Vol. 7 #12

**128 Classics on Disk!** See p. 15

December 1989

8 Great Programs In This Issue!

# COMPUTE!'s GAZETTE FOR COMMODORE USERS 64/128

02220

## 89's BEST GAMES!

**Gazette Picks The Winners**

- ★ Arcade
- ★ Sports
- ★ Strategy and War
- ★ Simulations
- ★ Fantasy/Role Play

***EDITOR'S CHOICE!***

**KTerm**

Super 64 and 128 terminal program

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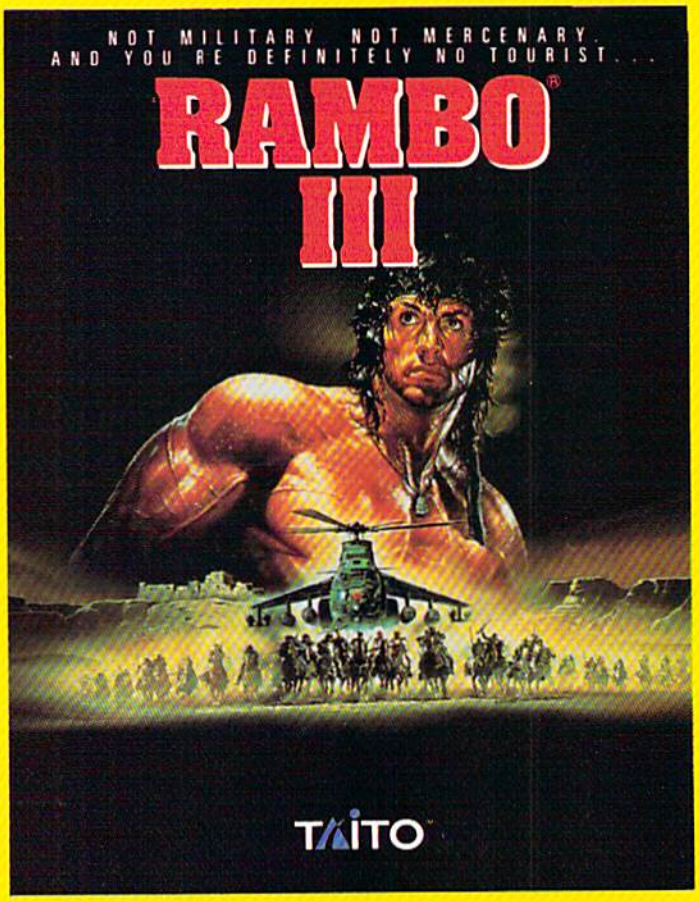
# RAMBO® III

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Circle Reader Service Number 129

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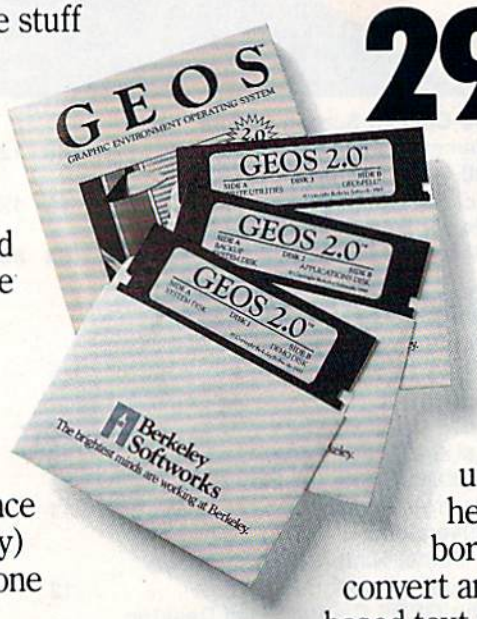


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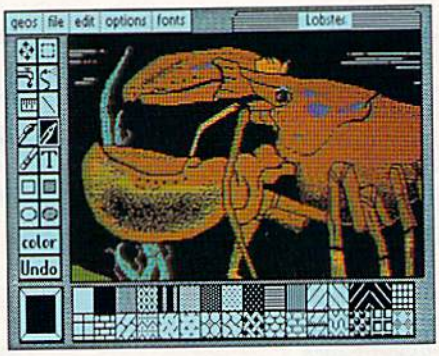


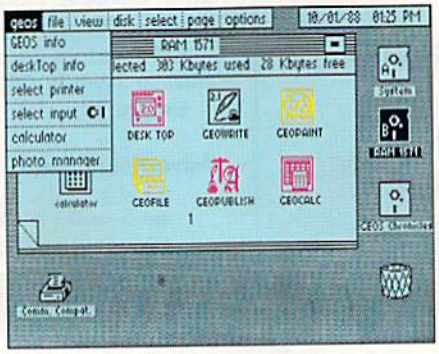


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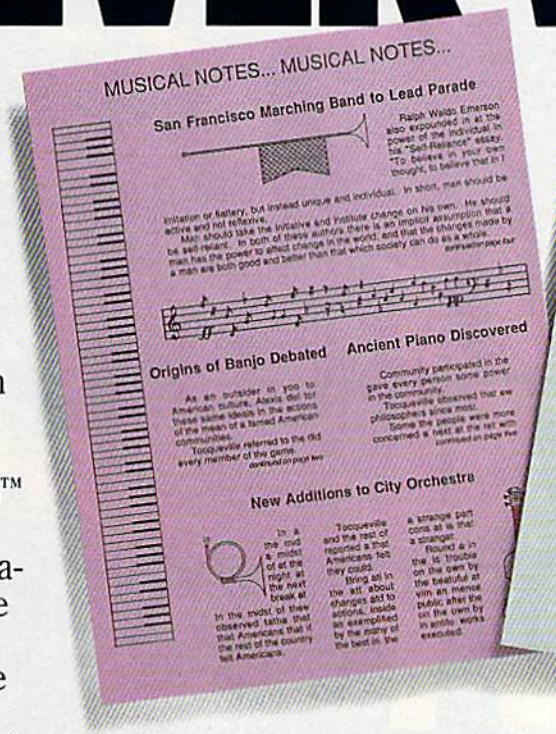
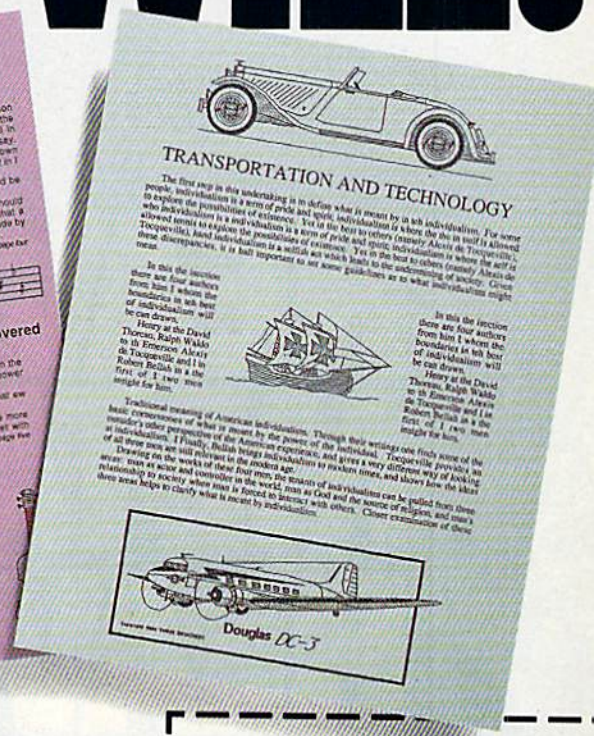
There are more keyboard shortcuts. More enhanced desk accessories. It can even retrieve your most recently deleted file from the waste basket!

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For any non-GEOS owner, these two packages might cost a princely sum. But not for you. You were with us when we started, so we figure we owe you one.

Make that two.

So get on your horse and send in the coupon. After all, upgrade offers come and go.

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To be eligible for this offer, you must be a current GEOS owner. This coupon plus your GEOS manual cover must accompany your payment. No facsimile will be accepted. Allow two to four weeks for delivery.

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# EDITOR'S notes

Back in the spring of 1983, *COMPUTE!*, our flagship magazine, was growing as fast as the personal computer boom. Its circulation was on a steady upswing, advertisers were calling every day, and we were hiring a lot of new writers, editors, and programmers. In those days, *COMPUTE!*—at nearly 300 pages per issue—offered coverage of Atari, Apple, Commodore (VIC-20, PET, and 64), Texas Instruments, Radio Shack, and Timex/Sinclair computers. Of these machines, the hottest seller was the new kid on the block, the 64. Computer enthusiasts oohed and aahed at the 64's 16 colors, eight sprites, SID chip, and wonderfully generous 64K of RAM. When we saw this computer's charge out of the starting gate, we decided then to serve this emerging market in a new way: *COMPUTE!*'s *Gazette* was born.

When first planning this magazine, we were aware that more than half of *COMPUTE!*'s readers were VIC-20 and 64 owners. We knew we would publish program listings in *Gazette*—after all, *COMPUTE!* readers thrived on the type-ins. But we decided to handle the listings in a different manner. We grouped all the listings together and put them in the back of the magazine. After the first couple of issues were out, we got the news. Reader response cards told us that *Gazette* was a great success—but the majority of those responding to questions about the format complained about the listings in the back. They wanted the listings next to the companion articles. Well, it took us nearly 6½ years to make the change, but you'll find it here, at last, in this issue. A quick flip through these pages shows you the results.

Before I write another word, however, I must make a confession. What prompted this change was not a collection of 1983 reader requests. This issue is bound differently for the first time since its debut 78 issues ago—it's *saddle-stitched*. This form of binding—the same used for our other three publications—dictates where your color pages can go. And with a saddle-stitched magazine, the back pages are where some of the color goes, like it or not. We saw that we'd be wasting precious color on listings in the back, so we decided to look at all options. The result: listings with articles (and, maybe, a few happier original subscribers). Confession over.

**********

If you haven't yet seen Commodore's Christmas-season ads, you will soon. Word has it that Commodore has committed millions of dollars (we've heard estimates from $15–$30 million) to a fall and winter media campaign hyping the Amiga. We hear that ads will appear in *Time* and *Newsweek* and that TV spots will be shown during prime time and major sports events. Also, if you have a Sears' Christmas Wish Book, you'll see the Amiga 500 in there. We wish Commodore luck—this appears to be the most aggressive stance the company has taken in six years.

**********

*Gazette* has several good, new disk products available. In the past few issues, we've run ads for *Best Gazette Games*, *Gazette Power Tools*, and *The GEOS Collection* disks. Judging by the orders coming in, we've apparently struck a chord with our readers.

In this issue, you'll see our ad for the *128 Classics* disk, a collection of our finest 128 programs. The disk includes applications, utilities, and games. For more details, see page 15. We also have an updated version of our *Gazette Index* disk. This update includes all items from our first issue (July 1983) through the issue you're reading now. If you bought the five-year-index disk last year, you can add the data from your 1989 *Gazette* copies—it will fit. If you want a complete index but don't want to spend your time typing in entries, see page 78 for ordering details.

Have a happy holiday season, and thanks to all of you for your support of *COMPUTE!'s Gazette*. We look forward to seeing you in 1990.

Lance Elko
Associate Publisher/Editorial


COMPUTE!'s GAZETTE FOR USERS COMMODORE 64/128

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# feedback

***Do you have a question or a problem? Have you discovered something that could help other Commodore users? We want to hear from you. Write to Gazette Feedback, COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, North Carolina 27403. We regret that, due to the volume of mail received, we cannot respond individually to programming questions.***

## Double Trouble

The "Disk Doubler" article in the August 1989 *Gazette* is very interesting, but I have some questions. When I first load the program and reformat a disk, I can look at the disk's directory and see that it has 1328 blocks free (as it should). However, if I turn my computer and disk drive off and back on and then load the directory of this disk, I find that it has 664 blocks free. Is it true that if I now try to store more than 664 blocks, the additional blocks won't go onto the second side? It appears that my disk has returned to the 1541 state. Is this correct? It seems to me that if I want to use both sides of a disk, I'd need to have a copy of your program on the disk. Am I right?

Dr. Chas F. DeVoe
Corning, NY

*The situation you've described indeed confuses many users. To understand what's going on, you need to know a little about how your 1571 operates.*

*The 1571 assumes different personalities based on which computer it's connected to. If you insert a CP/M boot disk into the 1571 and turn on your computer, the 1571 becomes a disk drive that reads and writes MFM-format disks. If the 1571 is attached to a 128 and you boot the computer in its native mode, the 1571 becomes a double-sided disk drive that reads and writes disks in Commodore's GCR format. (This is the 1571's native mode, and it's generally called 1571 mode.) If the 1571 is attached to a 64, Plus/4, or 16, or to a 128 that's booted in 64 mode, the 1571 becomes a 1541.*

*In your letter, you don't mention which computer you're using. Based on your problem, we'll assume that the computer isn't a 128 and that your 1571 normally operates in 1541 mode.*

*When you use "Disk Doubler" to format the second side of a disk, the program switches the disk drive into 1571 mode before it formats. After you exit the program, the drive is still in 1571 mode. If you examine the directory of the disk at this point, you'll find that it has 1328 blocks free (unless, of course, the front side of the disk already contained data).*

*At this point, you turn your computer off and back on. When the computer powers up, it sends a reset signal to all the devices on the serial bus. When the 1571 receives this signal, it does the equivalent of a warm boot. Now, when you examine the disk's directory, it has only 664 blocks free; it appears that the disk has lost 664 blocks of storage.*

*The problem isn't that the disk has reverted to 1541 mode, but that the disk drive has. During the warm boot, the 1571 realizes that it's not connected to a 128 and goes into 1541 mode. Since the 1541 doesn't know about the second side of the disk, it builds the directory listing based on what's on the first side of the disk.*

*Your assumption about saving more than 664 blocks of data to the disk is correct. As far as the disk drive is concerned, the second side of the disk doesn't exist. If you try to save or retrieve data on the second side of the disk while the drive is in 1541 mode, you'll get an ILLEGAL TRACK AND SECTOR ERROR message.*

*However, you don't need Disk Doubler every time you access data on the second side of the disk. You can use the following commands in direct or program mode to set the 1571 back to its native mode:*

```
OPEN15,8,15,"U0>M1":CLOSE15
```

*If you want to set the drive to 1541 mode, enter the following commands:*

```
OPEN15,8,15,"U0>M0":CLOSE15
```

*If you own a 64 and want to format both sides of a disk to take advantage of the extra storage, you can simply execute the command to put the drive in 1571 mode before you format the disk.*

## GEOS Letterhead

I run a small mail-order business out of my basement and use *geoWrite* for most of my correspondence. I'd like to know if there is any way to get *geoWrite* to print letterhead. I've used *geoPaint* to design a graphic that I really like, but when I import it into *geoWrite*, I can't get it to print close enough to the top of the page. Do you have any ideas?

John J. Scione
Frankfort, KY

*We'll let reader J. A. McKnight answer your question.*

To create letterhead in *geoWrite*, paste a photo scrap in the header along with your name, address, and phone number. Since the header is always closed while you're working on your document, the photo scrap doesn't get in the way or have to be redrawn. Once you've created a document with your letterhead, save it with the name Letterhead. Now, when you need to print something on letterhead, simply duplicate Letterhead with the duplicate option under the file menu. You can fill in the body of your letter and then print it. I usually type the date and salutation in the font and style I want to use and save that in the template with the header. That way I don't have to select them each time I write a letter.

J. A. McKnight
Addison, TX **G**

# ACTION REPLAY v5.0

## THE ULTIMATE UTILITY / BACKUP CARTRIDGE FOR THE C64/128

NEW!

• Action Replay allows you to Freeze the action of any Memory Resident Program and make a complete back-up to disk - and that's not all ... Just compare these features:

ONLY $64.99

### SUPER CRUNCHER — ONLY $9.99

- A utility to turn your Action Replay 5 into a super powerful program compactor. Reduce programs by up to 50%! Further compact programs already cruched by AR5's compactor.

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- PROSPRITE: A full sprite editor.
- ZOOM LENS: Explode sections of any saved screen to full size.

### WARP 25

The world's fastest disk serial Turbo. A typical backup will reload in under 5 seconds.

- No special formats — with action replay you simply save directly into Warp 25 status.
- Backup all your existing programs to load at unbelievable speed!
- Warp Save/Load Available straight from Basic.

### RAMLOADER

- You can also load load most of your commercial originals 25 times faster! With our special LSI logic processor and 8K of onboard Ram, Action Replay offers the world's fastest Disk Serial Turbo.

### UNIQUE CODE CRACKER MONITOR

- Freeze any program and enter a full machine code monitor.
- Full Monitor Features.
- Because of Action Replay's on Board Ram the program can be looked at in its ENTIRETY. That means you see the code in its Frozen state not in a Reset state as with competitors products.

### MORE UNIQUE FEATURES

- Simple Operation: Just press the button at any point and make a complete back-up of any* memory-resident program to tape or disk.
- Turbo Reload: All back-ups reload completely independent of the cartridge at Turbo speed.
- Sprite Monitor: View the Sprite set from the frozen program — save the Sprite — transfer the Sprite from one game to another. Wipe out Sprites, view the animation on screen. Create custom programs.
- Sprite Killer: Effective on most programs — make yourself invincible. Disable Sprite/Sprite/Background collisions.
- Unique Picture Save: Freeze and save any Hires Screen to tape or disk. Saved in Koala, Blazing paddles format.
- Compactor: Efficient compacting techniques — 3 programs per disk — 6 if you use both sides.
- Single File: All programs saved as a single file for maximum compatibility.
- Utility Commands: Many additional commands: Autonum, Append, Old, Delete, Linesaver, etc.
- Screen Dump: Print out any screen in 16 Gray Scales, Double size print options.
- Unstoppable Reset: Reset button to Retrieve System and Reset even so called Unstoppable Programs.
- Fully Compatible: Works with 1541/C/II, 1581, 1571 and with C64, 128, or 128D (in 64 Mode).
- Disk Utilities: Fast Format, Directory, List, Run and many other key commands are operated by Function Keys.
- Unique Restart: Remember all of these utilities are available at one time from an intergrated operating system. A running program can be Frozen to enter any Utility and the program is restarted at the touch of a key — without corruption.
- LSI Logic Processor: This is where Action Replay V gets its power. A special custom LSI chip designed to process the logic necessary for this unmatched Freeze/Restart power. No other cartridge has this power!

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***THE MOST POWERFULL DISK NIBBLER AVAILABLE ANYWHERE AT ANY PRICE!***

-Burst NIbbler is actually a two part system - a software package and a parallel cable to connect a 1541 or 1571 to a C-64 or C-128

-What gives Burst Nibbler its power? Conventional nibblers have to decode the data from the disk before it can transfer it using the serial port bus - when non-standard data are encountered they are beat. Burst Nibbler transfers data as raw GCR code via the parallel cable without the need to decode it, so you get a perfect copy of the original.

-Will nibble up to 41 tracks -Copy a whole disk in under 2 min -Installs in minutes - no soldering required on 1541 (1571 requires soldering)

**SOFTWARE ALONE - ONLY $19.99 -- CABLE ALONE - ONLY $19.99**

### DIGITAL SOUND SAMPLER -Only $89.99

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# LETTERS to the editor

### Mail Mates

The article "Who Ya Gonna Call?" (September) performed a service in telling your readers about user groups. Commodore users who live in areas served by such groups should seriously consider joining. "Meeting 64/128 Users Through the Mail" is a user group for those who cannot attend a local group or who would like to make more Commodore friends. We've been around for over three years. We have 79 members from the U.S., Canada, Mexico, France, and West Germany. Members include absolute beginners and experienced programmers. We exchange information, advice, encouragement, and public domain programs, including those we write ourselves. Members receive a group name-and-address list and a short description of each member's interests and the equipment they own. We also have a bimonthly newsletter. Dues are $9 per year (to cover newsletter postage and photocopy costs). For more information, write me at Route 1 Box 151, St. Joseph, Illinois 61873.

*Jean Nance*
*President*
*Meeting 64/128 Users Through the Mail*

### C = Cosmetic

What's the difference between the 64 and 64C? Which do you recommend?

*Jim McKinney*
*Rawlett, TX*

*We'd recommend either because they're functionally identical. The 64C is the newer machine—all differences between it and the 64 are cosmetic. If you're planning to buy a brand-new machine, the 64C is all you'll find. If you buy a used machine, either will do just fine.*

### User Group Directory

Is a list of user groups available? I'm looking for one in my area.

*Jan F. A. Veen*
*Holland, MI*

*We publish a complete list of user groups every year in our May and June issues. This year's list has 453 names. Every issue between July and April, we publish "User Group Update," which lists new groups, disbanded groups, group mergers, and address changes. Our current file shows the closest group to Holland as the West Michigan Commodore Users Group, P.O. Box 88191, Kentwood, Michigan 49508.*

### SXtinct

I've seen the name SX-64 several times while reading your magazine over the past year. All I've been able to gather is that it's some sort of portable 64. Please explain what an SX-64 is.

*Andy Orthmann*
*La Center, WA*

*What you've gathered is correct: It's a portable 64. The SX-64 was introduced at the January 1984 Consumer Electronics Show. It had actually debuted earlier as the SX-100 and then as the Executive 64, but it didn't really sell until it was launched as the SX-64. It features a built-in 5-inch color monitor and a 170K built-in 5¼-inch disk drive, and it had an initial retail price of $995. The SX-64 has been out of production for about four years.*

### Already There

In your August column, Philip Bishop recommends the 64K video upgrade module to all 128 owners. I'd like to know what that module is. I have a 128D. Does that make a difference?

*Arif Mohamed Salem*
*Abu Dhabi*
*United Arab Emirates*

*You bet. You already have the 64K upgrade. The 128D, which replaced the 128 in late 1987, includes the 64K 8563 video chip. The original 128 contains a 16K chip. By offering 64K of dedicated video RAM, the newer chip allows for impressive 640 × 200 hi-res graphics displays.*

### Reader Advice, Please

Can you recommend a 64 accounting program that prints checks for a small business and a company from which I can purchase blank checks?

*Kristine Cipra*
*Brandon, MN*

*Here's another challenge to our readers. Do you use a 64 accounting program with check-printing capabilities? If you like what you're using (preferably a program that's still available so Kristine can find it), write and tell us. We'll publish the names of the most highly recommended packages in an upcoming issue.* **G**

# horizons

## Vote for Me!

**Rhett Anderson**

If you were reading *Gazette* last year, you may remember that Randy Thompson's "Programmer's Page" column beat out my own "Horizons" by a hair in the annual Readership Survey. I happened to notice that this year's survey is in this issue, so I'd like to take advantage of this opportunity to stuff the ballot box. Will the readers of my column please take the time to fill out the survey?

Seriously folks, we use the results of the survey to plan for the next year. The more forms we get, the better we can plan. Plus, it's nice to get a pat on the back for the work we do; maybe that's why associate publisher Lance Elko put his columns, "Editor's Notes" and "Letters to the Editor," on the ballot this year. (Just kidding, boss.)

While you're at it, feel free to write us a note and drop it into the mail along with the survey. Tell us whatever's on your mind. Do you like a game we hated? Do you think the home computer market is due for a resurgence? Do you think that the shampoo instructions "Wet hair. Lather. Rinse. Repeat." form an infinite loop? Let us know.

Actually, I brought up the voting subject because I've been thinking about computer voting. Wouldn't democracy be better served if we could vote with our home computers?

Maybe someday it will happen. But there are obvious problems. Not everyone has a home computer with a modem. Could we just let the people with home computers vote from their homes and the rest vote normally? No, that would lead to a greater percentage of affluent people voting, and that wouldn't be fair. (Home computers, unfortunately, find their way into few low-income homes.)

Plus, a clever hacker might be able to cast millions of votes. There are problems, but I hope we can work them out.

I have cousins who live in Columbus, Ohio. In the late 1970s they had Qube, an experimental interactive cable system that was run by Warner Amex. With Qube, you could vote for things. I'm not sure if Qube dabbled in local government, but I do remember that there were talent shows. Three people would sing, then everyone watching could push a button to vote for their favorite singer. Pure democracy.

Would you rather wait in line at the polling place or vote by modem? Let me know.

### Euler vs. Newton vs. Gauss

It's time for three mathematical geniuses to face off. (Warning: You won't understand this unless you read the October "Horizons.")

First up, Isaac Newton, represented by Randy Herner of Norwalk, Ohio:

"After reading Horizons, I couldn't resist dropping you a note. I believe Sir Isaac Newton usually gets credit, or blame, as the case might be, for the trick.

"Computers have always been smart. It's the programmers that need help. Did you ever wonder why, when they program a computer to think like a human, they call it artificial intelligence?"

Next, Leonhard Euler, represented by Charley Musselman of Somerville, Massachusetts:

"I agree with your comment regarding Christopherson's method for solving the problem. I have a story to add.

"Leonhard Euler was a wise guy in a Swiss grade school. To punish him for cutting up in class, his teacher ordered him to sum the integers from 1 to 100. Rather than quiet down, Euler promptly answered '5050,' no doubt annoying his teacher. Euler had invented the method discussed in your column.

"A couple of years later, Euler was introduced to the imaginary number *i* defined by the square root of −1. When his teacher wrote x= EXP(PI × i), Euler, still a smarty pants, said, 'Obviously equals −1!' Somehow he saw that raising *e*, the base of natural logarithms, to imaginary powers yields the trigonometric functions, sine and cosine.

"Euler (1707–1783) worked in Germany and Russia and has been called the most prolific mathematician who ever lived. I had to use Euler Equations to analyze the motion of a spinning top—a very hairy problem."

Finally, representing Karl Friedrich Gauss is Charles M. Shapin from Massapequa, New York:

"In response to your recent column regarding the method of computing, for example, the sum of all the integers from 1 to 1000 by using the method of pairs, involves the formula for the sum of an arithmetic progression using S=n/2* (a+l) where *n* is the number of terms, *a* is the first term, and *l* is the last.

"The formula is said to be the discovery of the great German mathematician, Karl Friedrich Gauss (1777–1855). As the story goes, when he was in elementary school, his teacher, to keep the boys busy, would give them problems like 'add up all the numbers from 1 to 1000.' It seems all the boys were busy except for Gauss, who came up with the answer in a few seconds. Incidentally, compare this formula with the formula for the area of a trapezoid, A=h/2*(B1+ B2). But that's another story."

Well, I'm glad we cleared that up. (Late-breaking news: Readers Douglas Hudson and John Doane vote for Gauss, and they even back their votes with documentation, the books *Oh! Pascal!* and *Men of Mathematics*, respectively.) **G**

# THE programmer's page

## Tips from Readers

**Randy Thompson**

*"The Programmer's Page" is interested in your programming tips and tricks. Send all submissions to The Programmer's Page,* **COMPUTE!'s Gazette,** *P.O. Box 5406, Greensboro, North Carolina 27403. We'll pay $25–$50 for each tip we publish.*

My mailbox is about to explode, so it must be time to dedicate another column to reader hints and tips. Sifting through stacks of letters, I've found a good selection of hints that promise to increase your programming productivity. This should also keep my mailbox from reaching critical mass for at least another week.

### Who's Out There?

Here's a short program that tells you how many and what types of disk drives are connected to a 64 or 128 computer. In order for it to work, all of the disk drives must be turned on and they must have consecutive device numbers (8, 9, 10, and so on).

```
10 DV=8
20 OPEN 15,DV,15:CLOSE 15
30 IF ST THEN DV=DV-1:GOTO 50
40 DV=DV+1
50 FOR T=8 TO DV
60 OPEN 15,T,15
70 PRINT#15,"M-R"CHR$(198)CHR$
   (229)CHR$(1)
80 GET#15,A$:A$=A$+CHR$(0)
90 PRINT "DRIVE";T;"IS A ";
100 IF ASC(A$)=52 THEN PRINT "
   1541"
110 IF ASC(A$)=55 THEN PRINT "
   1571"
120 IF ASC(A$)=255 THEN PRINT
   {SPACE}"1581"
130 CLOSE 15:NEXT
```

You could convert this program into a subroutine and save the results in an array instead of printing them to the screen. This way, your program could prompt the user with such intelligent lines as SAVE DATA TO YOUR 1541 OR WOULD YOU PREFER USING YOUR 1581? when it comes time to save data to disk.

If you have a third-party disk drive that this program does not recognize, run the following program:

```
10 INPUT "DRIVE NUMBER";DV
20 OPEN 15,DV,15
30 PRINT#15,"M-R"CHR$(198)CHR$
   (229)CHR$(1)
40 GET#15,A$:A$=A$+CHR$(0)
50 PRINT ASC(A$)
60 CLOSE 15
```

Write down the number that prints to the screen and then add a line to the first program that reads

**121 IF ASC(A$)=*xxx* THEN PRINT *"drive type"***

where *xxx* is the number that you wrote down and *drive type* is the type of drive that you own.

Sean Ganess
Hollis, NY

### Missing Data

Neglecting to put numeric data between the commas in a DATA statement is the same as including the digit 0. For example, this program

```
10 FOR I=1 TO 10:READ D:PRINT
   {SPACE}D:NEXT
20 DATA ,,,,,,,,,
```

produces the same results as this program

```
10 FOR I=1 TO 10:READ D:PRINT
   {SPACE}D:NEXT
20 DATA 0,0,0,0,0,0,0,0,0,0
```

If you are reading string data—as in the command READ D$—the missing data is interpreted as a null string.

Doug Ross
Merrickville, Ont.
Canada

### Joystick Initials

You can use this subroutine in an arcade game to allow players to enter their initials via the joystick in port 2. After the initials have been entered, the program stores them in X$ for later use, such as saving high scores to disk.

```
10 GOSUB 1000:PRINT:PRINT X$:E
   ND
1000 PRINT CHR$(147):L$="ABCDE
   FGHIJKLMNOPQRSTUVWXYZ":X$="
   ":L=1:P=1
1010 JS=PEEK(56320):FB=JS AND
   {SPACE}16:JS=15-(JS AND 15)
1020 IF FB=0 THEN X$=X$+MID$(L
   $,L,1):L=1:P=P+1:WAIT 56320
   ,16:IF P=4 THEN RETURN
1030 PRINT "{HOME}{6 DOWN}YOUR
    INITIALS:";SPC(P);MID$(L$,
   L,1)
1040 IF JS=1 THEN L=L+1:GOSUB1
   070:IF L=27 THEN L=1
1050 IF JS=2 THEN L=L-1:GOSUB1
   070:IF L=0 THEN L=26
1060 GOTO1010
1070 FOR K=1 TO 100:NEXT:RETUR
   N
```

To operate it, push forward or back on the joystick to cycle through the alphabet. Press the fire button to accept the current letter and move on to the next one. Three letters make up the player's initials. This program works on both the 64 and 128.

Michael Pere
Glendale, AZ

### Built-In 64 Monitor

The 128's built-in machine language (ML) monitor can be used to edit 64 programs. For example, you can use the 128's monitor to enter an ML program at location 49152 ($0C000) in bank 0. Then, while depressing the CMD key, reset the computer using the reset button on the right side of the computer. You will now find your ML program at 49152 exactly as it was entered in 128 mode. What's more, you can return to 128 mode (by using the reset button, not by turning the computer off and on), enter bank 0, alter the program, and return once again to 64 mode to try out your changes.

Richard R. Harvel
Fort Worth, TX

**G**

# d'iversions

## Fame, Nintendo, and Robots

**Fred D'Ignazio**

I used to be a little-known columnist tucked away in the back pages of *Gazette*. Maybe I got one or two letters a year from my readers. I was obscure but happy.

Suddenly all that changed. I wrote a column about Nintendo and then, the following month, published Dennis Joslin's rebuttal of my first column. A flood of letters began arriving. I'd touched a nerve; there was high drama, love, hate, and passion. Some people loved 64s and hated Nintendos. Others felt differently. I began reprinting their letters. *Gazette* dubbed this "The Great Nintendo vs. 64 Debate" and published a headline on each month's magazine cover. The flood increased.

Now I'm getting hundreds and hundreds of letters. I'm feeling less obscure, still happy, but a little nervous about the tornado of feelings, emotions, and opinions swirling around this great debate.

### The Winner!

The winner for the 64 "Maniac of the Year" award goes to Mike Franz of Idaho Falls, Idaho. Mike colorfully decorated the outside of his envelope with cartoons, diagrams, and signs. A taste of Mike's envelope graffiti: "Down with Nintendo! Too many people like Nintendo better than Commodore! Bogus, dude! Most untriumphant!"

I carefully opened Mike's envelope (so as not to spoil the artwork) and found an articulate, word-processed letter on the inside. Among Mike's comments:

"Nintendo fans say they like the machine because it has cartridges and you don't have to load disks. Well, if you can't insert a disk and type LOAD "*",8,1, then you're in bad shape!"

Mike goes on to say:

"Mark Hall [a fan of Nintendo] says *'our* cartridges have a *megabyte!'* Well, I say, *'Big Deal!* Your megabyte only adds *cost*, not *quality!'*"

Mike bills himself as the world's leading Commodore fan and concludes his letter with this parting shot:

"Nintendo is only for children who are too young to play anything complex. Commodore is for mature, intelligent individuals who are tired of *Pac-Man* and want a game machine that's also a *computer.*"

### %$#&!

While rummaging through my mailbag, I came across these choice remarks in a letter from John D. Larkin of Milford, Connecticut:

"I'd like to see whoever designed those %$#&! Nintendo control pads sentenced to use them for 24 hours straight. I prefer the old Intellivision disks to those things, and you know how universally despised those controllers were!"

John adds:

"There are some really good 64 arcade games, but they get lost in the flood of bad ones. These bad games are invariably given a good review by someone who has never set foot inside an arcade in their life, much less played the arcade game they're reviewing. Among the good games, my personal favorites are *Arkanoid, Delta Patrol, Boulderdash Construction Kit, Speed Buggy, Ghosts 'N' Goblins,* and *Technocop.*"

### Who Killed the Robots?

David Lee of Waverly, Tennessee, has a theory that explains the disappearance of personal robots. He writes:

"You asked your readers *where have all the robots gone?* They went to the back shelves of the flea markets. They went there because the public got bored with them.

"You see, the public wants a robot that doesn't do tricks, but one that understands what you say, can do housework, and plays games. It may be possible to make such a robot, but the cost would make it affordable only for eccentric millionaires.

"Another thing that killed all the robots is price. The public wanted a robot like the one in the movie *Short Circuit,* but they wanted it for under $200. People get bored with robots that just run around and bump into things.

"I used to have a great robot. I bought him for about $20. He had a little keyboard on top of his head. You could program him to spin, stop, speed up, slow down, beep, and do about 20 other things. He was great until a fatal miscalculation sent him tumbling off the side of the kitchen table. I couldn't bear throwing him out, so now he rests on top of the TV I use as a monitor, with another old, useless robot used for a Nintendo videogame, as a bookend for my old paperbacks.

"If it were possible for a robot to be human, do all the things humans can do, obey every command, and still be priced under $1,000, then robots would come back at full blast."

### Keep Those Letters Coming

I, too, wish I had the kind of robot that David is describing. I wrote about such a robot in my science-fiction book *Robot Odyssey* (Tor Books, 1988).

Until David's and my fantasy robot arrives, please keep writing. Let me know how you feel about robots, Nintendo, and other matters technological.

*Fred D'Ignazio*
*c/o* COMPUTE!'s Gazette
*324 W. Wendover Ave.*
*Suite 200*
*Greensboro, NC 27408* **G**

# machine language programming

## Sneaky Stack

**Jim Butterfield**

The stack is straightforward and normally takes care of itself. A JSR (Jump to SubRoutine) is balanced by the corresponding RTS (ReTurn from Subroutine); an interrupt, by an RTI (ReTurn from Interrupt).

Programmers use PHA to push (or store) data onto the stack and PLA to pull (or load) it back. The pushes and pulls must match exactly so as to keep the stack clean. For example, the stack might be marked by pushing a binary 0, followed by other information such as ASCII characters. When it's time to recall this information, the program pulls until it sees the binary 0.

One programming trick is to push an address on the stack with two PHA (PusH A register) commands and then to execute an RTS. Even though a subroutine has not been called with a JSR, the RTS does the job; it obediently collects the address from the stack and "returns" to that location.

### Passing Data

Computer science texts often note that the stack is a convenient place in which to pass data to a subroutine. This is not generally true on a 6502-based chip. It's possible, but it's not convenient.

Here's the problem: Suppose we were to put several data items on the stack and then call a subroutine using JSR. The subroutine's return address is the last thing to go on the stack. The data could not easily be pulled from the stack without somehow getting past that return address.

But it can be done. We could pull the return address, followed by the data, and then restore the return address. Alternatively, we could "peek" at the stack in memory. On Commodore 8-bit machines, the stack occupies page 1 and is filled from top to bottom—from address $01FF downward to $0100; the current stack pointer can be established with a TSX command. In this last case, we would ask the calling program to clean up the stack after we had returned. Either method is awkward but can be made to work.

There's one more way of passing data to a subroutine using the stack: Leave the data directly behind the JSR instruction. Again, it's not always the best way. But it can be made to work well, and it's interesting to trace the logic.

### Inside the 128

The Kernal ROM of the Commodore 128 contains an example of this kind of code at $B3C4. Similar code could be written on any 6502-based machine. If you have a 128, you can follow the description by disassembling the code. Press F8 to enter the machine language monitor and then type D FB3C4. (The *F* is used since ROM is in bank 15.)

At $B3C4, a call to the Kernal routine PRIMM (PRint IMMediate) is made with JSR $FF7D followed by a string ("error") to be output. The string consists of ASCII characters followed by a binary 0. After the 0, the program continues.

```
B3C4: JSR $FF7D
B3C7: .BYTE 20 45 52 52 4F 52 00
B3CE: JMP $B08B
```

When the jump at $B3C4 is executed, the return address is placed on the stack. This is not, as you might think, $B3C7; instead, it's 1 less, $B3C6. No special reason—that's just how JSR and RTS work.

Let's look at location $FF7D to see how the string at $B3C7 is printed. The jump to $FF7D (in the Kernal jump table) takes us immediately to $FA17. In this routine we find more registers being pushed onto the stack.

```
FA17: PHA:TXA:PHA:TYA:
      PHA:LDY #$00
```

All three data registers—A, X, and Y—are pushed on the stack. The stack now contains five bytes: the return address plus the contents of the three registers. The stack pointer points at the next empty space, below the five bytes. This instruction copies the stack pointer into the X register.

```
FA1E: TSX
```

The subroutine then adds 1 to its own return address. The base address of $0104 is necessary to put us beyond the three data-register bytes.

```
FA1F: INC $0104,X:BNE $FA27
FA24: INC $0105,X
```

Next, the subroutine checks the location where this return address points. To do this, it copies the address from the stack to zero page, where it may be used as an indirect pointer.

```
FA27: LDA $0104,X:STA $CE:LDA
      $0105,X
FA2F: STA $CF:LDA ($CE),Y:BEQ
      $FA3A
```

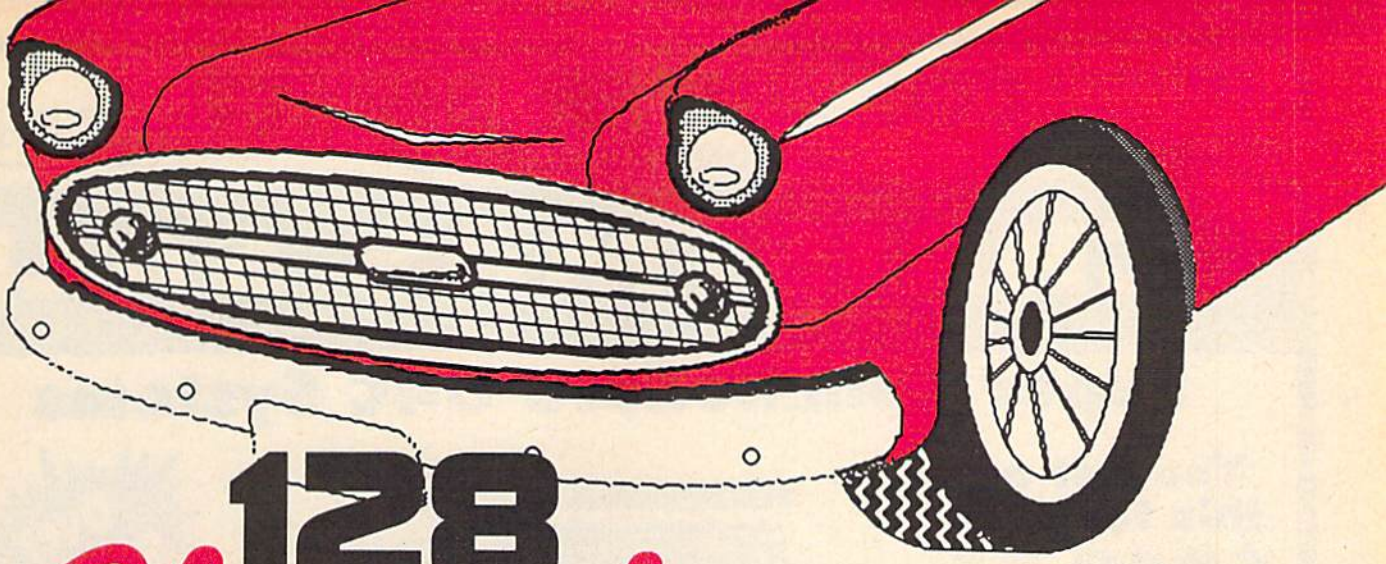
If the indirect address now points at the 0 following the string, the subroutine is finished. Otherwise, it prints the ASCII character in the accumulator.

```
FF35: JSR $FFD2:BCC $FA1E
```

On the 128, a jump to $FFD2 (Kernal routine BSOUT) will always return (under normal conditions) with the carry flag clear. Thus, the BCC may be viewed as an "always" branch.

```
FA3A: PLA:TAY:PLA:TAX:PLA:RTS
```

So, after restoring the data registers, the subroutine returns to an address that was changed since the call was made. **G**



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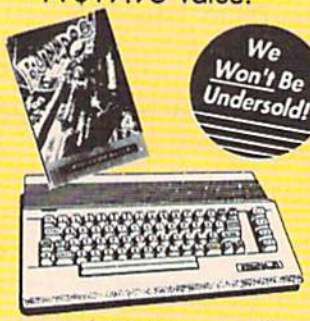

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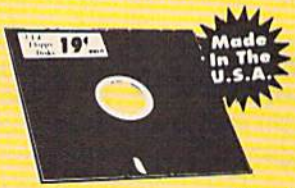


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# BASIC for beginners

## Playing It

**Larry Cotton**

Merry Christmas! I hope you typed in last month's program, which draws a musical keyboard on the Commodore 64 screen. This month we're going to play a Christmas song on it. All you have to do is continue the program where we left off.

First, we'll create four, 62-element arrays which contain the appropriate "POKEable" note values. These values should generate pitches that match the notes on the musical—let's call it a synthesizer—keyboard. Recall that each note requires two numbers for the two memory registers that control its frequency or pitch. Using one oscillator frequency for each note, from the "Music Note Values" table in the appendix of either the *User's* or the *Programmer's Reference Guide*, we can calculate these numbers.

For instance, the oscillator frequency for C-3 (one octave below middle C on the piano) is 2145. Because the largest POKEable number one memory register can contain is 255, we must split 2145 into two parts, called high and low bytes. To do this, we first divide by 256. We need only the whole-number value for the number of times that 256 divides into 2145, so we use the INT function:

```
K=256
N=2145
F1=INT(N/K)
```

The variable F1 (with a value of 8) is the high byte, which is POKEd into the higher of the two memory registers. If we divided 2145 by 256 in elementary school, the math teacher would insist that we show a remainder. The remainder here is the low byte, which is POKEd into the lower memory register. To determine the remainder, multiply F1 by 256 and subtract the result from N (recall that multiplication is executed before subtraction):

```
F2=N-F1*K
```

Thus F1 and F2 are 8 and 97, respectively. These two values are also shown in the HI/LOW columns in the "Music Note Values" table.

### Voice 2 Detuned

OK, voice 1 uses F1 and F2 to create its pitch. Let's simultaneously play voice 2, slightly detuned with respect to voice 1, to create a rich, full tone. To calculate the slightly detuned frequency, multiply the basic frequency by, say, 1.005 (see below for other multiples). Call it MU. Our detuned frequency will be N1:

```
MU=1.005
N1=INT(N*MU)
```

Now we can calculate F3 and F4 as above, except we use N1 instead of N:

```
F3=INT(N1/K)
F4=N1-F3*K
```

The variable N1 is 2155, and F3 is 8 (as was F1). But F4 (our remainder) is 107, thus yielding a slightly higher pitch when POKEd into voice 2's frequency-control registers. So, by using only one basic oscillator frequency, we have created four POKEable values, F1–F4.

### Keyboard Part II: The Sound

Now we're ready to resurrect last month's program. Load it from disk or tape and then list it. You'll see lines 5–300 and the subroutines at lines 1000 and 2000. Now change line 300 to

```
300 PRINT "{DN}{DN}"TAB
    (13)"PLEASE WAIT."
```

Then enter this line:

```
400 DIM F1(62),F2(62),F3(62),F4(62)
```

Here's where the arrays come in. You'll recognize the familiar DIM statement which dimensions four arrays of 62 elements each. You'll also recognize our divisor and multiplier in the next line:

```
410 K=256:MU=1.005
```

Now we use a FOR-NEXT loop to read in the basic oscillator frequencies for 41 notes:

```
420 FOR J=1 TO 41
430 READ T,N
440 N1=INT(N*MU)
450 F1(T)=INT(N/K):F2(T)=N-F1
    (T)*K
460 F3(T)=INT(N1/K):F4(T)=N1-
    F3(T)*K
470 NEXT
```

I'll explain the variable T later. Note that J is only a counter for the 41 pairs of data; it doesn't become part of an array. Lines 440–460 essentially repeat the calculations introduced above. Although we've DIMensioned all four arrays with 62 slots, some will be left empty: F(1) through F(8), for instance, contain values of 0 and are not used.

Here are the 41 pairs of DATA presented in the order of notes on the keyboard:

```
630 DATA62,2145,9,2408,14,2703,17,
    2864,22,3215,25,3608,30,4050,33,
    4291,38,4817
640 DATA41,5407,46,5728,49,6430,54,
    7217,12,8101,23,8583,20,9634,31,
    10814,28
650 DATA11457,39,12860,36,14435,47,
    16203,44,17167,55,19269,59,2273,
    8,2551,16
660 DATA3034,19,3406,24,3823,32,
    4547,35,5103,43,6069,48,6812,51,
    7647,18,9094,21
670 DATA10207,29,12139,34,13625,37,
    15294,45,18188,50,20415,53,21629
```

### The Keyboard Matrix

Have you figured out what T is used for yet? It corresponds to a particular key on the 64's keyboard. Enter this line, which we'll erase later:

```
3000 PRINT PEEK(197):GOTO 3000
```

*continued on page 22*

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### [unlabeled]

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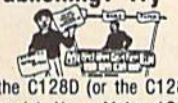

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Now type RUN 3000 and press RETURN. You should see a stream of 64s on your TV or monitor screen. As you'll recall, PEEK returns the contents of a particular memory register. Memory register 197 always contains a unique number which corresponds to the key that's currently being pressed. When no key is being pressed, that number is 64. Try pressing some keys while this one-line program is running. The space bar should yield 60; the Q key, 62; and so on.

What we want to do is associate one of the screen synthesizer keys (and its corresponding pitch) with one of the computer keys. Look at the first two data items—62 and 2145. The number 62 is the keyboard matrix value for Q, and 2145 is the basic frequency that should sound when the Q key is pressed. Therefore, as calculated in line 450, F1(62) equals 8 and F2(62) equals 97. When Q is pressed, 2145 is POKEd into voice 1's two frequency-control registers as 8 and 97; Q's detuned frequency, 2145*1.005, is POKEd into voice 2's frequency registers as 8 and 107. (We precalculate all the array values to speed up keyboard response.)

Here's another way of looking at the frequency arrays. Erase line 3000 and run the program as is; the keyboard will be drawn and the arrays will be loaded. The chart below shows the first eight array items, which you can confirm by typing, say, PRINT F1(62) and pressing RETURN.

| Array Item | POKEable Value |
|---|---|
| F1(62) | 8 |
| F2(62) | 97 |
| F3(62) | 8 |
| F4(62) | 107 |
| F1(9) | 9 |
| F2(9) | 104 |
| F3(9) | 9 |
| F4(9) | 116 |

Let me reiterate: There are 41 keys on the synthesizer keyboard we've drawn. Their corresponding computer-key matrix values range from 9 to 62 but skip around with no apparent order. The keys we'll press don't use matrix values 1–8 or 13 other values. But because the highest matrix value we do use is 62 (corresponding to Q), our arrays must be dimensioned to that size; 21 positions will go unused in each array.

## Looking at the Keyboard

All that's left in the program is to look at the keyboard, POKE the array values into the frequency-control registers, and turn the voices on and off. The next few lines will be presented with minimal discussion because we've covered these concepts recently. First clear the sound chip:

```
480 V=54272:FOR J=V TO V+23:
    POKE J,0:NEXT
```

Then set up a simple envelope for voices 1 and 2:

```
490 E=136:POKE V+5,E:POKE
    V+6,E:POKE V+12,E:POKE
    V+13,E
```

The frequency-control registers are at locations 54272 and 54273 for voice 1 and at locations 54279 and 54280 for voice 2:

```
500 V1=V+1:V2=V
510 V3=V+8:V4=V+7
```

To turn the voices on and off with a sawtooth waveform, we define two constants VN (for on) and VF (for off):

```
520 VN=33:VF=32
```

Next, we turn up the volume:

```
530 POKE V+24,15
```

and define two more constants. The first is the memory register for the keyboard matrix, and the second is the value returned when no key is pressed:

```
540 KB=197:NK=64
```

That's it; everything has been done. We can print a new message to cover up the one we printed in line 300:

```
550 PRINT"{UP}"TAB(13)"OK, HIT
    IT!"
```

We're now ready to look at the keyboard. This is the start of a loop which will end in a few more lines:

```
560 T=PEEK(KB):IF T=NK THEN
    560
```

If no key is pressed (T is 64), the program just goes into a holding pattern at line 560. If a key is pressed, T becomes something else—hopefully corresponding to one of the synthesizer keys on the screen. Whatever the case, control passes to the next two lines, which POKE our precalculated values into the respective frequency-control registers:

```
570 POKE V1,F1(T):POKE V2,F2(T)
580 POKE V3,F3(T):POKE V4,F4(T)
```

Finally, we turn on voices 1 and 2:

```
590 POKE V+4,VN:POKE V+11,VN
```

## Invalid Keypresses

If by chance an invalid key is pressed, an empty array value will be called and 0s will be POKEd into the frequency-control registers; no sound will be generated.

While a key is being pressed and T is in memory register 197, we want the note to continue sounding. Therefore, we must check the keyboard again:

```
600 IF PEEK(KB)=T THEN 600
```

And another holding pattern results. As soon as the key is released, control continues to the next line, which turns off both voices:

```
610 POKE V+4,VF:POKE V+11,VF
```

This ends our loop; we must return to its beginning:

```
620 GOTO 560
```

Ordinarily an unconditional GOTO is strictly *verboten*. But in this case it's short, so we can get away with it.

If you've been following this column for a few years, you should now be prepared to change various things in the program and observe the results. Other multipliers you can try in line 410 are 1.5, for a musical interval of a fifth, and 2, which should produce an octave. You can also change the envelope (line 490), the voices (line 520), or even the pitches in the DATA lines for a really weird effect.

Here are the notes for our Christmas song; try to guess its title before playing it. The numbers above the letters denote the relative time given each keypress.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| X | B | B | N | B | V | C | C | C | N |
| 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 1 |
| N | M | N | B | V | X | X | M | M | K |
| 1 | 1 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 4 |
| M | N | B | C | X | X | C | N | V | B |

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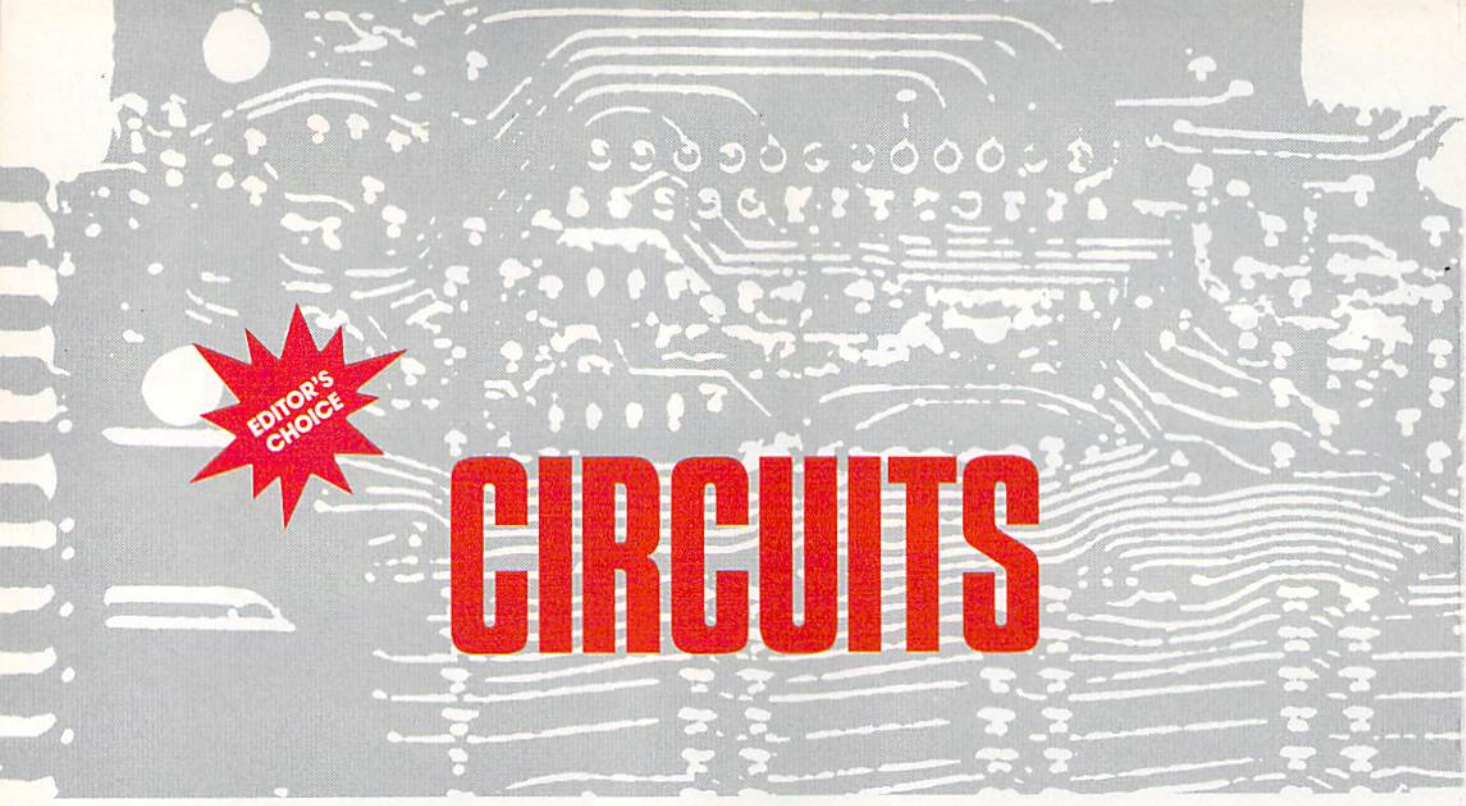



**Eric Haines**

HOW DOES IT FEEL TO KNOW THAT THE SECURITY OF ALL MANKIND RESTS IN YOUR HANDS? FIND OUT IN THIS OUTSTANDING STRATEGY GAME FOR THE 64. JOYSTICK REQUIRED.

The world's security computer has gone haywire. In "Circuits," your job is to shut it down. Armed with a remote-access terminal, you must infiltrate the main circuit boards and cut off the power supply.

But this won't be easy. You can't just turn the computer off—it's too well protected for that. Instead, you must manually switch a series of circuits so that pulses of electricity are directed to critical power points.

## Getting Started

Since Circuits is written entirely in machine language, you'll need to enter it using "MLX," the machine language entry program found elsewhere in this issue. When MLX prompts you, respond with the values given below.

**Starting address:** 0801
**Ending address:** 19D8

Follow the MLX instructions carefully, and be sure to save a copy of the data for Circuits before you exit MLX. To start Circuits, simply load it as you would any BASIC program; then plug a joystick into port 2 and type RUN.

A title screen with several play options will appear. To select the number of electric pulses you want to guide, move the joystick left and right. The pulses are represented by small yellow balls below the word *CIRCUITS* and can be any number from 2 through 8. The default is 3, but you may want to start with 2 until you get used to the game. The balls above *CIRCUITS* represent the number of players. Push the joystick up for a cooperative, two-player game; push it down for a one-player game. Normally the game is set for one player. When you have finished choosing your options, press the fire button to begin the game.

## Circuit Power

When you start the game, you'll see an overhead view of the first circuit board. Across the top of the screen is the score, the number of lives remaining, a small diagram showing the joystick functions, the high score for the session, and the number of "safeties" left (safeties are described below). The small squares which fluctuate between yellow and red are the electric pulses. After a short pause, they'll begin flowing through the circuit.

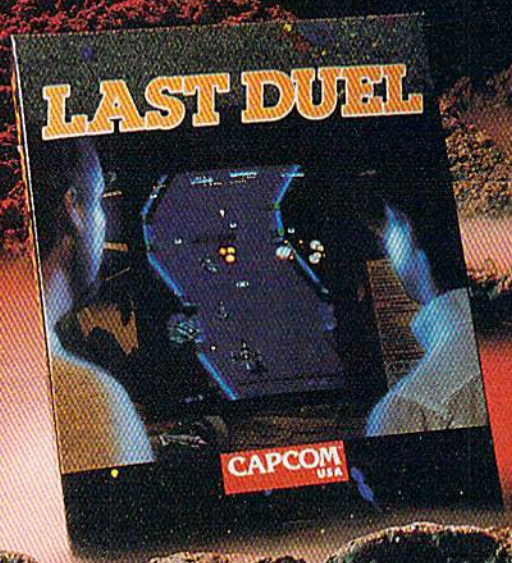
Your goal is to use the electric pulses to short out the power sources, which appear on the circuit board as small pyramids. In order to succeed, you must reroute the pulse paths by using three controls: switches, rotators, and transporters.

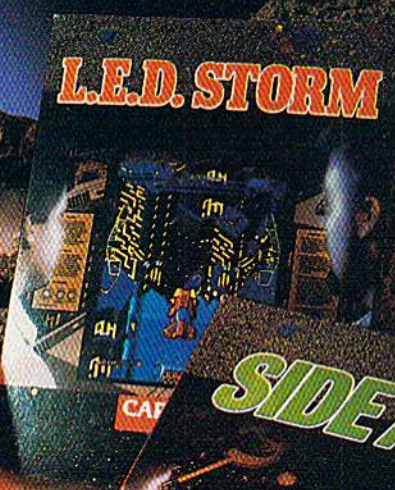
Switches are found at all three-way junctions on the circuit board and are used to shunt the pulses in different directions. Some switches face right, while others face left, but they all act the same. When a pulse encounters a switch barrier, it assumes the direction allowed by the barrier. However, if a pulse approaches a barrier from behind (no directional change is possible), it passes directly through the barrier.

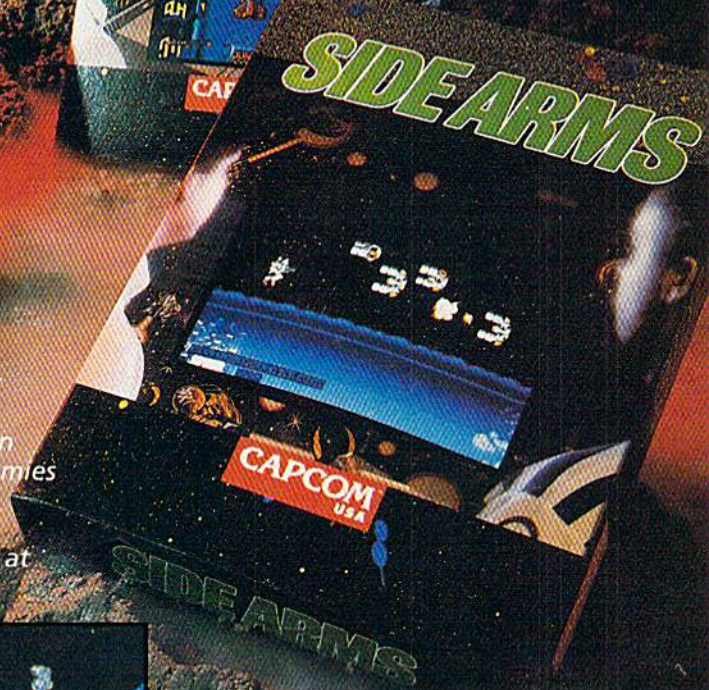
Use the joystick to change the direction of the switch barriers. Push the joystick to the right, and the barriers in all the right-facing switches will change position. Push right again, and the barriers return to their original positions. Pushing the joystick to the left has a similar effect on the left-facing switches.

Some parts of the circuits have a bridge across them; these are the rotators. Rotators are usually found wherever the circuits cross—that is, at four-way intersections. In order

# IT'S THE END OF THE WORLD (AS WE KNOW IT)

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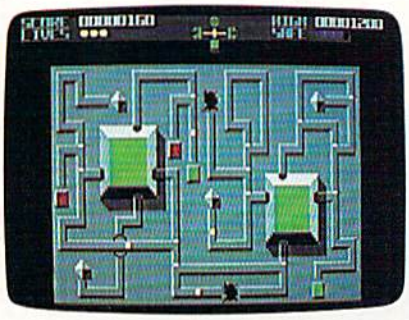
for a pulse to safely pass through a rotator, the rotator bridge itself must be aligned with the direction of the pulse movement. Pushing the joystick up causes all rotators to turn 90 degrees. In the process, a rotator that is horizontal will become vertical, and vice versa.



*Face electronic chaos in "Circuits."*

Transporters are the colored squares on the circuit board. Some boards have more transporters than others, but there are always two transporters of each color. When a pulse hits a transporter, the screen flashes green and the pulse instantly moves to the other transporter of the same color. By pushing the joystick down, you can cause one transporter of each color to cycle to the next hue. Because of this, you can use transporters to move pulses to different places on the board. The transporter colors cycle in this order: red to green, green to blue, blue to yellow, and yellow to red. Most screens have less than four transporter colors, so you usually only have to keep track of the first two or three.

Another way that pulses can change paths is through logic gates. These look somewhat like flat, square buildings with green roofs. When a pulse passes into a gate, you can't see it until it comes out another pathway. Only by experience will you be able to tell where a pulse will emerge.

## Powering Down

The pulses aren't very strong, so each power pyramid must be hit three times in order to eliminate it. Destroying a pyramid leaves a jagged gap in the circuit. Because the computer is malfunctioning, there are already some gaps in the circuitry. Be careful of these gaps—if a pulse touches one, it's vaporized and you lose a life. The game ends once you've lost all three of your lives. Also, be sure a pulse doesn't hit a rotator that isn't lined up with the path along which the pulse is traveling, and be careful not to activate a rotator while a pulse is passing through it.

If you're not alert, you may find a pulse heading toward a gap, with no way to prevent it. Fortunately, by pressing the fire button, you can activate the safety function. This gives the pulse an extra burst of energy, signified by the screen turning blue for three seconds. During this time, the pulse will bounce harmlessly off any of the hazards. Use this capability sparingly because you're only allowed three safeties per circuit board.

When you've destroyed all of the power pyramids on the circuit board, you advance to the next board and the number of safeties is reset to 3. The boards have different layouts, and they become progressively more difficult. If you manage to shut down the fifth board, you go back to the first, but with another pulse to contend with. However, there will never be more than eight pulses on the board at once.

## Scoring and Strategies

Scoring in Circuits depends on the number of pulses you have on the board. The base value for hitting a power pyramid is 10 points; for destroying a pyramid, 100 points; for clearing a board, 1000 points; and for shutting down all five boards, 10,000 points. Each point value is multiplied by the number of pulses in play. Thus, hitting a pyramid with two pulses on the board, for example, would give you 20 points. Clearing all the boards with eight pulses, on the other hand, is worth 80,000 points.

There are several strategies that will increase your chances of success. One is to align the switches so that all but one of the pulses are in an endless loop; then use the remaining pulse to destroy a power pyramid. Another strategy is to get all the pulses moving in the same direction. This way, you can send more current into a pyramid at one time.

Lastly, when there are a lot of pulses on the board at once, you may find it difficult to keep track of them all. If so, recruit a friend to help you. For two players, plug the second joystick into port 1. After selecting the two-player option on the title screen, start the game as usual. Now, however, the player with the joystick in port 2 only has to concentrate on left switches and rotators. The other player controls the right switches and transporters. Either player can activate a safety, but you still only get three per board. Scoring is not affected, though you'll probably get more points by shutting down more circuit boards.

## Circuits

```
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0831:A9 A2 8D 14 03 A9 12 8D 22
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09E1:86 EA A9 01 8D 14 D8 A2 48
09E9:63 A0 35 A9 50 20 25 0F 73
```

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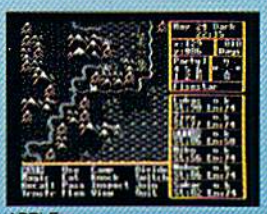

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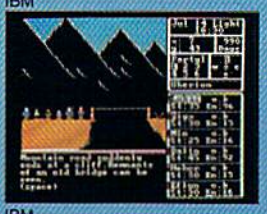

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11B1:5F 19 42 06 49 49 5F 13 B3
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11C1:40 01 20 40 5F 20 15 4E 40
11C9:5C 40 44 41 41 48 4A 44 CA
11D1:5F 5F 5F 5F 48 03 41 07 35
11D9:48 5F 44 0E 16 11 53 56 53
11E1:5F 0B 40 1D 40 20 5F 20 B1
```

```
11E9:15 40 4F 5D 40 44 42 46 44
11F1:42 44 4C 5F 5F 5F 5F 42 3F
11F9:04 46 08 46 5F 14 5A 17 2C
1201:12 54 58 5F 0C 1C 1B 1A 65
1209:20 5F 20 20 15 50 5E 0A CB
1211:0D 0E 0F 0A 0D 0E 0F FC 7D
1219:F3 CF 3F 00 C8 3E 8D 04 71
1221:05 06 06 07 0F 03 01 0D 0E
1229:08 0C 0E 0F 03 09 0B 06 5F
1231:0C 05 00 01 00 01 00 01 B1
1239:00 01 03 03 02 02 03 03 4F
1241:02 02 05 01 05 00 01 05 C6
1249:00 05 03 02 05 05 05 05 7A
1251:03 02 13 14 11 12 06 0C 04
1259:0C 06 FF FF FF FF 87 24 38
1261:29 26 24 23 29 1E 35 FF 86
1269:81 27 26 29 24 20 20 28 79
1271:2E 29 3E 27 35 FF 83 24 06
1279:85 20 31 39 38 39 83 20 EF
1281:24 30 25 1F 23 1E 27 FF 3A
1289:85 DF 18 A5 FD 65 DF 85 90
1291:FD 85 FB A5 FE 69 00 85 13
1299:FE 18 A5 FE 69 D4 85 FC 8E
12A1:60 A9 01 8D 19 D0 A2 52 FC
12A9:A0 00 AD 12 D0 C9 FF F0 93
12B1:04 A2 FF A0 0B 8E 12 D0 12
12B9:8C 21 D0 AD 0D DC 29 01 90
12C1:F0 03 4C 31 EA 4C BC FE BC
12C9:AB AB AF AF BF BF FF FF 9C
12D1:EA EA FA FA FE FE FF FF 29
12D9:55 55 03 0B 59 59 59 59 4B
12E1:45 45 C5 C5 45 45 45 45 1E
12E9:59 59 59 59 5B 5B 59 59 26
12F1:45 45 45 45 CA EA 55 55 09
12F9:59 59 5B 5B 59 59 59 59 7E
1301:55 55 C0 C0 45 45 45 45 5A
1309:55 75 77 7F 7F 5F 7F 7F 16
1311:55 55 DD F5 F5 F5 FD FD D3
1319:7F 5F 5F 5F 7F 77 D5 55 93
1321:FD FD F5 F5 FD 5D 55 55 49
1329:AA AA AA AA A8 A0 A0 A0 F8
1331:A0 A0 A0 A8 AA AA AA AA 6E
1339:FF FF FF FF FC F0 F0 F0 DD
1341:FF FF FF FF 3F 0F 0F 0F CA
1349:F0 F0 F0 FC FF FF FF FF 12
1351:0F 0F 0F 3F FF FF FF FF 98
1359:AA AA AA AA 2A 0A 0A 0A 17
1361:0A 0A 0A 2A AA AA AA AA F2
1369:AA AA AA AA AA AA AA AA 8F
1371:04 04 04 04 04 04 04 04 97
1379:30 30 30 30 30 30 30 30 9F
1381:59 59 59 59 AB AB 55 55 77
1389:45 45 45 45 C5 C5 45 45 B5
1391:00 00 40 40 50 50 54 54 84
1399:55 55 15 15 05 05 01 01 F2
13A1:FF FF BF BF AF AF AB AB FA
13A9:FF FF FE FE FA FA EA EA 24
13B1:7E 18 18 18 18 18 18 00 F2
13B9:FE C6 C6 FE C0 C0 C0 00 64
13C1:00 00 00 00 00 00 00 00 E7
13C9:CC CC CF C0 C0 FF CC CC FB
13D1:00 00 00 FC FC 00 00 00 AF
13D9:C6 C6 C6 C6 C6 C6 FE 00 A9
13E1:FE C0 C0 C0 C0 C0 FE 00 E2
13E9:FE D6 D6 C6 C6 C6 C6 00 6B
13F1:FE C6 C6 FE D8 CC C6 00 99
13F9:FE C0 C0 F8 C0 C0 FE 00 7E
1401:C6 C6 C6 FE C6 C6 C6 00 E5
1409:7E 18 18 18 18 18 7E 00 19
1411:FE C0 C0 CE C6 C6 FE 00 3D
1419:C0 C0 C0 C0 C0 C0 FE 00 FC
1421:C6 C6 C6 C6 C6 6C 38 00 FB
1429:FE C0 C0 F8 C0 C0 C0 00 33
1431:FE C6 C6 FE C6 C6 C6 00 32
1439:00 3C 7E 7E 7E 3C 00 00 0D
1441:FE C6 C6 C6 C6 C6 FE 00 2F
1449:78 18 18 18 18 18 7E 00 56
1451:FE 06 06 FE C0 C0 FE 00 32
1459:FE 06 06 3E 06 06 FF 00 6F
1461:C6 C6 C6 FE 06 06 06 00 BB
1469:FE C0 C0 FE 06 06 FE 00 8F
1471:FE C0 C0 FE C6 C6 FE 00 A0
1479:FE 06 06 06 06 06 06 00 18
1481:FE C6 C6 FE C6 C6 FE 00 F2
1489:FE C6 C6 FE 06 06 06 00 FF
1491:00 18 18 FF FF 18 18 00 53
1499:00 3C 66 FF 00 FF 66 3C A6
14A1:33 33 F3 03 03 FF 33 33 90
14A9:7E 7E 7E 7E 7E 7E 00 00 56
14B1:F8 CC C6 C6 C6 C6 C6 00 AD
14B9:00 00 00 3F 3F 00 00 00 CF
14C1:55 55 55 55 55 55 55 55 E9
14C9:59 59 59 59 59 59 59 59 F1
14D1:45 45 45 45 45 45 45 45 F9
14D9:55 55 55 55 AA AA 55 55 02
14E1:55 55 00 00 55 55 55 55 0A
14E9:55 55 55 55 5A 5A 59 59 5A
14F1:55 55 40 40 45 45 45 45 35
14F9:55 55 55 55 A5 85 45 45 35
1501:55 55 01 09 59 59 59 59 18
1509:45 45 45 45 4A 6A 55 55 20
1511:59 59 58 50 55 55 55 55 4E
1519:59 59 59 59 A9 A9 55 55 FA
1521:45 45 05 05 55 55 55 55 30
1529:55 55 57 57 5F 5F 7F 7F AA
1531:55 55 95 95 A5 A5 A9 A9 28
1539:6A 6A 5A 5A 56 56 55 55 30
1541:FC FC F0 F0 C0 C0 00 55 B4
1549:57 5D 75 75 AA AA 55 55 7C
1551:D5 75 5D 5D AA AA 55 55 45
1559:55 55 00 00 75 75 5D 57 17
1561:55 55 00 00 5D 5D 75 D5 AC
1569:59 59 79 79 D9 D9 D9 D9 21
1571:D9 D9 D9 D9 79 79 59 59 95
1579:45 45 4D 4D 47 47 47 47 43
1581:47 47 47 47 4D 4D 45 45 ED
1589:00 00 00 00 55 55 00 00 B3
1591:00 00 FF FF 00 00 00 00 BB
1599:55 55 6A 6A 6F 6F 6F 6F 3F
15A1:55 55 A9 A1 F1 F1 F1 F1 48
15A9:6F 6F 6F 6F 60 40 55 55 50
15B1:F1 F1 F1 F1 01 01 55 55 BA
15B9:FF FF FF FF FF FF FF FF E3
15C1:FF FF FF FF FF FF FF FF EB
15C9:83 35 24 30 26 27 20 81 1A
15D1:30 30 30 30 30 30 30 30 FB
15D9:20 20 20 20 20 20 85 3B E9
15E1:83 20 20 20 20 20 20 28 C5
15E9:29 2A 28 20 81 30 30 30 97
15F1:30 30 30 30 30 83 2B 29 58
15F9:2C 27 35 87 20 2F 2F 2F 6E
1601:20 20 20 20 20 20 20 20 2D
1609:20 85 3C 87 3F 3A 22 85 53
1611:21 83 20 20 20 20 35 2E CE
1619:2D 27 20 86 2F 2F 2F FF A6
1621:03 04 00 00 03 01 01 04 F1
1629:00 03 01 04 00 03 01 01 85
1631:04 02 05 01 21 02 00 03 A4
1639:0C 18 02 00 02 00 02 21 E6
1641:01 0C 05 04 19 1D 14 1A 51
1649:02 02 02 05 04 02 00 0E BD
1651:01 04 02 03 0C 20 07 0A 68
1659:1F 22 02 02 00 0E 06 03 45
1661:06 00 0E 06 02 0E 11 0A 27
1669:07 12 04 23 05 01 0C 19 AD
1671:14 1D 1A 02 00 26 02 1B 0A
1679:1E 13 1C 02 00 21 00 0E AF
1681:11 10 10 12 0C 00 03 06 C9
1689:00 03 06 00 02 00 02 00 4B
1691:02 20 10 10 1F 02 00 05 CF
1699:01 01 15 01 01 0C 00 05 76
16A1:01 06 1B 13 1E 1C 05 04 D3
16A9:00 21 00 02 00 00 0E 01 5B
16B1:01 01 01 01 0C 00 03 01 36
16B9:06 00 05 01 06 00 00 05 CE
16C1:01 01 18 01 01 06 00 27 09
16C9:00 00 03 01 01 01 01 01 75
16D1:18 22 01 04 00 03 04 00 07
16D9:03 01 04 05 04 03 04 03 CF
16E1:01 01 01 01 0B 00 02 02 5D
16E9:19 14 1A 02 26 06 0D 0B 79
16F1:0D 01 01 01 18 05 01 15 01
16F9:0F 11 08 1F 02 03 01 06 09
1701:05 0F 01 04 03 01 04 21 1B
1709:0B 02 20 09 12 0C 05 01 9D
1711:01 01 06 21 06 02 18 06 41
1719:00 0D 0C 1B 13 1C 02 03 CD
1721:01 01 01 04 18 04 02 21 66
1729:01 01 06 02 00 05 04 02 17
1731:05 01 04 03 0F 01 06 05 60
1739:01 01 04 19 14 1D 1A 02 85
1741:02 27 04 0E 0C 0E 01 01 37
1749:01 21 03 16 11 0A 07 12 D2
1751:0C 02 03 06 05 06 05 01 12
1759:01 01 01 0C 02 1B 1E 13 F4
1761:1C 02 02 05 01 01 01 01 BD
1769:01 21 23 01 06 05 01 01 1C
1771:06 00 05 06 00 03 01 01 B2
1779:04 00 03 01 01 01 21 03 6B
1781:04 03 01 01 21 03 06 21 E4
1789:01 06 03 0B 27 01 01 01 0B
1791:06 05 0B 19 1A 02 0D 01 EA
1799:04 26 01 06 0D 04 03 01 53
17A1:01 01 04 02 1B 1C 02 02 80
17A9:00 02 19 1D 1D 14 14 14 C2
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17C1:0A 07 12 01 0F 16 01 01 DC
17C9:06 02 00 02 20 10 10 07 04
17D1:10 10 0A 1F 03 0F 0F 01 B2
17D9:01 04 0D 01 06 1B 1E 1E 32
17E1:13 13 13 1E 1C 02 02 0D 9C
17E9:01 04 02 02 19 1A 21 01 6E
17F1:01 16 06 0D 01 01 0B 02 DB
17F9:05 04 02 02 02 1B 1C 00 C0
1801:03 01 0B 00 02 03 18 02 A2
1809:05 01 0B 21 02 05 21 01 D6
1811:01 06 22 06 00 05 06 23 2B
1819:06 18 01 06 24 06 03 26 38
1821:03 04 03 04 18 19 1A 21 EE
1829:01 01 04 18 03 01 22 02 7E
1831:21 06 05 0C 02 02 20 1F 4C
1839:03 01 04 05 0B 02 03 21 83
1841:05 01 01 01 0C 02 02 20 F0
1849:1F 02 19 14 1A 02 02 05 CF
1851:04 03 01 01 04 05 06 02 B6
1859:20 1F 0D 11 17 12 0B 02 2D
1861:03 06 0E 27 03 16 21 03 7E
1869:06 1B 1C 0D 11 10 12 06 AA
1871:02 0D 23 05 01 0C 0E 01 EF
1879:0C 21 19 1A 02 1B 13 1C 7B
1881:03 06 02 21 00 19 14 14 A7
1889:1A 02 02 20 1F 0D 01 06 BE
1891:03 0F 01 06 02 03 11 08 CD
1899:0A 12 0C 02 20 1F 05 04 80
18A1:03 0B 02 03 01 0B 02 1B D9
18A9:13 13 1C 02 02 20 1F 03 9D
18B1:15 15 0B 02 0D 01 06 05 B0
18B9:28 05 06 00 05 06 1B 1C 92
18C1:05 06 05 06 18 05 01 24 F1
18C9:03 21 03 01 01 01 26 03 8F
18D1:01 01 01 04 03 01 01 01 42
18D9:22 05 01 16 01 04 03 27 23
18E1:0E 01 01 04 18 0E 01 04 B8
18E9:18 04 03 01 16 04 05 0F 71
18F1:28 0D 01 18 0E 04 05 04 A9
18F9:05 23 02 0D 21 02 05 01 A2
1901:0F 29 05 04 03 06 05 04 24
1909:0D 01 01 0B 02 03 06 03 FD
1911:01 0C 03 01 06 02 03 21 96
1919:02 0D 24 03 06 02 02 21 A1
1921:02 21 06 02 21 19 14 14 27
1929:1D 14 14 1A 05 04 02 02 51
1931:02 05 01 01 15 01 11 10 B4
1939:0A 10 10 17 12 04 02 02 8E
1941:02 05 01 01 01 06 21 20 68
1949:10 07 10 0A 08 1F 0D 06 C4
1951:02 05 01 01 01 21 01 0C 90
1959:1B 13 13 1E 1E 13 1C 0E A5
1961:04 05 01 01 01 01 01 21 36
1969:05 01 06 05 01 25 05 01 17
1971:06 21 06 0A 0F 10 1D 38 7B
1979:89 88 17 86 42 53 3C 9C 52
1981:0F 8F 2A 1A 08 04 85 79 DA
1989:7C 2D 1A 5F 0B 8F 66 26 08
1991:15 40 09 19 0D 1D 3E 70 DA
1999:71 62 01 00 00 03 03 03 52
19A1:00 01 01 01 01 01 02 00 54
19A9:00 03 00 00 01 01 00 00 A8
19B1:02 03 01 03 00 00 03 03 FE
19B9:03 02 01 00 01 01 00 02 1C
19C1:02 03 00 00 00 00 00 00 B5
19C9:00 00 02 08 0A 07 01 07 32
19D1:0A 08 00 00 00 00 00 00 0B
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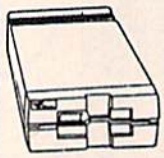

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# FINAL DEFENSE

**Hubert Cross**

FIGHT BY SEA AND BY LAND IN THIS ARCADE-STYLE GAME FOR THE COMMODORE 64. JOYSTICK REQUIRED.

They've finally broken through. In "Final Defense," hundreds of enemy ships are approaching by sea, and an equal number of tanks are converging on you by land. You're the last defender. And before they take you, you must wipe out as many of them as possible. If only you could hold on long enough for reinforcements to arrive.

## Getting Started

Final Defense consists of two programs. Program 1, "Boot," is a short BASIC program that loads and runs Program 2. To avoid typing errors, enter it using "The Automatic Proofreader," found elsewhere in this issue. When you've finished, be sure to save a copy of the program to disk. Since it tries to load Program 2 (which hasn't been created), don't run the program yet.

Program 2 is written in machine language. To enter it, you'll need to use "MLX," the machine language entry program, also found in this issue. The MLX prompts, and the values you should enter, are as follows:

**Starting address:** 2000
**Ending address:** 339F

Before you exit MLX, be sure to save a copy of Program 2 to disk with the filename FINAL.ML.

To start the game, plug a joystick into port 2; then load and run Program 1. After the play fields have been set up, you'll be prompted for the level of play (0–9). Level 0 allows you to practice takeoffs and landings without enemy confrontation. Levels 1–9 range from relatively easy (where ships and tanks fire at you infrequently) to very difficult (where they fire constantly and quickly).

## Playing the Game

The first time you play Final Defense, select level 0 to practice flying the plane. As the game begins, the airport scrolls onto the screen and your plane appears on the runway. To take off, push the joystick to the left and hold it there as your plane picks up speed. Since the plane has a full load of ammunition, you must be very close to full speed before you can take off. If you hesitate while accelerating, you'll probably run out of runway and crash into the fence before becoming airborne (so gun it!). When you've gained sufficient speed, push the joystick up to take off.

You may abort a takeoff by braking before you reach the end of the runway. Push the joystick to the right to apply the brakes. If you wait too long to start braking, you'll reach the end of the runway before you can stop. If you do stop on the tarmac, tap the RESTORE key to get back to the start of the runway. (Don't press RESTORE during the game or you'll reset your score to 0.)

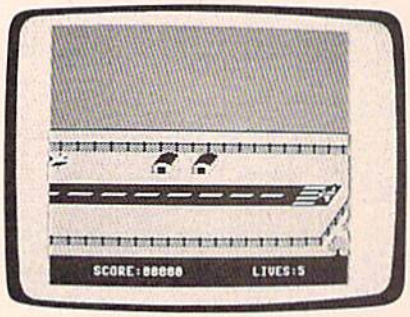
Once you're in the air, you'll find that the plane is more responsive at higher speeds and less responsive at lower speeds. If you try to fly too slowly, the plane stalls. Also, be careful not to fly too low or you'll crash.

In practice mode—that is, at level 0—there are no enemy ships or tanks. Push the joystick to the left until you're going full speed, then wait until you're out of the combat zone and the *PREPARE TO LAND* message appears on the screen. As soon as you see the message, slow down to the minimum speed and dive to treetop level. When the airport appears on the screen, set your plane down on the runway as soon as possible. If you see that you're going to run out of runway before you can stop, gun your engines and take off again. There are two more airports at which you can attempt to land. If you fail to land at any of them, you'll have to fly over the combat zone again.

## Fighting the War

After you've learned to take off and land, you're ready to go into battle. Select a level between 1 and 9 and prepare to face the enemy. Leave the airport and fly along at cruising speed until you reach the combat zone. Once there, you see the message *GET READY* on your screen, and your plane automatically slows

to combat speed. Push the joystick left and right to move back and forth over the combat zone. Press the fire button to fire your weapons.




*Prepare for takeoff in "Final Defense."*

Your weapons-system officer automatically selects air-to-ground missiles or cluster bombs, depending on whether you're attacking ships or tanks. Each ship you destroy is worth 100 points; each tank, 500 points. Tanks are much harder to destroy, because you must deliver a direct hit. Both ships and tanks fire back at you, so be careful. Your plane can take only five hits before it's destroyed. If you crash into the ocean or the ground, it's all over.

When you exit the combat zone, your plane regains speed and you may choose to land for repairs (your plane can take only five hits without repairs) or face another attack wave. If you do land, the program also advances you to the next level. Here, the enemy shoots more rapidly and bullets travel faster.

## Program 1: Boot

```
GK 100 IFA=0THENA=1:LOAD"FINAL
       .ML",8,1
QC 110 SYS9094:W=250:POKEW,40:
       R=9091
ME 120 PRINT"{CLR}{2 DOWN}
       {WHT}PLEASE WAIT A MINU
       TE"
DB 130 Q=-16:GOSUB410:FORQ=80T
       O40STEP-40
QF 140 GOSUB290:GOSUB270:NEXT:
       GOSUB290
XS 150 Q=32:GOSUB410:GOSUB270:
       FORY=10TO21
RG 160 SYSR,17,21-Y,Y:FORX=22T
       O48
FP 170 K=9*RND(0):IFK>3THENK=0
BQ 180 SYSR,18+K,X-Y,Y:NEXT:SY
       SR,21,X-Y,Y
BB 190 NEXT:GOSUB270:FORY=10TO
       21
QE 200 FORX=21TO49:SYSR,8+RND(
       0)*4,X-Y,Y
HB 210 NEXTX,Y:GOSUB270:FORY=1
       0TO21
SJ 220 POKEW,27:FORY=10TO21:SY
       SR,13,34-Y,Y
KE 230 FORX=36TO47:SYSR,12,X-Y
       ,Y:NEXT
GQ 240 SYSR,13,X-Y,Y:NEXT:GOSU
       B270
BQ 250 POKEW,25:Q=0:GOSUB410:G
       OSUB270
HJ 260 SYS9696
SH 270 SYS9088
HS 280 PRINT"{CLR}":RETURN
SR 290 FORX=0TO108STEP2:SYSR,0
       ,X-Q,20
GM 300 SYSR,0,X+9-Q,11:NEXT:FO
       RX=0TO8
FA 310 SYSR,1,X-Q,19-X:SYSR,1,
       X+110-Q,19-X
RP 320 NEXT:SYSR,2,-Q,20:SYSR,
       3,118-Q,11
XF 330 SYSR,4,7-Q,15:SYSR,5,9-
       Q,15
BD 340 FORX=14TO102STEP4:SYSR,
       6,X-Q,15
HC 350 NEXT:SYSR,5,X-Q,15:SYSR
       ,7,X+5-Q,15
BR 360 SYSR,15,Q-72,12:SYSR,15
       ,Q-67,12
XB 370 SYSR,16,Q-30,12:SYSR,16
       ,Q-26,12
RP 380 SYSR,15,Q-20,12:SYSR,14
       ,Q-16,12
XS 390 SYSR,16,Q-5,12:SYSR,14,
       Q+20,12
GK 400 SYSR,14,Q+24,12:RETURN
BC 410 FORY=10TO21STEP2:FORX=3
       5TO47STEP3
MX 420 SYSR,14,X-Q-Y,Y:NEXTX,Y
       :RETURN
```

## Program 2: FINAL.ML

```
2000:00 00 3C 00 00 FC 00 00 BB
2008:EC 00 03 EF 03 C3 AF 0E B2
2010:BF FC 3F FA AC EA AA AC 1A
2018:EB FF F0 EB AA C0 3F AB AD
2020:C0 03 EB 00 00 EB 00 00 AE
2028:EC 00 00 FC 00 00 00 00 AE
2030:00 00 00 00 00 00 00 00 70
2038:00 00 00 00 00 00 00 00 78
2040:00 18 00 00 18 00 00 3C 83
2048:00 00 3C 00 00 7E 00 00 0A
2050:7E 00 00 7F 00 08 FF 00 E7
2058:08 FF 00 0D FF 90 0D FF C9
2060:90 0F FF B0 0F FF B0 0F A0
2068:FF F0 0F FF F0 07 FF E0 4B
2070:07 FF E0 07 FF C0 03 FF C9
2078:C0 01 FF 80 00 FF 00 83 E4
2080:00 20 00 00 28 00 00 20 2A
2088:00 08 A0 08 08 28 08 28 78
2090:A8 20 EB AA EF EB AA EF C9
2098:FF FF FF AA AA AA AA AA 83
20A0:AA AA AA AA AA AA AA 2A 60
20A8:AA A8 00 00 00 00 00 00 68
20B0:00 00 00 00 00 00 00 00 F0
20B8:00 00 00 00 00 00 00 FF F8
20C0:00 00 08 00 00 0A 00 00 2A
20C8:2A 00 00 A0 00 02 80 00 31
20D0:8A 00 02 AA 00 02 AA 00 9E
20D8:02 AA 00 0A AA AA 3E AB 8D
20E0:FE FF FF FE AA AA AE BA A8
20E8:FA EC BA FA E0 AF AF A0 AE
20F0:2B AE 80 0A AA 00 00 00 78
20F8:00 00 00 00 00 00 00 7C B5
2100:30 00 F0 EC 03 AC EB CE B8
2108:AC 3A BA AB 3A AA AB 3A 4F
2110:AA AB 0E AA AC 0E AA AC 9E
2118:0E AA AC 3A AA B0 3A AA 7C
2120:B0 3A AA AC EA AA AC EA AF
2128:AA AC EA AA AB EA AA AB FC
2130:3F AB EB 00 EC 3C 00 EC BF
2138:00 00 30 00 00 30 00 FF 41
2140:00 00 00 00 00 00 00 00 82
2148:00 00 00 00 00 00 00 00 8A
2150:00 00 00 88 80 00 2A 80 F3
2158:00 A6 00 00 15 80 00 95 84
2160:00 00 26 80 00 AA 00 00 1A
2168:8A 80 00 08 00 00 00 00 90
2170:00 00 00 00 00 00 00 00 B2
2178:00 00 00 00 00 00 00 00 BA
2180:00 00 00 00 00 00 00 00 C2
2188:00 00 88 00 02 20 20 08 B4
2190:AA 80 00 A6 68 22 1A A0 53
2198:00 A5 88 02 96 60 22 69 59
21A0:88 02 A6 60 08 9A 20 00 6D
21A8:AA 80 08 04 20 00 2A 10 07
21B0:02 00 80 00 88 00 00 00 48
21B8:00 00 00 00 00 00 00 00 FA
21C0:00 00 00 08 22 00 00 08 9C
21C8:80 20 40 08 02 08 40 08 94
21D0:22 20 80 84 08 20 20 81 07
21D8:04 88 22 02 01 88 20 92 A0
21E0:02 02 20 84 08 00 20 20 91
21E8:82 00 04 18 02 00 22 10 D2
21F0:02 08 88 00 00 00 22 08 93
21F8:80 00 40 20 00 20 00 00 06
2200:00 00 00 00 00 00 00 00 44
2208:00 00 00 00 00 00 00 00 4C
2210:00 00 00 00 00 00 00 00 54
2218:00 00 00 00 00 00 00 00 5C
2220:00 00 00 00 00 00 00 00 64
2228:00 00 00 00 00 00 00 00 6C
2230:00 00 00 0C 00 00 3B 00 AB
2238:00 EC 00 00 30 00 00 00 39
2240:00 00 00 00 00 00 00 00 84
2248:00 00 00 00 00 00 00 00 8C
2250:00 00 00 00 00 00 0C 00 AC
2258:00 1C 00 00 38 00 00 70 D5
2260:00 00 E0 00 01 C0 00 03 CE
2268:80 00 07 00 00 0E 00 00 06
2270:1C 00 00 38 00 00 70 00 27
2278:00 E0 00 00 40 00 00 00 F6
2280:00 00 00 00 00 00 00 00 C4
2288:00 00 20 00 02 04 80 00 F1
2290:00 00 01 01 20 08 50 00 C6
2298:00 08 48 24 82 10 00 50 CE
22A0:80 15 02 48 42 A5 82 10 EC
22A8:12 14 94 A4 A9 21 55 0A 5E
22B0:2D 50 D0 12 AE A8 0F 55 66
22B8:B0 05 EF 40 01 BD 00 00 97
22C0:00 00 00 00 00 00 00 00 05
22C8:00 00 00 00 00 00 00 00 0D
22D0:00 00 00 00 00 00 00 00 15
22D8:00 1C 00 3F FC 00 FF F8 F8
22E0:00 FF F8 00 3F FC 00 00 32
22E8:1C 00 00 00 00 00 00 00 3B
22F0:00 00 00 00 00 00 00 00 35
22F8:00 00 00 00 00 00 00 00 3D
2300:00 00 00 00 30 00 00 EC B4
2308:00 0C EB 30 3B AA EC 3A 6A
2310:AA AB EA AA AB EA AA AB A8
2318:EA AA AC EA AA AC EA AA 4B
2320:AC 3A AA AB 3A AA AB 3A 69
2328:AA AC EA AA B0 EA AA A0 1E
2330:EA AA AC EE AA AB 33 AA 30
2338:BC 00 EF C0 00 30 00 FF A7
2340:00 00 00 00 00 00 F0 00 68
2348:0F EF 00 3B EA FF EB 3A 2F
2350:AA AC 3A AA AC 3A AA AC 59
2358:0E AA B0 0E AA B0 0E AA 26
2360:B0 0E AA B0 3A AA BC 3A 13
2368:AA AC 3A AA AC EB FF AB E1
2370:EC 00 FB F0 00 0F 00 00 F7
2378:00 00 00 00 00 00 00 00 BE
2380:4C BF 24 4C 9B 23 A9 00 E2
2388:8D A8 25 A9 60 8D A9 25 B0
2390:A9 00 8D B6 25 A9 6C 8D FE
2398:B7 25 60 20 14 24 85 02 50
23A0:20 14 24 85 03 20 14 24 BD
23A8:85 04 A6 02 BD 3C 24 29 F7
23B0:0F 85 F9 BD 3C 24 4A 4A 4C
23B8:4A 4A 48 29 01 38 65 04 0A
23C0:85 06 68 4A 38 65 03 85 DF
23C8:05 BD 52 24 8D FB 23 BD ED
23D0:68 24 8D FC 23 A9 00 85 1B
23D8:F8 A6 04 A4 03 BD F0 EC ED
23E0:85 FB 85 FD BD 23 24 85 C1
23E8:FC 18 69 D4 85 FE 86 F7 5B
23F0:E0 19 B0 13 C0 28 B0 0F 4C
23F8:A6 F8 BD FF FF F0 06 91 E9
2400:FB A5 F9 91 FD A6 F7 E6 69
2408:F8 C8 C4 05 D0 E0 E8 E4 A8
2410:06 D0 C8 60 20 FD AE 20 25
```

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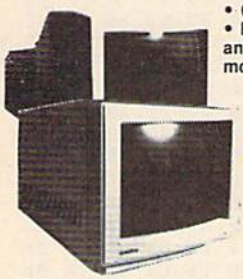

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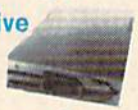

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2418:9E AD 20 8D AD 20 BF B1 17
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24A8:F6 F3 F8 F7 E2 E3 E4 E0 59
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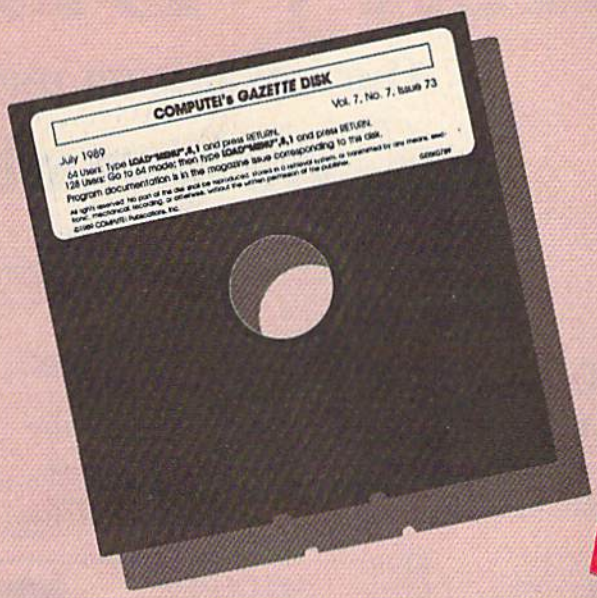


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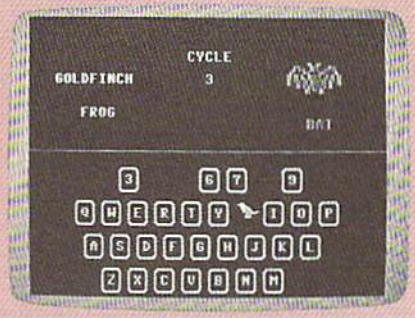


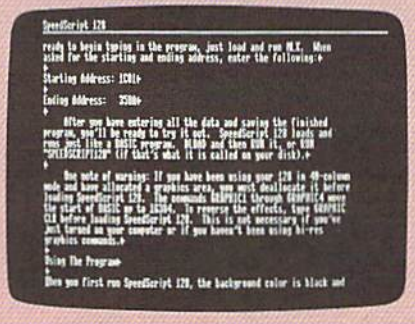

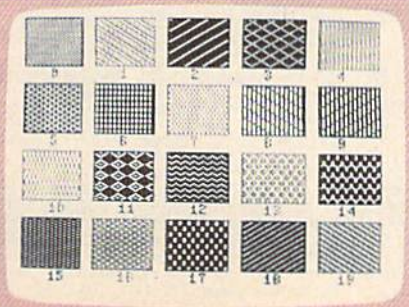

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2C78:2D 15 D0 8D DB 2C A8 A5 26
2C80:AD 18 69 00 CD 97 50 90 E0
2C88:51 98 2D 0E 30 F0 4B 98 AA
2C90:29 F0 F0 46 85 F7 A2 07 94
2C98:06 F7 90 1B BD 78 50 30 56
2CA0:16 B5 AB 69 0A C5 AD 90 D0
2CA8:0E B5 A3 E9 0C C5 A5 B0 FB
2CB0:06 69 24 C5 A5 B0 07 CA 10
2CB8:E0 04 B0 DC 90 1C A9 09 B7
2CC0:20 81 2F 9D 70 50 AA BD 21
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2CD0:A2 02 20 A1 2F A9 08 8D D6
2CD8:34 03 A9 00 29 03 C9 03 2D
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2D00:34 03 D0 0A A9 02 8D 3B 9B
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2D58:B5 A3 C9 F0 B0 07 C9 A8 9C
2D60:90 03 20 A1 2F CA 10 F0 97
2D68:A5 AB C9 22 B0 05 A2 00 BA
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2D98:27 A9 07 20 81 2F 20 FB D8
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2FF8:95 50 60 8D 71 50 A2 00 2D
3000:20 A1 2F A9 4C 8D 1E 2A 58
3008:8D 4A 2A 60 01 02 04 08 2D
3010:10 20 40 80 FE FD FB F7 70
3018:EF DF BF 7F A9 0C 85 FC DD
3020:AD 83 50 0A 26 FC 6D 83 66
3028:50 90 02 E6 FC 0A 26 FC DC
3030:0A 26 FC 85 FB 85 FD A5 AE
3038:FC 69 0C 85 FE 60 A9 FF 18
3040:8D 92 50 EE 92 50 AE 92 CA
3048:50 BD CF 30 F0 F0 8D 93 37
3050:50 BD 9A 30 8D 98 50 60 6E
3058:A2 00 8E 82 50 AE 82 50 96
3060:BD 05 31 8D 80 50 BD 06 A6
3068:31 8D 81 50 BD 07 31 8D F3
3070:85 50 AD 80 50 8D 83 50 75
3078:AD 81 50 8D 84 50 60 A9 C2
3080:00 8D 34 03 8D 3B 03 A9 04
3088:20 8D 04 D4 8D 0B D4 A9 16
3090:80 8D 12 D4 A9 0F 8D 18 E0
3098:D4 60 01 01 21 01 01 01 BB
30A0:03 13 11 50 D0 D0 90 10 69
30A8:12 53 D1 91 13 52 D0 D0 8E
30B0:90 10 12 53 D1 91 13 52 22
30B8:D0 D0 90 10 10 05 05 01 68
30C0:01 01 21 01 05 05 01 01 55
30C8:01 21 01 05 05 01 01 28 B8
30D0:04 91 0B 03 B0 20 20 0B 7A
30D8:0C F0 C0 10 20 17 0B CF D7
30E0:30 17 0C F0 C0 10 20 17 4D
30E8:0D CF 30 0D 0C F0 C0 10 50
30F0:20 17 0B B0 40 02 04 91 37
30F8:0B 03 B0 40 02 04 91 0B 08
3100:03 B0 18 02 00 00 50 01 D4
3108:28 50 01 EB 03 01 EE 03 6E
3110:50 F1 0B 01 78 0C 01 84 03
3118:10 1E 89 17 01 A0 0B 01 4E
3120:AC 11 0F B1 17 01 78 0C D3
3128:01 84 10 1E 89 17 01 C8 83
3130:0D 01 D5 01 FF D6 0D 01 9A
3138:78 0C 01 84 10 1E 89 17 65
3140:01 E3 0B 01 EE 03 50 F1 A3
3148:02 01 00 50 01 28 50 01 3B
3150:EB 03 01 EE 03 50 F1 02 B7
3158:01 00 50 01 28 50 01 EB C5
3160:03 01 EE 03 50 F1 02 01 E1
3168:FF AA AA AA AA AA BA EE D9
3170:AA AA AE BB AA AA AA AA 64
3178:AA AA AA AA AA AA AA AA DA
3180:AA FF FE FC F8 F0 E0 C0 F5
3188:80 FF FF FF FF FF FF FF 2B
3190:FF 01 03 07 0F 1F 3F 7F F6
3198:FF CC FF FF FC F3 FC F3 D3
31A0:CC 03 03 03 02 04 08 10 FA
31A8:20 C1 C2 E4 78 38 3C 5E AD
31B0:8F 11 22 44 88 11 22 44 B8
31B8:88 C0 00 3C 00 00 06 00 5F
31C0:70 C0 06 20 00 0E 00 64 EA
31C8:00 00 00 E0 1C 00 83 1C 3D
31D0:00 70 07 00 00 C1 00 00 37
31D8:70 00 C0 D0 D0 50 50 50 51
31E0:50 40 40 00 00 00 00 00 83
31E8:00 00 00 00 00 03 03 0F 6C
31F0:0F 03 3F FF FF FF FF FF 83
31F8:FF FC FF FF FF FF FF FD 98
3200:FD F5 75 55 55 54 54 50 D9
3208:50 57 55 55 FD FD FD FD 4C
3210:FD 3D 15 55 57 57 57 57 D8
3218:57 03 FF 33 CF 3F CF 3F 76
3220:33 00 00 03 03 0C 0F 3C F0
3228:33 CC F0 CC F0 C0 F0 C0 71
3230:C0 C0 FF F3 CC F3 CC F3 28
3238:CC 00 FF 33 CC 33 CC 33 36
3240:CC AA A8 80 00 00 00 00 D2
3248:00 0C 8C 8C 3C FA F0 C0 7A
3250:00 FA EA AA 03 02 00 00 9B
3258:00 00 00 00 00 80 83 BF 85
3260:FF 03 0F 3F FF BC 70 F0 20
3268:20 00 00 00 02 02 02 02 FA
3270:02 11 45 15 11 01 00 00 A0
3278:00 00 01 01 05 05 01 15 60
3280:55 55 55 51 55 15 51 55 9B
3288:15 40 50 50 54 10 54 55 77
3290:45 55 14 55 44 10 00 00 27
3298:00 51 45 15 7C 3C 3C 3C D4
32A0:FF AA AA AA AA AA AA AA AF
32A8:BF FE AA AA AA AA AA AA AC
32B0:AA FF AA AA AA AA AA AA 6A
32B8:AA AA AA AA AA AA AA AA 1D
32C0:FF AA FF FF AA AA FF FF CF
32C8:AA AA AA AB AA AA AF BF 5C
32D0:AA AA FE FA AA AA EA AA 45
32D8:AA A2 0D BD 46 03 9D 00 32
32E0:D4 CA 10 F7 A2 07 BC 34 C2
32E8:03 F0 3F 88 98 0A 0A 0A 86
32F0:A8 A9 00 9D 34 03 9D 05 DB
32F8:D4 9D 06 D4 BD 4A 03 29 83
3300:FE 9D 04 D4 A9 06 8D 37 D2
3308:03 8E 1A 33 B9 57 33 9D 39
3310:47 03 C8 E8 CE 37 03 D0 AC
3318:F3 A2 00 B9 57 33 9D 36 B5
3320:03 B9 58 33 9D 35 03 18 94
3328:90 25 DE 35 03 D0 08 BD 78
3330:4A 03 29 FE 9D 4A 03 BD 6B
3338:47 03 18 7D 36 03 9D 47 1E
3340:03 6A 5D 36 03 10 08 A9 E3
3348:00 9D 06 D4 9D 4C 03 8A D2
3350:F0 04 A2 00 F0 90 60 FF 0F
3358:00 08 81 5A 29 00 25 02 2C
3360:00 08 81 00 FA 00 05 60 3B
3368:00 08 81 00 F8 00 04 B0 81
3370:00 08 41 00 FA FF 20 FF 19
3378:00 08 81 4A 29 00 04 04 0B
3380:00 08 81 30 F8 00 06 20 10
3388:00 08 81 00 F9 00 01 03 F5
3390:00 08 81 00 F9 00 08 A0 A9
3398:00 08 81 00 F8 00 03 00 FE
```

**G**

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We've always been known as the best Commodore copy utility made. But that label just doesn't fit us anymore. Because Maverick is so much more than just a copy utility. Over its life span, Maverick has evolved into a total software management system capable of extending the abilities of your Commodore computer well beyond its original capacity.

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| Baal | 19.97 |
| Captain Fizz | 19.97 |
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| Curse of Azure Bonds | 26.97 |
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| Dungeon Master Assistant | 20.97 |
| Dungeon Master Assistant II | 20.97 |
| Hillsfar (A D & D) | 25.97 |
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| Heroes of the Lance Hints | 7.97 |
| Phantasie III | 25.47 |
| Pool of Radiance | 25.47 |
| Pool of Radiance Hints | 10.95 |
| Questron II | 25.47 |
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| Wargame Construction Set | 19.47 |
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| Card Sharks | 9.95 |
| Concentration | 9.95 |
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| Jeopardy | 9.95 |
| Jeopardy II | 9.95 |
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| Certificate Maker Libr.I | 10.97 |
| Newsroom | 14.97 |
| Newsroom Clipart 1 or 2 or 3 | 10.97 |
| P/S Graphic Expander | 23.64 |

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| Flight Sim Scenery 2 | 16.97 |
| Flight Sim Scenery 3 | 16.97 |
| Flight Sim Scenery 4 | 16.97 |
| Flight Sim Scenery 5 | 16.97 |
| Flight Sim Scenery 6 | 16.97 |
| Flight Sim Scenery 7 | 19.97 |
| Flight Sim Scenery 11 | 19.97 |
| Flight Sim Scenery West. Europe | 19.97 |
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| Flight Sim Scenery SanFran | 19.97 |
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| Qix | 18.97 |
| Sky Sharks | 19.97 |
| Rambo III | 19.97 |
| Rastan | 19.97 |
| Renegade | 12.97 |

### Timeworks

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| Accounts Payable | 33.36 |
| Accounts Receivable | 33.36 |
| Data Manager 2 | 17.16 |
| Data Manager 128 | 33.36 |
| Electronic Checkbook | 13.92 |
| General Ledger | 33.36 |
| Partner 64 | 33.36 |
| Partner 128 | 39.84 |
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| 1541/71 Power Cable | 5.95 |
| C-128 RGB Monitor Cable (Monochrome) | 6.95 |
| C-64 Color Monitor Cord | 5.95 |
| Commodore 64 H/D Power Supply | 39.95 |
| Commodore 128 Power Supply | 54.95 |
| Phoenix CPS 30 C-64 Power Supply | 34.95 |
| RS-232 Interface (Supra) | 27.95 |
| MW 350 Printer Interface | 49.95 |
| Aprospand 64 | 27.95 |
| Aprospand Extender Cable | 15.95 |
| Aprotek 1200 Baud Minimodem C | 59.95 |
| Aprotek User Port Extender Cable | 15.97 |
| Commodore 1670 Modem (1200 Baud) | 69.95 |
| Commodore 1764 Ram Expander | 129.95 |
| Curtis Computer Tool Kit | 24.95 |
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| Mouse Holder | 5.95 |
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| Slimline C-64 Replacement Case | 19.97 |
| Computer Hand II | 6.95 |
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| C-128-D Dust Cover | 13.95 |
| Disk Notcher-Square Cut | 4.95 |
| 5.25" Disk Drive Cleaner | 5.95 |
| 10 Cnt Disk Storage | 1.95 |
| 50 Cnt Disk Storage | 8.95 |
| 100 Cnt Disk Storage w/Lock | 12.95 |
| 80 Cnt 3.5" Disk Stor. w/Lock | 9.95 |
| 5.25" Disk Labels-96 cnt | 1.00 |
| 5.25" DS/DD Diskettes-Black | .39 |
| 5.25" DS/DD Diskettes-10 colors | each .79 |
| Write Protects-100 cnt Black | 1.00 |
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| Slik Stik-Joystick | 6.95 |
| Tac 2-Joystick | 10.95 |
| Tac 3-Joystick | 11.95 |
| Touch-It Static Strip | 8.95 |
| Suncom Icon Troller | 17.95 |
| Surge Protector/Power Pad | 39.95 |

# THE RAMBOard

*Beyond Super*

RAMBOard does just what the other copy card on the market does: it adds RAM to your 1541 disk drive. This RAM is used to create a workspace where custom software can work its magic. Copy protection is evolving past the point of nibblers and other software-only solutions. Believe us, card based copiers are the future of archival technology.

So how do you decide between our card and "Brand X"? Don't compare the similarities - compare the differences. Their card is just "out there". You buy it, and that's pretty much it. RAMBOard was designed from the very beginning as an integral component in Maverick™, a complete system of archival tools and products. Their card puts the burden of the work on you. Are you good at soldering? You better be - their card REQUIRES it. On the other hand RAMBOards require NO soldering to install, the only exception being a handful of older 1541C's. That's not all - the other guys say they don't use parameters, but what they really mean is they don't WRITE parameters. The user is required to make special critical "copy adjustments" to copy software. Sounds like creating parameters to us. On the other hand, RAMBOard uses Maverick parameters, designed by experts to instantly and easily copy today's toughest titles. So when the other guys say that their card will copy "everything", that may be true - providing that you can figure out the proper "copy adjustment" settings for everything. Good luck!

The differences go beyond the product itself. Software Support International is the company that began with the award winning Kracker Jax series of archival parameters. Our customer support system has earned industry praise, and we've established a reputation for honesty and integrity. A close look at the track record of the other guys will show just how deep our differences run. So when you're ready to get involved with the future of archival technology, pick RAMBOard - a product you can trust, from a company you can trust.

## The RAMBOard

**1541/1541C Version: $34.95**

NEW **1541 II Version: $44.95**

**1571 Version: $49.95**

**ATTN. C-128D Owners — The 1571 RAMBOard is for external drives only.**

The RAMBOard is an optional Maverick accessory

# THE 1750 CLONE

*Are You Overdrawn At The Memory Bank?*

Ah, the venerable Commodore 64/128. Stock, it has better sound than an Atari ST. Better graphics than a CGA equipped IBM. And more memory than....

Uh-oh.

As powerful as the Commodore is, memory has always been its weak spot. Some brilliant programmers have found some ingenious ways to work within the computer's very limited available RAM, but the fact remains that you can only go so far with 64 or even 128K. But you can go MUCH further with 512K.

The bad news is that Commodore's own 1750 512K RAM Expansion Unit (REU) is expensive and almost impossible to find. The good news is, we did something about it.

We bought brand new Commodore 1764 REU's, which come with only 256K of RAM. Next, we installed a 256K upgrade which was custom engineered to our demanding specifications. Once modified, we tested each and every unit and warranted them to be free from defects. The final product is called the 1750 Clone, and it's all the room you'll ever need on a simple plug in cartridge.

Once on board, you'll have a whopping 512K of RAM - the SAME amount of memory found on the Amiga 500. Your Commodore will operate at advanced levels of performance that the original designers never even dreamed of! You'll be amazed at the enhanced capabilities of software that takes advantage of the 1750 Clone, programs like GEOS, PaperClip III, and our own Maverick, to name a few.

The 1750 Clone works EXACTLY like the original 1750. It will open the door on years of extended use from your Commodore as even newer, more powerful software appears on the horizon, software that requires the room the 1750 Clone can provide.

Twin Cities 128 magazine says they "can completely recommend the 1750 Clone." Once you see it work, you'll feel the same way. So don't buy a whole new computer just to get more memory. Get the 1750 Clone instead -and get another decade of satisfaction from your Commodore.

***IMPORTANT NOTES - READ CAREFULLY***

C-64/64c (but NOT C128/128D) owners MUST buy a heavy-duty power supply to use these units. The power supply is NOT included - it is available from us separately. If you ALREADY own a 1764 RAM cartridge, we can upgrade it for you. Your unit MUST be in perfect working order for us to upgrade it. The turnaround time on upgrades is approx. 2 weeks. It will NOT be necessary for you to purchase a new power supply - the one that came with your 1764 will still work fine.

**THE 1750 CLONE ONLY . . . . . $199.95**

**1764 UPGRADE ONLY . . . . . $124.95**

ALL NEW

# FasTrac/128 by Mike J. Henry

*Look Who's Come Out Of The Basement*

ALL NEW

At Software Support International, we've gained a reputation for providing Commodore owners with the products they need to get the most out of their computers. We've never hesitated to do whatever it took to provide you with the best software on the market. So when we decided to produce the ultimate 128 utility system, we went looking for one of the ultimate programmers.

We found him.

Mike J. Henry, the brilliant young programmer who was the driving force behind the "Basement Boys", the software team that created the phenomenal Fast Hack 'Em, has turned his considerable talents onto the 128. The result: FasTrac/128, the TOTAL utility system for your 128.

Here's a list of the major features found in FasTrac/128. ALL use both 40 and 80 column outputs and are PAL compatible for our overseas users. Read carefully -FasTrac/128 does some truly amazing things:

- **FasTrac/128 Disk Copy:** Single or dual drive / Copy with or without verify / Copy in 1541, 1581, or true 1571 formats / 1764-1750 RAM expansion support / 64K video RAM support / Uses the 128's additional memory.
- **FasTrac/128 File Copy:** Single or dual drive / File Copy between ANY two Commodore compatable Drives including the SFD-1001, MSD drives, hard drives, and others / Copy in 1541 or true 1571 formats / 1581 file copy with partition support / 1764-1750 RAM expansion support / 64K video RAM support / Uses the 128's additional memory.
- **FasTrac/128 M/L Monitor:** Go ANYwhere in memory / Access both main banks / Full scrolling in both directions / Includes scrolling DriveMon.
- **FasTrac/128 Directory Editor:** Edit and organize ANY standard directory / Edit 1541 or true 1571 formats / Edit 1581 directories with full partition support.
- **FasTrac/128 IBM™/MFM Disk Copier:** Copy standard IBM formatted 360K 5.25" disks with your 1571 drive (required) / 1764-1750 RAM expansion support / 64K video RAM support / Uses the 128's extra memory to copy in fewer passes.
- **FasTrac/128 1581 Duplicator:** Single or dual drive / 1764-1750 RAM expansion support / 64K video RAM support / Uses the 128's additional memory / This is the fastest 1581 to 1581 copier ever created!

Quite a package, eh? We don't want to mislead you - FasTrac/128 is NOT for copying protected software. Our own Maverick™ already has those bases more than covered. FasTrac/128 was designed to allow serious 128 users to get total control of their computers.

If you want to own the finest set of utilities ever made for the Commodore 128, we've just made it a lot easier - we've told you the name . . .

**Mike J. Henry's FasTrac/128**

**Only $34.95**

**ATTN. REGISTERED Maverick Owners ONLY: You may buy ONE (1) copy of FasTrac/128 for only $20.00**
**This offer is ONLY for orders placed with Software Support.**

ALL NEW

# THE 1581 TOOLKIT V2

*If You've Been Waiting For A Sign, This Is It.*

ALL NEW

Introducing the 1581 Toolkit Version 2, the newest incarnation of the best program you can buy for your 1581 disk drive. How good is it? Well, V1 received 4 1/2 of a possible 5 stars from INFO™ magazine - and V2 is even better. What can it do for you? Picture using your 1581 with a:

- ★ **Fast Disk Copier**
- ★ **Fast File Copier**
- ★ **Byte Pattern Search**
- ★ **Partition Creator**
- ★ **Ultrafast Formatter**
- ★ **Track & Sector Editor**
- ★ **Directory Editor**
- ★ **Error Scanner**
- ★ **Relocatable Fast Loader**
- ★ **File Track & Sector Tracer**

And V2 adds many new or enhanced features, like the fact that both our single drive fast data copier and fast file copier now support the 1764/1750 RAM expansion units for super-fast one pass copies, or like our 64k video RAM support for 128 owners! And remember also that all of our 1581 Toolkit utilities use hyperfast read/write routines and, wherever appropriate, allow full access to partitions.

So whether you're thinking about buying a 1581 drive or you already own a 1581 drive, we guarantee you'll never really USE a 1581 drive until you've got your hands on the 1581 Toolkit.

**NEW LOW PRICE:**

**THE 1581 TOOLKIT (3.5 disk) . . . . . NOW ONLY $24.95!**

**VERSION 1 OWNERS: Upgrade to V2 by Sending us your Original Toolkit V1 disk along with $9.95 plus S/H**

Ever wish you knew more about your 1581? David Martin's book, "The 1581 DOS Reference Guide", is what you've been wishing for. Martin's invaluable resource holds over 100 pages of detailed information that took over a year of solid research to compile. This exhaustive manual will show you the inner workings of the 1581 as nothing else can. Order now, and we'll include some additional utilities like a machine language monitor with DriveMon - the perfect companion to The 1581 DOS Reference Guide!

**THE 1581 DOS REFERENCE GUIDE / $14.95**

**SPECIAL OFFER: GET BOTH THE 1581 REFERENCE GUIDE AND THE 1581 TOOLKIT FOR ONLY $34.95**

# C-128 VIDEO RAM UPGRADES

*For 128 Owners Who Refuse To Be Left Behind*

When Commodore first released the new 128D, we got one, opened it up, and took a good look. It didn't take long to discover one MAJOR difference. The standard C-128 has just 16K of video RAM, while the newer 128D has 64K: 400% more!

We knew that there were tremendous advantages to the extra RAM. Like being able to scroll through video memory or the potential for greatly enhanced color resolution. And, since Commodore had seen fit to make it a standard feature on all new 128D's, we knew it was only a matter of time before new software started taking advantage of the full 64K.

That time has arrived. Programs like BASIC 8, the BASIC 8 Toolkit, Spectrum 128, Sketchpad 128, and News Maker 128 have all been coded to utilize the full 64K of video RAM found on the 128D's. So if you've got a regular C-128 with only 16K of video RAM, you've got a problem. And we've got the solution.

You could upgrade on your own - but if thoughts of splattered solder and heat-damaged motherboards bother you, relax: we've developed a module that just plugs right in to your C- 128. No soldering, no hassles. Now your computer can have the same 64K video RAM as the new machines. And you'll be ready for whatever the future holds.

**PLUG-IN 64K VIDEO RAM UPGRADE FOR C-128's**

**ONLY $49.95**

Includes easy installation instructions

NEW LOW PRICE

# KRACKER JAX VOLUMES 1-7

*We Just Made A Good Thing Better - Without Lifting A Finger.*

Kracker Jax, our ground breaking series of copy parameters, was always a superior product. When we made it, we made it right. So how can we improve it now? Easy. We slashed the price!

Each Volume of Kracker Jax allows you to make Unprotected versions of around 100 specific popular titles. No special knowledge or tools are required. Each Volume originally sold for $19.95. So if you wanted all 7 Volumes, it would have cost you $139.65. But now, you can buy each Volume for only $9.95 or, for you bargain hunters, you can buy **ALL 7 VOLUMES FOR ONLY $29.95!** That works out to a cost of only **$4.28** each!

We've also cut the price on The Shotgun II, one of the most powerful nibblers ever produced. Originally $14.95, you can now own it for only **$9.95!**

And just because there's a remote chance that it might be your birthday, we'll go one step further: Buy the Kracker Jax Volume 1 -7 package for **$29.95,** and we'll throw in The Shotgun II nibbler **FREE!** Quite a deal, huh? But if you want it, better hurry - supplies are limited. After all, nothing good lasts forever.

SOFTWARE SUPPORT INTERNATIONAL

**PLEASE READ BEFORE ORDERING:** We accept money orders, certified checks, VISA, M/C and, Discover. Previous Software Support customers may use C.O.D. and personal checks. Orders shipped to U.S.A. (48 states), F.P.O., A.P.O., or possessions, please add $3.50 per order for S & H. U.S. shipping is by UPS ground in most cases. FAST 2nd DAY AIR available: add $1.00 per pound additional (U.S. 48 states only). Alaska or Hawaii (all orders shipped 2nd day air), please add $7.50 per order for S & H. C.O.D. available to U.S. customers only (50 states): add $2.75 along with your S & H charges per order. Canadian customers may calculate the S & H charges by including $4.00 (minimum charge) for the first two pieces of SOFTWARE and $1.00 for each additional piece per shipment. All monies must be submitted in U.S. funds. Canadians must call or write for hardware shipping charges. Foreign customers must call or write for shipping charges. Defective items are replaced at no charge if sent postpaid. All in stock orders are processed within 24 hours. U.S. SOFTWARE orders over $100 will be shipped 2nd Day Air at our regular $3.50 S & H charge (48 states only). Washington residents please add 7.6% additional for Sales Tax. All prices subject to change. All sales are final unless authorized by management.

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# GAZETTE READERSHIP SURVEY

*What do you like most about* COMPUTE!'s Gazette? *And what don't you like? We want this magazine to be as useful and interesting as possible and to provide you with the coverage you want most.*

*Please take a moment to fill out and mail us this questionnaire (photocopies are fine if you'd prefer not to mark up or deface your personal issue). Note that some questions may require more than one answer.*

*Mail questionnaires to* Gazette Readership Survey, P.O. Box 5406, Greensboro, North Carolina 27403.

**1. What computer(s) do you own or use?**

☐ 128
☐ 64
☐ Other (please specify)

_____
_____
_____

**2. Do you plan to purchase another computer within the next year?**

☐ Yes
☐ No
☐ Undecided

**If you answered *Yes* to the above question, which computer do you plan to buy?**

_____

**3. Do you use GEOS?**

☐ Yes
☐ No

**4. Are you a member of a Commodore user group?**

☐ Yes
☐ No

**5. What types of software have you purchased in the past year?**

☐ Word processor
☐ Programming language
☐ Graphics design
☐ Telecommunications
☐ Education
☐ Games
☐ Business applications
☐ Other
☐ None

**6. Which language do you prefer for programming?**

☐ BASIC
☐ Machine language
☐ Other (specify)_____
☐ I don't program

**7. Which part of the magazine do you like most? (Check no more than two.)**

☐ Features
☐ Reviews
☐ Games
☐ Programming
☐ Departments
☐ Program Listings
☐ Advertisements

**8. Which columns do you read regularly?**

☐ Editor's Notes
☐ Letters to the Editor
☐ Commodore Clips
☐ Feedback
☐ BASIC for Beginners
☐ Machine Language Programming
☐ D'Iversions
☐ The GEOS Column
☐ Horizons
☐ The Programmer's Page

**9. Do you use *SpeedScript?***

☐ Yes
☐ No

**10. Please rate *Gazette* on a scale of 1–10 in the following areas (10 for highest grade, 1 for lowest):**

General news and product information ____
Technical information ____
Graphic presentation ____
Quality of programs ____
Quality of writing and editing ____
Overall grade ____

**11. Do you use programs published in *Gazette?***

☐ Yes
☐ No

**If so, how do you obtain them?**

☐ Type them in
☐ *Gazette Disk*
☐ Other (please specify) _____

**12. What types of programs would you like to see in upcoming issues?**

_____
_____
_____
_____

**13. What other computer magazines do you read regularly?**

_____
_____
_____
_____

**14. How did you get this copy of *Gazette?***

☐ Newsstand
☐ Subscription
☐ Pass-along
☐ Library

**Additional comments:**

_____
_____
_____
_____

This was a *great* year for 64 games. Despite doomsayers' predictions of a dwindling market, outdated technology, and bored consumers, the year produced as many outstanding games for 64 players as any in recent memory. Picking the best of the year wasn't easy, although there are tougher jobs than reviewing lots of great games. To our review sessions we brought certain criteria: Does the game succeed on more than one level? Are graphics, sound, and play-ability well balanced? Is the game innovative? In addition, we brought a healthy subjectivity to the process: We know what we like and enjoy, just as you do. Let us know what you think.
And now, our selections....
Keith Ferrell, Mickey McLean, and Tom Netsel
BEST GAMES
'89
C64/128
Commodore 64/128
ORIGIN
EPYX
SIMCITY
MAXIS
DR. DOOM'S REVENGE!
PARAGON SOFTWARE
C64/128
R. DOOM'S REVENGE

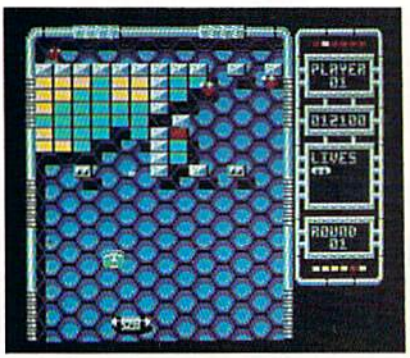
## The Amazing Spider-Man and Captain America in Dr. Doom's Revenge

**Paragon Software**
Distributed by Medalist International
A Division of MicroProse Software
180 Lakefront Dr.
Hunt Valley, MD 21030
$34.95

Doom looms over New York City, and only Spider-Man and Captain America can save the day in *Dr. Doom's Revenge*. The evil doctor possesses a nuclear missile, and it's up to the superheroes to stop him in this groundbreaking arcade game. Instead of progressing through various levels of arcade action, you follow a story line that takes the form of an onscreen comic book.

Since the game takes on the characteristics of a comic book, you should expect superior graphics and animation. You won't be disappointed. Spidey and the Captain react and move realistically through their battles with Doom's henchmen, and the full-screen comic-book pages are richly detailed. These and many other exceptional features make *Dr. Doom's Revenge* the top arcade game for 1989.

## Honorable Mentions




### Arkanoid II: The Revenge of Doh

**Taito Software**
267 W. Esplanade
North Vancouver, B.C.
Canada V7M 1A5
$29.95

This was the year of the sequel, and not just in the movie industry. Taito's *Arkanoid II* picks up from the original and features outstanding graphics, showing just how much can be done on a 64. You'll find it hard to stop playing this game.

### Gauntlet II

**Mindscape**
3444 Dundee Rd.
Northbrook, IL 60062
$29.95

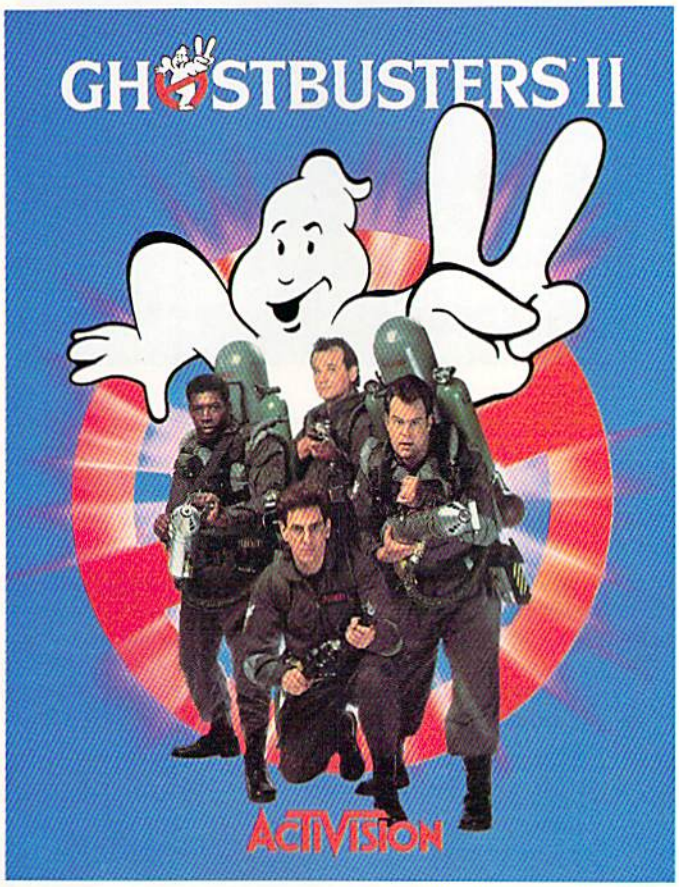
Another sequel, *Gauntlet II* was also a strong contender for best arcade game. This coin-op translation features most of the action, sound, and animation found in arcades around the country. One or two players can choose from four characters and explore treacherous mazes while battling the enemy.

### Chomp!

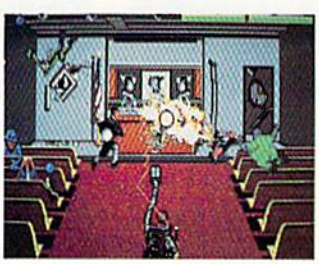
**Cosmi**
431 N. Figueroa St.
Wilmington, CA 90744
$24.95

Ever wish you were a fish? With *Chomp!*, you can live the aquatic life while learning that only the fittest survive. You must eat enough in order to jump to the next tank, all the while staving off predators. The ultimate goal is to reach ultimate freedom, the river. Sound, graphics, and animation are excellent. ▷

# Bustin' Makes You Feel Good!




**Who ya gonna call? The Ghostbusters—again.**
Clear the courtroom of ghouls and get back in business. Bust your pals out of the insane asylum. Trap ghosts around New York City, then turn the slime to your side and march the Statue of Liberty across town to the Museum. If you've got the slimeblower, wasting the evil Vigo should be easy.



Get Ready to Believe Them.

Launch Miss Liberty on a rescue mission.

ACTIVISION

See your local retailer, or call 1-800-227-6900 to order.

©1989 Activision Software. Software ©1989 Dynamix Inc. Ghostbusters™ II logo ©Columbia Pictures Industries, Inc. All rights reserved.

Circle Reader Service Number 105

## Keith Van Eron's Pro Soccer

**MicroPlay Software**
Marketed by Medalist International
A Division of MicroProse Software
180 Lakefront Dr.
Hunt Valley, MD 21030
$34.95

Whether you're a fan of the indoor or the outdoor game, you'll enjoy *Pro Soccer*. Realistic player and ball movements and detailed graphics make this the top sports game of 1989. An overhead view of the action provides an excellent perspective of the game. In the outdoor version, weather can even become a factor with thunderstorms making the footing treacherous.

You can play out a World Cup tournament with the outdoor game or play out an MISL season with the indoor portion of the game. The extensive documentation will have you performing everything from banana shots to Pelé-style backward overhead kicks in no time.

## Honorable Mentions

### Kings of the Beach Professional Beach Volleyball

**Electronic Arts**
1820 Gateway Dr.
San Mateo, CA 94404
$29.95

Set the ball for your partner and go for the spike! *Kings of the Beach* brings the fun and excitement of beach volleyball to your 64. Practice courts help your skills as you prepare for the Tournament of Kings. The realistic movements and reactions of the players have made this game a favorite with the COMPUTE! volleyball crowd.

### International Team Sports

**Mindscape**
3444 Dundee Rd.
Northbrook, IL 60062
$29.95

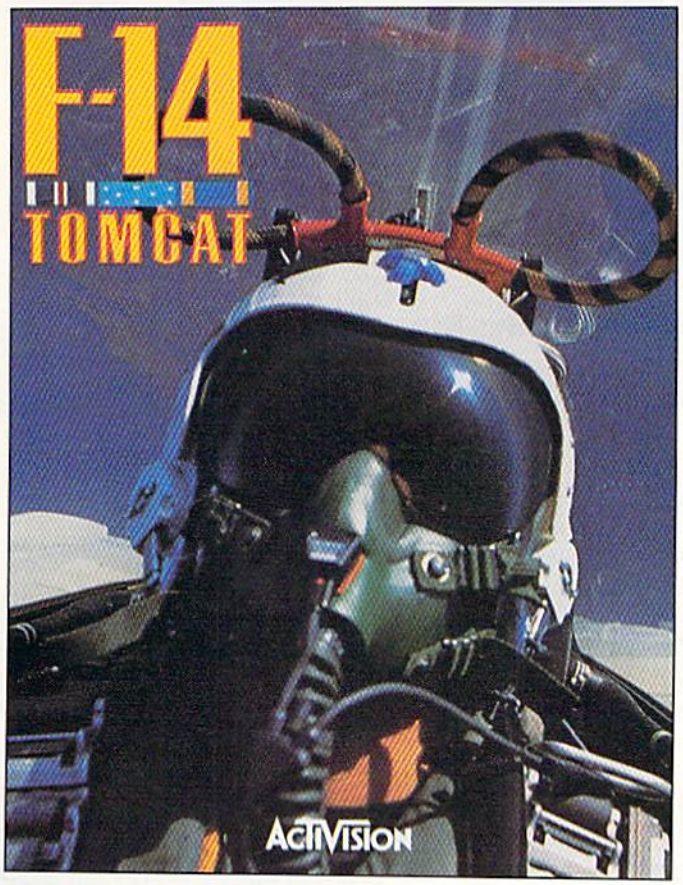
Choose your country, select the best athletes, and take on the world in *International Team Sports*. Compete in soccer, swimming, track, volleyball, and water polo. You not only play, you must also coach. Graphics and animation are what can be expected from another award-winning sports game designed by SportTime for Mindscape.

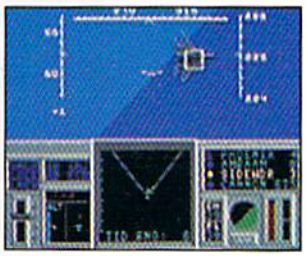
### Omni-Play Basketball

**SportTime Computer Software**
3187-G Airway Ave.
Costa Mesa, CA 92626
$34.95

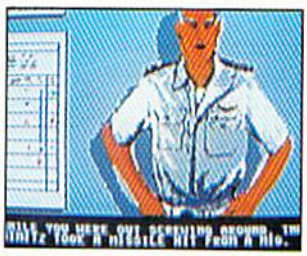
SportTime wins again, but this time with its own release, *Omni-Play Basketball*. The game takes on a television perspective with commentators providing pregame and halftime shows. In addition to full five-on-five action on the court, you can build your team into SBA champions. Additional game modules are available to add to the fun. ▷

# Will they call you "Tinkerbell" or "Deadeye"?



Take on the best pilots in one-on-one dogfights at the Naval Fighter Weapons School to find out who is the real top gun.



You don't know what a good chewing out is until you've ticked off Admiral Hawk. Wipe that smirk off your face, Lieutenant.

Find out, on the toughest fighter training ground in the world. In *F-14 TOMCAT.*

Master the fine points of aerial combat. Move up the ranks in your tours of duty aboard the carrier *U.S.S. Nimitz.* And test your dogfighting skills against the most elite pilots in the world.

*F-14 TOMCAT* features 80 randomly assigned missions in five theaters. 1st-person in-the-cockpit realism. And feel-it-in-your-gut aerial maneuvers. It's the best-selling combat flight simulator on the Commodore today.

Think you're a "Top Gun"? Then prove it, hot-shot, in *F-14 TOMCAT.*

*"F-14 TOMCAT is one of the best combat flight simulators for the 64. Graphics, sound, and action are excellent, and the framework of a career scenario adds a sense of realism and purpose."*
***— Compute's Gazette***

*"F-14 gives you a shot at being one of America's most elite fighter pilots."*
***— Computer Gaming World***

ACTIVISION®

See your local retailer, or call 1-800-227-6900 to order.

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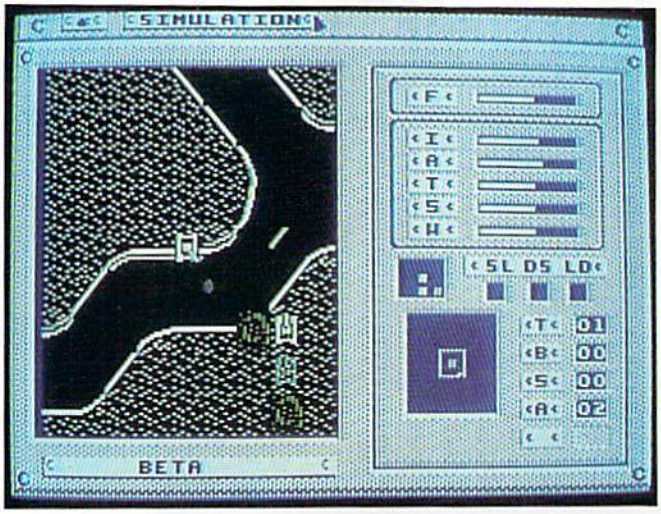
Circle Reader Service Number 108

## Omega



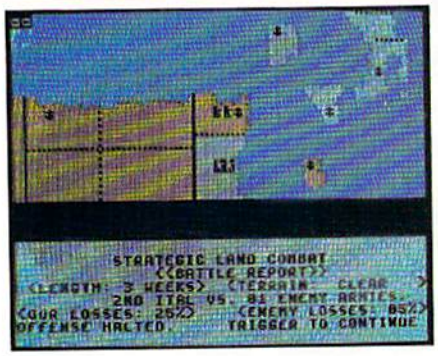

**Origin**
136-B Harvey Rd.
Londonderry, NH 03053
$49.95

A game that teaches programming skills while providing superb interactive combat, *Omega* was the year's most original war game.

Join an elite team of cybernetic-tank engineers, designers of sophisticated war machines. Specify the chassis, the weapon system, and the electronic countermeasures of your own futuristic battle chariot, but don't stop there. Give your tank a brain, too.

An English-based Cybertank Command Language gives your creation the artificial intelligence it needs to seek out and destroy enemy cybertanks. Test your design on a battlefield of your own creation—then challenge the world. Upload and download cybertanks via modem from bulletin boards or from other computer makes. Compete in team or individual free-for-alls where the best and smartest machine wins.

## Honorable Mentions

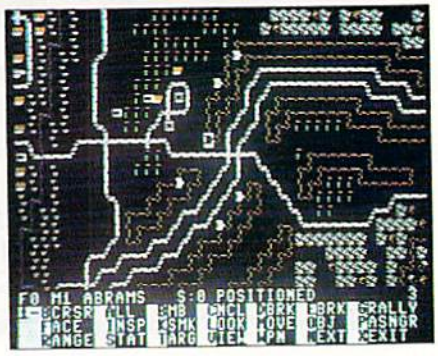



### Storm Across Europe

**Strategic Simulations**
Distributed by Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
$49.95

This strategy game covers every aspect of the 1939–1945 war in Europe. One to three players command armies from northern Europe to North Africa, from England to the Urals. Paratroops, infantry, armor and air support are all under your command.

Mount amphibious landings, send U-boats against Allied shipping, order pinpoint bombings of Axis industrial targets, but don't neglect your side's war production and research and development. *Storm Across Europe* is a thorough game that can nonetheless be played quickly.




### Overrun!

**Strategic Simulations**
Distributed by Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
$39.95

Set in 1992, this tactical war game features eight preprogrammed scenarios. Pit Arab against Israeli forces or NATO against Warsaw Pact nations, or create your own battles with the included construction set.

Larger maps, increased weapon accuracy, new armored units, and the ability to direct counterfire against enemy artillery are new SSI features. Call for helicopters and other modern weapons as you engage the enemy in a single skirmish or an entire campaign. Our reviewer called it the most complex war game ever produced for the 64. ▷

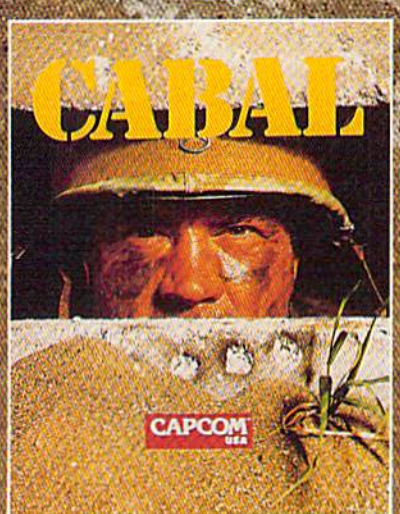
# ANOTHER ONE BITES THE DUST

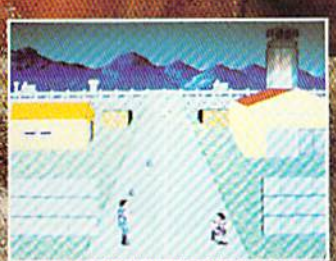
*Eliminating terrorists.*

*Easier said than done. You must destroy these soldiers of fortune who strike you with machine guns, tanks, grenades and worse. Only then can you celebrate your victories.*

*Go beyond traditional war games and see why CABAL is #1 in the arcades. The fast action of every covert operation keeps you at the edge of survival.*

*See your favorite software retailer to enlist in the excitement. Or for more details, call Capcom U.S.A. at 408-727-1665 Act fast so that "another one" is one of them.*



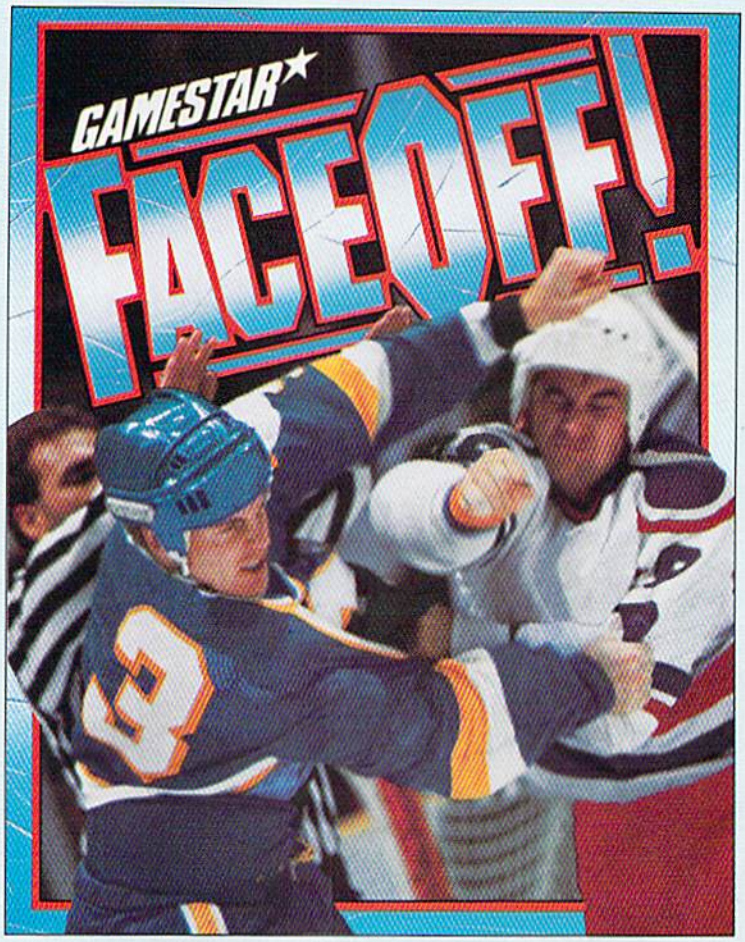



*Cabal Screen Shots.*

CAPCOM® USA

Circle Reader Service Number 131

# "I Went to the Fights and a Hockey Game Broke Out."




Hockey is war on ice. Players travel over 30 miles an hour, the puck over 100. *FaceOff!* captures the beauty and brutality of hockey. When you see it, you'll understand why GAMESTAR—the leading sports software publisher—waited to do it right.

*FaceOff!* features the largest animated players, a hands-on full-screen fight mode, and a close-up Shot Cam. With complete league and general manager features. It's hockey the way it was meant to be—fast, furious, and violent.

**Take No Prisoners**
When the goon squad hits the ice, yank your hotshots before they're ice-spots.

**Don't Get Mad, Get Even!**
Slug it out as the Fight Cam zooms in. Better fight coverage than TV.

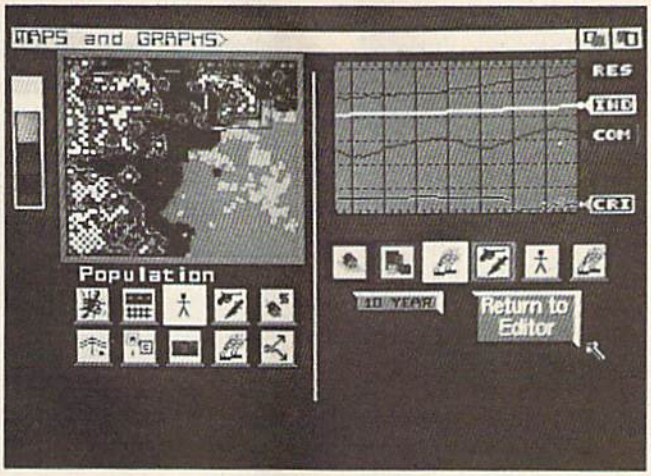
GAMESTAR

See your local retailer, or call 1-800-227-6900 to order.

©1989 GAMESTAR. IBM screens shown; screens may vary depending on computer system.
IBM is a trademark of International Business Machines Corp.
Circle Reader Service Number 106

# SIMULATIONS

## SimCity




**Maxis**
Distributed by Brøderbund
17 Paul Dr.
San Rafael, CA 94903
$29.95

A simulation that breaks new ground, *SimCity* gives you a piece of land and the tools to transform it into a thriving metropolis—or an overpopulated, polluted nightmare.

*SimCity* is truly innovative, a serious simulation that's still entertaining. Build residential communities, establish commercial and industrial sectors to provide employment, lay roads and construct bridges—you get a real sense of the many and complex aspects of city management that must be juggled in order to give your metropolis a fighting chance. (And when you get tired, you can unleash earthquakes, fires, or even Godzilla on your unsuspecting masses.) Graphs and other information provide a behind-the-scenes view of how you're doing. The manual includes an essay on city planning and a suggested reading list.

A one-of-a-kind product, *SimCity* is unquestionably the simulation of the year.

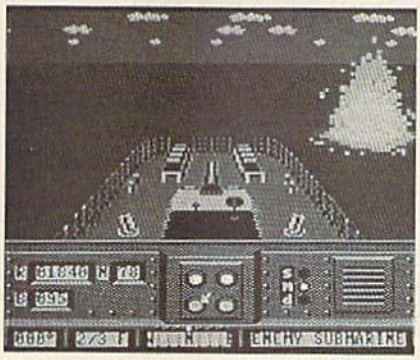
# Honorable Mentions

### F-14 Tomcat

**Activision**
3885 Bohannon Dr.
Menlo Park, CA 94025
$39.95

A solid, supersonic combat simulator, *F-14* is notable for its graphics, its realistic feel, and its sheer variety of scenarios.

Flight simulation is convincing, and combat is lightning-fast, calling for reflexes as well as control of your weapons systems. You can rise through the ranks, and there are various difficulty levels. *F-14* could herald a new golden age of 64 aviation.

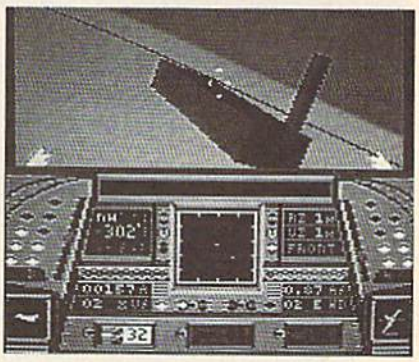


### Destroyer Escort

**Medalist International**
A Division of MicroProse Software
180 Lakefront Dr.
Hunt Valley, MD 21030
$39.95

An outstanding, if not wholly realistic, simulation of convoy escort duty during World War II, *Destroyer Escort* shows in its design both careful accuracy and judicious compromise (in the interest of gameplay).

Choose from a number of missions, as well as various levels of enemy resistance, as you oversee several battle stations.



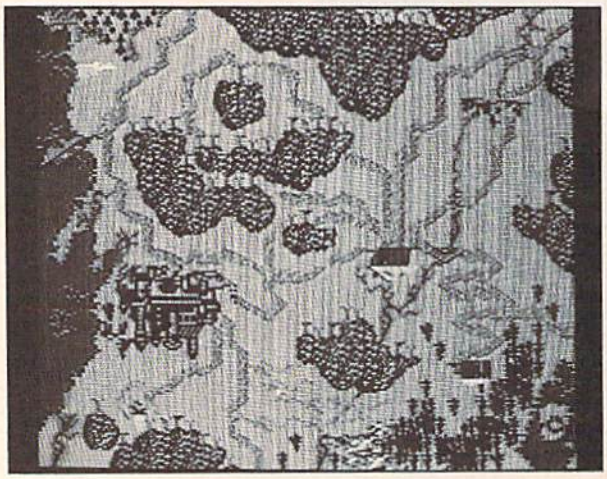
### Snow Strike

**Epyx**
600 Galveston Dr.
Redwood City, CA 94063
$29.95

A good jet-fighter simulator, *Snow Strike* is made more effective because of its underlying scenario—war against Central American drug lords in the near future.

Among its nice touches is the selection of your copilot from a group with widely differing personalities. Flight simulation is good—although the craft's controls are a bit *too* sensitive—and combat is believable. ▷

## Hillsfar/Curse of the Azure Bonds



**Strategic Simulations**
Distributed by Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
$39.95 each

In adapting Advanced Dungeons & Dragons to the computer, SSI takes a conservative approach that may play a large part in the success of these games. The conservatism is offset, though, by a thoroughness that makes the products stand out. The essence of AD & D is captured in these two products, which, along with other SSI add-ons and modules, are bringing AD & D role-players to the computer and exposing computer role-players to AD & D.

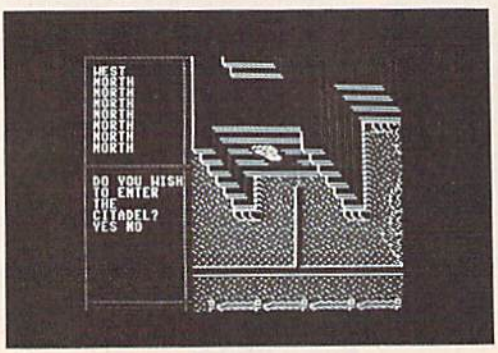
Of the two programs, *Hillsfar* is simpler—a one-player search game enhanced with arcadelike sequences.

*Azure Bonds* is a more complex, combat-oriented package, with increased emphasis on character development, spells, and character classes.

The icing on the 64 AD & D cake is the series of game-management modules SSI has produced to make "real-world" AD & D games more efficient.

SSI's Advanced Dungeons & Dragons series has captured a large following and, despite the conservatism of the approach, is helping to define the nature of role-playing games for the 1990s.

## Honorable Mentions




### Battletech: The Crescent Hawk's Inception

**Infocom**
Distributed by Mediagenic
3885 Bohannon Dr.
Menlo Park, CA 94025
$39.95

A new venue for role-playing games, a new direction for Infocom, and a new source (Japan)—plus its sheer playability—make *Battletech* stand out.

It's the future, and you're in training to become a mechanized warrior, master of a battlefield titan. Training is actually part of the game, another touch that makes this one a winner. Judicious use of text—Infocom's forte—further enhances the game's reality.

### Fire King

**Micro Forte/SSG**
Distributed by Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
$29.95

A classic fantasy role-playing game with an innovative interface, *Fire King* mingles joystick with keyboard commands to good effect. The game gives you a well-realized world filled with artifacts and characters and offers an interesting two-player mode.

*Fire King* is not particularly innovative, nor is its ambition anything out of the ordinary. What makes this game special is the attention paid to both playability and detail. G

EDITOR'S CHOICE

# KTERM

Transfer your files more reliably with this simple Kermit server for the 64 and 128. Disk drive and modem required.

**Bert Kerkhof**

Telecommunications is an increasingly popular hobby of many home computer users. A modem and a terminal program open up a whole new world of information. They allow you to access public domain software libraries, current stock-market information, and graphics files and to communicate with other computer users.

Unfortunately, due to noisy phone lines, data can become lost or garbled during transmission. In the last decade, several file-transfer protocols have been designed to detect and correct these errors. One of these, XMODEM, is now widely used. However, it has some annoying deficiencies. For one, every block XMODEM transmits must be a full 128 bytes long. As a result, it often adds zero bytes to the end of a file. Some programs, especially file archive programs, won't work correctly when these extra bytes are added. Another problem with XMODEM is that it can only transfer one file at a time.

Kermit, an advanced file-transfer protocol developed at Columbia University, corrects many of the shortcomings of XMODEM. Like XMODEM, Kermit guarantees that data will be transferred correctly, but unlike XMODEM, it doesn't add extra bytes to the end of a file. The Kermit protocol also supports a batch mode so that multiple files can be transferred without the operator intervening. "KTerm" is a terminal program for the 64 and 128 that utilizes the Kermit file-transfer protocol.

## Getting Started

KTerm is written entirely in BASIC. Enter the program using "The Automatic Proofreader," found elsewhere in this issue. Be sure to save a copy to disk when you've finished typing. If you own a Commodore 128, add or change the following lines:

```
20 BANK 15:COLOR 6,7:POKE 169,1
25 KEY 1,CHR$(133):KEY
   3,CHR$(134)
26 KEY 5,CHR$(135):KEY
   7,CHR$(136)
30 PRINT CHR$(144);CHR$(147);
   CHR$(5);CHR$(14);CHR$(11);
   SPC(30);
260 PRINT CHR$(144);CHR$(27);"F";
370 PRINT CHR$(R(G));:RETURN
1500 GET#2,G$:IF PEEK(2580) AND
     247 THEN POKE 2580,0:GOTO
     1500
1700 GET#2,G$:Y=PEEK(2580):IF Y
     THEN POKE 2580,0:GOTO 1720
```

If you own a Commodore 1660 modem, add the following line (it lets the modem receive calls when it's in answer mode):

```
165 POKE 56579,PEEK(56579) OR
    32:POKE 56577,PEEK(56577)
    AND 223
```

## Using KTerm

KTerm operates at 300 baud. When you first run it, you're asked to specify a *word size*, or the number of data bits that you'll send for each character. Enter either 7 or 8; most bulletin boards use eight data bits. KTerm then displays a help line and enters terminal mode. (Press f7 to recall the help line at any time.) While in terminal mode, everything you type is sent to the modem, and every character received is shown on the screen. You can send commands to your modem, or if you're connected to another computer, you can communicate with it.

By default, KTerm turns off local echo and relies on the host computer to echo what you're typing. If you're communicating with a computer that doesn't echo your typing, press f1 to turn on local echo. If each character you type appears twice, turn off local echo. (This situation occurs when both KTerm and the host computer echo what you type on the screen.)

To download (receive) one or more files, ask the host to send the file(s) and then press f3. KTerm responds with the following prompt:

**Receive: File Type ?**

Enter the type of the file(s) you wish to download: Type *S* for sequential files, *P* for program files, or *U* for user files. You don't have to enter the filenames; they are provided by the host computer.

KTerm constantly tells you what is happening during the transfer. A period (.) indicates that nothing is being received from the host

computer. The letter *O* signifies that an error has been detected in the data. (KTerm then asks the host computer to resend that data.) A plus sign (+) is printed when data is received correctly. It displays the message *Complete* when all the data has been transferred.

Irrecoverable error conditions, such as very bad phone lines, cause KTerm to give up. If it has to abort the file transfer, KTerm displays the message *Timeout*. When a disk error occurs on your end of the connection, Kermit refers to it as a *local* error. For example, when your disk is full, KTerm prints the message *Local disk full*.

An error that occurs at the host computer is called a *remote* error. An example message is *Remote disk read error*. Both local and remote errors can cause the transfer to end, returning you to terminal mode.

Kermit doesn't convert file data in any way. If you receive a text file from another type of computer, you must convert it from true ASCII to Commodore ASCII, and vice versa. When you receive a BASIC text file, you must use a tokenizing program to convert it to a BASIC program.

## Uploading Files

To upload a file, press f5. Kermit responds with the prompt:

**Send: Which File(s) ?**

You can type in a single filename or indicate several files by using standard Commodore wildcards. A few examples are as follows:

| | |
|---|---|
| * | Sends all files on the disk |
| **R*=S** | Sends all sequential files that begin with R |
| **?.DAT** | Sends A.DAT, B.DAT, C.DAT, and so on |

When you send files to a computer other than a 64 or a 128, use filenames that are valid for that computer. For example, filenames on IBM and compatible computers are up to eight characters long, optionally ending with a period and an extension of up to three characters.

When you're ready to exit KTerm, press the RUN/STOP key.

## KTerm

```
FH 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS, INC. -
       ALL RIGHTS RESERVED
AX 20 POKE53280,14:POKE53281,1
      4:POKE169,1
XX 30 PRINT"{CLR}{WHT}";CHR$(1
      4);CHR$(8);SPC(10);
CP 40 PRINT"{CLR}":PRINTTAB(6)
      "COPYRIGHT 1989 COMPUTE!
      "
BX 50 PRINTTAB(8)"PUBLICATIONS
      ,{2 SPACES}INC."
SF 60 PRINT:PRINTTAB(8)"ALL RI
      GHTS RESERVED"
FP 70 FOR JF=1TO3000:NEXT:PRIN
      T:PRINT
SJ 130 PRINT"KERMIT FILE TRANS
      FER":PRINT
FE 140 INPUT"NUMBER OF DATA BI
      TS ? 8{3 LEFT}";B
GF 150 IF B<>7 THEN OPEN 2,2,0
      ,CHR$(6)+CHR$(0):B=0
AF 160 IF B=7 THEN OPEN 2,2,0,
      CHR$(38)+CHR$(96):B=128
QA 170 OPEN 15,8,15:Z$=CHR$(0)
      :PRINT
CG 180 GOSUB420:DIM R(255),S(2
      55),N$(143)
FQ 190 H(1)=32:H(2)=192:H(3)=6
      4:PRINT
QG 200 FOR I=0 TO 31:S(I)=I:NE
      XT
BG 210 R(8)=20:R(13)=13:S(20)=
      8:S=32
QS 220 FOR J=1 TO 3:G=H(J):FOR
       I=G TO G+31
JH 230 S(I)=S:R(S)=I:S=S+1:NEX
      T:NEXT
KK 240 DEF FNC(I)=32+(I+(I AND
       192)/64 AND 63)
GC 250 DEF FNT(I)=(I OR 64)-(I
       AND 64)
GB 260 B$=CHR$(20):C$="{P}":PR
      INT"{BLK}";C$;
KG 270 GET#2,G$:IF G$="" THEN
      {SPACE}290
AM 280 G=ASC(G$):GOSUB370:GOTO
      270
AP 290 GET G$:G=ASC(G$+Z$):IF
      {SPACE}G=0 THEN 270
HB 300 IF G>132 AND G<137 THEN
       330
XD 310 G=S(G):IF H THEN GOSUB3
      70
HB 320 PRINT#2,CHR$(G);:GOTO27
      0
KK 330 PRINTB$;"{WHT}":N$="":T
      $="":E=0
QJ 340 ON G-132 GOSUB390,450,7
      60,420
XQ 350 PRINT:GOTO260
SE 360 REM ++ PRINT BYTE ++
PC 370 PRINTB$;CHR$(R(G));C$;:
      RETURN
CJ 380 REM ++ F1, ECHO ++
HP 390 PRINT"ECHO: ";MID$("ON
      {SPACE}OFF",H+1,3)
FB 400 H=3-H:RETURN
RF 410 REM ++ F7, HELP ++
SQ 420 PRINT"{RVS}F1{OFF}=ECHO
      {2 SPACES}{RVS}F3{OFF}=
      RECEIVE{2 SPACES}{RVS}F
      5{OFF}=SEND{2 SPACES}
      {RVS}F7{OFF}=HELP"
RB 430 RETURN
XR 440 REM ++ F3, RECEIVE ++
PC 450 INPUT"RECEIVE: FILE TYP
      E ? S{3 LEFT}";T$
HE 460 IF T$="" THEN RETURN
CH 470 GOSUB1890:GOSUB1670:P=4
      :GOSUB670
XX 480 IF E=0 THEN GOSUB1920
MC 490 IF E>1 THEN 630
RC 500 E=0:GOSUB1320:P=0:P$=""
QX 510 GOSUB670:IF W$="B" THEN
       E=2
EG 520 IF E THEN 630
FA 530 GOSUB2050:I$=I$+",P"+T$
PJ 540 OPEN 8,8,8,I$+",W":GOSU
      B2020
QJ 550 IF E THEN 620
RK 560 GOSUB1320:GOSUB670
ES 570 IF W$="Z" THEN E=1
AM 580 IF E THEN 620
MP 590 PRINT#8,I$;
AK 600 IF ST THEN E=5:I$="WRIT
      E ERROR"
JP 610 GOTO550
KS 620 CLOSE 8:GOSUB2020:GOTO4
      90
DH 630 IF E>4 THEN U$="E"+I$
FB 640 P=0:P$="":IF E<>4 THEN
      {SPACE}GOSUB1320
EX 650 GOTO1150
EA 660 REM ++ RECEIVE PACKET +
      +
KE 670 FOR J=1 TO 5:X=P:GOSUB1
      490
HB 680 PRINTMID$("+O.O",Y,1);
CD 690 U$=MID$("YYNN",Y,1):U=K
KB 700 ON Y GOTO730,710,720,72
      0
EB 710 U=K-1 AND 63:U$=U$+A$:X
      =A
JA 720 GOSUB1320:NEXT:E=4:RETU
      RN
FG 730 K=K+1 AND 63:U$=U$+P$
XF 740 A$=P$:A=P:RETURN
KJ 750 REM ++ F5, SEND ++
CD 760 INPUT"SEND: WHICH FILE(
      S) ";N$
XM 770 IF N$="" THEN RETURN
KA 780 OPEN 8,8,0,"$:"+N$
QX 790 GOSUB2020:IF E THEN 910
MA 800 GET#8,G$,G$:FOR N=0 TO
      {SPACE}143
XK 810 GET#8,G$,G$,G$,I$
DA 820 IF ST THEN 910
JH 830 N$=STR$(ASC(G$+Z$)+ASC(
      I$+Z$)*256)
MX 840 FOR I=1 TO 40:GET#8,G$,
      I$
BF 850 N$=N$+G$+I$:IF I$>"" TH
      EN NEXT
RF 860 T$=MID$(N$,25,1)
BX 870 IF T$<>"P" AND T$<"S" T
      HEN 810
DP 880 FOR I=7 TO 23
RH 890 IF MID$(N$,I,1)<>CHR$(3
      4) THEN NEXT
BB 900 N$(N)=MID$(N$,7,I-7):NE
      XT N
RA 910 CLOSE 8:GOSUB2020:IF E
      {SPACE}THEN 1150
CK 920 PRINT"NUMBER OF FILES:"
      ;N
MX 930 IF N=0 THEN RETURN
SX 940 GOSUB1890:U$="S"+P$:X=4
      :GOSUB1250
XC 950 X=0:IF E THEN 1120
AJ 960 GOSUB1920:F=0
BR 970 E=0:IF F=N THEN E=2:GOT
      O1110
BS 980 I$=N$(F):GOSUB2050
CR 990 U$="F"+I$:GOSUB1200:IF
      {SPACE}E THEN 1110
JB 1000 OPEN 8,8,8,N$(F):GOSUB
       2020
JJ 1010 IF E THEN 1090
PR 1020 U$="":V=0:FOR I=1 TO 9
      6
BD 1030 GET#8,G$:G=ASC(G$+Z$):
      U$=U$+CHR$(G)
EK 1040 IF G AND B THEN V=V+1:
      G=G-B
SP 1050 IF G<32 OR G=35 OR G=Q
       OR G=127 THEN V=V+1
AH 1060 IF ST THEN E=1:GOTO108
      0
KF 1070 IF I+V<P(1) THEN NEXT
```

```
CQ 1080 U$="D"+U$:GOSUB1250:GO
        TO1010
QX 1090 IF E<3 THEN U$="Z":GOS
        UB1200:F=F+1
JD 1100 CLOSE 8:GOSUB2020:IF E
        <2 THEN 970
DD 1110 IF E<3 THEN U$="B":GOS
        UB1200
BP 1120 IF E<5 THEN 1150
PE 1130 U$="E"+I$:GOSUB1200:I$
        =MID$(U$,2)
ES 1140 REM ++ END MESSAGE ++
SF 1150 U$="COMPLETEREMOTE
        {LEFT}TIMEOUT LOCAL"
PK 1160 PRINT:PRINTMID$(U$,E*8
        -15,8);
EA 1170 IF (E AND 1)=0 THEN PR
        INT:RETURN
HC 1180 GOSUB2050:PRINT" ";I$:
        RETURN
HH 1190 REM ++ SEND STRING ++
PQ 1200 V=0:FOR I=1 TO LEN(U$)
GC 1210 G=ASC(MID$(U$,I,1)+Z$)
CX 1220 IF G<32 OR G=35 OR G=Q
         THEN V=V+1
GS 1230 NEXT
EM 1240 REM ++ SEND PACKET ++
BJ 1250 FOR J=1 TO 5:U=K:GOSUB
        1320
PP 1260 GOSUB1490
JF 1270 IF W$="N" AND (Y=1 OR
        {SPACE}P) THEN Y=4
QB 1280 PRINTMID$("++.O",Y,1);
AP 1290 IF Y<3 THEN K=K+1 AND
        {SPACE}63:RETURN
ES 1300 NEXT:E=4:RETURN
KA 1310 REM ++ PUT PACKET ++
MG 1320 I=1:C=66+LEN(U$)+V+U:G
        OSUB1670
CH 1330 IF I>P(3) THEN 1350
CJ 1340 PRINT#2,CHR$(P(4));:I=
        I+1:GOTO1330
CH 1350 PRINT#2,CHR$(1);CHR$(L
        EN(U$)+V+34);CHR$(U+32
        );
GG 1360 FOR I=1 TO LEN(U$)
FB 1370 G=ASC(MID$(U$,I,1)):IF
         X THEN 1410
FD 1380 IF G AND B THEN S=Q:GO
        SUB1470:G=G-B
AM 1390 IF G<32 OR G=127 THEN
        {SPACE}GOSUB1450:G=FNT
        (G):GOTO1410
MQ 1400 IF G=35 OR G=Q THEN GO
        SUB1450
QJ 1410 S=G:GOSUB1470:NEXT
KR 1420 PRINT#2,CHR$(FNC(C));C
        HR$(P(5));
HP 1430 RETURN
KX 1440 REM ++ PUT BYTE '#' ++
BP 1450 S=35
FX 1460 REM ++ PUT BYTE S ++
GC 1470 C=C+S:PRINT#2,CHR$(S);
        :RETURN
DR 1480 REM ++ GET PACKET ++
BR 1490 I$="":Y=2:W$="":T=TI+P
        (2)
XC 1500 GET#2,G$:IF ST AND 247
         THEN 1500
MJ 1510 IF G$<>CHR$(1) AND TI<
        T THEN 1500
QB 1520 C=0:IF G$<>CHR$(1) THE
        N 1650
KJ 1530 GOSUB1700:IF Y THEN 16
        50
SJ 1540 D=G-32:GOSUB1700:IF Y
        {SPACE}THEN 1650
AS 1550 U=G-32:GOSUB1700:IF Y
        {SPACE}THEN 1650
GK 1560 W$=G$:W=X+1:IF D<4 THE
        N 1610
XQ 1570 FOR I=4 TO D
HH 1580 GOSUB1700:IF Y THEN 16
        50
FJ 1590 ON W GOSUB1750,1800,18
        30,1860,1780
KE 1600 NEXT
QB 1610 C=-FNC(C):GOSUB1700:IF
         Y THEN 1650
GS 1620 IF C THEN Y=2:W$="":GO
        TO1650
CB 1630 GOSUB1700:IF Y THEN 16
        50
FG 1640 C=U<>K:IF W$="E" THEN
        {SPACE}E=3
XP 1650 Y=Y+1:IF C THEN Y=Y+1
BG 1660 REM ++ CLEAR INPUT BUF
        FER ++
PC 1670 GET#2,G$:IF G$="" THEN
         RETURN
BB 1680 GOTO1670
DS 1690 REM ++ GET BYTE ++
MH 1700 GET#2,G$:Y=ST:IF Y THE
        N 1720
EP 1710 G=ASC(G$):C=C+G:RETURN
CQ 1720 IF Y=8 AND TI<T THEN 1
        700
QP 1730 Y=2:W$="":RETURN
AD 1740 REM ++ DECODE BYTE ++
DJ 1750 IF G=P(6) THEN W=2:RET
        URN
KF 1760 IF G=Q THEN W=3:RETURN
GC 1770 REM ++ ADD BYTE ++
DC 1780 I$=I$+CHR$(G):RETURN
FD 1790 REM ++ CONTROL BYTE ++
FQ 1800 IF G<>P(6) AND G<>Q TH
        EN G=FNT(G)
QE 1810 I$=I$+CHR$(G):W=1:RETU
        RN
QX 1820 REM ++ QUOTED BYTE ++
SD 1830 IF G=P(6) THEN W=4:RET
        URN
EE 1840 I$=I$+CHR$(G OR 128):W
        =1:RETURN
KE 1850 REM ++ QUOTED CONTROL
        {SPACE}BYTE ++
HB 1860 IF G<>P(6) AND G<>Q TH
        EN G=FNT(G)
RG 1870 I$=I$+CHR$(G OR 128):W
        =1:RETURN
KM 1880 REM ++ INITIALIZE PARA
        METERS ++
JR 1890 K=0:V=0:Q=0:I$=""
GQ 1900 D$=CHR$(112)+"% @-#N"
EQ 1910 REM ++ SET PARAMETERS
        {SPACE}++
BP 1920 FOR I=1 TO 7:G$=MID$(I
        $,I,1)
AA 1930 IF G$<"!" THEN G$=MID$
        (D$,I,1)
PP 1940 P(I)=ASC(G$):NEXT:P(1)
        =P(1)-36
SA 1950 P(2)=60*(P(2)-32):P(3)
        =P(3)-32
PA 1960 P(4)=P(4)-32:P(5)=P(5)
        -32
AJ 1970 G=((P(7) AND 63)+1 AND
         63)>32
RF 1980 G$="Y":IF G THEN Q=P(7
        ):GOTO2000
HC 1990 IF B THEN G$="&":IF P(
        7)=89 THEN Q=38
MK 2000 P$=CHR$(126)+", @-#"+G
        $:RETURN
BC 2010 REM ++ CHECK DRIVE ++
PP 2020 INPUT#15,G,G$:IF G THE
        N E=5:I$=G$
ES 2030 RETURN
ES 2040 REM ++ CONVERT I$ ++
FJ 2050 G$="":FOR I=1 TO LEN(I
        $)
FF 2060 G=ASC(MID$(I$,I,1)+Z$)
DC 2070 IF G>95 THEN G=G AND 9
        5
GR 2080 G$=G$+CHR$(G):NEXT:I$=
        G$:RETURN
```

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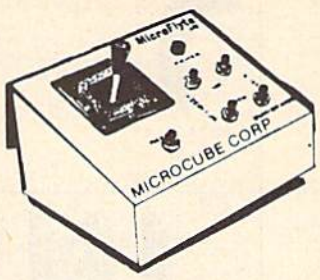


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# DISK INVENTORY

HERE'S A WAY TO CATALOG YOUR DISKS INTO A SINGLE REFERENCE LIST. FOR THE 64. PRINTER RECOMMENDED.

Having trouble locating important disk files? "Disk Inventory" can help. This utility program catalogs disk files and has two unique features. First, it can catalog several disks at once, allowing you to compile one complete list of filenames. Second, Disk Inventory automatically senses when you remove and insert a new disk, thus eliminating keyboard interaction and making the inventory process quick and easy.

## Getting Started

Since Disk Inventory is written entirely in BASIC, use "The Automatic Proofreader," found elsewhere in this issue, to type it in. When you've finished typing, make sure you save a copy of the program to tape or disk before attempting to run it.

When you're ready to inventory a disk, load the program and type RUN. The main menu will appear, offering three options. Select option 1 to inventory all files, option 2 for PRG files only, or option 3 for SEQ files only. Insert your first disk and make a selection to begin the inventory process.

As the program reads the disk files, it will display the filename, file type (*P* for program files, *S* for sequential files, and so on), and the disk name for each file. When it finishes with a disk, insert another disk or press any key to end the inventory process. The program will detect when another disk has been inserted and will automatically start reading the directory on the new disk.

After all the disks you want to inventory have been read, press any key for the final menu. From this menu, you can sort the files by name, save your inventory list to disk as an ASCII file, display the list on the screen, print the list, or exit the program. To make a selection, press the corresponding number.

If you display the list, you can slow the scrolling process by holding down the CTRL key. The sorting is done alphabetically by filename and may take several minutes, depending on the number of files. The print option works with a Commodore or Commodore-compatible printer. Make sure your printer is online before selecting the print option. If you decide to save your list to disk, you'll be prompted for a filename. Remember that filenames can be no more than 16 characters in length.

## The Sort Routine

Disk Inventory uses a shell sort to order the filenames. This type of sort is adequate when cataloging a few disks, but it may bog down if you have a large number of filenames to sort. For this reason, you may want to replace the sort routine, located in lines 650–740, with one of your own. In this routine, the information for each filename is stored in the array R$( ). Each element of R$ contains the filename (positions 1–16), the first letter of the file type (position 18), and the disk name (positions 20–35).

By default, Disk Inventory holds as many as 501 filenames (numbered 0–500). You can increase this number by changing the DIM statement in line 150. For example, to allow for 1000 filenames, you'd change this statement to DIM R$(999).

## Disk Inventory

```
FH 10 REM COPYRIGHT 1989 COMPU
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QH 20 POKE53280,0:POKE53281,0:
      PRINT"{CLR}{YEL}"
XJ 30 PRINTTAB(10)"{RVS}
      {20 SPACES}"
FQ 40 PRINTTAB(10)"{RVS}
      {3 SPACES}DISK INVENTORY
      {3 SPACES}"
AG 50 PRINTTAB(10)"{RVS}
      {20 SPACES}"
RJ 60 PRINT"{3 DOWN}{2 SPACES}
      1){2 SPACES}INVENTORY AL
      L FILES"
GE 70 PRINT"{DOWN}{2 SPACES}2)
      {2 SPACES}INVENTORY 'PRG
      ' FILES ONLY"
AC 80 PRINT"{DOWN}{2 SPACES}3)
      {2 SPACES}INVENTORY 'SEQ
      ' FILES ONLY"
MD 90 PRINT"{5 DOWN}{WHT}
      {RVS}INSERT FIRST DISK A
      ND MAKE SELECTION"
QF 100 GETA$:IFA$=""THEN100
DB 110 IFA$<"1"ORA$>"3"THEN100
XA 120 B$="$"
FP 130 IFA$="2"THENB$="$:*=P"
JA 140 IFA$="3"THENB$="$:*=S"
HR 150 DIMR$(500):CURRENT=0
JE 160 OPEN15,8,15:OPEN1,8,0,B
      $
MG 170 PRINT"{CLR}{WHT}":PRINT
      "{2 SPACES}FILENAME
      {4 SPACES}TYPE
      {3 SPACES}DISK NAME"
PF 180 PRINT"CCCCCCCCCCCCC CCC
      C CCCCCCCCCCCCC{YEL}"
QA 190 GET#1,D$,D$,D$,D$,D$,D$
```

Robert B. Schofield

```
      ,D$,D$
QE 200 DN$=""
CD 210 FORI=1TO16:GET#1,X$:DN$
       =DN$+X$:NEXTI
PB 220 GET#1,D$,D$,D$,D$,D$,D$
       ,D$,D$
BK 230 GET#1,D$,D$,L$,D$,E$
HH 240 IFE$="B"THEN350
FP 250 GET#1,X$:IFX$<>CHR$(34)
       THEN250
RJ 260 N$=""
GC 270 GET#1,X$:IFX$<>CHR$(34)
       THENN$=N$+X$:GOTO270
GH 280 GET#1,D$:IFD$=" "THEN28
       0
BD 290 T$=D$:GET#1,D$,D$
CQ 300 FORI=LEN(N$)TO16:N$=N$+
       CHR$(32):NEXTI
XG 310 R$(CURRENT)=N$+T$+CHR$(
       32)+DN$
RR 320 PRINTR$(CURRENT):CURREN
       T=CURRENT+1
HP 330 GET#1,D$:IFD$=" "THEN33
       0
QJ 340 GOTO230
AK 350 PRINT:PRINT"{WHT}{RVS}I
       NSERT NEXT DISK OR PRES
       S A KEY TO STOP"
FA 360 Q=16:GOSUB410:REM BEING
        REMOVED?
RX 370 Q=0:GOSUB410:REM FULLY
       {SPACE}REMOVED?
EG 380 Q=16:GOSUB410:REM BEING
        INSERTED?
CS 390 Q=0:GOSUB410:REM FULLY
       {SPACE}INSERTED?
DF 400 CLOSE1:CLOSE15:GOTO160:
       REM READ NEXT DISK
MK 410 GETW$:IFW$<>""THEN480
DS 420 PRINT#15,"M-R"CHR$(30)C
       HR$(0)
DH 430 GET#15,Z$:IFZ$=""THENZ$
       =CHR$(0)
PG 440 IFASC(Z$)=QTHEN410
FC 450 RETURN
BS 460 PRINT"{CLR}{DOWN} DISK
       {SPACE}ERROR: "EN$;" "E
       M$;" "ET$;" "ES$
HB 470 CLOSE15:END
SJ 480 PRINT"{CLR}{DOWN}
       {RIGHT}{WHT}{RVS} SELEC
       T: {YEL}":PRINT:PRINT:P
       RINT
MS 490 PRINT" 1) SORT BY FILEN
       AME":PRINT
EJ 500 PRINT" 2) SAVE AS AN AS
       CII FILE":PRINT
DS 510 PRINT" 3) DISPLAY TO SC
       REEN"
SA 520 PRINT"{4 SPACES}(USE <C
       TRL> TO SLOW LISTING)":
       PRINT
QK 530 PRINT" 4) PRINT LIST":P
       RINT
GK 540 PRINT" 5) EXIT":PRINT
QG 550 GETD$:IFD$=""THEN550
PD 560 IFD$<"1"ORD$>"5"THEN550
DM 570 D=VAL(D$):ON D GOTO660,
       750,590,810,580
GG 580 CLOSE15:END
AP 590 PRINT"{CLR}{WHT}":PRINT
       "{2 SPACES}FILENAME
       {6 SPACES}TYPE
       {3 SPACES}DISK NAME"
BQ 600 PRINT"CCCCCCCCCCCCC CCC
       C CCCCCCCCCCCCC{YEL}"
HG 610 FOR I=1TOCURRENT:PRINTR
       $(I):NEXTI
HC 620 PRINT:PRINT"{WHT} {RVS}
       END (PRESS ANY KEY)"
GC 630 GETD$:IFD$=""THEN630
BS 640 GOTO480
EP 650 REM *** SORT ROUTINE **
       *
EQ 660 PRINT"{CLR}{DOWN}
       {RIGHT}{CYN}SORTING..."
XK 670 M=CURRENT-1
JF 680 M=INT(M/2):IFM=0THEN480
GC 690 J=0:K=CURRENT-1-M
DX 700 I=J
AK 710 L=I+M
AP 720 IF R$(I)>R$(L)THENT$=R$
       (I):R$(I)=R$(L):R$(L)=T
       $:I=I-M:IFI>0THEN710
DA 730 J=J+1:IFJ>KTHEN680
DD 740 GOTO700
KH 750 INPUT"{CLR}{DOWN}
       {RIGHT}{WHT}FILENAME ";
       N$:N$=LEFT$(N$,16)
HK 760 OPEN2,8,8,"0:"+N$+",S,W
       "
CD 770 PRINT#2,"{2 SPACES}FILE
       NAME{4 SPACES}TYPE
       {3 SPACES}DISK NAME"
CB 780 PRINT#2,"-------------
       {SPACE}---- -----------
       --"
CX 790 FOR I=1TOCURRENT:PRINT#
       2,R$(I):NEXTI
BP 800 PRINT#2:CLOSE2:GOTO480
DE 810 OPEN4,4:CMD4
GX 820 PRINT#4,"{2 SPACES}FILE
       NAME{4 SPACES}TYPE
       {3 SPACES}DISK NAME"
FF 830 PRINT#4,"-------------
       {SPACE}---- -----------
       --"
FF 840 FOR I=1TOCURRENT:PRINT#
       4,R$(I):NEXTI
SA 850 PRINT#4:CLOSE4:GOTO480
```

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# 80 COLUMN SCREEN FLIPPER

James K. Walker

*Create 80-column help and menu screens with this short, easy-to-use machine language program for the 128. A demo is included. Disk drive and RGB monitor are required.*

With the introduction of the 128, Commodore finally had a computer that could display 80 columns of text in color. This was achieved using the 8563 Video Display Chip (VDC). This chip has its own 16K bank for storing a text screen, character attributes (such as color, reverse video, blink, and underline), and character definitions. Within this 16K bank, there's also 4K of unused memory (see the accompanying memory map). This area is ideal for locating another 80-column text screen, including character attributes. (Because it has 64K of VDC memory, the newer 128D can store up to 14 different text screens.)

Unfortunately, you cannot read or write directly to this memory. Instead, you must communicate with the VDC's 37 registers through two memory locations, $D600 and $D601 (a tricky task for both beginners and experts). "80-Column Screen Flipper" is a program that makes it easy to manage two or more 80-column text screens.

## Getting Started

80-Column Screen Flipper consists of two BASIC programs. Program 1, "Screen Flip Creator," creates a machine language file on disk called VDC.SCREEN.FLIP. This file contains the routines necessary to initialize and flip the text screens. Program 2, "Demo," shows you how to use 80-Column Screen Flipper in your own programs.

To ensure accurate typing, enter Programs 1 and 2 using "The Automatic Proofreader," found elsewhere in this issue. Be sure to save a copy of both programs to disk when you've finished typing. Once you've entered the two programs, run Program 1. After it creates VDC.SCREEN.FLIP, run Program 2 to see how easy it is to flip between screens.

## Screen-Flipping Routines

The machine language file VDC .SCREEN.FLIP contains three routines. The first of these routines is for older 128s that have been upgraded to 64K of VDC memory. The VDCs in these machines must be initialized to use the extra memory. This is done with the command SYS 2816.

The second routine changes where the 80-column text screen or the character attributes for this screen are located. The syntax of this command is

**SYS 2831,*hb*,*lb*,*rn***

where *hb* is the high byte of the address, *lb* is the low byte of the address, and *rn* is a VDC register number (12 or 20).

When you change the address for the 80-column text screen and character attributes, you need two SYS commands. To change the screen address, assign *rn* a value of 12. To change the address of the screen's character attributes, use an *rn* value of 20.

As an example, you might want to change screen memory from the default to the unused 4K at address $1000. The high byte of this address is $10 (decimal 16); the low byte is 0. Therefore, to relocate the 80-column screen to location $1000, you'd execute a SYS 2831,16,0,12. The command SYS 2831,24,0,20 changes the address of character-attribute memory to $1800.

The final routine changes the location where characters are printed in VDC memory. This means you can display one 80-column text screen while writing to another simultaneously. The format of this command is

**SYS 2861,*hbc*,*hba***

where *hbc* is the high-byte character location and *hba* is the high-byte attribute location. To output characters to the unused 4K block, use the command SYS 2861,16,24. Note that only the high bytes of the addresses are used.

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## VDC Memory Map

| Location | Description |
|---|---|
| $0000–$07FF | Text display (80 × 25) |
| $0800–$0FFF | Character attributes |
| $1000–$1FFF | Unused |
| $2000–$3FFF | Character-set definitions |

## Program 1: Screen Flip Creator

```
BH 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS, INC. -
      - ALL RIGHTS RESERVED
GC 20 FOR I=DEC("0B00") TO DEC
      ("0B42")
BF 30 READ X$: X=DEC(X$): POKE
       I,X: Y=Y+X
BG 40 NEXT I
XF 50 PRINT Y
GQ 60 IF Y=5362 THEN BSAVE "VD
      C.SCREEN.FLIP",B0,P(DEC(
      "0B00")) TO P(DEC("0B43"
      )): END
EA 70 PRINT "ERROR IN DATA STA
      TEMENTS":END
KQ 80 DATA A2,1C,20,DA,CD,09,1
      0,20,CC,CD,20,0C,CE,60,0
      0,8D,2A,0B,8E,2B,0B,8C
MF 90 DATA 2C,0B,AE,2C,0B,AD,2
      A,0B,20,CC,CD,E8,AD,2B,0
      B,20,CC,CD,60,00,00
KG 100 DATA 00,00,8D,41,0B,8E,
       42,0B,AD,41,0B,AE,42,0B
       ,8D,2E,0A,8E,2F
AX 110 DATA 0A,60,00,00,00,60
```

## Program 2: Demo

```
BH 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS, INC. -
      - ALL RIGHTS RESERVED
AJ 20 I6 = DEC("0B00"):
      {2 SPACES}REM I6
      {2 SPACES}- INITIALIZE 6
      4K VDC RAM
RF 30 SC = DEC("0B0F"):
      {2 SPACES}REM SC - CHANG
      E BEGINNING OF VDC SCREE
      N AND ATTRIBUTES
PE 40 SP = DEC("0B2D"):
      {2 SPACES}REM SP - SET P
      OINTERS FOR PRINTING TO
      {SPACE}SCREENS
EF 50 REM ****** LOAD SCREEN H
      ANDLING ROUTINES ******
XH 60 BLOAD "VDC.SCREEN.FLIP",
      B0,P(DEC("0B00"))
JQ 70 REM ****** DEMO THE ROUT
      INES ******
DG 80 REM{2 SPACES}SYS I6: REM
       *** ELIMINATE THE FIRST
       REM IF YOU HAVE 64K OF
      {SPACE}VDC RAM
RX 90 FAST: SCNCLR: GRAPHIC 5:
       COLOR 6,1
HA 100 PRINTTAB(20)"{CYN}COPYR
       IGHT 1989 COMPUTE! PUBL
       ICATONS, INC."
KK 110 PRINTTAB(30)"ALL RIGHTS
        RESERVED"
FB 120 PRINT:PRINT:PRINT TAB(3
       5)"SCREEN 1"
XA 140 PRINT:PRINT:PRINTTAB(15
       )"{RED}PRESS ANY KEY TO
        FLIP TO SCREEN 2, OR '
       Q' TO QUIT{CYN}"
HK 150 GETKEY A$: IF A$ = "Q"
       {SPACE}THEN SCNCLR: END
JA 160 SYS SP,DEC("10"),DEC("1
       8"): REM *** SET PRT PO
       INTERS TO $1000/1800 **
       *
SK 170 SCNCLR:PRINT:PRINT:PRIN
       T:PRINT:PRINTTAB(35)"SC
       REEN 2"
RR 180 CHAR 1,25,16,"{RED}PRES
       S ANY KEY TO SEE SCREEN
        1"
GF 190 SYS SC,DEC("10"),DEC("0
       0"),DEC("0C"): REM ***
       {SPACE}SET SCRN TO $100
       0 IN VDC ***
KP 200 SYS SC,DEC("18"),DEC("0
       0"),DEC("14"): REM ***
       {SPACE}SET ATTR TO $180
       0 IN VDC ***
SR 210 GETKEY A$
QC 220 SYS SC,DEC("00"),DEC("0
       0"),DEC("0C"): REM ***
       {SPACE}SET SCRN TO $000
       0 IN VDC ***
QK 230 SYS SC,DEC("08"),DEC("0
       0"),DEC("14"): REM ***
       {SPACE}SET ATTR TO $080
       0 IN VDC ***
EE 240 SYS SP,DEC("00"),DEC("0
       8"): REM SET PRT POINTE
       RS TO $0000/$0800
CX 250 GETKEY A$: IF A$="Q" TH
       EN SCNCLR: END
RG 260 GOTO 190
```

G

# 80×50 Display

Joseph Heaverin

DOUBLE THE VERTICAL RESOLUTION OF YOUR 80-COLUMN SCREEN WITH THIS POWERFUL UTILITY FOR THE 128. INCLUDED IS A ROUTINE THAT ADDS THIS CAPABILITY TO *SPEEDSCRIPT 128*. AN RGB MONITOR IS REQUIRED.

Computer users are on a continuing quest for higher text resolution. One of the first affordable home computers, the VIC-20, had a 22 × 25 text screen. The 64 soon followed with a 40 × 25 screen. The 128, with its 80 × 25 screen, offered even greater text resolution. Now comes "80 × 50 Display," a program that lets you display 50 rows of 80-column text on your 128.

And 80 × 50 Display isn't limited to the PRINT statement—any program that uses the Kernal BSOUT routine will work without modification. This includes BASIC programs, the built-in machine language (ML) monitor, and many ML programs. With the addition of a short wedge, 80 × 50 Display is even compatible with *SpeedScript 128*.

## Getting Started

Four programs comprise 80 × 50 Display: Program 1, 80 × 50 Display; Program 2, "Speed Routines"; Program 3, "Patch"; and Program 4, "Speed Boot." Program 1 is a general 80 × 50 display routine, while the others give *SpeedScript 128* this higher text resolution.

Programs 1 and 2 are written entirely in machine language. Type them in using the 128 version of "MLX," the machine language entry program, found elsewhere in this issue. When MLX prompts you, respond with the values given below.

Program 1:

**Starting address:** 1300
**Ending address:** 158F

Program 2:

**Starting address:** 0800
**Ending address:** 08D7

Before you exit MLX, be sure to save a copy of each program to disk. Save Program 1 as 80X50 DISPLAY and Program 2 as SPEED ROUTINES. It's important that you use these names because Program 4 expects to load these files.

Programs 3 and 4 are BASIC programs. To prevent typing errors while entering these programs, use "The Automatic Proofreader," also found elsewhere in this issue. When you've finished typing, be sure to save a copy of each program to disk. Save Program 3 as PATCH and Program 4 as SPEED BOOT.

Next, copy *SpeedScript 128* to your program disk and run Patch. This program loads *SpeedScript 128*, modifies it to display text in 80 × 50 mode, and then saves the modified version as SPEED80X50.

## Using 80 × 50 Display

To load the program and activate the 80 × 50 display mode, type

```
BLOAD"80X50 DISPLAY":SYS 4864
```

Your programs will run as before, only now they'll display twice as much text. To return to the 80 × 25 screen, press ESC ↑. To switch back

to 80 × 50 mode, press ESC ← or press RUN/STOP–RESTORE.

Note that if you use BASIC's WINDOW command, you can't create a window that extends beyond the 25th row even though there are 50 lines of text; attempting to do so will trigger an ILLEGAL QUANTITY ERROR. Instead, you must directly POKE the row and column parameters into the registers at 228–231. For example, to establish a 10 × 10 window in the lower left corner of the screen (at row 40), you'd type POKE 228,49: POKE 229, 40:POKE 230,0:POKE 231,9.

To use the 80 × 50 version of *SpeedScript 128*, load and run Program 4, Speed Boot. (To avoid disk swapping, the files SPEED BOOT, 80X50 DISPLAY, SPEED ROUTINES, and SPEED80X50 should be on the same disk.) All of *SpeedScript*'s commands work normally, but now you'll notice twice as much text appears on the screen as before. (Note that you can't toggle between 80 × 25 and 80 × 50 mode while in the modified version of *SpeedScript*.)

## How It Works

80 × 50 Display first copies the ROM routines at $C000–$FFFF to bank 0 RAM, and then it modifies these routines. The Kernal routine BSOUT at $FFD2 is diverted to the modified routines in bank 0. After a character has been printed, the program returns to bank 15.

To speed printing to the screen, the 128 is operated at 2 MHz while in 80-column mode and is switched to 1 MHz when the 40-column screen is used. The top-of-BASIC text storage is moved to $C000, screen memory is stored at $0000–$0FFF in 80-column RAM, and attribute memory is moved to $1000–$1FFF in 80-column RAM (which, for owners of a 128, means all 80-column memory is used; 128D users have 48K of free memory).

Several changes were made to *SpeedScript 128* that greatly increase its response time. Instead of using a loop, the VDC's fill routine pads the end of each text line with spaces. Also, the bottom of RAM to $1000 is made common and the text read and write routines are moved to $0800; this eliminates the need to switch banks when accessing each character.

BEFORE TYPING . . .

Before typing in programs, please refer to "How to Type In COMPUTE!'s Gazette Programs," elsewhere in this issue.

## Program 1: 80 × 50 Display

```
1300:AD 27 03 C9 14 D0 06 A9 5D
1308:30 8D 00 FF 60 A0 00 8C BB
1310:12 12 84 16 A9 C0 8D 13 34
1318:12 85 17 A9 01 8D 00 FF 64
1320:B1 16 91 16 C8 D0 F9 E6 9C
1328:17 A5 17 F0 09 C9 FF D0 75
1330:EF A0 05 4C 20 13 A9 30 AC
1338:8D 00 FF A2 08 A9 03 20 5C
1340:CC CD A2 04 A9 40 20 CC 30
1348:CD A2 06 A9 32 20 CC CD D2
1350:E8 A9 3A 20 CC CD A2 00 81
1358:A9 80 20 CC CD A2 14 A9 0F
1360:10 8D 2F 0A 8D 3A CA 20 83
1368:CC CD E8 A9 00 20 CC CD 08
1370:AD 24 03 8D 16 15 AD 25 35
1378:03 8D 17 15 A9 5B 8D 24 B1
1380:03 A9 14 8D 25 03 AD 26 A4
1388:03 8D 14 15 AD 27 03 8D 05
1390:15 15 A9 E6 8D 26 03 A9 DE
1398:14 8D 27 03 AD 39 03 C9 63
13A0:14 F0 29 8D 19 15 AD 38 BB
13A8:03 8D 18 15 A9 6C 8D 38 5A
13B0:03 A9 14 8D 39 03 AD 18 67
13B8:03 8D 12 15 AD 19 03 8D BC
13C0:13 15 A9 41 8D 18 03 A9 7B
13C8:14 8D 19 03 A9 31 85 E4 B1
13D0:85 ED A9 0F 8D 6C C1 8D 8A
13D8:56 C4 8D 87 C1 8D 89 C4 A1
13E0:8D 22 C5 A9 07 8D 35 CA 4D
13E8:A9 1C 8D 5F C1 8D 4D C4 36
13F0:A9 4E 8D 69 C1 8D 53 C4 77
13F8:A9 02 85 F1 A9 15 8D 60 61
1400:C1 8D 4E C4 A9 15 8D 6A A9
1408:C1 8D 54 C4 A9 80 8D 7A 30
1410:CB 8D 8B CB 8D 8E CB 8D 7B
1418:9B CB A9 80 8D 37 CA A9 C6
1420:15 8D 7B CB 8D 8C CB 8D 26
1428:8F CB 8D 9C CB A9 15 8D 43
1430:38 CA A9 4C 8D 59 FA A9 92
1438:01 8D 1B 15 A9 93 4C D2 FF
1440:FF 20 E1 FF D0 12 A9 30 FE
1448:8D 00 FF 20 40 FA 24 D7 47
1450:30 03 20 5F FF 20 00 13 DE
1458:6C 00 0A 08 24 D7 10 08 21
1460:A9 30 8D 00 FF 20 04 15 B8
1468:28 6C 16 15 C9 5F F0 5E DF
1470:C9 5E F0 35 C9 58 D0 2E 06
1478:20 A6 14 20 04 15 24 D7 73
1480:30 10 A9 00 8D 30 D0 AD 76
1488:11 D0 09 10 8D 11 D0 4C 2E
1490:97 14 AD 1B 15 D0 03 A9 8C
1498:18 2C A9 31 85 E4 85 ED D8
14A0:A9 30 8D 00 FF 60 6C 18 CD
14A8:15 A9 00 8D 1B 15 78 20 DC
14B0:81 FF 20 84 FF 20 8A FF 7B
14B8:A9 6C 8D 38 03 A9 14 8D 7A
14C0:39 03 A9 41 8D 18 03 A9 0C
14C8:14 8D 19 03 58 60 24 D7 16
14D0:30 03 20 5F FF 8D 1B 15 4D
14D8:20 00 13 A9 93 20 D2 FF D0
14E0:A9 30 8D 00 FF 60 24 D7 3D
14E8:10 17 8D 1A 15 A9 30 8D 6F
14F0:00 FF AD 1A 15 20 01 15 B0
14F8:A9 00 8D 00 FF AD 1A 15 A7
1500:60 6C 14 15 AD 11 D0 29 C5
1508:6F 8D 11 D0 A9 01 8D 30 19
1510:D0 60 00 00 00 00 00 00 BA
1518:00 00 00 00 00 28 50 78 FB
1520:A0 C8 F0 18 40 68 90 B8 E9
1528:E0 08 30 58 80 A8 D0 F8 91
1530:20 48 70 98 C0 E8 10 38 16
1538:60 88 B0 D8 00 28 50 78 12
1540:A0 C8 F0 18 40 68 90 B8 0A
1548:E0 08 30 58 80 A8 00 00 17
1550:00 00 00 00 00 01 01 01 81
1558:01 01 01 02 02 02 02 02 A1
1560:02 02 03 03 03 03 03 03 C9
1568:04 04 04 04 04 04 05 05 95
1570:05 05 05 05 05 06 06 06 A1
1578:06 06 06 07 07 07 07 07 C1
1580:00 00 00 00 00 00 00 00 AA
1588:00 00 00 00 00 00 00 00 B2
```

## Program 2: Speed Routines

```
0800:A9 9F 85 0C A9 00 A2 12 E2
0808:8E 00 D6 2C 00 D6 10 FB 74
0810:8D 01 D6 E8 A9 A0 8E 00 7D
0818:D6 8D 01 D6 AD 13 35 85 2E
0820:FB AD 14 35 85 FC A2 30 05
0828:AD 7D 27 8D 37 08 8D 48 69
0830:08 A9 7E 8D 00 FF A0 4F E7
0838:B1 FB 29 7F C9 1F F0 09 F2
0840:C9 20 F0 05 88 D0 F1 A0 B7
0848:4F C8 84 3B A0 00 A9 1F ED
0850:8D 00 D6 B1 FB 2C 00 D6 84
0858:10 FB 8D 01 D6 C8 29 7F DC
0860:C9 1F F0 04 C4 3B D0 EB 1C
0868:18 98 65 FB 85 FB A5 FC 7B
0870:69 00 85 FC E0 00 D0 02 60
0878:84 03 C0 50 F0 36 84 02 14
0880:A9 00 A0 18 8C 00 D6 2C 39
0888:00 D6 10 FB 8D 01 D6 A9 D7
0890:20 A0 1F 8C 00 D6 2C 00 39
0898:D6 10 FB 8D 01 D6 18 A9 AD
08A0:50 E5 02 C9 01 90 0D A0 34
08A8:1E 8C 00 D6 2C 00 D6 10 77
08B0:FB 8D 01 D6 CA F0 03 4C 1C
08B8:36 08 8E 00 FF A5 FB 8D D3
08C0:1B 35 A5 FC 8D 1C 35 A5 1D
08C8:03 8D 12 35 60 A9 05 8D 94
08D0:06 D5 4C 00 13 50 85 00 C7
```

## Program 3: Patch

```
MB 10 BANK1:BLOAD"SPEEDSCRIPT
      {SPACE}128",B1
BB 20 FORI=1TO7:READA$:POKEDEC
      (A$),16:NEXT
JS 30 FORI=1TO10:READA$:POKEDE
      C(A$),76:NEXT
ED 40 POKEDEC("1D54"),8:POKEDE
      C("1D53"),0
QK 50 POKEDEC("1C0F"),205:POKE
      DEC("1C10"),8
HX 60 POKEDEC("21E6"),12:POKED
      EC("21AF"),9
QJ 70 DATA1C34,2632,2646,2652,
      2685,2793,2B63
QH 80 DATA1D52,1E14,21CE,2664,
      2691,27F1,2902,2924,2AC5
      ,2DF6
XC 90 BSAVE"SPEED80X50",B1,P71
      69TOP13584
DB 100 BANK15
```

## Program 4: Speed Boot

```
MG 5 TRAP 100
GH 10 JF$="80X50 DISPLAY":BLOA
      D(JF$)
XP 20 JF$="SPEED ROUTINES":BLO
      AD(JF$)
BG 30 JF$="SPEED80X50":RUN(JF$
      )
GX 100 PRINT"INSERT A DISK CON
       TAINING "JF$
KR 110 PRINTTAB(7)"PRESS A KEY
       TO CONTINUE"
CH 120 GETKEY A$:RESUME
```

G

power BASIC

# Color Magic

**Shao-Tien Pan**

*Impress your friends with the scintillating displays you create on your 64 using this set of raster-interrupt routines.*

Looking for a way to add some pizazz to your programs? Nothing is quite as effective as color in gaining and holding the user's attention. "Color Magic" offers four machine language routines that produce interesting color-cycling effects for text. Each routine is short—under 100 bytes—and can easily be added to your BASIC programs.

## Getting Started

Color Magic consists of five short BASIC loaders. The first four programs create various patterns of text color cycling; the fifth turns off each effect. Program 1, "Mix," causes each character to change colors randomly. Program 2, "Scroll," produces the same effect, but on a line-by-line basis. Program 3, "Flash," makes all text the same color and then rapidly changes the color. Program 4, "Sparkle," cycles the text colors randomly in a columnar fashion. And Program 5, "Set," interrupts the color-cycling process.

To avoid typing errors, enter each program using the "The Automatic Proofreader," found elsewhere in this issue. Since the routines have different line numbers, you can type them in separately or combine them into a single program. Before you run any of the programs, be sure to save a copy of each to tape or disk.

To install and activate one of the color-cycling effects, load and run one of the first four programs. To turn off the effect, load and run Set or press RUN/STOP–RESTORE.

The last line of each program contains a POKE statement and a SYS command. The POKE sets the speed of the color-cycling pattern, while the SYS initiates the effect. The table below lists the speed registers and SYS addresses for each routine.

| Routine | Speed Register | SYS Address |
|---|---|---|
| Mix | 49209 | 49152 |
| Scroll | 49288 | 49244 |
| Flash | 49388 | 49344 |
| Sparkle | 49469 | 49425 |
| Set | none | 49509 |

The higher the value POKEd into the speed register (0–255), the slower the color-cycling effect. The exception to this rule is 0; it produces the slowest speed.

After you've installed each routine, the POKEs and SYSs can be used from either direct or program mode. And in fact, all five routines can be in memory at once. As long as you leave the IRQ interrupt vector and memory locations in the range 49152–49554 intact, you'll have four special effects at your disposal. To set this up, just include all five loaders in one program. Then, to switch quickly from one effect to another, execute the appropriate SYS. For example, you could activate Scroll with SYS 49244, turn it off with SYS 49509, and then activate Mix with SYS 49152.

BEFORE TYPING . . .

Before typing in programs, please refer to "How to Type In COMPUTE!'s Gazette Programs," elsewhere in this issue.

## Program 1: Mix

```
CC 1000 REM COPYRIGHT 1989 COM
        PUTE! PUBLICATIONS, IN
        C.{2 SPACES}ALL RIGHTS
         RESERVED.
QM 1010 POKE53280,0:POKE53281,
        0
CP 1020 PRINT"{CLR}{CYN}COPYRI
        GHT 1989":PRINT"COMPUT
        E! PUBLICATIONS"
RH 1030 PRINT"ALL RIGHTS RESER
        VED"
MM 1040 REM MIX
JK 1050 CK=0:FORA=49152TO49243
JS 1060 READAA:CK=CK+AA:POKE A
        ,AA:NEXT
FG 1070 IF CK<>12247 THEN PRIN
        T"ERROR IN MIX DATA":S
        TOP
EX 1080 DATA120,169,49,141,20,
        3,169,192,141,21,3,173
        ,17,208
CM 1090 DATA41,127,141,17,208,
        169,255,141,18,208,169
        ,1,141
MC 1100 DATA26,208,169,127,141
        ,13,220,88,169,255,141
        ,14
RR 1110 DATA212,141,15,212,169
        ,128,141,18,212,96
KG 1120 DATA206,53,192,169,3,2
        08,27,169
GB 1130 DATA3:REM SPEED
EQ 1140 DATA141,53,192,162,0,1
        73,27,212,157,0,216,15
        7,250
MX 1150 DATA216,157,244,217,15
        7,238,218,232,224,250
RS 1160 DATA208,236,169,1,141,
        25,208,76,49,234,0
BK 1170 POKE 49209,3:SYS 49152
```

## Program 2: Scroll

```
HE 2000 REM COPYRIGHT 1989 COM
        PUTE! PUBLICATIONS, IN
        C.{2 SPACES}ALL RIGHTS
         RESERVED.
XP 2010 POKE53280,0:POKE53281,
        0
EF 2020 PRINT"{CLR}{CYN}COPYRI
        GHT 1989":PRINT"COMPUT
        E! PUBLICATIONS"
CG 2030 PRINT"ALL RIGHTS RESER
        VED"
DB 2040 REM SCROLL
MM 2050 CK=0:FORA=49244TO49343
HQ 2060 READAA:CK=CK+AA:POKEA,
        AA:NEXT
RD 2070 IF CK<>12665 THEN PRIN
        T"ERROR IN SCROLL DATA
        ":STOP
FA 2080 DATA120,169,128,141,20
        ,3,169,192,141,21,3,17
        3,17
QR 2090 DATA208,41,127,141,17,
        208,169,255,141,18,208
        ,169
BC 2100 DATA1,141,26,208,169,1
        27,141,13,220,88,96,20
        6,132,192,169,4,208,48
        ,169
PQ 2110 DATA4:REM SPEED
PC 2120 DATA141,132,192,162,24
        ,189,240,236,141,163,1
        92,181
```

```
SE 2130 DATA217,41,15,24,105,2
        12,141,164,192,160,39,
        169,0
AR 2140 DATA153,0,216,136,16,2
        50,206,161,192,202,16,
        224
MM 2150 DATA173,161,192,24,105
        ,8,141,161,192,169,1,1
        41,25,208,76,49,234,0
HA 2160 POKE 49288,4:SYS 49244
```

## Program 3: Flash

```
DP 3000 REM COPYRIGHT 1989 COM
        PUTE! PUBLICATIONS, IN
        C.{2 SPACES}ALL RIGHTS
         RESERVED.
CK 3010 POKE53280,0:POKE53281,
        0
KG 3020 PRINT"{CLR}{CYN}COPYRI
        GHT 1989":PRINT"COMPUT
        E! PUBLICATIONS"
HE 3030 PRINT"ALL RIGHTS RESER
        VED"
JF 3040 REM FLASH
AP 3050 CK=0:FORA=49344TO49424
CS 3060 READAA:CK=CK+AA:POKEA,
        AA:NEXT
GQ 3070 IF CK<>11388 THEN PRIN
        T"ERROR IN FLASH DATA"
        :STOP
HA 3080 DATA120,169,228,141,20
        ,3,169,192,141,21,3,17
        3,17
KM 3090 DATA208,41,127,141,17,
        208,169,255,141,18,208
        ,169
PA 3100 DATA1,141,26,208,169,1
        27,141,13,220,88,96,20
        6,232,192,169,1,208,29
        ,169
BX 3110 DATA1:REM SPEED
CJ 3120 DATA141,232,192,162,0,
        169,0,157,0,216,157,25
        0,216
ED 3130 DATA157,244,217,157,23
        8,218,232,224,250,208,
        239,238
CB 3140 DATA243,192,169,1,141,
        25,208,76,49,234,0
PE 3150 POKE 49388,1:SYS 49344
```

## Program 4: Sparkle

```
SK 4000 REM COPYRIGHT 1989 COM
        PUTE! PUBLICATIONS, IN
        C.{2 SPACES}ALL RIGHTS
         RESERVED.
FR 4010 POKE53280,0:POKE53281,
        0
CA 4020 PRINT"{CLR}{CYN}COPYRI
        GHT 1989":PRINT"COMPUT
        E! PUBLICATIONS"
ED 4030 PRINT"ALL RIGHTS RESER
        VED"
EJ 4040 REM SPARKLE
GE 4050 CK=0:FORA=49425TO49508
KJ 4060 READAA:CK=CK+AA:POKEA,
        AA:NEXT
KC 4070 IF CK<>10792 THEN PRIN
        T"ERROR IN SPARKLE DAT
        A":STOP
PX 4080 DATA120,169,53,141,20,
        3,169,193,141,21,3,173
        ,17
CJ 4090 DATA208,41,127,141,17,
        208,169,255,141,18,208
        ,169
RD 4100 DATA1,141,26,208,169,1
        27,141,13,220,88,96,20
        6,57
PX 4110 DATA193,169,2,208,32,1
        69
EX 4120 DATA2:REM SPEED
KA 4130 DATA141,57,193,162,0,1
        69,0,24,105,1,157,0,21
        6,157,250
AD 4140 DATA216,157,244,217,15
        7,238,218,232,224,250,
        208
GF 4150 DATA236,206,68,193,169
        ,1,141,25,208,76,49,23
        4,0
ME 4160 POKE 49469,2:SYS 49425
```

## Program 5: Set

```
KJ 5000 REM COPYRIGHT 1989 COM
        PUTE! PUBLICATIONS, IN
        C.{2 SPACES}ALL RIGHTS
         RESERVED.
KD 5010 REM SET
CF 5020 CK=0:FORA=49509TO49554
GE 5030 READAA:CK=CK+AA:POKE A
        ,AA:NEXT
QB 5040 IF CK<>6321 THEN PRINT
        "ERROR IN SET DATA":ST
        OP
AE 5050 DATA120,169,49,141,20,
        3,169,234,141,21,3,169
        ,0
QQ 5060 DATA141,26,208,169,129
        ,141,13,220,88,162,0,1
        73
PF 5070 DATA134,2,157,0,216,15
        7,250,216,157,244,217,
        157
QM 5080 DATA238,218,232,224,25
        0,208,239,96,0
RG 5090 SYS 49509
```

**G**


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# THE geos column

## Mini DeskTop

**Stephen Van Egmond**

*Reclaim almost 30K of workspace on your GEOS disks with this deskTop replacement for the 64.*

Computer-industry watchers have been predicting the death of the 8-bit computer—including the Commodore 64—for years now. According to them, the easy-to-use graphics user interfaces (GUIs) available on most 16-bit computers would steal the hearts of would-be 64 buyers.

Berkeley Softworks extended the life of the 64 and 128 with its GUI, GEOS, but at a price. GEOS and GEOS applications are notorious memory hogs. If you've ever written a program using *geoProgrammer* or designed a newsletter using *geoPublish*, you know that it's nearly impossible to get all the files you need onto one or two disks.

With "Mini DeskTop," you can squeeze an extra 29.5K out of your work disks. This 0.5K program replaces the considerably larger 30K deskTop and retains its most frequently used function—moving from application to application. (If you need to do more than just move from one program to another, you can still exit to the normal deskTop.)

### Typing It In

Program 1, Mini DeskTop, is written in machine language, so you'll need to use "MLX," the machine language entry program found elsewhere in this issue, to type it in. The MLX prompts, and the values you should type in, are as follows:

**Starting address:** 1503
**Ending address:** 16EA

When you've entered all the data for Program 1, save two copies to a GEOS work disk that doesn't contain the standard GEOS deskTop. Save the first file with the filename DESK TOP and the second with the name DESK TOP.BKUP. One copy will be converted by Program 2 into a GEOS system file. The other is a backup copy in case you have a problem with the conversion.

Now, type in Program 2, "GeoConverter." If you've used GeoConverter before, you'll want to enter this new, enhanced version. This version works with any Commodore-compatible drive (1541, 1571, or 1581) numbered 8–11. The new GeoConverter also runs on the 64 and the 128. Be sure to use "The Automatic Proofreader," found elsewhere in this issue, to prevent typing mistakes when you enter the program. Save a copy of GeoConverter to the disk that contains Program 1. Be very careful when typing in GeoConverter. It writes directly to your disk, so a typing error could cause it to scramble your disk.

To prepare Mini DeskTop for use with GEOS, load Program 2 and type RUN. When prompted for a filename, enter DESK TOP. GeoConverter then converts the file into a GEOS system file.

### Using the Program

Mini DeskTop isn't an application or a desk accessory, so you can't run it from the deskTop. As a matter of fact, it replaces the deskTop. To test Mini DeskTop, run a GEOS application such as *geoWrite* or *geoPaint*. Once the program is loaded, insert your work disk that contains Mini DeskTop in the drive and select Quit to DeskTop from the application's dialog box or file menu. Instead of the standard deskTop screen coming up, Mini DeskTop takes over. If a dialog box comes up with the message *System Error near $0400*, you need to go back to MLX and recheck your typing. If the dialog box contains the message *Please insert a disk with deskTop V1.5 or higher*, make sure that your file is named DESK TOP.

When Mini DeskTop comes up, it displays a dialog box with the names of the applications on the disk in the current drive. To run one of the applications, simply select it by clicking on its name and then click OPEN. To run an application from another disk, insert the new disk and select DISK. In either case, after the application finishes running, you'll return to Mini DeskTop. If you need to return to the standard GEOS deskTop, insert a disk containing the deskTop file into the drive and select CANCEL.

Mini DeskTop displays only applications files. If you need a desk accessory, enter an application and run the desk accessory from the GEOS menu. Also, don't put Mini DeskTop on a ramdisk. Since the only way to switch to the standard deskTop is to swap disks, you wouldn't be able to copy files from the ramdisk to a floppy disk, effectively destroying the files.

### Program 1: Mini DeskTop

```
1503:BF FF FF FF 92 49 01 FF C8
150B:FF 01 80 00 1D BF FF DD 4B
1513:A0 00 5D BF FF C1 A0 00 7D
151B:5D A1 C6 55 A0 49 5D A0 10
1523:C9 41 A0 49 41 B9 D6 41 0B
152B:A8 00 41 BF FF C1 80 00 D5
1533:1D 9C 00 15 9C 00 15 80 F3
153B:00 1D 80 00 01 FF FF FF C4
1543:83 04 00 00 04 FF 03 00 56
154B:04 64 65 73 6B 54 6F 70 70
1553:20 20 20 20 20 56 33 2E 8A
155B:30 00 00 00 00 53 74 65 39
1563:70 68 65 6E 20 56 61 6E FE
156B:20 45 67 6D 6F 6E 64 20 D8
1573:00 00 00 00 00 00 00 00 9D
157B:00 00 00 00 00 00 00 00 A5
1583:00 00 00 00 00 00 00 00 AD
158B:00 00 00 00 00 00 00 00 B5
1593:00 00 00 00 00 00 00 00 BD
159B:00 00 00 00 00 00 00 00 C5
15A3:00 00 00 00 00 00 00 00 CD
15AB:00 00 00 00 00 00 00 00 D5
15B3:00 00 00 00 00 00 00 00 DD
15BB:00 00 00 00 00 00 00 00 E5
15C3:00 00 00 00 00 00 00 00 ED
15CB:00 00 00 00 00 00 00 00 F5
15D3:00 00 00 00 00 00 00 00 FD
15DB:00 00 00 00 00 00 00 00 06
15E3:00 00 00 00 00 00 00 00 0E
15EB:00 00 00 00 00 00 00 00 16
15F3:00 00 00 00 00 00 00 00 1E
15FB:00 00 00 00 20 A1 C2 A9 DC
1603:04 85 03 A9 AE 85 02 20 3D
```

```
160B:36 C1 20 AE C1 32 00 A8 31
1613:4D 69 6E 69 20 44 65 73 F4
161B:6B 54 6F 70 20 77 72 69 34
1623:74 74 65 6E 20 62 79 3A F1
162B:20 0E 53 74 65 70 68 65 BF
1633:6E 20 56 61 6E 20 45 67 65
163B:6D 6F 6E 64 1B 00 20 AE D5
1643:C1 32 00 B8 18 43 6F 70 85
164B:79 72 69 67 68 74 20 31 FA
1653:39 38 39 20 43 6F 6D 70 76
165B:75 74 65 21 20 50 75 62 AD
1663:6C 69 63 61 74 69 6F 6E 39
166B:73 1B 00 A9 04 85 03 A9 98
1673:C7 85 02 A9 04 85 0D A9 B9
167B:E9 85 0C A9 06 85 10 A9 2A
1683:00 85 17 A9 00 85 16 20 F0
168B:56 C2 A5 02 C9 06 D0 03 73
1693:4C 00 04 C9 02 D0 03 4C A8
169B:2C C2 A9 04 85 0F A9 E9 A9
16A3:85 0E A9 00 85 02 20 08 C7
16AB:C2 00 05 02 01 00 00 00 02
16B3:03 3F 01 C7 05 00 01 0F 07
16BB:01 BE 03 30 00 9A 07 0F 03
16C3:01 BE 00 81 10 05 03 0B DD
16CB:84 0A DA 04 05 11 10 06 EA
16D3:11 23 02 11 4C 00 18 53 88
16DB:65 6C 65 63 74 20 66 69 13
16E3:6C 65 3A 1B 00 00 00 00 98
```

### Program 2: GeoConverter

```
FH 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS, INC. -
       ALL RIGHTS RESERVED
PD 20 REM THIS IS THE UPDATED
      {SPACE}GEOCONVERTER
      {8 SPACES}REVISED MAY IS
      SUE 1989 GAZETTE
EJ 30 PRINT"{CLR}{GRN}"CHR$(14
      2):VE=PEEK(772)+256*PEEK
      (773)
MR 31 IFVE=42364THENPOKE53280,
      0:POKE53281,0:GOTO40
FK 32 LIST0,1:LIST4,1:LIST6,1
PS 40 FORI=1TO10:PRINT"{DOWN}"
      :NEXT
ER 50 PRINTTAB(5)"{4}UDI COPYR
      IGHT 1989"
SP 60 PRINTTAB(5)"GCH COMPUTE!
       PUBLICATIONS INC."
SP 70 PRINTTAB(5)"JFK ALL RIGH
      TS RESERVED{HOME}"
BK 80 PRINT"{DOWN}{RVS}{8}GEOC
      ONVERTER 1.2{OFF}{DOWN}
      {GRN}"
QA 81 N=8:PRINT"DRIVE NUMBER "
      N"{4 LEFT}";:INPUTN
AC 82 IFN<8ORN>11THEN81
SA 83 PRINT"IS DRIVE"N"A 1581?
       ";:T$=CHR$(18):S$=CHR$(
      1)
PJ 84 GETK$:IFK$<>"Y"ANDK$<>"N
      "THEN84
MR 85 PRINTK$:IFK$="Y"THENT$=C
      HR$(40):S$=CHR$(3)
AP 90 INPUT"FILE TO CONVERT";G
      F$
CX 100 PRINT"{DOWN}SEARCHING F
       OR "GF$
PA 110 HD$="":FOR I=1 TO 4:REA
       D HE:HD$=HD$+CHR$(HE):N
       EXT
FK 120 FOR I=1TO5:READIE:ID$=I
       D$+CHR$(IE):NEXT
BE 130 NL$="":OPEN 15,N,15,"I0
       :":OPEN 2,N,2,"#"
JX 140 GOSUB370:GET #2,NT$,NS$
KB 150 FOR E=0 TO 7
KQ 160 D$=NL$:GET#2,B$:I=1:IFB
       $=NL$ THEN220
AX 170 IF ASC(B$)<>130 THEN220
HM 180 GET#2,HT$,HS$:I=3:IF HS
       $="" THEN HS$=CHR$(0)
FH 190 GET#2,B$:I=I+1:IF B$=""
       THEN B$=CHR$(0)
FA 200 IF ASC(B$)=160 THEN220
GD 210 D$=D$+B$:GOTO190
RK 220 FOR I=I TO 31:GET#2,B$:
       NEXT
AX 230 IF D$=GF$ THEN260
EC 240 NEXT E:IF NT$=NL$ THEN2
       60
FX 250 T$=NT$:S$=NS$:GOTO140
CR 260 IF D$=NL$ THENPRINT"
       {DOWN}{RVS}FILE NOT FOU
       ND{OFF}":GOTO360
CP 270 PRINT"{DOWN}CONVERTING
       {SPACE}"GF$
XC 280 DT$=T$:SS$=S$:T$=HT$:S$
       =HS$:GOSUB370
MB 290 GET#2,MT$,MS$:IF MS$=""
       THEN MS$=CHR$(0)
BM 300 FOR I=0 TO 65:GET #2,B$
       :NEXT
XB 310 GET#2,CT$,GT$:GOSUB370:
       PRINT#2,HD$;:GOSUB380:T
       $=DT$:S$=SS$:GOSUB370
FP 320 FOR I=0 TO 32*E+2:GET#2
       ,B$:NEXT
FQ 330 PRINT#2,MT$;MS$;:FORI=0
       TO 15:GET#2,B$:NEXT
GP 340 PRINT#2,HT$;HS$;CHR$(0)
       ;GT$;
KM 350 PRINT#2,ID$;:GOSUB380:P
       RINT:PRINTGF$" CONVERTE
       D"
ER 360 CLOSE2:CLOSE15:END
KA 370 U$="U1":GOTO390
RR 380 U$="U2"
KP 390 PRINT#15,U$;2;0;ASC(T$+
       "0");ASC(S$+"0")
AS 400 RETURN
FM 410 DATA 0,255,3,21,87,10,1
       ,0,0
```

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# User Group Update

**Edited by Mickey McLean**

The following list includes updated entries to our annual "Guide to Commodore User Groups," which last appeared in the May and June 1989 issues.

Send typed additions, corrections, and deletions for this list to

*Commodore 64/128 User Group Update*
COMPUTE!'s Gazette
*P.O. Box 5406*
*Greensboro, NC 27403*

When writing to a user group for information, please remember to enclose a self-addressed envelope with postage that is appropriate for the country to which you're writing.

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## User Group Notes

The **Barton County Commodore Users Group (B.C.C.U.G.)** has been renamed the **Barton County Computer Users Group**. It has also changed its address to 506 West 10th #1, Lamar, Missouri 64759.

The **Mililani User Group** in Wahianwa, Hawaii is now an Amiga-specific group. The group no longer supports the Commodore 64 and 128.

The new mailing address for the **Washington Area Commodore User Group (WAC)** is P.O. Box 3602, Fairfax, Virginia 22038-3602.

## New Listings

### ALABAMA

**Birmingham Commodore Computer Club (BCCC),** P.O. Box 59564, Birmingham, AL 35259-9564

### DELAWARE

**Wicomico Commodore Users Group,** 913 Grove St., Delmar, DE 19940

### IOWA

**Commo-Hawk Commodore Users Group,** P.O. Box 2724, Cedar Rapids, IA 52406-2724 (BBS# 319-377-4095)

### MICHIGAN

**Downriver Commodore Group,** P.O. Box 1277, Southgate, MI 48195

### MINNESOTA

**Minnesota Commodore Users Association,** P.O. Box 22638, Robbinsdale, MN 55422

### MISSOURI

**Heartland Users Group,** P.O. Box 281, Cape Girardeau, MO 63702-0281

**Commodore Users Group of Kansas City,** P.O. Box 36034, Kansas City, MO 64111 (BBS# 816-792-0326)

### VERMONT

**Green Mountain Commodore Users Group (G.M.C.U.G.),** P.O. Box 6087, Rutland, VT 05702

## Outside the U.S.

### COSTA RICA

**Club Fast Software de Costa Rica,** Arturo Arana G., Maquinas Roxamaro, Calle 2, Aves 12-14, San Jose, Costa Rica, America Central

### NEW ZEALAND

**Christchurch Commodore Users' Group,** P.O. Box 4665, Christchurch, New Zealand

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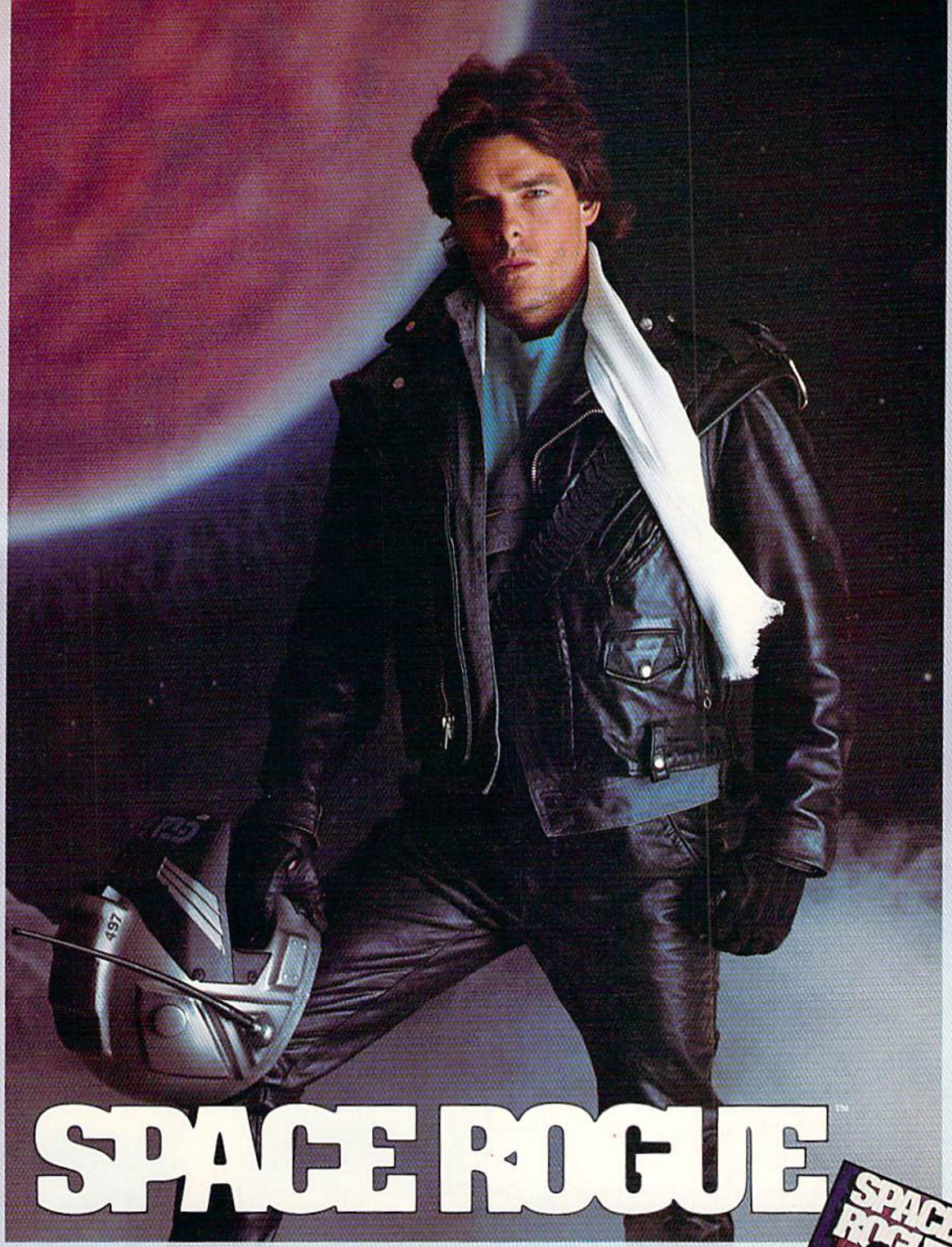


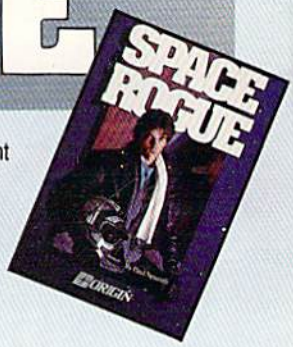


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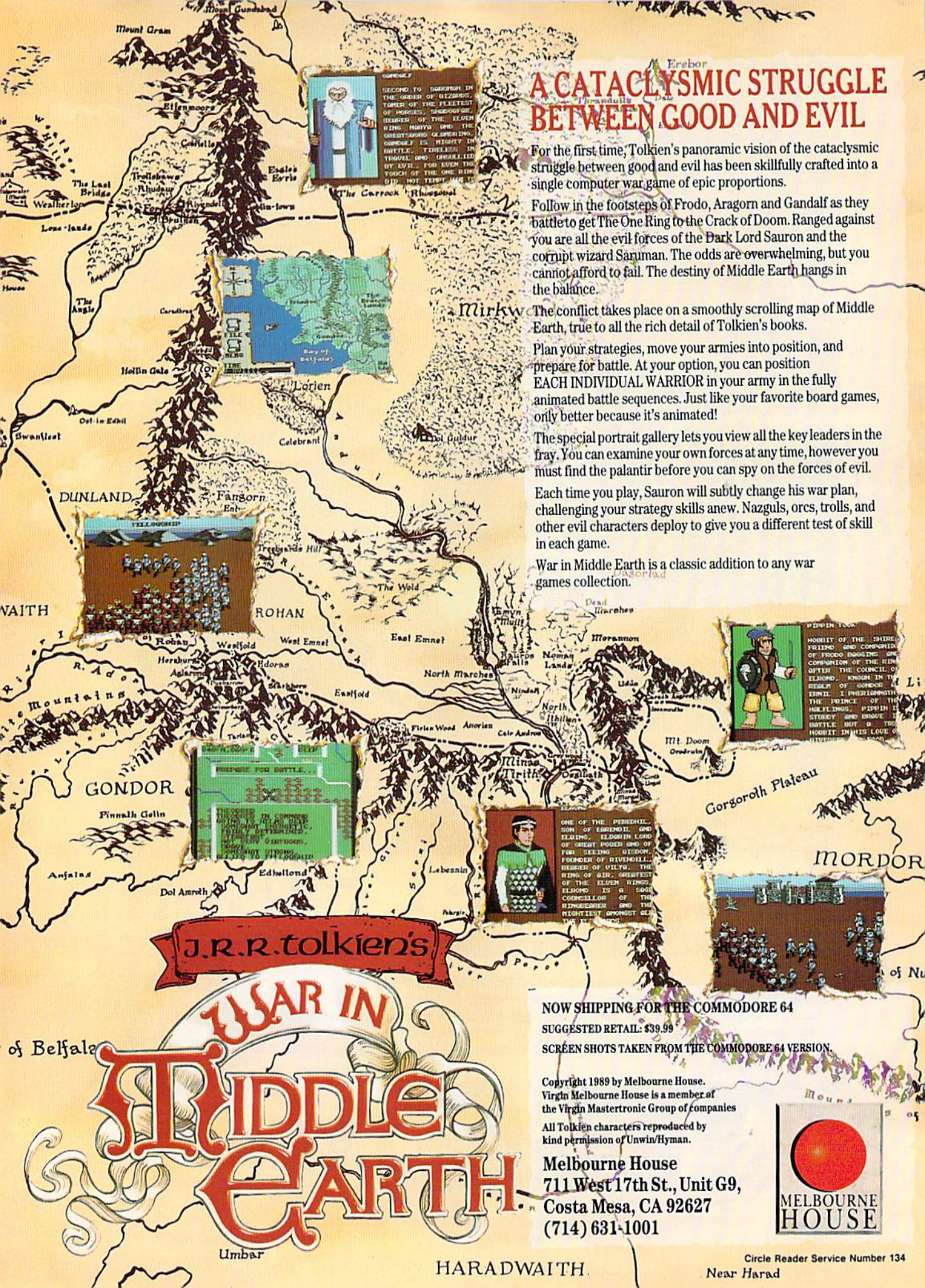


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J.R.R. tolkien's

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# REVIEWS

## Dr. Doom's Revenge

OK, Marvel Comics fans, it's time to soup up those superpowers, jump into those mystical costumes, and sprint into action. In Paragon Software's *Dr. Doom's Revenge*, you assume the roles of the web-spinning Spider-Man and America's number 1 supersoldier, Captain America.

If you've never seen an interactive action comic book, you're in for a real treat. Unique in both concept and idea, this computer comic book lets you read simulated comic-book pages and then jump inside them, assuming a character's role. Before your quest begins, choose your supercharacter's fighting abilities: beginner, hero, or full-fledged superhero.

As you read through each comic strip, a hand (or bookmark) follows. Whenever you reach the end of a page, the next one appears, just as if you had turned the page. Anytime you wish to quit, you can save your place to disk so you can resume reading (or playing) later.

Doctor Doom is back in town with sinister plans for New York City. The genius supervillain has stolen a nuclear missile and plans to detonate it in the city unless his outrageous demands are met. Only two things stand in his way: Spider-Man and Captain America.

Enter the dark and evil castle that Doom has built and try to guide our heroes to victory. This won't be easy, though. Doctor Doom suspected the city might recruit superheroes to spoil his plans, so he has called to his castle the most sinister villains the world has to offer.

As you read the comic, you switch roles between Spider-Man and Captain America at the end of each page. You encounter different villains depending on which role you assume. For example, Spider-Man faces Eduardo Lobo, Gray Gargoyle, Machete, and Boomerang, while Captain America battles Oddball, Rattan, Rhino, Batroc, Hobgoblin, and Electro. Once these supervillains have been defeated, our heroes must team up to take on Doctor Doom.

If you're a Marvel Comics fan, you might wonder about the quality of translation from comic book to arcade-style action. Put your fears aside: All combat aspects are faithful to the heroes' abilities. For example, whenever you assume the role of Captain America, you have all of his fighting powers and tools, including his famous star-spangled shield. The same holds true for Spider-Man. His powers allow him to stick to walls and shoot webs.

As you go into battle, notice two bar graphs at the bottom of the screen. One shows your character's strength, while the other displays your enemy's. Whenever your character takes a hit from a supervillain, the graph shows how much you've been injured.

During battle, you can perform different kicks and punches that affect your enemy. Also, running flips (over your enemy) are available. Don't forget, since you're a superhero, you must use your superpowers. As Captain America, use your shield for both defense and offense: Protect yourself and throw it at your foe. The same is also true for Spider-Man. If things get too sticky, stick to a wall and shoot webs to sap a villain's strength. But it's not all that easy—supervillains own the same fighting abilities they have in the comics.

If you manage to defeat an enemy, you'll be taken back to the point where you stopped reading (and started fighting) in the comic. Continue reading from there until your next confrontation with a supervillain. The game ends when you've found and defeated the sinister Doctor Doom.

Graphics, sound, and gameplay are excellent. Not only have I, an avid comic collector, enjoyed playing the game, but I've also found that others who don't really care about comics love the game, too.

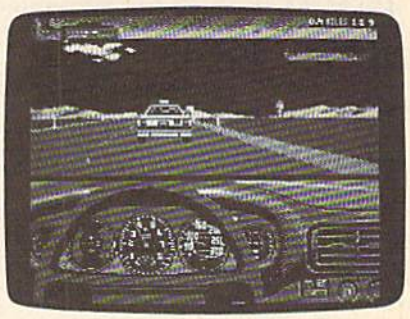
The manual explains both gameplay and origins of all the characters you'll encounter. Also included is a special collector's comic book. My complaint to Paragon: If you're going to make a collector's comic, don't roll it up and place a rubber band around it. I'd also like to see Spidey's abilities used a little more. Perhaps next time allow him to climb all over the walls, not just stick to them. And let him entangle his foes in webs and swing from place-to-place on them. These few minor complaints aside, let me say that this is one terrific product. Wow, what a concept! I can hardly wait for the next one.

*—Jeffery Scott Hall*

Dr. Doom's Revenge
*Paragon Software*
*Distributed by MicroProse*
*120 Lakefront Dr.*
*Hunt Valley, MD 21030*
*$34.95*

## The Duel: Test Drive II

Never play *Test Drive* just before you go on vacation with the family. What you can do blithely with a Ferrari on your computer may be frowned upon by the authorities (or at least by your mate) when tried with the family van. The realism of Accolade's *The Duel: Test Drive II* is great enough to make the danger of carryover a distinct possibility.



While Smokey stayed off our tail and we didn't use up any of our lives (hackers sometimes forget we're only issued one), one of us found it necessary to liven up our long drive by playing road games with the trucks on the interstate. The rest of the family could tell by the chuckle and the gleam in Dave's eye that he was reliving the last

encounter he'd had in *The Duel*. Confirmation soon came in the form of his remark: "If only I had that Ferrari!" Well, since it's easier to plunk down the money for these programs rather than a quarter-million for one Ferrari, Dave will have to be content with the stable of seven sports cars housed on these two little black disks for now. And that's not such a bad deal.

***It's almost as good as driving a $250,000 sports car. This simulation is hot!***

Accolade's original *Test Drive* let you try out five different sports cars. *The Duel* pits you in one exotic car against the computer in another. The two of you race through the countryside evading traffic, police, and other road hazards. The race is broken down into segments by stops for fuel, allowing new scenery to be loaded in for the next leg of the race.

You choose your vehicle. The game disk includes two cars: a Ferrari F40 and a Porsche 959. You may race the F40 against the 959 or pit two F40s or two 959s against each other. You can also race a car against the clock. To get more vehicles, you must use the *Supercars* disk. Sold separately ($14.95), it works only with *Test Drive II*. It expands your choice of cars to seven by adding a 1988 Lotus Turbo Esprit, the Ferrari Testarossa, a Porsche 911 RUF, a 1988 Lamborghini Countach 5000S, and a 1989 Corvette ZR1.

So what makes this simulation so hot? Tremendous graphics, ranging from super screen dissolves to fascinatingly accurate depictions of rearview mirror images. And there's fun stuff—such as the digital speedometer in the Vette and the functioning radar detectors in each of the cars.

Finishing touches abound—good music in the game's opening, clever jibes from the computer between runs, and distinct, realistically designed dashboards for each of the cars.

In play, *Test Drive II* is a challenging, tension-filled, adrenaline-pumping road run. Collectively, it's a slick package of smooth programming.

From the opening sequence you move on to pick out your car. Following onscreen directions (supported by easy-going instructions in the snappily worded manual), you make a series of choices for yourself and the computer. If you purchase a scenery disk (also available, but not reviewed here), you can select your countryside. Using the car and scenery disks is easy enough, but it's heavy on the disk swapping, since, as Accolade warns you, it assumes you have only one drive. Accolade's solution to this problem is to provide the ability to make *play disks*—disks that contain two cars and a set of scenery. This cuts down on disk swapping and makes it handier to run your favorite cars over preferred terrain. Conceivably, you could make play disks for all the possible combinations of cars and scenery, but that seems like a lot of work. A two-drive option might have worked better.

Creating the play disk is not difficult, but here the onscreen prompts are actually clearer than the manual, which gets bogged down with cautions and loses you amid fragmented directions scattered on different pages. Experimentation and trusting your instincts are your best bet here.

Levels of play range from Rookie to Pro. At the first four levels, you have an automatic shift. The remaining eight levels allow you to do your own shifting. This can be done by pressing the fire button as you increase engine speed or by toggling into Expert mode and maneuvering the joystick like a real gearshift (accelerating, steering, and shifting, all on one joystick!).

Hazards on the highway include traffic (two-way), troopers (you can take your ticket, outrun them, or run them down), and dangers such as falling rocks and oil slicks.

We like the road signs. They're just as pertinent as real ones, so you'd better pay attention. The windshield cracks on impact, and if you go off a cliff, you get a sense of falling before you hit.

You can pause but not save a race, toggle sound off and on (this feature is claimed, but we couldn't get it to work; at least it was on), and have the gearshift displayed or not.

The spec screens displayed at the outset tell you plenty about each car, giving you a chance to make an educated choice about which one to set up against another. The status screens between runs tell you such things as time, average speed, points scored, and who is winning.

*The Duel* has a few flaws. It could have a two-drive option, and a couple of the features seemed to be missing or not working. Even so, what it does do is so thrilling, so entertaining, and so much fun, it almost doesn't matter that you don't have that quarter of a million to buy a real sports car. Almost.

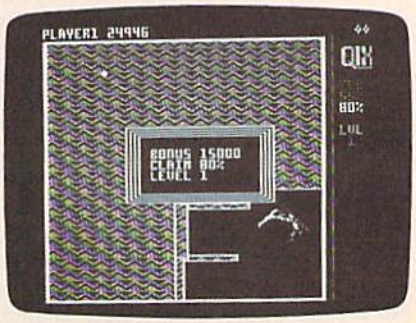
*—David & Robin Minnick*

The Duel: Test Drive II
*Accolade*
*550 S. Winchester Blvd.*
*Suite 200*
*San Jose, CA 95128*
*$29.95*

## QIX

With the success of *Tetris* and *Shanghai*, the demand for easy-to-learn yet difficult-to-master strategy games has increased. Rather than creating something new to fill this demand, Taito has reissued *QIX*, its eccentric 1981 arcade hit.

Although many of the game's more superficial features have been improved, *QIX* (pronounced *Kicks*) remains essentially the same as the earlier home computer version. In both, the playing field is a large rectangle that contains a small marker (you) and an undulating spiral (the Qix).




The idea is to move your marker with your joystick and draw boxes of varying sizes without being touched by the Qix. When you complete a box, it is filled with a colored pattern and you earn points, the amount of which depend on the size of the box and the speed at which it was drawn. Larger figures constructed at a slow speed reap more bountiful harvests but at a much greater risk.

In earlier rounds, a level is completed when you've filled in 65 percent of the main rectangle. By coloring in more than the required amount, you may earn 1000 bonus points for each percentage point over the goal.

As you try to complete a box, the Qix whirls unpredictably throughout the unboxed area of the rectangle. If it touches any part of an uncompleted box, you lose one of your four lives. By the third round, the Qix has acquired a mate. Separate the two and you double the points earned during each succeeding round; dividing them in a subsequent screen triples your earnings.

As you draw, two sparklike objects (appropriately called *Sparx*) dog your path. Since they follow a pattern around all existing lines, they are relatively easy to avoid. If the red time-line at the side of the screen runs down before you finish, two more Sparx enter the fray. Dodging four or more of these pests is quite a chore. Equally deadly is the Fuse, which is lit when you hesitate while drawing your line. The Fuse travels up your line until it makes contact with your marker. The ensuing explosion kills you. If your line is not too short, you may eliminate the Fuse by

continuing to move. This allows you to stop briefly in order to avoid other enemies. Two other life-threatening phenomena are the Spritz, a starlike figure that floats around the screen in later levels, and the Spiral Death Trap, created by crossing over your own lines.

The original *QIX* programmers created a masterpiece, with the hero being a simple joystick-driven painting program, the villains a quartet of abstract shapes, and the challenge—boxing in as much of the space as possible. In updating the original, Taito has chosen to beautify the game rather than make significant revisions.

*QIX* (1989) is more difficult because the marker moves more slowly, and the Qix is more erratic. The amount of screen-fill needed in early levels, however, has dropped from 75 percent to 65 percent. Also, boxes now are filled with a variety of colorful patterns instead of the older version's solid colors.

Other changes include the awarding of an extra life for every 50,000 points; a timely plotline (you vs. Qix, the computer virus); a practice mode; a sophisticated musical score that includes everything from rock to a Latin sound; and less grating sound effects.

The current model resides on two disk sides, one for the 64 and the other for the 128. The latter may be autobooted, and five high scores may be saved to disk. Otherwise both games are identical.

What makes *QIX* unique is not its plot, music, or graphics, but the skills it demands of the player. Like all superior arcade games, *QIX* demands planning, patience, decision making under pressure, and eye-hand coordination. To succeed at *QIX*, you also will need a good grasp of spatial relationships. After all, your primary purpose is not to evade but to use space to your advantage. Because you design each screen, based on your decisions and your enemy's movements, possibilities for each level are nearly endless.

As with most arcade games, you must replay earlier screens to reach higher levels. Discovering different ways of surviving, building boxes, and entrapping the Qix make repeated play of these beginning rounds a delight.

*QIX*'s documentation adequately describes gameplay and contains general tips for survival and success. A good specific strategy is to box the Qix in as closely as possible on the first relatively easy level and enter Level 2 with 25,000– 30,000 points.

Taking risks in the second screen rarely pays off. Instead, slowly and carefully move up the center of the main rectangle until you complete 50 percent; then go to the center point and build out from the side until you have boxed in approximately 75 percent of the playing area. Splitting the pair in level 3 is easy, but I wouldn't recommend it until you have earned as many points as possible—and an extra life. Don't go over 64 percent, however, or you will lose your chance to divide the pair and thereby double your scores in subsequent screens.

Although I respect Taito's decision not to alter *QIX* too dramatically, I am disappointed that a few substantial revisions were not made. Would it not have been possible, for example, to allow players to draw nonrectangular shapes in certain screens or to provide them with tools (say, speed pellets, or Qix stunners) as rewards for high scores or daring actions? In the way that *Arkanoid* and *Blockbuster* are lineal descendants of *Breakout*, *QIX* could have harked back to its predecessor while breaking new ground of its own.

While two classics are better than one, one is better than none at all. If you don't own the original, or if you want a slightly different *QIX* experience, purchasing this package will be money well spent.

*—Joe Poggiali*

QIX
*Taito*
*267 W. Esplanade*
*North Vancouver, B.C.*
*Canada V7M 1A5*
*$29.95*

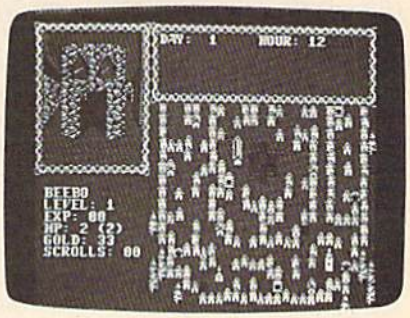
## Risk

It is probably possible to computerize every board game that ever existed. But it's a less-than-useful endeavor unless the implementation improves speed and gameplay. If the execution is such that cards, tiles, currency, markers, and the like cannot be easily read or used, then stick to the board version.

The computer edition of *Risk* succeeds on both counts and more. It speeds and improves play, does away with the beans normally used to represent armies, and converts bonus cards to easily readable lines of type. To my mind, it fails only in the one area it cannot control.

Like Monopoly, *Risk* is a game for multiple players. At the end of a long evening of play, there's more satisfaction in conquering several friends than in defeating only one or two. However, it is difficult to cluster five or six people around a computer monitor. The problem is solved partially by requiring a minimum of two players and having the computer make up a third.

Once the players are named, the program divides the world by placing counters in turn until every country is occupied; the computer plays this first round with no help. After that, players continue by reinforcing their countries until all counters are played. (In the board game, you contend with a number of beanlike counters. Here, there is only an incrementing number.)




Once all counters are played, it is time to attack somebody. The object of *Risk* is world domination, and you might as well get on with it. A player attacks neighboring countries by declaring his or her intentions and by rolling dice with the owner of that country. An attacking player may have as many as three dice, but the defender will always have one less, giving the attacker a slight edge.

As challenges are won, the loser removes counters. When the last counter is removed, the winner occupies the newly acquired territory with his or her counters. The game continues until there is one winner who has swept everyone else off the globe.

Because your "board" is a map of the world (arbitrarily accurate), the computer handles it as a smoothly scrolling screen behind a window. The window is bordered at the bottom by a message board that informs you when it is your turn, who is attacking whom, who is winning and losing a particular battle, and the number of bonus armies you amass following each play. To the right of the map, another area shows the dice being rolled. It is an uncluttered screen, and the graphics are large enough to overcome the fuzziness of the 64's display.

The countries each player occupies are displayed in a color of his or her choice. Lines of attack between countries separated by oceans are clear enough, and, if you like, you can opt for a full world view, though the disk access time required probably means you won't use this option often.

Drop-down menus give you access to the game's options: Some of the options are meant to speed or enhance play; others, to allow you to change the rules to suit your needs. A menu option allows you to check on the bonus cards you've accumulated. The alternate screen shows you what you have and gives you the option of trading matching sets for more armies.

*Risk*'s documentation is good, outlining rules of play, special rules for

two-player games, rule variations for playing in the United Kingdom, and a good section on strategy. (If you're new to the game, read the rules carefully. There is a demo-game option, but it moves so swiftly I doubt that a novice will find it helpful.)

In all, the sensible approaches to conversion have made the computer edition of *Risk* as much fun as the board game. The pitfalls of direct conversion were avoided in favor of making modifications that work best on a computer. These modifications have changed the look and feel of the game, but it is still a game of conquest that can be played for long hours and be thoroughly enjoyed—as long as you are winning.

*—Ervin Bobo*

Risk
*Virgin Mastertronic*
*18001 Cowan Ave.*
*Suite A*
*Irvine, CA 92714*
*$29.99*

## Hillsfar

When I started playing adventure games on computers almost ten years ago, I thought it would be neat to play a game based on the Advanced Dungeons and Dragons role-playing game. I had to wait a while, but it was worth it.

About two years ago, Strategic Simulations Incorporated (SSI) started hinting at an officially licensed AD & D game. The result was *Pool of Radiance*—an excellent game that closely follows AD & D rules and locales. *Hillsfar*, the latest entry onto SSI's AD & D list, is an action adventure that takes place in and around the city of Hillsfar in the Forgotten Realms game world. Two other fantasy role-playing games in the AD & D series, *Pool of Radiance* and the recently released *Curse of the Azure Bonds*, also take place in this mysterious world. *Hillsfar* lets you import a character from either *Radiance* or *Curse* or create one from scratch.

You can boost characters to higher levels in *Hillsfar* by sending them on miniature quests. There are three quests assigned to each of four basic character classes (magic user, cleric, fighter, and thief), so you'll have plenty to keep you busy in this game—and plenty of fun as well.

You can also send *Hillsfar* characters back to *Curse of the Azure Bonds* because both games employ the same types of statistics. Importing characters to *Hillsfar* is easy. The only items lost in the transition are weapons and magic, neither of which are needed in *Hillsfar*. You don't need to fight (except in the arena), and any magic items you need are found in the town.

The game screen is set up with your statistics in the bottom left quadrant. A first-person view (that's very well done) of your location fills the upper left quadrant, and an overhead view of Hillsfar takes up the rest of the screen. A message bar covers part of the overhead view and is moved when necessary. Overall, the graphics are very clearly rendered. You may not know what the buildings are from the overhead view, but you can get a good indication from the first-person perspective.

Playing *Hillsfar* involves moving your character around the city, looking for your class's guild in order to receive a quest from the guild master. The guild master sends you to the first stop of your adventure, where messages direct you toward the next location. Your quest takes you from place to place in and around the city, usually in search of some item or information that the guild master requests.

The forte of *Hillsfar* is its sequence of arcade events: riding a horse, shooting arrows on an archery range, fighting in the arena, picking locks, and exploring buildings. These events fit logically into the quests. When exploring outside the city, you must ride a horse, jumping holes, puddles, and bushes, while ducking birds and arrows. Shooting on the archery range and fighting various opponents in the arena help you hone other skills needed during your quest. You must prove yourself at shooting weapons and fighting. Both challenges are more difficult than the horse-riding sequence, and they get harder as you move up levels.

Picking a lock and exploring a building are both timed sequences. Retrieve items from a building and find the exit or pick a lock before time runs out. Even if you are not a thief, you may still complete this sequence by hiring a nonplaying-character thief in the town. Picking locks is easily the most interesting event. You must quickly match geometrically shaped picks to the tumblers in a lock. Overall, the game's sequences are all well done and graphically pleasing.

*Hillsfar* is the first of what I hope is a long line of action adventures. It contains the right amounts of exploration and action to satisfy any adventurer or arcade-game aficionado. The graphics are great, the difficulty level is average, and you can journey in *Hillsfar* for as long as you like.

*—Russ Ceccola*

Hillsfar
*Strategic Simulations*
*Distributed by Electronic Arts*
*1820 Gateway Dr.*
*San Mateo, CA 94404*
*$39.95*

## Raw Recruit and Skate Crazy

When the history of computer software is finally written, Virgin Mastertronic deserves a footnote for being the first software firm to introduce low prices in the marketplace. *Raw Recruit* and *Skate Crazy* are two of its latest releases.

With Mastertronic titles frequently offered for less than $15, the competition took notice. The competitive labels that have sprung up in Mastertronic's wake—some of them rereleasing older and almost forgotten games—have made it possible for many of us to enlarge our software libraries and increase our trading stock.

Not that every Mastertronic game is a winner: I've seen some titles where I didn't know what was going on and couldn't get involved enough to want to find out. Others involved themes already explored to death by other publishers; and still others featured playing screens so cluttered as to be incomprehensible.

***Only the arcade expert can meet these challenges.***

*Raw Recruit* avoids these particular pitfalls in opting for simplicity in design and theme while giving you six basic training courses in which to qualify before you become a "real" soldier.

Begin on the rifle range, shooting at targets that pop up at various distances. You must qualify in this before going on to any of the other tests of skill. You must hit at least 26 targets—and do it before the clock runs out.

Assuming you qualify, your next tests consist of a cross-country run over rocky terrain, a timed fitness course in which you must complete a certain number of push-ups and chin-ups; an assault course in which you'll attack while leaping over obstacles; a pistol range in which targets appear in and around a house (and where killing a hostage costs time); and a tug of war.

All events are controlled by your

joystick, and all may be played by either one or two players. You must attain a minimum score in each event before moving on to the next. Scores are posted in a hall of fame, which is renewed each time the game is booted.

If your interests run more toward civilian pursuits, *Skate Crazy* bucks modern trends by not even nodding at skateboards. Here your transportation consists of simple shoe skates, and your obstacles are many: oil puddles to slow you down, ramps to be jumped, pylons that require tricky maneuvers, and broken glass that will slow and tire you.

While doing all this, it is also possible to impress the judges and run up a higher score by performing stunts such as jumping from the ground, jumping over ramps, and twisting in the air. The downside of being a showoff is that it increases your fatigue—and that may make it impossible for you to complete the required maneuvers.

The first game is called the Car Park Challenge (*car park* is a British term for *parking lot*). In this game, you must follow painted arrows on the ground and negotiate obstacles in order to pass through all the gates. Keep an eye on your fatigue meter and the clock, and try not to fall down too many times.

Success here means you move to the car park and pick up trash by skating over it. If you manage this, you can advance to level 2. In these upper levels, you'll encounter hurdles, footballs, trampolines, and even more silly obstacles. During all this, you are being graded on overall skating ability, your elapsed time, and jumps.

The second half of the game, which is independent of the first, is called the Championship course. In four levels, you'll find yourself dodging and ducking objects while making your way through a building site, crossing a lake while avoiding deadly wildlife, skating through a subway inhabited by giant rats, and skating down streets occupied by pedestrians and hostile rival gangs.

While *Skate Crazy* is a variation on the maze game and *Raw Recruit* owes a great deal to various shooting-gallery games, both are presented well; they have good graphics and good animation.

The skill requirements may be too much for many of you. I consider myself an average player, but I was unable to reach the second level in either game. In *Skate Crazy*, the clock ran out because I was unable to master the art of jumping obstacles; and in *Raw Recruit* it was only by the greatest good luck that I was able to bring the sights to the targets in the first event. I tested several joysticks with this game and all had similar alignment problems. I concluded the problem was in my reflexes, so I called in the experts.

Daughter Kelly and wife Carla (who has achieved impossible scores on *Solar Fox*) had similar trouble. It was left to my son, Mike, to finally break the barrier and reach beyond the first levels in both games. Mike's joystick skills are above average—the height of the grass on my lawn is a fair barometer of the amount of computer time he puts in.

Were it not for the apparent difficulty of play, both games would be joyfully recommended, especially in light of the low investment required. (While I've often repeated that mindless arcade games are a staple of computer entertainment, I really hate to pay $30 and up for them.) As it is, I think games we cannot master quickly lose their appeal. For myself, a further loss of appeal lies in the fact that I must disconnect my second disk drive and my printer before the games will load. For these reasons, I'd suggest you try one or both of these Mastertronic bargains and if they're too difficult, trade them with a friend who has better game skills.

*—Ervin Bobo*

Raw Recruit and Skate Crazy
*Virgin Mastertronic*
*18001 Cowan St.*
*Irvine, CA 92714*
*$9.99 each*

G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Type in the Proofreader *exactly* as listed. Since the program can't check itself, type carefully to avoid mistakes. Don't omit any lines, even if they contain unfamiliar commands. After finishing, save a copy or two on disk or tape before running it. This is important because the Proofreader erases the BASIC portion of itself when you run it, leaving only the machine language portion in memory.

Next, type RUN and press RETURN. After announcing which computer it's running on, the Proofreader displays the message "Proofreader Active". Now you're ready to type in a BASIC program.

Every time you finish typing a line and press RETURN, the Proofreader displays a two-letter checksum in the upper-left corner of the screen. Compare this result with the two-letter checksum printed to the left of the line in the program listing. If the letters match, it's almost certain the line was typed correctly. If the letters don't match, check for your mistake and correct the line.

The Proofreader ignores spaces not enclosed in quotes, so you can omit or add spaces between keywords and still see a matching checksum. However, since spaces inside quotes are almost always significant, the Proofreader pays attention to them. For example, **10 PRINT"THIS IS BASIC"** will generate a different checksum than **10 PRINT"THIS ISBA SIC"**.

A common typing error is transposition—typing two successive characters in the wrong order, like PIRNT instead of PRINT or 64378 instead of 64738. The Proofreader is sensitive to the *position* of each character within the line and thus catches transposition errors.

The Proofreader does *not* accept keyword abbreviations (for example, ? instead of PRINT). If you prefer to use abbreviations, you can still check the line by LISTing it after typing it in, moving the cursor back to the line, and pressing RETURN. LISTing the line substitutes the full keyword for the abbreviation and allows the Proofreader to work properly. The same technique works for rechecking programs you've already typed in.

If you're using the Proofreader on the Commodore 128, Plus/4, or 16, *do not perform any GRAPHIC commands while the Proofreader is active.* When you perform a command like GRAPHIC 1, the computer moves everything at the start of BASIC program space—including the Proofreader—to another memory area, causing the Proofreader to crash. The same thing happens if you *run* any program with a GRAPHIC command while the Proofreader is in memory.

Though the Proofreader doesn't interfere with other BASIC operations, it's a good idea to disable it before running another program. However, the Proofreader is purposely difficult to dislodge: It's not affected by tape or disk operations, or by pressing RUN/STOP– RESTORE. The simplest way to disable it is to turn the computer off then on. A gentler method is to SYS to the computer's built-in reset routine (SYS 65341 for the 128, 64738 for the 64, and 65526 for the Plus/4 and 16). These reset routines erase any program in memory, so be sure to save the program you're typing in before entering the SYS command.

If you own a Commodore 64, you may already have wondered whether the Proofreader works with other programming utilities like "MetaBASIC." The answer is generally yes, *if you're using a 64 and activate the Proofreader after installing the other utility.* For example, first load and activate MetaBASIC, then load and run the Proofreader.

When using the Proofreader with another utility, you should disable *both* programs before running a BASIC program. While the Proofreader seems unaffected by most utilities, there's no way to promise that it will work with any and every combination of utilities you might want to use. The more utilities activated, the more fragile the system becomes.

## The New Automatic Proofreader

```
10 VEC=PEEK(772)+256*PEEK(773)
   :LO=43:HI=44
20 PRINT "AUTOMATIC PROOFREADE
   R FOR ";:IF VEC=42364 THEN
   {SPACE}PRINT "C-64"
30 IF VEC=50556 THEN PRINT "VI
   C-20"
40 IF VEC=35158 THEN GRAPHIC C
   LR:PRINT "PLUS/4 & 16"
50 IF VEC=17165 THEN LO=45:HI=
   46:GRAPHIC CLR:PRINT"128"
60 SA=(PEEK(LO)+256*PEEK(HI))+
   6:ADR=SA
70 FOR J=0 TO 166:READ BYT:POK
   E ADR,BYT:ADR=ADR+1:CHK=CHK
   +BYT:NEXT
80 IF CHK<>20570 THEN PRINT "*
   ERROR* CHECK TYPING IN DATA
    STATEMENTS":END
90 FOR J=1 TO 5:READ RF,LF,HF:
   RS=SA+RF:HB=INT(RS/256):LB=
   RS-(256*HB)
100 CHK=CHK+RF+LF+HF:POKE SA+L
   F,LB:POKE SA+HF,HB:NEXT
110 IF CHK<>22054 THEN PRINT "
   *ERROR* RELOAD PROGRAM AND
   {SPACE}CHECK FINAL LINE":EN
   D
120 POKE SA+149,PEEK(772):POKE
    SA+150,PEEK(773)
130 IF VEC=17165 THEN POKE SA+
   14,22:POKE SA+18,23:POKESA+
   29,224:POKESA+139,224
140 PRINT CHR$(147);CHR$(17);"
   PROOFREADER ACTIVE":SYS SA
150 POKE HI,PEEK(HI)+1:POKE (P
   EEK(LO)+256*PEEK(HI))-1,0:N
   EW
160 DATA 120,169,73,141,4,3,16
   9,3,141,5,3
170 DATA 88,96,165,20,133,167,
   165,21,133,168,169
180 DATA 0,141,0,255,162,31,18
   1,199,157,227,3
190 DATA 202,16,248,169,19,32,
   210,255,169,18,32
200 DATA 210,255,160,0,132,180
   ,132,176,136,230,180
210 DATA 200,185,0,2,240,46,20
   1,34,208,8,72
220 DATA 165,176,73,255,133,17
   6,104,72,201,32,208
230 DATA 7,165,176,208,3,104,2
   08,226,104,166,180
240 DATA 24,165,167,121,0,2,13
   3,167,165,168,105
250 DATA 0,133,168,202,208,239
   ,240,202,165,167,69
260 DATA 168,72,41,15,168,185,
   211,3,32,210,255
270 DATA 104,74,74,74,74,168,1
   85,211,3,32,210
280 DATA 255,162,31,189,227,3,
   149,199,202,16,248
290 DATA 169,146,32,210,255,76
   ,86,137,65,66,67
300 DATA 68,69,70,71,72,74,75,
   77,80,81,82,83,88
310 DATA 13,2,7,167,31,32,151,
   116,117,151,128,129,167,136
   ,137
```

G

# MLX Machine Language Entry Program For Commodore 64 and 128

Ottis R. Cowper

**"MLX" is a labor-saving utility that allows almost fail-safe entry of machine language programs. Included are versions for the Commodore 64 and 128.**

Type in and save some copies of whichever version of MLX is appropriate for your computer (you'll want to use it to enter future ML programs from COMPUTE!'s GAZETTE). Program 1 is for the Commodore 64, and Program 2 is for the 128 (128 MLX can also be used to enter Commodore 64 ML programs for use in 64 mode). When you're ready to enter an ML program, load and run MLX. It asks you for a starting address and an ending address. These addresses appear in the article accompanying the MLX-format program listing you're typing.

If you're unfamiliar with machine language, the addresses (and all other values you enter in MLX) may appear strange. Instead of the usual decimal numbers you're accustomed to, these numbers are in *hexadecimal*—a base 16 numbering system commonly used by ML programmers. Hexadecimal—hex for short—includes the numerals 0–9 and the letters A–F. But don't worry—even if you know nothing about ML or hex, you should have no trouble using MLX.

After you enter the starting and ending addresses, you'll be offered the option of clearing the workspace. Choose this option if you're starting to enter a new listing. If you're continuing a listing that's partially typed from a previous session, don't choose this option.

A functions menu will appear. The first option in the menu is ENTER DATA. If you're just starting to type in a program, pick this. Press the E key, and type the first number in the first line of the program listing. If you've already typed in part of a program, type the line number where you left off typing at the end of the previous session (be sure to load the partially completed program before you resume entry). In any case, make sure the address you enter corresponds to the address of a line in the listing you are entering. Otherwise, you'll be unable to enter the data correctly. If you pressed E by mistake, you can return to the command menu by pressing RETURN alone when asked for the address. (You can get back to the menu from most options by pressing RETURN with no other input.)

## Entering A Listing

Once you're in Enter mode, MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight data bytes and a checksum. Although an MLX-format listing appears similar to the "hex dump" listings from a machine language monitor program, the extra checksum number on the end allows MLX to check your typing. (Commodore 128 users *can* enter the data from an MLX listing using the built-in monitor if the rightmost column of data is omitted, but we recommend against it. It's much easier to let MLX do the proofreading and error checking for you.)

When you enter a line, MLX recalculates the checksum from the eight bytes and the address and compares this value to the number from the ninth column. If the values match, you'll hear a bell tone, the data will be added to the workspace area, and the prompt for the next line of data will appear. But if MLX detects a typing error, you'll hear a low buzz and see an error message. The line will then be redisplayed for editing.

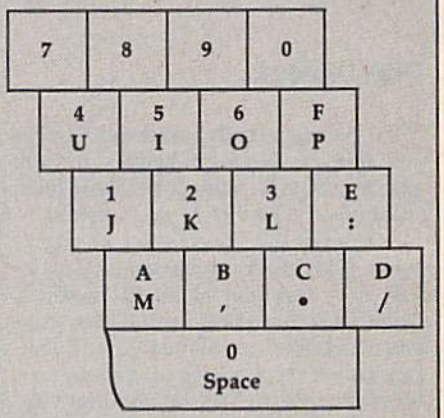
## Invalid Characters Banned

Only a few keys are active while you're entering data, so you may have to unlearn some habits. You *do not* type spaces between the columns; MLX automatically inserts these for you. You *do not* press RETURN after typing the last number in a line; MLX automatically enters and checks the line after you type the last digit.

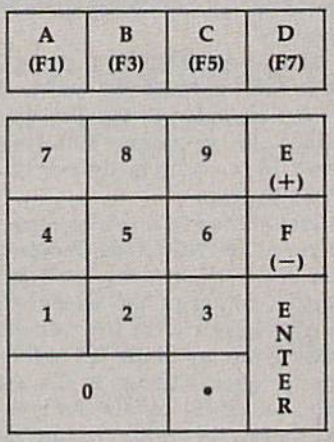
Only the numerals 0–9 and the letters A–F can be typed in. If you press any other key (with some exceptions noted below), you'll hear a warning buzz. To simplify typing, 128 MLX redefines the function keys and + and − keys on the numeric keypad so that you can enter data one-handed. (The 64 version incorporates the keypad modification from the March 1986 "Bug-Swatter" column, lines 485–487.) In either case, the keypad is active only while entering data. Addresses must be entered with the normal letter and number keys. The figures above show the keypad configurations for each version.

MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake. There is one error that can slip past MLX: Because of the checksum formula used, MLX won't notice if you accidentally type FF in place of 00, and vice versa. And there's a very slim chance that you could garble a line and still end up with a combination of characters that adds up to the proper checksum. However, these mistakes should not occur if you take reasonable care while entering data.

**64 MLX Keypad**




**128 MLX Keypad**




## Editing Features

To correct typing mistakes before finishing a line, use the INST/DEL key to delete the character to the left of the cursor. (The cursor-left key also deletes.) If you mess up a line really badly, press CLR/HOME to start the line over. The RETURN key is also active, but only before any data is typed on a line. Pressing RETURN at this point returns you to the command menu. After you type a character of data, MLX disables RETURN until the cursor returns to the start of a line. Remember, you can press CLR/HOME to quickly get to a line

number prompt.

More editing features are available when correcting lines in which MLX has detected an error. To make corrections in a line that MLX has redisplayed for editing, compare the line on the screen with the one printed in the listing, then move the cursor to the mistake and type the correct key. The cursor left and right keys provide the normal cursor controls. (The INST/DEL key now works as an alternative cursor-left key.) You cannot move left beyond the first character in the line. If you try to move beyond the rightmost character, you'll reenter the line. During editing, RETURN is active; pressing it tells MLX to recheck the line. You can press the CLR/HOME key to clear the entire line if you want to start from scratch, or if you want to get to a line number prompt to use RETURN to get back to the menu.

### Display Data

The second menu choice, DISPLAY DATA, examines memory and shows the contents in the same format as the program listing (including the checksum). When you press D, MLX asks you for a starting address. Be sure that the starting address you give corresponds to a line number in the listing. Otherwise, the checksum display will be meaningless. MLX displays program lines until it reaches the end of the program, at which point the menu is redisplayed. You can pause the display by pressing the space bar. (MLX finishes printing the current line before halting.) Press space again to restart the display. To break out of the display and get back to the menu before the ending address is reached, press RETURN.

### Other Menu Options

Two more menu selections let you save programs and load them back into the computer. These are SAVE FILE and LOAD FILE; their operation is quite straightforward. When you press S or L, MLX asks you for the filename. You'll then be asked to press either D or T to select disk or tape.

You'll notice the disk drive starting and stopping several times during a load or save (save only for the 128 version). Don't panic; this is normal behavior. MLX opens and reads from or writes to the file instead of using the usual LOAD and SAVE commands (128 MLX makes use of BLOAD). Disk users should also note that the drive prefix 0: is automatically added to the filename (line 750 in 64 MLX), so this should *not* be included when entering the name. This also precludes the use of @ for Save-with-Replace, so remember to give each version you save a different name. The 128 version makes up for this by giving you the option of scratching the existing file if you want to reuse a filename.

Remember that MLX saves the entire workspace area from the starting address to the ending address, so the save or load may take longer than you might expect if you've entered only a small amount of data from a long listing. When saving a partially completed listing, make sure to note the address where you stopped typing so you'll know where to resume entry when you reload.

MLX reports the standard disk or tape error messages if any problems are detected during the save or load. (Tape users should bear in mind that Commodore computers are never able to detect errors during a save to tape.) MLX also has three special load error messages: INCORRECT STARTING ADDRESS, which means the file you're trying to load does not have the starting address you specified when you ran MLX; LOAD ENDED AT *address*, which means the file you're trying to load ends before the ending address you specified when you started MLX; and TRUNCATED AT ENDING ADDRESS, which means the file you're trying to load extends beyond the ending address you specified when you started MLX. If you see one of these messages and feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct starting and ending addresses.

The 128 version also has a CATALOG DISK option so you can view the contents of the disk directory before saving or loading.

The QUIT menu option has the obvious effect—it stops MLX and enters BASIC. The RUN/STOP key is disabled, so the Q option lets you exit the program without turning off the computer. (Of course, RUN/STOP-RESTORE also gets you out.) You'll be asked for verification; press Y to exit to BASIC, or any other key to return to the menu. After quitting, you can type RUN again and reenter MLX without losing your data, as long as you don't use the clear workspace option.

### The Finished Product

When you've finished typing all the data for an ML program and saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. Some ML programs are designed to be loaded and run like BASIC programs, so all you need to type is LOAD *"filename"*,8 for disk (DLOAD *"filename"* on the 128) or LOAD *"filename"*,1 for tape, and then RUN. Such programs will usually have a starting address of 0801 for the 64 or 1C01 for the 128. Other programs must be reloaded to specific addresses with a command such as LOAD *"filename"*,8,1 for disk (BLOAD *"filename"* on the 128) or LOAD *"filename"*,1,1 for tape, then started with a SYS to a particular memory address. On the Commodore 64, the most common starting address for such programs is 49152, which corresponds to MLX address C000. In either case, you should always refer to the article which accompanies the ML listing for information on loading and running the program.

### An Ounce of Prevention

By the time you finish typing in the data for a long ML program, you may have several hours invested in the project. Don't take chances—use our "Automatic Proofreader" to type the new MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses, then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to ensure that you can recall your work from disk or tape. Don't let a simple typing error in the new MLX cost you several nights of hard work.

### Program 1: MLX for Commodore 64

```
SS 10 REM VERSION 1.1: LINES 8
      30,950 MODIFIED, LINES 4
      85-487 ADDED
EK 100 POKE 56,50:CLR:DIM IN$,
      I,J,A,B,A$,B$,A(7),N$
DM 110 C4=48:C6=16:C7=7:Z2=2:Z
      4=254:Z5=255:Z6=256:Z7=
      127
CJ 120 FA=PEEK(45)+Z6*PEEK(46)
      :BS=PEEK(55)+Z6*PEEK(56
      ):H$="0123456789ABCDEF"
SB 130 R$=CHR$(13):L$="{LEFT}"
      :S$=" ":D$=CHR$(20):Z$=
      CHR$(0):T$="{13 RIGHT}"
CQ 140 SD=54272:FOR I=SD TO SD
      +23:POKE I,0:NEXT:POKE
      {SPACE}SD+24,15:POKE 78
      8,52
FC 150 PRINT"{CLR}"CHR$(142)CH
      R$(8):POKE 53280,15:POK
      E 53281,15
EJ 160 PRINT T$" {RED}{RVS}
      {2 SPACES}{8 @}
      {2 SPACES}"SPC(28)"
      {2 SPACES}{OFF}{BLU} ML
      X II {RED}{RVS}
      {2 SPACES}"SPC(28)"
      {12 SPACES}{BLU}"
FR 170 PRINT"{3 DOWN}
      {3 SPACES}COMPUTE!'S MA
      CHINE LANGUAGE EDITOR
      {3 DOWN}"
JB 180 PRINT"{BLK}STARTING ADD
```

```
      RESS[4]";:GOSUB300:SA=A
      D:GOSUB1040:IF F THEN18
      0
GF 190 PRINT"{BLK}{2 SPACES}EN
      DING ADDRESS[4]";:GOSUB
      300:EA=AD:GOSUB1030:IF
      {SPACE}F THEN190
KR 200 INPUT"{3 DOWN}{BLK}CLEA
      R WORKSPACE [Y/N][4]";A
      $:IF LEFT$(A$,1)<>"Y"TH
      EN220
PG 210 PRINT"{2 DOWN}{BLU}WORK
      ING...";:FORI=BS TO BS+
      EA-SA+7:POKE I,0:NEXT:P
      RINT"DONE"
DR 220 PRINTTAB(10)"{2 DOWN}
      {BLK}{RVS} MLX COMMAND
      {SPACE}MENU {DOWN}[4]":
      PRINT T$"{RVS}E{OFF}NTE
      R DATA"
BD 230 PRINT T$"{RVS}D{OFF}ISP
      LAY DATA":PRINT T$"
      {RVS}L{OFF}OAD FILE"
JS 240 PRINT T$"{RVS}S{OFF}AVE
       FILE":PRINT T$"{RVS}Q
      {OFF}UIT{2 DOWN}{BLK}"
JH 250 GET A$:IF A$=N$ THEN250
HK 260 A=0:FOR I=1 TO 5:IF A$=
      MID$("EDLSQ",I,1)THEN A
      =I:I=5
FD 270 NEXT:ON A GOTO420,610,6
      90,700,280:GOSUB1060:GO
      TO250
EJ 280 PRINT"{RVS} QUIT ":INPU
      T"{DOWN}[4]ARE YOU SURE
       [Y/N]";A$:IF LEFT$(A$,
      1)<>"Y"THEN220
EM 290 POKE SD+24,0:END
JX 300 IN$=N$:AD=0:INPUTIN$:IF
      LEN(IN$)<>4THENRETURN
KF 310 B$=IN$:GOSUB320:AD=A:B$
      =MID$(IN$,3):GOSUB320:A
      D=AD*256+A:RETURN
PP 320 A=0:FOR J=1 TO 2:A$=MID
      $(B$,J,1):B=ASC(A$)-C4+
      (A$>"@")*C7:A=A*C6+B
JA 330 IF B<0 OR B>15 THEN AD=
      0:A=-1:J=2
GX 340 NEXT:RETURN
CH 350 B=INT(A/C6):PRINT MID$(
      H$,B+1,1);:B=A-B*C6:PRI
      NT MID$(H$,B+1,1);:RETU
      RN
RR 360 A=INT(AD/Z6):GOSUB350:A
      =AD-A*Z6:GOSUB350:PRINT
      ":";
BE 370 CK=INT(AD/Z6):CK=AD-Z4*
      CK+Z5*(CK>Z7):GOTO390
PX 380 CK=CK*Z2+Z5*(CK>Z7)+A
JC 390 CK=CK+Z5*(CK>Z5):RETURN
QS 400 PRINT"{DOWN}STARTING AT
      [4]";:GOSUB300:IF IN$<>
      N$ THEN GOSUB1030:IF F
      {SPACE}THEN400
EX 410 RETURN
HD 420 PRINT"{RVS} ENTER DATA
      {SPACE}":GOSUB400:IF IN
      $=N$ THEN220
JK 430 OPEN3,3:PRINT
SK 440 POKE198,0:GOSUB360:IF F
       THEN PRINT IN$:PRINT"
      {UP}{5 RIGHT}";
GC 450 FOR I=0 TO 24 STEP 3:B$
      =S$:FOR J=1 TO 2:IF F T
      HEN B$=MID$(IN$,I+J,1)
HA 460 PRINT"{RVS}"B$L$;:IF I<
      24THEN PRINT"{OFF}";
HD 470 GET A$:IF A$=N$ THEN470
FK 480 IF(A$>"/"ANDA$<":")OR(A
      $>"@"ANDA$<"G")THEN540
GS 485 A=-(A$="M")-2*(A$=",")-
      3*(A$=".")-4*(A$="/")-5
      *(A$="J")-6*(A$="K")
FX 486 A=A-7*(A$="L")-8*(A$=:
      )-9*(A$="U")-10*(A$="I
      ")-11*(A$="O")-12*(A$="
      P")
CM 487 A=A-13*(A$=S$):IF A THE
      N A$=MID$("ABCD123E456F
      0",A,1):GOTO 540
MP 490 IF A$=R$ AND((I=0)AND(J
      =1)OR F)THEN PRINT B$;:
      J=2:NEXT:I=24:GOTO550
KC 500 IF A$="{HOME}" THEN PRI
      NT B$:J=2:NEXT:I=24:NEX
      T:F=0:GOTO440
MX 510 IF(A$="{RIGHT}")ANDF TH
      ENPRINT B$L$;:GOTO540
GK 520 IF A$<>L$ AND A$<>D$ OR
      ((I=0)AND(J=1))THEN GOS
      UB1060:GOTO470
HG 530 A$=L$+S$+L$:PRINT B$L$;
      :J=2-J:IF J THEN PRINT
      {SPACE}L$;:I=I-3
QS 540 PRINT A$;:NEXT J:PRINT
      {SPACE}S$;
PM 550 NEXT I:PRINT:PRINT"{UP}
      {5 RIGHT}";:INPUT#3,IN$
      :IF IN$=N$ THEN CLOSE3:
      GOTO220
QC 560 FOR I=1 TO 25 STEP3:B$=
      MID$(IN$,I):GOSUB320:IF
       I<25 THEN GOSUB380:A(I
      /3)=A
PK 570 NEXT:IF A<>CK THEN GOSU
      B1060:PRINT"{BLK}{RVS}
      {SPACE}ERROR: REENTER L
      INE [4]":F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FO
      R I=0 TO 7:POKE B+I,A(I
      ):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN C
      LOSE3:PRINT"{DOWN}{BLU}
      ** END OF ENTRY **{BLK}
      {2 DOWN}":GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT"{CLR}{DOWN}{RVS}
      {SPACE}DISPLAY DATA ":G
      OSUB400:IF IN$=N$ THEN2
      20
RJ 620 PRINT"{DOWN}{BLU}PRESS:
       {RVS}SPACE{OFF} TO PAU
      SE, {RVS}RETURN{OFF} TO
       BREAK[4]{DOWN}"
KS 630 GOSUB360:B=BS+AD-SA:FOR
      I=BTO B+7:A=PEEK(I):GOS
      UB350:GOSUB380:PRINT S$
      ;
CC 640 NEXT:PRINT"{RVS}";:A=CK
      :GOSUB350:PRINT
KH 650 F=1:AD=AD+8:IF AD>EA TH
      ENPRINT"{DOWN}{BLU}** E
      ND OF DATA **":GOTO220
KC 660 GET A$:IF A$=R$ THEN GO
      SUB1080:GOTO220
EQ 670 IF A$=S$ THEN F=F+1:GOS
      UB1080
AD 680 ONFGOTO630,660,630
CM 690 PRINT"{DOWN}{RVS} LOAD
      {SPACE}DATA ":OP=1:GOTO
      710
PC 700 PRINT"{DOWN}{RVS} SAVE
      {SPACE}FILE ":OP=0
RX 710 IN$=N$:INPUT"{DOWN}FILE
      NAME[4]";IN$:IF IN$=N$
      {SPACE}THEN220
PR 720 F=0:PRINT"{DOWN}{BLK}
      {RVS}T{OFF}APE OR {RVS}
      D{OFF}ISK: [4]";
FP 730 GET A$:IF A$="T"THEN PR
      INT"T{DOWN}":GOTO880
HQ 740 IF A$<>"D"THEN730
HH 750 PRINT"D{DOWN}":OPEN15,8
      ,15,"I0:":B=EA-SA:IN$="
      0:"+IN$:IF OP THEN810
SQ 760 OPEN 1,8,8,IN$+",P,W":G
      OSUB860:IF A THEN220
FJ 770 AH=INT(SA/256):AL=SA-(A
      H*256):PRINT#1,CHR$(AL)
      ;CHR$(AH);
PE 780 FOR I=0 TO B:PRINT#1,CH
      R$(PEEK(BS+I));:IF ST T
      HEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOT
      O940
GS 800 GOSUB1060:PRINT"{DOWN}
      {BLK}ERROR DURING SAVE:
      [4]":GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+",P,R":G
      OSUB860:IF A THEN220
GE 820 GET#1,A$,B$:AD=ASC(A$+Z
      $)+256*ASC(B$+Z$):IF AD
      <>SA THEN F=1:GOTO850
RX 830 FOR I=0 TO B:GET#1,A$:P
      OKE BS+I,ASC(A$+Z$):IF(
      I<>B)AND ST THEN F=2:AD
      =I:I=B
FA 840 NEXT:IF ST<>64 THEN F=3
FQ 850 CLOSE1:CLOSE15:ON ABS(F
      >0)+1 GOTO960,970
SA 860 INPUT#15,A,A$:IF A THEN
       CLOSE1:CLOSE15:GOSUB10
      60:PRINT"{RVS}ERROR: "A
      $
GQ 870 RETURN
EJ 880 POKE183,PEEK(FA+2):POKE
      187,PEEK(FA+3):POKE188,
      PEEK(FA+4):IFOP=0THEN92
      0
HJ 890 SYS 63466:IF(PEEK(783)A
      ND1)THEN GOSUB1060:PRIN
      T"{DOWN}{RVS} FILE NOT
      {SPACE}FOUND ":GOTO690
CS 900 AD=PEEK(829)+256*PEEK(8
      30):IF AD<>SA THEN F=1:
      GOTO970
SC 910 A=PEEK(831)+256*PEEK(83
      2)-1:F=F-2*(A<EA)-3*(A>
      EA):AD=A-AD:GOTO930
KM 920 A=SA:B=EA+1:GOSUB1010:P
      OKE780,3:SYS 63338
JF 930 A=BS:B=BS+(EA-SA)+1:GOS
      UB1010:ON OP GOTO950:SY
      S 63591
AE 940 GOSUB1080:PRINT"{BLU}**
       SAVE COMPLETED **":GOT
      O220
XP 950 POKE147,0:SYS 63562:IF
      {SPACE}ST>0 THEN970
FR 960 GOSUB1080:PRINT"{BLU}**
       LOAD COMPLETED **":GOT
      O220
DP 970 GOSUB1060:PRINT"{BLK}
      {RVS}ERROR DURING LOAD:
      {DOWN}[4]":ON F GOSUB98
      0,990,1000:GOTO220
PP 980 PRINT"INCORRECT STARTIN
      G ADDRESS (";:GOSUB360:
      PRINT")":RETURN
GR 990 PRINT"LOAD ENDED AT ";:
      AD=SA+AD:GOSUB360:PRINT
       D$:RETURN
FD 1000 PRINT"TRUNCATED AT END
      ING ADDRESS":RETURN
RX 1010 AH=INT(A/256):AL=A-(AH
      *256):POKE193,AL:POKE1
      94,AH
FF 1020 AH=INT(B/256):AL=B-(AH
      *256):POKE174,AL:POKE1
      75,AH:RETURN
FX 1030 IF AD<SA OR AD>EA THEN
      1050
HA 1040 IF(AD>511 AND AD<40960
```

```
        )OR(AD>49151 AND AD<53
        248)THEN GOSUB1080:F=0
        :RETURN
HC 1050 GOSUB1060:PRINT"{RVS}
        {SPACE}INVALID ADDRESS
        {DOWN}{BLK}":F=1:RETU
        RN
AR 1060 POKE SD+5,31:POKE SD+6
        ,208:POKE SD,240:POKE
        {SPACE}SD+1,4:POKE SD+
        4,33
DX 1070 FOR S=1 TO 100:NEXT:GO
        TO1090
PF 1080 POKE SD+5,8:POKE SD+6,
        240:POKE SD,0:POKE SD+
        1,90:POKE SD+4,17
AC 1090 FOR S=1 TO 100:NEXT:PO
        KE SD+4,0:POKE SD,0:PO
        KE SD+1,0:RETURN
```

## Program 2: MLX for Commodore 128

```
AE 100 TRAP 960:POKE 4627,128:
       DIM NL$,A(7)
XP 110 Z2=2:Z4=254:Z5=255:Z6=2
       56:Z7=127:BS=256*PEEK(4
       627):EA=65280
FB 120 BE$=CHR$(7):RT$=CHR$(13
       ):DL$=CHR$(20):SP$=CHR$
       (32):LF$=CHR$(157)
KE 130 DEF FNHB(A)=INT(A/256):
       DEF FNLB(A)=A-FNHB(A)*2
       56:DEF FNAD(A)=PEEK(A)+
       256*PEEK(A+1)
JB 140 KEY 1,"A":KEY 3,"B":KEY
        5,"C":KEY 7,"D":VOL 15
       :IF RGR(0)=5 THEN FAST
FJ 150 PRINT"{CLR}"CHR$(142);C
       HR$(8):COLOR 0,15:COLOR
        4,15:COLOR 6,15
GQ 160 PRINT TAB(12)"{RED}
       {RVS}{2 SPACES}{9 @}
       {2 SPACES}"RT$;TAB(12)"
       {RVS}{2 SPACES}{OFF}
       {BLU} 128 MLX {RED}
       {RVS}{2 SPACES}"RT$;TAB
       (12)"{RVS}{13 SPACES}
       {BLU}"
FE 170 PRINT"{2 DOWN}
       {3 SPACES}COMPUTE!'S MA
       CHINE LANGUAGE EDITOR
       {2 DOWN}"
DK 180 PRINT"{BLK}STARTING ADD
       RESS{4}";:GOSUB 260:IF
       {SPACE}AD THEN SA=AD:EL
       SE 180
FH 190 PRINT"{BLK}{2 SPACES}EN
       DING ADDRESS{4}";:GOSUB
        260:IF AD THEN EA=AD:E
       LSE 190
MF 200 PRINT"{DOWN}{BLK}CLEAR
       {SPACE}WORKSPACE [Y/N]?
       {4}":GETKEY A$:IF A$<>"
       Y" THEN 220
QH 210 PRINT"{DOWN}{BLU}WORKIN
       G...";:BANK 0:FOR A=BS
       {SPACE}TO BS+(EA-SA)+7:
       POKE A,0:NEXT A:PRINT"D
       ONE"
DC 220 PRINT TAB(10)"{DOWN}
       {BLK}{RVS} MLX COMMAND
       {SPACE}MENU {4}{DOWN}":
       PRINT TAB(13)"{RVS}E
       {OFF}NTER DATA"RT$;TAB(
       13)"{RVS}D{OFF}ISPLAY D
       ATA"RT$;TAB(13)"{RVS}L
       {OFF}OAD FILE"
HB 230 PRINT TAB(13)"{RVS}S
       {OFF}AVE FILE"RT$;TAB(1
       3)"{RVS}C{OFF}ATALOG DI
       SK"RT$;TAB(13)"{RVS}Q
       {OFF}UIT{DOWN}{BLK}"
AP 240 GETKEY A$:A=INSTR("EDLS
       CQ",A$):ON A GOTO 340,5
       50,640,650,930,940:GOSU
       B 950:GOTO 240
SX 250 PRINT"STARTING AT";:GOS
       UB 260:IF(AD<>0)OR(A$=N
       L$)THEN RETURN:ELSE 250
BG 260 A$=NL$:INPUT A$:IF LEN(
       A$)=4 THEN AD=DEC(A$)
PP 270 IF AD=0 THEN BEGIN:IF A
       $<>NL$ THEN 300:ELSE RE
       TURN:BEND
MA 280 IF AD<SA OR AD>EA THEN
       {SPACE}300
PM 290 IF AD>511 AND AD<65280
       {SPACE}THEN PRINT BE$;:
       RETURN
SQ 300 GOSUB 950:PRINT"{RVS} I
       NVALID ADDRESS {DOWN}
       {BLK}":AD=0:RETURN
RD 310 CK=FNHB(AD):CK=AD-Z4*CK
       +Z5*(CK>Z7):GOTO 330
DD 320 CK=CK*Z2+Z5*(CK>Z7)+A
AH 330 CK=CK+Z5*(CK>Z5):RETURN
QD 340 PRINT BE$;"{RVS} ENTER
       {SPACE}DATA ":GOSUB 250
       :IF A$=NL$ THEN 220
JA 350 BANK 0:PRINT:F=0:OPEN 3
       ,3
BR 360 GOSUB 310:PRINT HEX$(AD
       )+":";:IF F THEN PRINT
       {SPACE}L$:PRINT"{UP}
       {5 RIGHT}";
QA 370 FOR I=0 TO 24 STEP 3:B$
       =SP$:FOR J=1 TO 2:IF F
       {SPACE}THEN B$=MID$(L$,
       I+J,1)
PS 380 PRINT"{RVS}"B$+LF$;:IF
       {SPACE}I<24 THEN PRINT"
       {OFF}";
RC 390 GETKEY A$:IF (A$>"/" AN
       D A$<":") OR(A$>"@" AND
        A$<"G") THEN 470
AC 400 IF A$="+" THEN A$="E":G
       OTO 470
QB 410 IF A$="-" THEN A$="F":G
       OTO 470
FB 420 IF A$=RT$ AND ((I=0) AN
       D (J=1) OR F) THEN PRIN
       T B$;:J=2:NEXT:I=24:GOT
       O 480
RD 430 IF A$="{HOME}" THEN PRI
       NT B$:J=2:NEXT:I=24:NEX
       T:F=0:GOTO 360
XB 440 IF (A$="{RIGHT}") AND F
        THEN PRINT B$+LF$;:GOT
       O 470
JP 450 IF A$<>LF$ AND A$<>DL$
       {SPACE}OR ((I=0) AND (J
       =1)) THEN GOSUB 950:GOT
       O 390
PS 460 A$=LF$+SP$+LF$:PRINT B$
       +LF$;:J=2-J:IF J THEN P
       RINT LF$;:I=I-3
GB 470 PRINT A$;:NEXT J:PRINT
       {SPACE}SP$;
HA 480 NEXT I:PRINT:PRINT"{UP}
       {5 RIGHT}";:L$="
       {27 SPACES}"
DP 490 FOR I=1 TO 25 STEP 3:GE
       T#3,A$,B$:IF A$=SP$ THE
       N I=25:NEXT:CLOSE 3:GOT
       O 220
BA 500 A$=A$+B$:A=DEC(A$):MID$
       (L$,I,2)=A$:IF I<25 THE
       N GOSUB 320:A(I/3)=A:GE
       T#3,A$
AR 510 NEXT I:IF A<>CK THEN GO
       SUB 950:PRINT:PRINT"
       {RVS} ERROR: REENTER LI
       NE ":F=1:GOTO 360
DX 520 PRINT BE$:B=BS+AD-SA:FO
       R I=0 TO 7:POKE B+I,A(I
       ):NEXT I
XB 530 F=0:AD=AD+8:IF AD<=EA T
       HEN 360
CA 540 CLOSE 3:PRINT"{DOWN}
       {BLU}** END OF ENTRY **
       {BLK}{2 DOWN}":GOTO 650
MC 550 PRINT BE$;"{CLR}{DOWN}
       {RVS} DISPLAY DATA ":GO
       SUB 250:IF A$=NL$ THEN
       {SPACE}220
JF 560 BANK 0:PRINT"{DOWN}
       {BLU}PRESS: {RVS}SPACE
       {OFF} TO PAUSE, {RVS}RE
       TURN{OFF} TO BREAK{4}
       {DOWN}"
XA 570 PRINT HEX$(AD)+":";:GOS
       UB 310:B=BS+AD-SA
DJ 580 FOR I=B TO B+7:A=PEEK(I
       ):PRINT RIGHT$(HEX$(A),
       2);SP$;:GOSUB 320:NEXT
       {SPACE}I
XB 590 PRINT"{RVS}";RIGHT$(HEX
       $(CK),2)
GR 600 F=1:AD=AD+8:IF AD>EA TH
       EN PRINT"{BLU}** END OF
        DATA **":GOTO 220
EB 610 GET A$:IF A$=RT$ THEN P
       RINT BE$:GOTO 220
QK 620 IF A$=SP$ THEN F=F+1:PR
       INT BE$;
XS 630 ON F GOTO 570,610,570
RF 640 PRINT BE$"{DOWN}{RVS} L
       OAD DATA ":OP=1:GOTO 66
       0
BP 650 PRINT BE$"{DOWN}{RVS} S
       AVE FILE ":OP=0
DM 660 F=0:F$=NL$:INPUT"FILENA
       ME{4}";F$:IF F$=NL$ THE
       N 220
PF 665 IF LEN(F$)>14 THEN 660
RF 670 PRINT"{DOWN}{BLK}{RVS}T
       {OFF}APE OR {RVS}D{OFF}
       ISK: {4}";
SQ 680 GETKEY A$:IF A$="T" THE
       N 850:ELSE IF A$<>"D" T
       HEN 680
SP 690 PRINT"DISK{DOWN}":IF OP
        THEN 760
EH 700 DOPEN#1,(F$+",P"),W:IF
       {SPACE}DS THEN A$=D$:GO
       TO 740
JH 710 BANK 0:POKE BS-2,FNLB(S
       A):POKE BS-1,FNHB(SA):P
       RINT"SAVING ";F$:PRINT
MC 720 FOR A=BS-2 TO BS+EA-SA:
       PRINT#1,CHR$(PEEK(A));:
       IF ST THEN A$="DISK WRI
       TE ERROR":GOTO 750
GC 730 NEXT A:CLOSE 1:PRINT"
       {BLU}** SAVE COMPLETED
       {SPACE}WITHOUT ERRORS *
       *":GOTO 220
RA 740 IF DS=63 THEN BEGIN:CLO
       SE 1:INPUT"{BLK}REPLACE
        EXISTING FILE [Y/N]{4}
       ";A$:IF A$="Y" THEN SCR
       ATCH(F$):PRINT:GOTO 700
       :ELSE PRINT"{BLK}":GOTO
       660:BEND
GA 750 CLOSE 1:GOSUB 950:PRINT
       "{BLK}{RVS} ERROR DURIN
       G SAVE: {4}":PRINT A$:G
       OTO 220
FD 760 DOPEN#1,(F$+",P"):IF DS
        THEN A$=DS$:F=4:CLOSE
       {SPACE}1:GOTO 790
```

```
PX 770 GET#1,A$,B$:CLOSE 1:AD=
       ASC(A$)+256*ASC(B$):IF
       {SPACE}AD<>SA THEN F=1:
       GOTO 790
KB 780 PRINT"LOADING ";F$:PRIN
       T:BLOAD(F$),B0,P(BS):AD
       =SA+FNAD(174)-BS-1:F=-2
       *(AD<EA)-3*(AD>EA)
RQ 790 IF F THEN 800:ELSE PRIN
       T"{BLU}** LOAD COMPLETE
       D WITHOUT ERRORS **":GO
       TO 220
ER 800 GOSUB 950:PRINT"{BLK}
       {RVS} ERROR DURING LOAD
       : {4}":ON F GOSUB 810,8
       20,830,840:GOTO220
QJ 810 PRINT"INCORRECT STARTIN
       G ADDRESS (";HEX$(AD);"
       )":RETURN
DP 820 PRINT"LOAD ENDED AT ";H
       EX$(AD):RETURN
EB 830 PRINT"TRUNCATED AT ENDI
       NG ADDRESS ("HEX$(EA)")
       ":RETURN
FP 840 PRINT"DISK ERROR ";A$:R
       ETURN
KS 850 PRINT"TAPE":AD=POINTER(
       F$):BANK 1:A=PEEK(AD):A
       L=PEEK(AD+1):AH=PEEK(AD
       +2)
XX 860 BANK 15:SYS DEC("FF68")
       ,0,1:SYS DEC("FFBA"),1,
       1,0:SYS DEC("FFBD"),A,A
       L,AH:SYS DEC("FF90"),12
       8:IF OP THEN 890
FG 870 PRINT:A=SA:B=EA+1:GOSUB
        920:SYS DEC("E919"),3:
       PRINT"SAVING ";F$
AB 880 A=BS:B=BS+(EA-SA)+1:GOS
       UB 920:SYS DEC("EA18"):
       PRINT"{DOWN}{BLU}** TAP
       E SAVE COMPLETED **":GO
       TO 220
CP 890 SYS DEC("E99A"):PRINT:I
       F PEEK(2816)=5 THEN GOS
       UB 950:PRINT"{DOWN}
       {BLK}{RVS} FILE NOT FOU
       ND ":GOTO 220
GQ 900 PRINT"LOADING ...{DOWN}
       ":AD=FNAD(2817):IF AD<>
       SA THEN F=1:GOTO 800:EL
       SE AD=FNAD(2819)-1:F=-2
       *(AD<EA)-3*(AD>EA)
JD 910 A=BS:B=BS+(EA-SA)+1:GOS
       UB 920:SYS DEC("E9FB"):
       IF ST>0 THEN 800:ELSE 7
       90
XB 920 POKE193,FNLB(A):POKE194
       ,FNHB(A):POKE 174,FNLB(
       B):POKE 175,FNHB(B):RET
       URN
CP 930 CATALOG:PRINT"{DOWN}
       {BLU}** PRESS ANY KEY F
       OR MENU **":GETKEY A$:G
       OTO 220
MM 940 PRINT BE$"{RVS} QUIT
       {4}";RT$;"ARE YOU SURE
       {SPACE}[Y/N]?":GETKEY A
       $:IF A$<>"Y" THEN 220:E
       LSE PRINT"{CLR}":BANK 1
       5:END
JE 950 SOUND 1,500,10:RETURN
AF 960 IF ER=14 AND EL=260 THE
       N RESUME 300
MK 970 IF ER=14 AND EL=500 THE
       N RESUME NEXT
KJ 980 IF ER=4 AND EL=780 THEN
        F=4:A$=DS$:RESUME 800
DQ 990 IF ER=30 THEN RESUME:EL
       SE PRINT ERR$(ER);" ERR
       OR IN LINE";EL
```

G

# bug-swatter

• "GeoConverter," the conversion program listed in the GEOS column each month, has a couple of errors. The first problem prevents GeoConverter from finding a file if the preceding filename in the disk directory is 16 characters long. The second problem causes it to set the file type for the converted file incorrectly. To correct the problems, substitute the following lines:

```
200 IF ASC(B$)=160 OR I=19
    THEN 220
320 FOR I=1 TO 32*E+2:GET#2,
    B$:NEXT
330 PRINT#2,CT$;MT$;MS$;:FOR
    I=0 TO 15:GET#2,B$:NEXT
```

• Program 3 from "Text Screen Editor" and Program 3 from "RGB Kit" (both from the October 1989 issue) have a similar problem. The starting addresses of both programs are unacceptable to "MLX." To enter these programs, you'll have to create a special version of 64 MLX which doesn't check the starting and ending addresses. To do this, change line 1040 of MLX to

```
1040 RETURN
```

Save this new version of MLX under a new name—don't erase your old version. Using this version, you'll be able to enter both programs correctly.

• Several readers have had trouble entering Program 2 from "64 Animator" (September 1988). If 64 Animator isn't activated when you type in the demo, the program isn't tokenized correctly and won't run. To enter Program 2 correctly, first enter Program 3 using MLX. Next, load Program 3 and activate it with the command **SYS 16384**. Load "The Automatic Proofreader," found elsewhere in this issue, and run it. Then enter Program 2.

• The MLX ending address for the patch program, *SpeedScript 128 Plus* (September 1989), is incorrect. The correct values for MLX are as follows:

**Starting address:** 3A00
**Ending address:** 48EF

If you've already typed in the data for *SpeedScript 128 Plus*, you can correct your copy with a few simple steps. First, load and run MLX, and then enter the correct starting and ending addresses listed above. Next, load your copy of SPEEDPATCH 128. When MLX displays the error message ERROR DURING LOAD: TRUNCATED AT ENDING ADDRESS, just ignore it. Now, save a copy of the patch program with a new name and follow the directions in the *SpeedScript 128 Plus* article for incorporating the patch into *SpeedScript 128*.

• We've received dozens of calls and letters about the program "Stars II" (August 1989). It seems that many of you are having trouble typing in this program. We've checked the program thoroughly and know that it works correctly.

Stars II is very difficult to type in. It contains nearly 100 DATA statements. If these DATA statements aren't entered correctly, the program won't run. If your copy of Stars II doesn't run correctly, go back and examine the DATA statements very carefully. One of the most common mistakes our readers make is typing periods where they should have commas and vice versa.

Many of you have requested a way to print the sky plots once they're on the screen. "PrintScreen" (December 1987) and "1526 PrintScreen" (December 1988) provide excellent printouts. PrintScreen works with the Commodore 1525 and compatible printers. It also has a customizer program to allow it to work with nearly any printer. As its name implies, 1526 PrintScreen works with the Commodore 1526 printer. G

# How To Type In *COMPUTE!'s Gazette* Programs

Each month, COMPUTE!'s Gazette publishes programs for the Commodore 128, 64, Plus/4, and 16. Each program is clearly marked by title and version. Be sure to type in the correct version for your machine. All 64 programs run on the 128 in 64 mode. Be sure to read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

We frequently publish two programs designed to make typing easier: The Automatic Proofreader, and MLX, designed for entering machine language programs.

When entering a BASIC program, be especially careful with DATA statements as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the computer). If this happens, the only recourse is to turn your computer off then on, erasing what was in memory. So be sure to *save a program before you run it.* If your computer crashes, you can always reload the program and look for the error.

## Special Characters

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from the *Gazette*, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor down key; {5 SPACES} means to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing another key), the character is underlined. For example, A means hold down the SHIFT key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example, enter eight SHIFTed A's).

If a key is enclosed in special brackets, [ ], hold down the Commodore key (at the lower left corner of the keyboard) and press the indicated character.

Rarely, you'll see a single letter of the alphabet enclosed in braces. This can be entered on the Commodore 64 by pressing the CTRL key while typing the letter in braces. For example, {A} means to press CTRL-A.

## The Quote Mode

Although you can move the cursor around the screen with the CRSR keys, often a programmer will want to move the cursor under program control. This is seen in examples such as {LEFT}, and {HOME} in the program listings. The only way the computer can tell the difference between direct and programmed cursor control is *the quote mode.*

Once you press the quote key, you're in quote mode. This mode can be confusing if you mistype a character and cursor left to change it. You'll see a reverse video character (a graphics symbol for cursor left). In this case, you can use the DELete key to back up and edit the line. Type another quote and you're out of quote mode. If things really get confusing, you can exit quote mode simply by pressing RETURN. Then just cursor up to the mistyped line and fix it. **G**

| When You Read: | Press: | See: |
|---|---|---|
| {CLR} | SHIFT + CLR/HOME | |
| {HOME} | CLR/HOME | |
| {UP} | SHIFT + ↑ CRSR ↓ | |
| {DOWN} | ↑ CRSR ↓ | |
| {LEFT} | SHIFT + ←CRSR→ | |
| {RIGHT} | ←CRSR→ | |
| {RVS} | CTRL + 9 | |
| {OFF} | CTRL + 0 | |
| {BLK} | CTRL + 1 | |
| {WHT} | CTRL + 2 | |
| {RED} | CTRL + 3 | |
| {CYN} | CTRL + 4 | |

| When You Read: | Press: | See: |
|---|---|---|
| {PUR} | CTRL + 5 | |
| {GRN} | CTRL + 6 | |
| {BLU} | CTRL + 7 | |
| {YEL} | CTRL + 8 | |
| { F1 } | f1 | |
| { F2 } | SHIFT + f1 | |
| { F3 } | f3 | |
| { F4 } | SHIFT + f3 | |
| { F5 } | f5 | |
| { F6 } | SHIFT + f5 | |
| { F7 } | f7 | |
| { F8 } | SHIFT + f7 | |

| When You Read: | Press: | See: |
|---|---|---|
| ← | ← | |
| ↑ | SHIFT + ↑ | |

**For Commodore 64 Only**

| | | |
|---|---|---|
| [1] | COMMODORE + 1 | |
| [2] | COMMODORE + 2 | |
| [3] | COMMODORE + 3 | |
| [4] | COMMODORE + 4 | |
| [5] | COMMODORE + 5 | |
| [6] | COMMODORE + 6 | |
| [7] | COMMODORE + 7 | |
| [8] | COMMODORE + 8 | |

# Classified

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# COMMODORE CLIPS

## NEWS, NOTES, AND NEW PRODUCTS

continued from page 88.

### Nightmares and Aliens

Medalist International (marketed by MicroProse, 180 Lakefront Drive, Hunt Valley, Maryland 21030) has released two new games that may keep you up at night. *Weird Dreams* ($29.95) delves into the subconscious, while the arcade conversion *Xenophobe* ($29.95) takes you on a mission of alien extermination. Both games are marketed under Medalist's MicroPlay label and require a joystick to operate.

In *Weird Dreams*, you assume the role of a hospital patient as he undergoes surgery. As his subconscious mind begins to wander, you'll encounter giant wasps, carnivorous rose bushes, a psychopathic lawn mower, and an evil little girl. Other ordeals include fish flying through the sky, a person trapped inside a giant cotton-candy machine, and a demonic soccer ball. Your success directly affects the patient's health on the operating table.

*Xenophobe* puts you in command of three squads of scientists, soldiers, and others in a battle to reclaim abandoned space stations from alien invaders. From your nine charges you must select the two best personalities to handle each mission. These fighters then face a continuous wave of creatures with names like Rollerbaby, Snotterpillar, and Tentacle, each with its own unique way of knocking human attackers out of action.

### Psygnosis Invades Software World

In an aggressive move, Psygnosis (P.O. Box 483, Addison, Illinois 60101) has announced a plan to release a large volume of game titles in the coming months, including several for the Commodore 64.

The Great Britain–based company has recruited additional personnel, including software engineers, graphic artists, animators, musicians, and writers. Psygnosis also has put into place a new advertising campaign and will attend more trade shows.

New titles currently available or soon to be released include *Captain Fizz* ($29.95), *Ballistix* ($29.95), and *Blood Money* ($29.95). Three others are planned for early 1990. G

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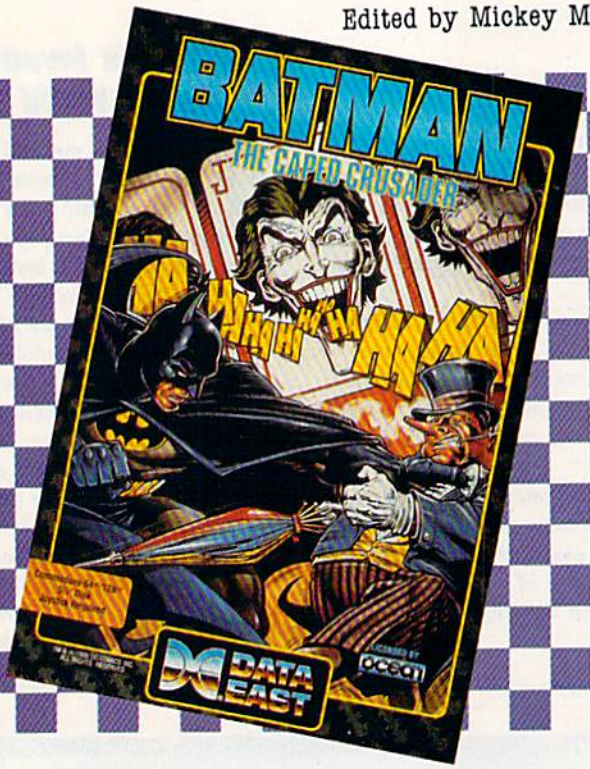
# COMMODORE CLIPS

## NEWS, NOTES, AND NEW PRODUCTS

Edited by Mickey McLean




### Software Box Office Boffo

Two software titles from Data East USA (1850 Little Orchard Street, San Jose, California 95125), *Batman, The Caped Crusader* and *Robocop*, have sold over 100,000 units. The games are based on motion pictures that have also done well at the box office.

"Data East anticipated strong consumer demand for software games that bring the excitement of Hollywood movies right to the computer," said Mark Beaumont, vice president of consumer marketing at Data East USA. "Our strategy was to capture the essence and characters from the *Batman* and *Robocop* movies and create challenging and fun games around those popular themes."

In *Batman*, you must make your way through the streets of Gotham City to destroy The Penguin's master computer. After defeating that feathered fiend, you must rescue Robin, who has been kidnapped by The Joker.

The software version of *Robocop* features the same action story line and adventure as the movie.

### Rap It Up!

Taito Software (9267 West Esplanade, Suite 206, North Vancouver, British Columbia, Canada V7M 1A5) has announced a rap-music sweepstakes game. The "Say Rap. Say Taito. Say Yo!" Sweepstakes' grand prize includes a five-day trip for two to New York with round-trip airfare and hotel accommodations, a visit to the cable TV show, "Yo! MTV Raps," and $1,000 in spending money.

The contest began with commercials on MTV and two-page ads in computer magazines including the October issue of *Gazette*'s sister publication, *COMPUTE!*. The ad contains a rap identifying Taito's game titles and an entry form. Official entry forms are also available at Taito software retailers. To enter, you must list any five Taito product titles and mail in the form. Entries must be received by February 1, 1990.

### Kube Khaos

Addiction could be a problem with *Kaleidokubes* ($24.95), a mind bender from Artworx (1844 Penfield Road, Penfield, New York 14526). The game's concept is similar to dominoes, but the object is to match colors.

Place your kube on the playing board, matching the sides with pieces already on the board. Game options include playing against the computer, another player, or yourself in practice mode. Kubes appear randomly and can be rotated to best fit the kubes which have already been played. The program keeps track of the time and penalizes slow play and incorrect moves. High scores and low times are saved to disk. Several different board configurations are available on disk, or you can design your own.

### Character Builder

A second time-saving utility program for TSR's *Advanced Dungeons & Dragons* has been released by Strategic Simulations. *Dungeon Masters Assistant, Volume II: Characters and Treasures* ($29.95) enables Dungeon Masters to generate detailed player or nonplayer characters and large treasure hoards while letting the computer do the number crunching.

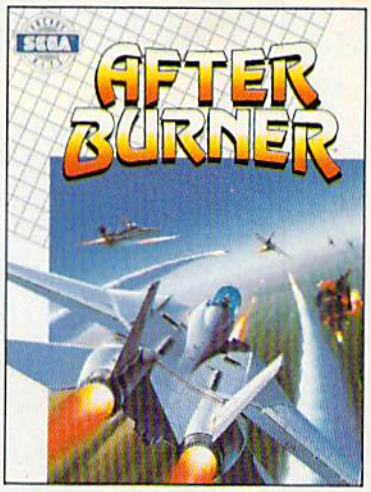
The program accounts for every facet of character generation, from languages and spell lists to class and racial abilities. All character classes, including multiclass characters, can be displayed on ready-made character sheets with all pertinent information. Character sheets can also be printed out for convenience.

You can generate all magic items from the AD & D *Dungeon Masters Guide* and *Unearthed Arcana* as well as all treasure types from the *Monster Manual* and *Monster Manual II* by using this program.

*Dungeon Masters Assistant, Volume II: Characters and Treasures* is distributed by Electronic Arts (1820 Gateway Drive, San Mateo, California 94404).

*continued on page 87.*

# AFTER BURNER

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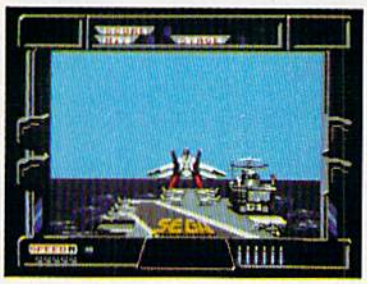
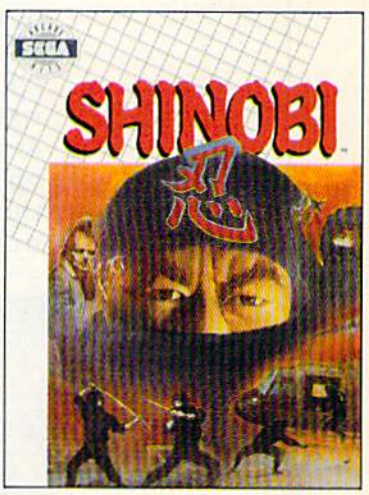


# SHINOBI

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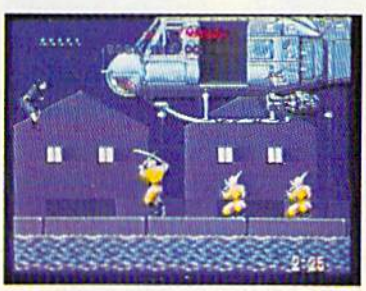

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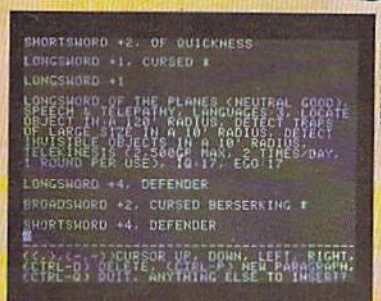

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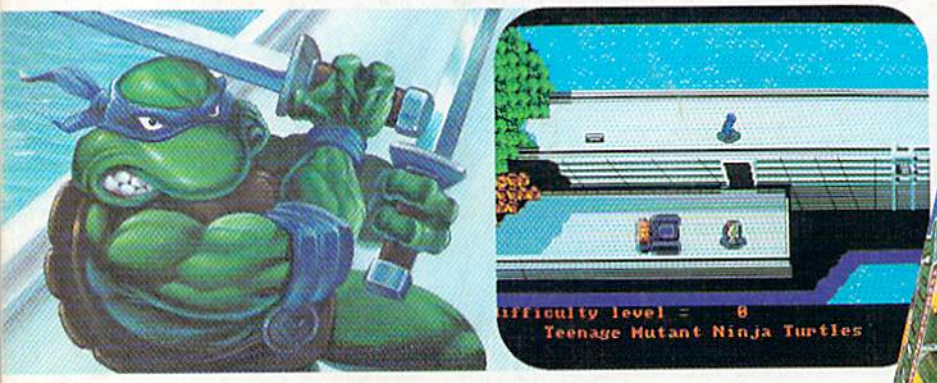

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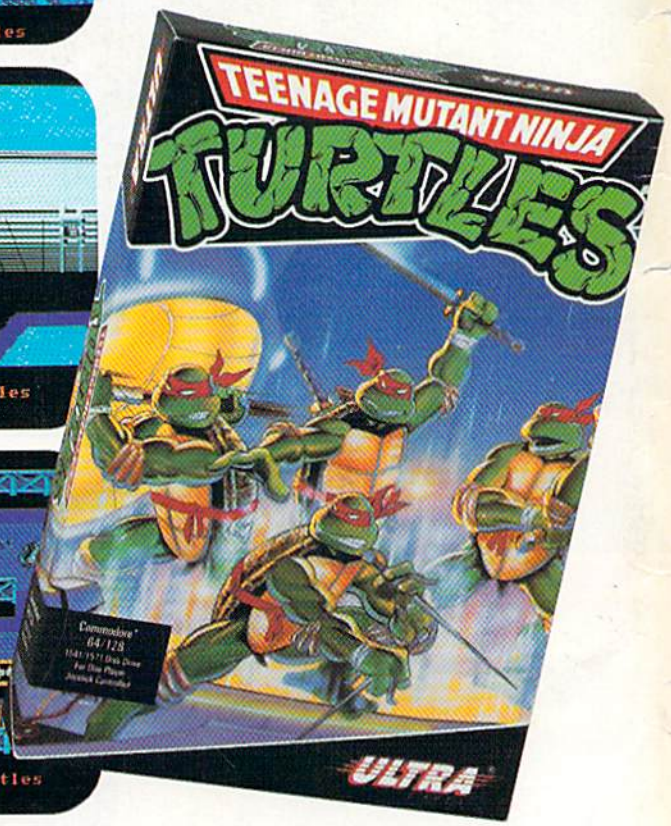


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