

I suppose one of the drawbacks of knowing how to program is that you do–even when perhaps you shouldn't. Every time there is a need for something to be done, it is awfully easy to find yourself writing a program to do it. I can think of a perfect example.

As usual, it was the middle of the night–best time for programming. Only this time I wasn't programming. I was putting the finishing touches on a new catalog. Had the ol' cranium in high gear. Ideas and good stuff were running good. I am not sure how it happened. Suddenly it just quit.

The word processor just quit! CRASH! Out to the machine language monitor (MLM). (That's when you get those funny letters on a PET or CBM screen and nothing seems to work.) All my work for nothing; several hours down the tube. Then it dawned on me–save the whole thing with the MLM. I did. Now I wouldn't need to retype all that creative genious. (Please, no one mention my laziness.) In just a few short minutes I would have my masterpiece back. Just a little conversion . . .

Four hours later I had something from which I could recover the catalog. Probably, I could have retyped it faster, but I knew how to program. Now, here's the dumb part. I have no idea where on earth that program is that I used to convert raw memory to real, useable sequential files. It's gone. Every programmer needs to find a way to keep (and find) precious, once-in-a-lifetime programs that just may be helpful sometimes.

PHILOSOPHY: BUILDING A PROGRAM LIBRARY

Building a program library is one of the first things that a professional programmer, or the aspiring professional, should do. Really, the issue is not whether to build or not, the issue is whether to be organized about it or not. You are going to accumulate programs, from all kinds of sources (more about that later), and you are going to want to keep the programs for later use.

To begin your plan, ALWAYS LABEL EVERY DISK. It is amazing to me to see the number of times that I observe professional programmers with 10 unlabeled disks lying around. Inevitably, there will be a mix-up. A disk will be lost or over-written. Of course Murphy's Law demands that the disk with the irreplaceable program or routine upon it is the one that's gone.

Use a label name that is catchy and can be remembered. I once got a program from a fellow from Canada. Its title was "Canadian Goodies". That's my source for "Disc Doctor", a really great program. There is a disk in my office that is called "Green Label". Everyone knows it. Sons and grandsons (or granddaughters, if your prefer) of that disk all proudly bear the same title. It's called that because the original disk on which I got it had a green stripe on the label. That disk has an excellent single disk backup program for the 1541.

Don't use the master disks. Store them away like vintage wine. Make a backup to really use. Confucious say, "He who use master too often soon have disk with hole in it."

Set up some library masters. Think of them as special bookshelves. Put your favorites there (easy way to keep them handy). Usually about five disks will do it. Every month have a backup party. That's when you sit down on Friday night with a two liter bottle of Dr. Pepper and don't come out until all five of your best disks have been backed up. Backing up means using some method to move the programs and stuff from one disk to another. The five basic "library shelves" for me are rather straightforward.

Programming routines are the pieces of programs that I try to use in most of my programs, so I won't have to do that again. This is the one that we will discuss more in a minute.

Programming utilities are programs that I use while programming. Here you'll find BASIC Aid from Canada, a program to find the actual end of a BASIC program within memory, a machine language extension and many, many more.

My *file manipulation* disk has dump and fix programs for relative files, sequential files and program files. It also contains programs to copy and erase programs, to rearrange directories and rename or read a disk.

A good *hardware diagnostic* disk will check timing and belt problems, check memory of the computer, demo and test printers, set various modes of printing, set and reset device unit numbers, dump memory of a unit's processor, etc.

Word and test processing contains programs to do everything from print labels to convert a Word Pro file to a Wordcraft file and vice versa. If I ever find the program I used that night to recover that catalog, I am going to put it right on this li'l ol' disk here.

The truth of the matter is that I have another disk. It contains the things I need most right now. It has a simple label: "JBB's–DO NOT TOUCH OR I'LL BREAK YOUR ARM!" I'm not sure, but I don't think I mean it. Nonetheless, noone ever bothers it.

Where do I get all these programs? I write most of mine. Some, though, came from friends and acquaintances from

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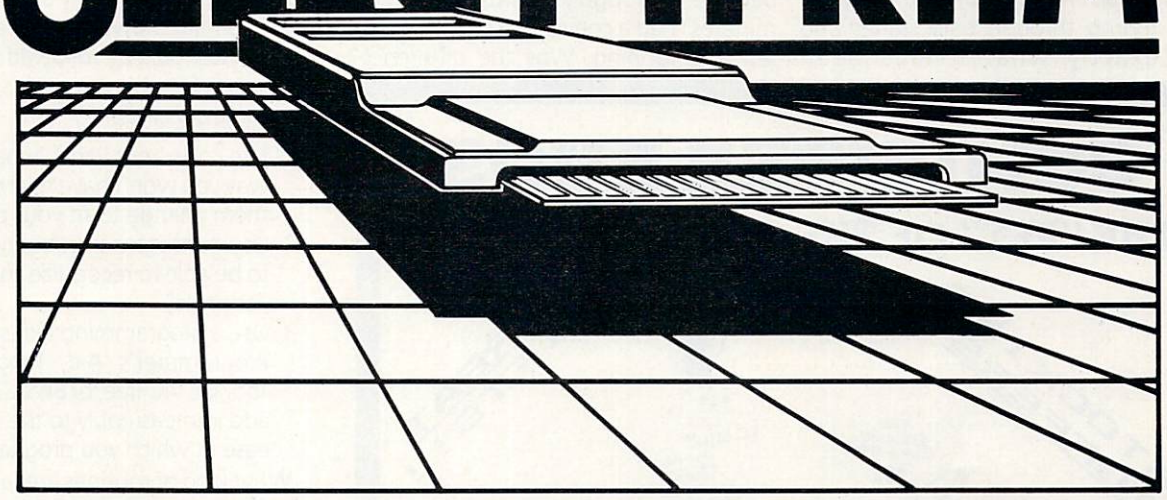

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meetings and shows. I am also a full-fledged member of TPUG (Toronto Pet User's Group), not an associate. I have a few programs from that library, probably the best in the world. Some of my programs came from magazines and books. I know folks who still have every program they ever saw and I know others who have none. Try to pick and choose. As for magazines, I personally subscribe to and read several. I never throw them away. I often thumb through back issues and find exactly what I have been needing–seldom exactly the way I can use it, but the concept I have been searching for.

Just the other day I needed to have some files converted for one of our beta sites to a different format. I asked one of my staff programmers to do it for me. He worked for a couple of days and then left on vacation with the job not done. He had tried to write code from scratch and became thoroughly confused. In thirty minutes I had a conversion program written and running. Why the difference? Simple. I pulled out an old program that had been used for file maintenance and used that to put the files into a basic sequential file. Then I modified the new, current file maintenance program to read the sequential file and write everything back out in its correct format. "Old programs never die, they just get their line numbers changed".

Programming routines can be used again and again. If they are to reach the full potential, however, there are some rules that should be followed. You might want to refer to last month's column to see some specifics.

1. Use consistent variable names. This way you won't have to always make them change to fit your program.
2. Use consistent numbering. It helps to be able to recognize lines by their "address".
3. Use a programming aid, such as the Programmer's Aid, Programmer's Tool Kit, VIC Tree, or BASIC Aid. These add immeasurably to the speed and ease at which you program.

What kind of routines are fair game for keeping as a routine? Almost any. Some specifics that come to my mind are:

a. screen layout
b. input routines
c. file openings
   1. input from file
   2. relative
d. error traps
e. file closings
f. input from file
g. write to file

There is much meat for discussion about several ideas presented here, but let me close this part of our coffee break with just one.

I use the word "file" a lot. Perhaps you are not too clear exactly what I mean by that. Commodore computers think of everything as a device. The printer is a device, the screen is a device, the keyboard is a device. A device is a numbered repository of information. Some devices can only receive information, others can only send information and some can do both. The screen can only receive information sent to it; there is no way for it to send information to the computer. The keyboard is just the opposite. The disk drive unit can do both—send and receive. In fact, it can communicate, since it has its own microprocessor. A file is a logical subdivision of a device. (Some computers think of a device and a file as being synonymous, but not Commodore.)

A file is a bunch of stuff stored on a disk

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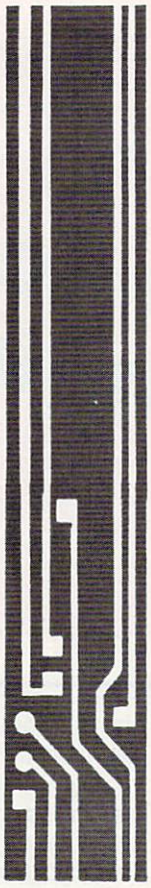

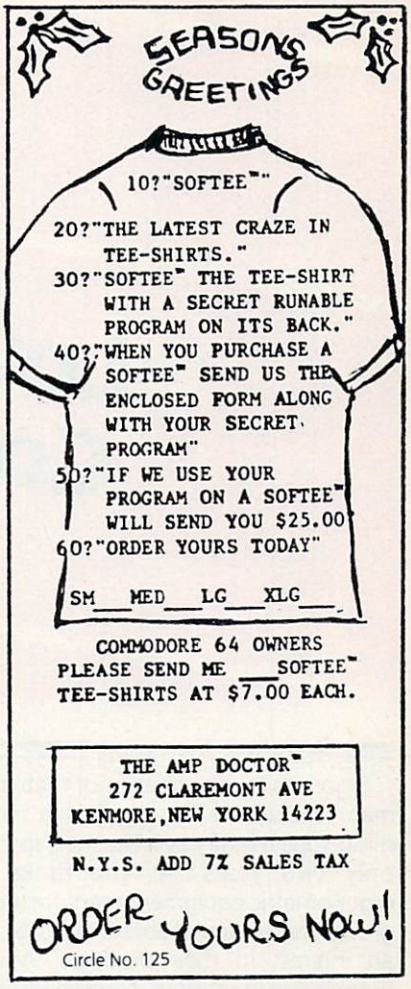

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By Colin F. Thompson

Ergonomics – the science of matching man to machine has become a multi-million dollar business in the short span of only two years. As the ranks of ergonometric equipment manufacturers grows, I have been unable to avoid taking an interest in their products. Advertisements in magazines, newspapers and my daily mail all vie for my attention.

I spend more time at my VIC keyboard than most because writing about the VIC is my profession. Eyestrain and lower back pain is an occupational hazard I cope with every day. Ergonometric equipment manufacturers of the world, rejoice! You have my attention.

I've spent a considerable amount of time evaluating new (and old) methods to ease the physical discomfort associated with typing on a computer terminal. Some of the new solutions work very well; namely, anti-glare screens for green monitors. Adjustable monitor stands and keyboard heights can also provide relief from discomfort.

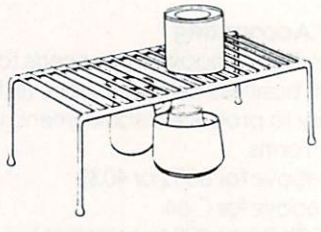
I'm pleased that some of the steps I've taken have resulted in better physical health. I'm not pleased by what this equipment has done to my bank balance. $100 for an anti-glare screen? $2,000 for a computer desk? Who's kidding whom?

Aside from the glare screen, which is useful, the one thing that has helped me most is the application of some good old-fashioned COMMON SENSE. I found that my physical discomfort could be traced directly to my sitting position, in relation to the keyboard and the monitor. Some experimentation revealed my hands were too high to type on the keyboard at my usual blinding speed (don't laugh). Solution? I raised my chair three inches. That little trick brought me back into the 25-30 WPM range. My back and neck still bothered me so I began adjusting the height of my monitor. First I raised it off the table to about eye level. For a while this brought relief, but soon my neck was feeling like a pretzel again. After considerable adjustment, I found the best height for the monitor was to have the bottom line about eight inches above the table's surface, with the face of the 13" screen about 28" from my eyes. These dimensions may not be accurate for you, but the idea of using common sense to find the dimensions is certainly valid.

My long days at the keyboard have also been eased by carefully positioning my peripheral equipment. Although I continue to adjust the position of the printers and disk drives, I found that a horseshoe arrangement of the hardware will keep everything in arm's reach.

Lighting is another source of eyestrain. Avoid overhead lights. They always manage to reflect off the video screen. I have positioned my computer table so that the monitors do not face a window. This reduces daytime glare. I prefer to have very little light directly in front of me. Drafting lamps with 40-60 watt "soft light" bulbs provide pools of light which illuminate only the areas I want.

After I found the best height for my monitor, I went shopping for a monitor stand. Finding one did not prove to be a problem. Finding one that I could afford was the problem. I looked at stands made of oak, walnut, pressboard, plastic and metal. The least expensive one was almost $30. My three homemade computer tables cost less than that! I found a low cost monitor stand by accident while shopping in the housewares department of a hardware store.



At first glance, the stand looked like the proper height, but it also appeared to be very flimsy. As you can see from the drawing above, it's made of wire. I tried bending and twisting it with little luck. The stand is made of welded steel wire, dipped in plastic. I instantly knew my search was over. The little rack only cost about $5. My mind raced to think of other uses for the rack as my eyes scanned the shelves for different sized racks. I found a goldmine in my neighborhood hardware store.

The rack turned out to be made by a Chicagoland firm named Grayline. They make dozens of wire racks, many of

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which have found a home in my computer room. The monitor stand is part number 710, Jumbo Helper Shelf. It supports my Commodore Color Monitor without sagging. It is also the perfect size for a 1540 disk drive. A similar stand, part #237, Freezer Rack, will support a printer or a stack of printer paper.

Raising the hardware off the table top has a couple of advantages. The equipment runs cooler, and the inevitable snakepit of cables can be brought under control. Photos 1 and 2 show the results of using only one of the #710 stands. Table space is saved and cable routing is better. (The plant is optional.) The little TV set is now raised to a height that eases eyestrain.

I like to organize my writing projects with file folders. My folders are usually stored away in a file cabinet. Active files can usually be found lying on a table somewhere. Grayline #218, Lid and Rack Tray, now holds all my active files on the table within arm's reach. Most of my diskette library is also stored away. Part #217, Lid Rack, now holds the diskettes that I use the most. A disk drive cover protects my active diskettes from dust when I'm not using them. Photo 3 shows, from left to right, #217, #710 and #218 in use. Photo 4 shows the complete system.

The Grayline product line is available in white, brown and gold. White matches the Commodore hardware. A call to Grayline's president, Mr. Arthur Meyer revealed the products are distributed nation-wide. I also found that Grayline is the largest maker of these products. So even if you live in Dirt, South Dakota, you should be able to find them. □

Grayline Housewares, 1616 Berkley Street, Elgin, IL 60120. Telephone: (312) 695-3900

PHOTO 1

PHOTO 2

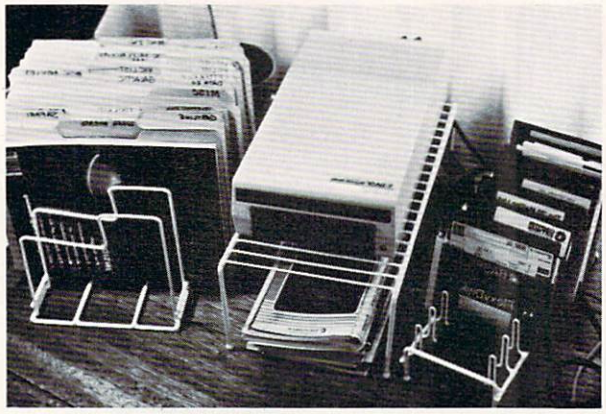

PHOTO 3

PHOTO 4

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Circle No. 36

Some New Commands For The Commodore 64

By Garry Kiziak

Regardless of which computer you buy, it isn't long before you start compiling a 'wish list' of commands you wish the manufacturer had included – commands such as PRINT USING, SORT, RESTORE TO, PRINT AT, AUTO, RENUMBER, etc. However, when several such people sit together and compare their 'wish lists', there is frequently very little agreement – "I don't really need a PRINT USING", "Why would you need to RESTORE TO a line number?, "I'd rather have . . .", and so on. Of course the manufacturer could include all these commands as well as many others. But chances are there might only be 10K-20K left in a 64K machine – hardly an acceptable trade off for most people.

An acceptable alternative, in many cases, is to have a solid, versatile, basic language with the ability to add these extra commands as the need arises.(Just look at the wealth of AMPER routines for the APPLE. It sure didn't take long for the C-64 wedge to arrive and alleviate the need for disk commands on the COMMODORE 64.)

In this and subsequent articles, I will present a series of commands that appeared on my 'wish list' for the COMMODORE 64; they may or may not appear on your list, but I'm sure you will find them useful. I will present these commands in such a way that they will eventually all fit together into a single package. If you have an assembler, then you can pick and choose the commands that you want, reassemble them at any address you choose, and thus add only the commands that you require.

In this first installment, I will list a number of commands that will enable you to manipulate the text screen in various ways – allowing for some very nice special effects. Next time I will show a sort routine that will allow you to sort a string array in either ascending or descending order at lightning speed. It will be a multi-field sort-so for example you can sort on one field in ascending order and, when matches occur in that field, sort on another field in descending order. (I will also give the changes necessary for the routine to work on a PET computer). In subsequent articles, I will look at some hires commands, sprite manipulation, and who knows what else. If you have any suggestions about what you would like to see, send them to me at the address indicated at the end of this article.

THE WINDOW CONCEPT

The normal text screen can be thought of as a grid-like structure consisting of 25 horizontal rows and 40 vertical columns. For my purposes, I like to number these 0 to 24 and 0 to 39 respectively (See Figure 1).

Often I have found it necessary to perform manipulations such as clearing, scrolling, etc. on just a portion of the screen (actually a rectangular portion called a 'window'). Figure 2 shows a window that extends from Row 5 to Row 11 vertically and from column 10 to column 30 horizontally.

To define a window, four parameters are required. These parameters can be given in many ways. I like to do it by assigning values to the following:

1. The *left* column of the window (10 for the window in fig. 2)
2. The *top row* of the window (5 for the sample window)
3. The *width* of the window (21 for the sample window;note-21 not 20)
4. The *depth* of the window (7 for the sample window; note-7 not 6)

Thus the window in figure 2 can be defined using the parameters 10, 5, 21, 7.

For a general window I will use the following variables:

LC = The left column of the window
TR = The top row of the window
WIDTH = The width of the window
DEPTH = The depth of the window

So a window is defined by the parameters LC, TR, WIDTH, DEPTH. Notice that the first two parameters (LC, TR) are the same as the Cartesian coordinates (x,y) of the top left corner of the window – keeping in mind that the top left corner of the screen is (0,0). Also notice that the entire screen can even be thought of as a window with LC = 0, TR = 0, WIDTH = 40, and DEPTH = 25.

REMEMBER: According to my convention, the columns are numbered from 0 to 39. Thus 0 < LC < 39 and similarly

$0 < TR < 24$. Also in order that a window actually be defined, both WIDTH and DEPTH must be positive (not zero) - actually $1 \le WIDTH < 40$ and $1 < DEPTH < 25$. In fact, we must even have

(i) $TR + DEPTH < 25$

and (ii) $LC + WIDTH < 40$

so that the window actually stays on the screen

THE ACTUAL COMMANDS

The commands that I will introduce shortly can be organized into 5 categories:

1) SCROLLING 2) REVERSING
3) COLOURING 4) FILLING and
5) DRAWING BORDERS

Before describing the commands in each category, let me define a number of variables. Then I will describe the syntax of each command and exactly what it does.

Define
UP = 12*4096 + 256
DWN = UP + 67
LFT = UP + 295
RHT = UP + 369
RVS = UP + 447
COL = UP + 511
FILL = UP + 547
BRDR = UP + 611

These are the actual call addresses for the routines that we will be using. They must be defined near the beginning of any program that uses these routines.

1) THE SCROLLING COMMANDS

There are 4 scrolling commands, each with 2 variations giving a total of 8 different possibilities.

(i) SCROLL UP
Syntax: SYS UP, LC, TR, WIDTH, DEPTH, W
Effect: This scrolls everything inside the window defined by LC, TR, WIDTH, DEPTH up one line. Everything else on the screen remains stationary. W is called the *wraparound parameter.* It determines the type of scrolling. If its value is non-zero, then the top line of the window will wrap around the bottom line. If W equals zero then the bottom line is blanked. This latter type allows you to print on the bottom line of the window after scrolling and hence achieve the same effect as when listing a BASIC program

(ii) SCROLL DOWN
Syntax: SYS DWN, LC, TR, WIDTH, DEPTH
Effect: Scrolls the window down one line. If $W \neq 0$, then the top line is blanked. When $W = 0$, the bottom line wraps around to the top.

(iii) SCROLL LEFT
Syntax: SYS LFT, LC, TR, WIDTH, DEPTH
Effect: Scrolls the window left one column. If $W = 0$, then the right column is blanked. When $W \neq 0$, the left column wraps around to the right.

(iv) SCROLL RIGHT
Syntax: SYS RHT, LC, TR, WIDTH, DEPTH
Effect: Scrolls the window right one column. If $W = 0$, then the right column is blanked. When $W \neq 0$, the right column wraps around to the left.

These scrolling commands can be used in many different ways. They can be used to create unusual menus, they can be used to clear the screen in unusual ways, they can be used to display text in a different but effective way, and so on.

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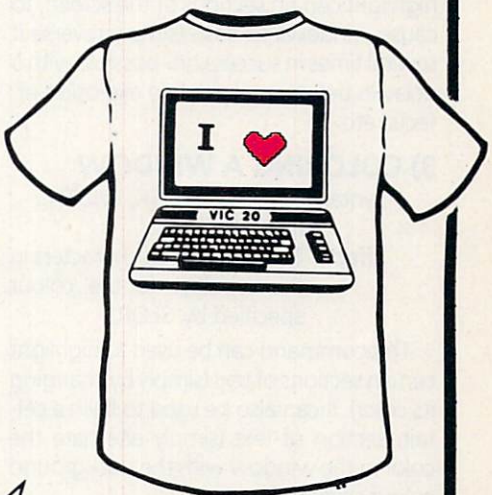

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2) THE REVERSE COMMAND

There are two commands for reversing a window.

(i) Syntax: SYS RVS, LC, TR, WIDTH, DEPTH

Effect: This reverses each character in the window using whatever colours are currently in the window.

(ii) Syntax: SYS RVS, LC, TR, WIDTH, DEPTH, CLOR

Effect: This reverses the window using the colour determined by the variable CLOR. CLOR can have any value between 0 and 255 but only 16 colours are possible. (i.e., 0 = black, 1 = white, etc.)

The reverse command can be used to highlight certain sections of the screen, to cause windows to flash (simply reverse it several times in succession - possible with a delay in between), to create explosion effects, etc.

3) COLORING A WINDOW

Syntax: SYS COL, LC, TR, WIDTH, DEPTH, CLOR

Effect: This changes all characters in the window to the colour specified by CLOR.

This command can be used to highlight certain sections of text (simply by changing its color). It can also be used to flash a certain section of text (simply alternate the color in the window with the background colour several times).

4) THE FILL COMMAND

Again there are two types of fill commands.

(i) Syntax: SYS FILL, LC, TR, WIDTH, DEPTH, CHTR

Effect: This fills the window with the character specified by the variable CHTR using whatever colors are already on the screen. CHTR can have any value between 0 and 255 and produces the same character as when POK(E)ing to the screen.

This command is useful for such things as erasing sections of the screen (simply fill the window with blanks - CHTR = 32), fast underlining, drawing grids, etc.

(ii) Syntax: SYS FILL, LC, TR, WIDTH, DEPTH, CHTR, CLOR

Effect: This fills the window with the character determined by CHTR using the color determined by CLOR.

This command is useful for filling a region with a block of color (use a reversed space - CHTR = 160, and CLOR = the color of your choice). It can also be used to erase a section of the screen while making sure that the color in that region is also a specified color (CHTR = 32, CLOR = whatever).

5) DRAWING BORDERS

(i) Syntax: SYS BRDR, LC, TR, WIDTH, DEPTH, CHTR

(ii) Syntax: SYS BRDR, LC, TR, WIDTH, DEPTH, CHTR, CLOR

Effect: The first command will draw a border around the window using the character determined by CHTR and using whatever color is presently on the screen. The second command will use whatever color is specified by CLOR.

When using these commands in a program, you must make certain that the variables UP, DWN, LFT, RHT, RVS, COL, FILL, and BRDR are properly initialized. Also you must make certain that none of your own variables conflict with these [e.g., If you have a variable COLUMN in your program, it will conflict with COL]. The parameters that define the window, the character, and/or the color can be variables or constants. If you use variables, then you can use any name that you wish.

Listing 1 is an assembly language listing of the routines. Use this if you only require some of the commands or if you need to relocate them.

Listing 2 is the same routine in DATA statements and will have to be included in any program that uses these routines. If you are using a disk, then you can save this routine as a PGM file and load it from within any program that requires it. This approach will save a lot of memory. Here's how its done.

1. Delete line 10000
2. Replace with

```
9998 OPEN 1, 8, 1, "COMMANDS"
9999 PRINT #1, CHR$(0); CHR$(193);
10000 FOR I = 49408 TO 50121: READ
    X: PRINT #1, CHR$(X); NEXT:
    CLOSE 1
```

3. Anytime you wish to use it from within a program, use the following line near the beginning of your program.

```
30 IF PEEK(49500) <>202 OR
    PEEK(50000)< >165 THEN LOAD
    "COMMANDS", 8, 1
```

Listing 3 is a sample program that demonstrates some of the things you can do with these new commands. I am sure you can use your imagination to come up with a host of others.

Continued on page 64

Figure 1

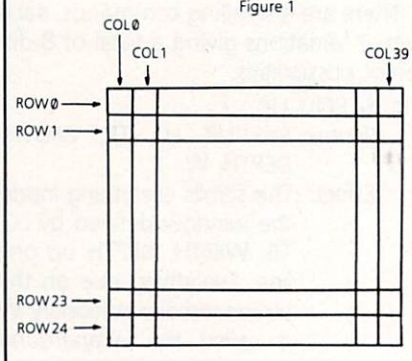


Figure 2

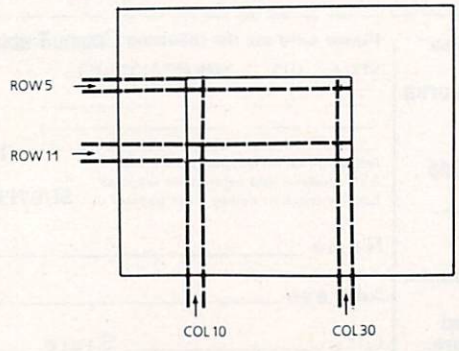
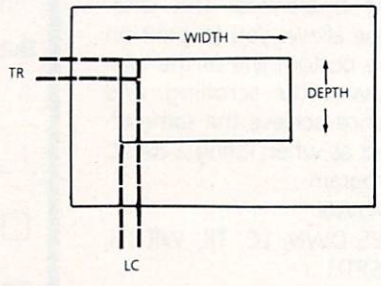


Figure 3



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Circle No. 136

Continued from page 62

LISTING 1

```
LINE# LOC   CODE        LINE

00001  0000             BAS1=$D0                ;SCREEN ADDRESS FOR ROW
00002  0000             BAS2=$D2                ;TEMPORARY WORK AREA
00003  0000             BAS3=$D4                ;COLOUR ADDRESS FOR ROW
00004  0000             BAS4=$D6                ;TEMPORARY WORK AREA
00005  0000             WRAP=$02                ;0=BLANKING  1=WRAPAROUND
00006  0000             ZP=$D0                  ;BEGINNING OF ZERO PAGE WORK ARE
A
00007  0000             LC=$FB                  ;LEFT COLUMN OF WINDOW
00008  0000             TR=$FC                  ;TOP ROW OF WINDOW
00009  0000             WIDTH=$FD               ;WIDTH OF WINDOW
00010  0000             DEPTH=$FE               ;DEPTH OF WINDOW
00011  0000             COLOR=$02               ;COLOR OF WINDOW
00012  0000             CFLAG=$AE               ;FLAG: $FF=SPECIFIED  $00=NOT
00013  0000             CHRCTR=$AF              ;CHARACTER FOR FILL OR BORDER
00014  0000             TXTPTR=$7A              ;TEXTPOINTER
00015  0000             TEMPZ=$C000             ;TEMPORARY AREA FOR ZERO PAGE
00016  0000             TEMPS=$C020             ;TEMPORARY AREA FOR SCREEN LINE
00017  0000             TEMPC=$C048             ;TEMPORARY AREA FOR COLOUR LINE
00018  0000             ILLQTY=$B248            ;ILLEGAL QUANTITY ERROR
00019  0000             COMBYT=$B7F1;CHECK FOR COMMA AND GET A BYTE
00020  0000                    *=$C100
00021  C100             ;
00022  C100             ; SCROLL UP ROUTINE
00023  C100             ;
00024  C100  20 E2 C1   UP      JSR GETPMS      ;GET WINDOW PARAMETERS
00025  C103  20 F1 B7           JSR COMBYT      ;GET WRAPAROUND PARAMETER
00026  C106  86 02              STX WRAP
00027  C108  20 14 C2           JSR SWAPZP      ;SAVE ZERO PAGE
00028  C10B  A5 FB              LDA LC
00029  C10D  A6 FC              LDX TR
00030  C10F  20 9B C1           JSR BASCLC      ;CALCULATE ADDRESSES FOR TOP ROW
00031  C112  20 CD C1           JSR SAVE        ;SAVE TOP LINE OF WINDOW
00032  C115  A6 FE              LDX DEPTH
00033  C117  CA                 DEX
00034  C118  30 15              BMI REPLAC
00035  C11A  18        START    CLC
00036  C11B  A5 D0              LDA BAS1
00037  C11D  69 28              ADC #$28
00038  C11F  85 D2              STA BAS2
00039  C121  85 D6              STA BAS4
00040  C123  A5 D1              LDA BAS1+1
00041  C125  69 00              ADC #$00
00042  C127  85 D3              STA BAS2+1
00043  C129  20 77 C1           JSR MOVE        ;MOVE LINE UP
00044  C12C  CA                 DEX             ;DO NEXT LINE
00045  C12D  10 EB              BPL START
00046  C12F  A4 FD     REPLAC   LDY WIDTH       ;REPLACE BOTTOM (TOP) LINE
00047  C131  B9 20 C0  LINE     LDA TEMPS,Y     ;WITH ORIGINAL TOP (BOTTOM)
00048  C134  91 D0              STA (BAS1),Y    ;LINE OR LINE OF BLANKS
00049  C136  B9 48 C0           LDA TEMPC,Y
00050  C139  91 D4              STA (BAS3),Y
00051  C13B  88                 DEY
00052  C13C  10 F3              BPL LINE
00053  C13E  20 14 C2           JSR SWAPZP      ;RESTORE ZERO PAGE
00054  C141  58                 CLI
00055  C142  60                 RTS
00056  C143             ;
00057  C143             ; SCROLL DOWN ROUTINE
00058  C143             ;
00059  C143  20 E2 C1   DWN     JSR GETPMS      ;GET WINDOW PARAMETERS
00060  C146  20 F1 B7           JSR COMBYT      ;GET WRAPAROUND PARAMETERS
00061  C149  86 02              STX WRAP
00062  C14B  20 14 C2           JSR SWAPZP      ;SAVE ZERO PAGE
00063  C14E  20 B6 C2           JSR LASTLN      ;CALCULATE ROW # OF BOTTOM LINE
00064  C151  AA                 TAX
```

```
LINE# LOC   CODE        LINE
00065  C152  A5 FB           LDA LC
00066  C154  20 9B C1        JSR BASCLC      ;GET ADDRESSES FOR BOTTOM LINE
00067  C157  20 CD C1        JSR SAVE        ;SAVE BOTTOM LINE
00068  C15A  A6 FE           LDX DEPTH
00069  C15C  CA              DEX
00070  C15D  F0 D0           BEQ REPLAC
00071  C15F  38        START2 SEC
00072  C160  A5 D0           LDA BAS1
00073  C162  E9 28           SBC #$28
00074  C164  85 D2           STA BAS2
00075  C166  85 D6           STA BAS4
00076  C168  A5 D1           LDA BAS1+1
00077  C16A  E9 00           SBC #$00
00078  C16C  85 D3           STA BAS2+1
00079  C16E  18              CLC
00080  C16F  20 77 C1        JSR MOVE        ;MOVE LINE DOWN
00081  C172  CA              DEX             ;DO NEXT LINE
00082  C173  10 EA           BPL START2
00083  C175  30 B8           BMI REPLAC
00084  C177  29 03     MOVE  AND #$03        ;MOVE LINE AND CHANGE
00085  C179  09 D8           ORA #$D8        ;POINTERS FOR NEXT MOVE
00086  C17B  85 D7           STA BAS4+1
00087  C17D  A4 FD           LDY WIDTH
00088  C17F  B1 D2     HERE  LDA (BAS2),Y
00089  C181  91 D0           STA (BAS1),Y
00090  C183  B1 D6           LDA (BAS4),Y
00091  C185  91 D4           STA (BAS3),Y
00092  C187  88              DEY
00093  C188  10 F5           BPL HERE
00094  C18A  A5 D3           LDA BAS2+1
00095  C18C  85 D1           STA BAS1+1
00096  C18E  A5 D2           LDA BAS2
```

Continued on page 66

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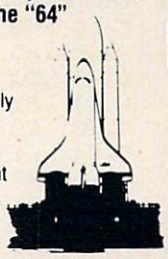

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```
 LINE# LOC   CODE        LINE
00097  C190  85 D0             STA BAS1
00098  C192  A5 D7             LDA BAS4+1
00099  C194  85 D5             STA BAS3+1
00100  C196  A5 D6             LDA BAS4
00101  C198  85 D4             STA BAS3
00102  C19A  60                RTS
00103  C19B                  ;
00104  C19B                  ; CALCULATE ADDRESSES FOR LEFT
00105  C19B                  ; SIDE OF WINDOW ON SPECIFIED ROW
00106  C19B                  ;
00107  C19B  48              BASCLC PHA
00108  C19C  A9 D8                  LDA #$D8          ;START 40 BYTES BEFORE THE
00109  C19E  85 D0                  STA BAS1          ;BEGINNING OF THE SCREEN
00110  C1A0  AC 88 02               LDY $0288
00111  C1A3  88                    DEY
00112  C1A4  84 D1                  STY BAS1+1
00113  C1A6  18              AGAIN  CLC               ;ADD 40*ROW #
00114  C1A7  A5 D0                  LDA BAS1
00115  C1A9  69 28                  ADC #$28
00116  C1AB  85 D0                  STA BAS1
00117  C1AD  A5 D1                  LDA BAS1+1
00118  C1AF  69 00                  ADC #$00
00119  C1B1  85 D1                  STA BAS1+1
00120  C1B3  CA                    DEX
00121  C1B4  10 F0                  BPL AGAIN
00122  C1B6  18                    CLC
00123  C1B7  68                    PLA               ;ADD COLUMN #
00124  C1B8  65 D0                  ADC BAS1
00125  C1BA  85 D0                  STA BAS1          ;SCREEN ADDRESS IN BAS1
00126  C1BC  85 D4                  STA BAS3          ;COLOUR ADDRESS IN BAS3
00127  C1BE  A5 D1                  LDA BAS1+1
00128  C1C0  69 00                  ADC #$00
00129  C1C2  85 D1                  STA BAS1+1
00130  C1C4  29 03                  AND #$03
00131  C1C6  09 D8                  ORA #$D8
00132  C1C8  85 D5                  STA BAS3+1
00133  C1CA  A4 FD                  LDY WIDTH
00134  C1CC  60                    RTS
00135  C1CD  A5 02           SAVE   LDA WRAP          ;SAVE CURRENT LINE
00136  C1CF  D0 03                  BNE NEXT
00137  C1D1  A9 20                  LDA #$20          ;USE BLANKS
00138  C1D3  2C                     .BYTE $2C
00139  C1D4  B1 D0           NEXT   LDA (BAS1),Y      ;USE ORIGINAL LINE
00140  C1D6  99 20 C0               STA TEMPS,Y
00141  C1D9  B1 D4                  LDA (BAS3),Y
00142  C1DB  99 48 C0               STA TEMPC,Y
00143  C1DE  88                    DEY
00144  C1DF  10 EC                  BPL SAVE
00145  C1E1  60                    RTS
00146  C1E2                  ;
00147  C1E2                  ; GET THE FOUR PARAMETERS THAT
00148  C1E2                  ; DETERMINE THE SIZE OF THE WINDOW
00149  C1E2                  ;
00150  C1E2  20 F1 B7        GETPMS JSR COMBYT        ;GET THE LEFT COLUMN
00151  C1E5  8A                    TXA
00152  C1E6  29 3F                  AND #$3F
00153  C1E8  85 FB                  STA LC
00154  C1EA  20 F1 B7               JSR COMBYT        ;GET THE TOP ROW
00155  C1ED  8A                    TXA
00156  C1EE  29 1F                  AND #$1F
00157  C1F0  85 FC                  STA TR
00158  C1F2  20 F1 B7               JSR COMBYT        ;GET THE WIDTH
00159  C1F5  CA                    DEX
00160  C1F6  86 FD                  STX WIDTH
00161  C1F8  18                    CLC
00162  C1F9  A5 FB                  LDA LC
00163  C1FB  65 FD                  ADC WIDTH
00164  C1FD  C9 28                  CMP #$28          ;IF > 40 THEN ILLEGAL QUANTITY
00165  C1FF  B0 10                  BCS ERROR
```

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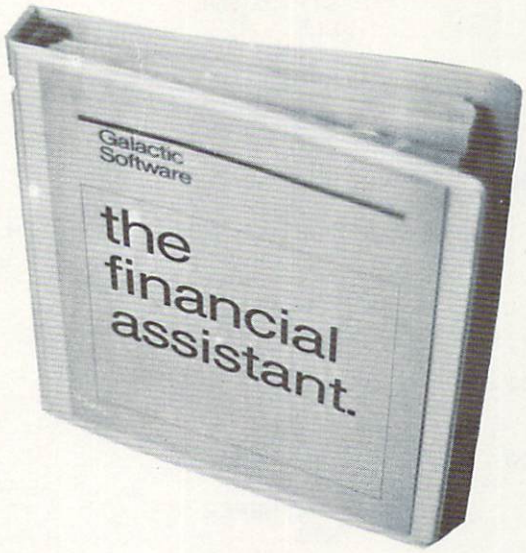

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Circle No. 18

Continued from page 66

```
 LINE#  LOC   CODE         LINE
00166  C201  20 F1 B7      JSR COMBYT      ;GET THE DEPTH
00167  C204  CA            DEX
00168  C205  86 FE         STX DEPTH
00169  C207  18            CLC
00170  C208  A5 FC         LDA TR
00171  C20A  65 FE         ADC DEPTH
00172  C20C  C9 19         CMP #$19        ; IF > 25 THEN ILLEGAL QUANTITY
00173  C20E  B0 01         BCS ERROR
00174  C210  60            RTS
00175  C211  4C 48 B2   ERROR  JMP ILLQTY
00176  C214               ;
00177  C214               ; SWAP PART OF ZERO PAGE WITH INPUT BUFFER
00178  C214               ;
00179  C214  78          SWAPZP SEI
00180  C215  A2 1E            LDX #$1E
00181  C217  B5 D0       HERE2  LDA ZP,X
00182  C219  48               PHA
00183  C21A  BD 00 C0         LDA TEMPZ,X
00184  C21D  95 D0            STA ZP,X
00185  C21F  68               PLA
00186  C220  9D 00 C0         STA TEMPZ,X
00187  C223  CA               DEX
00188  C224  10 F1            BPL HERE2
00189  C226  60               RTS
00190  C227               ;
00191  C227               ; SCROLL LEFT ROUTINE
00192  C227               ;
00193  C227  20 E2 C1    LFT    JSR GETPMS      ;GET WINDOW PARAMETERS
00194  C22A  20 F1 B7           JSR COMBYT      ;GET WRAPAROUND PARAMETER
00195  C22D  86 02              STX WRAP
00196  C22F  20 14 C2           JSR SWAPZP      ;SAVE ZERO PAGE
00197  C232  20 B6 C2           JSR LASTLN      ;GET ROW # OF BOTTOM LINE
00198  C235  A5 FB       START3 LDA LC
00199  C237  A6 D3              LDX BAS2+1      ;GET ROW #
00200  C239  20 9B C1           JSR BASCLC      ;CALCULATE SCREEN ADDRESSES
00201  C23C  A0 00              LDY #$00
00202  C23E  B1 D0              LDA (BAS1),Y    ;SAVE LEFTMOST CHARACTER
00203  C240  85 D2              STA BAS2        ;IN WINDOW
00204  C242  B1 D4              LDA (BAS3),Y    ;SAVE COLOUR OF THAT
00205  C244  48                 PHA             ;CHARACTER
00206  C245  90 0D              BCC TEST1
00207  C247  C8           HERE4  INY             ;MOVE LINE LEFT
00208  C248  B1 D0              LDA (BAS1),Y
00209  C24A  48                 PHA
00210  C24B  B1 D4              LDA (BAS3),Y
00211  C24D  88                 DEY
00212  C24E  91 D4              STA (BAS3),Y
00213  C250  68                 PLA
00214  C251  91 D0              STA (BAS1),Y
00215  C253  C8                 INY
00216  C254  C4 FD       TEST1  CPY WIDTH
00217  C256  90 EF              BCC HERE4
00218  C258  A5 02              LDA WRAP
00219  C25A  D0 03              BNE NEXT2
00220  C25C  A9 20              LDA #$20
00221  C25E  2C                 .BYTE $2C
00222  C25F  A5 D2       NEXT2  LDA BAS2        ;RESTORE WRAPAROUND CHARACTER
00223  C261  91 D0              STA (BAS1),Y
00224  C263  68                 PLA             ;RESTORE COLOUR
00225  C264  91 D4              STA (BAS3),Y
00226  C266  C6 D3              DEC BAS2+1      ;DO NEXT ROW
00227  C268  C6 FE              DEC DEPTH
00228  C26A  10 C9              BPL START3
00229  C26C  20 14 C2           JSR SWAPZP      ;RESTORE ZERO PAGE
00230  C26F  58                 CLI
00231  C270  60                 RTS
00232  C271               ;
00233  C271               ; SCROLL RIGHT ROUTINE
00234  C271               ;
```

Continued on page 70

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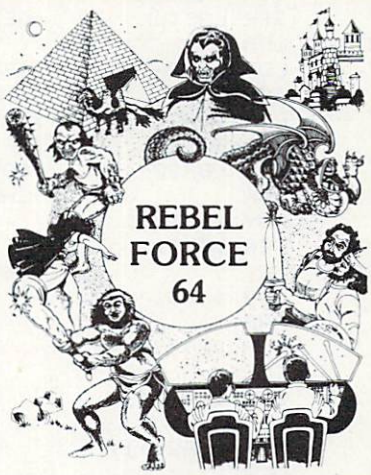

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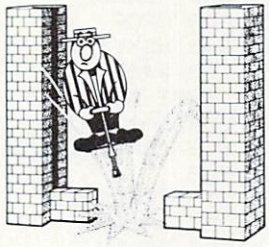

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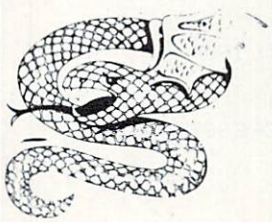
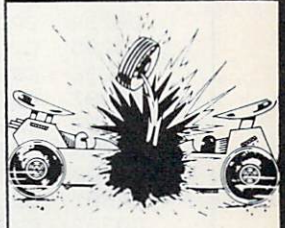


SNAKE OUT



HEAD ON

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Circle No. 12

Continued from page 68

```
 LINE# LOC   CODE        LINE
00235 C271  20 E2 C1    RHT     JSR GETPMS      ;GET WINDOW PARAMETERS
00236 C274  20 F1 B7            JSR COMBYT      ;GET WRAPAROUND PARAMETER
00237 C277  86 02               STX WRAP
00238 C279  20 14 C2            JSR SWAPZP      ;SAVE ZERO PAGE
00239 C27C  20 B6 C2            JSR LASTLN      ;GET ROW # OF BOTTOM LINE
00240 C27F  A5 FB       START4  LDA LC
00241 C281  A6 D3               LDX BAS2+1      ;GET ROW #
00242 C283  20 9B C1            JSR BASCLC      ;CALCULATE SCREEN ADDRESSES
00243 C286  B1 D0               LDA (BAS1),Y    ;SAVE RIGHTMOST CHARACTER
00244 C288  85 D2               STA BAS2        ;OF WINDOW
00245 C28A  B1 D4               LDA (BAS3),Y    ;SAVE COLOUR OF THAT
00246 C28C  48                  PHA             ;CHARACTER
00247 C28D  A4 FD               LDY WIDTH
00248 C28F  F0 0F               BEQ TEST2
00249 C291  88          HERE5   DEY             ;MOVE LINE RIGHT
00250 C292  B1 D0               LDA (BAS1),Y
00251 C294  48                  PHA
00252 C295  B1 D4               LDA (BAS3),Y
00253 C297  C8                  INY
00254 C298  91 D4               STA (BAS3),Y
00255 C29A  68                  PLA
00256 C29B  91 D0               STA (BAS1),Y
00257 C29D  88                  DEY
00258 C29E  D0 F1               BNE HERE5
00259 C2A0  A5 02       TEST2   LDA WRAP
00260 C2A2  D0 03               BNE NEXT3
00261 C2A4  A9 20               LDA #$20
00262 C2A6  2C                  .BYTE $2C
00263 C2A7  A5 D2       NEXT3   LDA BAS2        ;RESTORE WRAPAROUND CHARACTER
00264 C2A9  91 D0               STA (BAS1),Y
00265 C2AB  68                  PLA             ;RESTORE COLOUR
00266 C2AC  91 D4               STA (BAS3),Y
00267 C2AE  C6 D3               DEC BAS2+1      ;DO NEXT ROW
00268 C2B0  C6 FE               DEC DEPTH
00269 C2B2  10 CB               BPL START4
00270 C2B4  30 44               BMI FINI1
00271 C2B6                      ;
00272 C2B6                      ; CALCULATE ROW # OF BOTTOM LINE
00273 C2B6                      ;
00274 C2B6  A6 FC       LASTLN  LDX TR
00275 C2B8  8A                  TXA
00276 C2B9  18                  CLC
00277 C2BA  65 FE               ADC DEPTH
00278 C2BC  85 D3               STA BAS2+1
00279 C2BE  60                  RTS
00280 C2BF                      ;
00281 C2BF                      ; REVERSE ROUTINE
00282 C2BF                      ;
00283 C2BF  20 E2 C1    REV     JSR GETPMS      ;GET WINDOW PARAMETERS
00284 C2C2  A0 00               LDY #$00
00285 C2C4  B1 7A               LDA (TXTPTR),Y  ;CHECK IF COLOUR PARAMETER
00286 C2C6  C9 2C               CMP #','        ;IS INCLUDED
00287 C2C8  D0 08               BNE NEXT6
00288 C2CA  20 F1 B7            JSR COMBYT      ;GET COLOUR
00289 C2CD  86 02               STX COLOR
00290 C2CF  A9 00               LDA #$00
00291 C2D1  2C                  .BYTE $2C
00292 C2D2  A9 FF       NEXT6   LDA #$FF
00293 C2D4  85 AE               STA CFLAG
00294 C2D6  20 14 C2            JSR SWAPZP      ;SAVE ZERO PAGE
00295 C2D9  20 B6 C2            JSR LASTLN      ;GET ROW # OF BOTTOM LINE
00296 C2DC  A5 FB       START5  LDA LC
00297 C2DE  A6 D3               LDX BAS2+1      ;GET ROW #
00298 C2E0  20 9B C1            JSR BASCLC      ;CALCULATE SCREEN ADDRESSES
00299 C2E3  B1 D0       HERE6   LDA (BAS1),Y    ;REVERSE THE LINE
00300 C2E5  49 80               EOR #$80
00301 C2E7  91 D0               STA (BAS1),Y
00302 C2E9  A5 AE               LDA CFLAG
```

```
 LINE# LOC   CODE        LINE
00303  C2EB  D0 04           BNE YMIN1
00304  C2ED  A5 02           LDA COLOR
00305  C2EF  91 D4           STA (BAS3),Y
00306  C2F1  88        YMIN1 DEY
00307  C2F2  10 EF           BPL HERE6
00308  C2F4  C6 D3           DEC BAS2+1      ;DO NEXT ROW
00309  C2F6  C6 FE           DEC DEPTH
00310  C2F8  10 E2           BPL START5
00311  C2FA  20 14 C2  FINI1 JSR SWAPZP      ;RESTORE ZERO PAGE
00312  C2FD  58              CLI
00313  C2FE  60              RTS
00314  C2FF                  ;
00315  C2FF                  ; FILL WINDOW WITH COLOUR ROUTINE
00316  C2FF                  ;
00317  C2FF  20 E2 C1  COL   JSR GETPMS      ;GET WINDOW PARAMETERS
00318  C302  20 F1 B7        JSR COMBYT      ;GET COLOUR
00319  C305  86 02           STX COLOR
00320  C307  20 14 C2        JSR SWAPZP      ;SAVE ZERO PAGE
00321  C30A  20 B6 C2        JSR LASTLN      ;GET ROW # OF BOTTOM LINE
00322  C30D  A5 FB    START6 LDA LC
00323  C30F  A6 D3           LDX BAS2+1      ;GET ROW #
00324  C311  20 9B C1        JSR BASCLC      ;CALCULATE SCREEN ADDRESSES
00325  C314  A5 02           LDA COLOR
00326  C316  91 D4    HERE7  STA (BAS3),Y    ;FILL LINE WITH COLOUR
00327  C318  88              DEY
00328  C319  10 FB           BPL HERE7
00329  C31B  C6 D3           DEC BAS2+1      ;DO NEXT ROW
00330  C31D  C6 FE           DEC DEPTH
00331  C31F  10 EC           BPL START6
00332  C321  30 D7           BMI FINI1
00333  C323                  ;
00334  C323                  ; FILL WINDOW WITH CHARACTER ROUTIINE
00335  C323                  ;
```

Continued on page 118

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Circle No. 12

Data Organization For The VIC-20

By Arthur J. Dudley

One of the more interesting facets of programming is to explore a microcomputer's internal structure and organization. This includes memory maps, microprocessor architecture, operating systems, interpreters–the list goes on and on. Although exploring a microcomputer's internal structure is not a prerequisite for high level programming, the venture is nevertheless an enjoyable and rewarding experience. This article and articles to come will key in on just a small area of this vast topic–the organization of data in memory.

Data for the VIC-20 can be placed into four categories:

1. *String Variables*-A sequential set of numbers, letters, or characters. A dollar sign will appear after the variable name.

Example: A$ = "COMPUTER"

2. *Integers*-Whole numbers; contains no decimal places. An integer can be a whole number between -32768 and +32767 inclusive. A percent sign appears after the variable name.

Example: A% = 500

3. *Floating Point Real Numbers*-Numerical data carried to a number of decimal places. VIC's BASIC floating point reals can be carried to nine decimal places.

Some Examples: A = 1.2353
A = 1.564565329
A = 1.2

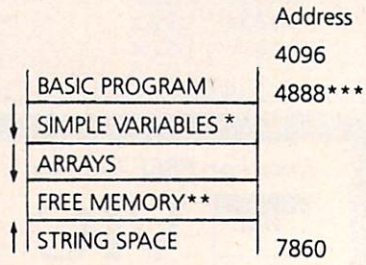
4. *Arrays* - A set of elements arranged in list or tabular form (can be more than one dimension). The set of elements is given one variable name with each element referenced by different subscripts.

Example: L(3) = 1 Value
Subscript: Indicates the third element of array
Name of Array

Variables are organized in memory as shown in Figure 1. Simple variables (integer, string, floating point) and arrays are placed into memory following the BASIC program in the direction of the arrows (from low address to high address). Variables come first followed by arrays. Strings start at the high end of memory and work toward the low end; therefore, when arrays meet the strings the computer has just run out of user available memory. Remember, variable assignments occur during program execution not before. This explains why the VIC has less memory available to the user after program execution if variables are being used. Load a program of your choice and enter PRINT FRE(X) before and after program execution to see what I mean (make sure you have some variables in your program).

Before you read any further, enter and SAVE the listed program. I plan to write an article on each of the four categories of variable, and the memory dump program will supplement each article. (Please See Program on Page 76.)

Figure 1: Standard Unexpanded VIC



* Contains string, integer, and floating point real variables.

** The function FRE(X) indicates the amount of memory in this area.

*** Address for the listed program only. This address will vary from program to program.

PROGRAM INSTRUCTIONS:

1. After the program is loaded enter RUN.
2. Enter your name. The sole purpose of this step is to demonstrate how strings are stored in memory.
3. You will see three columns appear on your screen. They are as follows: (from left to right) . . .
   a. Memory Addresses
   b. Decimal Representations stored

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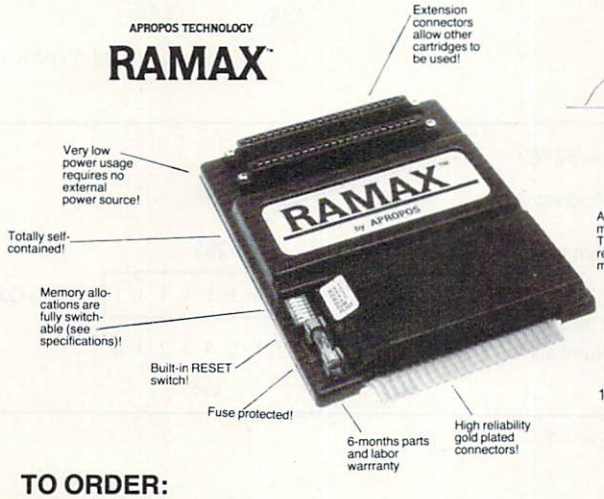

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  BLK 3 (8k: Adr. 24576-32767)
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in memory
c. Actual Variable Names listed in programs

4. Control key descriptions:
   SPACE BAR Scrolls to the higher memory addresses
   ↑ ..... Scrolls to the lower memory addresses (next to asterisk key)
   J ..... Advances to the address of your choice
   R ..... Returns to the first display (lowest memory addresses for variables)
   A ..... Branches to array variables section
   S ..... Branches to string variables section
   E ..... Exit from Program
5. *Important.* Articles will refer to examples and tables from time to time. The examples given duplicate information actually in memory. Use the SPACE BAR or the ↑ KEY as necessary to obtain a display of that variable.
6. If you do not fully understand the functions of the control keys, do not worry about it. I will cover the control keys in detail in future articles. Stay on the first display for now.

INTEGER VARIABLES

Since these are the simplest in form, I will begin with integers first. An integer will occupy a total of seven bytes in memory. Referring to Figure 2, the first two bytes are reserved for the variable's name. The VIC uses ASCII character codes to represent variable names; however, these codes are modified somewhat to allow the VIC to differentiate between the various types of variables (integer, real, string). The VIC adds the number 128 to the ASCII codes representing the first and second characters for integer variables. Floating point real numbers use the standard ASCII code to represent variable names; no modification is performed. Finally, String variables have the number 128 added to the ASCII code of the second character only; the first is left unmodified.

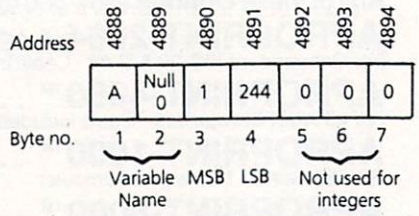
Example: For the integer variable name of A%, the first character will be represented by the decimal equivalent *193* [65 (ASCII code for an "A") + 128].

Since there is no second character, it will be represented by the decimal equivalent *128* [0 (ASCII code for a Null character) + 128].

Bytes five, six, and seven are not used for integers, which leaves us with bytes three and four to store the actual value. Let us take a close look at these two bytes. The third byte (stored at *4890*) is the most significant byte (MSB), and the fourth byte (stored at *4891*) is the least significant byte (LSB). The LSB represents the units of an integer, and the MSB represents the multiples of 256. Therefore, the number 500 is represented by a *244* as the LSB and a *1* as the MSB. The formula being LSB + (256 X MSB) = Positive Integer Value. In figure 2, we have 244 + (256 X 1) = 500.

LSB MSB

Figure 2: A% = 500



The Integer A% as shown on the screen display

4888 193 A ← variable name as listed in program
4889 128 ← decimal representation of variable name stored in memory
4890 1 ← MSB
4891 244 ← LSB
4892 0
4893 0
4894 0
addresses

Figure 3 has the MSB and LSB broken down to their binary codes and decimal representations. The decimal values indicated on the top of each box (byte) are what would be displayed with a PRINT PEEK (X) statement (X being the byte's address) and are the values you see in the second column of the screen display. The binary values inside each box are the actual binary codes stored in memory. You may have noticed that the left-most bit of the MSB is reserved for the sign. A one indicates a negative value, a zero a positive value. The maximum value the MSB can contain when excluding the sign is 127 (bits 0 through 6 set to one). The LSB can utilize all 8 bits thus it can have a maximum value of 255 (all eight bits set to one). By applying our formula, we can determine the largest positive integer value to be

32767 [255 + (256 X 127) = 32767].
LSB MSB

Now what about the negative side?

The VIC-20 handles negative values differently than positive values. Figure 4 shows the binary value of a -1 (all bits set to one). This method is called the two's complement and is the method used by the VIC-20 to represent all negative integers.

Here is how the conversion from negative to positive is made.

Example: An integer value of + 1 equals 00000000 00000001 in binary.
MSB LSB

Continued on page 76

Figure 3: B% = 32767

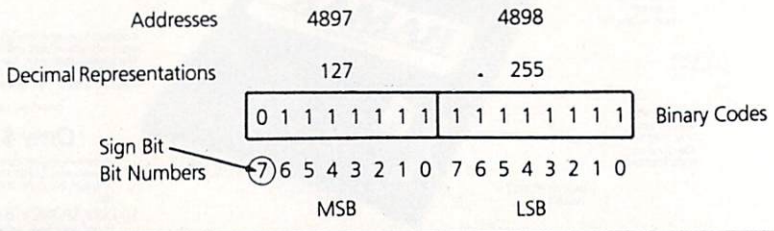
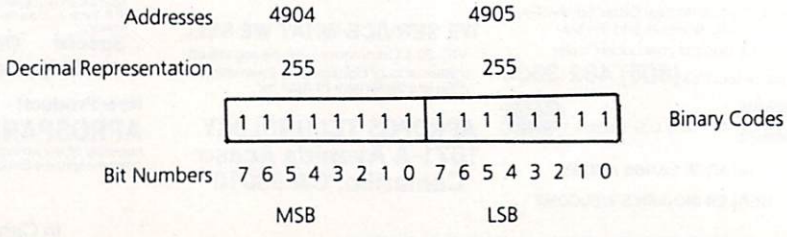


Figure 4: C1% = −1



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To change from a +1 to a -1 . . .

1) Set all bits to their opposite value.

```
00000000  00000001 becomes
  MSB       LSB

11111111  11111110
  MSB       LSB
```

2) Add a binary one to the LSB.

```
  MSB       LSB
1111111   11111110
                +1
--------------------
11111111  11111111
          = -1 (two's complement)
```

A memory dump will not give you binary codes but rather decimal equivalents; therefore, we need to know how to convert these over to their integer values for negative values as well. Remember, the conversion formula for a positive value is LSB + (256 X MSB) = Positive Integer Value. The formula for a negative value is (256 − LSB) + (255 −MSB) × 256 = Negative Integer Value. You ask, "By looking only at the decimal equivalent, how do I know if I have a negative integer in the first place?"

The answer is simple. If the MSB is greater than 127, you will have a negative integer. Example: What is the integer value if the MSB is 128 and the LSB is 0? Since the MSB is greater than 127, the integer will be negative; therefore, there is no need to multiply the conversion equation by a -1.

By applying our formula we have–

```
(256 -0) + (255 -128) X 256 = -32768
    LSB         MSB
```

(The lowest integer value possible)

Note: Refer to address number *4909* on your screen display to see how DD% = -32768 is stored in memory.

That concludes the portion on integers. Next month, I will cover floating point real numbers. If you have any questions or comments on this article, send your correspondence to: Arthur J. Dudley, c/o Commander Magazine, P.O. Box 98827, Tacoma, WA 98498

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Continued from page 72

```
5 REM **SET UP TEST VARIABLES**
6 A%=500:B%=32767:C1%=-1:DD%=-32768:CD=1.564565329:E$="XX":DIML%(4),M(4),N$(4)
7 FORJ=0TO4:L%(J)=J:NEXT:FORJ=0TO4:M(J)=J:NEXT:N$(1)="A":N$(2)="B":N$(3)="C":N$(
4)="D"
8 INPUT"□NAME  ";NA$
65 AD=PEEK(46)*256+PEEK(45)
75 DO=7
77 PRINT"□"
80 FORJ=ADTO65535
90 PRINTJ;TAB(7)PEEK(J);
92 IFDO=7THENDO=0:GOTO100
93 IFDO=1ORX$="J"ORX1$="J"THENGOTO100
95 PRINT:GOTO120
100 IFPEEK(J)=>128THENGOSUB1000
102 IFPEEK(J)<128ANDPEEK(J)>64THENPRINTTAB(14)CHR$(PEEK(J))
103 IFPEEK(J)<65THENPRINT
120 CO=CO+1
121 DO=DO+1
140 IFCO<21THEN169
150 GETX$:IFX$=""THEN150
152 IFX$=CHR$(94)THENDO=7:J=J-42
153 PRINT"□"
155 IFX$="J"THENGOSUB2000
156 IFX$="R"THENJ=AD-1:D=7:CO=0:X1$="  "
157 IFX$="E"THENEND
158 IFX$="A"THENJ=PEEK(48)*256+PEEK(47)-1:DO=7:CO=0
159 IFX$="S"THENJ=PEEK(52)*256+PEEK(51)-1:X1$="J"
160 CO=0
169 IFJ>=PEEK(48)*256+PEEK(47)THENDO=7
170 PRINT"□";:POKE36869,240:NEXT:END
1000 PRINTTAB(14)CHR$(PEEK(J)-128)
1010 RETURN
2000 PRINT"□"
2001 INPUT"ADDRESS";J1
2005 J=J1-1
2010 RETURN
```

VIC-20 And Commodore 64 Loader For Pet

By David A. Hook

With VIC-20s and Commodore 64s selling so well, there is bound to be an occasion where a PET/CBM user is called upon to transfer or load programs for the "color" machines. As many of you know, this can prove to be a frustrating experience.

I suspect there are many people who have a VIC or C-64 in one location, while wishing to use a PET interchangeably at another. School, business and home users may be candidates for minimizing the hassles described below.

Both the VIC and C-64 have a "relocating loader" built into the ROM. This means that Basic programs will LOAD into the machine at the "proper" location, i.e., wherever the "start-of-Basic" happens to be at the time. The VIC has three potential start-of-Basic locations, depending on which memory expansion cartridge or cartridges have been fitted. Only one configuration (VIC plus 3K or Superexpander) matches where the PET would begin its Basic.

The C-64 normally places Basic programs at an odd location for the PET. Both VIC and C-64 have many example programs where the start-of-Basic has been moved to serve other purposes. (High-resolution graphics pictures would be one case.)

You probably have read at least one article describing what to do after loading a VIC or C-64 program. If it doesn't seem to LIST on the PET, you are offered several things to try. After a few POKEs, the LIST may work and you can edit the program merrily. When you then SAVE this copy, you will probably perpetuate the messy procedure the next time you LOAD it back into the PET. Since you will have by then forgotten which POKE sequence worked, you can do it all over again.

This is not my idea of an efficient way to spend time. I'd rather be creating all manner of bugs in my programs. Why waste time POKEing when you could be frustrating yourself?

When I first got my VIC, I had no way to connect my 4040 Disk Drive to it. So that I could get backups to my VIC programs, I would LOAD the tape copy into the PET and then SAVE it onto disk. It made sense to have this copy "LISTable" on the PET, so this program was created.

There is a second, more subtle, shortcoming in the PET handling of VIC or C-64 programs. Using TINYMON FOR VIC or SUPERMON FOR VIC to create machine language programs, you get a file that the PET completely ignores. While many of you don't give a hoot about such files, they are of great importance to me.

The second function of V64 LOADER is to LOAD these programs into the PET, and store them in the location where they were meant to go! But, you ask, how will I know where to find it? Simple, he says, (never ask yourself a question you can't answer)–why not display the start and end locations on the screen as it's LOADing? They will be shown in hexadecimal form, so that you ML afficionados will know how to save it with the machine language monitor.

So much for the lengthy preamble. There are two versions of the program–one for Upgrade (Basic 2.0) and one for Basic 4.0 PET/CBMs. To simplify things, we'll use the Basic 4.0 version and then adapt it (if necessary) for Basic 2.

Accompanying the article is a program listing of the Basic portion. The unfamiliar-looking table is the "hex-dump" for the machine code part of the routine. You will also see the assembly language source code listing for the ML. Unless you know what this is, you can safely ignore it. It is not necessary to know a shred of machine language to enter, or to use, the program.

When the procedure below is followed, you will have a program that should be LOADed into the PET when it is first powered-on. After RUNning, the routine may be activated or cancelled with the same "SYS" instruction. It will sit in high memory, comfortably protected from intrusion from Basic until you need it.

Procedure:

You'll need to do this in three stages:

1) Type in the Basic portion and save it to tape or disk.
2) Enter the machine-language monitor, typing a bunch of hexadecimal numbers. Save this part separately, too.
3) Combine the two, then SAVE the composite program.

I'll attempt to lead the way through the puzzle . . . it's not too long a process.

Step 1:

Let's start with an empty computer–turn your machine off and back on again.

Type in the Basic portion by following the printed listing exactly. Don't leave out anything (or insert any extra either). When you are finished, '?FRE(Ø)' to check available memory. For 16K this should be 14809 bytes free, and for 32K, 31193 bytes free. Check carefully if you are more than a few different from this.

Do NOT attempt to RUN this yet.

Save this program to tape or disk, as file name "V64.BAS". Verify it normally.

Step 2:

Consult the "hex dump" of the program which accompanies this article.

Type 'SYS4' to enter the M.L. monitor. Don't be intimidated by the unfamiliar display–you can do this without really knowing what is going on!

Beside the ".", type the following:

M Ø64Ø Ø6FØ 'RETURN'

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The screen will fill with lots of numbers and letters. You must type the values you see in the tables right over the "AA" values on your screen. The first set of four values is the "address". Enter the values using the address as a reference to the matching "line". Don't forget to hit 'RETURN' at the end of each line. A double-check may save later grief.

When this "block" is done, type:

M Ø6F8 Ø7BØ 'RETURN'

Enter the correct values from the table, and double-check.

Now we are ready to save this part, so type:

S "Ø:V64-4.ML",Ø8,Ø64Ø,Ø7B8
(Drive #Ø on disk)

S "V64-4.ML",Ø1,Ø64Ø,Ø7B8
(Tape #1)

NOTE: Do not alter the range to be saved, or save a few extra bytes to be "on the safe side". The whole program will bomb out if you do!

Basic 4.0 users can proceed to Step 3. Upgrade (Basic 2.0) users need to make the following corrections. Type the instructions, then alter the bytes that are displayed to match those below:

M Ø728 Ø72F 'RETURN'

.: Ø728 2Ø 56 F6 2Ø 12 F8 2Ø ØA

M Ø738 Ø73F 'RETURN'

.: Ø738 ØØ 2Ø 97 F4 DØ Ø8 4C 6E

M Ø75E Ø76A 'RETURN'

.: Ø75E 6A E7 A9 2D 2Ø D2 FF 2Ø

.: Ø766 97 E7 2Ø 6A E7 B8 5Ø 28

M Ø797 Ø79B 'RETURN'

.: Ø797 B9 F3 4C DD F3 A5 9D 48

M Ø7AØ Ø7AF 'RETURN'

.: Ø7AØ 55 F8 AØ ØØ ØØ B1 D6 C9

.: Ø7A8 Ø3 FØ Ø3 4C BØ F5 4C BC

Now we are ready to save this part, so type:

S "Ø:V64-2.ML",Ø8,Ø64Ø,Ø7B8
(Drive #Ø on disk)

S "V64-2.ML",Ø1,Ø64Ø,Ø7B8
(Tape #1)

Step 3:

Get back to Basic, by typing:

X 'RETURN'

ReLOAD "V64.BAS" followed by the proper "V64-n.ML" (n = 2 or n = 4). When you do a Basic SAVE, it will get the whole works. Use a file name of "V64LOADER4.REL" or "V64LOADER2.REL" as the case may be.

Do not make any adjustments to the Basic portion. It would move the machine language too–and goodbye forever!!!

Check out:

ML programs have a nasty habit of "crashing" the PET instead of politely informing you of an error. We should perform a routine check before attempting to RUN it.

Type in NEW before entering the following Basic program:

```
10 LET T = Ø
20 FOR I = 1600 TO 1975
30 T = T + PEEK (I)
40 NEXT I
50 PRINT T
```

After a few seconds, the answer "45956" should appear on the screen (45866 for Basic 2.0). If yours doesn't match, there's an error to be tracked down. You will need to re-enter the ML monitor (SYS4), display the two "blocks" of memory as you did when you entered them, and carefully compare the values. Make the necessary changes, hitting 'RETURN' to store the new values. (If it's a Basic 2.0 variety, watch out for the changed lines in the body of the article–don't "correct" them back to Basic 4.0 by mistake.) You'll need to reSAVE the machine language portion using the ML monitor, as in Step 2. Use a different file name! Then put it together again, following Step 3.

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Operation:

Type 'RUN' and the program will relocate the machine language portion. It moves up to high-memory automatically, correcting the necessary pointers. Basic will not interfere with its operation.

On the screen, the Basic part of the program has displayed some information on how to use it. The line with a "SYS" number tells you how to cancel or reactivate it. Copy this down, because you won't remember it later.

You probably won't have to cancel it, unless you are concurrently using another ML program that wants to use the same technique to intercept characters before Basic sees them. (The CHRGOT routine, if you must know.)

To load a VIC or C-64 tape into the PET, type:

V "FILE NAME" 'RETURN'

The " " must be in the first column of a screen line or the PET will ignore it. The "file name" is optional—if omitted, the load will be done on the first program found.

You will get the normal messages, i.e., 'PRESS PLAY . . .', so follow normal procedure. When the 'READY' message appears and the cursor returns, a Basic program may be LISTed, edited and SAVEd just as if it were entered on the PET in the first place.

If the program was really a special, "absolute load file", the PET will load it in the same spot in memory it was SAVEd at (on the VIC or C-64). However, alongside the file name, the start and end address (in hex) will be printed. This will flag this type of load, and allow you to find it more easily in the PET memory. Without this program, the PET would have completely ignored this file!

While I was program librarian for the 8,000-member Toronto Pet User Group, our library acccumulated some 3,000 programs. It was an absolute minimum standard of mine that all submissions to the library be converted so that they would LIST on the PET. I believe that our members appreciated being able to "see" the program, even if it wouldn't run on their machine. I can safely say that this is one utility that I've used as much as anyone.

The Alternative:

Here is one technique for manually changing the Basic pointers in the PET, so a VIC or C-64 program can be handled.

For VIC:

LOAD the program and attempt to LIST it. If the listing shows on the screen, then carry on without further modifications. If it doesn't then type:

POKE 4096, 0 : POKE 41, 16 : CLR 'RETURN'

Try the LIST now. It came from an unexpanded VIC if you now have the program visible. If that doesn't work, try:

POKE 4608, 0 : POKE 41, 18 : CLR 'RETURN'

The LIST should work now, and the program was SAVEd on a VIC with an 8K (or more) expander in place. But if it doesn't, it's pretty tricky–(that's the reason I did this).

For Commodore 64:

LOAD the program and attempt to LIST it. If the listing shows on the screen, then carry on without further modifications. If it doesn't, then type:

POKE 2048, 0 : POKE 41, 8 : CLR 'RETURN'

This will catch most of the Basic programs that were SAVEd on the C-64. You are on your own if it doesn't.

I'm somewhat biased, but I think the investment in preparing V64 LOADER will be worth it. See you next month, when I hope to have another utility program ready for VIC owners. I would like to acknowledge the kind assistance of Mr. Maurice Taylor, of Taylor Business Computers, for use of some of his equipment in the preparation of this article.□

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LISTING 1

```
PROGRAM:  V64 LOADER.BAS

 100 REM LOAD VIC OR C-64 TAPES INTO PET
 110 REM     FOR BASIC 4.0 ONLY
 120 REM    AS OF JULY 14, 1983
 130 REM
 140 REM      (C) DAVID A. HOOK
 150 REM       58 STEEL STREET
 160 REM   BARRIE, ONTARIO, CANADA
 170 REM   L4M 2E9    (705) 726-8126
 180 REM
 190 REM ALL COMMERCIAL RIGHTS RESERVED
 200 REM
 210 PRINT"[CLEAR,RVS]"TAB(15)"VIC LOADER"
 220 SYS 1600
 230 PRINT"[DOWN3]-ACTIVATE OR CANCEL THE LOADER USING:"
 240 SA=PEEK(52)+256*PEEK(53)
 250 PRINT TAB(10)"[DOWN2]SYS("SA")"
 260 PRINT"[DOWN2]- TO LOAD A VIC TAPE, TYPE:"
 270 PRINT"[DOWN2]<V "CHR$(34)"FILE NAME"CHR$(34)
 280 PRINT"[DOWN2]- FILE NAME IS OPTIONAL.
 290 PRINT"[DOWN]- TYPE THE COMMAND AT COLUMN '0'."
```

LISTING 2

```
.
.:  0640 A5 2A 85 1F A5 2B 85 20
.:  0648 A5 34 85 21 A5 35 85 22
.:  0650 A0 00 A5 1F D0 02 C6 20
.:  0658 C6 1F B1 1F D0 3C A5 1F
.:  0660 D0 02 C6 20 C6 1F B1 1F
.:  0668 F0 21 85 23 A5 1F D0 02
.:  0670 C6 20 C6 1F B1 1F 18 65
.:  0678 21 AA A5 23 65 22 48 A5
.:  0680 34 D0 02 C6 35 C6 34 68
.:  0688 91 34 8A 48 A5 34 D0 02
.:  0690 C6 35 C6 34 68 91 34 18
.:  0698 90 B6 C9 BF D0 ED A5 34
.:  06A0 85 30 A5 35 85 31 6C 34
.:  06A8 00 AA AA AA AA AA AA AA
.:  06B0 BF AE FE FF 00 E4 34 AD
.:  06B8 FF FF 00 E5 35 B0 0B 86
.:  06C0 34 86 30 AD FF FF 00 85
.:  06C8 35 85 31 A2 03 B5 78 48
.:  06D0 BD FA FF 00 95 78 68 9D
.:  06D8 FA FF 00 CA D0 F1 60 C9
.:  06E0 3C D0 08 48 A5 77 C9 00
.:  06E8 00 F0 08 68 C9 3A B0 EF
.:  06F0 4C 7D 00 00 20 70 00 00
```

Continued on page 84

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BITS & PIECES

Dear Editor:

We would like to point out a couple of errors in the article by Gary Kiziak titled "A Character Editor for the Commodore 64" which appeared in the June issue.

The first error involves a correction which would only be noticed by cassette users since it has no effect on disk based systems. Here is the correction, which should be added as the first line in the "CHAR EDITOR" program.

```
90 IF PEEK(896)<>160 OR PEEK(933)
    <>169 THEN GOSUB 2500
```

The second error is a result of Commodore's introduction of the Kernal 2 ROM's. Anyone with the Kernal 1 ROM's will not have noticed any problems. Anyone with the Kernal 2 ROM's will have noticed that the 64 characters in the bottom half of the screen were missing– actually they were there, but they were invisible because they were the same color as the background (change the background color by pressing CTRL-B and you will see what I mean). Again it is a simple matter to fix this problem. Simply change lines 860 and 870 of the "CHAR EDITOR" program as follows:

```
860 J=1548:JJ=55820:FOR I=0 TO
    63:K=IAND15:IF K=0 THEN
    J=J+80:JJ=JJ+80
870 POKE 2*K+J,I+TT*64:POKE
    2*K+JJ,1:NEXT:RETURN
```

HELP?

Sirs,

I have a DMP-200 Printer (Radio Shack), a Commodore 64 computer, CPI-Serial to Parallel Interface (Micro Systems Development, Inc.), and a WordPro-64 program (Professional Software, Inc.). What type of Interface (or program codes) do I need to "make it all work"?

Very truly yours, Dennis Jackson

TYPING A PROGRAM FROM A VOICE RECORDING SAVES 80 PERCENT OF PROOFREADING TIME

It took a full day to proofread and debug a 200 line program from a magazine before I started using a voice recorder. The recording cuts this time to two hours.

Proofreading a computer listing efficiently ordinarily requires two people: one to read the magazine or print-out, and the other person to check the screen. The second person is not needed if a tape recording or speech synthesizer is used.

This article describes how I type listings and proofread from a cassette voice recording. A future article will describe an even better method that uses the VOTRAX speech synthesizer to read the screen while I check the magazine listing.

I get a pencil, the magazine listing, an easy chair, my voice cassette recorder, and a microphone with remote switch. I sit down, get comfortable in my big chair, lean back, relax and start reading the listing into the microphone. I use the pencil to regularly mark my place in the listings (especially important when readying long DATA statements). I read each statement twice, spelling out each character, and announcing "again" between the first and second readings. I use a standard way of pronouncing each character, not varying from program to program.

The reading goes rapidly and accurately, especially since I do not need to remember where my fingers are.

After the voice recording is finished, I carry the recorder over to the computer and replace the microphone with a foot operated remote switch (Radio Shack Part). I put the recorder on Play, press the foot switch, listen, and type.

The voice recorder is worth the effort of setting up. It is fast and accurate. You do not lose your place by constantly looking from screen to magazine to keyboard.

When I am ready to proofread, I list the program, rewind the tape, press Play and keep my eye on the screen while the recording spells out each and every character. I find dozens of typing errors that I would have missed without a good proofreading system.

Clif Gazaway

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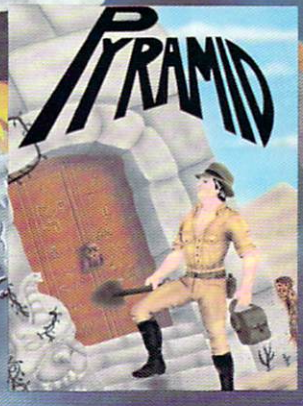

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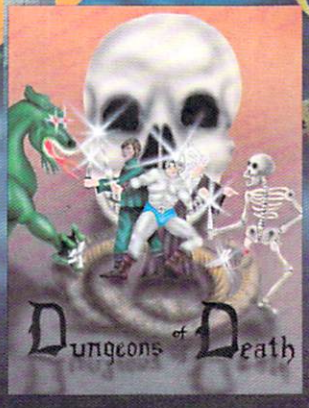

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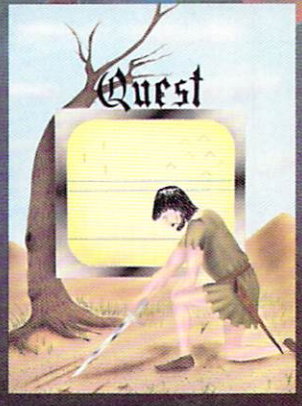

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Continued from page 85

```
 99:    7F48 D0 F1              BNE  WG100    ; EXIT
                        ;
101:    7F4A A2 01     WG300    LDX  #1       ; SET TO CASSETTE#1
102:    7F4C 86 D4              STX  FA
103:    7F4E CA                 DEX
104:    7F4F 86 D1              STX  FNLEN
105:    7F51 86 9D              STX  VERCK    ; '0' MEANS LOAD
106:    7F53 A9 02              LDA  #>BUF
107:    7F55 85 DB              STA  FNADR+1 ; FILENAMEIN BASIC BUFFER
                        ;
109:    7F57 20 70 00 WC100     JSR  CHRGET   ; GET FILENAME IF PRESENT
110:    7F5A AA                 TAX
111:    7F5B F0 17              BEQ  WC210    ; END OF LINE
112:    7F5D C9 22              CMP  #QUOTE
113:    7F5F D0 F6              BNE  WC100    ; KEEP LOOKING
114:    7F61 A6 77              LDX  TXTPTR
115:    7F63 E8                 INX
116:    7F64 86 DA              STX  FNADR    ; UPDATE START PTR
                        ;
118:    7F66 20 70 00 WC200     JSR  CHRGET
119:     7F69 AA                 TAX
120:    7F6A F0 08              BEQ  WC210    ; END OF LINE
121:    7F6C C9 22              CMP  #QUOTE
122:    7F6E F0 04              BEQ  WC210    ; FINISHED FILENAME
123:    7F70 E6 D1              INC  FNLEN
124:    7F72 D0 F2              BNE  WC200
                        ;
126:    7F74 20 95 F6 WC210     JSR  ZZZ      ; GIVE NORMAL MSGS
127:    7F77 20 57 F8           JSR  CSTE1
128:    7F7A 20 49 F4           JSR  LD300
129:    7F7D A5 D1     WC215    LDA  FNLEN
130:    7F7F F0 0B              BEQ  WC250    ; NO FILENAME GIVEN
131:    7F81 20 E6 7F           JSR  FVH      ; FIND 'VIC' HEADER
132:    7F84 20 D6 F4           JSR  FAF1     ; RE-ENTER PET ROM ROUTINES
133:    7F87 D0 08              BNE  WC270
134:    7F89 4C AD F5 WC220     JMP  OP160
135:    7F8C 20 E6 7F WC250     JSR  FVH      ; FIND 'VIC' HEADER
136:    7F8F F0 F8              BEQ  WC220
137:    7F91 A5 96     WC270    LDA  ST
138:    7F93 29 10              AND  #%00010000
139:    7F95 D0 4C              BNE  WC300
                        ;
141:    7F97 E0 01              CPX  #1       ; NORMAL PROGRAM HEADER
142:    7F99 F0 1D              BEQ  WC280
                        ;
144:    7F9B E0 03              CPX  #3       ;SPECIAL VIC 'ABSOLUTE LOAD'
145:    7F9D D0 DE              BNE  WC215    ; FIND ANOTHER HEADER
                        ;
147:    7F9F BD 7B 02 WC275     LDA  TAPE1+1,X  ; GET START/END
148:    7FA2 95 FB              STA  TMP0,X   ; FROM TAPE HEADER
149:    7FA4 CA                 DEX
150:    7FA5 10 F8              BPL  WC275
                        ;
152:    7FA7 20 17 D7           JSR  WROA     ; PRINT THEM ON SCREEN
153:    7FAA A9 2D              LDA  #"-"
154:    7FAC 20 D2 FF           JSR  WRT
```

Continued from page 88

```
155:   7FAF 20 44 D7          JSR  T2T2
156:   7FB2 20 17 D7          JSR  WROA
157:   7FB5 B8                CLV
158:   7FB6 50 28             BVC  WC290    ;
       ALWAYS
                        ;
160:   7FB8 AD 7D 02 WC280    LDA  TAPE1+3  ;
       GET PROGRAM LENGTH
161:   7FBB 38                SEC
162:   7FBC ED 7B 02          SBC  TAPE1+1
163:   7FBF AA                TAX
164:   7FC0 AD 7E 02          LDA  TAPE1+4
165:   7FC3 ED 7C 02          SBC  TAPE1+2
166:   7FC6 A8                TAY
                        ;
168:   7FC7 A5 28             LDA  TXTTAB   ;
       CHANGE HEADER BYTES
169:   7FC9 8D 7B 02          STA  TAPE1+1  ;
       TO START OF BASIC
170:   7FCC A5 29             LDA  TXTTAB+1
171:   7FCE 8D 7C 02          STA  TAPE1+2
172:   7FD1 8A                TXA
173:   7FD2 18                CLC           ;
       FIX END LOAD ADDRESS
174:   7FD3 6D 7B 02          ADC  TAPE1+1
175:   7FD6 8D 7D 02          STA  TAPE1+3
176:   7FD9 98                TYA
177:   7FDA 6D 7C 02          ADC  TAPE1+2
178:   7FDD 8D 7E 02          STA  TAPE1+4
                        ;
180:   7FE0 20 F8 F3 WC290    JSR  LD16     ;
       CONTINUE THE LOAD
                        ;
182:   7FE3 4C 1C F4 WC300    JMP  CONTLD
                        ;
184:   7FE6 A5 9D     FVH     LDA  VERCK    ;
       FIND A 'VIC' HEADER
185:   7FE8 48                PHA
186:   7FE9 20 9A F8          JSR  RBLK
187:   7FEC A0 00             LDY  #0
188:   7FEE B1 D6             LDA  (TBUF),Y
189:   7FF0 C9 03             CMP  #3       ;
       IS IT 'ABSOLUTE' TYPE
190:   7FF2 F0 03             BEQ  ABSLD
191:   7FF4 4C EF F5          JMP  FAH1     ;
       RE-ENTER ROM ROUTINES
                        ;
193:   7FF7 4C FB F5 ABSLD    JMP  FAH50    ;
       GOT HEADER TYPE '03'
                        ;
195:   7FFA 4C        MYGOT   .BYT $4C      ;
       SWAP INTO ZERO PAGE
196:   7FFB 30 7F             .WOR WEDGE
                        ;
198:   7FFD 07 7F     SART    .WOR VICLD    ;
       PROGRAM LOCATION START
```


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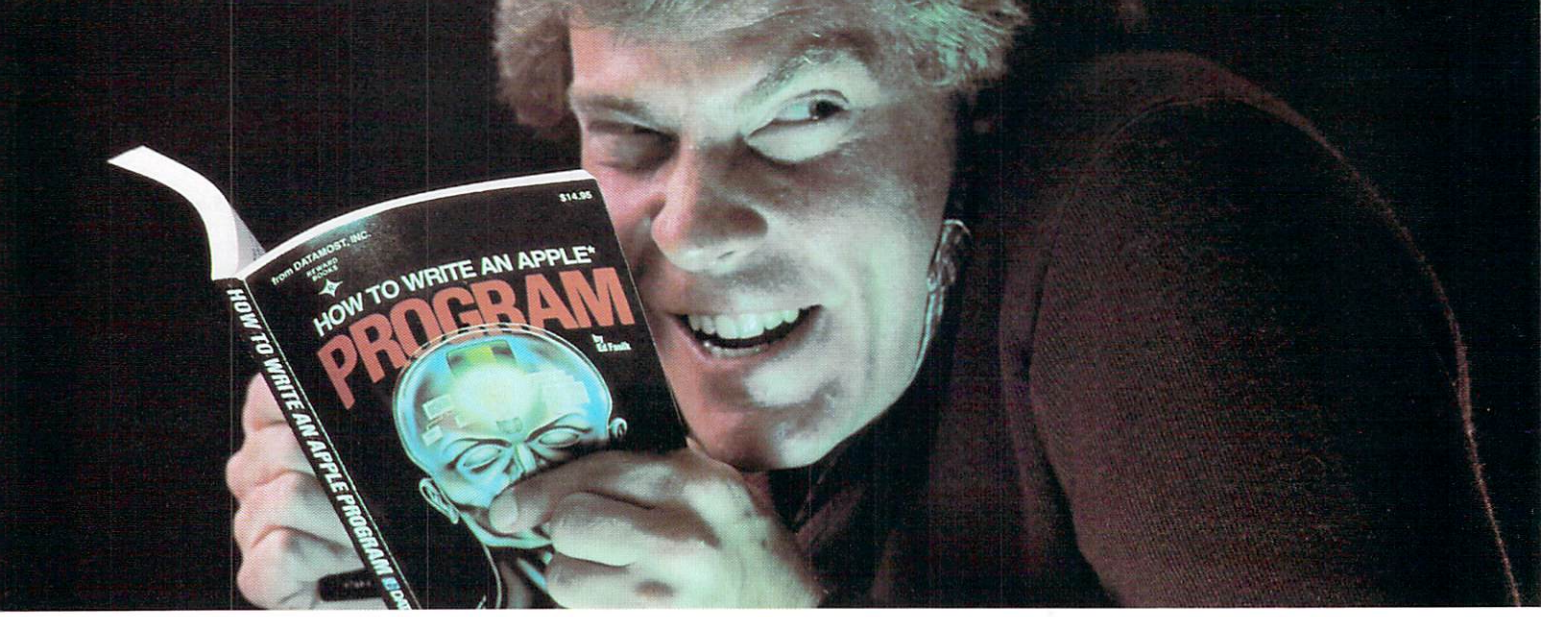

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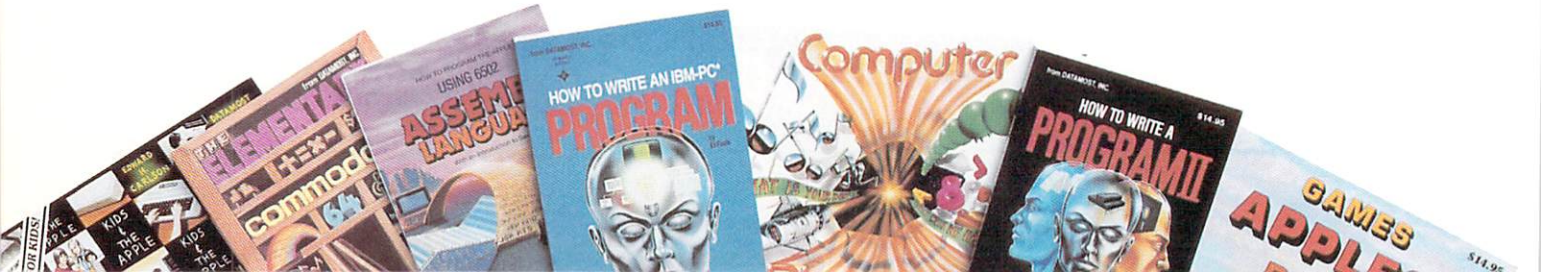


Boxed In

By K. T. Adkins

Boxes of money await you! As you frantically run around trying to break into each box, there suddenly appear openings. Will you get to them in time to run in and grab the money? Will you be able to get out safely with the money? Or will you get "BOXED IN"?

These are the challenges in store for you in this game for the unexpanded VIC.

"BOXED IN" is divided into two programs. The first program presents the title together with the instructions and automatically LOADs the main game program. When the game begins, you start off at the top of the screen. Below you are nine boxes, each with a stash of money in the center. You maneuver around the boxes with your joystick and watch for openings to appear. When you see an opening, you must race toward it, enter the box, grab the money and run.

There are, however, a couple of things to consider while playing the game. Openings may close before you get to them. But if they do, new openings will appear as long as you keep moving. Also, after you enter a box, an opening may close behind you. You may be able to get out if you keep hitting the insides of the box. However, since the game is timed, you may begin to worry that you won't get out quick enough and your time will be used up. Pushing the fire button on the joystick control will enable you to begin again, but the clock will still be running. In order to win the game, all the money must be secured from the nine boxes before your time runs out.

Construction of Part 2 is as follows:

Lines 80 through 97 create the special characters required.

Line 99 sets the clock.

Lines 100 through 295 display the boxes on the screen.

Lines 305 through 320 initialize required variables and display your character at the top of the screen.

Lines 330 through 387 allow for movement of your character as line 330 keeps check on your time.

Lines 400 through 440 allow for random openings in the sides of the boxes to appear.

Lines 450 through 520 check a move to determine if money was secured from a box. If so, a short jingle is played and the score counter is incremented.

Line 525 checks to determine if all the money has been secured.

Lines 600 and 610 close existing openings in the boxes and allow for new ones to be displayed.

Lines 650 and 860 contain the various messages used in the game.

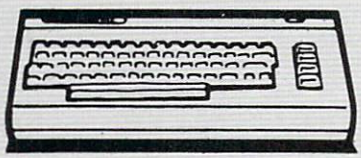
Lines 900 and 910 make up the joystick subroutine.

The remaining lines contain the DATA required for the characters created in lines 80 through 97.

```
1 REM - PART 1 - SAVE        FIRST ON TAPE
9 PRINT"■":POKE36879,110:PRINT"■■■
```

```
  330 IFP=-1THENPOKEV,0:RETURN
  340 READD
  350 POKES,P
  360 FORN=1TOD:NEXT
  370 POKES,0
  380 FORN=1TO20:NEXT
  390 GOTO320
  500 DATA209,250,215,250,217,500
  510 DATA215,500,209,500,207,500
  520 DATA201,2000,-1
READY.
```

```
1 REM - PART 2
2 PRINT"□"
80 POKE52,28:POKE56,28:FORT=7168TO7679
   :POKET,PEEK(T+25600):NEXTT:POKE36869,255
85 FORC=7504TO7511:READA:POKEC,A:NEXT
90 FORC=7464TO7471:READA:POKEC,A:NEXT
95 FORC=7416TO7423:READA:POKEC,A:NEXT
97 FORC=7384TO7391:READA:POKEC,A:NEXT
99 TI$="000000"
100 PRINT"□":POKE36879,127:X=38423:Y=38441
120 FORI=XTOX+4:POKEI,6:NEXTI:X=X+4
130 IFX=38529THENX=38599:Y=Y+88:GOTO120
135 IFX=38705THENX=38775:Y=Y+88:GOTO120
140 IFX=38881THEN160
145 IFX=YTHENX=X+4:Y=Y+22:GOTO120
150 X=X+3:GOTO120
160 X=38446:Y=38462
170 FORI=XTOX+2:POKEI,1:NEXTI:X=X+2
180 IFX=38506THENX=38622:Y=Y+132:GOTO170
185 IFX=38682THENX=38798:Y=Y+132:GOTO170
190 IFX=38858THEN210
195 IFX=YTHENX=X+6:Y=Y+22:GOTO170
200 X=X+5:GOTO170
210 X=38469:FORI=1TO3:POKEX,0:X=X+7:NEXTI
220 X=38645:FORI=1TO3:POKEX,0:X=X+7:NEXTI
230 X=38821:FORI=1TO3:POKEX,0:X=X+7:NEXTI
240 X=7703:Y=7721
250 FORI=XTOX+4:POKEI,31:NEXTI:X=X+4
251 IFX=7809THENX=7879:Y=Y+88:GOTO250
252 IFX=7985THENX=8055:Y=Y+88:GOTO250
253 IFX=8161THEN256
254 IFX=YTHENX=X+4:Y=Y+22:GOTO250
255 X=X+3:GOTO250
256 X=7726:Y=7742
257 FORI=XTOX+2:POKEI,27:NEXTI:X=X+2
258 IFX=7786THENX=7902:Y=Y+132:GOTO257
259 IFX=7962THENX=8078:Y=Y+132:GOTO257
260 IFX=8138THEN285
261 IFX=YTHENX=X+6:Y=Y+22:GOTO257
262 X=X+5:GOTO257
285 X=7749:FORI=1TO3:POKEX,36:X=X+7:NEXTI
290 X=7925:FORI=1TO3:POKEX,36:X=X+7:NEXTI
295 X=8101:FORI=1TO3:POKEX,36:X=X+7:NEXTI
300 A=PEEK(7680):DR=0
305 GOSUB900:IFJ1<>33THEN305
310 S=42:R=37:CL=144:P=1:Z=0:LL=1
320 X=7690:V=38410:POKEV,CL:POKEX,S
329 IFDR=1GOTO400
330 IFTI$="000300"THEN800
335 GOSUB900
336 IFJ1=33ANDLL=0THEN100
337 IFJ1=1ANDPEEK(37152)<>119THEN335
338 DR=DR+1:LL=0
340 POKE36878,15:POKE36876,220:POKE36876,0
344 IFDR=20THEN600
350 IFJ1=5ANDPEEK(X-22)=31THEN329
351 IFJ1=5ANDP<=1THEN329
355 IFJ1=5THENV=V-22:POKEV,CL:POKEX,32
    :K=PEEK(X-22):X=X-22:POKEX,S:P=P-1
    :GOTO500
360 IFJ1=17ANDPEEK(X-1)=31THEN329
365 IFJ1=17THENV=V-1:POKEV,CL:POKEX,32
    :K=PEEK(X-1):X=X-1:POKEX,R:GOTO500
370 IFJ1=9ANDPEEK(X+22)=31THEN329
371 IFJ1=9ANDP>=23THEN329
375 IFJ1=9THENV=V+22:POKEV,CL:POKEX,32
    :K=PEEK(X+22):X=X+22:POKEX,R:P=P+1
    :GOTO500
380 IFPEEK(37152)=119ANDPEEK(X+1)=31
    THEN329
385 IFPEEK(37152)=119THENV=V+1:POKEV,CL
    :POKEX,32:K=PEEK(X+1):X=X+1:POKEX,S
    :GOTO500
387 GOTO330
400 R1=INT(RND(1)*506)+7680:IFPEEK(R1)
    <>31THEN400
410 R2=INT(RND(1)*506)+7680:IFPEEK(R2)
    <>31THEN410
420 R3=INT(RND(1)*506)+7680:IFPEEK(R3)
    <>31THEN420
440 POKER1,A:POKER2,A:POKER3,A
450 IFK<>36GOTO330
500 IFK<>36GOTO329
505 IFK=36THENZ=Z+1:POKE36878,15
510 FORL=1TO5:POKE36875,200:FORM=1TO50
    :NEXTM
515 POKE36875,0:POKE36876,200:FORM=1TO50
    :NEXTM
520 POKE36876,0:NEXTL:POKE36878,0
525 IFZ=8THEN650
530 GOTO330
600 T=30720:POKER1+T,6:POKER2+T,6
    :POKER3+T,6
610 POKER1,31:POKER2,31:POKER3,31:DR=0
    :GOTO329
650 PRINT"□":POKE36879,76:PRINT"■■■■■"
660 PRINT"■YOU WIN!!!!
670 PRINT"■■WANT TO PLAY AGAIN (Y/N)?"
680 GET0$:IF0$<>"Y"AND0$<>"N"THEN680
690 IF0$="Y"THEN99
700 POKE37154,255:POKE36869,240:END
800 PRINT"□":POKE36879,76:PRINT"■■■■■"
810 PRINT"■YOUR TIME IS UP!!!!"
820 PRINT"■■YOU ONLY SECURED THE
    MONEY FROM"Z"BOXES."
830 PRINT"■■WANT TO PLAY AGAIN  (Y/N)?"
840 GET0$:IF0$<>"Y"AND0$<>"N"THEN840
850 IF0$="Y"THEN99
860 GOTO700
900 POKE37154,127:J1=NOTPEEK(37151)AND61
910 RETURN
2000 DATA24,154,84,56,16,24,36,68
2010 DATA48,178,84,56,16,48,72,68
2020 DATA255,255,255,255,255,255,255,255
2030 DATA255,255,255,255,255,255,255,255
READY.
```



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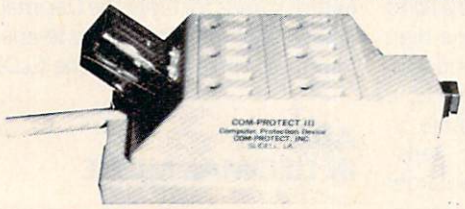

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Circle No. 25

An Introduction To Assembly Language Part XI: The Decimal Mode

By Eric Giguere

This month we delve into one of the more obscure and seldom-used features of assembly language: the decimal mode. It's an interesting mode because, when it is on, all additions and subtractions via ADC and SBC give decimal results instead of the normal hexadecimal. This makes it practical for use in programs where decimal numbers are preferred to hexadecimal numbers. Before continuing, we should take a look at how decimal numbers are stored in assembly language.

BINARY CODED DECIMAL

The proper term for decimal in assembly language is *binary coded decimal* or BCD for short. In BCD each byte holds two separate decimal numbers, ranging from 0 to 9. The upper four bits (the upper *'nybble'*) holds the first number and the lower nybble holds the second number. Here are the numbers from 0 to 9 as they would be shown in a nybble:

```
0 = 0000
1 = 0001
2 = 0010
3 = 0011
4 = 0100
5 = 0101
6 = 0110
7 = 0111
8 = 1000
9 = 1001
```

You'll probably notice that these numbers are the same as the regular hex numbers $00 to $09. But because each nybble represents one separate digit, two nybbles together in a byte represent two different digits, always between the values 0 to 9. If, for example, 1 was added to 01101001($69) while in decimal mode the result would be 01110000($70), and not 0110 1010 ($6A) if in the normal hex mode. The nybble combinations 1010 to 1111 are never used in BCD. If one digit goes past nine it will roll over to 0 and continue from there, while at the same time adding 1 to the next digit. The nybble on the left can be thought of as the "tens" and right nybble is the "ones". For larger numbers than 99 (9 tens and 9 ones) more bytes can be used. I find it easiest to store them in memory as they would be displayed, meaning the thousands and hundreds byte would precede the tens and ones byte. For example:

```
     byte #1          byte #2
  1001  1000       0111  0110
```

would read in BCD as 9 thousands plus 8 hundreds plus 7 tens plus 6 ones, or 9,867. More bytes could be added before byte #1 to produce billions and millions if desired. It depends on what the upper limit is to be.

ENTERING THE DECIMAL MODE

The instruction to get into decimal mode is very simple:

```
SED
```

which stands for SEt Decimal mode. After this instruction all additions and subtractions will be done in BCD. Before entering decimal mode it is usually wise to type the instruction SEI, which will disable the interrupt (which we'll learn about next month –don't worry about it). Otherwise the computer could crash. Exiting the decimal mode is as easy as entering it:

```
CLD
```

(which stands for Clear the Decimal mode) does it. Likewise, be sure to re-enable the interrupt with a CLI (after the CLD).

ADDING IN DECIMAL MODE

Adding in decimal mode is achieved in the same way as in the regular hex mode. Clear the carry before you start and use the lowest byte first. For a single byte adding a value is simple:

```
SEI
SED
CLC
LDA BYTE
ADC #VALUE
STA BYTE
CLD
CLI
```

Notice I was careful to include the SEI and CLI before and after the example. From now on I will assume that this will already

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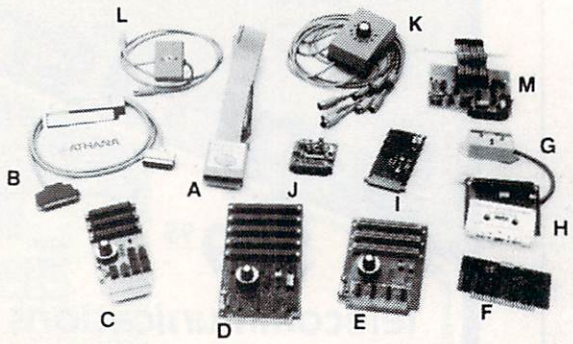

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have been done in my examples. A two-byte addition can be coded as follows:

```
SED
CLC
LDA LOBYTE
ADC #VALUE
STA LOBYTE
LDA HIBYTE
ADC #00
STA HIBYTE
CLD
```

As in a normal addition, if the first byte exceeds the BCD limit (99) the carry will be set and this will be added into the second byte by the ADC #00. For multibyte additions simply add more LDAs, ADCs and STAs for each byte (or you could make it into a loop).

Let's take a look at what happens when we add to a BCD number. Say we wanted to add 1 to the value 999. This would be coded in two bytes as 00001001 (09) and 10011001 (99). If we added 1 to the lower byte (10011001) the first digit would flip over to 0 and add 1 to the second digit, which would also flip over to 0. This would set the carry, and the lower byte would be equal to 00000000 (00). We would then proceed to add in the carry to the second byte (the third and fourth digits) and this would flip the 9 in 00001001 and add 1 to the upper nybble, resulting in 00010000. The combined number would then be read as 0001 0000 0000 0000, or 1000, which is exactly what results when 1 is added to 999. Go over this example slowly, writing every step down and you should see how it works.

SUBTRACTIONS

Subtractions in BCD also operate in the same way as regular subtractions. Don't forget the SBC and the SEI/CLI and everything should work fine.

KEEPING SCORE

Following this article you will find an example program which I call SCORE. It will increment and display a two-byte counter located at $FB-$FC each time it is called by a SYS 828. The program listing following is the BASIC loader for that program. Type it in (it should work on all Commodore machines including the PET/CBM) and RUN it. You should see a four-digit counter running at the very top of your screen. You might find this routine adaptable to your own programs to display the score or perhaps keep a timer running. But its real purpose is to be used as an example to demonstrate the decimal mode. Following is how the program works.

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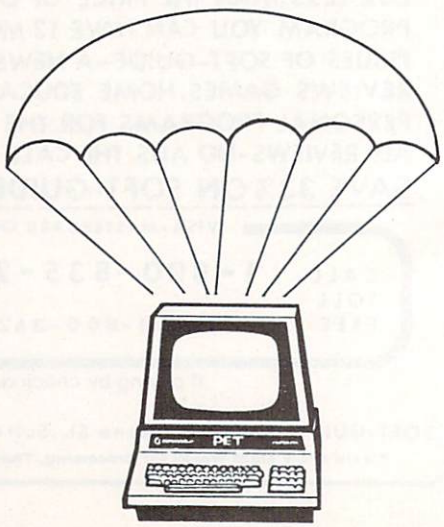
The program starts off in the cassette buffer at $033C (828). Lines 11 to 22 in the assembler listing add 1 to a BCD number located at NUMBER ($FB). Note that the value at $FB represents the thousands and hundreds and the one at $FC is the tens and ones. Lines 24 and 25 send the "home cursor" character to the screen. Anything now sent to the screen will start printing at the upper left corner, just as you had pressed the CLR/HOME key. Lines 27 to 43 print out the number as four separate digits, two digits at a time. Line 27 gets the byte, using the X-register as a pointer. A copy is stored on the stack for later use and then the value in the accumulator is shifted to the right four times. This has the effect of bringing the upper nybble (digit) into the lower one, where it can be ORAed with $30 to convert it to an ASCII numeral (which range from $30 to $39). It is then sent out to be printed by line 34. Lines 36 to 39 retrieve the original number from the stack, mask out the upper digit (leaving only the lower digit) and ORA this with $30, giving the second numeral in the byte, which is printed right after the first. This process is repeated for the second byte at $FC, whose two digits are printed right after the other two, and the program then exits via the RTS. It's a clean and easy way to convert BCD values into printable digits.

NEXT MONTH

Next month I'll show you a bit about the fascinating world of interrupts. In the meantime, if you have any questions or suggestions you may write me at: Eric Giguere, c/o Commander Magazine, P. O. Box 98827, Tacoma, WA., 98498.

Continued on page 100



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```
LINE LOC.   CODE     LABEL  OP. OPERAND        COMMENTS
---- ----   ----     -----  --- -------        --------

0001 033C           * DECIMAL MODE COUNTER *
0002 033C           *
0003 033C           * BY ERIC GIGUERE
0004 033C           *
0005 033C                  ORG $033C       ;CASSETTE BUFFER
0006 033C           ;
0007 033C           NUMBER EQU $FB          ;LOCATION OF VALUE
0008 033C           CHROUT EQU $FFD2        ;PRINT CHARACTER ROUTINE
0009 033C           HOME   EQU 19           ;HOME CURSOR CHARACTER
0010 033C           ;
0011 033C 78               SEI              ;SHUT-OFF INTERRUPTS
0012 033D F8               SED              ;SET DECIMAL MODE
0013 033E 18               CLC
0014 033F A5 FC            LDA NUMBER+1     ;GET LOWER VALUES
0015 0341 69 01            ADC #$01         ;ADD ONE IN DECIMAL MODE
0016 0343 85 FC            STA NUMBER+1
0017 0345 A5 FB            LDA NUMBER       ;GET HIGHER VALUES
0018 0347 69 00            ADC #$00         ;ADD IN CARRY
0019 0349 85 FB            STA NUMBER
0020 034B           ;
0021 034B D8               CLD              ;CLEAR DECIMAL MODE
0022 034C 58               CLI              ;RE-ENABLE INTERRUPTS
0023 034D           ;
0024 034D A9 13     SHOW   LDA #HOME
0025 034F 20 D2 FF         JSR CHROUT       ;MOVE CURSOR TO HOME
0026 0352 A2 00            LDX #$00         ;CLEAR POINTER
0027 0354 B5 FB     NEXTVL LDA NUMBER,X     ;GET TWO DIGITS
0028 0356 48               PHA              ;STORE ON STACK
0029 0357 4A               LSR              ;MOVE UPPER 4 BITS INTO LOWER
0030 0358 4A               LSR              ;4 BITS
0031 0359 4A               LSR
0032 035A 4A               LSR
0033 035B 09 30            ORA #$30         ;CONVERT INTO ASCII NUMERAL
0034 035D 20 D2 FF         JSR CHROUT       ;SEND TO SCREEN
0035 0360           ;
0036 0360 68               PLA              ;GET OLD VALUE
0037 0361 29 0F            AND #$0F         ;MASK OUT 4 UPPER BITS
0038 0363 09 30            ORA #$30         ;CONVERT TO ASCII NUMERAL
0039 0365 20 D2 FF         JSR CHROUT       ;SEND TO SCREEN
0040 0368           ;
0041 0368 E8               INX              ;INCREMENT POINTER
0042 0369 E0 02            CPX #$02         ;CHECK IF FINISHED
0043 036B D0 E7            BNE NEXTVL
0044 036D 60               RTS              ;FINISHED

ASSEMBLY COMPLETE.


SYMBOL TABLE:

NUMBER-$FB   CHROUT-$FFD2   HOME---$13   SHOW---$034D   NEXTVL-$0354


10 FOR I=828 TO 877: READ A: POKE I,A: NEXT
20 POKE 252,0: POKE 251,0
30 SYS 828: GOTO 30
100 DATA 120, 248, 24, 165, 252, 105, 1, 133, 252, 165, 251, 105, 0, 133
110 DATA 251, 216, 88, 169, 19, 32, 210, 255, 162, 0, 181, 251, 72, 74
120 DATA 74, 74, 74, 9, 48, 32, 210, 255, 104, 41, 15, 9, 48, 32
130 DATA 210, 255, 232, 224, 2, 208, 231, 96

READY.
```

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Continued from page 54

or tape. The "stuff" can be a program, or other information (data). The Commodore computer systems know four kinds of files: programs (sets of instructions), sequential (data), relative (different structure, but data) and user (you decide). Data is just a buzz word for information.

Next installment will take up flow charting or "Is Scribbling Only For Children?"

PRACTICAL APPLICATIONS: SIMPLE DATA FILES

Before we talk about data files, let me refresh our memory about arrays. The array is one concept that is used again and again in higher level programming. Perhaps you are not that clear on the exact meaning of the word. Let me see if I can help.

If you make up a list of everyone for whom you must buy a Christmas present, that is an array. Because you write one item to each line, you would call that a one *dimension* array. You use the term array to denote that the list has something in common. What there is in common is strictly up to you, or the designer of the array. Cheese, sparkplugs and newspaper may not sound like an array with anything in common, but they are an array, since they are the things on my Saturday morning shopping list.

If your Christmas shopping list has the name and what each person wants for Christmas, that is a two dimensional array. It is two dimensional because it goes 1)up/down and, 2) across. It makes no difference how far across or how far up and down, it is still two dimensional.

If you take several sheets of paper with these Christmas lists upon them, and stack the papers on a table, you now have a three dimensional array. We have the stack height as the third dimension. Again, it makes no difference how tall the stack is, the height still only represents one dimension.

Arrays of more than three dimensions are harder to visualize, so I will stop here. Further, there is seldom any need for more than three dimensions in an array anyway.

Figure A shows the program from last month in its final form. I made a small change to line 130 to improve readability, by removing the decimal from the rounded number if only whole numbers were desired. Next, I renumbered the lines in the 3000 range to 4000 to make them better align with the program structure presented last month. Finally, I changed the *7* at the end of line 3020 (new 4020) to a *6* and put a clear screen character in line 100 to make everything look tidier at the start. The result of all this appears in Figure B.

Let's add a new area in the 5000's for file closings. This is shown in Figure C. This routine is pretty simple. When the list has been printed on the screen, you now have a chance to store the list to tape or disk. I am showing both methods so you can see how each works.

Line 1010 was added to initialize the *cr$* to be a carriage return. The computer needs this carriage return between each piece of information in a sequential file to let it know where one piece of information ends and another begins. Line 5000 asks if you'd like to store your list. Notice that we provided a prompt that showed all the possible answers. Line 5010 gets the user's answer and then shortens whatever was entered to only one character. Line 5020 sends everything to an *end* in line 5999 if we are through. Line 5030 asks the question again if the other of the two possible answers is not given.

Line 5040 inquires for the type device to store the list and 5050 gets the answer and shortens it. If tape is not the entry, line 5060 moves you on ahead so that line 5070 can open the tape file. Let me explain the open command. The command *open* means to start using, as in "*open* the file drawer." The *3* is the number assigned to the file we are opening. This is a little bit like the story about the prisoners who had heard all the jokes, so they numbered them and just yelled out the number, rather than tell the whole thing. This number lets us refer to the file with only one character *(3)* rather than explaining each time all that is needed, where the file is located, what we want to do, etc. The first *1* tells the computer that this file is on the tape device. The tape always has a device number of *1*. The keyboard is *0*, the screen is *3*, the printer, usually *4* and the disk, usually *8*. The second *1* (the secondary address) gives the computer some particular information about this file: 1 stands for the file that we will write to. A *0* would indicate a file to be read, and a 2 informs of a write file, but one that is to be the last one of the tape. The quotes and "list" just name the file.

Line 5080 sends the program back to the first question if a totally improper response to the second is given. It may also be thought of as allowing the program to proceed if the desired storage device has been indicated to be a disk.

The command in line 5090 has a very special meaning and purpose. *Open* means the same thing as before, *15* is the file number, and the *8* refers to the disk drive unit number. The secondary address of *15* (the second *1*) tells the disk drive that we want to open a line of communication in both directions between the disk drive and the computer. This is normally called a command channel. This is how the disk drive unit's processor will tell the computer's processor how things have progressed in doing what the computer has requested the disk drive to do.

That *gosub900* is a very important routine. It is shown in Figure D. We need to digress just a moment to look at its function. This routine checks to be sure that the disk was able to do what was asked by the computer. Line 900 inputs an error number (e$), an error message (em$), the track where the problem occured (t$) and the sector (s$) through that command channel or communications link established in the previous line. If the terms track and sector are foreign to you, that's ok. We'll look at them another time. The variable *3* is also set.

Line 910 sends the program to the return in line 940 to go back to the point in the program from where it came, if no fatal error has been found. All fatal errors are numbered above 19. Line 920 prints the error and 930 stops the program. Line 940 is there in case the operator wants to ignore the error–not a good idea usually–and types in "cont" after the program quits with the stop in line 930.

In case the file was put on the disk previously, line 5100 scratches the file off drive 0 and then checks to be sure everything is ok.

Line 5110 opens the file with the file number of *3* on unit *8* (the disk drive unit). On the disk, a secondary address (in this case *3*) indicates which of the scratch pads (buffers) within the disk drive should be used with this file activity. If the idea of secondary addresses is confusing, just use a number for your file number higher than 1 and less than 12, then assign the secondary address the same as your file number and everything will almost always work out fine. People with newer PETs and CBM computers (with Basic 4.0) are able to use an easier syntax, but the one I have used will work for everyone. The *0:* is indicating that the file should be on drive 0. The name follows and then commas set off the fact that we have a sequential file to be written, thus the *s* and *w*. As always, we must check if the disk was able to perform as requested via the *gosub900*.

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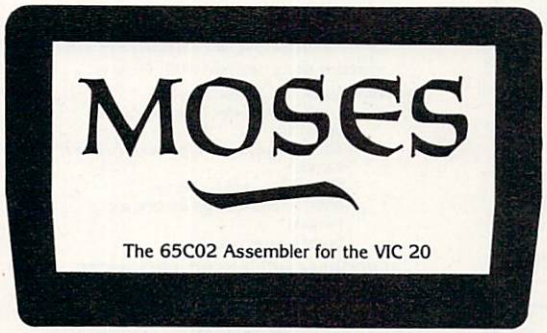

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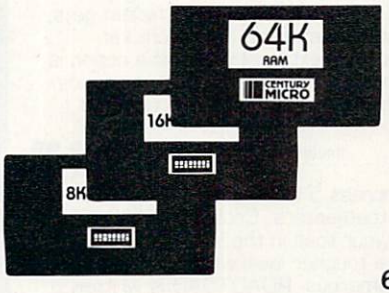

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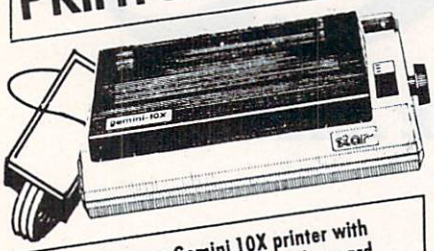

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Line 5120 sets a counter for printing information into the file. Line 5130 is not there because I found the coding I originally put there to be unnecessary, so I deleted the line. Line 5140 prints the name and a carriage return, and the grade and a carriage return. The trailing semicolon keeps an additional carriage return from being printed. This is the same as a print command to the screen.

Line 5150 checks the disk drive, if, in fact, the disk drive is being used (rather than the tape), to be sure all is still well. Line 5160 goes back to write another. When all nine have been written, line 5170 closes the write file, which is very important, and also the command channel. Note that we close the command channel (file 15) even though it may not have been open if we are using tape. You can always close a file even if it is not, nor has ever been open. This is the same theory my wife uses on checking the front door around midnight. Line 5199 wraps it all up.

Next month I'll show you how to retrieve all this from the tape or disk into our program for printing on the screen. We will add some lines in the 2000 range to do this.

Now, at the end of last month's column I suggested that you add some lines to the original program (Figure A) to average the grades. Figure E shows the lines that I added but many variations could be done to get the same effect. Figure F puts everything together to see the total project. Figure G gives you a short little program to get your data back from the disk to see what was put there. See if you can see how to change line 4000 to make it work for tape. You will need to clear your computer memory by typing "new" *after* saving your masterpiece and before typing in Figure G. □

Continued on page 106

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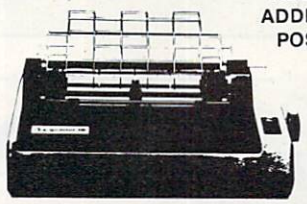

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Figure A

```
10 GOTO1000
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$): RETURN
1000 FOR I =1 TO 22:SP$ = 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
```

Figure B

```
10 PRINTCHR$(147):GOTO1000
100 IF DP < 0 THEN DP = 2
110 N$=MID$(STR$(INT(N*10↑DP+.5)),2)
120 IFLEN(N$)<DP+1THENN$=RIGHT$("0000000000"+N$,DP+1)
130 IFDP>0THENN$=LEFT$(N$,LEN(N$)-DP)+"."+RIGHT$(N$,DP)
140 IFN<0THENN$="-"+N$
150 DP=-1:N=VAL(N$): RETURN
1000 FOR I =1 TO 22:SP$ = SP$ + " ":NEXT:DP = -1
4000 FOR I = 0 TO 9
4010 INPUT"NAME, GRADE";NA$(I),GR(I):NEXT
4020 PRINT LEFT$("STUDENT NAME"+SP$,15);RIGHT$(SP$+"GRADE",6)
4030 FOR I = 0 TO 9:N = GR(I):DP = 0:GOSUB100
4040 PRINT LEFT$(NA$(I)+SP$,18); RIGHT$(SP$+N$,3)
4050 NEXT
```

Figure C

```
1010 CR$=CHR$(13)
5000 PRINT"STORE LIST (Y/N)";
5010 INPUTA$:A$=LEFT$(A$,1)
5020 IFA$="N"THEN5999
5030 IFA$<>"Y"THEN5000
5040 PRINT"TAPE OR DISK (T/D)";
5050 INPUTA$:A$=LEFT$(A$,1)
5060 IFA$<>"T"THEN5080
5070 OPEN3,1,1,"LIST":GOTO5120
5080 IFA$<>"D"THEN5000
5090 OPEN15,8,15:GOSUB900
5100 PRINT#15,"S0:LIST":GOSUB900
5110 OPEN3,8,3,"0:LIST,S,W":GOSUB900
5120 FOR I = 0 TO 9
5140 PRINT#3,NA$(I);CR$;GR(I);CR$;
5150 IFA$="D"THENGOSUB900
5160 NEXT
5170 CLOSE3:CLOSE15
5999 END
```

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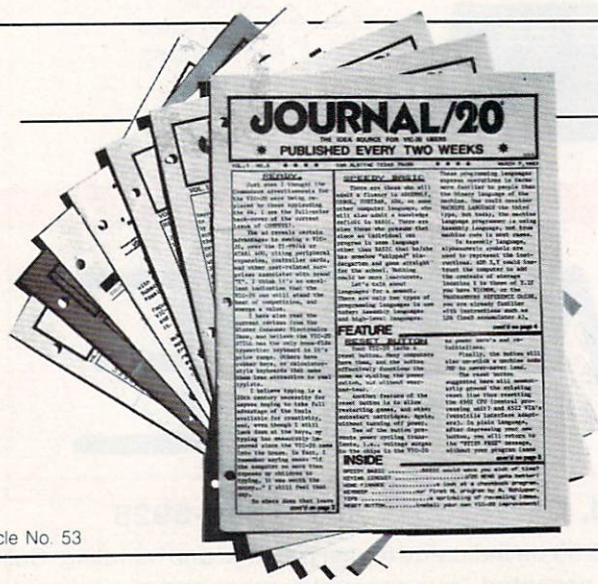

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Figure D

```
900 INPUT#15,E$,EM$,T$,S$:E=VAL(E$)
910 IFE<20THENRETURN
920 PRINTE$", "EM$", "T$", "S$
930 STOP
940 RETURN
```

Figure E

```
4045 TG=TG+N
4060 PRINTRIGHT$(SP$+"-----",21)
4070 N=TG/10:DP=2:GOSUB100
4080 PRINTRIGHT$(SP$+"AVERAGE",15);RIGHT$(SP$+N$,6)
```

Figure F

```
10 PRINTCHR$(147):GOTO1000
100 IF DP < 0 THEN DP = 2
110 N$=MID$(STR$(INT(N*10↑DP+.5)),2)
120 IFLEN(N$)<DP+1THENN$=RIGHT$("0000000000"+N$,DP+1)
130 IFDP>0THENN$=LEFT$(N$,LEN(N$)-DP)+"."+RIGHT$(N$,DP)
140 IFN<0THENN$="-"+N$
150 DP=-1:N=VAL(N$): RETURN
900 INPUT#15,E$,EM$,T$,S$:E=VAL(E$)
910 IFE<20THENRETURN
920 PRINTE$", "EM$", "T$", "S$
930 STOP
940 RETURN
1000 FOR I =1 TO 22:SP$ = SP$ + " ":NEXT:DP = -1
1010 CR$=CHR$(13)
4000 FOR I = 0 TO 9
4010 INPUT"NAME, GRADE";NA$(I),GR(I):NEXT
4020 PRINT LEFT$("STUDENT NAME"+SP$,15);RIGHT$(SP$+"GRADE",6)
4030 FOR I = 0 TO 9:N = GR(I):DP = 0:GOSUB100
4040 PRINT LEFT$(NA$(I)+SP$,18); RIGHT$(SP$+N$,3)
4045 TG=TG+N
4050 NEXT
4060 PRINTRIGHT$(SP$+"-----",21)
4070 N=TG/10:DP=2:GOSUB100
4080 PRINTRIGHT$(SP$+"AVERAGE",15);RIGHT$(SP$+N$,6)
5000 PRINT"STORE LIST (Y/N)";
5010 INPUTA$:A$=LEFT$(A$,1)
5020 IFA$="N"THEN5999
5030 IFA$<>"Y"THEN5000
5040 PRINT"TAPE OR DISK (T/D)";
5050 INPUTA$:A$=LEFT$(A$,1)
5060 IFA$<>"T"THEN5080
5070 OPEN3,1,1,"LIST":GOTO5120
5080 IFA$<>"D"THEN5000
5090 OPEN15,8,15:GOSUB900
5100 PRINT#15,"S0:LIST":GOSUB900
5110 OPEN3,8,3,"0:LIST,S,W":GOSUB900
5120 FOR I = 0 TO 9
5140 PRINT#3,NA$(I);CR$;GR(I);CR$;
5150 IFA$="D"THENGOSUB900
5160 NEXT
5170 CLOSE3:CLOSE15
5999 END
```

Figure G

```
4000 OPEN15,8,15:OPEN3,8,3,"0:LIST":INPUT#15,E:IF E <> 0 THENSTOP
4010 INPUT#3,A$:H=ST:PRINTA$:IFH=0THEN4010
4020 CLOSE3:CLOSE15
```

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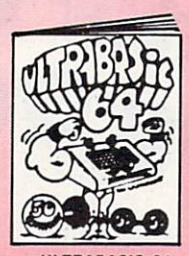

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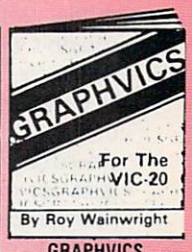

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Circle No. 69

VIC Letter Quality Printing On A Budget

By Jim Grubbs

Ever since I finally took my mother's advice and enrolled in a high school typing class I have wanted an IBM Selectric typewriter. Several years ago I finally found myself in a position to afford a used but clean Selectric 721. I had to settle for the model without self-correction; I just couldn't afford the extra one hundred dollars for it. I had been fortunate enough to have access to the latest model Selectrics at my place of employment. Now I would be able to type all my handouts and tests for my college electronics class at home. I was like a kid in a candy store. Little did I know what was in store for the future!

About two years ago I started actively looking for a home computer. I seriously considered an Apple II system at about two grand. That didn't include a printer of any kind and I had my heart set on a letter quality machine. Everything I looked at that would do the job ran $1,500 and more. The whole thing was so depressing it kept me from buying anything.

Last Christmas my family decided it would be nice to get dad a computer. The budget was limited and his level of interest uncertain. The decision was finally made to buy a VIC-20 and being the eldest son I got elected to purchase and check it out. That was all it took. The day dad's VIC got gift wrapped, mine got purchased! As it has turned out, both machines have been enjoyed beyond our expectations.

I still didn't have a printer though. I found myself getting more and more frustrated as the programs I wrote got longer and longer. It's hard to debug a 16K program twenty-two lines at a time, and without scrolling! I came close several times to giving in and buying an inexpensive printer, but in my heart I wanted a letter quality printer.

I was hearing stories about the Smith Corona TP-1. It sounded like what I wanted, but other than seeing them listed in the advertisements I couldn't find any information on them. I didn't even know for sure if a TP-1 would work with my VIC-20. I finally, after over six months, ventured into the typewriter store where I had bought my IBM. Rumor had it that they had a TP-1 in the flesh and were trying to get a small computer to hook it up to so they could demonstrate it.

After I walked in, I found just what I was looking for–I thought. There in the spotlight at the front of the store was a VIC-20 and disk drive obviously interfaced to what I took to be a TP-1. Unfortunately the only salesperson on duty that Saturday was unfamiliar with the computer stuff, as it was called, but I was welcome to try if I promised not to break it! As I sat there trying to figure out how TOTL.TEXT worked, something struck me as strange about the printer. It had a keyboard! The salesperson did know enough to tell me that what I thought was a TP-1 was in fact a Smith Corona Typetronic Electronic Typewriter. They did have a TP-1 and it became apparent that the printer was just the print mechanism from the Typetronic. I also learned that the Ultrasonic portable and the Typetronic II were capable of being interfaced to the VIC as well. I went home with some literature and made an appointment with the computer person for Monday.

Virtually all of my questions were answered in this visit. I found out that in addition to the typewriter itself, a device called "Super Cord" was being used. This is an interface made by Cord Ltd., another one of the Silicon Valley establishments. Overall I was very impressed and decided to go home and think it over.

The quality was everything I could hope for. The daisy wheel impressions were second to none, and I couldn't believe how easy ribbon and print wheel replacement was.

After thinking on it, I decided that the Typetronic/Super Cord combination was just what the doctor ordered. There are some limitations, but for my particular needs the advantages outweighed the problems.

As I see it, there are only a few points in favor of the TP-1 over the typewriters. The TP-1 is of course ready to interface through a relatively simple cord to the VIC. The Typetronic on the other hand only speaks "typewriter" code, not ASCII, and thus the Super Cord interface is required. It is a smart cord with conversion codes stored in ROM to match ASCII to the typewriter code. Both machines will print 12 characters per second, so there is no speed difference between the two. The TP-1 will support form feed. Either unit is available in 12 pitch elite or 10 pitch pica type.

The Super Cord is an RS-232 type device and therefore ties up the user port on the VIC. If you use a modem or other RS-232 type device this could be a problem without adding additional parts. One thing that you don't get, of course, is the Commodore graphic character set. If you are really into graphics this can be a big problem. In my case it is only a minor irritation. There are software interfaces available that may take care of some of these problems. Smart ASCII is designed to translate symbols like cursor right, cursor down, clear/home, etc., to plain English in listings. I have not had the chance to try any of them with my system yet. The single greatest irritation occurs when trying to print a greater than or less than symbol. The Super Cord supports the characters, but the daisy wheel has the ½ and ¼ symbols in their place which makes for some weird listings until you get used to it.

It also took me a while to figure out how to output a listing using my new printer. When all else fails, read the programmer's

Continued on page 116

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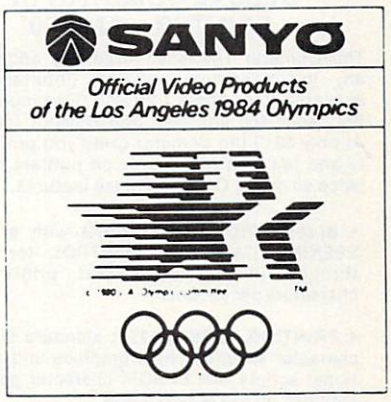

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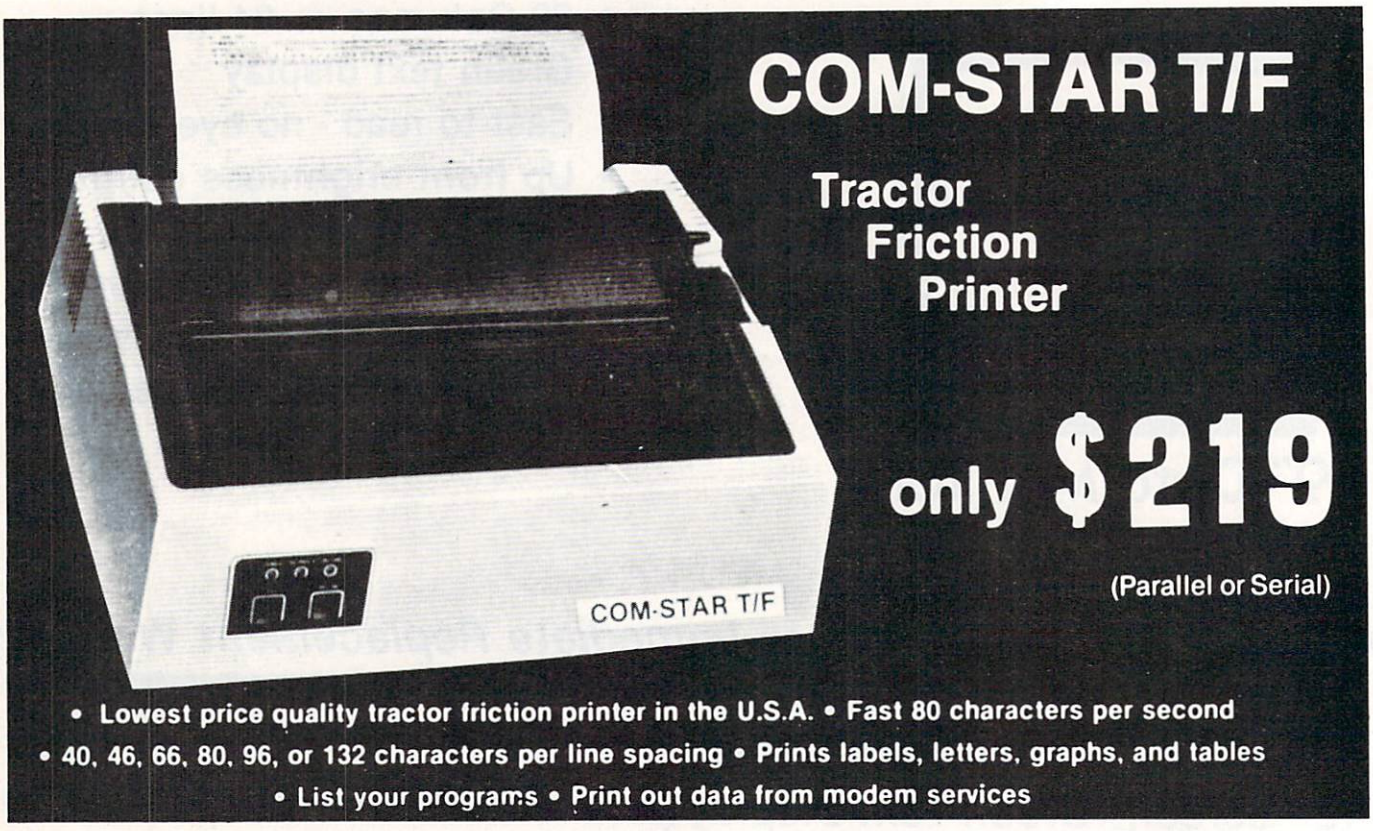

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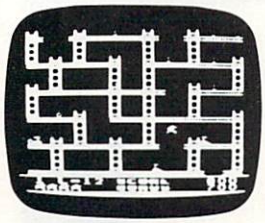

JUMPMAN
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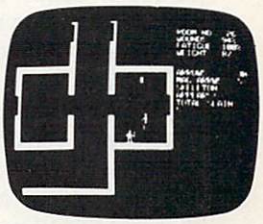

TEMPLE OF APSHAI (computer game of the year)
This is the standard by which other adventure games are judged. Full color graphics portray the temple and all its contents - magic, monsters, doomed cities and damsels in distress. Do battle in real time with over 20 monsters, expansion modules will keep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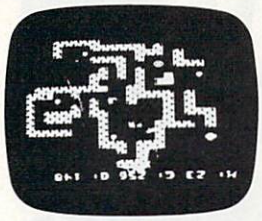

SWORD OF FARGOAL
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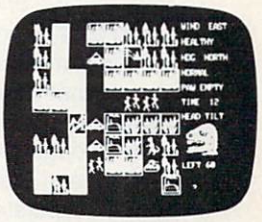

CRUSH CRUMBLE & CHOMP (Computer game of the year nominee)
Choose one of six monsters or create your own, and use your monster to destroy one of four unsuspecting cities. The cities aren't totally defenseless, they call on police, national guard, and even a mad scientist, complete with helicopter, to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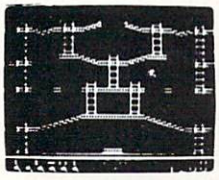

JUMPMAN JUNIOR
The devilish ALIENATORS are back! And they have overrun the Jupiter Command Substation. In this cartridge format sequel to the best-selling Jumpman, players must leap through 12 all new screens featuring electrocution traps, moving walls, hellstones, and dangers much too bizarre to be believed. How many screens can you master? Twelve different screens, 8 speeds.
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Continued from page 110

guide. With some interpretation I concluded correctly that OPEN 2,2,3,CHR$(2): 2:LIST (return) would do the trick. I then discovered another of Commodore's quirks.

Everyone else's upper case is Commodore's lower case and vice versa. What does this mean? When you do a listing all the alpha characters come out in lower case! I'm still working on that one.

All in all I now have everything I wanted. My listings are a little abnormal, but my letters and manuscripts look like I have a full time executive secretary. I can go drink a softdrink while the printer plugs along at 12cps. It won't set any speed records but does an adequate job.

What does all this cost? I do not have a list price for the Typetronic. I paid about $500 locally. I notice that the Ultrasonic portable is available in the $400 range by mail order. It is virtually identical but it is designed as a portable unit. The Super Cord is listed at $400, though I paid considerably less. I imagine the price will continue to come down as the demand goes up. The TP-1 would have cost me $695 locally. Again it too is available at a considerable savings from several sources. For about $50 more I got the Typetronic and the Super Cord installed and locally guaranteed. The modification to the typewriter is straightforward for anyone modestly adept at electronic work, though installation by a typewriter technician is recommended.

The Typetronic II for those of you who are wondering has some built in electronic features that you don't need if you are tying into a computer. They would be nice in the stand alone mode though. What about the SCM Typetronic as a typewriter? It is a pure delight to operate. If you have not used a truly electronic typewriter (not an electric typewriter like my old 721) you haven't typed! The feel of the keyboard is so smooth it will drive you crazy until you get used to it. Every key feels the same. Operation is much quieter than with old electro-mechanical units. You can use the typewriter even with your computer turned off, though you cannot use the typewriter and the computer simultaneously for separate tasks.

If you like the general concept but prefer another typewriter, Cord Ltd. supplies interfaces for several popular models including Royal, Adler, Hermes, Silver Reed, Brothers and Facit. Installation in some models is very difficult, however, so check carefully before you buy. Further information is available from Cord Ltd., 2815 Junipero Avenue, Building 102, Signal Hill, California 90806. Your local typewriter dealer will probably also be familiar with this interface.

All in all the Typetronic/Super Cord combination is earning its keep at my house. Consider it as another alternative somewhere between a low priced printer and a high speed, letter quality dot matrix super printer. It may just be what you have been looking for! □

Figure One

```
10 rem this is an example of a listing
20 rem using a Smith Corona Typetronic typewriter
30 rem and a Super Cord interface
40 rem the greater than symbol comes out: ½
50 rem the less than sign comes out: ¼
60 rem notice that all alpha characters
70 rem are in lower case
```

The SCM Typetronic fits in well with my C-64, Datasette and TV monitor. The Cord interface is not visible in this picture, but sits directly behind the Typetronic.

The SUPERCORD interface is the little white box sitting atop the SCM Typetronic.

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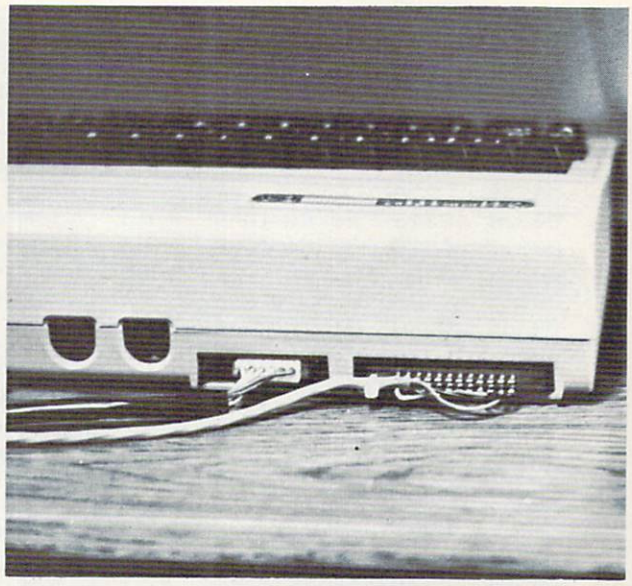
The SCM Typetronic in action!



Connection to the RS-232 port (right hand side) is all that is required to hook up SUPERCORD to the VIC or 64!

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Circle No. 50

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```
 LINE#  LOC   CODE        LINE

00331  C31F  10 EC              BPL START6
00332  C321  30 D7              BMI FINI1
00333  C323              ;
00334  C323              ; FILL WINDOW WITH CHARACTER ROUTIINE
00335  C323              ;
00336  C323  20 E2 C1    FILL    JSR GETPMS        ;GET WINDOW PARAMETERS
00337  C326  20 F1 B7            JSR COMBYT        ;GET CHARACTER
00338  C329  86 AF               STX CHRCTR
00339  C32B  A0 00               LDY #$00
00340  C32D  B1 7A               LDA (TXTPTR),Y    ;CHECK IF COLOUR PARAMETER
00341  C32F  C9 2C               CMP #','          ;IS INCLUDED
00342  C331  D0 08               BNE NEXT4
00343  C333  20 F1 B7            JSR COMBYT        ;GET COLOUR
00344  C336  86 02               STX COLOR
00345  C338  A9 00               LDA #$00
00346  C33A  2C                  .BYTE $2C
00347  C33B  A9 FF       NEXT4   LDA #$FF
00348  C33D  85 AE               STA CFLAG
00349  C33F  20 14 C2            JSR SWAPZP        ;SAVE ZERO PAGE
00350  C342  20 B6 C2            JSR LASTLN        ;GET ROW # OF BOTTOM LINE
00351  C345  A5 FB       HERE8   LDA LC
00352  C347  A6 D3               LDX BAS2+1        ;GET ROW #
00353  C349  20 9B C1            JSR BASCLC        ;CALCULATE SCREEN ADDRESSES
00354  C34C  A5 AF       START7  LDA CHRCTR        ;FILL LINE WITH CHARACTER
00355  C34E  91 D0               STA (BAS1),Y
00356  C350  A5 AE               LDA CFLAG
00357  C352  D0 04               BNE NEXTY
00358  C354  A5 02               LDA COLOR
00359  C356  91 D4               STA (BAS3),Y
00360  C358  88          NEXTY   DEY
00361  C359  10 F1               BPL START7
00362  C35B  C6 D3               DEC BAS2+1        ;DO NEXT ROW
00363  C35D  C6 FE               DEC DEPTH
00364  C35F  10 E4               BPL HERE8
00365  C361  30 97               BMI FINI1
00366  C363              ;
00367  C363              ; DRAW BORDER ROUTINE
00368  C363              ;
00369  C363  20 E2 C1    BRDR    JSR GETPMS        ;GET WINDOW PARAMETERS
00370  C366  20 F1 B7            JSR COMBYT        ;GET CHARACTER
00371  C369  86 AF               STX CHRCTR
00372  C36B  A0 00               LDY #$00
00373  C36D  B1 7A               LDA (TXTPTR),Y    ;CHECK IF COLOUR PARAMETER
00374  C36F  C9 2C               CMP #','          ;IS INCLUDED
00375  C371  D0 08               BNE NEXT5
00376  C373  20 F1 B7            JSR COMBYT        ;GET COLOUR
00377  C376  86 02               STX COLOR
00378  C378  A9 00               LDA #$00
00379  C37A  2C                  .BYTE $2C
00380  C37B  A9 FF       NEXT5   LDA #$FF
00381  C37D  85 AE               STA CFLAG
00382  C37F  20 14 C2            JSR SWAPZP        ;SAVE ZERO PAGE
00383  C382  20 B6 C2            JSR LASTLN        ;GET ROW # FOR BOTTOM LINE
00384  C385  A5 FB       HERE9   LDA LC
00385  C387  A6 D3               LDX BAS2+1        ;GET ROW #
00386  C389  20 9B C1            JSR BASCLC        ;CALCULATE SCREEN ADDRESSES
00387  C38C  A5 AF       START8  LDA CHRCTR        ;DO TOP BORDER
00388  C38E  91 D0               STA (BAS1),Y
00389  C390  A5 AE               LDA CFLAG
00390  C392  D0 04               BNE NEXTY2
00391  C394  A5 02               LDA COLOR
00392  C396  91 D4               STA (BAS3),Y
00393  C398  88          NEXTY2  DEY
00394  C399  10 F1               BPL START8
00395  C39B  C6 D3               DEC BAS2+1
00396  C39D  C6 FE               DEC DEPTH
00397  C39F  F0 E4               BEQ HERE9         ;DO BOTTOM BORDER
```

Continued on page 120

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Circle No. 118

Continued from page 118

```
00398  C3A1  30 22           BMI FINI2
00399  C3A3  A5 FB    HEREA  LDA LC
00400  C3A5  A6 D3           LDX BAS2+1
00401  C3A7  20 9B C1        JSR BASCLC
00402  C3AA  A5 AF    START9 LDA CHRCTR      ;DO RIGHT CHARACTER
00403  C3AC  91 D0           STA (BAS1),Y
00404  C3AE  A5 AE           LDA CFLAG
00405  C3B0  D0 04           BNE NEXTY3
00406  C3B2  A5 02           LDA COLOR
00407  C3B4  91 D4           STA (BAS3),Y
00408  C3B6  88       NEXTY3 DEY
00409  C3B7  30 04           BMI MORE
00410  C3B9  A0 00           LDY #$00        ;DO LEFT CHARACTER
00411  C3BB  F0 ED           BEQ START9
00412  C3BD  C6 D3    MORE   DEC BAS2+1      ;DO NEXT ROW
00413  C3BF  C6 FE           DEC DEPTH
00414  C3C1  F0 C2           BEQ HERE9
00415  C3C3  10 DE           BPL HEREA
00416  C3C5  20 14 C2 FINI2  JSR SWAPZP      ;RESTORE ZERO PAGE
00417  C3C8  58              CLI
00418  C3C9  60              RTS
00419  C3CA           .END
```

SYMBOL TABLE

SYMBOL	VALUE						
AGAIN	C1A6	BAS1	00D0	BAS2	00D2	BAS3	00D4
BAS4	00D6	BASCLC	C19B	BRDR	C363	CFLAG	00AE
CHRCTR	00AF	COL	C2FF	COLOR	0002	COMBYT	B7F1
DEPTH	00FE	DWN	C143	ERROR	C211	FILL	C323
FINI1	C2FA	FINI2	C3C5	GETPMS	C1E2	HERE	C17F
HERE2	C217	HERE4	C247	HERE5	C291	HERE6	C2E3
HERE7	C316	HERE8	C345	HERE9	C385	HEREA	C3A3
ILLQTY	B248	LASTLN	C2B6	LC	00FB	LFT	C227

Continued on page 122

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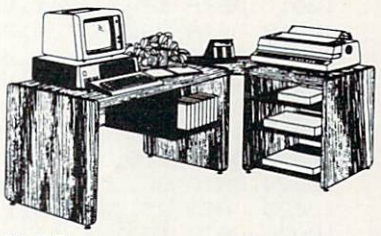

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Circle No. 152

Continued from page 120

```
SYMBOL TABLE

SYMBOL VALUE

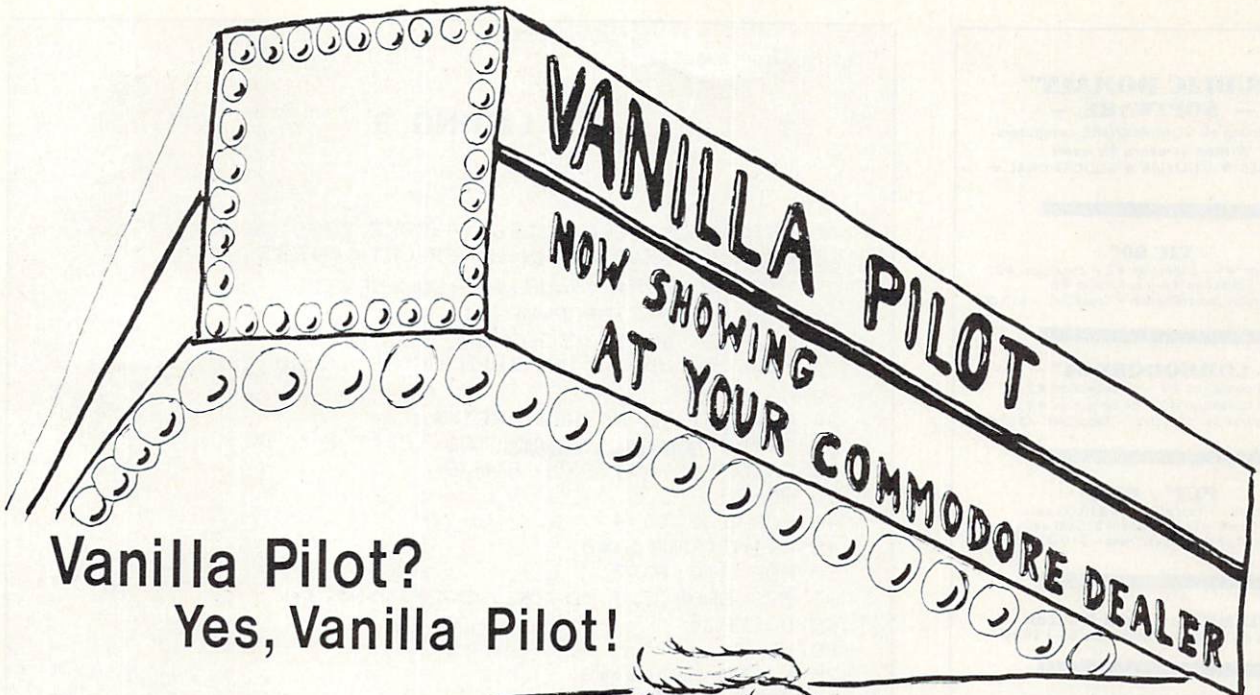
LINE    C131    MORE    C3BD    MOVE    C177    NEXT    C1D4
NEXT2   C25F    NEXT3   C2A7    NEXT4   C33B    NEXT5   C37B
NEXT6   C2D2    NEXTY   C358    NEXTY2  C398    NEXTY3  C3B6
REPLAC  C12F    REV     C2BF    RHT     C271    SAVE    C1CD
START   C11A    START2  C15F    START3  C235    START4  C27F
START5  C2DC    START6  C30D    START7  C34C    START8  C38C
START9  C3AA    SWAPZP  C214    TEMPC   C048    TEMPS   C020
TEMPZ   C000    TEST1   C254    TEST2   C2A0    TR      00FC
TXTPTR  007A    UP      C100    WIDTH   00FD    WRAP    0002
YMIN1   C2F1    ZP      00D0

END OF ASSEMBLY
```

LISTING 2

```
10000 FOR I=49408 TO 50121:READ X:POKE I,X:NEXT:RETURN
10001 DATA 32,226,193,32,241,183,134,2,32,20,194,165,251,166,252,32
10002 DATA 155,193,32,205,193,166,254,202,48,21,24,165,208,105,40,133
10003 DATA 210,133,214,165,209,105,0,133,211,32,119,193,202,16,235,164
10004 DATA 253,185,32,192,145,208,185,72,192,145,212,136,16,243,32,20
10005 DATA 194,88,96,32,226,193,32,241,183,134,2,32,20,194,32,182
10006 DATA 194,170,165,251,32,155,193,32,205,193,166,254,202,240,208,56
10007 DATA 165,208,233,40,133,210,133,214,165,209,233,0,133,211,24,32
10008 DATA 119,193,202,16,234,48,184,41,3,9,216,133,215,164,253,177
10009 DATA 210,145,208,177,214,145,212,136,16,245,165,211,133,209,165,210
10010 DATA 133,208,165,215,133,213,165,214,133,212,96,72,169,216,133,208
10011 DATA 172,136,2,136,132,209,24,165,208,105,40,133,208,165,209,105
10012 DATA 0,133,209,202,16,240,24,104,101,208,133,208,133,212,165,209
10013 DATA 105,0,133,209,41,3,9,216,133,213,164,253,96,165,2,208
10014 DATA 3,169,32,44,177,208,153,32,192,177,212,153,72,192,136,16
10015 DATA 236,96,32,241,183,138,41,63,133,251,32,241,183,138,41,31
10016 DATA 133,252,32,241,183,202,134,253,24,165,251,101,253,201,40,176
10017 DATA 16,32,241,183,202,134,254,24,165,252,101,254,201,25,176,1
10018 DATA 96,76,72,178,120,162,30,181,208,72,189,0,192,149,208,104
10019 DATA 157,0,192,202,16,241,96,32,226,193,32,241,183,134,2,32
10020 DATA 20,194,32,182,194,165,251,166,211,32,155,193,160,0,177,208
10021 DATA 133,210,177,212,72,144,13,200,177,208,72,177,212,136,145,212
10022 DATA 104,145,208,200,196,253,144,239,165,2,208,3,169,32,44,165
10023 DATA 210,145,208,104,145,212,198,211,198,254,16,201,32,20,194,88
10024 DATA 96,32,226,193,32,241,183,134,2,32,20,194,32,182,194,165
10025 DATA 251,166,211,32,155,193,177,208,133,210,177,212,72,164,253,240
10026 DATA 15,136,177,208,72,177,212,200,145,212,104,145,208,136,208,241
10027 DATA 165,2,208,3,169,32,44,165,210,145,208,104,145,212,198,211
10028 DATA 198,254,16,203,48,68,166,252,138,24,101,254,133,211,96,32
10029 DATA 226,193,160,0,177,122,201,44,208,8,32,241,183,134,2,169
10030 DATA 0,44,169,255,133,174,32,20,194,32,182,194,165,251,166,211
10031 DATA 32,155,193,177,208,73,128,145,208,165,174,208,4,165,2,145
10032 DATA 212,136,16,239,198,211,198,254,16,226,32,20,194,88,96,32
10033 DATA 226,193,32,241,183,134,2,32,20,194,32,182,194,165,251,166
10034 DATA 211,32,155,193,165,2,145,212,136,16,251,198,211,198,254,16
10035 DATA 236,48,215,32,226,193,32,241,183,134,175,160,0,177,122,201
10036 DATA 44,208,8,32,241,183,134,2,169,0,44,169,255,133,174,32
10037 DATA 20,194,32,182,194,165,251,166,211,32,155,193,165,175,145,208
10038 DATA 165,174,208,4,165,2,145,212,136,16,241,198,211,198,254,16
10039 DATA 228,48,151,32,226,193,32,241,183,134,175,160,0,177,122,201
10040 DATA 44,208,8,32,241,183,134,2,169,0,44,169,255,133,174,32
10041 DATA 20,194,32,182,194,165,251,166,211,32,155,193,165,175,145,208
10042 DATA 165,174,208,4,165,2,145,212,136,16,241,198,211,198,254,240
10043 DATA 228,48,34,165,251,166,211,32,155,193,165,175,145,208,165,174
10044 DATA 208,4,165,2,145,212,136,48,4,160,0,240,237,198,211,198
10045 DATA 254,240,194,16,222,32,20,194,88,96
READY.
```

Continued on page 124



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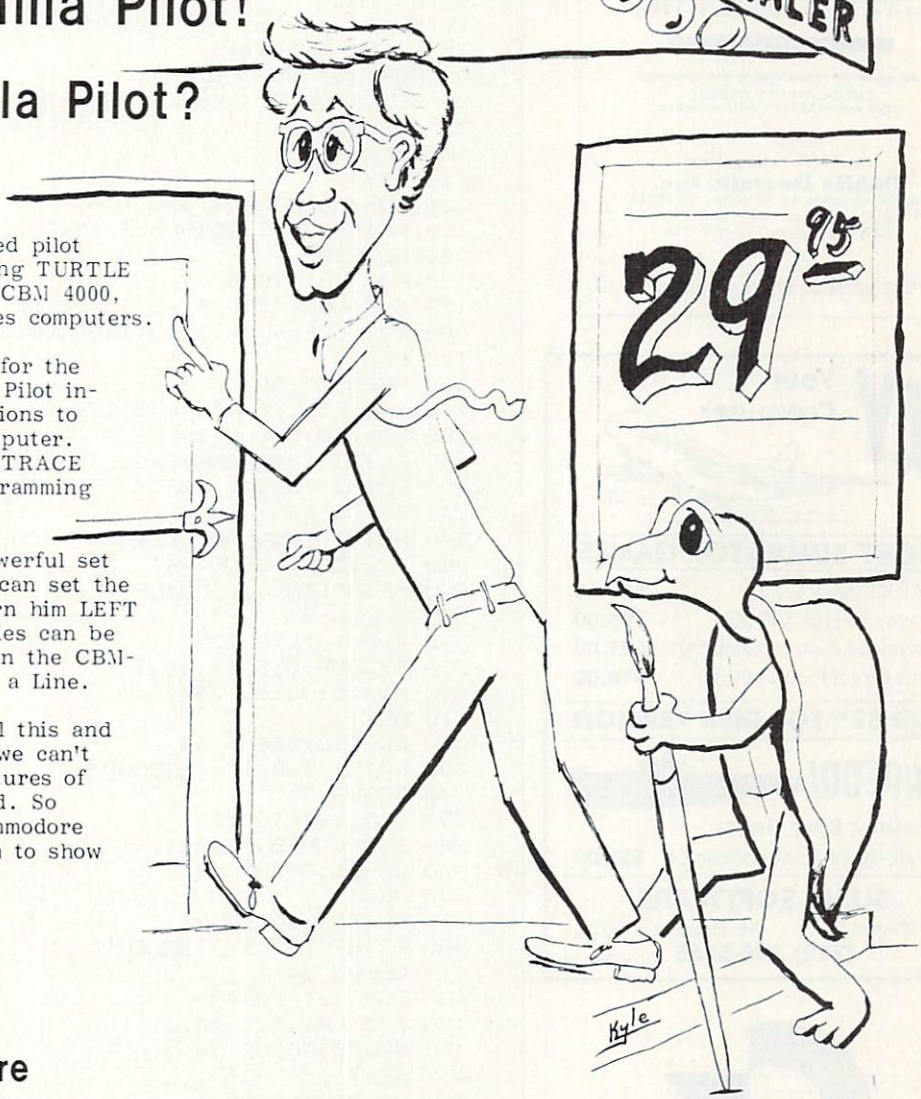

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Continued from page 122

LISTING 3

```
 0 PRINT "■":POKE 53280,14:POKE 53281,6
10 UP=12*4096+256:DWN=UP+67:LFT=UP+295
   :RHT=UP+369:RVS=UP+447:COL=UP+511
20 FILL=UP+547:BRDR=UP+611
30 IF PEEK(49500)<>202 OR
   PEEK(50000) <>165 THEN GOSUB 10000
32 GOTO 35
34 FOR L=1 TO ND:NEXT:RETURN
35 PRINT"■■■■■■■■■■■■■"TAB(16)"T E X T"
38 PRINT"■"TAB(16)"D E M O"
39 ND=25
40 FOR I=1 TO 4
45 K=INT(RND(1)*8)
50 FOR J=0 TO 7
60 SYS BRDR,J,J,40-2*J,25-2*J,160,J+K
65 GOSUB34
70 NEXT
75 K=INT(RND(1)*8)
80 FOR J=7 TO 0 STEP-1
90 SYS BRDR,J,J,40-2*J,25-2*J,160,J+K
95 GOSUB34
100 NEXT
110 NEXT
120 ND=1500:GOSUB 34
130 PRINT"■":T=25:GOSUB 1500:GOSUB 34
135 ND=250
140 FOR I=1 TO 6
150 SYS COL,4,14,31,3,15:GOSUB 34
160 SYS COL,4,14,31,3,6:GOSUB 34
170 NEXT
180 ND=1500:GOSUB 34
190 SYS FILL,0,17,40,8,160,2
200 ND=750:GOSUB 34
210 PRINT "■■■■■■SCROLLING WITH WRAPAROUND"
220 PRINT TAB(17)"■          "
230 GOSUB 34
240 PRINT "■■■CAN BE DONE IN ALL FOUR DIRECTIONS."
250 ND=1500:GOSUB 34
260 PRINT TAB(17)"■■UP"
270 GOSUB 34
280 FOR I=1 TO 22
290 SYS UP,5,5,30,11,1
300 ND=75:GOSUB 34
310 NEXT
320 ND=750:GOSUB 34
330 PRINT TAB(17)"■■DOWN"
340 GOSUB 34
350 FOR I=1 TO 22
360 SYS DWN,5,5,30,11,1
370 ND=75:GOSUB 34
380 NEXT
390 ND=750:GOSUB 34
400 PRINT TAB(17)"■■LEFT"
410 GOSUB 34
420 FOR I=1 TO 40
430 SYS LFT,0,5,40,11,1
440 ND=75:GOSUB 34
450 NEXT
460 ND=750:GOSUB 34
470 PRINT TAB(17)"■■RIGHT"
480 GOSUB 34
```

Continued on page 126

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Circle No. 8

Continued from page 124

```
490 FOR I=1 TO 40
500 SYS RHT,0,5,40,11,1
510 ND=75:GOSUB 34
520 NEXT
530 ND=750:GOSUB 34
540 SYS FILL,0,17,40,8,160,5
550 ND=750:GOSUB 34
560 PRINT "■■■■■■■■■SCROLLING WITH BLANKING"
570 PRINT TAB(17)"■■■■■■■■■
```

```
1045 SYS FILL,0,20,40,5,160,6
1050 PRINT"■■■■■■■■IT CAN ALSO BE USED
1060 PRINT"■■■■■■TO FLASH THE WINDOW.
1065 ND=1500:GOSUB 34
1070 FOR I=1 TO 14
1075 SYS RVS,3,11,33,5,5:ND=200:GOSUB 34
1080 NEXT
1085 ND=1500:GOSUB 34
1090 SYS FILL,0,20,40,5,160,6
1100 PRINT"■■■■■■■■BUT ...
1110 PRINT"■■■■■■FLASHING CAN BE OVERDONE.
1115 ND=1500:GOSUB 34
1120 FOR I=1 TO 60
1125 SYS RVS,0,0,40,25:ND=120-.033*I*I:GOSUB 34
1130 NEXT
1132 FOR I=1 TO 20:SYS RVS,0,0,40,25:NEXT
1135 ND=1500:GOSUB 34
1145 PRINT"■":POKE 53280,6:POKE 53281,15
1150 V$="■■■■■■■■■■■■■■■■■■■■■■■■■"
1155 PRINTV$TAB(12)"■FILLING A WINDOW"
1160 ND=200:GOSUB34:SYS UP,0,0,40,24,0
1165 PRINTV$TAB(12)"──────────────"
1170 GOSUB34:SYS UP,0,0,40,24,0
1175 GOSUB34:SYS UP,0,0,40,24,0
1180 PRINTV$TAB(6)"WITH A PARTICULAR CHARACTER"
1185 GOSUB34:SYS UP,0,0,40,24,0
1190 GOSUB34:SYS UP,0,0,40,24,0
1195 PRINTV$TAB(8)"CAN CREATE A NICE EFFECT"
1200 GOSUB34:SYS UP,0,0,40,24,0
1210 GOSUB34:SYS UP,0,0,40,24,0
1215 PRINTV$TAB(12)"IF THAT CHARACTER"
1220 GOSUB34:SYS UP,0,0,40,24,0
1225 GOSUB34:SYS UP,0,0,40,24,0
1230 PRINTV$TAB(11)"IS PROPERLY CHOSEN."
1232 ND=3000:GOSUB 34:ND=10
1235 FOR I=1 TO 25:GOSUB34:SYS UP,0,0,40,24,0:NEXT
1240 SYS FILL,5,4,33,15,160,2
1245 FOR I=1 TO 7:SYS FILL,5,3+2*I,33,1,160,1:NEXT
1250 SYS FILL,5,4,15,8,160,6
1255 FOR I=1 TO 7:SYS FILL,4+2*I,5,1,6,170,6:NEXT
1260 SYS FILL,2,3,1,20,160,0
1270 PRINTV$TAB(15)"ENJOY !!!"
1499 GOTO1499
1500 PRINT"■":POKE 53280,12:POKE 53281,15
1510 PRINT TAB(10)"■──────────────────"
1520 PRINT TAB(10)"■ SCROLLING COMMANDS ■■"
1530 ND=60*T:GOSUB 34
1540 A$="THESE COMMANDS":PRINT"■■"
     :GOSUB 2000:ND=20*T:GOSUB 34
1550 A$="PROVIDE NUMEROUS POSSIBILITIES"
     :PRINT"■■":GOSUB 2000:GOSUB 34
1560 A$="FOR CREATING":PRINT"■■":GOSUB
     2000:ND=20*T:GOSUB 34
1570 A$="S P E C I A L    E F F E C T S":PRINT"■■"
     :GOSUB 2000:ND=20*T:GOSUB 34
1580 RETURN
2000 PRINT TAB((40-LEN(A$))/2);
2005 ND=T
2010 FOR I=1 TO LEN(A$)
2020 PRINT MID$(A$,I,1)"■ ■■";
2030 GOSUB 34
2040 NEXT
2050 PRINT" "
2060 RETURN
```

Note: If you are a cassette user then you must include the routine from listing 1. *HERE.* If you are a disk user and have saved the commands as a PGM file then change line 30 accordingly.

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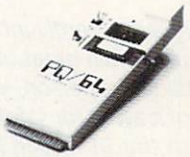

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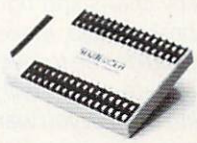

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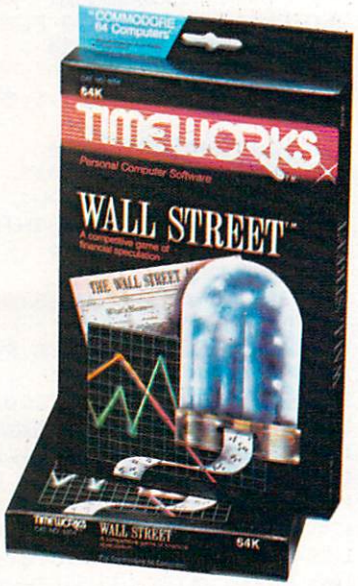
The Critic's Page



By Eric Giguere

You have recently inherited the estate of an unknown great uncle of yours. Being a cautious person, you decide to put most of it away for safekeeping. What to do with the $1 million left? Inside you a voice cries: "Play the stock market! Play the stock market!" Ever since you were an adult you've dreamed of risking your money on the stock market. "Why not?", you say. You hire a reputable broker and start playing the market. Your goal: to make $10 million in 15 years. But will you be able to do so? Only time will tell.

In the ensuing months you gain experience in buying and selling stocks. The quarterly charts and figures provided by your broker help make your decisions easier. You decide to invest a lot of money in real estate, which will always be going up. With the rest you want to take control of some big company. How about BTT, the Big Telephone and Telegraph Company? Good Idea. After a bit of wheeling and dealing you end up with a majority of the stock and are paid a fat salary as head of the company. But watch it! With all this money coming in, the IRS is sure to take a big bite out of it for taxes. To minimize this you invest more money in real estate and sock some of your free cash into an IRA (Individual Retirement Account) which will mature at the end of your 15 years. No way will the tax man profit at your expense!

You are now at the 15-year mark, quarter 2. You have gained control of several corporations and have a lot of money in real estate but you are still missing almost $1 million. Just as you were wondering how to remedy this, your broker calls. He has a special investment opportunity for you: a treasure hunt. Somebody will try to find the USS Loaded, a sunken ship loaded with money. This could be the break you needed. You decide to invest $300,000 in the venture. There is always a chance you'll lose it all, but if they do find the sunken ship you could quadruple your money. Time passes. It's now the third quarter of the 15th year. One more quarter left to achieve your goal. That morning the headlines in the newspapers announce the finding of the USS Loaded by a group of explorers. Yipee! You literally jump for joy! Later that same day your broker calls to say that you've quadrupled your money. You invested $300,000 and came back with $1,200,000!—enough to reach your $10 million goal! Patting yourself on the back you go out to celebrate. It wasn't easy, but you are now $9 million richer. Congratulations!

WALL STREET

Wouldn't it be nice if this had happened to you in real life? The odds are against your experiencing anything like this in real life, but nothing is impossible using a computer. That's why you should check out the *Wall Street* program from Timeworks. For 1 to 4 players on the Commodore 64, this simulation is very realistic. I've never played the real stock market, but this program gives you the feeling that you *are* playing it, right down to the ticker tape announcing the latest stock fluctuations. If you fancy yourself as a penniless financial wizard who could storm the stock market but for a lack of money, then this is the game for you.

The goals in *Wall Street* are simple. With one Player the objective is to increase your assets to $10 million in 15 years. With two to four Players you simply want to make more money than they in the same timespan. In both cases each Player or "trader" starts off with $1 million in cash and a $200,000 line of credit at the bank. You are then left on your own to "use your business savvy" as the manual states. The computer acts only as the broker and banker, giving you all the pertinent information needed to make profitable choices. How you spend your money is up to you.

STARTING THE GAME

Wall Street is available on both cassette and disk, though I would recommend the latter for serious game play. Loading the disk version takes a few minutes so the cassette version must take over a quarter of an hour to load. Once loaded, the title and a ticker tape machine will appear on the screen. On the bottom of the screen is a line of periods. This is the ticker tape itself. Messages will appear on the

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right, one character at a time, and move to the left, just like on a real ticker tape. It's interesting to see. You will be asked via the ticker tape if this is to be a continuation of a saved game. If it isn't, then you will be asked for the number of Players and the names (up to 20 characters) and initials (3 characters) of each Player. After this, the screen will clear and you will be presented with your first display: the Big Board.

DISPLAYS

Wall Street has four different screen displays: 1) the Big Board, 2) the Trader Summary, 3) the Trader Detail Display and 4) the bar charts. The Big Board displays all the investments, their prices (P/S), the net change since the last quarter (NPC), the estimated annual percentage (EAP) change and averages of the P/S and NPC for the different investment groups. This board is useful in determining which investments to go after.

The second display, the Trader Summary, is only used in multi-player games (2 or more Players). It shows how much each Player has tied up in each investment available, in thousands of dollars. This board is useful for figuring out what your opponents are doing.

The third display, the Trader Detail Display, is probably the most important. There is one Display for each Player. They list in detail each Player's holdings and it is here that the Player can buy or sell the investments, with changes immediately reflected in the Display. This is useful for keeping track of where you are and where you should be going.

The final display is the bar chart. A bar chart shows the changes in stock prices for a specified company during the last 32 quarters. Its usefulness is in helping to analyze trends.

THE INVESTMENT PORTFOLIO

The Investment Portfolio provided with *Wall Street* is not as large as in real stock markets but provides enough variation to make it interesting. The main two investments are stocks and real estate. With stocks you may invest in five companies: Big Telephone and Telegraph (BTT), American Business Machines (ABM), Defense Industries Inc. (DEF), Generic Motor Company (GMC) and Major Mining and Manufacturing Corp. (MMM). In real estate you can invest in either residential rental units (RER) or commercial rental space (REC). These will probably be the mainstream of your investments.

The other investments go as follows: Mineral Exploration Co. (MIN), Precious Metals (PMT), Money Market (MKT), Special Investments (SPE) and Individual Retirement Accounts (IRA). The Mineral Exploration Co. is a very risky company to invest in, though the return can be high. PMT is used to buy precious metals for speculation and is not quite as risky as MIN. The Money Market is always a good place to invest, but the return is low. Special Investments are at the top of the list of risks. These will only happen once in a while and can have a return from +400% to −100%. You should only invest in these if you can spare the money. The last investment possibility is the IRA, only possible in the last quarter of a year. It follows the Money Market in growth and is non-taxable. At the end of 15 years the cash invested in this account will be added automatically to your other assets. An IRA is the perfect place to sock money away so the tax man won't get it.

BUYING AND SELLING

The game is played for 15 years, each with 4 quarters, for a total of 60 quarters of Play. Every quarter each Player has the chance to buy or sell stocks and other investments when his Trader Detail Display is on-screen. You may buy as much of each investment as you want, provided you have the money. Transactions are entered in the format INV/B/SHRS where INV is a 3-letter abbreviation for the investment, B stands for Buy (S would mean Sell), and SHRS is the number of shares you want to buy. To buy 1000 shares of BTT you would enter BTT/B/1,000 and press RETURN. All transactions are entered in this way. When you are finished, simply press RETURN and the computer will move to the next player.

Once all players are finished entering their transaction, the screen displays the ticker tape machine again. Stock price changes for that quarter will scroll across the bottom of the screen. When finished, you will be returned to the Big Board and Play will recommence in the next quarter, with stock changes reflected in the P/S column. This cycle continues until the player(s) reach the end of year 15, quarter 4, at which time the computer will announce the winner and ask if you wish to play again. If you don't, it simply ends and you can load another program.

OTHER FEATURES

Wall Street is loaded with special features and one must play the game to appreciate them. Players can make loans or transfer assets between each other. A financial advisor is available to any Player who would like advice (for a price, of course). Players can gain controlling interest of a company or companies and get fat salaries as senior stockholders. A 20% line of credit is available for investment purposes. Sometimes there will be an unexpected occurrence where you might gain or lose some cash. To inject a bit of realism in the game, taxes are collected at the end of the fourth quarter of each year, and these can vary from 10% to 40%, depending on the amount of money you made during the year. And if the game gets a bit too long for you, it can be saved on disk or tape for continuation at a later date. When you reload the game, everything will be as you left it. These features make the game more interesting and enjoyable to play.

CONCLUSION

In my opinion, *Wall Street* is the best simulation I have seen so far for the Commodore 64. It's interesting trying to beat your friends or relatives and see who has the most "business savvy". If you like to play around with money and stocks then this game is definitely for you. □

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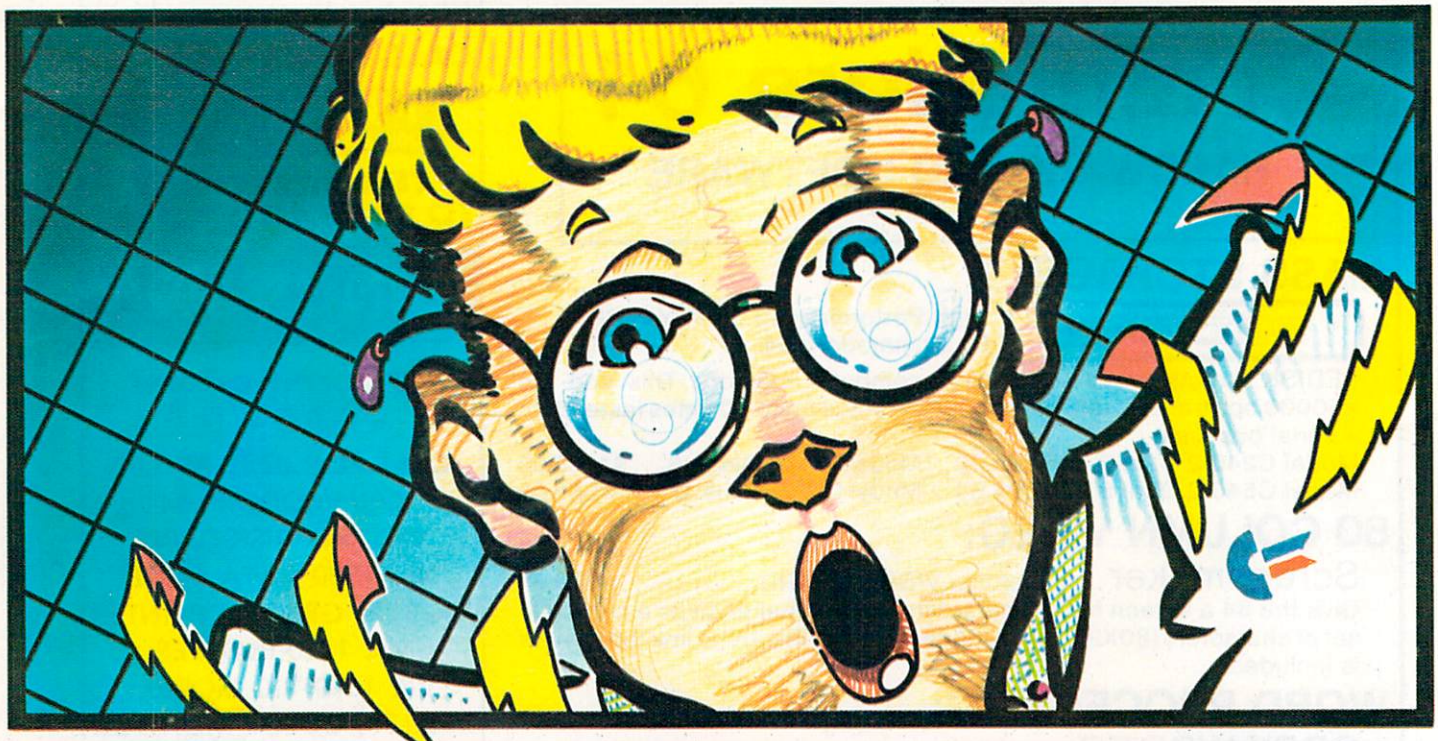

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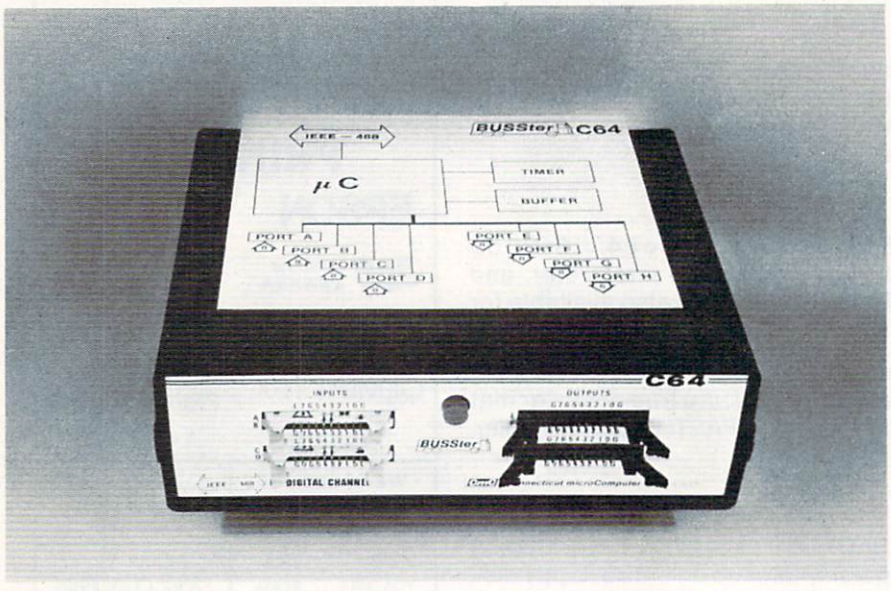

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Connecticut MicroComputer announces a new 64 digital line input/output module–32 in/32 out–which is a self contained IEEE-488 (GPIB) bus compatible device. The BUSSter C64 works with any computer that has an IEEE-488 interface (either built-in or added on) including computers manufactured by Commodore. The C64 is the third product in the BUSSter series of I/O modules.

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The BUSSter C64 Digital Input/Output Module is easily programmed through BASIC commands from the controlling computer.

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COURSE I: "How To Make Good Investments" comes complete with text and programs on cassette for $39.95.

PRODUCT PACKAGING

The product is packaged essentially like a book. The title (front cover) of the enclosed text will provide the attention getting and primary information. The cassette will be attached to the front cover, in clear view, with the title of the programs printed for additional consumer information. The book and cassette will be separately wrapped in cellophane and attached via adhesive. This makes for an easily handled and easily displayed product.

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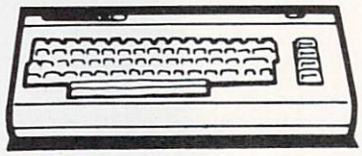


CREATIVE SOFTWARE ADDS "IN THE CHIPS" TO EDUCATIONAL PROGRAMS

Sunnyvale, CA..–Creative Software today announced that *In The Chips*, the third in a series of concept educational programs, will soon be available for the Commodore VIC-20 home computer.

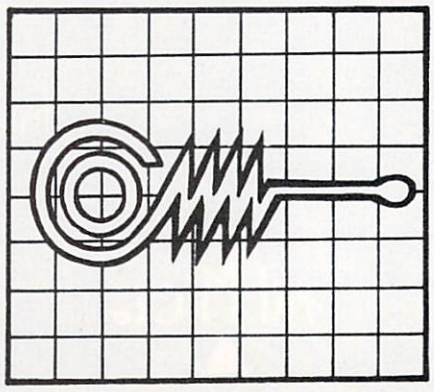
In The Chips tests the entrepreneurial ability of one or two players in the development and operation of rival game software companies. Each company owner starts with $100,000 to finance company operations. The object of the game is to use the capital in the most efficient way in order to "out-profit" the competition.

The company owners take turns using the joystick to direct an assistant to buildings where decisions are made regarding product development, inventory, pricing, and advertising. First the assistant is guided to the research and development house where the owners must decide which games will be manufactured. The busy assistant is then ordered to the warehouse to manipulate inventory levels. Meanwhile the treasury reports that funds are dissipating.

After the games have been developed and inventoried, the player must direct the assistant to the marketing department to set prices. And finally, the assistant must pay the bill at the local advertising agency.

After both players are finished, they get a chance to see their financial results for the quarter on the screen. They must use that information to make future inventory, pricing and budgeting decisions.

Creative Software is located at 230 East Caribbean Drive, Sunnyvale, CA 94089.



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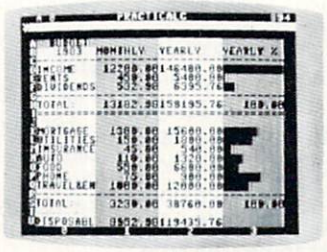

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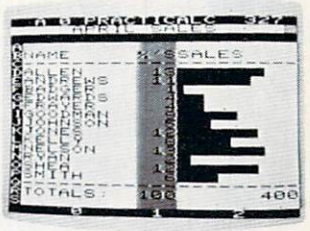

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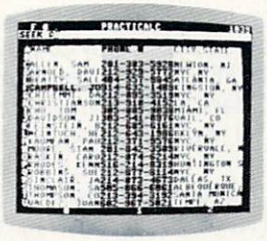

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*$40 is suggested retail price for tape version of PractiCalc-20 ($45 for disk version; PractiCalc Plus or PractiCalc 64 = $50 for tape version, $55 for disk).

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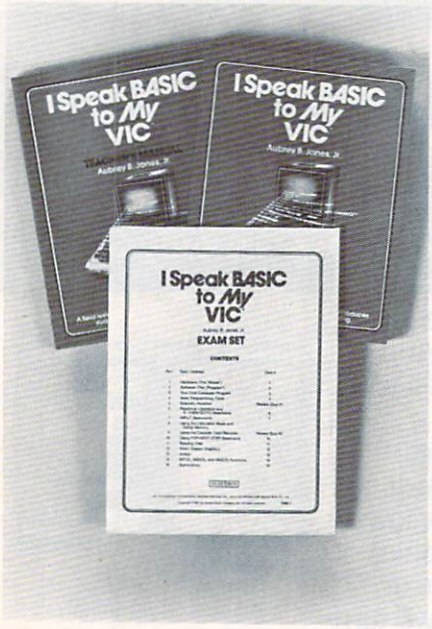

TEACHERS AID "I SPEAK BASIC TO MY VIC™" RELEASED

I SPEAK BASIC TO MY VIC is a computer literacy course that introduces students to BASIC programming and the operation of a VIC microcomputer.The VIC course is the latest addition to the best-selling *I Speak Basic* series that explains the BASIC language for the PET™. The series includes a Teacher's Manual, Student Text, and Exam Set for each machine.

Written by Aubrey Jones, *I Speak BASIC to My VIC* is designed for teachers regardless of their knowledge of microcomputers and their programming skill.

The core of the course is the Student Text that features learning objectives, definitions and examples of key terms and BASIC concepts, in class programming exercises, practices and assignments. Each version includes chapters explaining the parts and operation of the microcomputer. Chapters cover BASIC programming topics such as Mathematical Operations, Scientific Notations, Conditional and Unconditional Branching, Input Statements, Loops, Reading Data, Video Display Graphics, Arrays and Subroutines.

The Teacher's Manual provides techniques for presenting the material and emphasizing particular concepts, annotations to aid in lesson planning, suggestions for implementing the course, and answers to all practice exams.

The Exam Set contains 12 quizzes on sprite duplicating masters to check student understanding and reinforce learning. The quizzes can be easily reproduced for class use. A Classroom set of *I Speak BASIC* contains one Teacher's Manual, 20 Student Texts, and one Exam Set.

For more information contact:
Bill Madaras on (201) 843-0550

INFO DESIGNS, INC. ADDS TRAINING AND COMMUNICATIONS DIVISION

Birmingham, MI—Info Designs, Inc. today announced creation of a Training and Communications Division to complement the company's primary software products business. John Wysner, formerly Vice President of service systems at Sandy Corp., was named vice president of Info Designs and head of the new division.

The division, which sells videotaped training programs under the InfoVision name, is under contract to provide training tapes to Commodore Business Machines, Inc. for use by owners of Commodore computers. "The product line will be expanded to include training aids for other brands of computers and different types of software," said Richard Stahl, Info Designs president.

"We have adapted the personal instruction needs of novice computer users to the mass market nature of the microcomputer industry through these training aids," Stahl said. "The division fills a void in the microcomputer market and should increase buyer satisfaction with both the computers and software."

"Wysner's experience in developing and implementing state-of-the-art productivity and performance improvement systems should be of substantial benefit in the new division's efforts to provide similar services to the microcomputer software market," Stahl added. "Wysner has a strong background in instructional systems design, standards-based systems, communications network development and strategic planning."

Info Designs, Inc. creates and distributes software and instructional training programs for use by microcomputer owners. The company sells products under its own name through a network of more than 1,000 retail outlets and is under contract to supply software to Commodore Business Machines, Inc. for sale under the Commodore label. Its primary line of products includes software compatible with Commodore brand computers. The company also is working to expand its software offerings to include programs compatible with other operating languages and the systems of other computer manufacturers.

For further information contact Info Design at 6905 Telegraph Road, Birmingham, MI 48010. Telephone: (313) 540-4010.

EDUCATIONAL SOFTWARE INC. AND RESTON BOOKS SIGN CONTRACT

Educational Software Inc. (ESI) of Soquel, Calif., has contracted with Reston Books to publish and distribute ESI's Master Memory Maps™ for the Commodore 64, and VIC-20.

The books for the Commodore computers are completely new. Prices are to be $14.95 for the VIC-20 version and $15.95 for the Commodore 64 version. The books will be available from bookstores and computer outlets worldwide. These books may also be purchased directly from Educational Software Inc.

Computer enthusiasts, both beginner and expert, will find these books loaded with useful information on how to unlock the seeming mysteries of their computers. Covered in detail are such topics as: color locations, how to PEEK and POKE, using memory more efficiently, hints on speeding up BASIC, arcade game writing techniques, paddles, joysticks and much more.

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Output diskettes are interchangeable between versions, but the VIC-20 version charts 26 bi-weekly periods rather than 52 weekly periods.

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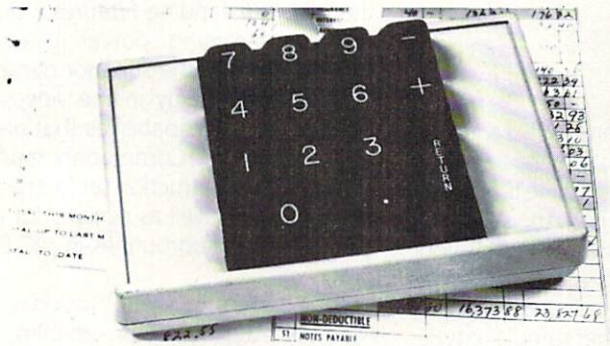
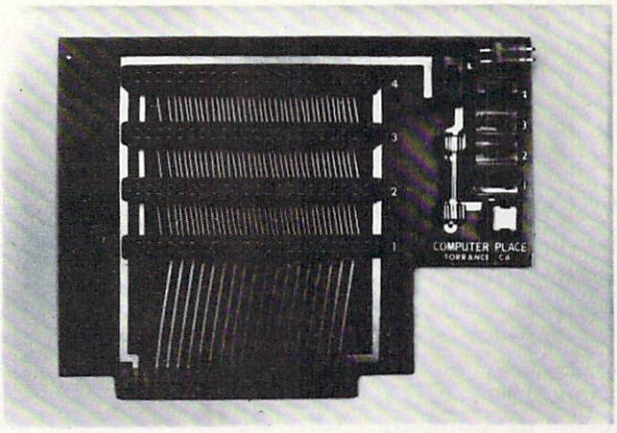


The CP Numeric Keypad is the best friendly companion for your Commodore 64 and VIC-20. It is designed with top-quality, low-profile key switches for smooth, reliable and low-cost numeric data entry. Now you can zip through your numeric work sheet, input your numbers and figures comfortably, quickly and more easily than ever before. The Numeric Keypad easily connects in parallel with the existing keyboard connector. No additional software is required. The setup is simple, the usage is comfortable, and the price is very affordable at only $69.95.



This CP VIC-20 Expander is the one you have been waiting for. It incorporates all the features you've ever wanted. It enhances your VIC-20 computer system by fully expanding the VIC-20 memory, plugging in cartridges for programming utilities, language extension, and many more applications. For only $54.95, you get these built-in quality features: Four high-quality positively keyed connector slots for full memory expansion and utility cartridges; Gold-plated contact fingers for solid, long-lasting connection; An on-board RESET button that allows the restart of the VIC-20 without turning off the computer; Four individual slot ON-OFF control switches which are arranged for easy access and designed with fingertip control rather than pentip; An external power supply hook-up provision with a two-way power source switch; A fuse block for overload and short protection.

Dealer inquiries welcome.

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COMPUTER SOFTWARE ASSOCIATES DEBUTS EDUCATIONAL/TUTORIAL SOFTWARE FOR THE VIC-20

Sprint Typer, an educational/tutorial typing program for the Commodore VIC-20 microcomputer, has just been introduced by Computer Software Associates. Sprint Typer is a cassette-loaded program written for an unexpanded VIC-20. It was designed primarily for the novice computer user who wants to get beyond games, or for the person who wants to upgrade his or her typing skills.

Sprint Typer is a typing tutorial program that lets you teach yourself touch typing and easy programming on the VIC by providing easy sentences that appear in random sequence. One hundred five words and eight digits are used to compose 356,625 different sentences in eight basic statement structures.

The program generates a sentence, which you then type. You are timed for speed, and the computer tells you the number of errors (if any) in the sentence. The computer also indicates what your fastest time is during a given session. When the sentence is typed perfectly, you will be given another sample to type.

Computer Software Associates' president, Sandow Ruby, points out that "There is a need for good tutorial programs for home computer users. Once people discover they can do much more than just play games on their VIC-20, they start to seek those kinds of programs that are going to improve their computer skills so they can get more value from their micros."

Sprint Typer, as in all Computer Software Associates products, is marketed and distributed by Micro Software International. Robert Shapiro, MSI's Executive Vice President of Marketing, notes, "Sprint Typer is the kind of program that every new VIC owner, in addition to those wanting to improve their typing, should acquire. It's the perfect companion to Computer Software Associates' VIC PAK #1, which was also designed for the novice computerist."

Sprint Typer was written by Mantronics Software, and sells for a suggested list price of $19.95. For additional information about Sprint Typer or the complete line of Computer Software Associates programs, contact Micro Software International, Inc., 44 Oak Street, The Silk Mill, Newton Upper Falls, MA 02164. Telephone: (617) 527-7510.

"VIC™ REVEALED" BOOK RELEASED

"VIC Revealed" is a comprehensive examination of the VIC's hardware capabilities, with assembly language programming and advanced programming techniques for the serious VIC owner.

The book is written by Nick Hampshire, a noted authority on Commodore machines and the author of *Library of PET Subroutines* and *PET Graphics*, published by the Hayden Book Company of Rochelle Park, New Jersey.

The book covers five major topics–the 6502 Microprocessor; VIC System Software; the Video Interface Chip; I/O Ports and I/O Processing and Functions.

Hampshire provides information on the VIC's outstanding features including the programming power given the limited memory, the superior game and graphics technology in the video chip, and unique I/O capabilities that are not even explained in Commodore manuals. The complete instruction set for the 6502 is provided, as well as options for using machine code subroutines in VIC BASIC programs.

The "System Software" includes a VIC Memory Map, system variables, user memory and data storage, the BASIC Operating Software, and VIC system "wedges"–machine code routines to modify the system operation or monitor functions.

In the chapter on the VIC video interface, the author includes details for sound effects programming. Differences between VIC high resolution mode and multicolor are discussed, and sample graphic subroutines are included. Six BASIC programs illustrate the VIC's sound and music capabilities.

The last sections of the book focus on I/O processing concerns including the

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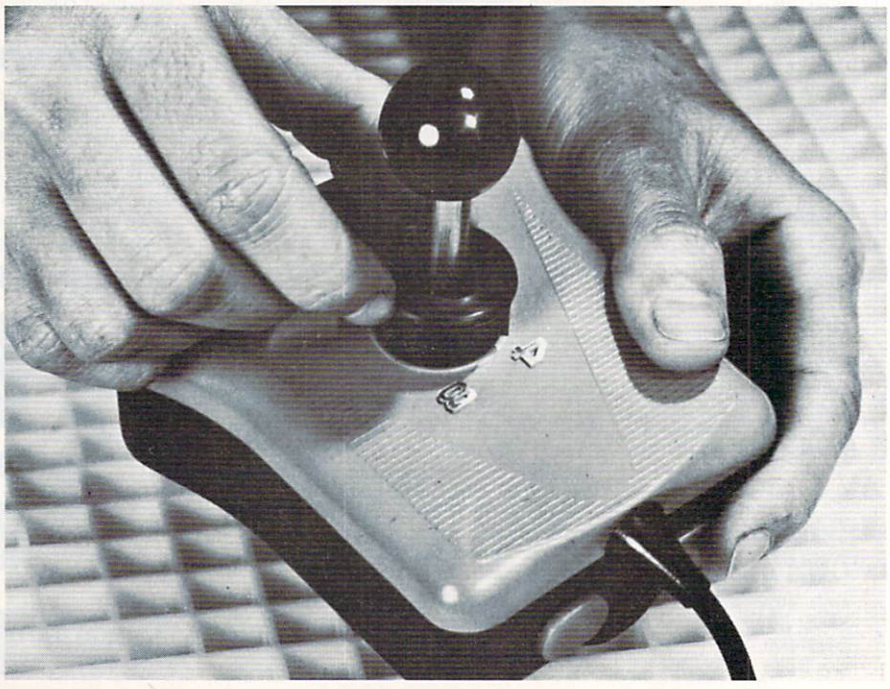

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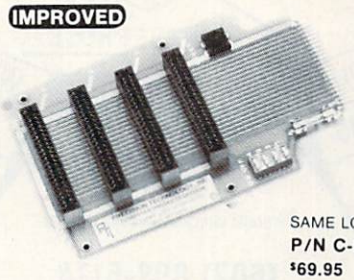

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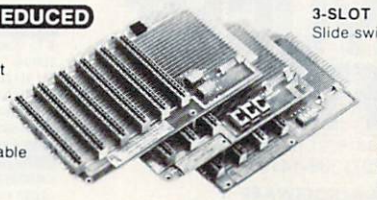

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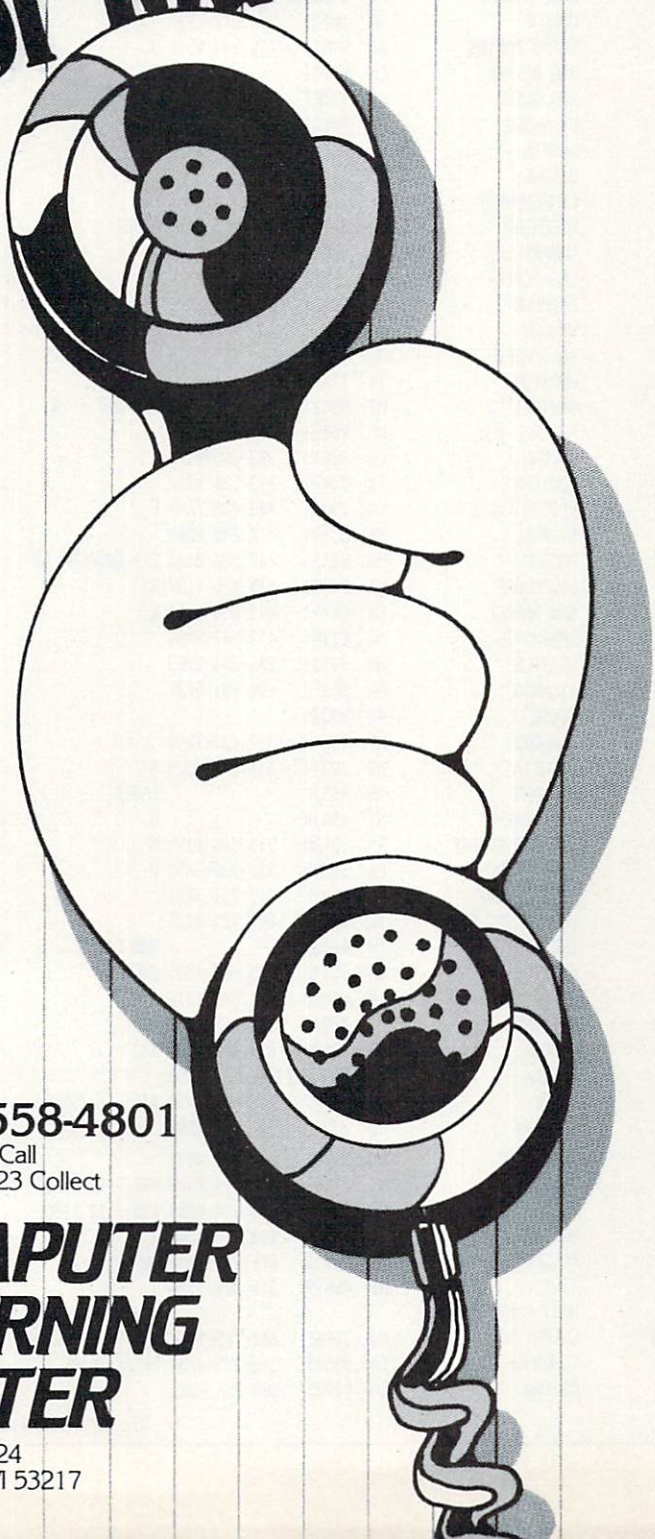

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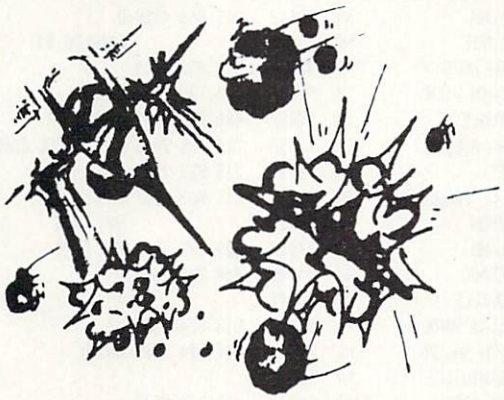

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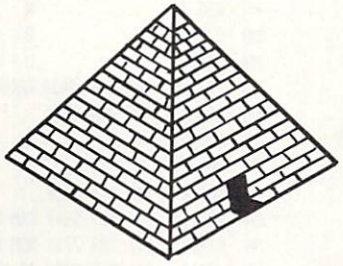

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GALAXY STORES	216 S OXFORD AVE	LOS ANGELES	CA	90004	800 421 8845		M
GARDEN VALLEY SOFTWARE	BOX 23	GARDEN VALLEY	ID	83622		E	S
GENERAL SYS CONSULTANTS	2312 ROLLING ROCK DR	CONLEY	GA	30027		B	S
GENESIS COMPUTER CORP	1444 LINDEN ST	BETHLEHEM	PA	18018	215 861 0850		H
GENISYS COMPUTER PROD	11212 BARCLAY DR	GARDEN GROVE	CA	92641	714 539 5989	RAM-EXP CARDS	H
GLOUSTER COMP BUS CO	6 BROOKS RD	GLOUSTER	MA	01930	617 283 7719	ROM BURNER	H
GOSUB INT'L	501 E PAWNEE STE 430	WICHITA	KS	67211	316 265 9992	10 KEY PAD	H
GP MICROSYSTEMS	72-31 67TH PLACE	GLENDALE	NY	11385		GU	S
HARLI SOFTWARE	1740 GARDEN BRIAR CT RR#2	THUNDAR BAY	ONT	P7C 4V1		G	S
HARMONY VIDEO & ELECT	2357 CONEY ISLAND AVE	BROOKLYN	NY	11223	800 221 8927		M
HARRISON COMPUTER CENTER	2263 BROADHOLLOW RD	E FARMINGDALE	NY	11735	800 645 9187		M
HARRY F LEONARD	5556 CHERRYWOOD RD	COLUMBUS	OH	43229	614 846 1823	U-MATH EQUATION	S
HD MANUFACTURING	91 LONG HILL RD	LEVERETT	MA	01054	413 549 3744	B - WORD PROC	S
HES	71 PARK LANE	BRISBANE	CA	94005	415 468 4110	BEGU	S
HEWITTS NAT'L WHOLESALE	2448 MENAUL NE	ALBUQUERQUE	NM	87107	800 821 9287		M
HYMAC SYSTEMS	BOX 446	WEST LINN	OR	97068	503 636 6888		O
HYPERTECH	1820 NE 142ND ST PENT 7	MIAMI	FL	33181		GU	H
IDEAL DEVELOPMENT SOFTWARE	652 W 700 N	CLEARFIELD	UT	84015		E	S
INTEGRATED CONTROLS	1240-L LOGAN AVE	COSTA MESA	CA	92626	714 641 0181		H
INTELLIGENT SOFTWARE	BOX 3745	SAN RAFAEL	CA	94912	415 459 2905		S
INTERDESIGN	2054 IRVINE PK RD	CHICAGO	IL	60618	312 975 2040		H
INTERFACE COMPUTERWARE	BOX 862	OREM	UT	84057	801 224 6400		H
ISA SOFTWARE	14114 DALLAS PKWY STE 530	DALLAS	TX	75240			S
J HALLIDAY	302 DOGWOOD CIRCLE	LAFAYETTE	GA	30728			S
JAMES PASLEY	803 LUCERNE DR	SPARTANSBURG	SC	29302		G	S

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JIM GRUBBS K9EI	BOX 3042	SPRINGFIELD	IL	62708		RU	S
JINI MICRO	BOX 247	RIVERDALE	NY	10463	212 796 6200	B - DATABASE	S
JMC	1025 INDUSTRIAL DR	BENSONVILLE	IL	60106			M
JOURNAL/20	BOX 1149	VAN ALSTYNE	TX	75095	214 482 6679	$12 - 24 ISSUES	P
JOYFUL COMPUTING ASSOCIATES	BOX 64	BEARSVILLE	NY	12409	914 679 2817		M
JUST ANOTHER SOFTWARE CO	BOX 893	PALO ALTO	CA	94301		U	S
K2 ELECTRONICS DESIGN	3998 VARSITY DR	ANN ARBOR	MI	48104	313 973 6267		H
K8 SOFTWARE	BOX 248C	CANTON	CT	06019		E	S
KANTRONICS	1202 E 23RD	LAWRENCE	KS	66044	913 842 7745	R	H
L MORRIS	2401 WENGERT #26	LAS VEGAS	NV	89104			S
LIGHTNING SOFTWARE	BOX 11725	PALO ALTO	CA	94306	415 327 3280	E-TYPING TUTOR	S
LOAD 20 MAGAZINE	550 GRANT AVE	JUNCTION CITY	KS	66441	913 762 4730	$50-12 ISS CASS	P
LOGISTIC ENGINEERING ASSOC	2097 HILLS LAKE DR	EL CAJON	CA	92020	619 562 1047	BEGH	S
LOGOS SOFTWARE	3291 LAUREL CYN RD	SANTA BARBARA	CA	93015	805 687 0205		S
LONGS ELECTRONICS	BOX 11347	BIRMINGHAM	AL	35202	800 633 3410	R	M
LORDS OF BASIC	BOX 459	LADSON	SC	29456		NAT'L USER GRP	O
LUNA SOFTWARE	BOX 26922	SAN JOSE	CA	95159	408 378 7793	BG	S
LYCO COMPUTER	BOX 10	COGAN STATION	PA	17728	800 233 8760		M
M PASCALL SOFTWARE	BOX 1143	SANTEE	CA	92071		GH-CASS CAT $1	S
M&M COMPUTER SYS	BOX 3736	CHERRY HILL	NJ	08034	609 482 2065		M
MDAGREEABLE SOFTWARE	5925 MAGNOLIA LANE	PLYMOUTH	MN	55442	612 559 1108	HU	S
MACRO DYNAMICS	8950 VILLA LA JOLLA DR 1200	LA JOLLA	CA	92037	619 452 5151	VIC PROD LIST	O
MADISON COMPUTER	1825 MONROE	MADISON	WI	53711	608 255 5552	VIC FURNITURE	O
MAGIC CARPET	BOX 35115	PHOENIX	AZ	85069		G	S
MAIL COMP	9434 CHESAPEAKE DR	SAN DIEGO	CA	92123	800 752 1341		M
MANTRONICS SOFTWARE DESIGNS	368 PIERCE PLAZA	NO MANKATO	MN	56001	507 345 7048	U - PROG AID	S
MARCO POLO CO	4681 S 83 E AVE	TULSA	OK	74145	800 331 9131		M
MARTIN GLASSER	121B BIRCH CIRCLE	AGLIN AFB	FL	32542		H-STOCK MKT	S
MASSWARE	BOX 2566	FRAMINGHAM	MA	01701	617 877 0023	G	S
MCKELVIE PROGRAMS	BOX 53076	PHILADELPHIA	PA	19105		H - D&D AIDS	S
MELBOURNE HOUSE SOFTWARE	333 E 46TH ST	NEW YORK	NY	10017			S
MERLIN ENTERPRISES	BOX 2876	TORRANCE	CA	90509	213 316 0945	G-MYSTERIES	S
METARESEARCH	1100 SE WOODWARD	PROTLAND	OR	97202	503 232 1712	VOICE SYNTHS	H
MFJ ENTERPRISES	BOX 494	MISSISSIPPI STATE	MS	39762	800 647 1800	R	S
MGR ENTERPRISES	10925 SW MIRA CT	TIGARD	OR	97223			O
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MICRO	BOX 6502	CHELMSFORD	MA	01824	617 256 5515	$24 - 12 ISSUES	P
MICRO INFORMATION SYS	BOX 73	WAYNE	NJ	07470		E	S
MICRO MANAGEMENT SYS	2803 THOMASVILLE RD	CAIRO	GA	31728	800 841 0860		M
MICRO MITTENS	BOX 10246	SAN JOSE	CA	95157	408 374 4364	COVERS	O
MICRO PLUS	BOX 473	KENVILLE	NJ	07847		GH	S
MICRO SENSE	BOX 6273	SAN BERNARDINO	CA	92412	800 982 6352		H
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MICRO-DIGITAL	752 JOHN GLENN BLVD	WEBSTER	NY	14580		G	S
MICRO-ED	BOX 24156	MINNEAPOLIS	MN	55424	612 926 2292	E	S
MICRO-MANIA	BOX 4110	ELKHART	IN	46514			S
MICRO-SYSTEMS DEVELOPMENT	11105 SHADY TRAIL STE 103	DALLAS	TX	75229	214 241 3743	BGH	H
MICRO-VIC-COMPUTERS	BOX 587	PITTSFIELD	MA	01202			M
MICRO-WARE DISTRIBUTORS	BOX 113	POMPTON PLAINS	NJ	07444	210 838 9027	BGH	H
MICROGRAMS	BOX 2146	LOVES PARK	IL	61130	815 965 2464	E	S
MICROPERIPHERAL CORP	2565 152ND AVE NE	REDMOND	WA	98052	206 881 7544		H
MICROPHYS PROGRAMS	2048 FORD ST	BROOKLYN	NY	11229	212 867 1333	E	S
MICROSIGNAL	900 EMBARCADERO DEL MAR UNIT A	GOLETA	CA	93117		U	S
MICROSIGNAL PUBLICATIONS	BOX 22	MILLWOOD	NY	10546			M
MICROSPEC LTD	2905 PORTS O'CALL CT	PLANO	TX	75075	214 867 1333	BEG	S
MICROTEK	9514 CHESAPEAK DR	SAN DIEGO	CA	92123	619 569 0900		H
MIDNIGHT/PAPER	635 MAPLE	MT ZION	IL	62549	217 864 5320	$20 - 6 ISSUES	P
MIDWEST MICRO ASSOCS	311 W 72ND ST	KANSAS CITY	MO	64114	816 333 7200	BU	S
MISSING LINK PROD	BOX 6468	COLORADO SPRINGS	CO	80934	303 475 0083		H
MOOSEWARE	BOX 17868	IRVINE	CA	92713			M
MOSES ENGINEERING	BOX 11038	HUNTSVILLE	AL	35805	205 837 3356	E	S
MTG TECHNICAL SALES	281 NEEDHAM ST	NEWTON	MA	02167	800 343 0854		M
MW SOFTWARE	BOX 126	URBANA	IL	61801		B	S
MYSTIC SOFTWARE	BOX 536	LAKESIDE	CA	92004	619 443 9776	GH	S
NATIONAL COMPUTER PROD	8228 CENTER DR	LA MESA	CA	92041	800 854 6654	CATALOG $1	M
NATIONAL VIC ASSOCIATION	9 CRABAPPLE LANE	NANUET	NY	10954		$14 - 12 ISSUES	P

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NELSON SOFTWARE	2232 OGSEN CT	ST PAUL	MN	55119	612 738 1000	BG - TAX PREP	S
NEW HORIZONS GROUP	#3-119 CHARLES ST	N VANCOUVER	BC	V7H 1S1	604 929 7347	BEGH	S
NIBBLES + BITS	BOX 2044	ORCUTT	CA	93455		G	S
NORTHLAND ACCOUNTING	606 SECOND AVE	TWO HARBORS	MN	55616	218 834 3600	H - TAX PREP	S
NUFKOP	BOX 156	SHADY COVE	OR	97539	503 878 2113	GU	S
NVUG NUGGET$	BOX 34575	OMAHA	NE	68134		$10 - 12 ISSUES	P
OEM INC	3002 OLEANDER AVE	FORT PIERCE	FL	33450	305 465 9363	GU	H
OMNI DISTRIBUTING	BOX 23737	JACKSONVILLE	FL	32241			M
OPTIMAL TECHNOLOGY	BLUE WOOD 127	EARLYSVILLE	VA	22936	804 973 5482		H
OPTIMIZED DATA SYS	BOX 595	PLACENTIA	CA	92670			H
OPTOMAM CONSUMER PROD	BOX 1038	PLACERVILLE	CA	95667	916 621 1090		M
PALOS VERDES LEARNING CTR	716 YARMOUTH RD #203L	PALOS VERDES ESTATES	CA	90274		E	S
PARR PROGRAMMING	2664 TYLER ST	GARY	IN	46407	219 885 0611	G	S
PARSEC RESEARCH	DRAWER 1766-P	FREMONT	CA	94538	415 651 3160	EXP CARD	H
PEEK MAGAZINE	4145 BROOKSIDE BLVD	CLEVELAND	OH	44135		$45-12 ISS CASS	P
PERSONAL COMPUTER SYS	BOX 1073	SYRACUSE	NY	13201	315 478 6800		M
PERSONAL PERIPHERAL PROD	BOX 3423	AURORA	IL	60505	312 961 2347		H
PERSONAL PERIPHERAL PROD	BOX 3423	AURORA	IL	60505	312 961 2347	U	S
PETRA CONSULTING	35 PINE ST	WOODSTOCK	NY	12498			H
PM PRODUCTS	4455 TORRANCE BLVD #177	TORRANCE	CA	90503		CHARTS	O
PM SOFTWARE	4400 ARDEN VIEW CT	ST PAUL	MN	55112	612 633 0891	B	S
PMI INC	BOX 87	BUCKFIELD	ME	04220	207 336 2500	E	S
POWER PLAY	BOX 651	HOLMES	PA	19043	215 345 8112	$10 - 4 ISSUES	P
POWERLINE SOFTWARE	110 WOODVIEW DR	HORSEHEADS	NY	14845			S
PR SOFTWARE	BOX 169	S SAN FRANSISCO	CA	94080		G-STRATEGY	S
PRACTICAL APPLICATIONS OF CAL	BOX 255768	SACRAMENTO	CA	95825		H - BIOMED	S
PRECISION TECHNOLOGY	2970 SO RICHARD ST	SALT LAKE CITY	UT	84115	801 497 6266	EXP CARDS	H
PRICE	67 TEED DR	RANDOLPH	MA	02368	800 343 1070		M
PRICKLY-PEAR SOFTWARE	9822 E STELLA RD	TUCSON	AZ	85730	602 886 1505	CAT FOR SASE	M
PRO-TECH EQUIPMENT	7411 SOUTHWEST 147TH CT	MIAMI	FL	33193	305 382 4011	COVERS	O
PROFESSIONAL MICRO SVC	100 W 22ND ST	BALTIMORE	MD	21218	301 366 0010		S
PROGRAM STORE	4200 WISCONSON AVE NW	WASHINGTON	DC	20016	800 232 2224		M
PROGRAMMERS INSTITUTE	BOX 3191	CHAPEL HILL	NC	27514	919 489 2198	$50-12 ISS CASS	P
PROGRAMS INT'L	MORAVIA CTR INDUSTRIAL PK	BALTIMORE	MD	21206	301 488 7719		M
PROGRESSIVE PERIPHERALS &SFTW	6340 W MISSISSIPPI AVE	LAKEWOOD	CO	80226	303 778 1312	G - CLOCK CARD	H
PROTECTO ENTERPRIZES	BOX 550	BARRINGTON	IL	60010	312 382 5244	80 COL- VOICE	M
PUBLIC DOMAIN INC	5025 S RANGELINE RD	WEST MILTON	OH	45383	513 698 5638	EGHRU	S
PYRAMID COMPUTERWARE	278 WARREN ST	EDGEWATER PARK	NJ	08010	609 386 9363		M
QUALITY COMPUTER SERVICE	801 S VICTORIA 104	VENTURA	CA	93003	805 656 1330	10 KEY PAD	H
QUANTUM DATA	14252 CULVER DR STE A	IRVINE	CA	92714		80 COL CARD	H
QUEUE CAT #11	5 CHAPEL HILL DR	FAIRFIELD	CT	06403	800 232 2224		M
QUICK BROWN FOX	548 BROADWAY STE 4F	NEW YORK	NY	10012	212 925 8290	BE - WORD PROC	S
QUMAX / GRW LABS	BOX 17010	ROCHESTER	NY	14617	716 338 2145	EGU	S
RAK ELECTRONICS	BOX 1585	ORANGE PARK	FL	32073		BEGHRU	S
RAM SOFT	6363 BEVERLY HILL #166	HOUSTON	TX	77057	713 784 7149	R	S
RAM/RBC SYSTEMS	BOX 351	MALDEN	MA	02148			H
RANDOM ACCESS COMPUTERS	BOX 1453	BENNING	FL	32541	904 837 7201	GHU	S
RANDOM ACCESS MARKETING	BOX 1561	NEWPORT BEACH	CA	92663	714 640 5119		H
RAR-TECH	BOX 761	ROCHESTER	MI	48063		GU	S
RAYMOND SCHREINER	391 BROADWAY	BAYONNE	NJ	07002	201 858 1194	U- DISK COPIER	S
RDE SERVICES GAMES DEPT	3500 WARRINGHAM	WATERFORD	MI	48095			M
RG SOFTWARE	417 SUSQUEHANNA AVE	WYOMING	PA	18644		G-STAMP FOR CAT	S
RICHVALE TELECOMMUNICATIONS	10610 BAYVIEW	RICHMOND HILL	ONT	L4C 3N8	416 884 4165	U	H
ROBIN'S SOFTWARE	BOX 20271	BLOOMINGTON	MN	55420			S
ROCKY MTN MICRO	10890 E 47TH	DENVER	CO	80239	303 371 2430		M
RUSSIAN SOFTWARE	1744 W DEVON	CHICAGO	IL	60660			S
RVR SYSTEMS	BOX 265	DEWITT	NY	13214	315 446 2763	U	H
SAURA	7510 FOXRIDGE WAY	ANCHORAGE	AK	99502	907 272 1373	B - TAX PREP	S
SAVE	1782 MARRIETTA BLVD NW	ATLANTA	GA	30318	800 241 2682		M
SCHOLASTIC INC	730 BROADWAY	NEW YORK	NY	10003	212 505 3000	E	S
SCHOOLMASTER PROGRAMMING	BOX 194	POMONA	CA	91769			S
SCIENTIFIC & EDUCATIONAL SFTW	BOX 54	DAYTON	OH	45420		EH- 10 KEY PAD	S
SCIENTIVIC SOFTWARE	525 LOHNES DR	FAIRBORN	OH	45324		U	S
SELECTIVE ENGINEERING TECH	M25-3	BIG BEAR LAKE	CA	92315		EGU	S
SIERRA ON-LINE INC	SIERRA ON-LINE BLDG	COARSEGOLD	CA	93614	209 683 6858	G	S
SIM COMPUTER PROD	1100 E HECTOR ST	WHITEMARSH	PA	19428		U	S
SIMPLEXSOFT LTD	617 N PROPERTY LANE	MARION	IA	52302			S

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SIRIUS SOFTWARE	10364 ROCKINGHAM DR	SACRAMENTO	CA	95827	916 366 1195	G	S
SJB DISTRIBUTORS	10520 PLANO RD STE 206	DALLAS	TX	75238			M
SKYLES ELECTRIC WORKS	231E SO WHISMAN RD	MOUNTAIN VIEW	CA	94087	415 965 1735	U - PROG AID	H
SKYLIGHT SOFTWARE	22 MILLER ST	BELFAST	ME	04915		GU	S
SLAGH SYS SERVICES	BOX 53	DEARBORN	MI	48121	313 846 6666	RAM CARD	H
SOFT 4 YOU	BOX 3259	RESTON	VA	22090		EU	S
SOFT-AWARE	BOX 725	GLENDORA	CA	91740	714 594 8285		H
SOFT-SELL	BOX 1226	LAFAYETTE	GA	30728			S
SOFTWARE CLEARING HOUSE	BOX 68756	INDIANAPOLIS	IN	46268	317 353 4855		M
SOFTWARE CO-OP	BOX 275	ELIZABETH	NJ	07207		GEGHU- RENTAL	S
SOFTWARE CONNECTION	5133 VISTA DEL ORO	FAIR OAKS	CA	95628	800 828 2838		M
SOFTWARE TO GO	RTE 3 BOX 389 A 52	CLINTON	TN	37716	615 457 5868	RENTALS	O
SOFTWAVE COMMUNICATIONS	1515 SASHABAW	ORTONVILLE	MI	48462		R	S
SOFTWEAR INT'L	164 NORTH ST	CALAIS	ME	04619		G	S
SOUTHERN SOLUTIONS	BOX P	MCKINNEY	TX	75069		BE	S
SOUTHWEST MICRO SYSTEMS	2554 SOUTHWELL	DALLAS	TX	75229	214 484 7836		M
SPACE SHUTTLE SOFTWARE	BOX 252	CAPE CANAVERAL	FL	32920		BH	M
STAR STORM	BOX 59	WILLISTON	VT	05495		G- SASE FOR CAT	S
STARTECH INC	13450 MAXELLA G185 STE 200	MARINA DEL REY	CA	90291		G	S
STRALEY SYSTEM SOFTWARE	1868 GRACE AVE	FT MEYERS	FL	33901	813 939 1310	G	S
STRICTLY COMMODORE	47 COACHWOOD PL NW	CALGARY	ALT	T3H 1E1		$15 - 6 ISSUES	P
SUBURBAN SOFTWARE	6224 TRANSIT RD	DEPEW	NY	14043		U - VOICE	S
SUNRISE ELECTRONICS	7057 LOMPOC CT	CITRUS HEIGHTS	CA	95610			M
SUNSHINE PERIPHERALS	1229 E 28TH ST	BROOKLYN	NY	11210			H
SUSIE SOFTWARE	BOX 388	PROSPECT HEIGHTS	IL	60070	312 394 5165	BGH-FLT SIMUL	S
SW COMPUTERS	1125 NE 82ND	PORTLAND	OR	97220	503 257 9464		M
SYMTEC	15933 W 8 MILE RD	DETROIT	MI	48235	313 272 2950		H
SYNAPSE	5221 CENTRAL AVE #200	RICHMOND	CA	94804	415 527 7751	G	S
SYNTAX SOFTWARE	33 ELMHURST AVE STE 502	WILLOWDALE	ONT	M2M 6G8	416 221 8088	G	S

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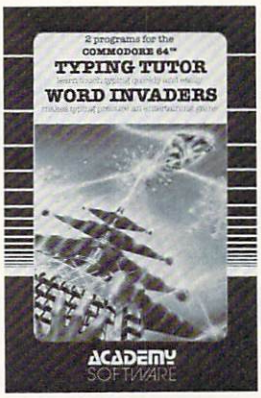

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Circle No. 2

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NAME	ADDRESS	CITY	ST	ZIP	TELEPHONE	PRODUCTS	TY
SYS MANAGEMENT ASSOCIATES	3700 COMPUTER DR	RALEIGH	NC	27619			O
T&F SOFTWARE	10902 RIVERSIDE DR	NO HOLLYWOOD	CA	91602	213 501 5845	H	S
TAMERACK SOFTWARE	BOX 247	DARBY	MT	59829	406 821 4569	E - PILOT LANG	S
TAYLORMADE SOFTWARE	8053 E AVON AVE	LINCOLN	NE	68505	402 464 9051	EGU-TYPE TUTOR	S
TEACHWARE	3277-B ROSWELL RD STE 450	ATLANTA	GA	30305		E	S
TELE SOFT	BOX 3456	TROY	MI	48084	800 255 2000		M
TELEGAMES SOFTWARE	BOX 152	HAMPTON	ONT	L0B 1J0	416 263 8864	BEGH-CAT 50CENT	S
TH WAHL	101 HIGHWAY BLVD	NO PEKIN	IL	61554			S
THE FLOPPY DISK	BOX 5392	NO HOLLYWOOD	CA	91616	213 762 3123	D&D SOFTWARE	M
THORN EMI VIDEO	1370 AVE OF THE AMERICAS	NEW YORK	NY	10019	800 526 7843	EXT291 - GH	S
TORONTO PET USERS GROUP	1912A AVENUE RD STE 1	TORONTO	ONT	M5M 4A1		BEGHRU	O
TOTAL INFORMATION SERVICES	BOX 921	LOS ALAMOS	NM	87544		BOOKS	M
TOTL SOFTWARE	1555 THIRD AVE	WALNUT CREEK	CA	94596	415 943 7877	B-LABEL-WDPROC	S
TRANSAMERICA TECHNOLOGY	BOX 1028	MADERA	CA	93639			O
TRI-MICRO	50 PLAZA SQ STE J	ORANGE	CA	92666	714 771 4038		S
TRONIC SOFTWARE	#125-1450 JONSTON RD	WHITE ROCK	BC	V4B 5E9			S
TRONIX PUBLISHING	701 W MANCHESTER BLVD	INGLEWOOD	CA	90301	213 671 8440	G	S
TST PRODUCTS	5808 14TH ST NW	PUYALLUP	WA	98371	206 922 0582		O
TYPE THRIFT		SHELBURNE	ONT	L0N 1S0		B - WORD PROC	S
UHL RESEARCH ASSOCS	7926 BERNER ST	LONG BEACH	CA	90808		H-CHK WRITER	S
UMI	3503-C TEMPLE AVE	POMONA	CA	91768	714 594 1351	BGU-PROG AID	S
UNIVERSAL RADIO	1280 AIDA DR	REYNOLDSBURG	OH	43068	614 866 4267	R	M
UNPROTECTED SOFTWARE CO	BOX 54-H	SCARSDALE	NY	10583			S
US TECHNOLOGIES	BOX 7735	SAN DIEGO	CA	92107	619 224 8016		M
VALLEY SOF'TOUCH	4974 N FRESNO STE 132	FRESNO	CA	93776			S
VERTEX INT'L	3941 B SO BRISTOL #108	SANTA ANA	CA	92704	714 850 1108	VIDEO CABLES	H
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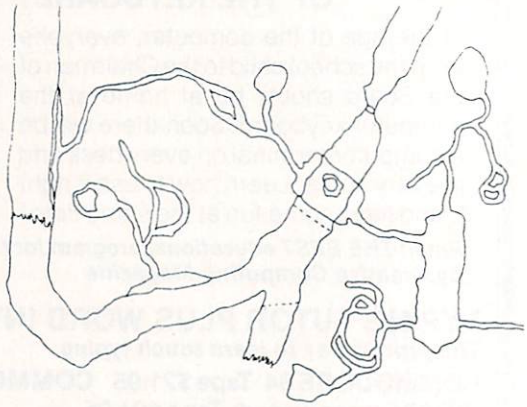

"SUPER SLOT"

Vegas action in your own living room. Start with 100 coins and work your way into riches (if you can). Great color, graphics, sound and Vegas action in this-an exciting game for your "64".

$14.95 cassette; $18.95 disk

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Explore the vast rooms, passages and mazes in this exciting adventure game. Trying to collect all of the treasures that you can, and travel through all 183 rooms to complete your venture.

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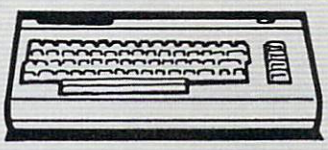
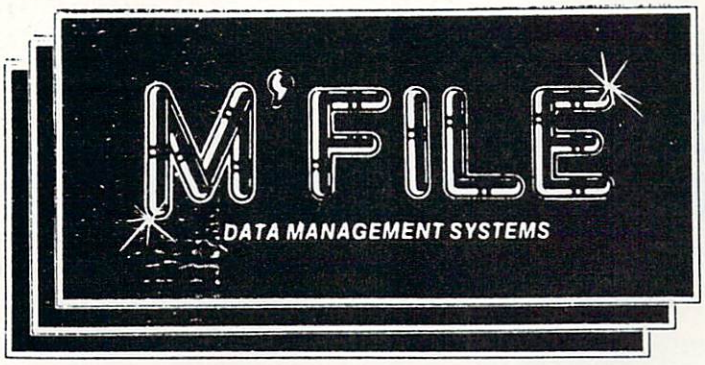
NAME	ADDRESS	CITY	ST	ZIP	TELEPHONE	PRODUCTS	TY
VICTORY SOFTWARE	2027-A SJ RUSSELL CIRCLE	ELKINS PARK	PA	19117	215 576 5625	EG	S
VICTRIX & CO	BOX 12232	BOULDER	CO	80303		U	S
VIDEO WIZARDS	292 CHARCOT AVE	SAN JOSE	CA	95131	408 263 9858	G	S
VIP ENTERPRISE	919 N CAMBRIA ST	ANAHEIM	CA	92801	714 527 8264		H
VIRGINIA MICRO SYSTEMS	13646 JEFF DAVIS HWY	WOODBRIDGE	VA	22191	703 491 6502		M
VOICE WORLD	13055 VIA ESPERIA	DEL MAR	CA	92014	714 481 7398		H
VOYAGER SOFTWARE	BOX 1126	BURLINGAME	CA	94010	415 343 0955	G	S
WALT GROSH KA9GLB	4800 N 49TH ST	MILWAKEE	WI	53218		R	S
WARD PUBLISHING	126 LEXINGTON CT	ANDOVER	KS	67002	316 733 5260		O
WAVE COMPUTERS	BOX 3883	FEDERAL WAY	WA	98003	206 839 9283	RAM CARD	H
WEBBER SOFTWARE	BOX 9	SOUTHEASTERN	PA	19399	215 687 5607	B-DATABASE-BOOK	S
WESTERN NEW ENGLAND SOFTWARE	BOX 31	WILBRAHAM	MA	01095		U	S
WILLIAM ROBBINS	BOX 3745	SAN RAFAEL	CA	94912		B-CAT FOR SASE	S
WISCONSON DISCOUNT SALES	2417 W BADGER RD	MADISON	WI	53713	608 271 6889		M
WORLD ELECTRONICS	117 27TH ST	BROOKLYN	NY	11232	212 499 5400	GHU - RAM CARD	H
WUNDERWARE	BOX 1287	JACKSONVILLE	OR	97530	503 899 7549	EG	S
X-TEK	BOX 411	XENIA	OH	45385			H
ZACHARIAS JOHN	10004 VANGUARD DR	SACRAMENTO	CA	95827		U	S
ZEPHER MICROS	232 S 43RD ST STE C	PHILADELPHIA	PA	19104	215 387 5266		M
ZIMAG	14600 S BROADWAY	GARDENA	CA	90248	213 217 0077	G	S
ZITEL COMPUTER SYS	BOX 252	CAPE CANAVERAL	FL	32920			H





M'FILE is a powerful data management program designed specifically for the Commodore 64 Computer. The package is extremely powerful yet friendly enough for the first time user. Menu driven operation eliminates the need for continuous reference to the printed documentation.

HARDWARE REQUIREMENTS:

* Commodore 64
* Commodore 1541
* Commodore 1525 or 1515 Printers
* Most Parallel Printers

CONTACT:
Double E Electronics, Inc.
12027 Pacific Street
Omaha, Nebraska 68154
Phone 402-334-7870

M'FILE DATA MANAGEMENT SYSTEM SPECIFICATIONS

- Up to 32 fields per record
- Up to 250 characters per record
- Maximum of 78 characters per field
- Maximum of 1000 records per disk (125 character records)
- Numeric and/or alphanumeric fields
- Full arithmetic calculations between fields
- Maximum of 10 user-defined interfield formulas
- "If-Then" syntax available within formulas
- Search on any or all fields
- Extremely fast record keyfield search
- Sort on any field
- Report generator allows columnar or horizontal printout
- Maximum of 15 user-defined report formats on the same file disk
- Screen Dump allows data to be printed at any point in the program
- Text'merge allows merging to most major wordprocessors

Applications:
Inventory, Mail List, Client Records, Collections, Patient Records, Personnel Files, Library Index, Phone List and many more.

M'File may be used for nearly all conventional Filing Applications.

M'Soft Inc.
SOPHISTICATED SOFTWARE

Circle No. 67

COMMODORE 64 SOFTWARE

GAMES				
HUNTER/KILLER grafic submarine adventure (T&D)	reg.	24.95	now	19.95
JUMPMAN 30 screens-best arcade game yet (T&D)	reg.	39.95	now	33.95
APE CRAZE like donky kong (T&D)	reg.	27.95	now	23.95
ESCAPE MCP fantastic maze game 10 screens (T&D)	reg.	27.95	now	23.95
SUPERCUDA multi screen Pac-man type game (T&D)	reg.	27.95	now	23.95
PEGASUS ODYSSEY colorful-graphic-challenging (T&D)	reg.	27.95	now	23.95
OMEGA RACE popular arcade game comes home (T&D)	reg.	29.95	now	19.95
BUSINESS				
DATA BASE MANAGER up to 1200 files per disk	reg.	149.95	now	99.95
GENERAL LEDGER can chart up to 350 accounts	reg.	199.95	now	149.95
ACCOUNTS REC. interactive with a/p, 9/1, & payroll	reg.	199.95	now	149.95
ACCOUNTS PAY interactive with a/r, 9/1, & payroll	reg.	199.95	now	149.95
PAYROLL interactive with a/r, a/p, & 9/1	reg.	199.95	now	149.95
EASY SCRIPT word processor	reg.	99.95	now	69.95
UTILITIES				
ASSEMBLER 64	reg.	49.95	now	29.95
LOGO	reg.	99.95	now	69.95
PILOT	reg.	99.95	now	69.95
HOME UTILITIES				
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FORGET-ME-NOT electronic calendar	reg.	29.95	now	24.95
MONEY MANAGER budget planner	reg.	29.95	now	24.95

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Tel. 609-386-9353

pyramid computerware

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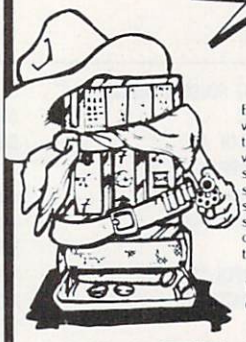

PRESENTING BANDIT

Experience the excitement of playing the casino slots without the expense. BANDIT is the slot machine game that's about as close as you can come to the real thing without hitting Atlantic City or Las Vegas. An accurate simulation of a typical casino-type double progressive slot machine, BANDIT includes features such as a separate "screen" callable at any time to display your standing and use of either keyboard or joystick for game control. Lively color graphics and authentic sound make this captivating game a great entertainer for all ages.

VIC-20 CH1006 ..... 15.99
COMM 64 CH2006 ..... 15.99

KILLER PILLER

Caterpillars . . . Caterpillars . . . EVERYWHERE!!! Your beautiful orchard is infested with the leaf munching little beasties and they're rapidly devouring everything in sight. Armed with just your super-lethal bug sprayer can you possibly wipe them out before they gobble up all of your trees? Maybe so. . . . BUT BEWARE . . . these caterpillars lay eggs that hatch into devious killer moths . . . AND GUESS WHO THEY'LL BE AFTER!!!
(7 SKILL LEVELS, FAST MACHINE CODE ACTION)

VIC-20 CH1005 ..... 15.99
COMM 64 CH2005 ..... 9.99

JUST RELEASED!
CURSE OF THE PHARAOHS (20/64)
ADD $2.50 FOR DISK (64 ONLY)

Add $2 Shipping & Handling

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world of commodore

INTERNATIONAL CENTRE, TORONTO
DEC. 8-11, 1983

The World of Commodore is being presented by Commodore to commemorate their 25th anniversary. It is the first all-Commodore show ever held in Canada, and will bring buyers flocking to examine and purchase your products.

World of Commodore represents a tremendous sales opportunity for retailers and distributors of products and services relating to Commodore computers. It is your opportunity to introduce your products and services to over 35,000 interested buyers.

The World of Commodore is designed specifically to appeal to the interests of present and potential Commodore owners, to Commodore dealers looking for new products to sell, and to meet your needs as an exhibitor.

December 8–11, 1983, The International Centre, 6900 Airport Road, (Derry and Airport Road), Toronto, Ontario, Canada.

For more information contact: Cameron MacDonald or Debbie Bannon at Hunter Nichols Inc., 721 Progress Avenue, Scarborough, Ontario M1H 2W7 Canada (416) 439-4140.

Circle No. 122

Help your child learn the basics with Computer Tutor!™ 40 learning programs designed by professional educators and tested in actual classrooms.

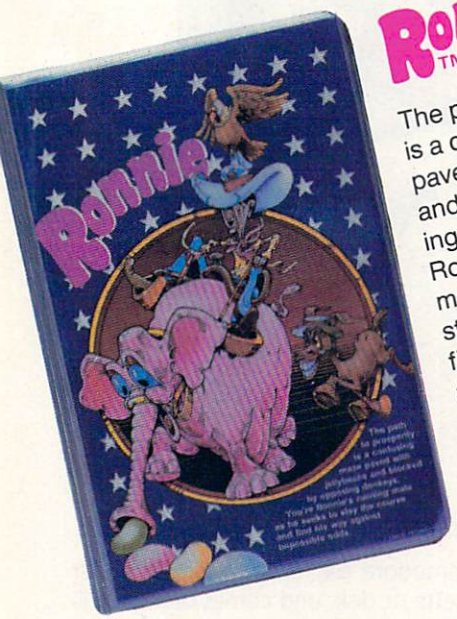
This outstanding set of educational programs was developed by professional educators in the classroom to meet the highest teaching standards.

Your child will delight in learning with Computer Tutor!™ Correct responses are reinforced with colorful graphics and sound.

Programs include Language Arts, Math and Social Sciences.
A—Kindergarten—Grade 3
B—Grade 2—Grade 4
C—Grade 3—Grade 5
D—Grade 4—Grade 6
E—Grade 5—Grade 7

Sugg. Retail per 8 program Album $99.00.
Sugg. Retail per 40 program set of 5 Albums $449.00

Runs on Unexpanded VIC 20 (cassette)



Ronnie™

The path to prosperity is a confusing maze paved with jellybeans and blocked by opposing donkeys. You're Ronnie's running mate as he seeks to stay the course and find his way against impossible odds!

SUGG. RETAIL $19.95
Runs on Unexpanded VIC 20 (cassette)

INFOBASE64™

Home/Business computer filing system. Ideal for lists, reports and inventories.

Tell the computer what you want filed and how you want it arranged. See it on the monitor screen or print it. Design the format yourself. Store up to 1000 records on a single diskette.

SUGG. RETAIL $59.95
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Dealer Inquiries Welcome

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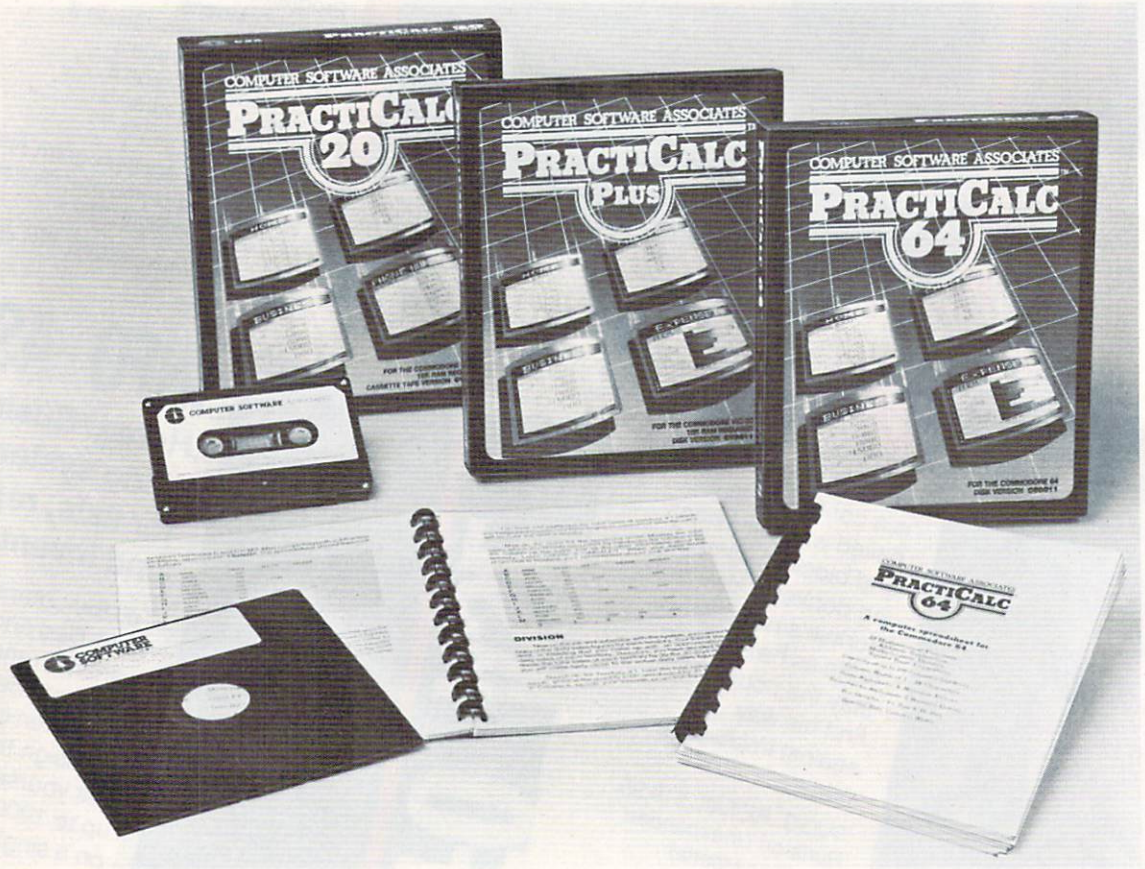
News Releases



NEW LOOK FOR PRACTICALC.

Computer Software Associates has completely revamped the packaging for its entire line, illustrated by the PractiCalc spreadsheet series shown here. The full-color boxes contain bar codes for inventory and pricing controls, product description on the back, can be rack-mounted and are protectively shrink wrapped. The PractiCalc series, which includes PractiCalc 20 and PractiCalc Plus for the VIC-20, and PractiCalc 64 for the Commodore 64, is available on either cassette or disk, and comes with fully illustrated documentation.

Contact: Sue Robbins, Paul Kaufman Associates, 149 Madison Avenue, New York, N.Y. 10016 (212) 685-6161

HUMAN ENGINEERED SOFTWARE CORPORATION RESTRUCTURES

BRISBANE, CALIF.—Human Engineered Software Corporation (HES) today announced the acquisition of additional funding and an agreement to obtain technical and marketing assistance.

Funding and technical expertise will be supplied by Microsoft Corporation of Bellevue, Wash.; Action Industries, Cheswick, Penna.; and Technology Venture Investors, Menlo Park, Calif.

Microsoft will provide HES with the technical expertise necessary to meet the home computer owners' demand for quality software and peripheral products. Microsoft is the dominant third-party software organization in the United States. According to William M. Gates, Microsoft's chairman, "Human Engineered Software has established an excellent reputation for creativity and program development. Our skills in developing transportable software, in understanding evolving hardware capabilities, and in helping the industry work toward standardization will greatly complement their existing strengths."

Action Industries, of Cheswick, Penn., will supply key mass merchant contact and sophisticated marketing support for HES. The 65-year-old company is a leading marketer of promotions to retail chains.

TVI, a Menlo Park, Calif. based venture capital firm specializing in high-technology industries, will provide technical and business support in addition to its capital infusion.

Human Engineered Software develops and markets a wide range of educational, entertainment, utility and business software and associated computer peripherals. Human Engineered Software products include Turtle Graphics, an educational program based on the Logo computer language, the popular Gridrunner game in which a player protects a solar power station in space, HES Modem I for connecting computers to telephone lines, and HESCard 20, a memory expansion board for the VIC 20 home computer.

SOFTWARE RELEASED FOR USING FFT ON C-64!

RED-SHIFT Software has released a software package for those interested in studying or using the Fast Fourier Transform (FFT) on the Commodore 64. The package contains a multi-mode input, transform, save, and high-resolution display program, as well as several utilities and sample data cases. A detailed instruction manual contains hints and kinks for the relative newcomer to FFT use. Literature is available. Special duplication agreements for educational institutions may be made.

$79.95 retail
$59.95 students/professors

RED-SHIFT SOFTWARE
P.O. BOX 45488
Seattle, Washington 98102

COMMODORE DONATES COMPUTER SYSTEMS TO EDUCATION DEPARTMENTS IN FOUR STATES

West Chester, PA.—Commodore Business Machines, Inc. recently donated a total of 120 systems to the State Departments of Education in four states: California, New York, Pennsylvania and Texas. The systems include computers, data storage units, printers, modems, and educational software.

The computer systems will be distributed by the State Departments of Education to educational support centers where they will be used for inservice teacher training and for evaluation of instructional software. The donated units will allow states to provide teachers with hands-on training.

Commodore dealers in the area of each training center have agreed to provide support for the donated units, and training for the program coordinators. Coordinators will, in turn, instruct the states' teachers.

The New York State Education Department's Commissioner of Education, Gordon M. Ambach, stated, "It (Commodore's Grant Program) will enable public and private agencies to cooperate in making the wisest use of available resources to resolve the overwhelming needs for teacher inservice training, while keeping in mind the complex dimensions of equitable access and delivery of training."

"Commodore through its grant program is helping to give educators the up-to-date technological training and support they need," said David Rosenwald, Commodore's Director of Education Sales. "It's part of an all encompassing effort by Commodore to further enhance its position in schools. This effort includes a dedicated educational sales force, grants to State Departments of Education, and increased availability of quality software."

UNIFORM CODING STANDARD GUIDES SOFTWARE DEPARTMENT PLANNING

Estill Springs, TN—Associated Technology has announced a uniform coding standard that can be used as is or tailored to establish a company's programming practices.

The 62 page guide covers documentation and coding practices for Cobol, Fortran and Basic. Examples are given which show how early versions of these languages can be made to meet modern programming rules.

The coding standard includes examples which can aid programmers, analysts, quality assurance personnel, software designers, configuration managers and department managers. The uniform standard is distributed by Associated Technology, Route 2, Box 448, Estill Springs, TN 37330. The cost is $23.00.

UMI WILL MARKET ALL NEW C-64 SOFTWARE ON 5¼-INCH FLOPPY DISKETTES

Pomona, CA—UMI (United Microware Industries, Inc.) will release all new software products for the Commodore 64 on 5¼-inch floppy diskettes, according to Russ Bedord, president.

"The number of diskette programs for the Commodore 64 is climbing rapidly," Bedord said. "Users prefer the diskette medium because it is handier and offers greater storage potential. Compared to cartridges, diskettes enable manufacturers to load in more game or personal productivity features at a given price level–an obvious advantage to both dealers and consumers."

New UMI diskettes for the Commodore 64 are:

Game	Action	Features
Renaissance	Joystick	8 levels of play
Pennant Drive	Joystick	Team diskettes
Motor Mania	Joystick	Fast driving action
Fuego	Joystick	Spaceship fire-fighting
Word Feud	Two Joysticks	1 or 2 play winner
Grand Master	Keyboard	Challenging chess

(All priced at $34.95)

UMI soon will release new Commodore 64 game software designed to use more of the memory potential of the diskette medium–up to 100K–at very competitive price points, said Bedord.

UMI (United Microware Industries, Inc.), headquartered in Pomona, is a major supplier of games, applications

Continued on page 158

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

Annihilator *from Victory Software*
★ 150,000 James Thompson, New York, NY

Applepanic *from Creative Software*
★ 5,000 Susan Fenton, Yonkers, NY

Arcadia *from Startech*
★ 250,224 Paul Tuch, Baltimore, MD

Astroblitz *from Creative Software*
★ 12,000 Kevin O'Neil, Hampton, NH

Baldors Castle *from Daedous Digital*
★ 500 Peter Morns, Orlando, FL

Chomperman *from Victory Software*
★ 50,368 Steve Carter, Milwaukee, WI

D'Use *from Tymac*
★ 7,513 David Anderson, San Diego, CA

Frogee *from Sierra-On-Line*
★ 65,425 Keith Floyd, Belt, MT

Gridder *from MicroDigital*
★ 45,678 Nick Blenkush, Santa Monica, CA

Keyquest *from Microware Distributing*
★ 74,798 Darrell Eastman, Tacoma, WA
★ 24,962 Nick Blenkush, Santa Monica, CA
★ 13,510 George Bergman, Atlantic City, NJ

Mazeman *from TSI*
★ 94,000 Jack Smith, Pierre, SD

Mutants Heard *from UMI*
★ 600 Alan Snyder, Eugene, OR

Pinball *from MicroDigital*
★ 50,600 Jane Wilcox, Chicago, IL

Scramble *from MicroDigital*
★ 500 Peter Morns, Orlando, FL

Skibberan *from UMI*
★ 15,990 Carl Whitney, Las Vegas, NV

Snakman *from MicroDigital*
★ 2,247,140 Mike Strezo, Richton Park, IL

Trashman *from Creative Software*
★ 8,610 Keith Swanson, Nashville, TN

Video Vermin *from UMI*
★ 10,164,437 Richard Seemayer, Fresh Meadows, NY
★ 2,150,836 Darrell Eastman, Tacoma, WA
★ 200,000 John White, Rockport, MA

Zap *from Microware Distributors*
★ 25,000 Richard Cambell, Wichita, KS

All entries must be received by the first of the month to be eligible for the following month.

King of the mountain!

Workhorse solutions for tough questions.

When **Southern Solutions** acquired the exclusive marketing rights for the CMS Accounting System, the first (and the best) accounting system for the Commodore computer, we offered dealers who were dissatisfied with their current accounting software the opportunity to swap ... ours for anyone elses.

WOW! We were covered with the others ... MAS, BPI, EBS, etc ... all trading for CMS. We provide the only complete coverage of real software for Commodore computers:

THE PREMIER ... SYSTEM IV. Real accounting. More like a mini, yet priced for the Commodore. SuperMath™ gives precision to **$1 billion.** No one else comes close. General ledger, accounts receivable, accounts payable, payroll, inventory, mailing list. Plus important vertical products: oil accounting, pharmacy management, encumbrance accounting, church records and more.

THE STANDARD ... SYSTEM III. Similar to System IV but lower priced. G/L, A/R, A/P, P/R, mailing list.

Commodore 64*. Complete line of bookkeeping record keeping, personal and household management. Usually sells for under $100. Uses one or two drives, just about any printer.

Peripherals. Monitors, monitor cables, blank cassettes.

All software has FileGuard™. Never lose data files, EVEN IF YOU LOSE ELECTRICITY! Compatible with almost any computer, disk drive and printer combination. User-definable reports. Fast file access.

Sold only through professional computer dealers.

To become a **Southern Solutions** dealer, or for the name of your nearest retailer, call or write our General Manager, Bill Swingler.

Dealer Hotline: 1-800-527-4548

*Commodore 64 is a registered trademark of Commodore

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P.O. Box P, McKinney, Texas 75069 - (214) 542-0278

software, and expansion memory products for the Commodore 64 and VIC-20 Computers. UMI software is packaged in 5¼-inch diskettes, plug-in cartridge, and tape cassette formats, and includes a variety of action-type games, intellectual exercises, and home, business, and utility programs.

For more information contact Court Newton (212) 986-6668.

SPINNAKER IN TOP 10

CAMBRIDGE, Mass.— Spinnaker Software Corp., the world's leading publisher of educational games for the home computer, has seven of the top ten spots on the July Education Best Sellers List in SOFTWARE MERCHANDISING. STORY MACHINE™ is currently holding the number one position based on demonstrating the "strongest sales activity for this survey."

STORY MACHINE™, SNOOPER TROOPS 1™, SNOOPER TROOPS 2™, FACEMAKER™, DELTA DRAWING™ LEARNING PROGRAM, KINDERCOMP™, and RHYMES & RIDDLES™, are among the programs that make up the Education Best Sellers List. There are currently 10 titles available from Spinnaker, all of which are available for the Commodore 64 computers.

According to Jay Mixter, director of marketing for the Cambridge-based firm, Spinnaker's noteworthy performance is attributed to "the successful combination of creative and innovative authors, and an aggressive marketing and advertising campaign."

Spinnaker will be introducing between 10 and 15 new fun and educational programs this coming year.

Contact: Nancy Evans at (617) 426-7600.

DEALERS SEE A LIGHT AT END OF COMMODORE TUNNEL

To make rolling with the punches easier for Commodore dealers, Kapri International Distributors of Sun Valley, Ca. has developed the Independant Commodore Software Dealer Association (ICSDA).

The program was formed by Chris Soular, President of Kapri. "This is the first program of its kind," says Soular. "We did this to help the Commodore dealer. It's going to be a breakthrough for everyone. Now the dealers have somewhere to turn in the dark tunnel of Commodore."

Soular explains that the program will include bulk rate ordering programs, advertising co-ops, top game lists of software, general information services, and an open-line communication network to bridge the gap between dealers and Commodore Business Machines.

Kapri says that ICSDA will be in full operation by January, 1984.

Contact Robert Tuffly at (213) 765-2774 for more information.

"CRISIS MOUNTAIN" FOR THE COMMODORE 64 AND VIC-20

Sunnyvale, CA—Creative Software today announced that *Crisis Mountain* has been licensed from Synergistic Software for the Commodore 64 and the VIC-20 home computers.

Crisis Mountain is an action game that challenges the player's strategic skills. The player controls "Kip" Armstrong, a daring mine explorer who has stumbled onto hidden mountain treasures as well as traps, bombs, and blood-sucking bats. As he winds his way through dark caverns, two buried time bombs tick away in remote caves and threaten to destroy the mountain – and Kip.

Kip's life is further threatened by dangerous obstacles that can keep him from reaching the bombs in time. Rocky fallout from two bubbling lava pits and huge boulders loosened by tremors tumble through the tunnels and into Kip's path. In addition, there is "Bertram" the belligerent bat that patrols the caverns and attempts to bite Kip and slow him down.

Kip starts out his adventure with a clean bill of health. He is at his peak at a strength level of "three" and can move quickly through the tunnels. At strength level "two" he can still walk, but moves slowly. Kip crawls at level "one" and loses his life at level "zero". Kip's strength level decreases if he is hit by boulders or bitten by Bertram. If he falls into a bubbling lava pit he automatically loses a "life." Kip has three "lives" per game.

When Kip reaches a bomb-site, he must quickly dig up the bomb and deactivate it. After he has deactivated both bombs, he is free to collect point-earning treasure and progress to an even more dangerous and treasure-filled mountain.

Crisis Mountain will be released in cartridge form for the Commodore 64 and VIC-20. Both versions are scheduled to be released in late October. The Commodore 64 cartridge has a suggested retail price of $34.95. The suggested retail price of the VIC-20 cartridge is $29.95.

FREE BOOKLET TELLS HOW TO SELL YOUR PERSONAL COMPUTER SOFTWARE

Estill Springs, TN—ATC Software announces a Free Booklet which offers advice on how to successfully sell your own personal computer software creations.

The manual tells how to obtain national directory listings, how to price a new software product, how to locate and qualify an advertiser, how to write a users manual and how to operate a successful mail order fulfillment service.

The 8 page booklet is available from ATC Software, Route 2 Box 448, Estill Springs, TN 37330.

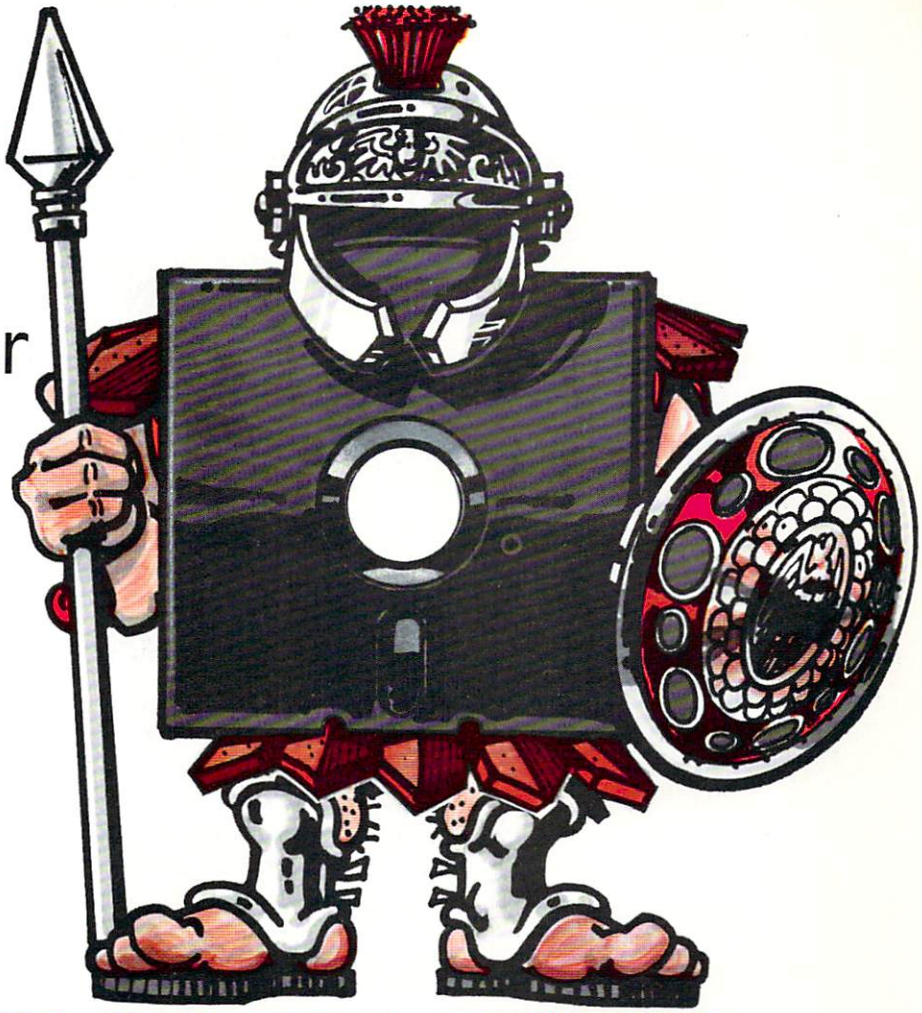
COMMODORE INTERNATIONAL LIMITED ANNOUNCES RECORD FOURTH QUARTER

West Chester, PA—Commodore International Limited today announced record revenues, net income and earnings per share for the fourth quarter and year ended June 30, 1983.

Mr. Irving Gould, Chairman of the Board of Commodore, in commenting upon the record results noted that "the past year's growth at Commodore was attributable to continuing and accelerating strength in Commodore's complete microcomputer product line, including extremely strong demand for the Commodore 64 personal computer."

Mr. Gould further noted that "the strong momentum from 1983 is carrying forward into the current year. In particular, we are now beginning to experience exceptionally strong demands for the Commodore 64 personal computer in Europe and Canada, in addition to the United States, as well as a considerably higher demand than ever before for our software and peripheral devices such as disk drives and printers. As a result, we fully expect that fiscal year 1984 will again be a year when Commodore's sales, net income and earnings per share register significant gains compared to the year just ended."

Mirage Concepts' Awesome New Data Base Manager Jumps to Every Command...



THE REAL POWER BEHIND YOUR THRONE!

Be The Master of All You Survey In Your Home, Office, Classroom or Recreation! Mirage Concepts conquers all opposition with its newly introduced Data Base Manager. It's the easiest to use and most powerful data base program ever devised for the Commodore 64™. Mirage's potent new Data Base Manager puts you in full command to force all aspects of your stored information into any sequence or any format you desire. Assume your role as the rightful ruler of all your domain with Mirage Concepts Mighty Data Base Manager. **$99.95** each

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MIRAGE CONCEPTS, INC.

2519 W. Shaw Ave., #106 • Fresno, CA 93711 • (209) 227-8369
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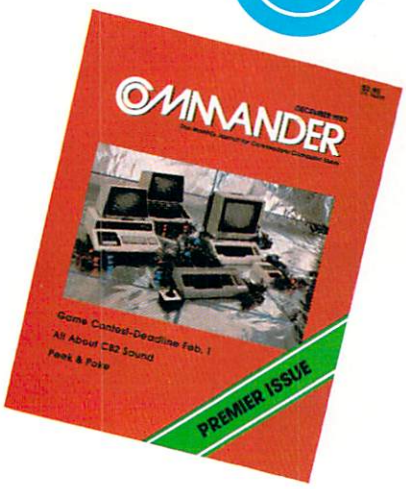

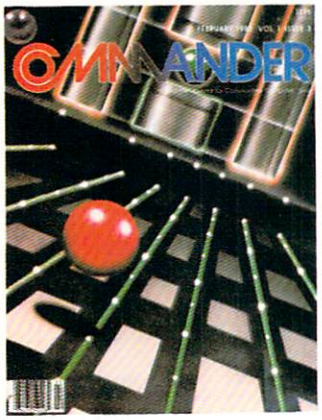

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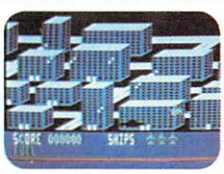

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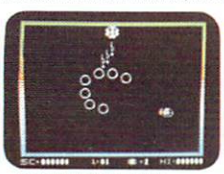

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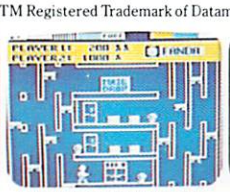

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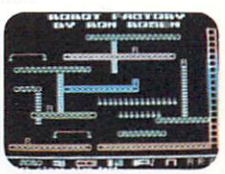

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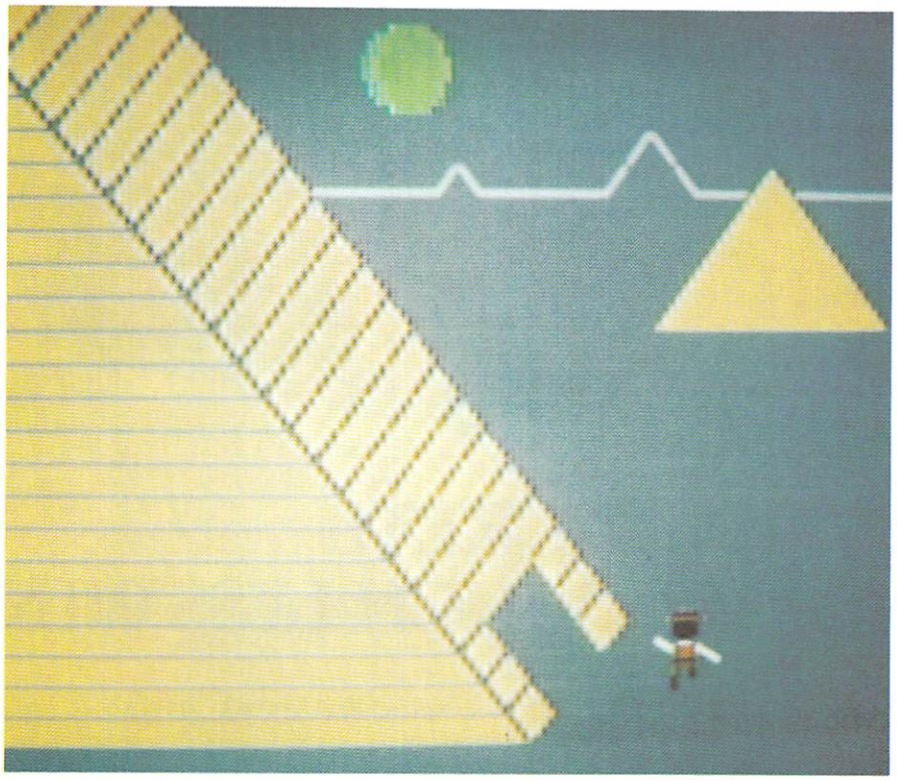

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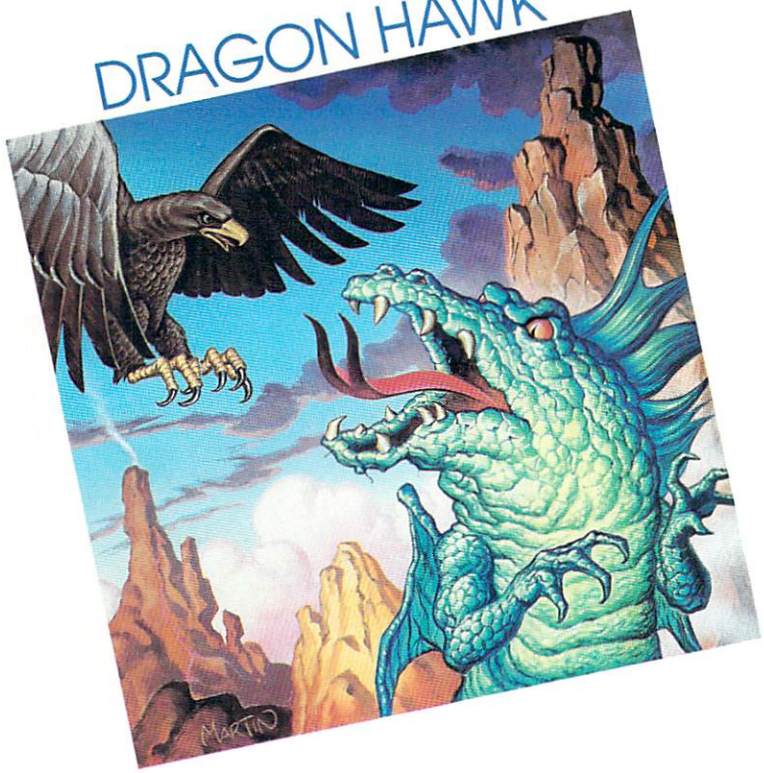

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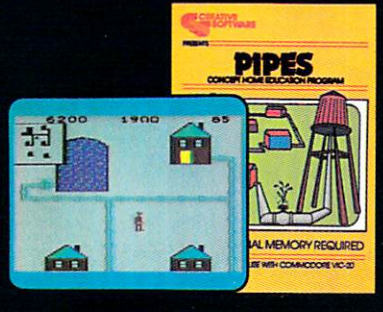

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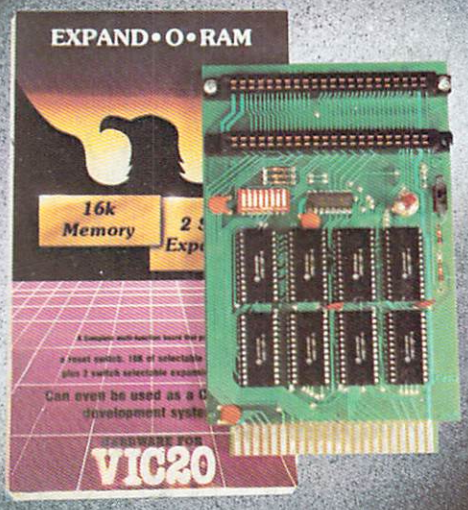

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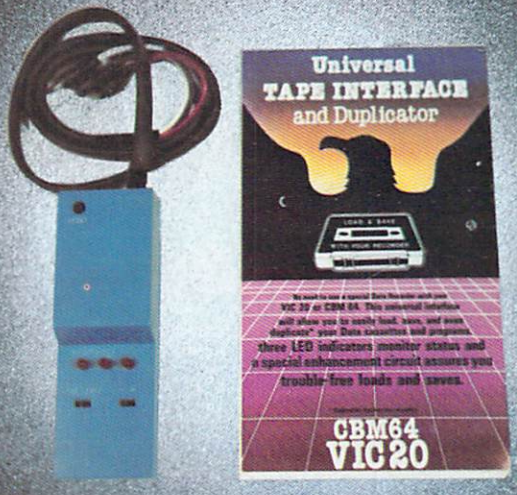

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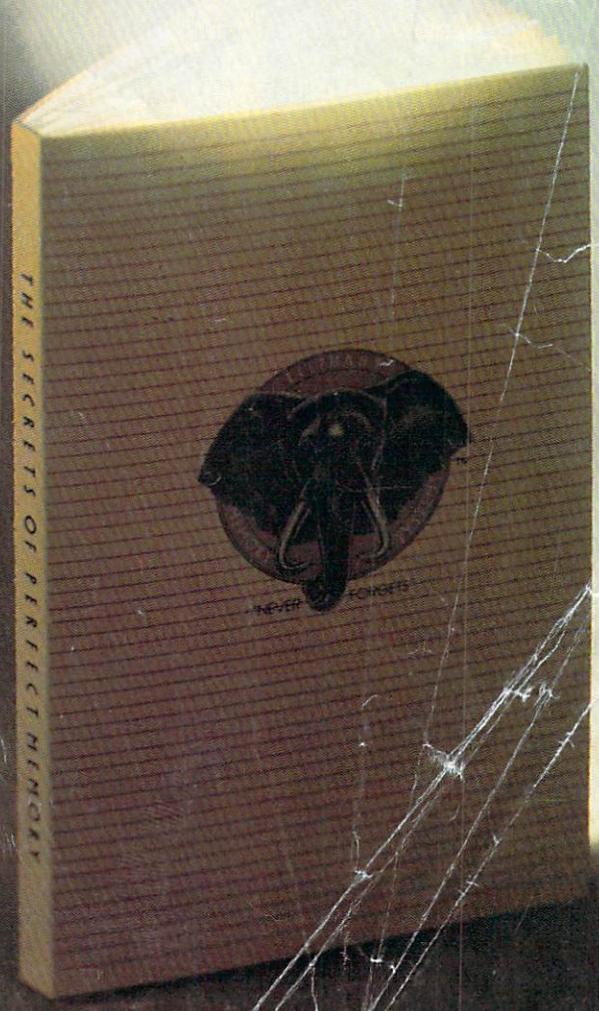
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