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The Monthly Journal for Commodore Computer Users

COMMANDER

AUGUST 1983 VOL. 1 ISSUE 9

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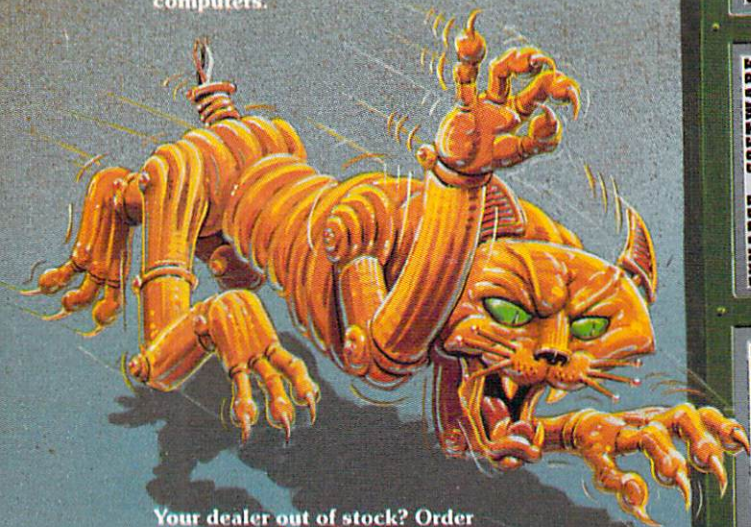

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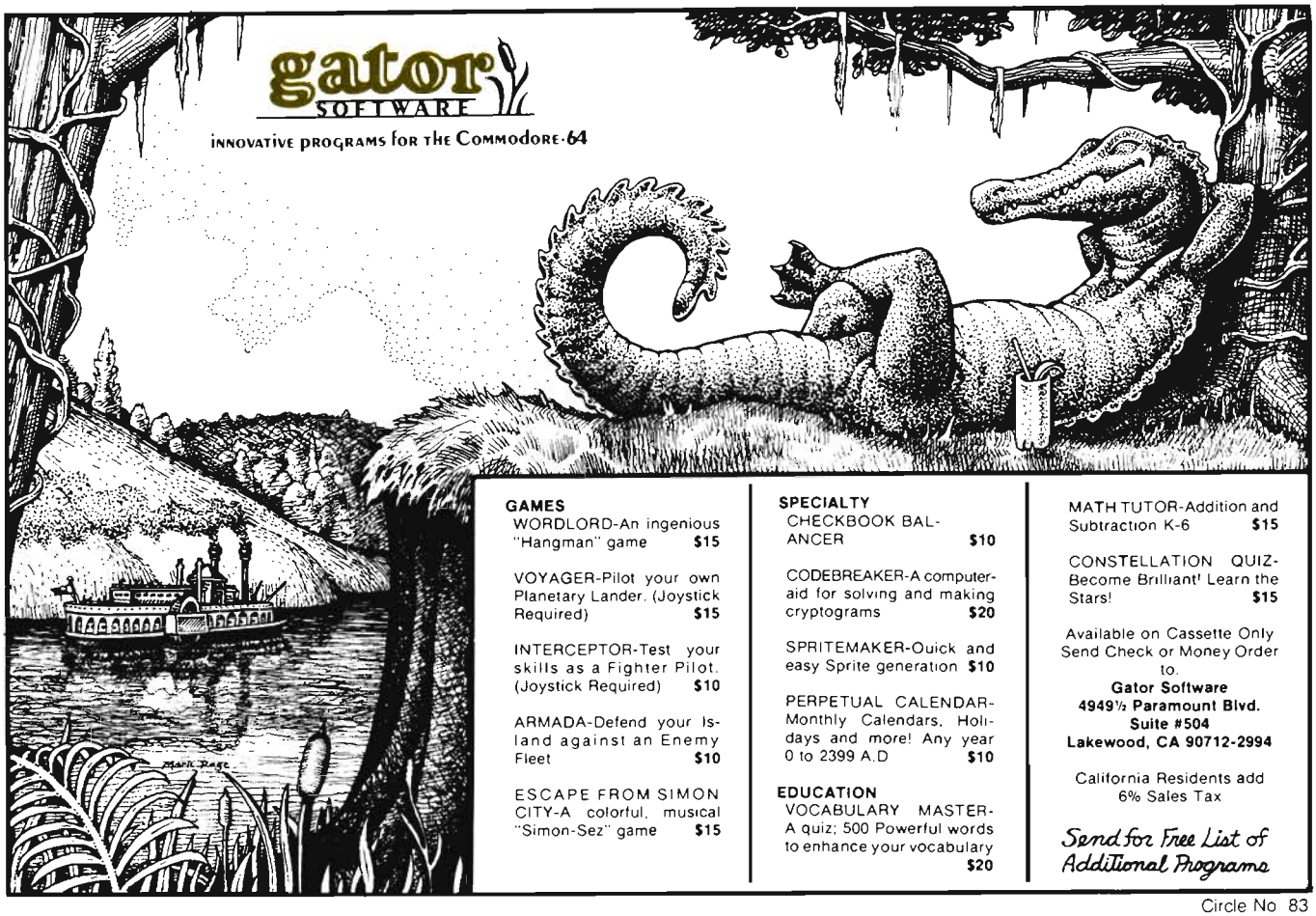

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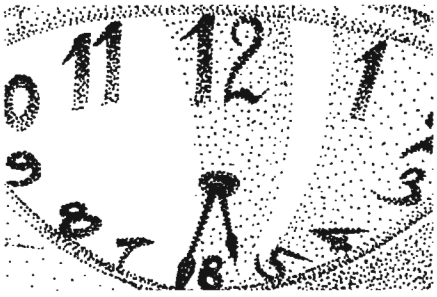

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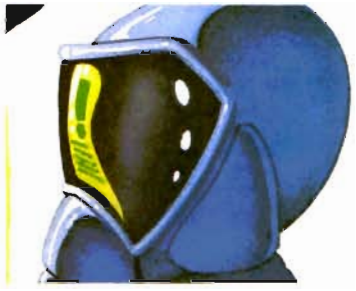

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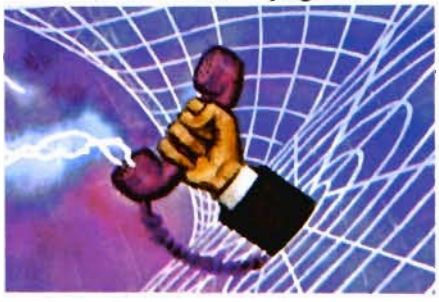

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COVER BY:
Randy "Tarkas" Hoar

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"Commodore Clipper" moored at Lake Michigan

Commodore has taken another big step toward breaking the myth of ATARI dominance of the personal computer market. The $80 VIC-20, which is now a reality, and the $200 C-64, has established a firm market position for Commodore in the hardware end of the personal computer business. But what about software you say. Well, that was the password on the gangplank to the "Commodore Clipper" which was moored on the Chicago waterfront during the 1983 Consumer Electronics Show (CES). The Commodore moguls were wining and dining software companies in an attempt to license as much software as they required for the Great Software Christmas Sale-abration.

The message at CES was clear—the acquisitions made on the clipper are intended to propel the Commodore machines to a leading position in software as well as hardware. Many of the software packages licensed by Commodore will have their prices reduced when Commodore sells them in order to further stimulate sales. Look for a flood of "new" releases by Commodore in all areas—Home, Business and Education.

All of this should bode well for the Commodore Computer buyer—there should be a much wider range of lower cost software from which to choose and the versatility of your computer will be greatly enhanced. Mr. Robert Lane, Commodore's North American operations boss summed it all up very succinctly:

"We are going to continue our forward thrust in being number one in the home computer market. Our success in the home computer market, in our belief, is going to rest very strongly on why we can do it *better,* not only for the home, but for business, and for education. This means one very important factor: software."

by Donald L. Stoner

This month, I have some good news and some bad news. The good news is that I am presenting another of those fantastic terminal programs written by Terry Imler. The bad news is that it requires at least 8K of memory (and preferably 16K) to run.

Even if you have an unexpanded VIC, you can still extract some of the clever routines that Terry has developed and use them in other programs. With some minor modifications, the program should run "like a champ" in the Commodore 64. It should make an ideal terminal program for the 64 since it has both an uploading and downloading capability.

Downloading—Transferring data from another computer to yours is called downloading. The routine to accomplish this occupies lines 420 to 610 (see accompanying listing, Figure 1). It is quite similar to the downloader for the unexpanded VIC which I discussed last month. To save space this month, let's skip a discussion of this and go on to the uploading feature. See the previous issue if you would like more details on the downloading aspect of the program. By comparing the two listings, you can see the similarities in this area.

There are many instances when it is desirable to transfer data (either text or BASIC programs) from your computer to another system. This is called uploading. The procedure involves bringing the data to be transmitted into the memory of your computer, then sending it without manually typing individual data bits.

You may wish to transfer a program to another Commodore owner or send electronic mail or text files to CompuServe. This can be done by preparing the material off line, then sending it full speed (30 characters per second or so) when your computer is connected to the telephone line.

There is a problem connected with uploading BASIC programs. As you may know, to save memory space and speed up cassette saves and loads, BASIC "tokenizes" the commands used in a program. For example, the statement "PRINT" is not saved as five ASCII characters. Rather, a single "token" is used to represent the PRINT statement. When the program sees this token, it knows to put the word PRINT on the screen and act upon the statement.

As a result, it is necessary to convert a BASIC program to the actual characters, just like you see them on the screen. Terry Imler has come up with an extremely clever way to do this. Before we get into this procedure, let's take a closer look at the program (see listing, Figure 1).

Lines 100-120 provide the initialization, while the screen menu is presented in lines 130-190. The conversion routine, between ASCII and Commodore lingo, is accomplished in the 200 series lines. The terminal program portion fits between lines 300 and 400. Downloading is handled between 420 and 620, as mentioned earlier. Finally, the uploader section occupies lines 630 to the end of the program.

With an 8K VIC, you will have about 3K of memory space to hold data which is to be uploaded. If you have a 16K VIC (or a 64), change line 110 from Z1%(3000) to (7000). Also change lines 670 and 700 from 299 to 6999. These changes will increase your storage area (buffer) to approximately 7K.

After you have entered the program, save several copies on a fresh cassette as "UPDOWNLOADER". Verify it before dumping the computer memory. The next step is to load a BASIC program, which you wish to upload, into your computer. Run it just to make sure that you didn't miss any data bits. Next, put another fresh cassette into your recorder and don't forget to position it past the plastic leader. Now type OPEN1,1,1,"CMD":CMD1:LIST. Press PLAY and RECORD. Nothing will appear on the screen, but an ASCII version of the program will be recorded on the tape. When the flashing cursor once again appears (after the tape stops), type PRINT#1:

CLOSE1. Finally, rewind this tape (which we will call the ASCII tape), set it aside and reload the UPDOWNLOADER tape, which you previously saved.

When the menu appears, select #1. The program will load the ASCII tape into memory and return you to the menu. Since you may wish to do some downloading, you will be instructed to put yet another fresh cassette into the recorder. There will be a short delay while the conversion section of the program loads and then the recorder will run.

To download data from the tape (or keyboard, if this was selected), press the F2 key (shift-F1). The first line of characters, up to the carriage return/line feed will be transmitted. Then press the F2 key again, the next line will be transmitted and so on. Continue pressing the F2 key until the entire program and text is sent. This procedure may seem a bit awkward but it gives you control over the sending of the program. For example, the material you are uploading could be a message, rather than a BASIC program. Each time you see the line prompt on a bulletin board, you can send the next line of the message.

As indicated by the menu, the program has provision for entering text from the keyboard. You can continue to do so until done or the memory is full.

Next month we will be discussing the problems of those !"#$%%&'()* interference patterns on your TV screen and what can be done to get rid of them. Until then, keep on Telecommunicating.□

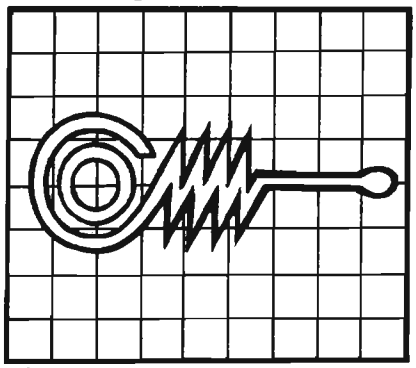

Figure 1

```
100   OPEN5,2,3,CHR$(6)
110   DIMF%(255),T%(255),X%(6),Z1%(3000):R=198
120   K$=" "+CHR$(157):J$=K$+CHR$(146):
      M=0:T=166:L=190:Y=212:E=34:D=0
130   PRINT"1=UPLOAD A PROGRAM":
      PRINT"2=UPLOAD DATA ENTERED
            FROM THE KEYBOARD"
135   PRINT"3=DONE"
140   INPUTC$:I=VAL(C$):IFI<1ORI>3THEN130
145   IFI=3THEN180
150   IFI=1THENGOSUB650:CLOSE1:GOTO130
160   IFI=2THENGOSUB700
170   GOTO130
180   PRINT"REMOVE TAPE FROM
            RECORDER. THEN INSERT
            TAPE FOR DOWNLOADING."
190   PRINT"WHEN YOU HAVE NEW TAPE
            IN,PUSH RETURN":INPUTC$
200   FORJ=32TO64:T%(J)=J:NEXT
210   T%(13)=13:T%(20)=8:RV=18:CT=0
220   FORJ=65TO90:K=J+32:T%(J)=K:NEXT
230   FORJ=91TO95:T%(J)=J:NEXT
240   FORJ=193TO218:K=J-128:T%(J)=K:NEXT
250   T%(133)=3:T%(134)=16:T%(135)=17:T%(136)
      =19
260   FORJ=32TO95:F%(J)=J:NEXT:FORJ=97TO122:
      F%(J)=J-32:NEXT
270   FORJ=123TO126:F%(J)=J-64:NEXT
280   F%(96)=32:F%(92)=17:F%(127)=20:F%(8)=20:
      F%(13)=13:F%(10)=17
290   FORJ=0TO127:F%(J+128)=F%(J):NEXT:
      Z2=-1:OPEN1,1,2,"COMP"
300   PRINT" "CHR$(147)
310   IFPEEK(R)<>DTHEN360
320   GET#5,A$:IFA$<>""THEN330
325   IFM=2THENM=1:GOSUB610:PRINT#5,CHR$(17);:
      GOTO310
327   GOTO360
330   A=ASC(A$):PRINTK$;CHR$(F%(A));:
      IFA=ETHENPOKEY,D
340   IFMTHENPRINT#1,CHR$(F%(A));:
      IFPEEK(T)=>LTHEN500
350   GOTO310
360   PRINTCHR$(RV);J$;:GETA$:IFA$=""THEN380
370   A=ASC(A$):IFA<137THENPRINT#5,CHR$(T%(A))
      ;:GOTO380
375   IFA=137THENGOSUB620
376   IFA=140THEN410
378   IFA=139THENM=1
380   CT=CT+1
390   IFCT=8THENCT=0:RV=164-RV
400   GOTO310
410   IFM=0THEN380
420   GOSUB550:PRINT#1,CHR$(60);CHR$(3);
      CHR$(252);CHR$(3);
```

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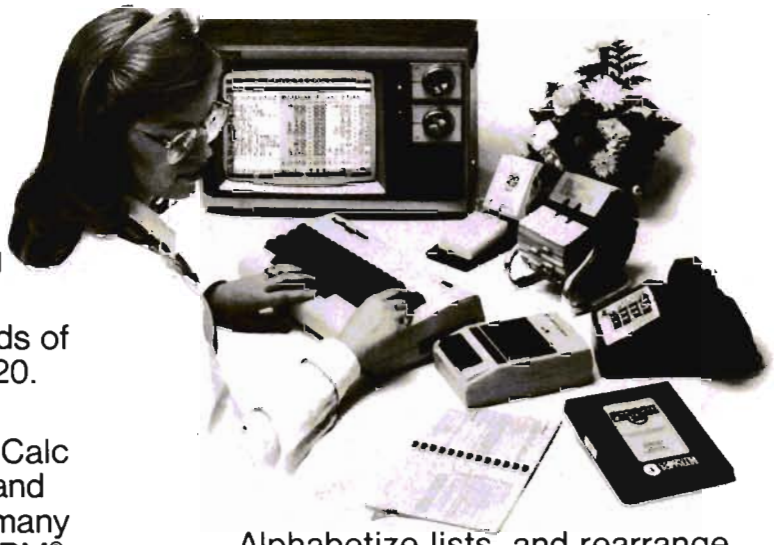

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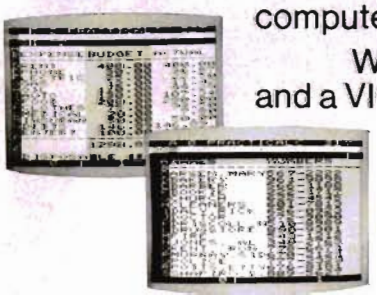

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TELECOMMANDER—continued from page 8

```
430   I=PEEK(T):PRINT#1,CHR$(10);:
      IFPEEK(T)>ITHEN430
440   GOSUB610:PRINT#5,CHR$(17);:M=0:GOTO380
500   IFM<>2THENGOSUB550
510   PRINT#1,CHR$(10);:IFPEEK(T)=>LTHEN510
520   M=2:GOTO310
550   PRINT#5,CHR$(19);
560   J=PEEK(667):FORI=0TO500:NEXT:
      IFPEEK(667)<>JTHEN560
570   GOSUB600:RETURN
600   RESTORE:FORI=0TO6:READA:XX(I)=PEEK(A):
      NEXT:RETURN
610   RESTORE:FORI=0TO6:READA:POKEA,XX(I):
      NEXT:RETURN
620   Z2=Z2+1:IFZ1%(Z2)=10THENPRINT:PRINT"END OF
      PROGRAM":RETURN
630   PRINT#5,CHR$(T%(Z1%(Z2)));:
      IFZ1%(Z2)=13THENRETURN
640   GOTO620
650   OPEN1:GOSUB690:C$=A$:GOSUB690
655   IFA$<>CHR$(13)ORC$<>CHR$(13)THEN
      PRINT"THIS IS NOT A PROGRAM LISTING":RETURN
660   GOSUB690
670   Z1%(Z2)=ASC(A$):Z2=Z2+1:
      IFZ2>299THENZ1%(Z2)=10:
      PRINT"MEMORY FULL":RETURN
680   IFASC(A$)=10THENRETURN
685   GOTO660
690   GET#1,A$:IFA$=""THEN690
695   RETURN
700   IFZ2>299THENPRINT:PRINT"MEMORY
      FULL":Z1%(Z2)=10:RETURN
710   PRINTCHR$(18);" ";CHR$(146);CHR$(157);:
      IFZ2<0THENZ2=0
720   GETA$:IFA$=""THEN720
730   IFASC(A$)=133THENZ1%(Z2)=10:Z2=Z2+1:RETURN
740   IFASC(A$)=20THENPRINTCHR$(157);"  ";
      CHR$(157);CHR$(157);:Z2=Z2-1:GOTO700
750   Z1%(Z2)=ASC(A$):Z2=Z2+1:PRINTA$;:GOTO700
990   DATA167,168,169,170,180,181,182
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Circle No. 62

The PromQueen: A Majestic Tour

by Howard Rotenberg

A new device for the VIC 20 has been developed by THE GLOUCESTER BUS COMPANY called the PROMQUEEN. It is a development system, expansion memory and an Eprom (Electrically Programmable Rom) burner all encased in one cartridge. It is a versatile system even to the point that you may place it in the expansion slot of your choice. It has many interesting features, some of which I will discuss here. I think a good place to start would be from the outside, so I will briefly discuss the hardware first.

The Hardware

The PROMQUEEN is encased in a durable plastic casing that could not easily be damaged. Your controls consist of four toggle switches, a zero force insertion socket, a reset button and a four position dip switch. The card edge connector is gold plated for maximum electrical conduction and reliability. Having a technical background (and being a bit nosey) I decided to take a look inside the cartridge to see the quality of its contents. The advertisement brochure is quite accurate in its specifications. I saw all top quality parts spread out on a printed circuit board that I wish I could have said I laid out. All parts are easily accessable if service is ever needed. A top quality Textool ZIF socket was indeed used (for the Eprom) that will ensure good electrical connection. Trim pots on the board may be used to adjust the programming voltages for the Eproms such as the 2732A that only requires 21 volts as opposed to 25 for 2716's and 2532's, etc. There were no corners cut on the quality of the parts to decrease cost (and subsequential reliability). THE GLOUCESTER BUS COMPANY has indeed given us a top quality product that started with top quality hardware.

The Software

The PROMQUEEN comes with a 100 page manual that single steps you through the process of learning how to use it. The manual is quite comprehensive and one should have no trouble understanding the different functions. It has an appendix that includes a summary of the 6502 opcodes and then goes on to give specifications of five Eproms. These Eproms are the 2716, 2732, 2732A, 2532 and the 2764. The Promqueen comes with a 4k Eprom called HEXKIT 1.0 that contains all the necessary software for its use. To access it, a simple SYS 29039 must be entered. At this point the software is now in RAM and the Eprom may be taken out.

The Menu

The main menu will give you five options that I will list here.

EDIT HEX . . . . . A
BURN EPROM . . . . . B
SAVE ON DEVICE C
LOAD FROM DEVICE . . D
V'FY SAVE . . . . . E

Options B through E are fairly straightforward so I will concentrate on the first one that will allow us to develop our program. When in the edit mode, there are 15 lines of text shown that consist of the following: the decimal address, the hex address, the opcode and the ascii value of the opcode if it is a displayable character. The cursor sits on the eighth line over the top of the opcode waiting for an entry. If you start to edit at $6000 hex as indicated in the manual you will see the code

starting at $5FF9 (24569) down to $6007 (24583). The editor has a scroll feature that allows you to go up or down to the address you chose or just review your editing session. You can always escape back to the main menu by typing an X. Entering another X will take you back to VIC basic. All your editing is done in 4k of RAM so you may verify that your program works before actually burning it into EPROM. There is a C/MODE for automatic VIC/ASCII conversions that will allow you to easily enter message tables. Another use that I found for it was to use it to enter 6502 code since many of the opcodes have corresponding ASCII values. This means that if you construct yourself a little table, then you can enter a lot of your code using a single keystroke.

Keystroke Commands

While you are in the edit mode, you have available to you 13 other commands to aid you with your development. Here is a brief summary and their functions.

I — Initiate

This will execute the machine language code that starts under the blinking cursor.

J — Jumpback

This is used to display an address before the use of the L, P or F8 keys.

K — Convert

Converts decimal numbers to HEX.

L — Look

This will search for the offset contained in a branch instruction.

M — Assign a marker

This will assign one of 16 possible markers to the address under the cursor.

N — Load the address

This will load the address of a marker previously placed.

O — Find offsets

Find the beginning and end markers and enter at either position.

P — Position

This will position you at the address using the low order byte currently under the cursor.

Q — Search

This will search for a 16 bit operand and put your display there.

R — Remap

This will remap by adding a user given offset to a 16 bit operand that has its low order byte under the cursor.

S — Stuff

This will fill a designated area with a specified byte.

T — Transfer

This is used to transfer a block of code to a specified area.

U — User-defined operand search

This will search for a match from the cursor edit position and reposition the cursor to that area.

The Hexkit Function Keys

There are 9 other keys that you may use with the software. These are listed below:

F1 — C/MODE ON/OFF

F2 — INSERT UP TO STOP ADDRESS

F3 — IF IN C/MODE, INSERT A ZERO STOP BYTE

F4 — DELETE UP TO STOP ADDRESS

F5 — SCROLL DISPLAY TO NEXT LOWER ADDRESS AND BIP

F6 — ALTERNATE SET MARKER KEYSTROKE THAT WORKS IN C/MODE

F7 — SCROLL DISPLAY TO NEXT HIGHER ADDRESS AND BIP

F8 — REPOSITION DISPLAY TO NEW ADDRESS. JUMPBACK WITH J.

X — GENERAL PURPOSE ABORT KEY

Using all these functions and commands help to make PROMQUEEN an easy, effective development system. You may even use it along with VICMON if you abide by a few instructions laid out in the manual.

The saving, loading, verifying and burning of Eproms are easily done by following the simple directions of the manual. If your Eprom is not blank (all FF's) then it will inform you and not start the burning procedure. This is a helpful and useful feature.

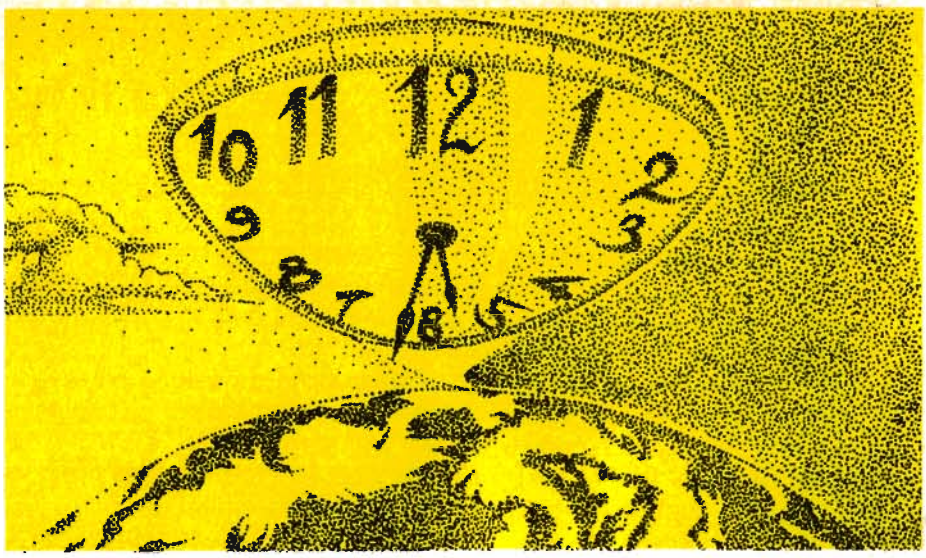
A Bonus

The following features I feel I must classify as bonus features. When you are not using the PROMQUEEN as a development system you have its 4k of ram at your disposal. This is done by switching in block 1 on the dip switch. Now your VIC will display 7679 bytes free. You have the ability to burn BASIC programs in to ROM as if they were machine language. With an additional auto start added, your program will appear just like any other game cartridge. This will not be user evident at all. There is another part of the development system that makes it unusual. This is when it is used in the MIMIC MODE. This means that you may develop programs for any other microprocessor that uses a low/high byte addressing order. By simply using a ribbon cable attached to the PROMQUEEN'S ZIF socket and a target computer, you may execute the code as if it were an Eprom in the target computer. Think about that! You can develop programs on the VIC for microprocessors such as the 8080, 8085, Z-80, 6509, 6809, 6501 and others. This feature is only available on much more expensive development systems.

Conclusion

After my experimentation with the PROMQUEEN I can say that it is a very sophisticated development system. It was well thought out from the hardware to the software. I feel that it will greatly aid the development of VIC programs and allow you to develop your skills at machine language programming at the same time. The PROMQUEEN lists for $199.00 US and $269.00 Canadian. For more information please contact GLOUCESTER COMPUTER, INC., 1 BLACKBURN CENTER, GLOUCESTER, MA 01930. The PROMQUEEN is truly a majestic product.□

How Time Flies



by Ian Adam

Whoever coined the phrase 'better late than never' probably didn't have to eat his dinner cold! Well, it's very easy to get so wrapped up in that great new program you're creating that you just completely lose track of the time. And all of a sudden, you've missed dinner AND the Dukes of Hazzard, and it's after midnight. Of course, it happens to all of us at some time, so here's an idea whose 'time has come'. It's a neat little routine that you can load into your 64 to help keep track of those slippery hours, and show off one of the great features of your machine at the same time.

With all the that computing power at your fingertips, why not put it to good use? This straightforward machine-language program allows you to select a continuous time display on the screen. With a simple command, it can be removed, replaced or the color changed. The clock is extremely accurate and remembers the time even when it's not displayed.

Aha!, you say, what's so great about that? After all, Commodore computers have the timekeeping function built right into BASIC; all you have to ask is 'PRINT TI$' for an instant update.

However, there are several limitations on use of the built-in timekeeping function. First of all, it is not very convenient to use while a program is running. You have to STOP the program carefully, ask the time (no syntax error, or else...), then CONTinue with the program. Second, the TI$ function is described in the manual as a 'jiffy clock'. That's Commodorese for 'not very accurate'. A recent sample of a half dozen computers gave a typical error of 2.2%. That's over one minute per hour, or 32 minutes per day! Good enough to keep track of whether it's light or dark outside, perhaps, but not adequate to launch the space shuttle. The TI$ clock also stops running when a file or program is being loaded or saved. And third, of course, it's only there when you ask, and we all know how easy it is to forget!

But despair not; a ready solution is at hand. In fact, your 64 contains not one, not two, but three built-in clocks. The additional timepieces are contained in the two 6526 Complex Interface Adapter chips (CIA's), and they offer some considerable advantages. These two chips are provided by Commodore for the purpose of carrying out a multitude of housekeeping functions, such as generating interrupts, reading the keyboard and joysticks, external communications, etc. The two clocks are a bonus. And very accurate, too... they include tenths of a second, and have that much accuracy over the course of a day. They also keep running during input/output operations, in fact any time the computer is turned on. With two clocks, you could keep track of the time in Madagascar if you wanted, and there are even programmable alarms so you could get there while dinner is still warm!

How to Use Them

These clocks are a little more difficult to access than TI$; with this program, however, it's as easy as apple pie. The time is contained in four registers for hours, minutes, seconds, and tenths (locations 56331 to 56328 for chip A, and 56587 to 56584 for chip B). To avoid having the time flip over while reading the clock, all four registers are frozen whenever the hours register is read or written to. The clocks continue to keep good time while this is in progress. The last step in any access should be a read or write to the tenths-of-seconds register, to 'unfreeze' the clock.

Each register stores its data in binary-coded decimal, or BCD, format. The hours register also contains an AM/PM indicated in bit 7. This would be an ideal format if the chip were running a display such as a digital alarm clock directly. For use in the computer, however, it does require some coding and decoding. This is a little awkward but not too dif-

ficult in BASIC, and even simpler in machine language. Once set, the clocks will automatically keep track of the time and AM/PM for as long as the machine is on, or until they are reset.

Using the Program

This machine-language program and BASIC loader will help to demonstrate these abilities. The program has been set up in subroutine form so that you can add it on to your own programs, if you wish. Line 10 calls the subroutine, and would be renumbered to fit into your program as necessary. The loader begins at line 9000, and POKEs the data into the cassette buffer starting at memory location 832. If your program requires this buffer for other purposes such as sprites, the code could be readily adapted to other locations; just remember to adjust the storage and jump locations.

After POKEing the data, the program asks you the exact time. First, answer the prompts for AM/PM and the hour. When asked for the next minute, you have an opportunity to set the time very precisely. Check an accurate time source such as that new quartz digital watch you got last Christmas, or a radio or TV time signal. If the present time is, let's say, 23 and a half minutes past the hour, then enter the NEXT minute, that is, 24. Wait for the correct time to reach the value you entered, then press 'RETURN' at that magic moment. Presto, the seconds are automatically set to zero, and you have a very precise clock. Before ending, the program leaves you with the instructions you need to adjust the machine code display.

The time display is operated with an interrupt drive. This means that the computer will update the display sixty times each second, as part of the regular operating system. It also means that the display is completely independent—whatever else you put on the screen, or even if the rest of your program crashes, the time will remain displayed, blocking out a portion of the output in the top right corner of the TV screen.

Operating the Display

The very simple instructions will be given by the program. For the record, however, here they are in print:

SYS 832: recall time display to screen;

SYS 994: turn off time display (still runs internally);

POKE 983,n: change color where n = 0 to 15.

These commands could also be included in a program, once the data is stored and the time set correctly. One word of caution, however. Remember that the video screen is 'live'; whenever you press 'RETURN', the computer reads everything on the current logical line as your input. This may include the time display, which could generate a syntax error or other problems. I have placed the display on the second screen line, so that you can enter simple commands on the first line, and execute them safely. As long as each command is not more than 39 characters in length, then the computer will not link the two screen lines together, and there will be no problem.

A problem could arise when you are editing a program. If you make a change, or even just press 'RETURN', on the first two lines of the screen, the time could be included in one of your program lines. That would be ok except that, when you run the program later, the time would be wrong! No, seriously, you could generate an error that way, or lose some of your program material. In that case, it would be better not to make any changes to the first two lines on the screen. Alternatively, turn the time display off for a while, until you are finished editing.

Go ahead and enter the program...it only takes a few minutes. There's no 'time' like the present. Then you'll have a constant and handy reminder of the time, so you don't have to miss dinner!

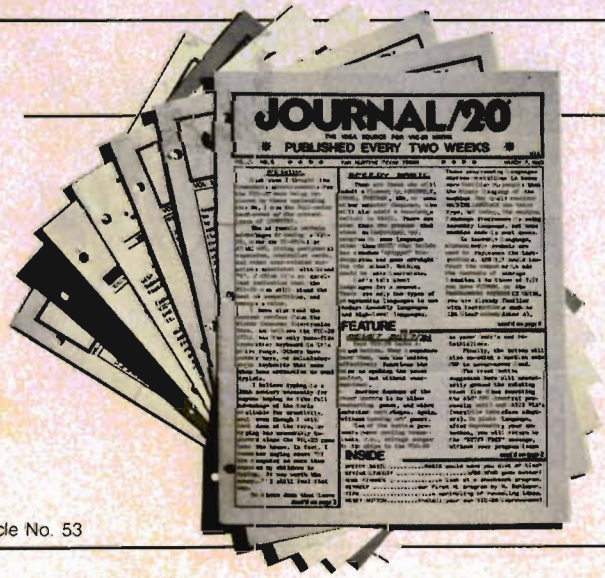
Next time: using the programmable alarm.□

```
0 REM ** 'HOW TIME FLIES'          **
1 REM
2 REM ** CONTINUOUS CLOCK DISPLAY **
3 REM     FOR COMMODORE 64
4 REM
5 REM     BY IAN ADAM
6 REM     VANCOUVER, B. C.
7 REM
10 GOSUB9000
20 PRINT"[CLEAR][DOWN][DOWN]** TIME WAI
TS FOR NO MAN  **[DOWN]
30 PRINT"CLOCK INSTRUCTIONS:[DOWN]"
40 PRINT"SYS 832:     TURN ON DISPLAY
50 PRINT"SYS 994:     TURN OFF DISPLAY
60 PRINT"POKE 982,N: CHANGE COLOUR
70 END
9000 CH=0:FORI=832TO1008
9010 READA:POKEI,A:CH=CH+A:NEXT
9020 IFCH-15605THENPRINT"[DOWN]WHOA...D
ATA ERROR":STOP
9030 INPUT"[CLEAR][DOWN][DOWN][DOWN][DO
WN][DOWN] IS IT AM OR PM";A$:INPUT"[DOW
N] AND THE HOUR";H
```

Continued on page 16

HOW TIME FLIES—Continued from page 15

```
9040 PRINT"[DOWN][DOWN] ENTER THE NEXT
MINUTE;":PRINT" PRESS 'RETURN' TO START
 THE CLOCK:[DOWN]
9050 IFH>12THENP$="P":H=H-12:GOTO9050
9060 IFH>9THENH=H+6
9070 IFLEFT$(A$,1)="P"THENH=H+128
9080 C=56328:POKEC+3,H:POKEC+1,0
9090 INPUTM:M=M+INT(M/10)*6
9100 POKEC+2,M:POKEC,0:SYS832:PRINT"[DO
WN][DOWN] IF NOT OK, PRESS ANY KEY
9110 FORI=1TO1000:IFPEEK(198)THENPOKE19
8,0:SYS994:GOTO9030
9120 NEXT:RETURN
9200 DATA 120,173,20,3,162,89,141,224,3
,142,20,3,173,21,3
9210 DATA 162,3,141,225,3,142,21,3,88,9
6,173,11,220,170,41
9220 DATA 15,24,105,48,141,67,4,138,16,
4,162,16,16,2,162,1,142
9230 DATA 77,4,162,32,41,16,240,2,162,4
9,142,66,4,173,10,220
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 74,74,74,24,105,48,141,72,4,1
73,8,220,105,48,141,75
9270 DATA 4,169,32,141,65,4,141,76,4,14
1,79,4,162,15,157,24
9280 DATA 4,202,208,250,169,58,141,68,4
,141,71,4,169,46,141,74
9290 DATA 4,169,13,141,78,4,169,1,162,1
3,157,65,216,202,208,250,76,0,0
9300 DATA 120,173,224,3,141,20,3,173,22
5,3,141,21,3,88,96
9310 REM COPYRIGHT IAN ADAM  1983
READY.
```

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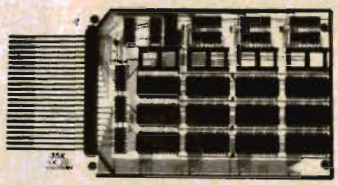

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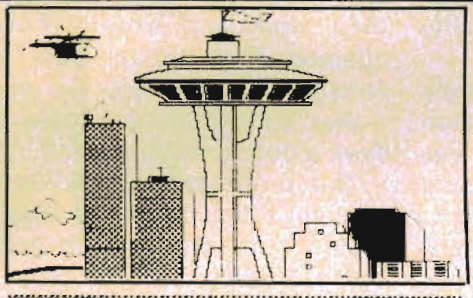

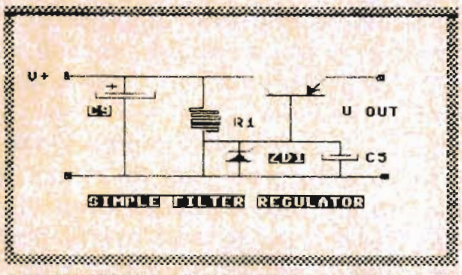

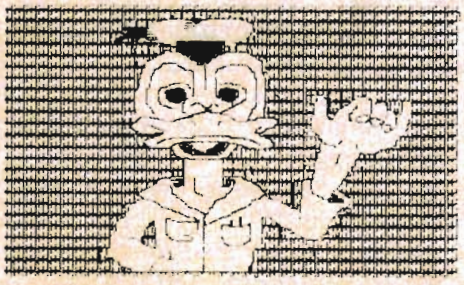

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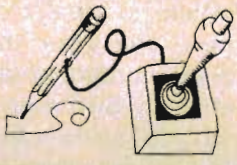

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Circle No. 49

The Commodore Convention —A Safari Adventure

by Robert J. Tuffly

In the dense jungle of computer software it is evident, if not a relief, to know that Commodore has a feasible policy for all its affiliates. At the Lion Country Safari Show, dealers, distributors, and end-users met to cut their way through the maze of endless options and bogus claims to find the true values that are available for each of their unique markets.

Being my first convention, I was naturally skeptical about the people and the atmosphere. I was under the impression that this would be some gathering of computer masters who would talk of the complexities of the Commodore or how complete their software package is compared to their competitors. Surprisingly enough, I was not overwhelmed by stereotypical salesmen or the dreaded computer analyst spewing out the advantages of a parallel interface on a 16K memory expansion system. Instead, I was shown a monkey typing his name on a Commodore 64, with more ease than I ever thought possible for an animal—let alone a writer.

Amidst the ground cover, roaming birds, and camels stood the Commodore Safari. Three massive tents, only comparable to some traveling circus, protruded the landscape like a docile haven from the surrounding wilderness. Moreover, the heat had begun to take its toll on the day as if it were, in fact, a sweltering day in Africa. Immediately, I headed for the safe, blessed oasis.

The End-Users

This was a video addict's paradise! Joysticks, games, computers, and more games dotted the arena like bees in a flower patch. To calm my racing thoughts, I stepped up to the nearest stand and ordered a beer. How could anyone approach this technological monstrosity? How was I to tell any reader exactly what it was like to be catapulted into the future in less than thirty seconds?

Suddenly, as though someone had entered the correct search command into my memory, it was clear. As I stood next to the Micro Ware booth, a lady was talking to a friend: "I have always been looking for an interface that was compatible for my 64. Not only did I find it, but I picked up some games for my grandson, too!" Yes, dealers such as House of Software were selling anything and everything they had—at up to 25% off. And not only that, Commodore had freighted in all types of software and hardware direct to their dealers, thus cutting shipping costs which in turn let them reduce prices to the end-user—meaning you and me: the people that make the home computer business possible. In short, WE are the ones for whom this show was originally put together. It was time, Commodore thought, to break the barriers of business. Just because they sell the computer does not mean that they are in an ivory tower, far above everyone concerned.

Perhaps the most convenient, logical display of the Convention was outside the main tent. A Demo Tent was constructed for the public's general information concerning the Commodore, VIC or PET computers. Companies, distributors or programmers with a product could come to this tent and show the potential buyers their work and exactly how it operates. One company, En-Tech, showed The Studio 64—a music maker which is so simple that even a child could run it.

The programmer, Ray Soular, explained that the most amazing feature of the Studio 64 is that the operator only has to copy the notes into the computer straight from the music sheet. The notes will print on the screen as you enter them or as they play.

In actuality, this program is like a word processor for music. Bars and notes can be moved around according to your needs. Best of all, you can save and recall all your compositions at the touch of a button.

And the sound was incredible! Soular had hooked up the 64 into concert P.A. system. The result was a Moog synthesizer type sound. With the three voices of four wave-forms each, there was a rich harmony and full bass.

Dealers

The dealer had a choice. He could meet with major distributors or find his main supplier just from the myriad of logos that decorated the tents like Christmas lights. There was no questions as to who was who.

More business cards, more hand-shaking, and more contacts were made at the Safari Convention than there were lions at the park. Everywhere, distributors met with dealers. Companies like Avalon Hill, HES, Startech finally came face-to-face with their respective dealers and consumers who have been, before then, nothing but a voice over the static-ridden phone. No more were geographic locations the boundaries. It was real — it was friendly — and it all happened in two days.

And it did not stop at the convention. Since many of the exhibitors had come as far away as Canada (for Southern California, that is quite a distance), the Lion Country Safari people had organized a luau. Here, they were allowed to relax and enjoy the park. Business was put aside for healthier aspects of living: like eating and drinking. Nothing, from what I observed, could have been a better remedy for such a long and hectic day.

Merchandise Available

Of the countless number of products at the Convention, there was a handful that rose above the rest as the most exciting and complete. It was difficult to determine these few—but it had to be done.

The hottest video game available for the Commodore 64 is Neutral Zone by Access. With 100% machine code and full 3-D simulation, this game has constant action. The player, or pilot, must protect the Mothership—a massive spaceship like something out of *"Close Encounters of the Third Kind"*—by stopping bombs that the attacking spaceships fire. Wait...then the spaceships must be destroyed too. True, there are other quality games around, but this one has the graphics and color to make it one of the top videos on the market today.

Of course, the convention would not have been complete without an outstanding data management system. Double E Electronics, Inc., wins this category. The M'File is a powerful program designed specifically for the Commodore 64. It is menu-driven and friendly enough for the first time user.

The M'File contains up to 32 fields per record and up to 250 characters per record. There is a whopping 1000 records per diskette if 125 characters are used per record. Search and sort features are the most complete and the most advanced. And here's the kicker: it merges with most major word processors.

Now for the hardware. This subject is interesting to many of our readers. So for all of you—I found a new generation in printer interfaces. Micro Ware now has an interface that is 100% compatible for the Commodore 64. No adjustments are needed. It prints clear Commodore symbols with no substitutions. It uses all Commodore commands as if they were written for it alone. Now ANY parallel printer can be hooked to a Commodore with the fears of 'Will it work?' virtually vanishing.

Behind the Scenes

The master mind, the man who put this whole unorthodox convention together was Dick Dale, Western Regional General Manager for Commodore Business Machines. He was quite an elusive man to track down. And no wonder. With over sixty exhibition booths, innumerable dealers, and all manner of buyers, he was constantly occupied with questions and problems.

Donned in a Safari outfit complete with hat, he kindly found time to talk. When asked about the location of this convention he said it was to establish a theme. 'We wanted a family atmosphere. Here, the computer oriented public can bring the family to enjoy the park AND the convention all at the same time.'

He continued, 'We want to show everyone that Commodore computer is the best home computer around. We want everyone to know that we stand behind everything that goes with the Commodore—including the dealers and the distributors. We are selling over 100,000 computers a month. We just wanted everyone to know that we are user-friendly. We do care.'

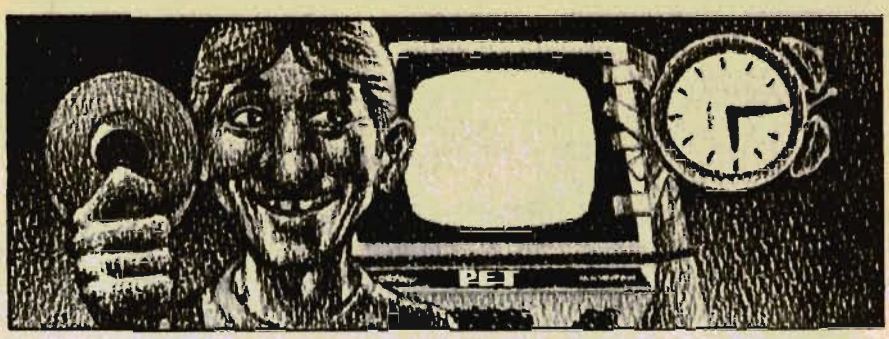
What of the old question pertaining to the stigma which is still present about all computers—does it really take a genius to run one? 'No. We have to fight this feeling all the way. A home computer is for the home. It won't break if you push the wrong key. It's a tool. In fact, after you finish using one, the hardest thing to figure out is where the power switch is located.'

He said that this was the first show ever for dealers and end-users of Commodore. 'We've been taking it on the road and have had as much success with it here as we've had anywhere. People are so receptive of the idea of getting to know us. I guess it all boils down to public commitment. We have to let the people know we are out there.'

After it was all done, there was a feeling of serene success. The tents were coming down, the families were on their way home and the birds were being fed. The Convention had made a living, relevant statement—Commodore Business Machines is not a company that manufactures computers and says 'Lotsa luck!'

As for me, no longer do I fear the computer as some foreign intruder trying to take over my life with technical jargon or electronic wizardry. My fears are finally at rest—now if I could only learn to accept lions.□

PET Goes "Big Time"



by Andy Calistrat

The following is a little routine which adds some nifty features to your Pet, commonly found otherwise only on larger, main-frame systems.

The program creates three new variables: CLK$ contains the time of day in the form 10:45 PM, etc.; DAT$ contains the current date in the form 01/18/83, etc.; and, an arbitrarily named variable, XX$, contains the period of the day—namely—MORNING, AFTERNOON, or EVENING. The following gives more information and outlines the routine (see program listing).

1. How To Use It.

To first use the routine, type it in exactly as shown. Do not add any spaces, or delete any spaces which are already there. Now, after initializing (see section 2), the routine is ready for use.

Since the program is written as a subroutine, it may be called using the GOSUB command. Each time you want to use it, simply add a line GOSUB 1 in your program. This creates, and subsequently updates, CLK$, DAT$, and XX$. It is important that each time one of these variables is needed, the GOSUB 1 command is used. Otherwise, CLK$, and eventually XX$, will become inaccurate.

To print any of the variables, use the standard PRINT command in BASIC. A short program which illustrates the use of the subroutine is listed below.

```
10 GOSUB 1
20 PRINT "GOOD ";XX$;". IT IS
   ";CLK$;" AND TODAY IS
   ";DAT$;"."
30 END
```

When run, the print out might look something like this:

```
RUN
GOOD EVENING. IT IS 10:52 PM
   AND TODAY IS 01/18/83.
READY.
```

2. Initializing.

The program maintains the current time based on the Pet's internal variable TIME$, or TI$, and the date based on memory locations 1016-1023 (see section 4, How It Works). Both of these memories must be initialized when first turning on the Pet, and under certain other conditions outlined below.

2.1 **How to Initialize.** TI$ and memory locations 1016-1023 are the only two memories which must be user-reset. Pet determines the period-of-the-day interval based on the TI$ register (again, see section 4). TI$ may be set to the current time by using the command TI$="HHMMSS" (in direct mode) where HHMMSS is the current time in hours, minutes, and seconds. Military time (i.e. 24 hour system) **must** be used. The 24 hour system begins at midnight with hour 00, carries till noon, at hour 12, and continues ahead with one PM being hour 13, two PM being hour 14, and so on. 11 PM is hour 23, and midnight begins a new day at 00.

So, for example, 9:07 AM may be entered as TI$="090700". 12:04 PM and 32 seconds is entered as TI$="120432", and 12:04 AM and 32 seconds is TI$="000432". 11:07 PM is TI$="230700", etc., etc. Note that although the 24 hour system is used when setting TI$, CLK$ will always be returned in "normal" (12 hour) format with an AM or PM tag.

Memory locations 1016-1023 are part of the second cassette buffer, which is a 192-byte block in memory used only when loading a program via the second cassette unit. Here we are using 8 bytes of this buffer to store the date in the form MM/DD/YY. When first turning on the Pet, set these locations equal to the current date. One method of doing this might be to first set D$="MM/DD/YY" where MM/DD/YY is the month, day, and year (example 01/18/83), and then execute the following line (in direct mode):

```
FOR I = 1016 TO 1023:POKE
   I,ASC(MID$(D$,I-1015,1)):NEXT I
```

The date is now set and the variables D$ and I are no longer needed and may be erased or reused.

2.2 **When to Initialize.** The procedure outlined in 2.1 for setting TI$ and locations 1016-1023 must be used in the following situations:

POWER ON: When first turning the computer on, all memory is cleared and all variables are reset. It is therefore necessary to set TI$ and 1016-1023. Note that you must, of course, also type in the program (unless you are going to use a program previously stored which already incorporates this subroutine).

NEW: Executing the NEW command will not harm TI$ or 1016-1023. It will, however, erase the subroutine (as well as any other program in memory), and therefore you might need to retype it.

SYS RESET: A SYS system

reset is a command which calls a machine-language subroutine in Pet's ROM, the same routine which is executed when you power up the Pet. It clears all the memory, prints the COMMODORE BASIC and BYTES FREE messages, resets the clock, and performs various other operations which initialize the computer.

Thus the command will erase any program in memory at the time of its execution (including the subroutine itself). It also resets the clock (TI$) to "000000". It will **not**, however, reset locations 1016-1023. Therefore, after performing a SYS system reset, use the procedure outlined in 2.1 as necessary.

STOP DISABLE: There are certain POKE commands which affect an interrupt routine in the Pet that controls the STOP key, thus causing it to be ineffective. Unfortunately, it is the same interrupt routine which drives the clock, so that when using one of these POKE values to disable the stop key, TI$ will freeze (and consequently so will CLK$ and XX$).

LOADING SECOND CASSETTE: The date stores alphanumerically in locations 1016-1023, which is, as previously stated, the upper end of the second cassette buffer. This means, unfortunately, that use of the second cassette to either LOAD, SAVE, or VERIFY any program or data tape will most likely re-write the above mentioned locations. If it is necessary to use the second cassette, simply re-write the date into 1016-1023 after the tape operation is complete.

MACHINE LANGUAGE: Because of its passive nature and infrequent use, the second cassette buffer is a favorite spot to store short machine language programs. Although the subroutine here only uses eight bytes, and the ones on the extreme upper end at that, there is the chance that a long machine language program, or one that is simply stored in those locations (1016-1023) might destroy the date information stored there. The only possible solution is to reset the locations after the machine language program has been executed. A machine language program stored in these locations cannot, however, coexist with the subroutine (at least the DAT$ function will not operate properly).

CHANGE OF DATE: It is possible that while using your Pet at night you will work past midnight (and believe me, I can tell you about those nights!). While the Pet will automatically advance CLK$ to 12:00 AM and switch the XX$ greeting to MORNING, it will **not** advance the date stored in locations 1016-1023. You must do this manually using the procedure outlined in 2.2.

3. Some Drawbacks.

Most system functions (like RUN) store in Pet's ROM (Read-Only-Memory). They are written into the computer before it is sold. They cannot be erased, never need to be reprogrammed, and do not use up user-memory (RAM). However, since the CLK$, DAT$, and XX$ variables are not functions offered by the computer's built-in operating system (they are actually creations of the subroutine described in this article), they carry with them some inherent limitations:

1. Lines 0-7 of programming space are used up. The subroutine cannot, therefore, coexist with a program using any line 0-7.
2. The program requires 353 bytes of user RAM to store, and an additional 44 bytes to execute. However, in most systems having 8K and up, the memory "loss" is negligible.
3. The variables CL$, DA$, XX$, and XX become reserved and cannot be used in any program coexisting with the subroutine.

However, if these restrictions do not pose any major limitations for your applications, the routine will work just fine and should justify its memory requirements.

4. How It Works.

The Pet keeps an internal

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register TIME$, or TI$. This is a six-byte alpha-variable that is system controlled (and thus reserved). The variable is initiated to 000000 on system reset (or by the user), and is incremented once a second by an interrupt routine within the Pet. This variable also stores in the format HHMMSS, so that after 000059 it advances to 000100. Additionally, it is on a 24-hour loop, so that after 235959 it resets to 000000. This makes it perfect for use as a base for CLK$.

Memory locations 1016-1023 are in the second cassette buffer, a 192-byte data block which is only used when loading program via the second cassette unit. Eight bytes are used off the high end to store alphanumerically (in ASCII code) the date in the format as given (MM/DD/YY).

Line 0 of the program executes a cold-start at line 10. This is just so that the subroutine is not the first thing executed when a new program is run.

Line 1 reads locations 1016-1023 and converts them, based on the ASCII code, back into the alpha representation of the date, and then stores it in the variable DA$. It also sets XX equal to .01 x the value in TI$ (i.e. 120345 becomes 1203.45, or 12:04 and 45 seconds PM).

Parameters for Morning, Afternoon, and Evening are:

12:00:00 AM—11:59:59 AM
MORNING
12:00:00 PM—05:29:59 PM
AFTERNOON
05:30:00 PM—11:59:59 PM
EVENING

Within these specifications, four conditions need to be dealt with:

1. Time is between 12 AM and 12:59:59 AM. In this condition, TI$ will be ØØMMSS where MM and SS are the minutes and seconds (any combination up to 59:59) and the hour is ØØ. Line 2 checks for this condition and, if it exists, it automatically sets the hour to 12 (as in 12 AM), and then sets the correct minutes, the AM marker, and XX$ to MORNING.

2. Time is between 1 AM and 11:59:59 AM. This interval involves a very much straightforward conversion. Line 3 checks to see if the time falls in this slot, and if it does, sets up CLK$ to equal HH:MM AM and XX$ to MORNING.

3. Time is between 12 PM and 12:59:59 PM. This is the only time in the PM phase in which the hour portion of the TI$ variable is identical to the hour portion of the CLK$ variable (12 in both cases). Thus line 4 sets the time to 12:MM PM and XX$ to AFTERNOON.

4. Hour is between 1 PM and 11:59:59 PM. During this interval, the hour portion of TI$ will be in the 13-23 range, and needs to be converted to a range 01-11 for the CLK$ variable. Line 5 properly sets up the hour (which is the TI$ hour minus 12) and adds a colon, the minutes, and the PM tag. Line 6 checks to see if it is before 5:30 PM, and if it is, sets XX$ to AFTERNOON and RETURNs to the program that called the subroutine. Otherwise, the subroutine defaults to line 7 (since it must be later than 5:30 PM) and, again, the RETURN command is executed. □

Program Listing

Type into computer **exactly** as shown. Do not omit any spaces. Do not add any extraneous spaces.

```
ØRUN1Ø

1DA$="":FORXX=1Ø16TO1Ø23:DA$=DA$+CHR$(PEEK(XX)):NEXT:XX=VAL(TI$)/1ØØ

2IFXX<1ØØTHENXX$="MORNING":CL$="12:"+MID$(TI$,3,2)+" AM":RETURN

3IFXX<12ØØTHENXX$="MORNING":CL$=LEFT$(TI$,2)+":"+MID$(TI$,3,2)+" AM":RETURN

4IFXX<13ØØTHENXX$="AFTERNOON":CL$="12:"+MID$(TI$,3,2)+" PM":RETURN

5CL$=STR$(VAL(LEFT$(TI$,2))-12):CL$=RIGHT$(CL$,2)+":"+MID$(TI$,3,2)+" PM"

6IFXX 173OTHENXX$="AFTERNOON":RETURN

7XX$="EVENING":RETURN
```

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Petspeed Tips

by Joe Rotello

Introduction

With the coming of Petspeed™, Commodore computer users everywhere have a powerful new programming ally. No longer are BASIC and 6502 Machine Language the only way to program fast and efficient PET/CBM and C-64 programs.

In working just about every day with this excellent BASIC Compiler, we would like to share some tips and hints on the everyday care and feeding of Petspeed with other COMMANDER readers. Let's start with a quick update and then we will go on to address various uses (and mis-uses).

Petspeed Update

In early May, a new version of Petspeed was introduced. Version 3.0 now allows for use with the PET "FAT FORTY" computer as well as the 8000 series CBM. Memory locations immediately below the start of BASIC, decimal 1023 and below, are no longer required by Petspeed.

Petspeed for the C-64 is now out. The operating procedure is nearly exactly the same as in the PET/CBM version. The program cannot be run as it is received, however. The user must first make two backup copies on the single drive 1540/41 disk, a "Petspeed Master" and a "Utilities Master". The programs have to be split over two disks due to the large number of Petspeed System and Utilities programs present.

The C-64 "security podule", otherwise known as a dongle, is placed into either the cassette port or control port 2, depending on which podule type is supplied. Note that as in the case of the PET 4000/8000 series version, the security podule/dongle is only required for compiling the actual BASIC source code.

When compiling on the C-64/1541 system, the disk should only contain the Petspeed System programs and the BASIC source code. Disk space is at a premium on the single drives 1540/41, compared to the dual drive disks. With the advent of Petspeed on the 64, users and programmers now have a viable way to generate and make excellent use of fast and efficient games and business programs where the speed of compiled BASIC is necessary.

Interesting Tips—Petspeed and Machine Language

Petspeed can be used to compile existing business and software packages; for example, an Accounting System that presently runs on the PET/CBM/C-64.

However, always observe a few pre-cautions:

a) Under many circumstances, the BASIC source code must not contain any machine language SYS calls. Although most problems with this situation can be programmed around (see below for one example), extensive changes are best left to experienced programmers.

b) Since the compiled version of the program(s) will take up more disk space than the BASIC counterpart, be careful to not run out of disk space, especially when the program suite consists of multiple programs on the same disk. This problem will be most evident on the 1540/41 disk drives where it is common to store both programs and data on the same disk.

c) We are beginning to see many software suppliers re-release their business and homeowner software in Petspeed versions. This should aid in clearing up any potential problems caused by (a) and (b) above.

However, Petspeed can be used with a machine language subroutine in many circumstances by "POKEing" the ML routine from a BASIC/Petspeed program. For example, a ML routine that will be stored perhaps in the second cassette buffer (or elsewhere on the C-64).

If, however, we have no choice but to intermingle Petspeed with a separate (i.e., non-POKEed) ML routine, we find that the Petspeed/ML interaction instructions and charts included with the Petspeed manual are indeed a little dry. But by careful examination, and trial and error testing on a simple program, the method of accessing variables in a ML routine from Petspeed is very simple. The key is to locate where Petspeed stores your variables and subscripts. This is made easy by the REPORT program present on the Petspeed System or Utility disk.

Bit Level Programming

Compiled programs are excellent for use in BASIC programs that do "bit level" work.

We have not yet seen a "bit level" BASIC program that did not

function well under Petspeed. For the most part, bit level execution under Petspeed is between 5 and 10 times as fast as the BASIC counterpart.

A Faster Petspeed?

Did you know that it is possible to construct areas of a BASIC program to get up to 30% faster execution under Petspeed, than even Petspeed normally does?

Not by changing Petspeed itself, but by making very minor changes in your BASIC source code, you can gain even more speed out of the compiled version. Here are a couple of tips:

1—Under Petspeed, POKE and PEEK can be negative numbers! Petspeed allows negative numbers to be assigned to the PEEK/POKE ranges you request. When executing, Petspeed (-) pokes are far faster than if Petspeed POKEed a (+) going POKE. See Program #1 listing for a small sample idea.

Remember, PROGRAM #1 is intended to be compiled (the negative poke routine won't work in BASIC) and the times required to fill the screen will be displayed. The range of POKE will have to be reduced if you have a 40 column PET and the video memory locations that get POKE'ed will have to be changed for the C-64.

But think of the speed improvement, say, for screen writing, or displaying a game video screen.

2—In CBM BASIC, the CMD command can be used to change the default output device; for example, any PRINT commands carried out after the CMD are directed to the device that you CMD'ed (sorry, bad English) until you turn it off with the appropriate PRINT # command. This tip you can perform in BASIC, but it really speeds up under the Petspeed Compiler. An example routine to write a series of data out to a SEQuential file might be:

```
10 open 5,8,8,"0:test,s,w"
20 cmd 5
30 for i= 1 to 100
35 print i
50 next
60 print #5
70 close5
```

You are reading correctly. Line 35 says "PRINT i" instead of the familiar "PRINT #5,I". And likewise, line 60 has to have the "PRINT #5" command in it in order to insure that the file is properly closed.

Using this method, file data transfer is about 15 to 25% faster than the traditional BASIC code, where we use GET#, PRINT# or INPUT# to fetch our data.

OK, now for the good stuff we promised. See PROGRAM #2? OK, that program is made to be compiled as shown, and it reads the simple data sent to the disk by the program we just described above. Note that lines 20 and 40 are NOT misprints. To the Petspeed compiler, they are perfectly allowable operators and commands.

What is really impressive is that the disk data transfer rate to and from the computer of the Petspeed version of PROGRAM #2 is about 30% FASTER than the Petspeed version of a traditional coding method (i.e., GET#, INPUT#, PRINT#, etc).

Eureka! There ARE ways to give even Petspeed a helping hand!

Be a little cautious when using the above ideas in programs where you open multiple data files in one program or transfer data between them or between the data files and memory. You may have to close one file before you open and work with another because you usually can't have two open files activated by the same CMD number.

Data Statements

Unlike PET/CBM BASIC, Petspeed cannot accept a BASIC source code DATA statement that exceeds 62 characters in length. If you "feed" Petspeed more than 62, the compiler will abort the process and exit with the error message "DATA ITEM TOO LONG IN LINE XXX", where "XXX" represents the location of the offending DATA statement.

Beware, as you will probably run up against this "problem" when you compile already existing games and business software. At this time, the best fix seems to be just to shorten the DATA statements, although you could try to concatenate DATA statements where one just HAS to have more than 62 characters in a DATA statement.

FOR/NEXT Loops

FOR/NEXT loops under Petspeed can be integer numbers. Where declared integers in FOR/NEXT are not allowed in BASIC, you may use them in a BASIC program that will be compiled.

Also, compiled FOR/NEXT loops execute far faster than their interpreted BASIC counterparts. FOR I = 1 to 10000:NEXT, that one might use as a timing loop in a BASIC program, will execute in about 11-12 seconds in BASIC. The same timing loop in Petspeed will execute in about 2.4 seconds. So be sure to allow for that "kick in the RAM" that Petspeed will give to all such similar loops.

STOP Key

Unlike BASIC, the (STOP) key can be very simply disabled under Petspeed without affecting the internal system clock; and without the user having to write any type of POKES/PEEKS or ML code in which to enable/disable the (STOP) key! In fact, unless told otherwise, the (STOP) key is disabled as a default when the BASIC program is compiled. It's easy to enable/disable the (STOP) key as you wish. Just have as the BASIC text: 10 REM !ES (which will ENABLE the STOP key) or 10 REM !DS (which will DISABLE the STOP key).

In addition, the enable/disable commands may be anywhere in the program. It is recommended that before the program ter-

minates, enable the stop key so the computer is returned to a "normal" operating state.

Sorts and Searches

Without question, Petspeed vastly improves the efficiency and execution speed of just about any BASIC sort/search routine. The average improvement is about ten times, but will depend on the efficiency of the BASIC code itself.

For example, SHELL/METZNER type sorts will speed up between 9 and 12 times as a general rule and the faster BASIC heap or subscript sorts now become a very efficient routine to compile into a series of programs.

At this particular time Petspeed is only able to handle up to three dimensional arrays. So keep away from those sorts that would violate the Petspeed restriction.

Search routines that wade through memory, sequential or relative files will be greatly speeded up. In fact, Petspeed disk searches seem to almost approach the speed seen by disk search routines that are completely done in ML!. Once more, help Petspeed by making the search routine as efficient as possible in BASIC. Then Petspeed can speed it up by between 5 and 15 times depending on how convoluted the search routine is.

New Functions

Sometimes forgotten is the fact that Petspeed allows the use of string and mixed string user defined functions. This is a very powerful concept. Now, for example, a user/programmer can utilize various PRINT USING type routines in a Commodore program or perhaps justify numbers.

For example, use "100 DEF FN JUST$(NUM) = RIGHT$(" "+STR$(NUM)10)" as the heart of routine that would right justify numbers. The code will not execute in BASIC, but it sure will when the program is compiled.

Since CBM BASIC does not incorporate a PRINT USING function, one can see the tremendous edge that Petspeed gives. Not only can you work with strings and mixed functions, but the whole routine is very fast since it is compiled to boot!.

As an added feature, the same PRINT USING/JUSTIFY format routine can be used to output to the screen and/or printer, thus ending the "dual code" routines many PET/CBM programmers now use.

What's the Difference?

The difference between Petspeed and Integer Basic Compilers is as follows:

Petspeed is a compiler that takes your PET BASIC program as it sits, without requiring the user to make any special changes in the BASIC program. It then refines the BASIC SOURCE program, making it much more efficient, and then compiles it down to disk as a transformed OBJECT CODE program. Not fully in machine language, rather the object code program is now in a "speed code" of its own, with its own high speed system code saved along with the program. One might say that the object code is now somewhere between PET BASIC and machine code. The object code cannot be listed or changed as can be a BASIC program.

Integer Basic Compiler™ (IB) is a different animal, yet similar in some respects. IB does not take an existing CBM BASIC program and change it. Rather, the user actually programs in a BASIC type language that is very similar to CBM BASIC. Some commands available in CBM BASIC DO NOT exist in IB, but many powerful commands, speed features and automatic functions exist in IB's version of BASIC.

Program 1

```
10  rem  negative pokes in petspeed
11  rem  wont work in basic!
12  rem  compare both types of pokes
13  rem  in petspeed
30  rem
40  input"Which Poke  (N)eg  (or)  (P)os";a$
60  ifa$="p"then100
70  ifa$="n"then 75
72  goto 40
75  ti$="000000":for i = -32766 to -30768
80  poke i,156:next:print ti/60" seconds":end
100 ti$="000000":for i = 32768 to 34687
110 pokei,156:next:print ti/60" seconds":end
115 rem
116 rem
117 rem  be sure to modify for c-64
118 rem  or for 40 col pet!
```

The IB compiler transforms the IB BASIC source code into ACTUAL 6502 machine object code and stores it to the disk. IB places various limitations on variables & subscripts (126), total number of variables (110), program lines (250 maximum) as well as the fact that all subroutines in the source code are placed AFTER the main IB BASIC program text.

IB is potentially one of the fastest and most powerful ways to program your 4000/8000 series PET/CBM computer. And Petspeed and Integer Basic can be used together to form an astoundingly powerful program with the best of all worlds; a compiled program that calls a true machine language program for its subroutines and other time consuming work.

The national supplier of Petspeed is: SMALL SYSTEMS ENGINEERING, 1056 Elwell Court, Palo Alto, CA 94303, (415)964-8201.□

Program 2

```
10  rem  faster data fetch in petspeed
11  rem  wont work in basic!
12  rem
10  open 1,8,3,"0:test,s,r"
20  #1
40  geta$
50  printa$
60  sa=st:ifsa<>64 then 40
70  print#1:dclose:end
```


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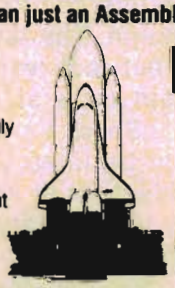

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Circle No. 14

Living with Mini Jini

by Colin F. Thompson

We live in interesting times.

Those of us who have owned a VIC for more than a year can remember the lack of software that forced us to write our own programs. Those days are gone forever. There is so much **quality** software and hardware available for the VIC that I am forced to change the format of this column. By showcasing one good product a month, I can only expose you to 12 items a year.

Since I have 17 items under review at this moment, I'm going to review three or more products a month in this column, beginning next month. The reviews will be shorter, but each review will be accompanied by a standardized evaluation "Short Form". Every product will be rated on several criteria. This should make your job of software selection easier and more rational.

Reviewing the Reviewers

There is something you should understand about reviewers: we are biased. Most of us try to give you the straight scoop on product reviews, but ALL of us are biased by our previous experiences. Anyone who uses a particular kind of software, say for instance, a word processor, uses that one over another word processor because of the difference in features.

Although Brand A and Brand B both make good word processors, it's inevitable that differences between the two will make you prefer one over another. In the next several months you will be reading reviews of many database, word processing, label and other home/business programs. I caution you not to be swayed by my personal remarks, but to read the features and benefits as presented and compare them to your own software needs. Also remember that I do not and will not write about products that are less than superior quality. Life is too short to spend reviewing junk.

Caveat Emptor

The best advice I can offer you is this: look for software that is expandable, and has the features you will need. After you have narrowed down the list of prospective programs to a few, write to the manufacturer and request the User's Manual. There may be a small charge, but reputable companies will be glad to hear from you. Don't be bashful either. After you have purchased a program and find a bug or wish another feature had been added, write the manufacturer. Be specific and polite. User feedback is the best tool these companies have to find out how the products are being used.

Polling Place

At a recent Commodore trade show I had the great pleasure of meeting many Commander readers. I found they all had two things in common. Good taste in reading material and a desire to USE their computers instead of playing games. My informal poll revealed that half of the people I spoke with had VICs, almost half had 64's and the rest had Pets. When questioned about why they bought these computers, 100% replied, "I wanted to learn about computing and use the computer in my home or office." Astounding! Not one person admitted being a hard-core gamer. Whatever Commodore computer you favor, good software and hardware is available now and it's not expensive. This month we will review the best home database for the VIC I have ever used. Let's get to it.

Mini Jini

Jini Micro is famed throughout the Pet/CBM community for its powerful database program called Jinsam. Last month I was tipped by a fellow writer, Mike Apsey, that they had released a VIC version of Jinsam. Since my constant lament is "there are no well written database programs for the VIC", I immediately contacted Jini Micro. I hoped they had packed a lot of the power of Jinsam into the VIC. Now, several weeks later, after using Mini Jini in my home, I can assure you that a good database program exists and it's affordable.

If you are a newcomer to the VIC or computers in general, let me explain what a "database" is. Databases existed long before computers. They were (and still are) called Filing Cabinets. These cabinets are big metal things with sliding drawers. A label on each drawer tells about the general contents. (A-D, Invoices for 1943, etc.) Each drawer can store several manilla file folders. Each

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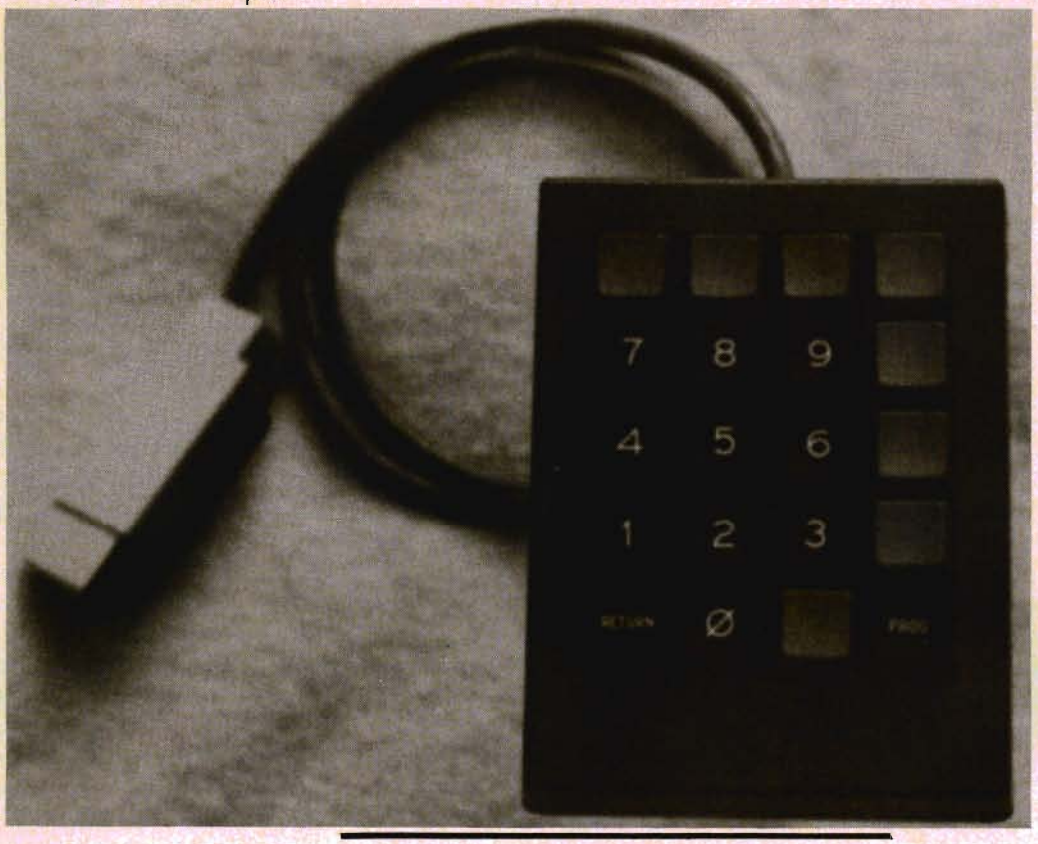

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Circle No. 84

folder might hold all the information for a client, customer, vendor, and so on. The papers in each folder could be letters, forms, bills, addresses etc. You could conceivably store any kind of data in a filing cabinet.

Retrieving that data is usually a simple matter of remembering the order in which the data is stored. By name or account number or date or anything. You just go to the right drawer and look in the appropriate file folder and pull out the record in question. Once you get the piece of paper you wanted, you search for the field that held the data in question. Name or Social Security number, etc. Since we all know how to do this, let's see how the computer can duplicate the function of a filing cabinet.

Organize or Agonize

Let's assume you have a collection of rare books. To catalog your collection, you will need to enter specific information about each book into Mini Jini. Information fields would be Title, Author, Publication Date, Subject, Purchase Price, Assessed Value, etc. Mini Jini will allow you to define up to ten of the categories (fields). Once you have determined how many fields to define and what the field names are to be, you may start entering the data on each book. Each book entered would be called a Record. Records may be up to 350 characters long on the VIC. This is much longer than the usual 255 characters available on other programs. (750 for the C-64). An unexpanded VIC can hold as many as 50 full records. If you have a 24K expander, the VIC will hold 500 records in memory.

Data entry is very easy. The program was designed to be used by computer novices. The fun starts after all your books have been entered. Save the file of books on your datasette or disk drive before you begin playing with the data. You will probably want to put the data in some sort of order. You may order your file any way you like. Let's put the file in alphabetical order of Author's name. Press the "O" key (for Order) and the program prompts you to select which field to sort on. Enter the field number which holds the Author's last name. After a few seconds you may go back to the menu and check the computer's work. Press "L" for Look and the first record will flash up on the screen. It will be record number 1 and will be the book written by the Author with the first name in the file (probably something like Adler or Andrews). To see the rest of the records, just keep pressing the return key. You may Order the file by any field.

To find a single record or group of similar records, use the Search option. Let's say you wanted to find the record for a book titled "Tale of Two CPU's." The Search menu prompts you for data to match. Type in the title and press return. Mini Jini will find and display the record very quickly. Once the record is on the screen, you may change it, delete it or print it.

Mathematically Speaking

All good databases have "calculated fields". Mini Jini is no exception. One of the Menu options is Mathpack. This is probably the most difficult option to master, but it is very powerful. Our book file had two math fields: Purchase Price and Assessed Value. To find the current value of your collection, go to the Mathpack menu and tell the program to add all the Assessed Value fields and display them. You could also average those fields to see the average value of each book. If you subtracted the total Purchase Price of the collection from the total Assessed Value, your net gain (or loss) will be displayed. Most simple math functions can be performed, including Sum, Average, Add, Subtract, Multiply and Divide. The A-S-M-D functions may be used by you. Relational operators like < , > , =, And, or Or are not supported now, but will be part of the utility packages described in Sneak Preview.

Mr. Fix-It

As you add books to your vast collection, you will want to update your file. This is done from the Fix option. Records may be altered by the Add, Change or Delete features. Mini Jini is so easy to learn and use that I haven't looked at User's Manual for many weeks. The options are easy to learn and the manual has MORE information than you should need. The style of the manual is tutorial, with the last several pages devoted to the advanced user. I think most people could learn to use Mini Jini in 20 minutes. Mini Jini is file compatible with WordPro, Papermate, and Busy-Writer.

Printing Options

Records may be printed in one of three kinds of formats. Before printing, you should Order your file the way you want it printed. Then select the Print menu. To get a complete record of your data, press "P" and all the fields of each record (including the record number) will be printed. If the file has names and addresses, you may select "L" for label and print labels. To make a horizontal listing with field names as column titles, press "R" for Report.

The Report format will be useful only if your records have less than about 72 characters each. Longer records will print past the 80 column limit of the VIC printer. You can get around this by selecting fewer fields to print or sending the compression codes to your non-Commodore printer. It can be done easily. Since Mini Jini is written mostly in Machine Language, printing and other functions are done rapidly. The calculations will occasionally "go to lunch" for a few seconds due to garbage collection, but that is expected on Commodore computers.

Disk Aid

A disk utility menu is provided to help with common disk operations. From the menu you may read the Directory, Initialize, New a disk and Scratch a file. The menu is typical of the thoughtful programming approach that Nancy Iscaro (project leader) has brought to Mini Jini. One disk feature I find very useful is the ability to Save the same filename by overwriting the old file. This saves space on the disk. Another trick is the use of the shift key to stop the directory from scrolling. The border and screen colors may be changed by the user to a combination that suits your taste. Most printers are supported, and all users are supported by a superb technical staff.

Sneak Previews

Jini Micro also offers an enormous collection of ready-to-run application files for Mini Jini. There are 69 different kinds of files which are pre-defined for specific uses. Some of the files are: Amateur Radio, Book Store, Paper Route, Mailing List, Real Estate, Recipes, School Admin., Stocks & Bonds and Word Processing. The files are real timesavers and a bargain at $9.95 for cassette and $14.95 on disk. Jini Micro is releasing a series of 23 applications for the vertical market later this year. These files will allow, for example, a shopkeeper to keep track of everything in his shop including finances, inventory, sales and personnel.

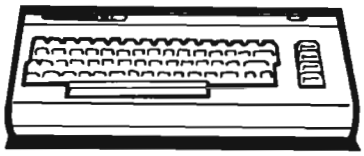
Two utility cartridges are scheduled for release. One is called the Report Forms Writer. It is a free-form report writer which allows the entry of text or data anywhere on the sheet, and can be used with existing forms to "fill in the blanks". One use would be as a check writer. The other utility is called Deep Sort and Change. Mini Jini will sort (Order) on one field only. Deep Sort and Change will allow your file to be sorted on multiple fields. For example, you could sort the file first by zip code and then by last name. It will also restructure the file. More field names may be added, or record lengths may be altered. These are standard features on the $500 databases for the IBM PC and Apple. I didn't expect to see them for the VIC.

Retail dealers will be pleased to learn that an instruction tape (VHS and Beta) is available to train sales people. You know a program is good when people write books on how to get more out of the program. Mini Jini is the subject of two of these "how to" books. They are scheduled to be released later this year by Chilton and will be reviewed by Commander.

Mini Jini underwent a revision change in late May. Some useful enhancements were added, including one which allows the user to send control codes to the printer. Registered owners of Mini Jini with version 20209, 20229, 64209 or 64229 may trade in their cartridge for the later revision for a $20 service charge and proof of purchase. Mini Jini is also available in foreign languages.

The Sum Is Not Average

If you hadn't noticed, I like this program. This is a database that can be used by anyone and is very versatile. It is not yet Jinsam for the VIC. but if you need a program to keep track of things around the house, club records, school work or anything like that, this is the one for you. Mini Jini is a cartridge for the VIC and C-64. No extra memory is needed, but it can use up to 24K of expansion RAM. $89.95 from Jini Micro, Box 274, Riverdale, NY 10473.□



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CES—A Free Verse of Forecast and Future

by Robert J. Tuffly

The magic of computers and the fortitude of the industry culminates at one convention every year, the Consumer Electronics Show (CES). It is a time to flex muscles—a time to stretch, to plan, to realize.

With over 1,000 exhibitors, three buildings of booths (each three stories), and approximately 80,000 people per day, a newcomer to the CES Show might be awed, even a bit anxious. But the first tell-tale signs of the convention portrayed some familiarity—a twenty-five foot high television screen viewing local programming to the congested streets. Perhaps the next observation would be slightly more revealing—does the show actually go on for miles? Indeed. People with briefcases, computer systems, trucks by the score combed the streets in hopes of finding an easy access to unload their wares. It was a mad race, a dash for individual glory, and it would end on the same upbeat as it had started.

It was a commercial affair. If you closed your eyes, the sounds were like a monstrous video arcade that made any game parlor seem like a Lilliputian to Gulliver. Advertisements marked the hallways and spotted the ceilings in a careful way.

Who Was There?

Through the myriad of exhibitors, there were a few who stood out of the crowd as exceptional companies that seemed to tailor to a specific line or who just seemed to have such an aggressive attitude that they attracted attention. One of these companies was Creative Software of Sunnyvale, California.

Aside from their new games and educational programs, Creative Software has a new weapon to combat the video market—Elliot Dahan. As of May 11, 1983, Dahan was elected to the board of directors for Creative Software as well as the appointment of vice president of marketing. He had previously joined Creative in August, 1982.

Having a wealth of information, Dahan attributed much of Creative's success to the fact that they are the largest independent publisher of VIC-20 software in the United States. The five year-old company, also has a full line of computer software for the Commodore 64.

Creative's top educational game—not only by my standards but by CES—is **Pipes.** This program was selected for the CES Software Showcase 1983 in the 'Education Category.' Made for the VIC-20 computer, **Pipes** was selected on the basis of '. . . the innovativeness of concept, technical superiority execution, and uniqueness of product,' by a panel of judges from every end of the computer field.

Creative does not only excel in education, they also have a full line of classic video games for the VIC-20. 'We believe that there will always be a market for people who want quality and consistency,' Dahan adds.

For the Commodore 64, Creative does not lack the ammunition needed to keep stride in this market. Such business programs as **Household Finance, Home Inventory, Loan Analyzer, Car Costs,** and **Decision Making** are all available on tape and disk versions.

The next company in this mass of manufacturers is Spinnaker Software, a leading publisher of learning games for the Commodore 64. With a comprehensive line of learning games for ages 2 through 15, Spinnaker seems to have dedicated its full thrust towards the learning aspect of computing.

Spinnaker was incorporated in April of last year. At that time, they took on the title of 'learning' games. "The reason we call them learning games instead of educational is because (the word) educational has a stigma to it," says Jay Mixer, a spokesman for Spinnaker at CES. ". . . (We want) to create a different educational experience.

When asked what Spinnaker's best selling program is, Mixer replied: "When you talk to us, it is very hard to answer that because we don't sell titles, we sell Spinnaker. The consumers know us as a brand and the retailers know us as a brand."

Spinnaker has a number of games that are designed for children, but made to be enjoyed by adults. **In Search of the Most Amazing Thing, Snooper Troopers I** and **II** are all detective games that can be a learning experience for children as well as a game for adults.

Some of the games the Cambridge, Massachusetts based company showed at CES were **Story Machine**—a program that lets the child create a story while the computer draws the action underneath the words; **Facemaker, Fraction Fever, Kids on Keys**, and **KinderComp.**

Another company that seems to have a definite toe-hold on the Commodore line is United Microware Industries (UMI). Known mostly as a game company, UMI has found a new branch to utilize in the marketing aspect of this computer realm. Russ Bedford, president of UMI calls this section 'Brain Strain.' '. . .users of these home computers are going to help lead the industry into a greater emphasis on serious and educational applications for the home,' Bedford said referring to the more intensive,

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thought-out programs that require more from the user and the program.

Of these more sophisticated games is **Pennant Drive**. This baseball game masterpiece not only combines a true-to-life screen of a baseball field, but it uses a real-world statistical response to add to the authenticity. This game involves management decisions. Each player selects from a roster of actual league players and the outcome is determined by real American and National League statistics.

Another classic game by UMI is **Grand Master.** This chess program is not only a challenge to the expert, but it is also a tutorial for the beginner. Taking-back moves, forcing moves, and asking the computer for suggestions are all incorporated in the program. Nine levels of difficulty add to the ongoing challenge and allow you to progress at your own pace.

The last of the UMI games that seem to stand above all the rest of their programs is **Renaissance**. This 1,000 year-old strategy game is just like the game Othello. It is a rebirth in the computer age—just like **Grand Master**, the player is challenged by the computer or another player. Eight levels constantly force the user to progress while the computer aids in instruction.

A very interesting product that UMI has developed is the **Wordtalk 64.** It is a telephone communication program that links the Commodore 64 to virtually any other computer via a modem. Data, documents, letters and messages can be sent and received at electronic speed. You can even connect with UPI News, the Dow Jones, Compuserve, and other news services using just your phone and your C64.

Some of the features that UMI include in this program are 35,000-character buffered input/output, text editor with word wraparound, output modem, full printer support with form control, communications error checking and much more.

Keeping in mind these facets, UMI's philosophies seem to be evident. Says Bedford 'UMI's business philosophy in the application area is to develop and market software that will more fully utilize the power and versatility of the VIC-20 and Commodore 64.'

If you are a video game addict, there is no possible way of avoiding the next company. Being the largest single source supplier of software and peripherals for the Commodore market, Human Engineered Software (HES) is striving to complete a wide spectrum for the entire software realm, according to Michael Humphress, Director of Marketing.

In reference to games, the all time leader in this field is **Gridrunner.** This fast action game is so well made and liked in the software field that a sequel has come about—**Attack Of the Mutant Camels**.

HES announced the aquisition of six new games from Japan. The release is aimed for this fall under the new company name HesWare and will be available simultaneously on the VIC-20 and Commodore 64.

In keeping with the goals of a widening spectrum, HES has licensed titles from other companies to round out their lines of software.

No convention would be complete without the hardware aspect to keep the software in full swing. Cardco, based in Wichita, Kansas, seemed to have the best line available for the Commodore.

Cardco's Commodore line is staggering. With a fifteen line series including software programs, a light pen, interfaces, and memory expansions, they seem to be in the heat of the hardware business.

I found the light pen most interesting. Called the Cardriter, this switch controlled light pen which includes six software programs is designed for use with the VIC-20 and Commodore 64. Three of the programs show the user how the pen works. There are also examples of how to use the light pen for menu selections or multiple choice testing in education. Coupled with a screen map for the 8,000+ points that can be read by the pen make it a versatile piece of hardware that can only compliment the computer's abilities.

Other items that I found exciting were the printers by Cardco. The Cardprinter/LQ1 is a daisy wheel printer for the VIC-20 and C64. The LQ1 is a 14CPS that is supplied fully interfaced for both standard parallel input as well as VIC and C64 serial bus input for plug-in compatibility. The LQ1 can be used for word processing and supports underlining, bold print, and shadow print as well as true proportional character spacing. It can also be used as a direct typewriter with auto correct when using a white correcting ribbon. In addition, the LQ1 can be used as a two color dot graphic printer for letterheads and logos. It is compact and comes with many accessories that Cardco fully supports.

Among the masses computers and software, the only distributor whose total support was focused on Commodore, was Kapri International Corporation, based in Los Angeles, California.

This major distributor for Commodore 64 software had a raffle in conjunction with Cymbal Software. Why? Well, during the convention Kapri celebrated its anniversary. Originally, Kapri was a national record distributor since 1963. But, now Kapri has converted to a full line computer software distributor.

During an interview, Chris Soular, president of Kapri seemed very aware about the trends of the Commodore market. "We live and breath Commodore software. As a result, we are the leading experts in this field. We carry only the best available and that is what our dealers are assured of when working with us."

Soular added, "The software industry is the same as the record industry. To succeed, you must be able to pick hits. We believe that Commodore has really hit the mark."

And Then There Was Commodore

Commodore Business Machines attended the show in full flare. With their complete line of computers, hardware, and software, Commodore

literally left no seas unmapped during their stay at CES. But, what most people didn't know was to come after the show—a night aboard the Commodore Clipper, a yacht that Commodore anchored just a few miles away from the show.

What Commodore exposed at this convention will put many other computer companies stranded at sea—Commodore hopes. "We are going to continue our forward thrust to be the number one home computer on the market . . . success in the market is going to rest . . . on software," says Sig Hartman, president of Commodore Business Machines, software division. "We want to be a half billion dollar company in terms of software," he continues. "There will be no talk of Commodore not having enough software."

To accomplish this, Commodore has drastically cut their prices on all existing software, the new titles they will acquire from other companies, and of course, the programs they are working on in-house. For example, software packages for the C64 will be priced substantially under $100 and the VIC-20, less than $30.

Commodore utilized the "boat theme" like wind filling the sails of their ship. They claim to have a boatload of software—700 new pieces that will be ready to go in twelve months for the VIC-20 and C64. Every category has been charted. "We just want everyone to know that we are in the software business . . ." said Hartman.

To sail into this endeavor, Commodore has signed contracts with existing manufacturers to obtain their software—mostly leading titles. One such company is Info Design. This company manufactures top business programs, but Commodore has acquired **General Ledger, Accounts Receivable, Accounts Payable,** and **Inventory Control.** According to Hartman, "The quality is here, but so must the price. Therefore, our prices will be 50% less than you can buy in the marketplace."

Commodore is also moving in a new direction in the manufacturing of software. It is a series called the **Magic Desk.** "It is unique," remarks Hartman, ". . . it is animated and what we call 'computer metaphor.' The screen has pictorial symbols that anyone . . . no matter what language can understand." The symbols include a typewriter, index file, telephone, calculator, and financial journal on the desk, and a waste basket underneath. There is also an artist's easel and a vertical file cabinet with a digital clock.

To use any feature of the **Magic Desk**, the joystick, trackball, or mouse moves a pointing finger to one of the objects on the screen. "The rest is magic!" beams Hartman. The **Magic Desk** comes in a plug in cartridge for the C64.

"We are constantly improving our ability to produce software in ROM cartridge form, not only in quality, but also in quantity,' reassures Hartman. *Prices that people can afford* seems to be the main underlining theme—to keep up with the price of the Commodore Computers themselves which are constantly dropping.

The future of the **Magic Desk** is bright. Calculating and home budget features are in the makings. Educational programs are also not out of the question. Since the animated characters on the screen can be modified to express any variety of symbols, the series has the ability to take off in any direction that Commodore chooses. (See page 42 for further details.)

Commodore announced a speech module for the C64. It plugs into the user port of the 64 and contains an additional port into which another 'talking' and 'non-talking' cartridge can be inserted Commodore says.

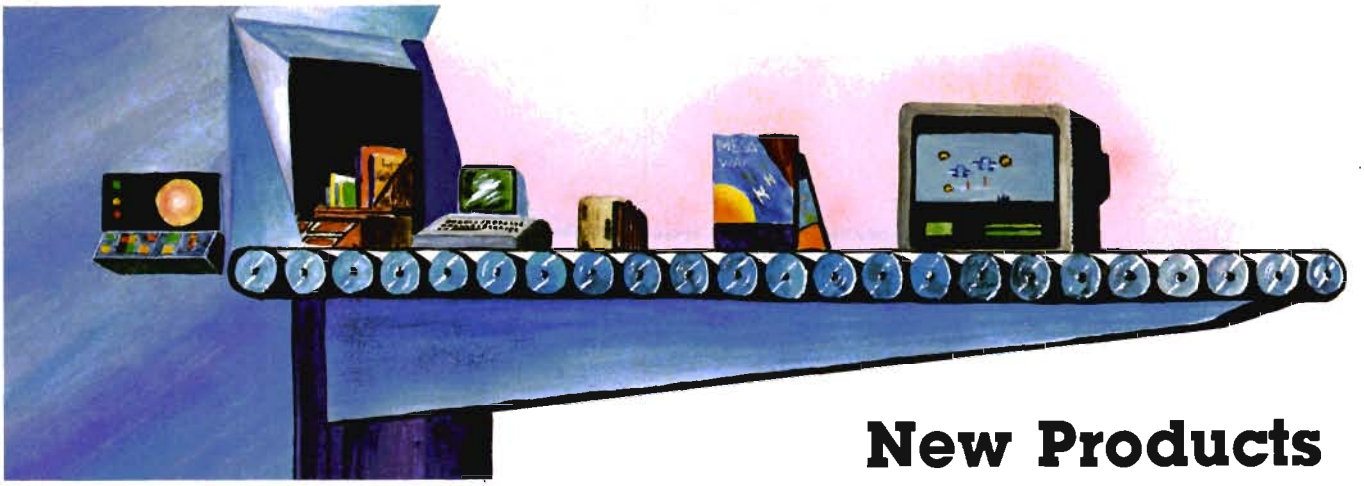
The module contains a built-in vocabulary of 235 words in a realistic female voice. The voice can be user defined to slow, normal, or fast and can be programmed directly from Basic and/or Assembler. The user can program music, graphics, and speech simultaneously. The Speech Module also supports a separate audio out so that the user may connect the speech output directly to a hi-fi system, a television, or a color monitor. Future projections include, spelling, counting, and foreign languages. (See page 63 for further details.)

Commodore has again added to its business machines by developing a new portable briefcase computer. Designed for the traveling business person, the Executive 64 has 64K RAM, a full upper/lower case low-profile detachable keyboard, built-in 6 inch color monitor, and a built-in floppy disk drive with 170K capacity—a second drive is optional. The unit weighs 27.6 pounds and is 5 x 14½ x 14½ inches. It is also compatible with the VIC-20 and C64 peripherals including telecommunications. Obviously, it is priced less than $1,000.

The last of the Commodore advances is in print form. The **3rd Edition of The Commodore Software Encyclopedia** is available for the general public. The new catalog contains over 800 pages and lists nearly 2,000 items for Commodore and non-Commodore software. It is the most comprehensive single software reference for Commodore computers, according to Commodore.

Commodore Business Machines has uncovered a massive plan to become the number one home computer business in the world. They have extensive and all encompassing advertising plans; their sales are up and are staying on a definite incline. Will there be a ceiling, though? With all the companies that they are contracting, will the software business reach a wall and the smaller companies become choked out because of this Commodore onslaught?

As the show came to a close, the future was to be realized. By Christmas, many of the companies promised new products and lower prices for their dealers. Perhaps T.S. Elliot said it best: 'In the end is my beginning.' At the end of the show was the beginning—with new companies to watch and established companies to watch out for. The next CES is scheduled for January 7, 1984 in Las Vegas, Nevada.□



New Products and Product Announcements from CES

C-1520 Plotter Printer

VIC-20/C-64

General Description:

The Commodore 1520 Plotter Printer is an 80 column graphics printer which connects directly to the Commodore 64 or VIC-20. It has the ability to create bar charts, pie charts and graphic illustrations with four available colors.

Specifications

- connects directly to Commodore VIC 20/Commodore 64
- four colors (black, blue, green, red)
- plotter speed of 264 steps/second (one step is equal to 0.2 mm along x-y axis)
- 96 characters (averages 14 characters/second)
- handles graphic characters
- uses standard 4½" paper
- 80 column
- water ink ballpoint pens
- drum type x-y plotter

Commodore Computer, 1200 Wilson Rd., Westchester, PA 19380; 3370 Pharmacy Ave., Agincourt, Ontario, Canada, M1W2K4□

ProAdventure I: Gothmog's Lair

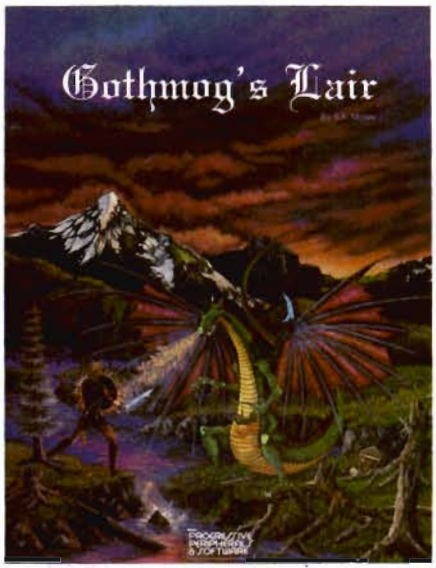
Commodore 64

Journey through forests, a swamp, the haunted mansion and its dungeon in your quest for the fabulous Arkenstone diamond, one of many treasures hidden in Gothmog's vast world. Battle with the dreaded Giant Spider and Baron Ahriman's undead army... can your gnome friend help you outwit the Old Man or recover the chest of antique coins from a shark-infested lake? You may even find the enchanted elven sword and slay Gothmog himself! But don't let the Thief and Cutthroat get to the treasures before you do!

Your Enemies: Thief, Cutthroat, Igor, Evil Spirit, Giant Spider, Swamp Demon and the "Graveyard Shift": Vampire, Mummy & Zombie.

Gothmog's Lair features full-color animated graphics, sound effects, and two selectable levels of play—for the novice and the seasoned veteran. It's a "real-time" adventure...the longer you take to find the treasures, the more time you allow the Thief and Cutthroat to get them before you!

A thoroughly illustrated manual with a fold-out map is provided to explain the wide variety of options available to you during play. Your success in Gothmog's Lair will depend on your skill and resourcefulness, NOT on your



luck at guessing the right words to say.

Prepare for one of the most challenging adventures you wil ever undertake as you enter...

Gothmog's Lair

cassette version $39.95
diskette version $39.95

Dealer inquiries invited.

Order from: Progressive Peripherals & Software, 6340 West Mississippi Avenue, Lakewood, Colorado 80226, (303) 778-1312□

Starlighter

Description

VIC-20

What we have created here is a new breed of stage lighting controller. A sophisticated, computer assisted, phase control system with more features and capabilities than thought possible in such a compact unit. And probably most important of all, brought it within the reach of many performing artists. Through the use of readily available equipment and the development of highly efficient machine language software, reliability have been enhanced to an almost unheard-of level. The unit comes ready to run, yet still allows for user programmability.

The control program is entirely contained in ROM (read only memory). The user need not load any information from tape or disk to begin controlling lights. The program begins running automatically upon power up. The unit controls 32 channels and has up to 120 scenes on line at a time: 80 pre-programmed in resident ROM and 40 programmed into RAM (random access memory) by the user. The RAM scenes can be saved to cassette tape or to floppy disk for later recall.

Fade times between each scene are programmable from 0 to 60 seconds. Further analog control is provided by the "SPEED" control allowing for fades up to two minutes. Each channel can have its own individually programmable fade rate within each scene. Any fade can be temporarily "frozen" or totally aborted at any time during the fade, and fading itself can be enabled or disabled at any time.

In manual mode, numbered keys 1-32 select individual channels, rather than the scene number. Each channel's light intensity and fade time can be programmed for later recall. RAM scenes are automatically stored upon exiting manual mode.

An entire set can be programmed and stepped through automatically or by manual advance. Three cue loops (40 scenes each) can be entered, paused, resumed, and reset, at any time with one keypress.

A ten scene chaser program further enhances the system. This is no ordinary chaser in which a few preselected channels are pulsed in sequence. The chase buffer can be programmed with up to ten **scenes**. When the chaser is invoked it will then sequence from scene to entire scene. The chaser may be stepped with any one or a combination of three control signals. When in the chase mode, the "SPEED" control affects the speed of the chaser. Auxiliary mode allows an audio input or footswitch to step scene changes. At any time, the "STEP" key will manually pulse the chaser to the next scene. Fades can be enabled or disabled during a chase to create varying effects: from a stark pulsing chase...to a smooth, undulating, wave-like chase.

A full color video display pro-

vides a simultaneous graphic representation of all activity. The current light level of each channel is displayed in percent of light level (0-99). When in manual mode, the fade time for the current working channel is displayed in seconds and tenths of seconds. The scenes currently stored in the chase "buffer" are displayed for recall and/or update. Further information regarding fade mode, 'speed' control

toggling frequency, and audio sensitivity is also shown. All information is continually updated in real time.

An important new feature of the Starlighter is its softstart dimmer control signals. This is a software generated program which briefly pre-warms the lamp filaments before allowing them to go to a bright level. This greatly enhances bulb life and helps prevent triac failure.

A dual output signal structure affords compatability with virtually all dimmer packs commercially available. The standard Starlighter controller board puts out a 15 milli-amp current pulse proportionally synchronized to the AC line frequency. This signal can directly drive optically isolated triacs. The needed power circuit can then be quite simple and relatively inexpensive. Reliability is enhanced due to the lack of complex electronic circuitry, and dimmer response is 100% uniform between channels.

The Starlighter low voltage control board puts out a DC proportional control voltage. While the standard is 0-10 volts, both minimum and maximum voltages are adjustable to accommodate dimmer packs from many manufacturers. This system is compatible with single phase, split-phase, and three phase AC line frequencies.

Custom splits between the two output configurations, unusual line voltages/frequencies, and custom cables will be available on a special order basis. In addition, custom PROMS can be programmed to each user's unique application.

Specifications

32 Control Channels, 120 Scenes: 80 preset, 40 programmable

* Individually programmable levels and fade times.
* Fade times from 0-120 seconds.
* Three 40 scene cue loops with automatic or manual advance.
* 1-10 **scene** chaser: sequences all 32 channels at once.
* Audio input for chaser advancing.
* Long term storage on cassette or floppy disk.
* Real time and pre-event color video display.

Starlighter Controller $995
Low Voltage Adaptor $295
100' Control Cable . . . . . $195 +

Progressive Peripherals & Software, 6340 West Mississippi Avenue, Lakewood, Colorado 80226, (303) 778-1312□

Introducing PQ/64 Add the Power of a PROMQUEEN to the Commodore C-64 ($299)*

All the features of our VIC PROMQUEEN * plus much more:

— 28 pin Textool ZIF socket. Simulated plastic case.

— Matrix switch EPROM type selection accommodates all JEDEC pinout devices that work on 5 volts. The cartridge reads, runs and programs 2716, 2516, 27C16, 2732, 2732A, 27C32, 2532, 2764, 2564, 27128 devices, as well as future devices such as 27256. No personality modules are required. The unit also programs and erases such EEPROMS as the 4016 (Hitachi).

— RS-232 communications software included in package, uploads and downloads code to and from RS-232 systems.

— New faster burn process with special erase check that allows programming of devices if no zeros must be changed to ones. Allows use of faulty devices and recharging of previously programmed devices.

— New burn test procedure allows previously programmed devices to be checked against a standard quickly, or EPROMs to be checked for erasure quickly.

— New larger code workspace accommodates 24K in RAM.

* The **PQ/64** does not include MIMIC mode.

Available June 1983.

* Prices subject to change.

Gloucester Computer, Inc., One Blackburn Center, Gloucester, MA 01930, (617) 283-7719.□

Rabbit Base, A Data File Manager For The Commodore VIC-20, Introduced By Computer Software Associates

Computer Software Associates, manufacturers of computer software packages, has introduced RABBIT BASE, a cassette-loading data file manager that is compatible with the Commodore VIC-20 with 16K RAM expansion. The suggested list price is $24.95.

This extremely versatile data file manager allows the user to sort entries, add, delete, change and fast-find items. Built-in features include an error checking routine and a crashproof code. Documentation is included with the software.

According to Robert Shapiro, Executive Vice President of Micro Software International, the exclusive marketing and distribution firm for CSA products, "RABBIT BASE is a user friendly program that allows even the novice computerist to follow the simple screen prompts without prior experience."

Together with CSA's other business, educational and game programs, RABBIT BASE will be marketed through Micro Software International's independent rep network in the U.S. For additional information, contact Micro Software International, 50 Teed Drive, Randolph, MA 02368, (617) 691-5700.□

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Commodore 64 is a trademark of Commodore Electronics Limited
Script 64 is a trademark of Richvale Telecommunications

Circle No. 11

New Briefcase Computer Expands Commodore's 64 Line

Commodore Business Machines, Inc., has introduced a portable computer designed for the traveling businessman. Designated the Executive 64, the new portable has 64K RAM, a full upper/lower case low-profile detachable keyboard, built-in 5-inch color monitor, and a built-in single floppy disk drive with 170K capacity—a second drive is optional. The new unit weighs 27.6 pounds and is briefcase size —5" x 14½" x 14½".

The Executive 64, a member of the Commodore 64™ family, is fully compatible with VIC 20™ and C-64 peripherals, including the VIC modem for telecommunications. External ports allow full-sized monitor and graphic printer hook-ups.

Using a Z-80 cartridge, the Executive 64 can accommodate a CP/M® operating system or, with a PET Emulator, the system can use much of the available PET software. Moreover, the Executive 64 can use the large number of game cartridges available to the 64 family of computers and has full music and sound capabilities.

Resident in the unit's ROM is BASIC V2. Other high level programming languages include PASAL, LOGO, COMAL, ASSEMBLER and PILOT. Additionally, the Executive 64's 6510 central processor is 6502 program compatible.

The Executive 64 retails for $995 at selected Commodore dealers and retailers.

Commodore Business Machines, Inc. is a wholly owned subsidiary of Commodore International Ltd. (NYSE:CBU), a fully integrated manufacturer of advanced microcomputer systems, consumer electronic products, semiconductors and office equipment. Commodore markets the Commodore VIC 20™, Commodore 64™, PET®, CBM® and SuperPET™ computer systems and software to major accounts and stores.□

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* Meaningful repetition to "lock in" skills.
* Reinforcement and motivation to the learner.
* Teaches students to eliminate guesswork and substitute reasoning.
* Rules can be presented in sequence or separately.
* Whenever relevant, exercises are presented to compare two or more spelling rules.
* Teaches many additional language skills.
* Allows each student to progress at own pace.
* Correct answers and summary of performance with option to continue are available on request.

Purchase the complete program for $199. Each rule consists of 4 to 6 tapes. Individual rules can be purchased separately.

The program will run on any 40-column PET, old or new, or COMMODORE 64.

Send for details: SLED SOFTWARE, P. O. Box 16322, Minneapolis, MN 55416, Telephone (612) 926-5820.□

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Circle No. 10

SAVE

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1782 Marietta Blvd., N.W., Atlanta, Georgia 30318

Everything you need to support your commodore VIC20

Cardco, Inc. CB/6 Cardboard/6	66.00
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Cardco, Inc. CE/1 Cardette/1	26.00
Creative Software Decision Maker/tape	12.25
Creative Software Loan Analyzer/tape	9.50
Creative Software Car Costs/tape	12.25
Creative Software Home Inventory/tape	12.25
Creative Software Choplifter/cartridge	31.50
EPYX 126 C Invasion Orion	16.00
EPYX 237 D Upper Reaches of Apshai	12.00
EPYX 436 C Crush, Crumble & Chomp!	18.00
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HES C304 Hes Writer	25.00
HES C305 Aggressor	25.00
HES C307 Shamus	25.00
HES C308 Protector	27.50
HES G213 Torg	12.00
HES G214 Raid On Isram	13.00
HES C310 Robot Panic	24.00
HES C312 Gridrunner	24.00
UMI 1604 Spiders of Mars	27.00
UMI 1635 Outworld	27.00
UMI 6611 Amok	17.00
WICO 15-9714 Joystick	21.00
WICO 72-4545 Commodore	47.00
WICO 15-1756 12'-0" Extension Cord	4.75

Maxell. Mini-Disks. 5¼".

MD-2D Double sided, double density. For use on TI, Shugart or equivalent (10 pkg.) $47.50
MD-1 Single sided, single density for mini floppy disc drives (10 pkg.) $33.50

Cardco, Creative Software, EPYX, HES, UMI, WICO, Romox.

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CM6- B

Circle No. 59

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Circle No. 76

Cardco, Inc. Releases Two New Printers

VIC-20/C-64

Designed to work with the VIC 20 and C 64 computers, both of the new printers from Cardco are complete with the well proven "CARD/PRINT" interface installed internally. Both units will be available by late summer from selected computer dealers that carry the Cardco product line.

The "CARDPRINTER/LQ1" is a letter quality daisy wheel printer that prints at 14 C.P.S. in either red or black. It includes bold, shadow, or underline printing in normal or proportional modes of 10, 12, or 15 C.P.I. The suggested retail price will be $599.95, and options will include a tractor feeder for $149.95, a cut sheet feeder with a capacity of 200 sheets for $199.95 and a keyboard for direct printing for $199.95.

The "CARDPRINTER/DM1" is a small dot matrix printer (impact type not thermal) that will print 40 columns of text on standard 3 inch adding machine roll paper. The printer will feature a print speed of 50 C.P.S., full Commodore graphics, full high-res dot addressable graphics and printing in either red or black (using two color ribbon provided) under software control. The suggested retail price for the "CARDPRINTER/DM1" will be $149.95.

For more information, contact Cardco, Inc., 313 Mathewson Ave., Wichita, Kansas 67214, (316) 267-6525.□

MicroSpec, Inc. Announces 6 Serious Applications for the Commodore 64—

***DATA BASE MANAGER**—Create and manage a user defined data base with an incredible 1200 records per diskette and 18 fields per record. Full editing capability. Powerful three level search and two level sort capability on any fields. User definable reports make it possible to define both the content and format of the output, making it possible to even print mailing labels. True random access file structure, non-destructive input routines, plus much more.

***INVENTORY MANAGER**—Manages an inventory of up to 1200 items. Maintains product code, description, quantity on hand, cost, sales price, and reorder points for all items in inventory. Prints suggested reorder report, comprehensive sales report, inventory status report, shrinkage report, and price lists. Also prints out physical inventory report in sort sequence to speed actual inventory counts. True random access file structure.

***PAYROLL MANAGER**—Manages an employee file for up to 100 employees. Full editing and scanning capability. Enter regular and overtime hours and the system calculates FICA and Federal Income tax, prints checks, prints payroll journal with department and company subtotals, and posts weekly payroll figures to QTD and YTD figures. Accepts non taxable pay and tracks three user defined payments or deductions per employee.

***MAILLIST MANAGER**—Manages a maillist of up to 1200 company names, names, and addresses. Full editing capability. Searches and sorts on any field. Prints labels from 1 to 4 wide. Each record in addition includes a remarks and selection field to limit mailings to a predetermined subset. Also includes file list capability. True random access file structure.

***GENERAL LEDGER**—Allows you to define your own chart of accounts and statement formats with up to 150 accounts. The system includes budget functions and prints a comprehensive budget report, current balance sheet, income statement, and update reports for audit purposes. Simple double entry system insures precise balancing of accounts. Fully integrative Accounts Payable Manager and Accounts Receivable Manager available soon.

***CHECKBOOK MANAGER**—Manages your financial position for both personal and business requirements. Allows you to define 20 each budget and income categories. Keeps track of up to 200 outstanding checks at any given time. The system reconciles your monthly financial statement and in addition tracks your expenses on a quarterly and yearly basis. To keep you from being smothered by an avalanche of figures, the system can even generate a bar graph which shows your budget guidelines against your actual expenses to visually help you manage your finances on a monthly, quarterly, and yearly basis.

All Programs come packaged in an impressive leather look binder and are accompanied by thorough documentation. Prices range from $54.95 to $99.95.

For more information, see the advertisement on page 164.□

Commodore's Magic Desk... A New Direction For Home Computer Software

Commodore 64

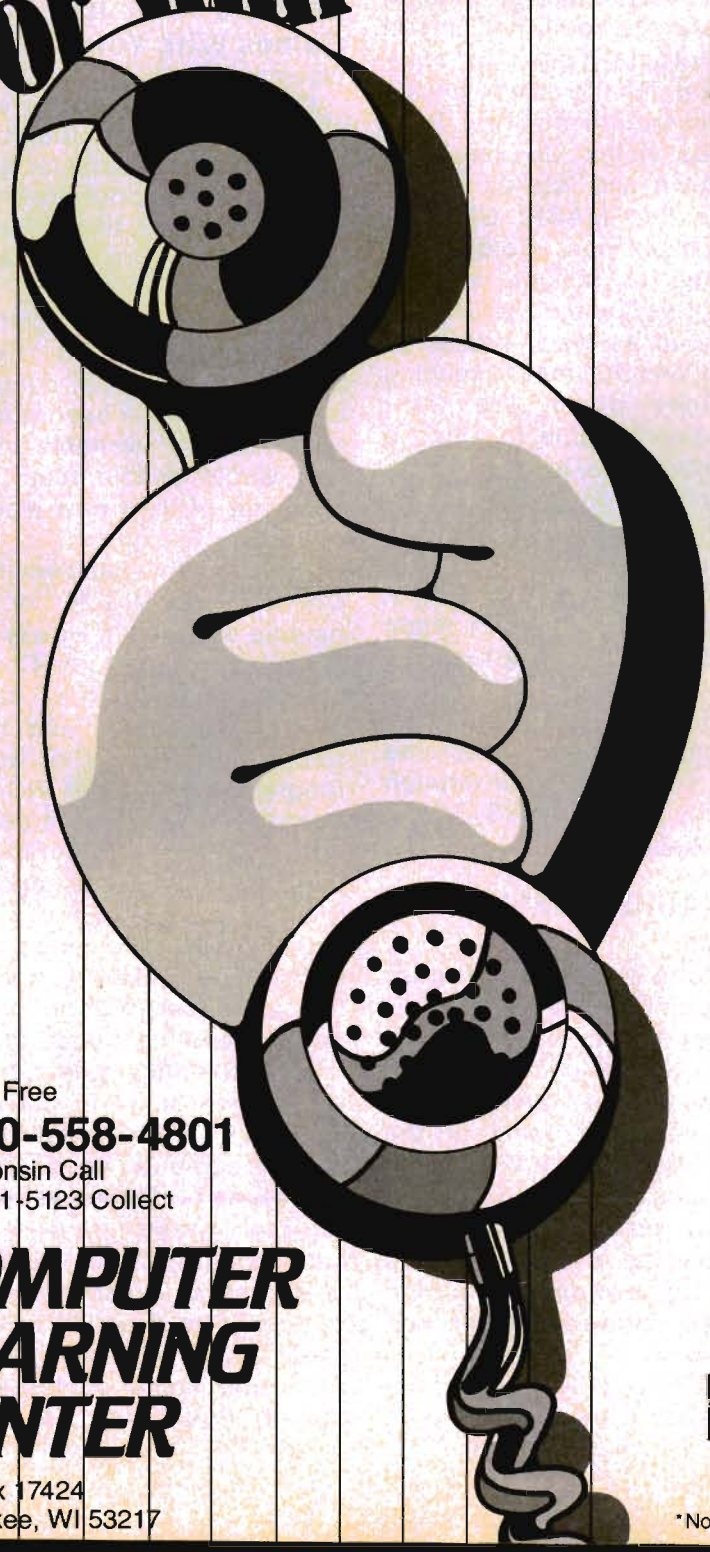
"Commodore's new MAGIC DESK™ software series is an entirely new direction for home computer software."

With those words, Commodore Software President Sig Hartmann introduced the new "MAGIC DESK" software series for the COMMODORE 64™ color computer. He made the announcement at a press conference held at the Consumer Electronics Show June 5, in Chicago.

"MAGIC DESK is unique for the home market," Hartmann said. "Imagine an animated, full color desk on your television screen. There's a typewriter, index file, telephone, calculator and financial journal on the desk, and a wastebasket under the desk. There's also an artist's easel and a vertical file cabinet with a digital clock on top of it.

"To use any feature of the MAGIC DESK, you can use a joystick, trackball or mouse to move a pointing finger to one of the objects on the

Order Up Some Proven Performance For Your Commodore 64.



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screen. For example, to use the typewriter, move the finger to the typewriter and press the 'fire button'. The rest is magic!"

Hartmann said the first package in the series is called "MAGIC DESK I -Type and File" and comes in plug-in cartridge for the COMMODORE 64. The cartridge activates the typewriter, index file and related editing and filing features of the animated desk. Future packages will provide calculating and budget capabilities, artistic and educational applications. Delivery of MAGIC DESK I is scheduled for early fall.

Pictorial Metaphors Make MAGIC DESK Multilingual

MAGIC DESK is a truly multinational software package because it uses NO LANGUAGE INSTRUCTIONS. All instructions and menus are PICTORIAL, using symbols which Commodore calls "metaphors".

It doesn't matter if the user speaks English, Spanish, French, or any other language, because the metaphors make it easy to use the MAGIC DESK. Hartmann said Commodore's definition of a "computer metaphor" is a "pictorial symbol which represents a specific computer function". Computer metaphors control all aspects of the MAGIC DESK program, from selection of features to individual menu items. International symbols have been used where appropriate.

"An example of a MAGIC DESK metaphor is the picture of a scrolled sheet of paper which appears at the bottom of the screen when you're using the typewriter," Hartmann explained. "After you've typed a page, you can move the pointing finger to the scrolled sheet, pick it up and move it to the file cabinet. There are 3 file drawers, with 10 files in each drawer and 10 pages in each file. You can give the files any titles you wish, and move the pages you've typed from one file to another, or copy the pages into several files. All of the pictorial files you see on the screen are linked to a Commodore floppy disk drive, which actually stores the information. You can print out the information on a Commodore printer or printer/polotter, just as easily."

MAGIC DESK Targeted Under $100

Commodore plans to price the MAGIC DESK series under $100 per cartridge, in keeping with the pricing on all other COMMODORE 64 software.

"We are constantly improving our ability to produce software in ROM cartridge form, not only in quality but also in quantity," Hartmann said. "Being able to design and manufacture our own ROM cartridges helps us keep our costs down and lets us market products like MAGIC DESK at prices people can afford. We're committed to making state-of-the-art software products available to as many people as possible, and that means keeping the prices down. We want everyone to be able to afford a computer system, including hardware, software and peripherals."

He added that MAGIC DESK I will be the first Commodore cartridge which contains a 32 K-byte program on ROM. It was made possible in part by the fact that Commodore is "vertically integrated", which means the company designs and manufactures its own computer chips through its wholly owned MOS TECHNOLOGY subsidiary.

Future MAGIC DESK Products

Hartmann declined to discuss future products in the MAGIC DESK series, but said the next cartridge will include calculating and home budget features.

He pointed to some of the "clues" contained on the MAGIC DESK itself (telephone, artist's easel) but noted that the metaphors on the desktop can be changed to accommodate a wide variety of software themes and packages.

The COMMODORE 64's sprite graphics allow the programmer to redefine the objects on the desk, he explained. This means that MAGIC DESK programs can put different objects on the desk—for example, an educational program might put ABC alphabet blocks on the desk, or a musical program might put a guitar there. The menu items can be changed in the same way.□

A Program That Lets You Do More Than Just Play Games With Your Computer

VIC-20/C-64

Computer games are great fun, but if you're interested in a personal home computer (or if you've been thinking about buying one), there comes a time when you want it to do more than just blast space aliens out of the sky. A number of home computer owners, intrigued by the possibilities of the computer's capabilities, have been frustrated by the lack of available software that would enable them to get more out of their new electronic wizards.

Until now this has been true for Commodore VIC-20 or Commodore 64 owners. However, one software manufacturer, Computer Software Associates, has addressed this need and has introduced a number of software programs that will let VIC-20 and Commodore 64 owners get more mileage out of their computers.

One of the new packages from CSA is a spreadsheet program (a sort of electronic ledger sheet) dubbed PractiCalc™, which offers a number of functions that cover a variety of situations.

More specifically, let's say that you own a small business, but you don't want to invest in an expensive computer costing several thousands of dollars, yet want to rapidly make budget and business projections, keep track of expenses, investments and inventory. The PractiCalc spreadsheet makes all this possible on the same home computer that allows your kids to whomp

nasties on the video screen. And, if you add a printer, you can get all the information on paper. . . in a matter of minutes. The spreadsheet does all the calculations for you.

Another example: If you're a student, you might want to figure out square roots, exponential numbers or other trigonometric functions. If you're working on a science project in a lab, you can enter numerical data for your experiments and then project results by entering "what if" numbers and formulas.

In fact, this "what if" function of PractiCalc is one of the things that makes it so useful, since it allows you to do all kinds of numerical projections.

To use PractiCalc you need a Datasette recorder or disk drive to load the program into your VIC-20 or Commodore 64, a TV or video monitor and, for the VIC-20 a 16K RAM Card for memory storage up to 600 cells, or a 24K RAM Card for a maximum of 2,000 cells.

Using the 600 cell (16K RAM) format, you can enter from 3 to 100 columns, and from 19 to 200 rows. However, when these are multiplied, the total cannot exceed more than 600. (That's your cell limit, remember!)

PractiCalc was created by Sandow Ruby, President of Computer Software Associates, who holds a degree in computer engineering from MIT. "We noticed that a lot of people wanted their home computers to be more than just toys," Ruby commented. "We realized that one of the most useful tools would be something like VisiCalc, which had been written for the Apple. The biggest difference, aside from the fact that PractiCalc is written for the VIC-20 and the Commodore 64, is the price."

PractiCalc has a suggested list price of $39.95 for either tape or disk version for the VIC-20; $49.95 for the tape version and $54.95 for the disk version for the Commodore 64.

Ruby realizes that price **is** important. "After all," he says, "nobody wants to buy a software program that costs more than the computer."

But the real beauty of PractiCalc is that it's a viable program that makes a home computer a useful and practical tool, and not just an expensive games machine.

For more information, see the advertisement on page 9.□

Leading Edge Products, Inc. Announces Gorilla Banana™ Printer Priced to Make Customers Go Ape!

As microcomputers drop in price, the cost of such vital peripherals as printers looms ever larger in relation to the cost of the microcomputer itself. It is hard to justify the purchase of a $500 printer for a microcomputer costing $300 or less. But a $249.95 printer makes a good deal of sense for such systems—as well as for backup and draft use with systems which already have more expensive printers.

Leading Edge® now offers just such a printer: the Banana™ is a versatile dot-matrix printer designed to sell at $249.95 and is the first product in the company's new popularly-priced Gorilla™ line.

The Banana is an 80 column, tractor-feed printer, capable of printing alphanumerics or graphics on fan-fold forms from 4½ to 10 inches wide. Print speed is 50 characters per second—considerably faster than the speediest typists.

The Banana's print head is of uni-hammer design for greater simplicity and consistency. Characters are printed in a clear, 5x7 matrix similar to that used by many CRT terminals. Normal character spacing is the standard 10 characters per inch, equivalent to pica typewriting, with a maximum 80 character typing line. Double width characters (five per inch) can be substituted under software command from the computer.

Line spacing in letter mode is the typewriter standard 6 lines per inch. Character sets include U.S., U.K., German and Swedish, selectable by software command or dip switch.

The printer also features both a character and a dot-addressable graphics mode, with a density of 63 x 60 dots per inch. Line spacing in graphics mode is reduced to 9 lines per inch to allow graphics characters on adjacent lines to abut when desired.

A Centronics-type parallel interface allows direct hookup to most popular microcomputers, including Commodore. The printer is quite compact (16" wide x 5" high x 8" deep) and weighs just 12 pounds. Power consumption is only 20 watts when printing and 8 watts at idle, thereby ensuring cool operation for longer life.

For more information, see the advertisement on the back cover.□

Broderbund Enters The Commodore 64 Market

Broderbund Software continues to diversify its product line by making four of its best selling titles available for the Commodore 64 computer. The programs are CHOPLIFTER!, SEAFOX, SERPENTINE, and DAVID's MIDNIGHT MAGIC, all available in June.

CHOPLIFTER! by Dan Gorlin (conversion by Dane Bigham) features realistic throttle action as you try to rescue hostages from behind enemy lines in your helicopter. You must fend off enemy jet fighters and air mines above, and tank fire and air-to-ground missile fire below as you try to bring the hostages to safety. The game features truly brilliant animation and realistic 3-D graphics unmatched in the field. CHOPLIFTER! on cartridge for the Commodore 64 carries a suggested retail price of $44.95, and is joystick controlled.

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London Sunday Times March 4, 1983

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SERPENTINE by David Snider (conversion by Mac Senour) is an arcade action game with 20 different levels of challenging play. You are the snake and must get to the giant serpents before they get to you. The snake must protect its young from attack and destroy giant serpent eggs as well. SERPENTINE on cartridge for the Commodore 64 carries a suggested retail price of $39.95, and is joystick controlled.

SEAFOX by Ed Hobbs is an underwater action game with five levels of difficulty. While piloting a submarine you must take on a convoy of enemy ships and its escort at the same time you dodge exploding depth charges, mines and torpedos. You need superior maneuvering ability and courage to survive! SEAFOX on cartridge for the Commodore 64 carries a suggested retail price of $39.95 and is joystick controlled.

DAVID'S MIDNIGHT MAGIC by David Snider (conversion by Martin Kahn) is an award-winning, high resolution pinball game. It features dual flipper control, upper and lower playing levels, tilt mechanisms, roll-over, multiple ball play, and many special effects. DAVID'S MIDNIGHT MAGIC on disk for the Commodore 64 carries a suggested retail price of $34.95.

"Broderbund's committed to making state-of-the-art software in a wide variety of formats," says Doug Carlston, president of the San Rafael, California based software manufacturer. "In light of the growing Commodore 64 audience, Broderbund believes it is important to give our dealers the opportunity to tap this burgeoning market plus give their Commodore 64 customers the opportunity to experience best selling hits from our line."□

Creative Software Announces Nine Titles For The Commodore 64

Creative Software, the largest independent publisher of VIC-20 software in the United States, is pleased to announce its entry into the Commodore 64 market with nine titles.

In keeping with its full-line approach to consumer software, five of the new titles are Home Application and four of the new titles are Entertainment.

The five Home Application titles are translations of the current VIC-20 best sellers: **Household Finance, Home Inventory, Loan Analyzer, Car Costs** and **Decision Maker**. They are all available in tape and disk versions and retail from $14.95 to $29.95. **Household Finance** will also be available in cartridge form for $39.95.

Two of the four Entertainment titles are translations of previous "Top-10" VIC-20 games: **Astroblitz** and **Trashman**. The remaining two Commodore 64 titles are original works: **Moondust** and **Save New York!** All of these titles are in a cartridge format and retail for $39.95.

Astroblitz and **Save New York!** will be shipping on July 1, 1983. All other titles will be shipping on June 1, 1983.

Creative Software, dedicated to publishing a full-line of consumer software programs, was founded in 1978. Its offices are located at 230 East Caribbean Drive, Sunnyvale, Calif., 94089.□

A Database Cartridge For The VIC 20 and C-64 Description

Jini Micro, Inc. announces a powerful yet easy to learn database manager. It's a must for anyone with filing or mathematic operations to perform. You can keep records for home, school, club or the office better and faster than by hand. Mini Jini works with an off-the-shelf VIC-20. By making use of a cassette or disk drive and printer (all optional) you can save lists and print reports or labels.

Mini Jini has a built in calculator that allows you to do billing, checkbook balances, classwork or sports statistics. Find anything anywhere in the file. Mini Jini files are compatible with WordPro™, Busy-Writer™ or Papermate™ word processors. This feature lets you make personalized letters, custom reports or form letters. You can even interchange Jinsam files with Mini Jini.

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Number of Fields 10
Sort (alphabetize) . . . . . By any field
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Print . . . . . Reports and Labels

Requires: VIC-20 or C-64
Optional: Datasette, Disk Drive or Printer (1515/1525, serial or parallel)
Price: $89.95
Also Available: A cassette or disk with 79 different files to help with your record keeping. These files are pre-defined database applications.
Price: Cassette $9.95
Disk $14.95

Available from: Jini Micro, Box 274, Riverdale, NY 10463.□

Computer Software Associates Introduces PractiCalc Plus™ For VIC 20

Computer Software Associates of Randolph, MA, has just announced the availability of PractiCalc Plus, an extremely powerful spreadsheet program for the Commodore VIC 20. Requiring a 16K RAM card expander, this second generation of PractiCalc offers the advanced functions of high resolution graphics and an inherent data base manager.

Available on both tape and disk formats, PractiCalc Plus allows the user to have numbers instantly converted into histograms (bar graphs) by depressing a single key. The bar graphs can then be printed out for inclusion in presentations, etc.

The built-in data base manager that PractiCalc Plus incorporates allows for sort and search routines, arranging data in

numerical or alphabetical order, maintaining and searching files of customers, phone numbers, recipes, etc.

Additionally, PractiCalc Plus performs all the mathematical functions of the original PractiCalc—addition, subtraction, multiplication, division, square roots, exponential numbers and other trigonometric functions.

PractiCalc Plus is ideal for preparing budgets and business projections; keeping track of expenses, investments and inventory; detailing salespersons' activities, etc.

PractiCalc Plus was written by Sandow Ruby, President of Computer Software Associates.

According to Robert Shapiro, Executive Vice President for Micro Software International, distributors of PractiCalc Plus and all other Computer Software Associates products, "PractiCalc Plus is the most powerful spreadsheet program available for the VIC 20, offering features that surpass the higher priced spreadsheet programs, for very modest cost."

PractiCalc Plus carries a suggested retail price of $49.95 in both tape and disk formats.

For additional information contact: Micro Software International, Inc. The Silk Mill, 44 Oak Street, Newton Upper Falls, MA 02164, (617) 527-7510.□

New Programmers Reference Guide Introduced for Commodore 64 Home Computer Users

Commodore Business Machines, Inc. has released the first in a series of manuals being prepared for users of the popular Commodore computers, **THE COMMODORE 64 PROGRAMMER'S REFERENCE GUIDE.** The 486 page manual provides the user with the most comprehensive reference source available on the best-selling Commodore 64 computer. It includes everything from MOS Technology chip specifications to memory maps.

Each section of the book was written by the expert who worked most extensively in that area. It was then tested at nearly 20 different Beta sites. The information provided is repeated on two different levels, one for the novice and another for the experienced user, with all sections color highlighted for easy reading.

The Commodore 64 manual is especially 'user friendly'. It not only provides detailed programming information, but also demonstrates how to use it, with special sections for beginners.

The **Commodore 64 Programmer's Reference Guide** is available at authorized Commodore dealers and in bookstores for a suggested retail price of $19.95.□

HES' Attack of the Mutant Camels™ Introduced—Sequel to Gridrunner™

VIC-20/C-64

Attack of the Mutant Camels™, the next episode in the best-selling Gridrunner™ adventure series, has been introduced for the Commodore 64 and VIC 20 by Human Engineered Software (HES) at CES, June 5, in Chicago.

Attack of the Mutant Camels occurs 100 years after the Grid Wars. The Droids, determined to crush Earth's interplanetary solar power station, have returned to vanquish the defending Gridrunner force and cut off the most vital source of power available to humans.

The stakes of this second space war are increased dramatically by the introduction of the Droids' benign mutant camels. The camels serve to mask Droid attacks upon the power grid. Gridrunner must blast the camels with powerful plasma cannons in order to evade the clutches of devious Snitches and Deflectors and to defend the station from the newly-refined powers of the X/Y Zappers and Pods. Skillful players earn 106 bonus points for each camel they hit.

Developed for HES by 20-year-old Jeff Minter, Attack of the Mutant Camels was inspired by the author's fondness for San Francisco radio station KMEL, 106 FM.

"With 20 different attack waves and more sophisticated weaponry, 'Attack of the Mutant Camels' is an extremely fast-paced, strategy-oriented game," said Michael Humphress, marketing manager for HES. "We haven't seen anyone yet who can surpass the ninth skill level."

Attack of the Mutant Camels is now available for use on the Commodore 64 and VIC 20 for a suggested retail price of $44.95.

HES develops, manufactures and markets a wide range of quality computer software and peripheral devices for the home computer market. HES is headquartered in Brisbane, Calif.□

Commodore Introduces MULTIPLAN for Commodore 64

Commodore announced that it will mass market MULTI-PLAN—one of the finest multiple spreadsheet packages in the industry—for the COMMODORE 64™ color computer.

David Harris, vice president, said Commodore will market MULTIPLAN as a home computer software product.

"The best news is that we will retail MULTIPLAN for under $100," Harris said, adding that all current software for the COMMODORE 64 is priced under $100.

"MULTIPLAN is one of the best professional spreadsheet packages available today," Harris continued. "We are pleased the Commodore and MICROSOFT, Inc. which developed the program, are able to provide this powerful software package for home computer users."

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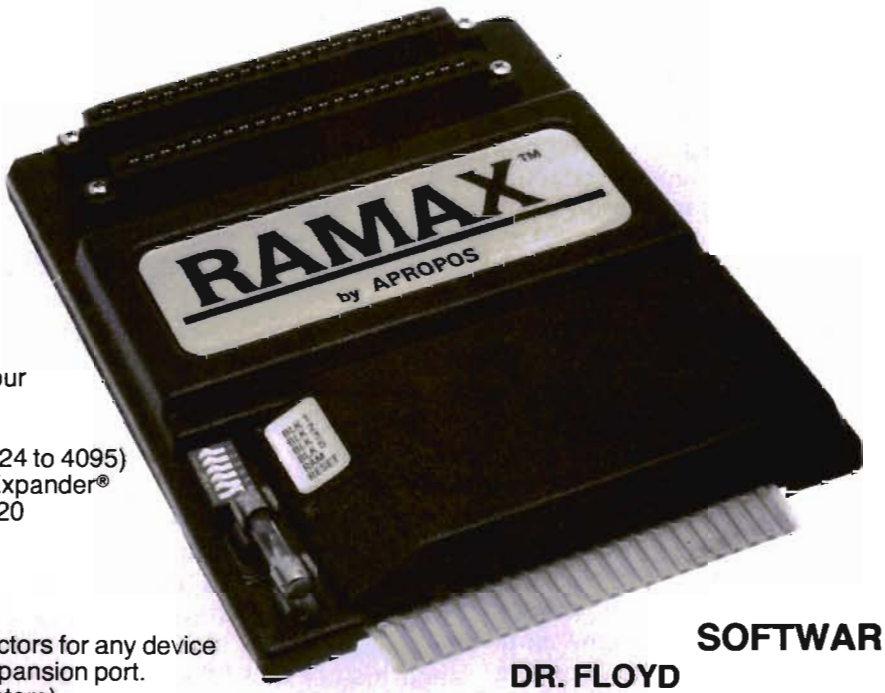

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$14.95 shipping included.

All software is on high quality cassettes and is replacement guaranteed.

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Leading Edge Products, Inc. Introduces Exciting "Trunk" Accessories To Popular Elephant Memory Systems® Line

Four New Storage Units Ideal Gift For Videogame and Computer Enthusiasts

The videogame and software business is exploding and so is the number of cartridges, cassettes and diskettes scattered every which way about the home of the avid consumer electronics enthusiast. Now there is no more excuse for losing these, because Leading Edge® is offering "Trunk" storage units for them at attractive price points. These "Trunks" are ideal for those with a rapidly expanding home software library—who want to ensure that all programs remain within easy reach, and of course, they also make the perfect gifts for the videogame or computer buff.

The four units are the initial entry in the firm's "Trunk" accessories line—designed to complement its Elephant Memory Systems® disks, one of the most popular brands around.

The "Trunks" offer protection from dust and dirt for sensitive game and microcomputer software and have been designed to be attention grabbing, while possessing functional appeal. Constructed out of lightweight yet durable plastic, they also incorporate a built-in carrying handle for maximum portability.

Another unit for games and cassettes carries the same price tag, as does a storage unit that holds up to 60 5¼" disks. The final product, priced at $39.95 holds up to 60 8" disks. (All prices are suggested retail).

For more information, see the advertisement on the back cover.□

PROKEY and PROKEY Deluxe Software Makes Your VIC-20 Act Like A $300 CW Keyboard For Only $20

With our software package your VIC-20 can become a full featured CW keyboard. Our price includes two separate programs. One is designed to run on an unexpanded VIC-20. This program will provide normal CW keyboard sending with a ten character buffer and a visual indication when the buffer is starting to get full. It also provides the capability of storing three regular user programmable messages, which can be changed while the program is running. You can also display the stored messages in order to check them. An abbreviated version of the serialized contest number generator is included. An "electronic notepad" allows you to keep track of the station you are talking to. A single key will send his/her call followed by DE and your call. These features allow you to keep QSO information in front of you at all times.

Program two requires memory expansion in order to load and run. A total of approximately 7K of user memory is required. This program includes all of the features of the basic program with the following additions:

Built in morse code clock—a single key will send the time in morse code.

Real time clock—the time is displayed in most modes in the corner of the screen.

Beacon mode—allows a beacon message (separate from above) to be sent at an interval of your choice—up to 23 hours and 59 minutes. User programs start and stop times or continuous operation. The message and time will be logged on the screen while in the beacon mode to confirm that the unit is functioning.

Logging information—PROKEY Deluxe will display logging information, including start and stop times, call of station worked, name **and** QTH automatically when you end your QSO by sending SK.

Buffered send—allows you to fill the screen with a message if you wish and edit it in any way you desire BEFORE you send it!

Price for both programs supplied on a single high quality cassette tape is $20 which includes all costs for PROMPT delivery of PROKEY and PROKEY Deluxe to you. (Ask our customers how fast we answer orders and requests for information!)

Price reflects software only. An interface to use your VIC to key a transceiver is required and may be driven off the speaker of your TV set/monitor using a circuit such as that described in May 1982 QST page 37. If you prefer TTL interfacing is available through the user port on the VIC. A simple one transistor keying circuit is required for direct interfacing. Full details are supplied with the software. We can also assist in locating the connector for the user port.

Read the review of our competition in the April issue of QST (1983) page 42, then order a truly GREAT keyboard program... PROKEY!

We give you things the competition doesn't: ours 50 wpm plus, theirs 25 wpm maximum. We have a morse clock, beacon mode, contest memory, menu selection, buffer full indication, changeable messages while running the program, buffered sending and more. We give you a code practice program, theirs is a separate program and costs extra.

PROKEY is another high quality program from: Jim Grubbs K9E1, P. O. Box 3042, Springfield, Illinois 62708.□

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Circle No. 9

Leading Edge Products, Inc. Introduces Popularly Priced Gorilla Monitor

Leading Edge products, Inc., of Canton, MA, introduces their first Gorilla Monitor—another product in this fast expanding, high-value computer peripherals line. This high-resolution, green-screen, non-glare monitor carries an amazingly low retail price tag of only $99.00. It also comes with a unique one-year limited warranty.

The 12-inch non-glare screen eliminates annoying reflections. It glows a pleasant green rather than harsh black-and-white—to prevent eyestrain. Special phosphores switch fast, yet flow evenly to prevent eyestrain due to flicker. Scrolling characters (or darting space ships) won't appear smeared or streaky.

The screen is sharp too: with a video band width of 18 MHz or better (roughly 6 times that of ordinary television sets), it can crisply display a full 25 lines of 80 characters apiece—2000 characters—matching virtually all home and professional computers. The clear, crisp display is also ideal for graphics.

Standard, composite-video input allows use with most computers requiring a monitor—or even for video uses where the green tint is acceptable.

The Gorilla monitor is designed for easy installation and comfortable use. A built-in tilt bracket lets the user adjust the monitor to a comfortable and convenient angle.

The monitor weighs 14 pounds, is 11.9"h x 13.6"w x 11.8"d, and consumes only 25 watts of power. It comes with a one-year limited warranty and a suggested retail price of $99.00.

Technical Summary

The Gorilla Monitor from Leading Edge features a 12-inch high-resolution phosphorous tube with a non-glare screen and medium-fast (P31) phosphorous persistence. Video band width is a minimum of 18 MHz (maximum 22MHz) and resolution is a minimum of 800 lines at the center, easily allowing a crisp 80 x 25 character display, or sharp detailed graph. The monitor weighs 14 lbs., and consumes 25W at 120-V. It takes a standard 75-ohm negative sync composite video signal as its input.

Contact Leading Edge or 1-800-343-6833 for more information.□

Human Engineered Software Acquires Rights To Six Hot Japanese Arcade Games

VIC-20/C-64

Human Engineered Software has acquired the home computer rights to six of Japan's hottest arcade games.

All packages will be released in cartridge format this fall under the HesWare label and will be available on the VIC 20 and Commodore 64 computers.

Human Engineered Software's new contracts cover the following products:

—**Rally X** from Namco, the Japanese company that created Pac Man, Pole Position and Xevious;

—**The Pit** from Coin-it;

—**Chameleon** from Jaleco, creators of Pop Flamer;

—**Mr. Jong** from Sanritsu;

—**Mr. TNT** from Telko;

—**Rootin' Tootin**, from Data East, developers of Burgertime.

In recent months, Human Engineered Software has moved quickly into the spotlight as a major, broad line supplier of software for multiple CPUs. Since January, the company has signed numerous agreements to license and market software from other manufacturers. This has included a joint venture agreement with ISA to market the company's full line of products, including the company's much-acclaimed Benji series of educational games; an agreement to license Synapse entertainment products for the VIC 20; and an agreement to license Spinnaker educational software products for the VIC 20 market.

The company has also continued to add new original material to its own HesWare label at the rate of four to six titles a month.

"A lot of software companies would rather concentrate on developing software and leave the marketing to someone else," said Ted Morgan, president of

Human Engineered Software. "We provide that service. HES has a strong sales and distribution organization already in place and we can take over the marketing. By pooling efforts, everyone's dollars go further."

Morgan said Human Engineered Software also helps companies that want to concentrate on one hardware but not lose profit from the sales of this product to other CPUs.

"Our expertise in the Commodore and VIC 20 market allows us to get software up on those machines quickly. We can release good software in a few weeks, extending the profit potential of every game," Morgan said.

Human Engineered Software's agreements with the Japanese arcade game developers again broaden the company's offering for retailers.

"This is the first time games will be introduced simultaneously on four different CPUs," Morgan said. "We have more to offer our dealers than other manufacturers."

Human Engineered Software is located in Brisbane, Calif.□

Are Great Retailers Great Game Players? For The Commodore 64 And VIC-20

To meet the demand for high-quality software for the widely available Commodore family of home computers, Datamost has announced ten software packages at the 1983 International Summer Consumer Electronics Show.

Nine of these programs are for the Commodore 64, and one is for the VIC-20. All are scheduled for immediate delivery and are available in cartridge and diskette versions. Suggested retail prices range from $34.95 to $39.95.

The new computer games for the Commodore 64 include:

...MONSTER SMASH. You and a group of friends are caught in a haunted cemetery after dark. Stop the pursuing monsters by pushing tombstones on top of them, and you can escape. Available on both cartridge and diskette.

...TOPSEE TURVEE. Designed for "younger audiences", this upside-down, right-side-up "3-D-perspective" computer game features two-grid action. Your goal is to fill up the grids with what closely resembles loaves of bread. As you work to fill up the grids, little creatures try to knock you off the grids into the holes so that when you re-appear you are playing upside down. Available on both cartridge and diskette.

...VENUS VOYAGERS. In this space-age game, you're the cadet of a spacecraft and must pilot your craft through tunnels to reach the planet, where a stranded co-cadet awaits rescue. Available on both cartridge and diskette.

...JET BOOT JACK. Collect the magic keys and rebuild an exit bridge that enables you, JET BOOT JACK, to escape from an underground labyrinth on a distant planet. Available on both cartridge and diskette.

...AIR STRIKE. Fly over enemy territory and zap out fuel storage tanks while avoiding defensive missiles. Available on diskette only.

...PAINT WIZARD is a graphics program which lets you "draw" on the computer screen. PAINT WIZARD defines the shape of the "paint brush" you use, and draws straight lines, circles, varied colors, and repeat patterns. Available on both cartridge and diskette.

...ROUNDABOUT, for the VIC-20 computer, uses cartoons and animation in a classic shoot-'em-up adventure. You control a scanning device that circles around the edge of the viewing screen, and you must defend yourself against 24 different moving targets. Available on diskette only for $34.05.□

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Circle No 9

Increase Productivity With Half-Megabyte

Microfazer breaks the conspiracy between a computer and printer by serving as a buffer to take over a printing task without tying up computer time. While Microfazer directs the printer, a personal computer user can continue computing.

This printing enhancer performs the task of a "buffer" or "spooler" without using any of the computer's own memory and significantly increases the productivity and efficiency of microcomputing in an office or home situation.

Microfazer, the first print buffer with a full half-megabyte, turns a "dumb" printer into a "smart" printer with 8K to 512 K RAM.

A half-megabyte (512K) is eight times the memory of most microcomputers and is equivalent to over 250 typewritten pages measuring 8½ by 11 inches.

Now with a new line of Microfazers, Quadram's any-computer-any-printer-buffers can be used with almost any computer and printer, whether serial or parallel.

Microfazer is enclosed in a durable metal case and is equipped with a pause/copy feature allowing additional copies of the buffered information with the push of a button.

LEDs on the front panel indicate pause/copy, ready and error status confirmation. Also, a reset switch is provided to both set the Microfazer and clear its memory. Data rates and handshake signals are user selectable on serial models.

The Microfazer unit is sized to stack with popular modems, disk drives and other peripherals, and some models can plug directly inside or onto the back of the printer.

Memory is expandable from 8K to 512K by plugging in additional memory chips, or by adding a Microfazer expansion board.

Flexibility is inherent in this concept of buffering since Microfazer is not permanently attached or configured for any specific printer, nor is it dependent on any single computer.

Retail prices for the parallel-to-parallel model (including cable) are: $159 (8K), $189 (16K), $225 (32K), $299 (64K), $445 (128K), $895 (256K), and $1395 (512K).

Serial-to-parallel and parallel-to-serial models are: $199 (8K), $220 (16K), $260 (32K), and $330 (64K).

For more information, contact Quadram Corporation, 4357 Park Drive, Norcross, Georgia 30093, telephone (404) 923-6666, or TWX 810-766-4915 (QUADRAM NRCS). Quadram is an Intelligent Systems company.□

Spinnaker Introduces 10 Learning Games For The C-64

Spinnaker Software Corporation announced at the Consumer Electronics Show (CES) that it is introducing 10 learning games in ROM cartridge format for the Commodore 64.

The leading company in learning game software listed the titles as follows: ALPHABET ZOO™, COSMIC LIFE™, DELTA DRAWING™, DELTA MUSIC™, FACEMAKER™, FRACTION FEVER™, KIDS ON KEYS™, KINDERCOMP™, STORY MACHINE™, and UP FOR GRABS™.

"Spinnaker created the learning game category for home computers when it released its first disk products last fall," noted Chairman William H. Bowman. "With this full line of cartridge based software, we are extending this concept to computer owners who do not have disk drives."

Bowman noted further that though the emphasis at CES was for cartridge software, Spinnaker will be introducing important new titles in disk format later in the summer.

"The cartridge format is very important for the mass merchant distribution channel," noted President C. David Seuss. "Many mass merchants will be entering the software retailing business this Christmas, and are interested in having something more than shoot-em-up arcade games. Spinnaker's line of learning software fits perfectly, and the cartridge format opens the doors to more consumers."

Seuss noted that each of the 10 titles introduced will be available for September shipment in time for the Christmas retailing season.

For more information, contact Spinnaker Software, 215 Tirst Street, Cambridge, MA 02142.□

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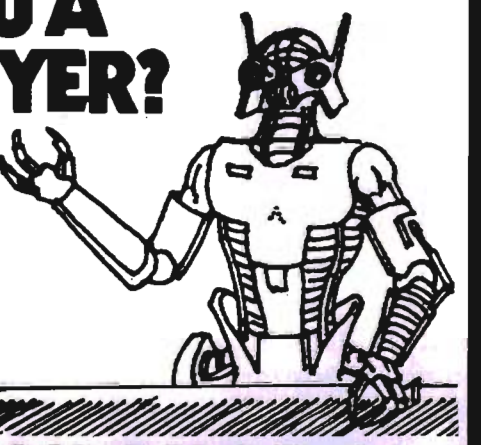

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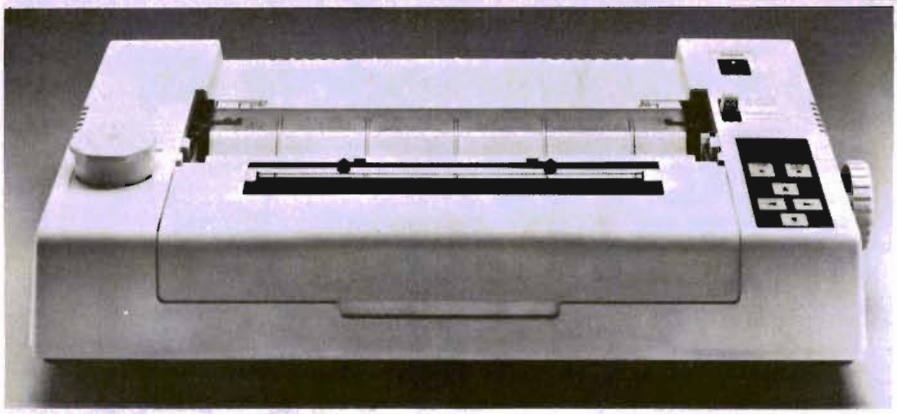

Leading Edge Products, Inc. Adds Fast, Near Letter-Quality C. Itoh 8600B Models to Printer Line

For the past several years, two types of printers—daisy wheel and dot matrix—have dominated the microcomputer field. Dot matrix printers offer speed, low cost and high reliability; daisy wheel and similar "letter-quality" types are slower and more costly, but print with the crispness of a typewriter. Now, a new type of printer is emerging: the multi-mode dot matrix printer which gives the user the choice in one moderately priced machine of clear printing at high speed, or extra clear "near letter-quality " printing at a more moderate rate of speed.

Two multi-mode dot matrix printers have been added to the C. Itoh line offered by Leading Edge Products, Inc., headquartered in Canton, Massachusetts. The two new models are the serial interfaced 8600 BR, and the parallel interfaced 8600 BP with graphics capabilities.

Both models offer three combinations of speed and character resolution: "near letter-quality," at 60 characters per second; "High-Resolution," at a fast 90cps; and high speed "Draft" printing at 180 cps. The matrixes making up each character range in density from 7 x 9 dots in Draft mode, through 13 x 9 for High Resolution, to 13 x 18 in the Near Letter-Quality mode. In all three modes, characters such as "p" and "g" have true descenders and can be underlined.

With standard "pica" spacing of 10 characters per inch, the 8600B models can print up to 80 characters per line. At "elite" spacing of 12 characters per inch, they can print up to 96 characters per line. In compressed mode, 17 characters per inch, as many as 136 characters may be printed on one line. A proportional spacing mode is also available as a standard feature. Line spacing is adjustable in increments of 1/120 inch.

The printers can handle fan fold or single cut sheets of paper in widths from 4½ to 10 inches, including original and up to three carbons. Friction feed is standard, but an optional tractor feed is available. Black or black-and-red ribbons may be used.

The serial model, 8600 BR, includes a 4K input buffer. It is designed for asynchronous, half duplex transmission at speeds of 110, 300, 600, 1200, 2400, 4800 and 9600 baud, using the built in RS232C or 20mA current-loop interfaces. This printer supports X-On/X-Off, Ready/Busy and ETX/ACK protocals. Current loop serial interface is also available standard.

The Centronics-parallel model, 8600BP, includes a 2K buffer and has graphics capabilities. There are two graphics modes available in the 8600B, an 8 dot high resolution mode and a super high resolution 16 dot graphics mode. Both graphic modes offer 16 different variations.

The 8600 BP also responds to most standard ASCII instruction codes, including: CR, LF, VT, FF, CAN, SO, SI DEL, DC1, DC2, DC3, DC4, GS, RS, LUS, FS, and AM.

Both printers are compact, 18.7" wide and 6.7" high x 15" deep and are manageable in weight (30 lbs.). Power consumption is a low 30 watts at idle and only 140 watts when operating.

Suggested retail prices are $1,395 for the 8600 BR, $1,295 for the 8600 BP and for optional tractor, $145.00.□

Broderbund Announces The Release of Three Best Sellers for the VIC-20

If you're the owner of a Commodore VIC-20 computer, you can stop missing out on the fun, games and adventure packed into Broderbund Software computer games.

"Until now," says Doug Carlston, president of the San Rafael, California manufacturer of computer software, "the more than one million owners of VIC-20 personal computers have been unable to enjoy Broderbund's high quality computer releases.

"Attracted to computers and videogames, thanks to the VIC-20's inexpensive pricing, these consumers still want software and videogames that offer them the same graphic creativity and resolution available to owners of more expensive Apples and Ataris," he continues.

"In addition, developing product for VIC-20 users enables Broderbund dealers to tap into that huge reservoir of consumers who've been waiting for high quality games."

Initial game introductions include: A.E., a game to rid the galaxy of pollution controlling stingrays running amok; SKY BLAZER, a shoot-em-up defense game with five different missions, and SEAFOX, a search and destroy submarine game.

The suggested list price of all three of these games is $39.95.□

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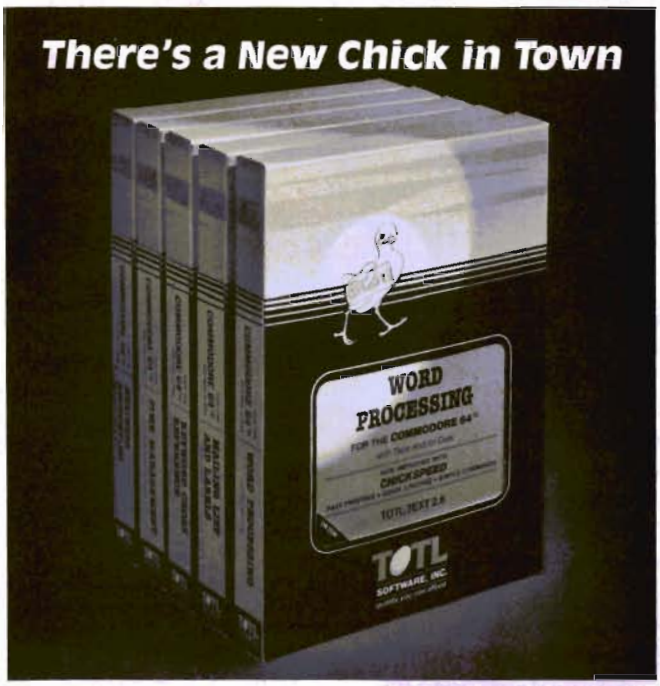

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Arcadeo is proud to present the first issues of Computer Games Guide and Home Video Games Guide. We at Arcadeo plan to bring the computer gamer and home video gamer intelligent, critical reviews on the latest games in a clear, easy-to-read format.

Computer Games Guide covers releases for VIC-20, Commodore 64, and other popular computers. Others may be added soon.

Charter subscribers may receive 12 issues of either edition for only $14.87 or $24.95 for both. Subscriptions received by Sept. 30, 1983, will receive a 13th issue free! Direct all subscriptions to: GAMES GUIDE, Subscription Dept., 6648 N. Newgard Ave., Chicago, IL 60626.□

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Video Command Joystick Controller Now Offers Maze Control

Zircon International, Inc. has introduced two improvements for its Video Command Joystick which will be available immediately.

This uniquely designed, handheld joystick is compatible with Commodore hardware. The Video Command has a reputation for being very responsive, precise and comfortable to hold. It now comes with a chrome ball control knob and detachable Maze Control Collar.

The introduction of the Control Ball is the result of design testing which indicated that most players preferred the ball knob for the greatest feeling of control. The chrome plating offers not only strong aesthetic appeal, but makes the knob more durable.

The Maze Control Collar allows the player the option of eliminating the diagonal

Commodore 6400 Printer

PET

General Description:

This daisy wheel printer Model 6400 is designed for applications requiring high-quality printing. By employing CPU 8085 to perform all controls, it has become possible to make vast reductions in the number of electronic parts, improving reliability. The number of mechanical parts has also been reduced and serviceability greatly simplified.

Specifications

Features

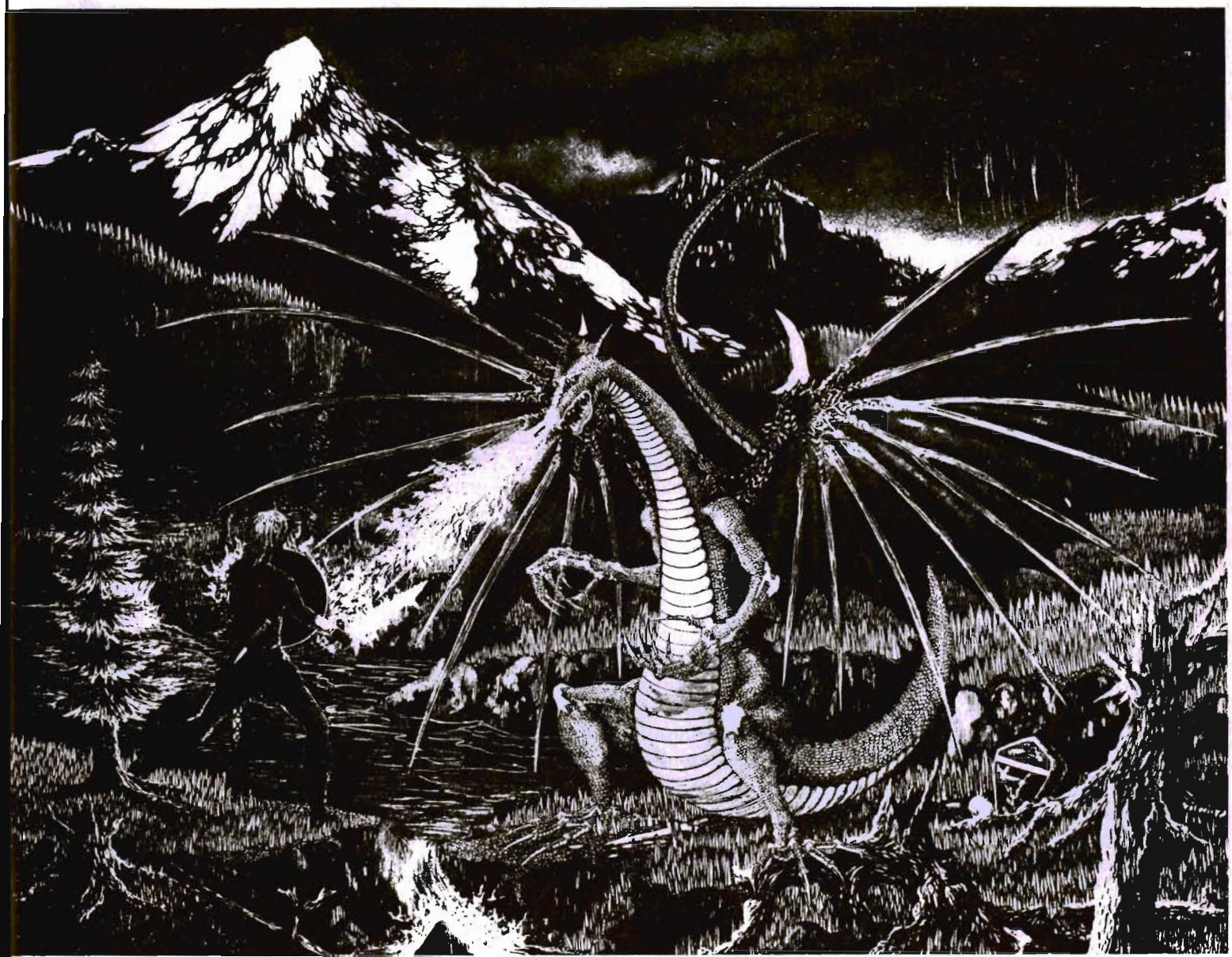
- Precision print wheel control has been achieved by means of a transducer, providing outstanding print quality.
- An integral-constructed frame made by aluminum diecast assured improved maintenance.
- Automatic Self-Test allows for quick and simple detection of printer trouble.
- Automatic print pressure control prolongs print wheel life by varying the printing pressure according to character shape.
- Paper Out detects the paper end, interrupts print operation and lights up the control panel.
- Both serial and line modes are switch-selectable.
- Uses standard Diablo print wheels and cartridge ribbons.
- Print speed (characters per second) 40, CPS—Bi-directional
- Static font impact system
- Number of columns
  136 (Pica pitch)
  163 (Elite pitch)
- Print spacing (min)—1/120 inches
- Line feed spacing (min)—1/48 inches
- Paper width—420 mm (Print area 13.6 inches)
- Cartridge type ink ribbon
- Number of character types per wheel—96
- Standard font—Courier 10
- Interface IEEE-488
- Power source—90-127 Volts at 60HZ
- Ambient condition:

	Temperature	Humidity
Operating	5-36C	10-90% R.H.
Storage	-25-60C	2-90% R.H.

- Noise-Lower than 65dB
- Weight-14Kg (30.8 lbs.)

Commodore Computer, 1200 Wilson Rd., Westchester, PA 19380; 3370 Pharmacy Ave., Agincourt, Ontario, Canada, M1W2K4□

If you like adventure you will love Gothmog's Lair



Journey through forests, a swamp, the haunted mansion and its dungeon in your quest for the fabulous Arkenstone diamond, one of many treasures hidden in Gothmog's vast world. Battle with the dreaded Giant Spider and Baron Ahriman's undead army . . . can your gnome friend help you outwit the Old Man or recover the chest of antique coins from a shark-infested lake? You may even find the enchanted elven sword and slay Gothmog himself! But don't let the Thief and Cutthroat get to the treasures before you do!

GOTHMOG'S LAIR features full-color animated graphics, sound effects, and two selectable levels of play — for the novice and the seasoned veteran. It's a "real-time" adventure . . . the longer you take to find the treasures, the more time you allow the Thief and Cutthroat to get them before you!

A thoroughly illustrated manual with a fold-out map is provided to explain the wide variety of options available to you during play. Your success in GOTHMOG'S LAIR will depend on your skill and resourcefulness. NOT on your luck at guessing the right words to say.

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GOTHMOG'S LAIR

To order, send check or money order to: **Galactic Software**, P.O. Box 10516, San Jose, CA 95157
or phone (408) 274-4434 for COD
or see your local dealer (dealer inquiries invited)

Circle No 18

response when playing maze games. On these games only the X-Y axis is used, and diagonal signals are ignored by the computer. When using a conventional joystick, one can accidently hit the "corners" or diagonals. This slows player response and decreases control. Maze Control prevents the diagonals from functioning giving the player more exacting control in maze games.

The Maze Control Collar snaps on and off easily, making the Video Command Joystick a more versatile controller. Zircon plans to make the Collar available as a separate purchase unit which can enhance earlier Video Command models.

The Video Command Joystick with Maze Control will have a suggested retail price of $14.95. The collar will be available at $1.98.

Zircon is located at 475 Vandell Way, Campbell, CA 95008.□

Four-Color Printer/Plotter Announced by Leading Edge Products, Inc.

Now, even home computerists as well as personal computer users can afford to make professional-looking 4-color graphic printouts with the new $695.00 printer/plotter announced by Leading Edge Products, Inc., of Canton, MA.

The resulting printouts can be extremely detailed: the pen can be moved in fine steps of 0.1 or 0.5 millimeter, less than the thickness of a fine-point ink line. Plotting is also relatively fast: the model CX 4800 can plot at speeds of 120mm per second (4.8 inches per second) for 0.1mm depth and half that for 0.5mm ones. The plot can cover an effective area of up to 192 x 203.2mm (7.6" x 8"). Positioning accuracy is within 1% for a pen shift of 100mm (.04") and within 0.2mm (.0008") for a shift of 50mm (2").

Color changes can be made automatically under command of the user's computer. The CX 4800 model holds four aqueous ballpoint pens, changing them automatically when commanded. Pen position remains accurate within 0.3mm or less after each change (compared to a line width of .012mm) for the pens themselves.

The pens are normally supplied with black, red, blue and green with other colors available upon request. Replacement pens are available from Leading Edge dealers. Each holds enough ink to draw more than 800 meters (2624 feet or nearly 1/2 mile), depending on the environment (less in dry environment, more in human environment) and the type of paper used.

As a printer, the model CX 4800 prints a standard 80 character line with a character size of 2.4 x 1.6mm (.096" x .064", the same as a typewriter with pica type)—at a printing speed of 8 characters per second. A total of 167 key characters are available, including upper and lower case, letters, numbers, punctuation marks, graphic symbols and foreign alphabets. Printing and plotting can be intermixed on the same page.

The model CX 4800 uses both single or fan folded sheets of standard sprocket-feed paper 9.5 inches wide in either the U.S. standard 11" or European style standard DIN A4 length. Paper feed is either manual or automatic under software panel front controls.

For simplicity, the model CX 4800 has six user controls plus self test: four directions controls, switching pen color and line feed. For versatility, it also responds to twenty-eight software commands from the user's computer.

The printer/plotter takes only 14.6" x 10.1" of desk space and stands only 4.68" high. It can operate comfortably at any temperature from 5° to 40°C (40° to 90°F) and at anywhere from 30 to 80% relative humidity.

The model CX 4800 printer/plotter will be available for delivery to LEP dealers by mid June.

ESP PLUS - EMI/RFI Filter Released!

Computer Power Solutions, Inc., Corporate Headquarters, located at 8800 49th Street, North, Suite 203, Pinellas Park, Florida, has released their latest new product, ESP PLUS - EMI/RFI Filter. at the Consumer Electronics Show, in Chicago, Illinois during the first week of June 1983.

Mr. Michael L. Einstein, Vice President, says, "this unique engineering design offers noise filtering protections, as well as transient surge protection for AC power lines." ESP-PLUS is a solid-state clamping device filtering a frequency range of 100K-50M Hertz, 60db maximum noise attenuation, and offers common mode (ground) as well as normal mode (line-to-line) noise protection. The ESP-PLUS exceeds the IEE 587-1980 Guide for surge protection. The unit plugs into any standard three-wire duplex outlet. Suggested retail price is $74.95. Available for immediate delivery from their manufacturing facilities in Pinellas Park, Florida.

For further details call the Florida Plant at 813/544-8804 or at 800-237-6010 (Outside Florida).□

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

Tronix Offers Three Fast-Action Games For Commodore VIC-20 on ROM Cartridge

Tronix Publishing, Inc. now offers three fast-action games on cartridge for the Commodore VIC-20 home computer—Gold Fever!, Scorpion, and Deadly Skies, announced Rick Taggart, director of marketing.

Retailers can order the cartridges now from Tronix's distributors and rep organizations, Taggart stressed.

A major objective of the Inglewood, Calif.,-based publisher is to fill the void for high-quality, fast games for the low-end home computer market, he noted. Founded just nine months ago, Tronix already offers eight games for the Commodore VIC-20 and 64 home computers, he said.

At CES, besides introducing Gold Fever!, Scorpion and Deadly Skies in cartridge format, Tronix displayed Juice, its newest game for the Commodore 64. A conversion of Kid Grid for the Commodore 64 was also previewed by Tronix at CES.

One of the three games being shown at CES in cartridge format is Deadly Skies, a "shoot-'em up" by designer Thomas Kim. The player, equipped with a squadron of five helicopters, fights to destroy an enemy military base.

Each sophisticated, highly maneuverable helicopter must be alert to enemy weapons. These include ground fire missiles, shooting straight out of the cloud layer; smart bombs, tracking the sky for the helicopter; asteroids darting around the skies; and UFOs, traveling through the upper atmosphere dropping bombs.

Deadly Skies, which retails for $39.95, features 32 play levels. As each of the first 16 levels is played, additional objects enter the screen, making each level more difficult. As the player progresses to the top 16 skill levels, action is twice as fast as at lower levels.

Also available now in cartridge is Gold Fever!, designed by Corey Ostman. Here, the player is a gold miner, who must gather all the gold in a mine shaft while avoiding runaway box cars, boulders and claim jumpers. To add to the excitement, the miner must do all this before oxygen runs out in the mine. If the miner does not leave the mine quickly enough, he will die of a lack of oxygen.

Gold Fever! features two alternating mazes. The game has nine skill levels, with more gold and increased action at the higher levels. Gold Fever! costs $39.95.

Scorpion, the third Tronix game in cartridge form, is designed by Jimmy Huey. It pits a scorpion struggling for survival against such enemies as dragons, frogs, venus fly traps, stalkers, worms and pods.

To survive, the scorpion must gather eggs and stun frogs and bring them to its house for food. Scorpion has 32 play levels with four modes: demonstration, easy, normal and hard. It carries a retail price of $39.95.

Each game is supported by Tronix's full merchandising program, which includes high-quality, integrated packaging; comprehensive point-of-sale material and a four-color self-displaying package that holds 12 products, Taggart noted.

More information on the games and other Tronix offerings is available by contacting Tronix Publishing Inc., 8295 S. La Cienega Blvd., Inglewood, Calif., 90301. The telephone is (213) 215-0529.□

Computer Software Associates Introduces "PS", A Programmable Spreadsheet For the VIC 20 and Commodore 64

"PS", the newest addition of the PractiCalc family published by Computer Software Associates, is a programmable spreadsheet that offers users advanced number handling capability. Written for the Commodore 64 and VIC 20 microcomputers, in machine language, "PS" is an extremely fast and powerful third-generation program that has all the features of CSA's PractiCalc Plus (including high- and low-resolution graphics, a data base manager, search routine, alpha-numeric sort, plus math and trigonometric functions) with the ability to han-

Intelligent Software For Commodore Computers

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

dle user-written programmable modules in BASIC. "PS" works on an off-the-shelf Commodore 64 or on a VIC 20 with 16K RAM expansion.

"PS"'s programmable function is written in BASIC so that a user can customize modules to his or her own needs, such as real estate or stock investment planning, for example.

As with PractiCalc Plus, "PS" has 22 mathematical functions that allow a user to do everything from simple calculations and trigonometric operations to planning a long-term budget. "PS" also has a sort feature that will sort words alphabetically, plus move, insert, and delete functions for easy reshuffling of data.

Programmed modules already included in the "PS" program are:

—FLIP, which turns columns into rows and rows into columns with a single keystroke;

—DIRECTORY, which tells the user which programs are stored on disc and how much memory remains;

—ENTRY, for file entry, which permits a user to specify fields and insert or delete them;

—LINEAR EQUATIONS, which computes the solution of up to 20 simultaneous linear equations;

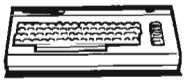
—MAX, which computes by iteration the maximum of a function of up to 20 variables over specified ranges;

—SCALE, which produces scaled bar graphs (histograms) in high or low resolution for any spreadsheet that's been created;

—XPRINT, which allows the user to "break up" the format of the spreadsheet and add text (for messages, notes, for example);

—HELP, a tutorial aid enabling a user to call up "PS"'s menu of commands at any point.

Contact MSI, 50 Tweed Drive, Randolph, MA 02368 for more information.□



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Circle No. 69

Commodore Announces Speech Module For The Commodore 64

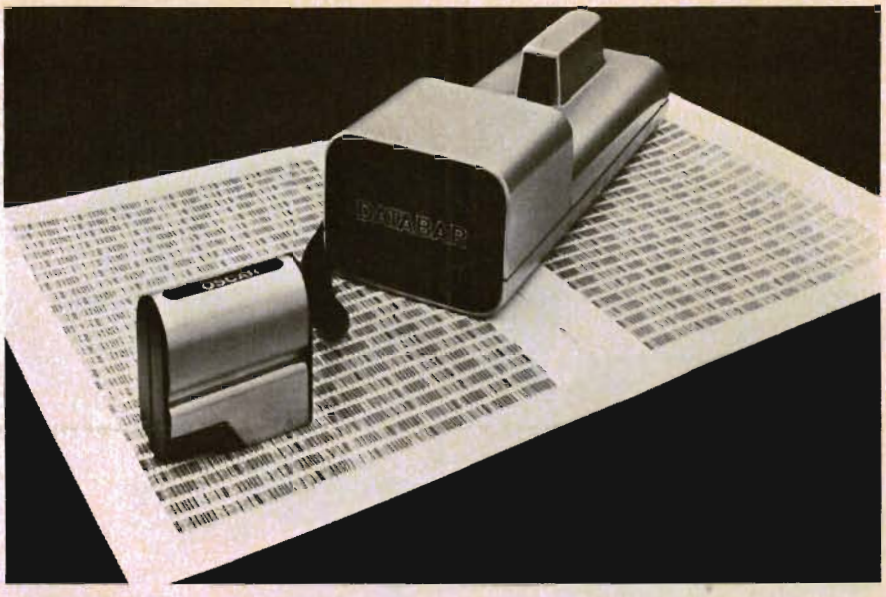
Commodore Business Machines, Inc. has developed true-to-life speech for the Commodore 64™ series of computers. The speech module plugs directly into the user port of the Commodore 64. It contains an additional port into which other "talking" and "non-talking" cartridges can be inserted.

The Commodore Speech Module contains a built-in vocabulary of 235 words in a pleasant female voice. The voice speed can be user defined to slow, normal, or fast. The words can be programmed directly from Basic and/or assembler. The user can program music, graphics, and speech simultaneously. The Speech Module supports a separate audio out so that the user may connect the speech output directly to a hi-fi system, a television, or a color monitor. More words and different voices will soon be available on disk and cartridge.

Future educational applications include the alphabet, counting, spelling, and animals. Higher level applications will include interactive foreign language modules, higher mathematics, and science.

Because the Commodore Speech Module can be made to produce any voice and a wide range of sound effects, game cartridges will take on an even more realistic effect. Two games soon to be released that currently work with the Speech Module are WIZARD OF WOR and GORF. More games are being prepared for release soon. The Speech Module can support game cartridges of up to 128K bytes.

Commodore's Speech Module plugs directly into Commodore's new portable computer, the Executive 64, making it the only "talking" portable on the market.□



DATABAR® Announces Breakthrough For Home Computer Users

DATABAR® Corporation has announced a revolutionary new concept for programming home computers. The new system consists of a compact, low-cost optical scanner (called "OSCAR™" for Optical Scanning Reader) along with a comprehensive program of software support.

One of OSCARS™' design objectives is communication with most of the popular home computers such as Commodore® . OSCARS™' BASIC software will be compatible with this machine, and it will be uniquely formatted in bar code to permit the average home computer user to enter entire programs in times typically less than two minutes.

Suggested retail for OSCAR™ is $79.95, which includes the premier issue of a new monthly magazine that will contain BASIC programs which can be scanned by OSCAR and transferred to computer memory, eliminating keyboard entry.

DATABAR® is also producing an extensive series of BASIC program packages which can be purchased in retail stores for $9.95. Depending on complexity, each retail package will contain from one to three programs. Program categories are: Family Health, Games, Home Business, Word Processing, Education, Math/Science, and General Interest. System hardware deliveries and the first issue of the monthly magazine are scheduled for the first quarter of 1984.

For further information contact: DATABAR® Corporation, 10202 Crosstown Circle, Eden Prairie, Minnesota 55344. Phone (612) 944-5700.□

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Track-Ball From Zircon

Zircon International's President, Robert W. Johnston, announced the addition of a Track-Ball controller to Zircon's growing line of game accessories.

Utilizing new technology, Zircon designers have developed a Track-Ball which provides instantaneous on-screen response over a full 360° field. This offers the video game player maximum control. Zircon's Track-Ball has the quick response of arcade track balls combined with Dual Fire Buttons and a fully Variable Autofire setting.

Track balls operate by reading the speed and rotational direction of a free spinning ball and translating that directly into movement on the screen. Thus, spinning the ball in any direction off center will instantly produce movement on the screen in the equivalent direction. Speed of the object relates directly to rotational speed of the ball—from very slow to as fast as the game program allows. Zircon's Track-Ball combines precisely tooled, high tolerance mechanical roller guides and ball with sophisticated electronic circuitry.

The Dual Fire Buttons are mounted on a recessed ledge thereby offering several significant advantages over earlier designs. First, by mounting the Fire Buttons on a recessed ledge, the hand on the Fire Button is out of the way of the hand spinning the ball. Secondly, by mounting two buttons on the front of the Track-Ball, Zircon has made its Track-Ball equally usable by both right and left-handed players. This is a flexibility not available in much of the existing video game hardware. A third advantage of the Dual Fire Buttons is that they can either be used interchangeably or, for certain Coleco games, the Dual Fire Buttons can function as two independent controls.

Control over firing is further enhanced by the addition of Variable Autofire. The Autofire switch changes the fire buttons from a single shot to an automatic machine gun rapid fire. The Variable Autofire allows a full range of adjustment so that the player can select the rate of fire best suited for the game he is playing.

"We've come a very long way from the early days of home video games when a simple joystick was more than adequate," commented Johnston. "Zircon's Track-Ball continues our commitment to provide players with more responsive and versatile controller hardware."

Suggested retail price for the Track-Ball will be $29.95. The Track-Ball is expected to begin shipping in August.

Zircon International, Inc. is a leading manufacturer in the replacement joystick controller industry. Zircon is located at 475 Vandell Way, Campbell, CA 95008.□

Human Engineered Software Announces Ten Software Titles For Commodore Market

VIC-20/C-64

Ten educational and entertainment software programs for use on the Commodore 64 and VIC 20 home computers have been introduced by Human Engineered Software (HES) at the Consumer Electronics Show in Chicago, June 5-8.

HES acquired the ten titles under joint venture and licensing agreements with three leading software development houses. Under terms of the agreements with the HesWare™ brand name, HES will package and market the following software programs for the VIC 20: Spinnaker Software's Kindercomp™, Story Machine™ and Facemaker™ creative learning programs, and Synapse Software's Necromancer™, Slime™, and The Pharoah's Curse™ graphic adventure games. HES will also introduce the Turtle Trainer™ and Turtle Tutor™ introductory programming packages and the Synthesound 64™ polyphonic music synthesizer.

HES' educational programs are designed to teach children reading readiness, counting, sentence structure and simple computer programming and graphics skills.

Necromancer, Slime and The Pharaoh's Curse involve players in creative game strategy by challenging them to defend truth and goodness against the mystifying forces of evil. Arcade-quality graphics heighten the excitement and realism of these fantasy adventure games.

Designed for children ages five and up, the Turtle Series products introduce the concepts of pro-

cedures, sequencing and Turtle Geometry, and are designed to teach children elementary program and logic skills.

Synthesound 64 turns the Commodore 64 home computer into a two-octive fast-attack keyboard and includes a rhythm unit that can be engaged independently.

"HES' announcement of these ten software title releases at CES emphasizes the company's range of software products to major retailers," said Michael Humphress, marketing manager for HES.

"With these new products, the Commodore owner now has an even greater variety of educational and entertainment programs to choose from," he added.

Companies licensing software to HES include ISA Software, Inc., Synapse Software, Inc. and Spinnaker Software, Inc.□

Market Demand Accelerates Introduction Of Joyboard™ For Other Video Game Systems

Responding to the high level of interest in "The Joyboard™" introduced earlier this year, AMIGA Corporation today unveiled versions of this innovative stand-on controller for other popular home computer systems, now including the Commodore VIC 20.

According to Don Reisinger, AMIGA's director of marketing, introduction of The Joyboard for these other systems was originally slated for early 1984. "We anticipated an enthusiastic response to The Joyboard when we demonstrated it at the New York Toy Fair earlier this year," noted Reisinger. "But with the current interest running far ahead of our expectations, we decided to accelerate the production of Joyboards for these other systems."

With The Joyboard, game play can be controlled using the entire body instead of just the hands, opening up unexplored avenues for video game play. And to complement The Joyboard, AMIGA has developed a complete line of first person video games—from skiing to surfing to body-play party games.

The Joyboard comes with Mogul Maniac™, a first-person skiing/slalom simulation game. Other current game titles include Surf's Up™ and Off Your Rocker™. Other games are under development. Retail price for The Joyboard with Mogul Maniac will be around $50; additional games around $20. The Joyboard will also be actively supported by a major promotional effort that will include national print and television advertising.

The Joyboard can also be used with currently available video games to add an exciting new twist. Used with "Maze-type" games, The Joyboard introduces a whole new control element. Or a conventional joystick can be plugged into The Joyboard and used with "Invader-type" games. Missiles can be fired by pressing the joystick trigger with the hand, and the shooter can be controlled using The Joyboard.

AMIGA Corporation was formed in 1982 by a combination of sales, marketing and technical management talents from both the toy and video game industries. □

PractiCalc 64 Introduced By Computer Software Associates

Commodore 64

Computer Software Associates of Randolph, MA, has recently introduced PractiCalc 64, a highly sophisticated spreadsheet program for the Commodore 64, which offers high resolution graphics and a data base manager programmed into the software.

Available in both tape and disk formats, PractiCalc 64 has a suggested retail price of $54.95.

The high resolution graphics allow the user to create bar graphs from numbers by depressing an encoded key. The graphs can then be printed out for inclusion in reports, presentations, etc.

The sort and search routines of the data base manager allow the user to arrange data in alphabetical and numerical order. Customer files can be maintained and searched, with individual elements sorted for quick reference; phone numbers can be listed, as can test results, high and low scores, etc.

PractiCalc 64 also offers normal spreadsheet functions of addition, subtraction, multiplication, division, square root, exponential numbers and other trigonometric functions. It has more than 2,000 cells available for data storage, which can be arranged in up to 100 columns and 250 rows.

PractiCalc is particularly useful for small business for preparing budgets and business projections; keeping track of inventory, expenses, investments, etc.; projecting results; figuring square roots and other trigonometric functions, or just playing with numbers.

Robert Shapiro, the Executive Vice President of Micro Software International, the exclusive distributors for all Micro Software Associates products, commented, "PractiCalc 64 is the most affordable and powerful spreadsheet program available today for the Commodore 64, offering features that surpass even VisiCalc."

PractiCalc 64 was written by Sandow Ruby, President of Computer Software Associates.

For additional information contact: Micro Software International, Inc., The Silk Mill, 44 Oak Street, Newton Upper Falls, MA 02164, (617) 527-7510.□

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Circle No. 5

Epyx Introduces Licensed "Arcade Classics"

Epyx, Inc. announced that the company will ship six "Arcade Classics" for home computers this fall. The games, licensed from Midway and Exidy, are the first in a new product line—"The Arcade Classics by Epyx." The series will feature classic arcade hits from the past for play on home computers.

Michael Katz, Epyx president and ceo, commented, "Our consumer research has indicated a strong interest in these arcade hits from yester-year. We are delighted to be able to offer them in home computer formats."

The classic titles include—from Midway: **Seawolf II**, featuring the player as the famous submarine captain, and **Gun Fight**, a well-known arcade shoot-out. Licensed games from Exidy include: **Circus**, a one of a kind classic with its bouncing clown, **Spectar**, a battleship maze game, **Fire One**, a submarine chase adventure game, and **Starfire**, an outer space combat game.

Midway's **Seawolf II** is for one or two players and features the player as the submarine captain. Players are awarded points for scoring hits on enemy PT boats, aircraft carriers and destroyers while simultaneously dodging enemy fire. **Seawolf II** emphasizes the genuine sounds of underseas battle with the whoosh of torpedos, sonar warnings and shattering explosions when targets are hit.

In **Gun Fight**, two cowboys square off for the countdown in an effort to be faster than the other guy. Each player has a six-shooter and no extra bullets. The gunslingers can move, dodge and even hide behind a cactus or stagecoach while squeezing off perfectly aimed shots.

Circus spotlights a bouncing clown who is bursting balloons. The player scores points by catching the clown on a spring board and sending him high up into the big top where he can break the balloons. The higher he goes, the more the colorful balloons break. Each time a row of balloons is cleared, music plays. One or two players can participate in **Circus**.

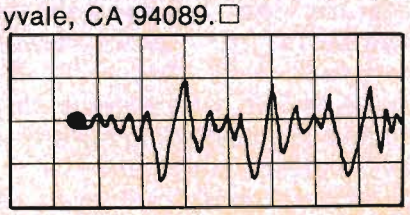
Many of today's popular titles were inspired by **Spectar**. Players score points by clearing a maze while simultaneously avoiding or shooting the enemy Rammers. The player must steer his battleship around on a geometric grid to both avoid collisions with Rammers and to fire at them. The intensity increases each time the old screen is cleared and a new, more difficult one appears.

Fire One is a vintage sub-chase game for one or two players. The object is to sink the opponent's fleet while avoiding his sub. Periscope views show the ships in target and range is determined by the sonar scan which displays all ships. The player may fire when underwater, and dive to escape the enemy.

Starfire is a single player game simulating combat between space-traveling fighters. The player controls the speed and direction of his fighter, and he can attack enemy fighters with his lasers. A message panel at the bottom of the screen provides a long-range scan of the galaxy and indicates the speed, direction, score and ability to fire. Points are awarded each time an enemy fighter is downed.

Shipment dates for the "Arcade Classics" will be this fall.

Epyx, Inc. is a leading independent designer and marketer of computer game software compatible with Commodore computers. The company is headquartered at 1043 Kiel Court, Sunnyvale, CA 94089.□



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CRICKET - From the company that brought you Asteroidz, Munchman and a host of other blockbusters. We now present CRICKET. This is a challenging game with a cast of characters you will love and hate. All you have to do is get Cherp from one side of the road to the river and then across the river. Not so fast though. First you have to figure out how to dodge the traffic and get to the center. Then how are you going to get across the river? Look here comes a log — even a turtle. Hitch a ride across the river and jump from one to the other. Keep a sharp eye out for Ade the Gator. He loves to have crickets for lunch. How many times can you get across the road and river. You will have to work as fast as you can. Time limit and bonus. You will find this game addictive and challenging and it will entertain you with hours of fun and enjoyment. **$14.95**

PARATROOPER

BUG BLAST - If you think Centipede was fun — look out for BUG BLAST. A new and fast action arcade game with realistic smooth action, quality hi-res graphics and trouble. Its very calm as the first wave attacks. Only a few bugs to kill. Just shoot thru the cactus and wipe them out. After a few attacks you feel you have everything under control. Now the attacks really start. Those protection areas have to go. Blast away. Will they ever stop? OK — the BUGS got me this time. Now its my turn, Just one more time — BUG BLAST — Now its your turn to get even. **$14.95**

BOMB'S AWAY - Can you stop him? The crazy bomber drops the bombs from the top of the screen. You get 3 buckets to catch them. Before you know it bombs are falling so fast you wonder when he will stop. Just when you think you have him under control your bucket gets smaller. Is your hand quicker than your eye? **Special $9.95**

PARATROOPER - You are the only one left to stop them. The sky is full of enemy choppers. Paratroopers keep dropping into your area with non-stop barrage of enemy troops. They are out to destroy you. This new game is an unbeatable blend of arcade action and quick thinking strategy. You must make every shot count — don't be to fast on the trigger. Every time you hit a chopper or paratrooper you get extra points. Wait until you see the climax of this game — you won't believe it! This is a multiple skill level game with razor-sharp graphics and sound. **$19.95**

MOW

MOW - Get ready for the fast and furious action of the craziest mower you have ever seen. How much grass can you cut? Joystick moves your mower around as fast as you dare. Watch out for granny's dafodils and grandpa's radio antenna. **$14.95**

COSMIC CRUZER - Bring the coin-op game into your VIC. 3 Scenarios. Your Cruzer moves over a mountainous landscape & into a tunnel of surface - to - air missle, silos and ground - to - air weapons. If you can make it in and out of the tunnel you fly into the asteroid field. Drop bombs and fire missiles at the fuel dumps to keep your fuel supply up. If you are really good you can get to the base and try, to destroy it. We don't know of any one that has hit the base yet. Maybe you will be the 1st. Cosmic Cruzer is a fun filled magnificently rendered home video game that will last for months of challenge. Highly addicting. Hi-Res Graphics, Color & Sound. SPECIAL PRICE - **$14.95**

SPACE PAK - Can you survive? 3 space games with the sights and sounds of arcade games. The excitement builds as the action is un-ending. Blast away at everything in sight. The alien attacks will stop at nothing to destroy you. Prepare for battle, there is no escape, unless you can help. Can you survive? Hi-Res, Color, Graphic & Sound. Joystick or keyboard. **$19.95**

ALIEN INVASION

ALIEN INVASION - Invaders from space are attacking your home planet. Hurry and man your lasers and prepare your robot forces for the inevitable attack of the Alien Invaders. The excitment builds as you command a battery of missile bases in a bunker. Each invader has a laser aimed right at you. Will they ever stop. Only you can save the Galaxy. You can compete with 4 people in the solar system. There are 20 levels of play. If you destroy the Aliens in the correct order you will receive bonus points. Can you get the top score? **$14.95**

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

SNAKE OUT

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

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

CRICKET

PARATROOPER

MOW

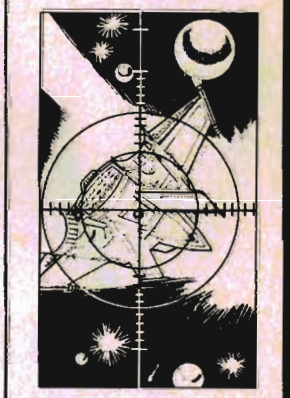
ALIEN INVASION

SNAKE OUT

BUG BLAST

TARGET COMMAND

COSMIC CRUZER



SPACE PAK

HEAD ON

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DATALOCK Digital Tape Now Available

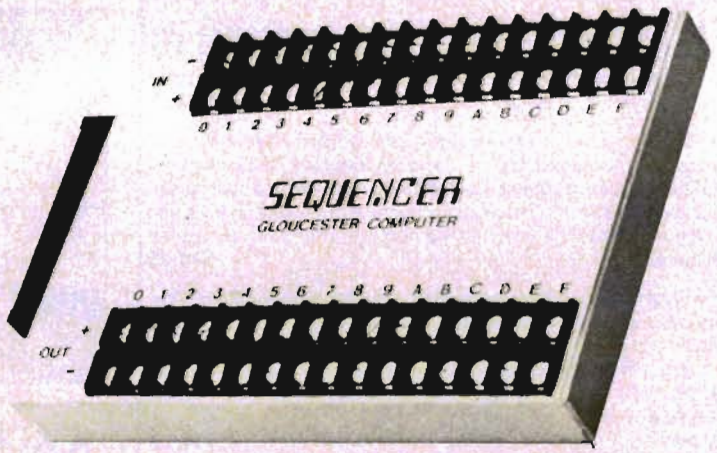
Owners of personal computers who use tape storage can now enjoy a new standard of reliability. NDC, a supplier of digital cassettes and duplication services to many software houses, has released DATALOCK digital tape for use with the Commodore and other brands.

DATALOCK is the highest-quality digital tape available in the U.S., assembled in a premium cassette shell with over-sized pad to insure correct, accurate alignment.

DATALOCK's specifications are superior to audio tape for digital recording: less distortion, cleaner high-end response, higher output ratio, greater reliability, and longer wear.

Prices postpaid for DATALOCK are $3.75 for a single cassette, $5.95 for a 2-pack, and $29.95 for a 12-pack in a smoke-plastic "library case". Dealer inquiries are invited.

For details, contact: Jim Ross, DATALOCK Marketing Director, NDC, 117 West 23rd Street, Independence, MO 64055, (816)254-0400□



Introducing Gloucester Sequencer

VIC-20/C-64

The **SEQUENCER** consists of a hardware package plugging into Commodore VIC-20 and C-64 user ports, and a kit of machine coded software in a ROM cartridge.

The hardware provides 16 independent opto-isolated inputs which detect switch closures etc, and 16 independent outputs which can be addressed individually for control output purposes, and in addition can be allocated to control stepper motors.

The software consists of a Kernal of machine coded routines which enable the user to examine I/O status, set up conditional tests of the inputs (on/off, don't care, and logic of 2 types; "OR" or "AND"), set outputs if condition is true, and vector to service routines as desired. Stepper motor drive software under timed interrupts is also included.

There are also 3 countdown timers with resolution of 1 second and intervals up to 18 hours.

SEQUENCER programs are designed to be loaded from tape or disk. In addition they can be ROMmed by PROMQUEEN and plugged into open slots in the ROM cartridge.

$299. Available July 1983. Prices subject to change.

Gloucester Computer, Inc., One Blackburn Center, Gloucester, MA 01930, (617) 283-7719.□

C-1701 Monitor

VIC-20/C-64

General Description:

The new Commodore 1701 color monitor gives you a superior color picture that enhances your computing experience. This monitor is simple to hookup to your computer and is easy to adjust.

Specifications

- 13 inch screen
- up to 80 column x 25 line display
- full color
- line resolution (320 HLine)
- Plug compatible with VIC 20 and Commodore 64
- Compatible with most personal computers
- Built-in speaker and audio amplifier
- Video recorder compatible

Commodore Computer, 1200 Wilson Rd., Westchester, PA 19380; 3370 Pharmacy Ave., Agincourt, Ontario, Canada, M1W2K4□

Circle No. 33

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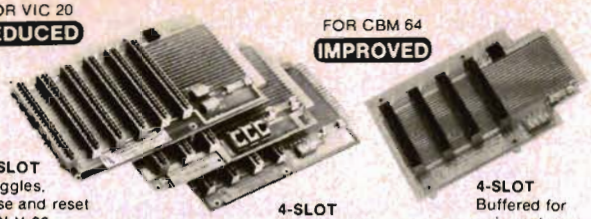

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shown without cover

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Circle No. 3

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Circle No. 80

Circle No. 10

Luna Software, Inc. Announces Two New Game Releases For The Commodore VIC-20 And The Commodore 64

HYPER-HEN: An arcade-style game for the Commodore VIC-20, Hyper-Hen from Luna Software, Inc. is a maze configured chase game which combines joystick finesse with the fear of capture that will send adrenalin levels soaring. Luna's hen attempts to travel the entire maze while avoiding diving chicken hawks, ravenous coyotes, and the mindless yet lethal zompies that wander aimlessly through Luna's space-age barnyard. Five levels of play assure that only the strong survive. Incidentally, the hen gets its name from the fact that if you find yourself caught in a trap between encroaching coyotes, hawks, and zompies you can press the "FIRE" button on your joystick and "HYPER" to another, possibly safer, place on the grid. Suggested retail: $19.95 VIC-20, $21.95 CM/64.

THE FINAL CONQUEST: PHASE ONE—"CARGO RUN": Cargo Run is the first in a series of three "Final Conquest" modules from Luna Software, Inc. A high resolution arcade-style game featuring three separate scenarios. In the first of the three scenes you drive a cargo truck back and forth across the desert trying to catch parachuted bundles from cargo planes cruising overhead. As you collect your freight the cargo planes come faster and faster and enemy jets appear. The enemy starts shooting and it's your job to get your rocket filled with cargo so you can leave the planet. The second scene depicts the space journey and subsequent hazards until you finally reach the heavily guarded refuelling planet; a stop you **must** make or you'll be out of fuel and stranded in space. Good luck trying to land amidst enemy forcefields and droid sharpshooters! Suggested retail: $31.95.

Luna Software, Inc., P. O. Box 26922, San Jose CA 95159-6922, (408) 378-7793.□

Computer Navigation

VIC-20

Celestial Software is packaging navigation programs for popular home computers. Programs include great circle sailing, rhumb-line sailing, dead reckoning, latitude by noon sight, longitude by time sight, star and planet identification, and sight reduction. All seven of these programs are on one cassette tape and come with an 11 page instructions booklet. Available for the Commodore VIC-20 at $19.95 postpaid. Available from Celestial Software, 3010 Warrington Ave., Lakeland, FL 33803. (813) 686-3311. For more information contact Lee Woas at the above address.□

FIVE POWERFUL SOFTWARE DEVELOPMENT TOOLS

Plus The Exciting New Book

INSIDE THE COMMODORE 64™

THE BOOK

A complete clear explanation of machine language, Assembly language, Commodore 64 architecture, graphics, joystick and sound effect programming. Detailed step-by-step guide to the use of the development tools. How to combine BASIC and machine language, make auto-start cartridges, interface with the internal ROM-based programs of BASIC and the Kernal. Sample programs fully explained.

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Make Custom "Video Slides" With Your VIC-20 $20 Complete

We are happy to announce the availability of SAVE PIX/VIDEO TITLIST, a program designed to store and reproduce "video slides" for use as titles for video cassette records, pictures for amateur radio slow scan or fast scan television, store displays, demonstrations or any situation where computerized video pictures might be of use.

No memory expansion is required. Full features are available on an unexpanded VIC.

Included are two data cassette tapes. Tape one consists of SAVE PIX, the program that allows you to make or modify your own video slides, using all of the characters and colors available with the VIC keyboard. This can be as simple as just making lists of credits for TV productions, or a full color picture, limited only by your imagination. Side two contains VIDEO

TITLIST, the program that actually allows you to use your pictures for many different applications. The second tape contains six sample pictures for you to use or modify as you see fit, and to give you some idea of what you can create using SAVE PIX/VIDEO TITLIST.

VIDEO TITLIST will allow you to scroll your picture onto the screen from the bottom or the side of the screen, or "paint" it into place to add interest to your presentation. Additionally, you may display your picture with a continuously scrolling message of your choice across the top of the screen.

A color test bar pattern option is included for adding the professional touch to your video tapes or for testing purposes.

SAVE PIX/VIDEO TITLIST is another high quality program from: Jim Grubbs, P. O. Box 3042, Springfield, IL 62708.□

C-1600 Modem

VIC-20/C-64

General Description:

The 1600 Modem is a 300 baud direct-connect telephone interface, which allows the VIC 20/ Commodore 64 to communicate with other computer systems. Its compact size, low price, and direct-connect efficiency make it the leading product of its kind on the market. Included is a cassette tape containing sophisticated terminal software, and a free password and one-hour subscription to the Compuserve* system, featuring Commodore's Information Network.

Specifications

Controls

Switchable from Originate to Answer, software controls for duplex, baud rate, parity. LED for carrier detection.

Interface

VIC 20/Commodore 64 user port plus, modular telephone handset plug. An optional adapter is available for non-modular phones.

Compatibility

Usable to communicate with any Commodore or ASCII computer system. Baud rate up to 300, parity selectable for even/odd/space/ mark, selectable number of stop bits and data bits.

Data Format

Serial, Binary, Asynchronous

Operate Mode

Manual Dial, Manual Answer/ Originate select, Full Duplex

Data Rate

0-300 BPS

Modulation

Frequency Shift Keyed

Line Interface

FCC part 68, Direct Connect

Data Interface

TTL Standard

Indicator

Data Carrier Detect Lamp

Power Requirement

9-11 Vac, 60 Hz, 180 mW

Commodore Computer, 1200 Wilson Rd., Westchester, PA 19380; 3370 Pharmacy Ave., Agincourt, Ontario, Canada, M1W2K4□

Leading Edge Products, Inc. Introduces the Peanut Pak™ To Consumers:

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With excitingly designed packaging featuring the well-known Elephant logo, The Peanut Paks™ all include a stylish Elephant sticker as an additional bonus. These Paks come in three different models, and all are 48 tpi. Together these three formats are compatible with over 90% of the microcomputers currently on the market.

For more information, see the advertisement on the back cover.□

VIC-20 and C-64 Typewriter Interfaces

Now, **Interdesign** gives you the most cost effective letter quality printer available!

Our Computype Interface allows your typewriter to act as a letter quality printer when used in conjunction with either a Commodore VIC-20 or Commodore C-64 personal computer.

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- Silver Reed
- Smith Corona
- Brothers
- Royal and many others

Contact: Interdesign, Inc. 2054 Irving Park Road, Chicago, IL 60618, (312) 975-2040.□

*VIC-20 version functional with up to 16K RAM expansion.

**No external RAM on VIC-20 version.

SPECIAL LEARNING ED SOFTWARE

PET/C-64

SPECIAL LEARNING ED SOFTWARE presents educational software for PET* and COMMODORE 64* Microcomputers.

The program consists of individualized computer-based instructional activities in spelling for students with specific language learning disabilities. However, this comprehensive program will improve the skills of any persons with spelling deficits. The ramifications of using the program are many, which include teaching slow learners, average students, gifted learners, adults as a refresher course, and those who are studying English as a second language. The program can be used by anyone who can read. It is especially appropriate for users in 4th grade and up.

The author is a Language Therapist, M.A., who has for many years tutored students in grades kindergarten through twelve. These students with specific learning differences are in need of specialized tutoring in the language areas.

The spelling program includes spelling rules, exceptions, and generalizations which provide repetitive exercises and reinforcement as well as motivation to the learner. The drill and practice which persons with specific language learning disabilities require to learn to spell can be provided through the use of the tapes or disks.

This unique program software, which covers five basic spelling rules essential to encode words, is a "first" for individuals with special learning disabilities. The complete program is recommended for Special Education, Language Arts-Reading, and English curriculum.

The copyrighted program includes:

F-L-S or Z Rule----4 Tapes----$38.00
Doubling Rule or One, One, One----4 Tapes----$38.00
Silent E Rule----5 Tapes----$47.50
The Y Rule----5 Tapes----$47.50
Extension of the Doubling Rule----6 Tapes----$57.00

You can SAVE by purchasing the complete program for $199.00. 1 Disk or 24 Tapes (24 lessons). Individual spelling rules can be purchased for the Tape program only. The program requires any 40-column PET or COMMODORE 64.

For further information on this program write to: SLED SOFTWARE, P. O. Box 16322, Minneapolis, MN 55416, Telephone (612) 926-5820.

New RGB High Resolution Display Color Monitor Offered by SAKATA

SAKATA U.S.A. CORPORATION, Elk Grove Village, Illinois, announces the placing on the market and immediate availability of its new Model SC-200, a CRT COLOR DISPLAY MONITOR that is unequalled for reproducing color graphics or copy more vividly, strikingly, true. Compatible with Commodore and other popular personal computers, SC-200 has already received wide acceptance in test areas.

This 13" (33 cm) RGB high resolution CRT MONITOR has 90° inline, display area which is 240 mm horizontal by 180 x mm vertical, a display format of 2000 characters (5 x 7 dots, 80 x 25), display color of eight colors plus intensity (16 colors), front and back external controls which provide the clearest pictures you could ever hope for, and many, many other quality features. SAKATA, now in its fourth generation, has always prided itself on unsurpassed quality and SAKATA COLOR MONITORS substantiate this.

This color monitor conforms to the standards of UL, FCC AND DHHS. The uniquely designed, streamlined cabinet of durable neutral color polystyrene blends with any room. Weight of the monitor is a modest 13 KG (28.6 lbs.) with outline dimensions of 362 W x 336 H x 421 D mm.

There are many other additional quality features which will make SAKATA SC-200 a great seller because it will be appreciated by those expecting to pay much more than the highly competitive price. Suggest retail is $649.00.

To obtain all of the facts, technical, prices, four-colored literature, communicate with SAKATA U.S.A. CORPORATION, 651 Bonnie Lane, Elk Grove Village, IL 60007. Or, call (312)593-3211 or 800-323-6647, outside Illinois. SAKATA has been serving industry since 1896.□

MINIMUF!

PET

No—Minimuf is not a small muffler for your pet. Minimuf is a mathematical model designed by leading scientists to predict with astonishing accuracy the "maximum useable frequency" (MUF) for transmitting in the HF region between any two points on earth. The original program used hundreds of thousands of bytes of memory, MINIMUF will load in your unexpanded VIC-20!

With Minimuf, no longer will you have to guess what band is best for communication at any given hour on any given day. It gives you almost instant propagation forecasts.

Once again we are providing two versions of the program on a single high quality cassette tape.

The first will load on a bare VIC, requiring no memory expansion. You will be prompted to enter your location (latitude and longitude) and the location of the area you wish to communicate with. You will need to input the latest sunspot information available from WWV and the day and month. In just a few minutes, Minimuf will calculate the MUF (maximum useable frequency) for each hour of a 24 hour period. These calculations take into account the sunspot number and normal seasonal changes as well as the path involved.

Since this is a very involved mathematical program it uses nearly all of VIC's memory space, allowing for no features to be added without memory expansion. Thus, program number two.

If you have at least minimal expansion, Minimuf will perform all of the functions mentioned, but will do it in a little better "human engineered" form.

In Minmuf2, you may select from a menu of several major cities from around the world which have been preprogrammed for your convenience. You can still enter the location as specific coordinates if you wish. The menu just makes generalizations much easier.

Minimuf was described in the December 1982 issue of QST. It is intended for normal F layer communication and does not take into account the possibility of other forms of propagation. It works best for distances between 250 and 6000 miles.

All of this is yours, supplied post paid to you for $6.00!

Be the envy of your DXer friends, or local repeater group! This program even helps SWLs and users of the new WARC bands. Order yours today... prompt delivery and satisfaction are assured.

MINIMUF is another high quality program from: Jim Grubbs, P. O. Box 3042, Springfield, Illinois 62708□

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Luna Software, Inc. Announces New Commodore Releases In Home Management and Education

VIC-20

EDU-PACK: The first in the new Luna learn series, Edu-Pack is a three module program for the Commodore VIC-20. It is comprised of "Addition", "Subtraction", and "VIC-VAN-GO", a full color educational playart package for children three to six years. The addition and subtraction modules teach young children these basic skills through positive reinforcement with friendly help-aids such as cartoon trains and rockets. The VIC-VAN-GO allows small children with limited manual dexterity skills to create colorful screen-scapes with simple joystick movements. Available on two cassettes: $31.95.

CHECKBOOK: Luna Software, Inc. is proud to present the new kid on the block from their line of VIC-20 home management software. Checkbook is a comprehensive check account software package which consists of Checkwriter, Checkreader, and Datatape.

CHECKWRITER is a program which records and files all of your checking account transactions. Checkwriter also automatically balances your checking account including service charges, both by month and check. This information is then automatically stored on the provided **Datatape.**

CHECKREADER is a search/accumulate/list program which can be very helpful in analyzing the family budget. It can search for any specified check or deposit or series of checks or deposits, while automatically accumulating the totals. Checkreader also has an option for using your VIC 1515 printer to list out the information on hard copy.

Checkbook is available on cassette with complete documentation enclosed in an attractive vinyl binder for $19.95.

Luna Software, Inc., P. O. Box 26922, San Jose, CA 95159-6922, (408) 378-7793.□

More & More Software For the Commodore 64!

Computer Marketing has announced distribution of four new software packages for the Commodore 64 to help you manage your life at home and in the office.

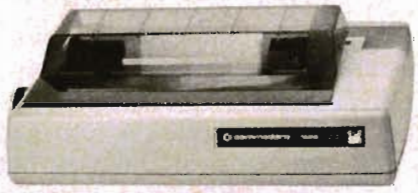
DIARY 64 keeps track of telephone numbers, birthdays, doctor appointments, business meetings...just about anything you need to remember! DIARY works like a big notebook with its "pages" appearing on the screen. You can file by page numbers or by dates. Information is easy to retrieve. If you don't remember the date of your next dentist appointment, just type in the name! Or if you need to know how full your schedule is for a specific day, simply pull up the date. Information is stored to disk or cassette. Suggested Retail—$59.95.

CHECKBOOK MANAGER is simple enough for the home user and sophisticated enough for business use. The program has a capacity of 250 checks, 100 deposits and 50 account charges available in a single file. With built-in security, unauthorized users cannot obtain information without the correct password. it will reconcile your checks, thereby helping you to balance your checkbook, a task most people put off! Suggested Retail—$39.95 for the Disk Version and $34.95 for the Cassette Version.

64 MAILING LIST holds 250 names and addresses per file, features full screen editing for adding, deleting or changing addresses, has full sort capabilities, and can print or review individual entries, sorted version of the file or the entire file. Suggested Retail—$34.95 for Disk Version and $29.95 for Cassette Version.

VANILLA PILOT's 19 editing commands make programming so easy that even school children can write programs immediately! Commands are simple and meaningful. For example: T for TYPE, J for JUMP, G for GRAPHICS, D for DRAW. Turtle Graphics adds a powerful set of commands which make it easy to change directions and draw lines of any length. The turtle has a palette of 16 colors. And when you are ready to add sound to your program, Vanilla Pilot has a very simple B (for Beep) command with a list of various sound parameters. Suggested Retail—$29.95 for either Cassette or Disk Version.

Computer Marketing Services, Inc. is located at 300 W. Marlton Pike, Cherry Hill, New Jersey 08002. (609) 795-9480.□



C-1526 Printer

VIC-20/C-64

The Commodore 1526 Printer is an 80 column, bi-directional, dot-matrix impact printer for creating printouts and hard-copies from the VIC 20/Commodore 64 computers. It is an intelligent device containing its own microprocessor, RAM, and ROM. It has the ability to create alphabetic letters in upper and lower case, digits, special symbols, graphic characters, and dot-programmable graphics. Interface cable for the VIC 20/Commodore 64 is included.

Specifications

Printing Method
Serial Impact Dot Matrix

Print Rate
45 lpm with 80 columns printed
78 lpm with 40 columns printed
124 lpm with 20 columns printed

Print Direction
Bi-directional

Column Capacity
80

Character Font
8x8

Line Spacing

Programmable
Character Size
0.094" high, 0.08" wide
Copies
3, including original
Ribbon Type
Cartridge
Ribbon Life
$1.2x10^6$ characters
Ribbon Cartridge
Commodore P/N613160550
Paper Width
10" computer folded paper
Forms
7.5 + (0.5x2 sprocket margins)
Pin-to-pin distance: .5" longitudinally, 9.5" laterally, 5/32" diameter

Commodore Computer, 1200 Wilson Rd., Westchester, PA 19380.□

Data Base Management System For VIC-20

WEBBER SOFTWARE announces a data base management system for the VIC-20. FLEX FILE 2.1 by Michael Riley offers all the features of earlier versions for the larger COMMODORE machines. A whole disk can be used for files, even with a single drive. There are 16 menu driven programs totaling about 97K. Records can be up to 254 characters and have 20 fields. With a 1540 drive, there can be over 3,800 records of 31 characters and one key. With records of 254 characters and three keys, the maximum number of records is 536. Up to 10 keys may be selected.

File editing features include: Add, Replicate, Change, Delete, Previous, Goto, Find, Browse, Key, User, Limit, Snapshot, Wipe, Return to File Menu.

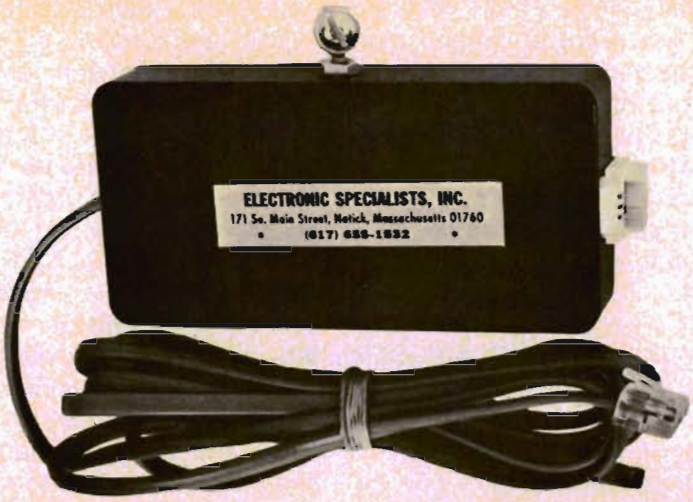
Records may be selected by testing any field against any combination of up to 20 of any 9 equality types which are: equals, less-than, greater-than, precedes, follows, not-equal-to, pattern matches (? is wild, * is wild ending), share-code-with (tests for 3 character code match), greater-than-field# (to compare fields).

FLEX FILE 2.1 keeps all records in order by all keys at all times. Maximum key field depth is 5. All mathematical (including LOG/TRIG) operations can be performed on any numerical field or column. Reports can be printed with nested subtotals, totals, averages, ratios, graphs, or special user-defined results.

There is wide user control over printed format: commands to printer, headers, column titles and content, calculated results, rounding, and justification.

FLEX FILE 2.1 comes with a 79 page 8½ x 11" manual which contains both operating instructions and illustrative examples.

The price is $110.00 plus $2.50 S&H. Currently available from: WEBBER SOFTWARE, Box 9, Southeastern, PA 19399□



Modem Protection

ELECTRONIC SPECIALISTS' expanding product line now includes MODEM protection. KLEEN LINE Security models are available for standard 4 pin telephone modular connectors (RJ-11) and the wider 8 pin connectors (RJ-45).

Intended to suppress damaging telephone line spikes caused by lightning, spherics or phone office switch gear, the KLEEN LINE Security system uses modern two stage semiconductor and Gas Discharge Tube suppression techniques. An Isolated ground is employed to isolate equipment from damaging lightning discharge current.

Model PDS-11 has suppression on red and green phone lines (pins 3 & 4) with yellow and black lines brought straight through. Standard modular 4 pin telephone connectors provide simple, trouble-free hook-up. PDS-11 @ $56.95.

Electronic Specialists, Inc., 171 South Main Street, P.O. Box 389, Natick, Massachusetts 01760, Phone: (617) 655-1532□

Composer, Program for the VIC-20 by Computer Software Associates, Lets You Compose Music

VIC 20 users can now compose songs at their keyboards, using COMPOSER, an educational program developed by Computer Software Associates and distributed exclusively by Micro Software International, Inc., of Randolph, MA. The cassette, which works on an unexpanded VIC 20, allows a "high-tech musician" to compose simple melodies using both musical notation and sound. If a Datasette recorder is used in conjunction with the VIC 20, the compositions can be stored on tape and saved for later recall and playback.

According to Robert Shapiro, Executive Vice President of Micro Software International, COM-

POSER should be a best-seller for people who want to expand their natural musical abilities with the aid of a computer.

"Computer Software Associates' COMPOSER, with a suggested retail price of only $14.95, makes music composition available at an affordable price," he said. "Just about everybody wants to write a song at one time or another, and the COMPOSER program will allow you to try your hand at musical composition using 20th Century technology."

Additional information can be obtained by contacting: Micro Software International, Inc., 50 Teed Drive, Randolph, MA 02368, (617) 691-5700.□

New "Strategy" Game Titles From Epyx

Epyx, Inc. plans two new titles in its "Strategy" game series for fall 1983. Michael Katz, company president and ceo, announced that the company's dominance in the area of strategy games will continue with the introduction of **Oil Barons** and **Dragonriders of Pern**.

"These two games continue the Epyx goal of providing challenging strategic simulations in the adventure/fantasy game area," Katz said. "We've long held a leadership position in this category, and we remain confident that our newest introductions will uphold that tradition."

Oil Barons, a realistic search for oil, is a challenging strategy game for the whole family. The game takes the player into the high-stakes world of international oil where decision-making and risk is a way of life. **Oil Barons** requires the player to make investment decisions, search for oil and drill. The game can be played by one to eight players, and there are nine different levels of skill from novice to expert. **Oil Barons** includes a game board of the earth's topography and playing pieces so that players can select and identify their drilling sites.

The excitement of the Ann McCaffrey best-selling, science fiction series is combined with the visual realism of a computer game in **Dragonriders of Pern**. Players ride flying dragons defending their homeland from the "dreaded threads". The fiery threads are threatening the planet Pern. If they land on the planet, the desolation caused is awesome. As a Dragonrider, the player must stop these "threads" using the dragon's fiery breath and his own abilities to maneuver quickly. Quick wits are necessary to avoid the invaders and save the planet in this stimulating adventure.

Shipment dates for **Dragonriders of Pern** and **Oil Barons** will be announced later this month.

Epyx, Inc. is a leading independent designer and marketer of computer game software compatible with the Commodore computers. The company is headquartered at 1043 Kiel Court, Sunnyvale, CA 94089.□

Commodore B128/256-80

General Description:

The Commodore B 128/256-80 is a highly advanced business computer. It delivers a minimum of 128K of User Memory (RAM). Other new features include a communications interface and a dynamic three voice music synthesizer. The B 128/256-80 can accommodate a second processor—creating a multi-processor system. The primary language is an improved version of the easy-to-use Commodore BASIC 4.0.

Specifications

Memory:

- 128K or 256 RAM externally expanded by 704K totaling 960K

Features:

- Basic 4.0+
- IEEE-488 bus.
- RS232-C Interface
- 8 Bit User Port
- 80 column x 25 line screen display
- Works with user supplied monitor
- 6509 microprocessor
- Optional future processors planned are Z-80 for CP/M® , 8088 for CP/M-86® , MSDOS
- Direct Audio/Video Output
- Programmable function keys and numeric keyboard

Compatible With:

- Storage: CBM 4040; CBM 8050; CBM 8250; D 9060; D 9090
- Printers: CBM 4022; CBM 4023; CBM 6400; CBM 8023; CBM 8300

Commodore Computer, 1200 Wilson Rd., Westchester, PA 19380; 3370 Pharmacy Ave., Agincourt, Ontario, Canada, M1W2K4□

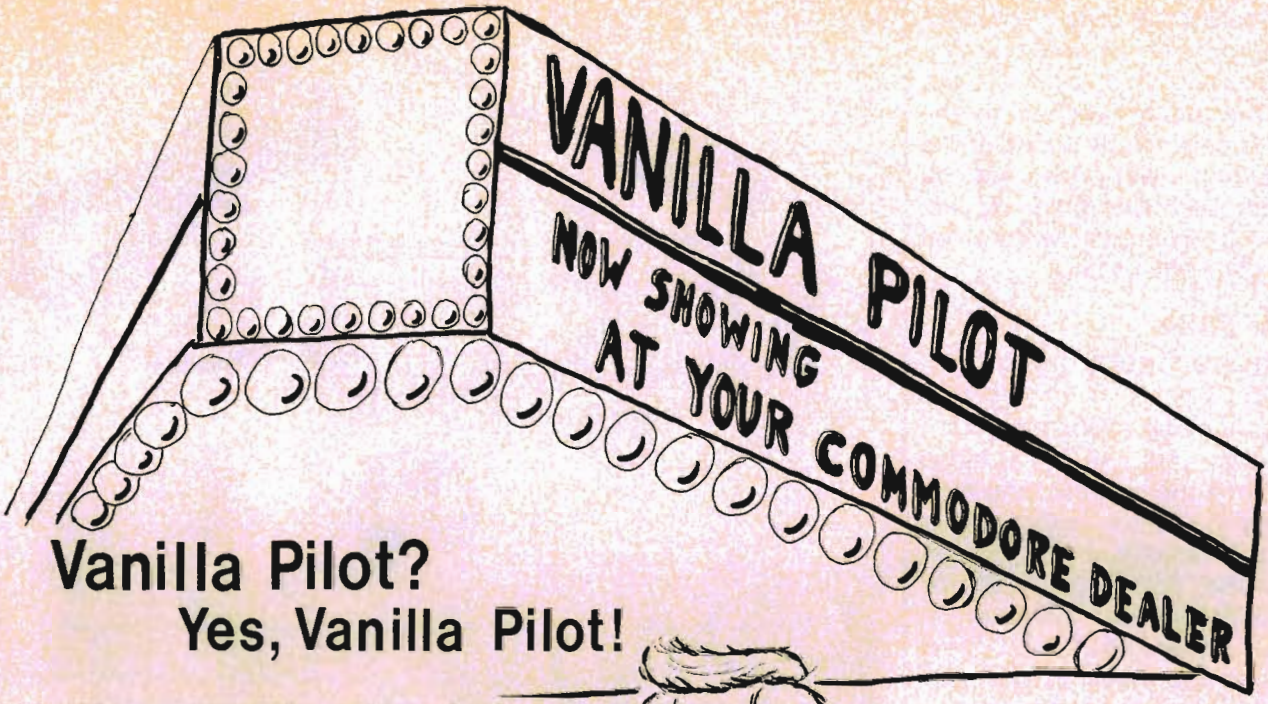
Snap Box Packaging Introduced By Comm*Data

Snap box of attractive durable vinyl plastic is housing Comm*Data's newest product entries, including Supercuda, Pegasus Odyssey and Primary Math Tutor, into the Commodore home computer software market. Shown first at the 1983 Summer CES the company began shipping product in this premier packaging less than one week later.

The Comm*Data snap box is unique to the market in that it comes with a tab for hanging on racks, augmenting the excellent stand and stack features of snap box style. Shrink wrap further insures a clean secure product.

The interior panels are formed to hold the diskette or cassette(s) in place, providing excellent after purchase storage. The art is brighter and improved. Additionally, art has been added to the spine along with the program name making product identification easy. Program descriptions and pictures of actual screens are provided on the back panel providing a true insight of the products features.

Comm*Data is continuing its



Vanilla Pilot?
Yes, Vanilla Pilot!

What is Vanilla Pilot?

Vanilla Pilot is a full-featured pilot language interpreter including TURTLE GRAPHICS for the PET or CBM 4000, 8000, 9000 and CBM-64 series computers.

At last! A Pilot interpreter for the Commodore computers. This Pilot includes some powerful extensions to the screen editor of the computer. Things like FIND/CHANGE, TRACE and DUMP enhance the programming environment.

The TURTLE has a very powerful set of graphics commands. You can set the Turtle's DIRECTION and turn him LEFT or RIGHT. The pen he carries can be set to any of the 16 colors in the CBM-64. He can DRAW or ERASE a Line.

What else? Vanilla Pilot is all this and much, much more. In fact, we can't tell you about all of the features of the language in this small ad. So rush down to your local Commodore computer dealer and ask him to show you Vanilla Pilot in action.

Tamarack Software
Darby, MT. 59829

Circle No. 42

blister cardstock style of packaging appropriate for any hanging rack display. The blister cardstock packaging-product combination is particularly aimed at the high-volume lower priced market.

Comm*Data Computer House, Inc., P. O. Box 325, Milford, MI 48042, (313) 685-0113.□

"Laser Zone" Adventure Game

VIC-20

A challenging space adventure game that requires an intense degree of concentration and high dexterity to master successfully is now available from Human Engineered Software (HES) for the VIC 20 personal computer.

Called Laser Zone™, HES' new game pits the player's two laser bases against succeeding waves of alien attackers while requiring players to simultaneously manipulate separate cannons, one mounted on the bottom of the screen, the other mounted along the right edge.

Aliens appear continuously at the upper left corner of the screen, veering toward one of the two lasers in an effort to destroy them.

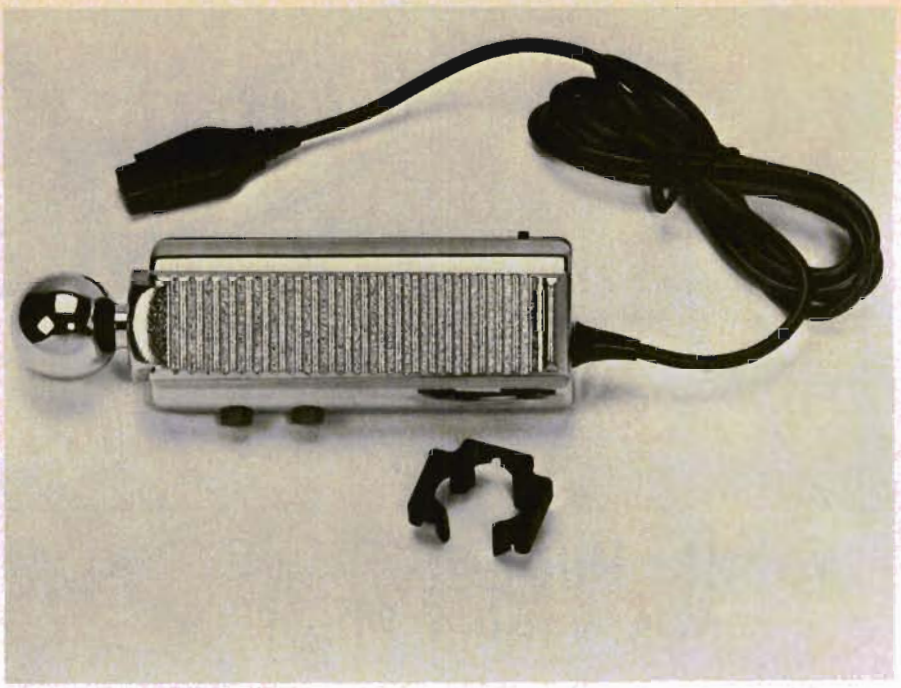
Players must learn to move and fire both lasers simultaneously in order to achieve high scores. For every round that is completed, the player is furnished with one "smart bomb" that will destroy all aliens currently on the screen.

To facilitate a beginning player's ability, a special training mode is provided in the game. Once trained, a player may select from 31 different levels of complexity.

Laser Zone was created by Jeff Minter, who also designed the popular Aggressor™ and Gridrunner™ computer games.

Laser Zone has a suggested retail price of $34.95.

HES develops and markets a wide variety of home computer games and educational software for the entire family. HES is headquartered in Brisbane, Calif.□



Zircon Announces Z-Stick™, The Electronic Joystick

Robert W. Johnston, President of Zircon International, Inc., today introduced the Z-Stick, a state-of-the-art electronic joystick controller to be available at retail in July, 1983.

This innovative controller was designed for the serious game player and Commodore hardware. The Z-Stick is fully chrome plated and offers great precision and responsiveness combined with three levels of control—Maze Control, Speed Control and Autofire.

Maze Control allows the player to select the option of eliminating diagonal response when playing maze games. On these games only the X-Y axis is used, and diagonal signals are ignored by the computer. When using a conventional joystick, one can accidentally hit the "corners" or diagonals which slows player response and decreases control. Maze Control prevents the diagonals from functioning so that the player has more exact control in maze games.

Speed Control gives the player a new dimension of play control. Using just the joystick, the player has until now been unable to control the speed of objects on the screen. Rate of movement is programmed into the game computer, and the joystick switches are either on or off. Zircon designers have devised a method of giving this control to the player—in the Z-Stick. The Z-Stick has a special Speed Control Button which, when activated, slows the object on the screen to 50% of normal speed, allowing for more accurate movements and placements on the screen. Speed Control provides the player with the means of slowing movement to allow for careful maneuvering into position when needed.

Autofire converts the fire button to a rapid fire machine gun by flipping a switch. In games where the ammunition is not limited, Autofire cuts down on trigger-finger fatigue and can increase scores. The effect is dramatic!

Z-Stick's three new control modes are designed to increase player control, and thereby improve performance on selected games. The result is an electronic joystick that is more versatile and responsive to the wide range of games available today.

The Z-Stick is designed to be

CPI

PARALLEL PRINTER INTERFACE FOR VIC-20 & C-64

GROW WITH US!

EXPANSION PRODUCTS FOR YOUR MICROCOMPUTER

Lifetime Warranty available upon return of Product Warranty Card.

MSD's CPI Parallel Interface works with either the VIC-20 or Commodore 64 and provides total feature flexibility through software commands or hardware switches.

The CPI plugs into the serial port and directly interprets the signals generated by the computer's built in software, therefore no software needs to be loaded or enabled. All you need is built into the CPI cartridge. This feature allows the CPI to be compatible with most software written for the VIC-20 and Commodore 64 that utilize 1515 or 1525 printers.

The CPI is capable of twelve printing modes, specified by software or hardware switch settings. These twelve printing modes are combinations of three options as follows:

Line Feed,ASCII Conversion and Listing Legibility.

Line Feed: The CPI can generate a line feed if needed through software or hardware switches.

ASCII Conversion: The CPI converts Commodore ASCII into standard ASCII characters through software or hardware switches.

Listing Legibility: Since many printers do not support the codes/graphics that the VIC-20 and Commodore 64 produce, program listing can become illegible if not impossible (Printer may "hang-up"). The CPI provides three listing modes to address this problem — Normal, Extended Tag and Abbreviated Tag.

In the Normal mode the CPI passes all commands from the computer to the printer. The Normal code would be used for programs written by the user or programs with commands supported by the printer.

In the Extended Tag mode the CPI will generate "tags" (neumonics) for graphics, cursor control, print control and special characters. For any graphics characters that are not standard ASCII, the decimal value of the graphics symbol is printed. For instance, the "checker board" character (press the Commodore key and the plus sign) lists as [166].

The Abbreviated Tag mode is the same as Extended Tag mode, except all the tags are replaced by the "#" sign. This mode would be used if you wanted a program listing to be formatted as the original program. That is without the "tags" using several print spaces instead of one print space.

The CPI is equipped with a built-in self-test program that will check the RAM, ROM and I/O hardware of its microprocessor. This test can be helpful in determining if something is faulty or if the configuration you are using is valid. The self-test will print information to the printer.

CPI LISTING LEGIBILITY TAGS

TAG	Is Printed For:	TAG	Is Printed For:	TAG	Is Printed For:	TAG	Is Printed For:
[CD]	Cursor Down	[DL]	Delete	[ORA]	Change to Orange	[F2]	Function Key 2
[CU]	Cursor Up	[BLK]	Change to Black	[BRN]	Change to Brown	[F3]	Function Key 3
[CL]	Cursor Left	[WHT]	Change to White	[LTR]	Change to Light Red	[F4]	Function Key 4
[CR]	Cursor Right	[RED]	Change to Red	[GY1]	Change to Grey 1	[F5]	Function Key 5
[HC]	Home Cursor	[CYN]	Change to Cyan	[GY2]	Change to Grey 2	[F6]	Function Key 6
[CS]	Clear Screen	[PUR]	Change to Purple	[LTG]	Change to Light Green	[F7]	Function Key 7
[RV]	Reverse On	[GRN]	Change to Green	[LTB]	Change to Light Blue	[F8]	Function Key 8
[RO]	Reverse Off	[BLU]	Change to Blue	[GY3]	Change to Gray 3	[PI]	Pi Symbol
[IN]	Insert	[YEL]	Change to Yellow	[F1]	Function Key 1		

Call toll free for nearest dealer

1-800-527-5285

MSD

MICRO SYSTEMS DEVELOPMENT, INC.

(214) 241-3743

11105 Shady Trail • Suite 104 • Dallas, Texas 75229

MSD also manufactures RS232 Interfaces, IEEE Interfaces, Port Expanders, RAM Cartridges, Audio Cassette Interface, Terminal Emulators, Disk Drives and Monitor Cables.

Win a FREE trip to Hawaii. Join our "Grow With Us" Club. The more you buy...the better your chances. Details at your Dealer.

All MSD Products Made In U.S.A.

VIC-20 and Commodore 64 are trademarks of Commodore Business Machines, Inc.

hand held to reduce player fatigue and, because of Zircon's unique design, the Z-Stick is equally usable for both right and left handed players. This is a flexibility not readily available in existing video game hardware.

"With the development of increasingly sophisticated video game cartridges, it has been necessary to develop matching control hardware to play these games," said Johnston. "We think the Z-Stick has the features which will enable the player to increase his scores on the most sophisticated video or computer games."

Suggested retail price of the Z-Stick is $19.95.

Zircon International, Inc. is a leading manufacturer in the replacement joystick controller industry. In addition to its full line of video game control products, the company designs, manufactures and distributes precision consumer electronic devices in the hardware and medical fields. Zircon International, Inc., is located at 475 Vandell Way, Campbell, CA 95008.□

"Balloon"?

VIC-20

Several interactive VIC-20 basic computer programs are available for amateur astronomers, model rocketeers, and satellite and hot-air balloon enthusiasts. The astronomy programs can be used to determine the location of the sun, moon, planets, comets and stellar objects. Model rocketry programs can be used to determine the altitude performance of model rockets and the glide performance of boost gliders. The location of Turo, Weather, Oscar and the Soviet amateur satellites can be determined easily and accurately with a VIC-20. The performance capability of hot-air balloons can be calculated with a program called "Balloon". Additional details about these programs can be obtained from David Eagle, P. O. Box 982, King of Prussia, PA 19406.□

DATASOFT Brings To Market Adventure Game Based on Hit TV Series 'DALLAS'™

Commodore 64

Ever wish you could have the opportunity to out maneuver the infamous "Dallas™" star, J.R. Ewing™? DATASOFT, Inc., is giving you the chance to do just that by introducing the most exciting and ambitious adventure game ever devised for home computers at Summer CES.

The "Dallas Quest™" game, which will be released on diskette, features J.R. Ewing™ as well as other characters from the popular series, now completing its fifth season on the air.

Your mission is to out-smart J.R.™ in the search for a lost map to a rich oil field in uncharted regions of a savage jungle. Your life is in constant danger from perils of the jungle, not to mention J.R.™, who intends to jeopardize your search and get there first. But with the game's sophisticated computer technology, you can be as powerful as he is—scheming, wheeling and dealing. Manipulate your way to the top and never look back.

The "Dallas Quest™" diskette will be compatible with the Commodore 64.

"Dallas Quest™" will be released by DATASOFT under a license obtained from Lorimar Productions, which created and holds the rights to the famous television series.

The suggested retail price of "Dallas Quest™" is $39.95.

DATASOFT is a leading supplier of computer software for home management, recreational and educational use.□

64K Expansion for VIC-20

CENTURY MICRO announces the release of their newest addition to their line-up of VIC-20 memory products. This newest cartridge is a 64K expander that offers some of the following features:

1. 64K ram organized as two sets of blocks 1,2,3, & 5.
2. Bank selectable through software.
3. Ram disk possibilities.
4. 90 day warranty.

The suggest list price is $249.95 but it is being offered for only $199.95 until further notice.

Press Release

CENTURY MICRO has moved to new quarters to allow for expansion. The new address is: 1832 Tribute Road, Suite 213, Sacramento, CA 95815, (916) 920-3656□

Commodore Announces Six New Adventure Games For Commodore 64

Commodore Software, the software division of Commodore Business Machines, Inc., announced six new adventure games for the COMMODORE 64™ color computer. The announcement was made by Sig Hartmann, president of Commodore Software.

The new games include:

ZORK I: THE GREAT UNDERGROUND EMPIRE
ZORK II: THE WIZARD OF FROBOZZ
ZORK III: THE DUNGEON MASTER
DEADLINE
STARCROSS
SUSPENDED

Sig Hartmann, president of Commodore Software, said: "These games include some of the best-selling adventure games in the industry. The ZORK series has been extremely popular and we believe it will be even more popular on the COMMODORE 64."

"Our research shows that the game-playing public wants more challenging games, games that make you think and analyze and make decisions...this excellent adventure series meets that need."

Hartmann said the games,

which were developed by INFOCOM, Inc.™, have a suggested retail price of $29.95 each. First deliveries will begin during June.

The ZORK Trilogy

The "Zork Trilogy" for the COMMODORE 64 was developed using INFOCOM's proprietary "INTERLOGIC"™ computer language. Each game contains a vocabulary of over 600 words. The player uses word commands to take various actions during the game.

ZORK I: THE GREAT UNDERGROUND EMPIRE—the object is to strive to discover the Twenty Treasures of ZORK and escape with them and your life.

ZORK II: THE WIZARD OF FROBOZZ—the quest continues, with new challenges introduced by the Wizard of Frobozz, a new character to confound your quest.

ZORK III: THE DUNGEON MASTER—is your final test, culminating in an encounter with the Dungeon Master.

DEADLINE, STARCROSS AND SUSPENDED

The other adventure games in the series lead the player through more strange worlds of challenge, each with a different theme:

DEADLINE—you have a 12-hour time limit to solve one of the most baffling cases in the annals of criminology. Game Kit includes an actual dossier on the crime...the player must piece together the clues encountered during the adventure.

STARCROSS—a mindbending science fiction adventure set in the year 2186. You meet a challenge issued eons ago... manual and navigation chart included.

SUSPENDED—you're in "suspended animation". Working through 6 robots, each equipped with different capabilities, you try to solve a twisting puzzle of problems. The game comes with a detailed manual and schematic of the underground complex which is your "domain".□

Commodore 64

HARDWARE AND SOFTWARE

MASS STORAGE:

PETDISK II — High Performance FLOPPY DISK for Commodore 64

PEDISK directly transfers data to computer memory. This and the 250000 bps transfer rate means performance up to 10 times faster than a serial bus disk.

Model C340-2 Dual 3'... $995.00 Model C877-1 Single 8'... $1095.00
Model C540-2 Dual 5'... $895.00 Model C877-2 Dual 8' ... $1695.00

80 COLUMN VIDEO:

Screenmaker 80 column VIDEO BOARD..... $179.95
Give the 64 a screen full of characters. Screenmaker gives a complete set of characters (80X24) in a 2K Video RAM. Software to link the system is included.

WORD PROCESSING:

COPY-WRITER Professional Word Processor..... $145.00
The next logical step in the evolution of Word Processors. Copy-Writer has the features found in the best and more. Double columns, shorthand, the works!

COMMUNICATIONS:

COMPACK Intelligent Terminal Package..... $129.95
A complete communications control center – record/read to/from disk – convert files ASCII, BASIC, BINARY, MAE – print incoming data. Complete with software, port board and cable.

LANGUAGES:

fullFORTH+ enhanced fig Forth for Commodore 64... $100.00
Strings, floating point, editor, conditional assembler, interpreter, and more are included in fullFORTH +. Target Compiler is also available for $50.00

KMMM PASCAL for Commodore 64 by Wilserve.... $85.00
One of the newest HL languages, KMMM PASCAL is a true compiler that generates machine code from PASCAL source... FAST! Editor, Compiler, Translator included.

UTILITIES:

Copymaker SINGLE DISK BACKUP ROUTINE..... $30.00
Copymaker allows a 1541 owner to quickly backup an entire floppy disk on ONE DRIVE! Simple swap prompting and full use of memory make this easy to use and essential for any disk owner.

MAE Macro Assembler Editor from EHS..... $ 99.95
MAE has become the standard of the 6502 industry by providing the power and ease of use needed by the best assembly programmers. MAE is a complete development system including a word processor and lots of source goodies.

MICROTECH is your complete 64 center. Dealer inquiries invited.

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Circle No. 6

SKYLIGHT SOFTWARE

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(207) 338-1410 COMMODORE 64

Software & Accessories for the VIC-20

—CARDCO—

CARDBOARD/6: 6 Slot Expansion . . . . . VIC . $79.99
CARDPRINT: Parallel Printer Interface for Vic or 64 . . . . . $64.99
CARDRITER: Light Pen with 6 good programs, Vic or 64 . . . $31.99
CARDADAPTER: Play Atari VCS Games on your Vic $74.99
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Circle No. 38

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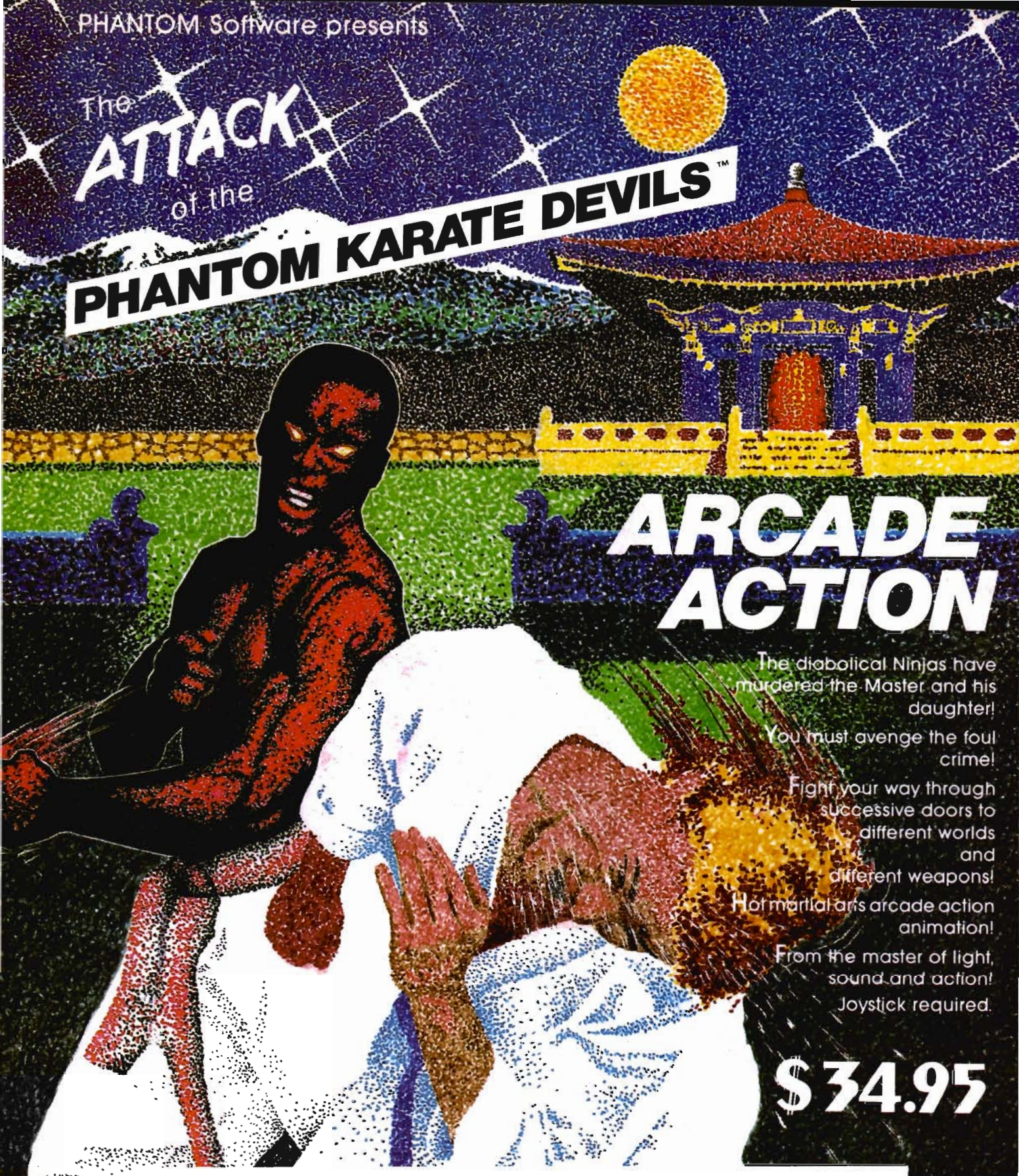

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Commodore P-128

by Fred Hambrecht

Editors Note:

Notification received just prior to printing revealed that Commodore has pulled the P-128 from the market and replaced it with the C-128 (to be released after the B series, see page 76). Due to the similarities between the B series and the P series we chose to run the following article in an effort to provide you with as much information as possible concerning the Commodore market.

Christmas in March! That's the way I felt unpacking the new Commodore 128 computer. A quick check of the reference manual.....Whoops! no manual. Oh well, it's more fun without the book, besides I know Commodore inside and out, what could be different? Plug it in, turn it on, and the monitor comes up (yes, monitor—no rf modulator included) with the Commodore Basic message. They even redid the color combination, white background with blue characters. Let's push a few keys and see what happens. Push F1 on the top left and it printed "PRINT#"; each of the other keys had such goodies as "directory", "dload", "list" etc. Hm! Have to spend more time looking at that later. The keyboard has a really nice layout, with a typewriter style return key in the main array. The numeric pad contains a separate enter key, along with a "?" key. In addition a CE key is provided to clear entries to the last arithmetic operator entered or to the beginning of the line. A single as well as a double ZERO key should make any "bean counter" happy. The feel of the keyboard, in my opinion, is the best on the market today. The back of the unit has a few more surprises: Two joystick ports, IEEE 488 interface, users port, and a real honest to goodness RS-232 connector.

Enough of the outside, let's look and see if the basic is the same. We entered a program in BASIC to look at the parse table in the ROMS and found a few more surprises. First of all the basic appears to be standard 4.0 with the following additions.

BANK—Sets the bank number (16 banks of 64k) for peeks, pokes, and bank saveload commands.

BLOAD/BSAVE—Used to load and save binary files from memory. I can't be sure but it appears that you can specify high and low addresses within the bank.

DISPOSE—Used with the TRAP instructin to purge unwanted NEXT and RETURNS.

IF..THEN..ELSE—A new one for COMMODORE

PRINT USING—Both PRINT and PRINT# are supported.

PUDEF—This redefines the symbols used in PRINT USING.

RESUME—Used with TRAP to RESUME after error handling.

TRAP—Uses user supplied error routines in place of the COMMODORE routines.

ERR$—Reserved string for error messages.

EL—Reserved variable for error line.

ER—Reserved for error #.

INSTR—Search for and return the position of substring with a given target string.

TI$—Returns time in the format HHMMSSJ where J is a 1/10 of a second. TI NO LONGER EXISTS!!

KEY—Allows programming of the 20 functions keys and takes the form KEY n, "expression" where n is the key number and the expression is what is to be printed to the screen. Or input as a string.

The screen now resides at locations 53248 to 54247 followed by the color memory at locations 54272 to 55271. The screen has many of the features of the 8032. I have discovered ESCAPE sequences that set windowing, insert line, delete line, erase to end of line, erase to start of line, etc. Now I wish I had the manual. Next, spend two hours on the

phone calling the folks at COMMODORE; NO ONE knows about the 128! Inside sources said the unit had been engineered "over seas" and they were as much in the dark as I was. Manuals are supposed to be available in the next month or so, and this unit was a dealer demo only. The units are not supposed to be sold until FCC and UL approval is obtained.

I can't stand it any longer, get out the screwdriver and tear it apart. When the cover is removed it reveals that the ROMS are prototypes; 28 pin ROMS have been JERRY RIGGED on to 24 pin sockets. Several nice features... The power supply is a switching regulator type made by someone other than COMMODORE and is easily removed for service. The internal 128K RAM is located in the lower left and upper right. Note the sockets for an additional 128K already exist. Wonder if they plan to drill holes in the boards ala the old 16K PET? The processor is a 6509, functionally the same as the 6510 used in the Commodore 64. It has in addition to the 6510 features a bank select register that allows the selection of 16 banks of 64K. The addressing appears to be that the operating system, SID chip, etc. resides in bank $F and the internal memory is in banks 0, 1, and 2. Only bank 0 is used in an unexpanded 128. A feature that appears to exist is a CO-PROCESSOR function. Interrupt, processor granted and refused signals lead me to think that we will probably see a multiuser system in the future. In spite of the fact this is a prototype, a lack of wire jumpers, etc. indicates the hardware is pretty solid, and the one remaining "cat to skin" is the firmware. The model I am playing with has no tape handling routines. In fact a "LOAD" will result in a "DEVICE NOT PRESENT ERROR". Speaking of error messages, a new one exists, if you overflow the subroutine stack the message is "OUT OF STACK" rather than the old ambigious "OUT OF MEMORY".

(Note: to Jim Butterfield, I stayed awake nights to try, just once, to generate a memory map before seeing yours in COMPUTE!)

The memory may be viewed as 16 pages of 64K each. Page 15 or $F is fixed in hardware as the operating system and hardware laid out as follows:

$FFFFF	KERNAL ROM
$FE000	PORT 2 6525
$FDF00	PORT 1 6525
$FDE00	ACIA 6551
$FDD00	CIA 6581
$FDC00	CO PROCESSOR EXT PORT
$FDB00	SID 6581
$FDA00	DISK PORT (internal)
$FD900	VIC 2 6567
$FD800	COLOR MEMORY 1K
$FD400	SCREEN RAM 1K
$FD000	CHARACTER DOT ROM 4K
$FC000	BASIC HI ROM
$FA000	BASIC LO ROM
$F8000	EXTERNAL ROM
$F4000	CARTRIDGE SLOT
$F2000	DISK ROM
$F1000	EXT BUFFER RAM
$F0800	2K BUFFER RAM
$F0003	INTERRUPT REGISTER
$F0001	EXECUTE REGISTER
$F0000	

A further breakdown of the $FD800 to $FE000 will let you see that the only difference between the P-SERIES and the B-SERIES is probably jumpers or land cuts. I suspect that changing a P128 to a B256 is no harder than changing a FAT 40 to an 8032. The addresses appear to be as follows:

$FE000	6525 (KEYBOARD)
$FDF00	6525 (IEEE-488)
$FDE00	6551 (RS-232 PORT)
$FDD00	6526 (IEEE & USER PORT)
$FDC00	EXTERNAL PROCESSOR
$FDB00	6581 (SID CHIP SOUND)
$FDA00	DISK UNITS (INTERNAL)
$FD900	6545 (CRT CONTROLLER)
$FD800	2K SCREEN RAM
$FD000	NOT USED FOR P-128 HMM!
$FC000	

A few general comments: The 128 should be a great machine, especially with the new low profile disks installed. I am presently running this one with an 8250 drive and the 8300P printer and am really pleased with it. I have been able to load most of the programs I have in basic and am in the process of converting some maching language routines. The only negative comment I have is that it is slower than the 64 and the 4032. The reason lies in the fact that all 20 function keys appear to be processed by CHRGET in the run mode. I will reserve judgement on this until I see a final ROM set. Aside from that, it's the neatest COMMODORE yet! □

ARMSTRONG

MAELSTROM

FROM COMM*DATA

WordPro 3 Plus

by Steve Punter

Available from:
Professional Software Inc.
51 Freemond Street
Needham, MA 02194

Price: $129 Canadian
(adver. at $89 U.S.)

For use with: Commodore 64
with one disk drive

Until you use a word processor it is hard to imagine how easy it becomes to write. If you make a mistake or wish to insert a line in the middle of a paragraph all you do is press a few keys and Voila!, mission accomplished, without messy correction ribbon or having to retype whole pages. These features are all found in WordPro 3 Plus, probably the premiere Word Processor for the Commodore 64. I find it surprisingly easy to use, yet it also has the advanced features I need in a word processor. With it text just flows from my fingers and I worry only about the phrasing of my document, not my typing. Interested? Read on...

Description

WordPro 3 Plus comes on disk and includes a good-sized binder of very thorough documentation. It even tells you how to turn on your 64! The only other things you need to start with are a printer, paper, and a blank diskette. Sorry, there are no provisions for using the tape recorder, so a disk based system is a must. But if you are seriously into word processing then you really do need a disk drive, so this should not be a problem for most. It could be irritating if you're on a tight budget, though.

WordPro's Features

Loading WordPro is simple, and complete instructions are provided in the manual. The program does take a while to load, so don't think there is something wrong as I did at first. Just have a bit of patience and it should load correctly. When finished it presents you with a list of options to set up WordPro. You must indicate what kind of printer you have, how many lines of text you want in the main area, as well as the device numbers of the printer and disk drives. This is useful at first because it allows for many different configurations, but after using it a while you get tired of always entering the same configuration each time you load WordPro. But there really isn't much you can do unless you wish to get into WordPro itself and change that part of the program—not for novices in any case.

After the initial setup, you are presented with a blank screen and a cursor. The top two lines are reserved for displaying status messages and for indicating tab stops. You may type anywhere on the rest of the screen, which scrolls up or down until you meet the beginning or end of text. There are quite a few options available, and all are accessed by pressing the CTRL key and then some other key or combination of keys. Briefly, here are some of the most common functions and the keys used to access them:

Cursor Movement—use normal cursor keys

One Letter Insertion/Deletion—use the INST/DEL key

Homing of Cursor—Press HOME key

Going to Start of Text—press HOME key twice consecutively

Inserting a Blank Line—Press CTRL and INST/DEL (unshifted)

Marking Off End of Paragraph—Press RETURN

Erasing Text—CTRL followed by E and then A for all, R for remainder after cursor, or L for a line range

Inserting Words or Sentences—Press CTRL and SHIFT simultaneously and type; end by Pressing CTRL and SHIFT again

Deletion of Words or Sentences—Press CTRL followed by D and then W for word, or S for sentence, and end with RETURN

These are but a few examples of the many commands included with WordPro. There are many advanced features available, such as global or local search and replace, duplication or transference of lines, and number alignments. To describe all of them would take more room than I have available.

Formatting Commands

Simply typing in sentences does not really make a word processor. The word processor must also be able to format your text so that it prints just as you want it to. There are twenty or so formatting commands available in WordPro that let you do just that. Commands to set margins, to center or justify text, and to create headers or footers, etc. All formal commands are done on a separate line and marked off from regular text by being preceded by a special checkmark, obtained by pressing CTRL and the slash ('/') key. A few of these are:

cn—turn centering on or off

ft—create a footer
hd—create a header
ju—turn justification on or off
lm—set left margin
pp—set paper length
ra—right align text
rm—set right margin

Again, more commands are available, but these are the ones used most often.

Documentation

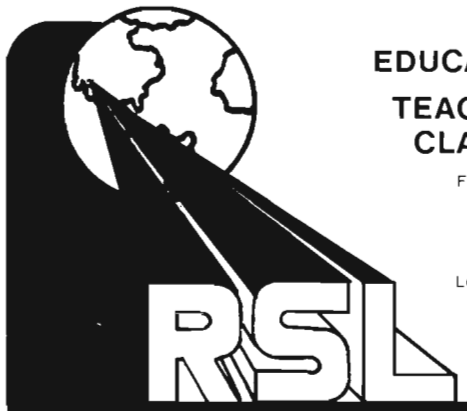
As mentioned before, the documentation is quite thorough. The manual acts as a tutorial but can also be used as a reference guide because of the comprehensive index. Everything is clearly explained, and examples are given to help enforce the use of the commands. After a while, you really only use the manual for the seldom used commands and options.

Disk Handling

Because WordPro is a disk based system, it has to be expected to have several disk functions included. Not only does it have the basic save and load procedures, but you can send any disk command as well as read the error channel, which makes it easy to format new diskettes and to initialize them (initialization is done with two keystrokes). You can also access the directory, but at a cost—you lose whatever text you were working on. This is really the only annoying feature of WordPro, since you have to first save your file, load the directory and then reload your file. Maybe I'm fussy, but I'm not thrilled by this arrangement.

Conclusion

In my opinion Word Pro 3 Plus is one of the best buys in utility software. It's easy to use and affordable. Of course, I haven't been able to compare it to other Commodore 64 word processors like the Paperclip or EasyWriter, which some say are better, but I'm very content with WordPro and the others would have to be pretty good to make me think otherwise.□



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Circle No. 77

To the Editor:

In the current issue of COMMANDER (May 1983), you published an article on page 72 entitled, "Converting Programs Between PET, VIC-20 and Commodore 64". I was extremely interested in the article because of the hours of frustration this has been causing me.

My original computer was a VIC-20, and I was so pleased with computing that I purchased a Commodore 64 rather than expand the VIC. In retrospect this may have been an error in judgment because just about everything I read is for the VIC and the Commodore is hardly mentioned. Secondly, all of the programs I have that ran on the VIC will not run on the C64.

The point of my letter is that the article described a method of converting PET's programs to the C64, but did not address the possibility of converting VIC to the Commodore. If there is a conversion method, i.e., add or subtract 31744, I would surely appreciate learning about it. Also, were can I obtain more info pertaining to PEEKS and POKES? These are still a mystery to me. Any help will be appreciated.

Yours truly, E.L. Barlow

Dear E.L.,

There is no easy conversion method for the VIC-20 to C-64. If both programs are in BASIC, there is the incompatibility of screen formatting and port/latch addresses. The hardware differences make program translation very complex. Sound, color, port and formatting routines will all need to be rewritten. If the BASIC program makes 'SYS' calls into the BASIC and KERNAL ROMS, then a knowledge of both BASICs at the machine language level is required. Even if the program writer limited the 'SYS' calls to the KERNAL JUMP TABLE, there are conversion problems with cursor positioning and screen printing.

If the programs or portions of the programs are written in machine language or a compiled language, then conversion will become very complex, if not impossible. We will need the tools of disassemblers, decompilers, assemblers and compilers. Even with these, the program writer may have made the program flow and logic so convoluted, it may be faster to write a new version of the application from scratch.

It was not by accident that the C-64 is upward compatible from the PET rather than the VIC-20. There is a large amount of software written for PET and the C-64 was designed to make the conversion as easy as possible for software vendors and PET owners. Getting access to some of this software may require a little effort on your part. Libraries, public and institutional, may have back issues of computer magazines. Some of the user groups have a large amount of public domain material, some of which may already be converted to the C-64. Otherwise, be prepared to spend some time, money (Advanced Programmer Guides) and effort (learning the workings of the various sound, video and port chips and their various addresses). I see no easy solution.

The best place for information on PEEKs and POKEs is 'The Advanced Programmer's Guide'. Once we get a grasp of how the processor operates and how data is used by the various chips and BASIC, then the full power of PEEK, POKE, USR and SYS becomes available to the programmer. These are commands that allow us to escape the restrictions of BASIC and access/store data or execute machine language routines or other languages. There is little room for error in their execution, and program crashes can be as spectacular as the expected results. If you have been following the series 'An Introduction to Assembly Language Programming on the VIC-20' in this magazine, then you are already on your way to understanding how

the processor uses and manipulates memory.

I think time will validate your decision to purchase the C-64. Even now, there are many application packages. As the end of the year nears, many vendors will be releasing new applications and games for the holiday season. Because of the recent price drop of the C-64, it will probably replace the VIC-20 as Commodore's low end home computer. I have always viewed the VIC-20 as a short term solution because of limited memory and the single control port. The VIC-20 I own is destined to become a smart communications terminal. The old PET is still on line doing what it does best, editing text and assembling machine language programs. As long as a computer is still working, there is no urgent need to upgrade the software to the next model; enjoy the best of both worlds. I never did upgrade the PET to BASIC 4.0 as I perceived it would be very expensive to update all the software and it was a mundane solution at best for a new DOS syntax. I did upgrade DOS ROMs in the disk drive to version 2A so I could use relative records. (It is the same combination of BASIC 3.0 and DOS 2A that ended up in the C-64).

These comments may not be helpful to you, E.L. However, your experience may be useful to our other readers who are considering the prospect of trading in the VIC-20 for a C-64. The C-64 is not compatible with the VIC-20 for reasons stated above. A few bucks saved on a trade-in of hardware can prove to be a very expensive lesson, when you realize that the cartridges and software are not compatible. Now that I have popped the expectation bubbles, remember that a little prudence can go a long way in avoiding the frustration E.L. writes about.

George Gaukel
Staff Writer

Dear Editor,

I appreciated your recent article "Array Assignment Sort" (Commander, May 1983,pp 40-41). The sort is much faster than more complicated basic sorts. Amazingly, sort time is a function of the square root of the number of elements to be sorted for smaller numbers, and is almost constant for larger numbers. Other sorts cannot even claim a linear relationship. Of course memory requirements demand that the number of elements to be sorted (or, at least, the values assumed) fall within a modest range, since array size is determined accordingly. In essence, the sort uses the power of basic to offset the time demands of the basic interpreter. Furthermore, the sort can be simplified by eliminating array b—see the enclosed improved version.

The role of array b is to index all possible values taken by the elements to be sorted and, for each index, to tell whether or not that value appears among the elements to be sorted. This technique is adaptable to programming the "sieve of Eratosthenes". This is an ancient method for determining all the prime numbers less than or equal to a given number n (a prime number is a whole number evenly divisible only by itself and 1). I enclose a page from an old Scientific American that has a nice chart illustrating the procedure.

The idea is this. Establishing an array a of dimension n initializes all the a(i) to 0. 2 is prime but its multiples aren't, so these are sieved out by placing a 1 in appropriate array locations: a(4), a(6), a(8), etc. We do the same for the next prime number: 3. Then we look for the next value i such that a(i) is still 0. This number (5 in this case) is the next prime, so we record this fact and sieve out all its multiples. And so forth. We can stop at the square root of n,

since if a number less than or equal to n has a proper prime factor, then at least one such is less than or equal to the square root of n. All remaining numbers that haven't been sieved out (i.e., for which a(i) = 0) are prime.

Sincerely, Michael Bertrand

Program

```
 5 rem  **improved version of "array ass
 ignment sort"**
 10 input"number of items to be sorted";n
 20 input"largest value to be sorted";z
 50 dima(n),c(z)
 70 forj=1ton:a(j)=int(rnd(1)*z):printa(j)
 ,:nextj:print:print
 100 forj=1ton:c(a(j))=c(a(j))+1:nextj
 110 fork=0toz-1:ifc(k)=0then125
 120 forq=1toc(k):printk,:nextq
 125 nextk
 130 end
ready.



 10 rem  **prime finder program**
 20 rem  ** by michael bertrand;201 divis
 ion st;madison,wi 53704**
 30 input"n";n:dim a(n):rem  **all the a(
 i) are initialized to 0**
 40 p=2:gosub 130:if n=2 then 90
 42 p=3:gosub 130:if n=3 then 90
 44 if n=4 then 90
 50 p=p+2:if a(p)=1 then 50:rem  **p is p
 rime only if a(p)=0**
 60 if sqr(n)<p then 80
 70 gosub 130:goto 50
 80 for i=p to n:if a(i)=0 then k=k+1:prin
 t i,:rem **counts & prints remaining
 85 next i :rem **unsieved numbers
 90 print:print:print "there are";k;"prim
 es <=";n:end
 128 rem  **the following routine sieves
  out multiples of p**
 130 k=k+1:print p,:for i=1 to int(n/p):a
 (p*i)=1:next i:return
ready.
```

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
73	74	75	76	77	78
79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100		

The Sieve of Eratosthenes *(from Scientific American, March 1964, Mathematical Games by Martin Gardner)*□

Gentlemen:

Even using a disk, the USER.DATA program takes a long time to load and run. Is there any way to speed this up?

Thank you,

John Smithfellow

Dear John,

If you are using a disk, then you have the capability to generate a binary file directly from the DATA statements. Change lines 110 thru 150 as follows.

```
110 OPEN8,8,8,
"0:USER.EXC,P,W"
115 REM WRITE START
ADDRESS $C000
120 PRINT #8,CHR$(0);
125 PRINT#8,CHR$(192);
130 REM WRITE THE FILE
135 FOR AD = 49152 TO 52946
140 READ DA
145 PRINT#8,CHR$(AD); : NEXT
150 CLOSE8 : END
```

Note the semicolons in the PRINT# statements are VERY important. Do not omit these. We

can now boot the binary file using the following.

```
10 IF ZZ=0 THEN ZZ=1
: LOAD"0:USER.EXC",8,1
20 IF ZZ=1 THEN POKE785,0
: POKE786,193
30 IF ZZ=1 THEN A=
USR(0),0,1,4 : A=USR(1)
```

If we like we can continue this sequence for loading other binary files.

```
40 IF ZZ=1 THEN ZZ=2
: LOAD"0:UTILITY1",8,1
50 IF ZZ=2 THEN ZZ=3
: LOAD"0:UTILITY2",8,1
```

We can get away with the above because the C-64 will allow overlay of programs while executing by using the LOAD command. If we are careful to put our utilities into areas not used by BASIC, then we could load any number of binary utilities. After a LOAD command, the program will restart execution at the first BASIC line of the program. Variable ZZ is used to control which lines are executed after a program restart. ZZ is set to zero when the RUN command is given.

We could also use this overlay capability as intended, to break a very large BASIC application into smaller segments. If we do this, we must remember that the first program segment must also be the largest, or we will destroy our variables. We can also get around this problem by using a monitor to save a small boot or menu driver along with a large chunk of memory past the end of the program.

```
.s "0:boot",08,0801,5000
```

As long as this is larger than any called application, then we should be ok. A good application for this would be a menu of BASIC games or tutorials for youngsters not up to handling the more complex disk operations. Also remember that all the called segments, when their task is finished, must reload the menu.

George Gaukel
Staff Writer

Gentlemen:

I enjoy your magazine very much and find it very informative. I do however have a question. How do I get a program that was written on my "64" to list on my 8032? I would like to use the utility ROM in the 8032 to re-number, and clean up in general, programs that I have written for the "64".

Thank you, Jerry Fellows

Dear Jerry,

Although I do not have a 8032, I do have PET. I will pass on some of my experiences with the PET and maybe help you with your problem.

The first two bytes of a program file on a disk are interpreted by the PET as an absolute load address. The C-64 will ignore this address (unless an appropriate secondary address is given) and load at the current start of BASIC memory. When I save a program from the C-64 this current start address is written to the disk file (default is 2049/$0801. When the PET loads this program, the program is stored starting at the C-64 save address not the PET start of basic address of 1025/$0401.

The best utility I have seen for changing the load address of a program file is one which alters the first sector of the stored disk program. To keep things simple, we will just make a duplicate copy on the disk with a different start address.

```
10 OPEN8,8,8,
"0:OLDFILENAME,P,R"
20 OPEN9,8,9,
"0:NEWFILENAME,P,W"
30 REM GIVE $0401 AS START
40 PRINT#9,CHR$(1);
50 PRINT#9,CHR$(4);
60 REM DROP OLD START
70 GET#8,IN$:GET#8,IN$
80 REM COPY THE PGM
90 GET#8,IN$:ZT=ST
100 IF IN$=""
THEN IN$=CHR$(0)
110 PRINT#9,IN$;
120 IF ZT=0 THEN 90
130 CLOSE8 : CLOSE 9
140 END
```

If the start address of the 8032 is different from $0401, then change lines 40 and 50. We now have a file while will load properly into PET or C-64.

Now the fun begins. If the Basic Tokens (single byte representations of BASIC commands) are the same for the host machine and the C-64 (as they are on the PET), then only minor editing problems will be encountered. the POUND sign becomes a backslash on the PET and strings which contain function, control or color keys should not be edited, as they do not exist on the PET (we can delete these but cannot add them). Also if the host BASIC contains commands which are not available on the C-64, do not edit them in (such as the BASIC 4.0 DOS commands).

If the token sets are different (the LIST will look like garbage), then we have real problems. A token translator program may be needed in this case. If the basic words which reference line NUMBERS (GOTO, THEN etc.) seem intact, then try the renumber utility.

If a cassette is being used, then things become more complex. Save the basic program from the C-64 and load into the host. Using a monitor with a TRANSFER command, move the program to its correct starting address. Save the program back to cassette using monitor SAVE command and the new start and end addresses. This relocated file is now ready for loading and editing if there are no problems with the tokens. The monitor can also be used with disk files, but there is also the greater possibility of errors with this technique.

George Gaukel
Staff Writer

Dear Editor:

Please reference the article "Array Assignment" by David

Continued on page 138

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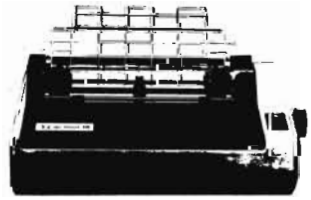

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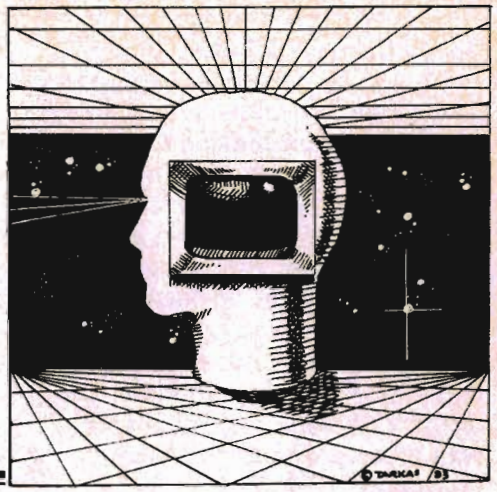
A Comprehensive Editor/Assembler for the VIC-20 and C-64

Part II

by Eric Giguere



This is the second program composing the editor/assembler EDIT/ASM for the VIC-20 and Commodore 64. If you typed in the Editor module from the last time, you're probably itching to create your new machine language program. You'll have to hold off that itch for a while because first you are going to have to type in the program following this article—all 8K of it—and read the instructions for using it. And if you have not typed in the Editor module (shame on you!!) but are still interested in this assembler business, then I can always send you a copy (detailed at the end) or you can start typing it in now, and leave this until later (it will not do you any good without the Editor). And if you don't know what the heck I'm talking about, then read on, dear reader, read on...

Assembly Language? What's That?

The key to understanding what this article is about is in understanding the term "assembly language". If you've been around computers for a while, you probably know that everything the computer does is done with numbers, each representing a different "command" or instruction. This is called MACHINE LANGUAGE and without it the chip in your VIC or C64 wouldn't be able to work and communicate and you would have a dead machine on your hands. That's why machine language is so important to a computer.

Unfortunately, we humans cannot cope well with numbers. After all, who really feels like memorizing 200 or more numbers? Because most people cringe at this kind of thing, some smart person decided to create a coding system to replace all those numbers. This is called ASSEMBLY LANGUAGE and uses short, 3-letter words to represent all those numbers. This system has worked very well so far, simply because humans work better with symbols than numbers. Let me illustrate this. Take the instruction "Load the Accumulator with the value 1" (the accumulator is a sort of "variable" in assembly language). It can be coded two different ways: in machine language

```
169 1
```

or in assembly language

```
LDA #01
```

Is it not easier to remember "Load the Accumulator" as LDA than as the value 169? It is, even though both mean the same thing. And every instruction has an easy-to-remember code like that, called a MNEMONIC (for "memory jogger"). This is what makes assembly language much easier than machine language, since the code for a particular instruction relates to the instruction itself and is easy to remember.

Hopefully you now have some kind of a grasp on the idea behind assembly language. If you're interested in learning more about it you can get a book on assembly language or you can read my monthly Commander column "Assembly Language Programming on the VIC-20" (it also applies to the C64), starting with the first issue of Commander. Of course, I don't expect you to understand assembly language right off the bat, but it's always good to have a notion of what it is.

What is an Editor/Assembler?

There is only one thing wrong with assembly language—the computer cannot understand it. It only understands numbers (machine language). Yet assembly language is simply machine language in symbolic form. All that has to be done, then, is to find some way to convert the assembly language into machine language (not as easy as it sounds, I'll tell you that!). This is done by a utility called an "assembler". First you create your assembly language program with an "editor" (sometimes called "text editor") which lets you input your code and edit it with special commands (sort of like a mini-word processor). When satisfied with your code you save it to disk or tape and load in your assembler. This program reloads your assembly language program and converts ("assembles",

hence the name) the symbols into numbers or machine language. This converted code is then saved to disk or tape and can then be loaded as a bona fide machine language program, which your computer will understand and execute. This is the purpose of EDIT/ASM. You create your assembly language code with the Editor module and assemble it with the Assembler module, giving you an easy and inexpensive way to create machine language programs.

A Note on the Editor Module:

Before going on any further with the assembler I want to make a comment about the Editor module of EDIT/ASM. After the program listing I have listed several changes you might wish to make. Specifically, there is a new input routine starting at line 1050. The old one had two problems: it wouldn't work on the C64 and it lets you enter illegal but invisible characters (such as cursor commands) that could raise havoc with the assembler. The routine I have provided here will solve these problems. (To change it for the PET/CBM: change the P = PEEK(209) + PEEK (210)*256 + POS(0) in line 1052 to P = PEEK(196) + PEEK(197) *256 + POS(0) and it should work.) Also, a few POKEs have to be changed for it to work on the C64. These are shown after the input routine. If you don't change them then the C64 will freeze up and you'll have to power down and restart. Finally, line 1057 of the input routine will require you to use the abbreviations for POKE, PRINT and GOTO to enter the line (see page 130 of the C64 manual).

The Assembler

When you RUN the Assembler module the screen will clear and it will ask you for "LIMIT?". Enter in a number according to how much memory you have. This is the maximum number of lines the computer will accept from a file (a 13K VIC can accept 200 lines). The screen will clear once more and a title will appear at the top. You will be presented with the prompt "SOURCE FILE:". This is your cue to type in the name of the file you want assembled, the "source" file. Type it in just like you did in the Editor module when you saved it—it will automatically add a ".SOU" denotation to the end of the filename (which will have been truncated to 12 characters). It will then ask you for "TAPE OR DISK?", with the default being disk. This is the device from which your source file will be loaded. Simply hit RETURN for disk or any other letter and RETURN for tape.

Next it will ask you "OBJECT FILE:". This is the opposite of the source file and will be the name of your machine language program (plus the suffix ".OBJ") once assembled. Simply press RETURN to keep the same name as the source file (this will not erase the source file), or type in your new filename and press RETURN. Again it wil ask you for "TAPE OR DISK?". This determines to which device your program will be saved to. Unfortunately at the present time I haven't completed the tape routine, so choosing tape will display a message denoting this and stop the program. The reason being is that creating a program on tape is not as easy as on disk, where you simply change one piece of information in the filename to save it as a program. If you try the same on cassette, it will instead create a sequential file which cannot be loaded into the computer. And I can't do a straight save to tape because the program is only assembled one byte at a time. I'm working on a solution, though, and hopefully by next month it will be ready for publication.

The next prompt asks if everything is correct. If you made a mistake or want to stop, simply enter an answer other than 'Y'. It will then ask you all over for the filenames and devices. Entering a QUIT for filename when it asks for the source file will exit you from the program. If everything is correct simply press RETURN. The program will then search for and load your file into memory. You will be asked if you want a new origin (origin is where in memory the program starts). If you don't have an ORG (origin) command in your program you will be forced to enter an origin. If you do have an ORG statement but you want to start the program elsewhere, then you can enter 'Y' and the new origin. Otherwise the program will search for and display the origin.

The next message asks you to press RETURN when ready to start assembling. This is done so you have time to change disks or tapes. When ready press RETURN and the computer will proceed to create the program file. The next three messages are just signals to show where the computer is at. First it will say "OBJECT FILE NOW OPEN" meaning the file has been properly prepared. Second message will say "NOW GETTING SYSTEM EQUATES..." and the third will say "GETTING ADDRESSING MODES..." When it is finished with these it will ask if you want the output to go to the screen or the printer, with the screen as default. It will then display the file to the specified device, showing line number, address, byte values of instructions, and the line as you originally typed it in. Be warned, though, that the output was designed for an 80-column printer and you could see a few extraneous values on the screen—these are printer commands, nothing to worry about. Once the assembly is complete a message and a symbol table will be displayed (a symbol table is a list of all labels and their values) and the object file will be closed. If everything has gone right then your program

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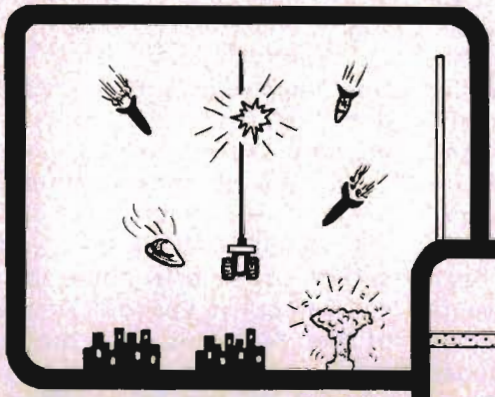
LASER COMMAND by Bob Burnett



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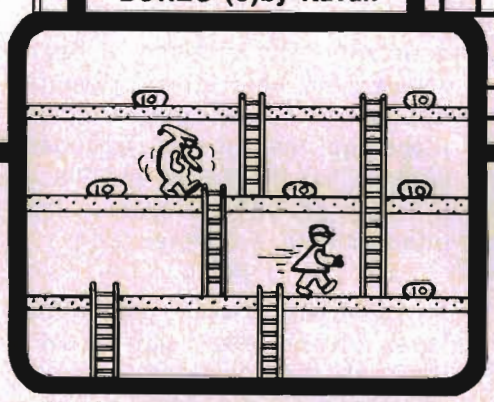

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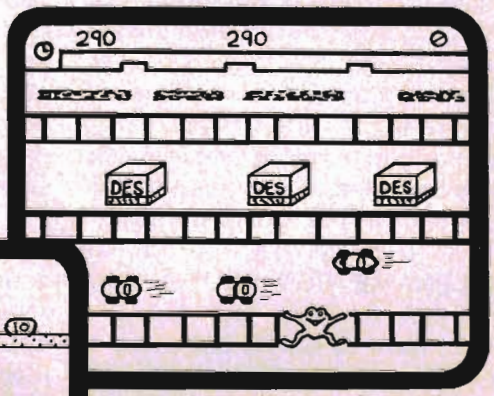

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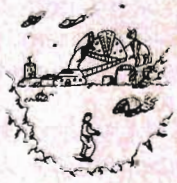

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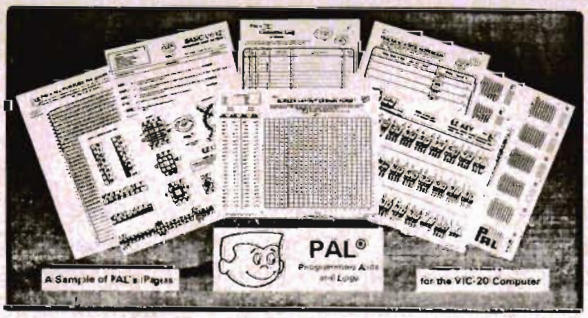

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should be able to load and execute in the computer.

Errors

Sometimes things just don't go right and you get an error message. First thing to do with an error is to make sure it didn't stop the program. If it did then **always** enter GOTO 350 and RETURN. This will close all active files and restore the RUN/STOP key. Doing anything else might cause havoc with the files; a dangerous practice with a disk drive. If you get disk I/O errors, such as ?FILENAME NOT FOUND, then the program will end but you won't have to GOTO 350 since it will have done so already. But any other kind of program error should be first cleared with a GOTO 350.

The remaining errors do not stop the program, but they will ruin your object file and you'll have to correct and reassemble your program to get it to work properly. The main error messages are:

ILLEGAL OPCODE—no such mnemonic exists

ILLEGAL ADDRESSING MODE-no such addressing mode exists for that instruction

NO SUCH LABEL—your program refers to a nonexistent or misspelled label

TOO LONG CONDITIONAL BRANCH—your branch exceeds 128 bytes backward or 127 bytes forward

NO DATA—usually occurs when there is no data following an ASC or BYT or DST instruction

NO DELIMITER—if the data for an ASC instruction does not end with a delimiter

ILLEGAL TABLE LENGTH—if the length of a DST table is less than 1

VALUE OUT OF RANGE—if the number is too big to fit in the allocated bytes

These errors happen during the final stage of assembling, when the file is displayed or printed. Other minor errors may occur before, but these are the ones to watch out for.

Special Commands

Along with the regular instructions available to the 6502/6510 chip, an assembler usually has a few other "Pseudo-opcodes" (opcode is another term for instruction). These "fake commands" are not real instructions but rather directives to the assembler program to carry out special commands. To simplify things and save memory I have only supplied EDIT/ASM with five Pseudo-opcodes: ASC, BYT, DST, EQU and ORG. Explanations of each follow. To use these Pseudo-opcodes you simply enter them in place of the normal opcodes while using the Editor and Place the data needed for each in the operand field. Example:

```
LABEL EQU $500F
```

This instruction would assign the label LABEL the value $500F. Refer to the following explanations for more details.

ASCii string

This is a handy little command that lets you easily store ASCII strings in memory (for messages and the like). Instead of having to store each character separately in memory one ASC command will do it for you, efficiently and neatly. The following is an example:

```
MESSGE ASC 'EDIT/ASM IS
   GREAT!'
```

This example will place the string EDIT/ASM IS GREAT! at the current assembler memory location and assign the label MESSGE to point to the first letter of the string (E). Notice the use of the apostrophe to denote the beginning and end of the string. The Assembler will take the first character it finds and use this as the delimiter or denoting character. This is done in case you wish to use the apostrophe itself within the string, as the following:

```
MESGE2 ASC :EDIT/ASM'S
   FEATURES ARE GREAT!:
```

Here the colon (':') is used as a delimiter, so the whole message between the two colons will be stored in memory.

If the Assembler encounters the delimiter before the end of your intended phrase it will assume that it has in fact reached the end:

```
MESGE3 ASC .THIS IS GREAT.
   HOW DO YOU LIKE IT?.
```

Only the string THIS IS GREAT in this example will be placed in memory. The rest will be ignored.

Also, the string has to end with the deliminating character or else the "NO DELIMITER" error will be generated. This is done so that you can put in spaces at the end of the message. The message itself can be as long as will be allowed by the Editor, thus no comments can be included on the same line as an ASC instruction.

BYTe storage

BYT is used to place individual bytes in memory. It must be followed by a list of values, all separated by commas as in DATA statements. Values can be in hex or in decimal or both. The following example illustrates the syntax:

```
VALUES BYT $F2,34,$54
```

This will place the values $F2, 34 and $54 into consecutive memory locations while assigning the label VALUES to point to the first value ($F2). Note that the last piece of data on the line must not be followed by a comma otherwise an error will be generated. Again, as in ASC you cannot have a comment following a BYT statement on the same line.

Define Storage Table

DST is useful for generating internal storage tables. Once encountered DST will create a blank area in memory of specified length and skip to the end of this table. Example:

```
TABLE DST 15
```

This example will skip ahead 15 memory locations and assign the label TABLE the value pointing to the start of this table. The length of the table may be in hex or in decimal and must be greater than

```
10 REM ***************
12 REM *             *
14 REM *  EDIT/ASM   *
16 REM *-------------*
18 REM *  ASSEMBLY   *
20 REM *   MODULE    *
22 REM *-------------*
24 REM *             *
26 REM * (C)1983 BY  *
28 REM *             *
30 REM * E. GIGUERE  *
32 REM *             *
34 REM ***************
35 :
37 :
39 :
45 POKE36879,27:PRINTCHR$(142)"[CLEAR]L
IMIT";:INPUTLI$:LI=VAL(LI$):IFLI<1THEN45
55 R$=CHR$(13):P$=CHR$(16):QU$=CHR$(34)
:SP$="0000":HN$="0123456789ABCDEF"
70 DIMA$(LI+1),B%(LI+1),S$(LI),V(LI):X=
FRE(0)
72 FORI=1TOLI:V(I)=256:NEXT
75 REM ADD 'POKE788,194' TO LINE 80 FOR
 VIC-20
77 REM ADD 'POKE808,239' TO ABOVE LINE
FOR C64
80 GOTO2500
349 REM QUIT
350 CLOSE2:CLOSE3:CLOSE4
351 END
352 REM TO RESTORE STOP KEY ADD THE FOL
LOWING TO LINE 350:
353 REM 'POKE788,191' FOR VIC
354 REM 'POKE808,237' FOR C64
355 END
1000 CLOSE1:OPEN1,0:INPUT#1,IN$:PRINT:C
LOSE1
1005 X$=LEFT$(IN$,1):Y$=RIGHT$(IN$,1):R
ETURN
1010 FORY=0TO2:SP(Y)=0:NEXT:Y=0:FORZ=1T
OLEN(Z$)
1012 X$=MID$(Z$,Z,1):IFX$=" "THENSP(Y)=
Z:Y=Y+1:IFY>2THENZ=LEN(Z$)+1
1014 NEXTZ:A$="":B$="":C$="":D$=""
1016 IFSP(0)=0THENA$=Z$:GOTO1024
1018 A$=LEFT$(Z$,SP(0)-1):IFSP(1)=0THEN
B$=MID$(Z$,SP(0)+1):GOTO1024
1020 B$=MID$(Z$,SP(0)+1,SP(1)-SP(0)-1):
IFSP(2)=0THENC$=MID$(Z$,SP(1)+1):GOTO10
24
1022 C$=MID$(Z$,SP(1)+1,SP(2)-SP(1)-1):
D$=MID$(Z$,SP(2)+1)
1024 A=VAL(A$):B=VAL(B$):C=VAL(C$):D=VA
L(D$):X$=LEFT$(A$,1):RETURN
```

Continued on page 100

zero. (In case you're interested DST fills the memory locations with 0, or BRK).

EQUate labels

EQU is probably one of the most useful instructions an assembler can have. It is used to assign a specific value to a label. It looks like this:

```
PRINT  EQU $FFD2
```

This will assign the label PRINT the value $FFD2, which is the address of the Commodore output routine. EQU can be used to assign pure values instead of memory locations. For example:

```
BLANK  EQU 32
```

which will assign the label BLANK the value 32, a blank space. In fact, the assembler doesn't even make a difference on what you assign labels for. The following three lines demonstrate what I mean:

```
ZERO  EQU $00
      LDA #ZERO
      STA ZERO
```

The first line assigns the value 0 to the label ZERO. The second line then loads the accumulator (LDA) with the value (denoted by the # sign) of label ZERO, which is zero. The second line stores the accumulator in memory location ZERO, or $00. Thus the only discrepancy in assigning labels is how you use them within your program. (An EQU can be followed by a comment).

One more thing about the equates: they have to be at the start of the program. Once the Assembler encounters an opcode other than EQU or ORG (it skips comments) it will assume the end of equates has been reached and will start assembling the main part of the program. I did this to make sure that the Assembler did not waste any time going through the whole program searching for equates that probably aren't there. Good programming practice dictates that you do put the equates at the beginning anyhow. But if you place an EQU anywhere else in the program you'll get an

"ILLEGAL OPCODE" message.

ORiGin of Program

ORG defines the origin or start in memory of your machine language program. You can place it anywhere in the program, but usually it will be found at the beginning (this speeds up the finding process). ORG is a single statement followed by a value from 0 to 65535 ($0-$FFFF), in hex or decimal, as such:

```
ORG $033C
```

and may be followed by a comment. Only one ORG statement per program is allowed.

Note: if you forget to place an ORG statement within your program, the Assembler will ask you to input one of your own choosing.

Comments

As shown last time, comments may be usually placed in the fourth field of a line as in this example:

```
START  LDA #32 ;THIS IS A
         COMMENT
```

Another kind of comment also exists and takes up the whole line. It is used mainly for detailed explanations and formatting of the assembly language program. To create one of these comments the first character in the comment must be a semi-colon (';') or asterisk ('*') as in

```
;THIS IS A FULL LINE
   COMMENT
```

or in

```
*** FORMATING COMMENT ***
```

In each case the Assembler will simply skip the whole line when it encounters the ';' or '*' in the first position.

Other Features

I should mention that working on registers in immediate mode is facilitated by three special characters that can be placed right after the pound sign ('#') that signifies the immediate mode: ', and . The apostrophe will mean to use the ASCII value of the character immediately following, as in

```
LOAD  LDA #'A
```

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```
1025 L$=MID$(STR$(L),2):L$=RIGHT$(SP$+L
$+" ",4):PRINTL$;:RETURN
1040 PRINT"[DOWN][RED]DISK I/O ERROR -"
:PRINT"[DOWN][BLACK]"E" "E$:CLOSE2:CLOS
E3:GOTO350
1999 REM CONV. ROUTINE
2000 IFLEFT$(V$,1)="$"THEN2050
2010 DV=VAL(V$):IFDV<0THENDV=-1:GOTO2040
2015 M=0:IFDV<256THENM=2
2020 N=DV:N%(1)=N/4096:N=N-N%(1)*4096:N
%(2)=N/256:N=N-N%(2)*256:N%(3)=N/16
2030 N%(4)=N-N%(3)*16:HX$="$":FORI=1+MT
O4:HX$=HX$+MID$(HN$,N%(I)+1,1):NEXT
2040 RETURN
2050 DV=0:M=0:IFLEN(V$)<4THENM=2:IFLEN(
V$)<3THENDV=-1:GOTO2040
2060 FORI=2TO5-M:B$=MID$(V$,I,1):X=ASC(
B$)-48:IFX>9THENX=X-7
2070 DV=X*16↑(5-I-M)+DV:NEXT:GOTO2015
2100 E$="ILLEGAL OPCODE":GOTO2200
2110 E$="ILLEGAL ADDRESSING MODE":GOTO2200
2120 E$="NO SUCH LABEL":GOTO2200
2130 E$="TOO LONG CONDITIONAL BRANCH":G
OTO2200
2140 E$="NO DATA":GOTO2200
2150 E$="NO DELIMITER":GOTO2200
2160 E$="ILLEGAL TABLE LENGTH":GOTO2200
2170 E$="VALUE OUT OF RANGE":GOTO2200
2200 DV=234:GOSUB6050:PRINT#4,P$"20***
";E$;" IN LINE";G"***":GOTO3555
2500 POKE53280,3:POKE53281,1:REM POKE36
879, 27 FOR VIC-20
2510 PRINT"[CLEAR][DOWN][BLACK]EDIT/ASM
 ASSEMBLER MODULE"
2520 PRINT"[DOWN](C) 1983 BY ERIC GIGUERE"
2550 PRINT"[BLUE][DOWN][DOWN]SOURCE FIL
E:";:GOSUB1000:SF$=LEFT$(IN$,12):IFIN$=
"QUIT"THEN350
2555 PRINT"[DOWN]TAPE OR DISK? D[LEFT]"
;:GOSUB1000:SD=1:IFX$="D"THENSD=8
2560 PRINT"[DOWN]OBJECT FILE:";SF$:PRIN
T"[UP][RIGHT][RIGHT][RIGHT][RIGHT][RIGH
T][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT][R
IGHT][RIGHT]";:GOSUB1000:SF$=SF$+".SOU"
2562 OF$=LEFT$(IN$,12)+".OBJ"
2565 PRINT"[DOWN]TAPE OR DISK? D[LEFT]"
;:GOSUB1000:OD=1:IFX$="D"THENOD=8
2570 PRINT"[DOWN]CORRECT? Y[LEFT]";:GOS
UB1000:IFY$<>"Y"THEN2550
2575 PRINT"[DOWN]SEARCHING FOR "SF$
2580 IFSD=1THENOPEN2,SD,0,SF$:GOTO2600
2590 OPEN15,8,15,"I":OPEN2,SD,2,"0:"+SF
$:INPUT#15,E,E$:IFE>20THEN1040
2600 INPUT#2,L:IFL>LITHENPRINT"[DOWN][R
ED]FILE TOO LARGE":GOTO350
```

```
2610 FORI=1TOL:INPUT#2,A$(I):NEXT:CLOSE2
2615 PRINT"FILE NOW IN MEMORY."
2620 PRINT"[DOWN]DO YOU WANT A NEW ORIG
IN? N[LEFT]";:GOSUB1000:IFX$<>"Y"THEN2640
2630 PRINT"[DOWN]ENTER ORIGIN:";:GOSUB1
000:V$=IN$:GOSUB2000:OG=DV:IFOG<0THEN2630
2635 GOTO 2660
2640 PRINT"[DOWN]SEARCHING FOR ORIGIN."
2645 F=1:FORG=1TOL:Z$=A$(G):GOSUB1010:I
FB$<>"ORG"THEN2655
2650 V$=C$:GOSUB2000:OG=DV:F=0:G=L+1
2655 NEXT:IFFTHENPRINT"[DOWN]NO ORIGIN
FOUND.":GOTO2630
2660 PRINT"[DOWN]ORIGIN IS AT:[DOWN]":P
RINTTAB(4)HX$TAB(10)DV
2665 PRINT"[DOWN]PRESS RETURN WHEN READ
Y TO OPEN OBJECT  FILE:  [LEFT]";:GOSUB
1000
2670 PRINT"[DOWN]CREATING OBJECT FILE "
OF$:IFOD=8THEN2700
2680 PRINT"[DOWN]NO CASSETTE ROUTINE IN
 MEMORY.":STOP
2700 CLOSE15:OPEN15,8,15,"S:"+OF$:OPEN3
,SD,3,"0:"+OF$+",P,W"
2705 INPUT#15,E,E$:IFE>20THEN1040
2710 PRINT"[DOWN]OBJECT FILE NOW OPEN."
:IFSD<>8THEN2720
2715 IFSD=8THENDV=OG-INT(OG/256)*256:PR
INT#3,CHR$(DV);CHR$(OG/256);
2720 REM
3070 PRINT"[DOWN]NOW GETTING SYSTEM EQU
ATES..."
3075 FORG=1TOL:Z$=A$(G):GOSUB1010:IFB$<
>"EQU"THEN3115
3080 SY=SY+1
3085 S$(SY)=A$:IFASC(C$)<58THENV$=C$:GO
SUB2000:V(SY)=DV:GOTO3110
3087 X$=C$
3090 K=LEN(X$):IFRIGHT$(X$,1)<"A"THENX$
=LEFT$(X$,K-1):GOTO3090
3095 F=1:FORH=1TOSY-1:IFS$(H)=X$THENV=V
(H):H=SY:F=0
3100 NEXTH:IFFTHENPRINT"[DOWN][RED]EQUA
TE ERROR IN LINE:":PRINTG:F=0:GOTO3110
3105 V$=MID$(C$,K+1):GOSUB2000:V=V+DV:V
(SY)=V
3110 NEXTG:GOTO3119
3114 REM CHECK TO SEE IF AT END OF EQUA
TES
3115 IFX$<>";"ANDX$<>"*"ANDB$<>"ORG"THE
NSL=G:G=L+1
3117 GOTO3110
3119 PC=OG:PRINT"GETTING ADDRESSING MOD
ES..."
3120 FORG=SLTOL:Z$=A$(G):GOSUB1010:T=13
:IFX$=";"ORX$="*"THEN3240
```

Continued on page 102

which in this particular instance will load the accumulator with the ASCII value of the letter A (65). The other two commands (and) are used to load the low- and high-bytes respectively of a label. For example, say you wanted to change a vector (pointer) in page zero to point to a part of the assembly language program. You could use the following code:

```
VECTOR EQU $00
;
CHANGE LDA # START
       STA VECTOR
       LDA # START +1
       STA VECTOR +1
       RTS
START  ...
       ...
```

This will take the low-byte of the memory location START and place it in VECTOR and then load the high-byte and store that in VECTOR + 1. This is useful for loading values from labels greater than 255.

Note: Another feature is shown here: the use of '+1'. When referencing to a label you can use the plus sign ('+') to denote that you want a value added to it. Simply follow the + with a decimal value (no spaces in between) and it will add that number to the value of the label. Again another useful feature.

Typing in the Assembler

The program itself is fairly straight-forward and you shouldn't encounter any problems in typing it in (although some lines may require the use of abbreviated keywords on the C64). Don't try typing it in if you have less than 13K (VIC and 8K expander) because the program occupies about 8K of memory. Be careful when typing in the data statements—a mistake here could change any programs you assemble.

How the Program Works

The Assembler in EDIT/ASM is basically a three-pass assembler. That is, it operates by going through the assembly language code three times before com-

pleting the assembly. The first time involves searching for all the equates. The second involves getting all the addressing modes for each particular instruction (if applicable). The third and final pass goes through the program and actually produces the final code, getting the values for each instruction and addressing mode from the DATA statements and sending them to the output device. Following is a list of the major program sections and what each does:

45- 80	Program initialization
350	end routine
1000	input routine
1010-1024	routine to separate fields in a line of source code
1040	disk I/O error routine
2000-2070	hex/dec & dec/hex conv. routines
2100-2200	error messages
2500-2570	input of file information
2575-2615	source file load
2620-2665	find origin
2670-2715	open object file
3070-3110	equate routine
3120-3240	get addressing modes
3250-3555	assembly routine
3560-3590	symbol table printout
5000-5020	truncation routine (find label)
6000-6065	printout routines
9000-9990	data for instructions in alphabetical order

You can use this list as a guide for finding your way around the program if you want to examine it.

As you type in the data statements you'll probably notice that there is a set pattern to them. First there is the string for the instruction, followed by all possible

EDITOR ASSEMBLER—Continued from page 101

```
3125 GR=0:XX=0:Y=0:P=0:IM=0:RE=0
3130 IFA$<>""THENSY=SY+1:S$(SY)=A$:V(SY)=PC
3135 PC=PC+1:IFC$=""THENT=9:GOTO3240
3140 PC=PC-1:IFB$<>"ASC"THEN3150
3145 X=LEN(C$)-2:IFX<1THEN3240
3147 PC=PC+X:T=10:GOTO3240
3150 IFB$<>"BYT"THEN3165
3155 X=1:FORI=1TOLEN(C$):IFMID$(C$,I,1)
="","THENX=X+1
3160 NEXT:PC=PC+X
3162 T=11:GOTO3240
3165 IFB$<>"DST"THEN3175
3170 V$=C$:GOSUB2000:PC=PC+DV:IFDV<1THE
N3240
3172 T=12:GOTO3240
3175 PC=PC+2:X$=LEFT$(C$,1):IFX$="#"THE
NC$=MID$(C$,2):IM=-1:GOTO3230
3177 IFX$="("THENC$=MID$(C$,2)
3180 X$=RIGHT$(C$,1):IFX$=")"THENP=1:GO
TO3205
3185 IFX$="X"THENXX=1:GOTO3205
3190 IFX$="Y"THENY=2:GOTO3205
3195 IFX$=","THEN3205
3200 GOTO3210
3201 :
3205 C$=LEFT$(C$,LEN(C$)-1):GOTO3180
3209 :
3210 IFASC(C$)>64THEN3220
3215 V$=C$:GOSUB2000:IFDV>255ORLEN(C$)>
3THENGR=4
3217 GOTO3230
3220 IFLEFT$(B$,1)="B"THENT=9:GOTO3235
3225 F=0:FORI=1TOSY:IFC$=S$(I)THENIFV(I
)<256THENGR=0:F=1:I=SY+1
3226 NEXT:IFFTHEN3230
3227 GR=4
3230 T=GR+XX+Y+P+IM+1:IF(T=6ORT=7)AND(P
=0)THENT=T+1
3233 IFT=3ANDP=0THENT=T-1
3235 PC=PC+1:IFT<4ORT=9THENPC=PC-1
3240 B%(G)=T:NEXTG
3245 :
3247 :
3250 PRINT"[DOWN]DO YOU WANT TO ASSEMBL
E TO [REV]S[OFF]CREEN OR [REV]P[OFF]RIN
TER? S[LEFT]";:GOSUB1000
3255 PD=3:IFY$="P"THENPD=4
3260 OPEN4,PD:PRINT#4,R$R$"FILE NAME: "
;OF$R$:IFPD=3THEN3270
3265 PRINT#4,"LINE LOC.   CODE     LABEL
  OP. OPERAND          COMMENTS"
3267 PRINT#4,"---- ----   ----     -----
  --- -------          --------"R$
3270 PC=OG:FORG=1TOSL-1:GOSUB6000:Z$=A$
(G):GOSUB1010:GOSUB6050:NEXT
```

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values for each addressing mode and a finishing -1. The first digit of the possible values indicates the addressing mode, so don't leave out those 0's in front of some numbers. The other numbers after the first digit represent the actual value of the instruction as will be stored on disk or tape. For example, the data statement for LDA goes as follows:

9290 DATA LDA,3161,1165,(etc.)

The value "3161" translates into addressing mode 3, value 161, while "1165" translates into addressing mode 1, value 165. This means that if a particular LDA instruction is used with addressing mode 3 (see following chart) then the value output to the object device will be 161. Similarily, for addressing mode 1 the value 165 will be output. Here is the table of addressing modes:

Mode:	Signifies:
0	immediate mode
1	zero page
2	zero page,x
3	(zero page,x)
4	(zero page),y
5	absolute
6	(indirect)
7	absolute,x
8	absolute,y
9	implied (no operand) or branch
10	ASC instruction
11	BYT instruction
12	DST instruction
13	comment

Please note this list is only for your reference if you want to examine the program and maybe even add your own instructions. They are only used by the program internally and stored in the array B%(G)I and have no implication on how you must enter your assembly language program.

Branches

Before going on with other things, I should mention to you how to use branches within your assembly language programs. It's very simple: all you do is enter the branch you want and the label of the section of the program you

EDITOR ASSEMBLER—Continued from page 102

```
3297 :
3298 :
3299 :
3300 PC=OG:FORG=SLTOL:T=B%(G):RESTORE:G
OSUB6000:Z$=A$(G):GOSUB1010
3310 IFT>9THENONT-9GOTO3450,3480,3520,3
550
3320 READZ$:IFZ$="END"THEN2100
3325 IFZ$<>B$THEN3320
3330 READZ$:IFVAL(Z$)=-1THEN2110
3335 IFVAL(LEFT$(Z$,1))<>TTHEN3330
3340 V$=MID$(Z$,2):GOSUB2000:GOSUB6020
3350 IFT=9ANDC$=""THEN3550
3360 GOSUB5000:IFLEFT$(V$,1)="'"ANDT=0T
HENDV=ASC(MID$(V$,2,1)):GOTO3380
3365 IFV$<"A"THENGOSUB2000:GOTO3380
3370 F=1:FORI=1TOSY:IFV$=S$(I)THENDV=V(
I):I=SY+1:F=0
3375 NEXT:IFFTHEN2120
3380 DV=DV+AD:IFT=9THEN3410
3390 DH%=DV/256:DL=DV-DH%*256
3392 IFT=0ANDHB=1THENDV=DH%:GOSUB6020:G
OTO3400
3395 DV=DL:GOSUB6020:IFT>4THENDV=DH%:GO
SUB6020
3400 GOTO3550
3410 FS=DV-PC-1:IFFS<-128ORFS>127THEN21
30
3415 IF FS<0THENFS=256+FS
3420 DV=FS:GOSUB6020:GOTO3550
3450 IFC$=""THEN2140
3455 C$=MID$(A$(G),SP(1)+1):DE$=LEFT$(C
$,1):F=1:FP=0:FORY=2TOLEN(C$)
3460 Z$=MID$(C$,Y,1):IFZ$=DE$THENY=LEN(
C$)+1:F=0:GOTO3470
3465 DV=ASC(Z$):FP=FP+1:PRINT#3,CHR$(DV
);:GOSUB2015:PRINT#4,MID$(HX$,2);" ";
3467 IFFP=3THENPRINT#4,P$"20"A$P$"27"B$
P$"31"C$;
3468 IFFP/3=INT(FP/3)THENPRINT#4,R$P$"1
0";
3470 NEXT:IFFP<3THENPRINT#4,P$"20"A$P$"
27"B$P$"31"C$;
3471 PRINT#4:IFFTHEN2150
3475 GOTO3555
3480 IFC$=""THEN2140
3485 V$="":FORZ=1TOLEN(C$):X$=MID$(C$,Z
,1):IFX$<>","THENV$=V$+X$:GOTO3495
3490 GOSUB2000:IFDV<0ORDV>255THEN2170
3492 GOSUB6020:V$=""
3495 NEXT:GOSUB2000:IFDV<0ORDV>255THEN2
170
3500 GOSUB6020:GOTO3550
3520 IFC$=""THEN2140
3530 V$=C$:GOSUB2000:IFDV<1THEN2160
```

```
3540 PC=PC+DV:FORZ=1TODV:PRINT#3,CHR$(0
);:NEXT
3548 :
3549 :
3550 GOSUB6050
3555 NEXTG:PRINT#3,CHR$(0);:PRINT#4,R$"
ASSEMBLY COMPLETE."
3560 PRINT#4,R$R$"SYMBOL TABLE:"R$:X=0
3570 FORG=1TOSY:X=X+1
3580 DV=V(G):GOSUB2015:PRINT#4,LEFT$(S$
(G)+"------",6)+"-"+HX$+"    ";
3585 IFX=5THENPRINT#4:X=0
3590 NEXT:PRINT#4,R$:GOTO350
5000 V$=C$:HB=0:AD=0:LB=0
5001 Z$=LEFT$(V$,1):IFZ$="#"ORZ$="("THE
NV$=MID$(V$,2):GOTO5001
5002 IFZ$="<"THENLB=1:V$=MID$(V$,2):GOT
O5001
5003 IFZ$=">"THENHB=1:V$=MID$(V$,2):GOT
O5001
5005 F=LEN(V$)-1
5010 Z$=RIGHT$(V$,1):IFZ$="X"ORZ$=","OR
Z$="Y"ORZ$=")"THENV$=LEFT$(V$,F):GOTO50
05
5015 FORF=1TOLEN(V$):IFMID$(V$,F,1)="+"
THENAD=VAL(MID$(V$,F)):V$=MID$(V$,1,F-1
)
5020 NEXT:RETURN
6000 G$=MID$(STR$(G),2):G$=RIGHT$(SP$+G
$,4):PRINT#4,G$;" ";
6010 DV=PC:GOSUB2015:PRINT#4,MID$(HX$,2
);" ";:RETURN
6020 PRINT#3,CHR$(DV);:PC=PC+1:GOSUB201
5:PRINT#4,MID$(HX$,2);" ";:RETURN
6050 Z$=A$(G):GOSUB1010:IFX$="*"ORX$="
"THENPRINT#4,P$"20"A$(G):RETURN
6060 IFPD<>3THENPRINT#4,P$"20"A$P$"27"B
$P$"31"C$P$"42"D$:RETURN
6065 PRINT#4,A$" "B$" "C$" "D$:RETURN
8997 :
8998 :REM DATA FOR INSTRUCTIONS
8999 :
9000 DATA ADC,0105,1101,2117,397,4113,5
109,7125,8121,-1
9010 DATA AND,041,137,253,333,449,545,7
61,857,-1
9020 DATA ASL,16,910,514,222,730,-1
9030 DATA BCC,9144,-1
9040 DATA BCS,9176,-1
9050 DATA BEQ,9240,-1
9060 DATA BIT,136,544,-1
9070 DATA BMI,948,-1
9080 DATA BNE,9208,-1
9090 DATA BPL,916,-1
9100 DATA BRK,90,-1
9110 DATA BVC,980,-1
```

Continued on page 106

want it to branch to, as such:

```
        LDA VALUE
        BEQ ZERO
        RTS
ZERO    JSR CLOSE
```

This example will cause a branch to the code at ZERO if the accumulator is loaded with a zero value from VALUE. You can branch forwards or backwards, as long as the branch doesn't exceed 128 backward or 127 forward, in which case you'll get an error message. Apart from this, branches are real easy and useful to implement.

Output

As I mentioned before, the output the program gives was designed for an 80-column printer, though it will work on the screen. It will print the current line #, current address in memory, up to three bytes of machine-language code, and then your program line as you entered it. Any errors incurred here are also printed out. An example of the printer output of a test assembly is given at the end of the program listing.

Conclusion

I hope that you are satisfied with the two modules of EDIT/ASM. They provide an easy and efficient way to create and assemble machine language programs with barely any hassle. If you want to save your fingers from strain, you can send me $6, a blank disk and a self-addressed (no stamps please) DISKETTE MAILER to the following address:

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EDITOR ASSEMBLER—Continued from page 105

```
9120 DATA BVS,9112,-1
9130 DATA CLC,924,-1
9140 DATA CLD,9216,-1
9150 DATA CLI,988,-1
9160 DATA CLV,9184,-1
9170 DATA CMP,3193,1197,0201,5205,4209,
2213,8217,7221,-1
9180 DATA CPX,0224,1228,5236,-1
9190 DATA CPY,0192,1196,5204,-1
9200 DATA DEC,1198,5206,2214,7222,-1
9210 DATA DEX,9202,-1
9220 DATA DEY,9136,-1
9230 DATA EOR,365,169,073,577,481,285,8
89,793,-1
9240 DATA INC,1230,5238,2246,7254,-1
9250 DATA INX,9232,-1
9260 DATA INY,9200,-1
9270 DATA JMP,576,6108,-1
9280 DATA JSR,532,-1
9290 DATA LDA,3161,1165,0169,5173,4177,
2181,8185,7189,-1
9300 DATA LDX,0162,1166,5174,2182,8190,-1
9310 DATA LDY,0160,1164,5172,2180,7188,-1
9320 DATA LSR,170,974,578,286,794,-1
9330 DATA NOP,9234,-1
9340 DATA ORA,31,15,09,513,417,221,825,
729,-1
9350 DATA PHA,972,-1
9360 DATA PHP,98,-1
9370 DATA PLA,9104,-1
9380 DATA PLP,940,-1
9390 DATA ROL,138,942,546,254,762,-1
9400 DATA ROR,1102,9106,5110,2118,7126,-1
9410 DATA RTI,964,-1
9420 DATA RTS,996,-1
9430 DATA SBC,3225,1229,0233,5237,4241,
2245,8249,7253,-1
9440 DATA SEC,956,-1
9450 DATA SED,9248,-1
9460 DATA SEI,9120,-1
9470 DATA STA,3129,1133,5141,4145,2149,
8153,7157,-1
9480 DATA STX,1134,5142,2150,-1
9490 DATA STY,1132,5140,2148,-1
9500 DATA TAX,9170,-1
9510 DATA TAY,9168,-1
9520 DATA TSX,9186,-1
9530 DATA TXA,9138,-1
9540 DATA TXS,9154,-1
9550 DATA TYA,9152,-1
9990 DATA END
9995 :
9996 :
9997 :
9998 *** END OF PROGRAM ***
9999 :
```

Example

```
      FILE NAME: TEST.OBJ

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

0001 033C                    ORG $28          ;START IN CASSETTE BUFFER
0002 033C               ;
0003 033C               **********
0004 033C               *  TEST  *
0005 033C               **********
0006 033C               *
0007 033C               *
0008 033C               * THIS IS AN EXAMPLE OF A FORMATTING COMMENT
0009 033C               *
0010 033C               ; FULL LINE COMMENT
0011 033C               ;
0012 033C               BLANK  EQU 32            ;BLANK SPACE
0013 033C               RBLANK EQU BLANK+128     ;REVERSE SPACE
0014 033C               VECTOR EQU 0             ;STORAGE IN LOCATION $00
0015 033C               ;
0016 033C A9 00         START  LDA #0            ;GET LOW-BYTE OF ADDRESS
0017 033E 85 00                STA VECTOR        ;STORE IT AT $00
0018 0340 A8                   TAY               ;ALSO SET Y TO 0
0019 0341 A9 1E                LDA #30           ;LOAD HIGH-BYTE
0020 0343 85 01                STA VECTOR+1      ;STORE ONE BYTE AFTER PR
EVIOUS LOCATION
0021 0345 A9 20                LDA #BLANK
0022 0347 91 00         MAIN   STA (VECTOR),Y ;PLACE ACC. IN ADDRESS
0023 0349 C8                   INY               ;INCREMENT POINTER
0024 034A D0 FB                BNE MAIN          ;IF NOT ZERO THEN MAIN
0025 034C E6 01         ADD    INC VECTOR+1      ;ADD ONE TO HIGH-BYTE
0026 034E A6 01                LDX VECTOR+1
0027 0350 E0 20                CPX #32           ;IS IT AT THE END?
0028 0352 D0 F9                BNE MAIN          ;NO, CONTINUE
0029 0354 60            EXIT   RTS               ;YES, RETURN

ASSEMBLY COMPLETE.
SYMBOL TABLE:
BLANK--$20    RBLANK-$A0    VECTOR-$00    START--$033C    MAIN---$0347
ADD----$034D    EXIT---$0355
```

64 Conversion

NEW INPUT ROUTINE FOR THE EDITOR MODULE

DELETE LINES 1050-1072 AND TYPE IN THESE:

```
1050 IN$="":PRINT" ■■";
1052 P=PEEK(209)+PEEK(210)*256+POS(0):CH=PEEK(P):RC=128:TT=0
1054 POKEP,CH+RC:TT=TT+1:IFTT>10THENTT=0:RC=128-RC:GOTO1054
1055 GETX$:IFX$=""ORX$=CHR$(34)THEN1054
1057 X=LEN(IN$):IFX$=CHR$(20)ANDX>0THENIN$=LEFT$(IN$,X-1):POKEP,
CH:PRINT"■■ ■■";:GOTO1052
```

Continued on page 108

64 CONVERSION —Continued from page 107

```
1060 IFX$=CHR$(13)ANDX>0THENPOKEP,CH:PRINT:RETURN
1062 IFASC(X$)<32ORASC(X$)>90THEN1054
1065 IN$=IN$+X$:POKEP,CH:PRINTX$" ";:GOTO1052
1070 GOTO1055

READY.
```

LINE 1057 ON THE C64 WILL REQUIRE YOU TO USE THE SHIFTED CODES FOR POKE, PRINT AND GOTO (SEE PAGE 130 OF THE C64 MANUAL).

OTHER CHANGES TO THE EDITOR FOR THE C64:

ADD A NEW LINE:

40 POKE 53280,3: POKE 53281, 1

AND DELETE THE 'POKE36879' FROM LINE 45.

CHANGE THE POKE 788,194 IN LINE 70 TO POKE 808, 239

AND THE POKE 788, 191 IN LINE 350 TO POKE 808, 237

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Circle No. 87

Revive That Old "Commodore PET" Computer

by Robert E. Mergy

A Memory Expansion From 8K To 32K

Last month we upgraded our old PETs to 4.0 Basic. We now have the ability to run the latest programs and we have the new disk commands. This is not completely true unless you have 32K bytes of RAM. The cost of memory expansion covers quite a range and most are in the $300.00 range except for one. Better Solutions offers a board that costs $124.95 without the RAM chips. They also give you an address of a company that will sell you the RAM chips for a $1.25 each. The memory expansion kit comes with good instructions on how to install it.

This month I am going to show you new technicians as well as those of you who are old experts how to build a 32K bytes memory expansion. The trick is always the cost so let me rephrase the last sentence; a low cost 32K bytes memory expansion. As memory chip density is increasing the old chips of lower density become less expensive so it is natural to pick one of these older chips. Then there is the question, "Do I go static or dynamic?". This question is a good argument and there are those who will take each side seriously. But I do not want to get into an argument, I just want to expand my memory so I am going to choose dynamic RAM. I will show you why:

	DYNAMIC	STATIC
cost	$1.25/ea (4116)	$1.60/ea (2114)
power	462 mW (max)	550 mW (max)
# IC's/32K	16	64
voltage	+5, −5, +12	+5
support IC's	5	4

The 4116 dynamic RAM chips cost $20.00 and the dynamic RAM controller cost $7.95, the other 4 IC's cost $2.42. The balance of the parts cost is about $24.00. This will bring the total to about $55.00 for the material to wire wrap this memory board. The 2114 static RAM chips cost $102.00 and the balance of the material required costs about $60.00. This brings the total to about $160.00. 32K of dynamic RAM requires about 7½ watts of power, 32K of static RAM requires about 35 watts of power. That is 5 times the power consumption. If you were to add 32K of static RAM to your machine you would probably need to add a fan to keep your machine cool on a hot day if not every day. The short term cost is 3 times greater for the static RAM and the long term is 5 times greater power consumption. I'll take the dynamic RAM; it's a real bargain.

Take a look at figure 1 while we discuss the circuit. J-8 and I-8 are both 22 pin wire wrap sockets (or 18 pin) with which we will pick up the signals from the main PC board to operate our memory board. These designators also refer to actual sockets on "PET's" PCB. One caution, there are four different PCBs that were used on the older "PETs". The difference is the use of two types of ROM IC's and two types of RAM IC's. The ROM IC's used were part no. 6540, a 28 pin IC, and part no. 2316B, a 24 pin IC. The RAM IC's used were part no. 6550, a 22 pin IC, and part no. 2114, a 18 pin IC. The following table will help you to identify which combination you have. In the right front corner of your main PC board you will find an assembly number which should correspond to one of the following:

ASSY NO.	RAM IC	ROM IC
320081	6550	2316B
320026	6550	6540
320135	2114	2316B
320132	2114	6540

I have made this conversion for both types of RAM and it is just a few more jumpers and cuts on the 2114 type. We will try to cover both types for you.

IC's 2 - 5 are used to develop the logic to do the timing and generate the row and column select, also it generates the multiplex addressing. IC-1 is a dynamic RAM address multiplexer/refresh counter which actually addresses the RAM IC's. We use the 8 megahertz clock that is available on the main logic PCB at location C-9 pin 1. Using phase 2 as the data and the 8 MHz as the clock and gated with A14 and A15 via IC's 4 & 5 we develop RAS (row address select), CAS0 and CAS$ (column address select 0 and column address select 1). IC's 2 & 3 serve two purposes, first it clocks logic gates in IC's 4 & 5 and secondly it generates MUXA and MUXB, the multiplex clocks for the MC3242A, IC-1. This design has been checked and the timing

will work if you use prime parts, see figure 5. Beware of your source, seconds and thirds will not give the same results. Most likely they will not work as timing is critical and the delay of the signals through the logic gates can kill the ability to read and write memory. The difference in cost savings is pennies, but in hours of trouble shooting the cause can cost big $$$$$.

To begin you will need a piece of perfboard with .1" centers that is cut to 3.7" by 7.5". Having selected the proper sockets (22 pin or 18 pin) according to the type of RAM your machine has, locate one of the sockets in the upper left hand corner and glue it in place. See figure 2. Now, with an Exacto knife, cut two slots where the other socket will go. This is done because the spacing of the two IC's are not in .1" increments. The two IC's are actually spaced .25" apart. Count down from the pins of the upper socket 2 holes and then cut a slot that takes in 12 holes for each side of the socket. Place the other socket in the slots and using a rubber band to hold it in place install the board into main PC board sockets I8 & J8 respectively. Make sure that the sockets are seated all the way down. Now glue the loose socket to the perfboard. After the glue dries you may remove the board and place the other sockets according to figure 2, glue them in place.

We are now ready to begin assembly of the other hardware. Install a .01 microfarad capacitor (c5 thru c56) on each IC from Vcc to ground, Vbb to ground and Vdd to ground. Take note of the numbering of the pins of IC's, from the top we count counterclockwise, from the bottom we count clockwise. See figure 4a & b. Assemble the power supply portion of the memory board according to figures 2 & 3. Be sure to use a small heatsink on the 12 volt regulator. This should be all of the parts that will require soldering. We will not begin to wire wrap the remainder of the board. I suggest that you prepare a wire wrap list so that you minimize your mistakes. When you have finished wrapping, using the circuit buzzer that you built to test the ROM board (last month's project) go over the circuit very carefully and correct any mistakes as you find them. It is a good idea to go back to the beginning and start over every time that you repair a miswire. When you can go from front to back without a single mistake then you can feel sure that you have a good board.

We will now modify our main PC board. To begin you will need some ribbon cable. 18" of 10 conductors (color coded) will do the job. On the right side of the main PC board in IC row "G" you will find a chip P/N 74154, on the right end of this chip you will find 4 solder pads that are pass throughs. Using solderwick, remove the solder from these pads. These 4 pads are address lines A12, A13, A14 and A15 from left to right. Separate 4 conductors from the ribbon cable and prepare the ends by separating the 4 wires for about one inch. Strip the end approximately 1/4 inch. Solder one wire into each of the holes. Now dress the wires along side the PCB down to the level between the two rows of RAM and ROM sockets (row H and row I). Fold the ribbon over to make a right angle turn, (see figure 4c) dress the cable to the space between socket rows 7 & 8, there make another fold over to form another right angle. You are now in position to terminate these wires to pins 2, 3, 4 and 5 of IC socket J8. A12 to pin 5, A13 to pin 4, A14 to pin 3 and A15 to pin 2. If you folded and dressed the wire properly, then the wires will line up with the terminals without any crossovers.

Separate one strand of wire from the remaining six conductors and strip 1/4" from one end. Locate IC "C9" and follow from pin 1 downward on the bottom side of the main PCB about one inch there is a pass through. Remove the solder and then insert and solder the wire previously prepared. Route this wire downward and around the end of IC socket J8 and terminate to pin 1 and solder. This is your 8 MHz clock. The jumpers that you have just finished installing can be glued to the PCB with a rubber glue or RTV. Just be sure that the glue that you use does not harm the PCB and that it does not act

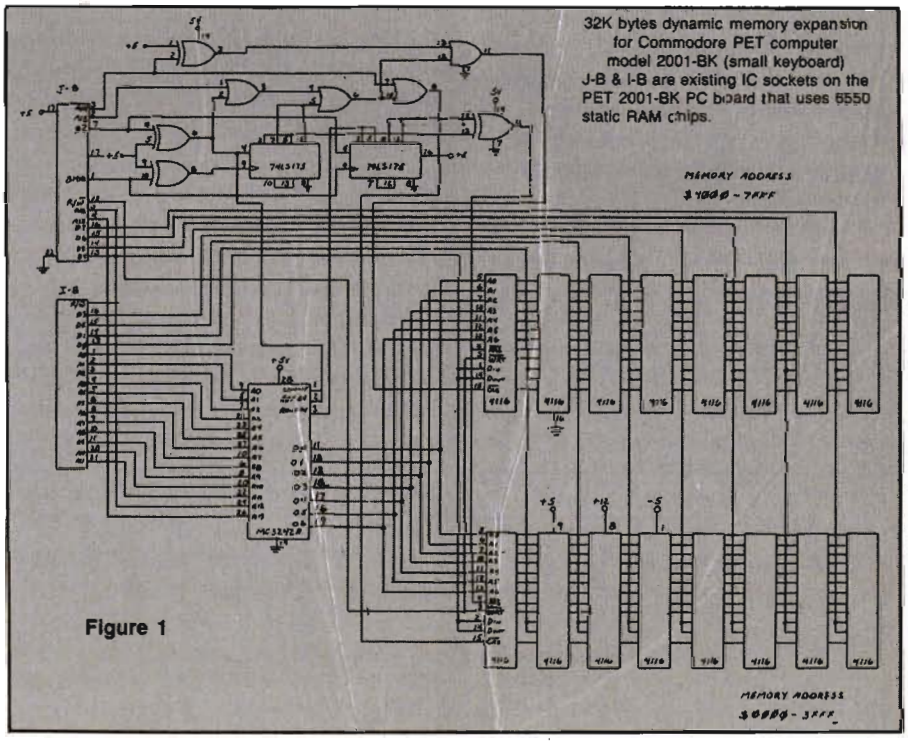


Figure 1

like a short to the circuit.

Now back to IC 74154, on the left end of this IC is a jumper wire, remove it. On the bottom side of the board install a jumper wire from A15 to the front most hold which will correspond to pin 2 IC "G3". This completes the jumpering of the main PCB. We will now make some cuts in the copper traces with an Exacto knife. Make two cuts about 1/8" apart on a trace and remove the copper between the cuts. Between IC sockets J7 & J8 cut the first 7 traces on the top of the PCB, these correspond to pins 1, 2, 3, 4, 5, 18 and 19. On the bottom side cut the trace that goes to pin 21, cut two traces that go to pin 18, one of these traces comes from pin 22 of the same socket.

If your machine has the 2114 RAM chips, then in addition to the above cuts and jumpers, you will need to add jumpers for A10 and A11. In row I, column 9 is a 74LS139 IC and on pin 14 is A10 and pin 13 is A11 which can be brought in to IC socket J8 pins 16 and 17. The rule is, if you connect a wire to the socket on the main PCB or to the wire wrap board, then it can only go to one signal. In this ram area there are a lot of jumpering from row to row. Just make sure that it only goes to the proper pin and nowhere else.

The power that is needed for your memory expansion is +5 volts at approximately 32 milliamps, +12 volts at approximately 560 milliamps and −5 volts at approximately 3.5 milliamps. These voltages are available on the PET transformer, see figure 5. You will need the remainder of the ribbon cable, with it you can make up a power connection, see figure 4d. Use a 5 position molex header on your wire wrap board and a molex plus on the end of the ribbon cable. Just be sure that you connect the power transformer correctly (see figure 5) or you will blow a fuse and a couple of diodes. If this should happen be sure to correct any mistakes and replace any blown parts. Caution, do not

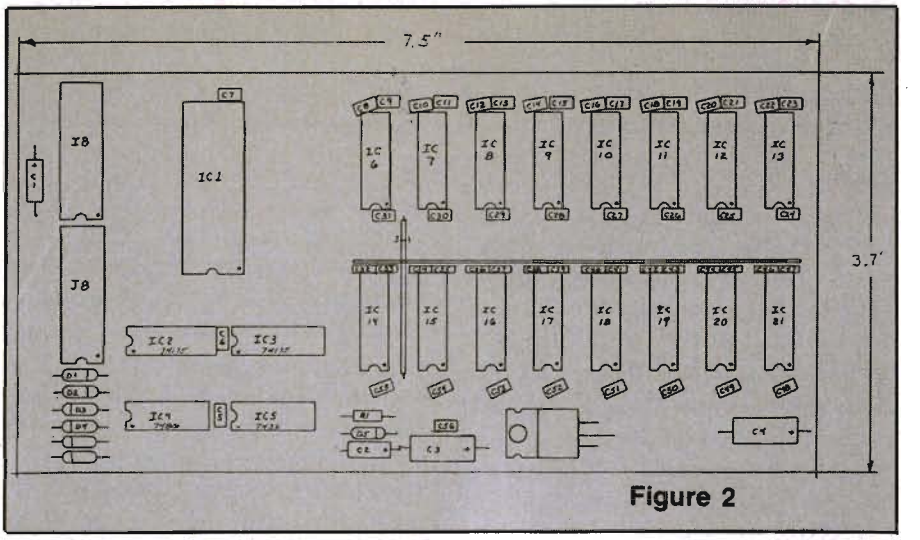


Figure 2

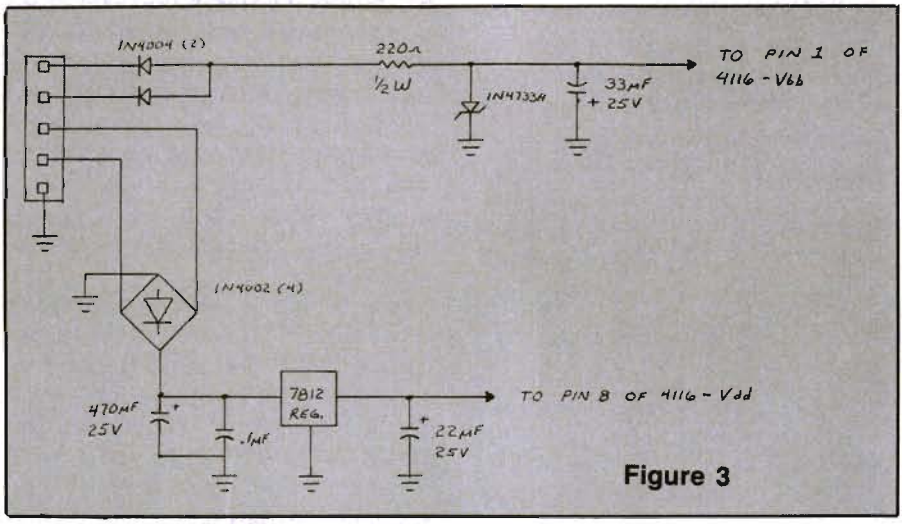
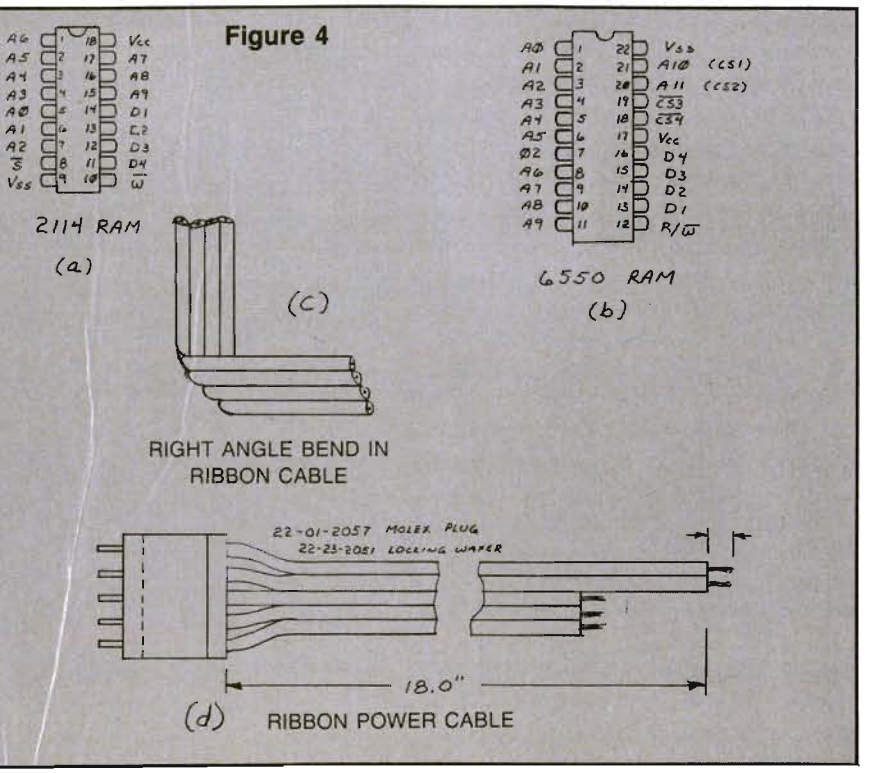


Figure 3

Figure 4



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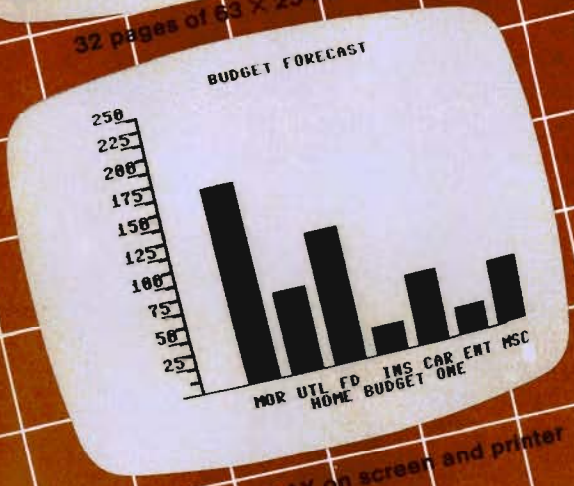

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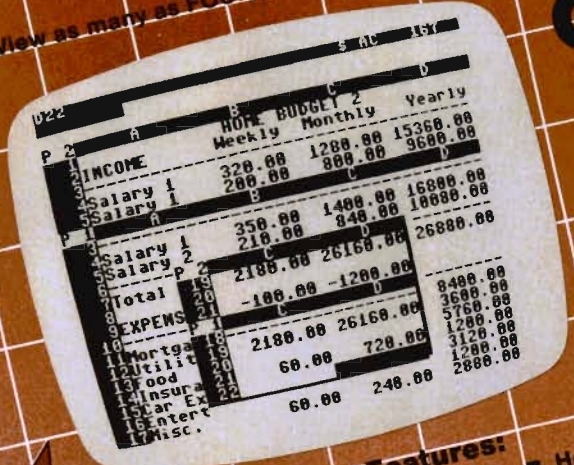

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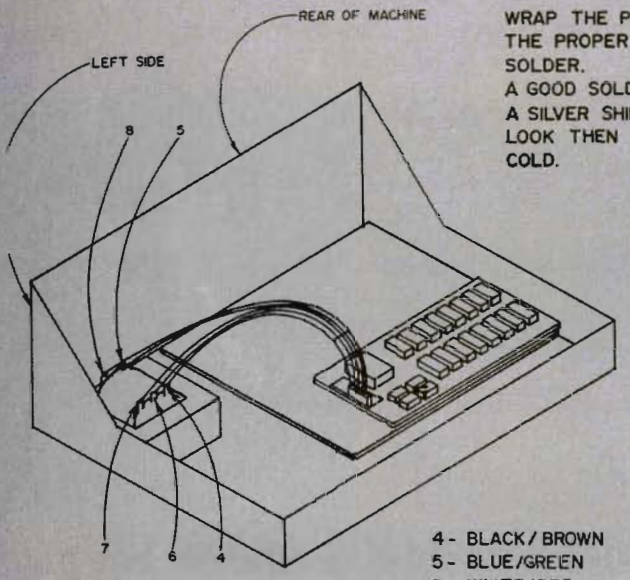
replace the fuse with a jumper or a larger fuse, you could damage the transformer.

Before you install any IC's into your board plug it in and turn on the power. With a volt meter check the voltages on RAM IC sockets pin1 = −5 volts +/− 10%, pin8 = +12 volts +/− 10%, pin9 = +5 volts +/− 10%. IC1 pin 28 = +5 volts, +5 volts on pins 14 of IC 4 & 5 and pin 16 of IC 2 & 3. If this works fine then remove the power and the board and install the IC's 1 thru 5, reinstall the board and power it up and again look at your voltages. Wait a few minutes and check for heat, it should get warm to the touch but not hot. I have included a little program (see figure 7) that you can burn into an EPROM (TMS2532) and then install it in the "F" ROM socket of your ROM board. This program will create reads and writes to the RAM and generate RAS, CAS0, CAS1, MUXA and MUXB signals so that you can look at them with an oscilloscope. If everything is good, then proceed to install the RAM chips. Be extra careful here because you can damage these parts with a static discharge from your hand. It is always best to make sure that you and the part are at the same potential, (preference is ground) a piece of aluminum foil and a piece of static foam will do the trick. Place the foil on the table then place the foam on top of the foil, place the board on the foil also. Remove one RAM chip at a time from the tube onto the foam (I use a dip sticker at this point) touch the foil with both hands then pick up the IC and install it into the board. When all of the RAM chips are installed replug the board and power it up. Always be sure to double check your work before applying power to avoid smoke.

Well, does it work? If not then don't get discouraged because we can fix it. If it does work, congratulations, you are getting good. For those of you who do not want to take on a project of this size, you can purchase a

Figure 5



WRAP THE PROPER WIRE AROUND THE PROPER TERMINAL AND THEN SOLDER.
A GOOD SOLDER JOINT WILL HAVE A SILVER SHINE. IF IT HAS A DULL LOOK THEN IT IS PROBABLY TOO COLD.

4- BLACK/BROWN
5- BLUE/GREEN
6- WHITE/RED
7- GRAY/ORANGE
8- VIOLET/YELLOW

SYMBOL	MIN	
T02H	440	—
T02L	560	—
TRAS	250	312
TMPXA	440	—
TCAS	265	312
TMPX0	T02H	—
T02H--	TCAS	—
TD2		
TD3	35	
	75	

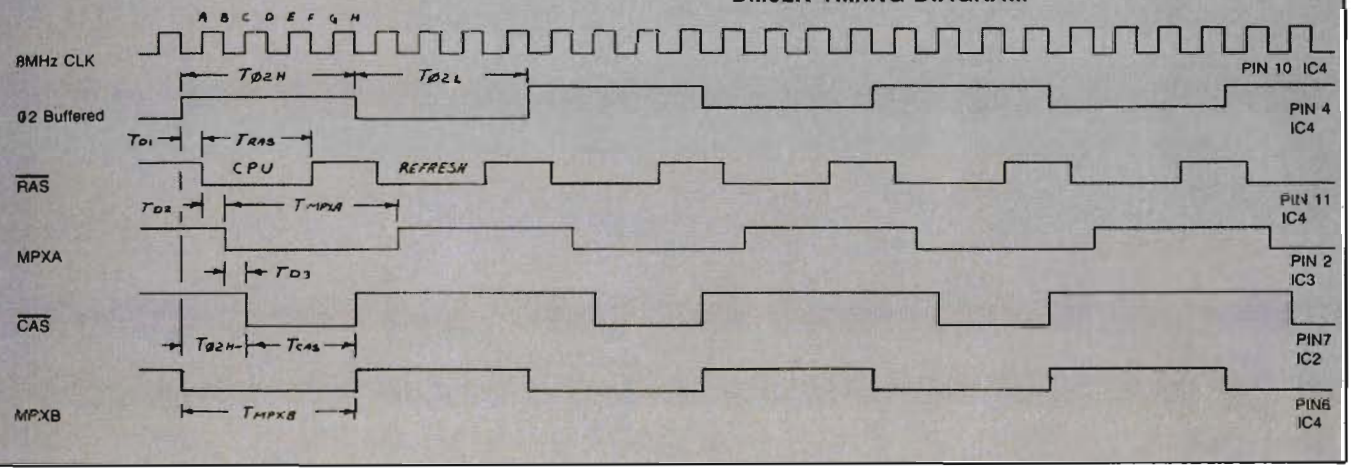
All times are in nano seconds and applies to A 1 MHz CPU

NOTES

1. Timing diagram is not drawn to scale.
2. Table values are for 4116's, 250nS devices
3. Install board and check power supply voltages (+5V, -5V & +12V) prior to installing RAM chips.

Figure 6

DM32K TIMING DIAGRAM



ready made PCB from BETTER SOLUTIONS, P.O. BOX 581, SANTA TERESA, NM 88008. Write for their information packet.

For those of you who are in trouble, we will try to bail you out. First, remove the power and then remove all of the IC's from your wire wrap board. Second, recheck your wire wrap list to the schematic and the pin out of the RAM socket of the RAM type used on your machine. Make any corrections. Third, check the wiring of the jumpers that you added, do they route the correct signal to the right pin on IC's 1 thru 5? Fourth, do you have the correct voltages on the correct pins of the IC's? If all of the above checks out, then I suggest that you find a friend with an oscilloscope, and using the timing diagram in this article, to help trace your problem.

Below is a check list to help you avoid trouble:

1. Make a point to point wire wrap list and check off each wire as you wrap.
2. Count pinout counterclockwise from the top and clockwise from the bottom.
3. Solder in all of the decoupling capacitors before you wire wrap.
4. Assemble the power supply and test it before you install the IC's.
5. Use 4116's 250 nano second RAM chips.
6. Use only prime IC's. Seconds do not meet the minimum access times.
7. Take your time, understand the instructions before you proceed.
8. Seek help from a friend that has a better knowledge about electronics.
9. When all else fails get professional advice and/or help.
10. You can do it, there is no magic in this. Just logic and some knowledge.□

Figure 7

```
319F  30AC-324B  MEMORYTEST2

END OF MAE PASS!

                0010            .CT
                0020            ;***MEMORY TEST SOFTWARE***
                0030            ;
                0040            .BA $3FFC              ;EPROM ADDRESS(RESET ADDRE
                0050            .OS
                0060            ;
3FFC- 00        0070            .BY $00
3FFD- FF        0075            .BY $FF
                0080            .FI D8 "MEMORYTEST2"

319F  30AC-324B  MEMORYTEST2

                0100            .BA $3F00
                0101            .OS
                0110            ;
                0120            ;    ****MEMORY TEST PROM****
                0130            ;
                0141 ZERO       .DE $0000              ;ZERO PAGE
                0142 SCREEN     .DE $8030              ;FIRST LINE SECOND CHR
                0150            ;
                0160            ;
3F00- A2 00     0170 BEGIN      LDX #0
3F02- A9 AA     0180            LDA #$AA               ;LOAD ACUM WITH A BYTE
3F04- 8D 00 00  0190            STA ZERO               ;STORE IN MEMORY $00
3F07- A9 00     0200            LDA #0                 ;CLEAR THE ACCUM.
3F09- AD 00 00  0210            LDA ZERO               ;READ MEMORY $00
3F0C- 8D 30 80  0220            STA SCREEN             ;WRITE TO CRT
3F0F- EA        0230            NOP                    ;WAIT
3F10- EA        0240            NOP                    ;WAIT
3F11- EA        0250            NOP                    ;WAIT
3F12- 4C 00 3F  0260            JMP BEGIN              ;RETURN TO THE BEGINNING
                0090            .EN
END OF MAE PASS!


 ---  LABEL FILE:  ---

BEGIN =3F00              SCREEN =8030              ZERO =0000

770000,3F15,3F15
```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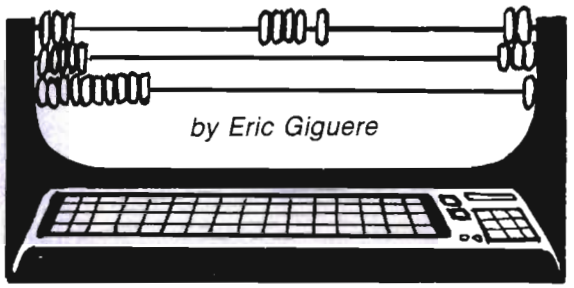
An Introduction to Assembly Language Programming on the Vic-20 Part VIII More Math



by Eric Giguere

Last month we got our first look at the often frustrating world of assembly language math instructions. This month we'll go a bit more in-depth and take a look at multiplication and division. Before continuing on with this month's topic, though, I'd like to correct a little error I made last month. I stated that math instructions only work on the accumulator. What I meant to say was that only ADC and SBC do so, while the next four I'll give you will work on memory as well as the accumulator. I guess I wasn't thinking. Oh, well. It happens.

Multiplication

Multiplication in assembly language is not as simple as adding or subtracting because there are no "real" multiplication instructions. Instead you must use a combination of other instructions. One way is to use a series of ADC instructions. Remember how you learned that multiplying 2x2 is the same thing as adding 2 twice? And that 5x4 is really the same as 5+5+5+5? This is the basic principle behind using ADC: simply add a number as many times as you need. As an example let's code 2x2, which could also be read as 2+2:

(See figure 1)

What did we do here? We managed to multiply VALUE by 2 and place the product in RESULT. Easy to understand, but awkward in coding (try multiplying by 26!). Also, how are we supposed to handle numbers when they exceed one byte? Searching for a more efficient routine we would probably use some kind of loop:

(See figure 2)

This little routine uses the X-register as a pointer for the number of additions left to make. The accumulator is loaded with 0. We then add 5 to the accumulator again and again until our pointer in X runs down to zero, after which we leave via a RTS (return from subroutine). The accumulator will hold first 0, then 5, then 10, 15, 20, and finally 25. This routine, then, has multiplied 5 by 5.

The above routine makes multiplication by larger numbers a bit easier but it still has problems. What if the number gets to be larger than one byte? We'd then lose the high byte and the number won't be right. Not only that, but the carry bit will be set and an extra 1 will be added with each ADC. No, using ADC alone for multiplication isn't the efficient solution.

ASL and ROL

The answer lies in two new instructions: ASL (arithmetic shift left) and ROL (rotate left). Used in combination with ADC, these instructions provide a simpler and far more efficient way to multiply bytes. ASL works like this: it takes a byte (the accumulator or a memory byte) and shifts all the bits one position to the left, placing the leftmost bit (bit 7) in the carry bit and a 0 in the rightmost bit (bit 0). As an example we'll ASL the value 129. Before the ASL it looks like this: (C represents the carry bit; it is clear at the moment)

```
C 7 6 5 4 3 2 1 0
0 1 0 0 0 0 0 0 0 (129)
```

After an ASL it will look like:

```
C 7 6 5 4 3 2 1 0
1 0 0 0 0 0 0 1 0 (2)
```

See what happened? Bit 7, a 1, was placed into the carry (we lost whatever value was there previously), a 0 was placed in bit 0, and the other bits simply shifted over to the left. The byte now equals 2 with the carry bit set. ROL operates in a similar fashion. Let's again use the number 129 but this time with the carry set:

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```
  C  7  6  5  4  3  2  1  0
  1  1  0  0  0  0  0  0  1
```

After a ROL it looks like:

```
  C  7  6  5  4  3  2  1  0
  1  0  0  0  0  0  0  1  1  (3)
```

What happened? The same thing as before (a shift left) except that the previous value of the carry was moved into bit 0 instead of being lost. This means that if the carry is 1 before a ROL, the byte we ROLed will have bit 0 set and vice-versa. This is the only thing that differentiates it from ASL. Otherwise they are identical (see figure 1 for diagrams representing these instructions).

Doubling

Right now you're probably wondering how ASL and ROL apply to multiplication. If you're smart you might have noticed that each time we perform an ASL or ROL (with the carry clear) we are in fact doubling the byte—multiplying it by two. As an example take the binary number %00000001 (1). After an ASL it becomes %00000010 (2). Do another ASL and it will become %00000100 (4). This proves that each time we perform an ASL we are also multiplying by 2. It also means that multiplication by 4 can be achieved by using two ASLs (2x2 = 4). Similarily, multiplication by 8 is achieved with three ASLs (2x2x2 = 8). Pretty neat, eh?

Of course there are some drawbacks to this method. One of them is that our multiplications will be accurate only if the number doesn't exceed one byte when ASLed or ROLed. This limits us to numbers less than 128 (2x128 = 256 which is greater than 255) when doing a single ASL or ROL (it gets worse if you do several). So what are we to do? Answer: use two bytes and the ROL instruction. Why? Remember that when you do an ASL bit 7 is transferred to the carry. If this happens to be 1 then it means that we have gone over 255 and should find a way to place that 1 into bit 0 of the high byte. It just so happens that ROL can accomplish that with no trouble. Thus the solution is as follows:

```
ASL VALLO
ROL VALHI
```

In case you're lost we'll go through the routine one step at a time. First let's assume that VALLO holds 129 and VALHI holds 0. When we do the ASL on VALLO it will become %00000010 (2) and the carry will be set (C = 1). Then we do a ROL on the high byte. It will shift the byte %00000000 over to the left and place the carry in the rightmost position. Because C = 1 there will be a 1 in bit 0 and the byte will then hold the value %00000001. To find the true value of the number stored in both bytes we multiply the high byte by 256 and add the low byte. The formula then is VALHI x 256 + VALLO, which translates into 1 x 256 + 2, or 258. Compare this with the previous value of 129 and you'll indeed see that we doubled the whole number (see figure 2 for a graphic representation of this process).

Mult. with Other Numbers

We have another problem: how do we multiply by a number other than a power of 2? The answer lies in the ADC instruction. Since we can only use left shifts to multiply by two we also have to add to reach the desired product. Say you want to multiply by 3. To do this you must first multiply by 2 using ASL or the ASL/ROL combination. The next thing to do is add the original value to this new value, giving the same result as if you multiplied by 3. The following demonstrates this:

Going through the program: INITLO and INITHI prepare the memory locations we will use by loading them with the value $0008 ($00 in high byte, $08 in low). We need two different locations so that the original values are saved for use in the addition. If we don't then the ASL and ROL will muck us up. MULT is the first part of the multiplication routine, where the ASL and ROL multiply the value by 2. ADDLO and ADDHI are the final parts of the routine which add the original value back into the new, doubled number, in effect achieving multiplication by 3. Not that hard, is it? If you're still not sure try to compare it with this BASIC program:

```
10 REM INITIALIZE
20 TE = 8:VL = TE
25 REM MULTIPLY
30 VL = VL*2
35 REM ADD FINAL VALUE
40 VL = VL + TE
45 REM NOW DO WHATEVER
   YOU WANT WITH VL
```

Of course, you could always replace the above with one line:

Program 1

```
LDA #2          ;VALUE TO BE MULTIPLIED
STA VALUE       ;STORE IT
CLC             ;ALWAYS CLEAR CARRY
LDA VALUE       ;GET INITIAL VALUE
ADC VALUE       ;ADD IT TO ITSELF
STA RESULT      ;STORE THE RESULT
```

Program 2

```
        LDA #5
        STA VALUE     ;STORE VALUE
MULT    CLC
        LDX #5        ;MULTIPLIER
        LDA #0
AGAIN   ADC VALUE     ;ADD TO VALUE
        DEX
        BNE AGAIN     ;IF X<>0 CONTINUE LOOP
QUIT    RTS           ;FINISHED
```

10 TE = 8:VL = TE*3

but this defeats the whole purpose of my example.

Division

Now that we have seen how to multiply we might as well learn how to divide. Basically, the procedure is the same as for multiplication but instead of ASL and ROL it uses LSR and ROR. LSR stands for Logical Shift Right and is the exact opposite of ASL. It shifts the byte one position to the right, places a 0 in bit 7, and moves bit 0 into the carry. ROR stands for, as you might expect, ROtate Right and works like ROL but instead shifting the byte to the right, bringing the carry to bit 7 and replacing it with bit 0. See figure 3.

A close look at LSR and ROR reveals that they are exact opposites of ASL and ROL in function. Instead of doubling a byte they halve it, divide it by two. A combination of them can divide by 4, 8, 16, etc., just like ASL and ROL. So in this respect we could expect our division routing to be coded as such:

```
LSR VALLO
ROR VALHI
```

But wait! Something's wrong here. Can you notice it? We're dividing the low and high bytes in the wrong order. The code should look like this:

```
LSR VALHI
ROR VALLO
```

Why? When we multiply we're shifting all 16 bits of the two-byte number to the left, starting from bit 0 of the low byte. To divide we have to shift all 16 bits to the right starting with bit 7 of the high byte (bit 15). This allows us to shift the whole number properly and thus manage to divide it by two. (The ROR serves to move bit 0 of VALHI into bit 7 of VALLO—via the carry, of course.) Division by other than powers of two is a bit more complicated. Instead of showing you how, I want YOU to figure out how to do it. If you want you can send me your solutions and I'll check them to see if they're right (I might even publish them if they are exceptional). Send to:

ERIC GIGUERE
c/o COMMANDER
PO BOX 98825
TACOMA, WA 98498

Please be sure to include your return address in your letter in case I misplace the envelope.

Other Uses for Shifts

Shifts left and right are also used for another purpose—to move bits around and test them for certain conditions. Say you only wanted to use the four high bits (bits 4-7) in your program and needed them moved into bits 0-3. Simply execute four LSRs and voila!, the bits are now in the desired locations. This is always useful to know.

Conclusion

Mathematics are not the easiest thing to accomplish in machine language but they can be done. Good use of ASL, ROL, LSR and ROL will ensure success at multiplication and division. Although they aren't called upon that often, these instructions may be useful to you in some way.□

Program 3

```
INITLO  LDA #8          ;LOAD LOW BYTE
        STA TEMPLO      ;AND STORE IN
        STA VALLO       ;2 LOCATIONS

INTIHI  LDA #0          ;LOAD HIGH BYTE
        STA TEMPHI      ;STORE AFTER 2
        STA VALHI       ;PREVIOUS LOCATIONS

MULT    ASL VALLO       ;DOUBLE VALLO
        ROL VALHI       ;MOVE CARRY INTO HIGH BYTE
                        ;IF NEEDED
: (VALLO & VALHI NOW EQUAL 16)

ADDLO   CLC             ;ALWAYS BEFORE AN ADDITION
        LDA VALLO
        ADC TEMPLO      ;ADD ORIGINAL VALUE
        STA VALLO

ADDHI   LDA VALHI
        ADC #0          ;TAKE CARE OF CARRY
        STA VALHI
: (VALLO & VALHI SHOULD NOW HOLD 24)
EXIT    RTS
```

Figure 1: ASC and ROL

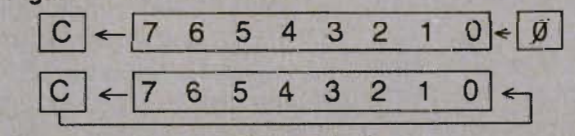


Figure 2: Shifting 2 Bytes Left

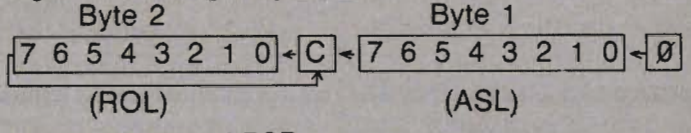
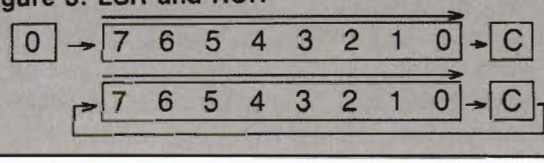
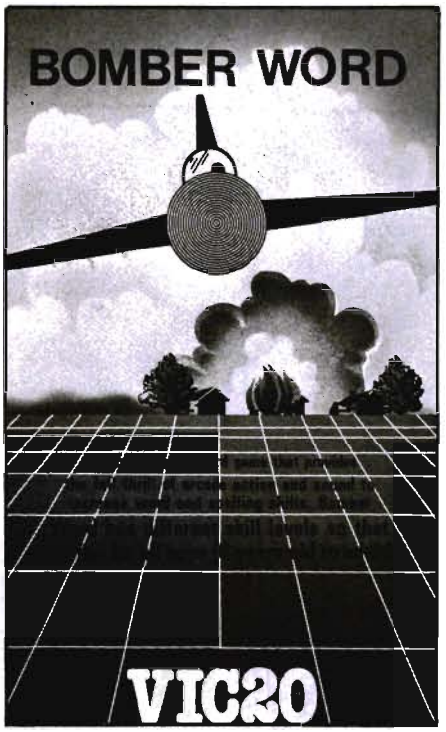


Figure 3: LSR and ROR



Product Reviews



Bomber Word

by Colin F. Thompson

It's hangman with a twist. I have several versions of hangman, but none are as fun as Bomber Word. The unusual cartridge game was the hit of a recent gathering at my home.

Bomber Word was, I'm sure, written for children. Its flashy graphics, sound and simple concept will attract the youngsters, but oldsters will find a challenge in it also.

The game picks a word from its extensive built-in vocabulary and displays a number of dashes equal to the number of letters in the word. Easy or Hard words may be requested, with a maximum word length of eight letters. The object of the game is to guess the letters of the word. A correct guess will replace the dash with the letter. An incorrect guess will launch a high flying, high res airplane across the top of the screen. Before the plane leaves the screen it drops a bomb on one of eight houses at the bottom of the screen. When all the houses are gone, the game is over. If you outwit the computer by guessing the word, you are rewarded with a familiar tune and a new word.

The twist is a series of options which allow you to create your own list of words to be guessed. The list may be saved to the cassette for later use. Another option lets two players play against each other. Bomber Word is a child-proof, rugged cartridge requiring no extra memory. For the VIC 20, $29.95. Available from: Micro-Ware Distributing, Inc., P.O. Box 113, Pompton Plains, NJ 07444.□

The Very BASIC Book for VIC20

by Colin F. Thompson

Did you buy the VIC 20 Programmer's Reference Guide only to find it was written in an arcane language? Welcome to the club. Every time I pick up the PRG I wish someone would rewrite it in English. At last it's been done.

Mr. C. S. Webber of Webber Software sent me a pre-release copy of the work, which looks very comprehensive and above all, comprehendable. The volume is 84 pages, 8½ X 11 with good bindings. The nine chapters and 2 indexes cover all aspects of programming and using the VIC. Many of the chapters are relevant for other Commodore computers including the 64. Printers, modems, sound, music, joysticks, and M/L monitors are discussed in detail.

I recommend the book for any VIC novice as the perfect adjunct to the VIC owner's manual and the PRG. The Very BASIC Book for VIC20 is available from Webber Software, Box 9, Southeastern, PA 19399. $14.95 post paid.□

VIC 20 and CBM 64 Expander Boards From Precision Technology, Inc.

by Craig Apple

Ever need to add more memory? Tired of changing those game cartridges? Let's take a close look at the expansion boards from Precision Technology, Inc.

I recently had a chance to examine the expansion boards available from Precision Technology, Inc. and was pleasantly surprised at the quality and workmanship of these products. Without a doubt the name of this company reflects very much on the quality of their product. Take for example their six slot expander for the VIC 20; Each expansion slot is individually turned on or off with convenient dip switches, enabling you to call on your programs instantly. Let's say, for example, you have six of your favorite games plugged into the expansion chassis. Of course, you can only operate one game at a time so all one needs to do is

select the preferred game, press the RESET button, which is located on the expansion board, and a few moments later you're ready to play.

For those avid experimentors and computer programmers who take their computing seriously, these people will appreciate this product for its ability to expand their VIC 20 to its maximum memory capability. Say for example, you have three 8K RAM boards, one 3K RAM board and perhaps some useful machine language cartridge located at A000. This will expand your VIC 20's memory to its maximum expansion capability. You are now ready for some serious number crunching.

There are many expansion boards on the market which may meet your needs, and this review is not a comparison between boards, rather an individual examination of this particular product. If you are the kind of person who demands quality in your products, then you should seriously consider the line of products from Precision Technology.□

C-64/VIC 20/PET/CBM OWNERS

WALLBANGER - Blast your way through the dodge'm, blast'm, and attack modes. If you destroy the bouncing balls before they destroy you, the walls close in for the next round. WALLBANGER is written in machine language, has great sound, and encourages complex strategies.

CASS/5K/VIC 20
ALL 40/80 COLUMN PETS & CBMS ..... **(Includes Shipping/Handling) $19.95**
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CHICKEN CHASE - Help your hapless hen avoid hungry chicken hawks, sneaky coyotes, and fiendish zompys. If your chicken gets into trouble, "hyper-hen" to a new spot on the maze. If your chicken travels the entire maze, you advance to the next level where the action is faster and the predators more numerous. Hi-res graphics, great sounds, and machine language help make CHICKEN CHASE a hilarious fun-filled game for the whole family.

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ROADTOAD - Hop your toad across 5 lanes of traffic, avoid deadly snakes, and dodge the dreaded toad-eaters. Cross a raging river full of logs, turtles, alligators, and park your toad in the safety of a harbor. Each time you park 5 toads, you enter a tougher level where the action is faster and the toad-eaters are more numerous. ROADTOAD is written in machine language and uses high resolution graphics. The sound effects are excellent and you can use a joystick or the keyboard to control your toad.

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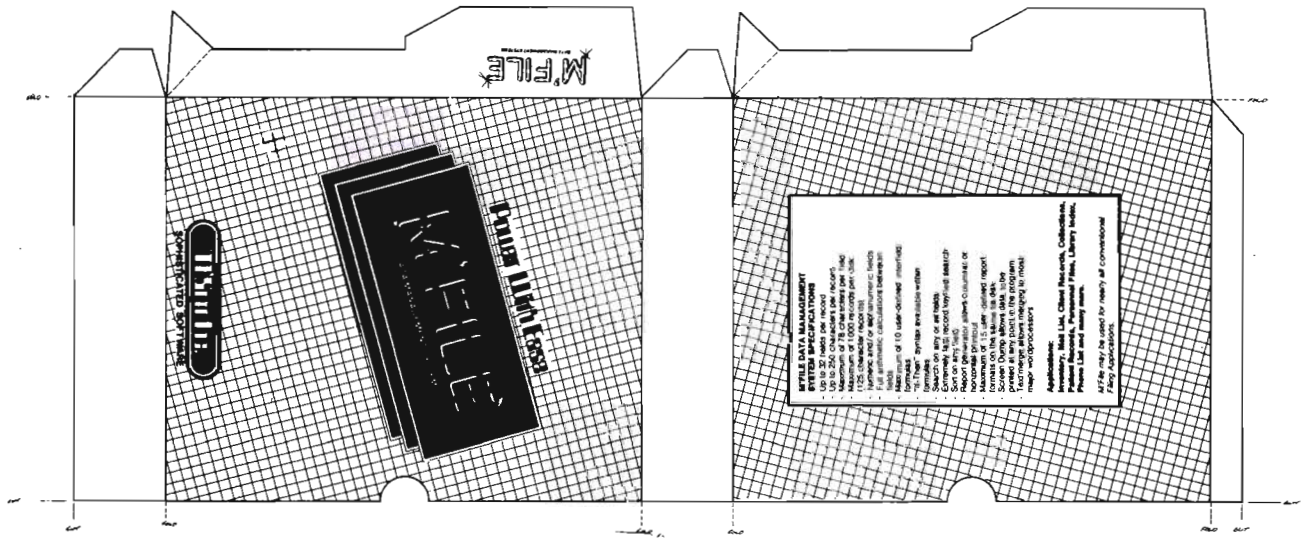
C-64/VIC 20/PET/CBM OWNERS

Circle No. 30



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 Properly Interfaced Parallel Printers

PRODUCT OF: Double E Electronics, Inc., 12027 Pacific Street, Omaha, Nebraska 68144, Phone 402-334-7870. Suggested Retail $109.95. For more information contact your local Commodore dealer.

Circle No. 67

VIC-20 Reviews

by Robert Foster

Mutant Herd

GOOD ***

This new game, developed by Thorn EMI Video, on a scale of one to ten would rate about a six with me. It is a fun, fast paced game and can be played by persons from eight years on. The only fault I found with this game was that it was difficult to tell the difference between my men and the insects they were trying to destroy.

Pesky insects are trying to capture your power source. The only way you can thwart their plans is to get one of your men into their burrows so he can destroy the queen which produces the insects.

This is easier said than done because the insects are unwilling to leave their burrows and must be forced out.

There are two lines on the screen, one horizontal, the other vertical, which are maneuvered with a joystick. While maneuvering the lines, you also push the insects off the screen, therefore helping save your pulsating power source.

If you get your man into the burrow, he is then faced with the dangerous task of destroying the eggs and the queen at the bottom of the screen. Each time your man goes to the bottom to drop one of his charges, he must hurry back to the top of the screen via the ladder and detonate the charge. Each time he detonates the charge, the game goes back to the first screen and the tempo increases. After the fourth time, your man is ready to encounter the queen and destroy her.

You are not alone with just one man. Several men appear on each screen. You also get three tries to complete your mission of destroying the queen.□

Rat Hotel

EXCELLENT ****

What kind of a game would have a title like that? It sounded rather intriguing to say the least, and I wanted to play it just from reading the title.

Imagine yourself as a harmless little rat with agility and speed as your only defenses. Constantly chasing you is a mean, old maintenance man named Waldo!

Now old Waldo is very serious about killing you. Very serious, indeed! So how does the old boy plan to do you in? He's set traps in the most unlikely places, and here and there he has dropped pieces of cheese to lure you into the traps.

The game starts out with a clever tune and you run about gathering cheese for your dinner. As soon as you gather all the cheese on one floor, you hop on the elevator and go to the next floor. In the meantime old Waldo never gives up his relentless pursuit—if he so much as touches you, you're dead.

So you work your way through the pieces of cheese as fast as you can so you can eventually end up at the big hunk of cheese in the basement. Only problem is—how to get the cheese from the trap without getting caught! Sometimes you come to a complete stop trying to decide—you'd better hurry—here comes Waldo!

In order to use the elevator, every piece of cheese on a given floor must be eaten—yet old Waldo can use the elevator anytime he wants. Seems as though the scales are tipped in Waldo's favor, doesn't it?

Should you make it to that big piece of cheese in the sky—aher—I mean, in the basement, you start over again at the top of the hotel—Waldo only a few steps behind—but this time the game moves faster and so does Waldo!

You get three rats—and you'll need 'em—seems like old Waldo is death on rats!

But this is a very fun and exciting game for all ages, easy to learn and a bit hard to master. Creative Software, the game's developer, has a real winner in Rat Hotel.□

Chomper

EXCELLENT ****

You are moving along safely chomping up little dots (just like Pac-Man). Suddenly monsters converge on you. What to do? Release your power capsules! Now it even sounds more like Pac-Man. However, there are some basic differences which make Chomper rather different.

Developed by Mark Purtiment for Random Access Computers, this cassette game has nine skill levels—one being easy and nine the most difficult. I found nine a real challenge!

This new game has a scoreboard for the best in each skill level. At the end of each game, if you beat the top score on that level, just type your initials from the keyboard and they are displayed on the screen.

It is possible to win one extra man by scoring over 10,000

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points. Prizes appear in the center of the screen and are worth 100 points. Prizes include strawberries, cherries, bells, keys, gold bars, pears and whiskey jugs.

When you turn on the monsters, after eating a power capsule, you receive 200 points for the first, 400 for the second, 800 for the third, and 1600 for the fourth.

Chomper is similar to Pac-Man in several ways, yet it is a unique and memorable game. I would recommend this new game to anyone wanting hours of entertainment without the bother of reading detailed instructions trying to figure it out. After your first experience with Chomper, you'll be addicted to it just as I was and will spend many fun-filled hours "chomping" up monsters!□

Skramble

GOOD ***

With unusual names like Wiggy's, Wiggy Cave, and Twister Cavern, I knew I was in for some fun and excitement with this new game by Terminal Software.

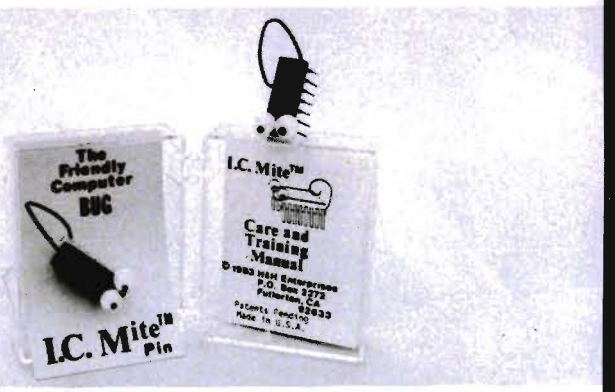
When I started to play Skramble, I was delighted with its excellent sound and graphics. It started out with the tune of Yankee Doodle. As the music plays, you move forward flying above terrain dotted with stationary missiles and enemy helicopters flying about. You can bomb the missiles and shoot the helicopters—that is, if they don't shoot you first! You dodge in and out among crevasses and huge canyons. If you get by the helicopters and missiles, Wiggy Cave awaits! Once inside there are still missiles and helicopters and an added new danger—Wiggys—small, spider-like creatures which drop from the cave's ceiling. Upon contact with a Wiggy, you are destroyed. However, if you should somehow skillfully maneuver your way through the cave and elude these dangers, you end up in Twister Cavern. This tight little cavern is barely large enough to get through.

About this time you find your craft running low on fuel. Below you are oil tanks. You must concentrate on bombing them, for the more enemy oil you destroy, the more you receive to replenish your dwindling supply! There is no room for error. You must obtain new fuel and keep the missiles, helicopters and Wiggys at bay. Think you can do it? All it takes is the ability to break through eight enemy defenses. Anyone with a sharp eye, quick reflexes, and patience should be able to win—eventually!

This is a fun game recommended for persons twelve or over. I feel it would be too difficult for younger children.□

COMPUTER BUGS

THE "PET" OF THE COMPUTER AGE!!



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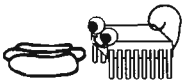

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Circle No. 85

Educational Reviews

by Maryanne Dodd

Typing and Keyboard Drills

During the years B.C. (before the computer), typing was an optional skill that usually was not necessary until junior high school or later. But with the advent of the computer good typing skills have become mandatory for efficient programming and word processing.

There is nothing more annoying for programmers of any age than to painstakingly enter a program and then after hours of work find that it won't run because of a typing error. Even as a fair typist I still find that quite a few of the bugs in my programs have their origin in a typing error. Children, particularly, get frustrated when they understand a programming technique but their programs fail to run because of typing errors or they sometimes lose motivation if their typing speed is so slow that it takes them forever to enter even a short program.

Now that I've convinced you that good typing skills and keyboard familiarity are vital to computer usage, why don't I stop before I start digressing and tell you about some typing software packages?

TYPE ATTACK
SIRRUS
VIC 20 Cartridge
Commodore 64 Disk
$39.95

WARNING!! TYPE ATTACK IS NOT FOR THE CHICKEN LITTLES OF THE WORLD. If you are afraid of the sky falling do not read the rest of this review and do not think of approaching or even glancing at TYPE ATTACK. IT COULD BE DANGEROUS TO YOUR HEALTH. Now that we have gotten rid of all of the cowardly meteorophobics among us, the rest of you go get out your space helmets and your laser keyboards, fasten your computer belts and let's get on with the adventure of exploring TYPE ATTACK.

High Speed Attack For Robots

TYPE ATTACK, designed by Jim Hauser and Ernie Brock, is a keyboard typing tutor that thinks it is a space arcade game. There are all the color, graphics, sounds and action that one expects in an arcade game, but when the skills are analyzed that are needed to score high we find that typing is definitely involved.

After loading TYPE ATTACK your first decision is choosing the speed of your attack. You have a wide range of choices from 1 to 99. The instructions suggest that beginners choose from 1-19 good typists choose from 20-59 and that the levels above 80 should be reserved for robots and genetic mutants.

Next you must decide upon the type of lesson. Your options are the fifteen preprogrammed lessons or the make a lesson. Lesson one starts with the home keys and the following lessons present the keyboard in a logical manner.

The Actual Attack

Once the speed and lesson is chosen the attack begins. Each character attack consists of three waves during which columns of characters are falling from the dark starry sky. The characters must be stopped before they touch the earth. Frantically you use the laser keyboard to destroy them. Oops, one touched the earth. You lose all of your energy and a red curtain complete with fatal music falls. After you successfully complete three waves of character attack, word attack begins. The object is to type each word correctly before it wraps around the screen. If all words are typed correctly bonus words are given.

At the beginning of each attack you are given 100 units of energy. Each typing error during character attack uses one unit of energy and each wave that hits the ground uses 35 units of energy. Correct responses during word attack add to the amount of energy. The game is over when you have used all of your energy. Words per minute are displayed on the left side of the screen during the entire game.

When all of the preprogrammed lessons are mastered there is an option to program your own lessons. Words up to six letters long can be entered in the word attack.

Age Appeal

TYPE ATTACK with its arcade action would appeal to all ages. The young primary age child could use TYPE ATTACK set at the slower speeds. They will probably start out using the two finger method of typing but when they discover that their scores are low they will be motivated to learn correct finger positioning. The make a lesson option could

be used as an innovative way to practice spelling words and to learn the words that are used as commands in programming.

The graphics and action have the sophistication to enchant older typing students. The higher speeds would challenge even an expert typist. The preprogrammed lessons follow the same pattern of presentation that is found in most conventional typing classes. The make a lesson option could be used to practice troublesome patterns or frequently used words that are difficult for each individual.

TYPE ATTACK is an intriguing method for practicing or learning to type. The program and the instruction booklet are both well designed and are presented in an entertaining manner. TYPE ATTACK is a software package that I would recommend for the whole family to use and enjoy.

HAPPY TUTOR
Commodore 64 Disk
Pacific Coast Software
$20.00

THE HAPPY TUTOR by Ed Cotta is a serious typing program consisting of keyboard drill and sentence practice for the mature user. It would be beneficial to a beginning typist or someone who knows how to type but desires to increase his speed for efficient programming or word processing.

Upon loading THE HAPPY TUTOR you are asked if you want instructions. If you answer "yes", instructions for the keyboard practice and sentence practice are typed on the screen along with the sound of clicking keys. After the instructions are given or if you answered "no" a menu appears. The menu consists of eight options: keyboard practice, sentence practice, load sentences, compose sentences, save sentences, directory, view sentences or add sentences.

Keyboard Practice

If the selection is keyboard practice a graphic representation of the Commodore 64 keyboard appears at the top of the screen. The letter to be typed is located between two *'s. The letter to be typed is also highlighted in pink on the graphic keyboard so that if you forget the location of a particular character you can glance upward at the graphic keyboard instead of downward at the Commodore 64 keyboard. There are seventeen levels of keyboard practice. Each level presents a different selection of keys. Level one starts with the home keys and level seventeen presents letters intermixed with those pesky number keys that I find so difficult. A happy face gives a rating according to speed—excellent, good, fair or needs practice.

Sentence Practice

During sentence practice the sentence scrolls across the screen. You type the word farthest to the left. There is a "bong" sound when an incorrect key is hit. At the bottom of the screen words per minute are given in the form of sentence score, sentence errors and the average score of all the sentences attempted.

Customized Drills

In addition to the preprogrammed sentences, you can compose your own sentence drills. The program has the capacity to store 25 sentences of up to 240 characters in length under one title. There is also an option to allow review and editing of sentences already composed. This feature makes THE HAPPY TUTOR live up to its name. It really is a tutor!! The sentences could be tailored to fit the needs of the individual. The sentences are stored on a separate disk; therefore, an infinite number of drills under separate titles can be composed. The only feature that I would like added to the program would be an option to allow the use of lower case letters and the shift key during sentence practice.

THE HAPPY TUTOR would be especially useful to someone who is planning to do word processing on the Commodore 64. I know that when I change computers or have been away from the keyboard for a few days it takes me a while to get the feel of the keyboard.

I would endorse THE HAPPY TUTOR as a very good addition to any software library. I am sure that it will be one of those selections that will be pulled off of the shelf and used again and again for years to come.

ALPHABET TUTOR
COMM*DATA
VIC-20 5K CASSETTE
$16.95

I know what you are thinking. At the beginning of the column I promised typing reviews this month, so why am I reviewing a preschool alphabet program. Well, I believe in family computing and feel that one is never too young to start becoming familiar with the keyboard. Besides I have discovered that in this day and age, kids come with a factory installed **computer magnet.** How else can you account for the fact that whenever I turn on the computer the current in the power line attracts kids from a block away instantly?

Computer Magnet In Action

Take today for instance. While I was writing this month's column I suddenly felt several pairs of eyes staring at my back. Then I heard hushed whispers. "What's your mother doing?" a small voice said. "Shhhhhh, be quiet," my son answered, "She's working." Another voice replied, "That doesn't look like work to me. Are you sure?" After several minutes of this exchange I decided to be a nice person and loaded ALPHABET TUTOR for them to test while I took a break from "work".

Letter Options

ALPHABET TUTOR is a letter recognition and sequencing program. There are three options: Learn the Alphabet, Guess

What's Next? or Guess What's Missing?

During the Learn the Alphabet segment the alphabet appears on the screen, while the well-known abc tune is heard. The letters both upper and lower case are highlighted on the screen. There is an option to make the letters move faster or slower. During this portion of the program no keyboard response is required. The child will sing along with the tune and visually practice alphabet recognition.

Keyboard Practice

Guess What's Next? provides practice with matching the alphabet on the screen to the correct letters on the keyboard, recognizing the corresponding lower case letter of the upper case letter displayed on the screen and entering the alphabet onto the keyboard in the correct order. For each correct response the letter is highlighted in rainbow colors. Incorrect responses are black. After all the letters are displayed on the keyboard the screen changes and the letters missed are shown. After matching is mastered the child can practice putting the alphabet on the keyboard without prompts.

Sequencing

The third segment, Guess What's Missing?, provides practice in sequencing. Four letters with a question mark at the beginning, the end or in the middle the letters are presented. The child is required to enter the missing letter. If the prompt option is chosen the lower case letter is displayed above the question mark. When an incorrect response is entered the screen turns red and the correct letter is displayed in white. After all the sequences the child is rewarded with the alphabet song and the letters missed are displayed.

ALPHABET TUTOR is suitable for children up through kindergarten. There are no graphics to confuse the very young child or a child with perceptual problems, but there is enough sound and color to keep the child interested. ALPHABET TUTOR will help the very young child learn the alphabet and it also introduces them to the computer keyboard.

Back To Work

I am certain that I'm not the only one who has observed the computer magnet phenomenon. If it occurs at your house why not try ALPHABET TUTOR from COMM*DATA? After all, no one should monopolize the computer. Everyone should have a turn. Right...Now if I could only convince the kids that it is my turn so that I can get back to work.□

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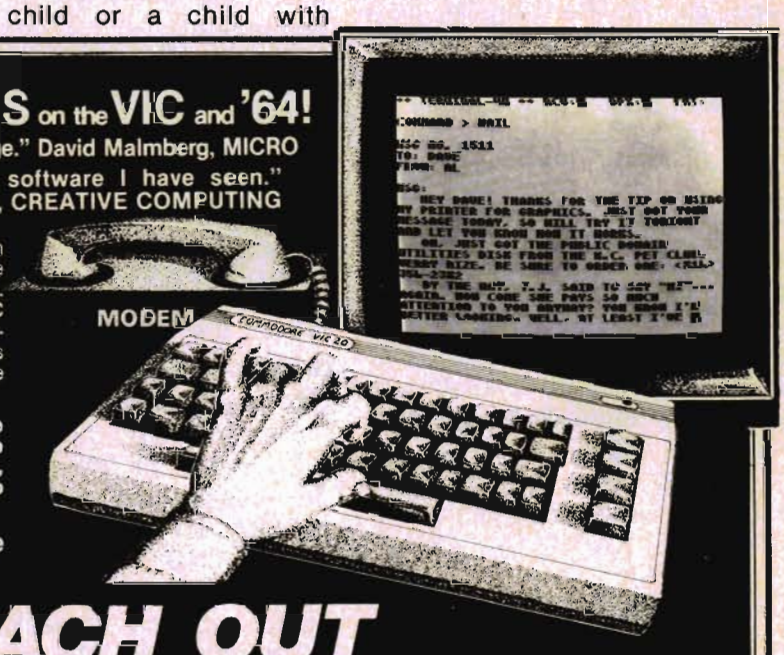

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Circle No. 25

News Releases

Luna Software, Inc. Merges With M.I.S. Software

Luna Software, Inc. is pleased to announce the merger of Luna with M.I.S. Software. According to Luna Vice-President Lou Ryan, Luna and M.I.S. effected their legal merger on May 5, 1983. Former M.I.S. President Jeff Shyshka will now assume the post of Chief of Software Development at Luna Software. A supplier of software for both the Commodore '64 and VIC-20, Luna Software, Inc. is currently marketing 23 titles in educations, home management, and arcade type games. Ranging in price from $17.95 to $37.95 for programs on both cassette and diskette, Luna has recently introduced a sophisticated mailing list/data base for the '64 and a space advanture game called "Cargo Run" which uses 48K RAM and is available only on diskette.

A free catalogue with descriptions and prices of Luna's software programs is available by writing to Luna Software, Inc., P.O. Box 26922, San Jose, CA 95159-6922 or by phoning (408) 378-7793. Dealer inquiries are invited.□

Commodore Software Encyclopedia Lists Over 2,000 Programs

Commodore Software has announced the availability of the 3rd Edition of the COMMODORE SOFTWARE ENCYCLOPEDIA.

The new catalog is the largest COMMODORE SOFTWARE ENCYCLOPEDIA ever, numbering over 800 pages. The encyclopedia lists nearly 2,000 entries including both Commodore and non-Commodore software contributed by software vendors from around the world. It is the most comprehensive single software reference for Commodore computers.

Available through Commodore dealers at a list price of $19.95, the COMMODORE SOFTWARE ENCYCLOPEDIA includes the latest Commodore software releases for the full line of Commodore computers including the VIC 20™; Commodore 64™; PET® Series: CBM® 4032, 8032 and 8096; and the new 'B' SERIES computers.

The encyclopedia has 18 major areas of interest including separate sections for the VIC-20 and COMMODORE 64, plus a 23-page index that makes it easy to find the right software for Commodore computer owners' specific needs.□

New Low Cost Interactive Commodore Computer/VCR Interface

The VIDEOBOOK CORPORATION of Seattle, Washington, announces a new **Computer/VCR INTERACTIVE INTERFACE and AUTHORING SYSTEM** for the Commodore 64 and the VIC 20 computers and home videocassette recorders. The new Interactive Interface, called the "PROMETHEUS 1"™, will connect the VIC 20 or the COMMODORE 64 computers to any of the older Panasonic 5000 series videocassette machines or the newer Panasonic 6500 portables or 8500 standard VCRs. The PROMETHEUS 1™ will also connect various other models of the Magnavox, Cannon, and Hitachi VCRs to the COMMODORE or VIC as well. A retrofit mod kit is planned for solonoid VCRs that don't have the required input plug.

The introduction of this low cost computer interactive interface means that anyone can now have a Home or Office Computer/VCR Interactive Learning Center for under $1,000.00 for the hardware configuration. This new module clears the way for the mass development of the long-anticipated VIDEOTAPE INTERACTIVE COURSEWARE MARKET. The VIDEOBOOK CORPORATION has developed an extensive catalog of Interactive Courseware (both educational and entertainment) for the home and office. Videobook's president, Jerry D. Pierson, hints at other new and startling products for the COMMODORE COMPUTERS to come from Videobook **soon.**

At the heart of the new Videobook Corporation system is the PROMETHEUS 1 VCR/Computer Interactive Interface, but the system also has the new, incredibly powerful COMP-U-TUTOR™ AUTHORING SYSTEM, developed by Videobook's Dr. Ted Cooper. The authoring system is greatly superior (and user friendly) to any other authoring system currently available including Control Data's PLATO. The authoring system not only allows parents or office managers to play back pre-packaged commercial courseware but will allow anyone to make his own custom program for home, office or corporate training system.

The PROMETHEUS 1 Computer /VCR Interactive Interface has a suggested list price of $49.95 but is available currently only from Videobook directly. The COMP-U-TUTOR™ AUTHORING SYSTEM composed of an instruction manual, a 5¼ by 5¼ floppy disk (and/or an audio cassette tape) with a computer program on it and a two hour videocassette, comes handsomely packaged in a sturdy system storage case with a velcro tab safety lock. The price for the COMP-U-TUTOR™ COMPUTER/VCR Interactive Authoring System is $149.95 complete. The Videobook Corporation will begin franchising the use of the copyrighted Interactive Authoring System to other courseware houses in August of 1983 so other computer software publishing houses can enter the 20 billion dollar Computer/VCR Courseware Market predicted by Dunn and Bradstreet three years ago.

For more information, free literature, or a Videobook Interactive Courseware Catalog, contact Videobook Corporation; P. O. Box 19597; Seattle, WA 98109.□

Showcase For VIC-20

Synapse Software, long a leader in game products for the Atari 400/800/1200 has established a complete line for the Commodore VIC-20.

Titled SHOWCASE SOFTWARE, the new line is composed of games designed expressly for the unique capabilities of the VIC-20, rather than translations of games from other systems.

The initial SHOWCASE offerings are Astro-Patrol (a space action "shoot-em-up"), SQUEEZE (a humorous game which takes place out on the farm) and SALMON RUN. Additional products will be released throughout the year.

SHOWCASE PRODUCTS are priced competitively and effectively at $19.95 suggested retail, and are receiving extensive advertising and merchandising support. P-O-P materials, posters and demos are available.□

Commodore Lowers Cost Of Personal Computing Announces Price Reductions

Commodore's Business Machines, Inc., has announced dramatic reductions in the prices of its hardware, software, peripherals and personal computer accessories. The following reductions will be effective June 15:

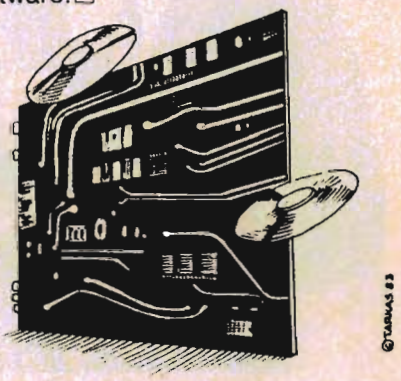
- Up to 50 percent of trade cost prices for software
- Up to 25 percent of trade cost prices for hardware
- Availability of the world's first 64K total personal computing system for less than $1000.

"The Commodore 64™ system will now take its place alongside the VIC 20™ and will continue our leading position as suppliers of home computers in the United States," said Commodore Computer Systems Division President Robert Lane in announcing the price reductions. "By lowering the trade cost prices for such compatible peripherals as printers and disk drives by up to $100 each, we are continuing our effort to provide computer capabilities to every American home at affordable prices."

According to Vice President of Marketing Myrddin L. Jones, the software price reductions underscore the added emphasis Commodore is placing on software and peripherals.

"We're actually expanding the utility of the product in the home by lowering the cost of peripherals and expanding the utility of the keyboard by lowering the price of the software, so that even the more sophisticated packages will be accessible to the consumer," Jones explains. "The software price reductions also allow the large existing base of VIC 20 users to expand their horizons with, for example, a voice synthesizer package for uner $100 or complete business and general ledger packages for $99."

Jones says that the new pricing structure will allow distributors that support Commodore to continue to realize competitive margins on both hardware and software.□



HES Offers Dealers Computer Camp Directory

A four-color directory of computer camps nationwide is now available in an attractive countertop display from Human Engineered Software (HES).

The elaborate fold-out directory shows the location of over 60 established computer camps on a nationwide map and gives parents tutorial information on how to evaluate a camp and choose the best one for their child's individual needs.

Included is information on courses offered and tips on how to apply for financial aid.

HES plans to offer dealers a package of 100 directories free, along with the countertop display. Additional packages will be offered at a nominal price.

Ted Morgan, president of Human Engineered Software, said more promotions will follow.

"HES plans to continue to develop promotional items designed to help build dealer traffic," Morgan said. "We see the sales effort as a partnership between manufacturer and dealer."

Human Engineered Software headquarters are located in Brisbane, Calif.□

Sandy Ruby (left), President of Computer Software Associates and Technical Vice-President of Micro Software International, and Robert Shapiro (right), Marketing Vice President of Micro Software International, display PractiCalc 20, the first spreadsheet for the VIC 20, and PractiCalc 64, the version for the Commodore 64 that has high- and low-resolution graphics.

Computer Software Associates Plans "Practical" Family Of Products

In keeping with its series of spreadsheet programs (PractiCalc, PractiCalc Plus, PractiCalc 64 and "PS, the Programmable Spreadsheet"), Computer Software Associates of Randolph, Massachusetts, has announced plans for a full line of "Practical" products to be developed over the next year.

Most significantly, each "Practical" product will be complementary to other "Practical" family members, greatly increasing and enhancing users' options that will result in extremely powerful and flexible programs.

Robert Shapiro, Marketing Vice President of Micro Software International, the merchandising and distributing firm that markets Computer Software Associates products worldwide, commented, "The addition of a 'Practical' family of products is the result of the natural outgrowth of the PractiCalc series. Our studies show that once users get beyond games for their VIC 20s and Commodore 64s, which seems to be happening with more frequency and rapidity, they look for software that is going to expand the usefulness of their machines."

Shapiro foresees three basic categories of software for the serious home market: spreadsheets, word processing and database managers. Computer Software Associates' initial entries outside the realm of spreadsheet programs will be PractiWord™ and PractiBase™, a word processing program and database manager, respectively.

PractiWord wil be available for both the VIC and Commodore 64 microcomputers in both tape and disk formats. Shapiro projects that it will be priced in the $50-$75 category. "Users aren't willing to spend more for a program than their machines cost," he notes. "PractiWord, which like PractiCalc, will be written in machine language, will be extremely fast, powerful and user-friendly." PractiWord will feature basic editing commands, tab, justificational and centering of text with an 80-character per line expansion capability.

PractiBase, a relational database manager, will also be written for both the VIC 20 and the Commodore 64. Shapiro foresees that the planned disk version will be the preferred customer choice because of its speed. PractiBase will contain password protection, alpha-numeric sort and select, "add," 'change" and "delete" functions, error checking routines, as well as other key functions.

"Once we have the three basic programs," Shapiro continued, "we plan to develop modules to accompany them." Contemplated programs include PractiPlot™, enabling the user to create histograms, pie graphs and wedges, cylinders, etc., for preparing reports, making presentations, and other situations where high- and low-resolution graphics are called for.□

Olympics of the Mind Computer Competition Sponsored by Commodore

Commodore Business Machines, Inc. participated as the exclusive computer sponsor in the 1983 Olympics of the Mind World Competition held at Central Michigan University, Mount Pleasant, MI. Commodore provided twenty VIC 20's and a computer problem for competing student teams to solve. The problem was used as a special warm-up activity.

Approximately three hundred teams representing schools from across the United States participated in three divisions. About one third of those participating attempted to solve the Computer Black Box Problem, created by Commodore employee, Mark Odgers. Teams from the following schools placed first: Division I (elementary grades)—Harry

Spence School, WI; Division II (middle school grades)—Alice Birney School, SC; Division III (high school grades)—Revere High School, OH. Coaches of winning teams were awarded a plaque, and each placing team member received an Olympics of the Mind medal. The computer competition awards were presented by Commodore representatives, Dan Kunz and Mark Odgers.

Commodore also provided the Olympics of the Mind Association with two model number 8032 computers for use in registration, scheduling, and scoring. Pat McAllister, Commodore employee, provided program and technical assistance.

The Olympics of the Mind Association, Inc. (OM) is a private, not for profit corporation with a Board of Directors representing several states. To participate in the OM World Competition, a team must first win local contests. Conceived and organized in 1978 by Dr. Ted Gourley, Director of Gifted Education, New Jersey State Department of Education and Dr. C. Samuel Miklus, professor of Industrial Education and Technology at Glassboro State College in NJ, the OM program is designed to encourage young people to develop techniques in creative problem solving. The program also aids teachers in enhancing the regular school curriculum.

It is anticipated that both a long term and a spontaneous computer problem will be included as part of the 1984 competition.□

Software Firm Signs Agreement with Commodore Business Machine

Info Designs, Inc., a Birmingham, Michigan software house has announced that it signed a major contract with Commodore Business Machines to develop a family of accounting software applications for the

Lance Proctor, Vice President of Info Design (left), Sig Hartmann, President of Software Division (center), and Richard Stahl, President of Info Design (right).

Commodore Series "B" microcomputer and Commodore-64 microcomputer. On a meeting aboard the Commodore exhibit boat at CES, Richard Stahl, president of Info Designs, Inc. and Lance Proctor, Vice President of Info-Design consummated the deal with Sig Hartmann, president of the software division and Jack Tramiel, president of Commodore Business Machines, Inc.

"We have established a professional business relationship with Commodore which combines our collective experience in software development, marketing, customer support and training."

"We are developing a total of six applications: Order Entry, Accounts Receivable/Billing, Accounts Payable /Checkwriting, General Ledger, Payroll and Inventory Management," according to Stahl. "These applications are modelled after our highly successful Management Accounting System software which has been sold on Commodore's CBM line of equipment for over two years. Shipments will start this summer."

In addition to the software development, the company plans to work collaboratively with Commodore to assist in the marketing and promotion of the new software product. "One area of assistance is a telephone consulting support program to provide end-users with access to knowledgeable technical and operations personnel to answer specific customer questions. We also plan to produce a series of videotapes known as InfoVision which will pro-

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Circle No 31

vide end-users with a simple and cost-effective approach to learn our accounting systems at leisure in the privacy of their own home," comments Stahl.

For more information, contact the company. Info Designs, Inc., 6905 Telegraph Road, Birmingham, MI 48010, 313/540-4010.□

Pipes Elected to 1983 CES Showcase

Pipes, the first in a series of concept home education programs produced by Creative Software, has been selected for the CES Software Showcase 1983. **Pipes** was named to the Showcase in the "Education" category for the VIC-20 home computer.

A panel of judges including Arnie Katz, Editor, **Electronic Games**, Seth Goldstein, Editor, **Video Week**, John Huback, Editor, **Video Business**, Jim McCullaugh, Editor, **Software Merchandising**, Betsy Staples, Editor, **Creative Computing** and Maggie Canon, Editor-in-chief, **InfoWorld**, selected **Pipes** from more than 180 entries in nine categories.

According to the EIA/Consumer Electronics Group, "The judges took into consideration the innovativeness of concept, technical superiority of execution and uniqueness of product." Only original programs produced specifically for the home entertainment market were considered for inclusion in the Showcase.

Designed and written by John Doering, **Pipes** is an educational program that plays like a game while it teaches spatial relationships and economics. The object of **Pipes** is to connect all the houses in town to the main water supply. The player must carefully select his materials and budget his money and inventory, to create a cost-effective water network.

Pipes is available now in the VIC-20 format and will be available for the Commodore 64 in August.

Creative Software is the largest independent publisher of VIC-20 software in the United States. The five-year old company is dedicated to producing a full-line of software for the home computer. Offices are located at 230 East Caribbean Drive, Sunnyvale, California 94089.□

HES To Pack $5 Gift Certificate in All Packages of Hot-Selling Gridrunner™ Game

Human Engineered Software (HES) will pack a $5 check, good toward the purchase of any HesWare software package or peripheral product, in all boxes of their hot-selling Gridrunner™ game, starting August 1.

The innovative promotion, which will be extended through January, 1984 to help dealers with pre-Christmas sales, is being offered for all CPUs. Gridrunner currently is available on the VIC 20 and Commodore 64 computers.

Manufacturers have seldom offered high-value promotions on popular-selling software packages.

"We want our dealers to know we're willing to support our products and that we're trying to provide that help in a significant way," Ted Morgan, president of Human Engineered Software, said.

Human Engineered Software is a division of USI International. Headquarters are located in Brisbane, Calif.□

Tronix Launches Move Into Commodore 64 Market

Marking its debut into the Commodore 64 market, Tronix Publishing, Inc., has introduced Juice, a new strategy game, and converted its other fast-action Atari game, Kid Grid, for that home computer, announced Rick Taggart, director of marketing.

"By offering these games and others in the future, we want to fill the current void for arcade-quality games for the Commodore 64," explained Taggart.

The Commodore 64 version of Juice in diskette will be available in early August to retailers from Tronix's distributors and rep organizations, said Taggart.

Both of these highly contagious Tronix games for the Commodore 64—Juice and Kid Grid—are created by Arti Haroutunian and feature likable "good guy" characters with extremely tough tasks to accomplish.

In the newest game, Juice main character Edison must complete circuit boards, a simple task except for the troublesome Killerwatts and other characters he encounters. Edison is smarter and can outthink his foes, but if he is struck, a meltdown is imminent.

Points are earned as Edison completes each round, and moves into more challenging levels. Higher play levels feature extra characters and involve more steps before Edison completes his circuit.

Juice has six play levels, each with three rounds plus a bonus round. The game begins with five Edisons, and a bonus Edison is earned at each 10,000 point level.

Adding to the strategy, the game has special scoring. For out-maneuvering the cunning Killerwatt, who is quick but can be led astray, Edison gains 500 points. Another 200 points are gained by contacting Flash or Recharge characters. Watch for Flash, however, as he disconnects everything in sight. The quicker Edison completes each round, the more points he scores.

An escape key of Juice freezes action, while option keys let a player select standard play or practice modes.

Carrying a retail price of $34.95, Juice requires no extra memory for the 64. The publisher will send copies of the new game to any editors interested in evaluation, he said.

Haroutunian's other game, Kid Grid, features the Kid, an affable little guy who darts around a grid,

attempting to connect all the dots. In hot pursuit are four bullies—Squashface, Thuggy, Muggy and Moose. If they catch the Kid, the results are explosive.

Besides the four villians, the Kid has to be on the lookout for a mysterious bouncing question mark. In aiding the Kid, the player's secret weapon is the joystick button, which, when pressed, zaps the bullies. As the "bad guy" characters turn white and freeze, Kid makes his escape.

According to Taggart, the better the player gets, the faster Kid Grid becomes. At more skilled levels, the Kid races around the grid at "lightning-quick" speeds. "When we developed Kid Grid, we tried to build in a factor which is missing in most other video games, and that's a game with a personality," explained Taggart. "The Kid is a personality and he's lovable. We wanted a game which you could pal around with for years and still be amused. Once you play Kid Grid, you'll be hooked," said Taggart. Kid Grid carries a retail price of $34.95 for the 64.

Juice, Kid Grid and other Tronix games are available through Tronix distributors and rep organizations.

For more information on Juice, Kid Grid or other Tronix games, contact Taggart at Tronix Publishing, Inc., 8295 S. La Cienega, in Inglewood, Calif., 90301. The telephone number is (213) 215-0529.□

New Video Training Series Teaches End-Users How To Use Commodore Computers and Software

Info Designs, Inc., a Birmingham, Michigan software house announced a series of consumer oriented "how to" video training tapes known as InfoVision™.

"We're planning to revolutionize the approach for training the masses on computer literacy and software," according to Richard Stahl, the company's president. "Our initial series of InfoVision programs will be designed for Commodore microcomputers and software because of Commodore's marketplace leadership in mass merchandising their computer products."

Over 18 titles will be released initially covering these knowledge categories:

* Computer Hardware Series
* Programming Series
* Productivity Series
* Business Accounting Series

Some examples of program titles include:

* How to use the Commodore -64 and Executive 64 computers
* How to program in BASIC
* How to use word processing
* How to use data management
* How to use electronic spreadsheets
* Understanding Accounting Basics
* How to use the Commodore General Ledger System

Each InfoVision program is accompanied with a professionally produced VHS or Beta videotape which provides a step by step self-paced instructional program on the subject matter, a "key" instruction card, a complete program index and an optional study guide. The InfoVision Series was developed by Info Designs in cooperation with Commodore and the leading software companies.

"As a leading supplier of business software," according to Stahl, "we sell directly through our distributor network and license other software for sale by Commodore. From this experience we have an in-depth understanding of the needs in the marketplace for end-user training."

The company plans to distribute the InfoVision Training Series through distributors and major accounts for mass merchandising to the consumer.

"Now that the computer has become a mass merchandise product for serious home and business use," according to Stahl, "we believe there will be a high demand for professionally produced, high quality instructional video programs to teach the end-user the 'how-to's' of his computer system and software."

For more information, contact the company. Info Designs, Inc., 6905 Telegraph Road, Birmingham, MI 48010, 313/540-4010.

Dentists Love Commodore's New Tooth Invaders Game

The newest video game from Commodore Business Machines, Inc. is making dentists, parents and kids very happy.

The new game, called "Tooth Invaders", was developed for the Commodore 64™ in cooperation with the American Dental Association.

The new cartridge game was introduced during National Dental Month and is being enthusiastically supported by dentists, according to Bill Wade, Commodore's software director.

"Dentists and parents traditionally have a tough time teaching dental hygiene to children," Wade said. "Tooth Invaders combines the fun of a video game with the most important principles of dental care. The game incorporates recommenda-

tions of the American Dental Association and is being used by dentists as well as parents.

"Already, more than 2000 dentists have ordered Commodore 64 computers and Tooth Invaders games for use in their offices," he said.

Wade stressed that Tooth Invaders is an excellent game even without the educational tie-in. He noted that the game has all the elements of the most popular computer games—fast action, exciting graphics, sound effects, 9 levels of difficulty, "good guys" and "bad guys", and an interesting story line.

The game's motto is: "A Clean Tooth Will Not Decay!" To prove the point, characters like "D. K. Germ" and "Plaque-man" help teach the use of dental floss, proper brushing and the dangers posed by cavities and plaque buildup.

Tooth Invaders is an excellent example of how computer games can be used constructively to accomplish worthwhile goals—in this case, dental hygiene.

"If you play the game, you can't help chuckling and remembering the game the next time you brush your teeth," Wade said. "Our research shows that the lessons of the game are retained by people who play it and that's our objective."□

Human Engineered Software Unveils New Brand Name For Entire Product Line

Human Engineered Software (HES) will market its line of software packages and peripheral products under a new brand name— HesWare™, the company announced at CES, June 5 in Chicago.

Designed to strengthen product identification, the HesWare™ logo will appear on all HES' software and peripherals for Commodore, beginning in June.

Each software product including cartridges, cassettes and diskettes will continue to be housed in an 8½" x 6" x 1" package with brightly colored graphics on the cover and product description on the back of packaging. The HesWare logo will run across the top of the packaging on the distinctive color spectrum on all HES packaging.

"We changed the product name because after testing our name we found that consumers tend to associate the term 'Ware' with quality software," said Bow Rodgers, vice president, marketing.

"By incorporating the company's name which already has good visibility and recognition at the retail level we've included both concepts in a single name," added Rodgers.

Point of purchase displays, posters, packaging and all dealer co-op advertising will reflect the change of HES' brand name, with the new HesWare logo and bold graphics for which the company is already known.

HES expects to achieve more impact and greater product identification among mass merchandisers and consumers. HES develops, manufactures and markets a wide range of quality computer software and peripheral devices for the home computer market. HES is headquartered in Brisbane, Calif.□

Commodore Announces Advertising Strategy

Commodore Business Machines, Inc. has announced substantial increases in advertising expenditures for the 1983/84 fiscal year beginning June 30. Although the specific level of expenditure remain proprietary, Myrddin L. Jones, vice president of marketing, says that the television schedule alone will achieve a level of 125 to 150 GRPs per week over a 12 to 16 week period.

The key targets for television advertising are adult males between the ages of 18 and 49, according to Jones. "To reach these markets, we'll be sponsoring a variety of sports programming, including Monday Night Football, the NFL Playoffs and baseball," he says.

Jones says that last year's ads emphasized hardware such as the VIC 20™ and the Commodore 64™ and helped Commodore capture a dominant share of the home computer market. This year's goal, he explains, is to promote the more than 500 software packages the company and its third party supporters offer for its home and business computer systems with the same objective—to capture a dominant share of the $1 billion software market.

A secondary objective for television advertising is to increase awareness of the Commodore 64 and its available peripherals by positioning it as the ideal system with the best price for the personal computer user. "Emphasis will be on applications rather than product," Jones says. "None of our competitors has effectively told consumers what can be done with their personal computing systems, and this will be a major objective of our advertising next year."

In the business area, Jones says Commodore will continue its vigorous four-color print program both to support existing products and to launch new business offerings.

In addition to the preceding, Jones says the company also plans to maintain aggressive sales promotion, distributor and public relations programs.

Commodore currently maintains a leading share of the $3-plus billion home computer market. In the educational computer market, Commodore also ranks in the top three with Apple and Radio Shack.

Contact Diane Ottinger, Commodore Systems Division, 1200 Wilson Drive, West Chester, PA 19380.□

VIC 20

40-80 COLUMN BOARD

NEW only $99.00 NEW

Now you can get 40 or 80 Columns on your T.V. or monitor at one time! No more running out of line space for programming and making columns. Just plug in this board and you immediately convert your VIC-20 computer to 40 or 80 columns! PLUS, you get a Word Processor, Mail Merge program, Electronic Spreadsheet (like VISICALC) and Terminal Emulator! These PLUS programs require only 8K RAM memory and comes in an attractive plastic case with instructions. List $149 Sale $99

• COMMODORE 64 COMPUTER — "80 COLUMN BOARD" LIST $275 SALE $179

(Less $20 Accessory Purchase Discount)

"15 DAY FREE TRIAL"

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Epyx Announces New Consumer Promotions

Reflecting the company's aggressive new approach to the computer software market, Epyx announces two consumer promotions for summer/fall '83—"Buy Two, Get One Free" and the "Demo Disk Sample Program".

The first promotion is targeted to help retailers through the traditionally slow summer months. Through August 31, 1983, the Sunnyvale-based supplier is offering consumers a free game with the purchase of any two. The consumer purchases any two Epyx games at retail and then, with the appropriate proof of purchase, can receive a free game through the mail direct from Epyx. A special order card will be enclosed with each game and attractive four-color counter cards provided to retailers to announce the premium.

The "Demonstration Disk Sample Program" is slated for fall and the objective is to give consumers a preview of what's coming from Epyx. Computer owners will be sent an order form offering them a "demo disk" for $3.00. The disk will feature five new Epyx games: **Silicon Warrior, PitStop, SWAT Rescue, Lunar Outpost** and **Dragonriders of Pern**. Consumers have the opportunity to preview the games and Epyx will refund their $3.00 when they purchase any of the new titles. Consumers need simply to mail in proof of purchase. Direct mail advertising will bring the message to computer gamers.

According to company president and ceo, Michael Katz, "These two promotions are designed to help our retailers move product and to establish consumer awareness of new Epyx titles. The 'Buy One, Get One Free' program was created to help encourage sales during the slower summer months. Our 'Demo Disk Program' will increase store traffic during the key fall selling months by providing consumers with a trial device."

The company is headquartered at 1043 Kiel Court, Sunnyvale, CA 94089.□

Gortek & MicroChips Teach Children How to Program

Commodore Business Machines, Inc. has unveiled "GORTEK"—a new robot-like character who will be helping children learn to program in a unique series of books and cassette tapes, the first of which is entitled: **GORTEK AND THE MICROCHIPS™**.

This delightful and unique concept in teaching young people to program combines a space adventure story with lessons in BASIC programming. Gortek

comes in two versions, for the Commodore VIC-20 and COMMODORE 64 color computers.

The first lession is designed for children under age 14, and consists of 2 cassette tapes containing 12 educational programs and a colorful glossy instruction book which reads like a comic book while teaching the fundamentals of BASIC. The book includes imaginative full color illustrations, large easy-to-read type, and is written so it may be read by older children . . . or used by younger children with parental assistance.

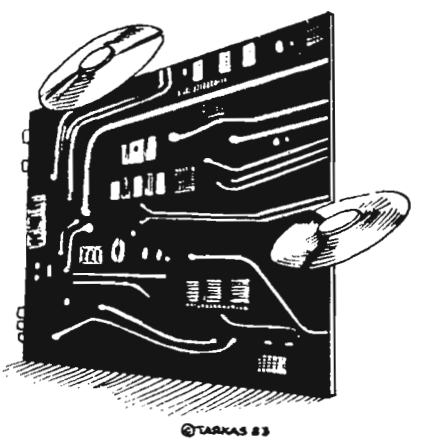
The unique combination of computer lessons and storybook format makes Gortek a fun experience for adults as well as children.

As the story goes, the planet Syntax is being invaded by the fearsome Zitrons. Gortek is working furiously to teach the microchips to program the computer to repel attack. The "Microchips Training Manual" teaches the child how to help stop the Zitrons (by learning how to program the computer!).

Those who complete the lessons and successfully repel the Zitrons earn the right to wear the Gortek badge which comes in the package.

This innovative approach to computer education was developed by three British school teachers who wanted to make programming fun to learn. The result is a pioneering achievement in the field of computer education.

Commodore Business Machines, Inc., is a wholly owned subsidiary of Commodore International Ltd. (NYSE:CBU), a fully-integrated manufacturer of advanced microcomputer systems, consumer electronics products, semiconductors and office equipment. Commodore's Computer Systems Division markets the Commodore VIC 20™, Commodore 64™, PET™, CBM™, and SuperPET™ systems and software to major accounts and stores.□



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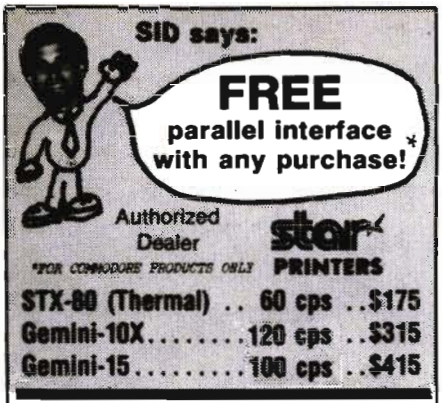

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Continued from page 93

Steffes and Art Dudly in the May issue.

In the number sorting program the first two lines should be as follows:

10 print "_____": input N
20 print "_____": input Z

Thank you.☐

Gentlemen:

I recently purchased the Commodore 64 computer, the 1541 disk drive, and the Okidata Microline 82A printer. In all I am pleased with my purchase. I am presently writing a program which makes use of alternate screens for inputing data. It is this which has prompted this letter.

The Programmer's Reference Guide describes on page 102-103 how to jump to an alternate screen but does not impart how to transfer the screen editing controls (the cursor) to the new screen. This information I found in a book entitled "Mastering the VIC-20" by A.J. Jones, E.A. Coley, and D.G.J. Cole.

I enclose a copy of the program which I have written. There are 15 possible screens on the C-64. This program will switch to each screen and clear it. When running the program, the screens located at locations 4096, 5120, 6144, and 7168 do not clear. No attempt, including direct POKES to memory will clear the screen.

Through various other programs designed to either read or copy the sections of memory in questions, I have determined that the garbage appearing on my screen must be coming from some other part of memory. Each program verifies that the memory in question is indeed blank. I have tried this program on another C-64 and obtained the same results. Please tell me where I am going wrong.

Sincerely, Timothy H. Rote.

Dear Timothy,

Your location of 648 (HIBASE) is correct for letting BASIC find the current screen address. The description on page 317 of the Guide is not very clear. "1st page of current screen memory" would be a more appropriate description.

A close review of pages 103-106 will show that the Character Generator ROM resides at address 4096-8191 ($1000-$1FFF). We must always remember that the VIC and the processor do not always look at memory in the same way. On power-up, we are in VIC memory bank zero and the Character Generator ROM is active for the VIC. If you wish to use standard characters in your screens, then you must work around the ROM. Switching to another bank for the screens will not help as the Character Generator (ROM or RAM versions) must always be in the same video bank as the screens.

As you are using the default bank, then screens 0, 4, 5, 6 and 7 will not be available. Screen zero contains RAM pages 0-3 which is where the processor ports and system variables/pointers reside. The other screens contain the Character Generator. We also cannot use these ROM addresses for sprites for the same reason.

If you do not need the Character Generator, then take a look at using Bank one. Also, you may only need one of the two Character Generators. In this case copy the portion of the ROM you need to a different address within the bank or to another bank and then set the appropriate pointers (see page 104).

The USER program in the May '83 issue of COMMANDER will do the things discussed here (and much more) at the machine language level and may prove to be useful in your application.

George Gaukel
Staff Writer

Checksum Errors: a Way to Recover

by Howard Rotenberg

Every now and then, you may get an error message like this: 23,READ ERROR,25,05. This depicts a checksum error of the bytes written on the disk. An error of 27 would mean it is a checksum error in the header. These errors are far less likely to occur. A checksum or CRC (cyclic redundancy check) is part of the information that is written to every sector that is used on your disks. I will not go into the inner dealings of the way information is stored on your disks, however I will show you a small program that should let you recover from these errors. It does not work 100% of the time, but the odds are very good. The steps are as follows:

1) Open the command channel.
2) Query for the drive track and sector at fault.
3) Initialize the disk.
4) Open a direct access file to channel 8 and logical file 8. The "#" sign will assign a disk buffer to the forementioned file.
5) Read in one block.
6) Write the block back out.
7) Initialize the disk again.
8) Display the disk status.
9) Close all files.

The Program:

```
10 OPEN 15,8,15
15 INPUT "ENTER DRIVE,TRACK,
SECTOR";
   D,T,S
20 PRINT#15,"I0"
30 OPEN 8,8,8,"#8"
40 PRINT#15,"U1";8;D;T;S
50 PRINT#15,"U2";8;D;T;S
60 PRINT#15,"I0"
70 PRINT DS$
80 DCLOSE
```

Conclusion:

After reading the block and writing it back out again, a new CRC is generated and hopefully this will fix the error. I must repeat that this is not 100% reliable, however it is certainly worth the effort to try and save that program. For the people using UPGRADE BASIC, you will have to read the error channel (instead of line 70) in your usual way since DS$ is only available in BASIC 4.0.□

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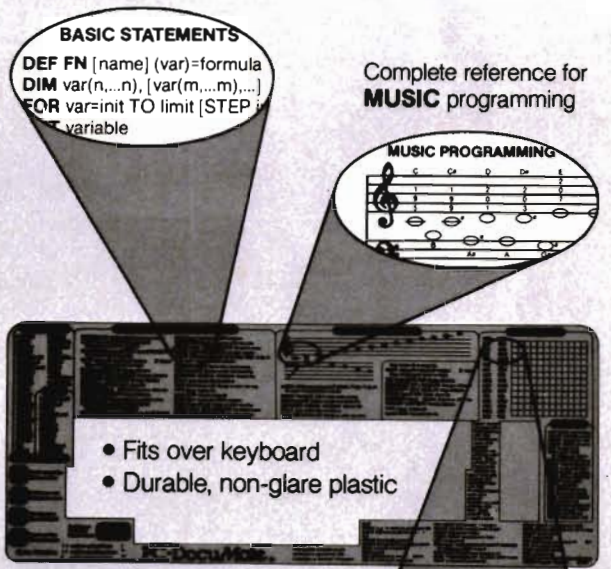
BASIC statements and options are documented



FEATURES

- Control keys defined
- BASIC language reference (Commands/Statements/Functions)
- Music programming guide
- Screen memory map
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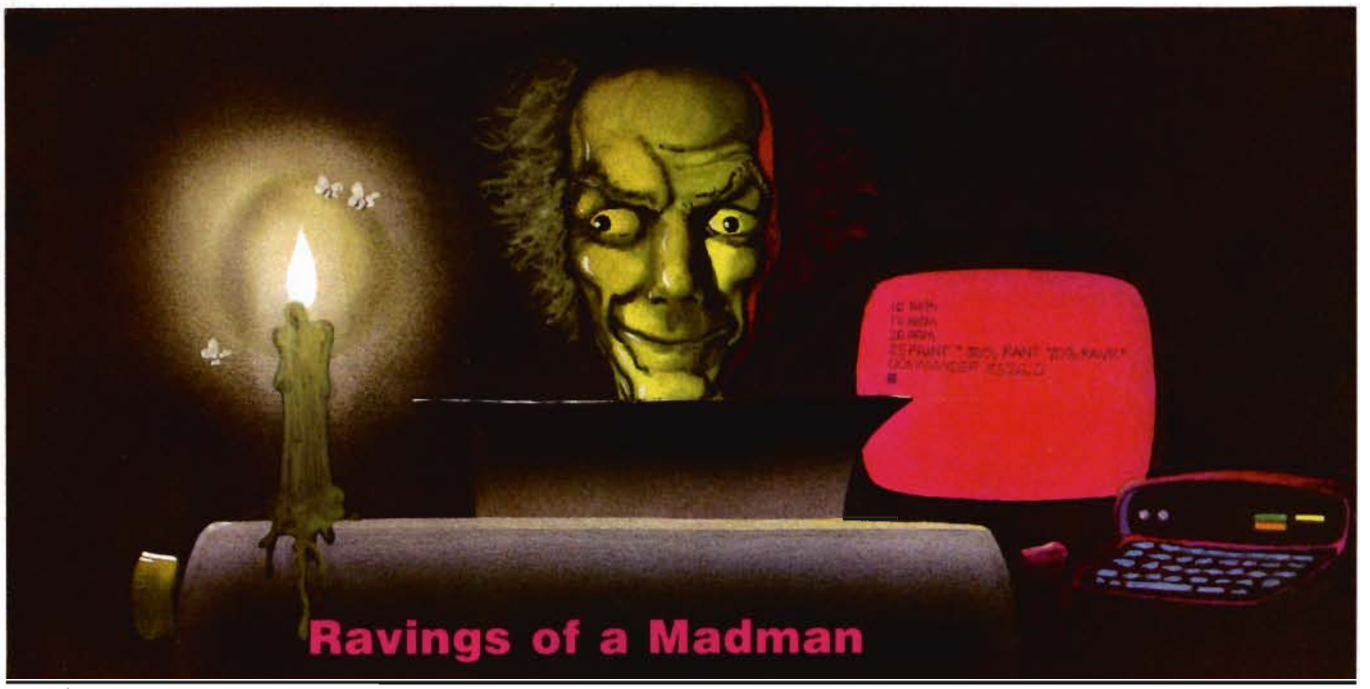

Ravings of a Madman

by Tim Parker

There was a time, long, long ago (but in a galaxy quite near here), when a computer could be easily identified. The computers of that age were ungainly, bulky brutes, occupying many square metres (or yards, if you prefer the Imperialistic approach....this galaxy in question was undergoing metrification) of floor space. The memory banks were literally that: bank upon bank of tubes. The mass storage devices (!) were punched paper tapes, which subsequently gave way to the punched paper card in an astounding technological leap. (The rumors that the changeover had been made because cards made better bookmarks was widely discouraged.) The screens, when they existed, were multicolor... black and white. A few even got green due to artistic pressures. The programs they ran were huge. Some occupied as much as 4 thousand bytes! The operators were highly trained specialists. Not just anyone could tame these magnificent computing devices. But the problems these machines solved were enough to justify their phenomenal costs. At long last, the dominant race could calculate the value of pi to one million places! Technology was wonderful.

Time passed slowly in this mystical world. A group of enterprising individuals working over their cauldrons eventually came up with a magnificent piece of magic. It replaced a vacuum tube, which was a long, heavy, breakable (and expensive) piece of equipment, with a funny looking flattish device that occupied a fraction of the room of the old tubes. These wizards were praised for their ingenuity, and awarded honours from all areas of the land. They devised a name for their mighty product: transistor! The transistor (which was one of a whole new fleet of modern devices called "solid state devices") revolutionized the computing machine business. The machine got smaller, and a little less expensive. The operators now only needed a bachelor's degree to understand the myriad lights and dials. Memory increased drastically. Some machines got well over 32 thousand bytes! Pi was calculated to two million places.

As time passed, the world in question had a technological boom unlike anything ever seen before. The devices used in computing machines got smaller and smaller, cheaper and cheaper. There was even a point when some radical thinker suggested that computing devices may become commonplace objects, available for the general public to purchase and use! After the lynching, pi was calculated to three million places.

After even more time passed, the radical thoughts that pursued the planet a decade previously had borne fruit. Calculating devices were commonplace. Some were even given away as promotional gimmicks! Computing machinery got smaller and smaller. One could carry in two hands the equivalent of a building's worth of machinery from a few years past. The average resident of the world could walk into a retail store and buy his own computer! He could learn how to program it with but a few hours study! Pi could be calculated to four million places by even the youngsters of the planet!

Naturally, the higher thinkers weren't happy with this trend to smaller and smaller. An obses-

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sion to bigger and faster had to develop at the same time. Some processors were developed to run a fraction of previous unit's times. Memory got faster. Computing times shrank to a theoretical limit. And pi at last was calculated to so many figures, that no one cared.

The phenomenally fast rise of computer devices and calculators has been like no other technology in the history of mankind. As a young schoolboy, I well remember getting my first "pocket" calculator. It had advanced functions: it could do squares and had a memory for storage of numbers! That was but a decade and a bit ago. Almost every year since then, a new calculator has emerged with functions that far surpassed the previous year's offerings. Round about Grade 12, I bought the "state of the art" calculator with over one hundred built in functions. The next year it was considered under powered. Three years ago, the "ultimate" calculator came along: the HP-41C. It could do pretty well anything you'd ever want. (Actually, the 41 has aged rather gracefully. After three years, there is no other machine that quite does what it does as well as it does. I still use an adaptation of it as my primary calculator. The speculation a while ago was that the 41 had reached the borderline between calculator and computer. It no longer seems so.) Calculators could handle alphanumerics, and store program on tape, cards, digital records, etc. They could have relatively large memories (considering that they are in essence programmed in machine language), and communicate with other machines. They could do dedicated computer jobs, and control machinery. Calculators were the microcomputers before the real microcomputer market blossomed.

But now the micros are here in full force. They are small, portable, powerful, dedicated and fully programmable. They can be bought for many purposes. They can have superb graphics, or be excellent wordprocessors. They can be calculated devices, or controlling devices. Essentially, any computer nowadays can do any task we could consider worth doing with few exceptions. And the micros have been around for only five years! Not a bad track record, but it sure makes keeping up with the field a headache.

As computers become commonplace, many people wish to own them. They all have different reasons. Some wish to play arcade quality games in the comfort of their own homes. Some wish to write with a device that avoids the infernal typewriter. Some wish to keep accounts up to date in an accounting system. Some wish to control laboratory equipment, and tabulate results. Some wish to do income tax without requiring expensive help! All the different reasons come down to one decision: which machine to buy?

There are several attitudes about this question. Some people have the opinion that whatever machine you buy now, it will be outdated in a matter of months. This results in a total pessimism that accomplishes nothing. Certainly there will be new computers along in a few months. And they certainly may have some features that your machine doesn't have. The point is, it is a never ending regressive circle. Why buy the new machine, when just six months more will get a better one? The end result is no machine is ever bought, and all the benefits of computers are negated.

Many people who bought computer years ago still use them. They may lack the "bells and whistles" of more recent machines, but the computer is intended for one purpose only: computing! If your machine does that, then be happy. If you bought your machine for the graphics, then a new machine will almost certainly appear with better resolution and pallet choices. Use what you have, and enjoy it!

In the microcomputer industry, it seemed to be a prevalent opinion that when the VIC-64 was introduced, the VIC-20 would bow out under the enhanced sound and graphics of the big brother. That has not happened. Both machines fill a certain niche in the industry, and neither truly replaces the other. Without a doubt, if the '64 cost the same as the '20, then most people would get the '64. But that condition does not exist.

A look at the oldsters in the computer market is always educational. The Apple, when introduced years ago, was a marvelous bit of machinery. It gave true computing power and graphics to the home for the first time at a reasonable price. Yet today they still exist. True, they are slow by today's standards, and the graphics are no longer state of the art, but there are thousands being sold consistently.

Larger machines, such as the 8080 based micros, still are around as well, as the technology for today's machines has been made backward compatible in many cases. Computers just do not become obsolete overnight. Some die a nasty death due to lack of support, or due to a simply inferior product, but most will be around decades from now.

So hang in there, VIC owners . . . you'll get support in the future years from the many other owners with VICs.

The number of software programs becoming available for the Commodore computers is rapidly increasing as the commercial viability of the machines increases. It is always difficult to stay on top of the microcomputer field, but the problem has been compounded over the last few years as the technology explosion continues.

Being involved in computers

professionally, the VICs are just two of the many machines I use. In the consulting business, everyone tries to get you to use his products, and as a consequence, my desks are littered with floppies. This has an inherent problem: I can never find the disks I need.

This all leads to advice for the disk drive users out there: label all floppies clearly, and make backups of them! When sifting through for a VIC format disk, I can eliminate the eight inch floppies immediately. But there are around three hundred five and a quarter floppies in various states of order on my writing desk. And the formats are nowhere near compatible. It is very frustrating to put an IBM format disk in a VIC drive, and watch the drive go crazy!

For storage, I recommend the plastic boxes that hold fifty disks at a time. There are several versions on the market, but I get mine from a nationwide electronic store chain. (No names, but they also market a computer line.) Their boxes allow separation of the disks into different categories, such as programming languages, word processors, etc. They are much easier to use than the floppy boxes that hold only ten.

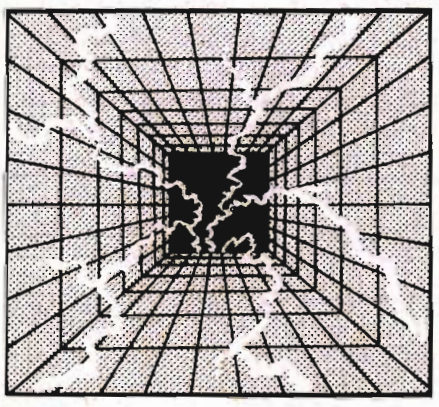
As for backups, even though it is frustrating at times, every disk should be copied (backed up) at frequent intervals. There is absolutely nothing more frustrating than spending several days writing a program or book, and have a read/write error crop up on the disk, losing the work. Be forewarned: it's a nasty lesson to learn!

At this point I'd like to extend my thanks for all the letters I've received from **Commander** readers. This column is now past the half year mark, and I've greatly enjoyed the writing of this column, and the other contributions. To those who have written to say they like the column: thanks! To those who grumble, what can I say? The column is intended to be ramblings of a random nature by someone who makes most of his living from the microcomputer industry, and that is what it reflects. No guarantee of quality. No money refunded.

Many people also sent tapes for copies of the various games I have published over the last while. All were sent out within forty-eight hours of receipt, by first class post as promised. A few have written telling me they never received the programs. Although I try to trace them all, as you can imagine, following up on several hundred tapes is frustrating. I do not keep a list of all those received (you try being organized at three in the morning!), but have none sitting around the house. To those that were lost, I extend my apologies, but I certainly have no influence over the mails!

And finally, to those who ask how I write this column, it is done on a portable CP/M machine using one of several word processors, depending on my mood. After writing (usually in two sittings), it is whipped through a spelling checker, then a grammar checker, then sent off to the good folks at **Commander**. When I receive the finished magazine, I usually am as surprised as the readers as to what I said!

All I need now, is to program the computer to do it all for me... □



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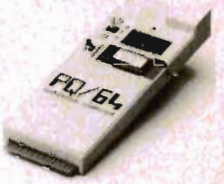

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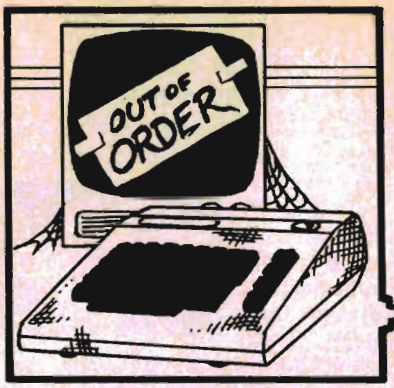
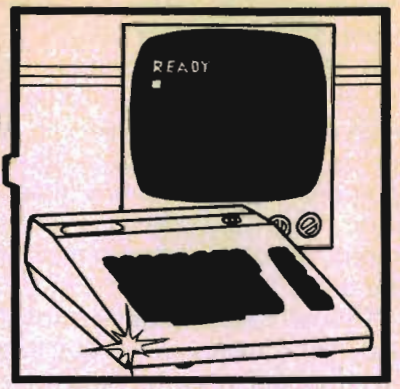


MAINTENANCE

—What are Your Options? Part II

by Tony Lamartina



Last month we talked about warranty policy and obtaining warranty service. This month we'll look at non-warranty service and several of the options available to you.

As in the case of warranty service, you can return your malfunctioning computer or peripheral to the dealer it was purchased from. Many dealers offer full post sale support, including repair services. Other dealers may send their repairs out to a local service facility and merely handle the paperwork for you.

A full service dealer is usually a good option. He can help when help is needed, take care of your repair needs and generally offer you the support that the computing community needs. Many dealers sponsor user groups and are sustaining members of that group.

If a full support dealer is your choice, you can pick any dealer, whether you purchased your equipment there or not. Most dealers with service capability are quite receptive to obtaining your service business.

Some dealers may do repairs on an hourly basis while others have per unit flat fees. For the most part, the flat fee is the best choice. This is a no-suprise repair. In other words, you'll know up front, what the cost of repair will be.

Besides dealer service, there are third party service companies offering a wide variety of services. These service companies are termed "third party" because in an agreement for repair service between the end user (you) and the manufacturer (Commodore), they are the third party. They have an agreement with the manufacturer to do warranty repairs as well as non-warranty repairs for the end-user.

Third party service companies also offer maintenance agreements, both extended warranty agreements and preventive maintenance agreements. An extended warranty agreement is basically an extension of the manufacturer's original warranty. For a fixed price, paid up front, the service company will warranty your computer or peripheral for a year from the date of the agreement. Should the device covered under such an agreement fail within the agreement period, repairs will be made by the servicing company at no charge to you. Remember, you paid your fees up front, at the beginning of the agreement.

The preventive maintenance agreement is an agreement between the servicing company and the user, that the user's equipment will be periodically cleaned, aligned and checked at no charge other than the original agreement price. These checks can be performed during the agreement period.

Reputable third party service companies will operate and quote from a published price list for these services. A third party service company offers only one product, service. They do not distribute or sell hardware, only service. There is another service company that can handle and is authorized to handle third party service agreements. This would be a national dealer/distributor with full service capabilities. There are at present only a couple of such organizations. They have a nationwide network of retail outlets and each location has a fully staffed service department located on the premises.

Their service organizations are a business unto themselves and do promote and sell their own service as a product. They do not exist solely to support their sales efforts, but rather exist as a service company, offering their services to you. They also will offer all of the services and service plans offered by the straight third-party service company.

Both these organizations offer on-site service, as well as mail-in and drop-in service. They both operate from a published labor, travel, and flat-fee service pricing.

You could ask for on site service. In other words, they come to you. You could mail in your defective equipment, or you could take your repairs personally to any of their service locations. These organizations go out of their way to make themselves available to you.

Another option would be the independent service agent. He may or may not be an authorized repair party. Some independents have made the necessary investments and have attended the manufacturers repair seminars. Other independents merely advertise their capability to repair a given line of products.

There are several conditions that separate the independent from the authorized full service dealer or third party service company, and there are advantages and disadvantages to each.

For instance, as I mentioned, some independents pay their own way to attend service seminars held by the manufacturer. This is also true of all authorized, full support dealers and third-party service companies.

Independents may be able to offer

service at a very attractive service rate, mainly because they do not have the overhead that dealers or third-party service companies have. They do not have clerical, receivable and training overhead costs to contend with. Consequently their rates are lower.

However, the independent usually cannot make the necessary investments for inventory. Therefore, without the proper parts on hand necessary to do the repairs, their repair jobs usually are lengthy in time and thus may be more expensive. The full service dealer and third party service company, have however, made the investments in training and warranty required by the manufacturer to obtain their authorized status. Repairs by these organizations are usually fast and efficient.

Other advantages over the independent are that the full service dealer and third-party service company both are established businesses, have and receive the most up to date service literature, and are responsible and can be held accountable for their services rendered. The independent usually answers to no one and may up and move, leaving you high and dry.

So, you may pay less per hour for the independent, you may pay for several service calls. Whereas, the full support dealers and third party service companies stand behind their service. If their repairs fail within a specified time, they will do the repair again at no charge.

Also, due to their size and setup, the full support dealer and third party company can offer the aforementioned service agreements. It is not likely that the independent will.

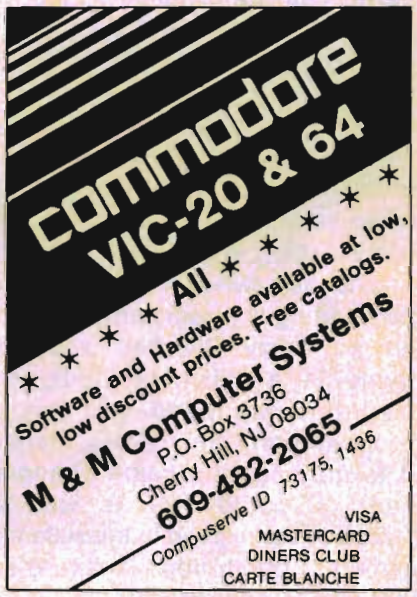
You could elect to send your repairs via UPS or the mail directly to the manuafacturer. This may save you a few dollars but certainly will add to the length of time you'll be without your equipment. It may be several weeks if not more to receive your repaired equipment back again.

Then, of course, you could elect to do your own repairs. If your unit is under warranty, DON'T! This may void your warranty. If, however, your computer or peripheral is out of warranty, then it's your option. I can tell you from experience though, that some of the largest repair bills went to some people who attempted their own repairs prior to bringing it in for service.

So, your choices are many. There's self service, not recommended. Leave service to those that do it for a living. There's the independent. A little cheaper, or is he? There's the full service dealer, the third party service company and the national dealer with a nationwide service arm.

The last 3, by far, are your best alternatives.

Next month, we'll conclude this three part series with a deeper look into maintenance agreements and some minor maintenance that you can perform on your own without fear of voiding your warranty or large repair bills. Next month's look could even help you keep your computer or peripheral at home and out of the repair shop.□



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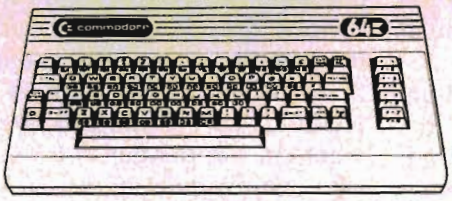

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Circle No. 23

The Game Gallery This Month – Crazy Scaler

by Jun Yukawa and Daniel Stoner

By way of introduction, I am one of the biggest game "phreaks" on the face of the earth. The three things I look for in a good game are: (1) If it holds my interest, (2) provides good action, and (3) it should be neither too easy nor too difficult. After having spent megabucks in the arcades, I know a good game when I see it and CRAZY SCALER is a classic.

One day (when I should have been doing my homework) I noticed a "Crazy Climber" type of game in a Japanese computer magazine. My friend (and genius programmer), Jun Yukawa, loaned it to me and as a game connoisseur, I could tell it was a "winner." Jun agreed to translate the game to English from Japanese so that I could understand it.

The game was so interesting and fun to play that we decided to implement it on the VIC-20. The difficult work (for me) of Japanese translation fell upon Jun and I would provide programming help, compassion and, of course, playtesting. The game progressed nicely and we had a great deal of fun thinking up the characters and hazards/traps for our hero. This is undoubtedly the most fun game we have ever made and I hope you have as much fun playing it as we have had.

The object of this game is to get CRAZY SCALER to the top of the building without getting killed. If your response is slow, you will never make it. By the way, you have three SCALERS before the game ends. There are five different screens, each one progressively more difficult.

On the first screen, you encounter a number of flower pots falling at you in a straight line. If one touches you, it's goodbye SCALER. There is also sound, but I only have a monitor to my VIC-20 so I cannot hear it. Your man must also avoid closed windows (a different color from the rest) that if touched, cause your SCALER to fall to the bottom and be splattered all over the pavement.

The second screen is the character Mr. T. He is falling at you trying to knock you off the building. Unlike the first screen, Mr. T is moving randomly back and forth because of "high winds" against the building. You must try and maneuver CRAZY SCALER away from him but without touching a closed window.

If you are successful at the second screen, you will advance to the third screen. The third screen is very much like the first. Instead of several flower pots dropping on you, a small but dangerous girder heads your way. Since the "winds" are calm on the screen, it falls in a straight descent.

The next one is (in my opinion) the hardest screen in the game. While climbing up the building, an umbrella falls down at an angle trying to bump into and kill you. The hard part is that it ricochets off the edge of the building right into your way. You must move your SCALER out of the umbrella's path. I must say I have not been able to get past this screen until a few days ago.

Finally, in the last screen, a large sign falls toward you except the "winds" are high so it moves around. I will not tell you what the sign says so you must figure it out by getting to the fifth screen. If you get past this one, it will go back to the beginning and start all over again.

The scoring for CRAZY SCALER is very easy. Every window you pass is + 50 points. After you reach the top of the building, your points double the higher you go. Buy the way, my high score is 54,000. I think some people can beat it.

If you have successfully beaten the high score, it will register on the screen at the end of the game, but it does not save it.

The following are the first two programs in CRAZY SCALER. The first program is the character generator set. Line 10 initializes the character generator. Lines 20-50 are reading character data statements. The machine language routine data statements are read by lines 60-90. Lines 100-300 read music data statements while line 140 loads program two. The character data statements for the various graphic objects such as the pot, Mr. T, Umbrella, and the SCALER, etc., are found in lines 200-232. Lines 240-245 are the machine language sub-routines for the movement of the SCALER. Finally lines 250-251 are the music data statements.

The following is the explanation for the second program. In lines 100-140 are the key inputs for J, I, and L. The horizontal moves are controlled by 150-180 and are the CRAZY SCALER climbing statements. Lines 250-270 check if CRAZY SCALER falls and lines 300-310 are the fall-

ing objects routine. Lines 320-520 make all the various objects fall, and the main routine is located in 600-620. Lines 630-650 make CRAZY SCALER climb to the top. Lines 700-740 make CRAZY SCALER fall to the ground and 750 to 770 are the game over routine. Lines 800-820 are the sound from an object hitting CRAZY SCALER. Lines 830-870 are the routines for making CRAZY SCALER grab the window. Lines 900 and 910 provide a time delay. Lines 1500-1540 are the beginning screen. Line 1700 prints the round# and the object that will be falling to kill CRAZY SCALER. Lines 2000-2100 print the game explanation. Lines 2300-2530 are the variable sets and 3000-3010 play the music. Finally, lines 5500-5510 clear the first screen.

As in the arcade game "Crazy Climber", the object of the game is to climb to the top of the building. Press (I) to climb up, (J) to go to the left, and (L) to go right.

To enter this program, first you must type the lines for the character generator program (program 1). After you have finished typing program (1) in, save it. Then, enter program (2). Once you have finished typing in program (2), save it right after program (1) on the same cassette. After program (1) is run, it will automatically load and program (2). You will still have to type RUN to activate the program.

If you press the run/stop key, you will see garbled characters. Type in POKE 36869,240 even though you cannot see these characters on the screen. This will change it back to the normal character set in the VIC-20. When you rerun the program, the graphics character set is reactivated.

If you do not wish to type the program in, send $5.00 to Dan Stoner, 6014 E. Mercer Way, Mercer Island, WA 98040. This charge is for the shipping and handling only and not for the program. By return mail, I will send you the fully entered CRAZY SCALER game program.

Unfortunately, Jun didn't have enough time to make any improvements in the program before the magazine deadline. One of the things I would like to add is a joystick control. Another change would be an extra man every 10,000 points or so. Last, but not least, I would like to convert the CRAZY SCALER program to the COMMODORE 64. If anyone makes these changes to the program, (or any other major changes), I would be happy to hear about them and would print the modifications in the upcoming months. Write me at the above address or in care of COMMANDER MAGAZINE.

Frankly, this is the best game I have ever seen for the VIC-20. In future issues, I will try my best to keep the games just as great as this one. □

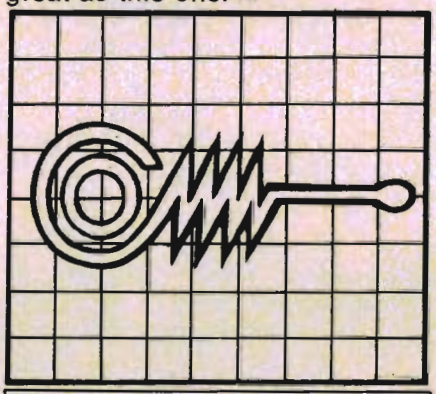

Figure 2—List of Variables

X—SCALER's horizontal position
V—movement
W—Human- wall data number
M—Round
U—Falling object X
Y—Falling object Y
Z—Umbrella's movement
H—High score
C—SCALER's remaining
S—Score

W$(W)—Wall data
A$(M)—Falling objects name
Y$—Y-Axis print

Continued on page 148

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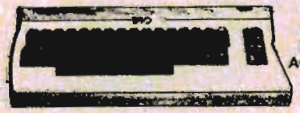

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Circle No. 65

CRAZY SCALER—Continued from page 147

Figure 1

```
10 REM *CRAZY CLIMBER*
20 GOSUB2500
30 GOSUB2000
40 GOSUB2300
50 GOSUB1700:GOSUB910
60 GOSUB1500
70 GOTO600
80 A=PEEK(197)
100 A=PEEK(197)
110 IFA=12THEN190
120 IFA=20ANDX>1THENV=-1:GOTO150
130 IFA=21ANDX<12THENV=1:GOTO150
140 RETURN
150 POKE8076+X,32:POKE8077+X,32:POKE809
8+X,32:POKE8099+X,32:POKE8120+X,32:POKE
8121+X,32
170 X=X+V:POKE8120+X,33:POKE8121+X,34:P
OKE8098+X,W+38
180 POKE8099+X,W+44:POKE8076+X,W+35:POK
E8077+X,W+41:RETURN
190 SYS7592:PRINT"[HOME]"W$(W):W=W+1:IF
W=3THENW=0
192 IFW<>2ORRND(1)>.4+M/100RK>148THEN200
195 PRINT"[HOME]"SPC(INT(RND(1)*4)*3+2)
"[CYAN]  [DOWN][LEFT][LEFT]  "
200 K=K+1:V=0:GOSUB170:S=S+50*M:GOSUB30
0:GOSUB250:POKE36876,165
210 PRINTLEFT$(Y$,5)SPC(15)"[REV][WHITE
]"S:POKE36876,0:RETURN
250 A=PEEK(8076+X):V=PEEK(8077+X):IFA<3
20RA>460RV<320RV>46THENF=1:RETURN
260 IF(PEEK(38796+X)AND7)=3OR(PEEK(3879
7+X)AND7)=3THENF=2
270 RETURN
300 ONMGOSUB320,350,390,420,460
310 RETURN
320 POKE7680+Y*22+U,32
330 Y=Y+1:IFY>22THENY=0:U=X
340 POKE7680+Y*22+U,20:POKE7702+Y*22+U,
21:RETURN
350 POKE7680+Y*22+U,32:POKE7702+Y*22+U,32
360 A=INT(RND(1)*3)-1:IFU+A<10RU+A>12TH
EN360
370 Y=Y+1:IFY>22THENY=0:U=X
380 U=U+A:POKE7680+Y*22+U,22:POKE7702+Y
*22+U,21:RETURN
390 POKE7680+Y*22+U,32:POKE7681+Y*22+U,
32
400 Y=Y+1:IFY>22THENY=0:U=X
410 POKE7680+Y*22+U,24:POKE7681+Y*22+U,
24:RETURN
420 POKE7680+Y*22+U,32:POKE7681+Y*22+U,
```

Continued on page 150

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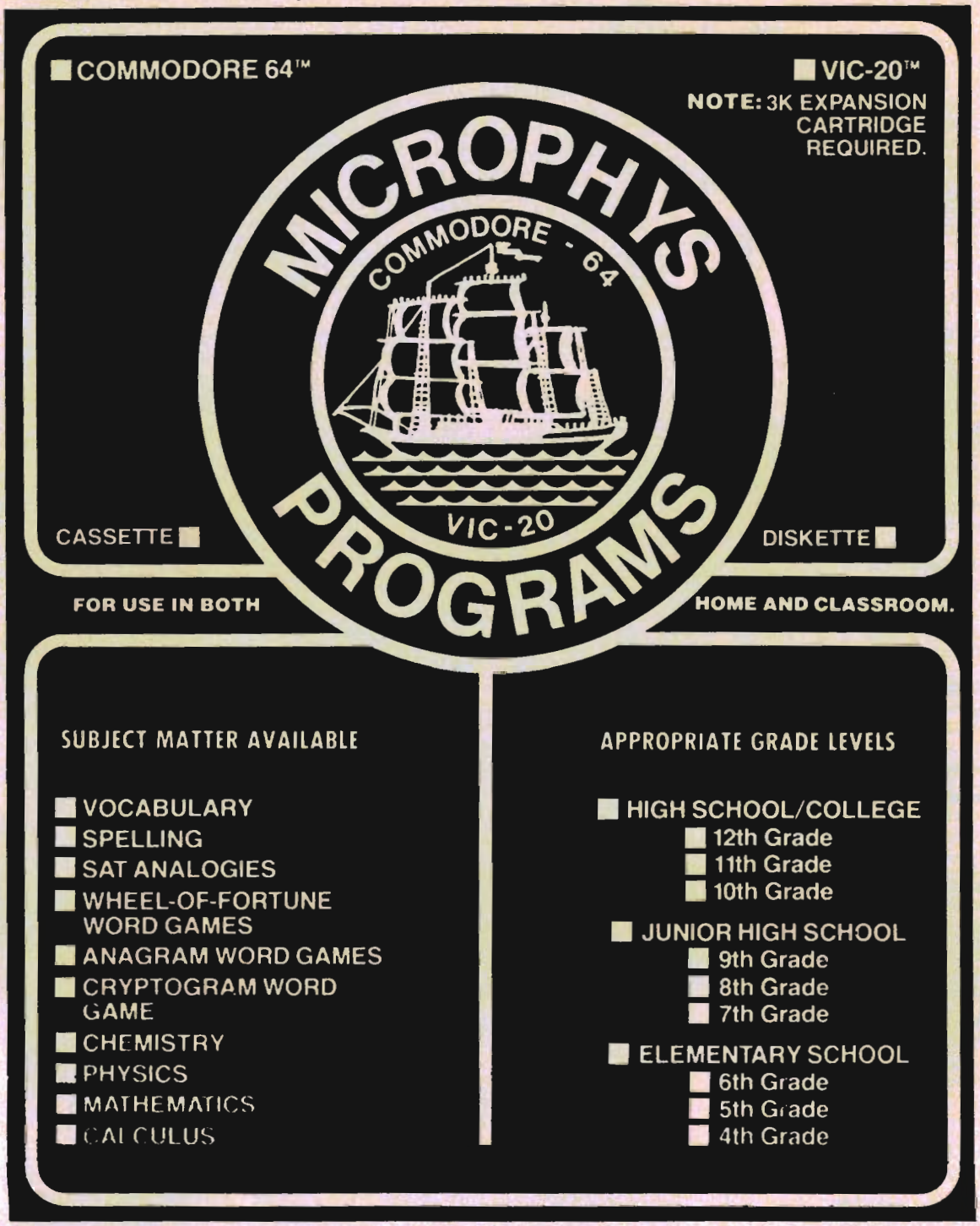

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Circle No. 46

CRAZY SCALER—Continued from page 148

```
 32
430 Y=Y+1:IFY>22THENY=0:U=RND(1)*12+1:Z
=1:IFRND(1)>.5THENZ=-Z
440 U=U+Z:IFU<10RU>12THENZ=-Z:U=U+Z
450 POKE7680+Y*22+U,25:POKE7680+Y*22+U,
26:RETURN
460 FORI=0TO2:POKE7680+Y*22+U+I,32:POKE
7702+Y*22+U+I,32:NEXT
470 Y=Y+1:IFY>22THENY=0:U=X
480 IFRND(1)<.8THEN520
490 IFU=XTHEN520
500 IFU>XTHENU=U-1:GOTO520
510 U=U+1
520 FORI=0TO2:POKE7680+Y*22+U+I,47+I:PO
KE7702+Y*22+U+I,50+I:NEXT:RETURN
530 FORI=0TO2:POKE7680+Y*22+U+I,47+I:PO
KE7702+Y*22+U+I,50+I:NEXT:RETURN
600 GOSUB100:GOSUB250:IFFTHEN700
610 GOSUB300:GOSUB250:IFFTHEN700
615 GOSUB300:GOSUB250:IFFTHEN700
620 IFK<1480RW<>0THEN600
630 GOSUB100:PRINT"[HOME][WHITE]
      ":GOSUB250:IFFTHEN700
640 IFK<169THEN630
650 GOSUB5500:GOTO50
700 ONFGOSUB800,830
710 PRINTLEFT$(Y$,19)SPC(16)"[WHITE][R
EV]-[OFF]£[REV]!!":FORI=0TO110:POKE3687
6,240-I
720 SYS7615:PRINTLEFT$(Y$,23)W$(W);:W=W
+1:IFW>2THENW=0
730 NEXT:POKE36876,0:PRINT"[CLEAR]":F=0
740 C=C-1:IFC>0THEN60
750 POKE36879,25:PRINTLEFT$(Y$,9)"[RIGH
T][RIGHT][RIGHT][RIGHT][REV][PURPLE]* G
AME OVER *[DOWN][DOWN]","[LEFT]   SCORE
="S
760 IFS>HTHENH=S:PRINT"[REV][RED][DOWN]
   YOU GOT HI-SCORE!"
770 GOSUB910:GOTO30
800 V=0:GOSUB170:POKE36879,35:POKE36874
,150:POKE36875,200
810 FORI=0TO15STEP.5:POKE36876,190+I:PO
KE36878,15-I:NEXT
820 FORI=0TO2:POKE36874+I,0:NEXT:POKE36
878,15:RETURN
830 PRINTLEFT$(Y$,19)SPC(16)"[WHITE]£]£
]":POKE36879,115
840 FORI=0TO1:FORA=0TO1:V=0
850 W=0:GOSUB170:POKE36876,200:GOSUB900
860 W=2:GOSUB170:POKE36876,230:GOSUB900
:NEXT:NEXT:POKE36876,0:RETURN
900 FORT=0TO150:NEXT:RETURN
910 FORT=0TO3000:NEXT:RETURN
```

Continued on page 152

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10,164,437	★Richard Seemayer, Fresh Meadows, N.Y.
2,150,836	Darrell Eastman, Tacoma, WA
GRIDDER	
45,678	★Nick Blenkush, Santa Monica, CA
FROGGEE	
65,425	★Keith Floyd, Belt, MT

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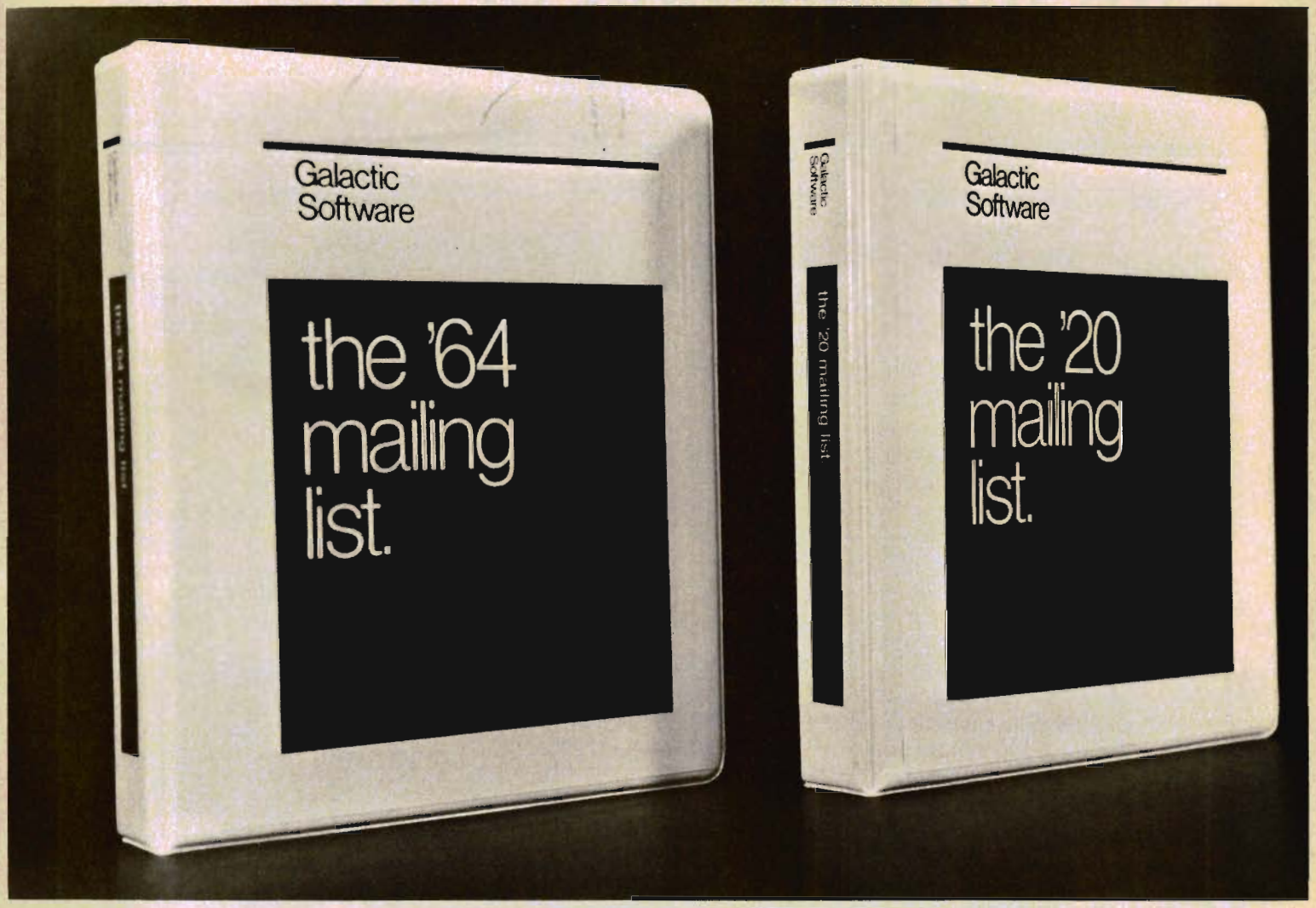
CRAZY SCALER—Continued from page 150

```
1500 POKE36879,25:PRINT"[CLEAR]"
1510 FORI=0TO7:FORW=0TO2:SYS7592:PRINT"
[HOME]"W$(W):NEXT:NEXT:W=0
1520 PRINT"[HOME][DOWN][DOWN][REV][WHIT
E]"SPC(16)"SCORE[DOWN]"SPC(17)S
1530 PRINT"[DOWN][DOWN]"SPC(16)"[REV]HI
GH":PRINTSPC(16)"[REV]SCORE[DOWN]"SPC(1
7)H
1540 PRINT"[DOWN][DOWN][DOWN]"SPC(16)LE
FT$("↑↑↑",C):V=0:X=7:GOSUB170:POKE36879
,99:Y=23:GOSUB300:RETURN
1700 POKE36879,25:PRINT"[CLEAR][REV][DO
WN][DOWN]"SPC(5)"[BLUE]ROUND"M:PRINT"[D
OWN][REV][LEFT]"SPC(7)A$(M):RETURN
2000 POKE36879,25:PRINT"[CLEAR]"SPC(4)"
[REV][PURPLE]_____",SPC(4)"[BLU
E]CRAZY CLIMBER"
2010 PRINTSPC(4)"[REV][PURPLE]─────
────","[OFF] #)[DOWN][LEFT][LEFT]&,[DOW
N][LEFT][LEFT]!"+CHR$(34)
2020 PRINT"[REV][LEFT] _____","[
PURPLE] KEY FUNCTION","[GREEN]─────
────"
2030 PRINTSPC(10)"[BLUE][REV]I[LEFT][DO
WN]I":PRINTSPC(8)"[REV]J──L"
2080 PRINT"[DOWN][DOWN][DOWN][DOWN][RED
][REV]   HIT RETURN KEY":POKE198,0
2090 GETA$:IFA$<>CHR$(13)THEN2090
2100 A=7656:GOSUB3000:RETURN
2300 M=1:S=0:C=3:K=0:F=0:POKE36878,15:R
ETURN
2500 READW$(2),W$(0):W$(1)=W$(0):FORI=1
TO5:READA$(I):Z=1:NEXT:POKE36869,255
2510 Y$="[HOME][DOWN][DOWN][DOWN][DOWN]
[DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DO
WN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN]
[DOWN][DOWN][DOWN][DOWN][DOWN][DOWN]":R
ETURN
2520 DATA" [GREEN] [PURPLE]  [GREEN] [P
URPLE]  [GREEN] [PURPLE]  [GREEN] [PURP
LE]  [GREEN] [PURPLE]"," [GREEN] [WHITE
]  [GREEN] [WHITE]  [GREEN] [WHITE]  [G
REEN] [WHITE]  [GREEN] [WHITE]"
2530 DATAPOT,"D[OFF]←[REV].D",BLOCK,UMB
RELLA,SIGN
3000 FORI=0TO17STEP2:POKE36876,PEEK(A+I
):FORV=15TOPEEK(A+I+1)STEP-.1
3010 POKE36878,V:NEXT:NEXT:POKE36876,0:
POKE36878,15:RETURN
5500 M=M+1:IFM>5THENM=1
5510 A=7638:GOSUB3000:K=0:RETURN

READY.
```

ENTER THE GALACTIC EXPERIENCE WITH



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An Introduction to Finances

by Howard Rotenberg

— How much will it cost?
— How much will I save?
— How much interest will I pay?
— How much interest will I make?
— Should I buy now or save a little longer?

If some of these questions sound familiar then this is the article for you. Finances can be one of the most confusing and conversely, the most interesting subjects at the same time. We can write a multitude of BASIC programs to solve our financial problems. We can calculate simple interest or compound interest. Mortgages and payback schedules can be calculated and printed out for our use. Most people do not realize how much money can be saved by making a small prepayment on a second mortgage. These are a few of the questions that I would like to answer with a few small programs that I will now share with you. The programs will all be fairly simple with some becoming a little more complex as we reach the end.

Imagine that you are interested in purchasing some new computer equipment. Should I buy it all now or maybe a little at a time? If I buy it now I won't have much money in the bank, however there is a sale on. How much money will I save? Program 1 will calculate this for you. We may proceed with the premise that:

1) SALE PRICE = THE ORIGINAL PRICE MINUS THE DISCOUNT.

2) THE DISCOUNT = THE ORIGINAL PRICE TIMES THE PERCENT OFF.

3) YOUR TOTAL SAVINGS = THE TOTAL REGULAR PRICE LESS THE TOTAL SALE PRICE.

You are asked to enter the original price and the discount as a decimal number. The program calculates the sale price (line 80) and your discount (line 100). Line 110 keeps a running total of your savings by simply adding the discount you receive. You may make a many entries as you like and find out your total saved in line 150.

Program #2 will give you the effective interest rate you get from a bank or other source of investment. This is dependent upon how many times a year your interest is compounded. We will let the variable R stand for our simple interest rate and Q stand for the number of times per year that the interest is compounded. We may use the following formula to calculate this:

$$E = ((1 + (R/Q))\uparrow Q) - 1$$

I have, and will continue to use an exclamation mark instead of the exponent or up arrow sign as my method of writing this text does not include it. If we execute program #2 with an interest rate of 7% (.07) and 12 months, we will find out that our effective yield for the year is 7.22900825%.

Now that we can calculate the effective yield, we may want to compute a total sum for 1$ invested at R% for Q interest periods over N years. We will do this in program #3. The formula that we will use is a spinoff of the previous one. It is as follows:

$$F = I*(1 + (R/Q))\uparrow(N*Q)$$

We may also want to use such a program to compare an investment that is compounded monthly as opposed to one compounded quarterly or bimonthly.

Let us take a look at a more practical side of the previous program. Most of us do not have large sums of money to be deposited all at once. We then would be more interested in a program that would calculate the amount of money that could be saved with smaller funds. Such a program would be one that will calculate a total for making specific deposits at predefined intervals for a specific length of time. We will of course consider that our money will be earning compound interest while it is in deposit. Program #4 will do just this and uses this formula to calculate our answer:

$$S = P*(((1 + (R/Q))\uparrow (N*Q)-1)/(R/Q)$$

In this formula P is the amount deposited, R the rate of interest, Q the number of compounding periods and N the number of years that the deposits will be made. At this point I would like to promise that this will be the second longest formula we will use. (SOME PROMISE, EH?)

We can take a different look at some of these programs and formulas and rearrange them to our heart's desire. We may want to calculate an initial amount, effective rate of interest, and the number of years that is necessary to reach a final sum. Let us take this as an example. We want a program that will tell us the initial

```
10 REM
20 REM ************************
30 REM *       PROGRAM #1       *
40 REM ************************
50 REM
60 PRINT"INPUT THE ORIGINAL PRICE, AND
DISCOUNT PERCENT AS A DECIMAL"
70 INPUT  OP,P
80 SP = OP - (OP * P)
90 PRINT"THE SALE PRICE = $"SP
100 PRINT"YOUR DISCOUNT IS $"OP*P
110 TS = TS + OP*P
120 PRINT"ENTER C TO CONTINUE OR E TO E
ND"
130 GETA$:IFA$<>"C"ANDA$<>"E"GOTO130
140 IF A$ = "C" GOTO 60
150 PRINT"YOUR TOTAL AMOUNT SAVED IS $"
TS
READY.
```

```
10 REM
20 REM ************************
30 REM *       PROGRAM #2       *
40 REM ************************
50 REM
60 PRINT"ENTER INTEREST RATE IN DECIMAL
";
70 INPUT R
80 PRINT"ENTER THE NUMBER OF INTEREST P
ERIODS PER YEAR";
90 INPUT Q
100 E = ((1+(R/Q))↑Q)-1
110 PRINT"YOUR EFFECTIVE INTEREST RATE
IS $"E*100"%"
READY.
```

```
10 REM
20 REM ************************
30 REM *       PROGRAM #3       *
40 REM ************************
50 REM
60 PRINT"ENTER YOUR INITIAL SUM, INTERE
ST RATE, PERIODS AND YEARS"
70 INPUT I,R,Q,N
80 F = I*(1+(R/Q))↑(N*Q)
90 PRINT"YOUR FINAL SUM WILL BE $"F
READY.
```

```
10 REM
20 REM ************************
30 REM *       PROGRAM #4       *
40 REM ************************
50 REM
```

Continued on page 156

amount needed on deposit to reach a desired sum of $5000. We must know the effective rate of interest and how many years we wish to leave our money tied up for. If we use 7.9% and six years we would need an initial investment of $3168.41. The program that will calculate this for us is program #5. The formula for the calculation is:

$$I = F/(1+R)\uparrow N$$

Alternatively, we may want to know the effective interest rate needed to achieve a particular final sum. The formula is:

$$R = ((F/I)\uparrow(1/N))-1$$

Mortgages

I would like to leave the banking programs and show two programs that may be of benefit to anyone who has a mortgage or may be getting one. The man who came up with the method of amortizing a mortgage had to have one of the greatest criminal minds in history. For those of you who have mortgages, you know exactly what I am talking about. For those interested, the word mortgage was derived from the French word mort which means death. (PAY FOR THE REST OF YOUR LIFE) Program #6 will really throw some light on how to save money when amortizing a mortgage. It requires only the interest rate, number of years for amortization and principal. The program will print a table to the screen or printer showing the monthly payment and total cost for amortization from the year you gave it down to a one year amortization. The really incredible part about it is that most people do not realize just how much money can be saved by amortizing for a shorter period of time. I have included a sample printout of a $14,500 mortgage at 14%. As you can see, if you amortize over 25 years your payment is $170.21 a month. If you can afford $10 more, you could amortize over 18 years

and by looking at the total cost you can see that you would save a staggering $12,138.62 by doing so. The table is entitled DEPRESSION TABLE, and you can easily see why.

The last program, simply entitled program #7, is most useful for those people who have a mortgage amortization table. This is simply a table that shows your payment number, interest, principal and principal remaining. Some times you may have the opportunity to prepay a certain sum into your mortgage. This program does a lot of the calculation for you. As you enter each payment you will see the payment number, principal remaining and your monthly payment. If you have some extra cash and wish to prepay some of your mortgage debt, this is the way you do it. You have three choices: 1) same payment, 2) abort or 3) prepay. If you choose the prepay option you are asked the approximate amount that you wish to prepay. The program will scan through the payments and inform you which payment number you are at and the exact amount you will have to pay to get to the payment. If you wish to make the payment you may answer yes and then the program will continue from your new payment number. You may chose not to prepay, in which case you are left with your normal payment. The program sets a window for the 8032, however you may leave this out for another computer.

Conclusion

At some time or another each of us have to make some financial decisions. It is because of programs such as the ones illustrated here, that job will become easier. For any problem you may have, there is a solution. It will just take a little thought. I hope this article will get you started in the fascinating world of finance.□

INTRO TO FINANCE—Continued from page 155

```
60 PRINT"ENTER INTEREST RATE, PERIODS P
ER YEAR, # OF YEARS, PERIODIC PAYMENT"
70 INPUT R,Q,N,P
80 S = P*(((1+(R/Q))↑(N*Q))-1)/(R/Q)
90 PRINT"THE TOTAL AMOUNT ACCUMULATED IS $"S
100 PRINT"YOUR INTEREST CAME TO";TAB(32
)"$";S-P*Q*N
READY.
```

```
10 REM
20 REM ************************
30 REM *      PROGRAM #5      *
40 REM ************************
50 REM
60 PRINT"ENTER FINAL SUM";
70 INPUT F
80 PRINT"ENTER EFFECTIVE INTEREST RATE";
90 INPUT R
100 PRINT"ENTER THE NUMBER OF YEARS";
110 INPUT N
120 I = F/((1+R)↑N)
130 PRINT"THE INITIAL SUM  NECESSARY IS $"I
READY.
```

```
10 REM
20 REM ****************************
30 REM *        PROGRAM #6        *
40 REM ****************************
50 REM
60 PRINT"[CLEAR]":DV=3
70 DEFFNR(P)=INT(P*1012+.5)/1012
80 INPUT"INTEREST RATE";I
90 INPUT"NUMBER OF YEARS FOR AMORTIZATION";Y
100 INPUT"PRINCIPAL";P
110 INPUT"OUTPUT TO PRINTER OR CRT C[LE
FT][LEFT][LEFT]";DV$
120 IFDV$="P"THENDV=4
130 OPEN4,DV
140 PRINT#4,TAB(28)"DEPRESSION TABLE"
150 PRINT#4,TAB(21)"FOR A";I;"%   $";P;
"MORTGAGE"
160 PRINT#4,
170 PRINT#4,"NUMBER OF YEARS
  MONTHLY PAYMENT                TOTAL COST"
180 FOR M = Y*12 TO 12 STEP - 12
190 MI  = (1 + I/200) ↑ (1/6.0) - 1
200 B = 1 - ( 1 + I / 200) ↑ (- M / 6.0)
210 QA =   1 / MI * (B)
220 IFDV=4THENPRINT#4,TAB(6);M/12;SPC(1
9);FNR(P/QA);SPC(18);FNR(P*M/QA):GOTO240
230 PRINT#4,TAB(6);M /12;TAB(29);FNR(P/
QA) ;TAB(55);FNR(P*M/QA)
240 NEXT
250 CLOSE4
READY.
```

Continued on page 158

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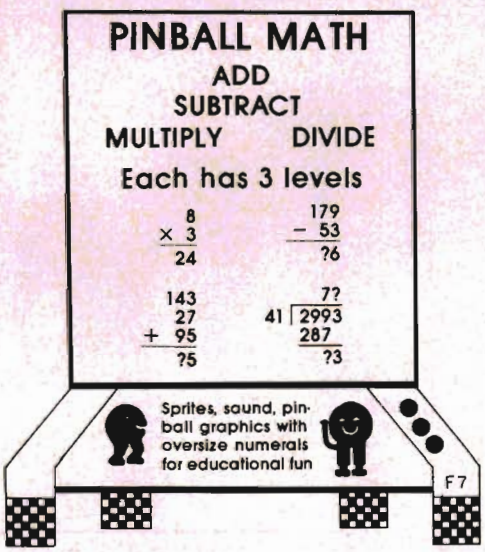

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INTRO TO FINANCE—Continued from page 156

```
20 REM ***************************
30 REM *         PROGRAM #7      *
40 REM ***************************
50 REM
60 PRINT"[CLEAR]"
70 T=0:DV=3
80 DEFFNR(P)=INT(P*10↑2+.5)/10↑2
90 INPUT"INTEREST RATE";I
100 INPUT"NUMBER OF MONTHS";M%
110 INPUT"PRINCIPAL";P
120 REM  INPUT"PAYMENT";PA
130 MI  = (1 + I/200) ↑ (1/6.0) - 1
140 PA = P / ((1/MI) * (1-(1+I/200)↑(-M
%/6.0)))
150 PRINT"ENTER 1 TO ABORT AND PRINT OU
T RESULT OR 2 FOR EXTRA PAYMENT"
160 INPUT"OUTPUT TO PRINTER OR CRT C[LE
FT][LEFT][LEFT]";DV$
170 IFDV$="P"THENDV=4
180 OPEN4,DV :PRINT"[CLEAR]"
190 PRINT"PAYMENT = "FNR(PA)
200 PRINT#4,TAB(28)"DEPRESSION TABLE"
210 PRINT#4,TAB(21)"FOR A"I"%   $"P"MOR
TGAGE"
220 PRINT#4,
230 PRINT#4,"PAYMENT #                  P
RINCIPAL REMAINING       MONTHLY PAYMEN
T"
240 PRINT"[HOME][DOWN][DOWN][DOWN][DOWN
][DOWN][DOWN][DOWN]"
250 FOR J = 1 TO M% :F=1
260 INPUT"NEW PAYMENT, 0 FOR SAME, 1 TO
 ABORT OR 2 TO PREPAY[RIGHT][RIGHT][RIG
HT]0[LEFT][LEFT][LEFT]";P1
270 PRINT"[UP]M";
280 REM PRINT"[UP]
                                        [
UP]"
290 IFP1=1THEN390
300 IFP1=2THENGOSUB420
310 IF P1 > 0 THEN PA = P1
320 IF PA > P + P*MI THEN PA = P + P*MI
330 T = T + PA :M1=M1+(P*MI) :REM T=TOT
AL COST M1 = INTEREST
340 IFFTHEN P = P + P*MI - PA
350 IFDV=4THENPRINT#4,TAB(6);J;SPC(19);
```

```
      FNR(P);SPC(13);FNR(PA):GOTO370
      360 PRINT#4,TAB(6);J;SPC(19);
      FNR(P);SPC (18);FNR(PA)
370 IF P <= 0 THEN 390
380 NEXT
390 PRINT#4,"TOTAL COST = $"FNR(T):PRIN
T#4,"TOTAL INTEREST = $"FNR(M1)
400 PRINT#4,"PRINCIPAL PAYED WAS $"FNR(
T-M1)
410 CLOSE4:PRINT"[HOME][HOME]":END
420 INPUT"ENTER APPROXIMATE AMOUNT TO P
REPAY";P2
430 P3=P:REM SAVE ORIGINAL PRINCIPAL
440 FORK=J TO M%
450 P = P + P*MI - PA
460 Y=P3-P>P2 :REM PRINTK,P,P2
470 IFYTHENPRINT"PAYMENT #"K;"   PRINCI
PAL";FNR(P);"   COST";FNR(P3-P):GOTO490
480 NEXT
490 INPUT"DO YOU WISH TO MAKE THE PAYME
NT";A$
500 IFA$<>"Y"THEN620
510 REM
520 REM ********************************
******
530 REM *  SET TO NEW PAYMENT AND PRINC
IPAL *
540 REM ********************************
******
550 REM
560 PRINT"[UP][UP][UP]■":PRINT"■":PRINT
"■[UP][UP][UP]":J=K:P1=P3-P:F=0:RETURN
570 REM
580 REM ********************************
******
590 REM *     RESET PRINCIPAL AND PAYME
NT    *
600 REM ********************************
******
610 REM
620 PRINT"[UP][UP][UP]■" :PRINT"■":PRIN
T"■[UP][UP][UP]" :P1=PA:P=P3:RETURN

READY.
```


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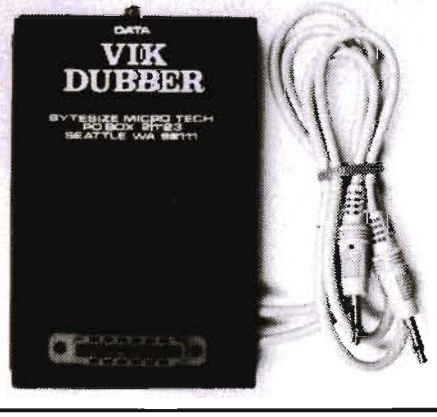

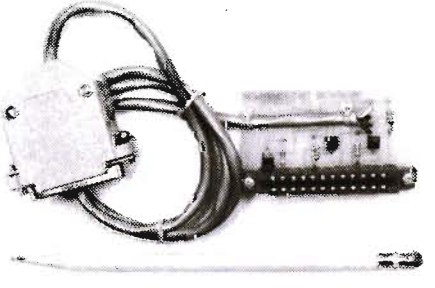

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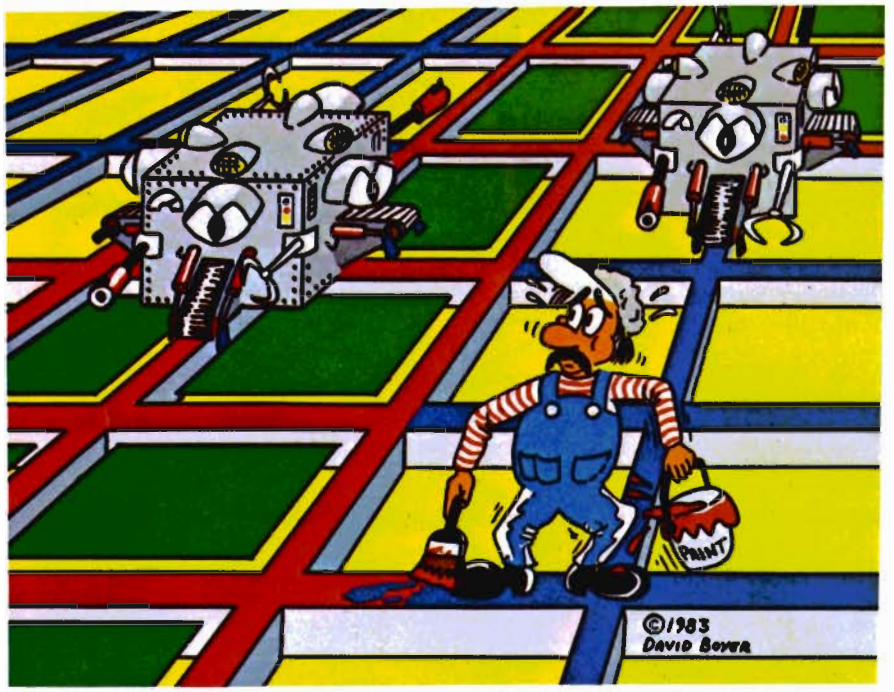

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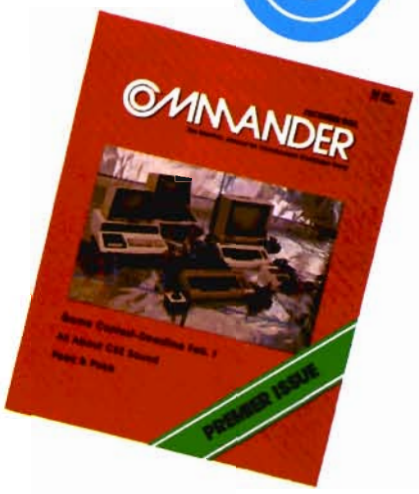

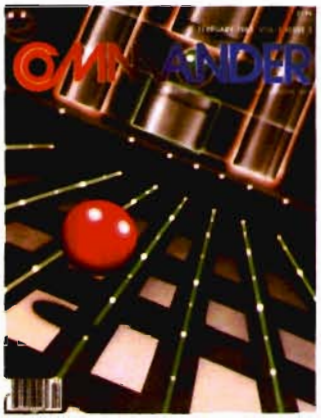

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PO Box 17142
Bethabara Station
Winston-Salem, N C 27116
Contact—Joel D. Brown
Interests—VIC-20 & CBM 64
Newsletter—The "VIC" Connection

Florida
Miami 2064
12911 SW 49th Street
Miami, FL 33175
Contact—Jim Luftman
(305) 226-1185

Kentucky
The Commodore Connection
1010 South Elm
Henderson, KY 42420
Contact—Jim Kemp
(502) 827-8153
Interests—VIC, CMB 64, PET

Ohio
Central Ohio PET User's Group
107 South Westmoor Avenue
Columbus, OH 43204
Contact—Philip H. Lynch
(614) 274-0304
Interests—Support of all Commodore Products

Northeast Ohio Commodore Users Group
5104 Mayfield Road
Lyndhurst, OH 44124
Contact—Ross Black, President
(216) 423-5010

Commodore Youths of Ohio
9729 Lawndell
Navarre, OH 44662
Contact—Todd Archinal
(216) 767-3514
Interests—Commodore Users under 20

SW Ohio VIC Users Club
659 Carthage Avenue
Cincinnati, OH 45215
Contact—Tom E. Harris
761-7510

Public Domain
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West Milton, OH
Contact: Bill Munch
(213)394-3192

The VIC Indy Club
PO Box 11543
Indianapolis, IN 46201
Contact—Linda Kropzer
(317) 878-3342

Michigan
Michigan's Commodore-64 Users Club
14342 Stephens
Warren, MI 48089
Contact—Doug Schwartz
(313) 776-5835 or
Chuck Ciesliga
(313) 773-6302
Newsletter—Sprite 64 (monthly)
Interests—All uses of Commodore 64

South Dakota
VIC-64 Users Club
203 East Sioux Avenue
Pierre, SD 57501
Contact—Larry J. Lundeen
(605) 224-4863

Illinois
The Fox Valley PET User's Club
833 Willow Street
Lake in the Hills, IL 60102
Contact—Art Dekneef
(312) 658-7321

Chicagoland C-64 Users Club
190 Oakwood Drive
Woodale, IL 60191
Contact—Russ Hurlbut
(312) 860-2015

Kansas
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Route 1, Box 115
Viola, Kansas 67149

Texas
Commodore (Houston) Users Group
8738 Wildforest
Houston, TX 77088

Gulf Coast Commodore Users Group
PO Box 128
Corpus Cristi, TX 78403
Contact—Lawrence J. Hernandez, President
(512) 887-4577

California
San Gabriel Valley Area Users Group
5534 Santa Anita Avenue
Arcadia, CA 91006
Contact—Norm Ellenburg
(213) 575-5834
(213) 224-3762
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SFVCUG (San Fernando Valley Commodore Users Group)
21208 Nashville
Chatsworth, CA 91311
Contact—Thomas Lynch (President)
(213) 889-2211 X2015 Days
(213) 709-4736 Nights
Newsletter—Monthly
Interests—All Commodore Products

Commodore Interest Association
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Victorville, CA 92392

Amateurs and Artesian
PO Box 682
Cobb, CA 95426
Contact: B. Alexander KR6G

Medocina Coast Commodore Club
PO Box 677
Gualala, CA 95445
Contact—Cathi Matthews
(707) 884-376
Interests—The News, 64's

Washington
Cyborg Gazette
30023-118th Avenue SE
Auburn, WA 98002
Contact—Ben Dunnington
(206) 939-0582
(206) 924-6992
Newsletter—Commodore 64 Magazine

The Emerald City Users Club
PO Box 19597
Seattle, WA 98109
Contact—Ian Hunter, President
Chris Wilkie, Vice President
(206) 282-3271

A.T.S. VIC-20 Computer Club
7906-34th Avenue SW
Seattle, WA 98126
Contact—Ken Gazaway
(206) 935-2697
Publication—For VIC-20 only

Whidbey Island Commodore Computer Club
PO Box 1471
Oak Harbor, WA 98277
Contact—Michael Clark
(206) 675-4815
Donald Sims
(206) 675-0301
Newsletter: Chips 'N Bits

Central Washington Commodore User's Club
1222 South 1st Street
Yakima, WA 98902
Contact—Bob Wood or
Tim McElroy

Commodore 64 Users
West 1918 Boone Avenue
Spokane, WA 99201
Contact—Terry or Sara Voss
(509) 327-7202

Canada
Winnipeg PET Users
9-300 Ennis Killeo
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Contact: Larry Nevfeld

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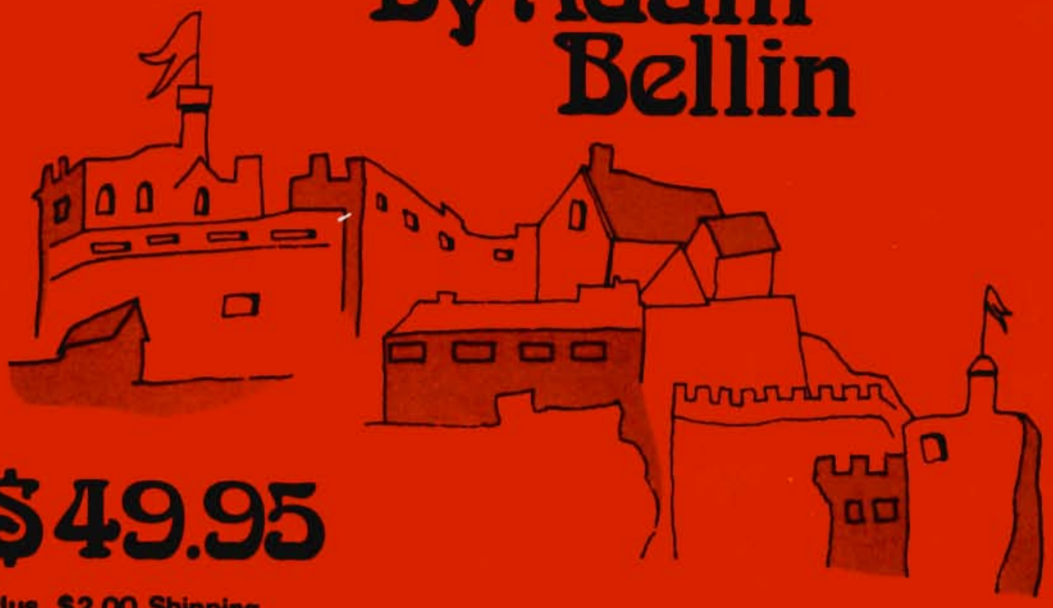
By Adam Bellin



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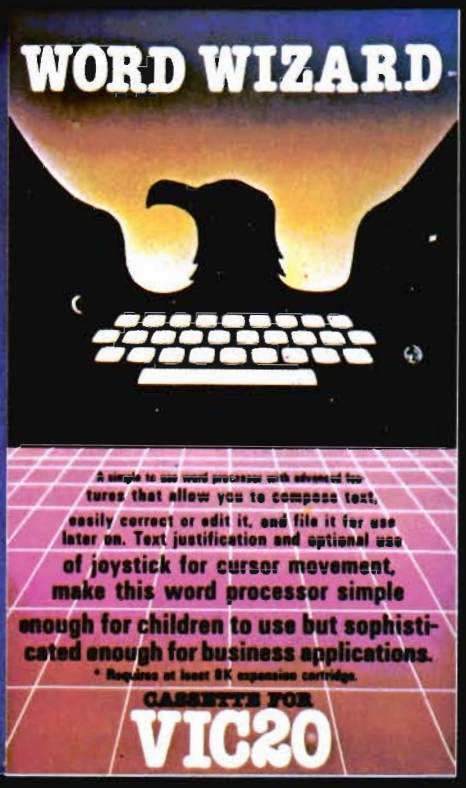

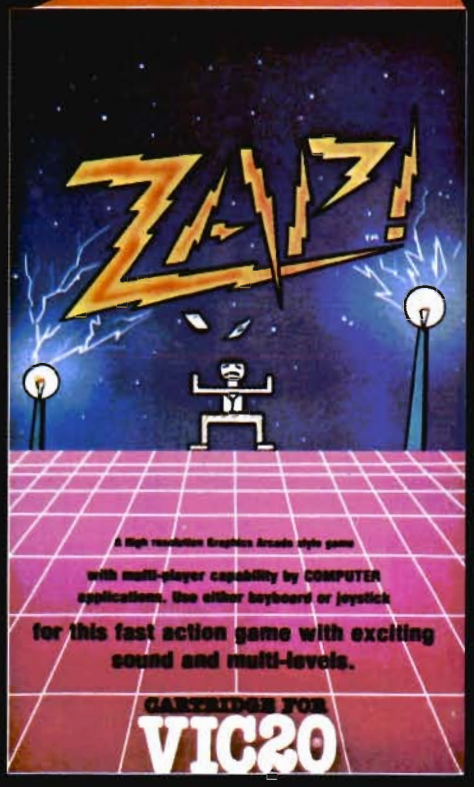

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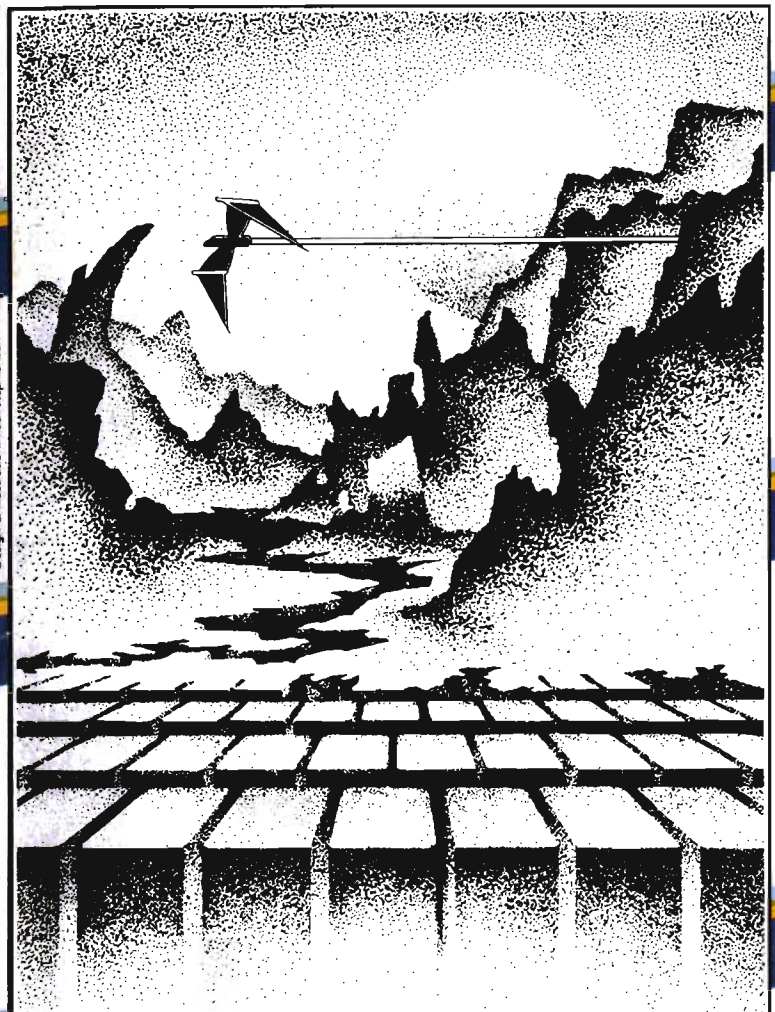

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