Fun, Games and Beyond with

Commodore Home Computers

Volume I, Number 1 Premier Issue $2.50

POWER/PLAY

COMPUTING

The VIC Magician: Some Helpful Sleight-of-Hand for Home Users

Our Hero Plays Black Dragon on The Source

Great Cartridge Games for the VIC 20

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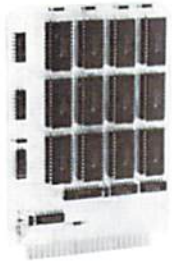
Expand your VIC to 80 columns.

Quantum Data's new Video Combo Cartridge brings you: 40 or 80 column display, plus 16K RAM and PROM socket. $299.00

With the Video Combo Cartridge from Quantum Data you can now have 40 or 80 column display, 16K RAM and PROM all in one cartridge. It comes set for 40 column Display compatible with the VIC video modulator and your home T.V. Then, when you are ready to upgrade to 80 columns and a video monitor, just make a simple, no-cost change inside the cartridge. Instructions are provided. Also provided is a socket for a PROM, 16K of memory and AC adaptor. If you don't need memory, then 80 columns can be yours for only $199.50. A listing of the driver software is provided at no charge. A programmed PROM containing this software is also available for $19.95.



QDI expandor:

- Expands Basic user memory up to 24K in 8K steps
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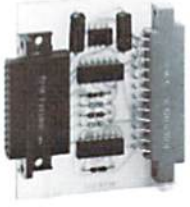

QDI Printor RS-232 interface:

- Provides RS-232 voltage conversion for VIC serial port
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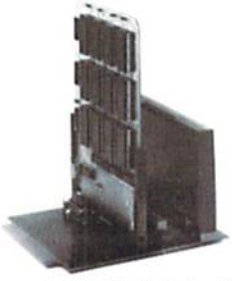

QDI Minimother:

- Adds 3 slots to the memory expansion port
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ON THE COVER Many of you will recognize the artwork from Commodore's **Jupiter Lander** cartridge game. See our games section for more on the many exciting cartridges available for Commodore home users.

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Braindrops

Welcome to the premier issue of POWER/PLAY and the exciting, expanding world of Commodore computing at home!

Whatever Commodore computer you're using in your home, you'll discover in these pages how to get the most out of its POWERful computing capabilities. In fact, if you get good enough at using your computer's POWER, you may never have to leave your home again.

Now, we do think all that POWER is fine. But you'll also find that Commodore computing at home is intrinsically PLAYful. And, to be frank, our inclination, here in POWER/PLAY, is more toward the PLAY part. "Fun, games and beyond" is our motto, and also happens to define how we've structured this issue.

In the FUN section you'll find—what else—fun things to do with your basic computer. (In this case the "basic computer" is a VIC 20 and Datassette.)

We consulted Mr. Webster and found out a game is the same thing as a contest. So that's how we decided what went into the GAMES section.

Which leaves us with BEYOND. In that section you'll find information for the more sophisticated user, and applications that require peripheral equipment beyond (!!) the basic computer. We've also stashed our reviews and miscellany there.

I think you'll find this first issue of POWER/PLAY both useful and enjoyable.

Diane LeBold

We're Glad You Asked

For the benefit of the multitude of new Commodore home computerists, we've decided to use this first issue of POWER/PLAY to answer some of the most frequently asked questions about VIC and its related products. Those of you who have been using your VIC for a while, or who have been reading COMMODORE Magazine, may have heard some of this before, but you never can tell. Even advanced users might learn a few things here.

Q. When will the Programmer's Reference Guide be out?
A. The VIC 20 Programmer's Reference Guide is available right now through authorized Commodore dealers and retail stores that carry Commodore products. For a complete review of the Reference Guide, see page 40.

Q. How do you clear up wavy lines on the TV screen?
A. Wavy lines on the screen are caused by RFI (Radio Frequency Interference). All computers tend to generate this interference. The problem can be made less apparent by re-orienting the modulator with respect to the TV antenna, or by tuning the TV set, making sure the switchbox is connected and set properly.

Q. My TV screen sometimes flutters during operation. How do you correct this?
A. Some TVs do tend to flutter with the use of a home computer. To eliminate the flutter with the VIC 20, use the following POKE command:

POKE 36864,133

Each time the VIC is reset (including power-up), you must issue this POKE command.

Q. Why do I sometimes have problems loading programs from cassette tapes?
A. Radiation from the TV screen can interfere with loading a program on tape from your VIC Datassette recorder. To alleviate the problem, move the recorder as far as possible from the TV. Also, because new tapes are often tightly wound, we suggest you play the tape a few times without loading. This will loosen the tape and facilitate loading.

Q. Is the PET/CBM software adaptable for the VIC?
A. Generally speaking, PET/ CBM software can be adapted to the VIC if there is sufficient memory. Programs most easily adapted are those in BASIC that contain no PEEKs or POKEs. However, since most PET/CBM programs use PEEKs and POKEs, and because the screen size is so different from the VIC, it's almost easier to take the general idea of the program and completely rewrite it, using memory maps. The VIC memory map can be found in the VIC 20 Programmer's Reference Guide, available from Commodore. PET/CBM maps are available in various places, such as the **PET/CBM Personal Computer Guide**, published by Osborne McGraw Hill.

Q. What is the purpose of the RS232 Terminal Interface Cartridge?
A. The RS232 Terminal Interface Cartridge converts the signal produced by the VIC into true RS232 standard format, which is used by some non-Commodore MODEMS.

Q. How is a MODEM hooked up to the VIC?
A. Right now, two methods are available for hooking up a MODEM. If you have a modular phone, your best bet is to get the VIC MODEM cartridge, available at your Commodore dealer. With this inexpensive cartridge, you simply plug the handset cord of your phone directly into the MODEM cartridge, run the software driver, and you're all set to enter the world of computer telecommunications! If you don't have a modular phone, then you'll have to purchase the VIC RS232 Terminal Interface Cartridge and connect it via an RS232-to-RS232 cable to an RS232 acoustic MODEM. For details on the VIC MODEM, see our telecommunications department, page 36.

Q. What telecommunications networks work with the VIC?
A. The VIC MODEM cartridge allows you to access such networks as The Source, CompuServe, MicroNet, Dow Jones and the New York Times, to name just a few. In addition, Commodore is presently developing a network exclusively for Commodore users. Again, see our telecommunications department on page 36.

Q. Will more software be available for the VIC?
A. Commodore's VIC Product Development Group is currently working on many new and exciting arcade-style cartridge games, as well as helpful application software. For more information on the arcade games, see page 28.

Q. How do you use joysticks with the VIC? Do you need joysticks with VIC game cartridges?
A. With the current VIC cartridges, joysticks are not necessary, but they are optional in the following: VIC Avengers, Superslot, VIC Super Alien and Radar Rat Race. To learn how to use joysticks with your VIC, see Andy Finkel's article on page 26, or the VIC 20 Programmer's Reference Guide, available from Commodore.

Q. What does the VCU piggyback do for the VIC 20?
A. The VCU (Video Circuit Upgrade) improves the color of early versions of the VIC 20 units, serial numbers less than 50900, which were manufactured in Japan. Newer VIC units made in the U.S. have this circuit included.

Q. Is it possible to hook up an audio cassette recorder to the VIC 20?
A. A standard audio cassette recorder will not work with the VIC 20. A VIC Datassette is necessary for use with any cassette tapes. HOWEVER, the VIC Datassette does use audio cassette TAPES. For best results use a short (C-10 or C-15) tape, and make sure it is NOT chromium dioxide. Chromium dioxide cuts the high frequencies, which is exactly where data is stored.

Q. Can more than one peripheral be hooked to the VIC at one time?
A. Up to five disk drive units can be daisy-chained together. To include a VIC printer in the system, simply connect it as the last unit of the chain.

Q. Is it possible to hook a monitor to the VIC 20?
A. The VIC 20 can be connected directly to a monitor without using the modulator. The cable required depends on the monitor's input connector.

Q. What kind of BASIC is used on the VIC 20?
A. The VIC 20 uses PET BASIC 2.0.

Q. Is there a way to increase the number of columns per line?
A. At this time, there is no really efficient technique to increase the number of columns per line on the VIC 20. It is possible to write programs to increase the

(continued on page 45)

And Now A Word From Our Sponsor . . .

We at Commodore are delighted with the growing interest in computing at home. The potential of home use is just beginning to be tapped, and things that were only possibilities yesterday are rapidly becoming realities today. In fact, home use is expanding so quickly that between the time I write this and the time you read it a whole new range of products and possibilities will have emerged.

To help the tremendous number of Commodore home users get the most out of their computing experience, we decided to create a magazine devoted exclusively to their needs and interests. Our intention is to provide plenty of information on how to use Commodore computers for personal development and entertainment, as well as for practical purposes.

Most importantly, we hope POWER/PLAY can become a forum for our home users—a means of connecting with other Commodore enthusiasts to exchange ideas and information. If you are willing, you can use POWER/PLAY to establish a network of personal support that will greatly enhance your understanding and appreciation of what your computer can do.

We hope you will come to regard POWER/PLAY as an essential accessory to your Commodore home computer, just as our business, scientific and educational users have come to rely on COMMODORE Magazine as an irreplacable source of information about Commodore products outside the home. You can make POWER/ PLAY whatever you want it to be, by contributing your ideas and energy. We invite and encourage you to participate in creating a magazine that will be uniquely yours.

Kit Spencer
Vice President, Marketing

Illustration by **Greg Martin.**

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Access: Commodore User Groups

User groups have what we call a synergistic effect. That is, cooperative effort achieves things that individuals probably couldn't accomplish independently.

To encourage that cooperation, and help you get the most out of your home computing experience, this section of POWER/PLAY is devoted to getting users together.

Let us know what your group is doing, send messages via free "classified" style ads, or simply list your group. We'll do whatever works to help you contact other users and/or get the information you need.

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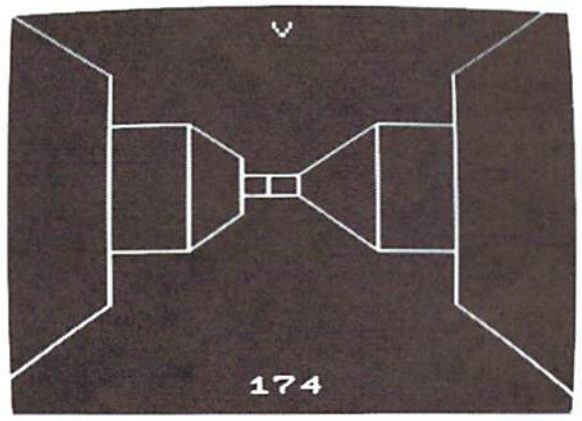

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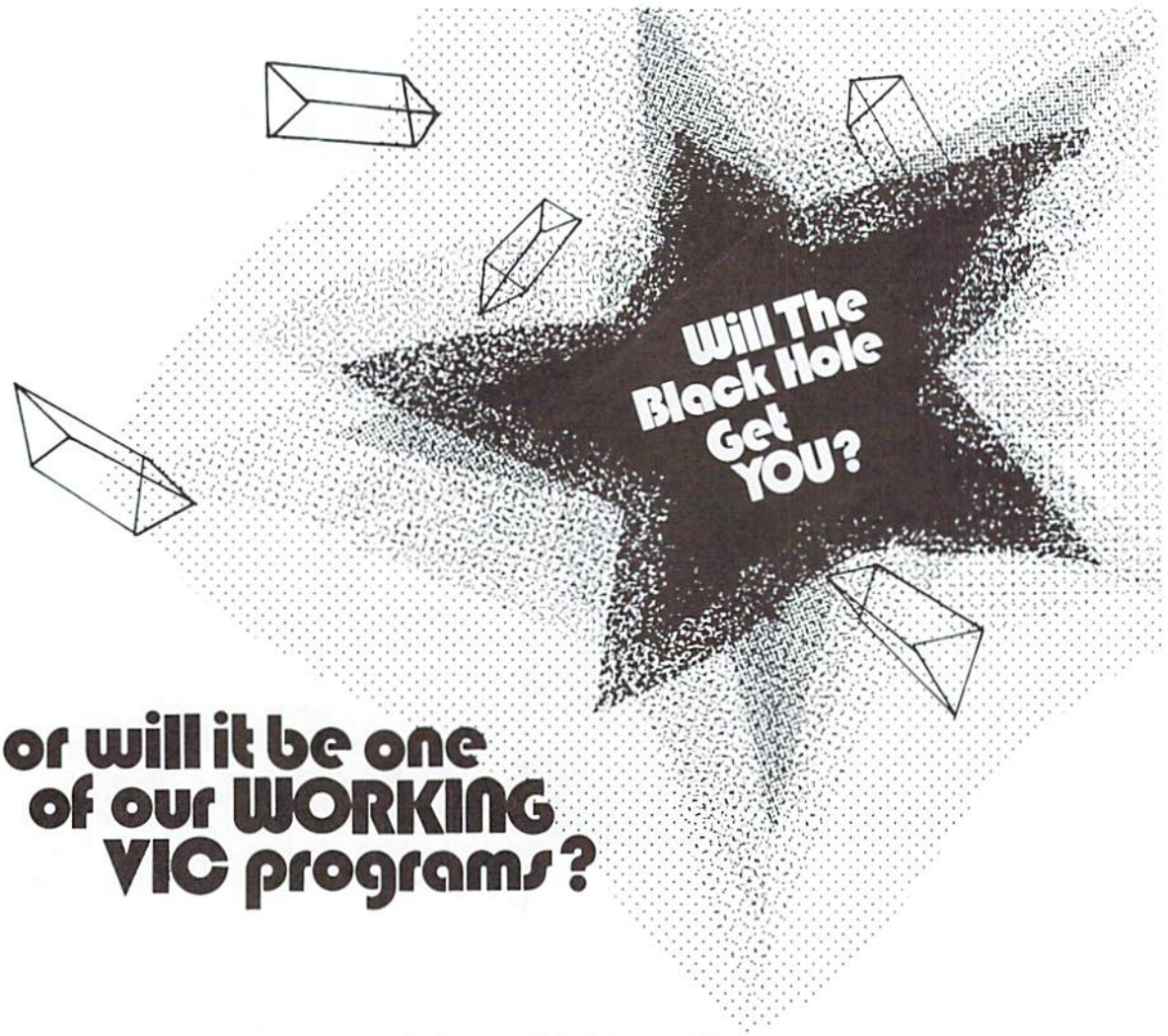

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Your First Computer "Magic"

by Michael Tomczyk, VIC Product Manager

Reprinted from **Commodore** Magazine, October 1981

Writing programs for Commodore's VIC 20 is a lot like performing magic. The results are certainly astounding, and your friends are sure to be amazed.

Actually, computing isn't much different from magic if you're talking about illusions. For example, the VIC automatically tells you if you make a programming mistake by displaying an "error message" on the screen. That doesn't mean there's an "intellectual rabbit" hiding under the keyboard. It simply means the VIC 20 is a "logical" machine.

We're going to be exploring the VIC's peculiar logic—and some magic, too—in this series of articles which focus on elementary BASIC programming. The purpose is to show first-time computer owners how to COMPUTE, with secondary emphasis on hard-line programming. The philosophy is: you don't have to know how to repair a car in order to drive one; likewise, you don't have to be a computer scientist to "drive" the VIC 20.

That's the beauty of Commodore's "friendly computer." It's easy to learn, fun to "drive," and you don't need a license (or PhD.) to use it.

Everyone likes to perform magic with their new computer, but doing the neat tricks the salesperson showed you in the store doesn't seem so easy when you get the thing home.

Here are some of the favorite programs of Commodore's VIC Group. These programs are not only fun, but they incorporate some helpful computing techniques you might want to mix, match, and experiment with. Most of these programs are explained in the VIC owner's guide.

Before we begin, here's a quick refresher on how to enter a program into the VIC 20:

1. Type the program line-by-line as shown, including the line number.
2. Hit the RETURN key at the END of each numbered line of instructions.
3. Type the word RUN and hit RETURN to make the program execute.
4. To stop a program which is "running," hit the RUN/STOP key.
5. You can RUN a program over and over by STOPping it and typing RUN (because the program stays in the VIC's memory when you type it in).
6. Before typing a new program, type the word NEW and hit RETURN to erase the old program.
7. If a program "hangs up," hold down the RUN/STOP key and hit the RESTORE key. This resets the VIC without losing the program.

VIC-TRICK #1 (NAMES, NAMES, NAMES)

```
10 PRINT "YOUR FRIEND'S NAME . . .";
20 GOTO 10
```

This is a fun program most of us have used over the years to impress friends who never saw a personal computer close up before. Type in a person's name, with some dots to make it more readable on the screen. The PRINT command displays the name, or any message between the quotation marks, on the screen. The GOTO command tells the VIC to go back to line 10 and print it again. The semicolon at the end of line 10 makes each message appear right next to the last one. Try changing the semicolon to a comma, or leaving it off entirely, and see what happens.

VIC Magician

VIC-TRICK #2 (255 COLORS)

```
10 FOR X = 1 TO 255 STEP 1
20 POKE 36879, X
30 PRINT CHR$ (147)
40 FOR T=1 TO 700: NEXT T: NEXT X
```

This little program displays the VIC's 255 screen and border color combinations. It's very helpful because you can go through all 255 combinations step-by-step, and find the color combination you like best for a particular program. The POKE command in line 20 is the key. RUN the program until you see a color combination you like. Hit the RUN/STOP key to freeze the colors. Write down the POKE command shown on the screen for reference. Now type CONT and hit RETURN to continue the program from where it left off. This is the "lazy" approach to choosing colors. The best way is to check page 37 or 134 in the VIC owner's guide.

VIC-TRICK #3 (THE ROLLING SCREEN WINDOW)

```
10 POKE 36867,4: PRINT CHR$ (147)
20 PRINT "YOUR MESSAGE HERE . . ."
30 FORX=0TO120:POKE 36865,X:NEXT
40 GOTO20
```

You can change the size and position of the VIC's screen window by using some of the special "POKE" commands. This little program uses these commands to make your message scroll downward across the screen. The message in line 20 should be 22 letters long. Try typing 22 hearts (Hold down the SHIFT key and type S, which has the heart on the front) instead of a message.

VIC-TRICK #4 (THE SEASICK PROGRAM)

```
10 PRINT CHR$ (147) "SEASICK"
20 FOR L = 0 TO 6.28 STEP .1
30 POKE 36864, 5 + 4 * SIN(L)
40 POKE 36865, 27 + 4 * COS(L)
50 NEXT: GOTO 20
```

This program makes the screen move around . . . and around . . . and around. We call it the Seasick program because that's how you might feel if you stare at it too long. The programming magic here is the VIC's ability to move the screen around using POKE statements.

VIC-TRICK #5 (DRAWING A HIGH RESOLUTION CIRCLE)

```
 10 FOR S = 7168 TO 7679: POKE S,0: NEXT
 20 POKE36879,8:PRINT CHR$ (147);
 30 FOR S = 7680 TO 8185: POKES, 160: NEXT
 40 POKE 36869,255
 50 FOR L = 0 TO 7: FOR M = 0 TO 7
 60 POKE 7680+M*22+L, L*8+M
 70 NEXT M, L
 80 FOR X = 0 TO 63
 90 Y1 = 32 + SQR (64*X-X*X)
100 Y2 = 32 - SQR (64*X-X*X)
110 FOR Y = Y1 TO Y2 STEP Y2-Y1
120 CH = INT (X/8) *8 + INT (Y/8)
130 RO = (Y/8 - INT(Y/8))*8
140 BY = 7168 + 8*CH + RO
150 BS = 7-(X-INT(X/8)*8)
160 POKE BY, PEEK (BY) OR (2 ↑ BS)
170 NEXT Y,X
180 GOTO 180
```

This 18-line program looks like a lot . . . but it does a lot. This is our first program to actually draw something on the VIC 20 screen in high resolution, dot programmable graphics. Dot programmable graphics are different from VIC graphics, in that VIC graphics are made up of 8x8 dot blocks (64 dots per block). Dot programming lets you access each dot individually, and "draw" in high resolution programmable graphics. The mechanics of how to do this are discussed in the VIC 20 PROGRAMMER'S REFERENCE GUIDE. But, if you really want to get into programmable graphics and plotting, we suggest you get the VIC 20 SUPER EXPANDER CARTRIDGE. This special cartridge gives you 3K RAM extra memory and adds several new commands to VIC BASIC to let you plot individual points, lines, arcs and circles . . . and even "paint" closed figures on the screen in color! The Super Expander also has built-in music writing commands and a special "music mode."

We hope this brief "magical" introduction to the VIC gives you some interesting programs to experiment with. In future columns, we'll continue our exploration of the VIC's capabilities and give you a magician's hat full of programming tips and tricks to help you become a "VIC Wizard."

If you have a particular topic you'd like us to discuss in this column, please drop a line to VIC MAGICIAN, in care of this magazine.

Learning About The Cursor

Reprinted from **Commodore** Magazine, December 1981

The subject of this "magical" installment is how to position or "program" information to print where you want it on the screen. This covers everything from how the cursor works to how to write programs that print words or graphics in specific locations on the screen.

Cursoring Around

Cursor control is one of the VIC 20's most useful features. (The cursor is that blinking square on the screen that tells you where the next symbol will appear).

There are many ways to move the cursor around the screen, to make it appear and disappear and do crazy things . . . but the cursor's real power is its ability to **position** graphics, letters, numbers on the screen. Let's explore the cursor in depth and see how it works.

When you first turn on the computer, you should see a blinking blue rectangle (the "cursor") directly below the opening display. The cursor is controlled by the CRSR keys.

CRSR Keys

The CRSR keys are located at the lower righthand corner of your keyboard. They're the ones with the arrows on them. As you can see, these two keys let you move the cursor to the right or left, up or down. If you press the (↕) key, the cursor moves **down** the screen. If you hold down the SHIFT key and press the **same key** the cursor moves **up** the screen.

Moving the cursor right and left is just as easy. The (↔) key moves the cursor to the right and SHIFTing the same key moves the cursor to the left.

Special Features of the VIC 20 Cursor

Here are some special features of the VIC 20 cursor controls:

1. Automatic repeat. If you hold down either of the two CRSR keys you'll discover that the cursor automatically **repeats** as long as you hold it down. This is to help you move quickly to a desired location and is an excellent "screen editing" feature of the VIC 20.

2. Scrolling. If you press the "down" cursor key and keep holding it, you'll see that the cursor moves to the bottom of the screen . . . and when the cursor hits the bottom the entire screen will **scroll up one line at a time.** This is to give you more space when you're writing a program. Note that the VIC 20 screen scrolls only when you "cursor down." Moving the cursor to the top of the screen does not have any scrolling effect.

3. Wraparound. Try moving the cursor **horizontally** by pressing the CRSR RIGHT key. Notice that when it reaches the end of the line you're on, it automatically **jumps down to the beginning of the next line.** Conversely, if you SHIFT CURSOR LEFT the cursor will move left and jump **up** one line when it reaches the edge of the screen. This process of jumping up or down from one line to the next is called "wraparound."

4. CLR/HOME. Often, you want to move the cursor to the top lefthand corner of the screen. This is called the "home" position. The HOME key on the VIC is located at the top right corner of the keyboard. If you hit this key the cursor moves "home." If you hold down the SHIFT key and type CLR/HOME, you are actually typing **CLEAR** which **erases** any information you might have on the screen and positions the cursor at the home position.

To see how these keys work, try typing some information on the screen. Now type the HOME key. The cursor jumps to the "home" position. Now type CLEAR by holding down the SHIFT key and typing CLR/HOME. All information is gone and the cursor is in the "home" position.

5. RETURN/SHIFT. You can also move the cursor down the lefthand column by hitting the RETURN key . . . but be careful when using this method. As a computer, the VIC has been taught to read and understand computer **programs**, which are identified by typing a line number from 0 to 65000 in the far lefthand column of the screen. If you type a word without any line number and that word is not one of the "commands" in the VIC's vocabulary, the VIC will tell you that you've made a **programming error.** Here's how it works . . .

Try this: Hit the CLR/HOME key and type the word HELLO. Now hit the RETURN key. The VIC responds by telling you you've made a SYNTAX ERROR. This makes it difficult to type several lines on the screen. One way to overcome this is to type your message and then hold down the SHIFT key and hit the RETURN key. The cursor will move to the next line but the HELLO command will not be "entered" and the VIC will not give you an error message. To try it, type HELLO, then hold down the SHIFT key and hit RETURN.

This SHIFT/RETURN key combination can be a very useful feature. If, for example, you're drawing a graphic picture . . . you can draw the picture and move to the next line quickly using SHIFT/RETURN without getting any error messages. This is helpful because a common technique in creating graphic programs in BASIC is to first draw the graphic picture on the screen, then add line numbers, quotation marks and the PRINT command along the lefthand column to convert your picture into a numbered BASIC program. (See the COLOR & GRAPHICS chapter in the VIC owner's manual). SHIFT/RETURN is also useful for moving around a BASIC program displayed on your screen when you want to move to different areas for editing purposes without affecting the program lines.

Programming the Cursor

So far, we've discussed some ways to move the cursor in **direct mode.** Now let's see how you can move and position the cursor in your computer **programs.**

You can PRINT cursor commands inside your computer programs—just like letters, numbers and graphic symbols. The format for doing this is exactly the same as PRINTing any VIC character. Try typing this program line:
10 PRINT "HELLO"

Now press the [CRSR RIGHT] key five times between the first quotation mark and the word HELLO. If you type this it will appear on your screen like this:
10 PRINT "]]]]] HELLO" (Don't forget to hit RETURN at the end of the line to enter it).

Don't worry about the reverse bracket signs. We'll explain those in a moment. Now type RUN and hit RETURN. In the previous example, the word HELLO was printed in the left column. Now the word is printed 5 spaces over to the right because we put five CURSOR RIGHT commands in our program. The VIC moved the cursor five spaces from the left column and printed the word HELLO, just as it was instructed.

Now . . . you're probably wondering why those funny brackets appeared when you typed the [CRSR RIGHT] key. The VIC uses special reverse symbols to show you where cursor commands are located in your program. This is helpful when editing a program or studying a program you haven't seen before. Here's a list of the graphic symbols used to represent the various cursor keys:

CURSOR RIGHT " ▌
CURSOR LEFT " ▐
CURSOR UP " ▚
CURSOR DOWN " ▞
HOME " ▀
CLEAR " ▄

The key to positioning a word or graphic image somewhere on the screen . . . or even making it MOVE in animated programs . . . is using the CURSOR key with the PRINT statement. Here are some exercises to give you some practice: In each program the heart symbol indicates the shifted CLR/HOME key and the right bracket indicates the right cursor.

Exercise 1.
Type the same HELLO program except use CURSOR UP instead of CURSOR RIGHT.

Exercise 2. A common programming technique.
```
10 PRINT "♥HELLO"
20 FOR X=1 TO 1000:NEXT
30 PRINT "♥BYE"
```

Exercise 3. Try combining the CLEAR and CURSOR RIGHT commands.
```
10 PRINT " ]]] HELLO"
20 FOR X = 1 TO 1000:NEXT
30 PRINT "]]]]]]]] GOODBYE"
40 FOR X = 1 TO 1000:NEXT
50 GOTO 10
```

Exercise 4. Here's another version of Exercise 3, using just the CLEAR command.
```
10 PRINT "♥HELLO"
20 FOR X = 1 TO 1000:NEXT
30 PRINT "♥GOODBYE"
40 FOR X = 1 TO 1000:NEXT
50 GOTO 10
```

Exercise 5. A simple animation example.
```
10 PRINT "♥0":FOR X = 1 TO 150:NEXT
20 PRINT "♥]0":FOR X = 1 TO 150:NEXT
30 PRINT "♥]]00":FOR X = 1 TO 150:NEXT
40 GOTO 10
```

Moving the Cursor With CHR$ Codes

Having learned that the cursor can be included in PRINT statements like any VIC character, it stands to reason that cursor commands would have their own CHR$ codes so you can use them in CHR$ statements, like VIC characters.

The format CHR$(90) provides a more powerful alternative to the PRINT statement when displaying and manipulating VIC characters. All characters, including function keys and cursor controls, have their own CHR$ code numbers. For example, the number for the letter "Z" is 90, so if you type the following command, the letter Z will be printed on the screen:

```
10 PRINT CHR$(90)
```

This looks more clumsy than simply PRINTing the letter Z, but in many instances you can't or don't want to use the PRINT statement, so you use CHR$. In any event, here are the CHR$ numbers for the cursor controls:

CHR$ CODE	SCREEN MOVEMENT
29	CURSOR RIGHT
157	CURSOR LEFT
145	CURSOR UP
17	CURSOR DOWN
19	HOME
147	CLEAR

The format for using this technique in a program is to type:
10 PRINT CHR$(29)

Exercise 6.
Here's an example of how you can print a "CLEAR" command using the CHR$ technique:
```
10 PRINT CHR$(147)"VIC CLEARS, MOVES
   HOME AND PRINTS MESSAGE"
20 PRINT CHR$(17)CHR$(17)CHR$(17)"NOW
   DOWN"CHR$(17)
30 PRINT CHR$(29)CHR$(29)CHR$(29)"THEN
   RIGHT"CHR$(17)"OKAY!"
```

Things to note in this example include how the CHR$ statements are placed after the PRINT command . . . how in line 20 information printed in quotes can be mixed with CHR$ statements . . . how several CHR$ statements can be printed in a row to move the cursor more than once . . . how different messages and CHR$ statements can be "mixed and matched" as in line 30.

Exercise 7.
You can use "variables" in CHR$ statements, for example if you're going to be using the statements several times in a large program. Variables are important and we'll do a future article on them, but for now think of a variable as one or two letters which can be used as a **substitute** for a number, word, sentence or other piece of information. In this case, we will begin by "defining" our variable A equal to 147 (CHR$ code for CLEAR). This means we

can substitute the letter A for the number 147 in my program. Note that we can still use the letter A normally in words and sentences, and that we can still use the number 147 if we want. This example simply clears the screen and prints HELLO.

```
10 A=147
20 PRINTCHR$(A)"HELLO"
```

These few examples were designed to help you understand how the VIC 20's **screen editing** commands work, especially in your programs. It's one thing for a computer to be as flexible as the VIC in placing information on the screen, but it's equally impressive that you can **write these positioning commands in your BASIC programs!**

Time Delay Loops ...An Advanced Technique Made Easy

Reprinted from **Commodore** Magazine, December 1981

In this article we want to show you an advanced BASIC programming technique which first time computerists often stumble over by accident. If you're just starting out in computing it's important to remember that it's just as easy to learn a so-called "advanced" technique as it is to learn a "simple" one. The problem is that good descriptions of advanced techniques are hard to find. It seems like you have to read through a whole book to reach them . . . or search through a dozen computer journals for an explanation you can understand.

We forged some new ground with our innovative PERSONAL COMPUTING ON THE VIC 20 which comes free with every computer, but there are a lot of so-called "advanced" techniques that VIC owners are ready for as soon as they finish reading their owner's guide.

One place to get advanced programming information is the VIC 20 TEACH YOURSELF PROGRAMMING SERIES, which contains a "friendly" self-teaching programming manual and some interactive tapes which lead you through the lessons, step by step.

Another good source of programming information is the VIC 20 PROGRAMMER'S REFERENCE GUIDE, which every VIC owner should have. This invaluable "bible" of the VIC covers everything from the VIC's BASIC vocabulary to machine language programming tips.

Both the TEACH YOURSELF PROGRAMMING series and the PROGRAMMER'S REFERENCE GUIDE are available through your Commodore dealer.

The Time Delay Loop . . . Special Use of "For . . . Next"

One of the best "magic" tricks programmers use to control the speed of their programs is called the "time delay loop." This is a simple line you put in your BASIC program to make it move at a given speed. The technique is simple. All you do is include a line which says:

```
FOR T = 1 TO 1000:NEXT
```

You can include the line anywhere in your program, wherever you want a "time delay" and you can include several delays in different places if you want. For example, the first program below PRINTs two messages, separated by a "time delay."

The T in the time delay line can be any letter, two letters, or a letter and a number, but we usually use a T to specify "time" because FOR . . . NEXT loops can be used for purposes other than time delay. Also, using a T for time makes it easy to spot the time delay loops when you list a program with a lot of FOR . . . NEXT loops used for different purposes.

Another changeable item in the time delay loop is the number 1000. This can be **any number.** A larger number makes the time delay longer and a shorter number shortens the time delay. Actually, what you're doing is telling the VIC to count to 1000 (or whatever number) before proceeding. If the number is large, the VIC takes a longer time to count than if the number is short.

Example 1 . . . Time Delay

```
10 PRINT"THE VIC 20 IS GREAT!"
20 FOR T = 1 TO 1000: NEXT
30 GOTO 10
```

This prints the message, "THE VIC 20 IS GREAT!," counts to 1000, and goes back to line 10 to print the message over again. The time delay specifies how long the VIC should wait before printing the message over again. Try substituting X or A2 for the "T" in line 20 and you'll see that this doesn't change the program. Try putting another number (200 or 2000) instead of 1000 in line 20 and see how the program gets faster or slower.

Time delay loops can be used to lengthen or shorten the duration of musical or sound effect tones being played on the VIC, as shown in the following example:

Example 2 . . . Time Delay Loops With Music

Here's a program that uses a time delay loop with a musical sound effect. The time delay relates to the length of time each note is played. You might pay special note to line 30 as well, which uses a FOR . . . NEXT . . . STEP statement to "step" through a range of VIC musical note values (from the Table of Musical Notes in the VIC user manual). Although we're looking mainly at time delay loops, there are other uses for the FOR . . . NEXT statement

which we will cover in a future article. Back to time delays. Here is the music program:

```
 5 PRINT"WATER FILLING UP"
```
Prints this message on the screen while the sound effect is playing.

```
10 V=36878:S=36875
```
Set the volume equal to V and the speaker we want to use (in this case 36875) equal to S1.

```
20 POKEV, 15
```
Set the volume at maximum level (15)

```
30 FORN=195TO225 STEP 1: POKES, N
```
VIC speakers can accept note values from 128 to 255. Here we are saying, for note values from 195 to 225, POKE Speaker 1 with those values, STEPping up one at a time from note to note.

```
40 FORT=1TO100:NEXTT
```
This says count to 100 before moving to line 50 (where we play the next note). This is our TIME DELAY LOOP.

```
50 NEXTN
```
POKE the "NEXT N" into Speaker 1 . . . keep doing this until we reach the limit (which we set at 225 in line 30).

```
60 POKES, 0
```
Turn off the speaker; otherwise it will keep playing.

In this example, we see how a time delay loop affects the duration of a series of musical notes we want to play. If you want the notes to be shorter, change the "100" in line 40 to a smaller number. OR . . . use a larger number to make the notes play longer. Notice that if you make the notes VERY short (change 100 to 2 in line 40) you get interesting sound effects.

You can get "reverse" sound effects by changing line 30 to: 30 FORN=225TO195STEP—1:POKES,N This reverses the notes and steps backwards (—1) from 225 to 195 for a "water emptying" sound.

The key lesson here is the FOR . . . NEXT loop. In EXAMPLE 2 above we used the loop for two purposes . . . first, a time delay loop to extend the duration of notes we are playing and secondly, we used the FOR . . . NEXT loop to define N as a **series of note values**, then instructed the VIC to play that series one at a time by STEPping from value to value. The NEXT N in line 50 was the place where the note was actually played. You can prove that the note is actually played when the program hits line 50 by adding this line to your program:

```
45 PRINT"PLAY NOTE"
```

The program will now print "PLAY NOTE" just **before** it plays each note because you inserted the PRINT instruction before the NEXT N (next note) instruction in your program. This is important because it illustrates how you can combine sound effects with printed information (or graphic symbols) in your programs. Just mix and match PRINT statements with sound effects and you're writing programs that "sing."

Conclusion

We've taken a quick look at two major uses for time delay loops . . . one to place a "time delay" between two parts of a program to make it run slower . . . the other to place durations in a musical program where the time delay affects the sound being produced.

The best way to use time delay loops is to experiment. The best way to find out if time delays are required by your program is to see how fast it runs. If it runs too fast, slow it down by inserting a time delay. You can put a time delay loop anywhere you can put an ordinary program line, and you can use as many time delays as needed in a single program. You can even include a time delay as a GOSUB routine and keep coming back to it if you have a long-running program which requires the same delay to be repeated several times.

More information on time delays is available in the VIC owner's manual, the VIC 20 PROGRAMMER'S REFERENCE GUIDE, and most books on BASIC for the PET/CBM microcomputer.

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VIC-20 SOFTWARE
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All machine language! FAST! Enables VIC to emulate a standard terminal. Add a BIZCOMP or VIC modem directly (or RS-232 modem with interface*) and access SOURCE, TELENET, or any of the free Bulletin Boards around the country (list included.) Special features include reformatting screen data for easier viewing and screen-dump of data to VIC-1515 printer.

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Two-program set helps you design custom graphics characters. **GEN/EDIT** displays an enlarged 8x8 square; move the cursor around in it and turn dots on or off to form a character (holds 100). Erase, edit or recall at random. Load **DATAMAKER** when finished designing. Characters automatically become numbered data statements. Save them on tape just like a program. Instructions included for appending to any new or old program.

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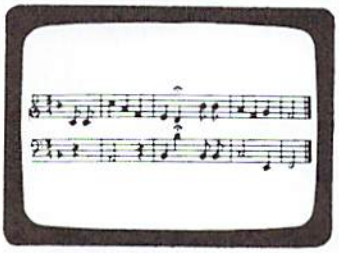

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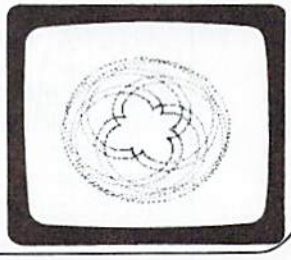

PLOTTING uses dot-plot and line-plot routines to make equations perform computer video-art on your screen. Change equation values and create your own interesting patterns. Plot routines may be easily included in your own programs.

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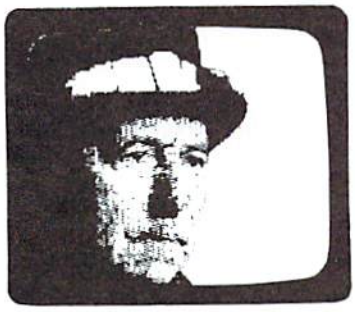
VIC-PICS .... Digitized pictures! ($18.95)

Nineteen fascinating high-resolution pictures to display on your VIC screen. Created by digitizing video camera images. Includes portraits, models, scenery, and much more. Over 16K points analyzed in each picture. Three styles: hi-contrast, dithered, and colorized. Compatible with both color and B/W sets.



Are they REALLY worth a thousand words?

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*RS-232 printers require an interface. See ours above.

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Play Black Dragon

It's true the VIC-MODEM is a serious tool for accessing information. To get an idea of exactly how serious it is, take a look at our telecommunications department on page 36. However, as you may have noticed, somebody always finds a way to turn a tool into a toy, which is how we ended up with a lot of great games on the telecommunications networks.

Not all the network games work well with the VIC, because they're designed for a larger screen. For some games, you have better luck with the 80-column screen on the Commodore CBM, for instance. One game that works very well on the 22-column VIC screen is Blackdragon, a cumulative fantasy role-playing game, available on The Source.

Just so you know there are really people behind all this, we might mention that Blackdragon was authored by Bob Maples, a live human being who calls himself a "mild-mannered telecommunications engineer".

It so happens that Commodore's own Bill Hindorff is a Blackdragon Hall of Famer. Fighting his way through the multi-layered maze under the name of Thrash, Bill has accumulated 3,839,999 experience points over several months of play (probably more, by the time you read this), and has defeated the arch-demon of the maze several times.

Those of you who know the game may raise an eyebrow at that, since, theoretically, a character is automatically retired to the Elysian Fields forever if he defeats the arch-demon just once, and you've got to start all over again with a new character. Bill's secret method for avoiding permanent retirement will have to remain just that, however—his secret.

And now, let's go back to that fateful night in 1982—the night Bill discovered that somebody had rearranged the Blackdragon Hall of Fame, and Thrash, for some reason, was no longer in it. His only alternative, to immediately regain his honor, was to descend into the maze, find the evil one, and battle him to the death again.

Bill dials up The Source and gets a menu. He types in choice number 4 to get into command mode and gets a › symbol. Then he types in

play blackdragon

Let's go with him.

"You are about to enter the Labyrinth. Many have entered it and 16711 people made it out alive. This Magical Labyrinth is filled with *Treasure* but . . . it is also infested with monsters and filled with traps and pits. If you can make it out alive with some of the gold, your strength and abilities will grow and grow . . ." says the computer. Then it wishes the adventurer good

luck—but, of course, has to add "You'll need it!!" as a parting shot.

Bill requests Thrash, who lives in a file, and asks for his hero's latest data. The computer tells him Thrash's data stacks up like this:

Strength 29	Intelligence 28	Wisdom 30
Endurance 29	Dexterity 26	Hits 289
Gold 0	Experience 3559699	Level 21
Magic spells 51	Cleric spells 50	

Thrash has also accumulated the following magic items: the mythril shield, armor of valor, sword of sharpness, helmet of defense, ring of protection, boots of levitation, elven boots, a quiver for arrows (with 5 arrows in it), an invisibility ring, staff of healing and wand of teleportation.

In short, he's managed to get just about everything you can get in the course of the game—which is no small accomplishment. In case you're wondering about the zero gold, however, that's simply because you always enter the maze with none. Whatever gold you've accumulated as you've gone through the maze in the past is transformed into experience points when you come out. Also, the fact that Thrash has risen to character level 21 means he stands a good chance of defeating the level 20 arch-devil.

In contrast to an experienced character like Thrash, a new character might look something like this:

Strength 11	Intelligence 9	Wisdom 10
Endurance 13	Dexterity 11	Hit points 12

and would have only 2 magic spells, and no experience or magic items.

The most points any new character can start off with in any category is 18, so this particular new character, whom Bill created purposely to contrast with Thrash, didn't make out too badly for a beginner.

But now, back to the Labyrinth.

Using his boots of levitation and his ability to teleport, Thrash descends immediately to level 10 of the maze—the darkest, deepest depths—and the place he's most likely to find his hated rival. A new character, without the magical boots and teleportation ability, would have to scramble down bit-by-bit, wandering around each of the higher levels until he found a staircase, hoping he didn't run into any monsters in the interim, or that he could defeat the ones he stumbled over.

Thrash, on the other hand, moves with purpose through the halls of level 10. He has much of the maze mapped out in his mind, and his experience has taught him the arch-demon is most likely to be found in a certain section of this level.

But even his vast experience can't prevent unexpected attack, because monsters and bad guys are thrown into the maze at random. So, as he moves along, he encounters nasty Hobbits and vicious Wood Elves, a Gray Ooze, Gelatinous Cubes, Purple Worms—and even has to fight a Source Progammer. He vanquishes all his foes quite easily, however—even the belligerent Programmer—until he meets a floating mass of energy that zaps him, and saps him of 37 hit points.

He doesn't dare be in any kind of weakened condition when he meets the super-devil, so Thrash immediately uses spells to heal himself. Why doesn't he use his staff of healing? Because, through experience, he's found out that once you use the staff, you stand a chance of having it disappear. As long as he has an alternative, he avoids using the staff for that reason. And he's got plenty of spells to use, instead.

All along the way, Thrash keeps accumulating gold and frequently comes across "vendors" who want to sell him potions, spells and books. Try to imagine what these vendors might look like after years in an underground labyrinth. Probably not like the Avon lady.

Although he has the alternative to ignore, bribe or fight these vendors, Thrash always chooses to trade with them instead. This is not so much because he's a nice guy, or anything John Wayne-ish like that. Rather, Thrash's long experience in the maze has taught him that trading is the most efficient way to deal with these guys.

But he trades only for potions—not spells or books—because he can examine a potion before he decides what to do with it, and if it's evil, he can throw it away. He doesn't get that alternative with the spells and books. In their case, he gets what he gets. Period. And sometimes those spells and books can sap him of his magic or cause him all kinds of trouble.

In his encounters with vendors this time around, Thrash gains hit points and intelligence from two potions he buys, but wastes a few thou in gold on three evil potions he has to throw away.

Time goes on as Thrash stays hot on the hunt for the malignant demon. Bill's been at the keyboard for over an hour, now. He's fought a vampire, a zombie, a doom dog and an angkheg (to name a few), and has accumulated over 32,000 gold pieces, but still his rival evades him.

Then, without warning, he's there.

The computer announces the arch-devil with an almost perceptible shiver. Then . . .

"Foolish mortal, dare you defy me?" roars the demon. "To leave this room you must defeat me!"

This is it, at last! Thrash doesn't hesitate.

POW! Thrash gives the demon 189 quick hits. But his antagonist throws a fireball his face for 128 hits. Thrash is hurt, but in his heroic splendor he manages to get in two more blows, for a total of 347 hits on the demon.

(continued on page 22)

A Little VIC Music

(Editor's note: We've intentionally left out the title of this well-known little tune to add an element of mystery and surprise to your endeavors. Forgive us, Jim.)

The following program plays music on the VIC. The music is listenable, and the program is worth looking at, too.

You'll note that the three voices of VIC are different. Voice three is sharper, and is better for carrying the tune. Voice one is the softest.

Hope you don't mind my breaking up the listing with comments.

```
 90 REM: VIC MUSIC/JIM BUTTERFIELD/DECEMBER 81
         This tells you who to blame
100 DIM A(8)
```

Makes room for eight voices. How come? We only have three voices on the VIC and four "lines" in the song. Watch for the trick.

```
110 POKE 36878, 15
```

Set the volume to maximum.

```
120 FOR A = 5 TO 0 STEP -1
```

Here's our main loop. We're going to play the tune six times.

```
130 T = TI + S
140 IF TI < T GOTO 140
```

This waits for time "s" before allowing the program to continue. The time is measured in "jiffies": units of 1/60 second.

```
150 READ S, A(A + 0), A(A + 1), A(A + 2), A(A + 3)
```

Here comes the song data. It's taken from the DATA statements near the end of this program. We're reading the data into the table cleverly; this way, each voice "comes in" at the proper time.

```
160 POKE 36874, A(3): POKE 36875, A(4): POKE 36876, A(5)
```

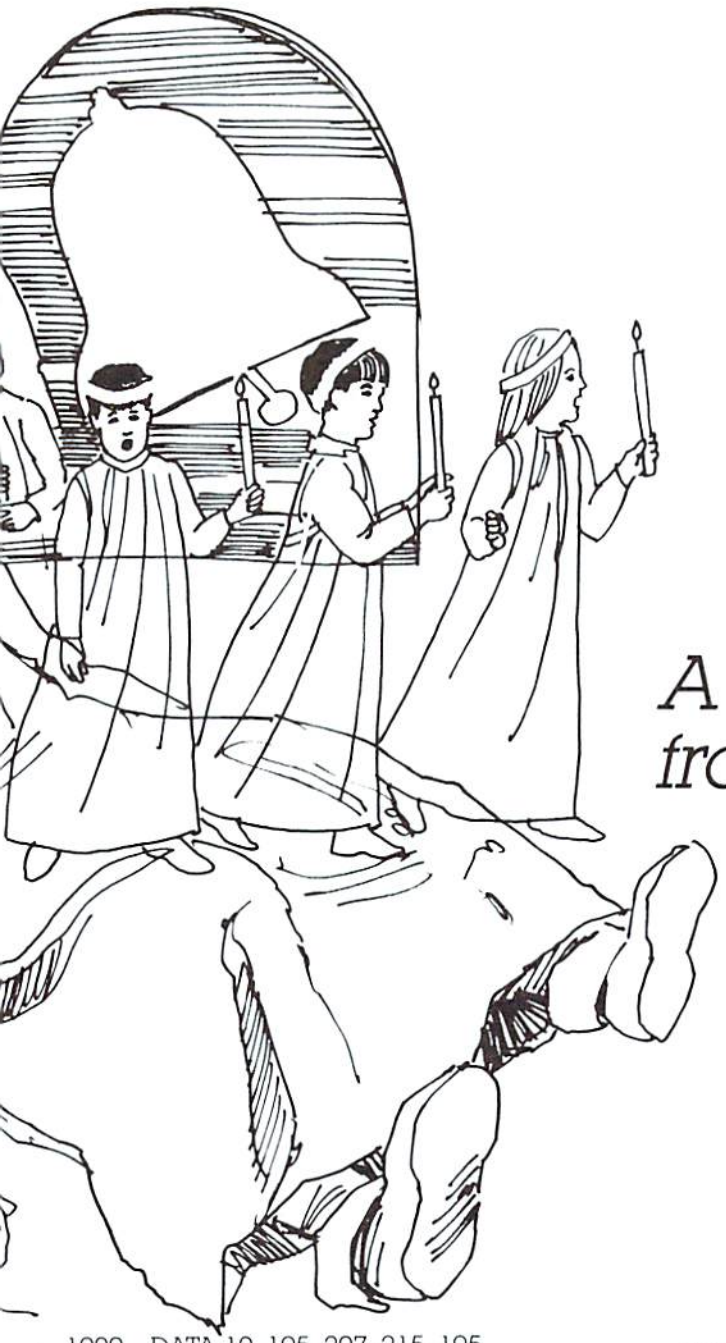
Play the music! This puts the notes into the VICs playing electronics.

```
170 IF S <> 0 GOTO 130
```

If there's no more music to play, variable S will become zero (from the data statement at line 1120) We may want to do it again, though.

```
180 RESTORE: NEXT A
```

RESTORE takes us back to the start of the data statements (line 1000) so that we can play it again if we wish. NEXT A takes us back for the six repeats.



A mystery tune from VIC expert Jim Butterfield.

190 POKE 36878, 0: end
Turn down the volume and quit. The END statement isn't really needed here, but it's good practice.

The rest of the program is our DATA statements containing the music. It's set up with a timing value followed by the four "parts". By careful reading of the program, you may be able to work out how the different voices come in during the repeats (hint: the key to the trick is in lines 150 and 160).

```
1000  DATA 10, 195, 207, 215, 195
1010  DATA 10, 195, 207, 219, 195
1020  DATA 10, 201, 209, 215, 175
1030  DATA 10, 201, 209, 209, 175
1040  DATA 20, 207, 215, 207, 195
1050  DATA 20, 195, 215, 195, 0
1060  DATA 10, 195, 207, 215, 195
1070  DATA 10, 195, 207, 219, 195
1080  DATA 10, 201, 209, 215, 175
1090  DATA 10, 201, 209, 209, 175
1100  DATA 20, 207, 215, 207, 195
1110  DATA 20, 195, 215, 195, 195
1120  DATA 0, 0, 0, 0, 0
```

It's not very big, but it's interesting to see how the coding comes together. Check Appendix F of your VIC-20 Friendly Computer Guide and you'll see how to set up the notes. Write your own music. If you like programming you might want to try your hand at writing a program which allows DATA statements to be written in easier form. For example, line 1000 might be written as DATA 10,C,E,G,C . . . but your program will need to be smart enough to catch the letters and translate them into the appropriate numbers.

Music doesn't have to stand by itself, of course. You could add it as an extra touch to games and animations. Looking at it the other way, you could add to the music—how about a "bouncing ball" program that lets you sing along with VIC?

You can get some nice effects from the VIC, although you'll never quite achieve orchestra quality sound. I can recall showing a group of users some simple music coding on the VIC. At one point, I played a simple rendition of "Dixie", and noticed a listener who had tears in his eyes. I was touched. I asked him, "Are you a Southerner?"

"No," he replied. "I'm a musician."

I guess you can't win 'em all.

VIC 20 Helps Deliver the News

Another grand old American institution has entered the space age: hometown newspaper carriers have begun computerizing their routes. And at least one carrier—17 year-old Jim Dubrouillet of Holland, Pennsylvania—is operating his paper route with the help of a VIC 20.

Jim designed the program himself, roughing it out in about five days then gradually perfecting it over months of use. The program allows him to draw a map of his route on his TV screen, list out who owes him money and how much, enter new customers and delete those who discontinue, note who's on vacation, and record which homes along the route don't receive the paper. Altogether the program now uses 3,482 bytes of VIC's 3.5 kilobyte RAM, pared down from the original 3,545 bytes.

The detailed map is the most complex part of the program. Using its screen graphics capabilities and only three lines in the program, VIC draws the streets covered by Jim's route. Then the location of each of the 76 homes along the route appear, in the order in which he collects. Each one is labelled with a three-letter abbreviation of the family's last name.

The names are color-coded, so Jim can tell at a glance exactly what each family's status is. White type means they receive both the daily and Sunday papers, cyan is daily only, black is Sunday only. Purple letters mean the family is on vacation, blue means they don't receive the paper, and reversed letters mean they owe him money.

The colors of the names on the map are changed automatically when he enters new information concerning the family's status.

Jim notes that, when he first wrote the program, it took 40 seconds for the VIC to plot the map on the screen. Now he's got it down to 14.3 seconds, give or take a millisecond.

"I had some junk in there that I've taken out,' he admits modestly. "The first version was very bad, I thought. But I've improved it."

Correspondingly, the program has helped improve his paper route. Jim says his VIC helps him keep his records "much straighter", which means, among other things, that he now avoids the embarassment of going back twice to collect from a customer—a common problem in the past.

Operating his paper route, as you might guess, isn't the only way the high school junior uses his VIC. Although he seems to be a serious kid (however seriousness goes at seventeen) he has a definite inclination toward the playful side of computing. Since he bought the VIC in the summer of 1981, he has not only become skilled at cartridge games like Jupiter Lander ("I've gotten up to 91,500 points," he says gleefully), but has modified a few to suit himself.

For instance, he and a friend modified a well-known commercial computer game into a new game they call "Escape."

"We didn't like the original. It was too simple," Jim says of his motivation for tampering with the program. "So we modified it and came up with this."

He explains his version of the game: "It places you in a cave and you have to kill three barbarians, first . . . then you get clues to the rooms that are next to the rooms that have the combination to the safe that contains a time chamber to take you back to regular time." Pause. Gasp.

One of his original games, VICFLIP-IV, is a computer version of a popular board game, complete with sound effects and joystick. He seems pretty proud of this particular program, which he created with his friend, Sean Smith, although he again tries to downplay it in his typically modest manner.

"It's a boring game, really," he says as he demonstrates how to play, "but I haven't been able to do any real action games because I don't know machine language."

As Jim goes on playing VICFLIP against the computer, it becomes obvious that he thinks of the VIC as a personality in itself. When VIC flips its owner's blocks, for instance, Jim calls the computer "a sneaky little rascal."

"I know how he (the VIC) plays—which is usually unfairly," he goes on. "But it's no problem," he says as he flips

VIC's black blocks into white, "He's easy to beat."

When Jim finally does beat the machine, VIC beeps hysterically—sort of like a swarm of drowning clarinets. (Editor's Note: The Jim Dubrouillet/Sean Smith VICFLIP-IV program listing appears in this issue, page 32).

In addition to his paper route and games, Jim puts his VIC to academic use, as well. His spelling program prints a phonetic pronunciation on the screen, which Jim then has to spell correctly. His vocabulary program gives him a definition, then waits for him to type in the correct word.

He's also trying to develop a standard test of written English at the elementary school level "for a teacher down the street who's interested", he says. His biggest problem in developing that program, he explains, is in "figuring out how to keep the kids from fighting over who's turn it is to use it."

You almost might have been able to predict Jim's interest in computers from the detailed kinds of hobbies he pursued before he got his VIC. Maybe not so much from his tropical fish, but take his card houses, for instance. Actually, "houses" is not nearly adequate to describe the elaborate constructions he has created out of thousands of playing cards. His most complex construction, which took a day to build, occupied most of the livingroom, he says.

"I liked that house so much," he goes on, "I made detailed plans of the whole thing, so I could duplicate it."

Then, he says, a friend and he "demolished it with rubber bands."

He admits he's tried to get his VIC to design card houses, but without much success.

"They're not very big, and don't have much organization," he says of these attempts.

Jim was first exposed to programming in his ninth grade Algebra II class at Council Rock High School in Newtown, Pennsylvania. In addition to his class work in computing, he was also one of a group of students chosen to test-run programs on the school's PET computers—a job he enjoyed, he says, because he got to work on his own programs during that time.

It seems highly probable, as more schools integrate computing into their curricula, that we'll be facing a growing wave of youngsters like Jim Dubrouillet, highly literate in computers. The results could be revolutionary. In fact, as this goes to press, Jim has given up his paper route to move on to bigger and better things —what else but a computerized lawn service. Stay tuned for more on the Jim Dubrouillet story.

THE COMMODORE CHALLENGE PRIZES PRIZES PRIZES

If you've been playing around at home developing original games and programs for your Commodore computer, send your best—on cassette or disk, please—to the Commodore Challenge contest. Include a brief description of the program's purpose, including documentation on how to use it. If it's a game, be sure to include instructions.

Each issue, we'll award prizes to two entries. First place winners will receive a VIC 20 8K Memory Expander Cartridge. Second place winners will receive a VIC 3K Memory Expander. All entries become the property of Commodore Business Machines, Inc., upon submission. Winning entries published by POWER/PLAY will become public domain software.

Fill out the entry form below, and submit it with your game or program to:

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Signature _____

Parent's signature, if contestant is minor _____

VOID WHERE PROHIBITED

Maryland "VIC-ar" Computerizes Sermons

Rev. Ray Murray, Jr. admits he agreed to chip in on the VIC 20 his son wanted last Christmas because he hoped to be able to use it himself. But, he says, he wasn't sure he could learn to actually program the little computer.

Three months later, he not only had his library of 400 books entered on an input system, but had devised a program for cataloging his many sermons, and had filled three of the 100 sermon categories he had set up for himself.

Entering the sermons on cassette tape, he explains, is a longterm project for him.

"I've been preaching for about 20 years," he says, "so I honestly couldn't tell you how many sermons I have. It'll take years to put them all in."

Since each sermon takes about 1500 bytes of VIC's 3.5K memory, Rev. Murray says he can get about two sermons on a tape. Then he has access to them by topic and title.

"When I push the number of a category, it lists all the sermons in that category by title. Then I push the number of the title to get the whole sermon," he explains.

However, he types in sermons only on Tuesday and Thursday mornings, the Hagerstown, Maryland, pastor says. It's a matter of self-control, in a way, because otherwise "I'd be playing with it all the time".

It's not hard to conclude that the minister's touch of apprehension about learning to program faded quickly.

"For a fella who's never written a program before," he says enthusiastically, "it was simple to use."

Rev. Murray says he learned the basics of programming from books he took out of the library.

"I just read them until I memorized them," he goes on. "In three weeks' time I was doing just about everything a home computer could do. It's pretty simple, once you learn the idea behind it."

He also balances his checkbook with the VIC 20, and, of course, plays games. Using the VIC, he has cut about an hour off doing his monthly bank statement, he says.

Meanwhile, his 15 year-old son, Ray III, does get to use his Christmas present, the minister assures you.

"He uses it to keep track of his paper route—he's got a pretty complicated program for that—and he uses it for games," the elder Murray explains.

Although her two older sons and her husband all think the VIC 20 is a useful tool and an enjoyable pastime, Mrs. Murray evidently isn't quite so enthusiastic about the home computer, according to her husband.

"She calls it my second wife," Rev. Murray laughs. "When I get aggravated, she says I should throw it away."

If it's any consolation, Mrs. Murray, you're not the first computer widow. Nor will you be the last. But more on that in a later issue.

BLACKDRAGON:
(continued from page 17)

This heavy attack turns out to be fatal—the demon starts to go down. But he's no marshmallow. He manages to get in 112 hits on Thrash, even as he gasps his dying gasp.

"Thou hast banished (the demon) back to hell," the computer announces triumphantly. "The Ruby Rod is yours!"

Somewhere you think you hear a cheering crowd.

After the long, tedious search, Thrash has accomplished his purpose very quickly, thanks to the great strength and courage of his character. A lesser character could not have vanquished the evil one so expeditiously—and, in fact, could easily have been killed.

Temporarily weakened, but glorious in his victory, Thrash begins his ascent out of the labyrinth. Using his ability to levitate, he carries the Ruby Rod back into the light and fresh air of the upper worlds.

"Well and goodly, faithful warrior," says the computer gratefully. "Thou hast proven thyself in the struggle against evil. For thy efforts thou wilt be retired to the Elysian Fields of spendor, and thy name shall be added to the ranks."

So Thrash's name gets back into the Hall of Fame. But, since Bill is strongly opposed to early retirement, he isn't about to let Thrash go to the Elysian Fields. Instead, he secrets his character away under cover of darkness to a mysterious hideout, where he will recuperate from his wounds—and come back to fight again in The Source's neverending "struggle against evil."

(A special note to novice Blackdragon players: Should the network shut you down while you're playing, your character will be killed. If you want to get the character back, call The Source Customer Service and tell them your problem. Sometimes they can locate the lost file and re-establish your character.)

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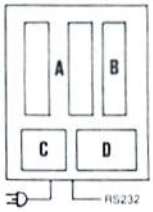

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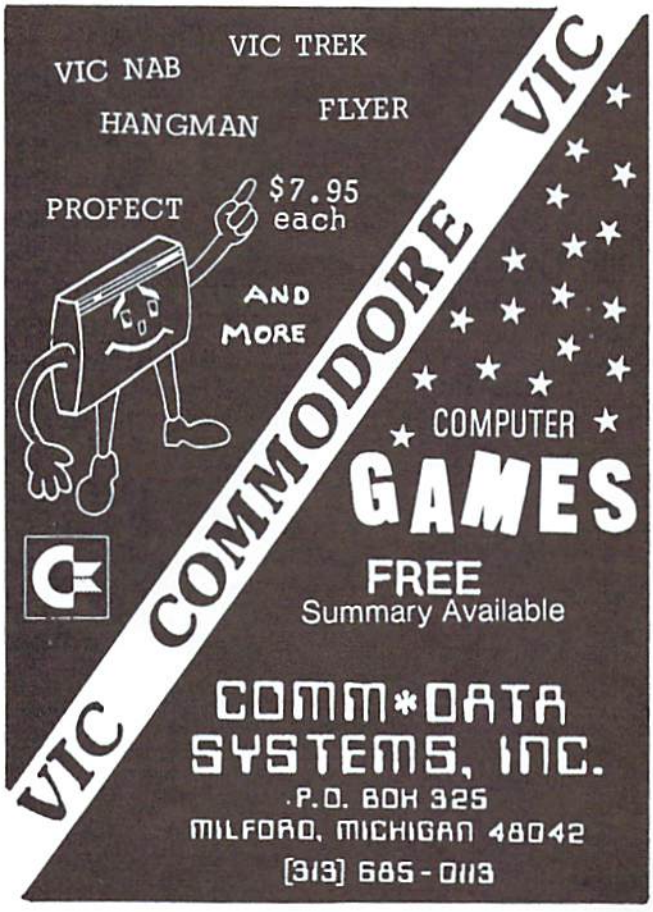

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- **VIC-DIS (DISASSEMBLER) - $9.95**
  For the beginning or expert machine language programmer. Provides best screen display and, if you have the VIC-1515 printer, great printout. Allows disassembly of M/L programs of up to 1K bytes loaded from tape and ROM routines in the unexpanded VIC. HEX/DEC and DEC/HEX conversions.
- **SHARK JAWS - $8.95**
  Swimmers try to cross the channel, round the buoys and reach the boat as sharks attack. Harpoon the sharks and beat the high score.

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Programs for Learning at Home

Just as there is more than one way to skin a cat (never having skinned one, I can't vouch for that, but I trust it's true), there is also more than one way to have fun with your Commodore computer.

Unfortunately, educational material is generally not equated with "fun", especially among younger folks. This often exasperates parents, who expend a lot of energy trying to get these balky kids to do their homework. We all know the story, from one side or the other. Right, kids?

Fear not. With educational programs that make learning fun, you can have the best of both worlds. For instance, take a look at this:

MATH FOR THE VIC 20: New From Micro-Ed

The people at Micro-Ed, in Minneapolis, have been busy translating many of their popular PET educational programs into VIC 20 educational programs. For those of you who would love to love math, or have children you love, whom you'd love to love math, Micro-Ed recently added some elementary-level math programs to their list of what's available for the VIC. These kinds of programs are a great way to transform drudgery into fun, as you or your children learn (or re-learn) important basic skills at home—without worrying about any "teacher's dirty looks."

The Micro-Ed **Math Sports Package** contains 10 programs on cassette tape, geared mainly to the elementary level. With these programs you get practice in addition, subtraction, multiplication and division by playing exciting sports: track, basketball, football and baseball among them. **Math Golf** takes skills a little further by giving students practice in forming equations with different math operations. And **Numbowl** challenges a student's ability to form equations with three random numbers. Each of the tapes in the **Sports Package** is also available individually.

In addition to the **Math Sports Package** tapes, seven other elementary-level math programs for the VIC are also newly available from Micro-Ed. **Parting Shots, Pail Green, On the Line,** and **Branded** provide practice with fractions. **Prime Fishin'** works with prime numbers. **Sector Five** is an exercise in estimation. And **A Dollar and Change** clocks the player's quickness in making change.

Micro-Ed has a complete catalog of educational programs for the VIC 20 (and for the PET, as well) that are ideal for learning all kinds of subjects at home. Write to them at P.O. Box 24156, Minneapolis, MN 55424.

IF I ONLY HAD A BRAIN...

Learning at home is a terrific opportunity for both children and adults to expand their skills and awareness. Adults might take a look at Commodore's **Typing Tutorial** to learn or brush up on typing skills. Or use our **Home Babysitter** to entertain—and teach—preschool tots.

If you're looking for some good learn-at-home programs, watch our advertisements. Eventually, most VIC-PET educational software houses will show up here. Or, better yet, take a look at the **Commodore Software Encyclopedia** for a comprehensive overview of what's available for our whole product line. If that doesn't work, watch this section of POWER/PLAY for timely information on some of the more interesting developments in educational software for your Commodore computer.

VIC Fix

VIC Manual Program Corrections

Those of you who've tried to type in TANK-V-UFO and KILLER COMET, two programs in the appendix of your VIC owner's manual, may have run into a problem. Or, to be more specific, two problems. Since we're very conscientious, we'd like to help you fix the programs so they'll work. Here's how.

In TANK-V-UFO, the problem is in line 135. That line is exactly 88 characters long—if typed without a space after the line number—which makes it difficult, if not impossible, to enter. You can correct this by doing either of the following:

1. Type the line exactly as it is, but do not type the space after the line number. After the last character of the line (the 0 in 170) is typed, the cursor will be on a blank line. Pressing RETURN will now enter nothing. So, before pressing RETURN, cursor up to the 1 of 135. Then press RETURN.
2. Or, type the line using abbreviated commands.
   P shifted E for PEEK
   P shifted O for POKE
   G shifted O for GOTO

In the second program, KILLER COMET, you may have difficulty finding the reverse T character in line 0. Since this is the delete character the author used to remove the line number and the REM during listing of this program, you can simply ignore the line entirely. That is, don't bother to enter it at all. Or enter it without the quotes.

If you're really set on knowing about that reverse T, however, then you can do this:

1. Type: 0 REM" then press RETURN
2. With cursor controls, reposition the cursor to the screen position right after the quote mark in that line
3. Press SHIFT and INST together 6 times
4. Press DEL 6 times
5. Press the quote mark
6. Enter the remainder of the line

"Probably the best-documented programs I've seen for PET/CBM."
Robert Baker
Microcomputing
September 1981

PET/CBM & VIC OWNERS! Utilities & Games

"The strongest points of this system are its unsurpassed documentation and its human engineering."
Ralph Bressler, The Paper
Nov/Dec. 1981

GAMES FOR VIC

Skier Thrill to downhill skiing, using your joystick to hit flags and avoid obstacles. Great graphics. 3 levels of difficulty.

Maze of Mikor Adventure-like game with stunning graphics challenges you to steal the Warlock's gold as you evade the demon.

Tank Wars Match your wits against the evasive enemy, as you maneuver around obstacles and avoid mines.

Victrek Graphics and sound add to the excitement as you scan galactic maps, maneuver through star bases, and battle klingons. Enhanced version included for 8K VIC.

Pinball Score points with flippers through bumpers and alleys. This game is the real thing.

Simon Four squares light and sound at random. Then you imitate the sequence. It gets tougher as you get better.

Fuel Pirates Protect your stock of atomic fuel from raiding pirates using your particle cannon.

Lazer Blitz Terrific graphics as you destroy enemy aircraft from your flying saucer.

Pak Bomber is dropping bombs that you must catch. Great challenge for eye-to-hand coordination.

All games run on any VIC 20. Price each game on cassette $15.95.

UTILITIES FOR PET & VIC

6502 ASSEMBLER PACKAGE
HESBAL is a 1- or 2-pass Assembler using standard MOS mnemonics and operand formats, has pseudo-opcodes and over 25 error messages. HESEDIT is a full screen text editor for use with HESBAL or alone. Assembler package runs on PET or VIC with 1 cassette and minimum 8K, (specify PET or VIC). $23.95 on cassette, $26.95 on diskette.
HESCOM transfers data and programs bidirectionally between PETs, VICs, or a PET and VIC at 3 times the speed of the disk. Set up VIC as a terminal to PET and create games for 2 players. Or use VIC as a peripheral to PET for hi-res graphics and sound. Only $49.95 on cassette, $52.95 on diskette.
HESCOUNT monitors BASIC program's execution and accumulates data. Essential for debugging and optimization. Discover how many times your program looped, and when IF statements were true or false. Fast execution. Runs on PET or VIC. On cassette $23.95. On diskette $26.95.
HESCAT Complete hi-speed diskette cataloging system. Five programs let you sort names, print reports 3 ways, and locate file names in memory or on disk, and much more. Works with any PET/CBM, 16K and dual drives. $39.95.
HESLISTER takes complex BASIC programs and prints (to screen or printer) in an easily understood manner. Lets you analyze BASIC programs to alter or debug code. Works on any PET/CBM and 1 disk drive. $23.95.
HESPLOT Very fast hi-res graphics subroutines for VIC. Includes line drawing routines. With 8K VIC plot within field of 176 x 160. On cassette $15.95.

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Joystick Control on the VIC

by Andy Finkel
Reprinted from **Commodore** Magazine

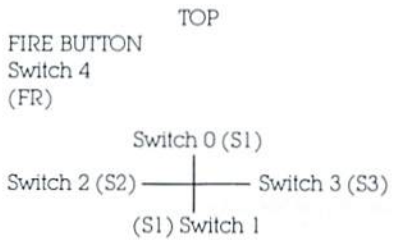
games...

Like all other input and output, joysticks are controlled using the VIC's 6522 peripheral interface adapters (PIAs). The 6522 is a versatile and complex device. Fortunately, it isn't necessary to delve deeply into the mysteries of the 6522 PIA to read the joysticks.

Each 6522 has two Input/Output ports, called port A and port B. Each of the ports has a control register attached, called the DATA DIRECTION REGISTER (DDR). This highly important register controls the direction of the port. By using this register, you can use the port for input, output, or both at the same time. To set one bit of the port to output, set the corresponding bit of the Data Direction Register to 1. To set a bit of the port for input, set the corresponding bit of the DDR to 0. For example, to set bit 7 of port A to input, and the rest of the bits to output, poke 127 in the DDR for port A.

To read the joystick, one port (and one DDR) of each of the 6522 PIAs on the VIC must be used.

The joystick switches are arranged as follows:



Switch 0, switch 1, switch 2 and the Fire button can be read from PIA #1, which is located beginning at location $9110. Switch 3 must be read from the other 6522 (PIA #2), which is located beginning at location $9120.

Now, the key locations for the joystick are as follows:

Hex	Decimal	Purpose
9113	37139	Data direction register for I/O port A on PIA #1
9111	37137	Output register A Bit 2 Joy switch 0 Bit 3 Joy switch 1 Bit 4 Joy switch 2 Bit 5 Fire button
9122	37154	Data direction register for I/O port B on PIA #2
9120	37152	Output register B Bit 7 Joy switch 3

To read the joystick inputs, you first set the ports to input mode by setting the DDR to 0. This can be done by a POKE. Then the value of the switches can be read by two PEEKs. Sounds easy, right? There is only one problem . . . PIA #2 is also used for reading the keyboard. Setting the DDR can disrupt the keyscan rather badly. So you have to make sure you restore the DDR to the original condition if you want to use the keyboard afterwards.

To make things really easy, you can use the following program. Lines 10 to 25 are initialization. The rest of the program, beginning at line 9000, can be called as a subroutine whenever you want to read the joystick.

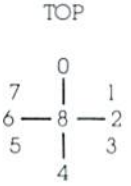
```
10 DIM JS (2,2):
   POKE37139,0:DD=
   37154:PA=37137:PB=37152

20 FORI=0TO2:FORJ=0TO2:
   READJS(J,I):NEXTJ,I

25 DATA-23,-22,-21,-1,0,1,21,22,23

30GOSUB9000:PRINT JS(X+1,
   Y+1):GOTO30

9000 POKEDD,127:S3=
   -((PEEK(PB)AND128)=0):
   POKEDD,255

9010 P=PEEK(PA):S1=
   -((PAND8)=0):S2=((PAND16)=
   0):S0=((PAND4)=0)

9020 FR=-((PAND32)=0):X=
   S2+S3:Y=S0S1:RETURN
```

The variables S0, S1, S2, and S3 will be 0 normally, and will be set to 1 (or −1) when the joystick is pointed in that direction. Two of the variables will be set to 1 on diagonal moves. FR will be 1 when the firing button is pressed, and 0 otherwise.

The AND function is used to pick out one bit of the joystick port. The bits are numbered from 7 (most significant bit) to 0 (least significant bit). By ANDing the 6522 port with a number whose value is a power of two, a single bit is selected. (For example, to pick bit 3, AND using 2, 3 or 8).

The JS array in the program is set up to make it easy to move around the screen using the joystick. The numbers in the DATA statement of line 25 can easily be changed for other purposes. For example . . .

To 'decode' the joystick in this pattern:



This data statement should be changed to:

```
25 DATA 7,0,1,6,8,2,5,4,3
```

VIXEL™

Vixel Volume One

Fire

Fly a water-dropping helicopter, and try to put out the high-rise fire before it spreads.

Draw

Be an artist! This high-resolution drawing program makes it easy to create pictures on the screen, and then save them on tape.

Race

Race the computer, head-on! Simple but lots of fun.

Vixel Volume Two

Superfont

Design programmable characters on your VIC-20 with this easy-to-use program. Especially useful when creating animations, since you can edit four characters at once as a 2 × 2 block. SUPERFONT creates DATA statements after you have finished designing the characters.

Safari

You are a photographer on an African Safari in this great game. The jungle animals run past as you try to snap their pictures. An excellent example of how to use large blocks of programmable characters on the VIC to create animation effects.

Quix

How good is your memory? QUIX presents patterns of color and sound that gradually get longer and harder to remember.

The programs Fire, Draw and Race are available on VIXEL Volume One for only $12.95. The programs Superfont, Safari and Quix are available on VIXEL Volume Two which is also $12.95. Both Vixel #1 and Vixel #2 work with the standard 5K VIC-20. Foreign orders add $3.50 for shipping. CA residents add 6% tax. VISA and MasterCard welcome. Please add $1.00 shipping for credit card orders.

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VIC-20 is a trademark of Commodore Business Machines.

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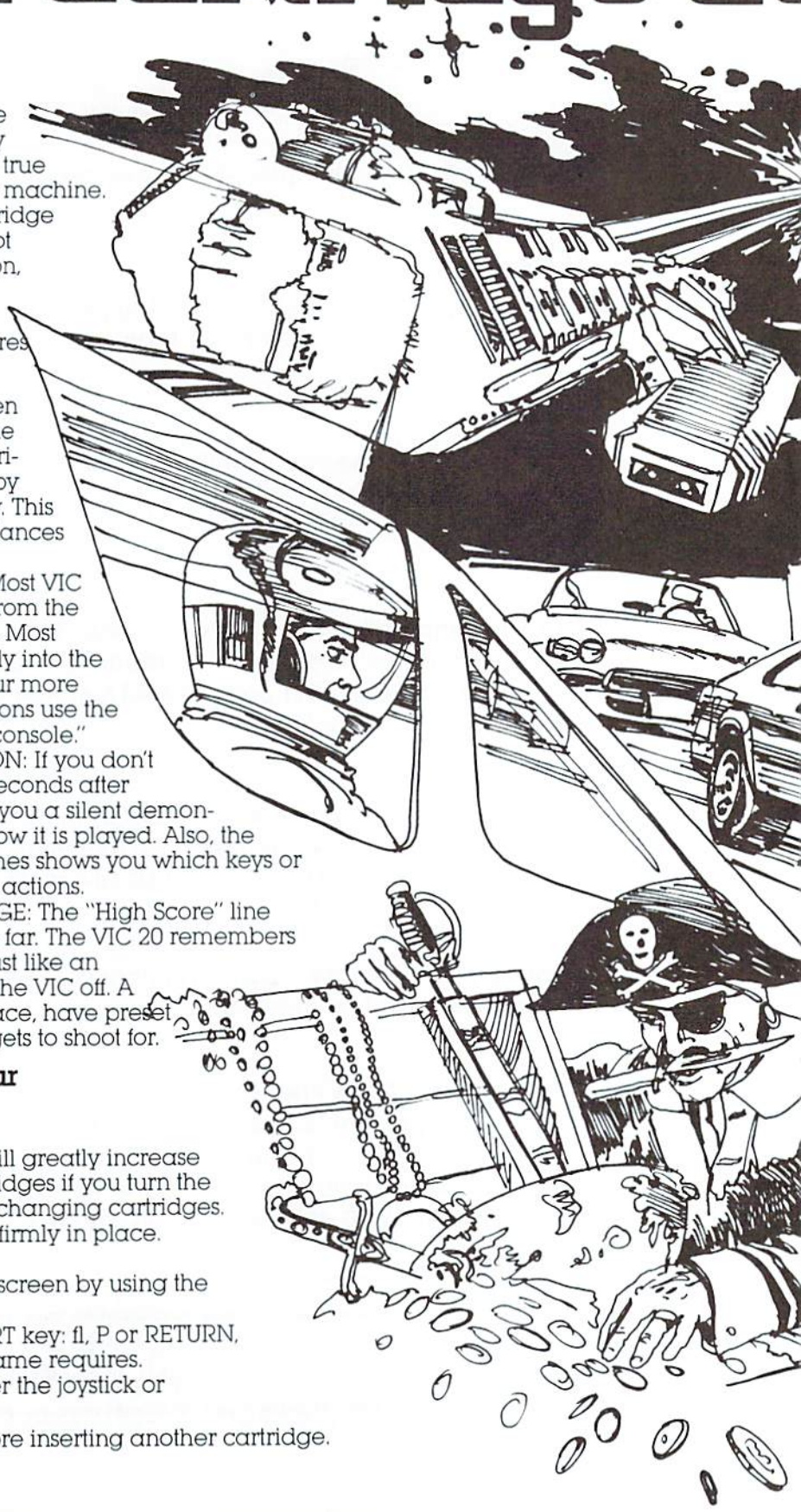
USA

Great Cartridge Ga



Plug in a VIC 20 cartridge game and you'll immediately see the difference between a true computer and a video game machine. VIC computer games on cartridge are real "arcade" games—not imitations. Judge the resolution, graphics, sound effects and play action for yourself.

Some of the unique features of VIC 20 cartridge games:

• SCREEN POSITION: When the display first appears on the screen, you can adjust the horizontal position of the picture by pressing the CRSR control key. This unique feature allows for variances between different TV sets.

• KEYBOARD/JOYSTICK: Most VIC computer games work both from the keyboard and with a joystick. Most standard joysticks plug directly into the VIC 20 game port. A few of our more sophisticated games/simulations use the keyboard only as a "control console."

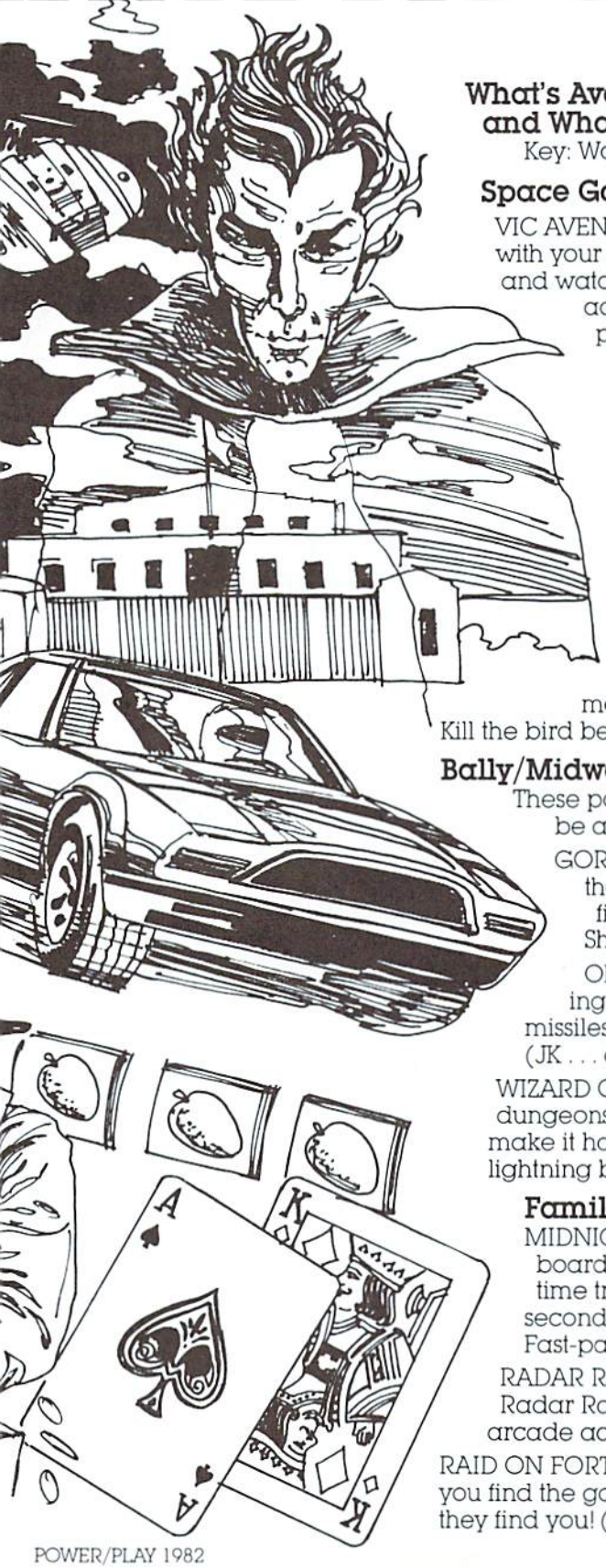
• SILENT DEMONSTRATION: If you don't play a game within several seconds after turning it on, the game gives you a silent demonstration of itself to show you how it is played. Also, the opening display on most games shows you which keys or joystick positions affect which actions.

• HIGH SCORE CHALLENGE: The "High Score" line shows you the highest total so far. The VIC 20 remembers the highest score recorded, just like an arcade game, until you turn the VIC off. A few games, like Radar Rat Race, have preset high scores that give you targets to shoot for.

Getting Started with your Cartridge Game

1. Turn on your television set.
2. Turn your VIC 20 off. You will greatly increase the life of your game cartridges if you turn the VIC off before inserting or changing cartridges.
3. Insert the game cartridge firmly in place.
4. Turn on the VIC 20.
5. Adjust the picture on your screen by using the CRSR key.
6. Type the appropriate START key: f1, P or RETURN, depending on what the game requires.
7. Play the game, using either the joystick or keyboard controls.
8. Turn the computer off before inserting another cartridge.

ames for the Vic 20



What's Available on Cartridge from Commodore—and What's Coming Soon

Key: Works with: J=Joystick, K=Keyboard, P=Paddle

Space Games

VIC AVENGER: Blast the rows of aliens and flying saucers with your space cannon. Hide behind bunkers for protection, and watch for the mystery UFO's worth extra points. An addicting game, and one of Commodore's most popular. (JK)

JUPITER LANDER: One of the most authentic landing games ever developed. Use your VIC keyboard like a control console to pilot your Jupiter Lander to a soft landing in one of the game's caverns. Make as many landings as you can until your fuel runs out. A real challenge.(K)

VIC SUPER ALIEN: You're trapped in a maze—and so are the Super Aliens. Capture all the aliens in the maze before they attack and eat (ugh!) you. A fast-paced game. (JK)

LORD OF THE SKIES: Killer birds and their UFO allies are out to get you. As the birds become more valuable, the bombs fall faster and faster. Kill the bird before you get blasted. (JK . . . coming soon)

Bally/Midway Arcade Game Series

These popular coin-operated arcade games will soon be available for the home.

GORF: Begin as a Space Cadet and advance through the ranks as you shoot down Gorfian flagships. But first you have to get through the Invaders, the Laser Ships and much more. (JK . . . coming soon)

OMEGA RACE: Go through Omegan warrior training in the Space Arena. You've got to watch out for missiles, space mines and the Death Ship to make it! (JK . . . coming soon)

WIZARD OF WOR: Will you make it out of the Wizard's dungeons? His monster pets, some of them invisible, will make it hard on you. And the Wizard can teleport and throw lightning bolts. (JK . . . coming soon)

Family Games

MIDNIGHT DRIVE: Turn your VIC keyboard into the dashboard of a race car. Play action combines road racing, time trials and night driving. Ignition, kilometers per second, rpm, 4 gears, accelerator . . . they're all there. Fast-paced and authentic. (K)

RADAR RAT RACE: Cats and enemy mice try to stop your Radar Rat from getting all the cheese in the maze. Great arcade action. (JK)

RAID ON FORT KNOX: In the complex of tunnels under Fort Knox you find the gold. But the guards are on your trail. Get out before they find you! (JK . . . coming soon)

PINBALL SPECTACULAR: Video pinball **par excellence**, with some of the best action available. Bumpers, free balls, crawling monsters, spinner, drop targets, bonus multipliers and terrific sound effects. (P . . . coming soon)

Casino Games

SUPER SLOT: Plays identically to the one-armed bandits in Las Vegas: drop coins, pull the lever . . . and jackpot! Features increased odds for larger bets, display of winning combinations and colorful action. (JK)

DRAW POKER: Beat the dealer at 5-card draw. Play against the odds for bigger and bigger stakes; bet double or nothing when you win. (K)

Children's Games

MOLE ATTACK: When the moles stick their heads out, try to bop them. But don't hit their tails, or you'll lose points. Action gets faster as time runs out. (JK . . . coming soon)

THE SKY IS FALLING: A great game to teach motor skills, as you help Chicken Little by catching pieces of the falling sky. Fun and challenging. (P . . . coming soon)

Scott Adams Adventure Game Series

ADVENTURELAND ADVENTURE: Find the 13 treasures as you explore the dismal swamp and the bottomless pit. Find the hidden caves —but try not to upset the sleeping dragon. (K . . . coming soon)

PIRATE COVE ADVENTURE: Say the magic word, and you're transported from a London apartment to Pirate Island. Collect the treasures as you sail the sea in a pirate ship. (K)

MISSION IMPOSSIBLE ADVENTURE: The nuclear reactor has been rigged as a time bomb by a dying scientist. Can you get past the security system to save the world? (K)

THE COUNT ADVENTURE: As night falls, you're trapped in Count Dracula's castle. He wants to drain your blood. Can you destroy him, first? (K)

VOODOO CASTLE ADVENTURE: Your friend, Count Cristo, has had a curse put on him, and you must find the clues to the spell that can free him. But what's that moaning coming from the fireplace? (K)

Classic Board Game

SARGON II CHESS: The world's most popular computer chess game. Play black or white pieces, select from 7 levels of difficulty. You can even ask Sargon to suggest your move. (JK)

Games On Tape

Several excellent Commodore games are available on cassette tape, rather than cartridge. These games have all the excitement of Commodore's cartridge games.

CAR CHASE: Computer cars are trying to crash into you as you race through the maze picking up points. (JK)

SLITHER/SUPER SLITHER: Two versions on one tape. Targets appear and disappear at random as you slither around.

VIC 21 (BLACKJACK): One or two can play against the computer, with the full range of casino options, including split pairs and surrender. (K)

BLUE MEANIES FROM OUTER SPACE: Defend yourself against the invading Blue Meanies with your laser cannons. Meanwhile, you can repair your ship with your repair robot. (K)

Games from the Outside World

According to several expert Commodore game players the following games are among the best produced by outside software houses for the VIC 20. If you've got a favorite, let us know. And PLAY ON!

SPIDERS OF MARS, on cartridge from United Microware Industries: You're a fly combatting hoardes of invading spiders and other carnivorous insects. They come from all sides, so you've got to be fast to get them before they blow you apart! Starts at ten levels of play, all of them fast-paced. Great sound effects, too. (JK)

METEOR RUN, on cartridge from United Microware Industries: Shoot meteorites, aliens and space debris coming in at your rocket. But watch out for those little meteorites that fly diagonally across your path. They can catch you unaware. Progressively complex levels of play. (J)

SNAK MAN I, on tape from American Peripherals: Yet another version of a popular arcade game we all know and love. Our experts like this version better than the Atari game machine version. (JK)

High Scores

For serious game players who thrive on competition, we'll be running the highest known scores for all Commodore games—cartridge and cassette. If you have a score that beats the existing record, send it in. But please remember you're on your honor, and phony scores will be on YOUR conscience, not ours.

VIC AVENGER:

JUPITER LANDER:
Jim Dubrouillet—91,500

SUPER ALIEN:

MIDNIGHT DRIVE:
Neil Harris—13 km

RADAR RAT RACE:
Neil Harris—85,050

SUPER SLOT:

DRAW POKER:

CAR CHASE:

SLITHER/SUPER SLITHER:

BLUE MEANIES:

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NEW VIC SOFTWARE PET

ALIEN INVASION — Arcade style excitement for your VIC. Look out here they come. Aliens are descending from the sky. Move your laser into position and defend the earth. The attacks are unending — can you survive or will Vader rule the galaxy. Many extras on this one. 20 levels of play. $9.95

CATTLE-ROUNDUP — The cows are loose in the maze. You have 2 minutes to get each cow back into the corral. You can push, coax and call the cows. Some cows are not very smart and some are very stubborn. You will have to help them. Be careful that you don't leave the corral gate open. Color graphics and sound. Eight levels of play and a time limit. $9.95

HEAD ON — Your car moves forward around the race track. You can move up, down, right and left. Try to score points by running over the dots on the track. Watch out for the crusher — if you crash you lose a car. Four cars and bonus levels. Full color graphics and sound. Fast action and very addicting. 9 levels of play. $9.95

SNAKEOUT — Blocks appear on the screen at random. You move up, down, right and left and try to move your snake over the blocks. Each block that you get raises your score. Keep building your score but watch out because the escape routes keep getting smaller. Time limit, color graphics and sound. 3 games on this cassette. Snakeout — 2 player Snakeout and Trapper. 9 Levels of Play. $9.95

TARGET COMMAND — Move your laser into position and get ready for some quick action. Different types of missiles are dropping. How many can you shoot down. They all travel at different speeds and different levels. You must be fast on the trigger to get them all. Time limit, bonus points and very addicting. Color graphics and sound. Arcade style fun. 10 levels. $9.95

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?
Cass. 8K $9.95

ASTEROIDZ — Its your ship vs. a swarm of killer gammaroidz. You are on a collision course and must destroy them before they blast you into the next galaxy. Four levels of play. Has hyperspace keys that move you around. Arcade style entertainment at its finest. Great graphics and sound.
Cass. 8K $9.95

MUNCHMAN — How many dots can you cover? It's you against the computer munchers ZIP and ZAP. Can you clear the maze first or will they get you? Number keys move you up, down, right and left. GREAT GRAPHICS AND SOUND.
Cass. 8K $9.95

TARGET COMMAND — Its you against a barrage of enemy lazers that are aimed at your ammo dumps. Sight in on the targets and score as many hits as you dare. As your skill increases so does the the difficulty — (5 levels to select). This is an arcade-style game with great graphics and sound effects. A must for your PET/CBM.
Cass. 8K $9.95

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The boards, inside the PET/CBM, install in minutes without special tools or equipment . . . just a screwdriver.

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...PET/CBM/VIC? SEE SKYLES...

Flip Out With VICFLIP-IV

Jim Dubrouillet (our computerized newspaper carrier . . . see page 20) and his friend Sean Smith designed this program. If you like the board game "Othello", you'll love VICFLIP-IV. The point is to end up with the most blocks (black or white) in your color.

The first section contains the instructions. Then it automatically loads the game. If two people play, the game goes as fast as they can play it. Our only criticism is that, when you play against the computer, VIC can be pretty slow making his move. But the sound effects are good, and the game itself is challenging, so just be patient as VIC scans the scene to choose his flip. All in all, we think you'll enjoy VICFLIP-IV.

```
READY.

1 GOTO21
2 W0=1:GOSUB100:POKE198,1:POKE631,131:PRINT"■■■■■■■■■■■■■■■■":END
6 PRINT"■■TO PLAY THE VIC, TYPEVIC1, VIC2, VIC3, OR  VIC4 FOR 'ANOTHER'."
7 PRINT"■■THE HIGHER THE NUMBERTHE HARDER THE GAME."
8 PRINT"■■THE GAME ENDS WHEN NOSQUARES REMAIN BLUE."
9 PRINT"■■THE VIC DECIDES WHO  CHOOSES THE COLOR."
18 GETA$:IFA$=""THEN18
19 GOTO2
21 POKE36879,152:GOTO100
100 POKE36878,15:PRINT"■■■■■■■■■■■■■■■■
```

```
READY.

21 INPUT"■■■■■NAME";A$:INPUT"ANOTHER";B$:DIMA$(1):X=1:Z=1:IFLEFT$(B$,3)<"VIC"THE
N25
22 A=VAL(RIGHT$(B$,1))-1:LF=-(A=0)*999-(A=1)*25-(A=3)*.63:CO=1:GOTO26
25 IFRND(1)>.5THENC$=A$:A$=B$:B$=C$
26 DIMA(8):PRINTA$" WHITE OR BLACK";:INPUTC$:IFC$="B"THENC$=B$:B$=A$:A$=C$:CO=2*
CO
27 INPUT"# ACROSS";N:INPUT"UP & DOWN";O:A$(1)=A$:A$(0)=B$:V=15:DW=36874
28 POKE36878,V:N=2*INT((INT(-((N<11)AND(N>2))*N-(N>10)*10-(N<4)*8))/2):C$(0)="■"
29 N1=2*INT(INT(-((O<11)AND(O>2))*O-(O>10)*10-(O<4)*N)/2):PRINT"■":O=N-1:C$(1)="
■"
30 DIMD(8),D2(8),S(1):FORA=0TO8:READD(A):NEXT:DATA-23,-22,-21,-1,0,1,21,22,23:S(
0)=2
31 N3=N/2:N4=N3+1:N5=N1/2:N6=N5+1:N7=N3*N5:N8=N7
33 FORU=1TO4:IFINT(INT(N7*(1/U))*U)=N7THENN8=INT(N7*(1/U))
34 NEXT:N7=N8
35 FORA=1TO2*N1STEP2:FORB=1TO2*NSTEP2:E=7703+22*A+B:POKEE-23,207:POKEE-22,227
36 POKE36879,42:POKEE-1,229:POKEE,160:NEXTB,A:PRINT"■■■";
37 S(1)=2:S(0)=2:FORA=38400TO38906:POKEA,6:NEXTA
38 POKE36865,34:POKE36864,-2*N+25
40 FORA=1TO(N1-1)/2:PRINT"■■";:NEXT
41 FORA=1TOO/2:PRINT"■■";:NEXT:PRINT"■■ ■■■■■
```

```
106 IFC$="Y"THENRUN
109 CLR:POKE36879,27:PRINT"■";:END
110 POKE37154,127:POKE37139,0:POKEDW+2,0
117 QZ=38421+2*X+44*(Z-1):QW=QZ-30720:R=PEEK(QZ)AND7:GOSUB140
118 POKEQZ+1,C:POKEQZ+22,C:POKEQZ+23,C:POKEQW+1,102:POKEQW+22,102:POKEQW+23,102:
POKEQZ,C
120 POKEQW,102:POKEDW+C,200+X*2:P=PEEK(37137):X=X+((PAND16)=0)-((PEEK(37152)AND1
28)=0)
125 Z=Z-((PAND8)=0)+((PAND4)=0):GOSUB140:POKEQZ,R:POKEQW,207
126 POKEQZ+1,R:POKEQZ+22,R:POKEQZ+23,R:POKEQW+1,227:POKEQW+22,229:POKEQW+23,160
127 POKEDW+C,2*Z+220:IF(PAND32)><0ANDC$><"F"THEN117
130 POKEDW+C,0:POKEDW+2,225:POKE37154,255:POKE37139,128:GOTO1000
140 GETC$:X=X+(C$="J")-(C$="K"):Z=Z+(C$="I")-(C$="M")
141 Z=(Z+(Z>N1)-1)*-(Z>0)+1:X=(X+(X>N)-1)*-(X>0)+1:RETURN
200 B=PEEK(F-30720):IFB><207THENFL=FL-D2(A):D2(A)=0:GOTO1014
202 GOTO1011
300 POKEDW+2,0:X=0:Z=0:FM=0:SA=0:HV=-9:X2=0:Z2=0:MF=0
302 SA=SA+1:X=X*-(X<N)+1:Z=Z-(X=1):QZ=38421+2*X+44*(Z-1):POKEDW+C,2*X+200:GOTO10
00
303 IFFL>0THEN405
305 IFMF=0ANDSA=N1*NTHENW1=W1+1:GOTO50
306 POKEDW+C,2*Z+220:IFSA<N1*NTHEN302
310 :FORA=0TO8:D2(A)=A(A):NEXT:X=X2:Z=Z2
311 FL=MF:E=38421+2*X+44*(Z-1):GOTO1020
405 CA=LOG(ABS((X+(X>N3)*N3+(X<N4)*N4)*(Z+(Z>N5)*N5+(Z<N6)*N6)))/LOG(N7)
406 CB=(CA<>INT(CA)):VL=(CB-(CB=0))*CA+FL*CA*LF
407 XZ=0:IFVL>HVOR(VL=HVANDFL>MF)THENXZ=1
408 IFXZ=1THENHV=VL:X2=X:Z2=Z:FORA=0TO8:A(A)=D2(A):NEXT:MF=FL
409 GOTO305
1000 FL=0:E=QZ:DX=135
1001 IF(7ANDPEEK(E))<2THENON1-(C0=C+1)GOTO1016,303
1002 FORA=0TO8:IFA=4THENNEXTA
1005 D2(A)=0
1006 D2(A)=D2(A)+2
1008 FL=FL+2:F=E+D(A)*D2(A):IF(7ANDPEEK(F))>1THENFL=FL-D2(A):D2(A)=0:GOTO1014
1009 GOTO200
1010 IF(7ANDPEEK(F))>1THENFL=FL-D2(A):D2(A)=0:GOTO1014
1011 IF(7ANDPEEK(F))=-(C=0)THEN1006
1013 FL=FL-2
1014 NEXTA
1015 IFC0-1=CTHEN303
1016 IFFL<1ANDW=3THENW=0:W1=W1+1:GOTO50
1017 IFFL<1THENW=W+1:C=-(C=0):GOTO50
1020 W1=0:W=0:S(C)=S(C)+1+FL/2:S(-(C=0))=S(-(C=0))-FL/2:FORA=0TO8
1025 FORY=0TOD2(A)-2STEP2:F=E+D(A)*Y:POKEF,C:POKEF+1,C:POKEF+22,C:POKEF+23,C
1026 POKEDW+4,INT((A+7)*(V/15)):DX=DX+1:POKEDW+2,DX:NEXTY,A
1027 IFS(0)+S(1)=N*N1THEN100
1030 GOTO50
READY.
```

KEY TO REVERSED SYMBOLS:	TEXT	KEYS
	RVS HEART	CLR
	RVS Q	CRSR DOWN
	BLOCK	BLACK
	RVS E	WHITE
	RVS S	HOME
	RVS J	CRSR RIGHT
	RVS R	RVS ON
	RVS ▬	RVS OFF
	RVS ◥	CYAN
	RVS ←	BLUE

KEY TO LINE 41

```
RVS ON,WHITE,┌,┐,BLACK,┌,┐,CRSR DOWN,CRSR LEFT (4 TIMES)
WHITE,└,┘,BLACK,└,┘,CRSR DOWN,CRSR LEFT (4 TIMES)
┌,┐,CRSR DOWN,CRSR LEFT (2 TIMES),└,┘,WHITE
└,┘,CRSR UP,CRSR LEFT (2 TIMES),┌,┐
```

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Finds roots to complex polynomials. $9.95

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VIC - 20 SOFTWARE

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Tele/Scope

The VICMODEM brings mainframe computing home.

by Jeff Hand

Computer networks were once only an idea in a science fiction writer's mind. But science fiction is becoming reality quicker than you may think. Imagine, for instance, having access to tremendous amounts of information, almost unlimited memory and the programming ability of a mainframe right in your home.

That kind of power is available right now to home computerists, who can use a modem and a telephone to link their small computers to big mainframe computers. Tying into computer networks via telephone is called telecommunications—which is the subject of this column.

The VIC 20 and the VICMODEM cartridge can be your keys to the vast empire of telecommunications. A modem converts (MOdulates) a computer's signals so they can be sent over telephone lines, then translates them back to signals the computer can understand (DEModulates).

With the VICMODEM, available from Commodore, you can communicate over the phone with computer networks across the nation—from huge mainframes to someone else's personal computer.

With the VICMODEM, the capabilities of your VIC 20 are magnified and enhanced. The applications are only as limited as your imagination. You can program in several computer languages—COBOL, FORTRAN, PASCAL and BASIC—and various assembler languages, for instance.

In addition, subscription telecommunications networks such as CompuServe and The Source have data banks that include scientific information, newswire stories, newspapers from across the country, numerous programs, stock quotes, financial advice and various computer utilities. Not only that, but you and your computer can play a good game of bridge or backgammon quickly and inexpensively over the phone.

What, specifically, can **you** do with the help of a VICMODEM?

Businessmen—The VIC 20 and VICMODEM allow you to get current stock quotations and company reports. You can use one of many business programs for accounting, statistics, data management, letters and contracts. Store information and update it at any time. A back-up copy of all information you enter into the system is maintained, so no data can be lost.

Students—In school it's virtually impossible to get enough time on the computer terminal. With the VIC 20 and VICMODEM you can work conveniently at home—and forget about the mobs at the terminals—by tying into the school computer. Or suppose you have an assignment to write a paper on current American foreign policy in Central America. You simply hook up the VICMODEM to your VIC 20 and call a service like The Source or CompuServe. Online you access the UPI service and several editorials from various national papers to gather your information. To make your task even easier, you can use the VIC word processing capability to print the report on your VIC printer. You're a step ahead of your peers and it was less work!

Farmers—Use a computer network like Agnet to stay informed on the latest market prices for your produce. Get up-to-the-minute weather reports, programs for soil analysis and scores of helpful farming tips on a range of subjects from birthing a calf to exterminating moles.

Shoppers—Shopping for durable merchandise is easy on a computer network like CompuServe. You don't have to leave home, and the service is available 24 hours a day. You do all your research, pricing and comparison shopping right on the computer. Your account is billed for any purchase you make, and merchandise is delivered right to your door.

CBer's—CBing on the computer is the next best thing to being there, and can be cheaper than a phone call. Since you can converse with more than one person at a time, you can even hold a conference with friends from around the country.

These are just a few ideas to demonstrate the tremendous utility of computer networks. Now we get to the "how-to" part.

To begin telecommunicating via your VIC 20, you'll need a Datassette, the VICMODEM cartridge, VICTERM I software, a modular telephone and an account with a computer network. The VICMODEM is the most inexpensive modem on the market today, and Commodore has included the VICTERM I software FREE with your VICMODEM purchase.

If you still want more for your money when you buy your VICMODEM, Commodore is providing a year's FREE subscription to CompuServe, an extensive telecommunications net-

work. You say you're still not satisfied? How about this: Commodore is also giving you one hour free on CompuServe to get acquainted with the service.

So, at the amazingly low price of around $484 (counting the cost of your VIC 20), you have everything you need to start telecommunicating. If you need a modular phone, however, there's not much Commodore can do. You'll have to talk to Ma Bell.

Contained in the VICMODEM package you'll find all the information you need for getting onto The Source or CompuServe, in the form of two snappaks—one from The Source and one from CompuServe. Each pack contains your I.D. numbers, the password for each system, an agreement of use and an explanation of how to log onto the network.

Suppose you take advantage of Commodore's free subscription and decide to subscribe to CompuServe. Then what happens? After you log on, the first thing you'll see is a letter from Commodore welcoming you to Commodore's Information Network. The Commodore Information Network is available on CompuServe to help Commodore users get the most out of their computers.

Next on your screen a menu page for the Network will appear. A menu is a listing of the information selections available to the user, just as a restaurant menu is a listing of meal selections. The information menu allows you to easily access any information contained in the database. In this case, you can choose from such delectables as technical tips, software tips, hotline, directory of user groups, "Program of the Month," bulletin board, product announcements and free public domain software.

Of course, there are also many small computer networks you can access with your VICMODEM. These smaller networks are usually maintained from a private home to post announcements for a user group or a special interest such as computer hardware, education, humor or commodities. Phone numbers for these networks are available on The Source.

If you don't have a Datassette or want to borrow a friend's modem to try telecommunications, this short functional program will allow you to communicate with another computer through the modem, although it does not have any of the capabilities of VICTERM I software. This program, by the way, will also work for RS232 modems.

TERMINAL SOFTWARE FOR THE VIC:

```
100 open 5,2,3,chr$(6)
      REM opens channel to modem
110 dim f%(255), t%(255)
      REM dimension in & out buffers
120 for j=32 to 64: t%(j)=j: next
      REM characters into out array
130 t%(13)=13: t%(20)=8: rv=18: ct=0
      REM defines special characters
140 for j=65 to 90: k=j+32: t%(j)=k: next
      REM lower case into array
150 for j=91 to 95: t%(j)=j: next
      REM special characters into array
160 for j=193 to 218: k=j-128: t%(j)=k: next
      REM upper case into array
170 t%(146)=16: t%(133)=16
      REM defines f1 and RVS/OFF as break
180 for j=0 to 255
      REM recieving array the same as sending array
190 k=t%(j)
      REM    "
200 if k<>0 then f%(k)=j: f%(k+128)=j
      REM     "
210 next
220 print " " chr$(147)
      REM clears the screen
230 get#5,a$
      REM reads from modem and puts out to screen
240 if a$=" " or st<>0 then 280
      REM       "
250 print " " chr$(157);chr$(f%(asc(a$)))
      REM       "
260 if f%(asc(a$))=34 then poke 212,0
      REM resets the quote mode
270 goto 230
280 print chr$(rv)" "chr$(157);chr$(146);:get a$
      REM cursor
290 if a$<>" " then print#5,chr$(t%(asc(a$)));
      REM       "
300 ct=ct+1
      REM       "
310 if ct=8 then ct=0: rv=164-rv
      REM       "
320 if (peek(37151)and 64)=1 then 320
      REM check modem before sending
330 goto 230
```

If you have any suggestions, problems, or compliments, drop us a line through the FEEDBACK command on CompuServe. Have fun exploring . . .

JINSAM Gives A Golden Anniversary Party

by Nancy Iscaro,
Jini Micro-Systems, Inc.

This is it, the BIG one. Fifty years married to one man, for my mom. Fifty years married to one woman, for my dad. As a daughter, how do you express your love and appreciation? A party, of course.

But it's got to be more. You've got to consider the folks' temperaments and idiosyncrasies. They had the first TV on the block and the first computer in the condo. They've never needed to keep up with the Joneses. Instead, they've always taken the lead. They're modern and FULL of life.

The party was no secret. You can't ignore or hide a party like this—it's a family affair. My sisters and I got together and planned the strategy. The place, the food, the time were all set. Then came the invitations. What should we use? Caligraphy? Raised printing on parchment? NO!! That might be special, but not special enough for our folks.

JINSAM, the data base management system by JINI Micro-Systems, Inc., designed to be used with the Commodore CBM micro, came to the rescue. The system was originally created for the FOX-TANGO Corporation, which dad founded. It seemed only logical that this modern 50th anniversary couple should have JINSAM/WordPro designed invitations.

On our CBM, we created a mailing list database with plenty of room for names, addresses, telephone numbers and several blank fields, then entered the names of friends and relatives. My sister Susan called and checked addresses, my sister Karen entered the data into JINSAM and I composed the invitations on the WordPro word processing system.

Once the names were entered into JINSAM, we used WORDPROPACK to prepare a variable block file with five variables for name, address, city, state and zip code. While JINSAM prepared the file, my sisters revised the invitation. We placed the WORDPROPACK variable block file into WordPro's extra text area and printed sample invitations onto a one-way mailer called a TRANS-O-GRAM. With very little fuss the copy was perfect. We typed "RVS" "O" "L" "C" "RETURN", and personalized invitation after invitation was printed.

At first my folks objected to the fuss and bother of a party, but as plans fell into place my mom loved the whole affair because it was different. Dad thought it was unpretentious and gave us lots more names. And if someone did give a gift or make a donation to a charity, as Mom and Dad had requested, they had a great way to thank people. Dad entered the names in JINSAM and had WordPro write a thank-you letter.

The party turned out to be a marvelous success. Because our TRANS-O-GRAMS looked so authentic, everyone thought they had gotten a telegram. In fact, the invitations turned out to be the talk of the party, second only to the anniversary couple. Some people thought they must have been expensive, most thought they were "different", and some just thought they were strange— especially our Uncle Irv, a musicologist who said they reminded him of invitations to sit on international music committees. But we just thought it had been a fun family project.

Best Books

This is mainly a starter list for new computerists. But we've thrown in a few goodies for more advanced users.

Basic Programming

VIC 20 Programmer's Reference Guide
Finkel, Harris, Higginbottom & Tomczyk
Commodore Business Machines, Inc.
available at your Commodore dealer

Hands-on BASIC with a PET
Herbert D. Peckham
McGraw Hill: New York, NY
available at your local bookstore

The PET/CBM Personal Computer Guide
(1st edition is better for VIC users)
Adam Osborne & Carroll S. Donahue
Osborne/McGraw Hill: Berkeley, CA
available at your local bookstore

BASIC and the Personal Computer
Dwyer & Critchfield
Addison Wesley: Reading, MA and Menlo Park, CA
available at your local bookstore

Some Common BASIC Programs
PET Edition
Lon Poole
Osborne/McGraw Hill: Berkeley, CA
available at your local bookstore

BASIC from the Ground Up
David E. Simon
Hayden Book Company:
Rochelle Park, NJ
available at your local bookstore

(continued on page 45)

JINSAM

Data Manager selected by NASA, Kennedy Space Center

SAVE TIME! SAVE MONEY!
JINSAM saves taxpayers 100's of thousands of $

"Much more powerful than you can imagine!"
Robert Baker
Kilobaud Microcomputing

JINSAM is an integrated system. It makes it easy to use your information to its fullest. No more will hundreds of valuable hours be spent searching or analyzing needed information nor re-entering information for various reports.

JINSAM transforms your desk-top computer into the "state of the art" data processing machine with features and accessories found nowhere, even at 10 times the price. NASA, Kennedy Space Center selected JINSAM 8.0 and saved approximately $95,000 over other software/hardware costs. Riley County, Kansas also selected JINSAM 8.0 and saved approximately $90,000 over other software/hardware costs.

JINSAM is designed for you. It is forgiving. It has help commands for every option, available at the touch of a button. The amount of information you store, its structure and/or your hardware can change but your data won't have to be re-entered. Recovery utilites are included even for catastrophes, security passwords are built in for privacy, simple editing and entry includes auto recall, and deleting records is easy and the space is reclaimed. JINSAM includes TWO FREE accessories for reports and labels. You have unlimited report formats with summing and lined up decimals and the label printer prints up to 5 across – any size and even allows single envelopes or index cards.

JINSAM 1.0 allows fast and easy file handling, manipulation and report generation for any CBM computer with CBM 2040 disk drive. It features a menu for ease, has encrypted passwords, 3 deep sorts, .5 to 3 second recall.

JINSAM 4.0 for CBM 4000 series adds JINSORT, user accessible machine sort of 1000 records in 15 seconds; compaction/expansion of information, automatic list maintainance, unlimited number of fields, unlimited record length and much more.

JINSAM 8.0 for CBM 8000 series has all 4.0 features plus unlimited sort, horizontal format, and search by key or record number.

JINSAM 8.2, NEW FOR '82 expands 8.0 capabilities by adding information search by word, key or record number and machine language print, format and manipulation routines.

★CUSTOM DATA FILES
★CUSTOM REPORTS/LABELS
★KEYED RANDOM ACCESS
★FAST/EASY/MENU DRIVEN
★MULTIPLE SEARCH KEYS
★PRIVACY ACCESS CODES
★WILD CARD SEARCH

JINSAM EXECUTIVE version (soon to be released) is our most powerful professional system for the CBM 8000 and 9000 series. Executive will have 8.2 extended features plus allow multiple users with in-use lockout protection, executive command files, automatic math relations, join, merge or link files, greatly increased record capacity and machine information search by word, as well as by key or record number and many, many more features.

There are currently 7 more interfacing modules – and more under development, including independent interfaces between JINSAM and business packages for your G/L, A/R, A/P needs. We announce the availability of modules and enhancements in JINSAM's quarterly newsletter.

WORDPROPACK - Intelligent interface for WordPro 3, 3+, 4, 4+, creates lists of information from JINSAM files. It allows up to 10 conditions based on each item of information. Produce individualized letters, report cards, special reports, checks, invoices, etc.

MULTI-LABEL - Prints multiple labels per record with up to 2 lines for messages and consecutive numbering. Produce inventory, caution labels, bulk mail labels, etc.

MATHPACK - global calculator/editor +, −, *, /, by another field or constant; null (remove contents) of a field or replace contents of a field with any word, number or phrase. Sum multiple fields in each record or running sum of single field in all records. Extract information or effect permanent change. Replace in the same field or place in a waiting field.

DESCRIPTIVE STATPACK - Determine MEAN, MEDIAN, MODE, STANDARD DEVIATION, VARIANCE, RANGE. Generate HISTOGRAMS from 1 to 25 steps, and produce Z-SCORE reports.

ADVANCED STATPACK - (You must also acquire DESCRIPTIVE STATPACK) Generate one, two or three way CROSSTABS (number of occurance) CHI SQUARE, LINEAR REGRESSION, with graphic representation and prediction, LINEAR CORRELATION and SIMPLE ANALYSIS OF VARIANCE.

CALCPACK - 2 way interface to VisiCalc or any user program. It lets you use VisiCalc for complex manipulation, editing, placing results in JINSAM for sorting, storing or moving data to WordPro as well as giving the ability for exchange with your own applications.

INTERAC - Interface which can read VisiCalc files, WordPro files and almost any sequential files to build JINSAM databases automatically. For example: You could "download" information on holerith cards to sequential files and INTERAC would place them into JINSAM files.

All accessories are accessed thru the JINSAM menu and require security password to gain entrance.

JINSAM gives you FREEDOM OF CHOICE. Start with JINSAM 1.0 and upgrade hardware and data at any time. Choose from accessories at any time. The JINSAM Newsletter brings the latest updates, user input and uses and keeps an eye on the future.

JINSAM stands alone by placing "a lot of potential computing power in one integrated program package" (Fred Klein, Ferson div. of Bausch & Lomb). "The JINSAM package is justification for buying a system no matter what the hardware, be it Vector or Commodore or whatever the system" (Larry Colvin, Micro Computer Systems). It is a "grandfather" in this young field since the first JINI MICRO database system has been marketed since 1979. JINSAM EXECUTIVE will be the third generation in development. All JINSAM systems are sophisticated and flexible yet easy to use. JINSAM is saving its users valuable time and money in government, educational and research institutions, business and industry worldwide.

JINSAM is a Commodore approved product. See your local dealer for a demonstration.

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WordPro is a trademark of Professional Software, Inc.
VisiCalc is a trademark of Personal Software, Inc.
CBM is a trademark of Commodore Business Machines, Inc.

JINSAM Data Manager

.... Additional Information and nearest dealer
.... Newsletter Subscription ($5 US/$8 Worldwide)
.... JINSAM Demo Disk ($15, plus shipping & tax)
.... User's Guide ($40.00, plus shipping & tax)

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Dealer Inquiry Welcome

BOOK REVIEW

We present here an objective review of one of Commodore's many publications, by a freelance expert in the field.

VIC 20 Programmer's Reference Guide

by Robert Baker

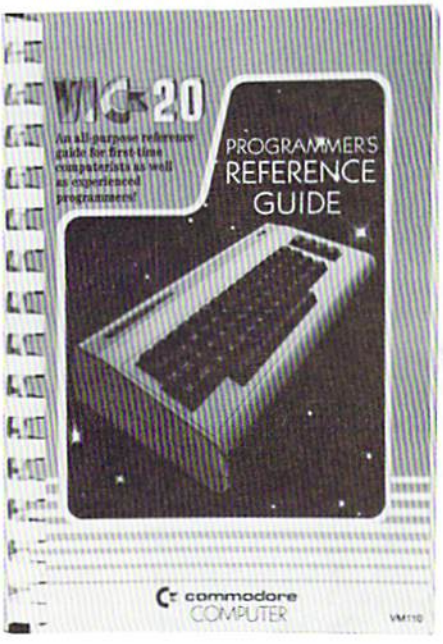
Reprinted with permission from **Microcomputing**, June 1982

As mentioned in early announcements, the book is divided into four sections: Basic Programming, Programming Tips, Machine Language and Input/Output.

A short applications guide is really a bit of subtle advertising for various VIC accessories and programs, but it does give a nice list of ideas on ways to use the system. Besides the normal reading material, the book has a number of useful charts and tables in the appendices. For hardware enthusiasts, there's even a full schematic of the VIC 20 inside the back cover.

The first part of the book describes the various commands and operations of VIC BASIC in detail. It's a handy yet thorough reference for VIC BASIC, but does not attempt to teach you how to actually program. Each entry in the BASIC vocabulary guide explains how the instruction is used and includes simple examples to help clarify matters. You'll even find information on how to abbreviate most of the commands to save typing time or to cram more commands into each program line. The sections on numbers, variables and operators should be especially helpful to newcomers in the world of computers.

The second portion of the book covers various programming tips for writing your own BASIC program. About one-third of this section covers cursor controls and program editing, using the GET statement, and simple discussions of various ways to save memory within the programs. The remaining two-thirds covers the use of graphics and sound, with a good deal of information packed into those 20-some pages. There's a nice description of the programmable characters and how you can even use them for high resolution or multi-color graphics. Several sample programs are included at the end to help illustrate the techniques covered, including the mixing of sound and graphics.

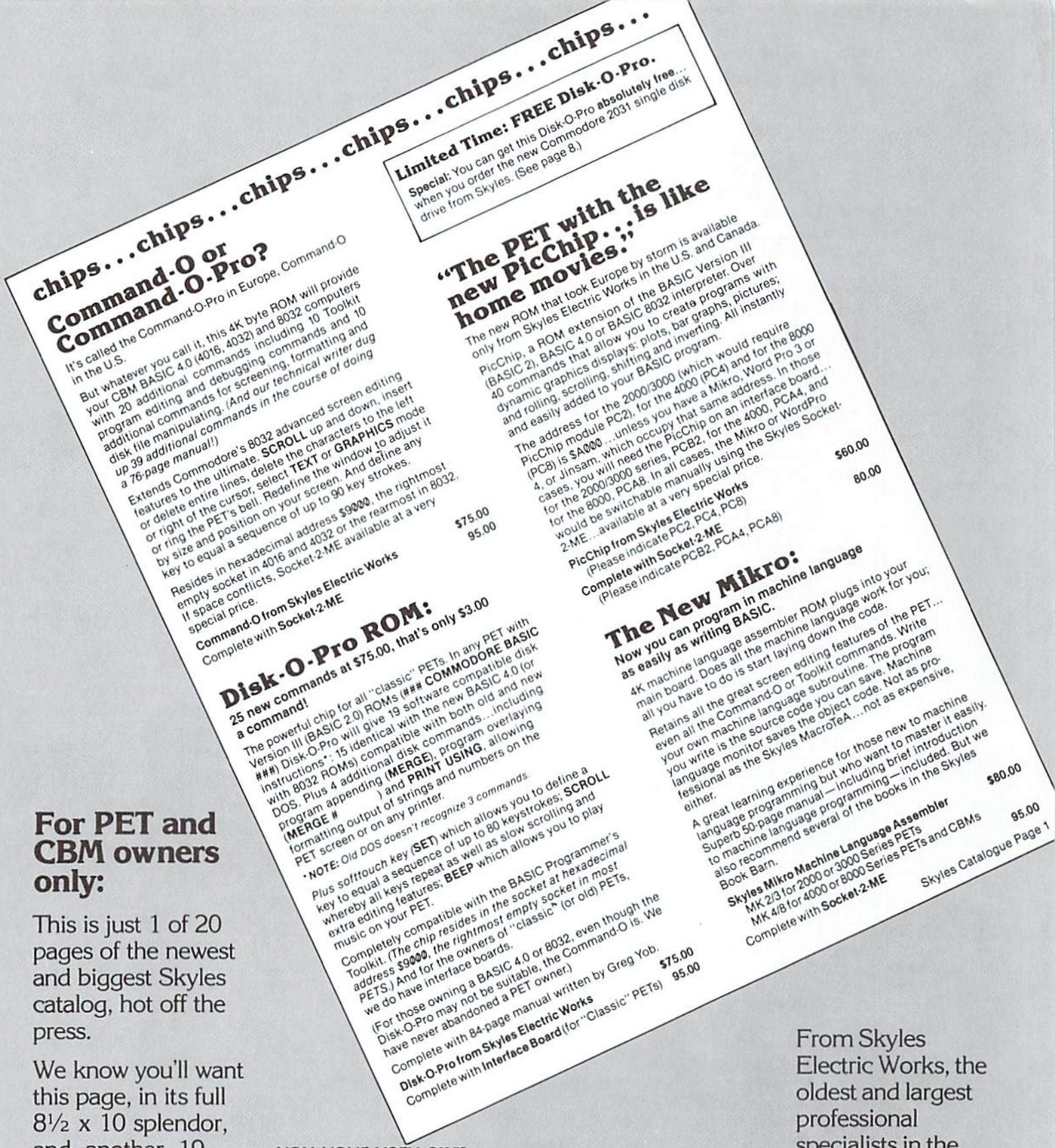


The third part of the book is an introduction to machine language programming and the internal workings of the machine. It attempts to provide information for all levels of users, but is primarily for the more advanced programmers. It starts out with an overall functional description of the VIC 20 to give you an idea of the way the VIC 20 processes programs within the system. The system overview contains a block diagram of the system as well as the internal 6502 microprocessor itself. Simple memory maps are included along with a discussion of how a BASIC program is stored in memory. All this information should be useful to some degree to just about any VIC user.

The last part of the book covers input and output to the VIC system. There's a complete description of the User Port, the Serial Bus and the VIC Expansion Port. There's a big write-up on the RS-232 interface, but a few important details are omitted. In particular, a previous section of the book refers you to this section for the valid secondary addresses when OPENing the RS-232 channel, but the information is just not there. It would have been really nice if there were some information on actually connecting RS-232 devices to the VIC for those unfamiliar with the RS-232 handshake lines. Brief information is also included in this last section on using a joystick, paddles or a light pen with the VIC. There's even a short section on the VIC graphic printer and how it's used.

There are a number of charts, maps and tables in the appendices, and most are very useful and handy references. However, novice programmers might need more help than what's presented in Appendix I when converting programs to VIC 20 BASIC from other systems. The authors only touch the surface with the information they present, but it should be useful. Don't forget, there's also a full VIC 20 schematic and a complete index as well.

As a whole, the book is very well done and probably the best I've seen from Commodore. It provides information of value for users at all levels of experience. As its name suggests the book is a reference guide for programmers. It will not teach you how to program, but it will provide a wealth of information in one handy source that is just not available elsewhere.



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PROGRAM REVIEW

We gave Commodore's new "Introduction to BASIC" software package to a helpless beginner, who then spent his evenings learning basic programming skills. Here are the results of his endeavors.

Commodore's "Introduction to Basic"

Helps Teach Programming at Home

by John O'Brien

With the introduction of the low-cost VIC 20, Commodore made computers affordable to almost anyone. Now Commodore's teach-yourself-programming courses are making it affordable and convenient for almost anyone to learn BASIC programming.

The first part of the teach-yourself series is "An Introduction to BASIC, Part One." The package includes a 152-page manual, two cassettes containing 17 programs to be used with the manual, and a stencil for drawing program flow charts.

"An Introduction to BASIC" assumes no prior knowledge of programming. That's why I reviewed this program. Like many of you, I have no background in computers or programming. However, I do have a strong interest in learning. I just never found the time to take courses, and thought programming might be beyond me.

I found "An Introduction to BASIC" a great way to ease into programming. The first few chapters are very easy, and everything is thoroughly explained. You are taken into programming so gradually you don't realize how much you are learning.

The manual is consistent with the VIC owner's manual and the **VIC 20 Programmer's Reference Guide** in that technical material is explained in a way that puts the reader at ease. The examples always help clarify and solidify the concepts that were just learned. Of course, this is what examples are supposed to do, but anyone who went to school can probably remember textbook examples that only confused you about what you thought you understood.

The author, Andrew Colin, puts strong emphasis on doing, rather than just reading. Although the text is important, the student spends more time using the VIC or writing programs than reading from the manual. For example, Unit Eight is about "tracing" programs to find mistakes. The tape that goes with it provides a program packed with mistakes for the student to fix. Although you get the theories and methods in the manual, it's fixing the program on tape that really drives the message home.

The tape that goes with Unit Six is a good example of a fun tape that also teaches effectively. The point of the program is to demonstrate how to make changes in existing programs. To teach this, the program makes random sentences, with each word and phrase picked randomly from short lists of possibilities. Some rather unusual sentences come out, such as "The Ayatollah Khomeini made friends with Mrs. Thatcher in the public baths." The student goes into the program and changes the list of possibilities—not only names, but phrases and adjectives that the program chooses from. You can imagine the possibilities—I ended up changing the program around for hours, had a lot of fun, and actually learned something in the process.

As you get deeper into the course, you find you must have total understanding of all the information you learned previously or you will have to keep going back over earlier chapters. To prevent this, be sure you haven't glossed over something just because you didn't think it was important at the time. The units in the manual move forward logically, building on all previous information. Once something is explained in an earlier unit, it is used later without further explanation. That's why it's best to take this course all at once. If you don't, you'll probably end up having to go back and refresh your memory each time you start.

The only problem I found with the package is that some of the quizzes on tape were too easy. If you use only the quizzes to measure your mastery of the material you have just studied, you may get a false sense of security. The best indication of how well you're doing is the ease with which you write programs. If you find you must look constantly in the back of the book for information, then it doesn't matter how well you have done on the quizzes.

"An Introduction to BASIC" will not make you an expert programmer, but it will give you an excellent foundation to build on. By the end of the course you will be able to write some practical programs and even some fairly sophisticated games. But it requires a commitment of time, energy and concentration. Just reading the manual will greatly expand your understanding of BASIC, but to get the most out of the package—you'll have to do some work.

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Get Serious

What's happening on the POWERful side of Commodore microcomputers

If you're interested in the applications of Commodore's microcomputers outside the home—or in more sophisticated home uses—you'll find some tidbits here to whet your appetite. For the full story on these products, consult our sister publication, COMMODORE Magazine.

While Commodore continues to revolutionize the whole concept of home computing, the company is also devoting substantial time to expanding the capabilities of its PET, CBM, and SuperPET computer products. In recent months, several noteworthy hardware and software developments have confirmed Commodore's commitment to developing new and innovative products for all levels of microcomputing.

Some of these recent developments include three new disk drives, COBOL for the SuperPET, and lots of new software for the CBM.

Hard Disk Drives Introduced

Three new disk systems will greatly enhance the power of your Commodore microcomputer. Two of the new disk systems are 5¼ inch rigid Winchester technology disk drives, the D9060 and the D9090. The third is a dual floppy disk unit, the 8250.

These three new products were designed around the concept of providing users with large file handling capabilities supported by the same BASIC program statements and DOS commands used with other Commodore disk units. All three of the units are compatible with any of Commodore's PET or CBM series computers, and all conform to PET IEEE interface requirements.

Cobol Will Become 6TH SuperPET Language

Reaffirming its commitment to continued development of a new generation microcomputer, which offers the features and languages of a mainframe, Commodore has announced an agreement with Waterloo Computing Systems Limited to develop COBOL for the SuperPET computer.

With this announcement, COBOL becomes the sixth interpretative language developed by Waterloo for the SuperPET. Other languages include: BASIC, FORTRAN, APL, Pascal, and 6809 Assembler.

Presently, documentation for the SuperPET package includes a system overview and reference manuals for each of the product's five languages. The newly revised package will also include a COBOL reference manual.

Software, Software, Software

Three new software packages for the CBM are now available from your authorized Commodore dealer. These new products include UCSD Pascal, CMAR Multi-Key File Access System, and the ATLAS 1200 Equipment Maintenance System.

- **UCSD Pascal**

Pascal has become one of the standard languages used to teach programming and for writing business application packages. The UCSD implementation of Pascal, originally developed at the University of California at San Diego, has become one of the most popular Pascal implementations for education and business today. SUGGESTED RETAIL PRICE: $175.00

- **CMAR Multi-Key File Access System**

CMAR is a utility that allows you to set up files, by generic key, and will perform all the necessary file maintenance functions such as read, write, change, and delete. CMAR files are dynamic, eliminating the need for reorganization whenever key and data records are modified. The product is written in 6502 machine language and it interacts directly with BASIC 4.0. SUGGESTED RETAIL PRICE: $150.00.

- **Atlas 1200 Equipment Maintenance System**

If you are an Independent Service Organization (ISO) or a Third Party Maintenance Company, and would like to increase revenue flow while decreasing time spent on accounting and administration, then ATLAS 1200 may be your solution. ATLAS 1200 allows the user to maintain service, customer, and equipment information, keep an accounts receivable on each customer, identify and log all call for later retrieval, track equipment under warranty, and produce statements on a timely basis. SUGGESTED RETAIL PRICE: $595.00.

Attention Commercial Programmers!

Commodore is compiling a list of software commercially available for its computers. If you have software you would like to have included in this listing, please submit the following for review:

- copy of program on disk or cassette tape
- documentation describing the purpose and utility of the program
- information on price of program and where it can be purchased
- specification of equipment necessary for program to operate

Selected programs will be reviewed in POWER/PLAY, at the discretion of our Software Committee.

Please submit this information to:
SOFTWARE COMMITTEE
Commodore Business Machines, Inc.
The Meadows, 487 Devon Park Drive, Wayne, PA 19087

BEST BOOKS:
(continued from page 38)

Understanding Your VIC, Vol. 1
David E. Schultz
Total Information Service
Box 921
Los Alamos, NM 87544

Machine Language Programming

6502 Software Design
Leo J. Scanlon
Howard W. Sams & Co.:
Indianapolis, IN
available at your local bookstore

MOS Programming Manual
MOS Technology
available from:
Falk Baker Associates
382 Franklin Avenue
Nutley, NJ 07110

Miscellaneous

Commodore Software Encyclopedia
CBM Software Group
available at your Commodore dealer

International Microcomputer Software Directory
Imprint Editions
420 South Howe
Fort Collins, Colorado 80521

Computerist's Directory:
The National Phone Book of Computing
P.O. Box 405
Forestville, CA 95436

QUESTIONS:
(continued from page 3)

number of columns, but they use too much memory to be effective. **Last minute note: see inside front cover.**

Q. Is it possible to use CBM Dual Disk Drives with the VIC 20?
A. It will be possible to connect CBM Dual Disk Drives using the VIC IEEE adapter cartridge, available in the near future. Also available is a VIC single disk drive. We'll keep you posted on those developments as they occur.

Q. How can I obtain VIC schematics and a VIC memory map?
A. Schematics, memory map and other technical information for the VIC 20 are included in the VIC 20 Programmer's Reference Guide, available at your Commodore dealer.

Q. What does the Super Expander do? What is the pixel matrix size?
A. The VIC Super Expander is a cartridge that not only expands the VIC's memory by 3 kilobytes but also gives you high resolution graphics plotting, color, paint and sound commands. All commands may be typed as new BASIC commands or accessed by hitting one of the VIC's special function keys.

Super Expander has 1024 x 1024 dot screen plotting. The resolution of the VIC screen is 176 x 184 pixels. The Super Expander maps down to the actual resolution of the screen.

Q. Can more than 32K of RAM be added to the VIC?
A. The 6502 microprocessor, which is the heart of the VIC 20, can address only 64 kilobytes of memory. Much of the memory in the VIC is ROM (Read Only Memory), which is already allocated to system routines. When we subtract the used ROM from the possible 64K of memory, this leaves room for approximately 32 kilobytes of RAM (Random Access Memory).

Q. Do the various application software cartridges reduce the amount of RAM available?
A. The Programmer's Aid and VICMON Machine Language Monitor cartridges, soon to be available, do not reduce the amount of RAM accessible to BASIC. The VIC 20 Super Expander **adds** 3 kilobytes to Random Access Memory.

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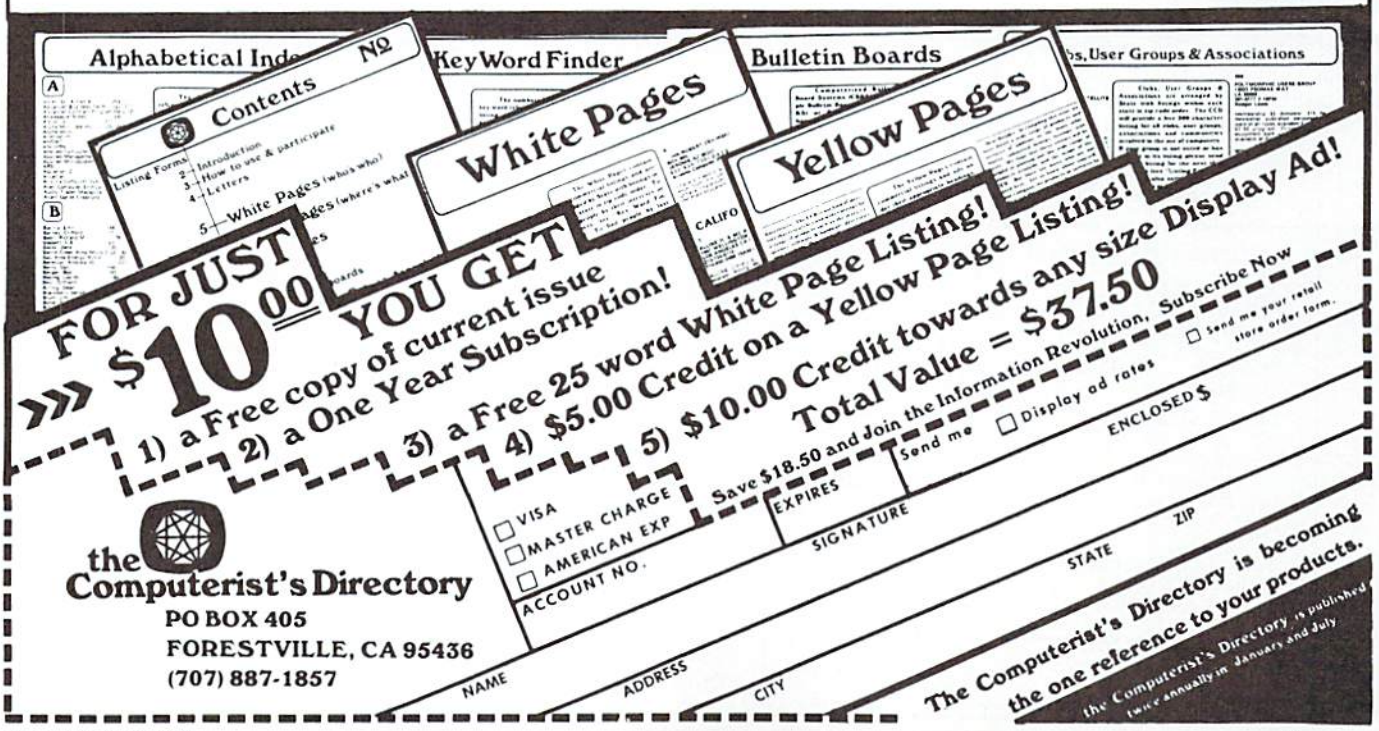

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Programming The PET/CBM

By Raeto Collin West

Described by Jim Butterfield as "unquestionably the most comprehensive and accurate reference I have seen to date." This encyclopedia for PET and CBM owners has over 500 pages of detailed reference information. From sorting techniques to memory maps, you'll use the book constantly. Seventeen chapters plus index, illustrations, programs, tables, and diagrams. "Your book is EXCELLENT!" – Jim Strasma, from a letter to the author. ISBN: 0-942386-05-1. Paperback, $24.95.

COMPUTE!'s First Book of VIC

From the Editors of **COMPUTE!** Magazine, almost 200 pages of timely, useful applications articles and programs for the VIC-20. Appeal and utility for the absolute beginner to the more advanced user. Approximately 80% of the articles and programs have appeared in **COMPUTE!** during the fall of '81 or more recently. Spiral Bound. Excellent resource! ISBN: 0-942386-07-8. Paperback, $12.95.

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256 pages of Commodore PET and CBM articles from **COMPUTE!** magazine issues now in print. Includes such classic articles and programs as "Feed Your PET Some Applesoft," "Disk Lister: A Disk Cataloging Program," and "Cross Reference For The PET." Spiral bound. ISBN 0-942386-01-9. Paperback. $12.95.

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Mail to: **COMPUTE!** Publications, P.O. Box 5406, Greensboro, NC 27403 USA

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☐ VIC-20 ☐ Radio Shack Color Computer
☐ Apple ☐ TI 99/4A
☐ Atari ☐ Other _____
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Future File

Commodore MAX Machine and Commodore 64 Introduced

by Mike Heck

Two new Commodore computer systems, complementing the current VIC line at both the high and low end, will soon be appearing on your dealer's shelves. These new products are breakthroughs in terms of both price and performance, and will be of real interest to anyone who currently owns Commodore equipment or who is considering a personal computer.

Commodore MAX Machine

The new low-end computer, called the Commodore MAX Machine, provides surprising graphic and music capabilities, and will teach computing with the use of a BASIC language plug-in cartridge. You can also add a cassette recorder to the MAX Machine for program loading and saving.

Some of the software initially available for the MAX Machine includes a number of "space" games, a "music maker" cartridge, and converted versions of programs currently running on the VIC 20, such as Sargon II chess and the Bally/Midway arcade games like GORF and OMEGA RACE.

Commodore 64

At the other end of the home computing spectrum is the Commodore 64, which, on the surface, looks a lot like a VIC 20, but packs features normally found only on much larger microcomputer systems. The Commodore 64 contains a huge 64K RAM, can accept a Z80 microprocessor on a plug-in cartridge, and supports multiple levels of high-resolution graphics. It is a sophisticated personal computer, ideal for those who can make use of its power and capabilities. It can even handle small business applications.

Besides looking like a VIC 20 clone, the Commodore 64 contains many of the same interfaces as the VIC, including an 8-bit user port for attaching the VIC modem or accessory communication cartridges. A cassette interface allows use of programs and files created on all other Commodore computers. This compatibility means most BASIC programs written for 40-column PET computers will run without modification.

The only exceptions to that are programs that POKE screen memory locations, an area that is different on each Commodore system. To ease that incompatibility problem, Commodore will have a PET emulator that will eliminate BASIC program conversion and make the '64 operate like a PET in most areas. Machine language would still need some work to operate properly, however.

The Commodore 64, through a serial port, can also use VIC peripherals such as the VIC single disk drive and VIC graphic printer. With the addition of an IEEE-48 cartridge, the '64 will run any Commodore peripheral, such as a dual disk drive or CBM printer.

Although all the games designed for the MAX Machine will operate on the Commodore 64, the '64 is not a game machine. In fact, with the 64K of RAM (about 40K is user accessible for BASIC programs and 52K for machine language programs), you can put some real business applications on this machine. Versions of the popular WordPro and WORDCRAFT word processing programs will be available, along with an "electronic spreadsheet" package. Data base programs and sophisticated personal financial applications are also part of the first software offerings planned for the Commodore 64.

One of the most impressive features of the Commodore 64 is its ability to run CP/M® using the Z80 cartridge, giving users access to one of the largest collections of microcomputer software available.

The Heart Of The Systems

Although they are designed for very different purposes, both new computers have certain things in common. Both rely on state-of-the-art integrated circuits designed and produced by Commodore's MOS subsidiary. A new 6500 family microprocessor, the 6510, is common to both computers. It uses the same instruction set as the familiar 6502—the heart of all other Commodore systems—but contains additional input/output (I/O) lines to handle the processing required by the new systems.

The 6510 microprocessor, upward compatible from the 6502, allows machine language programs running on other Commodore computers to be easily converted to run on the MAX Machine or Commodore 64.

Graphics Capabilities

Both computers also rely on a new display chip to handle all the display characteristics that normally would require a character generator and other supporting circuits for color and graphics.

The video display produced by both computers is 40 columns by 25 lines, with 255 foreground/background color combinations, 16 text colors and all 64 PET graphic characters. Additionally, the user can construct programmable characters to replace the normal character set.

Both have a high-resolution graphic mode of 320 by 200 points (pixels) and can use 16 colors simultaneously. To facilitate game graphics and animation, 256 independently movable display objects can be created, with up to 8 objects per line. Each object is 21 by 24 pixels in size, and can be up to 3 colors.

CP/M is a registered trademark of Digital Research, Inc.

Both computers provide collision detection between objects, so a program can tell if one object hits another and can determine what to do next. You can also select object display priority to determine whether one object will move in front of or behind another.

Independent magnification in both horizontal and vertical directions for each object is also possible, to add a lot of versatility to creating graphics. To make movement easier and smoother, you can scroll objects in horizontal and vertical directions, pixel by pixel.

In addition, the Commodore 64 has a number of other high-resolution modes that are not possible with the MAX Machine. These extra modes give you additional colors in each pixel zone and allow more flexibility in designing graphics.

Sound Capabilities

Another feature of both new Commodore computers is the SID (Sound Interface Device) sound synthesizer circuit. It can produce music and sound that rivals some of the dedicated music synthesizers now available.

The SID produces three independent voices, each with a nine-octave range. Four waveforms are possible: sawtooth, triangle, variable pulse and noise. The sound synthesizer also contains a programmable ADSR (attack, decay, sustain, release) generator, and a programmable filter, independently selectable for each voice, that contains low pass, high pass, band pass and notch outputs. The sound synthesizer also has variable resonance and a master volume control.

With all these sophisticated features you have almost complete control over the type of sound produced by either computer. Hooked up to a good quality audio system, you'll be amazed at the orchestration you can command.

Other Similarities

In addition, both computers can accept a variety of plug-in program cartridges. These cartridges are small—about 2 inches by 2½ inches—but can contain RAM or ROM (Read Only Memory). The cartridges will allow up to 16K of ROM and 2K of RAM.

Both also have two game controller sockets. Each socket will accept a joystick, double paddle or lightpen. And each computer has a direct audio and video output for connection to an audio amplifier and video monitor. An RF modulator is supplied for hook-up to a standard TV set.

Quick Reference Facts

	Commodore MAX Machine	Commodore 64
Memory	2K built-in 2K RAM, 16K ROM add-on	64K built-in 16K ROM add-on
Screen Size	40 col x 25 lines	40 col x 25 lines
Graphics	320 x 200 pixels 255 foreground/ background color combo 16 text colors 64 graphic characters 256 movable Sprites Independent magnification	320 x 200 pixels 255 foreground/ background color combo 16 text colors 64 graphic characters 256 movable Sprites Independent magnification Extended Hi-res modes
Sound	6581 Sound Interface Device (SID) 3 independent voices, 9 octaves each Programmable ADSR Programmable filter Variable resonance & master vol. control	6581 Sound Interface Device (SID) 3 independent voices, 9 octaves each Programmable ADSR Programmable filter Variable resonance & master vol. control
Games	All Commodore games on cartridge	All Commodore games on cartridge
Peripherals	Datassette Joystick Double paddle Lightpen	Datassette Joystick Double paddle Lightpen Z80 microprocessor on cartridge VIC MODEM VIC disk drive VIC graphic printer With IEEE-48 cartridge: All Commodore peripherals
Compatability	Same game cartridges will work on Commodore 64.	Other BASIC Commodore programs easily converted. PET emulator to be available.

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