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December 1987

Issue 54, Vol. 5, No. 12

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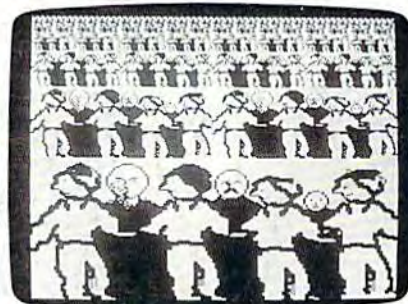
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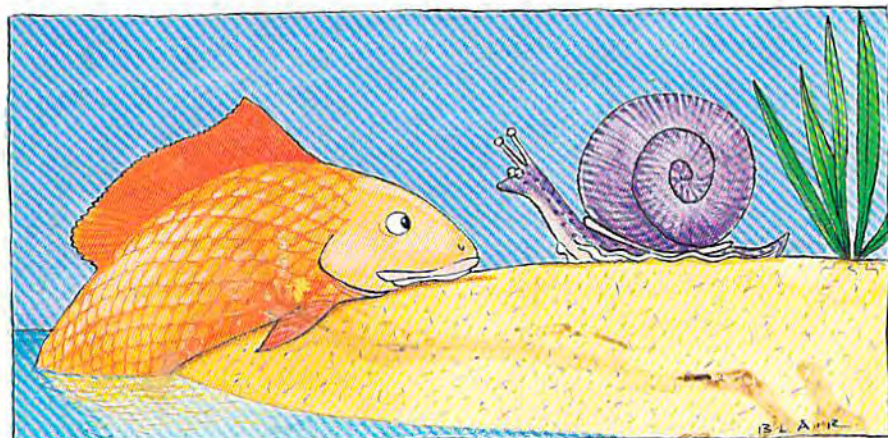


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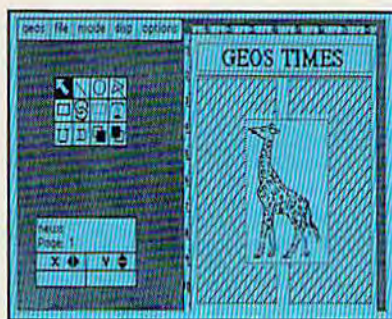
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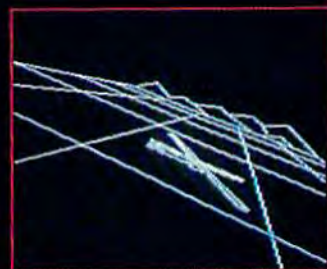
1986 - Flight Simulator II for the 68000 computers



1982/1983 - Microsoft Flight Simulator & Flight Simulator II



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# editor's notes

As we are about to enter 1988, our fifth year of GAZETTE publication, we would like to thank you for your continued support and enthusiasm. The mail, programs, and articles we receive constantly reflect your strong interest and involvement. Despite the thousands of quality programs published commercially and in Commodore-specific magazines over the years, we still see increasingly innovative and unique programs—and this is exemplified in this issue, perhaps our best bundle of Commodore software in any of our 1987 issues.

The theme of this issue is games, and we've assembled a group that will appeal to players of all interests, ages, and skill levels. "Crossroads," in the opinion of many here, is the best 64 arcade-style shoot-'em-up we've ever published. In terms of playability, challenge, and action, it rivals many commercially successful games. "Snake Pit," for one or two players, adds some interesting new twists to the popular *Blockade* genre of action games. The graphics are excellent, and, at the higher speed levels, Snake Pit will challenge even the best arcade player. For those who prefer strategy to action, the unique and clever "Root Race" fits the bill. Both children and adults will enjoy "Animal Match," which features outstanding graphics and sound and is a fine educational tool. And for word puzzle buffs, there's "Word Find."

Over the years, GAZETTE has offered a number of applications and utilities that have proven very popular with our readers—*SpeedScript*, "Meta-BASIC," "TurboDisk," and "Ultrafont+," to name a few. This issue features several programs that would make our "best utilities" list. "Disk Rapid Transit" is a file copier—for BASIC or machine language programs—that rivals and even surpasses many commercially available ones. It's lightning fast and very easy to use. It works with one or two 1541 or 1571 disk drives, and it can copy a 130-block file in only 35 seconds (five times faster than the built-in DOS routines of the 1541).

"PrintScreen" is easily the most comprehensive 64 screen dump we've published. It prints out screens with re-defined characters, hi-res graphics, and

sprites. And it works with most popular printers. It can be used with this month's "Power BASIC" offering, "Power Pause," which, with the press of a key, freezes your screen whether a listing is scrolling by or you're in the middle of an action game.

If your interest lies in 64 graphics, "Grafastics" is a must. This program takes your hi-res art and offers you unique creative control for a multitude of special effects. Included are features such as mirror, reverse, rotate, and perspective.

Next month, the 64 version of *SpeedScript* will be four years old. But user interest has by no means waned. We still receive a large number of *SpeedScript* enhancers and support utilities, the best of which we publish every few months. This issue includes "Instant 80," which adds a fast, true 80-column preview to *SpeedScript* documents.

While Charles Brannon's *SpeedScript* has made its fair donation to Commodore archives, so has another GAZETTE feature: Richard Mansfield's column, "Machine Language for Beginners." This has been a regular part of GAZETTE since the first issue, July 1983. This month marks his final column. As frequently happens with changing roles, his recent promotion to vice president/editorial director for COMPUTE! Publications is requiring more and more of his time. We know from reader mail that his column has served many of you well and has consistently clarified one of the most difficult areas of programming. But we're not abandoning the topic. Next month's issue will debut a new column, "Machine Language Programming" by Associate Editor Jim Butterfield. As many of you know, Jim has been a key figure in the Commodore community since 1979. Jim will focus on various areas of ML programming, some for beginner levels, some for advanced.

While planning this issue's main feature—"Best Sellers! The Commodore Games That Live On and On"—it occurred to us that we were just as curious about the topic as any of our readers could be. What are the all-time best-selling games for the Commodore 64? Keith Ferrell, our features editor, posed this question to 13 leading software

publishers, and the results, in many cases, were surprising.

In 1988, we'd like to get to know you better. On page 24, you'll find the "GAZETTE Readership Survey," a questionnaire for all interested readers. With the compiled information from the responses, we can get direct feedback from you, enabling us to better meet your interests in 1988. We're looking forward to hearing from you. Have a safe and happy holiday season.



Lance Elko  
Editor

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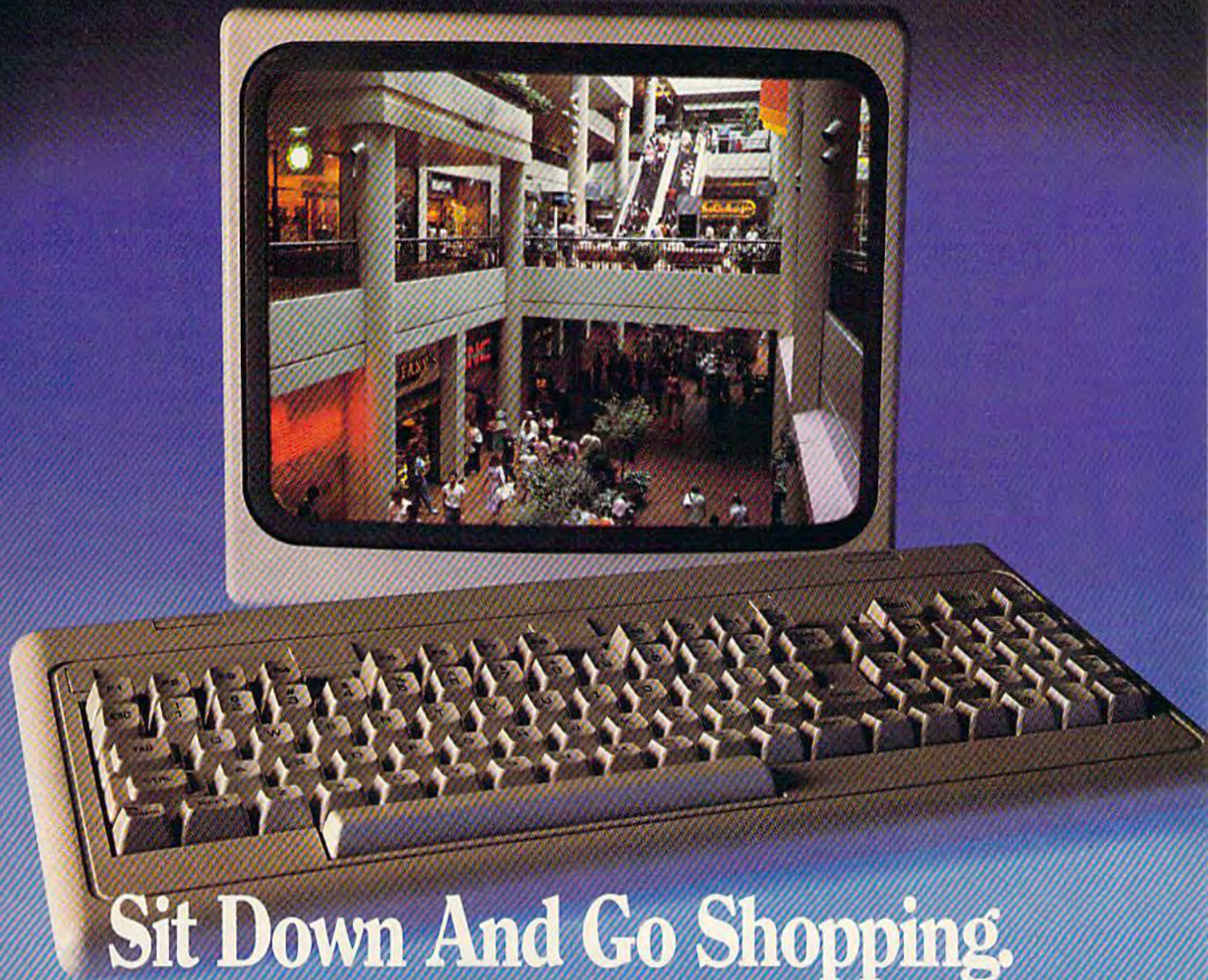
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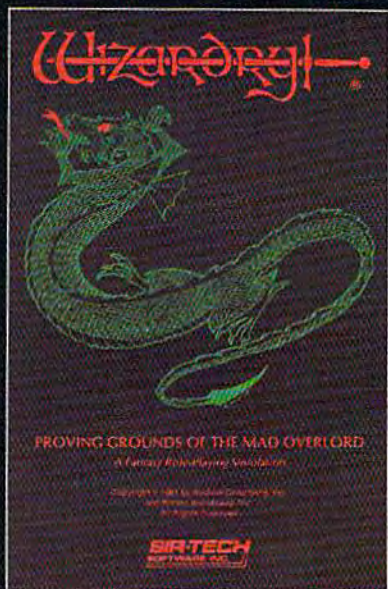


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*Do you have a question or a problem? Have you discovered something that could help other Commodore users? We want to hear from you. Write to Gazette Feedback, COMPUTE's Gazette, P.O. Box 5406, Greensboro, NC 27403. We regret that, due to the volume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

## The Way Scientists Count

I have a 64C computer and need to be able to make calculations such as 25 divided by 40,000, rounded off to .0006. However, when I do this, I get 6.25E-04. I thought the computer could go at least nine places to the right of the decimal point, but no matter what I try, I get this error message. Any ideas?

Rich Holzer

The letter E in the answer doesn't mean error. The 64 automatically switches to scientific notation when numbers get too large or too small. The number 6.25E-04 is the 64's way of saying 6.25 times 10 to the negative 4th power, which is the same as 6.25 times .0001, or .000625. Your computer can handle up to nine digits of precision, of which only three are needed for the answer .000625.

To see scientific notation in action, run the following program:

```
JB 10 A=1:B=1
RK 20 PRINT A,B
BA 30 A=A*10:B=B/10:GOTO20
```

## Printers Have A Quote Mode, Too

For the past ten months, I have enjoyed using the SpeedScript word processor. However, since my purchase of version 3.1, I have noticed a bug in the program. I have waited until now in the hopes that the bug would be mentioned in the magazine. Unfortunately, it hasn't.

Whenever SpeedScript attempts to print a line to the printer or the screen which contains an odd number of quotation marks followed by embedded format commands, the format commands are not interpreted correctly. On the printout, reverse video characters appear. For example, if I try to underline a word inside quotation marks, the control codes for enabling underlining

appear as reversed characters and the word is not underlined.

I believe that when SpeedScript encounters a single quotation mark while printing a document, the program thinks it's in the infamous quote mode.

Mark E. Chaloult

For readers who don't know about quote mode, here is a brief demonstration. First, type a few words and press SHIFT-CLR/HOME. The screen clears. Now type something and include a single quotation mark (SHIFT-2). When you press SHIFT-CLR/HOME, you'll see a reversed heart following the quotation mark. The screen doesn't clear because the computer is in quote mode.

Commodore printers (and printers that emulate Commodores) also have a quote mode. This is useful when you're printing out program listings that might contain various control characters.

The problem you're having is caused by quote mode, but it's not SpeedScript that's in quote mode, it's your printer. Either your printer or interface is in Commodore emulation mode, and while that mode is in effect, an odd number of quotation marks will put you into quote mode. The only suggestion we can make is that you check the manuals for your printer and interface to see if Commodore emulation mode can be defeated by a direct command or by changing the DIP switch settings.

## How Big Is Too Big?

What is the maximum size, in blocks, of a program you will accept? The program I wish to submit will be at least 190 blocks once it is completed. Is this too long?

Calvin Tran

Yes. A program with a size of 190 blocks (nearly 50K) is far too long for us to publish. As a general rule, we try to limit BASIC programs to less than 8K (32 disk blocks). Machine language programs should be less than 4K (16 blocks). If the program is truly outstanding—the word processor SpeedScript or the game "Crossroads," for example—the rule can be stretched (up to 60 blocks for BASIC, up to 30 blocks for ML).

The main reason for limiting program size is that readers must be able to type in the programs in a reasonable time.

The listing for your 190-block program would take up at least 12 magazine pages, which is a lot of typing. A second reason is that space for program listings is limited; a 12-page program would probably displace four or more other programs.

## Extended Background Color Mode

In a past Feedback question, you mentioned an extended background color mode for the 64. Could you explain how to use extended background color mode, and how it differs from normal text mode?

Matt Sulser

The 64 and the 128 in 40-column mode can display 256 characters on the text screen. The first 128 (numbered 0-127) include characters, punctuation, and graphics symbols. Characters 128-255 are the reversed images of the first half of the character set. To see the complete set of available characters, see the user's guide that came with your computer. Look in the appendix which lists screen codes.

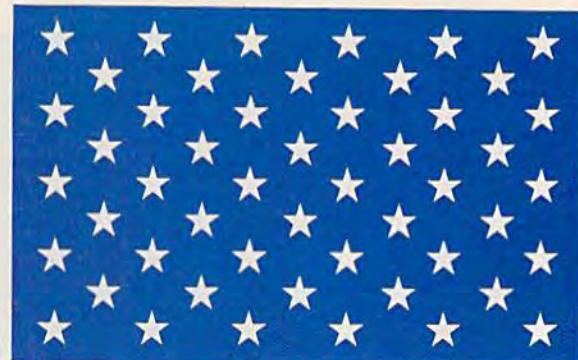
On a normal text screen, only one background color is available. It's controlled by the register at location 53281. When you POKE 53281 with a number between 0 and 15, the entire screen changes color. Each character can have a different foreground color, but they all share a common background color.

The rules about color change when you enter extended background color mode. Instead of a single, global background color, you can choose from one of four available colors. Each character has a unique foreground color as well.

You pay a price for this added color capability. While extended background color mode is in effect, the number of available character shapes shrinks from 256 to 64. The number of background colors increases fourfold, but the number of characters is cut to a fourth. The 64 characters are 0-63 in the screen code table. If you'd prefer other characters, you'd have to create and install a custom character set (only the first 64 characters need be redefined).

Why 64 characters? Extended background color mode divides the character set into four separate groups, thus using up a total of 256 character definitions. The key to extended background mode is that each group of 64 characters has its own





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background color register. Here's a list of the color registers along with their corresponding character sets:

Color Register	Screen Code	Character Set
53281	0-63	Normal characters
53282	64-127	Shifted characters
53283	128-191	Reversed normal characters
53284	192-255	Reversed shifted characters

It's easiest to think of characters in terms of their screen code instead of their ASCII value while you're using extended background color mode.

Bit six of the video register located at 53265 controls extended background color mode. When this bit is on (set to one), extended background color mode is enabled. Clearing this bit returns things to normal. To see extended background color mode in action, run the following program.

```
AC 10 POKE 53281,6:PRINT CHR$(147):POKE 53281,0:REM CL
    EAR SCREEN & SET TEXT CO
    LOR
QJ 20 REM SET COLOR REGISTERS
    {SPACE}TO BLACK, WHITE,
    {SPACE}CYAN, AND YELLOW
CG 30 POKE 53281,0:POKE 53282,
    1:POKE 53283,3:POKE 5328
    4,7
EQ 40 REM DISPLAY ALL FOUR CHA
    RACTER SETS
FA 50 FOR I=0 TO 63:POKE 1024+
    I,I:NEXT
```

```
EB 60 FOR I=64 TO 127:POKE 108
    0+I,I:NEXT
BB 70 FOR I=128 TO 191:POKE 11
    36+I,I:NEXT
GG 80 FOR I=192 TO 255:POKE 11
    92+I,I:NEXT
KF 90 PRINT:PRINT:PRINT:PRINT:
    PRINT:PRINT TAB(240)"PRE
    SS ANY KEY"
BG 100 GET K$:IF K$="" THEN 10
    0
BP 110 POKE 53265,PEEK(53265)
    {SPACE}OR 64:REM ENTER
    {SPACE}EXTENDED BACKGRO
    UND COLOR MODE
EB 120 PRINT CHR$(145)"THIS IS
    EXTENDED BACKGROUND CO
    LOR MODE"
HQ 130 GET K$:IF K$="" THEN 13
    0
BB 140 POKE 53265,PEEK(53265)
    {SPACE}AND 191:REM EXIT
    EXTENDED BACKGROUND CO
    LOR MODE
```

### Function Keys F9 And F10

Did you know that you can redefine the HELP key on the 128? The program I've enclosed allows you to substitute any four letters for the word **HELP**, which prints when you press the HELP key.

Paul G. Hutchinson

The program you wrote **POKEs** into the area of memory where the function key definitions are stored, replacing the four characters that spell **HELP** with four oth-

ers. (Incidentally, the **SHIFT-RUN/STOP** key combination is treated as **F9**, and **HELP** is **F10**.) Here's a similar function key definition program that's not limited to four characters:

```
CH 10 A$=CHR$(147)+"THIS IS TH
    E NEW HELP KEY"
RH 20 Y=LEN(A$):X=10:A=252:MEM
    =POINTER(A$)
CQ 30 BANK1:POKEA,PEEK(MEM+1):
    POKEA+1,PEEK(MEM+2):POKE
    A+2,1
PQ 40 BANK15:SYS65381,A,X,Y
```

Line 10 defines the string to be assigned to the **HELP** key and line 20 sets up several variables. To redefine **SHIFT-RUN/STOP**, change the value of **X** in line 20 from 10 to 9. You may also insert the values 1-8 for keys **F1-F8**, although for these keys it's easier just to use the **KEY** command. Line 30 sets up a zero-page pointer to the string, and line 40 calls the **PFKEY** Kernal routine that redefines function keys.

### Controlling Sprites

I'm working on a video game for my 64 and I need help. What is the best way to make a sprite rebound from background characters (a wall, for instance)? Is there a way to detect a specific custom character that is involved in a collision with a sprite? I know how to **PEEK**

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to detect collisions. Finally, could you write a machine language subroutine for a homing sprite? The homing sprite would chase after a player-controlled sprite. I'd like to be able to SYS to the routine from a BASIC program.

Keith R. Woodard

Try using four variables for each sprite—two to keep track of the current x- and y-position and two to keep track of the changes in the x- and y-positions. Say the variables are called PX, PY, CX, and CY. Within the main loop—where the program reads the joystick, checks the time, moves sprites, or whatever—you would do at least two things, update the PX and PY variables and move the sprite to the proper position on the screen.

At some point in the program, say the variables hold these numbers: PX=150, PY=162, CX=2, CY=-1. To update the position variables,  $PX = PX + CX$  and  $PY = PY + CY$ . The new values would be 152 for PX and 161 for PY. After changing the variables, store the new values from PX and PY into the sprite-position registers. Incidentally, since CX is positive, the sprite is moving to the right; and with CY being negative, the sprite is also moving up.

What happens when the sprite approaches a boundary? There are two ways to check for this condition. The first is to draw a border around the active screen area and read the collision register. When

the sprite hits one of the border characters, you can make the sprite rebound. The second is to compare the PX or PY variable to the known edges of the screen. In sprite coordinates, the top line of the screen is 50. Thus, when the PY variable is 50 or less, you want the sprite to bounce back into the main screen. At this point, you should leave the values of PX and PY as they are. The change in X (variable CX) would also remain the same. But the sign of CY has to change. You'd use a line such as  $IF PY \leq 50 THEN CY = -CY$ . If CY had been -1, it would now be +1. If it had been +6, it would change to -6. The next time the sprite position is calculated, the new CY will move the sprite away from the border. The same idea would apply to checking the bottom, left, and right borders.

The next question is, how do you check which character was involved in a collision? There aren't any hardware registers you can PEEK to find the answer. Sprites are a minimum of three characters wide and nearly three characters high; if you expand the size of the sprite, it might cover a six-by-six area. It's possible that the sprite-to-character collision involves several different characters. If you keep track of the current position in PX and PY, there are a couple of ways you can decide which character was hit by a sprite. The first is to compare PX and PY to the known locations of various objects such as

walls or treasure chests. The second is to calculate the screen position of the sprite and PEEK into screen memory to see which characters are in the vicinity.

Your third question asks for a routine to cause a computer-controlled sprite to chase a player-controlled sprite. There's no single technique for writing a pursuit routine. It depends on what kind of playing field you're using. If the screen is entirely open, the simplest way to give chase is to subtract the x- and y-position of the prey from the x- and y-position of the predator. You would again use the PX and PY variables. If the computer sprite is to the right of the player's sprite, the computer's PX would be a larger number and subtracting the player's x-position would give you a positive number. Likewise, if the computer's sprite is to the left, you'd get a negative number. The sign (plus or minus) can be extracted with the SGN function and then used to move the computer's player left or right. The same principle applies to the y-position.

If there are a few obstacles such as lakes or trees through which a sprite is not allowed to move, you'd have to adjust the routine slightly to allow dodging or movement around obstacles.

If the game is similar to Pacman, the pursuit routine gets even more complicated. The chase sprite has to stay within the confines of the maze. It's not a good idea to use the collision register; most of the time

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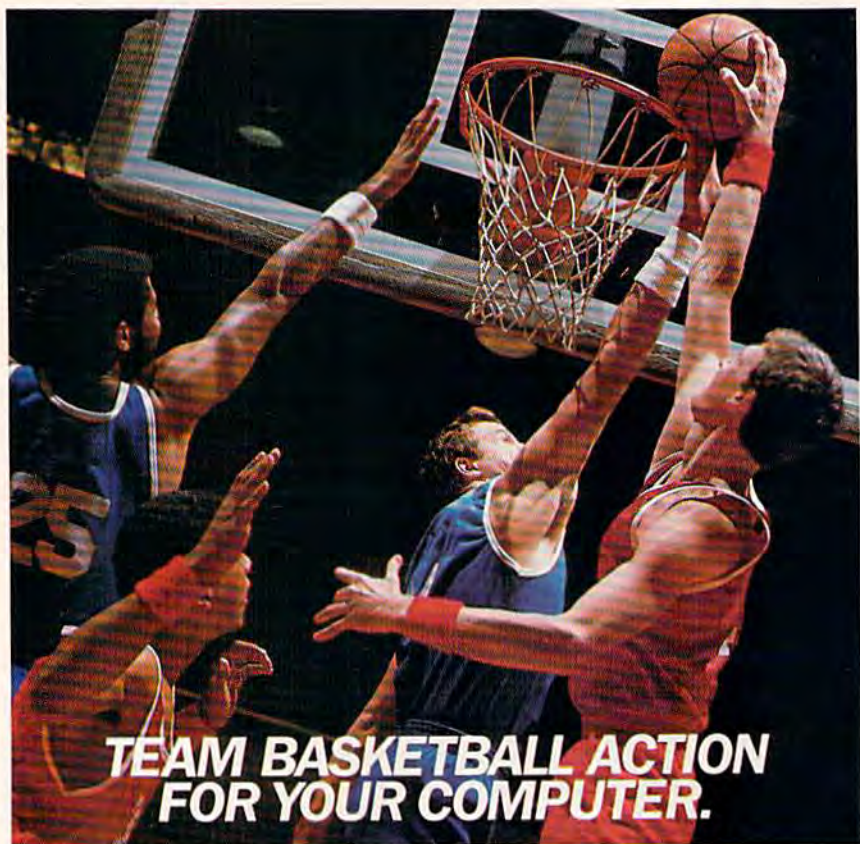
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a collision is imminent. You'd probably want to put all of the corners into an array and check the x- and y-position of the sprite to see if it's in a corner. If so, you'd turn the corner and continue in a straight line. When the pursuing sprite reaches an intersection, it would have to make the decision of which fork in the road provides the fastest route to reach the player. The form the program took would depend entirely on the size and shape of the maze.

## In The Numbers

What is the difference between the 6502 and the 6510 microprocessor chips?

Matt Morgan

The 6502 processor family is a large one. Many computers (including all the eight-bit computers from Apple, Atari, and Commodore) use the 6502 or a variation of it. The 6510 processor found in the Commodore 64 acts just like a 6502, except for one thing: A few input/output circuits were added to the chip to make memory locations 0 and 1 control data ports and bank selection. In all other respects, programming the 6510 is the same as programming the 6502.

Two newer members of the 6502 family, the 65C02 and the 65816, are upwards-compatible with the 6502. This means that they run programs written for the 6502, plus they add additional instructions to allow shortcuts and new addressing modes. Because of the differences between the 6502 and the 6510, you cannot unplug your 6510 and replace it with one of these newer chips.

## Click And Gone

I have recently purchased a modem and would like to know if the call-waiting signal on the telephone would have any effect when I am online with my computer.

Shaun Conrardy

The telephone company's call-waiting option generates an audible click when you're on the telephone and a second call comes in. If you happen to be using a modem, the click will usually knock you offline. This can lead to unhappy results, especially if you've just spent 30 minutes downloading a file and were almost finished receiving it.

In some telephone exchanges, you can disable call waiting—for a single call only—by pressing \*70 on your touchtone telephone before dialing the number. To see if this works in your area, ask your local phone company or test it out by having two friends call while you have call waiting turned off.



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# Best Sellers!

## The Commodore Games That Live On And On

Keith Ferrell, Features Editor

*Some games take on a life of their own, outperforming even their creator's high expectations. What makes a best seller? GAZETTE talked to several leading software publishers and found out which games were their Commodore best sellers—and why.*

We all have our favorite software games and entertainment packages, and sometimes our views are shared by tens of thousands of others, creating a best seller.

We asked the major publishers of Commodore entertainment software what made their popular games special. Their answers were informative and surprising.

Here are the top three best-selling Commodore games from 13 of the leading software publishers:

### Access

**1. Beach-Head** A combat simulation that places the player in confrontation against naval, air, and land forces, *Beach-Head* was one of the first arcade war games to offer realistic graphics, according to Kevin Jones of Access. The game's realism has helped make it an ongoing best seller. A sequel, *Beach-Head II*, was also popular.



*Beach-Head*

**2. Raid over Moscow** Challenging players to master many arcade scenarios as they penetrate Soviet security, this game's playability and strong graphics have made it perennially popular with Commodore owners. *Raid over Moscow* is now packaged with *Beach-Head* and *Beach-Head II* in a value pack that continues to enjoy strong sales.

**3. Leaderboard** Appealing to legions of golf fans, *Leaderboard* offers players the same perspective enjoyed by actual golfers. The game tracks the ball in a manner similar to a golfer's view of the real thing.



## Accolade

**1. Hardball!** The great American pastime also makes for great software, says Peter Doctorow, Accolade's vice president for product development. *Hardball!* has been such a success, he says, because Accolade's goal was to recreate the feeling of baseball. He graciously acknowledges that some of the credit for the software's success belongs to Abner Doubleday, the inventor of baseball.



*Hardball!*

**2. Ace of Aces** This game combines flight simulation, strategy, historical recreation, and the difficulties of accomplishing a mission. The combination of elements, along with the sense of reward that accompanies the successful completion of a mission, makes *Ace of Aces* a consistent seller.

**3. Fight Night** Accolade's third best-selling program is set in the world of boxing. In *Fight Night*, the user has unique control over the characters, a feature that's helped achieve the game's success.

## Activision

**1. Ghostbusters** The success of the Bill Murray/Dan Aykroyd film played a large part in making *Ghostbusters* a success with Commodore users, says Melinda Mongelluzzo, public relations coordinator for Activision. Mongelluzzo believes the game's combination of comedy and arcade action contribute greatly to *Ghostbuster's* continued sales.

**2. GBA Basketball Championship: Two on Two** GBA Basketball struck a responsive chord with Commodore owners who enjoy graphic sports games.



*GBA Basketball Championship*

**3. Hacker** A consistent seller since its release in mid-1985, *Hacker* has sold more than 50,000 copies. Commodore owners enjoy the program's challenge, which is nothing less than using their skills and instincts to find the way through a computer system.

## Avalon Hill

**1. Super Sunday** This is Avalon Hill's top-selling computer game, according to Phyllis Opolko, spokesperson for the company. Opolko attributes the game's ongoing success to the accuracy of the statistical game, as well as the graphics the program offers.

**2. Spitfire '40** *Spitfire '40* found a warm response among flight simulator fans. The program simulates the classic World War II British fighter planes.

**3. NBA** This program became an immediate best seller for Avalon Hill upon its release last spring. As with *Super Sunday*, an accurate statistical game matched by solid graphics is considered to be the key to *NBA's* popularity.



*NBA*

## Brøderbund

**1. Karateka** A fast-action martial arts game, *Karateka* has kicked and chopped its way to the top of Brøderbund's all-time best seller list. Ulla Thomsen, a public relations spokesperson for the company, observes that *Karateka's* ongoing sales success, since its mid-1985 release, is a function of the tightness of the game's programming, its graphics, and the public's fascination with karate.



*Karateka*

**2. Lode Runner** This action/strategy game offers players the chance to create their own mazes and walls. Thomsen believes that this never-ending supply of challenging screens has helped *Lode Runner* remain a top seller for more than four years.

**3. Where in the World Is Carmen San Diego?** *Carmen San Diego's* ability to appeal to players of all ages has made it a Brøderbund best seller. The game appeals to users of all interests, and is educational for both children and adults.



## Electronic Arts

1. *Skyfox* Skyfox's state-of-the-art futuristic combat simulation has found an enthusiastic market, says Charlotte Taylor of Electronic Arts. The game challenges players to defend an asteroid base against hordes of alien invaders.

2. *Dr. J and Larry Bird Go One on One* This was one of the first sports simulations to incorporate the skills and idiosyncracies of actual players. The participation of Julius Erving and Larry Bird played a large part in establishing the game as one of the company's consistent best sellers. Taylor points out that when all computer systems are lumped together, *One on One* is Electronic Arts's all-time, number-one-selling program.



One on One

3. *Racing Destruction Set* One key to *Racing*'s strong sales is that users can create their own features, such as automobiles and race tracks. Taylor says that Commodore owners tend to prefer arcade-type games that combine action with creativity.

## Epyx

1. *Winter Games* *Winter Games* is one of the most popular of Epyx's *Games* series, according to Noreen Lovoi, manager of the company's public relations. As in all Epyx products, Lovoi continues, the emphasis on graphics and playability finds a ready market among Commodore owners. Another factor in its success, she adds, is *Winter Games*' offering of several different events within one package.



Winter Games

2. *Summer Games II* Having reached the market in May 1985, shortly before the actual summer games were held in Los Angeles, *Summer Games II* is a strong second-place best seller for Epyx. Again, graphics, ease of play, and variety of activity have helped make *Summer Games* an entertainment package for all seasons.

3. *Temple of Apshai* The first Epyx product—actually released in 1979 by Automated Simulations, Epyx's predecessor—*Temple of Apshai* is a high-fantasy game. The timeless quality of such games has helped *Temple* continue to sell. In its current incarnation, the game is marketed as the *Temple of Apshai Trilogy*—the original game bundled with its two sequels.

## Firebird

1. *Elite* Combining space commerce and trading with a complex interstellar culture and lots of arcade action, *Elite* is Firebird's number-one Commodore program, according to Tom Benford, who handles the company's public relations. The fact that *Elite* allows players to build careers and accumulate wealth over long periods of time is appreciated by those who like games that operate on several levels and require more than a few minutes to play.



Elite

2. *The Pawn* An illustrated text adventure, *The Pawn* has attracted Commodore owners with its fantasy story and high-quality graphics. Equally important is the game's sophisticated parser and the unexpected humor of some of its situations and language.

3. *Starglider* Number three on Firebird's list is its 3-D space combat game, *Starglider*. The variety of perspectives on the action, as well as the realtime nature of *Starglider*'s combat have helped make the game a big seller.

## Infocom

1. *Zork Trilogy* Originally designed on a mainframe more than a decade ago, *Zork* was divided into three parts for microcomputer gamers; the first part was released in 1980. The game, according to Cynthia Weiss of Infocom, pioneered the form of interactive text adventures. With nearly a million copies sold in all formats, the *Zork Trilogy* is one of the most successful computer games ever published.

2. *The Hitchhiker's Guide to the Galaxy* Based on Douglas Adams' highly successful novel, and assembled with the assistance of Adams, this release appealed to fans of whimsical science-fiction adventure as well as admirers of Adams' work. The nature of the original novel helped insure a successful translation of it into interactive form.

3. *Leather Goddesses of Phobos* This game parodies the science fiction of the 1930s. *Leather Goddesses* is essentially humorous, focusing on the more exaggerated elements of early science fiction. It contains a pronounced ribald element as well. Another appeal is that the game allows players to select the genders of their characters.



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## Microprose

**1. F-15 Strike Eagle** Three years after its release, this combat flight simulator remains on the charts. Michael Harrison of Microprose attributes its initial success to the fact that it was ahead of its time when first released. F-15's ongoing sales have occurred because the game lets players take the controls of a jet fighter—and experience something they couldn't do without a computer.



F-15 Strike Eagle

**2. Silent Service** This simulation of a World War II submarine command offers an accurate recreation of history, and that accounts for a big part in the game's success; for example, the technological capabilities of the sub increase as the war progresses, just as technology improved during the actual war.

**3. Gunship** Among the most high-tech simulations available, *Gunship* puts players at the controls of a highly armed helicopter. Another factor in its large sales is the inclusion on the disk of both past and present "hot spots"—mission scenarios that reflect current headlines.

## Mindscape

**1. Bop-n-Wrestle** Karen Novak of Mindscape says there's a simple explanation for *Bop-n-Wrestle*'s success: The game offers good entertainment. What people want most out of computer games, she adds, is fun.

**2. Infiltrator** This flight simulator includes characters and a story line. According to Novak, the added richness of the game has attracted buyers in large numbers.

**3. Superstar Ice Hockey** A 1987 release, *Superstar Ice Hockey* moved immediately onto Mindscape's all-time best-seller list. Its success is a function of its breadth of approach: The game engages players on strategic as well as arcade levels, allowing them to manage and coach, as well as play.



Superstar Ice Hockey

## subLogic

**1. Flight Simulator** Since its 1984 release, says subLogic spokesman Norm Olson, this program has remained popular because of its appeal to a common desire: People want to know how to fly an airplane. The company's goal was to create a simulation that provided 90 percent of the experience of flying, with none of the cost of lessons and aircraft rental.



Flight Simulator

**2. Jet** Another flight simulator, *Jet* adds supersonic speeds as well as a military element. The program allows players to select weaponry and engage in combat in either an F-16 or an F-18 fighter.

**3. Night Mission Pinball** The appeal of this game stems from its variety of challenges. It offers more than 40 different user-adjustable parameters through which players can tailor the game to their own tastes.

## SSI

### (Strategic Simulations, Inc.)

**1. Phantasie** *Phantasie* was one of the original fantasy role-playing games, notes Linda Blanchard of SSI. The game found an enthusiastic response among Commodore owners who enjoy assuming the parts of characters on heroic quests in mystical lands inhabited by creatures such as elves and gnomes.



Wizard's Crown

**2. Wizard's Crown** Another fantasy game, this adds a level of tactical combat to its role-playing quest adventure. The combination of war-game style tactics and high-fantasy adventure has helped make *Wizard's Crown* a strong seller.

**3. War Game Construction Set** The success of this 1987 release is a result of its originality. The game allows users to create any type of battle simulation, from actual historical encounters to wholly imaginary conflicts. *War Game Construction Set* can be enjoyed by players of any skill level.





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## EOS: Earth Orbit Stations

EOS is a game that isn't easily defined. In fact, I'm not even sure it should be called a game. The competitive aspects of EOS are hardly the focal points of the program—even losers can be successful while winners can fail. No one kills an alien or even takes a shot at one. Of course, maybe that's because there aren't any, at least none that I've discovered.

What I think you have here, cleverly disguised as a game of space exploration, is an educational program that stresses some heavy economic concepts, requires logic and forethought, and eschews violence in favor of equally tense quarterly financial reports.

Earth Orbit Stations (EOS), from Electronic Arts, places from one to four players in charge of the development of an ambitious space exploration and exploitation program. The player must not only determine how to build various space stations, he must also finance them and make them both profitable to run and beneficial, from a research standpoint, to the future of mankind. And you thought clearing out a few monster-infested dungeons was tough!

Basic game play is simple. Players take turns working their way through a series of phases during a fiscal quarter. Each player (computer controlled or otherwise) begins by "launching" his first space station. This is done by placing into orbit the minimum number of special modules necessary to sustain life in space: a command module, life module, logistics module, galley and gym module, and so on.

Once the initial space station is constructed, the challenge begins. New support modules must be added in order to make your station more functional and more profitable. Next, the modules must be graphically set in place and connected to the space station. Placement of modules is not to be taken lightly—the physical placement is simple, but modules can be connected to one another only in a certain manner. Illogical placement of modules can force a player to purchase connectors, thus spending hard-earned money on nonfunctional pieces for the station.

Once a module is in position, it cannot be moved.

Just as much forethought must be given to which modules are purchased. If you're not careful, you'll quickly find that you have too many production modules without enough support modules to house the crew and supplies necessary to work and produce. Of course, the opposite can occur just as easily: You find yourself with far more support modules than are necessary for your crew, and too many people and an excess of power to work your production modules.

---

*EOS isn't science fiction. The program was designed around NASA plans for the next 50 years of space exploration.*

---

Modules can be set to one of two status levels: Commerce or Research. Modules set to Commerce will, with luck, generate income; modules set to Research will, you hope, make scientific breakthroughs in various fields, earning your station (and you) technical points. The benefits of making money are obvious. The benefits of technical points, however, are just as important. You must earn these points to increase your tech rating; this allows you access to more sophisticated modules, which, in turn, can be used to generate more income or tech points. Of course, all of this sounds easier to accomplish than it actually is.

Each fiscal quarter after the first, a player must examine his income summary, noting both profits and operating expenses, money in the bank, and cash available. Next, he should check the market activity to see what type of ventures are resulting in the most play. Use this information when examining your Commerce modules to determine pricing for your goods and activities.

When examining your Commerce modules, you'll be given information on percentage use of that module or its goods, the price you're charging for the



service, your operating costs, and your profit or loss. This information, combined with the market activity, should dictate your actions on any particular turn.

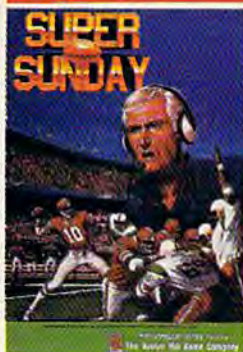
For example, let's assume that one of your modules is a Chemical Lab and you notice that the current demand index for Science and Materials is high. You might wish to increase your price for the goods produced by your Chemical Lab and, in this way, increase your own profits. Conversely, if the demand for Science and Materials is low, you might have to lower your pricing to get any use at all out of your Chemical Lab module.

After examining your Commerce modules, check your Research modules to find out if any progress has been made. Research can be one of two types: enhancements or breakthroughs. Enhancements earn fewer tech points but are more likely to take place. Breakthroughs can earn many tech points but are often risky enterprises.

All initial module settings can be changed during a player's turn. Commerce modules can be shifted to research and vice versa. Research modules can change their emphasis from enhancement to breakthrough. When and how these changes occur will determine the success of your space station. Turning a low profit Commerce module into a Research module can sometimes be a very solid strategy.

Just building a Super Earth Orbit Station isn't all there is to EOS. The structure of the turns described above revolve around one of seven possible scenarios, each with its own objective. The first mission (a relatively easy scenario designed to introduce players to the game) is called Research. The object in this scenario is simply to develop a steady income so that you can engage





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in research. The winner is the Space Director (player) who earns the most tech points by the end of eight fiscal quarters, which translates to two years.

A more advanced scenario is Search for Life. Here you must launch probes to other worlds, build huge Life Science/Cargo liners, Jupiter Explorers, and Research Colonies to investigate potential life sources on other planets. You have ten years to report discoveries.

Other scenarios require that you build space hospitals, lunar settlements, and orbiting space colonies. Scenarios tend to build on one another, although there is nothing that dictates a particular playing order. It's just that the sophistication level of the missions increases and expects more expertise on the gamer's part if success is to be achieved. And as in any endeavor, experience plays a major role in a rewarding outcome.

EOS isn't science fiction. The program was designed around NASA plans for the next 50 years of space exploration. Many of the space modules from which you can choose are either currently functional or under development. This game provides the player with a much better understanding of just what it's going to take to truly conquer space. I am not a space buff and I was astonished at the enormity of the

task of just putting together a station, and I was amazed that the technology is developing to actually accomplish this task. That's part of what I meant about EOS being educational.

Besides the obvious strengths of the program as a learning device, EOS possesses a variety of other nuances that teach while entertaining. Launching probes is exciting; however, to do so, a player must determine where to send the probe. The EOS Orbit Library lists all the planets and moons in our solar system.

Making a profit from your Commerce modules provides great satisfaction; however, to maximize those profits, a player must learn to use the power of advertising to promote his products. Of course, the player must decide how much advertising is beneficial. It takes money to make money, so loans may be taken from the bank to finance expansion of your Earth Orbit Station. Money borrowed must be paid back—overextending yourself results in bankruptcy and the loss of your station. All of these situations are fun to role play, teaching economics while they entertain.

From a graphics standpoint, EOS does a nice job of depicting the shuttle modules and overheads of space cities. There is a limit to the variety of graphics,

though, and they become, by the very nature of the program, repetitive. Text is clear and easily accessible, thanks to the use of pull down windows, dialogue boxes, and other Macintosh-like menus.

EOS excels, too, in the area of replay value. Although seven scenarios may not sound too impressive, all the scenarios are replayable and each scenario lasts from 2 to 40 hours. Add to this the fact that you have 39 different modules from which to construct your station and you have enough variety at your disposal to play EOS time and time again without repetition and boredom creeping into the picture.

EOS is a unique program, more of a simulation of the future than a game in the truest sense of the word. It's one of those products that appears simple on the surface but can be incredibly complex when pushed to its maximum capacity (the rule book is only 14 pages in length, and that includes five pages of appendices and mission descriptions). Fascinating and challenging, EOS will provide adults of all ages with many hours of play. It is sure to stimulate both your intellect and your imagination.

—James V. Trunzo

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## Dan Dare: Pilot Of The Future

Comic book hero Dan Dare hits the interactive screen here, striving with his pal Strikey to rescue Digby the spaceman and Peabody the professor. They've been captured by the profoundly evil Mekon, who has the gall to face Dare from his control dome and shoot energy bolts at him, trying to prove that while energy can never be destroyed, comic book heroes definitely can.

But getting to Mekon is definitely more than half the fun. Dare starts the adventure on the surface of Mekon's asteroid, where he must fight his way past a host of despicable green things called Treens and open three hatches that lead down to the prison complex. Actually, he need open only one, but unless he finds all three, he can't rescue both Digby and Peabody and still manage to get past Mekon.

And finding all three isn't easy. Dare will need a crowbar to pry open jammed hatches and a tree branch to open electrified ones. A third hatch is accessible only with the help of his pet Strikey, who spends most of the adventure leaping about all around Dare, not bothering to help when he's called upon. If it weren't for the SPCA...

Once in the prison complex, Dare has two tasks. First, he must find the two prisoners (Digby and Peabody) and free them from their cells. Here, he'll need passes that open the doors between rooms. To get these, he must beat up another batch of Treens, who seem highly unwilling to cooperate with him. Eventually, after climbing ladders and trying several rooms, he'll find the prisoners and release them.

*Dan Dare is fun for all,  
playable by kids and adults.*

Once that task is completed, he's ready for the second—diverting the giant industrial laser. The complex contains three controlling computers, and the only way for Dare to reach Mekon is to destroy all three. You see, the computers are in charge of the asteroid's collision course with earth, and since the asteroid contains an atomic bomb, Dare must destroy it to save the world. For most of us, it's the mission of a lifetime. For Dare, it's merely another annoyance in the day-to-day life of a superhero.

Destroying the computers is a matter of turning a series of reflectors to direct the laser beam toward the computers. In many ways the least satisfying portion of the adventure, this section demands a great deal of running back and forth to figure out which way to turn the reflectors. The section is also—and I can hardly believe I'm writing this—far less realistic than the others. Finding the prison complex seems reasonable as does exploring the prison complex to find the prisoners, but what's a laser doing here, especially one whose only function is to destroy the asteroid's controlling computers? If you're Dan Dare, it's a wonderful thing to find, but its purpose is at best obscure.



Once the computers are destroyed, Dare finally reaches Mekon. Dan's object here is to avoid getting zapped long enough to use his grenades to destroy the dome and escape back to his ship. I would like to give a play-by-play of what happens here, but my Dare has never destroyed the dome. The first time he reached Mekon he was so overwhelmed, he decided that death was superior to this kind of excitement. In other attempts, he used Mekon's chamber to display new levels of tactical incompetence and died even faster. Since the game cannot be saved, once Dare dies he must start from the surface again, so playing time becomes a factor.

All these activities are controlled entirely by joystick. Movement, boxing, and grenade tossing are fairly standard, but an impressive element is the decision-making. When Dare finds something—a hatch, a crowbar, the reeds, the laser—the screen displays a printed message—for example, "Dan treads on something." Pressing the fire button reveals the choices, which you cycle through by moving the joystick lever. When you reach the one you want, simply release the fire button and Dan will do as you've decided.

What this simple interface means is that the game is playable by anyone who can read the messages—kids, for instance. My eight-year old has been playing it regularly, and except for the rather clumsy boxing system, she does very well. She wishes Strikey did more

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than just bounce around (he does, but not much) and that Dan didn't die so easily (he is, after all, a comic book hero). Aside from that, she finds the quest interesting and the game thoroughly enjoyable. Since I did as well, I have no trouble recommending the game. And since it's from Electronic Arts' new moderately priced Amazing Software series, I can even recommend it financially.

On to the asteroids to face Mekon!  
—Neil Randall

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## 1541/1571 Drive Alignment System

If you have trouble loading commercial software, the software may not be at fault: Your disk drive may be misaligned. This is a serious problem, but not so dire as it may sound. Software is available to help you realign your misbehaving disk drive.

The 1541/1571 Drive Alignment System from Free Spirit is a fine piece of reasonably priced software aimed at solving alignment problems. The program can easily and profitably be used by anyone with modest mechanical background or ability. With it, I realigned my slightly out-of-adjustment 1541 in less than an hour. To be fair, I had worked with another alignment program before, which saved me considerable time. Nonetheless, *this* job was easier and less time-consuming even discounting my previous experience.

---

*The program can easily and profitably be used by anyone with modest mechanical background or ability.*

---

Aside from ease of use, Free Spirit's program has a number of features to recommend it. It works on both 1541 and 1571 drives (there are also special instructions for the SX64). All software is contained on one double-sided disk (no other correctly aligned reference disk is required). A half-track position test allows you to fine-tune the alignment, and a special procedure permits loading the program even when the drive will load nothing else. In addition, the program autoboots on the 128.

As you would expect, Free Spirit has incorporated motor-speed and head-stop-position checks into the program. All tests are fast and give instant feedback.

The brief, eight-page manual is satisfactory, offering a modest number of helpful disassembly diagrams. Of course, for the uninitiated, *no* number of diagrams is sufficient: You could always use more! And it seems that the number of screws is *never* what the manual indicates and that your particular drive *always* looks different from the picture. The real problem here is that there are so many models and minor variants of Commodore drives that, until you find your way around, things are likely to be a little confusing. All in all, the documentation does a reasonable job of coping with these variants. The strength of the package, though, is the program itself—something you will appreciate time and time again.

I recommend this software to those who do their own alignment on an ongoing basis (a simple program run shows whether or not adjustment is needed). For the neophyte ready to tackle his or her own disk drive, I offer four suggestions. First, be patient—it gets easier. Second, take the program's safety advisory seriously, especially the part about *disconnecting the power*.

Next, use the appropriate type and size screwdriver (the only tool required); the stepper motor set screws are very tight if they've not been previously removed. Finally, the adjustments are not just tiny; they are *miniscule* (the manual aptly uses the term "microscopic").

Free Spirit's alignment system is an excellent, efficient program that can help you save both money and down time.

—Art Hunkins

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## Street Sports Baseball

What could be worse than an American man admitting he doesn't like baseball?

I don't like baseball. Hot dogs and Chevrolets are all right. And, of course, I'm crazy about Mom and her deep-dish apple pie. But baseball I have never liked.

It probably stems from being gawky as a kid. I couldn't run. I couldn't field.

Like all the other neighborhood kids, I admired my brother's ability to send the center fielder into the cornfield across the road to search for his pop flies. But I was such a miserable hitter they had to allow me ten strikes—and I was likely to strike out anyway.

I don't like baseball.

But I do like *Street Sports Baseball* from Epyx.

The game requires one or two joysticks (depending on the number of players), and it loads from a single side of a single disk.

As in real baseball, the strategy begins long before the players hit the field. The first choice is between two playing fields—a blacktopped parking lot and a grassy vacant lot studded with stumps. The bases are shingles and old tires. Garbage can lids serve as the pitcher's mound and home plate. Although it's nice to have a choice of playing fields, the action didn't appear to be different.

The next choice to be made is whether to play against another human or against the computer. I must warn you that the computer is good. It's able to do things I was never able to do, like make double-plays. On the other hand, it will never get you into a pickle, stuck between bases as the fielders play catch over your head. Also, the computer is a very conservative player. When the ball is thrown toward the infield, its players turn around and head back to the last base they touched, even if they were nearly to the next base.

After the field has been selected and you have decided whether to play the computer or another person (a choice that requires two joysticks), you are presented with a group of bored-looking kids hanging out on the steps of tenements, waiting for something interesting to happen. Unlike the picture on the instruction manual and the program packaging, the kids don't look like extras from Michael Jackson's *Beat It* video. They're just ordinary kids. I'm sure the aura of urban life was entirely intentional—and perhaps necessary. The name *Street Sports Baseball* has an attractive raffishness about it missing in possible alternative titles like "Sand Lot Baseball."

At this point, you are given the option of choosing your team, of allowing the computer to choose at random for you, or of loading a previously saved team from disk.

If you decide to pick a new team, the order of choosing is decided by the toss of a coin. You and your opponent will take turns choosing players. When you press the joystick to the left or right, another player will appear in the small window on the upper left of the screen, along with a brief list of the player's talents and quirks.

Dana, for instance, is excellent in center field. She rarely misses a fly ball. But if she's hit a grounder and has to throw the ball, an ice age could pass before it arrives at home plate. She has a keen eye but a weak arm. The rest of the players have similar trade-offs of skills and deficiencies.

---

*Your role is more like manager than player. Still, to a great extent, your joystick and fire button skills will make the difference between winning and losing.*

---

You will have to keep these deficiencies in mind when assigning the players their positions on the field and their batting order; their fact sheets don't appear at that juncture. Fortunately, the players' qualities are also listed in the instruction manual, so you can refer to it when placing your players.

Once started, the game is simple. When you are at bat, your player swings when you press the fire button. The run to first base is automatic, but you must hold the firebutton down to make your player continue for doubles, triples, or home runs. Pulling downward on the joystick makes your player slide.

When you are pitching, things get a little more complicated. You have to control three outfielders, four infielders, and the pitcher. Fortunately, you control only the player in the immediate vicinity of the ball. When you press the fire button, the pitcher winds up and throws. Pulling down on the joystick causes the pitcher to throw a fast ball; pushing up, a slow ball. Pushing the joystick to one side or the other makes the ball curve. All of these controls work as long as the ball is in flight. In other words, you can throw a slow ball that suddenly picks up speed. Or you can curve a ball far to the

left or right and still make it home in on the plate.

When the batter hits the ball, the screen switches to the outfield. If the screen doesn't show an outfielder, move the joystick. Soon he or she will come running out.



In a window to the left, you can see the relative positions of all the players and the ball. When going after fly balls, the fielders have to watch out for hazards that litter the field. The parking lot, for instance, has trash cans and oil slicks. Catching the ball is no trick, unless the player is clumsy and falls over an obstacle—or unless the player just isn't very good.

For an embarrassingly long time, I couldn't figure out how to get the ball to second base from the outfield. Finally I decided to cheat and read the instructions. To throw from the outfield to second base, the joystick must be pressed up. This is an extremely unnatural movement, and, even after I was aware of it, I was unable to remember to do it when playing the game. The four joystick positions refer to the four bases and not to the direction thrown.

The hardest thing to get used to (and this is strange because it is probably the most realistic feature of *Street Sports Baseball*) is that the quality of play is much more dependent on the quality of the players than on your skills. Some players will strike out no matter how good you are at pressing the firebutton. Others seem to hit everything that comes their way. Your role is more like manager than player. Still, to a great extent, your joystick and fire button skills will make the difference between winning and losing: When a bad player is up at bat, you just have to be that much better, to make up for his weakness.

The use of sound in *Street Sports Baseball* is incidental—an occasional horn or siren will go by. The animation is of the high quality you would expect if you've seen one of Epyx's earlier offerings (*Summer Games*, for example). The kids are life-like and likeable: You'll catch yourself rooting for them.

*Street Sports Baseball* comes with a teaser on the back of the disk: a brief look at the next Epyx game, *Street*



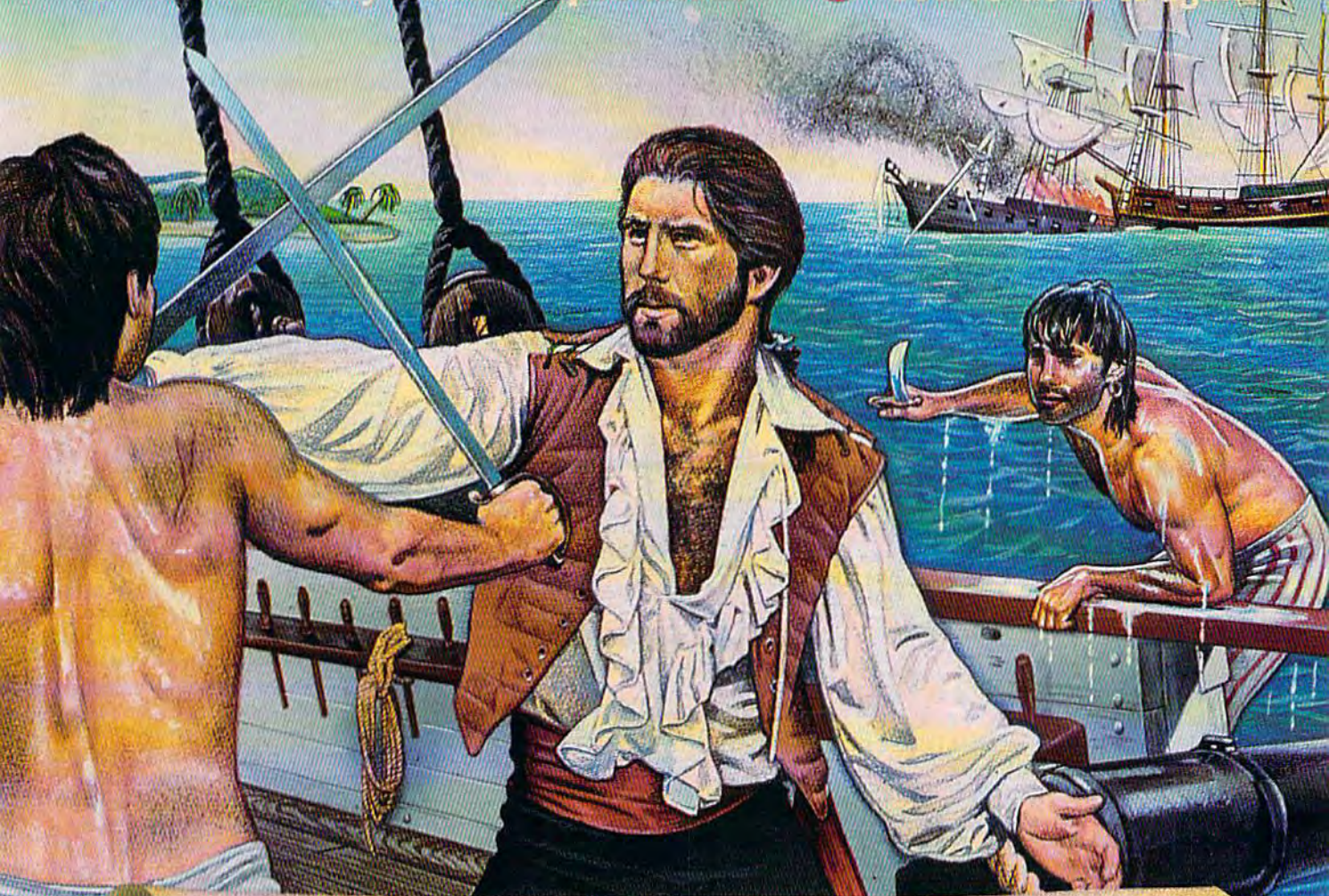
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*Sports Basketball* (scheduled for release by the time you read this), which looks like another winner.

—Robert Bixby

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## The Advanced OCP Art Studio

There are scores of art and drawing programs for the Commodore 64 on the market. These range in complexity from simple children's onscreen coloring books, through basic drawing programs, to those which incorporate more sophisticated texture and shading techniques. For most people, these programs are quite satisfactory. They take advantage of Commodore's superior color capabilities, put the user's creativity to work, and produce attractive pictures. Now comes a program designed for the more discriminating computer artist.

*The Advanced OCP Art Studio* from Rainbird Software (distributed in the U.S. by Firebird) is actually two programs in one. There is one disk (or tape) and manual for *Art Studio* and a second set for the *Advanced Art Studio*. (OCP, by the way, is the company that designed the program.)

In both levels the user interacts with the program using pull-down menus. Only those options that are valid at a particular time are displayed. Both programs support multiple input devices including a joystick, mouse, Koalapad, and the keyboard, although only one of these can be active at a time.

Windows or subsections of the screen can be manipulated in formats that include flipping, rotating, shrinking, or stretching.

There are three levels of magnification for close-up pixel-by-pixel editing. A special function is available in this mode which enables more precise drawing by overlaying a grid on the screen. Usual drawing functions including lines, circles, and boxes are provided, along with an ability to draw triangles. Text in one of nine sizes can be entered onto the screen. Text fonts can be edited and saved to disk or tape to create libraries of fonts for later use. Finally, drawings may be stored on disk or tape. Sample artwork is already on disk to whet your appetite.

Both programs allow printouts. They were initially written to use the Commodore MPS-801 printer, but through a special BASIC configuration program, almost any dot-matrix printer that supports bit-image graphics can be

used. Setting this up is no trivial task: The configuration program, in effect, guides you through the generation of a printer driver, and it assumes you are very familiar with the operation of your printer. You need to know such things as how many print wires are in the head, which bits control which wires, what codes to send to enter and leave graphics mode, how many dots there are per line, and so on. All this information should be in your printer manual, but be prepared to experiment until you get it right. Once you successfully complete your driver, however, all your artwork can be printed in various sizes, and even sideways.

Each program comes with a standalone screen-loader program (again written in BASIC and available to LIST and modify) that allows you to load screens of artwork you have created with *OCP Art Studio* into your own programs. This is a tremendous feature if you're doing any serious programming, and it can give your programs a truly professional look.

---

*If anything can be done to a picture or a portion of it, this program does it.*

---

The manuals for both programs are comprehensive and coherent. For the programmer they contain a wealth of technical information. For the artist, they offer guidance in obtaining the best and most creative results.

While the programs have much in common, they also differ. The first program, *Art Studio*, allows you to work in hi-res mode (320 × 200 pixels). You have 16 pens, 8 random sprays, 16 user-definable brushes, and 32 user-definable patterns to choose from, with 16 colors in which to use them. Although the brushes and patterns may be edited to suit your needs, the newly created patterns cannot be saved.

*Advanced* is the appropriate word in describing the differences between *Art Studio* and *Advanced Art Studio*. *Advanced Art Studio* gains its power through the use of Commodore's multi-color bitmapped mode. This mode sets up "cells" consisting of four pixels in the x direction and 8 pixels in the y direction. Up to four colors may be displayed in each cell. This, combined with a unique feature in the Colours menu, gives you great control over detail. In the Colours menu, you have the ability to exclude up to 15 of the 16 colors and to create a pri-

ority list among the rest. This enables you to position parts of your drawing in front or back of others. It also prevents some of the "bleeding over" of colors when working in detail so common in other programs.

*The Advanced OCP Art Studio* has 16 drawing pens, 8 random sprays, 12 user-definable multicolored brushes and 12 user-definable patterns. Here, when patterns or brushes are modified, the new ones may be saved to tape or disk.



*OCP Art Studio* has far more features than can be adequately described here. If anything can be done to a picture or a portion of it, this program does it. What makes this package special is its level of sophistication. It is not for the average doodler—although an ambitious one could learn a lot from it. Rather it is for the serious computer artist who can use it to its fullest potential. It requires a knowledge of color and artistic technique as well as an understanding of how a computer manipulates design and color.

Those who may appreciate this program most are programmers trying to create background screens for their programs. But users who wish to develop expertise in computer art—those willing to spend time following the manuals and experimenting with the programs—will find *The Advanced OCP Art Studio* an excellent place to learn.

—Robin and David Minnick

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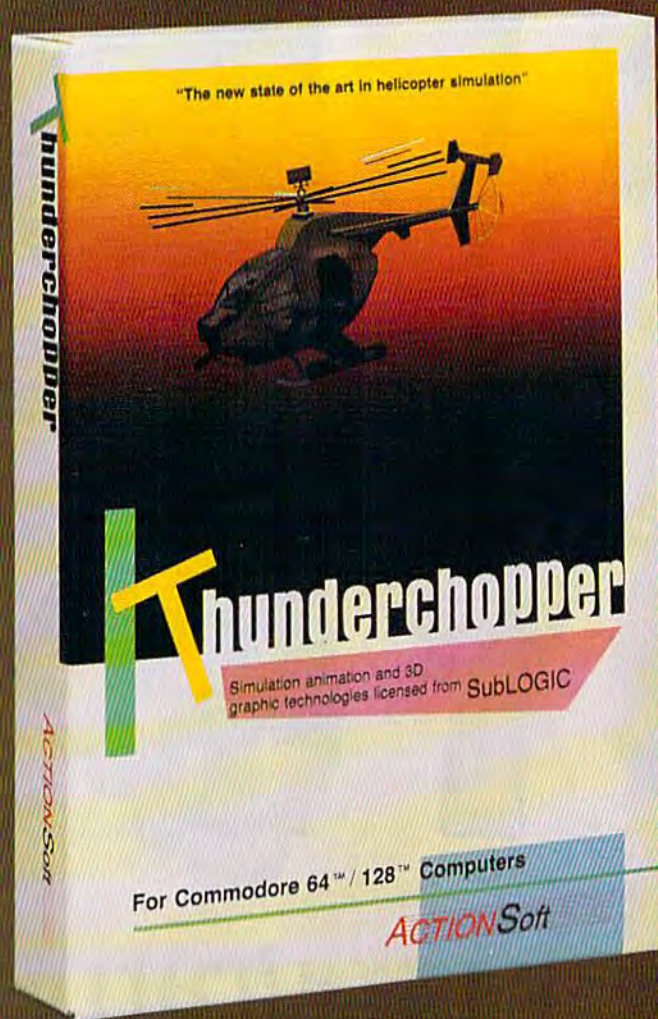
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# Crossroads

Steve Harter

*In this arcade-style game, one of the best we've ever published, you battle a host of hostile, mutant creatures. The fight takes place in a maze—which is different at each level. You progress by capturing "spars"—whirling fans with magical properties. On each level, you'll encounter new hordes of monsters. For the 64, one or two players. Joystick(s) required.*

Carefully, you lean out into the hallway. Looks clear. Eerie, how there's no sound. With so many creatures near, you'd think you would hear something. They're just waiting for you, probably, hunched over an illegal dice game, or digging through a garbage can for scraps of food.

You need to catch one more spar to move on to the next level. Now you can hear one whirling down the hall. Well, no choice really—better move. You run down the hall, looking down each hallway you pass. Trouble. One hall harbors a group of dangerous monkeys. A particularly nasty one looks up and stares right into your eyes. You see him reach for his gun. Panicked, but trying to look cool, you fire a few blind shots and move on, sweating. They're on your tail now, no doubt about it.



*A unique and challenging action-packed game, "Crossroads" features several mazes and nine different enemies—each with its own personality.*

Just when you think you've got them licked, you run almost head-on into a blue rubberhead. It bellows in anger. No time to shoot. You duck down a hall. There's the spar. You can hear the rubberhead

screaming behind you as it starts to shoot. But you've won this round—on to the next level of "Crossroads."

Crossroads is a game that features nine different types of enemies. You—alone or with a friend—must battle these frenzied, aggressive creatures in a series of different mazes.

## Getting Started

Crossroads is written entirely in machine language. Type it in using "MLX," the machine language entry program found elsewhere in this issue. When you run MLX, you'll be asked for the starting and ending addresses for the data you'll be entering. For Crossroads, respond with the following values:

Starting address: 0801  
Ending address: 1F30

Be sure to save a copy of the program to tape or disk before exiting MLX.

Crossroads loads and runs like a BASIC program. When you're ready to play, plug a joystick into port 1 (or plug in two joysticks for a two-player game), load the program, and type RUN.



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CUT HERE



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## An Enemy At Every Turn

When Crossroads starts, several monsters are transported into the maze. This is your opportunity to see how various species interact; for example, monkeys and rubberheads are bitter enemies. Here's a list of all the mutants and their point values:

Blue Flea	50
Red Human Mutant	150
Cyan Mashed Potato	300
Orange Lion	400
Green Mashed Potato	600
Yellow Lemonshark	1000
Blue Rubberhead	1000
Brown Monkey	1100
Purple Rubberhead	1500

Each type of animal has its own personality. For a closer look at each species, the demo screen lets you bring any animal out into the maze. Use the keys 1-9 to bring out the creatures. For example, press 1 for a blue flea, 2 for a red human mutant, and so on. Hold down the key to bring out several creatures of the same kind.

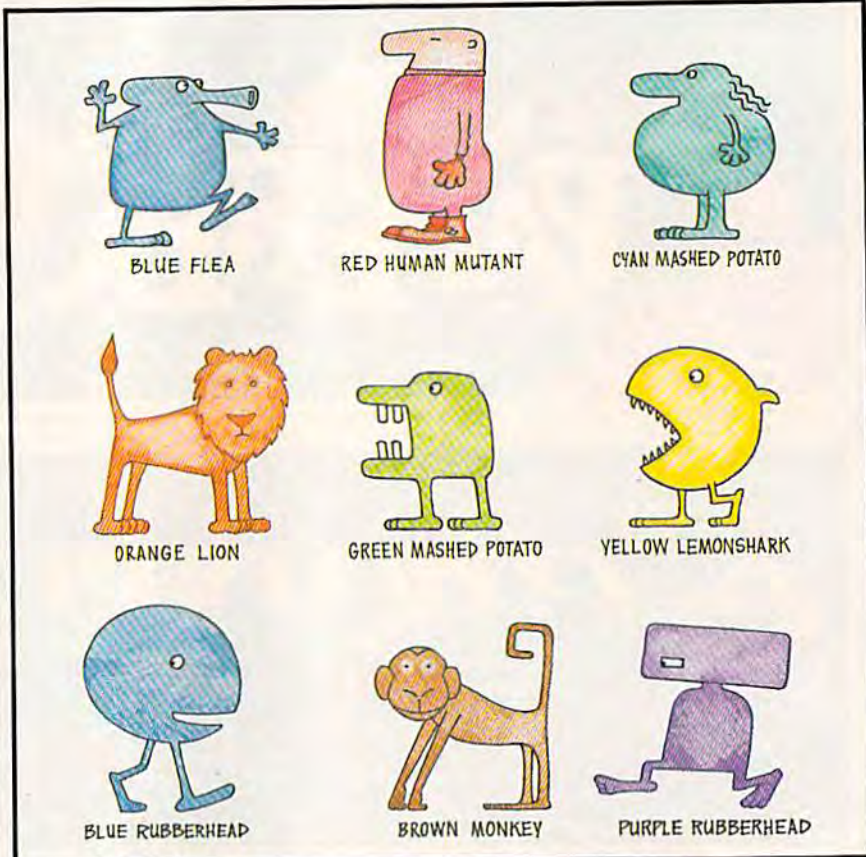
At the top of the screen is the status area. You'll see your score, your opponent's score (if you have an opponent), the current high score, the number of shields you have (S), and the number of lives remaining (L).

Choose between 1 and 2 players by moving the joystick up or down. When you're ready to begin the battle, press the fire button. The first maze appears. Into the maze, monsters appear, eight at a time. Finally, you (and your opponent, in the two-player game) appear, player 1 in the lower left corner, player 2 in the lower right.

You acquire shields by picking up the whirling, fan-like spars. Shields protect you from being destroyed by shots. You lose a shield each time you are shot. If you're hit without a shield, you lose a life. You'll move on to the next maze when you have collected five spars. You receive 500 bonus points for each shield you have left at the end of the level. Every 10,000 points, you get a new life. You are limited to a maximum of 9 lives and 9 shields at one time.

Move around the maze and shoot the mutants. Note that the mutants also become more powerful when they pick up spars.

You can pause the game by



pressing f5. While the game is paused, you can change the color of your player. Press f1 to cycle through and change the color of player 1; press f3 to change player 2.

## Warnings And Tips

Be careful when attacking blue or purple rubberheads. If you shoot a rubberhead in the back, your bullet will bounce back and hit you. However, if you keep your distance when firing, you'll be able to shoot the bullets that bounce back until the rubberhead turns toward you. Rubberheads are also dangerous because they shoot special guided missiles that can shoot bullets at you. It's best to destroy these missiles as quickly as possible.

Beware of shooting in hallways that run the entire length of the screen—since shots wrap around from one side of the screen to the other, you may end up shooting yourself. If you fire a few bullets down an unblocked passageway and then quickly get out of the way, the bullets will continue moving until something walks into them. These traps become good defensive strategy.

Your gun has unlimited fire-

power. Hold down the fire button for continuous firing.

Finally, as each new maze appears, pay close attention to the types of mutants that show up. If one species is over-represented, try not to kill off the enemies of that species—you'll need their help.

See program listing on page 108. ☐

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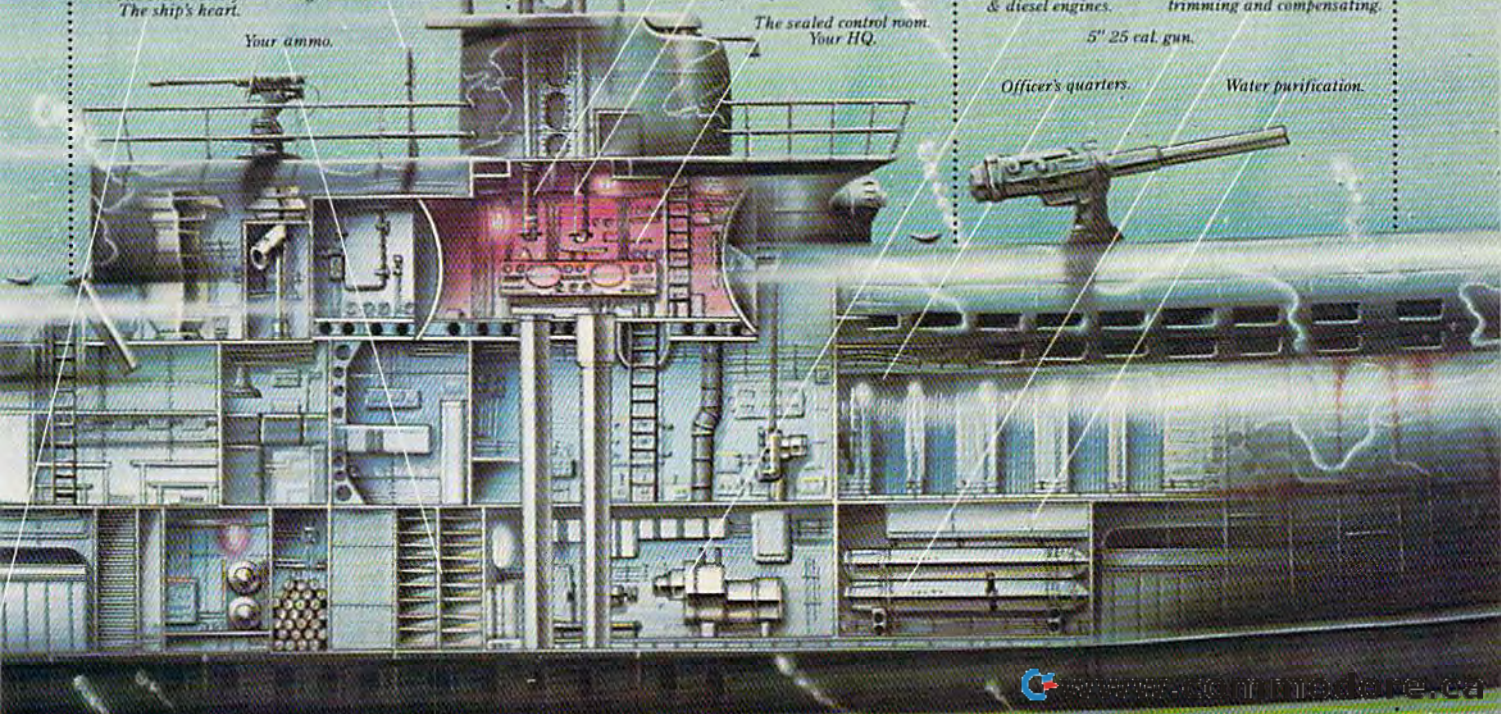
Independent generator & diesel engines.

Salt water tank, for trimming and compensating.

5" 25 cal. gun.

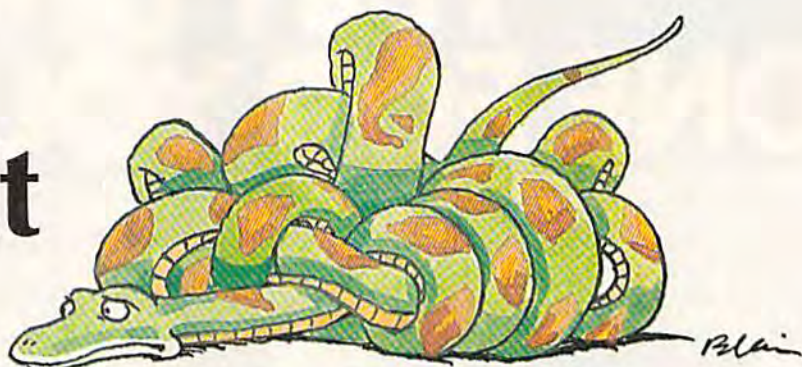
Officer's quarters.

Water purification.





# Snake Pit



Michael L. Hall

*Like all creatures, snakes have to eat—it's the only way to grow. But in "Snake Pit," growth can be dangerous. A nonstop action game for the 64 that really puts your reptilian reflexes to the test. For one or two players. Joystick(s) required.*

"Snake Pit" is a fast-action game for one or two players. As a hungry snake on the move, catching mice is just one of your concerns. As your snake eats, it also grows in length, making it harder to maneuver. And if your snake collides with anything—a wall, your opponent, or even your own slithering tail—it's good riddance to you.

## Typing It In

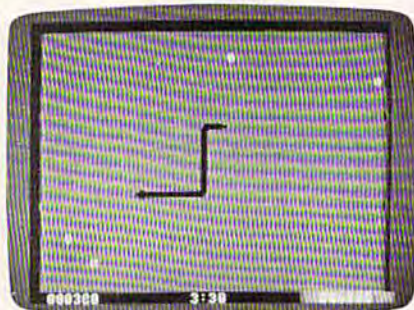
The program is written entirely in machine language so you will need to type it in using "MLX," the machine language entry program found elsewhere in this issue. When MLX asks you for the starting and ending addresses, use the following:

Starting address: C000  
Ending address: CB87

When you've finished typing in all the data, save a copy to tape or disk. The game is loaded with a command of the form LOAD "filename",8,1 where filename is the name you used when saving the program. (Tape users should replace ,8,1 with ,1,1.) To start the game, type SYS 49152 and press RETURN.

## Life In The Snake Pit

When the game first begins, a title screen appears and you are asked to choose between a one- or two-player game. Using a joystick plugged into either port, move left or right until



One or two players can test their arcade skills in this fast-paced contest.

the selection of your choice is highlighted in green. Press the fire button to make your selection. Next, you are asked to choose a speed setting. Again, move the joystick left or right until the desired speed is highlighted and press the fire button. Game speed varies between 1 (slow) and 5 (very fast).

At the top of the screen, the current score for each player is displayed along with a timer. The game begins with five minutes on the clock. When the timer reaches zero, the game ends. In a two-player game, the player with the highest score wins.

Around the edges of the screen is a blue border with six mouse holes. There are four mice on the screen at all times. Whenever a mouse is eaten by a snake, another

mouse enters the pit from a mouse hole.

In the center of the screen lie the snakes—one black and one green. The joystick plugged into port 1 controls the green snake while the joystick plugged into port 2 controls the black snake. In one-player games, only the black snake appears. The score for the black snake appears on the left. The green snake's score is on the right.

To begin the game, each player must move his or her joystick in any direction. At this point, the snakes begin moving and the mice start scampering about. Once a snake has started moving, it cannot stop. Use the joystick to change your snake's direction.

## Scoring

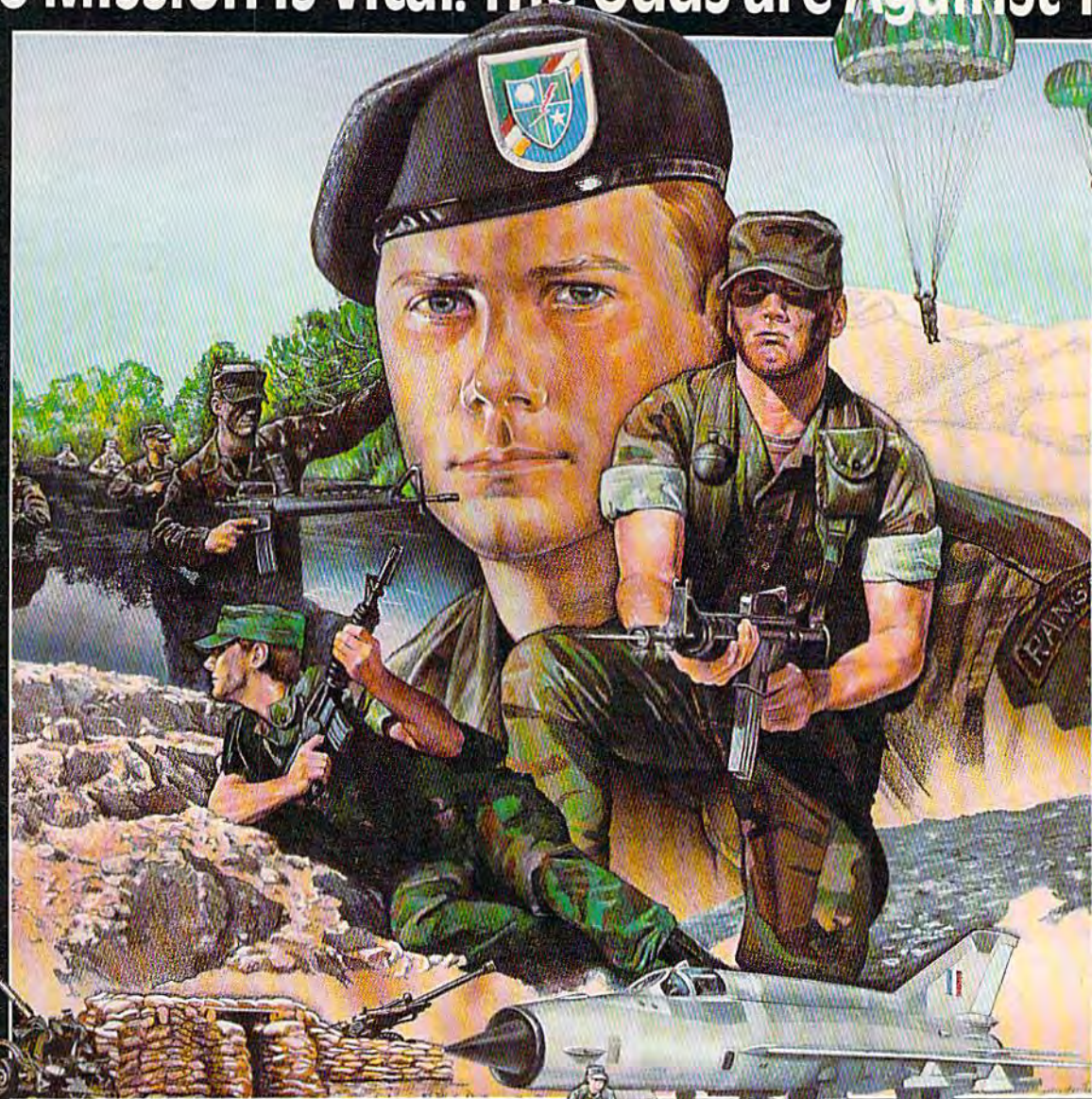
There are two ways to score points. First, you get 30 points for each mouse that you catch. (Take note: Whenever a snake eats a mouse, it also grows in length, making the snake harder to maneuver.) Secondly, if your opponent's snake crashes into the sides of the pit, into you, or into himself, that snake turns yellow and dies. When this happens, you get points determined by the length of your opponent's snake; for each unit of length, you gain 20 points. You may attempt to force your opponent into a collision in order to gain points, but be careful not to crash yourself. When a snake crashes, the screen clears after a short delay and a new round begins.

When the timer winds down, a horn sounds and the game ends. To begin a new game, press the fire button.

See program listing on page 107. ©



# The Mission is Vital. The Odds are Against You.



You're one of the elite... parachuting alone behind enemy lines. The enemy controls the terrain, hidden in bunkers and machine gun nests... you may be surrounded. You might complete the mission if you crawl through the ravine and approach from the rear... or maybe a frontal attack will take them by surprise.

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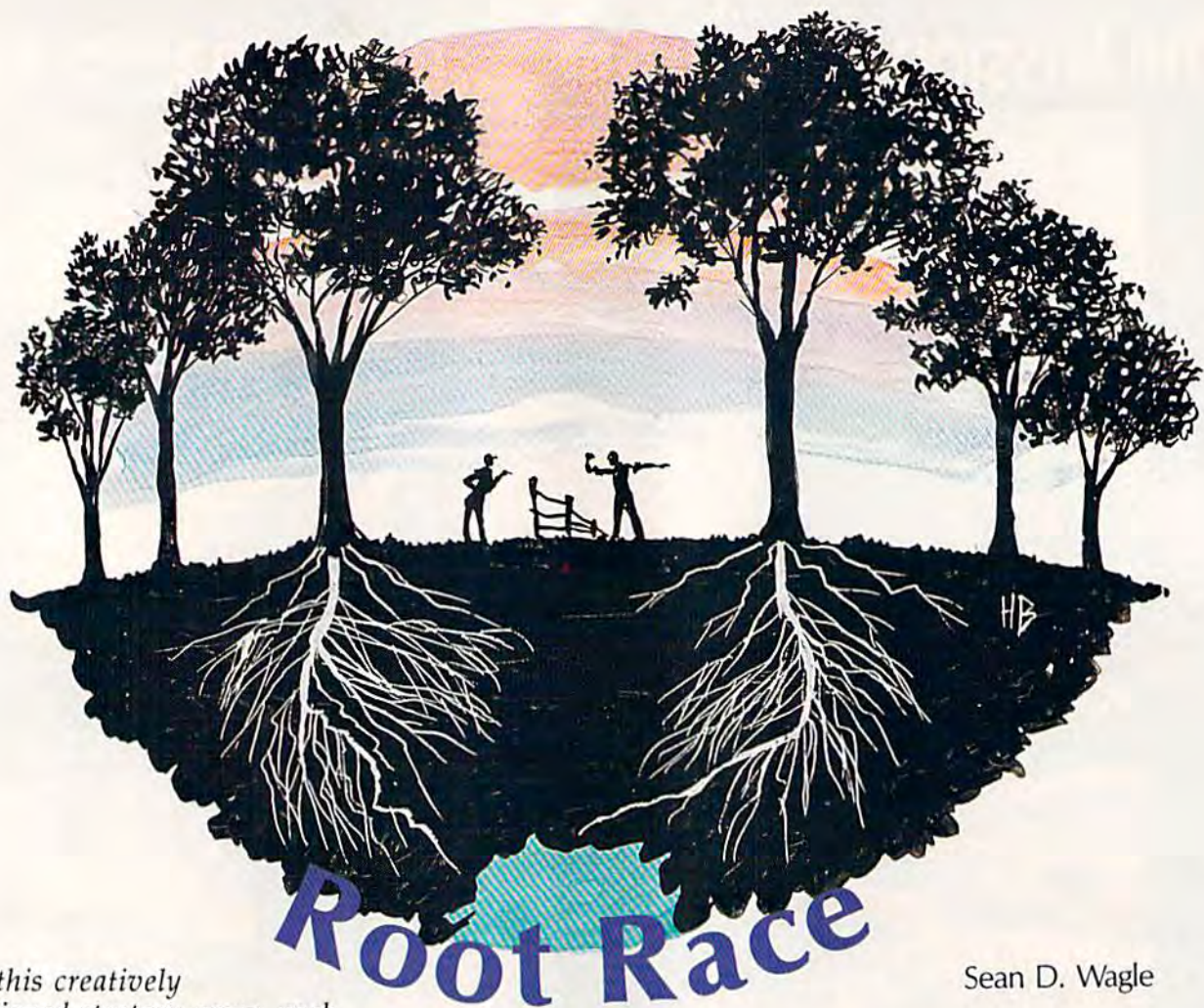


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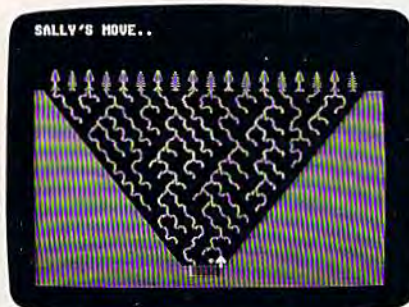
*In this creatively designed strategy game, each player controls a group of trees, manipulating the root system in an effort to reach water. The player with the most efficient root system wins. You can play against a friend, the computer, or sit back and watch the computer play against itself. For the 64 with disk drive. Joystick(s) required.*

Sean D. Wagle

Imagine a stand of trees on a grassy knoll. Two kinds of trees—yours and your opponent's—alternate. Well below the earth's surface is a large pocket of water. The trees' roots move through the earth, toward the water, branching and blocking each other as they grow. Only one tree from each player's group will reach the pool. In "Root Race," you must decide which tree will make it, sacrifice the others, and block your opponent's expansion.

Root Race consists of two BASIC programs: Booter (Program 1) and Root Race (Program 2). Type in and save both programs on the same disk. Because Program 1 looks for the filename Root Race, be sure to save Program 2 with that name. To get started, load Booter and type RUN. Press the space bar

when the program is ready and follow the screen prompts. First, Root Race asks whether you want to play with one or two joysticks. Then, select a color for the ground. To make Root Race easy on the eyes, choose a dark color like brown, blue, gray, or black. Next, select the colors for your trees and your opponent's. Now the program will ask how many trees (from three to nine) you want to use. (For beginners, start with three or four trees until you get a feel for the game.) Next, decide whether to play against a friend, the computer, or have the computer demonstrate the game by playing against itself. Last, unless the computer is playing against itself, you'll be asked to enter your name(s)—up to 15 characters per name is allowed.



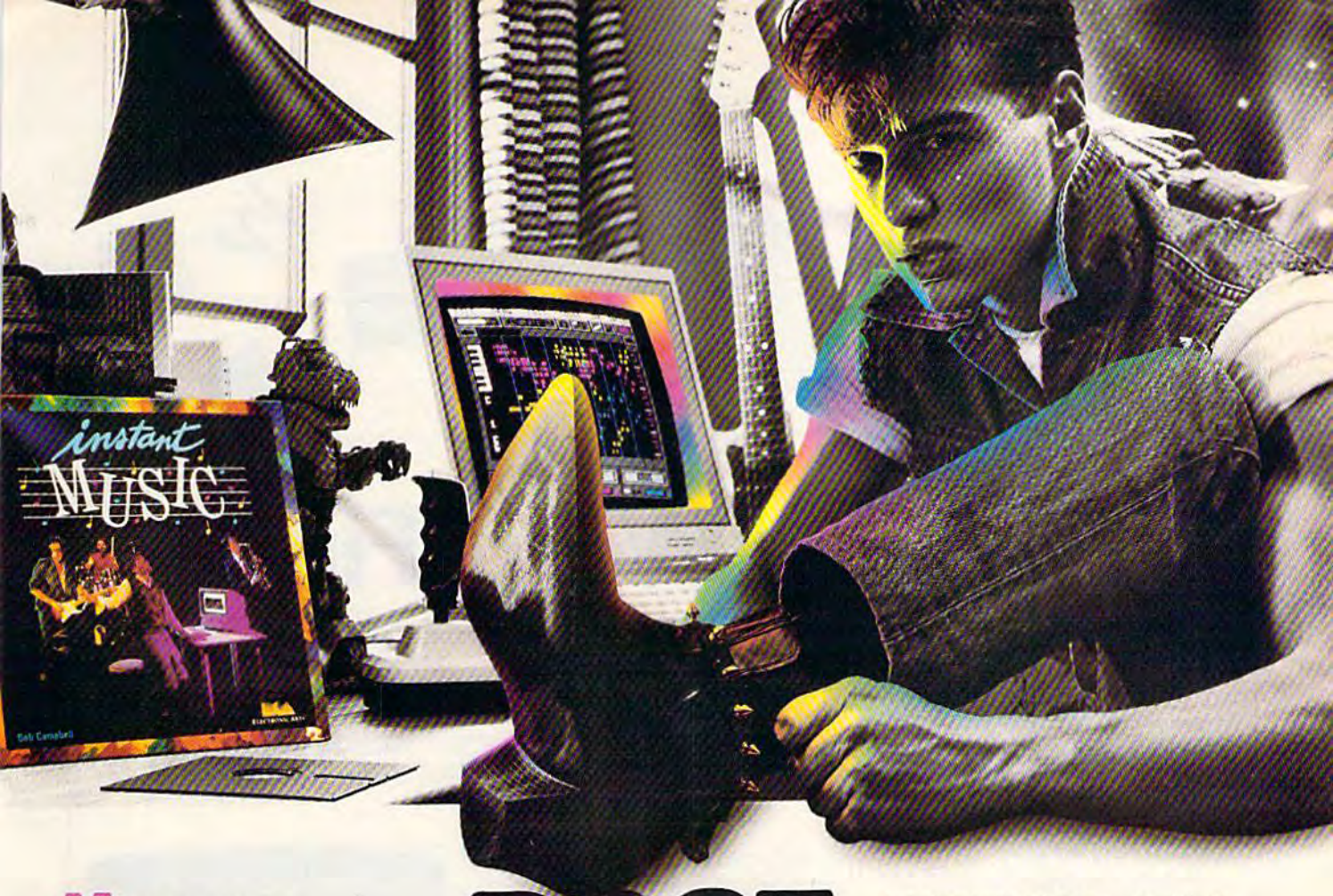
*The final move is about to be made in this game, after which the computer will analyze the size of the competing root systems and announce the winner.*

### Growing Roots

The program keeps track of whose turn it is to play and starts each player's turn by displaying his or her name on the screen and placing the joystick's pointer under one of the player's trees. Player 1 (in the two-player game, the contestant controlling the joystick plugged into port 1) begins by selecting a tree from which to grow roots. To select the tree, tap the joystick left

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Screen shot represents C64 version.



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or right until the pointer rests beneath the tree whose roots you want to grow. The pointer will go only where a legal move is possible, so don't worry if it won't move to every tree.

When you've selected a tree, press the fire button and the program will ask, "Which way?" Move the joystick left or right to indicate the direction you want the tree to grow. There are two movement restrictions: You can't move to a location where either you or your opponent has already placed a root, and you can't move to a lower level until your trees have made all the legal moves on their current level. The small gray dots show the levels and the places to which moves are permitted on each level.

After player 1's turn is over, player 2 can move using his or her own joystick or player 1's joystick. Going first in Root Race is an advantage, so the second player should play carefully. If the game ends in a tie, player 2 has countered player 1's moves successfully and defended very well.

When the game is over, the program offers the option of playing the same game again—using the same colors, number of trees, and player arrangement—or going back to the beginning.

## Strategy

To win in Root Race, you need to keep the game's objectives in mind: You must reach the water with a tree that has a longer root system than the other player's. One of your trees will make it. You need to be sure it's one with an extensive root system. To expand your root system, you should branch roots whenever possible. The trees in the center have the most room to branch, and the least chance of being cut off, so they are usually able to grow the longest roots and make it to the water. But don't ignore the trees on the sides: They can put pressure on the center trees, and occasionally one of them even wins. See program listings on page 100. ■



# Word Find

Keith Murray

*This program is an adaptation of the classic pencil-and-paper word-search game, but with something new: You can specify a time limit and play competitively. For the 128, 64, Plus/4, and 16.*

In the traditional version of this game, you're presented with a 20 × 20 grid full of seemingly random letters. The object is to find the words hidden in this maze. The computer version works just like the pencil-and-paper game—but it has the added challenge of being able to specify a time limit for your search.

"Word Find" is written entirely in BASIC. After you've typed it in and saved it, load the program and type RUN. Word Find will ask if you want to use a time limit. If you choose this option, you can select any time period between 1 and 59 minutes. Next, enter the number of words you want to find. You can search for as many as 20 words. Last, type in the words you want to be hidden. Each word can be 3–12 characters long.

## Word Hunt

After you've finished selecting the words for your search, the program draws a 20 × 20 grid on the screen, filled with letters. Your words appear to the right of the grid (so you won't forget them). Inside the grid, your words will be placed in almost any position. They might be horizontal, vertical, diagonal, backwards, or forwards.

Now start looking. When you



*Puzzle buffs will enjoy this computer version of a classic word-search game. In the photo above, the words "dog" and "school" have been located.*

think you've found a word, at the appropriate prompts, type the row and column numbers that correspond to its first letter. If you're right, the program highlights the word you've found in purple. If you're wrong, you're gently notified.

After you've found all the words you originally entered, the final screen appears. Press the space bar to play again and any other key to quit. If you choose the time-limit option, you must find all the words in the specified time to win. If time runs out and you haven't found all your words, those remaining are outlined in reverse video and the game ends.

See program listing on page 95. ■



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# Animal Match

David Wright

*You're on safari in "Animal Match," a memory game with outstanding graphics and sound for players of all ages. Two skill levels are included. For the Commodore 64.*

Children of all ages—and lots of adults—will enjoy "Animal Match," a game formatted like the once-popular TV game show and board game Concentration. It includes an easy version for younger children and a more difficult version for older kids and adults. Animal Match features 18 kinds of animals, ranging from bats to polar bears to zebras.

In the easy version of Animal Match, you simply see which animals pop up when you press various keys. Then you match the animals, pair by pair, until none remain. The more difficult version requires that you match two animals only when a picture of the animal is displayed at the top of the screen.

## Getting Started

Animal Match is written in machine language, so you'll need "MLX," the machine language entry program found elsewhere in this issue, to type it in. When MLX prompts you for the starting and ending addresses, respond with the following values:

Starting address: C000  
Ending address: CB9F

Be sure to save a copy of the program to disk or tape when you've finished typing.

When you're ready to play the game, load it with a statement of the form `LOAD "ANIMAL",8,1`. Tape users should use a statement like



*Match the animals until all the keys disappear. "Animal Match" is an educational game that offers skill levels for all ages.*

`LOAD "ANIMAL",1,1`. When loading, use the filename that you specified when you saved the program.

Type `NEW` to reset BASIC's pointers and then `SYS 49152` to start the game.

You are presented with three options. Press 1 to match the animals on the keys (the easy version). Press 2 to match the animals on the keys with the animal displayed on the screen (the difficult version). Press 3 to exit the program and return to BASIC.

When playing for the first time, choose the first option (press 1). The game begins immediately. At the top of the screen, you'll see a picture of an animal. Below this picture, its name is displayed. After a brief pause, this animal will be replaced by another. After all 18 ani-

mals have been displayed, they are recycled in the same sequence. A cycle number appears near the picture, and acts as a timer that will tell you how long (how many cycles) you took to match all the animals.

At the bottom of the screen is a graphic representation of the keyboard (letters and numbers only), with each key corresponding to one of the animals. When you press a key, the animal "hiding" beneath the key appears. Press a second key. If the animals match, the keys disappear, and you have one less pair to match. If the animals don't match, both will go back into hiding and you'll have to try another pair of keys.

When the game ends, you go back to the three-option title screen. You can also return to this screen at any time during the game by pressing the `F1` key.

To play the more difficult game, select the second option (press 2). In this version, you can remove pairs only by pressing *both* corresponding keys while the animal is being displayed at the top of the screen. For example, if a polar bear is shown, you must press both keys that have polar bears hiding behind them. The animal isn't displayed for long, so you'll have to hurry. This game is difficult; it may take dozens of cycles before you can remove every pair.

If you choose the third option (press 3)—exit to BASIC—you may restart the game by typing `SYS 49152`.

See program listing on page 105. ☐





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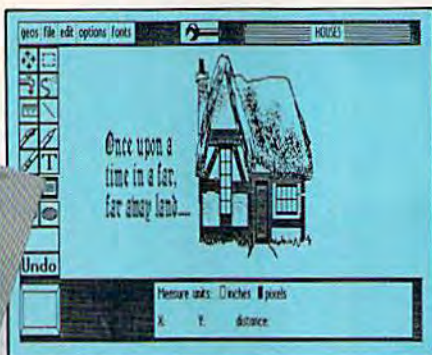
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You see, by recognizing your machine as a 128, GEOS 128 operates at a full 2 MHz, instead of 1 MHz. So you get twice the speed. Twice the power. And since GEOS 128 also supports the quicker 1571 and 1581 double-sided disk drives — and the 1750 RAM expansion unit — there's no telling how much faster that puppy will fly.

## Fast and slick with mouse or stick.

Using GEOS is ridiculously simple. All you need is a mouse or joystick, and a keen ability to point and click. Everything else is pretty much a matter of reading *menus* (a technical term for "little lists of things"), or selecting *icons* (a technical term for "little pictures of things"). It's

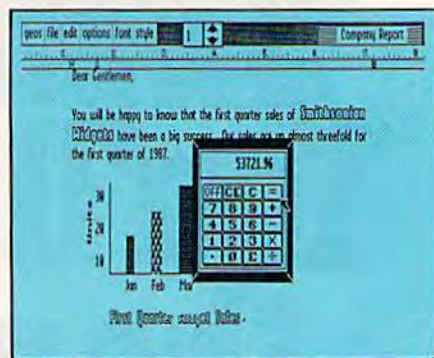
sort of like talking in sign language.

For example, if you want a document for word-processing, you point to the icon that looks like a stack of papers. Click your mouse and bingo — you're in the file. If you want to erase the file, you drag the stack of papers over to the little waste basket and click your mouse.

Poof. That's about as tough as it gets.

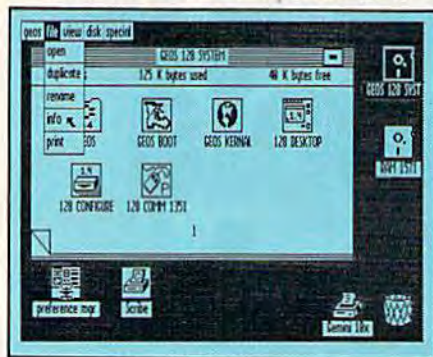
## Working within the system.

Learning where things are in GEOS is pretty simple, especially if you've ever sat behind a desk. Because that's exactly how we designed



GEOS 128.

You keep your documents and graphics in files; everything else stays right on the desktop: the notepad, the calculator — there's even an alarm clock. In fact, the only thing our desktop





# GROWING UP ING OLD?

Now, we realize that's a lot to pack into one GEOS package. But as long as we're packing it in, we might as well let you know something else: There's more.

doesn't have a place to put your feet when the boss isn't around.

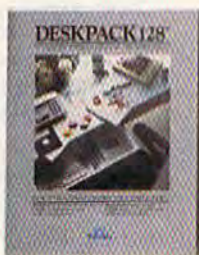
But not only does GEOS give you a place to write and draw, it actually helps you write and draw better. Because unlike your basic office model, our desktop comes with geoWrite and geoPaint built right in.

With geoWrite, your way with words leaves people speechless, as they watch you effortlessly cut, paste and move entire blocks of copy anywhere on the page. And since geoWrite comes with different fonts in a variety of styles and sizes, your documents become even more dazzling.

With geoPaint, you can draw designs. Create with colors. And tantalize your tastes with tons of tones and textures. Invert, rotate or mirror images.

Then place them wherever you want: either in your geoWrite document, or in your GEOS Photo Album for later use.

But no matter what kind of masterpiece you create, you



It's true. Because there are always new GEOS applications just waiting to jump off the shelves and into your 128. Packages like geoDex and geoFile, for keeping addresses and data straight. Fontpack and Writer's Workshop, for tweaking text with that special, extra touch. And,

of course, geoCalc, a full-featured graphics spreadsheet for all you number freaks.

They're just the first in a long line of GEOS applications that are constantly being developed to keep your 128 up to date.

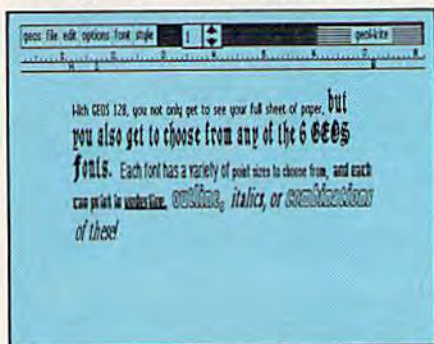
So if you'd rather have your 128 grow up than grow old, load up with GEOS. You owe it to yourself. You owe it to your 128.

Heck, you owe it to your grandchildren.

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**GEOS 128**



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John Howard

*"One note of caution about the Waste Basket: It is actually an incinerator—any files dropped into it cannot be recovered." So states the GEOS user's manual, in reference to the deskTop Waste Basket. Here's a program that allows you to rescue disk files from the GEOS incinerator. "GeoTrash Restorer" pulls deleted files from the Waste Basket and places them back on top of the deskTop.*

Have you ever crumpled up a piece of paper, tossed it in the waste basket, and then, realizing that it was something important, pulled it back out? The same thing can happen with disk files while using the GEOS deskTop—only you can't pull anything out of this waste basket. Unlike the Amiga's Trashcan directory or the Macintosh's Trash icon, files placed into GEOS's Waste Basket are deleted immediately.

Fortunately, Commodore DOS does not actually erase deleted files from a disk. And as long as you have not saved or rearranged any files since dragging something into the Waste Basket, you may recover the deleted file. "GeoTrash Restorer" takes advantage of this fact, allowing you to sift through the deskTop Waste Basket—without even getting your hands dirty—and restore any documents you have inadvertently thrown away.

### Typing It In

GeoTrash Restorer is written in BASIC. Because this program writes directly to your disk directory, it requires accurate typing, so be sure to enter the program using the "Automatic Proofreader," found elsewhere in this issue. If you wish to run GeoTrash Restorer from the deskTop, be sure to save a copy to a GEOS work disk.

### Retrieving Files From The Waste Basket

To retrieve a file from the deskTop Waste Basket, run GeoTrash Restorer. If you saved GeoTrash Restorer to a GEOS work disk, you can run the program by double-clicking GeoTrash Restorer's icon. Otherwise, you must load and run the program from BASIC. To exit GEOS, select the BASIC option found in the Special menu.

When the program instructs you, place the GEOS work disk containing the deleted file into drive 8 and press RETURN. GeoTrash Restorer searches the disk, looking for files that have been thrown away.

Every time GeoTrash Restorer finds a deleted file, it asks you if you want to restore it, and if so, to indicate the file type. GEOS files are almost always USer files (type 3). The only other types of GEOS files to date are GEOS, GEOS BOOT, BACKUP, and DISK COPY, which

are all PRoGram files (type 2). So, to restore a GeoWrite file, for example, enter a 3 for USR. If you do not want to restore the specified file, simply enter a 0. GeoTrash Restorer can even be used to restore deleted files on your other Commodore disks. Two other file types are available on Commodore disks besides the USR and PRG files used by GEOS. These are SEQuential files (type 1) and RELative files (type 4). You may need to restore SEQ or REL files if you are working on your other Commodore disks.

When GeoTrash Restorer finishes, you are instructed to boot GEOS and validate the disk. Never use the normal Commodore validate command on your GEOS disks; use the validate command available from the Disk menu on GEOS's deskTop. After validating the disk, you should be able to use the restored files just as if they'd never been tossed in the Waste Basket. See program listing on page 95. ■

### GeoConverter Fix

Douglas S. Curtis

Since GEOS uses a unique format for its files, GEOS applications must be converted if they are written using a standard 64 assembler. The need for such a converter will disappear when a true GEOS assembler is released, but until then, conversion is an unfortunate necessity.

In the October issue, "The GEOS Column" published the program "GeoConverter," a utility that converts standard machine language program files to GEOS files. This program works similarly to the PRGTOGEOS program in Berkeley Softworks' *The Official Programmer's Reference Guide*. As stated in that article, both GeoConverter and the PRGTOGEOS program occasionally create files that give a system error when run. We now know why.

Both converter programs fail when the file being converted is stored on disk with a starting sector number of 0. To read the starting track and sector number of a file, GeoConverter and PRGTOGEOS use BASIC's GET command. Unfortunately, when the 64 GETs a value of 0 from disk (that is, sector 0), BASIC returns a null string, not a CHR\$(0). Now, when the starting sector number is written back to disk, a null string (nothing) is output to the disk. Without the proper sector number, the resultant file bombs when booted from the deskTop.

To fix GeoConverter, change the following lines:

```
170 GET#2,HT$,HSS:I=3:IF HSS="" THENHSS=CHR$(0)
280 GET#2,MT$,MSS:IF MSS="" THENMSS=CHR$(0)
```



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# machine language for beginners

Strings

Richard Mansfield  
Editorial Director

When people first learn BASIC (or any other new language), the first thing they want to do is put "hello" or some other message on the screen. This gets you in touch with the computer and teaches you several things about the new language. It's also a demonstration that things are working, since viewing things on the screen is one of the best debugging tools there is.

Printing's easy, of course, in BASIC:

```
10 PRINT "HELLO"
```

In machine language there are three primary ways to print strings. All three methods require a loop because you print your message one character at a time:

```
10 * = 870; 4864 for the 128
15 SCREEN = 1024
20 LDY #0
30 LOOP LDA MESSAGE,Y: STA
  SCREEN,Y
40 INY: CPY #5: BNE LOOP
50 RTS
100 MESSAGE .BYTE "HELLO"
```

Line 10 tells your assembler to store this program at address 870, which is a safe area to use in the 64. (If you are a 128 user, use 4864.) The value 1024 (the start of Commodore 64 and 128 screen memory) is assigned to the label SCREEN in line 15. This is the same way you assign a value to a constant in BASIC.

## Variables vs. Constants

Let's digress a moment to distinguish between constants and variables. Although they can be used interchangeably in BASIC, you'll need to know the difference when programming in ML. When you use labels in ML, such as SCREEN and MESSAGE as seen above, they cannot be changed while the program is running. They are *constants*; in this case they're addresses within RAM. A *variable*, though, is going

to vary while the program executes. It might be the score of a game or anything else that will change. Variables in ML are simply bytes of RAM set aside to hold values:

```
SCORE .BYTE 0
```

This looks like our MESSAGE above, but it's just a blank we arbitrarily set aside. When the program runs, we'll reference this byte however we wish. It can be changed any time the program wants to update it (just like a BASIC variable). To raise the score by one

```
INC SCORE
```

and the byte goes up one in value. If, however, you tried to INC MESSAGE, you would change the H to an I, and INC SCREEN would increment the character in the upper left of the screen.

But back to strings, the matter at hand. Line 20 sets the Y register to zero so it can pick off each letter in the message, starting with the zero letter, H, and working up via the INY in line 40. In line 30, we load a character from the address of label MESSAGE *plus* the value of Y (which keeps going up during this loop). We then store it at the address of the screen, plus Y.

In line 40 we CPY (ComPare Y) to 5 to see if we've picked off all five letters. If we haven't, we BNE (Branch if Not Equal to zero) back to the loop and get the next letter. If Y *has* reached 5, we RTS (ReTurn from Subroutine) back to BASIC.

## Zero-Delimited Strings

Line 100 uses the label MESSAGE to identify the address where the message will be assembled into RAM memory. The .BYTE command tells the assembler to read the characters between the quotation marks and place them in RAM.

There's another way to print strings. Just insert a zero at the end of the message, and, when that zero is detected within the loop, you

know you're done:

```
10 * = 870; 4864 for the 128
15 SCREEN = 1024
20 LDY #0
30 LOOP LDA MESSAGE,Y
40 BEQ DONE; IF ZERO, BRANCH OUT
  OF LOOP
50 STA SCREEN,Y
60 INY: JMP LOOP
70 DONE RTS
100 MESSAGE .BYTE "HELLO"
110 .BYTE 0
```

Here we LDA MESSAGE,Y and the zero will eventually trigger the BEQ in line 40, exiting from the loop. We add the zero to the end of the message in line 110. Finding no quotation marks after .BYTE, the assembler stores numbers rather than characters. By the way, anything following the semicolon is ignored by the assembler to allow you to comment your programs. See lines 10 and 40.

The third way to print strings involves JSR'ing to the PRINT routine within BASIC:

```
10 * = 870; 4864 for the 128
15 PRINT = $FFD2
20 LDY #0
30 LOOP LDA MESSAGE,Y
40 BEQ DONE
50 JSR PRINT
60 INY: JMP LOOP
70 DONE RTS
100 MESSAGE .BYTE "HELLO"
110 .BYTE 0
```

Here, the only differences from the previous examples involve defining the start address of BASIC's PRINT routine (line 15) and going to that subroutine in line 50 after we've picked up the character we want to print. The PRINT subroutine also keeps track of the cursor location and prints each new character in the proper place. These examples are designed to run on the 64 or 128 (in 40-column mode). Be sure before you SYS 870 (SYS 4864 for the 128) that your screen is displaying lowercase characters. ☐



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# simple answers to common questions

Tom R. Halfhill, Staff Editor

Each month, *COMPUTE!'s Gazette* tackles some questions commonly asked by Commodore users. If you have a question you'd like to see answered here, send it to this column, c/o *COMPUTE!'s Gazette*, P.O. Box 5406, Greensboro, NC 27403.

**Q.** In the September "Simple Answers to Common Questions," there was a letter from a reader who had accidentally formatted a disk. You responded that the only way to recover the lost data was to rebuild the directory using a disk sector editor, provided that a short format had been used. But in the July 1986 "Gazette Feedback" column, there was an item entitled "Recovering from a Short Format." This item offered a short program that would rebuild the directory as long as the disk had been formatted without an ID.

Michael Hocter

**A.** Right you are. This isn't the first time a sharp-eyed reader has pointed out a solution to a problem that already appeared in a past issue, and it probably won't be the last. Maybe someday when the entire archive of *COMPUTE!'s Gazette* (going back to 1983) is on CD-ROM, we'll be able to search for things like this in a matter of seconds.

The program you mention is printed below. Before anyone attempts to run it, however, observe a few warnings. First, it works only on disks which have been "short formatted"—that is, formatted without an ID number, as described in the September column. Second, it restores all but the first eight programs on the disk, although sometimes it may restore the first program. If it does restore the first program, the restored file appears on the directory under the filename ZZ. Finally, the restored disk still doesn't win a clean bill of health. Immediately

copy any files you can to another disk, then completely reformat the first disk before using it again.

```
10 FORA=1TO10:READB:A$=A$+CHR$(B):NEXTA:FORA=1TO14:A$=A$+CHR$(160):NEXTA
20 DATA 0,3,21,18,4,130,17,0,90,90
30 OPEN1,8,15:OPEN2,8,2,"#0"
40 PRINT#1,"U1 2 0 18 1"
50 PRINT#1,"M-W"A$
60 PRINT#1,"U2 2 0 18 1"
70 CLOSE2:CLOSE1
```

**Q.** Do you know of any Commodore software for the collection and storage of genealogical information?

**A.** In a book entitled *I Didn't Know You Could Do That With A Computer!* (COMPUTE! Books, 1986), author Dan Gutman cites *Family Roots*, a program published by Quinsept, P.O. Box 216, Lexington, MA 02173. Although we've not seen this program, Gutman states that it's intended for those with a serious interest in the subject. It's almost certain that there are other genealogical packages among the thousands of programs available for Commodore computers.

We receive a great many letters from readers who want us to recommend specific software packages designed for a specialized purpose. We can rarely respond to these requests, since we usually haven't used the software. It's worthwhile to remember, however, that when you can't find a program for a specialized application, there's a great deal of general-purpose software on the market that's capable of tackling almost any task. For instance, if you can't find a program designed specifically for storing genealogical information, you could consider using any good, general-purpose database program. When you think about it, a genealogical database has a lot in common with

an ordinary address book—it's just more detailed.

You can even press a word processor into service as a competent information organizer. The advantage here is that a word processor doesn't restrict you to a rigid record format, as some database programs do. Just enter your data as if you were writing a letter, perhaps making each "record" a separate paragraph. Any good word processor has a high-speed search function that can locate a certain string of characters in a split second. This makes it easy to locate a specific record in a large file without scrolling through the text and searching for it yourself.

For instance, if you need to look up the birth and death dates of an ancestor whose name is John Jones, simply search for *John Jones* or for any other string of characters which you suspect is unique to his record (such as his hometown, his wife's maiden name, or the name of an offspring). You could even begin each record with a special code that indicates that person's position in your family tree, then use the code as a basis for searches.

If your text file grows too large, you can split it into separate files, perhaps one for each branch of the family. You can also use the word processor's printing features to make copies of the file for relatives.



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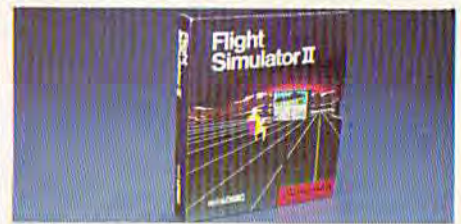
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# BASIC for beginners

## Working With Strings

Larry Cotton

This month, we'll look at the three string-related functions: LEN, VAL, and STR\$.

### The Length (LEN) Function

The LEN function is very useful when dealing with strings. Enter the following program for an example:

```
AX 10 INPUT"YOUR FIRST AND LAST NAMES";N$
RS 20 L=LEN(N$)
FS 30 PRINT:PRINT"YOUR NAME IS
      "L"CHARACTERS LONG."
```

As you will notice, LEN counts the number of characters in a string. In line 20, the variable L becomes the LENGTH of N\$, the name entered. Note that LEN counts *all* characters—even the space between names.

What if you don't want to count spaces? One way is to use a FOR-NEXT loop in conjunction with MID\$ to scan the string. Substitute line 30 and add lines 40-70 to the above program:

```
MK 30 FOR T=1 TO LEN(N$)
AE 40 M$=MID$(N$,T,1)
RA 50 IF M$=" " THEN L=L-1
GJ 60 NEXT
EP 70 PRINT:PRINT"YOUR NAME IS
      "L"LETTERS LONG."
```

You should look at this program carefully; it's somewhat tricky. In line 30, we use LEN(N\$) as the upper limit in a FOR-NEXT loop. Line 40 uses the MID\$ function to examine each character of your name. If the character currently under scrutiny (M\$) is a space, line 50 subtracts 1 from the variable L. By the end of the FOR-NEXT loop, L is equal to the length of N\$, minus any spaces.

Another practical use for LEN is to validate information after it is entered. Here's how:

```
EG 10 PRINT"{HOME}"
XA 20 INPUT"A FIVE LETTER WORD
      IS";W$
QM 30 IF LEN(W$)<>5 THEN PRINT
```

```
"THAT'S NOT FIVE LETTERS
.";GOTO 10
FK 40 PRINT"NOW THAT'S FIVE LETTERS LONG."
```

Line 30 simply checks to see if the length of the string entered is 5. If not, a message is printed and the question is repeated. If the IF-THEN statement proves false (W\$ is five characters long), the program falls through to line 40, where it continues.

Notice that GOTO 10 must be on the same line as the IF-THEN statement. If it were on the next line, the program would GOTO 10 regardless of the length of W\$.

As you might expect, LEN is not limited to variables. For example, entering PRINT LEN("GAZETTE") causes a 7—the number of characters in "GAZETTE"—to print to the screen.

### Converting Between Strings And Numbers

The next two functions we'll look at are VAL and STR\$. In simplest terms, VAL converts a string into a number, and STR\$ converts a number into a string.

Here's an example of how to use the VAL function in association with GET to input a number from the user:

```
AS 10 PRINT"ENTER A NUMBER FROM 1 TO 5"
BX 20 GET A$:IF A$="" THEN 20
FJ 30 N=VAL(A$)
GS 40 IF N<1 THEN 20
ED 50 IF N>5 THEN 20
QA 60 PRINT N
```

As you know, GET receives one, and only one, character from the keyboard. In line 30, VAL checks to see if that character is a number. If it's not, a value of 0 is returned.

When you run this example, you'll see that it handles all types of characters. If you enter letters, for instance, line 40 sends control back to line 20 because N is equal to 0. Line 50 checks for digits greater

than 5. If all is well, line 60 prints the value of the key pressed.

Let's see how VAL works with an INPUT statement:

```
AS 10 PRINT"{CLR}"
FC 20 PRINT"TYPE SEVERAL CHARACTERS."
GK 30 INPUT W$
JH 40 W=VAL(W$)
JA 50 IF W=0 THEN PRINT"YOUR ENTRY DOES NOT BEGIN WITH A NUMBER.";END
MR 60 PRINT"YOUR ENTRY EQUALS"
      W
```

Enter this program and run it. If you enter a string that begins with numbers and ends with letters, VAL returns the value of the numbers. But if you began your entry with just one letter, W will equal 0, and line 50 will be executed.

Don't think that VAL is too smart. It's happy only if it finds a number as the first character in a string. If that first character is a number, VAL continues looking for numbers that follow. The first non-numeric character VAL encounters stops it cold.

### From Numbers To Strings

The STR\$ function converts numbers into strings—the opposite of VAL. Try this example:

```
QJ 10 INPUT"WHAT IS A THREE-DIGIT NUMBER";N
PC 20 N$=STR$(N)
JX 30 IF LEN(N$)<>3 THEN PRINT
      N$ "IS NOT THREE DIGITS";GOTO 10
CB 40 PRINT"THANKS!"
```

This program has all the makings of a real head-scratcher because it looks like it would work, but doesn't. Why not? Because, numeric variables always reserve a space in front for the sign (+ or -). Therefore, the actual length of a three-digit numeric string is 4. So, to check for a valid entry, we need to change line 30 to read:

```
GA 30 IF LEN(N$)<>4 THEN PRINT
      N$ "IS NOT THREE DIGITS";GOTO 10
```



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## Putting VAL And STR To Work

Another very common use for VAL is with program menus. Take a look at this example, which also takes advantage of ON-GOTO:

```
AS 10 PRINT "{CLR}"
XK 20 PRINT:PRINT:PRINT"WHICH
{SPACE}SURFACE WILL YOU
{SPACE}MEASURE?"
CC 30 PRINT:PRINT"1. WALL"
AG 40 PRINT:PRINT"2. WINDOW"
AJ 50 PRINT:PRINT"3. DOOR"
HH 60 PRINT:PRINT"4. MISC."
FG 70 PRINT:PRINT"PRESS 1-4":P
RINT
QG 80 GET N$:IF N$="" THEN 80
GG 90 ON VAL(N$) GOTO 110,120,
130,140
GP 100 GOTO 80
AB 110 PRINT"WALL{2 SPACES}
{UP}":GOTO 80
EC 120 PRINT"WINDOW{2 SPACES}
{UP}":GOTO 80
MJ 130 PRINT"DOOR{2 SPACES}
{UP}":GOTO 80
QX 140 PRINT"MISC.{2 SPACES}
{UP}":GOTO 80
```

You may remember that ON-GOTO directs the flow of a program according to the number following the ON statement. The key line here is 90, which sends control to lines 110, 120, 130, or 140, depending on whether the user

types a 1, 2, 3, or 4, respectively. Numbers entered are converted from A\$ using the VAL function. If a number other than 1-4 is entered, line 100 sends control back to GET another character.

Let's finish by entering a short seasonal program which illustrates several of the string functions described.

```
MA 10 PRINT"HOW TALL IS YOUR T
REE ";
MK 20 INPUT"(6 TO 19)":T$
HE 30 T=VAL(T$)
JQ 40 IF T<6 THEN RUN
EK 50 IF T>19 THEN RUN
BC 60 PRINT"NOW TYPE ANY"T"CHA
RACTERS."
KG 70 INPUT C$:L=LEN(C$)
KQ 80 IF L<>T THEN 60
HF 90 PRINT "{CLR}"
PB 100 FOR J=1 TO 15-T:PRINT:N
EXT
CH 110 FOR J=1 TO T
RP 120 PRINT TAB(20-J) LEFT$(C
$,J) RIGHT$(C$,J):NEXT
HD 130 FOR J=1 TO 3:PRINT TAB(
19) "*" "*" "*" "*" :NEXT
KS 140 GET K$:IF K$="" THEN 14
0
```

Until next month, have a safe and happy holiday season. ☺

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Todd Heimarck  
Assistant Editor

Here's an experiment to try: Load a short BASIC program into a Commodore 64. Type LIST. There it is, the program you just loaded.

Now type POKE 775,191 and try to list the program. Nothing happens. LIST doesn't work. Type POKE 775,167 and the LIST command returns from wherever we sent it. Incidentally, the equivalents for the 128 are POKE 775,139 (disable LIST) and POKE 775,81 (enable).

How does a single POKE turn off a command like LIST? How does location 775 control the LIST command? Of all the numbers between 0 and 255, why would 191 turn off LIST and 167 turn it back on?

Maybe when you type LIST, a Commodore 64 PEEKs into 775. If it finds the magic number 167 there, it proceeds. If it discovers the magic number 191, it refuses to LIST. And maybe when the engineers sat down to design the 128, the boss said, "I'm getting kind of tired of 167 and 191. Let's make LIST search for 139 and 81 instead."

It's certainly possible, but it's not true.

LIST is a BASIC command, so it must be built into the computer. If it's built-in, it's part of read only memory (ROM). ROMs are unchangeable memory; you can PEEK (read) from ROM but not POKE (write) there. It doesn't seem possible that you can modify something that can't be modified. Moreover, the first ROM address in the 64 is location 40960, which is not even close to 775.

### Spies And Blackmailers

You've probably seen movies where one person, usually a bad guy involved in nefarious activities like kidnapping or spying or blackmail, has something that another person (probably a good guy) wants to ob-

tain. They make an arrangement to meet at a certain street corner at a certain time. The second person, lugging a briefcase full of cash, arrives at the appointed hour. The bad guy is nowhere in sight.

A pay phone rings and everybody watching the movie immediately knows that it's the bad guy calling. The character with the money is told to deliver it to another location. If the film is more than 30 years old, the good guy might say "What, are you giving me the runaround?"

In movies, it's the *runaround*, but in computers it's called *indirection*. The phone booth would be called a *vector*. The only purpose of a vector is to point somewhere else in memory.

### The MAIN Loop

Back to LIST. The 64 has a loop called MAIN that continually checks for keys that you might have pressed. When you type a normal character, the ASCII value goes into the keyboard buffer, and, within 1/60 second, MAIN pulls it back out. MAIN then does two things: It prints the character to the screen and stores it in the input buffer. When you press RETURN, MAIN goes off to parse the input buffer. Lines that begin with numbers are BASIC program lines to be added to the program in memory. Lines that start with the letters A-Z are commands.

When you type LIST and press RETURN, the computer scans through its list of valid commands. Sure enough, LIST is there, so the 64 obeys you (if LIST weren't on the list, the computer would print ?SYNTAX ERROR).

The LIST command is in ROM, so the 64 executes a machine language JSR (Jump to SubRoutine) instruction, which is like a BASIC GOSUB, except instead of going to a line number, it jumps to an ad-

dress in memory. The first thing the LIST routine in ROM does is an indirect jump (JMP) through a vector in RAM. JMP is similar to GOTO. An indirect JMP is like answering a phone and getting a new address to jump to. The LIST vector occupies locations 774-775. The program never actually goes to location 774 for ML instructions—it just gets an address from 774 and jumps to that location in memory.

But we've POKEd a new number into the vector. The indirect jump doesn't enter the normal LIST routine. Instead, it ends up somewhere else in memory, in a place that contains an RTS (ReTurn from Subroutine), which is like the BASIC command RETURN.

The LIST command still works (sort of), but it does a GOSUB/JSR to someplace that does an indirect GOTO/JMP to a location that turns out to be a RETURN/RTS. The POKE changed the vector so when you typed LIST, you returned to where you started. The program didn't list. You've given the computer the runaround.

There are lots of vectors, including one called IMAIN at 770-771. IMAIN points to the MAIN routine (remember MAIN, which sits around waiting for the user to type something?). After you load a program, BASIC jumps through the IMAIN vector because it has to find out if you're going to type some new lines, RUN, LIST, or whatever. If you change IMAIN to point to your own machine language routine and save memory from 770 to wherever your program is (there's some free memory at 679-767), then you'll have a program that will automatically run when you load it. That's how some boot programs work. ■



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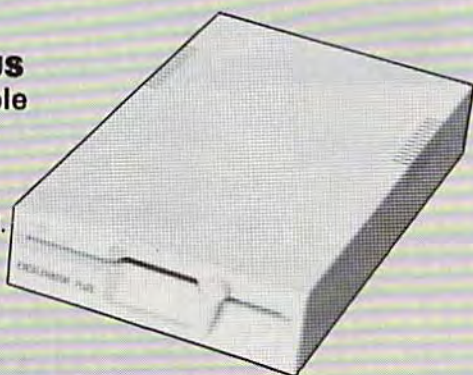
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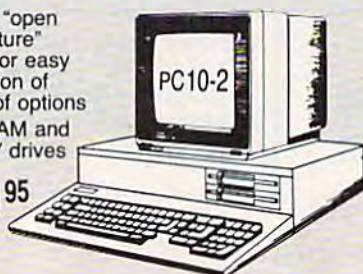
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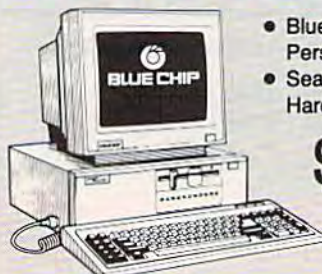


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Fred D'Ignazio  
Associate Editor

This is my inaugural GAZETTE column in my new town of Lansing, Michigan. I'm writing it in my hotel room on my computer. Outside my window, I can see tractor trailers, brilliantly lit by the late afternoon sun as they roar down the interstate. The room is quiet except for the clickety-click of my computer keys and the soft crooning of Bobby Goldsboro on the local "easy listening" radio station.

I'm alone in my room with my trusty cat Mowie. We're the advance scouts for the move. The rest of my family will be joining us in a few days. I feel very complete here in the room, just Mowie, my computer, and me. I don't even notice the lack of a robot.

A robot?

A few years ago in my GAZETTE columns I predicted that most computer companies would soon be manufacturing personal robots. I even wrote a book (*Working Robots*, Dutton, 1982) in which I foresaw the invention of robot "friends." So what happened? Where are all the robots? How come there isn't a robot friend here in my room with me and Mowie?

### A Stalled Revolution

I hate to admit it, but the robot revolution has stalled. Notice I don't say failed, just stalled. But the immediate result is the same. Personal robots remain an expensive curiosity—more the stuff of science fiction than of Sears.

Why? It's plain to see. All I have to do is look around me. I have just driven almost a thousand miles to this hotel room on the outskirts of Lansing, Michigan. Except for my little green duffle bag, the only two things I brought in my room are my computer and my cat. I brought the computer because it is

an indispensable tool and, I confess, I can't bear to be without it. I brought the kitty because she would have complained bitterly had I left her in the car and because I can't bear to be without her either.

I own over 20 personal robots. So why didn't I carry a robot with me and bring it into the room? Because the robot doesn't have a reason to be in the room. Unlike my computer, there is no robot on the market which qualifies as an "indispensable tool." And there is no robot around that could be a family pet and take the place of Mowie.

This is not to say robots haven't tried. During the late 1970s and early 1980s, robot manufacturers made robots which they claimed could become your playmate and your personal butler. But this claim was highly exaggerated if not completely false. I worked with many of these robots, and I ended up spending so much time programming them, debugging the programs, and guiding them around the house, it was more like caring for a mischievous toddler than having a butler or a friend.

### Lots Of Fun, But . . .

At one time we even ran our own robot "hotel." The guests in our hotel were hilarious, but they made our lives chaotic. They got stuck under the kitchen table. They spilled drinks. They fell down the stairs. They held conversations with the trash can. They chased after Mowie. They activated our burglar alarm when we came home from parties. They got lost underneath couches. They insulted our guests. And they were constantly underfoot—whirring, whizzing, clicking, and saying silly things like "Old McDonald had a robot. Ee-yi, ee-yi, oh!"

The robots that came the closest to *tool* or *pet* were the Hubot from Hubotics and the HEROjr

from Heath. Hubot didn't pretend to be a robotic handyman; Hubotics didn't claim that its robot could wash the dishes, take out the trash, or mow your lawn. Instead, Hubot concentrated on things a robot could do: It could be a portable entertainment, data processing, and communications center. Hubot had a TV in its belly along with a computer and videogame machine. You could have an optional telephone installed.

And HEROjr was cute! It toddled around happy as a lark, singing songs, and chatting with anything that crossed its path. If it got stuck (and it often did), it began moaning, "Help . . . Help . . ."

But neither robot took the country by storm. Neither was ever as successful as computers or cats. And, as I sit here pecking away on my computer and feeling my cat's tail curl softly around my foot, I think I know why. Neither robot crossed the fine, invisible line between *novelty* and *necessity*. Computers are slowly but surely gaining in popularity because people are finding they can do things better on their computers—things that *have to be done*. Cats have their own hook—their ability to love. Quite simply, we love them because they love us. They are loyal, they trust us, they depend on us—we can't help but love them.

So, here I sit in my hotel room with my computer at my fingertips and my cat at my feet. But no robot. I can't live without my cat or my computer, but as much as I like robots, I can live without them.

How about you? What would it take to make robots a necessary part of your life? Please write me and let me know.

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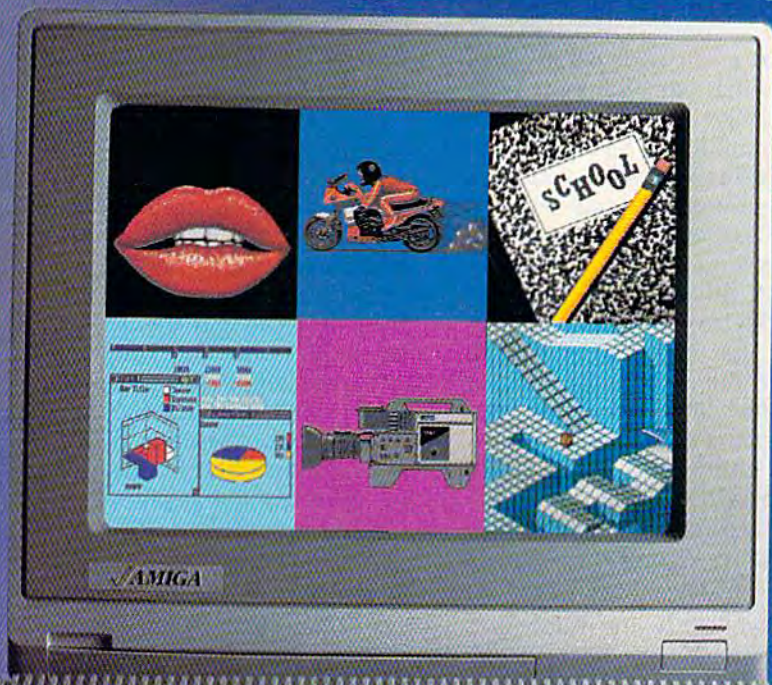
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*If you've discovered a clever time-saving technique or a brief but effective programming shortcut, send it to "Hints & Tips," c/o COMPUTE's Gazette. If we use it, we'll pay you \$35. We regret that, due to the volume of items submitted, we cannot reply individually to submissions.*

### Quick Line Delete

Joseph R. Charnetski

The 128, Plus/4, and 16 each have a DELETE command that makes it easy to do away with BASIC program lines that you no longer need. Unfortunately, BASIC 2.0 lacks this useful command. When you wish to delete a line on the 64, you must type the proper line number and press RETURN. Needless to say, deleting a large group of lines can be tedious. One solution is to use "MetaBASIC" or another programming aid that includes a DELETE command. But if you just want to delete a few lines, you might not want to load a utility.

One common solution is to write a one-line program to list lines to the screen, such as

```
FOR I=3000 TO 3200 STEP
10:PRINTI:NEXT
```

This will list 20 line numbers to the screen in the range 3000 to 3200. To delete the lines, just press RETURN on each number. If your program isn't numbered in increments of 10, you'll miss some lines, so you may have to change the step value.

Luckily, there's an easier way. First, type **POKE 774,0**. This POKE makes the LIST command list line numbers only. The contents of the line are still in memory, but only the line numbers print to the screen. Now, just list a range of lines.

```
LIST 3000-3200
```

Then press RETURN on each line you want to delete. When you want to return the LIST command to nor-

mal operation, type **POKE 774,26** or press RUN/STOP-RESTORE.

### VIC Speed For The 64

Geoff Larsen

The 1540 disk drive (which was designed for the VIC computer) was a faster drive than its offspring, the 1541. The difference in speed is, believe it or not, related to the screen sizes of the VIC and the 64. The VIC's smaller screen puts less of a demand on the system. (The VIC has a screen size of 22 characters across by 23 characters vertically, while the 64's screen is 40 by 25.) On the VIC, 4048 bytes of memory had to be read and displayed, but 8000 need to be read and displayed on the 64. The 64 can't keep up with the 1540 unless you turn off the screen.

If you are willing to turn off the screen, you can put the 1541 into 1540 mode with one simple disk drive command. This is especially useful from within a program that needs to read or write to disk. The following line blanks the screen and speeds up the serial bus:

```
POKE 53265,PEEK(53265)AND239:
OPEN15,8,15,"UI-":CLOSE15
```

And this line returns the screen and drive to normal:

```
POKE 53265,PEEK(53265)OR16:
OPEN15,8,15,"UI+":CLOSE15
```

This technique is most useful for reading and writing files from within a program. Be sure to warn the user that the screen will blank so that he or she doesn't think the computer has locked up.

### Smart Loaders

Dan Farnham

Adding a second disk drive can make you a more efficient programmer. But when you have two drives, it's all too easy to access the wrong one. This is especially a problem with loaders—programs that try to

load other programs. If I write a loader program that assumes the disk is in a certain drive, I often find that the loader is searching the wrong disk, resulting in a FILE NOT FOUND error.

The solution is to use memory location 186, which holds the device number of the most-recently-accessed device. (This memory location serves the same purpose on both the 64 and the 128.) For example, if you have a program which must perform a few POKES and then load in a machine language program, your loader might look like this:

```
10 REM POKES here
20 LOAD "FILENAME",PEEK(186),1
```

A recent example is the program "TurboSave 128" from the April 1987 issue of GAZETTE. I use this loader:

```
10 SCNLRL:PRINT:PRINT"BOOTING
TURBOSAVE 128"
20 BOOT"TURBOSAVE
128",U(PEEK(186)),B1
```

All programs  
listed in this  
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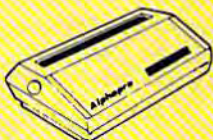
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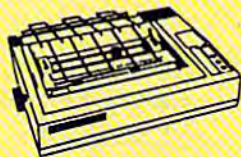
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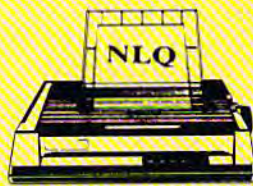
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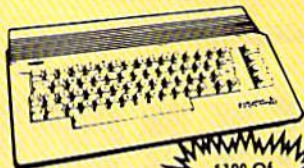
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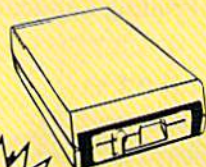
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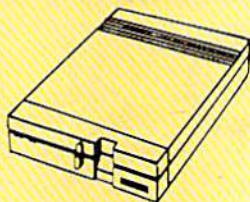
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James Host

*Almost everyone will appreciate this handy utility that freezes your computer's operation with the press of a key. You can use it to pause games or halt program listings. Versions for the Commodore 64 and 128.*

Whether you are playing a game or simply trying to read text that is speedily scrolling off the screen, pausing the computer's operation can be very useful.

"Power Pause" adds a software-driven pause button to your Commodore 64 or 128. Compatible with BASIC and many machine language programs, Power Pause allows you to freeze the computer's operation by depressing the SHIFT LOCK key and then pressing RESTORE. To resume regular program execution, simply release SHIFT LOCK by pressing it again.

In addition to adding a pause function, Power Pause allows you to set the screen's default text, background, and border colors. These colors are set up when you run Power Pause, and they are retained even after pressing RUN/STOP-RESTORE.

### Using The Program

After typing in the appropriate version (Program 1 is for the 64; Program 2 is for the 128), be sure to save a copy. To activate Power Pause, just type RUN. It takes a few seconds to POKE the machine language into memory. When finished, the message POWER PAUSE IS NOW ACTIVE appears on the screen. You can now load and run the program of your choice.

To pause a program, press the SHIFT LOCK key and then press RESTORE. Everything will freeze—graphics, sound, and text. To unfreeze the computer, just unlock the SHIFT LOCK key.

As noted, Power Pause allows you to set BASIC's default screen colors. To do this, you must change three DATA statements in the program. To set the border, background, and text colors, change the numbers found in lines 200, 220, and 240, respectively. These lines are clearly labeled with REMARK statements. The number entered must represent one of the standard Commodore colors, 0-15.

Additionally, for programmers experimenting with custom characters or the hi-res screen, Power Pause returns you to the normal text screen whenever a direct-mode command is entered or a SYNTAX ERROR occurs.

The 64 version of Power Pause occupies memory locations \$CF00-\$CFFF (52992-53247), and wedges into BASIC's operating system through several vectors located in page three. On the 128, Power Pause is stored in bank 0 at \$1B00-\$1BFF (6912-7167).

See program listings on page 96. ■

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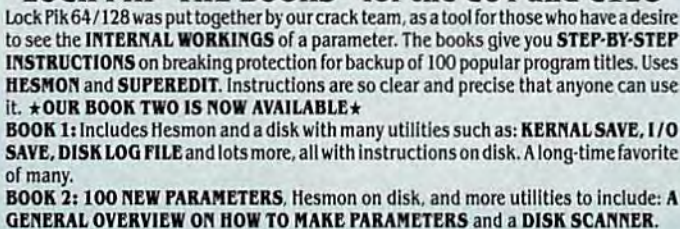
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## True 80-Column Preview For *SpeedScript*

Glen Mackinnon

*Add a fast 80-column preview option to SpeedScript 64 (versions 3.0 or higher). With a couple of keypresses, you can see exactly how your document looks prior to printing.*

Unless you use *SpeedScript* with a 40-column printer, getting a word processing file to look "just right" can mean a lot of wasted paper: The last word in a paragraph appears on a page by itself, one-page letters take up two pages, and seemingly organized columns of information come out jumbled. "Instant 80" provides an 80-column solution to this 40-column problem.

Instant 80 allows you to see, onscreen, precisely what will be printed on paper. Instant 80 merges with *SpeedScript*, creating a modified *SpeedScript* program with 80-column previewing capabilities. The only tradeoff for this enhancement is that it reduces *SpeedScript*'s text area by 1.5K, leaving you with 41K to work with. In real terms, this means that your total work space is reduced by slightly more than a page of text.

### Getting Started

Note that Instant 80 is not a stand-alone program. You must have a copy of *SpeedScript*, version 3.0 or higher.

Instant 80 is a 450-byte machine language program. Type it in using the "MLX" machine language entry program found elsewhere in this issue. When prompted for the starting and ending addresses, enter the following:

Starting address: 2500  
Ending address: 26C7

When you are finished typing, save it to tape or disk with the name INSTANT 80. To combine Instant 80 with *SpeedScript*, follow these instructions:

1. LOAD "SPEEDSCRIPT",8 (for disk) or LOAD "SPEEDSCRIPT" (for tape).
2. LOAD "INSTANT 80",8,1 (for disk) or LOAD "INSTANT 80",1,1 (for tape).
3. Type POKE 2062,0:POKE 2063,37.
4. SAVE "SPEEDSCRIPT/80",8 (for disk) or SAVE "SPEEDSCRIPT/80" (for tape).

You now have a copy of *SpeedScript* with Instant 80 permanently installed. To use this modified version, load and run SPEEDSCRIPT/80 as you would any BASIC program.

### Previewing In 80-Columns

To use Instant 80, press CTRL-SHIFT-P, followed by S. This is the command sequence to direct *SpeedScript*'s output to the screen. Instead of the usual 40-column output, Instant 80 provides a true 80-column view of your file. The text displayed is distinguishable on a normal color television,

better on a black-and-white television, and quite clear on a monitor such as the 1702.

To freeze the scrolling text, press SHIFT or SHIFT LOCK. Release the SHIFT or SHIFT LOCK key to continue 80-column output. After the entire document has listed to the screen, press any key to return to *SpeedScript*. If you wish to halt the listing sooner, press RUN/STOP. Note that pressing the RESTORE key while the document is listing to the screen will cause the program to crash.

### How It Works

Instant 80 uses the 64's high-resolution screen to generate 80-column text. Letters are created using 4 × 8-pixel bitmapped characters. This produces characters that are the same in height but half as wide as the 64's normal characters.

By default, Instant 80 produces brown characters on a gray screen. If you prefer different colors, you can modify the program. To change the colors, load SPEEDSCRIPT/80 and execute the following POKE before running the program:

POKE 9562, background + character \* 16

where background and character are the background and character colors (numbered 0-15), respectively. To make this change permanent, save your newly modified version of SPEEDSCRIPT/80 to tape or disk with a new name before running the program.

See program listing on page 97. ■



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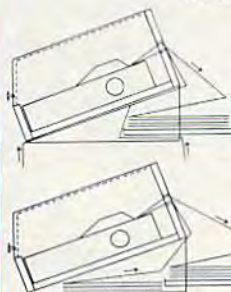
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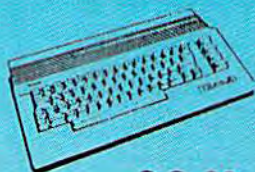
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# Customize Your 128's CP/M Keyboard

James Adams

*If you've ever wished you could put one of your computer's keys where another is or have one key do the job of a half-dozen, then KEYFIG, the keyboard redefinition program that comes on the 128's CP/M disk, is just what you're looking for. With KEYFIG, you can personalize your keyboard just the way you want it.*

Imagine being able to have any key on your 128's CP/M keyboard return any value you want. You could assign a key either a single character—put the ESCape key's value at F1, for example—or a string—have @ print your name, address, and phone number any time you press it. KEYFIG, the keyboard reconfiguration utility included on the 128's CP/M disk, can work this bit of magic for you.

## Meet KEYFIG

KEYFIG, or the C128 Soft Keyboard Program, is a menu-driven utility that allows you to redefine most of the computer's keys. (There are a few keys that KEYFIG will not allow you to change: SHIFT, SHIFT LOCK, CONTROL, Commodore, CAPS LOCK, and the 40/80 DISPLAY key.)

Let's walk through the modification of some function keys. We'll use the up and down arrows (on the top row of the keyboard) and the RETURN key (not ENTER—the two have different values in KEYFIG) to make menu selections.

Suppose we wanted to modify the function key F1 to return the sequence DIR and F2 to give us the more complete directory listing using DIR[FULL,USER=ALL].

DIR is a built-in, or resident, directory command that will list all the files on the current drive and

user area. It is always available and requires no additional program file on disk to run. The use of the [FULL, USER=ALL] options require that DIR.COM be on the disk in the current drive. It will list each file on the disk in any user area and also display time, date, and read-write protection information.

Before using KEYFIG, you'll need to load the CP/M operating system from disk. You can do this by placing a CP/M system disk in the drive and either turning the computer on or typing BOOT from BASIC 7.0. When you see the A> system prompt, simply type KEYFIG, and you're ready to begin.

The first question that KEYFIG asks is "Do you want help?" The help information is called from the file KEYFIG.HLP on the system disk. The only problem with these instructions is that they can be accessed only when KEYFIG is first run. If you answer N to the prompt, you will not be able to return to the instructions later. If you get stuck and need help in the middle of a session, you will have to exit KEYFIG with CONTROL-C and start again.

There is a solution to this problem, however. You can print the help file and use it as a reference until you become familiar with KEYFIG. Do this by pressing CONTROL-P to send everything that ap-

pears on the screen to the printer. Next, enter TYPE KEYFIG.HLP at the A> prompt. The file will take four, 40-column pages to print.

After the instructions, KEYFIG needs to know where you want to begin your work: Do you want to modify the default definitions, the definitions on the CP/M boot disk, or the current definitions (those currently in memory)? If this is the first time you have used KEYFIG, all three of these areas will contain the same key definitions and assignments. If you have modified several versions of CP/M+, then each location may contain different sets of configurations. Press the highlighted choice to select the default definitions.

KEYFIG now gives you a menu of three choices:

*Edit a Key Definition  
Set up Logical/Physical Colors  
Exit and Save your Work File*

Since we want to edit a key and this option is already highlighted, press RETURN to go to the next menu. Initially, half of this menu is blank since no key has been selected. Pressing any key will fill in the rest of the menu.

## Modifying A Key

Each key returns four possible values: the normal (unshifted) value, the SHIFTed value (the value returned when the key is pressed along with the SHIFT key), the CONTROL value, and the Commodore value.

At first, it may seem that you cannot modify the RETURN key or the up- and down-arrow keys on the top row of the keyboard. We are using these for selecting and exe-

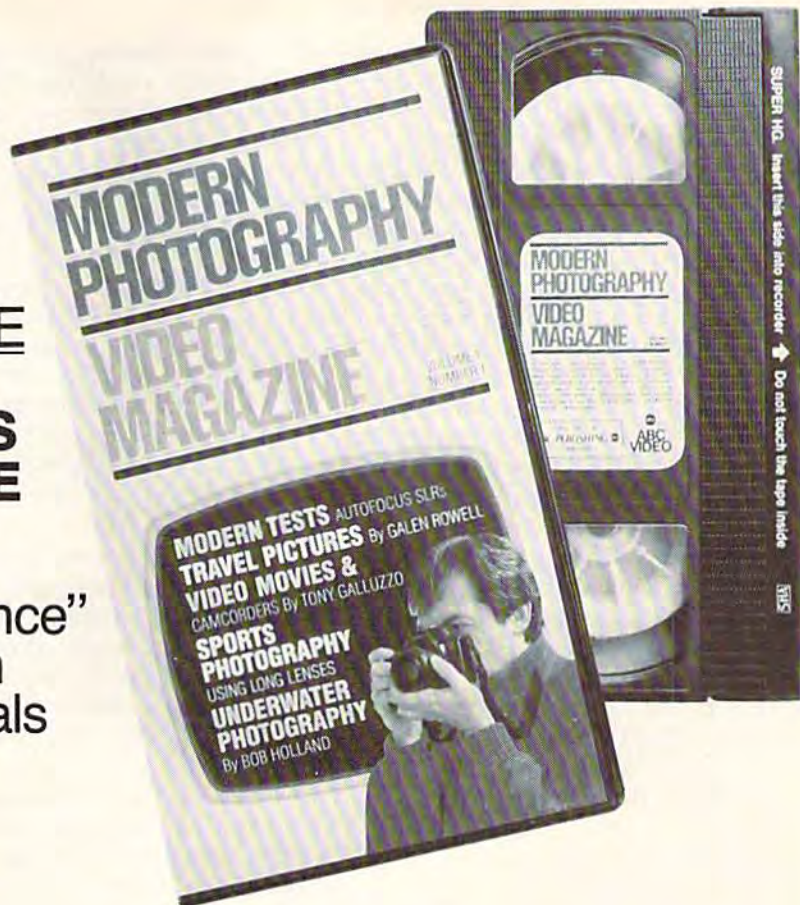


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cutting the menu choices. They can, however, be modified by simultaneously pressing the CONTROL key and the key to be changed.

The default CAPS LOCK key has no apparent effect on the CP/M keyboard. It is possible to go into the CAPS LOCK mode by pressing the Commodore key. This will cause any letter key to be returned as a capital while punctuation and numbers remain unchanged. This mode remains in effect until the Commodore key is pressed again. This means that the Commodore key values are not practical to redefine.

In our example, we want to modify the F1 key, so press F1. The menu shows that this key is undefined—it returns "F1" when pressed. The highlight is on the first choice, the normal, unshifted F1. Press RETURN to continue.

The next menu will allow you to modify the selected key in five ways:

*Assign a string*  
*Assign a new character*  
*Assign a color*  
*Assign a hex value*  
*Assign a special function*

For our example, we need the first choice.

Now, KEYFIG gives us two screens of key definitions to choose from. Some of these are, as yet, undefined. You may choose any selection from this library. KEYFIG will allow you to store up to 31 definitions in any CP/M+ file. You may define, for instance, line 10 as the string "dog" and assign that definition to the ESCape key. Keep in mind that if you later select line 10 from the library, redefine it as "cat," and assign it to F7, the ESCape key will also be assigned "cat." The original definition of the ESCape key will be lost.

Notice that the first screen includes the function keys to modify. F1 is in line 00, and we could select this choice to modify. But there is an easier way to assign DIR to F1.

As you may have discovered, pressing F3 will give you the DIR command followed by a return. It's often convenient to include a return as the last character in a command string so the string will execute automatically. (If you've used the 128's KEY command you may be familiar with the idea.) But, as

you'll learn shortly, pressing RETURN while editing a string in KEYFIG tells the program you've finished with that string. So how can you place a return in a command string? KEYFIG has a solution to this problem. When you want a return in a definition, simply press CONTROL-M. This appears as ^M in the KEYFIG library. (Any control codes will use the ^ character to indicate the CONTROL key.) Now notice that DIR^M is in line 02 of the library. All we need to do is assign DIR^M to F1. Use the down arrow to highlight line 02, and press RETURN.

Now the real work is ready to be done. The next menu will allow you to either accept or modify the definition you have just chosen. Remember that if you modify a definition here, it will automatically change in the library list in the previous menu.

Since we want to accept the current DIR^M definition, press RETURN—we're back at the key selection menu. Our new key assignment is shown in the first line.

## A Full Directory

Now, let's move on to the second part of our example. Remember, we want to be able to see the whole directory including time and date stamping for all user areas on the current disk drive at the touch of the F2 key.

The F1 key should still be on the key selection menu. Notice that both the SHIFTed value and the CONTROL value currently contain "F2". Move the highlight down to the SHIFTed value line (line 3) and press RETURN.

As in our first example, we will select the *Assign a string* option from the next menu. This brings us to the 31-option library. There is no ready-made definition to plug in this time, so highlight line 01, "F2", and press RETURN.

Now, type in the command to be assigned to the F2 key:

```
DIR[FULL,USER=ALL]^M
```

To accept the new definition, press RETURN and, again, we're back at the key selection menu. This time, our new key assignment is shown in the SHIFTed line and in the CONTROL line. The new definition has been assigned to both lo-

cations because both keys originally used string 01 from the library. This was not the case in the first part of our example, which used the F1 key since the first two values functioned independently. Changing the normal value did not affect the Commodore key value.

Even though only 11 characters will be printed on the menu, the entire string is held in memory and will be executed properly. To check this, move through the menus to the library section, and you will see the entire definition in line 01.

When you have finished modifying keys, select the *Exit and Save your Work File* option from the beginning menu. You must save your work if you wish to use your new definitions.

If you will need your modifications only for the current work session, or if you want to test your redefinitions before you save them, you can save your work as the current definitions.

KEYFIG will also allow you to save your work on the disk as part of the CP/M+ file. In this way, your new definitions will be loaded each time you boot the computer in CP/M mode. (If you exit KEYFIG and save your workfile as the current definitions, you can still save these to the boot disk by reentering KEYFIG later, selecting the current definitions as your workfile, and saving this workfile on the boot disk.) If you keep a customized copy of CP/M+ on each applications disk (perhaps with a special PROFILE.SUB file for automatically executing a series of commands), each word processor, spreadsheet, database, or other program can have its own keyboard assignments and specialized function keys.

By following the menus, it is possible to reconfigure your CP/M keyboard to better serve your particular needs. KEYFIG gives you a flexibility unknown in the 128 or 64 modes. Experiment and discover what works best for you.

## Some Ideas

Here are a few other customizing ideas you might want to try.

- The ALT key could be programmed to alternate disk drives. The normal, CP/M default drive is A:. If you need to switch to drive B:,



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press ALT, which can be defined as B:M in the normal position and A:M in the shifted position (for changing back to the default drive).

- If you use a program such as *WordStar* for word processing or *NSWP* (New SWeeP) for file management, you may want to define your ALT key as LB:M and LA:M. Both of these programs use L to initiate a change in the logged disk drive. You may wish to keep the LB:M and LA:M sequence only on your word processing disk and the more generic B:M and A:M on your CP/M system disk.

- The HELP key could be defined as HELP:M. This would automatically execute the file *HELP.COM* from the A> prompt (if you have *HELP.COM* and *HELP.HLP* on the disk in drive A:).

- If you regularly use a program which requires TABbing to a position other than the five spaces preset by the TAB key, you could define TAB as ^I for a ten-space TAB or ^II for a 15-space TAB, or you could simply insert the number of blank spaces you need for your application.

- The cursor keys in the lower right of the keyboard may need to be redefined for some programs. The default values are ^X (CURSOR DOWN), ^W (CURSOR UP), ^F (CURSOR RIGHT), and ^A (CURSOR LEFT). Many CP/M programs use ^X, ^E, ^D, and ^S for these cursor movements.

- The RUN/STOP key is unused in the CP/M mode except to toggle the READ/WRITE display in the lower right corner of the screen. This is a good place to add your own key definitions.

- You can redefine your numeric keypad as a cursor control area to use in word processing and spreadsheet programs. The values 8, 2, 6, and 4 can be redefined as cursor up, down, right, and left. The remaining numbers—9, 3, 7, and 1—could be used for other functions like page up, page down, go to top of file, and go to end of file.

- If you use a different computer that has an IBM Selectric keyboard layout, you can reconfigure your 128 to emulate that computer's keyboard. ☐

# User Group Update

Caroline D. Hanlon

This list includes updated entries to our annual "Guide to Commodore User Groups," which last appeared in the May and June 1987 issues.

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 are writing.

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

COMPUTE! Publications  
P.O. Box 5406  
Greensboro, NC 27403  
Attn: Commodore User Groups

## User Group Notes

The National Association of Blind and Visually Impaired Computer Users (NABVICU) has organized a user group. For more information, write the **International Blind Users Group (I-BUG)**, P.O. Box 1352, Roseville, CA 95661-1352.

**AJ's User Group** in Brampton, Ontario, Canada has disbanded.

The **Commodore 64/128 User Group** in Hot Springs, AR, has changed its name and address to **Commodore User Group**, Rt. 9, Box 354-A, Hot Springs, AR 71913.

## New Listings

### CALIFORNIA

**Southern California Commodore Users Group**, 11018 E. Rosencrans Ave., Suite 203, Norwalk, CA 90805

### COLORADO

**Commodore User Group**, P.O. Box 272, Niwot, CO 80544

### DELAWARE

**Special Interest Groups NULL (S\*IG\*NULL)**, 2438 Owen Dr., Wilmington, DE 19808

### FLORIDA

**Lake/Sumter Commodore Users Group**, P.O. Box 416, Leesburg, FL 32749

### MAINE

**Northern Maine Commodore User's Group**, P.O. Box 493, Loring AFB, ME 04751

### MARYLAND

**National Bureau of Standards Commodore Users Group**, 8 Cross Ridge Ct., Germantown, MD 20874

### MINNESOTA

**Saint Paul MCUA**, 2418 E. South Ave., No. St. Paul, MN 55109

**3M Personal Computing Club, Commodore SIG**, 3M Center Bldg., 235-3E-08, St. Paul, MN 55144

### MONTANA

**Commodore Programs Inc.**, 740 Eastside Rd., Deer Lodge, MT 59722 (This is a mail-in group only.)

### NEW JERSEY

**Data Exchange Beneficial Users Group (PCUG)**, 213 Burns Way, Fanwood, NJ 07023

### OKLAHOMA

**Tulsa Area Commodore Users Group**, 2851 E. 21st Pl., Tulsa, OK 74114

### VIRGINIA

**Portsmouth Commodore Users Group (PCUG)**, P.O. Box 6561, Portsmouth, VA 23703

### WISCONSIN

**715 Commodore Users Group**, 1052 S. Fork Dr., River Falls, WI 54022

## Outside the U.S.

### BRAZIL

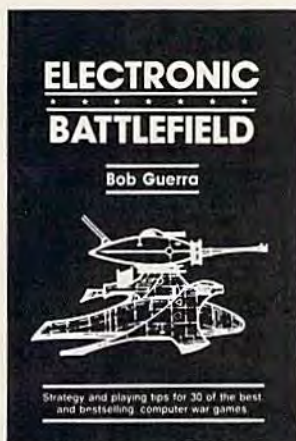
**Commodore Grupos de Usuarios**, Carlos A. Silva, Rua Gen. Roca 176, Apt. 501, Rio de Janeiro, RJ 20521, Brazil

**Commodore Users Group Porto Alegre**, Ferreira de Abreu, 91/3, Porto Alegre, RS, 90040, Brazil ☐



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Bob Guerra

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Note: The books do not include any of the software products mentioned.

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# Grafnastics

Robert Bixby

*If you want to fine-tune your graphics for world-class performance, then "Grafnastics" may be just what you need. With these programs you can make your graphics images do somersaults. For the 64 with disk drive.*

Have you ever wished you could take one of your hi-res graphics images and mirror one side to the other, create a deep perspective, reverse the right and left sides, or rotate the image 180 degrees? If you have, then the programs accompanying this article are for you. "Grafnastics" (Program 1) is a set of machine language subroutines that give you unusual creative control over your graphics. "Sample Sketcher" (Program 2) is a short BASIC program that demonstrates how to use Grafnastics in your own programs.

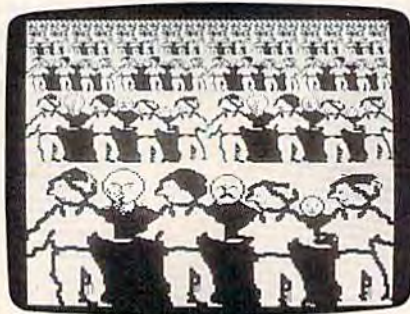
Because Grafnastics (Program 1) is written entirely in machine language, it must be entered using "MLX," the machine language entry program found elsewhere in this issue. Be sure to read the instructions for using MLX before you begin entering data. When you run MLX, you'll be asked for a starting and an ending address for the data you'll be entering. The correct values for Grafnastics are as follows:

Starting address: C000  
Ending address: C6D7

After you've entered all the data, be sure to save a copy to disk with the name GRAFNASTICS before leaving MLX.

## Using Grafnastics

To get started, load Grafnastics with the statement LOAD "GRAFNASTICS",8,1, and then type



*The Perspective option was used to quickly multiply a single row of figures.*

NEW. Grafnastics is now resident and ready for you to use. To access the Grafnastics subroutines, type SYS 49152,*n*, where *n* is the number of the routine you want to use. The routines—values for *n*—are as follows:

0 provides a help screen which lists the values for *n* and offers a brief description of each routine.

1 creates perspective. Grafnastics takes the image on the bottom half of the screen and creates a seemingly infinite series of copies above it. Each succeeding row contains double the number of images from the previous row, drawn half the size of the previous row's. For example, if the bottom of the screen has a drawing of four soldiers, the next row will have eight soldiers—half the size of the first row's; the third row will have sixteen sol-

diers—half the size of the second row's, and so on.

2 mirrors the left half of the screen onto the right half.

3 mirrors the right half of the screen onto the left half.

4 mirrors the top of the screen to the bottom.

5 mirrors the bottom half of the screen to the top.

6 rotates the picture 180 degrees.

7 flips the picture so right and left are reversed. Note that flipping horizontally and rotating is the same as flipping vertically. For this reason, there's no need for a separate vertical-flipping routine.

8 switches to the high-resolution screen.

9 switches to the text screen.

10 recalls a screen that has been saved with the archive routine (discussed below). Each time a routine is called, Grafnastics saves the current screen before it is altered. If you don't like your changes, use this routine to go back to your previous drawing.

11 activates the archive routine that saves a copy of the screen.

12 clears the screen.

## Drawing A Pixel

The Grafnastics routines operate on the high-resolution screen at memory location 24576. (This is the screen used by *Koala Painter*, *Doodle*, and many other 64 graphics routines.) All Grafnastics screens are in black-and-white. The hi-res screen is divided into 320 horizontal pixels and 200 vertical pixels.



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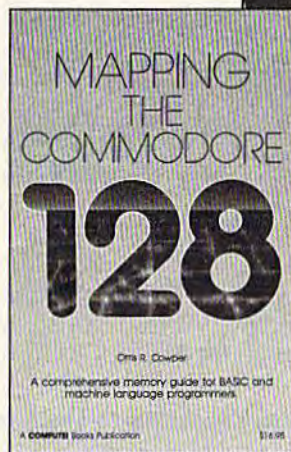
Todd Helmarck and Patrick Parrish

ISBN 0-87455-085-8

592 pages

This collection of machine language routines is a must for every Commodore 128 and 64 machine language programmer. Scores of these routines can simply be inserted into your own programs. Included is the assembly language code with easy-to-understand documentation and instructions. *There is a companion disk available for \$12.95 that includes all the programs in the book (858BDSK).*

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You must POKE values into memory locations corresponding to these pixels (0-319 and 0-199), but you can't POKE a number larger than 255. To get around this limitation, Grafastics divides the horizontal screen into two regions. The first (region 0, the left four-fifths of the hi-res screen) comprises the initial 256 horizontal locations, while the second (region 1, the right one-fifth of the screen) comprises the remaining 64 ( $256 + 64 = 320$  horizontal pixels).

Following is a list of the memory locations Grafastics uses to draw on the screen, and the values for each.

- 49716: The region number (0 or 1).
- 49715: The horizontal location of the pixel (0-255 or 0-63).
- 49718: The vertical location of the pixel (0-199).
- 49711: One of three values—1 turns the pixel on, 2 turns it off, and 0 peeks to see whether a pixel is on or off.

After putting the proper values in these locations, use SYS 49483 to

draw, erase, or check the pixel's status. Let's plot, PEEK, erase, and PEEK again, the pixel in the center of the screen.

First, let's plot the point. Enter and execute the following statement in direct mode:

```
POKE 49716,0:POKE 49715,160:POKE
49718,100:POKE 49711,1:SYS 49483
```

That plots the center pixel. But is it really plotted? Let's check.

```
POKE 49716,0:POKE 49715,160:POKE
49718,100:POKE 49711,0:SYS 49483
```

Now type

```
PRINT PEEK(2)
```

If the PEEK statement returns a nonzero value, the pixel is plotted. To erase a pixel, type

```
POKE 49716,0:POKE 49715,160:POKE
49718,100:POKE 49711,2:SYS 49483
```


You have erased your pixel. To make sure, check it just the way you did before. Now the value should be 0, indicating your pixel is gone.

### Sample Sketcher

To make drawing with Grafastics (Program 1) easy, you can use the BASIC program Sample Sketcher

(Program 2). First, type it in and save a copy. Next, load it and type RUN. Sample Sketcher loads GRAFNASTICS and then displays the main menu. Following is a summary of Sample Sketcher's commands:

M	Display the menu.
O	Peek screen locations.
1	Draw on the hi-res screen with the joystick.
2	Erase using the joystick.
H	Go to the hi-res screen.
P	Perspective (see description in article, above).
R	Rotate the screen.
T	Go to the text screen.
U	Undo (recall a screen from archive).
I	Invert the screen.
S	Save a screen.
L	Load a screen.
C	Clear the screen.
Cursor Left	Mirror the screen right to left.
Cursor Right	Mirror the screen left to right.
Cursor Down	Mirror the screen top to bottom.
Cursor Up	Mirror the screen bottom to top.

See program listings on page 97. 



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# Disk Rapid Transit

Ken Turcotte

*Easily the fastest file copier we've ever published, "Disk Rapid Transit" copies any file or group of files—BASIC or machine language. For the 64 with either one or two disk drives.*

What's the easiest and fastest way to copy files from one disk to another? The jury's still out, but "Disk Rapid Transit" is right up there among the leaders, surpassing even many commercial file copiers.

Disk Rapid Transit works with one or two 1541 or 1571 disk drives. It can copy a 130-block file in 35 seconds—that's about five times the speed of the 1541 using the built in DOS routines. And it's easy to use—just select the files you want to copy and follow the prompts. Disk Rapid Transit can also make multiple copies—read the file once and then save it to as many disks as you like.

[Ed. note: Disk Rapid Transit is intended for copying only nonprotected disks. Certain protection schemes contain information that could send the program into an infinite loop.]

## Typing It In

Disk Rapid Transit is written in machine language, so you'll need to type it in using "MLX," the machine language entry program found elsewhere in this issue. When MLX asks for starting and ending addresses, respond with the following values:

Starting address: 0801  
Ending address: 1988

Be sure to save a copy to disk before leaving MLX.

Although the program is written in machine language, it loads and runs like a BASIC program. When you're ready to use Disk Rapid Transit, load the program and type RUN. The first thing

you'll see is the main menu. From this menu, you can toggle the number of the current drive, view the directory of the current drive, perform a software drive number change, exit to BASIC, or begin the copying procedure.

## Using Two Drives

If you are using two drives to make copies, one should be designated drive 8; the other, drive 9. When you buy a disk drive, it is normally numbered as drive 8. A 1571 drive can be set to drive 9 by flipping a switch on the rear of the drive (see your drive manual for details). A 1541 drive, on the other hand, requires a hardware modification in order to permanently renumber the drive. As an alternative, Disk Rapid Transit allows you to change the drive number via software. Select R to renumber the drive. You will be instructed to turn off all drives except the one you wish to renumber and then press RETURN to continue. When prompted, turn your other drive(s) back on.

Disk Rapid Transit defaults to drive number 8. This is the current drive, the drive from which you will copy files. Press T to change the current drive to device 9. Press T again to toggle it back to 8.

To view the directory of the current drive, type \$.

## Easy To Use

If you own two disk drives and you're going to be copying several files from the same disk, it's best to use both of them to eliminate the

need for disk swapping.

When you're ready to copy files, select 1 for a one-drive copy or 2 for a two-drive copy. The screen clears and then displays a new menu at the bottom. At the top of the screen, above a divider, is a list of the files on the disk. If there are more than 16 files, you can step through the pages with the + and - keys. If you wish to return to the main menu, press A.

Use the cursor keys to move the cursor up and down the screen. Press the space bar to select the files that you want to copy. Each file is highlighted as you select it.

If you wish to copy all the files on a disk, make sure that no files are already highlighted and press f1. This is much simpler than highlighting each file individually. If you want to copy all but a few files from the disk, highlight just the ones you don't want and then press f1. Pressing f1 actually changes the state of all the files (from highlighted to unhighlighted or vice versa).

After you've selected the files you wish to copy, press C (for Copy) or M (for Multiple copies), depending on whether or not you wish to make more than one copy of each file. If you are using two drives and you press C, all the files will be copied. If you select multiple copies, as each file is copied, you will be prompted to copy the file again or go on to the next file. Disk Rapid Transit will take you through the copying procedure. Be sure to follow all the instructions carefully. If you're copying files to a blank disk, be sure that the disk has been formatted.

See program listing on page 103. ☐



# Dynamic Screen

André Delisle

*Here are two creative utilities that allow you to animate text on your screen—game instructions, menus, and help files are just three examples. With these programs, you can create moving, colorful screens and display them in your own programs. For the 128, 64, Plus/4, and 16. A disk drive is required.*

Have you ever wished there was a way to make your information screens more eye-catching and interesting? It's often difficult to be creative with menus and help screens, but the two BASIC programs accompanying this article give you just the tools you need. With "Dynamic Screen" (Program 1) you can create menus, help screens, title screens, and all kinds of instructions that move and change color. "Dynamic Screen Reader" (Program 2) makes it easy to display these animated screens in your own programs.

To get started with Dynamic Screen (Program 1), simply type it in and save a copy. Be sure to use "The Automatic Proofreader" included elsewhere in this issue to prevent typing mistakes. When you run Dynamic Screen, the main menu will present you with four choices: *Edit screen*, *Read screen*, *Directory*, and *Exit*. To make a selection, move through the options using your cursor keys. Press RETURN when the option you want is highlighted. Let's go through the steps to edit and read a screen.

## Creating A Screen

To create a screen, choose the *Edit screen* option from the menu. The program will ask you for a name for your screen. If a screen already has the same name, it will be erased, so be sure to use a new name or the name of an old screen you don't

mind erasing. After typing in a name, you'll be presented with a blank screen. This is your canvas. Anything you type—including cursor movement keys, color changes, and so on—will be recorded by Dynamic Screen so the screen can be displayed later. Dynamic Screen disables the INST/DEL key, so to erase, move the cursor to the character you want to rub out and press the space bar. It's the ability to erase that gives Dynamic Screen its power to animate. Pressing RETURN while in *Edit screen* tells the program you're through designing the screen, so be sure not to press it until you're finished.

Let's create a simple animated screen. First, just type your name. Now, move the cursor back over your name to the first letter. Press the space bar to erase the first letter. Then type your name again, over the characters remaining on the screen from the first time you typed it. This time your name should be one space to the right of its original position. Move the cursor back to the first letter and repeat the process, erasing the first letter and typing your name one space further to the right each time. Try changing colors and using reverse video. You may notice that you can type in Dynamic Screen's border area and even scroll the border off the screen. This will be recorded just as you type it, so be very attentive as you create.

When you're through, press RETURN. Now select *Read screen* from the menu. When prompted for a filename, type the name you used for your screen in *Edit screen* mode. Now sit back and enjoy the show. You can use *Read screen* to view any screen you've created with Dynamic Screen.

The *Directory* option gives you a list of files on a disk, with a slight twist. Screens are stored as SEQ files, so *Directory* places a red arrow to the right of each SEQ filename. Screen filenames have another unique identifying trait. Dynamic Screen inserts a £ character in front of the name of any file saved from within Dynamic Screen. The red arrows and the £ character at the beginning of each filename make your screen files easy to spot in directory listings. When you finish viewing the directory, press RETURN to go back to the main menu.

When you're ready to leave Dynamic Screen, the last menu option, *Exit*, returns you to BASIC.

## Programming With Dynamic Screen Reader

If you want to incorporate dynamic screens into your own programs, you can use Dynamic Screen Reader (Program 2) as a subroutine. To begin, type it in and save a copy to disk. To prepare the subroutine for use, all you need to do is insert the filename of the screen (created by Program 1) you want to display. Replace the name DEMO in line 80 of Dynamic Screen Reader (Program 2) with the name of the screen you want to display. Now you're ready to call the subroutine and read a screen.

See program listings on page 102. ■



# PrintScreen

James Host

*This is one of the most full-featured screen dumps we've ever seen—it lets you send your favorite screens to your printer—including those with hi-res graphics, sprites, or redefined character graphics. For the Commodore 64 and most printers.*

With all the flexibility of the 64's graphics, sooner or later, you'll find yourself wishing that you could send everything on your screen to your printer. Perhaps the most common way to do this is to use a BASIC subroutine similar to this one:

```
910 PRINT "{HOME}";
920 OPEN 3,3,3
930 OPEN 4,4,0
940 FOR I=0 TO 999
950 GET#3,A$
960 PRINT#4,A$;
970 NEXT I
980 PRINT#4
990 CLOSE 4
1000 CLOSE 3
1010 RETURN
```

This method has a few drawbacks. First, it works only with BASIC programs. Also, if your program uses redefined characters, they will show up on the printer as standard characters. And finally, any sprites that you might have on the screen won't appear on the screen dump.

"PrintScreen" solves these problems, printing just about any screen to your printer. It works with custom character graphics, sprites, hi-res screens, and even extended color background mode.

## Typing It In

Program 1, PrintScreen, is written entirely in machine language, so you'll need to enter it with "MLX," the machine language entry program found elsewhere in this issue. When MLX requests starting and ending addresses, respond with these values:

Starting address: 0801  
Ending address: 0F30

Be sure to save a copy of PrintScreen to disk or tape before exiting MLX.

Program 2, "Printer Changer," is written in BASIC. It must be typed carefully, so be sure to use "The Automatic Proofreader" when you enter the program. Printer Changer is used to customize PrintScreen to work with your printer.

PrintScreen is easy to use: Just load it and type RUN. PrintScreen installs itself in memory. Next, load and run the program that creates the screen you want to print. When the screen is just how you want it, hold down the Commodore logo key and tap RESTORE. The screen freezes. In a few moments, your screen will begin printing. (Note: The sprites will disappear from the screen during the screen dump, but they will be printed.) After the screen dump finishes, your program will continue running where it left off.

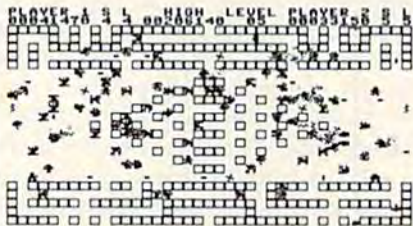
## Customizing The Program

If PrintScreen does not work correctly with your printer, you'll need to use Program 2, Printer Changer, to customize the program. First, load and run Printer Changer. Be sure you have your printer and interface manuals handy to answer the questions asked by the program.

Answer the prompts carefully. Some of the printer commands that you must supply will consist of more than one number. For these, the Printer Changer will print several question marks, one at a time. Type a single number at each question mark. When you've finished

entering all the numbers, press RETURN by itself at the next question-mark prompt.

After all the printer commands have been entered, Printer Changer will instruct you to load and run PrintScreen. Do so, and then save the altered program to disk or tape. If your printer supports several graphics densities, you may want to make several customized screen-dump programs.



*This screen dump, from the machine-language game "Crossroads" (elsewhere in this issue), includes sprites and redefined character graphics.*

## Nearly Foolproof

PrintScreen is nearly foolproof. It works with most BASIC and machine language programs. RUN/STOP-RESTORE does not disable the program. To disable it, you must turn off your computer or type SYS 64738.

The program uses memory locations \$CF00-\$CFFF and the RAM beneath the I/O block and the Kernal ROM. As long as these areas of memory are not used by the program you load in, PrintScreen should work. One exception: If the program relocates the screen to memory above 49151, the dump won't be accurate.

Printing a screen takes all of the computer's attention—so don't press Commodore-RESTORE while the computer is communicating with a disk drive or modem.

See program listings on page 98. ■



# COMPUTE!'s Gazette

## Author's Guide

Here are some suggestions which serve to improve the speed and accuracy of publication for prospective authors. COMPUTE!'s GAZETTE is primarily interested in new and timely articles on the Commodore 128, 64, Plus/4, and 16. We are much more concerned with the content of an article than with its style, but articles should as be clear and well-explained as possible.

The guidelines below will permit your good ideas and programs to be more easily edited and published:

1. The upper left corner of the first page should contain your name, address, telephone number, and the date of submission.

2. The following information should appear in the upper right corner of the first page: If your article is specifically directed to one model of computer, please state the model name. In addition, *please indicate the memory requirements of programs.*

3. The underlined title of the article should be placed about  $\frac{2}{3}$  of the way down the first page.

4. Following pages should be typed normally, except that in the upper right corner there should be an abbreviation of the title, your last name, and the page number—for example: Memory Map/Smith/2.

5. All lines within the text of the article must be double- or triple-spaced. A one-inch margin should be left at the right, left, top, and bottom of each page. No words should be divided at the ends of lines. And please do not right-justify. Leave the lines ragged.

6. Standard typing on computer paper should be used (no erasable, onionskin, or other thin paper), and typing should be on one side of the paper only (upper- and lowercase).

7. If you are submitting more than one article, send each one in a separate mailer with its own tape or disk.

8. Short programs (under 20 lines) can easily be included within the text. Longer programs should be separate listings. *It is essential that we have a copy of the program, recorded twice, on a tape or disk.* If your article was written with a word processor, we request that you include a copy of the text file on the tape or disk. If you include a copy of your article on disk, please save the article as plain text, without any special formatting characters or control codes. Most word processors provide an option for saving a document as plain ASCII text or in unformatted form. Please use high-quality 10- or 30-minute tapes with the program recorded on both sides. The tape or disk should be labeled with your name and the title of the article. Tapes are fairly sturdy, but disks need to be enclosed within plastic or cardboard mailers (available at

photography, stationery, or computer supply stores). If possible, programs written in machine language or a compiled language should include source code (or an annotated disassembly if the program was written with a machine language monitor).

9. A good general rule is to spell out the numbers zero through ten in your article and write higher numbers as numerals (1024). The exceptions to this are: Figure 5, Table 3, TAB(4), and so on. Within ordinary text, however, the zero through ten should appear as words, not numbers. Also, symbols and abbreviations should not be used within text: Use *and* (not &), *reference* (not ref.), *through* (not thru).

10. For greater clarity, use all capitals when referring to keys (RETURN, CTRL, SHIFT), BASIC words (LIST, RND, GOTO), and the language BASIC. Headlines and subheads should, however, be initial caps only, and emphasized words are not capitalized. If you wish to emphasize, underline the word; then it will be italicized during typesetting.

11. Articles can be of any length—from a single-line routine to a multiple-issue series. The average article is about four to eight double-spaced, typed pages.

12. We do not consider articles which are submitted simultaneously to other publishers. If you wish to send an article to another magazine for consideration, please do not submit it to us.

13. COMPUTE!'s GAZETTE pays between \$70 and \$800 for published articles. In general, the rate reflects the length and quality of the article. Payment is made upon acceptance. Following submission (to Editorial Department, COMPUTE!'s GAZETTE, P.O. Box 5406, Greensboro, NC 27403), it will take from four to eight weeks for us to reply. If your work is accepted, you will be notified by a letter which will include a contract for you to sign and return. *Rejected manuscripts are returned to authors who enclose a self-addressed, stamped envelope.*

14. If your article is accepted and you subsequently make improvements to the program, please submit an entirely new tape or disk and a new copy of the article reflecting the update. We cannot easily make revisions to programs and articles. It is necessary that you send the revised version as if it were a new submission entirely, but be sure to indicate that your submission is a revised version by writing *Revision* on the envelope and the article.

15. COMPUTE!'s GAZETTE does not accept unsolicited product reviews.



## BEFORE TYPING . . .

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

# GeoTrash Restorer

Article on page 52.

```
KC 10 REM COPYRIGHT 1987 COMPU
TEI PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
PX 20 PRINT "{CLR}{43}CHR$(14):
POKE53280,0:POKE53281,15
AJ 30 PRINT "{3 SPACES}COPYRIGH
T 1987 COMPUTE! PUB., IN
C."
FX 40 PRINTTAB(11)"ALL RIGHTS
{SPACE}RESERVED"
MC 50 PRINTTAB(13)"{3 DOWN}
{BLK}TRASH RESTORER{43}"
CH 60 PRINTTAB(7)"{DOWN}BRINGS
FILES BACK FROM THE"
HE 70 PRINTTAB(7)"GEOS DESKTOP
WASTE BASKET"
GE 80 PRINTTAB(5)"{4 DOWN}INSE
RT DISK AND PRESS <RETURN>
N>"
ME 90 GETA$:IFA$<>CHR$(13)THEN
90
KA 100 PRINT "{CLR}{2 RIGHT}
{3 DOWN}SEARCHING FOR D
ISCARDED FILES..."
QR 110 OPEN15,8,15:OPEN8,8,8,"
#"
EK 120 T=18:S=1:F1=0
SB 130 PRINT#15,"U1:";8;0;T;S:
PRINT#15,"B-P:";8;0;DR=
1
CX 140 GET#8,NT$,NS$:NT=ASC(NT
$+CHR$(0)):NS=ASC(NS$+C
HR$(0)):F2=0
PC 150 BP=3
RK 160 PRINT#15,"B-P:";8;BP:GE
T#8,VE$:VE=ASC(VE$+CHR$(
0))
MC 170 IFVE<1ORVE>35THEN420
FP 180 BP=BP-1
AX 190 PRINT#15,"B-P:";8;BP:GE
T#8,FT$:FT=ASC(FT$+CHR$(
0))
BE 200 IFFT<>0THEN420
AA 210 BN=BP+3:NA$=""
RA 220 PRINT#15,"B-P:";8;BN
PF 230 GET#8,NS$
PP 240 IFN$=CHR$(160)THEN260
CK 250 NA$=NA$+N$:GOTO230
DM 260 PRINT "{CLR}{5 DOWN}
{4 RIGHT}NA$
QB 270 PRINT "{2 RIGHT}{DOWN}HA
S BEEN DISCARDED"
SG 280 PRINT "{2 DOWN}{2 RIGHT}
IF YOU WANT TO RESTORE
{SPACE}IT"
PX 290 PRINT "{2 RIGHT}INDICATE
FILE TYPE"
AD 300 PRINT "{2 RIGHT}OR 0 TO
{SPACE}CONTINUE."
SK 310 PRINTTAB(5)"{DOWN}FILE
{SPACE}TYPE MENU"
PC 320 PRINT "{3 RIGHT}{1.
{2 SPACES}SEQUENTIAL
CD 330 PRINT "{3 RIGHT}2.
{2 SPACES}PROGRAM
JS 340 PRINT "{3 RIGHT}3.
{2 SPACES}USER
```

```
BF 350 PRINT "{3 RIGHT}4.
{2 SPACES}RELATIVE
JB 360 INPUT "{DOWN}{4 RIGHT}YO
UR CHOICE..."CH$
XP 370 IFCH$<"0"ORCH$>"4"THENP
RINT "{UP}{24 SPACES}
{2 UP}":GOTO360
XJ 380 IFCH$="0"THEN420
FH 390 PRINT#15,"B-P:";8;BP
JH 400 CH=VAL(CH$)+128
GB 410 PRINT#8,CHR$(CH);:F2=1:
F1=1
XX 420 DR=DR+1:BP=BP+33
JF 430 IFDR<9THEN160
GP 440 IFF2=0THEN460
HE 450 PRINT#15,"U2:";8;0;T;S
JQ 460 IFNT<>0THENT=NT:S=NS:GO
TO130
KF 470 IFF1<>0THEN500
HQ 480 PRINTTAB(5)"{2 DOWN}NO
{SPACE}DISCARDED FILES
{SPACE}RESTORED."
AF 490 GOTO570
JQ 500 PRINT "{CLR}{2 DOWN}
{2 RIGHT}TO COMPLETE TH
E"
JR 510 PRINT "{2 RIGHT}TRASH RE
STORER PROCESS"
XQ 520 PRINT "{2 RIGHT}BOOT UP
{SPACE}GEOS"
SG 530 PRINT "{2 RIGHT}AND VALI
DATE THIS DISK"
KG 540 PRINT "{2 RIGHT}USING TH
E GEOS VALIDATE COMMAND
."
FS 550 PRINTTAB(9)"{2 DOWN}DO
{SPACE}NOT USE THE NORM
AL"
FF 560 PRINTTAB(9)"DOS VALIDAT
E COMMAND!"
QD 570 CLOSEB:CLOSE15
FQ 580 PRINTTAB(4)"{DOWN}PRESS
<RETURN> TO EXIT TO BA
SIC"
DE 590 GETA$:IFA$<>CHR$(13)THE
N590
DF 600 PRINT "{CLR}{73}CHR$(142
):POKE53280,14:POKE5328
1,6:END
```

## Word Find

Article on page 46.

```
KC 10 REM COPYRIGHT 1987 COMPU
TEI PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
BP 20 XR=781:YR=782:BO=53280:B
A=BO+1:Q=12
XD 30 NDX=198:IFPEEK(65530)=5T
HENBANK15:XR=7:YR=8:NDX=
208
CX 40 IFPEEK(65530)=164THENXR=
2035:YR=2036:BO=65305:BA
=65301:Q=14:NDX=239
KS 50 PL=65520:POKEBO,0:POKEBA
,0
KM 60 IFPEEK(65530)<>164THENS=
54272:FORN=STOS+24:POKEN
,0:NEXT
RS 70 AL$="QAZXSWEDCVFRTGBNHYU
JMKIOLP"
HR 80 PRINT "{CLR}{PUR}
{3 SPACES}COPYRIGHT 1987
COMPUTE! PUB., INC."
MM 90 PRINTTAB(10)"ALL RIGHTS
{SPACE}RESERVED":GOSUB84
0
QP 100 PRINT "{7 DOWN}"TAB(15)"
{RVS}WORD FIND{6 DOWN}"
DQ 110 INPUT "WOULD YOU LIKE A
```

```
{SPACE}TIME LIMIT (Y/N)
";TL$
BS 120 IFTL$<>"Y"ANDTL$<>"N"TH
EN120
AQ 130 IFTL$="N"THENTL$="20000
0":TL=0:GOTO170
RE 140 INPUT "{DOWN}HOW MANY MI
NUTES (1-59)":TL:IFTL<1
ORTL>59THEN140
DK 145 IF TL<>INT(TL) THEN 140
KQ 150 TL=INT(TL):TL$=STR$(TL*
100):TL$=RIGHT$(TL$,LEN
(TL$)-1):TL=1
DJ 160 FORWW=1TO6-LEN(TL$):TT$
=TT$+"0":NEXT:TL$=TT$+T
L$
CM 170 GOSUB770:GOSUB680:GOSUB
620:GOSUB460:GOSUB420
QX 180 REM - MAIN LOOP -
KR 190 TI$="000000":TU=0:WF=0
SA 200 POKEYR,27:POKEXR,1:SYSP
L:INPUT "{CYN}ROW ";RO$:
RO=VAL(RO$)
GC 210 IFRO<1THENBS=0:GOTO240
KK 220 IFRO>20THENBS=1:GOTO240
JG 230 GOSUB1060:GOTO250
FR 240 POKEYR,27:POKEXR,1:SYSP
L:PRINT "TOO ";BS$(BS):G
OSUB1070:GOSUB1060:GOTO
200
PR 250 IFTI$>TL$THENTU=1:GOTO8
90
QK 260 POKEYR,27:POKEXR,1:SYSP
L:INPUT "COLUMN ";CO$:CO
=VAL(CO$)
DE 270 IFCO<1THENBS=0:GOTO300
XD 280 IFCO>20THENBS=1:GOTO300
SF 290 GOSUB1060:GOTO310
RH 300 POKEYR,27:POKEXR,1:SYSP
L:PRINT "TOO ";BS$(BS):G
OSUB1070:GOSUB1060:GOTO
250
XD 310 F=0:FORI=1TONW:IFRO<>PY
(I)ORCO<>PX(I)THEN330
JH 320 F=2:IFT(I)=0THENX1=I:T(I
)=1:F=1:I=NW
JE 330 NEXT:IFF=1THEN360
EJ 340 C$="WRONG":IFF=2THENC$=
"THAT'S FOUND"
RB 350 POKEYR,27:POKEXR,1:SYSP
L:PRINTC$:GOSUB1070:GOS
UB1060:GOTO200
RG 360 FORI=0TOLEN(W$(X1))-1:X
P=3+PX(X1)+I*DX(TW(X1))
MF 370 YP=2+PY(X1)+I*DY(TW(X1
)):GOSUB960
BA 380 PRINT "{PUR}"MID$(W$(X1
),I+1,1):GOSUB1030
HJ 390 NEXT:POKEYR,25:POKEXR,2
+X1:SYSP:PRINTW$(X1):W
F=WF+1:IFWF=NWTHEN880
CK 400 GOTO200
MJ 410 REM - FILL GRID -
AX 420 FORY=1TO20:FORX=1TO20
KG 430 IFA$(X,Y)=" "THENA$(X,Y)
=MID$(AL$,26*RND(1)+1,1
)
BH 440 XP=3+X:YP=2+Y:GOSUB960:
PRINTA$(X,Y):NEXT:NEXT:
RETURN
DD 450 REM - POSITION WORDS -
FM 460 PW=0
BP 470 PW=PW+1
FB 480 PX(PW)=INT(20*RND(1)+1)
:PY(PW)=INT(20*RND(1)+1
)
BF 490 DR=INT(8*RND(1)+1):TW(P
W)=DR
SA 500 CX=PX(PW)+LEN(W$(PW))*D
X(DR):CY=PY(PW)+LEN(W$(
PW))*DY(DR)
PK 510 IFCX<1ORCX>20ORCY<1ORCY
>20THEN480
```



```

EJ 520 F=0:FORCK=0TOLN(W$(PW)
)-1
ER 530 Z1$=MID$(W$(PW),CK+1,1)
:Z2$=A$(PX(PW)+CK*DX(DR)
),PY(PW)+CK*DY(DR))
KS 540 IFZ2$<>"ANDZ1$<>Z2$THE
NF=1
XM 550 NEXT:IFF=1THEN480
KE 560 FORCK=0TOLN(W$(PW))-1
EH 570 Z1$=MID$(W$(PW),CK+1,1)
:A$(PX(PW)+CK*DX(DR),PY
(PW)+CK*DY(DR))=Z1$
FK 580 XP=25:YP=2+PW:GOSUB960:
PRINTW$(PW):NEXT
SM 590 IFPW=NWTHENRETURN
MP 600 GOTO470
DP 610 REM - SORT BY LENGTH -
XQ 620 POKEYR,29:POKEYR,1:SYSPL:
PRINT"SORTING"
GQ 630 F=0:FORI=1TONW-1
XR 640 IFLEN(W$(I))<LEN(W$(I+1))
THENT$=W$(I+1):W$(I)=W$(I+1)
:W$(I)=T$:F=1
FX 650 NEXT:IFF=1THEN630
XS 660 GOSUB1060:RETURN
BP 670 REM - PRINT GRID -
RP 680 PRINT"{CLR}{BLU}
{2 DOWN}{3 RIGHT}";
DX 690 PRINT"{RVS}{D$}";:FORI=1
TO20:PRINT"{RVS}{I$}";:N
EXT
GF 700 PRINT"{RVS}{F$}{DOWN}
{LEFT}";:FORI=1TO20:PRI
NT"{RVS}{K$}{OFF}{DOWN}
{LEFT}";:NEXT
SP 710 PRINT"{RVS}{V$}{2 LEFT}";
:FORI=1TO20:PRINT
{OFF}{I$}{2 LEFT}";:NEXT
QM 720 PRINT"{RVS}{C$}{LEFT}
{UP}";:FORI=1TO20:PRINT
{OFF}{K$}{LEFT}{UP}";:N
EXT:PRINT"{GRN}"
HF 730 FORI=1TO20:NU$=STR$(I):
NU$=MID$(NU$,2):IFLEN(N
U$)=1THENNNU$=" "+NU$
AJ 740 XP=1:YP=I+2:GOSUB960:PR
INTNU$:XP=I+3:YP=0:GOSU
B960:PRINTLEFT$(NU$,1)
BC 750 XP=I+3:YP=1:GOSUB960:PR
INTRIGHT$(NU$,1):NEXT:R
ETURN
SD 760 REM - INPUT WORDS -
BS 770 INPUT"{CLR}{DOWN}HOW MA
NY WORDS (MAXIMUM OF 20)
";NW:PRINT:IFNW<LORNW<
20THEN770
EQ 780 PRINT"{CLR}ENTER EACH W
ORD BETWEEN 3 AND"Q
RR 790 PRINT"CHARACTERS IN LEN
GTH:{DOWN}";:FORI=1TONW
SP 800 PRINT"> ";:INPUTW$(I)
QA 810 IFLEN(W$(I))<3ORLEN(W$(
I))>QTHENPRINTCHR$(13)"
{3 UP}";:GOTO800
FK 820 NEXT:RETURN
HX 830 REM - SET UP VARIABLES
{SPACE}-
KD 840 DIMA$(20,20),W$(20),PX(
20),PY(20),DX(8),DY(8),
TW(20),T(20)
JQ 850 FORI=1TO8:READDX(I),DY(
I):NEXT:BS$(0)="SMALL
{2 SPACES}";BS$(1)="BIG
{4 SPACES}";:RETURN
CX 860 DATA 0,-1,1,-1,1,0,1,1,
0,1,-1,1,-1,0,-1,-1
CE 870 REM - SUBROUTINES -
CA 880 GOSUB1070:GOSUB970
XX 890 FORX1=1TONW:FORI=0TOLN
(W$(X1))-1
GP 900 XP=3+PX(X1)+I*DX(TW(X1)
):YP=2+PY(X1)+I*DY(TW(X

```

```

1)):GOSUB960:PRINT"
{RVS}{GRN}";
EQ 910 PRINTMID$(W$(X1),I+1,1)
SR 920 GOSUB1030
MM 930 NEXT:XP=25:YP=2+X1:GOSU
B960:PRINTW$(X1):NEXT
GP 940 POKENDX,0:FORPS=1TO5000
:NEXT
EK 950 PRINT"{CLR}{9 DOWN}"TAB
(7)"YOU DIDN'T FINISH I
N TIME.":GOTO990
QG 960 POKEYR,XP:POKEYR,YP:SYS
PL:RETURN
KC 970 PRINT"{CLR}":XP=14:YP=1
2:GOSUB960:PRINT"{RVS}
{RED}YOU DID IT!"
DX 980 IFTL=1THENPRINT"
{2 DOWN}{2$}{8 SPACES}
{RVS}AND YOU FINISHED I
N TIME!"
JF 990 XP=6:YP=17:GOSUB960:PRI
NT"{4 DOWN}{RED}PRESS
{RVS}SPACE BAR{OFF} TO
{SPACE}PLAY AGAIN"
XS 1000 GETA$:IFA$=" "THENRUN
ER 1010 IFA$<>" "THENPRINT"
{CLR}":END
JR 1020 GOTO1000
KM 1030 IFPEEK(65530)=164THENV
OL7:SOUND3,1000,5:RETU
RN
XF 1040 POKES+5,64:POKES+6,0:P
OKES+24,15:POKES+1,100
:POKES,0:POKES+4,129
GH 1050 FORN=1TO22:NEXT:POKES+
4,0:RETURN
GA 1060 POKEYR,27:POKEYR,1:SYS
PL:PRINT"{12 SPACES}";:
RETURN
JE 1070 FORI=1TO1000:NEXT:RETU
RN

```

#### BEFORE TYPING . . .

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

## Power BASIC: Power Pause

Article on page 74.

### Program 1: Power Pause—64 Version

```

KC 10 REM COPYRIGHT 1987 COMPU
TEI PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
BB 20 PRINT"{CLR}{BLK}
{3 SPACES}COPYRIGHT 1987
COMPUTE! PUB., INC."
KM 30 PRINTTAB(10)"ALL RIGHTS
{SPACE}RESERVED{DOWN}"
MQ 40 FORJ=52992TO53104:READA:
X=X+A:POKEJ,A:NEXTJ:READ
A:POKE53105,A
MD 50 FORJ=53106TO53109:READA:
X=X+A:POKEJ,A:NEXTJ:READ
A:POKE53110,A
DJ 60 FORJ=53111TO53114:READA:
X=X+A:POKEJ,A:NEXTJ:READ
A:POKE53115,A
KC 65 FORJ=53116TO53215:READA:
X=X+A:POKEJ,A:NEXTJ
AR 70 IFX<>25623THENPRINT"ERRO
R IN DATA STATEMENTS.":S

```

```

TOP
AD 80 SYS 52992
EM 90 PRINT " POWER PAUSE ACTI
VATED"
DC 100 PRINT " TO PAUSE, HIT S
HIFT LOCK/RESTORE"
HA 110 PRINT " TO UNPAUSE, REL
EASE THE SHIFT LOCK KEY
"
HB 120 DATA 120,173,0,3,141,12
9,207,173,1,3,141,130,2
07,173,22,3
SA 130 DATA 141,156,207,173,23
,3,141,161,207,173,38,3
,141,144,207,173
QK 140 DATA 39,3,141,145,207,1
73,24,3,141,218,207,173
,25,3,141,219
HF 150 DATA 207,169,66,141,0,3
,169,207,141,1,3,169,0,
141,222,207
MD 160 DATA 88,96,72,169,131,1
41,38,3,169,207,141,39,
3,169,155,141
FK 170 DATA 17,208,173,0,221,4
1,252,9,3,141,0,221,173
,24,208,41
MB 180 DATA 2,9,20,141,24,208,
169,8,141,22,208,169,4,
141,136,2
AM 190 DATA 169
BF 200 DATA 11:REM BORDER COLO
R
XX 210 DATA 141,32,208,169
GJ 220 DATA 12:REM BACKGROUND
{SPACE}COLOR
MR 230 DATA 141,33,208,169
JD 240 DATA 0:REM TEXT COLOR
PX 250 DATA 141,134,2,104
CE 260 DATA 76,0,0,72,169,146,
141,24,3,169,207,141,25
,3,104,76
RC 270 DATA 0,0,72,173,222,207
,208,68,238,222,207,169
,0,141,22,3
BA 280 DATA 169,0,141,23,3,165
,1,72,169,55,133,1,169,
253,141,0
HF 290 DATA 220,173,1,220,234,
205,1,220,208,247,201,1
27,208,13,173,1
CP 300 DATA 220,234,205,1,220,
208,247,201,255,208,243
,169,0,141,222,207
SK 310 DATA 169,127,141,0,220,
104,133,1,104,76,0,0,10
4,64,0,170

```

### Program 2: Power Pause—128 Version

```

KC 10 REM COPYRIGHT 1987 COMPU
TEI PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
JR 20 BANK15:PRINT"{CLR}{BLK}
{3 SPACES}COPYRIGHT 1987
COMPUTE! PUB., INC."
KM 30 PRINTTAB(10)"ALL RIGHTS
{SPACE}RESERVED{DOWN}"
GC 40 FORJ=6912TO7043:READA:X=
X+A:POKEJ,A:NEXTJ:READA:
POKE7044,A:FORJ=7045TO70
52:READA:X=X+A:POKEJ,A:N
EXTJ:READA:POKE7053,A
KD 50 FORJ=7054TO7056:READA:X=
X+A:POKEJ,A:NEXTJ:READA:
POKE7057,A:FORJ=7058TO71
61:READA:X=X+A:POKEJ,A:N
EXTJ
CR 60 IFX<>27235THENPRINT"ERRO
R IN DATA STATEMENTS.":S
TOP

```



```

QX 70 SYS6912
BK 80 PRINT " POWER PAUSE ACTI
VATED"
KF 90 PRINT " TO PAUSE, HIT SH
IFT LOCK/RESTORE"
DB 100 PRINT " TO UNPAUSE, REL
EASE THE SHIFT LOCK KEY
"
SQ 110 DATA 120,173,0,3,141,15
9,27,173,1,3,141,160,27
,173,22,3
EQ 120 DATA 141,185,27,173,23,
3,141,190,27,173,38,3,1
41,174,27,173
ME 130 DATA 39,3,141,175,27,17
3,24,3,141,236,27,173,2
5,3,141,237
CK 140 DATA 27,169,66,141,0,3,
169,27,141,1,3,169,0,14
1,248,27
MH 150 DATA 88,96,72,169,161,1
41,38,3,169,27,141,39,3
,169,0,141
KS 160 DATA 0,255,133,216,133,
217,173,0,221,41,252,9,
3,141,0,221
FX 170 DATA 173,44,10,41,2,9,2
0,141,44,10,169,4,141,6
,213,169
DG 180 DATA 27,141,17,208,169,
200,141,22,208,169,252,
141,48,208,169,26
BH 190 DATA 141,0,214,169
BF 200 DATA 11:REM BORDER COLO
R
EP 210 DATA 141,32,208,165,241
,41,128,9
AC 220 DATA 0:REM TEXT COLOR
KB 230 DATA 133,241,169
XH 240 DATA 12:REM BACKGROUND
{SPACE}COLOR
GS 250 DATA 141,33,208,44,0,21
4,16,251,141,1,214,104,
76,0
RD 260 DATA 0,72,169,176,141,2
4,3,169,27,141,25,3,104
,76,0,0
AA 270 DATA 173,248,27,208,57,
238,248,27,169,0,141,22
,3,169,0,141
JP 280 DATA 23,3,169,253,141,0
,220,173,1,220,234,205,
1,220,208,247
AF 290 DATA 201,127,208,13,173
,1,220,234,205,1,220,20
8,247,201,255,208
SX 300 DATA 243,169,0,141,248,
27,169,127,141,0,220,76
,0,0,104,141
EC 310 DATA 0,255,104,168,104,
170,104,64,95,170

```

## Instant 80

See instructions in article on page 76 before typing in.

```

2500:78 A9 CC 8D B1 09 A9 27 8F
2508:8D A9 09 A9 2D 8D 79 17 E8
2510:A9 25 8D 7A 17 A9 79 8D B1
2518:80 18 A9 25 8D 81 18 A9 7C
2520:97 8D 26 03 A9 25 8D 27 B2
2528:03 58 4C 88 09 48 A5 BA 8B
2530:C9 03 D0 41 A9 3B 8D 11 B4
2538:D0 A9 38 8D 18 D0 A9 94 21
2540:8D 00 DD 8D B4 26 A9 E0 58
2548:8D 50 25 A9 E0 AA 9D 00 92
2550:E0 E8 D0 FA E0 50 25 D0 E2
2558:F5 A9 9F 9D 00 CC 9D 00 44
2560:CD 9D 00 CE 9D 00 CF E8 5B
2568:D0 F1 8E B8 26 8E B2 26 EB

```

```

2570:A9 FE 8D B3 26 68 4C 4A F1
2578:F3 48 AD B4 26 F0 14 A9 96
2580:17 8D 18 D0 A9 1B 8D 11 AF
2588:D0 A9 97 8D 00 DD A9 00 3C
2590:8D B4 26 68 4C 91 F2 48 F0
2598:AD B4 26 D0 04 68 4C CA DD
25A0:F1 78 68 48 8D B5 26 A5 C8
25A8:01 48 8A 48 98 48 AD B5 52
25B0:26 C9 0D D0 03 4C 73 26 85
25B8:29 E0 F0 04 C9 80 D0 03 23
25C0:4C 5D 26 4A 4A 4A 4A 4C
25C8:AA BD AA 26 18 6D B5 26 97
25D0:A6 C7 F0 02 09 80 A6 FE 35
25D8:8E B6 26 A6 FF 8E B7 26 17
25E0:A2 1B 86 FF 0A 26 FF 0A 07
25E8:26 FF 0A 26 FF 85 FE A9 A7
25F0:33 85 01 A0 07 A2 07 A9 DA
25F8:00 99 B9 26 B1 FE 4A 7E DF
2600:B9 26 4A 4A 7E B9 26 4A 12
2608:4A 7E B9 26 4A 4A 7E B9 E4
2610:26 CA 88 10 E2 AD B8 26 99
2618:F0 0F A2 07 BD B9 26 4A D0
2620:4A 4A 4A 9D B9 26 CA 10 53
2628:F3 A9 34 85 01 AD B2 26 02
2630:85 FE AD B3 26 85 FF F0 28
2638:24 A0 07 B9 B9 26 11 FE C2
2640:91 FE 88 10 F6 AD B8 26 2D
2648:49 01 8D B8 26 D0 0E AD F4
2650:B2 26 18 69 08 8D B2 26 1B
2658:90 03 EE B3 26 AD B6 26 42
2660:85 FE AD B7 26 85 FF 68 10
2668:A8 68 AA 68 85 01 58 68 48
2670:4C CA F1 A9 34 85 01 A2 CA
2678:E0 8E 87 26 E8 8E 84 26 DC
2680:A2 00 BD 40 E0 9D 00 E0 38
2688:E8 D0 F7 EE 87 26 EE 84 A2
2690:26 D0 EF 8E B2 26 A9 FE 8B
2698:8D B3 26 8A 9D 00 FE 9D 8E
26A0:40 FE E8 D0 F7 8D B8 26 84
26A8:F0 B3 00 00 C0 E0 00 C0 A4
26B0:80 80 00 00 00 00 00 05
26B8:00 00 00 00 00 00 00 05
26C0:00 20 00 00 00 00 00 15

```

## Grafnastics

See instructions in article on page 88 before typing in.

### Program 1: Grafnastics

```

C000:A9 5C 85 38 20 9B B7 E0 61
C008:00 D0 03 4C 0C C6 E0 01 21
C010:D0 03 4C 49 C2 E0 02 D0 47
C018:03 4C BD C3 E0 03 D0 03 D9
C020:4C 59 C3 E0 04 D0 03 4C 5A
C028:86 C4 E0 05 D0 03 4C 07 BC
C030:C5 E0 06 D0 03 4C 21 C4 EA
C038:E0 07 D0 03 4C 92 C5 E0 4F
C040:08 D0 03 4C EB C0 E0 09 4C
C048:D0 03 4C C5 C0 E0 0A D0 47
C050:03 4C 9E C0 E0 0B D0 03 1E
C058:4C 8B C0 E0 0C D0 03 4C FE
C060:2D C1 60 D0 D2 CF C7 D2 3A
C068:C1 CD A0 C2 D9 A0 D2 CF 45
C070:C2 C5 D2 D4 A0 C2 C9 D8 E8
C078:C2 D9 A9 00 85 FD 85 FB 32
C080:A9 60 85 FC A9 E0 85 FE 4A
C088:A0 00 60 20 7A C0 B1 FB 9E
C090:91 FD C8 D0 F9 E6 FC E6 CC
C098:FE A5 FE D0 F1 60 20 7A BB
C0A0:C0 20 EB C0 20 10 C1 78 51
C0A8:A5 01 29 FC 85 01 B1 FD C3
C0B0:91 FB C8 D0 F9 E6 FC E6 6C
C0B8:FE A5 FE D0 F1 A5 01 09 41
C0C0:03 85 01 58 60 AD 02 DD 66
C0C8:03 85 02 DD AD 00 DD E4
C0D0:29 FC 09 03 8D 00 DD A9 49
C0D8:15 8D 18 D0 A9 1B 8D 11 3E
C0E0:D0 A9 00 85 C6 A9 00 8D F7
C0E8:15 D0 60 AD 02 DD 09 03 AC
C0F0:8D 02 DD AD 00 DD 29 FC 17

```

```

C0F8:09 02 8D 00 DD AD 18 D0 D7
C100:29 0F 09 78 8D 18 D0 AD A0
C108:11 D0 09 20 8D 11 D0 60 1E
C110:A9 5C 85 FC A9 00 85 FB 54
C118:A0 00 A2 00 A9 01 91 FB B0
C120:C8 C0 00 D0 F9 E6 FC E8 93
C128:E0 04 90 F2 60 20 88 C5 B8
C130:A9 60 85 FC A0 00 A2 00 6B
C138:A9 00 85 FB 91 FB C8 C0 CF
C140:00 D0 F9 E8 E6 FC E0 20 D2
C148:90 F2 60 AD 34 C2 4A AD A6
C150:33 C2 6A 4A 4A 8D 35 C2 C5
C158:AD 36 C2 4A 4A 8D 37 0B
C160:C2 AD 36 C2 29 07 8D 38 5C
C168:C2 AE 37 C2 A9 00 8D 39 AD
C170:C2 8D 3A C2 E0 00 F0 15 2A
C178:AD 39 C2 18 69 40 8D 39 9B
C180:C2 90 03 EE 3A C2 EE 3A CD
C188:C2 CA 4C 74 C1 8E 30 C2 5C
C190:8E 31 C2 AD 35 C2 18 0A C9
C198:0A 0A 90 03 EE 31 C2 18 BF
C1A0:6D 38 C2 8D 30 C2 90 03 CA
C1A8:EE 31 C2 AD 39 C2 18 6D 95
C1B0:30 C2 8D 30 C2 90 03 EE FE
C1B8:31 C2 AD 3A C2 18 6D 31 61
C1C0:C2 8D 31 C2 A9 60 18 6D C7
C1C8:31 C2 8D 31 C2 AD 33 C2 50
C1D0:29 07 8D 32 C2 A9 07 38 82
C1D8:ED 32 C2 8D 32 C2 A9 01 02
C1E0:A2 00 EC 32 C2 F0 05 0A 64
C1E8:E8 4C E2 C1 8D 2E C2 AD C4
C1F0:31 C2 85 22 AD 30 C2 85 C9
C1F8:21 A0 00 AD 2F C2 F0 0C 82
C200:C9 02 F0 1A B1 21 D0 2E 05
C208:C2 91 21 60 A9 00 8D 38 21
C210:C2 85 02 B1 21 2D 2E C2 90
C218:8D 3B C2 85 02 60 AD 2E FE
C220:C2 49 FF 8D 2E C2 B1 21 33
C228:2D 2E C2 91 21 60 00 00 CB
C230:00 00 00 00 00 00 00 B5
C238:00 00 00 00 00 00 00 BD
C240:00 00 00 00 00 00 00 C5
C248:00 20 88 C5 A9 C7 8D 3F 0A
C250:C2 A9 00 8D 48 C2 8D 40 23
C258:C2 8D 41 C2 A9 63 8D 3C 29
C260:C2 A9 00 8D 3D C2 8D 3E D8
C268:C2 AD 3F C2 8D 36 C2 AD 47
C270:40 C2 8D 33 C2 AD 41 C2 BD
C278:8D 34 C2 A9 00 8D 2F C2 1C
C280:20 4B C1 AD 3B C2 F0 0E D0
C288:20 06 C3 A9 01 8D 2F C2 12
C290:20 4B C1 4C A1 C2 20 06 54
C298:C3 A9 02 8D 2F C2 20 4B 93
C2A0:C1 EE 3D C2 AD 3D C2 D0 4F
C2A8:05 A9 01 8D 3E C2 C9 40 E4
C2B0:D0 1A AD 3E C2 F0 15 A9 6C
C2B8:00 8D 3D C2 8D 3E C2 CE 2F
C2C0:3C C2 AD 3C C2 C9 FF D0 9C
C2C8:03 4C 05 C3 EE 40 C2 EE AC
C2D0:40 C2 AD C2 C2 D0 05 A9 ED
C2D8:01 8D 41 C2 C9 40 D0 22 A9
C2E0:AD 41 C2 F0 1D A9 00 8D 12
C2E8:40 C2 8D 41 C2 EE 48 A9 2A
C2F0:AD 48 C2 C9 02 90 0B A9 66
C2F8:00 8D 48 C2 CE 3F C2 CE DE
C300:3F C2 4C 69 C2 60 AD 3C 27
C308:C2 8D 36 C2 AD 3D C2 8D BC
C310:33 C2 AD 3E C2 8D 34 C2 F2
C318:60 A9 60 85 FE 85 FC A9 50
C320:00 85 FB A9 00 85 FD A2 DC
C328:00 8E 48 C2 60 A9 01 8D C1
C330:43 C2 A9 80 8D 44 C2 A9 F3
C338:00 8D 45 C2 AD 42 C2 2D 21
C340:43 C2 F0 09 AD 45 C2 0D DD
C348:44 C2 8D 45 C2 0E 43 C2 40
C350:4E 44 C2 C0 E7 AD 45 C2 B4
C358:60 20 88 C5 20 19 C3 A0 13
C360:00 8C 47 C2 A0 98 8C 46 E6
C368:C2 AC 46 C2 B1 FD 8D 42 54
C370:C2 20 2D C3 AC 47 C2 91 DD
C378:FB AD 47 C2 18 69 08 8D 82
C380:47 C2 AD 46 C2 38 E9 08 49
C388:8D 46 C2 B0 DC E6 FB E6 2D
C390:FD E8 E0 08 90 C9 A2 00 DE
C398:A5 FB 18 69 38 85 FB 90 EB

```



```

C3A0:02 E6 FC E6 FC A5 FD 18 83
C3A8:69 38 85 FD 90 02 E6 FE DC
C3B0:E6 FE EE 48 C2 AD 48 EC
C3B8:C9 19 90 A3 60 20 88 C5 12
C3C0:20 19 C3 A0 00 8C 47 C2 A4
C3C8:A0 98 8C 46 C2 AC 46 C2 D4
C3D0:B1 FB 8D 42 C2 20 D3 BA
C3D8:AC 47 C2 91 FD AD 47 C2 F1
C3E0:18 69 08 8D 47 C2 AD 46 8F
C3E8:C2 38 E9 08 8D 46 C2 B0 59
C3F0:DC E6 FB E6 FD E8 E0 08 EB
C3F8:90 C9 A2 00 A5 FB 18 69 46
C400:38 85 FB 90 02 E6 FC E6 1C
C408:FC A5 FD 18 69 38 85 FD EF
C410:90 02 E6 FE E6 FE EE 48 88
C418:C2 AD 48 C2 C9 19 90 A3 1B
C420:60 20 88 C5 A9 60 85 FC 26
C428:A9 7F 85 FE A9 00 85 FB 5B
C430:A9 3F 85 FD A0 00 B1 FB 53
C438:8D 42 C2 20 D3 8D 48 4F
C440:C2 B1 FD 8D 42 C2 20 D3 BA
C448:C3 91 FB AD 48 C2 91 FD E0
C450:A5 FD 38 E9 01 85 FD B0 9C
C458:02 C6 FE A5 FB 18 69 01 E2
C460:85 FB 90 02 E6 FC A5 FC 51
C468:C9 6F 90 CA A5 FB C9 A0 C2
C470:90 C4 60 AD 3D C2 8D 33 9D
C478:C2 AD 3E C2 8D 34 C2 AD 33
C480:3C C2 8D 36 C2 60 20 88 4E
C488:C5 A9 00 8D 40 C2 8D 41 A1
C490:C2 8D 3D C2 8D 3E C2 A9 47
C498:00 8D 3F C2 A9 37 8D 3C 5D
C4A0:C2 AD 40 C2 8D 33 C2 AD 97
C4A8:41 C2 8D 34 C2 AD 3F C2 86
C4B0:8D 36 C2 A9 00 8D 2F C2 D8
C4B8:20 4B C1 AD 3B C2 F0 0E 0D
C4C0:20 73 C4 A9 01 8D 2F C2 C9
C4C8:20 4B C1 4C D9 C4 20 73 C7
C4D0:C4 A9 02 8D 2F C2 20 4B 50
C4D8:C1 EE 3F C2 CE 3C C2 AD AD
C4E0:3F C2 CD 3C C2 90 BA EE F4
C4E8:3D C2 EE 40 C2 AD 3D C2 AD
C4F0:00 0B A9 01 8D 41 C2 8D 6F
C4F8:3E C2 4C 97 C4 C9 40 D0 F3
C500:96 AD 3E C2 F0 91 60 20 E4
C508:88 C5 A9 00 8D 40 C2 8D FE
C510:41 C2 8D 3D C2 8D 3E C2 FD
C518:A9 C7 8D 3F C2 A9 00 8D 5A
C520:3C C2 AD 40 C2 8D 33 C2 A9
C528:AD 41 C2 8D 34 C2 AD 3F 53
C530:C2 8D 36 C2 A9 00 8D 2F 0B
C538:C2 20 4B C1 AD 3B C2 F0 83
C540:0E 20 73 C4 A9 01 8D 2F 31
C548:C2 20 4B C1 4C 5A C5 20 3A
C550:73 C4 A9 02 8D 2F C2 20 E4
C558:4B C1 CE 3F C2 EE 3C C2 DA
C560:AD 3C C2 CD 3F C2 90 BA E7
C568:EE 3D C2 EE 40 C2 AD 3D A7
C570:C2 D0 0B A9 01 8D 41 C2 11
C578:8D 3E C2 4C 18 C5 C9 40 23
C580:D0 96 AD 3E C2 F0 91 60 11
C588:20 EB C0 20 10 C1 20 8B 8C
C590:C0 60 20 88 C5 20 19 C3 C5
C598:A0 00 8C 47 C2 A0 98 8C D0
C5A0:46 C2 AC 46 C2 B1 FD 8D 60
C5A8:42 C2 20 D3 8D 3B C2 6A
C5B0:AC 47 C2 B1 FB 8D 42 C2 35
C5B8:20 2D C3 AC 46 C2 91 FD 41
C5C0:AC 47 C2 AD 3B C2 91 FB AB
C5C8:AD 47 C2 18 69 08 8D 47 A4
C5D0:C2 AD 46 C2 38 E9 08 8D 25
C5D8:46 C2 B0 C6 E6 FB E6 FD AD
C5E0:E8 E0 08 90 B3 A2 00 A5 F0
C5E8:FB 18 69 38 85 FB 90 02 68
C5F0:E6 FC E6 FC A5 FD 18 69 9A
C5F8:38 85 FD 02 E6 FE E6 5B
C600:FE EE 48 C2 AD 48 C2 C9 DB
C608:19 90 8D 60 A2 00 8E 21 51
C610:D0 8E 20 D0 20 C5 C0 BD 12
C618:24 C6 F0 07 20 D2 FF E8 2D
C620:4C 17 C6 60 93 99 0D 0D A2
C628:43 4F 50 59 52 49 47 48 59
C630:54 20 31 39 38 37 20 43 CB
C638:4F 4D 50 55 54 45 21 0D 27
C640:0D 0D 81 30 20 20 48 45 22

```

```

C648:4C 50 0D 31 20 20 50 45 2C
C650:52 53 50 45 43 54 49 56 8E
C658:45 0D 32 20 20 4D 49 52 2F
C660:52 4F 52 20 52 5F 4C 0D EC
C668:33 20 20 4D 49 52 52 4F F7
C670:52 20 4C 5F 52 0D 34 20 FD
C678:20 4D 49 52 52 4F 52 20 4C
C680:42 5F 54 0D 35 20 20 4D 1A
C688:49 52 52 4F 52 20 54 5F A9
C690:42 0D 36 20 20 49 4E 56 64
C698:45 52 54 0D 37 20 20 46 79
C6A0:4C 49 50 0D 38 20 20 48 4C
C6A8:49 52 45 53 0D 39 20 20 FA
C6B0:4C 4F 52 45 53 0D 31 30 38
C6B8:20 52 45 43 41 4C 4C 0D A8
C6C0:31 31 20 41 52 43 48 49 C4
C6C8:56 45 0D 31 32 20 43 4C 6C
C6D0:45 41 52 0D 00 00 00 00 6C

```

## Program 2: Sample Sketcher

```

MG 10 IFK=0 THEN K=1:LOAD"GRAFNA
STICS",8,1
SX 20 POKE53281,0:POKE53280,0:
A=49152:A$="M":GOTO200
MJ 30 A=49152:A$="":GETA$:IFA$
=" " THEN 210
QH 40 IFA$="H" THEN SYS4,8
DS 50 IFA$="T" THEN SYS4,9
AK 60 IFA$="R" THEN SYS4,7
MH 70 IFA$="I" THEN SYS4,6
GD 80 IFA$=CHR$(145) THEN SYS4,5
EC 90 IFA$=CHR$(17) THEN SYS4,4
XM 100 IFA$=CHR$(157) THEN SYS4,3
SK 110 IFA$=CHR$(29) THEN SYS4,2
DE 120 IFA$="P" THEN SYS4,1
BR 130 IFA$="L" THEN 310
BH 140 IFA$="S" THEN 320
MD 150 IFA$="0" THEN POKE49711,0
MQ 160 IFA$="1" THEN POKE49711,1
MK 170 IFA$="2" THEN POKE49711,2
FP 180 IFA$="C" THEN SYS4,12
SF 190 IFA$="U" THEN SYS4,10
XQ 200 IFA$="M" THEN SYS4,9:GOSU
B380:GOTO30
AF 210 N=(PEEK(56320)AND15):IF
N=15 THEN 300
GM 220 X=X+(N>8)AND(N<12))-((
N<8)AND(N>4))
QR 230 Y=Y-(N=13)-(N=9)-(N=5)+
(N=14)+(N=10)+(N=6)
KF 240 X=X-(X<0)+(X>319):Y=Y-
(Y<0)+(Y>199):X2=X
BR 250 X1=(X>255):POKE49716,X
1:IFX1=1 THEN X2=X2-256
GS 260 POKE49715,X2
AF 270 POKE49718,Y
SP 280 SYS49483
ES 290 IFPEEK(49711)=0 THEN SYS4
9152,9:PRINTX,Y,PEEK(2)
DF 300 GOTO300
HE 310 K=1:SYS4,11:SYS4,9:INPU
T"[CLR]LOAD FILENAME";N
A$:SYS4,8:LOADNA$,8,1
CH 320 SYS4,9:INPUT"[CLR]SAVE
[SPACE]FILENAME";NA$:IF
NA$=CHR$(13) THEN 300
GS 330 PRINT"[2 DOWN]PLEASE WA
IT..."
CJ 340 OPEN15,8,15:OPEN8,8,8,"
0:"+NA$+"P,W":PRINT#8,
CHR$(0)CHR$(92);
RG 350 FORI=23552TO32575:INPUT
#15,E1$,E2$
BC 360 IF E1$="00" THEN PRINT#8,C
HR$(PEEK(I));:NEXT
XJ 370 PRINT#15,E2$:FORI=0TO10
00:NEXT:CLOSE8:CLOSE15:
GOTO300
RA 380 PRINT"[CLR][CYN]
[2 SPACES]COPYRIGHT 198
7 COMPUTE! PUB., INC."
QH 390 PRINTTAB(10)"ALL RIGHTS
RESERVED[DOWN]"

```

```

DX 400 PRINT"[RVS]M[OFF] MENU"
GP 410 PRINT"[RVS]0[OFF] PEEK"
FH 420 PRINT"[RVS]1[OFF] DRAW"
HA 430 PRINT"[RVS]2[OFF] ERASE
"
HS 440 PRINT"[RVS]H[OFF] HI-RE
S"
QK 450 PRINT"[RVS]P[OFF] PERSP
ECTIVE"
FP 460 PRINT"[RVS]R[OFF] ROTAT
E"
XF 470 PRINT"[RVS]T[OFF] TEXT"
KM 480 PRINT"[RVS]U[OFF] UNDO"
PB 490 PRINT"[RVS]I[OFF] INVER
T"
DC 500 PRINT"[RVS]S[OFF] SAVE"
HX 510 PRINT"[RVS]L[OFF] LOAD"
ED 520 PRINT"[RVS]C[OFF] CLEAR
SCREEN"
MM 530 PRINT"[RVS]CRSR-LT[OFF]
MIRROR R TO L"
QF 540 PRINT"[RVS]CRSR-RT[OFF]
MIRROR L TO R"
EX 550 PRINT"[RVS]CRSR-DN[OFF]
MIRROR T TO B"
PG 560 PRINT"[RVS]CRSR-UP[OFF]
MIRROR B TO T"
JM 570 RETURN

```

## BEFORE TYPING . . .

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

## PrintScreen

See instructions in article on page 93 before typing in.

## Program 1: PrintScreen

```

0801:0B 08 0A 00 9E 32 30 36 2E
0809:32 00 00 00 00 A0 00 B9 6E
0811:34 0A D9 04 CF D0 1E C8 FF
0819:C0 0F D0 F3 EA A0 00 B9 3A
0821:04 CF 99 34 0A C8 C0 37 C9
0829:D0 F5 A2 75 A0 08 20 1B 4B
0831:09 EE 04 CF 60 A0 00 B9 3E
0839:30 09 99 00 CF C8 D0 F7 12
0841:84 FD A2 30 86 FB A2 09 DC
0849:E8 86 FC A9 D8 85 FE 78 FC
0851:A9 30 85 01 A2 07 B1 FB 93
0859:91 FD C8 D0 F9 E6 FC E6 24
0861:FE CA D0 F2 A9 37 85 01 23
0869:58 20 00 CF A2 E0 A0 08 8C
0871:20 1B 09 60 0D 59 4F 55 41
0879:52 20 43 55 53 54 4F 4D 50
0881:20 50 52 49 4E 54 45 52 35
0889:20 53 50 45 43 49 46 49 F1
0891:43 41 54 49 4F 4E 53 0D 1A
0899:48 41 56 45 20 42 45 45 17
08A1:4E 20 49 4E 43 4F 52 50 3B
08A9:4F 52 41 54 45 44 20 49 28
08B1:4E 54 4F 20 54 48 49 53 93
08B9:0D 50 52 4F 47 52 41 4D F6
08C1:2E 20 20 53 41 56 45 20 38
08C9:49 54 20 54 4F 20 44 49 A9
08D1:53 4B 20 41 53 20 55 53 8F
08D9:55 41 4C 2E 0D 0D 00 0D FA
08E1:50 52 49 4E 54 53 43 52 85
08E9:45 45 4E 2D 36 34 20 49 96
08F1:53 20 4E 4F 57 20 41 43 73
08F9:54 49 56 45 2E 0D 54 4F 43
0901:20 50 52 49 4E 54 2C 20 52
0909:55 53 45 20 43 3D 2F 52 05
0911:45 53 54 4F 52 45 2E 0D 2B
0919:0D 00 86 FB 84 FC A0 00 9B
0921:B1 FB F0 0A 20 D2 FF C8 DE
0929:D0 F6 E6 FC D0 F2 60 78 99

```



```

0931:20 8A FF AD 26 03 8D 5F 88
0939:CF AD 27 03 8D 60 CF AD EE
0941:02 03 8D 50 CF AD 03 03 0A
0949:8D 51 CF A9 39 8D 02 03 12
0951:A9 CF 8D 03 03 AD 18 03 10
0959:8D AC CF AD 19 03 8D AD CF
0961:CF A9 00 8D F0 CF 58 60 76
0969:48 A9 52 8D 26 03 A9 CF 8D
0971:8D 27 03 A9 61 8D 18 03 83
0979:A9 CF 8D 19 03 68 4C 00 E9
0981:00 48 A9 61 8D 18 03 A9 6D
0989:CF 8D 19 03 68 4C 00 00 AE
0991:78 48 AD F0 CF D0 42 EE EB
0999:F0 CF 8A 48 98 48 A5 01 20
09A1:48 A9 36 85 01 A9 7F 8D 9C
09A9:00 DC AD 01 DC EA CD 01 E7
09B1:DC D0 F7 C9 DF D0 16 AD 1E
09B9:01 DC EA CD 01 DC D0 F7 D2
09C1:C9 FF D0 F3 20 AE CF 20 8D
09C9:00 C0 20 AE CF 68 85 01 27
09D1:68 A8 68 AA A9 00 8D F0 53
09D9:CF 68 4C 00 00 78 A9 C0 6D
09E1:8D C9 CF 8D D2 CF A9 D8 02
09E9:8D CF CF 8D D8 CF A2 07 DB
09F1:A0 00 A9 30 85 01 B9 00 30
09F9:C0 8D F1 CF B9 00 D8 99 24
0A01:00 C0 AD F1 CF 99 00 D8 D7
0A09:C8 D0 EB EE C9 CF EE CF 5D
0A11:CF EE D2 CF EE D8 CF CA 65
0A19:D0 DC A9 36 85 01 60 00 56
0A21:00 60 60 60 60 60 60 05
0A29:60 60 60 60 60 60 4C 29
0A31:3B C0 00 60 02 19 60 0A 58
0A39:01 0D 05 13 60 08 0F 13 37
0A41:14 60 00 0E 04 04 03 1B A9
0A49:41 07 00 00 00 00 00 03 C2
0A51:1B 41 0C 00 00 00 00 00 C4
0A59:02 1B 4B 00 00 00 00 00 9E
0A61:00 02 40 01 00 00 00 00 0E
0A69:00 00 EE 20 D0 A5 FB 8D FF
0A71:A5 C0 A5 FC 8D A6 C0 A5 3B
0A79:FD 8D A7 C0 A5 FE 8D A8 DD
0A81:C0 AD 15 D0 8D A9 C0 A9 4F
0A89:00 8D 15 D0 A5 9D 8D AA 1A
0A91:C0 20 BE C0 A9 E0 A0 E0 E4
0A99:A2 20 20 E1 C4 CE 20 D0 9B
0AA1:AD A5 C0 85 FB AD A6 C0 0B
0AA9:85 FC AD A7 C0 85 FD AD B5
0AB1:A8 C0 85 FE AD A9 C0 8D 0E
0AB9:15 D0 AD AA C0 85 9D 60 A4
0AC1:EA EA EA EA EA EA EA D5
0AC9:EA EA EA EA EA EA EA DD
0AD1:EA EA EA EA EA EA EA E5
0AD9:EA EA EA EA EA EA EA ED
0AE1:EA EA EA EA EA EA EA F5
0AE9:EA EA EA EA EA EA EA DD 26
0AF1:49 03 0A 0A 0A 0A 0A E3
0AF9:8D 91 C0 AD 18 D0 29 0E 90
0B01:0A 0A 18 6D 91 C0 AA A0 FD
0B09:36 29 7F C9 10 D0 06 A2 83
0B11:D0 A0 32 D0 08 C9 18 D0 73
0B19:04 A2 D8 A0 32 8E 92 C0 B0
0B21:8C 93 C0 AD 18 D0 29 0F 9C
0B29:4A 4A 18 6D 91 C0 8D 94 10
0B31:C0 AD 11 D0 29 20 F0 0F FC
0B39:AD 92 C0 29 E0 20 A0 E7
0B41:E0 20 E1 C4 4C 90 C1 A9 2A
0B49:00 8D 95 C0 8D 96 C0 AD 77
0B51:11 D0 29 40 8D 97 C0 AD 47
0B59:93 C0 85 01 A9 00 85 FD 80
0B61:A9 E0 85 FE AD 95 C0 85 EF
0B69:FB AD 96 C0 18 6D 94 C0 28
0B71:85 FC A0 00 B1 FB AE 97 10
0B79:C0 F0 02 29 3F 84 FC 0A 0F
0B81:26 FC 0A 26 FC 0A 26 FC E6
0B89:85 FB 18 A5 FC 6D 92 C0 42
0B91:85 FC B1 FB 91 FD C8 C0 76
0B99:08 D0 F7 A5 FD 18 69 08 6C
0BA1:85 FD 90 02 E6 FE EE 95 D2
0BA9:C0 D0 03 EE 96 C0 AD 95 4C
0BB1:C0 C9 E8 D0 07 AD 96 C0 A1
0BB9:C9 03 F0 03 4C 35 C1 EA 69
0BC1:A9 36 85 01 AD A9 C0 8D 1E
0BC9:AF C0 AD 1D D0 8D B0 C0 4E
0BD1:AD 17 D0 8D B1 C0 AD 10 73
0BD9:D0 8D B2 C0 A0 00 8C B3 EF
0BE1:C0 A0 00 8C B4 C0 84 FC F7
0BE9:8C B5 C0 8C B6 C0 8C B8 1F
0BF1:C0 8C B7 C0 A9 F8 85 FD C8
0BF9:AD 94 C0 18 69 03 85 FE 07
0C01:AC B3 C0 B1 FD A2 05 0A 1E
0C09:26 FC CA 10 FA 85 FB 18 CB
0C11:A5 FC 6D 91 C0 85 FC 4E 66
0C19:B2 C0 2E B8 C0 4E B0 C0 6D
0C21:2E B6 C0 4E B1 C0 2E B5 9D
0C29:C0 4E AF C0 B0 03 4C B5 17
0C31:C2 AD B3 C0 0A AA BD 00 0F
0C39:D0 38 E9 18 8D B7 C0 AD 01
0C41:B8 C0 E9 00 8D B8 C0 BD B1
0C49:01 D0 38 E9 32 8D 9A C0 79
0C51:EA A0 FF 8C B9 C0 A0 00 E1
0C59:8C BD C0 B1 FB 8D BB C0 A8
0C61:8C BC C0 AD B8 C0 8D 99 5F
0C69:C0 AD B7 C0 8D 98 C0 A0 41
0C71:FF 8C BA C0 C8 8C 9E C0 86
0C79:0E BB C0 2E 9E C0 20 CD 88
0C81:C4 A9 01 18 6D 98 C0 8D E4
0C89:98 C0 A9 00 6D 99 C0 8D 34
0C91:99 C0 EE BA C0 AE BA C0 27
0C99:EC B6 C0 D0 E1 EE BC C0 FF
0CA1:AE BC C0 E0 08 D0 C8 A0 1C
0CA9:00 8C BC C0 AC BD C0 C8 2F
0CB1:B1 FB 8D BB C0 8C BD C0 83
0CB9:C0 03 D0 B3 EE 9A C0 EE 9A
0CC1:B9 C0 AE B9 C0 EC B5 C0 3E
0CC9:D0 8C A9 03 18 65 FB 85 A6
0CD1:FB A9 00 65 FC 85 FC EE 8F
0CD9:B4 C0 AE B4 C0 E0 15 F0 42
0CE1:03 4C 22 C2 EE B3 C0 AE 75
0CE9:B3 C0 E0 08 F0 03 4C B2 87
0CF1:C1 EA A9 00 8D 9B C0 20 57
0CF9:90 FF 78 AD 14 03 8D AB B7
0D01:C0 AD 15 03 8D AC C0 AD 08
0D09:18 03 8D AD C0 AD 19 03 6E
0D11:8D AE C0 A9 95 8D 18 03 66
0D19:8D FA FF 8D FE FF A9 C4 A1
0D21:8D 19 03 8D FB FF 8D FF 7C
0D29:FF A9 A4 8D 14 03 A9 C4 DF
0D31:8D 15 03 AD 14 C0 AE 15 A8
0D39:C0 AC 16 C0 20 BA FF A9 43
0D41:00 20 BD FF 20 C0 FF AE CD
0D49:14 C0 20 C9 FF 20 B7 FF 2E
0D51:29 80 F0 03 4C C9 C3 AD 2D
0D59:17 C0 A2 18 A0 C0 20 80 CD
0D61:C4 AD 29 C0 A2 2A A0 C0 3A
0D69:20 80 C4 AD 32 C0 A2 33 34
0D71:A0 C0 20 80 C4 A9 00 8D 72
0D79:98 C0 8D 99 C0 AD 9B C0 10
0D81:8D 9A C0 A9 00 8D A0 C0 F3
0D89:8D 9D C0 20 B6 C4 4E 9E EF
0D91:C0 2E 9D C0 EE 9A C0 EE A9
0D99:A0 C0 AE A0 C0 E0 07 D0 7C
0DA1:EA 18 2E 9D C0 AE 13 C0 7E
0DA9:F0 13 4E 9D C0 A9 00 A2 F3
0DB1:06 4E 9D C0 2A CA 10 F9 B8
0DB9:09 80 8D 9D C0 AD 9D C0 BC
0DC1:20 D2 FF EE 98 C0 D0 03 FB
0DC9:EE 99 C0 AE 98 C0 E0 40 8E
0DD1:D0 AB AE 99 C0 E0 01 D0 0B
0DD9:A4 A9 0D 20 D2 FF AD 9B E1
0DE1:C0 18 69 07 8D 9B C0 C9 26
0DE9:C8 B0 03 4C 32 C3 AD 20 D5
0DF1:C0 A2 21 A0 C0 20 80 C4 8F
0DF9:AD 14 C0 20 C3 FF 20 C3 35
0E01:FF 78 AD AB C0 8D 14 03 13
0E09:AD AC C0 8D 15 03 AD AD D5
0E11:C0 8D 18 03 AD AE C0 8D 5B
0E19:19 03 60 A9 9F 85 FD A9 E1
0E21:C0 85 FE A9 00 8D 9F C0 AF
0E29:AD 9A C0 C9 C8 B0 10 AD 4E
0E31:99 C0 C9 01 90 0A D0 07 E8
0E39:AD 98 C0 C9 40 90 01 60 AD
0E41:AD 9A C0 4A 4A 4A 8D A1 CF
0E49:C0 AD 99 C0 4A AD 98 C0 6B
0E51:6A 4A 4A 8D A2 C0 AD 9A 65
0E59:C0 29 07 8D A3 C0 AD 98 ED
0E61:C0 49 FF 29 07 8D A4 C0 3B
0E69:A9 01 AE A4 C0 F0 04 0A 96
0E71:CA D0 FC 8D A4 C0 A9 00 1B
0E79:85 FE AD A2 C0 0A 26 FE 71
0E81:0A 26 FE 0A 26 FE 18 6D 77
0E89:A3 C0 85 FD A5 FE 69 E0 15
0E91:85 FE AE A1 C0 F0 10 18 22
0E99:A9 40 65 FD 85 FD A9 01 9F
0EA1:65 FE 85 FE CA D0 F0 78 C4
0EA9:A0 00 A9 35 85 01 60 C9 59
0EB1:00 F0 10 86 FB 84 FC A0 01
0EB9:00 AA B1 FB 20 D2 FF C8 8B
0EC1:CA D0 F7 60 78 48 AD 0D C9
0EC9:DD AD 0D DC A9 8F 8D 19 6F
0ED1:D0 68 40 78 AD 0D DD AD 0B
0ED9:0D DC A9 8F 8D 19 D0 68 BC
0EE1:A8 68 AA 68 40 A9 00 8D 7E
0EE9:9E C0 20 EC C3 B1 FD 2D 66
0EF1:A4 C0 F0 03 EE 9E C0 A9 FB
0EF9:36 85 01 60 AD 9E C0 F0 13
0F01:0A 20 EC C3 B1 FD 0D A4 4A
0F09:C0 91 FD A9 36 85 01 60 70
0F11:85 FC 84 FE A0 00 84 FB BB
0F19:84 FD B1 FB 91 FD C8 D0 D5
0F21:F9 E6 FC E6 FE CA D0 F2 BB
0F29:60 00 00 A0 A0 A0 00 4A

```

## Program 2: Printer Changer

```

KC 10 REM COPYRIGHT 1987 COMPU
TE! PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
QK 20 PRINTCHR$(14)CHR$(8)
{CLR}{3 SPACES}COPYRIGHT
1987 COMPUTE! PUB., INC
"
FD 30 PRINTTAB(10)"ALL RIGHTS
{SPACE}RESERVED"
EP 40 DIMM(55):PRINT"{6 DOWN}
{3 SPACES}PARAMETER CHAN
GER FOR PRINTSCREEN"
RG 50 FORJ=0TO54:READM(J):NEXT
:FORI=1TO1500:NEXT
PP 60 PRINT"{CLR}IS YOUR PRINT
ER COMMODORE 1525":PRINT
"COMPATIBLE (Y/N)";
PM 70 INPUTA$:IFAS<>"Y"ANDAS<>
"N"THEN70
MJ 80 M(15)=0:IFAS="Y"THENM(15
)=1
SS 90 PRINT"{DOWN}THE NUMBERS
{SPACE}IN PARENTHESES IN
DICATE"
EG 100 PRINT"THE USUAL VALUES
{SPACE}FOR COMMANDS."
CP 110 PRINT"{DOWN}WHEN PRINTI
NG, WHAT LOGICAL FILE"
RB 120 PRINT"NUMBER DO YOU USE
(14)";:INPUTM(16)
CQ 130 PRINT"{DOWN}WHAT IS YOU
R PRINTER DEVICE":PRINT
"NUMBER (4)";:INPUTM(17
)
RS 140 IFM(15)=1THEN340
HX 150 PRINT"{DOWN}WHAT SECOND
ARY ADDRESS DO YOU WANT
"
CF 160 PRINT"TO USE FOR TRANS
PARENT WITH":PRINT"LINE
FEED (4)";:INPUTM(18)
ES 170 PRINT"{DOWN}WHAT COMMAN
D IS NEEDED TO SET YOUR
"
DX 180 PRINT"PRINTER TO 7/72-I
NCH LINE SPACING?"
XG 190 PRINT"ENTER ONE CODE PE
R QUESTION MARK."
PH 200 PRINT"AFTER YOU'VE ENTE
RED ALL VALUES (IE.,
RF 210 PRINT"27, 65, 7), PRESS
RETURN TO CONTINUE."
MM 220 I=20:I=19:GOSUB390
JD 230 PRINT"{DOWN}WHAT COMMAN
D IS NEEDED TO SET YOUR
"
SM 240 PRINT"PRINTER BACK TO 1
2/72-INCH LINE"
FS 250 PRINT"SPACING (27, 65,
{SPACE}12)";

```



```

PD 260 I=29:L=28:GOSUB390
SD 270 PRINT"[DOWN]WHAT COMMAN
D IS NEEDED TO TURN ON"
AA 280 PRINT"YOUR PRINTER'S DO
T-COLUMN GRAPHICS"
CH 290 PRINT"MODE (27, 75)?"
GC 300 I=38:L=37:GOSUB390
CP 310 M(46)=2:REM NUMBER OF W
IDTH-BYTES FOLLOWING GR
APHIC COMMAND
MX 320 M(47)=64:REM LOW-BYTE O
F WIDTH NUMBER
AJ 330 M(48)=1:REM HIGH-BYTE O
F WIDTH NUMBER
PJ 340 FORJ=0TO55:POKE52996+J,
M(J):NEXT:REM $CF04
PH 350 PRINT"[DOWN]OKAY, YOUR
[SPACE]PRINTER PARAMETE
RS HAVE"
JJ 360 PRINT"BEEN STORED IN ME
MORY.{2 SPACES}NOW, LOA
D"
JM 370 PRINT"AND RUN PRINTSCRE
EN. THEN SAVE"
AD 380 PRINT"IT TO DISK UNDER
[SPACE]A NEW NAME.":END
CD 390 J=0
XR 400 AS$=""
HH 410 INPUT" ";AS$:IFA$=""THEN
440
SR 420 M(I+J)=VAL(AS$):J=J+1
XS 430 IFJ<8THEN400
AQ 440 M(L)=J:RETURN
CF 450 DATA 96,2,25,96,10,1,13
,5,19,96
PJ 460 DATA 8,15,19,20,96
SM 470 DATA 1
QS 480 DATA 14,4,0
GP 490 DATA 1,8,0,0,0,0,0,0,0
FD 500 DATA 1,15,0,0,0,0,0,0,0
DA 510 DATA 0,0,0,0,0,0,0,0,0
XH 520 DATA 0,0,0,0,0,0,0,0,0

```

#### BEFORE TYPING . . .

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

## Root Race

Article on page 44.

### Program 1: Booter

```

CB 10 PRINT"[CLR]{3 DOWN}POKE4
4,64:POKE16384,0:NEW"
BS 20 PRINT"{2 DOWN}LOAD"CHR$(
34)"ROOT RACE"CHR$(34)",
8"
KD 30 PRINT"[4 DOWN]RUN[HOME]"
QF 40 POKE198,3:POKE631,13:POK
E632,13:POKE633,13

```

### Program 2: Root Race

```

KC 10 REM COPYRIGHT 1987 COMPU
TE! PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
BX 20 IFPEEK(49155)<>14THENGOS
UB1600
FB 30 DIMA(17,16),SC(17),V(17,
16):X=RND(-TI)
DS 40 SYS49152:FORT=0TO7:POKE1
4336+160*8+T,255:NEXT
DA 50 PRINT"[CLR]":FORT=54272T
O54296:POKET,0:NEXT:POKE
54296,15
HG 60 POKE53272,31:POKE53281,0
:POKE53280,11:H=1024:CL=

```

```

54272+H:POKE54278,240
AR 70 POKE53280,0:POKE2040,13:
POKE54276,17:FC=252:FD=2
53
CB 80 FORT=0TO127:POKE832+T,0:
NEXT:FORT=0TO7:READX:POK
E832+T*3,X:NEXT:POKE5328
7,1
GC 90 FORT=0TO9:REDEF(T):NEXT
:C(2)=15
KP 100 INPUT"[HOME]{DOWN}[YEL]
1 OR 2 JOYSTICKS";JN:IF
JN=1THENPRINT"[CYN]PLUG
IT IN PORT ONE."
FD 110 IFJN=0ORJN>2THEN100
FB 120 AS$="[BLK]{WHT}[RED]
[CYN]{PUR}[GRN][BLU]
[YEL]{1}{2}{3}{4}{5}{6}
{7}{8}"
QS 130 PRINTCS"[HOME]{4 DOWN}
{RVS}[21 SPACES]{DOWN}"
GQ 140 T=C(2):PRINT"[7]SELECT
[SPACE]GROUND COLOR WIT
H THE SPACE BAR, AND TH
EN HIT F7.{2 DOWN}"
XE 150 IFPEEK(203)=60THENT=T+1
:C(2)=T
GE 160 CS=MID$(AS,(15ANDT)+1,1
):FORX=1TO30:NEXT:IFPEE
K(203)<>3THEN130
BK 170 FORT=1TO15:POKEH+364+T*
2,160:POKECL+364+T*2,T:
NEXT:POKE198,0
KR 180 INPUT"[DOWN]{6}PLAYER O
NE'S ROOT COLOR (1-15)"
:C(0):C(0)=C(0)AND15:IF
C(0)=0THEN180
FJ 190 INPUT"[DOWN]{GRN}PLAYER
TWO'S ROOT COLOR (1-15
)";C(1):C(1)=C(1)AND15:
IFC(1)=0THEN190
QD 200 IFC(0)=C(1)THENPRINT"
[WHT]THOSE COLORS ARE T
HE SAME !!":GOTO180
XD 210 POKE198,0:INPUT"[DOWN]
[YEL]HOW MANY TREES PER
PLAYER (3-9)";TN:IFTN>
9ORTN<3THEN210
AQ 220 Q=TN*2:PRINT"[DOWN]
[WHT]SELECT A GAME: F1=
TWO PLAYERS"
EA 230 PRINT"[15 SPACES]F3=GAM
E DEMONSTRATION"
JM 240 PRINT"[15 SPACES]F5=PLA
YER VS COMPUTER"
HQ 250 GETA$:IFA$=""THEN250
KB 260 IFA$<>"[F1]"ANDAS<>"
[F3]"ANDAS<>"[F5]"THEN2
50
MA 270 P$(0)="COMPUTER ONE":P$
(1)="COMPUTER TWO":IFA$
="[F3]"THEN330
GP 280 IFA$="[F5]"THENP$(0)="P
LAYER 1":P$(1)="COMPU
TE R":INPUT"[DOWN]{CYN}NAM
E";P$(0):GOTO330
GP 290 INPUT"[DOWN]{CYN}PLAYER
ONE'S NAME";P$(0):INPU
T"[DOWN]{8}PLAYER TWO'S
NAME";P$(1)
AH 300 IFP$(0)="COMPUTER ONE"
THENP$(0)="PLAYER ONE"
KC 310 IFP$(1)="COMPUTER TWO"
THENP$(1)="PLAYER TWO"
GJ 320 P$(0)=LEFT$(P$(0),14):P
$(1)=LEFT$(P$(1),14)
SK 330 FORT=0TOQ-1:A(T,0)=T+2:
NEXT
MQ 340 GOSUB1420:POKE53269,1:Q
Z=0
PA 350 U=56320:U2=56321:F=0
SQ 360 M=0:PRINT"[OFF]"

```

```

DX 370 PL=0:CM=AS$="[F3]":GOSUB
1090:IFM=Q-1-RCTHENRC=R
C+1:M=0:L=0
GF 380 IFRC=Q-2THEN420
GF 390 PL=1:CM=AS$="[F5]"ORA$=
"[F3]":GOSUB1090:IFM=Q
-1-RCTHENRC=RC+1:M=0:L=
0
KM 400 IFRC=Q-2THEN420
BS 410 GOTO370
JA 420 S1=SC(A(0,Q-2)-2):S2=SC
(A(1,Q-2)-2):B=(A(0,Q-2
)AND1):POKEFC,0
BF 430 IFS1>S2ANDB=0THENK=0
CA 440 IFS1>S2ANDB=1THENK=1
RA 450 IFS2>S1ANDB=0THENK=1
AA 460 IFS2>S1ANDB=1THENK=0
EX 470 G$=P$(KAND1)
XQ 480 POKE53269,0:POKE198,0:P
OKEFD,0:G2$="S":IFABS(S
1-S2)=1THENG2$=" "
XQ 490 FORT=0TO300:NEXT
RJ 500 IFS1<>S2THENPRINT"
[HOME]{WHT}"SP$[HOME]T
HE WINNER IS [YEL]"G$"
[WHT], WHOSE ROOT"
BS 510 IFS1=S2THENPRINT"[HOME]
[CYN]A TIE GAME. [WHT](
GOOD DEFENSE BY PLAYER
[SPACE]2)"
SF 520 IFS1<>S2THENPRINT"
[HOME]{DOWN}SYSTEM IS"A
BS(S1-S2)"YARD"G2$"LAR
GER."
AS 530 READB,D,X:IFB<0THEN550
GP 540 POKE54272,D:POKEFC,B:FO
RT=1TOX*88:NEXT:GOTO530
XP 550 POKE54272,0:POKEFC,0:RE
STORE:FORT=1TO18:READX:
NEXT
HE 560 PRINT"[HOME]{3 DOWN}{6}
{4 SPACES}PLAY SAME GAM
E AGAIN? (Y<< >>N)";
MC 570 IFPEEK(203)=39ORPEEK(U2
)=247THENPRINT"[CLR]":J
=1:GOTO600
DS 580 IFPEEK(203)=25ORPEEK(U2
)=251THENJ=2:GOTO600
PQ 590 GOTO570
FJ 600 PRINT"[CLR]":FORT=0TO17
:FORX=0TO16:SC(T)=0:A(T
,X)=0:NEXT:NEXT:RC=0:LG
=0
GA 610 ONJGOTO120,330
AF 620 E=0:PRINT"[HOME]
{27 SPACES}";
PA 630 IFRX+D>Q-RC-2THEN780
RA 640 IFRX+D<0THEN780
RF 650 IFA(RX+D,RC+1)AND1<>0TH
EN780
PQ 660 B=INT(RND(-TI)*5):POKEF
D,0:POKEFC,EF(B*2):POKE
FD,EF(B*2+1)
CH 670 A(RX+D,RC+1)=A(RX,RC):S
C(A(RX,RC)-2)=SC(A(RX,R
C)-2)+1:V(RX+D,RC+1)=D+
2
AD 680 T=INT(RND(0)*3)*4
DC 690 IFDTHEN730
BX 700 IFPEEK(X+H)<>143THENPOK
EX+H,140+T/4:GOTO720
QK 710 POKEH+X,130+T
DG 720 POKEH+H+1,131+T:POKEH+C
L,C(PL):POKEH+CL+1,C(PL
)
BH 730 IFNOTDTHEN770
HF 740 POKEH+H-1,128+T:POKEH+C
L-1,C(PL):POKEH+CL,C(PL
)
MB 750 IFPEEK(X+H)<>143THENPOK
EX+H,140+T/4:GOTO770
JE 760 POKEH+X,129+T

```



```

HJ 770 M=M+1:RETURN
HH 780 E=-1:RETURN
KK 790 POKEFD,0:POKEFC,2:POKE5
4276,33
XH 800 PRINT"[HOME]{6}NO MOVES
ARE POSSIBLE FOR "P$(P
L);:FORT=1TO2000:NEXT
QH 810 POKEFC,0:POKE54276,17:R
ETURN
KM 820 IFXT>0THENIFA(XT-1,RY)A
ND1=0ANDA(XT+1,RY)AND1=
0THENDD=NOTDD
GK 830 IFXT=0THENXT=1:DD=0
CM 840 RETURN
BG 850 FF=0:D=1:IFRX<0THENRX=0
FR 860 IFRC=0ANDF=<TN-2THENF=F
+1:RX=TN-1:GOTO1120
DC 870 IFF>1ANDRC>0THENRX=INT(
TN-RY/2)-1:IFRX<0THENRX
=0
QG 880 FF=-1:IFRY>1THEN920
HG 890 DD=-1:IFRX>0THENIF(-A(R
X-1,RY)AND1)THENIF-A(RX
+1,RY)AND1THENRX=RX-1:G
OTO890
QA 900 IFRX>0THENIF(-A(RX-1,RY
)AND1)AND(A(RX+1,RY)AND
1=0)THENDD=0
ER 910 GOTO1120
MJ 920 FORT=0TOTN*2:IF(A(T,1)A
ND1)=0THENNEXT
BD 930 IFT=TNTHENIF-(TNAND1)TH
ENCS=-1:TR=TN+2:GOTO980
EJ 940 IFT=TN-1THENIF(TNAND1)=
0THENCS=-1:TR=TN+3:QZ=-
1:GOTO970
RR 950 LG=0:FORT=3TOTN*2-5STEP
2:IFSC(T)>LGTHENLG=SC(T
):TR=T+2
JS 960 NEXT:CS=0:IFTR>2TNTHEN
CS=-1
MF 970 IFCS=0THEN1040
HM 980 DD=-1:FORT=1TOTN*2-RY-1
:IFA(T,RY)<>TRTHENNEXT
QR 990 XT=T
RE 1000 IF(RY>TN-1)THENIF(-A(X
T+1,RY)AND1)AND(A(0,RY
)AND1=1)THENXT=XT+1
ES 1010 DD=0:GOTO1000
KH 1020 IFQZTHENRX=XT:DD=-1:GO
TO1120
EC 1030 GOTO1080
JR 1040 D=1:DD=0:FORT=TN*2-RYT
O1STEP-1:IFA(T,RY)<>TR
ORA(T,RY+1)>0THENNEXT
PA 1050 XT=T
AQ 1060 IFRY>TN-1ANDXT>0THENIF
(-A(XT-1,RY)AND1)THENX
T=XT-1:DD=-1:GOTO1060
FE 1070 IFPEEK(203)=2THENDD
BX 1080 GOSUB820:RX=XT:GOTO112
0
SB 1090 PRINT"[HOME]{WHT}"SP$;
"[HOME]"P$(PL)""S MOVE
..":RX=0:RY=RC:D=1
RB 1100 POKE53269,0:B=0:E=0:FF
=0:IFCMTHENRX=INT(RND(
1)*(Q-RY-2))
AB 1110 IFA$="[F5]"ANDPL=1THEN
850
HJ 1120 IF(RX>Q-RC-1)ANDBTHENR
X=0
GR 1130 IF(RX<0)ANDBTHENRX=Q-R
C-1
HK 1140 IFRX>Q-RC-1ANDNOTBTHEN
E=E+1:RX=0
GK 1150 IFRX<0ANDNOTBTHENE=E+1
:RX=Q-RC-1
AE 1160 PY=99+RC*8:PX=(CE+RC)*
8+24+RX*16:IFE>1THEN79
0
GK 1170 IF(A(RX,RC)AND1)<>PLTH
ENRX=RX+D:GOTO1120
QX 1180 X=INT((PX-24)/8)+INT((
PY-50)/8)*40
JR 1190 IFPEEK(X+H+1)<>148ANDP
EEK(X+H-1)<>148THENRX=
RX+D:GOTO1120
CD 1200 IFPX>255THENPOKE53264,
1
GA 1210 IFPX<256THENPOKE53264,
0
XM 1220 POKE53248,PXAND255:POK
E53249,PY:B=-1:POKE532
69,1
RD 1230 IFNOTCMTHEN1270
SK 1240 D=INT(RND(1)*2)-1:IFFF
THEND=DD
CM 1250 GOSUB620:IFETHEND=INT(
RND(1)*2)-1:GOTO1250
KS 1260 RETURN
AP 1270 J=1:IFPL=1ANDJN=2THENP
OKE56322,0:J=0
GG 1280 IF(PEEK(U+J)AND8)=0THE
NRX=RX+1:D=1:GOTO1100
QM 1290 IF(PEEK(U+J)AND4)=0THE
NRX=RX-1:D=-1:GOTO1100
HK 1300 POKEU,127
DB 1310 IF(PEEK(U+J)AND16)>0TH
EN1270
EC 1320 PRINT"[HOME]{OFF}WHICH
WAY???{19 SPACES}";
DM 1330 D=-2
FK 1340 IF(PEEK(U+J)AND8)=0THE
ND=0
KE 1350 IF(PEEK(U+J)AND4)=0THE
ND=-1
KD 1360 POKE56322,255
FH 1370 IFD=-2THEN1340
AD 1380 GOSUB620:IFNOTETHENRET
URN
JJ 1390 PRINT"[HOME]{5 SPACES}
{YEL}I M P O S S I B L
E{3 SPACES}M O V E"
AQ 1400 POKEFD,0:POKE54276,33:
FORK=0TO5*STEP.2:POKE
FC,ABS(SIN(K)*9)+3:NEX
T
QR 1410 POKE54276,17:POKEFC,0:
GOTO1090
FJ 1420 SP$="{40 SPACES}":CE=2
0-Q:G$="":G2$=""
MX 1430 PRINT"[CLR]{3 DOWN}"SP
$C$"{DOWN}"
JJ 1440 FORT=2TOCE:G$=G$+" ":N
EXT:G$=G$+"U"
SF 1450 FORT=1TOCE:G2$=G2$+" "
:NEXT:G2$="V"+G2$
DQ 1460 D$="OT":FORT=1TOQ-2:D$
=D$+"OT":NEXT:D$=D$+"O
"
QP 1470 G$="{RVS}"+"G$
HP 1480 X=160+H+CE:X2=160+CL+C
E:FORT=0TOTN-1:POKEX+T
*4,147:POKEX2+T*4,C(0)
GJ 1490 POKEX+T*4+40,146:POKEX
2+T*4+40,C(0):POKEX+T*
4+2,145:POKEX2+T*4+2,C
(1)
XH 1500 POKEX+T*4+42,144:POKEX
2+T*4+42,C(1)
AB 1510 NEXT
DX 1520 FORT=1TOQ-2
DD 1530 PRINTG$"{5}"D$C$G2$;:D
$=LEFT$(D$,LEN(D$)-2):
G2$=G2$+" "
AH 1540 G$=" "+G$
EC 1550 NEXT
SG 1560 IFTN<10THENFORT=1TO(10
-TN)*2:PRINTSP$;:NEXT
T=(10-TN)*2
PG 1580 FORK=0TO2:POKE56276-K-
T*40,14:NEXT
AR 1590 PRINT"[HOME]{WHT}";:RE
TURN
FK 1600 POKE53281,1:POKE53280,
1:PRINT"[CLR]{1}
{3 SPACES}COPYRIGHT 19
87 COMPUTE! PUB., INC.
"
SD 1610 PRINTTAB(10)"ALL RIGHT
S RESERVED{6 DOWN}"
RE 1620 PRINTTAB(11)"{RVS}R O
{SPACE}O T{3 SPACES}R
{SPACE}A C E{DOWN}"
JG 1630 FORT=1TO350:READA:X=X+
A:NEXT
CK 1640 IFX<>25073THENPRINT"ER
ROR IN DATA STATEMENTS
.":STOP
SM 1650 RESTORE:FORT=1TO66:REA
DX:NEXT
DP 1660 FORT=0TO99:READX:POKE4
9152+T,X:NEXT:FORT=0TO
183:READX:POKE15360+T,
X:NEXT
AF 1670 RESTORE:RETURN
FR 1680 DATA 24,60,126,255,219
,24,24,24,18,70,16,16,
21,113,18,50,5,131
MF 1690 DATA 16,195,1.5,14,239
,1,16,195,1.5,18,209,1
,16,195,1.5
PM 1700 DATA 18,209,1,21,31,1.
5,18,209,1,42,62,1.5,3
1,165,1,42,62,1.5
BB 1710 DATA 31,165,1,18,209,1
.5,31,165,1,50,60,2.5,
-1,-1,-1
CA 1720 DATA 169,0,141,14,220,
169,251,37,1,133,1,162
,0,189,0,208,157,0,56
AG 1730 DATA 189,0,209,157,0,5
7,232,208,241,165,1,9,
4,133,1,169,1,141,14
JC 1740 DATA 220,169,27,141,17
,208,169,127,141,13,22
0,169,65,141,20,3,169,
192,141
DS 1750 DATA 21,3,169,129,141,
26,208,96,165,252,240,
5,24,101,253,133,252,1
41,1
BX 1760 DATA 212,169,1,141,25,
208,169,0,141,18,208,1
73,13,220,41,1,240,3,7
6
RD 1770 DATA 49,234,76,188,254
FF 1780 DATA 0,0,0,3,6,12,24,2
4,24,24,48,224,0,0,0,0
,24,24,48,51,30
FG 1790 DATA 0,0,0,0,0,0,224,4
8,24,24,24,0,0,0,1,3,6
,12,24,24,24,112,192
EM 1800 DATA 0,0,0,0,24,24,12,
6,3,0,0,0,0
FP 1810 DATA 0,0,192,240,24,24
,24,0,0,0,15,24,48,48,
24,24,112,192,128
QC 1820 DATA 0,0,0,0,24,12,12,
7,0,0,0,0,0,0,0,0,224,
48,24
RE 1830 DATA 24,24,24,60,231,1
29,0,0,0,28,54,99,193,
0,0,0,0,24,120
DK 1840 DATA 200,203,14,0,0,0,
0,0,0,0,0,0,0,126,24
,255,24,255
CG 1850 DATA 24,60,126,0,0,24,
24,60,24,126,24,255,60
,24,24,24,60,126,219
GM 1860 DATA 0,24,60,60,126,12
6,255,255,0,0,0,56,124
,56,0,0,128,192,224
JM 1870 DATA 240,248,252,254,2
55,1,3,7,15,31,63,127,
255

```



## BEFORE TYPING . . .

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

# Dynamic Screen

Article on page 92.

## Program 1: Dynamic Screen

```
KC 10 REM COPYRIGHT 1987 COMPU
TE! PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
MK 20 B=53280:BA=B+1:X=211:CY=
214:XR=781:YR=782:SC=102
4:CO=54272:CC=646
GH 30 IFPEEK(65530)=5THENBANK1
5:X=236:CY=235:XR=7:YR=8
:CC=241
SE 40 IFPEEK(65530)<>164THEN60
AR 50 B=65305:BA=B-4:X=202:CY=
X+3:XR=2035:YR=2036:SC=3
072:CO=-1024:CC=1339:P=1
PP 60 PRINTCHR$(8)CHR$(14)"
[CLR]{3 SPACES}COPYRIGHT
1987 COMPUTE! PUB., INC
.
DQ 70 PRINTTAB(10)"ALL RIGHTS
[SPACE]RESERVED":FORI=1T
O2000:NEXT
CJ 80 NA=4:PORT=1TONA:REDAY(T
),AW(T),AM$(T):NEXT
BK 90 DATA10,13,"EDIT SCREEN",
11,13,"READ SCREEN"
DM 100 DATA12,13,"DIRECTORY":D
ATA13,13,"EXIT"
FQ 110 GOSUB280:PRINTTAB(11)"
[4 DOWN]{WHT}- EDIT SCR
EEN[5 SPACES]-"
AM 120 PRINTTAB(11)"- READ SCR
EEN[5 SPACES]-"
SK 130 PRINTTAB(11)"- DIRECTOR
Y[7 SPACES]-"
RS 140 PRINTTAB(11)"- EXIT
[12 SPACES]-"
BA 150 PRINTTAB(11)"[Z]*****
*****[X]"
GM 160 PRINTTAB(11)"[6 UP]{A}*
*****[S]"
QS 170 REM GET COMMANDS
FE 180 A=1
AA 190 W=AW(A):Y=AY(A):GOSUB27
0:PRINT"[RVS]{WHT}"AM$(
A)"[OFF]";
CS 200 GETA$:IFA$=""THEN200
FE 210 W=AW(A):Y=AY(A):GOSUB27
0:PRINT"[WHT]"AM$(A);
PD 220 IFA$=CHR$(13)THEN260
CH 230 IFA$="{DOWN}"THENA=A+1+
(A>NA-1)*NA
HD 240 IFA$="{UP}"THENA=A-1-(A
<NA-2)*NA
KF 250 GOTOL90
KR 260 ONAGOTO470,400,690,880:
GOTO80
GG 270 POKEXR,Y:POKEYR,W:SYS65
520:RETURN
DF 280 POKEB,6:POKEBA,6
HR 290 PRINT"[CLR]{2 SPACES}
{CYN}{RVS}[A]*****
*****[S]"
* [S]
RD 300 PRINT"[2 SPACES]{RVS}-
[2 SPACES][Z][A]*****
```

```
*****
[SS][CYN]{2 SPACES}-"
FP 310 FORI=1TO16:PRINT"
[2 SPACES]{RVS}-
[2 SPACES][Z]-
[28 SPACES]-{CYN}
[2 SPACES]-":NEXT
HF 320 PRINT"[2 SPACES]{RVS}-
[2 SPACES][Z][Z]*****
*****
[X][CYN]{2 SPACES}-"
DB 330 PRINT"[2 SPACES]{CYN}
{RVS}[Z]*****
*****[X]"
JF 340 PRINT"[DOWN]{2 SPACES}
{RVS}{WHT}CRSR[OFF]=CHO
ICE[9 SPACES]{RVS}{WHT}
RETURN[OFF]=EXECUTE"
XE 350 GOSUB900:PRINT"[HOME]
[2 DOWN]":PRINTTAB(9)"
[RVS]{WHT}[A]*****
*****[S]"
JE 360 PRINTTAB(9)"[RVS]-DYNAM
IC SCREEN: MENU-"
EE 370 PRINTTAB(9)"[RVS][Z]***
*****[X]"
HS 380 RETURN
XJ 390 REM READ FILE
GX 400 GOSUB970
PR 410 OPEN15,8,15:OPEN2,8,2,"
0:£"+F$+"S,R":GOSUB65
0:GOSUB940:IFDETHEN870
MQ 420 GET#2,B$:IFST=0THENPRIN
TA$+CHR$(0):GOTO420
EK 430 PRINT"[HOME]":POKEY,22
:PRINT:POKEY,15:PRINT"
[BLK]PRESS [RVS]RETURN
[OFF]{HOME}"
MB 440 GETA$:IFA$=""ORA$<>CHR$(
13)THEN440
JE 450 GOTO870
JC 460 REM WRITE SCREEN FILE
XJ 470 OPEN15,8,15:GOSUB970:PR
INT"[CLR]"
PR 480 PRINT#15,"S0:£"+F$:GOS
UB940:OPEN2,8,2,"0:£"+
F$+"S,W"
FG 490 PRINT"[CLR]{BLK}{RVS} C
OMLETE YOUR SCREEN AND
PRESS RETURN[2 SPACES]
[OFF]"
EK 500 FORI=1TO2000:NEXT:GOSUB
650
CB 510 GETA$:GOSUB570
PK 520 IFA$=""THEN510
HX 530 IFA$=CHR$(20)ORA$=CHR$(
148)THEN510
XF 540 IFA$=CHR$(13)THENPRINT#
2:GOTO870
BR 550 PRINTA$:PRINT#2,A$:GO
TO510
HH 560 REM GET CURSOR
ME 570 WL=PEEK(X)
XS 580 IFWL>39THENWL=WL-40:GOT
O580
BK 590 WL=WL+PEEK(CY)*40+SC
HG 600 POKECO+WL,PEEK(CC):WO=P
EEK(WL):WT=WO:WQ=128:IF
WO>127THENWQ=-WQ
SJ 610 WT=WT+WQ:POKEWL,WT:WQ=-
WQ:FORWR=1TO40
RM 620 GETA$:IFA$<>""THENPOKEW
L,WO:WR=40:NEXTWR:RETUR
N
FA 630 NEXTWR:GOTO610
EM 640 REM BORDER
XJ 650 A=40:C=23:PRINT"[BLK]
[CLR]{RVS}[A]":FORH=1T
OA-2:PRINT"*":NEXT
PG 660 PRINT"[S]":FORV=1TOC:P
RINT"-SPC(A-2)"-":NEX
T
```

```
AM 670 FORI=1TO40:POKESC+CO+96
0+I,0:NEXT:POKESC+960,2
37:FORI=0TO37
XX 680 POKESC+961+I,192:NEXT:P
OKESC+999,253:PRINT"
[2 HOME]":POKEX,4:RETUR
N
XG 690 PRINT"[CLR]{BLK}{RVS}
[6 SPACES]BLOCKS
[2 SPACES]PROGRAMS
[4 SPACES]FILE TYPE
[5 SPACES][OFF]"
JR 700 POKEB,2:POKEBA,15-(P=1)
*34:OPEN15,8,15:OPEN2,8
,0,"S0":GOSUB940
CX 710 GET#2,A$,B$
GC 720 GET#2,A$,B$:GET#2,A$,B$
EB 730 A=0:IFA$<>""THENA=ASC(A
$)
CH 740 IFB$<>""THENA=A+ASC(B$)
*256
DD 750 PRINT"[9 RIGHT]{RVS}"MI
D$(STR$(A),2);TAB(12);"
[OFF]";
RK 760 GET#2,B$:IFST<>0THEN850
RP 770 IFB$<>CHR$(34)THEN760
QF 780 GET#2,B$:IFB$<>CHR$(34)
THENPRINTB$:GOTO780
KC 790 GET#2,B$:IFB$=CHR$(32)T
HEN790
JC 800 PRINTTAB(28);A$=""
QC 810 A$=A$+B$:GET#2,B$:IFB$<
>""THEN810
SQ 820 PRINT"[RVS]"LEFT$(A$,3)
:IFLEFT$(A$,3)="SEQ"THE
NPRINTTAB(34)"[UP]{RED}
<=[BLK]"
EF 830 GETA$:IFA$<>""THEN870
HH 840 IFST=0THEN720
FP 850 PRINT"BLOCKS FREE":PRI
NT"[14 RIGHT]PRESS
[RVS]RETURN[OFF]"
EE 860 GETA$:IFA$<>CHR$(13)THE
N860
EM 870 CLOSE2:CLOSE15:GOTO110
RX 880 PRINT"[CLR]":END
EE 890 REM TONE
CX 900 IFPEEK(65530)=164THENVO
L7:SOUND1,881,9:RETURN
GE 910 POKE54296,15:POKE54276,
33:POKE54277,9:POKE5427
8,0
MB 920 POKE54273,34:POKE54286,
75:FORI=1TO400:NEXT:POK
E54276,2
MB 930 RETURN
XX 940 INPUT#15,A$,B$,C$,D$
JM 950 DE=0:IFVAL(A$)>0THENPRI
NTA$,B$,C$,D$:FORT=1TO2
000:NEXT:DE=1
SD 960 RETURN
CA 970 INPUT"[HOME]{23 DOWN}
[3 RIGHT]FILENAME";F$:I
FLEN(F$)>15THEN970
DB 980 IFF$=""THENCLOSE15:GOTO
110
BF 990 PRINT"[CLR]{BLK}":POKEB
,1:POKEBA,15-(P=1)*34:R
ETURN
```

## Program 2: Dynamic Screen Reader

```
KC 10 REM COPYRIGHT 1987 COMPU
TE! PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
GD 20 B=53280:BA=B+1:X=211:CY=
214:SC=1024:CO=54272
JE 30 IFPEEK(65530)=5THENBANK1
5:X=236:CY=235
SE 40 IFPEEK(65530)<>164THEN60
QH 50 B=65305:BA=B-4:X=202:CY=
```



```

X+3:SC=3072:CO=-1024:P=1
PP 60 PRINTCHR$(8)CHR$(14)"
{CLR}[3 SPACES]COPYRIGHT
1987 COMPUTE! PUB., INC
"
DQ 70 PRINTTAB(10)"ALL RIGHTS
{SPACE}RESERVED":FORI=1T
O2000:NEXT
BG 80 PRINT"[CLR][BLK]":POKEB,
1:POKEBA,15-(P=1)*34:F$=
"DEMO":REM SCREEN FILENA
ME
EG 90 OPEN15,8,15:OPEN2,8,2,"0
:E"+F$+"S,R":GOSUB160:
GOSUB200
QF 100 IFDTHEN140
QR 110 GET#2,A:IFST=0THENPRIN
TA$+CHR$(0):GOTO110
HF 120 PRINT"[HOME]":POKEYC,22
:PRINT:POKEY,15:PRINT"
{BLK}PRESS{RVS}RETURN
{OFF}[HOME]"
AF 130 GETA$:IFA$=""ORA$<>CHR$(
13)THEN130
JQ 140 CLOSE2:CLOSE15:PRINT"
{CLR}":END
KR 150 REM BORDER
SK 160 A=40:C=23:PRINT"[BLK]
{CLR}[RVS][A$]":FORH=1T
OA-2:PRINT"*":NEXT
EA 170 PRINT"[S$]":FORV=1TOC:P
RINT"- "SPC(A-2)"-":NEX
T
PP 180 FORI=1TO40:POKESC+CO+96
0+I,0:NEXT:POKESC+960,2
37:FORI=0TO37
RA 190 POKESC+961+I,192:NEXT:P
OKESC+999,253:PRINT"
[2 HOME]":POKEY,4:RETUR
N
KS 200 INPUT#15,A$,B$,C$,D$
JP 210 DE=0:IFVAL(A$)>0THENPRI
NTA$,B$,C$,D$:FORT=1TO2
000:NEXT:DE=1
CD 220 RETURN

```

#### BEFORE TYPING . . .

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

## Disk Rapid Transit

See instructions in article on page 91 before typing in.

```

0801:0B 08 0A 00 9E 32 30 36 2E
0809:33 00 00 00 00 0A 9F 15
0811:A8 A2 08 20 BA FF A2 9F DB
0819:A0 14 A9 05 20 BD FF 20 1C
0821:EE 11 A9 0F 20 C3 FF A9 CC
0829:08 8D D6 12 A5 01 29 FE 1F
0831:85 01 A2 FE 9A A2 03 A9 97
0839:00 95 00 E8 E0 2B D0 F9 8C
0841:20 E7 FF A2 00 BD 1D 13 C9
0849:20 D2 FF E8 E0 EF D0 F5 0B
0851:AE D6 12 A9 00 20 8E 12 FA
0859:20 E4 FF C9 58 D0 07 A9 0D
0861:07 85 01 6C 02 A0 C9 24 87
0869:D0 03 4C 7D 0F C9 52 D0 19
0871:03 4C EE 0D C9 54 D0 0B 11
0879:AD D6 12 49 01 8D D6 12 EA
0881:4C 2D 08 C9 0D F0 A5 C9 E1
0889:31 90 CD C9 33 C9 C9 38 D4
0891:E9 31 AA BD DA 12 8D D6 25
0899:12 BD D8 12 8D D7 12 20 6E

```

```

08A1:96 0B 20 8B 11 20 CB 0D 2A
08A9:20 E4 FF C9 0D D0 F9 A9 E8
08B1:0F A2 08 A8 20 BA FF A9 13
08B9:00 20 BD FF 20 EE 11 20 88
08C1:D8 11 20 0B 12 90 0B 20 40
08C9:CC FF A9 0F 20 C3 FF 4C C2
08D1:2D 08 20 CC FF A9 12 8D A3
08D9:8B 12 A9 00 8D 8C 12 20 4C
08E1:6A 12 20 E4 FF 85 61 20 F6
08E9:E4 FF 85 62 20 CC FF A9 21
08F1:0F 20 C3 FF A9 12 8D 7F 3A
08F9:19 A9 00 8D 80 19 A9 00 95
0901:85 07 A9 1A 85 08 AD D7 ED
0909:12 8D D5 12 20 6D 16 A5 EB
0911:08 85 25 A9 00 85 0D A9 A1
0919:00 85 03 A9 1B 85 04 A0 1F
0921:02 B1 03 F0 1D C9 84 F0 1A
0929:19 A0 1F B1 03 D0 13 A0 11
0931:1E A9 BE 38 E5 08 D1 03 0E
0939:90 08 E6 0D A0 01 A9 FF 9F
0941:91 03 A9 20 18 65 03 85 F5
0949:03 D0 D4 A0 00 B1 03 F0 73
0951:05 E6 04 4C 20 09 A5 0D 62
0959:D0 03 4C 2D 08 A9 00 85 5D
0961:22 85 1D A9 93 20 D2 FF E6
0969:A5 22 0A 0A 0A 0A 20 26 97
0971:0B A5 0D 4A 4A 4A 85 E4
0979:20 A5 0D 29 0F 85 21 A9 B3
0981:00 85 1F A9 13 20 D2 FF 32
0989:A0 01 B1 03 30 10 18 A5 2A
0991:03 69 20 85 03 A5 04 69 FB
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0B69:F0 04 C8 4C 5E 0B A2 14 4F
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1769:08 A9 00 8D 11 D0 A9 00 FD
1771:8D 0E DC 58 A9 0F 20 C3 98
1779:FF 60 A9 A4 20 D2 FF A9 35
1781:04 20 D2 FF 20 CC FF 78 C0
1789:A9 07 8D 00 DD A5 08 8D 23
1791:9F 17 2C 00 DD 30 FB A9 2C
1799:00 8D 9E 17 AD 00 1A 85 97
17A1:FF A2 04 2C 00 DD 10 FB 4F
17A9:A9 00 06 FF 2A 06 FF 2A 01
17B1:A8 B9 EA 17 8D 00 DD CA 64
17B9:D0 EE 48 68 48 68 EA A9 FE
17C1:07 8D 00 DD EE 9E 17 D0 A5
17C9:D3 A0 00 B1 07 F0 05 E6 12
17D1:08 4C 8E 17 E6 08 AD 6B 78
17D9:17 8D 11 D0 AD 70 17 8D 11
17E1:0E DC A9 0F 20 C3 FF 58 DC
17E9:60 07 17 27 37 00 A9 4D B9
17F1:20 D2 FF A9 2D 20 D2 FF 0F
17F9:60 AD 00 1C 49 08 8D 00 0B
1801:1C A9 03 85 31 A5 22 C5 8C
1809:08 D0 68 2C 83 04 10 03 90
1811:4C C8 04 20 0A F5 50 FE E3
1819:B8 AD 01 1C 91 30 C8 D0 A2
1821:F5 A0 BA 50 FE B8 AD 01 08
1829:1C 99 00 01 C8 D0 F4 20 71
1831:E0 F8 AD 01 03 85 09 AD C3
1839:00 03 85 08 AD 00 03 85 54
1841:21 A2 04 A9 00 8D 00 18 14
1849:A9 00 06 21 2A 06 21 2A F6
1851:A8 B9 7F 04 8D 00 18 CA DB
1859:D0 EE 48 68 48 68 48 68 1A
1861:A9 02 8D 00 18 EE 44 04 A1
1869:D0 D2 A5 08 D0 8B A9 01 F4
1871:4C 69 F9 A9 00 4C 69 F9 F9
1879:0A 02 08 00 00 00 A9 02 85
1881:8D 00 18 A9 00 8D 83 04 57

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1889:AD 85 05 85 08 AD 86 05 F3
1891:85 09 A9 E0 85 01 A5 01 86
1899:30 FC F0 F6 60 A9 02 8D E9
18A1:00 18 A9 FF 8D 83 04 A9 39
18A9:00 8D 84 04 AD 85 05 85 21
18B1:08 AD 86 05 85 09 A9 E0 F6
18B9:85 01 A5 01 30 FC F0 F6 FF
18C1:60 2C 84 04 10 75 20 9E 7E
18C9:F5 85 3A 20 8F F7 20 10 4C
18D1:F5 A2 09 50 FE B8 CA D0 0D
18D9:FA A9 FF 8D 03 1C AD 0C BA
18E1:1C 29 1F 09 C0 8D 0C 1C 4F
18E9:A9 FF A2 05 8D 01 1C B8 F4
18F1:50 FE B8 CA D0 FA A0 BB 3D
18F9:B9 00 01 50 FE B8 8D 01 23
1901:1C C8 D0 F4 B1 30 50 FE CA
1909:B8 8D 01 1C C8 D0 F5 50 A2
1911:FE AD 0C 1C 09 E0 8D 0C 64
1919:1C A9 00 8D 03 1C A9 00 78
1921:8D 84 04 AD 86 05 85 09 F2
1929:AD 85 05 85 08 F0 07 C5 64
1931:22 F0 08 4C 7A 04 A9 01 AE
1939:4C 69 F9 A2 04 A9 00 8D A9
1941:00 18 48 68 48 68 EA EA AD
1949:48 68 48 68 AD 00 18 4A 31
1951:26 21 4A 4A 26 21 48 68 7B
1959:CA D0 F1 A9 02 8D 00 18 5C
1961:A5 21 8D 00 03 FE 6A 05 0E
1969:D0 D1 A9 FF 8D 84 04 AD E1
1971:00 03 8D 85 05 AD 01 03 52
1979:8D 86 05 00 04 11 00 AB
1981:00 00 00 00 00 00 00 B3

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C100:09 C0 20 23 C0 EE 09 C0 03
C108:AD 09 C0 C9 5B D0 F0 60 B9
C110:A0 18 A9 00 99 00 D4 88 1E
C118:D0 FA A9 0F 8D 18 D4 A9 09
C120:80 8D 0C D4 A9 F0 8D 0D 4F
C128:D4 60 20 F4 C0 20 10 C1 E9
C130:A9 8E 20 D2 FF A9 08 20 34
C138:D2 FF A9 00 8D 21 D0 A9 96
C140:0B 8D 20 D0 A0 00 A9 05 1B
C148:8D 08 D4 A9 21 8D 0B D4 F3
C150:18 A2 02 A0 0E 20 F0 FF A5
C158:A0 00 8C 16 C0 B9 94 C1 F6
C160:F0 07 20 D2 FF C8 4C 5D 68
C168:C1 20 E4 FF C9 31 D0 08 2E
C170:A9 01 8D 12 C0 4C E2 C3 9C
C178:C9 32 D0 08 A9 00 8D 12 82
C180:C0 4C E2 C3 C9 33 D0 06 D2
C188:20 10 C1 4C 86 C3 20 F5 17
C190:C1 4C 69 C1 9E 41 4E 49 31
C198:4D 41 4C 20 4D 41 54 43 F9
C1A0:48 11 11 D0 9A 20 20 50 65
C1A8:52 45 53 53 3A 0D 0D 96 FC
C1B0:20 20 20 31 20 46 4F 38
C1B8:52 20 4B 45 59 53 20 4F D2
C1C0:4E 4C 59 0D 0D 99 20 20 A9
C1C8:20 20 32 20 46 4F 52 20 E0
C1D0:4B 45 59 53 20 41 4E 44 92
C1D8:20 53 48 41 50 45 53 0D A9
C1E0:0D 97 20 20 20 20 33 20 DE
C1E8:54 4F 20 45 58 49 54 20 73
C1F0:47 41 4D 45 00 AC 10 C0 F9
C1F8:C0 08 D0 02 A0 00 B9 1A AB
C200:C2 8D 18 D4 B9 12 C2 8D C3
C208:15 C0 C8 8C 10 C0 20 FA E8
C210:C0 60 00 02 08 07 05 06 9A
C218:04 00 01 03 05 07 09 06 4C
C220:04 02 A9 11 8D 0B D4 18 C8
C228:AD 0A C0 69 8D 0A C0 01
C230:8D 07 D4 D0 17 EE 0B C0 31
C238:AD 0B C0 8D 08 D4 C9 64 D3
C240:D0 0A A9 10 8D 0B D4 A9 D2
C248:00 8D 18 C0 60 A9 81 8D 7A
C250:12 D4 A9 0A 8D 0F D4 60 9C
C258:A2 23 A9 00 9D E8 C6 CA 16
C260:10 FA 60 20 58 C2 A2 12 DF
C268:A9 80 8D 1C C0 AD 1B D4 1E
C270:C9 24 B0 F9 A8 B9 E8 C6 5E
C278:D0 F3 8A 99 E8 C6 AD 1C 28
C280:C0 F0 88 A9 00 8D 1C C0 6D
C288:4C 6D C2 A9 80 8D 1C C0 B5
C290:CA D0 DA 60 A9 0D 8D F8 A6
C298:07 A9 0E 8D F9 07 A9 0F F4
C2A0:8D FA 07 AD 14 C0 20 7C C7
C2A8:C3 AC 14 C0 B9 1D C0 20 AD
C2B0:7A CB 20 3F C5 AC 14 C0 28
C2B8:B9 21 C0 A8 B9 D0 C0 8D 26
C2C0:04 C0 B9 AC C0 8D 05 C0 81
C2C8:20 47 C3 AD 14 C0 0A A8 E3
C2D0:AD 04 C0 99 00 D0 C8 AD 62
C2D8:05 C0 99 00 D0 AD 03 C0 48
C2E0:F0 0B AC 14 C0 C8 98 0D DF
C2E8:10 D0 8D 10 D0 AE 14 C0 87
C2F0:E8 8A 0D 15 D0 8D 15 D0 38
C2F8:AC 14 C0 B9 1D C0 A8 88 53
C300:B9 22 C6 8D 0E C0 AC 14 7F
C308:C0 99 27 D0 60 18 A2 05 F5
C310:A0 03 20 F0 FF AD 0E C0 4F
C318:8D 86 02 AD 14 C0 D0 06 6E
C320:18 A2 08 20 F0 FF AC 14 54
C328:C0 B9 1D C0 A8 C0 01 F0 69
C330:07 18 69 09 88 4C 2D C3 92
C338:A8 A2 0A 88 B9 34 C6 2D D2
C340:D2 FF C8 CA D0 F6 60 AD C7
C348:05 C0 0A 0A 0A 8D 05 C0 B5
C350:18 AD 05 C0 69 32 8D 05 30
C358:C0 A0 03 A9 00 8D 03 C0 60
C360:18 2E 04 C0 2E 03 C0 88 93
C368:D0 F6 18 AD 04 C0 69 18 02
C370:8D 04 C0 AD 03 C0 69 00 A0
C378:8D 03 C0 60 A2 03 86 FC D0
C380:A2 40 86 FB AA E0 00 F0 C3
C388:0B CA 18 A5 FB 69 40 85 31
C390:FB 4C 85 C3 60 A9 06 8D 59
C398:86 02 18 A2 0B A0 00 20 0C
C3A0:F0 FF A0 28 A9 A4 20 D2 2A

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#### BEFORE TYPING . . .

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

## Animal Match

See instructions in article on page 48 before typing in.

```

C000:4C 2A C1 00 08 E2 5A 00 F1
C008:23 5B 08 00 00 00 0E 05 14
C010:02 02 01 01 01 02 00 01 54
C018:0A 0A 00 00 80 0D 0D 4D C0
C020:52 16 1B C9 30 90 5A C9 92
C028:5B B0 56 C9 41 B0 07 C9 8F
C030:3A 90 03 4C 81 C0 A0 00 68
C038:8C 13 C0 8D 06 C0 C9 41 BD
C040:90 03 38 E9 07 38 E9 30 8D
C048:8D 08 C0 A8 BE AC C0 B9 19
C050:D0 C0 A8 18 20 F0 FF AD 73
C058:15 C0 8D 86 02 A0 00 AD EE
C060:16 C0 F0 0C B9 9B C0 20 D9
C068:D2 FF C8 C0 11 D0 F5 60 90
C070:B9 87 C0 20 D2 FF C8 C0 B3
C078:14 D0 F5 AD 06 C0 20 D2 18
C080:FF A0 01 8C 13 C0 60 D5 45
C088:C0 C9 11 9D 9D 9D DD 20 18
C090:DD 11 9D 9D 9D CA C0 CB 38
C098:91 9D 9D 20 20 20 11 9D 41
C0A0:9D 9D 20 20 20 11 9D 9D 7C
C0A8:9D 20 20 20 0D 0D 0D 0D CA
C0B0:0D 0D 0D 0D 0D 13 16 47
C0B8:16 13 10 13 13 13 10 13 55
C0C0:13 13 16 16 10 10 10 10 A5
C0C8:13 10 10 16 10 16 10 16 4A
C0D0:1F 04 07 0A 0D 10 13 16 49
C0D8:19 1C 06 14 0E 0C 0B 0F B5
C0E0:12 15 1A 18 1B 1E 1A 17 12
C0E8:1D 20 05 0E 09 11 17 11 4E
C0F0:08 0B 14 0B A9 93 20 D2 EA
C0F8:FF 60 A9 30 8D 09 C0 AD 8A

```



C3A8:FF	88	D0	FA	18	A2	03	A0	0E	C650:20	20	20	20	20	44	45	45	DD	C8F8:00	00	00	00	00	00	00	00	00	00	00	8A	
C3B0:12	20	F0	FF	A0	00	B9	C2	A2	C658:52	20	20	20	20	20	5A	45	98	C900:00	00	00	00	00	00	00	00	00	00	00	93	
C3B8:C3	20	D2	FF	C8	C0	06	D0	AA	C660:42	52	41	20	20	20	20	20	AF	C908:00	00	00	00	00	00	00	00	00	00	00	9B	
C3C0:F5	60	1E	43	59	43	4C	45	09	C668:4C	49	5A	41	52	44	20	20	D1	C910:01	C0	00	07	60	00	01	F8	C2				
C3C8:18	A2	05	A0	14	20	F0	FF	B2	C670:20	45	4C	45	50	48	41	4E	B1	C918:00	00	EE	00	00	00	EF	00	00	00	49		
C3D0:AE	11	C0	E8	8E	11	C0	A9	7E	C678:54	20	20	53	51	55	49	52	36	C920:73	80	00	7C	CE	00	1F	78	82				
C3D8:0A	8D	86	02	A9	00	20	CD	15	C680:52	45	4C	20	47	4F	4C	44	68	C928:00	09	00	00	09	00	00	1B	61				
C3E0:BD	60	A9	0D	8D	F8	07	A9	6D	C688:46	49	4E	43	48	20	20	20	AC	C930:00	00	00	00	00	00	00	00	00	C3			
C3E8:0E	8D	F9	07	A9	0F	8D	FA	2A	C690:20	43	52	41	42	20	20	20	50	C938:00	00	00	00	00	00	00	00	00	CB			
C3F0:07	20	4D	C2	20	63	C2	20	0E	C698:50	4F	4C	41	52	20	42	45	9C	C940:00	00	00	00	00	00	00	00	00	D3			
C3F8:F4	C0	A9	FF	8D	11	C0	20	B2	C6A0:41	52	20	47	49	52	41	46	38	C948:00	00	00	00	01	81	80	03	ED				
C400:10	C1	20	C8	C3	20	95	C3	20	C6A8:46	45	20	20	20	42	4C	55	A8	C950:00	C0	06	C3	E0	07	00	E0	15				
C408:A9	0E	8D	15	C0	20	FA	C0	2A	C6B0:45	20	4A	41	59	20	20	53	25	C958:0E	66	70	1C	24	38	4E	7E	79				
C410:A9	05	8D	0F	C0	A9	12	8D	B0	C6B8:54	41	52	46	49	53	48	20	B7	C960:72	C5	FF	A3	63	FF	C6	3D	BE				
C418:07	C0	A9	01	8D	14	C0	8D	66	C6C0:20	20	53	50	49	44	45	52	0E	C968:FF	BC	82	FF	41	7D	00	BE	3A				
C420:17	C0	A9	46	8D	05	D0	A9	CA	C6C8:20	20	20	20	20	20	42	41	BB	C970:03	00	C0	06	00	60	07	00	8D				
C428:00	8D	04	D0	8D	11	C0	A9	7E	C6D0:54	20	20	20	20	20	20	46	9E	C978:E0	00	00	00	00	00	00	00	00	7C			
C430:04	0D	10	D0	8D	10	D0	A9	06	C6D8:52	4F	47	20	20	20	20	4C	5C	C980:00	00	00	00	00	00	00	00	00	14			
C438:04	8D	1D	D0	8D	17	D0	A9	EB	C6E0:41	4A	59	42	55	47	20	20	97	C988:00	00	00	00	00	00	00	00	00	1C			
C440:64	8D	19	C0	A9	02	20	7C	A0	C6E8:00	00	00	00	00	00	00	00	76	C990:00	00	00	00	00	00	00	00	00	24			
C448:C3	AD	17	C0	20	7A	CB	20	BF	C6F0:00	00	00	00	00	00	00	00	7E	C998:3F	70	3F	FF	FC	FF	FF	FB	B3				
C450:3F	C5	AC	17	C0	88	B9	22	AF	C6F8:00	00	00	00	00	00	00	00	86	C9A0:FF	FF	FE	FF	FF	80	7F	DE	F3				
C458:C6	8D	29	D0	A9	04	0D	15	67	C700:00	00	00	00	00	00	00	00	8F	C9A8:00	7C	1E	00	3B	1D	80	3C	AA				
C460:D0	8D	15	D0	AD	19	C0	8D	46	C708:00	00	00	00	00	00	00	00	97	C9B0:1E	00	00	00	00	00	00	00	00	53			
C468:1A	C0	A9	05	8D	1B	C0	18	27	C710:00	00	00	00	00	00	00	00	9F	C9B8:00	00	00	00	00	00	00	00	00	4C			
C470:A0	1B	A2	09	20	F0	FF	AD	68	C718:07	F0	00	1F	FC	00	3F	FE	BE	C9C0:00	0E	00	00	1E	00	00	36	FE				
C478:29	D0	8D	86	02	AD	17	C0	9A	C720:00	7F	FF	00	7C	7F	18	FB	9D	C9C8:00	00	07	00	00	03	00	00	49				
C480:A8	20	2D	C3	20	E4	FF	C9	A6	C728:BF	B0	F7	DE	E6	F6	DD	F8	78	C9D0:03	80	00	01	C0	00	01	E0	FE				
C488:85	D0	03	4C	DC	C4	F0	08	12	C730:F9	DB	F8	7F	B7	F0	1F	B7	42	C9D8:00	00	F0	00	00	FF	00	00	8A				
C490:AE	0C	C0	D0	03	20	4B	C5	8E	C738:FC	00	07	80	00	00	00	00	2F	C9E0:7B	F0	00	3E	D8	00	3F	F0	88				
C498:AD	18	C0	F0	03	20	22	C2	C5	C740:00	00	00	00	00	00	00	00	CF	C9E8:00	3C	F8	00	38	38	00	28	75				
C4A0:AD	07	C0	F0	31	AD	0C	C0	03	C748:00	00	00	00	00	00	00	03	DD	C9F0:18	00	28	28	00	28	28	00	09				
C4A8:F0	03	20	14	C6	20	0B	C6	44	C750:C0	70	C3	0E	FC	66	3F	FF	B5	C9F8:28	28	00	68	68	00	18	18	BC				
C4B0:AD	1A	C0	D0	CF	A9	FB	2D	07	C758:18	FF	DE	DB	FB	E7	7E	E7	12	CA00:00	00	00	00	00	00	00	00	95				
C4B8:15	D0	8D	15	D0	AC	17	C0	2C	C760:77	BD	EE	1F	FF	F8	0F	7E	6B	CA08:00	00	00	E0	00	00	78	00	9C				
C4C0:C8	8C	17	C0	C0	13	F0	03	F7	C768:F0	03	E7	C0	1F	FF	F8	3D	62	CA10:00	6F	00	00	B8	00	03	B0	FD				
C4C8:4C	44	C4	20	C8	C3	A0	01	BB	C770:DB	BC	33	99	CC	1F	81	F8	FB	CA18:00	07	D0	00	1F	60	00	3F	43				
C4D0:8C	17	C0	4C	44	C4	20	FC	B5	C778:0F	00	F0	06	00	00	00	00	A7	CA20:60	00	7C	C0	00	F3	80	07	59				
C4D8:C4	20	E4	C4	A9	00	8D	15	33	C780:30	00	00	00	00	00	00	00	28	CA28:FE	00	3F	CA	00	FF	09	00	E3				
C4E0:D0	4C	2A	C1	A9	00	8D	1B	CA	C788:00	00	00	00	00	00	00	00	18	CA30:F8	06	C0	60	00	00	00	00	E1				
C4E8:C0	A0	03	A9	FF	8D	1A	C0	21	C790:00	00	00	00	00	00	00	00	20	CA38:00	00	00	00	00	00	00	00	CD				
C4F0:20	0B	C6	AD	1A	C0	D0	F8	6F	C798:00	00	38	00	00	3E	00	C0	E8	CA40:00	00	00	00	00	00	00	06	E1				
C4F8:88	D0	F0	60	20	10	C1	A9	8D	C7A0:57	E0	F3	FF	FC	FF	D5	B7	DD	CA48:00	0E	00	00	1E	00	00	1C	6E				
C500:11	8D	0B	D4	A0	00	B9	2B	C9	C7A8:7A	FF	F7	FF	FF	B8	F1	FF	2C	CA50:00	00	3C	1E	00	3C	FC	03	3D				
C508:C5	8D	0B	D4	C8	B9	2B	C5	71	C7B0:FE	C0	E0	C0	00	01	80	00	1D	CA58:FF	F8	1F	FF	E0	7F	FE	00	13				
C510:8D	07	D4	A9	1E	8D	1A	C0	75	C7B8:00	00	00	00	00	00	00	00	48	CA60:F0	7F	80	00	FF	E0	00	F3	D5				
C518:20	0B	C6	AD	1A	C0	D0	F8	98	C7C0:00	00	00	00	00	00	00	00	50	CA68:F8	03	E0	7C	03	C0	1C	07	79				
C520:C8	C0	14	D0	E1	A5	10	8D	23	C7C8:00	CA	60	00	51	40	00	31	D3	CA70:80	00	06	00	00	00	00	00	07				
C528:0B	D4	60	43	0F	32	3C	2A	92	C7D0:80	00	1B	00	00	6E	C0	00	3F	CA78:00	00	00	00	00	00	00	00	0E				
C530:3E	21	87	2A	3E	32	3C	43	2D	C7D8:1F	00	00	15	80	00	1F	80	0C	CA80:00	00	00	00	00	00	00	00	16				
C538:0F	54	7D	64	79	86	1E	A0	19	C7E0:00	0E	C0	00	01	FF	E0	03	D8	CA88:00	00	00	00	00	00	00	7E	00				
C540:00	B1	FD	91	FB	C8	C0	3F	D4	C7E8:FF	FC	03	FF	FE	01	FF	FB	10	CA90:18	FF	18	0C	FF	30	0C	FF	CE				
C548:D0	F7	60	A2	01	8E	16	C0	9F	C7F0:00	F8	78	01	60	1C	01	40	93	CA98:30	0C	7E	30	66	18	66	3B	B7				
C550:20	23	C0	AD	13	C0	F0	03	28	C7F8:6C	02	40	C8	06	40	18	00	35	CAA0:7E	DC	0F	7E	F0	07	7E	E0	F7				
C558:4C	F9	C5	AD	14	C0	D0	0B	6C	C800:C0	00	00	00	00	00	00	00	F1	CAA8:1C	99	38	01	BD	80	03	24	E3				
C560:AD	20	C0	CD	06	C0	D0	03	97	C808:00	00	00	00	00	00	00	00	99	CAB0:C0	06	00	60	00	00	00	00	2E				
C568:4C	F9	C5	AC	08	C0	B9	E8	B8	C810:00	00	00	00	00	00	00	00	B1	CAB8:00	00	00	00	00	00	00	00	4E				
C570:C6	D0	03	4C	F9	C5	AC	14	0D	C818:00	10	00	00	38	00	00	7C	EB	CAC0:00	00	00	00	00	00	00	00	56				
C578:C0	99	1D	C0	AD	06	C0	99																							



# BEFORE TYPING . . .

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

## Snake Pit

See instructions in article on page 42 before typing in.

```
C000:78 A5 01 29 FB 85 01 A2 74
C008:00 BD 00 D0 9D 00 38 BD 21
C010:00 D1 9D 00 39 CA D0 F1 42
C018:A2 1F BD DB C9 9D E0 38 E6
C020:CA 10 F7 A2 6F BD FB C9 68
C028:9D 08 39 CA 10 F7 A2 17 0B
C030:BD 6B CA 9D D8 39 CA 10 EF
C038:F7 A5 01 09 04 85 01 58 60
C040:A9 1E 8D 18 D0 A9 5B 8D C2
C048:11 D0 A9 06 8D 22 D0 A9 5C
C050:00 8D 23 D0 A9 05 8D 24 47
C058:D0 A2 17 A9 00 9D 00 D4 B3
C060:CA 10 FA A9 0F 8D 18 D4 F8
C068:A9 93 20 D2 FF A9 00 8D 09
C070:20 D0 A9 0B 8D 21 D0 A9 58
C078:44 85 FB 85 FD A9 05 85 7B
C080:FC A9 D9 85 FE A2 08 A0 B1
C088:1F A9 01 91 FD A9 60 91 26
C090:FB 88 10 F5 18 A5 FB 69 4C
C098:28 85 FB A5 FC 69 00 85 7C
C0A0:FC 18 A5 FD 69 28 85 FD 30
C0A8:A5 FE 69 00 85 FE CA 10 B7
C0B0:D6 A2 0A BD AB CA 9D 76 9D
C0B8:05 CA 10 F7 A2 1C BD B6 A8
C0C0:CA 9D BD 05 CA 10 F7 A2 40
C0C8:17 BD D3 CA 9D 10 06 CA 70
C0D0:10 F7 A2 1C BD EB CA 9D 3F
C0D8:5D 06 CA 10 F7 A9 01 85 D2
C0E0:21 A9 1D 85 FB A9 06 85 71
C0E8:FC 20 E2 C1 20 16 C2 A2 EA
C0F0:01 BD 00 DC 85 02 29 10 C6
C0F8:D0 06 20 44 C9 4C 49 C1 80
C100:A5 02 29 04 D0 1C A5 21 9F
C108:F0 39 C6 21 20 EF C1 38 B9
C110:A5 FB 89 0E 85 FB A5 FC E7
C118:E9 00 85 FC 20 E2 C1 4C 6D
C120:43 C1 A5 02 29 08 D0 1B B0
C128:A5 21 C9 01 F0 15 E6 21 DA
C130:20 EF C1 18 A5 FB 69 0E 77
C138:85 FB A5 FC 69 00 85 FC 55
C140:20 E2 C1 CA 10 AB 4C EC 26
C148:C0 A2 1D BD 08 CB 9D BD BC
C150:05 CA 10 F7 A2 17 BD 26 9D
C158:CB 9D 10 06 CA 10 F7 A2 B4
C160:1C BD 3E CB 9D 5D 06 CA 1F
C168:10 F7 A9 21 85 20 A9 19 52
C170:85 FB A9 06 85 FC 20 FC A8
C178:C1 20 16 C2 A2 01 BD 00 68
C180:DC 85 02 29 10 D0 06 20 96
C188:44 C9 4C 21 C2 A5 02 29 16
C190:04 D0 23 A5 20 C9 41 F0 A4
C198:43 18 A5 20 69 10 85 20 31
C1A0:20 09 C2 38 A5 FB E9 04 47
C1A8:85 FB A5 FC E9 00 85 FC C9
C1B0:20 FC C1 4C DC C1 A5 02 BB
C1B8:29 D0 8D 20 A5 20 C9 01 31
C1C0:F0 1A 38 A5 20 E9 10 85 F2
C1C8:20 20 09 C2 18 A5 FB 69 6A
C1D0:04 85 FB A5 FC 69 00 85 A4
C1D8:FC 20 FC C1 CA 10 9F 4C C0
C1E0:79 C1 A0 0A B1 FB 18 69 5D
C1E8:40 91 FB 88 D0 F6 60 A0 BC
C1F0:0A B1 FB 38 E9 40 91 FB 58
C1F8:88 D0 F6 60 A0 03 B1 FB 4A
C200:18 69 40 91 FB 88 D0 F6 A7
C208:60 A0 03 B1 FB 38 E9 40 36
C210:91 FB 88 D0 F6 60 A2 40 9A
C218:A0 00 88 D0 FD CA D0 F8 C1
```

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C220:60 A2 05 A9 00 95 39 CA 4D
C228:10 FB A9 00 8D 0A DD 8D C7
C230:09 DD 8D 08 DD A9 93 20 C0
C238:D2 FF A9 0E 8D 20 D0 A9 75
C240:09 8D 21 D0 A2 27 A9 01 E4
C248:9D 00 D8 BD 83 CA 9D 00 16
C250:04 CA 10 F2 A9 00 85 FB 10
C258:A9 04 85 FC A2 17 18 A5 7B
C260:FB 69 28 85 FB A5 FC 69 75
C268:00 85 FC A0 00 A9 60 91 F1
C270:FB A0 27 91 FB CA 10 E6 2C
C278:A0 27 A9 60 91 FB 88 10 F0
C280:FB A9 06 8D 40 D9 8D 80 0D
C288:DA 8D CD BD 8D DA DB 8D 73
C290:A7 DA 8D 67 D9 A9 BB 8D 43
C298:40 05 8D 80 06 A9 BC 8D 17
C2A0:CD 07 8D DA 07 A9 BD 8D 16
C2A8:A7 06 8D 67 05 20 77 C8 0C
C2B0:20 AB C8 A9 41 85 18 A9 DE
C2B8:05 85 1C A9 0C 8D 41 D9 33
C2C0:A9 1D 8D 41 05 A9 81 85 7F
C2C8:19 A9 06 85 1D A9 0C 8D 93
C2D0:81 DA A9 1D 8D 81 06 A9 FC
C2D8:A6 85 1A A9 06 85 1E A9 1D
C2E0:0C 8D A6 DA A9 1F 8D A6 DD
C2E8:06 A9 66 85 1B A9 05 85 10
C2F0:1F A9 0C 8D 66 D9 A9 1F D7
C2F8:8D 66 05 A2 07 A5 21 D0 8B
C300:36 A9 00 9D F0 D9 A9 22 4B
C308:9D F0 05 CA 10 F3 A9 2C B7
C310:8D F0 05 A9 24 8D F7 05 22
C318:A9 00 85 07 A9 01 85 09 FA
C320:A9 F7 85 0B A9 05 85 0D 55
C328:A9 F0 85 0F A9 05 85 11 DF
C330:A9 20 85 14 4C 92 C3 A9 64
C338:00 9D 50 D9 A9 22 9D 50 30
C340:05 A9 05 9D 90 DA A9 22 94
C348:9D 90 06 CA 10 E9 A9 2C D7
C350:8D 50 05 A9 24 8D 57 05 F8
C358:A9 26 8D 90 06 A9 2E 8D B9
C360:97 06 A9 00 85 07 A9 05 0B
C368:85 08 A9 01 85 09 A9 03 A0
C370:85 0A A9 57 85 0B A9 90 24
C378:85 0A A9 05 85 0F A9 06 05
C380:85 0E A9 50 85 0F A9 97 DB
C388:85 10 A9 05 85 11 A9 06 26
C390:85 12 20 77 C8 AD 0A DD C9
C398:C9 05 F0 69 AD 00 DC 29 4B
C3A0:0F 49 0F F0 ED A5 21 F0 2C
C3A8:09 AD 01 DC 29 0F 49 0F 35
C3B0:F0 E0 20 77 C8 AD 0A DD 53
C3B8:C9 05 F0 49 A6 20 A0 00 10
C3C0:88 D0 FD CA D0 F8 20 35 D0
C3C8:CA A6 21 86 02 20 83 C5 46
C3D0:A6 02 CA 10 F6 A5 13 C9 C4
C3D8:21 B0 09 A5 14 C9 21 B0 53
C3E0:03 4C B2 C3 A9 0F 85 FB 20
C3E8:20 77 C8 AD 0A DD C9 05 B2
C3F0:F0 13 A2 00 A0 00 88 D0 F0
C3F8:FD CA D0 F8 C6 FB A5 FB 49
C400:D0 E6 4C 35 C2 A9 70 8D B3
C408:12 04 8D 14 04 8D 15 04 13
C410:20 66 C9 A2 1B A9 01 9D C5
C418:C6 DB BD 5B CB 9D C6 07 D2
C420:CA 10 F2 A2 01 BD 00 DC 77
C428:29 10 F0 06 CA 10 F6 4C 99
C430:23 C4 4C 59 C0 A2 03 86 B8
C438:02 B5 18 85 FB B5 1C 85 FF
C440:FC A0 00 B1 FB C9 20 90 63
C448:7E 20 97 E0 A5 8D C9 2A 3B
C450:B0 0F A9 41 85 FB A9 05 B3
C458:85 FC A9 1D 85 15 4C B9 BD
C460:CA C9 55 B0 0F A9 81 85 1C
C468:FB A9 06 85 FC A9 1D 85 C1
C470:15 4C B9 C4 C9 7F B0 0F D7
C478:A9 A5 85 FB A9 07 85 FC 22
C480:A9 1C 85 15 4C B9 C4 C9 84
C488:A9 B0 0F A9 B2 85 FB A9 DC
C490:07 85 FC A9 1C 85 15 4C A6
C498:B9 C4 C9 D4 B0 0F A9 A6 72
C4A0:85 FB A9 06 85 FC A9 1F 14
C4A8:85 15 4C B9 C4 A9 66 85 7E
C4B0:FB A9 05 85 FC A9 1F 85 ED
C4B8:15 A0 00 B1 FB C9 20 D0 28
C4C0:03 4C 5B C5 4C 7A C5 85 04
```

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C4C8:15 20 97 E0 A5 8D 10 3B A4
C4D0:20 97 E0 A5 8D 10 1A 38 DF
C4D8:A5 FB E9 28 85 FD A5 FC 60
C4E0:E9 00 85 FE A9 1C 85 16 DE
C4E8:A5 15 C9 1E F0 6D 4C 43 BE
C4F0:C5 18 A5 FB 69 01 85 FD 30
C4F8:A5 FC 69 00 85 FE A9 1D 5A
C500:85 16 A5 15 C9 1F F0 53 D9
C508:4C 43 C5 20 97 E0 A5 8D 5E
C510:10 1A 18 A5 FB 69 28 85 E2
C518:FD A5 FC 69 00 85 FE A9 FF
C520:1E 85 16 A5 15 C9 1C F0 32
C528:32 4C 43 C5 38 A5 FB E9 DE
C530:01 85 FD A5 FC E9 00 85 CC
C538:FE A9 1F 85 16 A5 15 C9 25
C540:1D F0 18 A0 00 B1 FD C9 30
C548:20 D0 10 A9 20 91 FB A5 99
C550:FD 85 FB A5 FE 85 FC A5 C3
C558:16 85 15 A5 FB 85 FD 18 57
C560:A5 FC 69 D4 85 FE A0 00 E1
C568:A9 0C 91 FD A5 15 91 FB 7E
C570:A6 02 C5 A5 FB 95 18 A5 FC 99
C578:95 1C A6 02 CA 30 03 4C 34
C580:37 C4 60 B5 09 85 15 85 4E
C588:16 BD 00 DC 29 0F 85 17 04
C590:29 01 D0 07 A9 00 85 16 E9
C598:4C BF C5 A5 17 29 08 D0 8B
C5A0:07 A9 01 85 16 4C BF C5 B9
C5A8:A5 17 29 02 D0 07 A9 02 0A
C5B0:85 16 4C BF C5 A5 17 29 26
C5B8:04 D0 04 A9 03 85 16 B5 A5
C5C0:B0 85 FB 85 FD B5 0D 85 71
C5C8:FC 85 FE A5 15 D0 0B A5 16
C5D0:16 AA BD 77 CB 85 17 4C 30
C5D8:00 C6 C9 01 D0 0B A5 16 73
C5E0:AA BD 7B CB 85 17 4C 00 7E
C5E8:C6 C9 02 D0 0B A5 16 AA 5D
C5F0:BD 7F CB 85 17 4C 00 C6 BD
C5F8:A5 16 AA BD 83 CB 85 17 7B
C600:A5 16 D0 10 38 A5 FB E9 3B
C608:28 85 FD A5 FC E9 00 85 3A
C610:FE 4C 49 C6 C9 01 D0 10 C9
C618:18 A5 FB 69 01 85 FD A5 F0
C620:FC 69 00 85 FE 4C 49 C6 61
C628:C9 02 D0 10 18 A5 FB 69 EE
C630:28 85 FD A5 FC 69 00 85 60
C638:FE 4C 49 C6 38 A5 FB E9 28
C640:01 85 FD A5 FC E9 00 85 DE
C648:FE A6 02 A5 16 95 09 A0 53
C650:00 B1 FD 95 13 C9 21 90 F5
C658:03 4C 6F C7 A5 17 91 FB 8D
C660:A5 FE 18 69 D4 85 FE B5 8A
C668:07 91 FD A5 FE 38 E9 D4 79
C670:85 FE A9 23 18 65 16 91 FB
C678:FD A5 FD 95 0B A5 FE 95 0A
C680:0D B5 13 C9 20 F0 10 20 06
C688:24 C9 20 24 C9 20 24 C9 C1
C690:20 AB C8 20 8A C9 60 B5 26
C698:0F 85 FB B5 11 85 FC A0 23
C6A0:00 B1 FB 85 15 A9 20 91 93
C6A8:FB A5 15 C9 2B D0 2E 38 0E
C6B0:A5 FB E9 28 85 FB A5 FC 34
C6B8:E9 00 85 FC A5 FB 95 0F 13
C6C0:A5 FC 95 11 B1 FB C9 28 5D
C6C8:D0 05 A9 2E 91 FB 60 C9 1F
C6D0:21 D0 05 A9 2B 91 FB 60 56
C6D8:A9 2C 91 FB 60 C9 2C D0 8B
C6E0:2E 18 A5 FB 69 01 85 FB 56
C6E8:A5 FC 69 00 85 FC A5 FB 1D
C6F0:95 0F A5 FC 95 11 B1 FB E1
C6F8:C9 29 D0 05 A9 2B 91 FB 39
C700:60 C9 22 D0 05 A9 2C 91 3C
C708:FB 60 A9 2D 91 FB 60 C9 BC
C710:2D D0 2E 18 A5 FB 69 28 C9
C718:85 FB A5 FC 69 00 85 FC 41
C720:A5 FB 95 0F A5 FC 95 11 82
C728:B1 FB C9 2A D0 05 A9 2C 85
C730:91 FB 60 C9 21 D0 05 A9 30
C738:2D 91 FB 60 A9 2E 91 FB 6D
C740:60 38 A5 FB E9 01 85 FB DC
C748:A5 FC E9 00 85 FC A5 FB 8E
C750:95 0F A5 FC 95 11 B1 FB 43
C758:C9 27 D0 05 A9 2D 91 FB 22
C760:60 C9 22 D0 05 A9 2E 91 A0
C768:FB 60 A9 2B 91 FB 60 20 53
```



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C770:AE C9 A6 02 B5 0F 85 FB AF
C778:B5 11 85 FC B1 FB 85 15 45
C780:A5 FB 85 FD 18 A5 FC 69 2D
C788:D4 85 FE A9 07 91 FD A5 7E
C790:21 F0 11 A2 00 E4 02 D0 A1
C798:02 A2 01 20 24 C9 20 24 A0
C7A0:C9 20 AB C8 A6 02 B5 0B D2
C7A8:C5 FB D0 07 B5 0C C5 FC 0F
C7B0:D0 01 60 A5 15 C9 2B D0 46
C7B8:32 38 A5 FB E9 28 85 FB DA
C7C0:A5 FC E9 00 85 FC B1 FB 1F
C7C8:C9 28 D0 0D A9 2E 85 15 58
C7D0:4C 80 C7 A0 00 B1 FB 85 ED
C7D8:15 C9 21 D0 07 A9 2B 85 51
C7E0:15 4C 80 C7 A9 2C 85 15 B8
C7E8:4C 80 C7 C9 2C D0 2C 18 69
C7F0:A5 FB 69 01 85 FB A5 FC F3
C7F8:69 00 85 FC B1 FB C9 29 F7
C800:D0 07 A9 2B 85 15 4C 80 3D
C808:C7 C9 22 D0 07 A9 2C 85 FD
C810:15 4C 80 C7 A9 2D 85 15 ED
C818:4C 80 C7 C9 2D D0 2C 18 A2
C820:A5 FB 69 28 85 FB A5 FC 97
C828:69 00 85 FC B1 FB C9 2A 2A
C830:D0 07 A9 2C 85 15 4C 80 7D
C838:C7 C9 21 D0 07 A9 2D 85 10
C840:15 4C 80 C7 A9 2E 85 15 22
C848:4C 80 C7 38 A5 FB E9 01 8E
C850:85 FB A5 FC E9 00 85 FC 7F
C858:B1 FB C9 27 D0 07 A9 2D 90
C860:85 15 4C 80 C7 C9 22 D0 06
C868:07 A9 2E 85 15 4C 80 C7 A8
C870:A9 2B 85 15 4C 80 C7 AE 46
C878:0A DD AD 09 DD F0 09 E8 7A
C880:A9 60 F8 38 ED 09 DD D8 C9
C888:85 02 4A 4A 4A 4A 09 70 49
C890:8D 14 04 A5 02 29 0F 09 A4
C898:70 8D 15 04 86 02 09 05 3D
C8A0:F8 38 E5 02 D8 09 70 8D F2
C8A8:12 04 60 A5 39 29 0F 09 40
C8B0:B0 8D 07 04 A5 39 4A 4A 10
C8B8:4A 4A 09 B0 8D 06 04 A5 60
C8C0:3B 29 0F 09 B0 8D 05 04 76
C8C8:A5 3B 4A 4A 4A 09 B0 28
C8D0:8D 04 04 A5 3D 29 0F 09 BA
C8D8:B0 8D 03 04 A5 3D 4A 4A C7
C8E0:4A 4A 09 B0 8D 02 04 A5 78
C8E8:3A 29 0F 09 F0 8D 25 04 60
C8F0:A5 3A 4A 4A 4A 09 F0 50
C8F8:8D 24 04 A5 3C 29 0F 09 E2
C900:F0 8D 23 04 A5 3C 4A 4A 11
C908:4A 4A 09 F0 8D 22 04 A5 26
C910:3E 29 0F 09 F0 8D 21 04 83
C918:A5 3E 4A 4A 4A 09 F0 7A
C920:8D 20 04 60 B5 39 F8 18 A5
C928:69 10 D8 95 39 90 14 B5 D2
C930:3B F8 18 69 01 D8 95 3B 0B
C938:90 09 B5 3D F8 18 69 01 DC
C940:D8 95 3D 60 A9 00 8D 00 BB
C948:D4 8D 05 D4 A9 40 8D 01 02
C950:D4 A9 F8 8D 06 D4 A9 11 98
C958:8D 04 D4 A2 80 20 D2 C9 6C
C960:A9 10 8D 04 D4 60 A9 00 3A
C968:8D 00 D4 A9 0C 8D 01 D4 65
C970:A9 24 8D 05 D4 A9 FC 8D B8
C978:06 D4 A9 21 8D 04 D4 A2 54
C980:A0 20 D2 C9 A9 20 8D 04 50
C988:D4 60 A9 00 8D 07 D4 A9 AF
C990:C0 8D 08 D4 A9 20 8D 0C 2B
C998:D4 A9 42 8D 0D D4 A9 21 52
C9A0:8D 0B D4 A2 10 20 D2 C9 F2
C9A8:A9 20 8D 0B D4 60 A9 02 F8
C9B0:8D 0E D4 A9 0A 8D 0F D4 3D
C9B8:A9 02 8D 13 D4 A9 8C 8D 78
C9C0:14 D4 A9 81 8D 12 D4 A2 E1
C9C8:10 20 D2 C9 A9 80 8D 12 DF
C9D0:D4 60 A0 00 88 D0 FD CA 49
C9D8:D0 F8 60 00 18 3C FF 7E 4F
C9E0:FF 7E 3C 00 76 FE FF FF 4B
C9E8:FE 7E 00 3C 7E FF 7E FF 4E
C9F0:3C 18 00 00 6E 7E FF FF 1A
C9F8:7F 6E 00 7E 7E 7E 7E 39
CA00:7E 7E 7E 00 FF FF FF 44
CA08:FF 00 00 00 00 3C 3C 7E 85
CA10:FF FF FF 00 F0 FC FF FF 21

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CA18:FC F0 00 FF FF FF 7E 3C A1
CA20:3C 00 00 00 00 0F 3F FF 49
CA28:3F 0F 00 00 00 0F 1F 3F DA
CA30:7F 7F 7E 00 00 F0 FC E7
CA38:FE FE 7E 7E FE FE FC 8B AB
CA40:F0 00 00 7E 7F 3F 1F CD
CA48:0F 00 00 3C 3C 3C 18 18 44
CA50:18 00 00 00 00 0F FF 2E
CA58:0F 00 00 00 00 18 18 1E
CA60:3C 3C 3C 00 00 F0 FF 6E
CA68:F0 00 00 FF FC F8 F8 2D
CA70:F8 FC FF 00 00 81 C3 FF 4F
CA78:FF FF FF 3F 1F 1F 1F E1
CA80:1F 3F FF A0 A0 B0 B0 59
CA88:B0 B0 B0 A0 60 60 60 6A
CA90:60 60 60 60 70 7A 70 AA
CA98:70 60 60 60 60 60 60 36
CAA0:60 E0 E0 F0 F0 F0 F0 E7
CAAB:F0 E0 E0 A0 93 8E 81 8B 7A
CAB0:85 A0 90 89 94 A0 4D 4F EC
CAB8:56 45 60 4A 4F 59 53 54 56
CAC0:49 43 4B 60 54 4F 60 53 2F
CAC8:45 4C 45 43 54 60 47 41 E4
CAD0:4D 45 7A A0 B1 A0 90 8C 75
CAD8:81 99 85 92 A0 60 60 60 17
CAE0:60 A0 B2 A0 90 8C 81 99 82
CAE8:85 92 A0 50 52 45 53 53 A0
CAF0:60 46 49 52 45 60 42 55 1C
CAF8:54 54 4F 4E 60 54 4F 60 EF
CB00:43 4F 4E 54 49 4E 55 45 8F
CB08:4D 4F 56 45 60 4A 4F 59 5D
CB10:53 54 49 43 4B 60 54 4F 97
CB18:60 53 45 4C 45 43 54 60 62
CB20:53 50 45 45 44 7A 60 60 9F
CB28:A0 B1 A0 60 A0 B2 A0 60 08
CB30:A0 B3 A0 60 A0 B4 A0 60 98
CB38:A0 B5 A0 60 60 60 60 4D
CB40:50 52 45 53 53 60 46 49 64
CB48:52 45 60 42 55 54 54 4F 7E
CB50:4E 60 54 4F 60 42 45 47 84
CB58:49 4E 60 47 41 4D 45 60 D2
CB60:4F 56 45 52 7A 60 50 52 4B
CB68:45 53 53 60 46 49 52 45 29
CB70:60 42 55 54 54 4F 4E 21 56
CB78:27 21 28 29 22 28 22 21 9A
CB80:2A 21 29 2A 22 27 22 00 2F

```

#### BEFORE TYPING . . .

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

## Crossroads

See instructions in article on page 38 before typing in.

```

0801:0B 08 0A 00 9E 32 33 30 2E
0809:30 00 00 00 00 00 44 AA 64
0811:AA 11 00 00 00 00 11 AA 87
0819:AA 44 00 00 00 00 00 3C CB
0821:3C 00 00 00 00 00 00 3C 8B
0829:3C 00 00 00 38 38 30 7F D9
0831:BE 68 CE EC 38 38 30 7F E5
0839:76 30 3C 3F 8F FF 3C 94
0841:7E 7E EE 87 FF F1 FF 3C 8A
0849:7E 7E 38 3C C7 8D BF FC F3
0851:FF EC C6 3C 27 6D 9F FF DF
0859:3F 3C 30 38 3C 72 FF FF 3E
0861:7E 1C 66 73 3C 72 FF FF 60
0869:7E 10 10 18 7E CF FF F0 56
0871:F8 7F E6 87 3F CF FF F0 5D
0879:FF 7F 30 38 7C 6C FF F0 79
0881:F0 FF 84 E7 7C 6C FF FA A9
0889:F5 FF 18 1C E0 8F 8F FF B1
0891:FC FF C2 83 20 EF 89 FF 84
0899:F8 FF 4C 68 18 3E 78 FF E0

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08A1:FF 6C C6 67 18 3E 78 FF C6
08A9:FF 38 38 3C 3C 38 3C 7F 4D
08B1:BC 3C 77 64 3C 38 3C 7C 1C
08B9:7C 3C 18 1C 00 00 3C B9 0E
08C1:FE 7C 44 66 3C 38 7F FF 13
08C9:6C 48 00 00 80 40 20 10 77
08D1:08 04 02 01 02 04 08 10 77
08D9:20 40 80 7E FF FF FF FF 02
08E1:FF FF 7E FF 81 81 81 81 58
08E9:81 81 FF FF FF BD 99 99 DE
08F1:BD FF FF 3C E7 BD 66 66 0E
08F9:BD E7 3C A9 FF BD 0E D4 2C
0901:8D 0F D4 A9 80 8D 12 D4 06
0909:A9 03 85 02 A9 00 8D 4B 35
0911:0B A9 28 8D 4C 0B A2 31 F5
0919:20 52 0B 69 0A 9D 00 20 AE
0921:20 52 0B 69 08 9D 00 21 A7
0929:20 52 0B C9 03 F0 F9 C9 77
0931:02 D0 02 A9 FF 9D 00 22 EB
0939:20 52 0B D8 07 AB BD 00 B4
0941:22 F0 E5 98 C9 03 F0 F0 14
0949:C9 02 D0 02 A9 FF 9D 00 83
0951:23 20 52 0B 9D 00 24 9D CA
0959:00 25 CA 10 BB A9 15 85 43
0961:FB A9 00 A0 3E 20 4A 0B F7
0969:88 10 FA A2 31 BD 00 25 F2
0971:C9 FF D0 1E BD 00 20 18 AA
0979:7D 00 22 9D 00 20 C9 18 94
0981:B0 4C BD 00 21 18 7D 00 1B
0989:23 9D 00 21 BD 00 24 9D 7A
0991:00 25 BD 00 20 4A 4A AD
0999:85 FC 0A 0A 0A 85 FD BD AF
09A1:00 20 38 E5 FD AB B9 CD F4
09A9:08 85 FD AD 4C 0B 8D 50 B5
09B1:0B AD 4B 0B 8D 4F 0B BD 4C
09B9:00 21 0A 18 7D 00 21 18 1D
09C1:65 FC A8 20 4E 0B 05 FD 83
09C9:20 4A 0B DE 00 25 CA 10 08
09D1:9C AD 4B 0B C9 C0 D0 07 B1
09D9:EE 4C 0B A9 00 F0 03 18 54
09E1:69 40 8D 4B 0B C6 FB 30 BA
09E9:03 4C 62 09 C6 02 30 03 0F
09F1:4C 17 09 A9 00 8D 0E DC DA
09F9:A9 73 85 01 A2 00 BD 00 0F
0A01:D0 9D 00 20 BD EC D0 9D C7
0A09:EC 20 E8 E9 EC D0 EF A9 FA
0A11:77 85 01 A9 01 8D 0E DC 34
0A19:A9 18 8D 18 D0 A9 80 8D F6
0A21:37 0B A9 21 8D 38 0B A9 E7
0A29:0B 85 02 AD 37 0B 10 03 48
0A31:EE 38 0B 18 69 80 8D 37 4D
0A39:0B A9 00 A4 20 36 0B E8 C0
0A41:E0 80 D0 F8 A5 02 0A 0A E2
0A49:0A 0A A8 A2 00 B9 0D 08 2D
0A51:20 36 0B C8 E8 E0 08 D0 9C
0A59:F4 B9 0D 08 4A 4A 4A D2
0A61:20 36 0B E8 C8 E0 10 D0 BD
0A69:F0 B9 05 08 0A 0A 0A 1C
0A71:20 36 0B E8 C8 E0 18 D0 DD
0A79:F0 B9 FD 07 20 36 0B E8 7D
0A81:C8 E0 20 D0 F4 20 A9 0A C8
0A89:A0 00 A2 40 20 DA 0A A0 67
0A91:20 A2 60 20 DA 0A C6 02 FA
0A99:10 91 A2 1F BD C8 08 9D 6F
0AA1:D8 21 CA 10 F7 4C 58 0B 71
0AA9:A9 00 85 FC 8A 38 E9 20 3C
0AB1:A8 20 3A 0B A4 FC 39 CD 73
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0AC1:20 3A 0B A4 FC 18 79 D4 30
0AC9:08 20 36 0B C8 84 FC C0 74
0AD1:08 D0 D9 E8 E0 40 D0 D0 62
0AD9:60 86 FC 84 FD A9 04 85 CB
0AE1:FB A9 00 85 03 A9 00 85 FA
0AE9:FE A5 FE 18 65 FD A8 20 DC
0AF1:3A 0B A6 03 3D CD 08 DD F9
0AF9:CD 08 D0 16 A5 03 18 65 41
0B01:FC AD 20 3A 0B 18 A6 FE 6C
0B09:7D D4 08 48 98 AA 68 20 F8
0B11:36 0B E6 FE A5 FE C9 08 96
0B19:D0 CF E6 03 A5 03 C9 08 6D
0B21:D0 C3 A5 FC 18 69 08 85 11
0B29:FC A5 FD 18 69 08 85 FD DC
0B31:CF FB D0 AD 60 9D FF FF 18
0B39:60 AD 37 0B 8D 47 0B AD CF
0B41:38 0B 8D 48 0B B9 FF FF AB

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0B49:60	99	00	00	60	B9	00	00	DF	0DF1:F2	20	CD	0E	A2	00	86	3A	84	1091:AF	E8	5A	80	B5	AB	5A	5A	82
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1449:F0	EE	C8	AD	D9	3F	C9	06	FE	16F1:BD	32	3F	C9	0A	90	0B	38	EE	1999:3F	F0	08	20	23	1C	AD	95	25
1451:F0	E6	60	AA	BD	00	42	85	5A	16F9:E9	0A	9D	32	3F	CA	FE	32	C9	19A1:3F	D0	40	CE	D1	3F	D0	12	DB
1459:FC	BD	00	4E	AB	B9	68	11	62	1701:3F	E8	BD	3A	3F	C9	0A	90	2A	19A9:AD	C6	3F	8D	D1	3F	A5	A2	9E
1461:18	7D	00	40	85	FB	BD	00	90	1709:0B	38	E9	0A	9D	3A	3F	CA	C7	19B1:85	FC	A5	A2	C5	FC	F0	FA	C3
1469:43	10	02	E6	FB	BD	00	43	FF	1711:FE	3A	3F	E8	CA	10	D9	A0	AE	19B9:D0	A1	20	55	17	AD	1B	D4	90
1471:29	04	F0	06	E6	FB	E6	FB	9E	1719:00	A2	00	B9	32	3F	D9	46	14	19C1:D0	1E	AD	1B	D4	C9	C8	90	3B
1479:E6	FB	86	03	20	94	14	A6	37	1721:3F	90	0E	F0	05	99	46	3F	3E	19C9:17	AD	DE	3D	C9	05	B0	10	76
1481:03	BD	00	43	10	0C	E6	FB	49	1729:A2	01	C8	C0	09	D0	EC	F0	64	19D1:EE	DE	3D	20	AC	14	A9	3F	25
1489:20	D2	1A	A6	07	A4	08	20	1F	1731:04	E0	01	F0	F0	A0	00	A2	75	19D9:20	22	0F	A9	01	20	42	0F	3D
1491:A2	14	60	BD	00	4C	20	F9	63	1739:00	B9	3A	3F	D9	46	3F	90	08	19E1:4C	5C	19	A9	00	8D	95	3F	AF
1499:1A	A8	BD	00	4B	20	EE	1A	83	1741:0E	F0	05	99	46	3F	A2	01	62	19E9:A2	01	86	3A	A6	3A	B5	11	BC
14A1:AA	A5	FC	20	42	0F	A5	FB	BF	1749:C8	C0	09	D0	EC	F0	04	E0	4E	19F1:F0	0B	BD	91	3F	D0	06	20	99
14A9:4C	22	0F	AD	1B	D4	29	1F	DA	1751:01	F0	F0	60	E6	0D	A6	0D	26	19F9:1B	1A	20	E1	1C	C6	3A	10	E2
14B1:85	FC	AD	1B	D4	29	07	18	B4	1759:EC	AA	3F	90	07	F0	05	A2	42	1A01:EB	AD	00	4D	18	6D	01	4D	31
14B9:65	FC	AA	AD	1B	D4	29	0F	91	1761:0F	86	0D	60	BD	00	47	F0	CD	1A09:C9	05	90	03	4C	97	1E	A5	48
14C1:18	69	02	85	FC	AD	1B	D4	92	1769:EB	DE	00	4A	D0	E6	BD	00	87	1A11:11	D0	90	A5	12	0D	8C	4C	A7
14C9:29	07	18	65	FC	AB	20	2B	97	1771:48	9D	00	4A	A0	03	A9	00	34	1A19:F6	1B	BD	00	DC	8D	A8	3F	F4
14D1:0F	C9	20	D0	6D	60	85	FC	45	1779:99	CA	3F	88	10	FA	BD	00	7F	1A21:86	05	29	0F	38	E9	05	A8	0C
14D9:86	FE	A2	00	BD	BE	3F	F0	B1	1781:43	10	03	4C	DF	1E	BD	00	6D	1A29:B9	2D	11	85	04	30	10	BD	BE
14E1:12	E8	E0	08	90	F6	AE	CE	76	1789:41	10	1C	20	21	1F	A6	0D	C1	1A31:00	4E	C5	04	D0	0E	BD	00	2C
14E9:3F	E8	E0	08	90	02	A2	00	5A	1791:C9	40	90	03	4C	E6	18	C9	EE	1A39:43	10	41	20	DF	1E	60	A6	1C
14F1:8E	CE	3F	A9	01	9D	BE	3F	D2	1799:20	D0	03	4C	04	19	A9	00	09	1A41:05	4C	55	14	BD	00	4E	A8	2A
14F9:A5	FC	9D	6E	3F	AB	B9	86	65	17A1:9D	00	47	20	94	16	60	20	67	1A49:85	06	BD	00	43	30	18	A4	29
1501:11	9D	77	3F	20	52	0B	AB	07	17A9:82	1B	A0	03	A6	0D	B9	7F	80	1A51:04	20	D5	1A	20	24	1F	A6	62
1509:B9	64	11	9D	A0	3F	A4	FE	6F	17B1:3F	C9	20	F0	12	C9	40	B0	ED	1A59:05	C9	20	F0	17	C9	3F	B0	A4
1511:B9	00	42	9D	27	D0	B9	00	2A	17B9:14	C9	3F	D0	0A	BD	00	42	E2	1A61:13	A5	06	85	04	90	15	B9	E7
1519:43	30	04	A9	00	F0	09	B9	9B	17C1:29	10	F0	03	20	0C	19	88	C2	1A69:7B	11	C5	04	D0	CD	20	D2	69
1521:00	4E	A8	85	FD	B9	1D	11	6E	17C9:10	E2	4C	47	18	C9	E0	90	F0	1A71:1A	20	18	1C	A5	04			



```

1B31:00 42 BD 62 11 9D 00 4B 20
1B39:85 07 A9 17 9D 00 4C 85 A5
1B41:08 BD 7F 11 9D 00 4E A9 1F
1B49:00 20 D7 14 A6 05 A9 28 88
1B51:9D 91 3F 20 24 1F A6 05 94
1B59:C9 20 F0 1D C9 3F D0 05 5E
1B61:FE 00 4D D0 14 86 09 20 BA
1B69:89 1C A6 0A 20 94 16 A6 07
1B71:0A A9 00 9D 00 47 20 7A C8
1B79:1E A4 05 20 05 14 4C CD 69
1B81:0E A9 03 85 FC 86 05 BD AB
1B89:00 49 85 FD 85 02 A0 03 1B
1B91:A9 00 99 83 3F A9 64 99 0B
1B99:8B 3F 88 10 F3 A6 05 BD 79
1BA1:00 4B 85 03 BD 00 4C 85 97
1BA9:FB A4 FC A5 03 18 79 25 91
1BB1:11 20 EE 1A AA 85 03 A5 0F
1BB9:FB 18 79 29 11 20 F9 1A CC
1BC1:A8 85 FB 20 2B 0F A4 FC 0B
1BC9:99 7F 3F 98 AA FE 83 3F B5
1BD1:B9 7F 3F C9 20 D0 04 C6 5C
1BD9:FD D0 CE A4 FB A6 03 20 08
1BE1:4B 0F 29 0F A4 FC 99 87 6B
1BE9:3F C6 FC 30 07 A5 02 85 6C
1BF1:FD 4C 9E 1B 60 A2 08 BD 1B
1BF9:4B 19 F0 08 9D 17 06 A5 1B
1C01:A2 9D 17 DA CA 10 F0 20 B5
1C09:0A 1F F0 03 4C A4 19 A9 2D
1C11:93 20 D2 FF 4C B3 0B A5 62
1C19:07 9D 00 4B A5 08 9D 00 79
1C21:4C 60 A2 02 A9 00 8D 94 09
1C29:3F 86 05 BD 00 47 F0 3A 58
1C31:BD 00 43 10 06 20 DF 1E 40
1C39:4C 6B 1C 20 21 1F A6 05 CF
1C41:C9 20 F0 21 C9 40 B0 0C 53
1C49:20 94 16 A6 05 A9 00 9D 50
1C51:00 47 F0 16 20 94 16 A6 01
1C59:05 20 84 1C 20 A4 1D 20 5C
1C61:73 1C 4C 6B 1C A6 05 20 40
1C69:F3 1E A6 05 E8 E0 10 D0 04
1C71:B8 60 A4 0A B9 00 47 F0 A0
1C79:01 60 A6 05 BD 00 41 AA 8A
1C81:4C A8 16 86 09 20 D2 1A BD
1C89:A0 00 A6 09 84 0A B9 00 37
1C91:47 F0 45 B9 00 4B 85 0B 31
1C99:C5 07 F0 16 B9 00 43 10 5A
1CA1:37 B9 00 4E A8 A5 0B 18 D2
1CA9:79 25 11 20 EE 1A C5 07 7E
1CB1:D0 26 A4 0A B9 00 4C 85 FC
1CB9:0B C5 08 F0 16 B9 00 43 D3
1CC1:10 16 B9 00 4E A8 A5 0B 2A
1CC9:18 79 29 11 20 F9 1A C5 85
1CD1:08 D0 05 E4 0A F0 01 60 A7
1CD9:A4 0A C8 D0 AF 68 68 60 5D
1CE1:AD A8 3F 29 10 F0 01 60 3C
1CE9:A4 3A B9 B7 3F F0 01 60 D5
1CF1:A9 05 20 21 14 A4 3A A9 A7
1CF9:0C 99 B7 3F B9 00 4E 85 79
1D01:FE 84 05 A2 02 BD 00 47 F4
1D09:F0 1C E8 E0 10 D0 F6 AE 4E
1D11:B6 3F 86 FD 20 94 16 AE 55
1D19:B6 3F E8 E0 10 D0 02 A2 14
1D21:02 8E B6 3F A6 FD A5 FE 42
1D29:A4 05 20 2F 1D 60 9D 00 93
1D31:4E B9 00 41 86 05 84 FD 64
1D39:20 D8 15 A4 FD BD 00 42 CF
1D41:29 F0 19 00 42 9D 00 42 3A
1D49:BC 00 4E A6 FD 20 D5 1A 4C
1D51:A6 05 20 18 1C A6 FD BD DA
1D59:00 43 10 08 A6 05 20 D2 43
1D61:1A 20 18 1C A5 FD C9 02 30
1D69:B0 05 A6 05 9D 00 41 20 F1
1D71:24 1F A6 05 C9 20 F0 28 83
1D79:C9 40 B0 06 A9 00 9D 00 A7
1D81:47 60 86 09 20 89 1C 20 58
1D89:A4 1D A6 0A BD 00 47 D0 20
1D91:0F A6 09 BD 00 41 C9 02 94
1D99:B0 E7 AA A4 0A 4C A8 16 AE
1DA1:4C 55 14 A4 0A B9 00 43 9E
1DA9:29 40 F0 28 A6 09 BD 00 FD
1DB1:43 29 20 F0 1F B9 00 4E 19
1DB9:A8 BD 00 4E D9 7B 11 F0 6C
1DC1:13 BC 00 4E 89 7B 11 9D 15
1DC9:00 4E A9 01 A6 09 BC 00 AF
1DD1:41 4C 21 14 A6 0A DE 00 40
1DD9:47 A9 01 20 D7 14 A6 09 A9
1DE1:BD 00 43 29 20 F0 03 DE 9F
1DE9:00 47 BD 00 41 30 20 C9 82
1DF1:02 B0 10 BD 00 47 C9 02 E9
1DF9:90 15 A6 0A A9 00 9D 00 BF
1E01:47 F0 0C BD 00 43 29 20 F9
1E09:F0 05 A9 01 20 D7 14 A0 6D
1E11:03 A6 09 BD 00 41 30 06 E0
1E19:C9 02 90 02 A0 07 84 0B 22
1E21:A6 0A BD 00 47 D0 12 A5 32
1E29:0B C9 07 F0 04 A9 02 85 9D
1E31:0B 20 94 16 A6 0A 20 7A 07
1E39:1E A6 09 BD 00 47 D0 08 F1
1E41:20 94 16 A6 09 20 7A 1E BB
1E49:A6 09 0E 02 B0 0B 20 0F 58
1E51:0F BD 00 47 D0 03 4C 17 3B
1E59:1B A6 0A E0 02 B0 12 20 33
1E61:0F 0F A0 01 A5 0B 20 21 C7
1E69:14 BD 00 47 D0 0A 4C 17 F1
1E71:1B A0 02 A5 0B 20 21 14 2D
1E79:60 BD 00 4D 85 FE A9 00 A5
1E81:9D 00 4D C6 FE 30 F1 20 5F
1E89:AC 14 A9 3F 20 22 0F A9 9B
1E91:01 20 42 0F D0 ED A2 01 14
1E99:86 3A A9 04 AA 20 D8 15 B9
1EA1:A6 3A BD 00 4D F0 0B DE 9A
1EA9:00 4D A0 04 20 A8 16 4C A9
1EB1:A1 1E C6 3A 10 EA AE 45 91
1EB9:3F E8 E0 0A 90 05 A2 00 6A
1EC1:EE 44 3F 8E 45 3F 20 CD 8C
1EC9:0E 20 0A 1F D0 FB 20 0D 0C
1ED1:0E AD 00 47 85 14 AD 01 CD
1ED9:47 85 15 4C D3 12 86 13 89
1EE1:20 94 16 A6 13 20 D2 1A 59
1EE9:20 18 1C 20 06 1B 20 55 F3
1EF1:14 60 86 13 20 06 1B 20 C1
1EF9:55 14 A6 13 20 5A 14 60 DE
1F01:BD 00 43 49 04 9D 00 43 F4
1F09:60 A2 07 BD 54 19 F0 08 CD
1F11:9D C7 05 A9 0A 9D C7 D9 7B
1F19:CA 10 F0 A5 CB C9 03 60 25
1F21:20 D2 1A A6 07 A4 08 20 CC
1F29:2B 0F 60 00 00 00 00 00 CC

```

# bug-swatter

## Modifications and Corrections

• In the July "BASIC for Beginners" column, the last subroutine listed, lines 4000-4030, has been giving several of our readers trouble. Line 4020 in particular seems to be the culprit. If you have had problems getting the program to work, be sure that you have typed a space between the quotation marks in the IF statement.

• "Easy Full-Screen Animation" (July) has a problem handling very large data files. The problem is caused by the POKE statement in line 480. The program assumes that the value of PA will be less than 32768. If PA is larger than 32767, only a small portion of the data file will be saved to disk. To correct this problem, change line 480 as follows:

```
480 J=INT(PA/256):K=PA-256*J
:POKE174,K:POKE175,J:SYS62954
```

• The listings of line 1 of "Program Appender" (September) have been switched. The line labeled as the 128 version is the Plus/4, 16 version and vice versa. We regret any confusion this may have caused.

• Several readers have had problems viewing the disk directory from "SpeedScript 128" (October). According to one reader, "the directory seems to work sometimes, but most of the time it doesn't." The directory will work correctly every time if you make sure that the 40/80-column key is depressed each time you run SpeedScript 128. If you can't look at the disk directory

from within SpeedScript 128, simply exit the program, press the 40/80-column key, and run it again.

• We inadvertently omitted the "Automatic Proofreader" checksums when listing "GeoConverter" (p. 95) in the October issue. The checksums and corresponding line numbers are listed below. After typing this in, be sure to see "Geo-Converter Fix" on p. 52 in this issue.

```

KC 10  KK 110  BK 210  KP 310
AH 20  MD 120  FK 220  KQ 320
SX 30  CR 130  AA 230  MQ 330
HM 40  FB 140  GR 240  QJ 340
DJ 50  JX 150  JS 250  AS 350
FJ 60  HR 160  GJ 260  QC 360
SX 70  MA 170  JR 270  KQ 370
FM 80  QF 180  FJ 280  QE 380
PS 90  GH 190  JM 290  PX 390
HA 100 BR 200  XA 300  BP 400

```



# news & products

## Yaks, Jets, And Myths

Eurosoft International has announced three software titles for the Commodore 64: *Yak's Progress*, a compilation of eight games from popular British programmer Jeff Minter; *Jump Jet*, a vertical takeoff flight and combat simulator; and the repackaged version of *Valhalla*, an interactive computer movie.

Minter's collection offers arcade-style games with titles including *Revenge of the Mutant Camels*, *Laser Zone*, *Sheep in Space*, and *Metagalactic Llamas*. Most of the games revolve around the attempted domination of earth by forces of Zzyax and Irata, interstellar allies with an array of devious weapons at their disposal.

*Jump Jet* features the Sea Harrier VTOL (Vertical TakeOff and Landing) fighter plane. Known as a "jump jet" by the pilots who fly it, the Harrier is famous for its VTOL abilities, as well as its capacity to hover and fly backward.

The player selects one of five skill levels, then proceeds to lift off the deck of an aircraft carrier. Using the radar and the range finder within the on-screen instrument panel, the player seeks and destroys enemy aircraft by launching Sidewinder air-to-air missiles. Audible warnings are given to the pilot using Commodore's voice and sound capabilities. Once the enemy has been destroyed, the pilot must relocate the carrier and attempt to land the *Jump Jet* to successfully complete the mission and gain promotion.

*Valhalla*, winner of the 1984 British Microcomputing Game-of-the-Year Award, uses the MOVISOFT animation technique in six adventures to find hidden treasure.

The game takes place within the world of Norse mythology. Players interact with 36 animated characters in pursuit of the lost treasure of *Valhalla*. Depending on their disposition, each mythological character can either help or hinder as you discover your way around *Valhalla's* world of over 81 different locations.

Suggested retail price for *Jump Jet* and *Valhalla* is \$24.95; for *Yak's Progress*, \$19.95.

Eurosoft International, 114 East Ave., Norwalk, CT 06851

Circle Reader Service Number 201.

## Programming Package For GEOS

Berkeley Softworks, developers of GEOS, has unveiled a full-featured application development software package titled *geoProgrammer* that is targeted for GEOS enthusiasts who have a good understanding of 6502 assembly language.

*geoProgrammer* is comprised of three main components: *geoAssembler*, *geoLinker*, and *geoDebugger*.

*geoAssembler* reads source text from a *geoWrite* document. A source document may include other *geoWrite* documents. Supporting standard 6502 assembly language mnemonics and addressing modes, a user can define over 1,000 labels for each assembly module. Expressions can include any combination of arithmetic and logical operators. When graphics need to be defined in a program, the user can simply paste in a picture from *geoPaint*. Graphics appear as pictures in listings instead of long lists of numbers.

*geoLinker* accepts link structure from the *geoWrite* document and reads relocate object modules produced by *geoAssembler*.

*geoDebugger*, the program's interactive symbolic debugger, automatically transforms the RAM Expansion Unit into a monitor so applications using maximum available memory can be debugged.

Suggested price for *geoProgrammer* is \$69.95.

Berkeley Softworks, 2150 Shattuck Ave., Berkeley, CA 94704

Circle Reader Service Number 202.

## Speed Up Your 64

Swisscomp has released the Turbo Processor which speeds up Commodore 64 programs such as *Flight Simulator*, *Pocket Writer*, and the majority of spreadsheets, databases, wordprocessors, graphics programs, and many games.

The 4-MHz 16-bit processor card plugs into the expansion (cartridge) port of the 64 and has a 65816 Microprocessor running at 4 MHz. It has 64K of CMOS battery-powered RAM and a 32K EPROM with two operating systems. In one mode it emulates the 64's 6502/6510 microprocessor, allowing full compatibility with a majority of the software for that machine, and in the



Swisscomp's Turbo Processor

Turbo Processor mode it can speed-load programs from the 1541 disk drive when used with the optional Turbo Loader cable. In both modes, the processing is sped up by over 400 percent. It can also reduce speed to 100 KHz, which is 1/10 the 64's original speed.

The card has an on-board rechargeable battery, which is automatically trickle-charged when connected to the computer. Programs loaded into the card will remain in RAM even after the switch is turned off and the card is unplugged.

Suggested retail price is \$189.95. The optional Turbo Loader cable, which comes with an EPROM that plugs into the 1541, retails for \$39.95.

Swisscomp, 5312-56th St., Tampa, FL 33610

Circle Reader Service Number 203.

## Five New Titles From Electronic Arts

Electronic Arts has released five new titles for the Commodore 64/128 from three of its affiliated labels.

From DataSoft comes *Video Title Shop* and the accompanying data disk *Video Title Shop Graphics Companion*. Used in conjunction with a video cassette recorder, a video camera, and a Commodore 64 or 128, the program can add enhancements to home video productions, or the user may create a specialized color video production.

The program enables the user to add title screens, borders, and graphics to video productions, and it includes a variety of font styles and sizes, the ability to superimpose text over graphics, scroll, and fade-in and fade-out. The user can use the program to import



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graphics from other paint programs.

*Video Title Shop Graphics Companion* contains a library of ready-made graphics that can be used as is or modified for a specific video production. The program includes 25 pictures applicable for holidays and celebrations such as Christmas, Easter, family vacations, birthdays, and weddings.

*Video Title Shop* retails for \$29.95, and the *Video Title Shop Graphics Companion* sells for \$19.95.

DataSoft has also released *Alternate Reality: The Dungeon*, which is the second in the Alternate Reality fantasy role-playing series for the Commodore 64. (The initial offering in the series was *The City*.) *The Dungeon* is one-third larger than its predecessor and includes four levels of dungeons where the user will encounter monsters and other challenges.

The game begins with a character being abducted by a spaceship and taken to a world called Alternate Reality. The user can stay in the other world or return to earth to seek vengeance on the abductors. Players can transfer their character from *The City* or begin with a new character. The longer you play, the stronger the character becomes, which helps him defend against enemies.

*Alternate Reality: The Dungeon* retails for \$39.95.

Electronic Arts affiliate, Game Designers Workshop, has released *Road to Moscow* for the Commodore 64, a simulation which allows players to relive the War in Russia between 1941 through 1945.

The program contains five strategy games including 1941 Invasion, 1942 Second Offensive, 1943 Russian Offensives, 1944 Battle of Poland, and a Campaign Game spanning the entire period. In each game, players move or fortify units such as infantry, cavalry, militia, paratroops, and artillery while meeting with the armies of the Germans, Hungarians, Rumanians, Finns, Slovaks, Italians, and Soviets. The object of the game is to take and hold Russian cities before the computer or your opponent accumulates reinforcements. The program contains ten levels of difficulty and random strategic events so no game can be played the same.

Suggested retail price is \$39.95.

Strategic Studies Group has released *Battles in Normandy, June-July 1944*, a sequel to *Battlefront*. This strategy game for the Commodore 64 is based on D-day, when the allied forces invaded Normandy. The game recreates the invasion and the battles that followed.

One or two players can relive the scenarios of these battles the way they are set up in the game or they can use the design kit within the program to vary the battles or create entirely new

ones. The program also contains an observe mode that allows the user to watch how these battles were actually fought or to test new scenarios that they have created.

*Battles in Normandy* retails for \$39.95.

Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404

Circle Reader Service Number 204.

### New Price For *The Toy Shop*

Bröderbund has announced a price reduction for *The Toy Shop*. The new suggested price for the Commodore 64 version is \$39.95. The program originally sold for \$59.95. *The Toy Shop Refill Kit* has also been reduced from \$24.95 to \$19.95.

The program is designed to make 20 different working mechanical models. Users can first customize designs, print them out, and then mount them on adhesive cardstock. The parts can then be cut out and assembled. Models include an antique truck, a carousel, and a jet plane.

Bröderbund Software, 17 Paul Dr., San Rafael, CA 94903-2101

Circle Reader Service Number 205.

### Music Software

Mastery in Music Software has released six music tutorial programs for the Commodore 64 that offer a unique alternative to drill and practice.

*Guitar Master* includes sections called Tuning, Chord Analyzer, Progressions, Pick & Strum, Transposing, Scales, and Fret Notes that can aid the student learning to play the guitar.

Other programs available include *Flute Master*, *Clarinet Master*, *Saxophone Master*, *Trumpet Master*, and *Singing Master*. Each can be personalized by your choice of key signature, time signature, tempo, note type and range. Price is \$39.95.

*Mastery in Music Software*, P.O. Box 1027, Bend, OR 97709

Circle Reader Service Number 206.

### Napoleon In Russia

KRENTek Software has released *Borodino: 1812 Napoleon in Russia*, a war game that reenacts the battle that decided Napoleon's invasion of Russia and forced his disastrous retreat.

You can be Napoleon, directing your infantry, cavalry, and artillery, while the computer plays the Russians. Try the two-player option in the game that covers the entire three days of battle in the village of Borodino, west of Moscow. Eight historical and what-if scenarios, with optional fatigue and morale options, can be played in a 15-20 minute mode or in versions of 4

or more hours. Available for the Commodore 64, the suggested retail price is \$59.95.

KRENTek Software, 5401 N. 10th, Suite 214, McAllen, TX 78504

Circle Reader Service Number 207.

### Pick Lottery Numbers

*Pure Gold Lotto* is the debut market entry of The Rosewater Company's low-cost Pure Gold series. The program aids in picking lottery numbers for U.S. and Canadian lotteries. A key feature is the Numbers Wheeling system, with which Rosewater claims you can increase your chances of winning in a 6/40 lotto game from 1 in 3,838,380 to 1 in 548,340.

Included in the package is a booklet containing the addresses and 24 hotline telephone numbers of all the state lotteries and other information, including taxes on winnings. *Pure Gold Lotto* is available for the Commodore 64 and sells for \$19.95.

The Rosewater Company, P.O. Box 32252, Baltimore, MD 21208

Circle Reader Service Number 208.

### Three Dimensions For The 64

Digiscape Software has released *3D Surface*, a software package for the Commodore 64 that lets the user graph topographic maps, spatial frequency and distribution, subsurface geology, open-pit mines, building sites, and logos—all in three dimensions.



A printout of a 3D Surface screen

The menu-driven program removes hidden lines, and one of its more advanced features allows the user to rotate a 3-D graph through 360 degrees. The graph's viewing angle may be adjusted from 10 degrees to 80 degrees. All graphs may be compressed or expanded, printed, and saved to disk. The price is \$39.95.

Digiscape Software, P.O. Box 113058, Carrollton, TX 75011-3058

Circle Reader Service Number 209.

### Three Games From Accolade

Accolade has released three new games for the Commodore 64 that test users' skills in putting, driving, and space flight.

*Mini-Putt* is a miniature golf game for one to four players that features cartoon-style animation and four courses.







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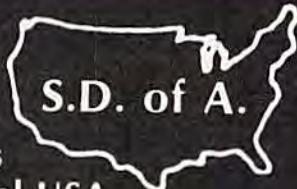
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Shanghai ..... \$19	<b>Shanghai</b> ..... \$19	<b>Marble Madness</b> ..... \$21	<b>Zork 1</b> ..... \$23	<b>Typing Tutor 3</b> ..... \$19	<b>Compuserve Starter Kit</b> ..... \$19
Tass Times ..... \$19	<b>The Last Ninja</b> ..... \$23	<b>Monopoly</b> ..... Call	<b>Zork Trilogy</b> ..... \$39	<b>SIR-TECH</b>	<b>Disk Case (Holds 75)</b> ..... \$6.88
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		<b>Pegasus</b> ..... \$21	<b>Gradius</b> ..... \$19	<b>SOFTWARE SIMULATIONS</b>	<b>Icontroller</b> ..... \$14
		<b>Road to Moscow</b> ..... \$26	<b>Rush 'n Attack/Yie Ar Kung Fu</b> ..... \$19	<b>Football</b> ..... \$19	<b>Messenger Modem</b> ..... \$33
		<b>Sansion</b> ..... \$14	<b>Yie Ar Kung Fu 2</b> ..... \$19	<b>Pure Stat Baseball</b> ..... \$25	<b>Panasonic Printers</b> ..... Call
		<b>Scrabble</b> ..... \$23	<b>MICROLEAGUE</b>	<b>SPRINGBOARD</b>	<b>Suncom Joysticks</b> ..... Call
		<b>Skate or Die</b> ..... Call	<b>Baseball</b> ..... \$25	<b>C.M. Library Vol. 1</b> ..... \$19	<b>Wico Bat Handle</b> ..... \$17
		<b>Star Fleet 1</b> ..... \$26	<b>Box Score Stats</b> ..... \$16	<b>N.R. Clip Art Vol. 1</b> ..... \$19	<b>Wico Boss</b> ..... \$12
		<b>Strike Fleet</b> ..... \$21	<b>General Manager</b> ..... \$19	<b>N.R. Clip Art Vol. 2</b> ..... \$25	<b>Wico Three-Way</b> ..... \$19.95
		<b>World Tour Golf</b> ..... \$21	<b>1986 Team Data Disk</b> ..... \$14	<b>N.R. Clip Art Vol. 3</b> ..... \$19	<b>XETEC Super Graphix</b> ..... \$59
		<b>ENLIGHTENMENT</b>	<b>WWF Wrestling</b> ..... \$25	<b>P.S. Graphics Expander</b> ..... \$23	<b>XETEC Super Graphix Jr.</b> ..... \$39
		<b>Guide to Chess</b>	<b>MICROPROSE</b>	<b>SSI</b>	<b>*all programs on disk unless otherwise noted!</b>
		<b>Openings</b> ..... \$39	<b>Acrojet</b> ..... \$16	<b>Battle of Antietam</b> ..... \$32	
			<b>Airborne Ranger</b> ..... \$23	<b>Battle Cruiser</b> ..... \$37	
			<b>F-15 Strike Eagle</b> ..... \$23	<b>Battle Group</b> ..... \$37	
			<b>Gunship</b> ..... \$23	<b>B-24</b> ..... \$23	

P.O. BOX 111327—DEPT. CG—BLAWNOX, PA 15238

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Each course represents a theme drawn from such sources as famous movies, countries, sports, and video and arcade sequences.

The main play screen includes the golfer window, which features the golfer in several animated positions, and a power bar, which is used to select the force and angle of each shot. The overview window displays a top view of the layout of the entire hole, allowing the player to see the placement of obstacles and the position of the tee and hole. Each hole is divided into play-screen windows, which are close-up views of the particular section that the player's ball is in.

The program features three types of obstacles: paths, requiring precise aim; setbacks, consisting of objects that interfere with the path of the ball; and timing, which requires the player to take the shot at a precise moment, such as through a windmill.

The game is completely joystick controlled and retails for \$29.95.

In *Test Drive*, players test drive their choice of a Ferrari Testarosa, Lamborghini Countach, Lotus Esprit Turbo, and several other sports cars. Each car's specifications is adjusted according to the vehicle's capabilities.

This driving simulation game displays the interior of the car and the road from the vantage point of the driver. The player will see an actual rendition of the car's dashboard with an inset for the gearshift knob. The remainder of the screen displays the driver's view through the windshield and the road to be challenged. A radar detector and a rear-view mirror are also depicted.

The object of the game is to drive different sections of highway within a certain time limit. Along the way, the player will encounter slower vehicles, oncoming traffic, falling rocks, and the highway patrol, who will appear in the rear-view mirror with his lights flashing if the player is caught speeding. The game ends prematurely when the driver is pulled over by the highway patrol, goes off the road, or arrives at his or her destination too slowly. The player's final score is based on total driving time and is compared to the best score recorded by the designers of this program.

The game retails for \$29.95. An Amiga version is available at a suggested retail price of \$44.95.

The third release from Accolade is *Apollo 18: Mission to the Moon*, which allows users to recreate any one of the original moon missions of the 1960s. Program graphics are based on actual footage of the Apollo missions.

Players can assume the role of either a mission control specialist or an astronaut. In either role, the player must perform tasks from prelaunch to splashdown in order to complete the mission.

The game consists of stages including launch, flight to the moon, orbiting the moon, docking, landing and walking on the moon surface, lunar blastoff, redocking, return route, spacewalking, re-entry, and splashdown and recovery.

The player can score points in each stage of the game by performing tasks. A minimum score is required for each task in order to progress to the next stage. Digitized voice and sound are featured throughout the game.

*Apollo 18* has a suggested retail price of \$29.95.

Accolade, 20813 Stevens Creek Blvd., Cupertino, CA 95014

Circle Reader Service Number 210.

### 3-D Space Flight Simulator

*Echelon* is a 3-D space flight simulator for the Commodore 64 released by Access Software. *Echelon* is the name of a top secret military facility where you will be taught to operate the 21st Century's most awesome combat and exploration vehicle, the Lockheed C-104 Tomahawk.

You will be trained to operate the C-104's advanced instrumentation and weaponry on a series of simulators. When you are ready, you will be assigned to an action-packed patrol zone, where you must find the solution to a series of puzzling and mysterious events. The *Echelon* package includes the LipStik, a voice-activated control headset used for operating various controls aboard the spacecraft. Suggested retail price is \$44.95.

Access Software, 2561 S. 1560 West, Woods Cross, UT 84087

Circle Reader Service Number 211.

### New From Free Spirit

Free Spirit Software has announced several new software titles for the Commodore 64.

The *Communicator* is a full-featured, menu-selected terminal program written in assembly language for fast, efficient operation. Communication parameters, which may be user defined or selected, include baud rate (50-1800), word length, stop bits, parity, and duplex.

The *Communicator* supports an 18K buffer with full printer, disk, modem, and status line support. Disk files may be sent with or without X-modem protocols. Other features include macro key options, video attribute options, file conversion options, autodial, alarm clock/timer, and DOS command menus.

It can be ordered by mail for \$39.95 (shipping and handling included).

*Masterpieces I, Flags of the World* is the first of a series of detailed hi-res drawings of famous objects and works of art, which can be viewed on a moni-

tor or printed on a Commodore 1525 compatible or color printer. *Flags of the World* contains the flags of 180 countries and is available for \$9.95.

*English and Scottish Songs* is a collection of 16th- and 17th-century English and Scottish folk songs. The historical background of each song is presented, and then the words are displayed on the screen as the music plays. *My Heart's in the Highlands*, *British Grenadier*, and *Barbara Allen* are among the selections. It sells for \$9.95.

*Best of Scott Joplin, Volume II* is the tenth in a series of classical music disks for the 64 by musician Lorne Strider. A biography of Joplin appears on the screen as the music plays. The price is \$9.95.

Circle Reader Service Number 212.

Free Spirit Software, 538 S. Edgewood, LaGrange, IL 60525

### QuantumLink Moves Offices

QuantumLink, the Commodore-specific online information service has moved to larger offices in Vienna, VA. The new location is nearly double the size of its previous home. Company staff has increased by 200 percent since QuantumLink's inception two years ago, making the move necessary.

QuantumLink serves its customers with round-the-clock, toll-free telephone numbers, a monthly digest of activities, guided online tours, and other support services.

QuantumLink, 8619 Westwood Center Dr., Vienna, VA 22180

Circle Reader Service Number 213.

### Ready-To-Use GEOS Graphics

Those Designers has announced additional *Diskart* graphics for use with GEOS. The four new disks (*Diskart 5, 6, 7, and Musi-Kit*) contain a variety of clip art and illustrations, and they can also provide you with a professional-looking sheet-music tool. These hi-res graphics can be pasted directly into *geoPaint* and *geoWrite* documents, and all are compatible with GEOS 128. Each *Diskart* disk retails for \$8.50.

Those Designers, 3330 Lewis Ave., Signal Hill, CA 90807

Circle Reader Service Number 214.

### Five New Titles From IntelliCreations

DataSoft's IntelliCreations has released five new games for the Commodore 64.

*Tomahawk* is a helicopter simulation game in which the player pilots a U.S. Army Apache helicopter. Apaches are designed to fly at speeds in excess of 200 mph and are equipped with the latest in high-tech weaponry. Players can select combat or training missions at



four pilot-rating levels. Features include offensive and defensive flight maneuvers, ground attack and air-to-air interception, day and night vision systems, and instruments-only flying.

Suggested retail price is \$34.95.

In *Force 7*, the player is the commander of a special forces unit sent to the planet Karis to rescue humans at an energy fabrication plant that has been overrun by aliens. Only one crew member can be teleported to the planet surface at a time to fight the aliens, because only one space suit has survived the journey.

The action/adventure game retails at \$19.95.

IntelliCreations has expanded its war strategy game series with *Bismark—The North Sea Chase*, a battleship simulation in which the player can choose to command the Royal Navy or the German battleship that sunk the H.M.S. Hood in 1941. Players can use conventional battleship weapons or use a Fairey Swordfish torpedo plane via a cockpit flight simulator.

Suggested retail price is \$34.95.

Another war strategy game, *Tobruk—the Clash of Armour*, is a tank simulation that allows the player to assume the role of Rommel, head of the German Afrika Korps. The game reflects Rommel's attempt to defeat the British in North Africa and move into Egypt, destroying the Allies' hold on the southern Mediterranean.

The game retails for \$34.95.

*Dark Lord* is an introductory graphics/text adventure game in which the player goes into the Alterworld, where an evil wizard must be destroyed. The program contains 80 screens of graphics, animation, music, a self-running demo, and a random relocation of objects.

Suggested retail price is \$19.95.

DataSoft, 19808 Nordhoff Pl., Chatsworth, CA 91311

Circle Reader Service Number 215.

## Expanding Desktop Publishing

Commodore users can expand their system's desktop publishing capabilities with a new software package from Berkeley Softworks titled *geoPublish*. The software works in conjunction with the GEOS (Graphic Environment Operating System) program. With this program, users can create multiple page, multiple column documents (such as newsletters), mixing text columns, graphics images and line graphics on each page.

Users can create a customized master page that contains graphics and text to appear on each page of a document. Master-page definitions can also be loaded from a library or saved for later use.

To design the layout, the user defines rectangular regions on each page of a document. Text flows into columns, automatically continuing onto later pages as necessary. The text retains all information from the source *geoWrite* document, including font style and size, tabs, centering, and justification. When the text is edited, it automatically reflows back into columns. During or after this process, graphics or photos can be pasted onto each page and cropped, centered, or scaled to fit. If graphics images overlap text regions, text automatically reflows around the graphics.

The onscreen ruler and guidelines help the user modify the layout. An onscreen tool box allows users to choose the graphics tools needed to draw lines, rectangles, and circles in various widths and patterns.

Before the finished product is printed, the user can preview all pages on the screen and focus on any particular area of the page for viewing the actual size of graphics and text. The finished product can be printed on any GEOS-compatible printer.

*geoPublish* retails for \$69.95.

Berkeley Softworks, 2150 Shattuck Ave., Berkeley, CA 94704

Circle Reader Service Number 216.

## Artworx Releases CYCLEKNIGHT

In *CYCLEKNIGHT*, a new game release for the Commodore 64 from Artworx, you drive a hi-tech motorcycle that carries you into a forgotten land of make-believe. Armed with deadly weapons, you journey through 2000 chambers of a dark medieval castle in search of your kidnapped queen and her loyal villagers.

Rev engines one-on-one with the infamous Blacknight, and try your hand at bartering with strange creatures in this program that combines animation and action with strategy, fantasy, and adventure. Suggested retail price for *CYCLEKNIGHT* is \$19.95.

Artworx Software, 1844 Penfield Rd., Penfield, NY 14526

Circle Reader Service Number 217.

## A Handle For Your 128

Solomon Software Systems has announced *Handle 128* for the Commodore 128. Its menu selections provide one-keystroke access to utilities. The Terminal Setup Menu allows the user to display and set the time, choose the console color scheme, and select some terminal parameters. The program's Sequential File Utility Menu provides the user with the ability to rename, copy, and append sequential files. The user can also verify the BAM, format one or two sides, and collect a disk. The Sequential File Transfer Menu allows se-

lection of input and output devices for creating or transferring files.

Suggested retail price is \$19.95.

Solomon Software Systems, 24285 Sunnymead Blvd. #256, Moreno Valley, CA 92388

Circle Reader Service Number 218.

## Mindscape Announces

### Wordmaze

Mindscape's Educational Division has introduced *Wordmaze*, a word puzzle program for students from grades 3-12. The program is designed to help develop vocabulary and spelling skills as students search for words hidden in a block of scrambled letters.

The program takes words from eight lists covering topics from space to sports, or from user-supplied lists, and randomly places them in a matrix or maze of letters. The words are placed in any of eight directions and may overlap with other words, sharing some of the same letters. Students may search for words on the computer monitor or from a print-out. *Wordmaze* for the Commodore 64 comes with a teacher's guide and activity sheets for \$49.95.

Mindscape, 3444 Dundee Rd., Northbrook, IL 60062

Circle Reader Service Number 219.

## Keyboard-Mounted Joystick For GEOS

Suncom has released a different input method for Commodore 64s and 128s using GEOS. The IconTroller can be used in place of a mouse or a full-sized joystick. The product mounts directly on the keyboard surface with the use of semipermanent, double-faced tape, which is included in the package. A feed-through jack on the accessory allows the user to attach a game-duty joystick or a mouse while the IconTroller is installed and in use.

The IconTroller retails for \$19.99.

Suncom, 260 Holbrook Dr., Wheeling, IL 60090

Circle Reader Service Number 220.

## Crazy Clip Art

*Postcards*, recently released from Activision, is a collection of comical clip art, backgrounds, and captions. The program can be used to make postcards, invitations, office notes, mementos, and personalized messages. The clip art includes creatures such as warthogs, dogs, platypuses, cats, rhinos, and rats; people, including Honest Abe and Mona Lisa; signs; foods; aliens; and spacemen. There is also a library of backdrops such as a landscape, a beachscape, and a moonscape. The clip art can be dropped on top of a background, and messages can be added by



using phrases and letters included in the clip art collection, or by typing in your own.

The program also features a paint program, allowing the user to write and design personal creations.

*Postcards* is available for the Commodore 64 at a suggested retail price of \$24.95.

Activision, P.O. Box 7286, Mountain View, CA 94039

Circle Reader Service Number 221.

## New Language For 64

Trident Software has introduced *64-Tran*, a FORTRAN Development Environment for the Commodore 64. (CP/M is not required.) It allows the user to write programs in a language other than BASIC. The program can take a source program and generate relocatable machine code. Source programs can be generated using any word processor that outputs sequential files, or you can use a translator, which is included, to allow the use of the Commodore 64 built-in editor. Also included is a Linker/Loader, which combines the machine code from your program with system machine code to create a new program.

*64-Tran* uses standard FORTRAN statements with enhancements. The program can be used on the Commodore 128 in 64 mode.

Suggested retail price is \$50.

Trident Software, P.O. Box 180, Glenelg, MD

Circle Reader Service Number 222.

## Time-DOS And Dragsters

Family Software has announced the release of *Time-DOS*, a date- and time-stamping utility, and *Drag Race Eliminator*, a simulation of professional drag racing.

*Time-DOS* wedges into the 64 or 128 operating system and provides ten new direct-mode commands, plus a realtime calendar clock. Program files can be stamped automatically with the date and time when created, accessed, or both. All files can be stamped manually either in direct mode or under program control. The new directory provides the usual information, plus the date and time stamp for each file. The disk contains both *Time-DOS 64* and *Time-DOS 128* and has a suggested retail price of \$19.95.

*Drag Race Eliminator* has five classes of NHRA competition that permit the user to practice time trials, compete with the computer, or race another player. Written entirely in machine language, this Commodore 64 game uses music and sound, multicolor hi-res graphics, and a 3-D split screen view of the track. The sophisticated timing sys-

tem includes a Pro-Start Christmas Tree, individual elapsed-time clocks, reaction timers, and win lights. Times are computed to within 1/1000 second.

*Drag Race Eliminator* has a suggested retail price of \$24.95.

Family Software, 3164 Surrey Ln., Aston, PA 19014

Circle Reader Service Number 223.

## Sound Librarian

*Sound File* by Blank Software is a complete sound and sequence librarian for the Ensoniq ESQ-1 Digital Wave Synthesizer with a Commodore 64.

*Sound File* supports up to four on-screen sound banks, flexible patch/sequence dumps, mouse-driven sound swapping, as well as sound and sequencer storage. Its autosort patch libraries help to organize patches into characteristic groups like strings, effects, or electronic percussion up to 120 patches long.

With its built-in sequencer, you can name swap, store, and transfer song and sequence files individually or in groups. It uses pull-down menus for easy-to-learn operation. Suggested retail price is \$69.95.

Blank Software, 1034 Natoma St., San Francisco, CA 94103

Circle Reader Service Number 224.

## New Titles And Price Cuts From Cosmi

Cosmi has released three new simulations for the Commodore 64: *Shirley Muldowney's Top Fuel Challenge*, *Chernobyl*, and *Steve Garvey vs. Jose Canseco in Grand Slam Baseball*. Each has a suggested retail price of \$24.95.

Cosmi also has reduced the prices of several of its popular software programs. *Super Huey*, a helicopter flight simulator that has sold over 150,000 copies, is now selling at a suggested retail price of \$12.95. Also reduced to \$12.95 are Paul Norman's *Forbidden Forest* and Richard Petty's *Talladega*, a 3-D NASCAR racing simulation.

Cosmi, 415 N. Figueroa St., Wilmington, CA 90744

Circle Reader Service Number 225.

## Boxing From Activision

Activision has announced the addition of *Star Rank Boxing II* to its Gamestar line of sports simulation software. Two players can square off against each other in exhibition action, or one player can compete against computer opponents.

In the exhibition mode, players may fight in one of three weight classes and can create up to five fighters in each class. Players must fight four computer challengers, each more skillful than the

one before, to win the title.

Before each fight, the "Tale of the Tape" shows the boxer's height, weight, reach, age, record, and how he compares to the current champion and other contenders in the division. The game's animation gives fighters the ability to block and duck punches, throw crosses, jabs, uppercuts, and body shots.

The game is available for the Commodore 64 and retails for \$29.95.

Activision, P.O. Box 7286, Mountain View, CA 94039

Circle Reader Service Number 226.

## Celebrity Cookbook


Merrill Ward has introduced an electronic cookbook for the Commodore 64 that includes such favorites as Ronald Reagan's recipe for bell peppers stuffed with corned beef hash.

*The Celebrity Cookbook, Vol. 1* features music and color graphics, and utilizes a single-key approach to call up and print out recipes, to determine how much liquor to buy for a party, or to calculate ingredients for different guest lists.

The program's recipe filer features word wrap, a find feature, and permits the use of Commodore drawing keys to decorate and design recipes.

*The Celebrity Cookbook, Vol. 1* has a suggested retail price of \$29.95, while volumes 2-6 retail for \$14.95 each.

Merrill, Ward, 255 N. El Cielo Rd., Suite 222, Palm Springs, CA 92262

Circle Reader Service Number 227. 

All programs  
listed in this  
magazine are  
available on the  
GAZETTE Disk.

Details  
elsewhere  
in this issue.





## SUPER DISK UTILITIES

for the C128 & 1571

Super Disk Utilities is the ultimate utilities disk for the 1571 disk drive and C128 computer. Super Disk Utilities is a full featured disk utility system that will perform virtually every CBM DOS function available. No need for numerous utility disks to perform various functions. SDU does it all!

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SDU helps you learn the inner workings of the 1571 drive with the 1571 Memory Monitor and unique RAM Writer. With these options you can assemble, disassemble any section of drive RAM or ROM. Use the Ram Writer to program the 1571 RAM yourself! SDU uses an options window to display all possible choices available at any given time. No need to memorize hidden commands. SDU fully supports a second 1571 drive. Many of the utility functions also work on the 1541 drive. SDU performs many MFM utility functions including analyze MFM disk format, format MFM disks, read a CP/M + directory, format in CP/M + (GCR format) and more. Super Disk Utilities is available for only \$39.95!

## THE COMMUNICATOR

Fastest, easiest, most efficient, most feature-packed terminal program for the C64. Among its many features are:

- Menu selected options
- User selected/defined baud rates
- Very large buffer capacity
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- Video attribute options including 40, 64, 80 column display
- File conversion options include text to BASIC, Pet-ASCII to ASCII, program to image
- Terminal emulation capability includes Tektronix -4010 graphics protocol
- Alarm Clock/Timer
- Autodial features
- DOS Command menus, file copy utility
- Written 100% in assembly language
- Easy to use instruction manual

All these features and more for only \$39.95!

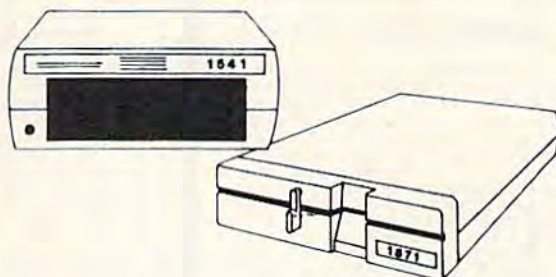
**Super Disk Librarian** - Full featured disk cataloging & library system for the C128 in 128 mode - \$29.95

**Super 64 Librarian** - Disk cataloger for the C64 - \$29.95

**Mr. Quizzer** - Test making program for the C64 or C128 - \$19.95

**Spirit Writer** - Word processor for the C64. Includes 30,000 word spelling checker. Only \$29.95!

**Fun Biorhythms** - Print personalized Biorhythms on your printer. For the C64. Only \$9.95!



## 1541/1571 Drive Alignment

1541/1571 Drive Alignment reports the alignment condition of the disk drive as you perform adjustments. On screen help is available while the program is running. Includes features for speed adjustment and stop adjustment. Complete instruction manual on aligning both 1541 and 1571 drives. Even includes instructions on how to load alignment program when nothing else will load! Works on the C64, SX64, C128 in either 64 or 12 mode, 1541, 1571 in either 1541 or 1571 mode! Autoboots to all modes. Second drive fully supported. Program disk, calibration disk and instruction manual only \$34.95!

## CHRISTMAS CLASSICS

Place your C64 or C128 in a holiday mode with Free Spirit's renditions of these all-time Christmas favorites. Joy to the World, Deck the Hall, Twelve Days of Christmas; O Tannenbaum and Jingle Bells are among the over 40 songs included. Only \$9.95!

*Free Spirit Software, Inc.*

538 S. Edgewood  
LaGrange, IL 60525  
(312) 352-7323

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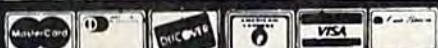
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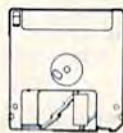
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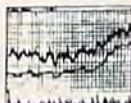
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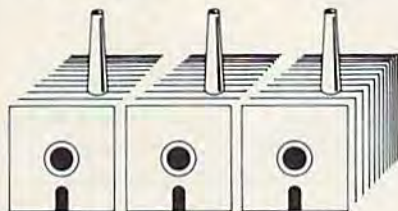
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# How To Type In COMPUTE!'s Gazette Programs

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, [ F ], 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.

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

[ F1 ]	COMMODORE	1	
[ F2 ]	COMMODORE	2	
[ F3 ]	COMMODORE	3	
[ F4 ]	COMMODORE	4	
[ F5 ]	COMMODORE	5	
[ F6 ]	COMMODORE	6	
[ F7 ]	COMMODORE	7	
[ F8 ]	COMMODORE	8	



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# The Automatic Proofreader

Philip I. Nelson

"The Automatic Proofreader" helps you type in program listings for the 128, 64, Plus/4, and 16 and prevents nearly every kind of typing mistake.

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 PROOFREADER FOR ";:IF VEC=42364 THEN
   {SPACE}PRINT "C-64"
30 IF VEC=50556 THEN PRINT "V1
   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:POKE
   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
   B,HB: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:POKE SA+
   29,224:POKE SA+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 104,74,74,74,168,1
   85,211,3,32,210
280 DATA 255,162,31,183,227,3,
   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
```



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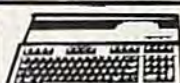


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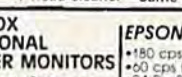
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# MLX Machine Language Entry Program For Commodore 64

Ottis Cowper, Technical Editor

*"MLX" is a labor-saving utility that allows almost fail-safe entry of Commodore 64 machine language programs.*

Type in and save some copies of MLX—you'll want to use it to enter future ML programs from COMPUTE!'s GAZETTE. 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.

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, the numeric keypad modification from the March 1986 "Bug-Swatter" column is now incorporated in the listing. The keypad is active only while entering data. Addresses must be entered with the normal letter and number keys. The figure below shows the keypad configuration:

7	8	9	0
4 U	5 I	6 O	F P
1 J	2 K	3 L	E :
A M	B ,	C .	D /
0 Space			

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.

## 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 redis-



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played. 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. 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. Disk users should also note that the drive prefix 0: is automatically added to the filename (line 750), 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.

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 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-RE-STORE 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 or LOAD "filename" for tape, and then RUN. Such programs will usually have a starting address of 0801 for the 64. Other programs must be reloaded to specific addresses with a command such as LOAD "filename", 8,1 for disk 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 insure 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.

### 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$,
    1,J,A,B,A$,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$="0123456789ABCDEF"
SB 130 RS=CHR$(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}LOAD 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
```



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```

JC 390 CK=CK+25*(CK>25):RETURN
QS 400 PRINT"[DOWN]STARTING AT
      [43]";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$:FOR J=1 TO 2:IF F T
      HEN BS=MID$(IN$,I+J,1)
HA 460 PRINT"[RVS]B$LS$;IF I<
      24THEN PRINT"[OFF]";
HD 470 GET AS:IF AS=N$ THEN470
FK 480 IF(AS>"/"ANDAS<"")OR(A
      $>"@ANDAS<"G")THEN540
GS 485 A=-(AS="M")-2*(AS=",")-
      3*(AS=".")-4*(AS="/")-5
      *(AS="J")-6*(AS="K")
FX 486 A=A-7*(AS="L")-8*(AS=":
      ") -9*(AS="U")-10*(AS="I
      ") -11*(AS="O")-12*(AS="
      P")
CM 487 A=A-13*(AS=S$):IF A THE
      N AS=MID$("ABCD123E456F
      0",A,1):GOTO 540
MP 490 IF AS=RS AND((I=0)AND(J
      =1)OR F)THEN PRINT B$;:
      J=2:NEXT I=24:GOTO550
KC 500 IF AS="[HOME]" THEN PRI
      NT B$;J=2:NEXT I=24:NEX
      T:F=0:GOTO440
MX 510 IF(AS="[RIGHT]")ANDF TH
      ENPRINT B$LS$;GOTO540
GK 520 IF AS<>L$ AND AS<>D$ OR
      ((I=0)AND(J=1))THEN GOS
      UB1060:GOTO470
HG 530 AS=L$+S$+L$:PRINT B$LS$;
      J=2-J:IF J THEN PRINT
      [SPACE]L$;:I=I-3
QS 540 PRINT AS;: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$,I):GOSUB320:IF
      I<25 THEN GOSUB380:A(I
      /3)=A
PK 570 NEXT:IF A<>CK THEN GOSU
      B1060:PRINT"[BLK]{RVS}
      [SPACE]ERROR: REENTER L
      INE [43]";F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FO
      R I=0 TO 7:POKE B+I,A(I
      ):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN C
      LOSE3:PRINT"[DOWN]{BLU}
      ** END OF ENTRY **{BLK}
      [2 DOWN]";:GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT"[CLR]{DOWN}{RVS}
      [SPACE]DISPLAY DATA ";:G
      OSUB400:IF IN$=N$ THEN2
      20
RJ 620 PRINT"[DOWN]{BLU}PRESS:
      {RVS}SPACE[OFF] TO PAU
      SE, {RVS}RETURN[OFF] TO
      BREAK[43]{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 AS:IF AS=RS THEN GO
      SUB1080:GOTO220
EQ 670 IF AS=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[43]";IN$:IF IN$=N$
      [SPACE]THEN220
PR 720 F=0:PRINT"[DOWN]{BLK}
      {RVS}T[OFF]AEE OR {RVS}
      D[OFF]ISK: [43]";
FP 730 GET AS:IF AS="T"THEN PR
      INT"T[DOWN]";:GOTO880
HQ 740 IF AS<>"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$+,"P,W":G
      OSUB860:IF A THEN220
FJ 770 AH=INT(SA/256):AL=SA-(A
      H*256):PRINT#1,CHRS(AL)
      ;CHRS(AH);
PE 780 FOR I=0 TO B:PRINT#1,CH
      RS(PEEK(BS+I));:IF ST T
      HEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOT
      O940
GS 800 GOSUB1060:PRINT"[DOWN]
      {BLK}ERROR DURING SAVE:
      [43]";GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+,"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}[43]";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

```

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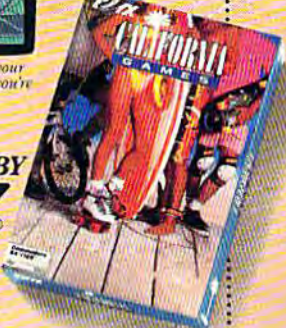
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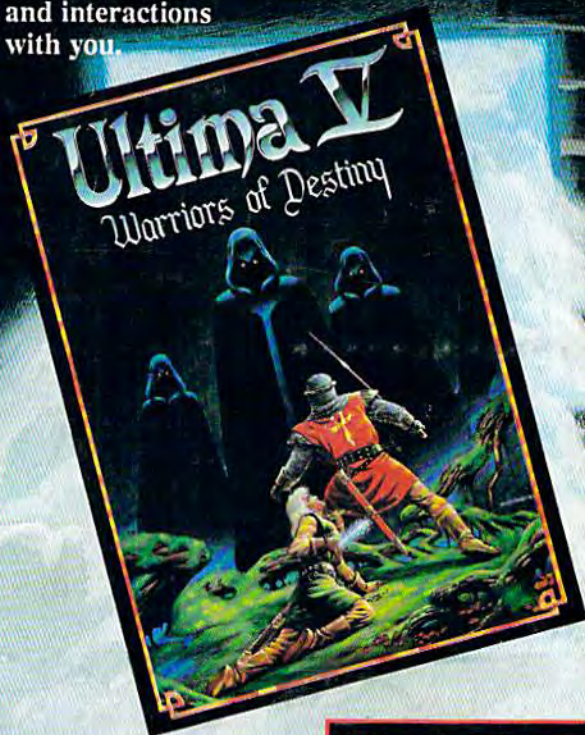


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