Word Processing In The Home

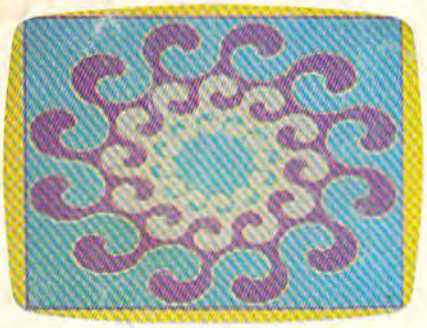
COMPUTE!'s GAZETTE

$2.50
January 1984
Issue 7 Vol. 2, No. 1
02220 $3.25 in Canada

For Owners And Users Of **Commodore VIC-20**™ And **64**™ Personal Computers

Computing For Families

Reviews of some of the best educational games on the market for the whole family to enjoy. Evaluated by our crack review panel—columnist Fred D'Ignazio and his own family.



64 ELECTRONIC NOTEPAD

Ever lost the instructions for using a favorite program? Electronic Notepad keeps the information where it belongs—on the same disk with your programs.

SpeedScript Word Processor For VIC And 64

Turn your computer into a superior writing tool with *SpeedScript*, a ready-to-type program with all the major features of commercial word processors. Written entirely in machine language for the 64 and expanded VIC.

Tetracrystals Of Veluria & Cave-In: Two Unique Games For 64 And VIC

Create multicolored crystals which grow and evolve in *Tetracrystals*, an unusual non-violent game for VIC and 64. Or rescue trapped miners in *Cave-In*, an exciting 3-D maze game for the VIC.

HARDHAT CLIMBER

Thrilling Action Game For VIC And 64

All you have to do is pick up the toolboxes scattered throughout the building. Seems easy enough. But watch out for the broken ladders, holes in the floor, and [illegible]

Also In This Issue

0 71486 02220 01

A million laughs

SPARE CHANGE™ You are the game-happy owner of the Spare Change Arcade. Two fun-loving, but overworked Zerks—the main characters in your most popular game—have broken loose and are trying to retire from the business. You try madly to stop them. If you can get a coin into the juke box, the Zerks get so caught up in the music, they drop everything and start dancing. You also try popping popcorn and making a pay phone ring—which immediately makes the Zerks stop, answer and start a wild conversation. If you "win" the game, there are rib tickling cartoons by the Zerks to reward your efforts. It's a game full of sight gags, surprises and comedy. From the best. Brøderbund! For the Apple® II/II+/IIe, Atari® Computers, and Commodore 64™ in disk format.

and an endless challenge

LODE RUNNER™ Here's a game that will never stop challenging you. That's because Lode Runner is more than a spellbinding, fast-action game with its 150 different mind-boggling game screens. Lode Runner is also an easy-to-use Game Generator that lets you create your own games. Without any knowledge of programming, you can easily design unique Lode Runnner screens, then bring them to action-packed life. You will maneuver through scene after scene, running, jumping, drilling passages and outfoxing enemy guards in a secret underground hideaway as you pick up chests of gold stolen from citizens of the Bungeling Empire. There's no end to the thrills, chills and challenge. Of course, it's from Brøderbund! For the Apple® II/II+/IIe; Atari® Computers; Commodore 64™ (disk and cartridge); VIC-20™ (cartridge); IBM® PC.

Ask your Brøderbund dealer for sneak previews.

Brøderbund Software **Discover the Difference**

17 Paul Drive San Rafael, CA 94903

First Star Has 4 New Games.

Fernando Herrera, designer of *ASTRO CHASE*™ and our design team again define "State of the Art." Superior graphics, real-time animations,™ multiple screens, intermissions, arcade-quality sound, innovative gaming, challenge and excitement—we deliver it all!

THE BAD NEWS? You can't play them all at once.

BOING!™
Designed by Alex Leavens & Shirley A. Russell
ATARI Atari VCS 2600

BRISTLES™
Starring Peter the Painter
Designed by Fernando Herrera
ATARI Atari Home Computers
Commodore Computers

FLIP and FLOP™
ATARI Designed by Jim Nangano
Atari Home Computers
Commodore Computers

PANIC BUTTON™
TRS-80 Color Computer by Paul Kanevsky
Vic-20 Home Computer by Wayne Lam

FIRST STAR SOFTWARE INC

"When being first counts...we're number one!"
22 East 41st Street, New York, NY 10017
Distributor and Dealer Inquiries Invited/212 532-4666

"Make note of that name, Electronic Arts. It may well set the standard for sophisticated entertainment software in the '80's."

—Creative Computing.

ELECTRONIC ARTS COMES TO THE COMMODORE.

C64, Ap, At

HARD HAT MACK™
by Michael Abbot and Matthew Alexander

"An outstanding, state-of-the-art game. Hard Hat Mack is the blue collar hero of this three screen climbing game and his tasks are far from simple."
—Arcade Express

"If you put Hard Hat Mack in the ring with all other games on the market, it would win most bouts in the opening seconds of the first round. It's that good."
—Softalk

ARCHON™
by Free Fall Associates

"No review could possibly do more than hint at the manifold excellence of Archon. It is truly a landmark in the development of computerized strategy games."
—Video

"...you're bound to fall for it. Imagine a chess game in which you can cast spells."
—Creative Computing

"...the offices of A.N.A.L.O.G. echo with the searing roar of dragon-fire and shouted obscenities from angry players. Archon turns friend against friend and inspires grudges that can last for days. What better compliment can you give to a computer program."
—A.N.A.L.O.G.

C64, Ap, At

Ap, C64, At, signify availability for Apple II, II+, IIE, Commodore 64, or Atari home computers with disc drive. All screen shots represent Commodore 64. Apple is a registered trademark of Apple Computer, Inc. Commodore 64 is a registered trademark of Commodore Business Machines, Inc. Atari is a registered trademark of Atari, Inc., a Warner [illegible]

MURDER ON THE ZINDERNEUF™

by Free Fall Associates

"Whodunit fans, drop your Agatha Christie and come running. This is your game! The graphics are among the most colorful and attractive I have seen in any game." – Antic

C64, At

M.U.L.E.™

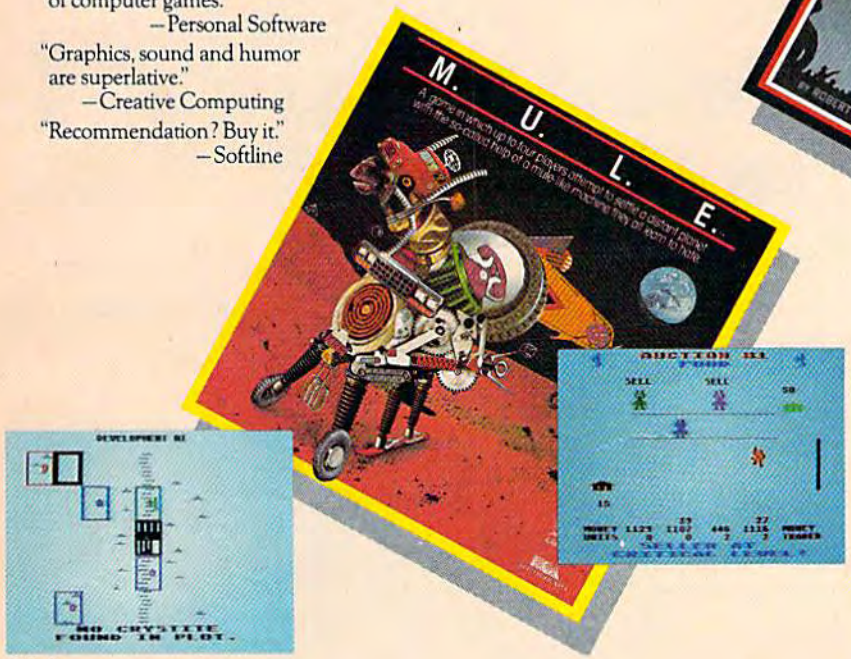
by Ozark Softscape

"A must-have."
– Electronic Fun

"May well become the Monopoly of computer games."
– Personal Software

"Graphics, sound and humor are superlative."
– Creative Computing

"Recommendation? Buy it."
– Softline



C64, At

PINBALL CONSTRUCTION SET™

by Bill Budge

"The best program ever written for an 8-bit machine."
– Steve Wozniak

"A fully integrated graphics-oriented design tool that lets you create your own video pinball games, required study for all serious software authors."
– A.N.A.L.O.G.

"A tour de force."
– Creative Computing

C64, Ap, At

ELECTRONIC ARTS

Home Software for the Commodore 64

Look for our other Commodore 64 titles like AXIS ASSASSIN™ WORMS?™ and THE TESSERACT STRATEGY™ at your favorite computer store, software center and at fine department stores throughout the country.
For more information about these and other Electronic Arts products, write or call us at 2755 Campus Drive, San Mateo, CA [illegible]

If you're all thumbs at the keyboard, MasterType™ will make you a computer whiz.

MasterType #1 on everybody's list... the first step in computer literacy.

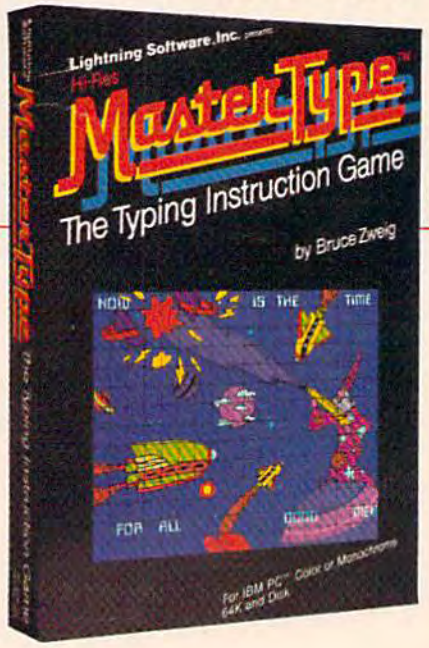
MasterType delivers. It is the one and only typing program that dares to be fun without being intimidating. It combines the fast action of video games with the best typing skills development techniques available. The result? Highly motivated and enjoyable learning.

After each of the 18 action-packed program segments, you'll see how you measure up. And you'll become so caught up in the action that before you know it, you'll become a master at the keyboard, calling all the shots.

On disks for
Apple®, Atari®, Commodore 64® $39.95
IBM-PC® $49.95

MasterType is part of the growing Scarborough family, which includes Songwriter and PictureWriter, as well as the forthcoming software for home management, science and business games.

New
Atari® and Commodore 64® cartridges.



The Scarborough System.

You'll grow with us.

January 1984 Vol. 2, No. 1

FEATURES

GAMES

REVIEWS

EDUCATION/HOME APPLICATIONS

PROGRAMMING

DEPARTMENTS

PROGRAM LISTINGS

* = General, **V** = VIC-20, **64** = Commodore 64.

COMPUTE!'s Gazette is published twelve times each year by **COMPUTE!** Publications, Inc., Post Office Box 5406, Greensboro, NC 27403 USA. Phone (919)275-9809. Editorial offices are located at 505 Edwardia Drive, Greensboro, NC 27409. Domestic subscriptions: 12 issues, $20. Send subscription orders or change of address (P.O. Form 3579) to Circulation Dept., *COMPUTE!'s Gazette*, P.O. Box 5406, Greensboro, NC 27403. Second class application pending at Greensboro, NC 27403 and additional mailing offices. ISSN 0737-3716

THE EDITOR'S *notes*

An End And A Beginning

The Friday, October 28, announcement by Texas Instruments that they were withdrawing from the home computer industry was met with mixed emotions. While we can't speak directly for the hundreds of thousands of TI owners, we're certain there was disappointment and chagrin. As recently as 14–16 months ago, one highly regarded industry analyst was touting the TI product line as becoming the leader in the industry. Oh, well. We'll be curious to see what TI's promise of continued service and support turns into.

One thing that's noted below in "The Beginning" portion of this editorial regarding IBM's announcement of PCjr is that they've adopted a strategy of open architecture. Third-party developers will be assisted and encouraged in the access to information necessary to help them develop hardware, cartridges, software, etc. This was not the TI approach during product marketing; rather, they chose to make their marketing channels proprietary in many ways, to force vendors to work through them.

Given that many software vendors will probably turn from the TI in favor of other, more active markets, we wonder if TI will release vendors from this restriction. We anticipate that the strong and active TI user groups will be able to maintain support for some time, even if the level from TI begins to decline. Given the merchandising routes used by TI, we expect that support products will be strong sellers through December, and then begin to disappear from many of the single product outlets. After all, no one can realistically expect the local drugstore that sells TI to continue to maintain and rotate TI software and new products from the third-party market after the machine is no longer for sale.

In closing, the news wasn't met negatively by Wall Street.... Within just two days of the announcement, TI's stock rose by almost 30 percent. We assume that TI will think long and hard about any future entries into the home computer market after their several abortive tries since 1980.

The Beginning

IBM's November 1st announcement of PCjr was long awaited, eagerly watched, and disappointing to some. As a home computer, the unit(s) are impressive, powerful, restrained as breakthroughs go, and expensive. All things considered, though, we can be quite confident that PCjr will make a major mark in next year's marketplace. Our editors are hard at work developing materials in support of PCjr (we'll be adding both PC and PCjr to our sister publication COMPUTE!), and hoping anxiously that some kind third-party vendor will quickly develop a keyboard designed for touch typists. At a glance: bottom line PCjr with 64K and cassette BASIC: $689.00 plus $40 per joystick (?!), $30 for a cassette cable, $30 for RF modulator, etc. If you'd like the expanded PCjr with its one (and only one may be used) disk drive, you'll start at $1259. But, as with all top-of-the-line products and prices, you can expect full service, support, and a tremendous amount of sophisticated IBM and third-party software. And we project it's a reasonable bet that IBM won't pull out of the marketplace. Beyond the concern over the keyboard is the lack of extended sound and graphics capabilities on the bottom-line unit. Many of these capabilities can be added by going to the extended BASIC that is available on a $75 plug-in cartridge. But apparently sprites don't exist, and color isn't as extensive as that on the 64 (although resolution is higher).

And in closing, one COMPUTE! pundit had this remark about the new PCjr: "If I could interface it with my 64 I could have great sound and graphics...."

Happy new year! from COMPUTE! Publications.

Robert Lock

Editor In Chief

WordPro 3 Plus™/64

The #1 Selling Word Processor for the Commodore 64™

Now Includes SpellRight Plus! Spell Checking Program

WordPro 3 Plus™/64 and SpellRight Plus™ provide a total word processing solution for the Commodore 64™ which gives you:

- ★ Sophisticated Word Processing
- ★ Built-in Mail Merging for Form Letters
- ★ Math Functions for Column Totals
- ★ Fast and Complete Spell Checking via SpellRight Plus
- ★ A Super Value (two programs) for Only $99.95!

WordPro and SpellRight are both specifically designed for the novice user with no computer or word processing experience whatsoever. And with over 40,000 WordPro versions sold, you can be sure that WordPro is a very sophisticated word processor loaded with powerful features including: Transfer, Insert, Delete, and Rearrange Text, Auto Page Numbering, Math Functions, Headers, Footers, Global Search and Replace, the Ability to Create Multiple Personalized Letters and Documents, and much more. WordPro can create documents of virtually any length and will print up to 165 columns wide. You get all of this PLUS fast and complete spell checking using SpellRight Plus!

SpellRight Plus locates and highlights misspelled words and then allows you to quickly correct the misspellings — improving the quality of your letters and reports.

And, best of all, WordPro and SpellRight's powerful arsenal of features can be put to use almost immediately — by even the novice user. So whether you're a student, professional writer, in business, education or a hobbyist, you'll quickly become a WordPro Pro!

Both WordPro and SpellRight Plus are also available separately at popular computer outlets nationwide.

Invest in the best . . .WordPro Plus. In a class by itself.

Professional Software Inc.

51 Fremont Street
Needham, MA 02194

(617) 444-5224
Telex: 951579

Dealer and Distributor inquiries are invited.

COMPUTE! Publications, Inc.
One of the ABC Publishing Companies

Publisher Gary R. Ingersoll
Editor in Chief Robert C. Lock
Director of Administration Alice S. Wolfe
Senior Editor Richard Mansfield
Managing Editor Kathleen E. Martinek
Art/Design Director Georgia Bikas Davis

Editorial
Tom R. Halfhill, Gazette Editor; Stephen Levy, Editor, COMPUTE! Books Division; Gail Walker, Production Editor; Ottis R. Cowper, Technical Editor; Charles Brannon, Program Editor; Tony Roberts, Assistant Managing Editor

Assistant Editors
Lance Elko, Dan Carmichael (Submissions), Gregg Keizer (Books), John Krause (Technical), Kathy Yakal, Editorial Assistant (Features); Randall Fosner, Editorial Assistant (Books)

Editorial Programmers
Patrick Parrish (Supervisor), Gregg Peele (Assistant), Jeff Hamdani, Kevin Martin, Chris Poer

Technical Assistant
Dale McBane

Programming Assistant
Mark Tuttle

Copy Editing/Proofreading
Juanita Lewis (Assistant), Becky Hall, Linda Shaw, Martha Banks

Administrative Staff
Vicki Jennings, Laura MacFadden, Julia Fleming

Associate Editors
Jim Butterfield (Toronto), Harvey Herman (Greensboro), Fred D'Ignazio (Roanoke), David Thornburg (Los Altos), Bill Wilkinson (Cupertino)

Production
Irma Swain, Assistant Production Manager; De Potter, Mechanical Art Supervisor; Terry Cash, Debi Thomas, Typesetting

Artists
Leslie Jessup, Cindy Mitchell (Publications), Janice Fary, Debbie Bray (Books); Todd Heimarck, Promotions Assistant; Harry Blair, Illustrator

Operations/Customer Service
Carol Lock, Manager; Patty Jones, Customer Coordinator; Assistants: Chris Patty, Chris Gordon; Fran Lyons, Dealer Coordinator; Assistants: Gail Jones, Sharon Minor

Customer Service Staff
Dorothy Bogan, Supervisor; Rhonda Savage, Lisa Flaharty, Anita Roop, Sharon Sebastian, Debi Goforth, Jenna Nash; Operators: Cassandra Robinson, Mary Sprague
Jim Coward (Warehouse Manager), Larry O'Connor, Chris Cain, Dai Rees, Jack McConnell

Data Processing
Leon Stokes, Manager; Joan Compton, Assistant

Accounting
Paul J. Megliola, Manager; James M. Hurst, Comptroller; Assistants: Linda Miller, Doris Hall; Staff: Anna Harris, Emilie Covil, Anne Ferguson

Advertising Sales
Andy Meehan, National Sales Manager; Patti Williams, Production Coordinator; Bonnie Valentino, Accounting Coordinator; Rosemarie Davis, Sales Assistant

Sales Representatives

Jerry Thompson	415-348-8222
Phoebe Thompson	408-354-5553
JoAnn Sullivan	619-941-2313
Ed Winchell	213-378-8361
Harry Blair	919-275-9809

Jules E. Thompson, Inc.
National and Canadian Sales Representatives
1290 Howard Avenue, Suite 303
Burlingame, CA 94010

Address all advertising materials to:
Patti Williams, COMPUTE!'s GAZETTE,
505 Edwardia Drive, Greensboro, NC 27409

Sales Offices, The Thompson Company

New England	617-720-1888
Mid-Atlantic	212-772-0933
Southeast	919-275-9809
Midwest	312-726-6047
Texas	713-731-2605
Northwest	408-354-5553
Northern CA	415-348-8222 or 408-354-5553
Southern CA	619-941-2313 or 213-378-8361
Nevada, Arizona	619-941-2313
New Mexico	213-378-8361
Colorado	303-595-9299

COMPUTE! Publications, Inc., publishes
COMPUTE! **COMPUTE! Books** ***COMPUTE!'s Gazette***

Corporate Office:
505 Edwardia Drive, Greensboro, NC 27409

Mailing Address:
Post Office Box 5406, Greensboro, NC 27403

Telephone: 919-275-9809
Office Hours: 8:30 AM to 4:30 PM Monday-Friday

Chief Executive Officer Robert C. Lock
President Gary R. Ingersoll
Director, Finance & Planning Paul J. Megliola
Comptroller James J. Hurst
Executive Assistant Debi Nash
Assistant Carol Dickerson

Subscription Information
COMPUTE!'s Gazette Circulation Dept.
P.O. Box 5406, Greensboro, NC 27403

TOLL FREE
Subscription Order Line
800-334-0868
In NC 919-275-9809

COMPUTE!'s Gazette
Subscription Rates
(12 Issue Year): US (one year) $20. Canada, Mexico and Foreign Surface Mail $25. Foreign Air Mail $45.

The COMPUTE!'s Gazette subscriber list is made available to carefully screened organizations with a product or service which may be of interest to our readers. If you prefer not to receive such mailings, please send an exact copy of your subscription label to: COMPUTE!'s Gazette, P.O. Box 961, Farmingdale, NY 11737. Include a note indicating your preference to receive only your subscription.

Spinnaker Aerobics.™ The more you do, the less you have to show for it.

Spinnaker's new computer fitness program makes shaping up fun to do. And makes you feel terrific.

AEROBICS gives you everything you need. Warm-ups, stretches, aerobics, cool-downs. It lets you work on overall fitness. Allows you to concentrate on conditioning specific parts of your body. Or both.

Best of all, you can exercise on your own schedule. In your own home. For as long or as little as you like. Whatever works for you.

Whether you're a beginner or already in great shape, you'll love working out with Spinnaker AEROBICS. Which means you'll do it more often. And have even less to show for it.

AEROBICS is compatible with Apple,® Atari,® and Commodore 64™ computers.

SPINNAKER™

We make learning fun.

GAZETTE FEEDBACK

EDITORS AND READERS

Do you have a question or a problem? Have you discovered something that could help other VIC-20 and Commodore 64 users? Do you have a comment about something you've read in COMPUTE!'s GAZETTE? We want to hear from you. Write to Gazette Feedback, COMPUTE!'s GAZETTE, P.O. Box 5406, Greensboro, NC 27403.

1526 Printer Recall

I have recently purchased a Commodore 1526 printer for my Commodore 64 computer system. I have found that I cannot load programs from my 1541 disk drive while the 1526's power switch is on. If the power switch is on and I attempt to load the program, the system locks up after a short period of time and the only way I can reset the system is to turn off the computer. Also, programs I have purchased which require repeated accessing of sequential or relative files will lock up the system if the printer is on.

The dealer who sold me this equipment assured me that this was normal operation. However, I wrote to a software company complaining that their software was not working correctly with my printer and they advised me that the 1526 printer and the 1541 disk drive were incompatible. I have written to Commodore four different times and have received no reply.

Are you aware of any incompatibility problem between the 1526 printer and the 1541 disk drive? If so, could you please explain what the problem is? Do you have any idea what Commodore plans to do to resolve this problem?

Gary L. Martin

The recently introduced Commodore 1526 printer does indeed suffer from serious problems when used with the 1541 disk drive—or any device on the serial port. Commodore has recalled the 1526 from dealers and instructed them to accept returns from any customers experiencing problems.

The 1526 is an 80-column dot matrix printer, similar to the 4023 printer that has been available for the Commodore PETs and CBMs. The 1526 appeared on the market briefly, then rapidly disappeared. According to a Commodore spokesperson, the 1526 suffers from a "firmware problem" that interferes with other devices plugged into the serial port (such as the 1541 disk drive). One Commodore dealer wrote to us saying that in some cases, the problem can be helped if the equipment is switched on in a certain order (in general, turn on the 64, the disk drive(s), and the 1526; see last month's "Gazette Feedback").

If this does not help, we recommend returning the printer to your dealer for a refund. It is not normal operation for any computer system to lock up when correctly interfaced peripherals are being used. At this writing, Commodore does not know when the 1526 will be fixed and remarketed. Perhaps it will be available again by the time you are reading this.

Reruns For Automatic Proofreader?

Before I received the October 1983 issue of COMPUTE!'s GAZETTE, I had many problems getting programs that I typed in from the magazine to come out right. When I read and used the "Automatic Proofreader" it did help me, but only with the programs with the REM statements [Proofreader checksum numbers]. If I used this program to check an earlier program listed in your magazine [without the checksum numbers], I could not understand how to check those lines.

Can you tell me how I could use this helpful checksum program with these other programs? How does it work, and how can I figure out the REM numbers of these other programs? Do you have future plans to relist the earlier programs listed without the checksum numbers?

Jeff Cherkis

In the September issue you asked for feedback on the GAZETTE. First I'd like to say that once in a while a magazine jumps out in front of the pack, sometimes by design and sometimes by doing something lucky. The GAZETTE did it with the program "Proof-

Introducing Snooper Troops™ detective series. Educational games that turn ordinary homes into Sherlock homes.

Where can you find educational computer games that your kids will really enjoy playing?

Elementary, my dear Watson, from Spinnaker.

Our SNOOPER TROOPS™ detective games are fun, exciting and challenging. And best of all, they have real educational value. So while your kids are having fun, they're learning.

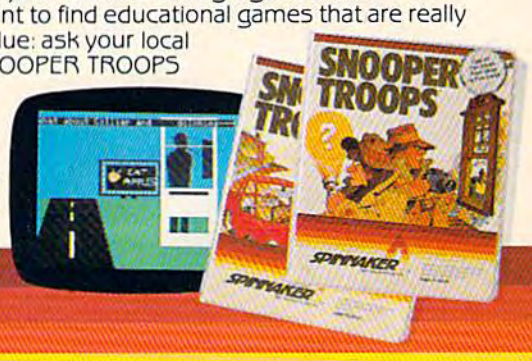
As a Snooper Trooper your child will have a great time solving the mysteries. But it will take some daring detective work. They'll have to question suspects, talk to mysterious agents, and even search dark houses to uncover clues.

Luckily, the program provides your kids with everything they need: like a SnoopMobile, a wrist radio, and a SnoopNet computer.

SNOOPER TROOPS detective games help your children learn to take notes, draw maps, organize and classify information and they help develop vocabulary and reasoning skills. All while your kids are having a good time.

So if you want to find educational games that are really fun, here's a clue: ask your local retailer for SNOOPER TROOPS computer games.*

*Available in disks for IBM,® Atari,® Apple,® Commodore 64.™



SPINNAKER™

We make learning fun.

Racing

It's cold on top of the mountain. But the view is great and the people are pulling for you.

So you pull on your gloves, adjust your goggles, check your bindings, take a deep breath and you're off.

Now the clock is running, so you'd better concentrate on your technique. Get as close to the gates as you can, but not too close—contact with a slalom pole will cost you precious penalty seconds. Turn too sharply and you'll come to a stop.

And slalom poles aren't the only obstacles in your path. This is a mountain, remember, so look out for the rocks.

You can ski around them. Or jump over them—your choice.

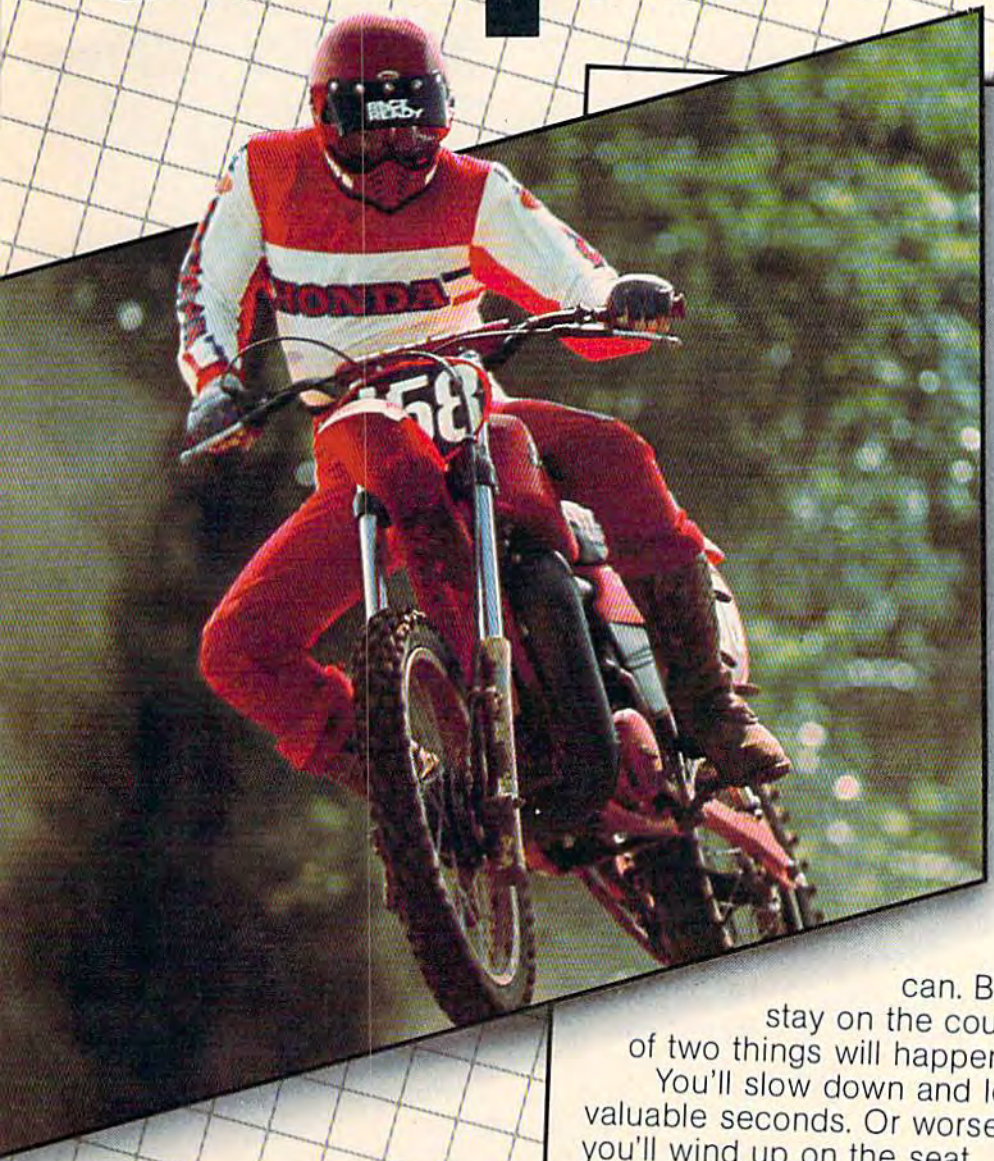
Just don't waste too many tenths of a second trying to make up your mind!

Developed by Steven Sidley
Available on diskette for your Commodore 64™

SLALOM!

TRONIX™

stripes.



There are those who say that motocross asks more from the athlete than any other sport.

That may or may not be true. But this much *is* true.

Motocross! is unlike any computer game you've ever come across.

At the start/finish line you check your gauges, gun your engine and surge onto the course.

Through the corners, up the hills, into the ruts and down the straights you maneuver for position and try to beat the clock.

Stay ahead if you can. But whatever you do, stay on the course. If you don't, one of two things will happen.

You'll slow down and lose valuable seconds. Or worse, you'll wind up on the seat of your pants.

Who says computers don't like to get dirty?

Developed by Jim Rupp
Available on diskette
for your Commodore 64™

tronix™

8295 South La Cienega Blvd.
Inglewood, CA 90301 (213) 215-1125

Commodore 64 is a trademark of Commodore Electronics Ltd.

reader" by Charles Brannon in the October issue. What more can I say—*fantastic*—and now for a suggestion:

Print *just* the line number and checksum for *all* of the programs in your previous issues. Example:

```
120–147
130–121
etc.
```

Why bother? Your readers will love you and you'll get reader loyalty.

Stuart B. Wahlberg

We have received many letters from readers complimenting the Automatic Proofreader, including some letters from people who said they had never got a program to work correctly until they used the Proofreader. Almost every letter requested checksum numbers for programs previously published in COMPUTE!'s GAZETTE. *Some people wanted to know how to compute their own checksum numbers for these earlier programs; they didn't understand why the checksums appear inconsistent (i.e., short program lines sometimes have large numbers while long lines sometimes have small numbers).*

We also received a few letters from readers who said the Proofreader doesn't work and neither do the programs they enter with it. We'd like to take this opportunity to discuss possible problems that may be encountered when using the Proofreader to enter programs, and to address your other questions and comments about our program listings as well.

First of all, the Automatic Proofreader does *work. Some VIC-20 tape users had problems reLOADing programs entered with the first version of the Proofreader (see November "Bug-Swatter" and November/December "Automatic Proofreader"). But even this problem never affected the typing or checking of the programs, and it was immediately corrected in the next version of the Proofreader. The Proofreader repeatedly passes all in-house testing, and most readers we hear from have used it with success.*

Readers experiencing problems with the Proofreader should carefully check their typing of the Proofreader program; as we noted in October, unfortunately it can't check itself *(although the current version does check for errors in the DATA statements). If you make a subtle error when typing the Proofreader, it can cause incorrect results when using it to check other programs. A couple of readers who had trouble with the Proofreader saw no difference between the VIC-20 and Commodore 64 versions published in the October issue and concluded that we mistakenly published the same version twice. Both versions are very similar. However, they are not identical. The difference is the fifth DATA element in line 220. To reduce confusion, we rewrote the Proofreader so the same version now works on both computers.*

Assuming the Proofreader program itself has been entered correctly, we have traced most of the problems some readers are encountering to three main causes:

- Transposed keystrokes. *Because of the way the Proofreader checksum numbers are computed (see below), the Proofreader cannot detect transposition errors. In other words, if you type PIRNT instead of PRINT, the Proofreader won't know the difference. Of course, this particular typo would result in a ?SYNTAX ERROR AT LINE xxx when the program is run, but other transpositions might not cause a syntax error. The most common example is numbers in DATA statements. If you type DATA 156 instead of DATA 165, the Proofreader still thinks everything is okay. So does the computer. You probably won't get an error message, but the program won't work right. Solution: Be extra alert for transposition errors.*

- Long program lines. *Normally, you can't enter a program line longer than 80 characters on the Commodore 64 or 88 characters on the VIC-20. However, many programmers abbreviate keywords when writing their programs to save typing and memory. When the programs are listed, the abbreviations automatically expand into the full keywords, and lines longer than 80 or 88 characters often result. The only way these lines can be typed from a listing is to use the same abbreviations (see "Simple Answers To Common Questions" elsewhere in this issue). Since the Proofreader cannot handle abbreviations, it cannot accurately check these lines. Solution: Use abbreviations to type long lines and carefully check the typing yourself. Because long lines cause so many problems for so many readers, we are trying to eliminate them wherever possible, and we urge programmers not to use abbreviations unless absolutely necessary.*

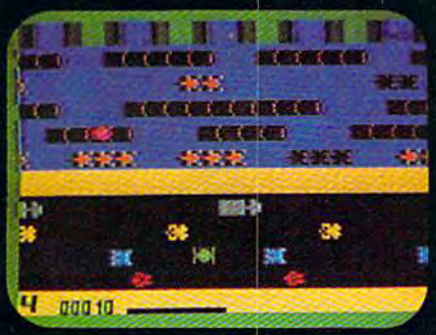
- Mistakes in listings. *Theoretically these should never happen. Theoretically. But sometimes they do. We receive letters from some readers who doubt that we test programs before publication, or who doubt that the programs work in the first place. However, we promise that all programs do work and are tested. (For those who still don't believe it, proof can be seen in the screen photos which accompany almost all programs in* COMPUTE!'s GAZETTE—*if the programs don't work, or if we don't try them, where do the screen photos come from?) After testing, the listings are made on a printer directly from disk and then photographed, not retypeset. In theory this should produce a perfect listing of the program.*

But in practice there are about two dozen things that can go wrong, including some in the printing process which are effectively beyond our control (see this month's "Bug-Swatter"). However, most listing problems are *within our control, and we are constantly striving to reduce them to a minimum. If you discover a subtle error in the operation of a program, chances are it escaped our testing. But if a program runs obviously wrong or crashes altogether at the outset, it is a sure sign of a typo—introduced either during the listing process (us) or the typing process (the user). These typos are extremely hard to track down. Upon receiving the first complaints, we immediately test the program*

ATARI 5200

TI99/4A

ATARI 400/800/600XL



INTELLIVISION

COMMODORE VIC 20

ATARI 2600

COMMODORE 64

COLECOVISION

8 WAYS YOU CAN PLAY FROGGER*™ AT YOUR PAD.

FROGGER is one of the all-time great award-winning home video games. And now Parker Brothers has programmed it into all the most popular video and computer formats so you can keep things hopping in your own home.

Catch Frogger along with POPEYE,® Q*bert,™ TUTANKHAM™ and SUPER COBRA™ where you buy your video and computer games. You'll find it absolutely ribbitting. ®PARKER BROTHERS

from our archive disks. So far, a program has never failed to run. Unfortunately, all this tells us is that the typo happened sometime after we tested the program, saved it on disk, and made the listing. Unless we can find a discrepancy between our working copy of the program and our published listing, we cannot assume an error. We are often guided in these cases by reader feedback. If we receive a large number of similar complaints about a certain program, we strongly suspect something went wrong at our end. But if some readers tell us a certain program works fine, while others say it does not, it is difficult for us to conclude the first group of readers somehow made a typo that just happened to correct the alleged typo we made. Solution: If a program does not work, and neither you nor a proven copy of the Proofreader can find an error, write or call us to describe the exact nature of the problem. Perhaps we will have a fix, or can report that other readers are having no trouble with the program.

Now to address your other questions. The Proofreader, of course, requires you to compare the number which appears at the top of the screen to the checksum number in the program listing. Since previously published programs lack these checksum numbers, you cannot check them with the Proofreader. Nor can you compute your own checksum numbers. The computer which makes our listings automatically generates the checksums by adding the ASCII values of all the characters in a line and storing the sum in a single byte. Since one byte holds the sum, the checksum never exceeds 255. If the sum is greater than 255, the byte "rolls over" past zero. For example, 240 + 20 = 4 (a principle well known to machine language programmers). That explains why some short program lines have large checksum numbers and vice versa. (Incidentally, it also means that there's a tiny chance that two or more typos in a line could cancel each other out and yield a correct checksum match.)

Even if you manually computed your own checksums this way, they would be meaningless, since they would be thrown off by any errors in the line. The checksum must be computed from a working version of the program, as our listing computer does.

Several readers have asked us to republish line numbers of earlier programs with just the checksum numbers appended (there is not enough space to reprint the programs and articles in their entirety). That way, you could check for typos in programs you typed in months ago but never got to work. We are considering this and will do so if there is enough demand. Let us know how you feel.

Copyright Questions

I have a few questions about the programs listed in your magazine. Can I photocopy them? Photocopy machines are in libraries and about everywhere else. I once read a news clipping where the courts have ruled that it's okay to photocopy something for your own personal use and files. Is this so? What is, and what is not public domain? Can I use the programs listed in COMPUTE!'s GAZETTE at my place of business as well as my home?

Clarence C. Hogan

Everything in COMPUTE!'s GAZETTE *is copyrighted, and nothing is in the public domain unless specifically stated. This is true of virtually all magazines and books, unless they specify otherwise. This means that programs you type in from a magazine or book which you have purchased are for your personal use. You may not sell the programs in any form, or give copies to people who have not purchased the same book or magazine issue. Both parties are liable if this federal law is broken. Photocopies are fine as long as they are for your personal use. You can use the programs at your place of business with the same restrictions.*

From VIC To 64

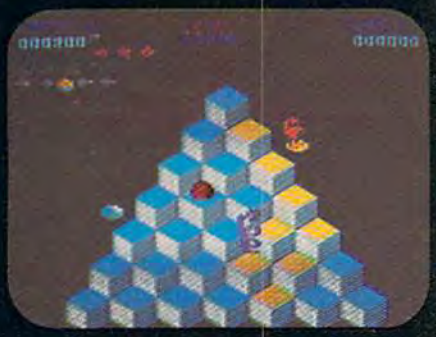
I own a VIC-20, but have decided to purchase a Commodore 64. I would like to know if you could answer some questions. First, are all the cartridges made for the VIC-20 compatible with the 64? Secondly, can machine language be used directly on the 64? I heard that it can be used on the VIC-20, but you're better off buying some kind of software on cartridge. Does the Commodore 64 need any additional software to run machine language easily? Thirdly, do you know where I can write to Commodore to obtain information about software, hardware, maintenance, etc., pertaining to their products? Any information you can give me would be appreciated.

Brian Cummings

No cartridges for the VIC-20 are compatible with the Commodore 64, or vice versa. The cartridge ports (where you plug in the cartridges) are different sizes on the 64 and the VIC. Even if you could make the cartridges fit the slot, the programs encoded in the cartridges would not be compatible.

Neither the VIC nor the 64 needs any additional software to run *machine language programs. Machine language is the native language of all computers—the language with which they "think." BASIC, on the other hand, is a foreign language to computers (just as it is to people) and must be interpreted internally before the computer can understand the instructions. Machine language programs can be loaded and run directly from tape, disk, or cartridge with either the VIC or 64. A machine language program can even be loaded into memory by a BASIC program with the POKE statement. It can then be run with the SYS or USR commands.*

However, to write *machine language programs on a VIC or 64, you generally do need additional software. In theory, you could get by without it by laboriously converting the machine language instructions into decimal numbers by hand and then POKEing them into memory with BASIC. For short routines this might work out. But for more ambitious programs, most people*



ATARI 5200

TI99/4A

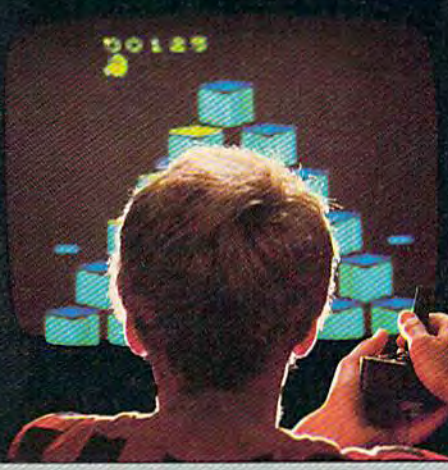
ATARI 400/800/600XL

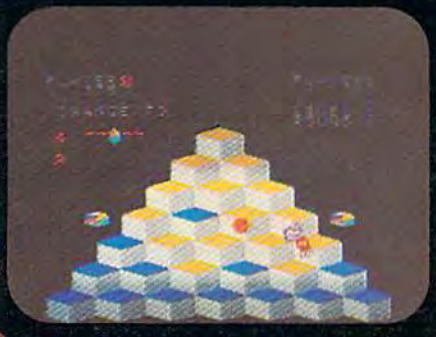
INTELLIVISION

COMMODORE VIC 20

ATARI 2600

COMMODORE 64





COLECOVISION

HOW TO GET Q*BERT™ OUT OF YOUR SYSTEM.

If you've been wanting to play Q*bert, but haven't been able to find it available for your home system, your time has come. Because now you can keep things hopping with any of these popular home video and computer formats.

Get going to your nearest video store and get Q*bert today. And while you're there, check out Parker Brothers' POPEYE,® FROGGER,™ TUTANKHAM,™ and SUPER COBRA.™ All the great Arcade Action® games, now in all the great home formats.

PARKER BROTHERS

who value their sanity prefer to use a monitor *or an* assembler *to write machine language. Some computers (such as the earlier Commodore PETs and the Apple) have built-in monitors, but consumer computers aimed at the home market generally do not. Most people find that assemblers are the easiest way to write machine language, especially if their previous programming experience is with high-level languages such as BASIC. Monitors and assemblers are available on cartridge, tape, and disk for either the VIC or 64. To learn more about monitors, assemblers, and machine language, see "Machine Language For Beginners," a regular monthly column in* COMPUTE!'s GAZETTE.

To write to Commodore for more information about its computers and other products, use this address:

Commodore Business Machines, Inc.
1200 Wilson Drive
West Chester, PA 19380

For maintenance information, you might try this address:

Commodore Service Center
950 Airport Road
West Chester, PA 19380

An authorized Commodore dealer in your area may also be able to answer your inquiries. You can call 1-408-727-3754 for repair cost and full service information. Commodore also offers a customer assistance number, 1-215-436-4200. As of this writing, Commodore's toll-free customer assistance number is no longer active.

Expanded VIC Memory

I have a Commodore VIC-20 computer and would like to know what you mean when you say (before a long program) "for VIC-20 expanded to 8K." Does this mean total RAM or user RAM? With my Super Expander cartridge I have 8K total RAM (the VIC has 5K, and my expander adds an additional 3K of RAM). I would like to know if I can now run some of your programs which say this.

Steve Medendorp

All VICs have the built-in 5K of Random Access Memory (RAM), so when we say "for the 8K expanded VIC-20," we are referring to the 8K expansion memory only. In other words, you would need an 8K expansion cartridge. Similarly, "16K expanded VIC" means a VIC with two 8K cartridges plugged into a motherboard or one 16K memory expander, and "3K expanded VIC" means the Super Expander or another 3K expansion cartridge is required. Occasionally we publish a program that specifically requires the Super Expander because it adds special graphics commands to the VIC as well as 3K of RAM. We try to make most of the programs we publish run on unexpanded VICs so the greatest number of readers can use them.

VIC Memory Expansion

Is it possible to add more than 24K to the VIC-20?

Charles Q. Berkey, Jr.

Yes and no. The VIC-20 has 4K of Random Access Memory (RAM) built in, at 4096 to 8191 (hex $1000–1FFF), plus 1K for overhead: pointers, the stack, and so on, for a total of 5K RAM. You can buy memory expanders which add 3K, 8K, 16K, or 24K from Commodore or third-party manufacturers.

If you program in BASIC, 24K is the most memory you can add to your 5K VIC. If you use machine language, you can add up to 35K, for a total of 40K.

The first thing you have to remember when you add memory is that a VIC has only one expansion port. That means if you own an 8K expander and want to add 8K more, you have two choices. You can buy memory chips and rewire your expansion cartridge (not recommended unless you know exactly what you are doing). Or you can buy a multiple cartridge board "motherboard" that allows you to plug more than one cartridge into the expansion port. It is similar to an electrical extension cord you might use in your home. Often these motherboards have switches so you can select one or more cartridges which are plugged in. (For example, you could "switch off" the memory expanders without physically unplugging them, in case you want to run a program that is designed exclusively for the unexpanded VIC.)

Memory can be added to the VIC in the following blocks:

3K	1024–4095	($0400–0FFF)
8K	8192–16383	($2000–3FFF)
8K	16384–24575	($4000–5FFF)
8K	24576–32767	($6000–7FFF)
8K	40960–49151	($A000–BFFF)

Adding expansion memory to the VIC can cause complications, however. If you plug in the 3K expander, screen memory (7680–8191 in the unexpanded VIC) remains in the same place (7680–8191). But if you add more than 3K, screen memory moves to 4096–4607. This can result in compatibility problems with some programs written for the unexpanded VIC.

Whether your VIC has 5K or 40K, it wants to put BASIC programs in a continuous section of memory. The BASIC program goes at the bottom, followed by free memory and variables (at the top of memory). When you add 8K or more, any memory below screen memory (4096) becomes invisible to BASIC. That's why only a maximum 24K can be added for BASIC programming.

Once you add memory to locations 8192–32767, the other memory expansion is available only in machine language (or PEEKs and POKEs).

What Is A Utility?

What is a utility program? Does this type of software make it easier to program?

Fred Soderlund

A utility is a program that programmers use for a specific purpose. Many utilities provide new BASIC commands or disk commands. For example, let's say you want to add a menu to a program you have written. If you already have a program that makes menus, you could add it to your program by typing it in line by line. But if you own a utility with an append command, you simply merge the two programs—which results in a lot of saved time.

If both programs use lines 900–1000, you could get around the problem with a RENUMBER utility which changes the line numbers (you would have to RENUMBER before you append). If both programs use the variable DN and R$, you could use a utility which searches the programs and tells you which variables you used and where.

If you use certain routines in many programs (reading the joystick, figuring compound interest, etc.), a utility can save you time.

Some utilities contain certain commands that work only with disk drives or printers. Certain commands will be most useful to a machine language programmer (for example, copying one block of memory to another, or hex to decimal conversions). Other utilities are designed to help you write programs with graphics or sound routines.

Utilities are programming tools. Their usefulness depends on what they do and what you need. If you are just getting into programming, you probably don't need many programming tools. But as you start writing larger and more complex programs, you will find that a collection of the right utilities can save you lots of time and work. Utilities are sold commercially, and many public domain utilities are available for free through local user groups. Also, nearly every issue of COMPUTE!'s GAZETTE *includes ready-to-type program listings for useful utilities.*

HOTWARE

A Look At This Month's Best Sellers And The Software Industry

Kathy Yakal, Editorial Assistant

Commodore 64 Entertainment

This Month		Last Month
1	*Fort Apocalypse* (Synapse)	2
2	*Jumpman* (Epyx)	1
3	*Temple of Apshai* (Epyx)	3
4	*Frogger* (Sierra On-Line)	4
5	*Planetfall* (Infocom)	10
6	*Choplifter* (Creative)	–
7	*Gridrunner* (HesWare)	7
8	*Neutral Zone* (Access)	5
9	*Sword of Fargoal* (Epyx)	6
10	*Shamus* (HesWare)	–

Commodore 64 Home/Business/Utility

This Month		Last Month
1	*WordPro 3 Plus/64* With *Spell Right* (Professional)	1
2	*Quick Brown Fox* (Quick Brown Fox)	2
3	*M File* (M Soft)	11
4	*Money Manager* (Timeworks)	5
5	*Practicalc* (Computer Software Associates)	4
6	*Calc Result* (Handic)	–
7	*Data Manager* (Timeworks)	–
8	*Electronic Checkbook* (Timeworks)	6
9	*PaperClip* (Batteries Included)	8
10	*Oracle* (Batteries Included)	–

Commodore 64 Educational

This Month		Last Month
1	*Facemaker* (Spinnaker)	4
2	*Fraction Fever* (Spinnaker)	–
3	*Up For Grabs* (Spinnaker)	3
4	*Primary Math Tutor* (Comm*Data)	5
5	*Dungeons of the Algebra Dragons* (Timeworks)	–
6	*Kindercomp* (Spinnaker)	1
7	*Touch Typing Tutor* (Taylormade)	2

VIC-20 Entertainment

This Month		Last Month
1	*Gridrunner* (HesWare)	1
2	*Shamus* (HesWare)	3
3	*Choplifter* (Creative)	2
4	*Temple of Apshai* (HesWare)	4
5	*Crush, Crumble and Chomp* (HesWare)	–
6	*Amok* (UMI)	10
7	*Predator* (HesWare)	9
8	*Escape MCP* (Comm*Data)	–
9	*Exterminator* (Nüfekop)	7

VIC-20 Home/Business/Utility

This Month		Last Month
1	*Quick Brown Fox* (Quick Brown Fox)	1
2	*Turtle Graphics* (HesWare)	2
3	*HES Writer* (HesWare)	3
4	*HES Mon* (HesWare)	4
5	*Household Finance* (Creative)	5
6	*Practicalc* (Computer Software Associates)	–

VIC-20 Educational

This Month		Last Month
1	*Touch Typing Tutor* (Taylormade)	1
2	*Primary Math Tutor* (Comm*Data)	–
3	*Type Attack* (Sirius)	2
4	*Gotcha Math Games* (Comm*Data)	5
5	*Hangman/Hangmath* (Creative)	4

Don't let price get in the way of owning a quality printer.

Adding a printer to your computer makes sense. But deciding which printer to add can be tricky. Do you settle for a printer with limited functions and an inexpensive price tag or buy a more versatile printer that costs more than your computer? Neither choice makes sense.

Here's a refreshing option—the new, compact STX-80 printer from Star Micronics. It's the under $200 printer that's whisper-quiet, prints 60 cps and is ready to run with most popular personal computers.

The STX-80 has deluxe features you would expect in higher priced models. It prints a full 80 columns of crisp, attractive characters with true descenders, foreign language characters and special symbols. It offers both finely detailed dot-addressable graphics and block graphics.

And, of course, the STX-80 comes with Star Micronics' 180 day warranty (90 days on the print element).

The STX-80 thermal printer from Star Micronics. It combines high performance with a very low price. So now, there is nothing in the way of owning a quality printer.

*Manufacturer's suggested retail price.

star™ micronics • inc

THE POWER BEHIND THE PRINTED WORD.

Computer Peripherals Division
P.O. Box 612186, Dallas/Ft. Worth Airport, TX 75261 (214) 456-0052

Now with more computer connections.

The new STX-80 printer for only $199.*

NOW YOUR COMPUTER FITS THE ORIGINAL ARCADE HITS.

Now the excitement of original arcade graphics and sound effects comes home to your computer.

Introducing ATARISOFT.™ A new source for computer software.

If you own a Commodore VIC 20 or 64, a Texas Instruments 99/4A, an IBM or an Apple II, you can play the original arcade hits.

DONKEY KONG by Nintendo, CENTIPEDE,™ PAC-MAN, DEFENDER, ROBOTRON: 2084, STARGATE and DIG DUG. (On the TI 99/4A you can also play Protector II, Shamus, Picnic Paranoia and Super Storm.)

So, start playing the original hits on your computer.

Only from ATARISOFT.

Some games also available on ColecoVision and Intellivision.

ATARISOFT™

Now your computer fits the arcade hits.

Complete this coupon and we'll keep you up to date on the newest hits from ATARISOFT.™

Name _____

Address _____

City _____ State _____ Zip _____

Telephone _____

PRODUCT OWNED: (Check one)

1 ☐ TI-99/4A
2 ☐ IBM PC
3 ☐ Commodore 64
4 ☐ ColecoVision
5 ☐ Commodore Vic 20
6 ☐ Intellivision
7 ☐ Apple II
8 ☐ _____

Mail to:
Atari, Inc., P.O. Box 2943,
So. San Francisco, CA 94080.

ASM 6

SIMPLE ANSWERS TO COMMON QUESTIONS

TOM R. HALFHILL, EDITOR

Q A

Each month, COMPUTE!'s GAZETTE *will tackle some questions commonly asked by new VIC-20/Commodore 64 users and by people shopping for their first home computer.*

Q. ***I have a 1541 disk drive and a friend has one of the older 1540 disk drives. Is there any problem in trading disks back and forth?***

A. Yes, there is a potential compatibility problem. If you're merely *reading* from each other's disks, you should be safe. But *writing* to them could be hazardous to the files stored on the disks.

The reason is that the 1541 disk drive runs slightly slower than the 1540. In our experience, the difference is insignificant when reading disks formatted on one drive or the other. But if you try to write, the speed difference could cause adjacent blocks of data to be overwritten.

The 1541 drive can be accelerated to the 1540's speed by entering this statement:

```
CLOSE15:OPEN15,8,15,"UI-"
```

This makes it safe to write to a 1540 disk on the 1541 drive. To restore the 1541's original speed, initialize the disk or enter:

```
CLOSE15:OPEN15,8,15,"UI+"
```

(Notice that "UI-" *speeds up* the drive and "UI+" *slows it down*. This syntax might be the opposite of what you'd expect, but it's straight from pages 8-9 of the *VIC-1541 User's Manual.)*

Unfortunately, you can't slow down a 1540 drive the same way, so it's risky to write to 1541 disks on the 1540. If you use both kinds of drives or frequently swap disks with someone who uses a different drive, you should mark all your disks "1541" or "1540" to avoid problems.

Q. ***Some programs in your magazine I cannot get to run, and I've traced the problem to certain lines which are very long. I type the line exactly as printed in the listing, but when I press RETURN and re-LIST the line, only part of it is there—the rest was chopped off somehow. Even the "Automatic Proofreader" doesn't help. Are these lines, indeed, the problem? If so, is there any way to type these lines and get these programs to work? Why didn't you test the programs first to make sure they worked?***

A. You've zeroed in on a problem which seems to have troubled many other readers. Until a number of similar letters and phone calls came in, we had not realized how many readers are unfamiliar with BASIC line-length limits and with the use of keyword abbreviations to solve the problem. Nor had we realized how many programmers routinely use long lines in their programs.

The problem, as you deduced, is that certain lines are too long to type in—at least, too long to type in *normally*. But there is a way to enter them.

Normally, the Commodore 64 does not allow entry of BASIC lines which exceed 80 characters (two screen lines). The VIC-20's limit is 88 characters (four screen lines). If you type in more characters than these limits allow, the extra characters will be discarded when you press RETURN. Unfortunately, the computer does not warn you that the line has been truncated. If you re-LIST the line, you'll see the difference, but most people don't find out until they attempt to RUN the program for the first time. The program either fails to run properly or crashes altogether, often with a cryptic error message as the only clue. The problem can be hard to isolate, especially for nonprogrammers. Frustrated, many people blame a bug in the program or the listing and give up.

But the problem is easy to fix once discovered. The trick is to enter the long line as the programmer did when he or she wrote the program.

In an appendix of the user manual which came with your VIC or 64 is a table of keyword abbreviations (a summary of the most commonly used abbreviations appeared in last month's "Horizons: 64" column). Abbreviations allow you to enter BASIC keywords without typing all the characters. Usually an abbreviation consists of the

VIC 20 (cassette) Commodore 64 (diskette) (cassette)

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

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

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

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

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

Ronnie™

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

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

INFOBASE64™

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

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

SUGG. RETAIL $59.95
Runs on Commodore 64 (diskette)

KOLOB

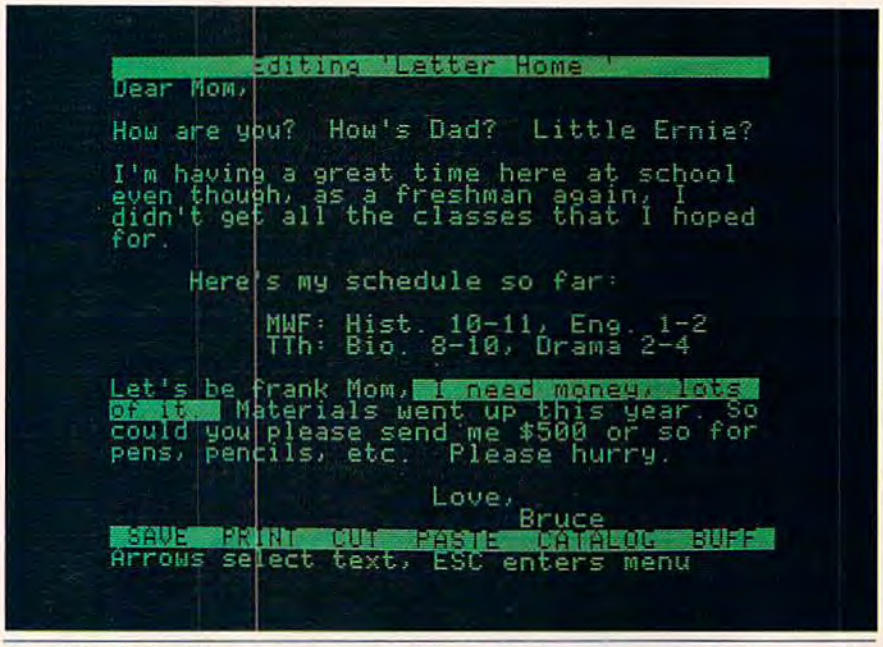
SOFTWARE PRODUCED BY KOLOB MARKETING INC.

Dealer Inquiries Welcome

Impact Marketing Inc. • P.O. Box 21445 • Salt Lake City, Utah 84121

VISA

If you can learn to use this word processor in 90 seconds, can it really be any good?



CUT & PASTE™ *displays its commands on a single line at the bottom of the screen. This makes working with it easier and also gives you more usable space on the screen.*

Of all word processors on the market today, Cut & Paste may well be the easiest to use. In fact, by the time you finish reading this section of the ad, you'll know how to work with Cut & Paste. So read on.

START TYPING. Working with Cut & Paste is like working with a typewriter. If you know how to use a typewriter, you already know how to type in your draft with Cut & Paste. The only real difference is, with Cut & Paste it's easier to correct typos.

MAKING CHANGES. Let's say you've decided to make a cut in your rough draft. To do this you put the cursor (the bright block) at the start of the text you want to delete, and stretch it through to the end of your cut. Then you send the cursor down to the "CUT" command on the bottom of the screen. Done.

If, on the other hand, you want to keep that line, but put it in a different part of your draft, you use the "PASTE" command. You mark the point of insert with the cursor. Then you put the cursor over "PASTE." That's all there is to it.

PRINTING IT OUT. When you like the way your work looks, you print it. Put the cursor on the "PRINT" command. Then set your margins, in inches. That's it.

You now know how to use Cut & Paste.

OKAY, IT'S SIMPLE. BUT HOW GOOD IS IT? Cut & Paste has all the features you'll ever need to use at home. Here are a few of them:

1. Scrolling dynamic menus
2. Automatic word wrap
3. Simple cut & paste editing
4. Block indenting
5. Set margins and paper size in inches
6. Tabs
7. Automatic page numbering
8. Controllable page breaks
9. Headings
10. Scrolling text windows
11. Automatic widow and orphan control
12. Clear and concise manual

In other words, Cut & Paste will do just about everything other word processors do. But Cut & Paste will do it more easily. Without complex commands and modes.

If you think about a word processor in terms of what it replaces (typewriters, pens and paper, files), Cut & Paste begins to look very good indeed.

And when you consider that *all this power can be had for approximately* $50, we think you'll see why we believe Cut & Paste is something of an achievement.

A PHILOSOPHY OF DESIGN. The people who designed, developed and programmed Cut & Paste have some fairly heavy credentials.

They are people who worked on the internationally-famous user interface designs that led to the Xerox Star® and Apple's Lisa.® They are also

THE CHANGING OF THE GUARD. *Until quite recently we used pens and paper and typewriters to write with, mostly because we knew how to use them. They have been good tools, but limited. You tend to make messes when you work with them, and getting rid of those messes makes extra work. Cut & Paste is an inexpensive and practical alternative. Because it is as easy to use as a typewriter, you really will use it. Which may make it the first sensible word processor for the home. Thus an alleged labor-saving device has come to a position where it really can save a significant amount of labor, i.e., yours.*

THE MEN WHO MADE CUT & PASTE. *The Linotype machine pictured here was the 19th century's most important contribution to word processing technology. It let typesetters compose and rearrange text in the form of metal castings. The importance of Cut & Paste, of course, must await the judgment of history. Nevertheless, the seven men who developed it look confident here. Standing left to right, they are: Norm Lane, Steve Shaw, David Maynard, Dan Silva, Steve Hayes and Jerry Morrison. Seated at the console is Tim Mott, whose idea this was in the first place.*

people who have in common a very lucid philosophy of design.

Computers and the programs they run are tools, they believe. Tools are never noticed unless they are bad tools. When they're good, they become, in effect, invisible. And if you want to make a good tool—an invisible tool—you'd best study the way people use the tools they already have.

As a result of this thinking, Cut & Paste was designed to work much in the same way that you already work with a typewriter or with pen and paper. The most complex and powerful parts of the program are hidden from view. The work they do takes place deep in the machine. All you get to see are the results.

But beyond that, there is something almost indefinable about a good design. Things about it just seem to work crisply. Little touches and features that you notice make you want to smile. If it's really good, it *feels* good.

Cut & Paste feels good.

ELECTRONIC ARTS™

THE PRODUCTS *of Electronic Arts can be found in your favorite computer stores, software centers, and in leading department stores throughout the country. Both Cut & Paste and Financial Cookbook™ are now available at a suggested retail price of $50 for the Apple IIe and the Commodore 64 and will soon be available for the IBM-PC and Atari.*

OUR COMMITMENT TO HOME MANAGEMENT.

Cut & Paste is just one of a growing number of products we're publishing within the category of "home management software." These products are all built around the same program architecture, making them all equally "friendly," as well as remarkably straightforward and practical. We believe that designs like these will soon make home computers as functional and efficient as today's basic appliances.

Our next product in this line is called *Financial Cookbook*. It's a realistic alternative to the complex, pre-programmed financial calculators we all wish we knew how to use. With a few, simple keystrokes, *Financial Cookbook* lets you make more than 30 key time-value-of-money computations—just about all the ones you'd ever use for personal finances—like calculating mortgages with changing interest rates, compounding the interest on IRA and savings accounts, and buy-versus-lease comparisons for automobile purchases.

To find out more about these home management products and about what we have planned for the future, call or write: Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403 (415) 571-7171.

first letter of the keyword and a SHIFTed second character. For instance, the abbreviation for POKE is P-SHIFT-O. (Note that the SHIFTed O appears on screen as a graphics character.)

You're still limited to typing 80 or 88 characters when using abbreviations. However, when you LIST a line with abbreviations, the abbreviations expand out to the full keywords, even if the resulting line exceeds the limit. The line appears illegal, but executes normally. Be aware that you cannot edit this line, however; if you want to make a change, you must retype the line from scratch.

Another problem with abbreviations is that they confuse the "Automatic Proofreader." The checksum program cannot be used to spot typos in long lines.

Programmers use abbreviations to save typing and memory. Not that the abbreviations themselves save memory—BASIC stores all keywords as one-byte tokens, whether abbreviated or not. But abbreviations allow programmers to pack more statements into each line, and reducing the number of lines in a program *does* save a little memory.

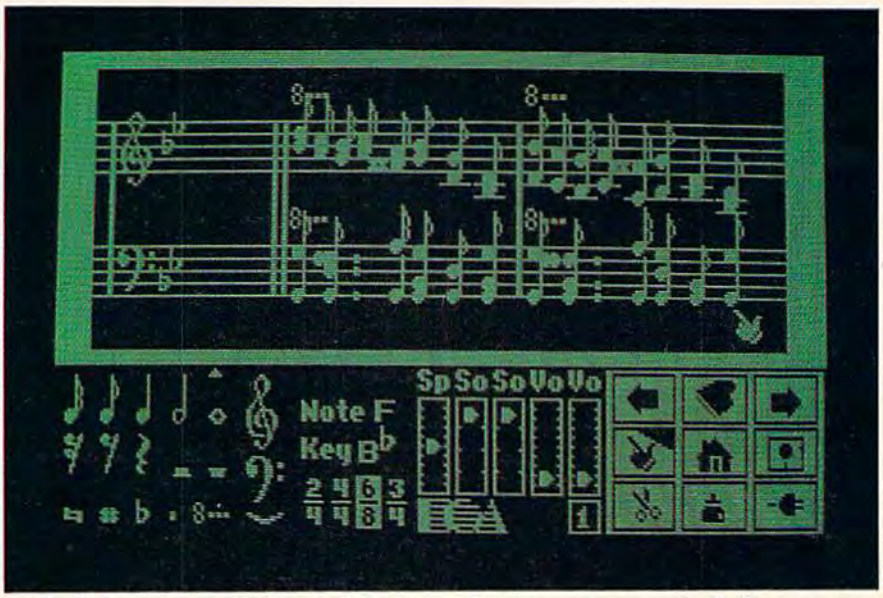
Since these long lines execute normally, the programs work fine when we test them prior to publication. We list the program directly from disk and don't hear of a line-length problem until letters begin arriving three months later.

To correct this problem, our lister program now warns us whenever it detects a line exceeding 80 characters. We then try to break up the long line into two shorter ones. Unfortunately, some programs—especially on the unexpanded VIC—require every available byte of memory. Breaking up a line can ruin a working program. In these cases, we'll at least try to warn you of the long lines.

Readers can help, too. If you submit a program to COMPUTE!'s GAZETTE, do not exceed the line limits *unless absolutely necessary to conserve memory*. Also, please do not number BASIC lines by ones, so that our programmers have room to break up long lines if necessary.

The END of DINKETY-DINK.

Announcing the first computer music program that actually sounds like music.



LET'S FACE IT. Up till now, music programs for your home computer have all sounded, well, pretty lame. There were the ones that resembled little electronic music boxes, remember? And then there were those that sounded like so many burps.

Enter Music Construction Set.™ It's the first music program that really makes use of the power of that machine you've got. If you're a serious student, this means you'll be able to work with an intricacy and range of sound quality you've never heard before on a computer. And if you know nothing about music, you'll find something even more important. Namely, that this thing is simple enough to be a lot of fun.

Take a good look at this screen because it, you, and a joystick are the whole story here.

That's you at the right end of the staff of notes – the little hand. Move the joystick, and you move the hand. Use it to carry notes up to the staff. Lay in rests, signatures, clefs, then point to the little piano in the lower right and listen, because you'll hear the whole thing played back.

Move those little scales in the middle up and down to vary the music's speed, sound quality, and volume. Use the scissors to cut out whole measures, then use the glue pot to paste them in somewhere else. Got a printer? Great. Print the score out and show it off to your friends.

But what if you're not up to writing your own stuff yet? No problem. There are twelve pieces of music already in here, from rock 'n roll to baroque. They're fun to listen to, and even more fun to change. (Apologies to Mozart.)

The point is, the possibilities are endless. But if you're still skeptical, visit your nearest Electronic Arts dealer and do the one thing guaranteed to send you home with a Music Construction Set in tow.

Boot one up. Point to the piano. And listen.

ELECTRONIC ARTS™

MUSIC CONSTRUCTION SET is now available for Apple II, II+, IIe, and Commodore 64 computers. The Apple version, with a Mockingboard,™ plays chords of up to six notes each. The Commodore version plays chords of up to three notes each. Apple is a registered trademark of Apple Computer. Commodore is a registered trademark of Commodore Business Machines, Inc. For more information about Electronic Arts, write us at 2755 Campus Drive, San Mateo, CA 94403 or call (415) 571-7171.

WORD PROCESSING *In The Home*

Tom R. Halfhill, Editor

Word processors are displacing typewriters in offices as rapidly as ballpoints replaced fountain pens a few decades ago. But there are good reasons why many of today's households could use a word processor, too.

Word processors are probably the most popular inventions to hit the business world since electric typewriters in the 1960s. Every day, in somebody's office somewhere, a hapless typewriter with its rubber roller platen, pile of typing paper, and bottle of white correction fluid gives way to a gleaming new computer-age word processor. Secretaries are signing up for word processing courses to keep from becoming as obsolete as their traded-in typewriters. The quiet hum of video monitors and the whir of disk drives is replacing the percussion of mechanical striking arms slapping against paper.

It's called the "electronic office" or the "paperless office." At first there was resistance, but by now it's taken for granted that word processing (and computerization in general) is having a significant impact on the function of American business. The business of staying in business and competing for profits is too important for any business person to long ignore a new tool or method for achieving greater productivity.

But in the last five years something even more amazing has happened. This chic new business tool, the computer word processor, has started to find its way into the American home, too. The invention of the inexpensive microcomputer (and its clever packaging as the home computer) has made it possible for millions of people to afford a word processor as readily as most businesses. A $50–$100 word processing program running on a $100–$400 home computer with a printer can perform most of the major writing functions of a typical $5000 or even $10,000 dedicated business system.

However, just as many business users had to be sold on the advantages of word processing, so do many home users. After all, it's much easier to justify the expense of word processors in a business, where dozens or even hundreds of letters, memos, and reports are generated every day. But what good is word processing in the home? How much writing goes on in the average household?

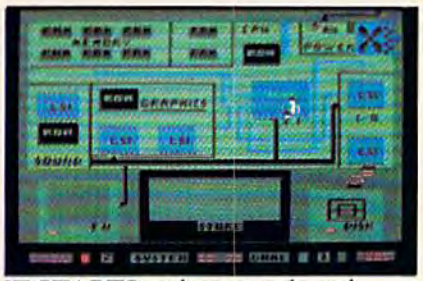
The answer varies, of course, but it can be argued that nearly any home with an adult working in a professional occupation, or with a student of almost any age, can probably benefit from an inexpensive home computer-based word processor. The key is to recognize what a powerful application word processing really is.

First of all, consider the precedence set by other business inventions which have moved into the average household: the calculator and the typewriter.

Mechanical adding machines were used by businesses for decades without making significant inroads into the home. There were several reasons for this: Adding machines were expensive, bulky, and nonportable. Also there was little use for a computing device, however primitive, in the typical home of the early- to mid-20th century. Household finances were generally pretty simple before the proliferation of credit cards, widespread con-

A GAME FOR KIDS. BUT NOT NECESSARILY.

What if you could get small enough to crawl inside your computer and see how all that stuff really works?



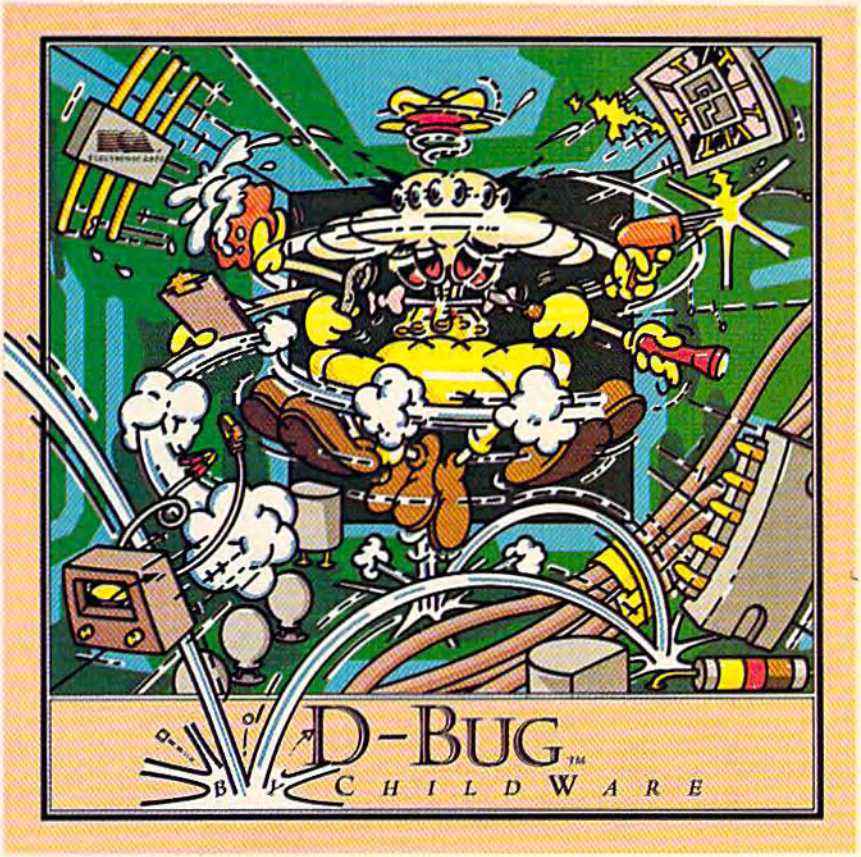
IT STARTS with an arcade-style game. You play it for a while and then something happens. The system goes down in a crash. And now your job is to find out why and make things right again.

Expert help is available in the form of a strange character named Charlie Fixit. He's got a way of making you small enough to get inside the machine. But being inside is yet another game. There are stray charges to duck, static to avoid, and all sorts of intriguing devices to explore before you can get everything back into working order.

The name of this unusual program is D-Bug, and it's a wonderful way to introduce your children (and maybe even yourself) to the terminology and basic workings of computers. But beyond this specific knowledge, you'll also learn some fairly subtle skills about how to link causes and effects, and how to develop creative strategies for solving problems.

D-Bug was designed, developed and programmed by ChildWare—pioneers in the field of computer literacy for children. It is just one of an entire line of programs we're publishing that deliberately blur the traditional distinctions between education and entertainment.

D-Bug is now available on diskette for Commodore 64 and Atari home computers and can be found at your favorite computer stores, software centers, and in fine department stores throughout the country.



ELECTRONIC ARTS™

To find out more about our company and our products, write or call 2755 Campus Dr., San Mateo, CA 94403 (415) 571-7171.
Commodore 64 is a registered trademark of Commodore Business Machines, Inc. Atari is a registered trademark of Atari, Inc., a Warner Communications Company

sumer loans, checking accounts, modern investment alternatives such as money market funds, and increasingly complicated income tax returns.

Luckily, the electronic calculator arrived at just the right time. Soon after they began replacing adding machines in businesses, they started showing up in homes. A whole new market was created. During the 1970s, calculators grew cheap, small, and powerful. Today almost nobody balances their checkbook or figures a tax return by hand. The very idea is becoming unthinkable.

The spread of typewriters from the office to the home is even more to the point since, like word processors, they are writing machines. Typewriters started appearing in American offices soon after their invention late in the 19th century. At first, their move to the home was held back by many of the same factors which discouraged the home use of adding machines: Early typewriters were expensive, bulky, nonportable, and not all that useful in the average household.

But sometime around World War II things started to change. New typewriters appeared on the market designed for personal use—relatively inexpensive, small, and portable. Colleges began requiring students to hand in typed term papers. Many people started using typewriters for personal business correspondence, and those with office jobs were taking work home. Soon typewriters became a common appliance in millions of households.

For many of the same reasons, word processors are spreading from offices to homes, too. Almost anything a typewriter can do, a word processor can do better. A home computer-based word processor is still more expensive than a cheap portable typewriter, but on the other hand, even the most advanced electronic "memory typewriter" is not as flexible as the typical home computer word processor. College, high school, and even younger students are using word processors for term papers and reports. Their parents can use the same word processor for personal business letters, or for work taken home from the office.

Best of all, the expense of a home word processor is minimal if the household already owns a home computer. Maybe the computer was originally purchased for running education/home application programs, or playing videogames, or for learning how to program. It can be transformed into a powerful word processor with the addition of the appropriate program and maybe a printer and disk drive.

Thinking of a word processor as a substitute for a typewriter is enough to justify its purchase for many people. But there are other reasons which may be even more compelling. A word processor is much more than just an electronic, computerized typewriter—it's a whole new way of writing.

In the beginning, typewriters were used simply to make neat copies of documents composed originally in longhand. Even today many people still use typewriters this way, preferring to write everything out before typing up the final draft.

But soon after their invention, typewriters were embraced by writers, especially journalists. For the first time since the clay tablet and stylus an entirely new writing implement had been invented. Newspapermen were among the first to make the transition from writing by hand to composing their thoughts directly on a keyboard. Pencils and pens—which in various forms had been the only writing instruments since writing itself was conceived—were relegated to note-taking and editing.

Why is this important? Because the transition to the keyboard is an important step in the development of many writers. The majority of professional writers do their writing on a keyboard, not in longhand.

Some writers, including a few famous ones, still contend that writing in longhand with a pen is a more intimate way of committing thoughts to paper. We won't argue this point, because it's one of those philosophical questions that is rarely resolved. However, there is little doubt that writing in longhand is slow. When deadlines are not important, this may not matter. Indeed, many writers who always write in longhand are accustomed to pacing their thoughts accordingly, and argue convincingly that longhand doesn't slow them down.

But many writers who switch to typewriters notice something strange and wonderful: apparently because they can put their thoughts to paper so much faster, the words start coming faster. At first the switch from longhand to typewriters is not always easy. It is forced on those writers who must consistently produce on deadline—such as journalists—and the transition can be traumatic. Before long, however, the old pen-and-paper method seems agonizingly slow, and they dread being out of reach of a keyboard.

Unfortunately, efficient as they are, typewriters are far from the ultimate writing tools. Once a word is typed, for practical purposes it is committed as indelibly as a word penned in ink. It's possible to make minor corrections with erasable bond, correcting ribbons, chalk strikeover sheets, or white correction fluid. But major revisions mean extensive retyping. Longhand manuscripts aren't very flexible, either. Many drafts may be required before the final acceptable copy is ready.

What do you like best about COMPUTE!'s GAZETTE?

It teaches me more about my Commodore 64 than any other magazine. Explanatory articles on how programs work The Gazette is the best magazine for Vic-20 owners Good writers! Your program listings are outstanding The Gazette Feedback column. I rate it the best magazine for my needs The interviews with professional programmers I'M NEW AT COMPUTING; THE GAZETTE IS VERY HELPFUL Plain language articles for beginners It helps me learn the essentials and excitement of computing The articles on Machine language Educational programs in basic It's not too technical for the average person. The advanced programming techniques The ads and reviews ARTICLES ABOUT DISK DRIVES AND MODEMS The large number of programs The programming tips and reviews Information on things the manuals do not explain Your professional writing; you have very knowledgeable authors I like learning how computers work It tells me about current events in the computer industry

The above comments are from The Editor's Feedback Cards, a monthly part of our continuing dialogue with the readers of COMPUTE!'s GAZETTE.

Every month, readers of COMPUTE!'s GAZETTE get ready-to-type-in games and applications programs, tips on programming in BASIC and machine language, reviews of new hardware and software, feature articles that explain and entertain, and much more.

If you would like to become a GAZETTE subscriber, return one of the subscription cards in this issue or call the number below. The basic subscription price of $20/year saves you $10 off the newsstand price. Why not subscribe today? Call Toll Free in the US 800-334-0868, 919-275-9809 in NC.

COMPUTE!'s GAZETTE

P.O. Box 961 Farmingdale, NY 11737

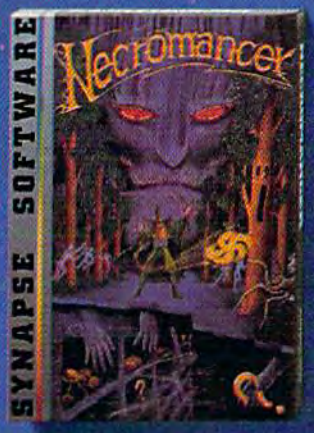
FOR THE COMMODORE 64®

Pop open a box of

On guard!

The terrifying sights and sounds of deep space, as seen from the pilot's seat of a heavily armed star cruiser. Are you ready to meet the deadly Gorganitor? Sentinel.™

Synapse excitement!

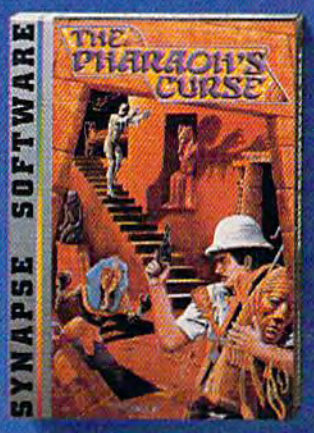


Spell-binding

Only you can restore the forest with ancient spells. Then you must march your armies of enchanted trees into battle against the Troglodytes and the evil Necromancer. Who will emerge triumphant from the final conflict? Necromancer.™

Take the controls

Your helicopter mission—capture vital fuel and weapons, free the enslaved masses, and finally destroy the fortress itself. Will you triumph or be crushed by the fiendish Kraalthan lords? Fort Apocalypse.™



Ancient treasures

A fortune is yours for the taking. But can you avoid the ghost of Rama and the evil mummy? Are you nimble enough to leap the chasms and outsmart the deadly booby traps separating you from freedom? The Pharaoh's Curse.™

Join the Elite today!

A whole new dimension in gaming from the leader in home computer excitement! Elite Club membership entitles you to an ID card, certificate, a Synapse hat, patch and quarterly newsletter, all for one low membership fee.

You'll also receive advance information on new Synapse games and be able to buy special T-shirts and posters. Join the Elite today, or send for more information and receive a FREE Synapse patch!

Special Offer: The first 1000 members also receive an incredible Blue Max™ poster!

synapse
synapse

☐ YES. Send me a FREE patch and more club information.

☐ YES, I want to join. I've enclosed $10 for one membership or $15 for my family. ($12/$17 in Canada). Cash, check, money order or VISA/MasterCard.

Name_____

Computer_____

Address_____

City_____

State_____ Zip_____

Please allow six to eight weeks for membership processing.

synapse

5221 Central Avenue, Richmond, CA 94804 · (415) 527-7751

That's where word processing comes in. You may have heard or read elsewhere about the advantages of word processing: Documents are typed not on paper, but on the video screen. Characters, words, phrases, sentences, paragraphs, or even large blocks of text can be modified, deleted, inserted, added to, moved, duplicated, and manipulated to your fingers' content. When everything is just right, you can print out as many perfect copies as you want. You can store the document on disk or tape for later use. You can merge documents saved on disk or tape to create a larger document, giving you the power to build anything from a form letter to a novel.

Most people these days are at least partly familiar with the advantages of word processors, even if they haven't actually used one themselves. But there's another bonus that is a bit more subtle—*a word processor can make you a better writer.*

This isn't just another outrageous claim of the "computers-will-save-the-world" ilk. This writer, and many others, is convinced that it's true.

Word processing makes writing so flexible, so fluid, that almost all the inhibitions are banished. Since anything you type can be changed in virtually any way, there is no reason to agonize over every word and phrase. If it doesn't "read" right, just back up and try again. Experimentation is easy. Even radical changes to your text are only a few keystrokes away. No other writing tool offers anything near this level of flexibility.

Let's face it—everything you write that is seen by other people is a reflection of not only your writing skill, but also your intelligence, style, and personality. These things show up between the lines, if not actually within them. If you are writing for publication, or sending a memo to your boss, or compiling a report to be seen by coworkers, or mailing a complaint letter to a company or a congressman, can you afford not to have every sentence as perfect as you can make it? How many times have you let a typo or awkward sentence slip by because it would mean retyping or rewriting an entire page or more?

Even more important, word processing should not be limited to adults. Children should be encouraged to write on a word processor as soon as they can handle the keyboard and the equipment (which these days is a pretty early age, it seems). Many school systems are beginning to realize the educational value of word processing. Word processors are becoming standard equipment in hundreds of schools, even at the elementary level. In fact, one commercial word processor now on the market for home computers (Brøderbund's *Bank Street Writer*) was specifically designed with young people in mind.

For years, standardized college-entry exams have revealed that the writing skills of American students are sadly deteriorating. Perhaps more emphasis on composition and the careful revision of one's own work—assisted by word processing—can help reverse the trend. Early results from classrooms using word processors are encouraging.

It certainly wouldn't hurt if children were started in this direction at home, using their family's home computer. They could be urged to use the computer for writing book reports, letters to grandparents, keeping a personal diary, composing their own stories, collecting jokes they hear, or just fooling around. In short, anything that gives them writing practice, whether they realize it or not.

More than a few adults have improved their writing with a word processor, too—including this writer. When I hear the cliché that computers (particularly home computers) are "a solution in search of a problem," I argue that even if computers were good for nothing else but word processing, it would be enough to justify their existence. Although the world got along fine for years with pencils and typewriters, sometimes a problem doesn't become obvious until a better solution is invented.

Calc Result

The Commodore 64™ Spreadsheet that puts you a million miles ahead

CALC RESULT..The one spreadsheet guaranteed to turn your Commodore into a powerful financial tool. Offering you every feature found on other more expensive programs for much less the cost.

Flexible...you can view four different areas at once

Versatile...customize your own print formats

Distinctive...display beautiful color graphics

CALC RESULT *Advanced* is a three-dimensional spreadsheet with built-in HELP function and 32 pages of memory. For the Commodore 64 $149.95. For the CBM™ 8032 $199.00. For first time users CALC RESULT *Easy* gives you a fast way to perform financial calculations—easily. For the Commodore 64 $79.95. For a down to earth demonstration of either version visit your local dealer today.

Developed by:
handic software ab
–a company in the Datatronic group–

A Product of:

Distributed by:

DES—DATA EQUIPMENT SUPPLY
213-923-9361

SOFTEAM
800-421-0814

COMPUTER MARKETING SERVICES, INC.
800-222-0585

WAREHOUSE 1, INC.
EASTERN U.S./800-253-5330
WESTERN U.S.-800-255-0056

BLUE SKY SOFTWARE
Ashland Office Center
Evesham & Alpha Avenues
Voorhees, NJ 08043
609/795-1025

Commodore 64 is a trademark of Commodore Business Machines

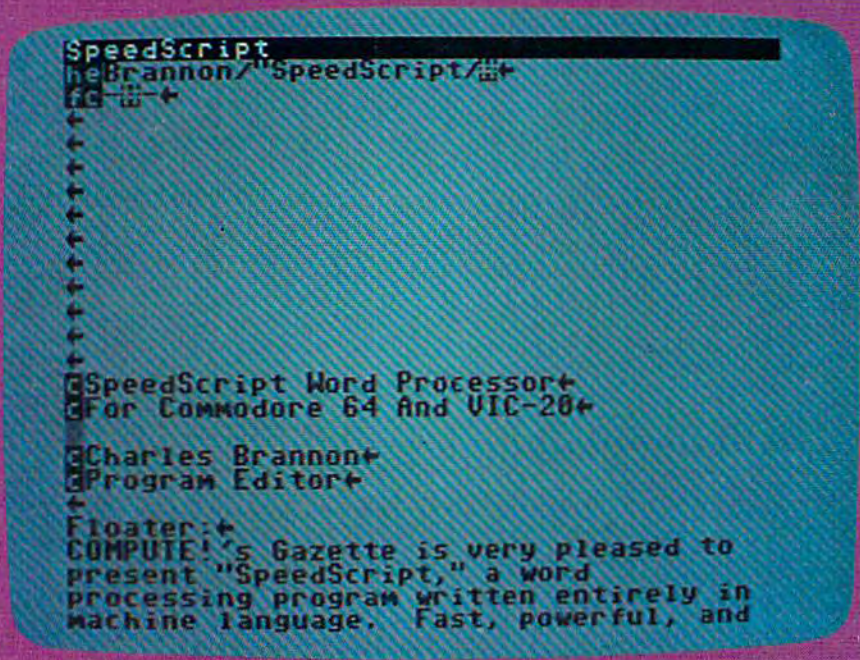
SpeedScript

Word Processor

For Commodore 64 And VIC-20

Charles Brannon, Program Editor

COMPUTE!'s GAZETTE is very pleased to present "SpeedScript," a word processing program written entirely in machine language. Fast, powerful, and easy to use, it includes almost all the major features found in professional word processor programs for personal computers. We believe it approaches commercial-quality programs costing $50 or more. It runs on the Commodore 64 (leaving a huge 45K free for text) and the VIC-20 with 8K or greater memory expansion. SpeedScript will considerably amplify the utility of your computer.



A current advertising campaign extols the virtues of a ballpoint pen that can erase like a pencil, dubbing it the "portable, personal word processor." It can even plot graphics. Like a word processor, the pen can edit, change, and erase. It can produce flawless hard copy. And, indeed, you can draw circles, squares, and bar graphs. But can the pen move paragraphs? Put a 100-page book on a 5¼" disk? Turn a rough draft into final copy with only a few changes? Can it truly edit without a trace of correction, and produce formatted, double-spaced, automatically page-numbered text?

Maybe we're not being fair to the erasable pen, but it should be made clear that word processing is more than just a computerized typewriter. Such a "word processor" would be a few lines long:

```
10 OPEN 1,4
20 INPUT A$
30 PRINT#1,A$
40 GOTO 20
```

When RUN, the program flashes the cursor and waits for a line to be typed. When you hit RETURN, the line is sent to the printer. You can move the cursor left and overstrike or use the DEL key to make changes to the line before you hit RETURN and print it out. But once it's on paper, it's committed. Too late to make any changes.

With a true word processor, you type everything in first, then print the whole thing out. Before you print, you can make as many changes as you want. A good word processor lets you change any line, swap paragraphs, and manipulate your text in numerous other ways. You can buy such a word processing program for your VIC or 64 for $40 to more than $100, depending on the features.

Or you can type in "SpeedScript." Even if you already own a commercial word processor for your VIC or 64, we think you'll be pleasantly surprised. SpeedScript offers all the standard features, plus others you may not have seen before. And there are nearly identical versions for both the 64 and VIC (with 8K or more expansion memory).

Entering SpeedScript

First, you'll need to type in SpeedScript. Programs 1 and 2 look long, but they are only about 4.5K, shorter than most BASIC games. The mass of numbers are machine language. Only with machine language do you get such power, speed, and compactness. Unfortunately, machine language isn't as easy to enter as a BASIC program. To aid with all the typing, we've developed MLX, the machine language editor. Be sure to read and understand the MLX article before you begin typing in SpeedScript.

Type in and SAVE the MLX program. The VIC version will require the 8K expander, both for MLX and SpeedScript. When you are ready to enter SpeedScript, turn your machine off and on (to clear it out), then enter one of these two lines before you load MLX:

for the VIC:

```
POKE 44,37:POKE 9472,0:NEW
```

for the 64:

```
POKE 44,27:POKE 6912,0:NEW
```

You can then load MLX from tape or disk, and enter RUN. MLX will ask for the starting and ending addresses. The starting address is the first number in the listing: 2049 for the Commodore 64, and 4609 for the VIC-20. The ending address is the last number plus five: 6842 for the 64, and 9342 for the VIC-20. After you enter this, follow the instructions in the MLX article to enter the listing. We've entered it here, and it takes only a few hours (you can stop, save your work, and continue typing in several sessions). No matter what your typing speed is, rest assured that it will be well worth your effort.

Get more out of your Commodore.

PIPES*
For the VIC-20 and Commodore 64.

Arlo is a hard-working plumber, but a touch absent-minded. He's building a water supply system for the whole neighborhood, and he really has his hands full. Help Arlo decide what kind of pipe to buy and where to put it... his limited budget doesn't leave him much margin for error. Figure out the shortest, most economical way to get everyone hooked up...and just hope poor Arlo has remembered to open and close the right valves. A marvelously entertaining and challenging exercise in planning, economics and spatial relationships for all ages.

Look for complete promotional details inside each specially-marked box of our year's biggest hits. Or talk to your Creative Software dealer. See how creative your Commodore really can be!

C R E A T I V E

*SELECTED AS SOME OF THE "MOST INNOVATIVE COMPUTER PROGRAMS" 1983 CES SOFTWARE SHOWCASE AWARDS.

Get Creative!

***SAVE NEW YORK*™**
For the Commodore 64.

It was as peaceful a day as New York ever gets, when suddenly the sky went dark and a monstrous droning noise filled the air. Hordes of grotesque aliens were swooping down from all sides, biting into the Big Apple as if they hadn't eaten for days. They were laying eggs, too. Horrible slimy things that got down into the subway tunnels and began clawing their way up. If anyone was going to save the city, it would have to be me. I leapt into my rocket and began blasting away. I thought I stood a fighting chance, but fuel's running low... another wave of invaders on the horizon ...signing off...

S O F T W A R E

Award-Winning Hits for your Commodore

CHOPLIFTER*
For the Commodore VIC-20.

Those are our men they're holding hostage! We don't care how you do it, but you've got to shoot your way in there and bring 'em back alive. You've got three choppers, probably not enough but it's all we can spare. And the enemy camp is pretty heavily fortified. With tanks, jetfighters and truly nasty laser bombs. Okay, maybe it's a suicide mission, but somebody's got to do it. Dozens of innocent lives are at stake. We're counting on you... don't let them down!

Now you can play some of America's hottest computer games on your Commodore, and get a FREE introduction to Home Management Software. It's our way of showing you that action-packed gaming is only the beginning of your Commodore's capabilities.

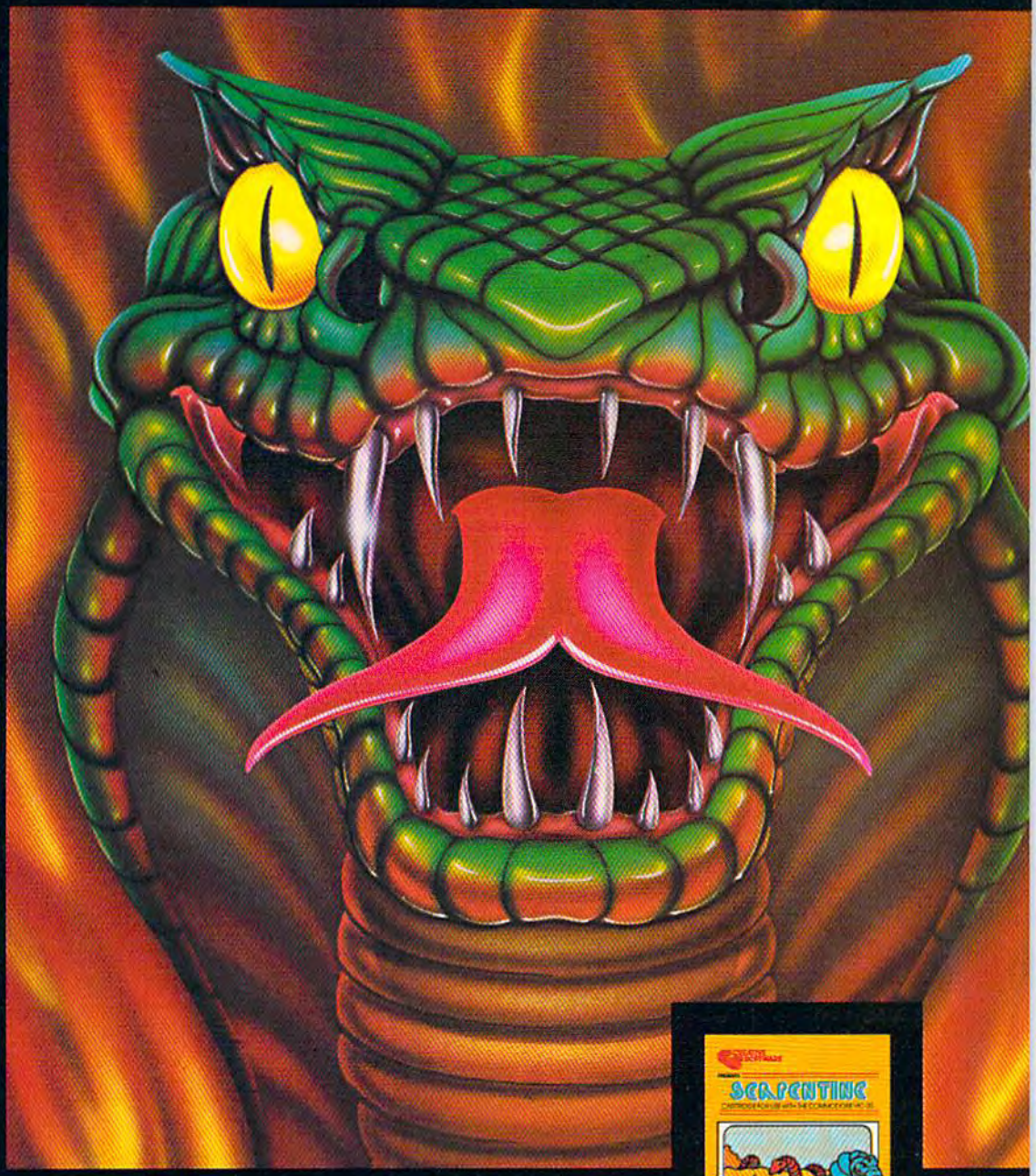
C R E A T I V E

*SELECTED AS SOME OF THE "MOST INNOVATIVE COMPUTER PROGRAMS" 1983 CES SOFTWARE SHOWCASE AWARDS.

with a Free Software Bonus.

SERPENTINE*
For the Commodore VIC-20.

In the Kingdom of Serpents, the only rule is eat or be eaten. Three huge and evil red snakes are slithering through a complex series of mazes, closing in on your good blue serpent from all sides. Move fast and watch your tail! Try to survive long enough to let your eggs hatch into reinforcements. Swallow the magical frogs or your enemy's eggs and you can get the strength to go on... but look out to your left... and ahead of you! They've got you surrounded, and it looks like meal time.



It can teach you. Manage your family finances. Even help you buy a new car. And now, for a limited time only, when you buy one of our specially-marked games you'll receive a certificate good for one of our Home Management Programs absolutely free.

S O F T W A R E

"CHOPLIFTER" AND "SERPENTINE" ARE VIC-20 TRANSLATIONS OF ORIGINALS BY DAN GORLIN AND DAVID SNIDER, RESPECTIVELY.

"CHOPLIFTER" AND "SERPE[illegible]" ARE LICENSED FROM BRODERBUND SOFTWARE, INC.

Getting Started

After you enter SpeedScript with MLX, you can just LOAD it like a BASIC program. As a matter of fact, you can make copies of it with the SAVE command, as usual (SAVE "SPEEDSCRIPT" or SAVE "SPEEDSCRIPT",8 for disk). After you LOAD, enter RUN.

The screen will be light gray or white with black (or dark gray) lettering. The top line of the screen is highlighted.

The blinking cursor shows you where text will appear when you begin typing. You cannot type on the top line of the screen. This is the command window, and is used by SpeedScript to ask questions and display messages. When a message is displayed, it will remain until you begin typing again.

To get started, just begin typing. If a word you're typing won't fit on the screen line, the word and the cursor are moved to the next line. This is called word wrap, or parsing. It makes your text much easier to read on the screen, as words are never split across the margin. Another thing to notice is that a back-arrow appears if you press RETURN. This marks the end of a paragraph or line. It is not necessary to press RETURN at the end of each screen line, as you must do when reaching the end of a line on a typewriter.

Most of us, being human, are not infallible, so you may need to correct your typing mistakes. This is a big advantage of a word processor. You fix your errors before you print, so there's no messy fluids or special ribbons (Did you ever have to manually erase on a typewriter?—ugh!)

If you want to backspace, press the INST/DEL key in the unSHIFTed position. The cursor backs up and erases the last letter you typed. You can press it as many times as necessary to back up to the error, then retype the rest of the sentence. This is clearly not the best way to do things. Instead, you can move the cursor nondestructively. The cursor control keys are in the lower-right corner of the keyboard (see Figure 1: Keyboard Map). The CRSR left/right key moves the cursor to the right, and when SHIFTed moves the cursor left. Before you can correct the error, you have to move the cursor to the word in question. For example, to correct this line:

```
Now is the rime for
all good men
```

The cursor is moved to the "r" (cursor-left 21 times):

```
Now is the rime for
all good men
```

The letter "t" is typed:

```
Now is the time for
all good men
```

And the cursor is moved to the end:

```
Now is the time for
all good men
```

Resume typing:

```
Now is the time for
all good men to
come to the aid of
they're country.
```

Another error! We typed "they're" instead of "their." No problem.

In the above example, of course, you don't have to press the cursor-left key 21 times. You can just hold down the cursor-left key. It will repeat, and keep moving until you let go.

English Cursor Controls

You can also move the cursor in ways that make sense in plain English. For example, if you hold down SHIFT and press the f1 function key, (which is how you get f2), the cursor jumps back to the previous word. To correct the error in the example above, just press f2 five times. You can then press f1 five times to go back to the end of the sentence and resume typing. Here is a list of what the function keys do:

f1: Move cursor to next word.
f2: Move cursor to previous word.
f3: Move cursor to start of next sentence.
f4: Move cursor to start of previous sentence.
f5: Move cursor to start of next paragraph.
f6: Move cursor to start of previous paragraph.

SpeedScript recognizes a sentence by the ending punctuation (. or ? or !), or by a RETURN mark (back-arrow). A paragraph is any sequence of characters that ends in a RETURN mark (a RETURN mark by itself, which you can use to make blank lines, counts as a paragraph).

Since you're working with English, the cursor up-down keys do not move up or down exactly one screen line. Instead, they act like f3 and f4. Cursor-down moves to the next sentence, and cursor-up moves to the previous sentence. This is easier to understand for many people, but it takes some getting used to for others.

As you begin to move the cursor around, you'll notice that you cannot move the cursor past the end of text. There is an invisible marker, sometimes called End Of File (EOF) at the end of the document. You can add text to the end of your document, but you cannot move past it, since there's nothing there. In a very few cases, you may see some text past the end of file, but you can't move to it, so ignore it.

Many of the other keys behave predictably. The CLR/HOME key in the unSHIFTed position moves the cursor to the top of the screen. If you press it twice, it brings you to the top of your document (in case the document is longer than one screen). The insert key (SHIFT-INST/DEL) inserts a space at the cursor position. You can press it as many times as necessary to make space for inserting a word. You

Flight Simulator II

For the Commodore 64™

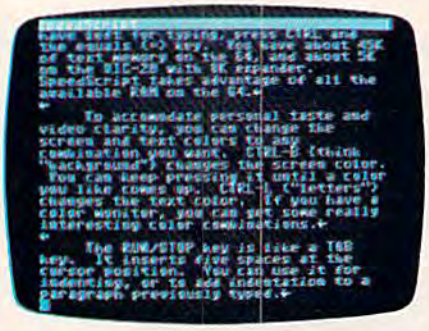
Put yourself in the pilot's seat of a Piper 181 Cherokee Archer for an awe-inspiring flight over realistic scenery from New York to Los Angeles. High speed color-filled 3D graphics will give you a beautiful panoramic view as you practice takeoffs, landings, and aerobatics. Complete documentation will get you airborne quickly even if you've never flown before. When you think you're ready, you can play the World War I Ace aerial battle game. Flight Simulator II features include ■ animated color 3D graphics ■ day, dusk, and night flying modes ■ over 80 airports in four scenery areas: New York, Chicago, Los Angeles, Seattle, with additional scenery areas available ■ user-variable weather, from clear blue skies to grey cloudy conditions ■ complete flight instrumentation ■ VOR, ILS, ADF, and DME radio equipped ■ navigation facilities and course plotting ■ World War I Ace aerial battle game ■ complete information manual and flight handbook.

See your dealer . . .

or write or call for more information. For direct orders please add $1.50 for shipping and specify UPS or first class mail delivery. American Express, Diner's Club, MasterCard, and Visa accepted.

Order Line: 800/637-4983

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995



can also go into insert mode, where every letter you type is automatically inserted. In insert mode, it is not possible to overstrike. You enter or leave insert mode by pressing CTRL-I.

Normally when you type a key, that letter or symbol appears. Certain keys, such as CLR/HOME, however, perform a function. SpeedScript extends this idea and places all the command keys in an easy-to-remember order. For example, insert mode is turned on or off by pressing CTRL-I. (To use a control key, hold down CTRL while you type the other key.)

When you enter insert mode, the command window changes color to remind you. If you press CTRL-I again, you're back in normal overstrike mode, and the command window reverts to its usual color.

CTRL-Z moves you to the bottom of your document (end of file). It's useful for adding text to the end. If you want to check how much memory you have left for typing, press CTRL and the equals (=) key. You have about 45K of text memory on the 64, and about 5K on the VIC-20 with 8K expander. SpeedScript takes advantage of all the available RAM on the 64.

To accommodate personal taste and video clarity, you can change the screen and text colors to any combination you want. CTRL-B (think "background") changes the screen color. You can keep pressing it until a color you like comes up. CTRL-L ("letters") changes the text color. If you have a color monitor, you can get some really interesting combinations.

The RUN/STOP key is like a TAB key. It inserts five spaces at the cursor position. You can use it for indenting, or to add indentation to a paragraph previously typed.

If you want to change the case of a letter or word, position the cursor on the letter and press CTRL-A. It will switch from lower- to uppercase or vice versa. CTRL-A moves the cursor to the right, so you can hold it down to change more than one letter. Another handy command is CTRL-X, or Transpose. It will switch two adjacent letters. My most common typing mistake is to wsitch (switch) two letters while I'm typing fast. With CTRL-X, it's easy to exchange the two letters without overstriking (which is useful in insert mode).

Text Deletion

With a typewriter, if you don't like what you've typed, you can tear the paper out, crumple it up, and dunk it into "file 13." With a word processor, this satisfying act is accomplished with but a few keystrokes.

With the DEL key, you can erase the last letter typed. If you're in the middle of text and press it, you'll notice that the character the cursor is sitting on is pulled on top of the previous character, and the rest of the text follows along. It sounds a little confusing, but it's easy:

```
The quick brown fox
juunmped over
```

Cursor is moved to error:

```
The quick brown fox
juunped over
```

DEL is struck twice, deleting the erroneous characters:

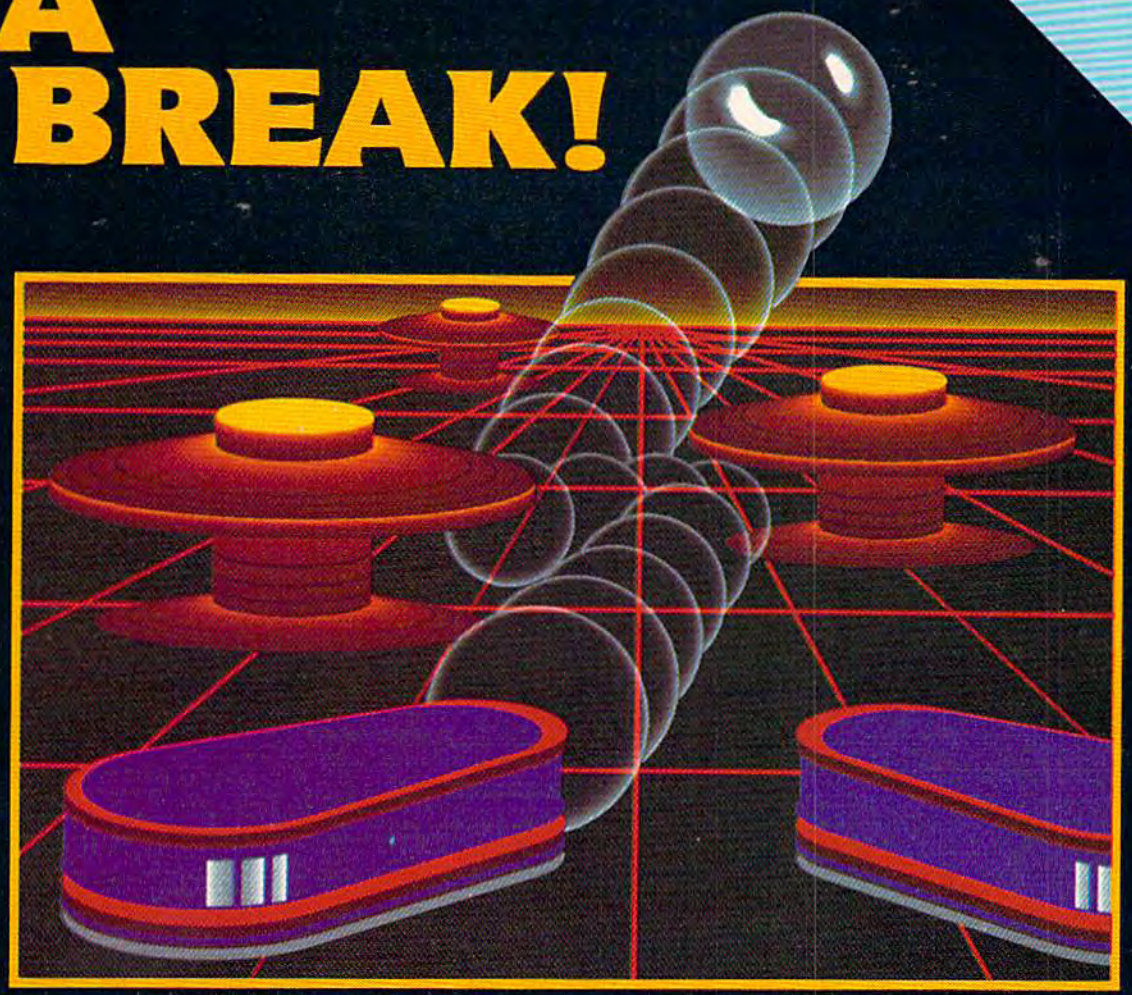
```
The quick brown fox
juuped over
The quick brown fox
jumped over
```

If you don't want the text to be pulled back, you can press the back-arrow key. It will just backspace and blank out the previous character without pulling the adjacent characters backward. Another way to delete is with CTRL-back-arrow. The cursor does not move, but the following text is "sucked into" the cursor. It is like a tiny black hole.

If you want to strike out a whole word, sentence, or para-

TAKE A BREAK!

For Commodore 64



WITH NIGHT MISSION PINBALL

You deserve the best. You've earned it. Now reward yourself with a session of **Night Mission PINBALL**, the most realistic and challenging arcade simulation ever conceived! ■ Stunning graphics and dazzling sound effects put **Night Mission PINBALL** in a class by itself. Game features: multi-ball and multi-player capabilities, ten different professionally designed levels of play, and an editor that lets you create *your own* custom modes. ■ So take a break with **Night Mission PINBALL** from SubLOGIC. Winner of *Electronic Games* magazine's 1983 Arcade Award for Best Computer Audio/Visual Effects.

See your dealer . . .

or write or call for more information. For direct orders please add $1.50 for shipping and specify UPS or first class mail delivery. Illinois residents add 5% sales tax. American Express, Diner's Club, MasterCard, and Visa accepted.

Order Line: 800/637-4983

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

graph, it's time for a more drastic command: CTRL-E. When you press CTRL-E, the command window turns red (to instill fear and awe). You see the message:

```
Erase (S,W,P):
RETURN to exit
```

Each time you press one of the three keys, a sentence, word, or paragraph is pulled toward the cursor and deleted. You can keep pressing S, W, or P until all the text you want to remove is gone. Then press RETURN to exit the Erase function and resume writing. Erase will remove text to the right of the cursor. If you are at the end of a sentence, word, or paragraph, you can use Delete (CTRL-D) to erase backward. CTRL-D displays:

```
Delete (S,W,P)
```

and immediately returns to the normal mode after its work is done. As an analogy, CTRL-Delete is like the DEL key, and CTRL-Erase is like CTRL-back-arrow.

What if you pressed one key too many in the Erase command? What if you change your mind? Oh, no! What if you accidentally erased the wrong paragraph? On most word processors, you're out of luck. But with SpeedScript, you can retrieve the crumpled-up piece of paper and "uncrumple" it. Within certain limitations, SpeedScript remembers and stores the text you Erase or Delete. If you change your mind, just press CTRL-R.

Here's how it works. When you Erase text, the text is moved from the main screen into a *failsafe buffer*, a reserved area of memory. The Commodore 64 version of SpeedScript reserves 12K for the failsafe buffer and the VIC-20 version has 1K.

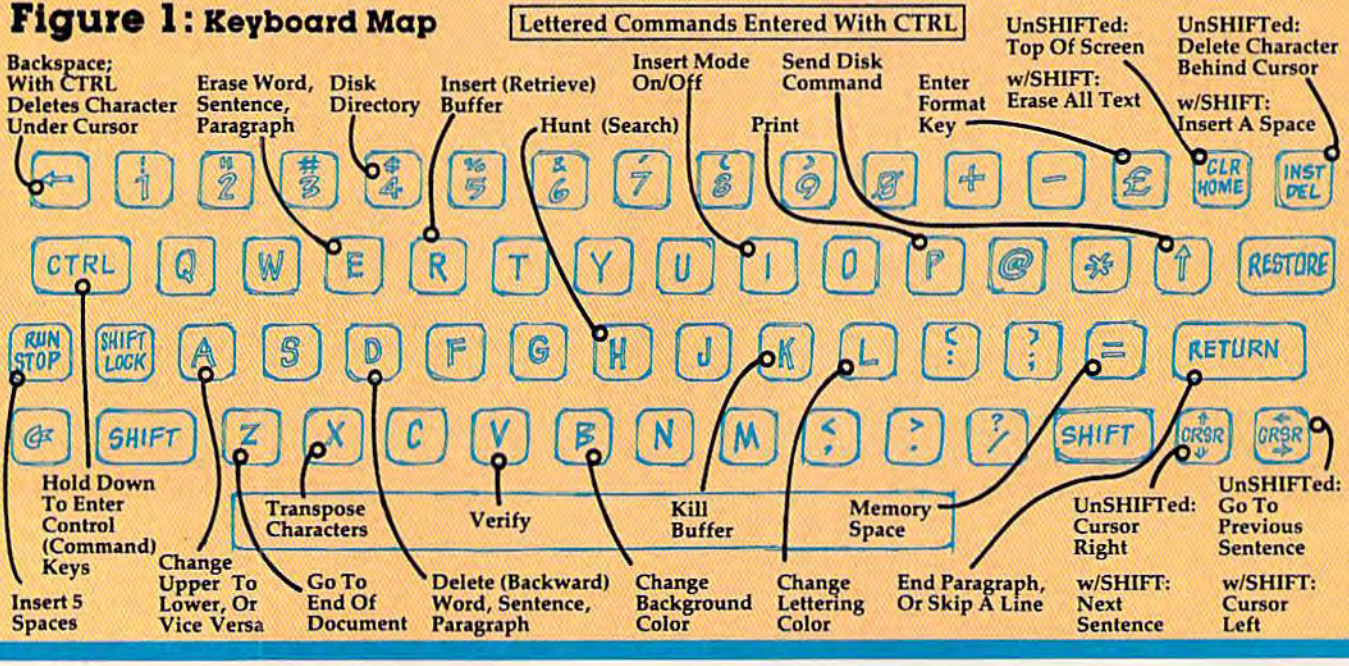
There's another valuable use for the buffer, too. You can move text by putting it in the buffer and recalling it at the destination. Just Erase the paragraphs, words, or sentences you want to move, then place the cursor where you want to insert the text and press CTRL-R (think "Restore," "Retrieve," or "Recall"). In a flash, the text is inserted. If you want to copy (rather than move) a word, sentence, or paragraph, you can restore the deleted text with CTRL-R, then move the cursor and press CTRL-R to insert the deleted text again. You can retrieve the buffer contents as often as you like. For example, if you use a long word or phrase often, just type it once, Erase it, then use CTRL-R to have the computer type it out for you.

You should be aware that CTRL-E and CTRL-D will clear the previous buffer contents. When you move one paragraph, then go back to move another, you don't want to have both paragraphs merged together the second time. Additionally, if CTRL-Delete added text to the buffer instead of replacing the buffer, CTRL-R would insert the text entries out of order, since CTRL-D deletes "backward."

If you want to move two paragraphs at the same time instead of separately, you can override the replacement and cause CTRL-Erase to add to the end of the buffer. Just hold down SHIFT with CTRL as you press E. If you want to force the buffer to be cleared, you can use CTRL-K (Kill) to clear the buffer. If you try to delete more than the length of the buffer (12K on the 64, 1K on the VIC), you'll see "Buffer Full". Stop and move the text, or use CTRL-K to clear the buffer to erase some more.

Finally, if you really want to wipe out all your text, there is a way. (Beware: You cannot re-

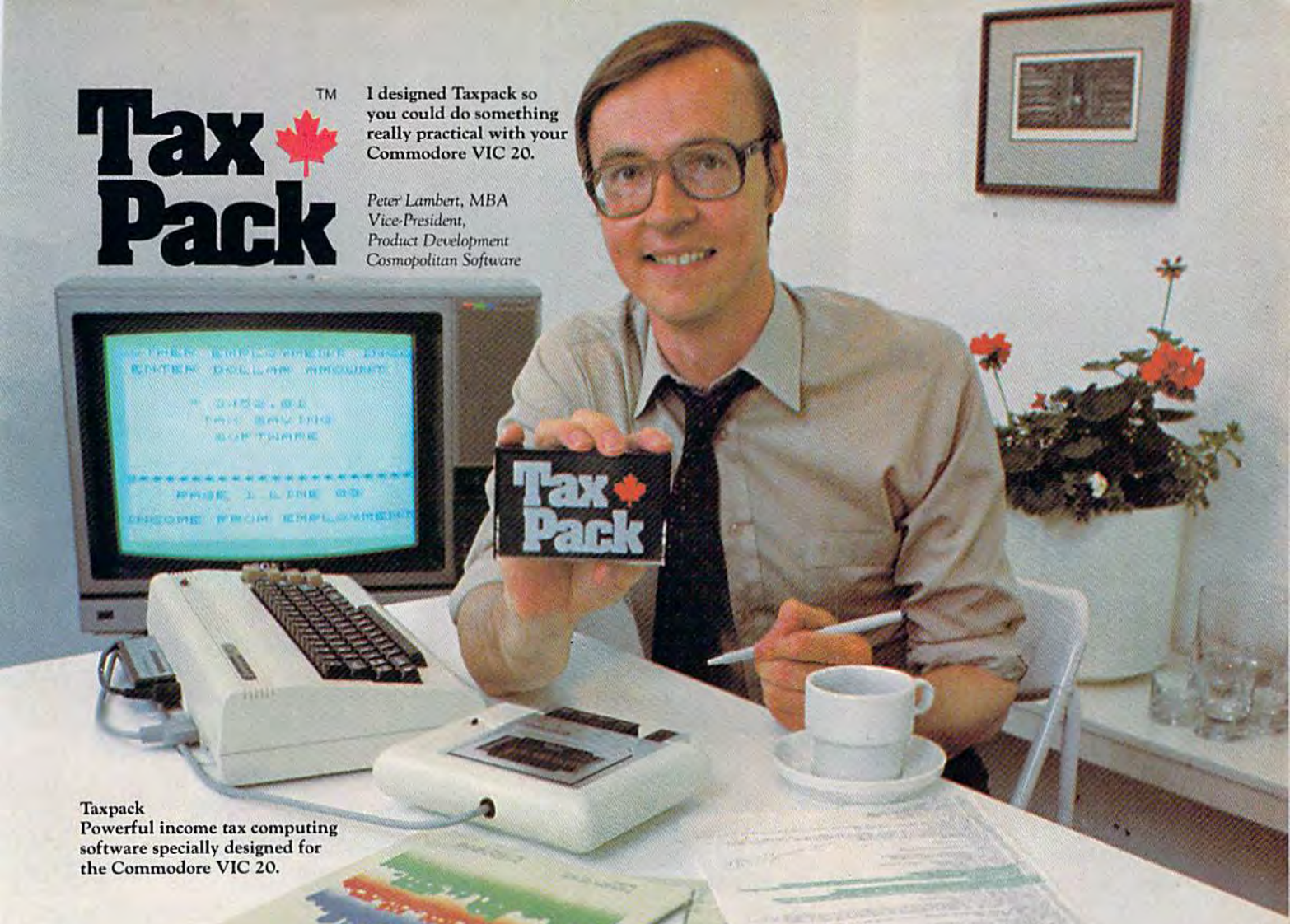
Figure 1: Keyboard Map



Tax Pack™

I designed Taxpack so you could do something really practical with your Commodore VIC 20.

Peter Lambert, MBA
Vice-President,
Product Development
Cosmopolitan Software



Taxpack
Powerful income tax computing software specially designed for the Commodore VIC 20.

Now you can use your Commodore VIC 20 to perform all the calculations on your Canadian T1 general tax form. *Taxpack* guides you easily through every aspect of the form with friendly prompts and a comprehensive instruction manual. This new software is available on cassette tape and will run on the standard 3.5k memory in your Commodore VIC 20 home computer.*

Taxpack lets you tackle your income tax form at your own pace. A convenient save-and-restore function lets you record and review historical results. Professional editing features assure easy and accurate data entry. *Taxpack* puts the power of tax modelling and planning for subsequent years in your hands, today.

**The cassette also includes an expanded version of Taxpack with enhanced display features, for the Commodore VIC 20's with 8k+ memory expansion.*

Many happy returns
Because you can calculate and preview more tax scenarios with *Taxpack* than you'd have the patience or the time to do manually, this software can help you save tax dollars. Custom-tailored to the Canadian T1 general form, *Taxpack* will be updated every year to reflect changes in the government's income tax regulations. Innovative program design allows us to update *Taxpack* within days of the new T1's availability.

So easy to order
To use your *Visa* or *Mastercard*, phone us toll free; or, send your cheque or money order with the handy mail-order form attached. We'll confirm your order by return mail. Your up-to-date *Taxpack* cassette and manual will be shipped within 15 days of the release of the 1983 T1 general form.

To order with Visa or Mastercard call us toll-free:

1-800-268-6364

(from B.C., call 112-800-268-6364)

Satisfaction Guaranteed
We guarantee that you will find *Taxpack* an excellent software value. If you are not totally satisfied, drop us a note to say why, and return the product post paid to us within 10 days for a full refund of the purchase price.

I Want Taxpack!

Please send me _____ Taxpacks @ $29.95 $_____
Nova Scotia residents only, add 10% Sales Tax +$_____
Add $2 per unit shipping and handling charges +$_____
Total $_____

My Name _____

Address _____

City _____ Province _____

Postal Code _____ Telephone _____

Make Cheque or Money Order payable to:
Cosmopolitan Software Services Limited
and mail with this order form to:
Box 953, Dartmouth, Nova Scotia B2Y 3Z6 Attn: Order Desk

cover from a total clear.) Press SHIFT-CLR/HOME. You will see:

```
ERASE ALL TEXT: Are
you sure? (Y/N):
```

If you really want to erase all the text, press Y. Any other key, including N, will return you to your text unharmed. You should use this command only when you want to start a new document, as it is one of the few ways to lose text beyond recovery.

Search Feature

When you are lost in the middle of a big document and want to find a particular word or phrase, the Hunt command comes in handy. Press CTRL-H and you'll see:

```
Hunt for:
```

Enter the word or phrase you want to find, then press RETURN. SpeedScript will locate the word and place the cursor on it, scrolling if necessary. If the phrase is not found, you'll see a "Not Found" message in the command window.

The first time you use Hunt, SpeedScript will search for the phrase from the top of the document. Pressing CTRL-H again will find the next occurrence of the search phrase after the cursor position. You can search for a new phrase without waiting to get "Not Found" for the previous phrase by holding down SHIFT while you press CTRL-H.

There are some tricks to using Hunt. For example, if you search for the word "if," SpeedScript will match it with the embedded "if" in a word like "specific." Should you just want to find the word "if," search for "if" followed by a space. Also, searching for "if" will not match with the capitalized "If."

Saving And Loading

What makes a word processor truly great is that you can save your typing to tape or disk. Say you're writing a term paper. You type it in and save it to disk. Your teacher returns the rough draft with suggested corrections. Without retyping the entire paper, you just load the original, make some changes, and print it out. A 5¼" disk can hold more writing than a briefcase! You can also write in stages: save your work as you go along, then come back to it at another time. Saving and loading alone elevates word processing far above any other means of writing.

To save your work, press f8 (SHIFT-f7). You will see:

```
Save:
```

Enter the name you want to use for the document. Follow the standard Commodore filename rules, such as keeping the name to 16 characters or less. Press RETURN, then press either T or D, answering the prompt TAPE OR DISK?.

After the Save is completed, you'll see NO ERRORS (hopefully). If there was an error during the save, such as no disk in the drive, or a disk full error, SpeedScript will read the error channel and display the error message. You'll get the error "file exists" if you try to save using a name that's already on the disk. If you want to replace the file, prefix the name with the characters "@:", such as "@:Document". This is called "Save with Replace." You can also press CTRL-↑ (up arrow, explained below) and scratch the file before you save.

Press f7 to load a file. You may want to use SHIFT-CLR/HOME to erase the current text first. The Load feature will append text starting wherever the cursor is positioned. This lets you merge several files from tape or disk into memory. If the cursor is not at the top of the file, the command window will change color to warn you that you are performing an append. You should add text only to the end of the file, as the end-of-file marker is put wherever the load stops. Also, beware that you can crash SpeedScript if you try to load a file and don't have enough room (a file longer than available memory).

You can use CTRL-V to Verify a saved file. Verify works like Load, but compares the file with what's in memory. It's most useful with tape, but you can use it with disk files, too.

SpeedScript files appear on the directory as PRG, program files. The documents certainly aren't programs, but since the operating system has convenient Save and Load routines, the text files are just dumped from memory. This is also more reliable for tape. You can load files created on some other word processors, such as *WordPro* or *PaperClip*, but you may have to do some reformatting. If the upper- and lowercase come out reversed, you can hold down CTRL-A to transform the entire file.

Other Disk Commands

Use CTRL-4 (think CTRL-$, as in LOAD"$",8 from BASIC) to look at the disk directory. You will not lose whatever text you have in memory. While the directory is being printed on the screen, you can press CTRL to slow down the printing, or the space bar to freeze the listing (press the space bar again to continue).

You can send any other disk command with CTRL-↑ (up-arrow). It may not seem easy to remember, but I think of the arrow as pointing to the disk drive. The command window shows a greater-than sign (›). Type in the disk command and press RETURN. By referring to your disk drive manual, you can do anything the commands permit, such as Initialize, New, Copy, Rename, Scratch, etc. (also see "Getting Started With A Disk Drive," a continuing series in COMPUTE!'s GAZETTE). If you press RETURN without entering a disk command,

Strengthen your hand with Superbase 64™

The complete information control system for the Commodore 64

The World Famous Commodore 64.

No matter what your business or interest, with Superbase 64 you have a totally flexible 'record' system, as big as you want it, as fast as you need it.

Create your own formats, enter your records, change layouts and datafields.

Superbase gives you unrivalled control in home or office, business or professional practice, with a range of features including:

YOUR OWN RECORDS
- Design your layout using text, numeric, calculated result, date, linking and key fields
- Record size up to 1100 characters spread over up to 127 items
- Number of records limited only by your equipment – can be thousands
- As many databases as you want – each with up to 15 files
- Learn fast through built-in HELP screens – then add your own notes

FAST ACCESS
- Keyed records for high speed retrieval – 3 secs for any file size
- Select and search for any name, description, number, date, etc. in multiple combinations
- Sort records into any order
- Display selections or generate printed reports
- Browse through records matching on any criteria

TOTAL CONTROL
- Links to other programs and EASY SCRIPT for personalised mailings, high-quality letters, quotes, tables, etc.
- Effective management of invoices, addresses, stock, membership, appointments – any and every kind of record
- English like commands for easy conversational programming, plus built-in BASIC

DATABASE MANAGEMENT
- Easy to understand menus
- Add or amend fields, or alter length – no file rebuilding needed
- Update files with automatic batch processing option
- Calendar arithmetic for effective time management
- Display quantities, values, totals, as you enter them. Formulae for on-screen result calculation.

Superbase 64™

Precision Software (USA), Inc.
Suite 11D
1675 York Avenue
NEW YORK
N.Y. 10128
(212) 410 3418

Precision Software

OFFICIALLY APPROVED BY COMMODORE

commodore

Table 1:
Clip-Out Quick Reference Card—Editing Commands

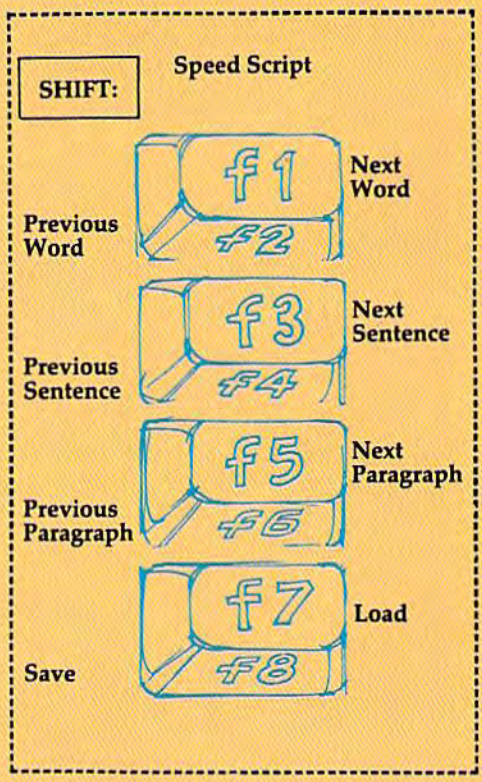
CTRL-A: Change case
CTRL-B: Change background color
CTRL-D: Delete
CTRL-E: Erase
CTRL-H: Hunt
CTRL-I: Insert Mode
CTRL-K: Clear buffer
CTRL-L: Change lettering color
CTRL-P: Print
CTRL-R: Recall buffer
CTRL-V: Verify
CTRL-X: Transpose characters
CTRL-Z: End of document
CTRL-4: Disk directory
CTRL-↑: Send DOS command
CTRL-£: Enter format key
f1: Next word
f2: Previous word
f3: Next sentence
f4: Previous sentence
f5: Next paragraph
f6: Previous paragraph
f7: Load
f8: Save
Cursor Up: Previous sentence
Cursor Down: Next sentence
Cursor Left/Right: As implied
CLR/HOME: Erase All
Back-arrow: Backspace
CTRL-Back-arrow: Delete character
RUN/STOP: Insert 5 spaces

Table 2:
Clip-Out Quick Reference Card—Format Commands

Format commands in column one are entered with CTRL-£.

Cmd	Description	Default
l	left margin	5
r	right margin	75
t	top margin	5
b	bottom margin	58
h	define header	none
f	define footer	none
w	wait for next sheet	no wait
a	true ASCII	
u	underline toggle	
c	center line	
e	edge right	
#	page number	
1–9	see text	

Figure 2:
Clip-Out Function Key Overlay



SpeedScript displays the disk error message (if any). It may be obvious by now that CTRL-↑ is much like the DOS wedge.

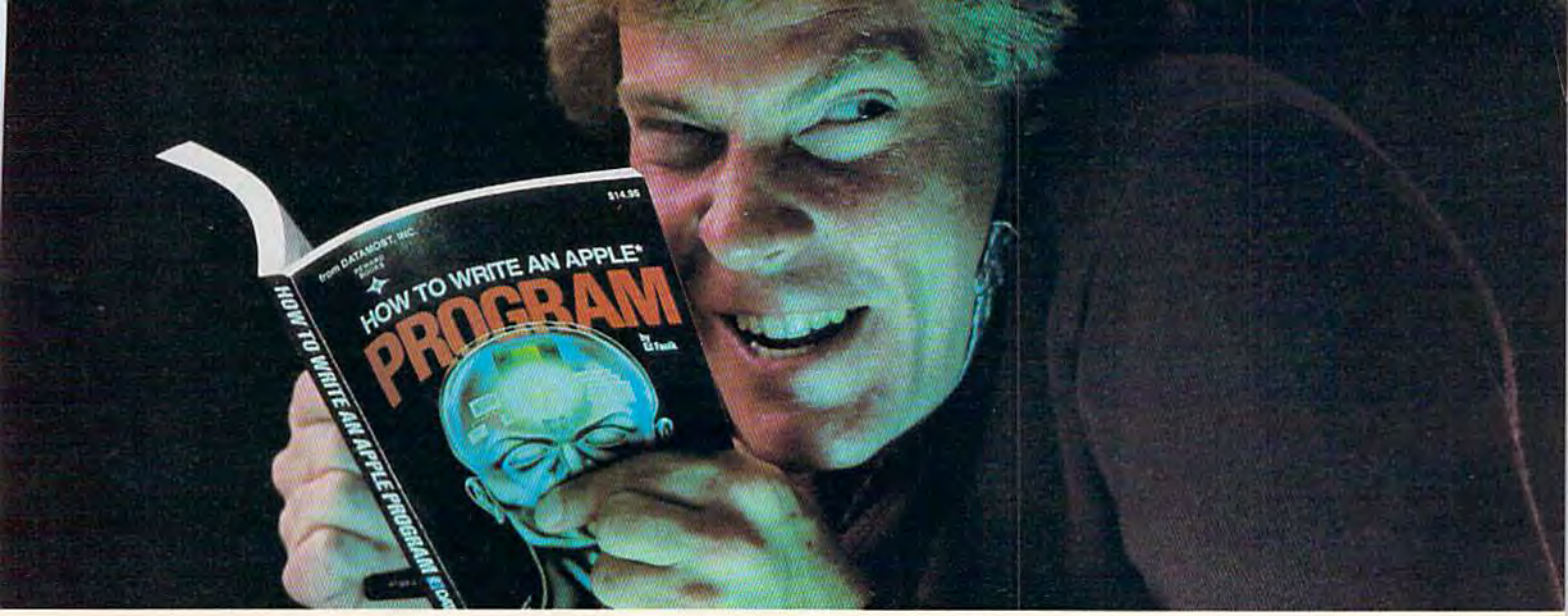
PRINT!

At last, we get to the whole point of word processing—the printout. Actually, you can use SpeedScript without a printer. If you and a friend each have a copy of SpeedScript, you can exchange letters on tape or disk, ready to load and view. You can get a lot of text on one tape or disk. And if you have a friend with a printer and a VIC or 64, you can bring SpeedScript and your files.

Before your text can be printed, it must be formatted. The text must be broken into lines with margins, and there has to be a way to divide the output into pages. For those with pinfeed paper, we also need to skip over the perforation. Of course, it would be nice to be able to automatically number all pages. And why not let the computer center lines for you, or block them edge right? You should be able to change the left and right margin anytime, as well as line spacing. Headers and footers at the top and bottom of each page would add a really nice touch.

Well, SpeedScript does all that and more. But with that power comes the responsibility to learn more commands. These commands do not act directly on the text, but control how the text is printed out. Some commands do things like change the left margin, while others let you do things with the text like centering or underlining. Remember, the formatting commands will not change how the text on the screen looks. They affect only the hardcopy (what's on paper).

Thanks to several default settings, you can print right away without using any printer commands. If you press CTRL-P, SpeedScript will make several assumptions and begin to print. A few of these assumptions are: left margin of five spaces, right margin at 75 (meaning a line



Outsmart your computer.

Show your computer who's boss. Earn its respect. With a Datamost book.

No matter what age or ability level you're at, we have the right book that talks just to you. And your computer. Whether you own an Apple.* An Atari.* Or just about any brand.

All our books are incredibly easy to understand.

Which will make it incredibly easy to understand your computer.

What If You're Scared Of Books About Computers?

Don't be.

Our books are written in friendly, familiar American English. Highlighted with cartoons. And illustrations. So they're fun to read. As well as educational.

And there's over 30 books to choose from. Basic computer learning books to programming books to coloring books.

You won't be bombarded with complicated programming routines until you're ready for complicated programming routines. And no funny technical talk until you've reached the level where you don't think it's funny.

We'll tell you what you need to know. And then, when that's understood, you can take the next step toward outsmarting your computer.

Before You Spend Big Bucks On A Computer, Spend Little Bucks.

Once you've decided, kind of, almost, nearly, what type of computer you think you'd like to buy, buy a Datamost book.

It'll help you understand the Atari or the Commodore* or the Apple of your eye.

Before you spend a lot of money. Before you take your computer home.

You'll make a better purchase decision. Because you'll understand what you're doing. And what you and your computer can do together.

So there won't be any misunderstandings to ruin your new relationship.

How To Get The Most Out Of Your Computer.

Get the most out of our minds.

Datamost books for every computer. Everybody. Every level. Pretty smart, huh?

DATAMOST™ INC

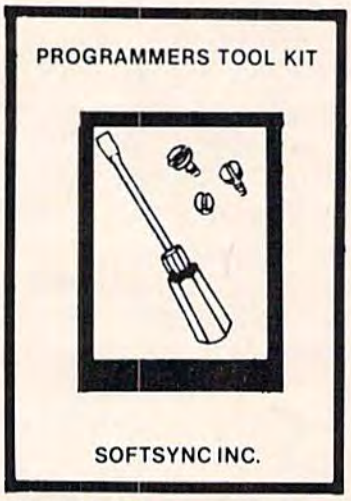
The most out of our minds.™

Datamost, Inc., 8943 Fullbright Ave., Chatsworth, CA 91311, (213) 709-1202
*Atari is a trademark of Atari Computer.*Apple is a trademark of Apple Computer.
*Commodore 64 is a trademark of Commodore Business Machines, Inc.

Commodore 64
HOTWARE sale
for grownups
LUXURY, FACILITY OR NECESSITY?

COMPUTER MECHANIC • Tune up your car with computer diagnosis • Teaches auto maintainance • Diagnostic guide • Data base for car records • Prevents car failure!
List $49.00. **Sale $29.00.** (Tape or Disk)

PERSONAL ACCOUNTANT • Easy to use • Double entry accounting system • Home and business • 3 integrated programs • Simultaneously post entries • Compiles financial reports • Large data base • Breaks down expenses • Amortization and payment schedules!
List $49.00. **Sale $29.00.** (Tape or Disk)



PROGRAMMERS TOOL KIT • Access hi-res graphics • Draws and fills in rectangles, ovals, circles for bar charts, pie charts, and line graphs • Creates single-multi color sprites easily moved • Double width characters • Load and save all memory blocks • Extends and enhances basic • A must for serious programmers!
List $49.00. **Sale $29.00.** (Tape or Disk)

MODEL DIET • Lose weight • Analyze your diet • Based on government research • Tracks calorie intake • Personalizes your diet • Keep fit and healthy!
List $49.00. **Sale $29.00.** (Tape or Disk)

• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
• BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

SOFTSYNC
SOFTWARE

PROTECTO
ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5[illegible]

COMMODORE 64

CASTLES AND CREATURES

DR. DATA's role playing game in which you fantasize yourself as a knight, or otherwise brave person looking for adventure. You journey through the Castle and explore its TOWERS and DUNGEONS, slaying CREATURES as you go.

A top selling Canadian graphics and text adventure game.

DISC

LIST: $29.95 PROTECTO PRICE: $22.95

P. MAN

DR. DATA's prescription: Have your 64, eat every apple to the core, then return to the store to eat the core, but don't get caught by the apple salesmen.

Another fast action, arcade quality, high-resolution game exclusively yours from ABI SOFTWARE.

DISC

LIST: $21.95 PROTECTO PRICE: $17.95

ROBOT RUN

DR. DATA'S PATIENT is being held captive in an installation with a multi-room maze-like security system. You must blast your way through enemy droids, your weapon is a laser, but take heed, for they band together and fight back.

Another fast action, arcade quality, high-resolution game exclusively yours from ABI SOFTWARE.

DISC

LIST: $21.95 PROTECTO PRICE: $17.95

- **THE ASSEMBLER** – Assembler language monitor. (VIC 20 & 64).
- **INNER SPACE PLANT ATTACK** – Save the world's plants.
- **RESCUE FROM MARS** – Rescue the landing party.
- **THE DESIGNER** – Sprite and character generator.
- **SONIC BOOM** – Stop the sound – 20 tunes.
- **JET DUEL** – Two-player air battle.
- **BREAKIN** – Arcade game.

PROTECTO ENTERPRIZES We Love Our Customers

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

length of 70 characters), and double spacing. If you want to change these settings, you'll need to use the formatting commands.

Entering Format Commands

The format commands are single letters or characters that appear on the screen in reverse video. To get a reverse video letter, press CTRL and the English pound sign (next to the CLR/HOME key). The command window will prompt "Key:". Now press one of the format letters, such as "r" for right margin, or "c" for center. That letter will appear in reverse video (within a "box," with its colors switched). SpeedScript recognizes only lowercase letters and some symbols as commands.

Changing Printer Variables

The printer variables are values such as left margin, right margin, line spacing, top and bottom margins, etc. They are called variables because they can change. For example, to quote a passage within your text, you may indent it by increasing the left margin, and also change to single spacing to set it apart. You would then want to switch back to normal margins and double spacing for the rest of the paper.

To change a printer variable, just follow the reverse video letter with a number. Do not leave a space between a letter and a number. You can put the format commands anywhere in text, though I prefer to group them together on a line of their own. Here is an example setting:

```
[l10[r60[s1[t10[b50←
```

To set off these format commands, I'll show here that they are in reverse video by enclosing them in brackets. You'll enter them with CTRL-English pound sign.

[l] Left margin, default 5. The left margin is the number of spaces to indent for each line.

[r] Right margin, default 75. This must be a number less than 80, which is the number of characters that can fit on a line. Add the line length you want to the left margin to get the right margin.

[t] Top margin, default 5. How many blank lines to skip from the top of the page to the first line of printing. Should be at least 5.

[b] Bottom margin, default 58. A number less than 66, which is the number of lines on an 8½" × 11" sheet of paper or pin-feed paper. Do not use a bottom margin more than 58.

[h] Define header. The header is printed at the top of each page, if you specify one. To define the header, begin a line with [h], enter the header text, then press RETURN. Example:

```
[hAccounting
Procedures←
```

You can embed a format [c] after the [h] to center the header, a format [e] to block the header edge right, and a format [#] any place you want a page number to appear. Examples:

A centered page title with a dash on each side:

```
[hcPage -[#]-←
```

The header used when this article was written:

```
[he Brannon/
"SpeedScript/[#]←
```

[f] Define footer. Just like header, but appears at the bottom of each page. A centered page number within parentheses:

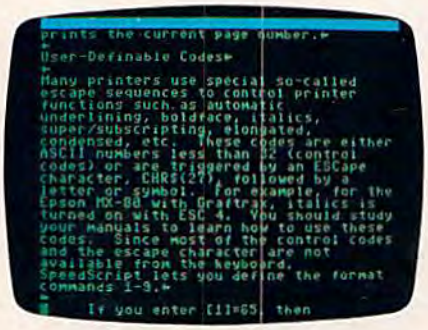
```
[fc(#)←
```

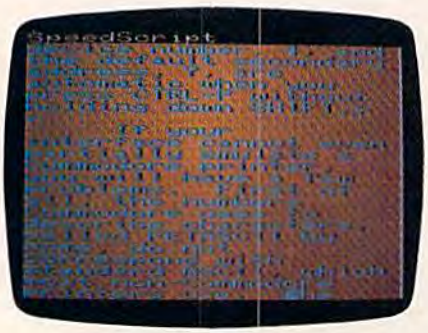
[n] Next page. This command forces the printer to skip to the next page, regardless of the position on the current page.

Other Commands

These commands do not change printer variables, so they are usually embedded within a line.

[u] Underline—place on each side of a word or phrase to under-





line. It works by backspacing and overstriking an underline symbol on top of each character. Some printers, including the VIC 1525, do not support the backspace command, so underlining will not work on these printers.

[c] Center—place this at the start of a line you wish to center. Remember to end the line with RETURN.

[e] Edge right—like center, but will block the line to the edge of the right margin.

[#] Page number—When SpeedScript encounters this symbol, it prints the current page number.

User-Definable Codes

Many printers use special so-called escape sequences to control printer functions such as automatic underlining, boldface, italics, super/subscripting, elongated, condensed, etc. These codes are either ASCII numbers less than 32 (control codes) or are triggered by an ESCape character, CHR$(27), followed by a letter or symbol. For example, for the Epson MX-80 with Graftrax, italics is turned on with ESC 4. You should study your manuals to learn how to use these codes. Since most of the control codes and the escape character are not available from the keyboard, SpeedScript lets you define the format commands 1–9.

If you enter [1]=65, then every time the reverse video [1] is encountered during printing, that character (65 is the letter A in ASCII) is sent to the printer. For example, SpeedScript uses the back-arrow for a carriage return mark, so you can't directly cause a back-arrow to print on the printer. Instead, you can look up the ASCII value of the back-arrow, which is 95. You would enter [1]=95, say, at the top of your document. Then, any place you want to print a back-arrow, just embed a [1] in your text. The first four numbers are predefined so that you don't have to set them, but you can change their definition:

[1]=27 (escape), [2]=14 (elongated, most printers), [3]=15 (elongated off), [4]=18 (condensed).

A fascinating possibility is to trigger the bit graphics capability of your printer. For example, you could define special characters. On the VIC 1525, you could send a graphic box (for a checklist perhaps) with:

```
[1]=8[2]=15[3]=255[4]=193
[1]3[4][4][4][4][3][2] Toothpaste
```

This would appear on the printer as:

```
□ Toothpaste
```

Printer Compatibility

SpeedScript works best, of course, with a standard Commodore printer. However, we have used it with several other printers such as the Epson MX-80, an Okidata Microline 82A, and the Leading Edge Prowriter (NEC 8023), via an appropriate interface. The interfaces I've used are the Cardco Card/Print and the Tymac Connection. Any interface that works through the Commodore serial port should be fine. SpeedScript will probably not work with an RS-232 printer attached to the modem/user port. SpeedScript may operate with some interfaces which emulate a Centronics port on the user port via software, as long as the software does not conflict with SpeedScript. If you can get your printer to work fine with CTRL-P, skip the next few paragraphs to avoid confusion.

The Commodore printers and most interfaces use a device number of 4. (Other device numbers are 1 for the tape drive and 8 for the disk drive). If you have more than one printer attached with different device numbers, you can enter this number by holding down SHIFT while you press CTRL-P. You'll be asked to enter the device number and the secondary address. Incidentally,

you can get a rough idea of page breaks before printing by using a device number of 3, which causes output to go to the screen.

The secondary address is a command number for the printer. For Commodore printers or interfaces which emulate the Commodore printer, the secondary address should be 7, which signifies lowercase mode. The default device number, 4, and the default secondary address, 7, are automatic when you press CTRL-P without holding down SHIFT.

If your interface cannot even partially emulate a Commodore printer, you will have a few problems. First of all, the numbers Commodore uses to describe characters, called PETASCII by some, do not correspond with standard ASCII, which most non-Commodore printers use. The result is usually that upper- and lowercase come out switched. SpeedScript lets you get around this if you place a format [a] at the top of your file.

You also need to use the [a] if you want to bypass the emulation offered by the interface. You may do this to be able to activate your printer's special function codes which are often intercepted and interpreted by the interface. You will also have to use a different secondary address. I'll have to bow out and suggest you scrutinize both your printer's manual and that of the interface.

Pinfeed Versus Single Sheet

The pinfeed or tractor feed is the cheapest and most common paper delivery system for printers. Some printers, however, have a platen like a typewriter and can accept single sheets of paper, such as stationery or company letterhead paper. Normally, SpeedScript prints continuously, skipping over the perforation that divides continuous pinfeed paper.

If you are using single sheets of paper, you need SpeedScript to stop at the end of each page, tell you to insert a new sheet, then continue. If you place a reverse video [w] (for Wait) at the top of your file (again, use CTRL-English pound sign to do this), SpeedScript will do just that. When you get to the end of the page, insert a new sheet, then press RETURN to continue printing.

As you can tell, SpeedScript is a truly comprehensive word processor. I used it to write this article, and it is becoming popular here at COMPUTE! Publications, where writing is a main activity. Although SpeedScript is ultimately easy to use, it may take you a while to master all the features and variations. I hope your adventure will prove to be fascinating and fruitful.

See program listings on page 172.

The Inner World Of Computers

Part 3: How A Computer Remembers

Tom Prendergast

This month's installment examines how computers store information in memory, how you can manipulate that information with PEEK and POKE commands, and how a computer stores a BASIC program.

There have been lots of fan letters (at least two) wanting to learn more about the ELFS (ELectronic FingerS) that work the microswitches inside your computer. Keep those letters coming, folks.

There's one thing we'd like to clear up at the beginning, though. Some people thought it was cruel to shrink programmers down to ELF-size so they could be squeezed into a computer. That's not what we said! We said some genius noticed that the ON/OFF pattern of the front-panel switches on the early mainframes looked like binary and began to program the switches in binary. Then, since hand-setting was no longer necessary, the switches were moved inside. So it was the program and not the programmer that was put inside the computer—there's a big difference.

The earliest computers, full of vacuum tubes and wires, were called "giant brains." They were as big as the side of a barn, but they weren't as brainy as an unexpanded VIC of today because they were four-bit computers, with *nybble*-sized (four-bit-wide) memory cells. You might call them the "four-fathers" (Ouch!) of the VIC and 64, which have eight-bit (*byte*-sized) memory cells.

Four bits limit you to 16 possible binary ON/OFF switch-patterns—0000, 0001, 0010, 0011, 0100, 0101, 0110, 0111, 1000, 1001, 1010, 1011, 1100, 1101, 1111—if you remember our "15-cent computer" of two months ago. You can crowd a heckuva lot more information into an eight-bit byte, because the powers of two *double* the possibilities with every bit you add.

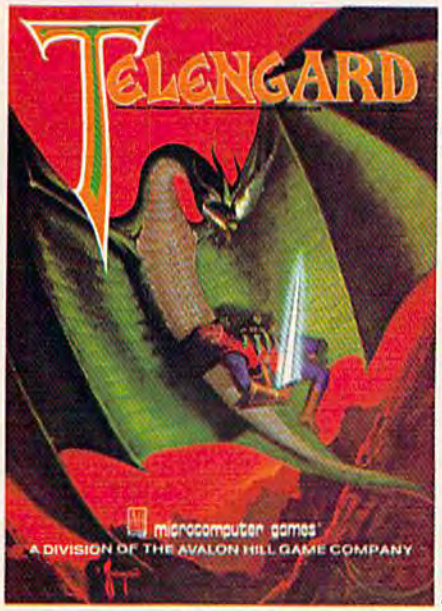
Even so, you can do a lot with four-bit nybbles. Hexadecimal is read in nybbles, and the VIC-20 uses nybble chips in color memory.

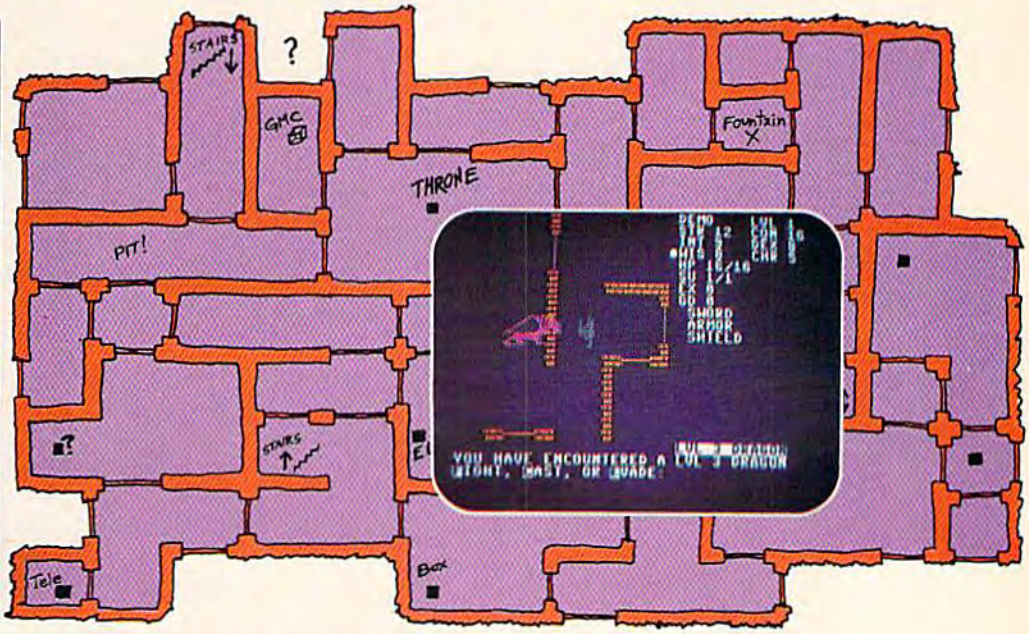
ELF joke: How many ELFS does it take to change a light bulb? Eight if it's a light bulb, but only four if it's a color bulb.

A computer's brain is a lot like ours, although it's a lot smaller, because it's divided into different sections that remember different things. There's a section that remembers what color it was using (color memory), a section that remembers where it put certain things (the *stack*), sections that remember how to do arithmetic and what the letters of the alphabet are.

A PEEK is like reading a computer's mind because it tells you the different kinds of information stored in a memory cell.

Be Amazed!





Telengard: How low can you go?

We've created a subterranean monster. Fifty stories low.

That's the number of levels in the TELENGARD dungeon.

Each labyrinthine level holds hundreds of dark chambers and tomb-like corridors for the mighty adventurer to explore. It goes without saying that a shifting collection of hideous monsters with unpredictable behavior patterns can make life in the TELENGARD maze quite interesting—and frequently quite short!

Using wits, magic and true grit, your character delves deeper and deeper into the depths of TELENGARD in this realtime fantasy role-playing game. Available on cassette for Commodore® 64, Atari® Home Computers (40K), TRS-80® Mods. I/III (32K) and PET® 2001 (32K) for a ghoulish $23.00. 48K diskettes for Apple® II, Atari®, Commodore® 64 and TRS-80® available also, for $28.00.

AND FOR THOSE WHO DON'T DIG UNDERGROUND GAMES . . . There's **B-1 NUCLEAR BOMBER**, a nail-biting solitaire simulation of a manned B-1 on a mission over the Soviet Union. Your plane is equipped with six Phoenix Missiles, a one megaton warhead and orders to retaliate! Cassette for Commodore 64, Atari Home Computers (32K), TI99/4 & 4A (16K), VIC-20 (16K), Timex/Sinclair 1000 (16K), and TRS-80 Mods. I/III (16K) are available for an explosive $16.00. Diskette versions for Apple (48K), TRS-80 (32K), Atari (24K) and IBM (48K) just $21.00.

NUKEWAR: Defend your country by massive espionage efforts, or by building jet fighter bombers, missiles, submarines and ABM's. Your cold and calculating computer will choose its own strategy! Cassette for Commodore 64, VIC-20 (16K), TRS-80 Mods. I/III (16K) and Atari Home Computers just $16.00.

FOOTBALL STRATEGY: Animated action on a scrolling field. A head-to-head challenge or solitaire as you select the best offensive or defensive plays in response to your opponent. Commodore 64, Atari Home Computers (32K) and TRS-80 Models I/III/IV (16K) cassette for $16.00. Atari (32K), IBM (64K) and TRS-80 Models I/III/IV (32K) diskettes available at $21.00.

T.G.I.F.: Thank Goodness It's Friday! Avalon Hill's new party game for one to four players recreating an often-not-so-typical week in the lives of the working class. Half the fun is just making it from Monday to Sunday. Commodore 64, Atari Home Computers (40K) cassette for a meager $20.00. Atari diskette (48K) for $25.00.

AVAILABLE WHEREVER GOOD COMPUTER GAMES ARE SOLD or call Toll-Free: 1 (800) 638-9292 for the name of a store near you. Ask for Operator C.

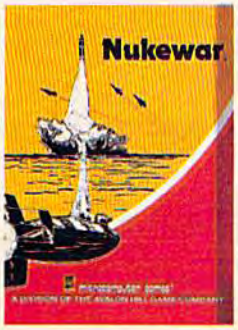
microcomputer games®

a Division of the

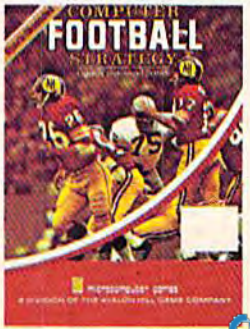
Avalon Hill Game Company

4517 Harford Road, Baltimore, MD 21214 U.S.A. Earth

*Trademarks of Tandy Corp., Apple Computers, Commodore Business Machines, Warner Communications and International Business Machines.



AH QUALITY



If you count the ASCII and CHR$ codes (see the charts in the back of the VIC and 64 manuals), you'll find there are 256 of them. You have a code for every letter of the alphabet, the decimal numbers from 0 to 9, punctuation marks, graphics—plus codes that call up functions, such as CHR$(147), which clears the screen.

A fully expanded VIC, PET, Apple, Atari, or Commodore 64 has 65536 memory cells, each of which can remember up to 256 different switching-patterns (thought patterns.) Some cells are "hard-wired"—the Read Only Memory (ROM) cells—and can't be changed. But you can change anything in Random Access Memory (RAM) with a POKE.

You can POKE any number up to 255, but when you get to the limit of ON-bits a byte can hold—11111111 (255)—that's it! The next number would be 256 (100000000), and that's 9 bits—too many bits for an eight-bit byte. If you POKE 256 or higher, you'll get an ?ILLEGAL QUANTITY ERROR.

By the way, don't you just love those error messages? What's so illegal about asking for something that isn't there? And the question mark before ILLEGAL is a dead giveaway that they're not quite certain it is illegal. But that's not the ELFS' fault, it's a canned message in ROM memory. When you get a little deeper into machine language, you'll be able to change error messages to anything you want. Like, SORRY, SWEETHEART—TRY AGAIN. You do this by changing the "pointer" (sort of like an ELF bird dog) to point to a different block of memory cells where your new message is stored.

Here's a short program to show you what we're talking about. It POKEs different characters into the RAM cells that are "mapped" to the screen:

```
10 SC=7680:PRINT CHR$(147):POKE 36879,7
20 FOR CELLS=0 TO 505:POKE SC+CELLS,79:NE
   XT
30 PRINT"{15 DOWN}{RVS}{4 SPACES}PRESS SP
   ACEBAR{4 SPACES}"
40 GET SPACEBAR$:IF SP$=""THEN 40
50 POKE SC+CH,CH:PRINT CHR$(19);:PRINT"
   {14 DOWN}{RVS} CODE NUMBER";CH"
60 CH=CH+1:GOTO 40
```

Note: For the Commodore 64, change lines 10 and 20 as below:

```
10 SC=1024:PRINT CHR$(147):POKE 53281,7
20 FOR CELLS=0 TO 999:POKE SC+CELLS,79:NE
   XT
```

When you RUN the program, the screen divides itself into little cells. Now watch the top left HOME cell and press the space bar. @ appears in that memory position, with the CODE NUMBER 0 in reverse below.

Press the space bar again and the letter A appears in the second cell. The code number changes to 1 (its POKE value). Keep pressing the space bar until you've filled up the first 256 screen cells with all of the characters and graphics in character ROM.

Don't press the space bar to POKE beyond code 255, though. You did? You overloaded the byte and got an ?ILLEGAL QUANTITY ERROR IN 50, right? Don't say we didn't warn you!

OK. So we've learned how to POKE things into RAM. Now let's take a PEEK to see how BASIC stored our program in memory. Clear the screen because we're going to see a lot of numbers and you don't want them scrolling off the screen.

Now list line 10 (type LIST 10 and RETURN), and directly below—with no line number—type this:

```
FOR I=0TO31:PRINT PEEK(4096+I);:NEXT
```

For the 64, use PEEK(2048+I)

Make sure you've included the semicolon after the second parenthesis, then type RETURN.

This is what you should see for the VIC (the 64 display will be slightly different):

```
READY.
LIST 10

10 SC=7680:PRINT CHR$(
147):POKE 36879,7

READY.
FOR I=0TO31:PRINT PEEK
(4096+I);:NEXT
 0  32  16  10  0  83
 67  178  55  54  56
48  58  153  32  199
40  49  52  55  41  58
  151  32  51  54  56
 55  57 44 55  0

READY.
```

What do all these numbers mean? Each one represents the byte stored in the 32 memory cells storing line 10. VIC program storage starts at 4096 (2048 is the starting address for the 64), so that accounts for the first zero. That zero is a "null byte"—sort of a place marker—and so is the zero at the very end marking the end of line 10 in memory.

The next two numbers are actually one two-byte number because it's a *pointer* pointing to the memory address where the NEXT program line is stored. (Line 20 has a pointer in front of it pointing to where line 30 is stored, and so on, for every line to the end of the program.) The VIC, 64, Apple, and Atari hitch two bytes together to form an address. This means you can have an address as high as 65535 (1111111111111111 in binary), but figuring out addresses gets really complicated because the bytes are hitched together backwards and the *high byte* follows the *low byte*.

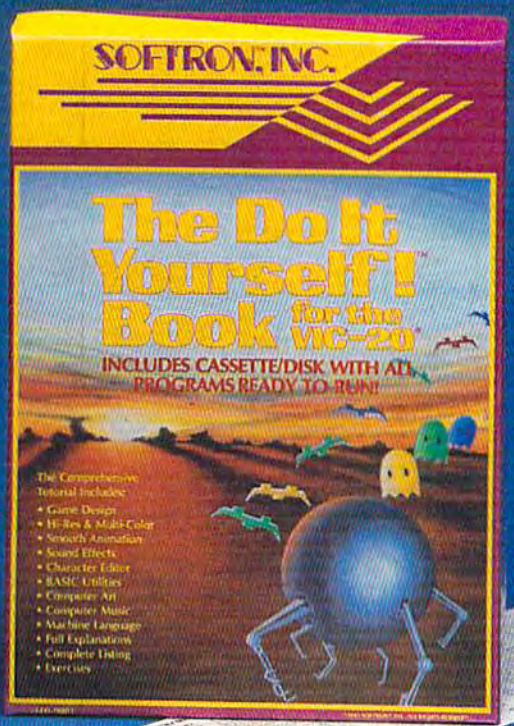
SOFTWARE BREAKTHROUGH from SOFTRON, INC.

The Do It Yourself! Book™

For the Vic 20®
Comprehensive tutorial with
26 programs ready to load and run!

- Game Design
- Hi-Res & Multi-Color
- Smooth Animation
- Sound Effects
- Character Editor
- BASIC Utilities
- Computer Art
- Computer Music
- Machine Language
- Full Explanations
- Complete Listing
- Exercises

Available soon for the Commodore 64®.
$27.95 Book and Cassette



PIZZA TIME!™

For the VIC-20®
20 levels of progressive,
fast action maze game!
All machine code, multi-color
arcade action for the VIC-20.
Two players, joystick,
8K expan., $22.95 cassette

Keyboard Soft/Lay™

For the VIC 20®, Commodore 64®
No more endless paging through
manuals and books! All you need is
immediately at your fingertips!
BASIC commands, memory locations,
memory map, printer codes, music notes,
and more... $8.95

Ask for these Softron™ products at
your favorite computer store,
or directly from us:
150 Nassau St. Suite 2024
New York, N.Y. 10038
212-608-2922
Orders only 800-328-8029
Dealer inquiries invited.

Ez/Disk™

For the VIC 20,® Commodore 64®
Now even you can use a disk drive! No more lengthy
BASIC commands...so easy to use...

Press one key for:	And enter only program name for:	
• Disk directory	• Load, save, verify	
• Read errors	• Load, save machine language files	
• Format new disk	• Back-up files	• Rename
• Compress files	• Delete	• More utilities

Call the menu anytime...
All without losing your BASIC program in memory!
EZ to understand—unnecessary manual included!
$29.95

Send Check, M/O plus $3 S/H. $2 extra for disk. (Except Ez/Disk™) N.Y. Residents, add 8¼% tax. Add $3 for COD.
The Do It Yourself! Book, Pizza Time! Keyboard Soft/Lay, Ez/Disk and Softron are trademarks of Softron, Inc. VIC 20 and Com[illegible]

Fortunately, there's a little ELF in there that does all the figuring when a program is running, but if we want to figure it out, we have to multiply the high byte (16 for the VIC, 8 for the 64) by 256 and add the low byte (32) to it. Quick now, what's the starting address for line 20?

Hang in there—we're coming out of the darkness into the light.

The number 10 looks familiar. What do you suppose it represents? It's the "10" of line 10! The zero following the 10 is the high byte of the line number. Like addresses, line numbers are kept in low byte/high byte form. The 83 and 67 are the ASCII coding for S (83) and C (67) of our SCreen variable SC.

Now we're going to throw you a curve. You might expect that the equal sign would be ASCII coded, too, but it's not. In this particular case, the equal sign is an *operator*, and the token code for = is 178. All BASIC operators are tokenized—squeezed into a byte. PRINT, for instance, which has five letters and would need a location for each letter in ASCII, when tokenized to 189 requires only a single cell. This saves a lot of memory space. You don't save any memory by tokenizing a one-character operator like = but CHR$ and POKE are operators and use only one cell.

If you count the number of characters in the listed version of line 10, then count the numbers, you'll find that tokenizing saves you eight bytes: 39 versus 31. There is another reason for tokenizing besides saving memory. The BASIC interpreter, which converts your BASIC programs into machine language (which can be executed by the computer), can only understand instructions in tokenized form. That is, when the interpreter sees the number 153 it knows you want to print, but it does not understand the letters PRINT.

We're going to leave the rest of the numbers up to you to figure out. One trick is to use the operator tokens as landmarks (see the list below for the tokens used in the program), so that any numbers in between must be ASCII. The ASCII code for the digit 0 is 48, for instance; 1 is 49, and so on, in sequence up to the 9, which is 57.... The left parenthesis "(" is 40 in ASCII, the right parenthesis ")" is 41, and a space is 32. You'll find the rest of the ASCII code on page 145 of the VIC manual and on page 136 of the 64 manual.

So that's how an ELF remembers. Some of this may have seemed complicated and roundabout—all the different codes, numbers that aren't numbers, binary, hex—but it's something that's been worked out over the years, and it works!

That's not to say that someone won't think of an easier and quicker way of doing things. A few years from now, we'll be heehawing at today's computers as hard as we heehaw at the big monsters of just a few years ago. You can bet that the computers of the future will be as different from today's machines as rockets from the high-wheeled bike.

Next month we'll take you inside a computer for a guided tour of ELFland. And we'll also show you an easy way to convert decimal to binary that's so simple you can do it in your head. (Who said you need a computer to compute?) Until then, may the ELFs be with you.

SOME BASIC TOKENS

OPERATOR	TOKEN NUMBER
FOR	129
NEXT	130
GOTO	137
IF	139
POKE	151
PRINT	153
GET	161
TO	164
THEN	167
PEEK	194
CHR$	199

HAVE YOU FLOWN YOUR C-64 TODAY?

Imagine yourself at the controls of a small, single-engine plane, 10,000 feet in the air, on your approach to the runway and safety. You're running low on fuel, but your instruments show that you're on the glide path, and lined up with the runway. It's a beautiful, sunny day, and you can see the airport in the distance, across the grassy fields. But the crosswind is tricky, and it will take all your skill to land safely. You're coming down now, and the runway is getting closer. A bit left, OK, now lower the power, fine, now put down the flaps. Pull the nose up a bit more, you're a little low. Watch the power! Don't stall. OK. Here comes the runway. You hear the squeal of tires on pavement, your pulse quickens, you're down, but watch it, you're pulling right! Brakes, brakes! Left more! You've stopped safely! Good job. The first real-time flight simulator for C-64 is now available from MMG Micro Software. There are four levels of difficulty, landings in clear or foggy weather, landings with or without instruments, and with or without the real-time view from the cockpit. **Final Flight!** requires a Commodore 64, 1 joy stick, and is offered on tape or disk for the same suggested retail price of $29.95

MMG

Final Flight! is available at your local dealer or direct from **MMG Micro Software**. Just send check or money order to P.O. Box 131, Marlboro, N.J. 07746 or for Mastercard, Visa, and C.O.D. deliveries call **(201) 431-3472**. Please add $3.00 for postage and handling. New Jersey residents add 6% sales tax. Also available for ATARI computers.

Getting Started With A Disk Drive

Part 3: More Disk Commands

Charles Brannon, Program Editor

More on the disk commands, and simplifying them with the DOS wedge.

Last month, we covered many aspects of disk use, from formatting a disk to LOADing, SAVEing, and VERIFYing BASIC programs. I suggest you get that back issue if you haven't seen it yet.

The disk drive, like your computer, has its own microprocessor and memory, which makes it a computer in its own right. This intelligence lets it perform many of the tasks that the computer itself performs on other personal computer systems.

This saves computer memory, since no program is required for essential operations (called the Disk Operating System, DOS). Also, since the disk drive has some independence, it can execute the command you send it, then let the host computer go on to some other task. This is *multitasking*: two microprocessors working together to perform separate tasks simultaneously.

All your VIC or 64 has to do is send an "English-like" command to the drive. As discussed last month, you first have to open up the lines of communication (a channel). This line:

```
OPEN 15,8,15
```

does that trick. The first number can be almost anything. It is just a *code number* that subsequent commands will use to identify this particular channel. The second number, 8, signifies the disk drive. Here is a list of device numbers for Commodore devices:

1 = Cassette
2 = RS-232 (modem)
3 = Screen
4 = Printer
5–7 = Expansion (other printers)
8 = Disk drive
9 = Another optional disk drive

The last number, 15, is the *secondary address*, also known as the command number. In our case, this number tells the disk drive that all input/output through this channel will be communication with the drive's command channel, rather than data to be read or written. We'll cover other uses of the secondary address when we get into reading and writing our own data files.

After we've OPENed our channel, we can send commands in BASIC with PRINT# (say, PRINT-file), or request information from the drive with INPUT# (you got it, INPUT-file). Last month, we tried out the NEW command that formats a disk (prepares it for storage). The form of NEW is:

```
PRINT#15,"N:disk name,ID"
```

Remember that the PRINT#15 will not work

SCRIPT 64

SCRIPT 64™ Makes Your World Letter Perfect

SCRIPT 64 moves you into the exclusive neighborhood of sophisticated word processing for an amazing $99.95.

In addition to all the standard text editing features most higher priced systems offer, SCRIPT 64 also gives you an 80 column format and a built-in spelling dictionary...all in one program for the Commodore 64™.

To make your world letter perfect, ask your dealer for a demonstration of SCRIPT 64 today.

Developed by:

RTC

Richvale Telecommunications, LTD.

A Product of:

Blue Sky Software
Ashland Office Center
Evesham & Alpha Avenues
Voorhees, NJ 08043
609-795-4025

Distributed by:

Warehouse 1, Inc.	Computer Marketing Services, Inc.	DES-Data Equipment Supply
Eastern U.S. 800-253-5330	800-222-0585	213-923-9361
Western 800-255-0056		

Also available for the IBM-PC.

Script 64, Commodore 64 and IBM-PC are registered trademarks of Richvale Co[illegible] Commodore Electronics Limited, and International Business Machines, Corp. respectively.

unless we've first OPENed file 15. If you don't OPEN a file, yet try to access it, you'll get the obvious:

```
?FILE NOT OPEN ERROR
```

Another possible error is:

```
?DEVICE NOT PRESENT ERROR
```

You'll usually get this if you don't have the device (disk drive, printer) turned on, attached, or "ready" (some printers have a "local" mode where you control it from its console rather than from the computer).

Here's another command that you'll use a lot. Everyone has files on his disk that he no longer needs. The files may be temporary files, obsolete, or even incorrect. You may also need to remove files from a disk to free up some room on the disk for a new file. The SCRATCH command allows this. Its format is:

```
PRINT#15,"S:filename"
```

Again, the command itself is inside the quotes. The PRINT#15 is just BASIC's way of sending a command. We'll cover another way to send commands with the DOS wedge a little later.

After you send the SCRATCH command, the drive goes to work and BASIC instantly comes back with READY, even though the disk is still spinning. This can be a little misleading. You cannot remove the disk yet—not while the red "busy light" shines and the disk motor is on. But you are free to use your computer for other tasks, such as LISTing a program on the screen.

If you try to send another disk command before the drive has finished SCRATCHing the file, the computer will "hang" while it waits for the drive to finish, then sends the command and returns READY. This process is known as "pipelining."

You can use the asterisk (*) wildcard with SCRATCH, but do be careful. For example,

```
PRINT#15,"S:ENERG*"
```

erases all files on the disk beginning with "ENERG" such as "ENERGY FILE", "ENERGY BASE", "ENERGIZE", etc. It will not remove a file called "SOLAR ENERGY". As you can tell, the asterisk is powerful but dangerous. If you sent:

```
PRINT#15,"S:*"
```

every single file on your disk would be SCRATCHed, quite a catastrophe if done by mistake. I generally do not use the asterisk with SCRATCH, just to be safe. If you're not sure what a file's name is, you can always LIST the directory with LOAD "$",8.

After you SCRATCH a file, it leaves a "hole" behind. If you had three files on a directory:

```
Ø "DEMO DISK        " QZ 2A
2    "TINSELTOES"       PRG
3    "SPACEFACE"        PRG
1    "SMELDGEOIDS"      PRG
658 BLOCKS FREE.
```

and SCRATCHed the middle one:

```
Ø "DEMO DISK        " QZ 2A
2    "TINSELTOES"       PRG
1    "SMELDGEOIDS"      PRG
661 BLOCKS FREE.
```

then there is an invisible gap left between what is now the first and second files. This can be confirmed by writing another file to the disk. Let's say you write a program:

```
10 INPUT "AMOUNT";A
20 PRINT "4% SALES TAX:";A*1.04
```

then SAVE it as "TAXCOMP". The directory would then look like this:

```
Ø "DEMO DISK        " QZ 2A
2    "TINSELTOES"       PRG
1    "TAXCOMP"          PRG
1    "SMELDGEOIDS"      PRG
66Ø BLOCKS FREE.
```

It's sometimes necessary to change the name of a file. Perhaps you've merely changed your mind, don't like the existing name, or want to use an existing filename for another file. The disk drive lets you RENAME a file.

```
PRINT#15,"R:new name=old name"
```

For example, to change the nondescript "GAME1" into "SPACE THIEF", use:

```
PRINT#15,"R:SPACE THIEF=GAME1"
```

This is one of the few commands that readily makes sense.

Another disk command is COPY. It lets you copy a file onto the same disk with a different filename. It can be used in this manner to make convenient backup copies of a file on the same disk. Another use is to move files. If you want to place another program at the top of the disk, for example, COPY the existing program to the disk with a different name, SCRATCH it (which leaves behind a "hole,") then RENAME it. Now you can SAVE the file you want at the top of the disk since it will fill the hole left by the SCRATCHed file.

COPY has a really strange syntax:

```
PRINT#15,"C0:new file=0:other file"
```

I've found you can shorten it to:

```
PRINT#15,"C:new file=other file"
```

In fact, RENAME was also shortened from "R0:NEWNAME=0:OLDNAME". The shorter

Last Year Over 20,000 Americans Were Committed To Asylum.

Once people enter *Asylum*, they don't *want* to leave. And neither will you.

Inside this thrilling adventure game from Screenplay™ challenges lie around every corner, behind every door. There are hundreds of doors, too!

You've gone crazy from playing too many adventure games. You've been placed in the asylum to act out your delusions. To cure yourself, you must make good your escape.

There's no one you can turn to for help. Almost every turn leads to a dead end. Or worse, vigilant guards stand in your way. If you can't outmuscle them, can you outthink them? Inmates line hallways offering help.

Asylum runs in 48K on the Atari, Commodore 64 and IBM PC computers. See your local software dealer. $29.95.

But can they be trusted?

While getting out of the asylum may take months, you'll get into our game instantly.

Smooth scrolling three dimensional graphics give you a very eerie sense of reality. This feeling is also heightened by the use of full sentence commands.

No wonder thousands of people bought *Asylum* last year, and *PC World* recently named *Asylum* one of the top ten games for the IBM PC.

Play *Asylum*. All you have to be committed to is fun.

screenplay

Box 3558, Chapel Hill NC 27514 800-334-5470

You could win $10,000 from Screenplay anywhere our games are sold.

form, with the drive number (0) deleted, works just fine:

```
PRINT#15,"R:NEWNAME=OLDNAME".
```

COPY cannot copy a file to a different disk or disk drive. It does have another use. You can use COPY to "glue" several files together under a different name. This merge operation is useful for combining two or more data files into one. Again, all the files have to be on the same disk. You can combine up to four files. The syntax here is trickier than ever:

```
PRINT#15,"C0:newfile=0:file1,0:file2,0:file3,0:file4"
```

The filename "newfile" (or whatever you call it) will be a merge of file1, file2, file3, and file4. Fortunately, you can shorten this command, too:

```
PRINT#15,"C:newfile=file1,:file2,:file3,:file4"
```

The drive number, again, was left out, since there is only one drive in the 1541 (as opposed to the earlier dual-drive 2040 and 4040 for CBM computers). If you only want to chain two files together:

```
PRINT#15,"C:newfile=file1,:file2"
```

Notice that the last file in the command need not have ",0" or "," added to the end. Fortunately, few people will ever need to use this variant of the COPY command.

By the way, some of you may be thinking that COPY would be a convenient way of merging two programs, such as a main program and a subroutine. Indeed, Commodore Disk BASIC 4.0 uses COPY for its APPEND command. But since COPY just tacks the files together, it leaves the "end of program" marker between the two files. When you LOAD the combined program and LIST or RUN, the computer sees only the first program, even though the second one is there, using memory. It is possible to remove the end of program marker, but the technique is not brief enough to include here (cheer up, Disk BASIC 4.0 can't do it either).

There are many other disk commands, but most of the rest will be useful only to programmers. We'll cover two of the more arcane ones, though: Validate and Initialize. The form of both commands is simple:

```
PRINT#15,"V"   for validate
PRINT#15,"I"   for initialize
```

What do these do? Initialize causes the disk light to shine, and the disk whirs, spins a bit, then quits. Validate will take quite awhile to finish, then will seemingly have done nothing when you look at the directory. To understand these two commands, we'll have to take a look at the BAM—the Bit Access Map (or Block Availability Map).

There are 683 blocks on one disk. Each block holds 256 bytes, giving you a potential 174,848 bytes of space.

(By the way, a sector size of 256 bytes would seem to indicate double density, since single-density drives use only 128 bytes per sector, so maybe you should buy double-density grade disks. On the other hand, the classification is usually reserved for drives with more than 35 tracks. Try several brands and grades of disks and see which works best for you.)

Somehow, the disk drive has to keep track of which blocks have been used for files, and which are available for future use. Were it not for this housekeeping, a new file could overwrite a previous one. The BAM is stored on the disk as a block of bits, where each bit (on/off, 1 or 0) specifies whether the sector in the corresponding position as the bit is allocated or not (the twelfth bit denotes sector 12). When a file is written, the sectors used are noted in the BAM. In fact, the last line of the directory: xxx BLOCKS FREE, is computed from the BAM.

DOS does not read the BAM every time it needs the information. Usually, DOS reads the BAM once, and stores it in its own memory. It will then update the BAM on the disk when it's done. If you change disks, however, the drive may get confused. It may try to write new files with the old BAM, then write the old BAM to the new disk. Scramble city! The old BAM may say that certain sectors are available, but they might not be on the new disk.

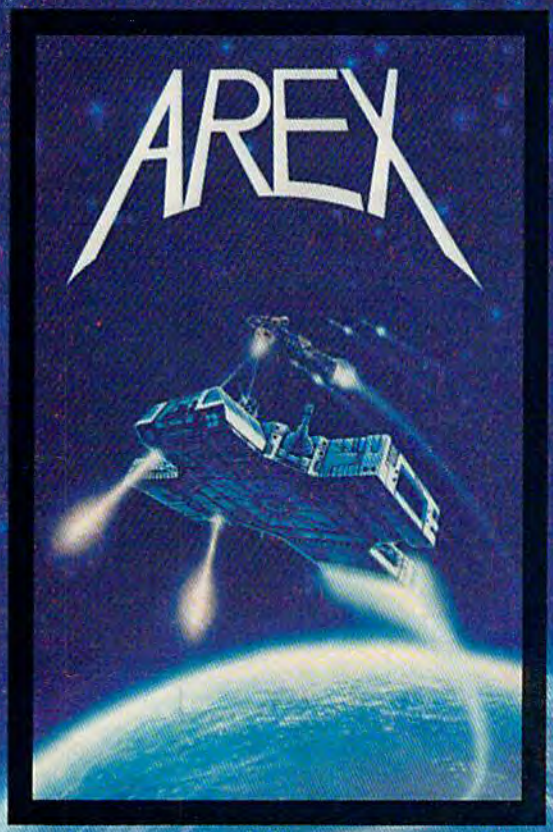
Fortunately, DOS checks the disk's ID before it tries to write a file, or change the BAM. The drive is helpless, however, if you have NEWed (formatted) both disks with the same ID. This is why it is vital that every disk have a unique ID number.

You can prevent this possible catastrophe with Initialize. Initialize forces the drive to read the BAM from the diskette. It also resets some other minor DOS variables. Some people revere Initialize with religious fanaticism, refusing to write to a disk without the ritual of OPEN 1,8,15,"I" (yes, you can send a command via the filename in OPEN).

In practice, it can't hurt. In fact, sometimes the disk head will find itself in an intermediate position between tracks, usually when jostled. The disk can't figure out where it is, since it can't read its signposts which were put on the disk during formatting. You can set the disk straight with an Initialize, which tells it to "go home." (Home is track 18, where the BAM and directory are stored.)

Validate is more useful. It reconstructs the entire BAM by tracing each file on the directory, noting which sectors are used. After it's traced

BECOME AN INTREPID SPACE ADVENTURER . . .



by William Muk
CoCo version by Roger Schrag
Apple version by Gordon Eastman
Atari and Commodore 64 version by John Anderson

Far beyond the known galaxies, you venture deep into the vast reaches of outer space. But you are not alone! In a flash, without so much as a how-do-ya-do, they're in hot pursuit and you're left to do before you're done unto. **Can** you elude your pursuers? **Will** you elude your pursuers? And who ***are*** these guys anyway? Find the answers to these and other compelling questions in AREX. See your dealer today!

AREX . . . Coin-op arcade realism at home for 1 to 2 players.

AREX

APPLE 48K DISK	042-0172	$34.95
ATARI 16K TAPE	160-0172	$34.95
ATARI 16K DISK	162-0172	$34.95
CoCo 16K TAPE	060-0172	$34.95
COMMODORE 64	160-0172	$34.95
COMMODORE 64	162-0172	$34.95
IBM 64K DISK	132-0172	$34.95
TRS-80 16K TAPE Model 1 & 3	010-0172	$34.95
TRS-80 32K DISK Model 1 & 3	012-0172	$34.95

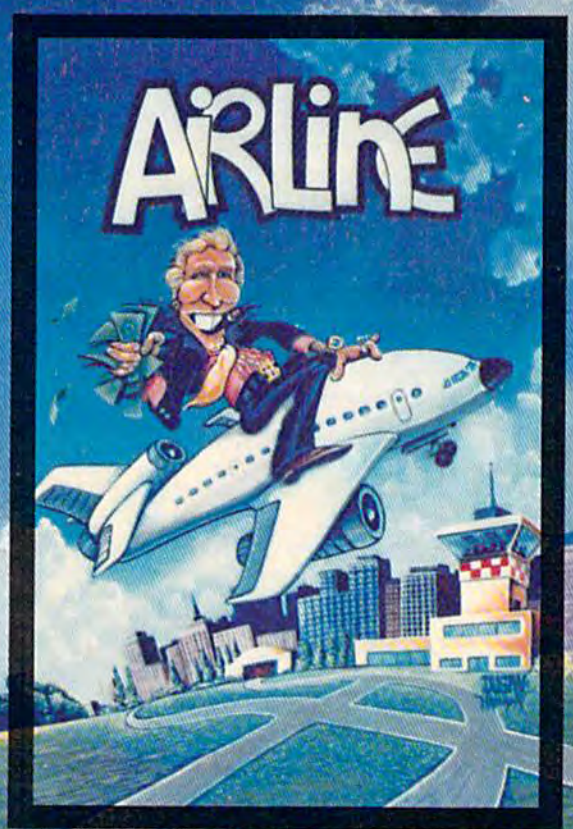
. . . OR FLY HIGH IN THE WORLD OF HIGH FINANCE

by George Schwenk
TRS-80 version by Dave Simmons
CoCo version by Roger Schrag

"Yas, after purchasing diamond mines in South Africa, oil wells in Saudi, and rare beer cans in Walla Walla, Washington, I had begun to wonder what other trendy commodities remained to be added to my swelling portfolio. Then a snip of a ticket girl dared to tell me (ME, Hartley J. Wormsflather III!) that my flight was overbooked. To avoid future misunderstandings, I bought the airline."

"I think I'm on to something profitable here." Hartley J. Wormsflather III

AIRLINE . . . A no-holds-barred strategy game for 1 to 4 players.



AIRLINE

ATARI 400 & 800 / CoCo / Model 1 & 3 16K TAPE . .	140-0169	$24.95

Published by

Adventure INTERNATIONAL

a subsidiary of Scott Adams, Inc.
BOX 3435 • LONGWOOD, FL 32750 • (305) 862-6917
Prices Subject To Change Without Notice

To order, see your local dealer. If he does not have the program, then call (800) 327-7172 (in Florida (305) 862-6917) or write for our free catalog. DEALER INQUIRIES ARE INVITED!

through all the files, it can then rewrite the newly created BAM to the disk. This can sometimes give you more blocks free on the directory.

Some error or discrepancy in DOS occasionally causes it to misallocate sectors. It may fail to free up blocks, or, rarely, fail to allocate them. These accumulated bit errors can add up to a lot of wasted disk space over time, since the disk won't write to an allocated sector. Validate finds out the truth, so you can sometimes free up disk space unexpectedly.

It's worrisome when this happens, though, since it proves that DOS has made minor errors. If DOS failed to allocate a sector, then that sector could be used by another file, destroying the original file.

Another bug seems to be related to BAM. When you load one program yet get another, the pointers on the disk which identify the starting sector of each file have become switched or garbled. This problem is also accompanied by sectors of the original file which have become overwritten, so there is no way to recover. This problem happens most often with frequently used disks or those which are full. It can also happen when you forget to use the "0:" prefix when SAVEing to disk (SAVE "0:program",8).

Validate can sometimes clear up these confused disks. It can also aggravate it, since the directory from which Validate computes the BAM may be incorrect itself.

You may be tired of always having to OPEN 15,8,15 to send a command. And no one likes having to SAVE your program before you LOAD "$",8 to LIST the directory. Well, Commodore hears you. It has thoughtfully provided a convenient shortcut for using the disk drive from BASIC. Just insert your TEST/DEMO disk and LOAD "C-64 WEDGE",8 or LOAD "VIC-20 WEDGE",8 and RUN. The program will then LOAD the actual wedge program (which is in machine language) and execute it.

The wedge adds a few single-key commands to BASIC. You can use these commands only in the immediate (READY) mode, not in a program. First, let's display the directory. Enter:

```
@$
```

Magically, the directory scrolls by on the screen. You can hold down CTRL to slow it down, or press SPACE to freeze it. Press SPACE again to continue. And when it's finished, you still have your program in memory. Most useful.

You can also send any of the disk commands we've mentioned. Just replace the PRINT#15, with @. For example:

```
PRINT#15,"R:newname=oldname"
```

would be:

```
@R:newname=oldname
```

Remember the small one-line program from last month that will read the error message if the red light is blinking?

```
10 OPEN 15,8,15:INPUT#15,EN,EM$:PRINT
   EN;EM$:CLOSE15:END
```

Quite a lot just to read the error message. The wedge makes this trivial. Just enter the @ and hit RETURN, without sending a command. If there is no error, you'll see:

```
00, OK,00,00
```

Otherwise, you'll see something such as:

```
63, FILE EXISTS,00,00
```

For a complete list and description of DOS error messages, see Appendix B in your disk drive manual.

With the wedge, you should never have to remember to add ",8" to the end of a LOAD or SAVE. Instead, two single-key commands, / (divide-by, on ? key) and the back-arrow (upper-left corner), give you single-key LOAD and SAVE. To LOAD a program, enter:

```
/program
```

If you would like to LOAD and RUN in one step, use the up-arrow:

```
↑program
```

SAVEing is easy with:

```
← 0:program
```

If the file exists on the disk already, you may want to SCRATCH it first, or use @0: in place of 0: (called Save with Replace).

There's another convenience, too: You don't have to enter the filename. Just list the directory with @$, then stop it (RUN/STOP) when you see the name you want. Move the cursor up to the directory and just type the / or ↑ in the first column, and hit RETURN. The wedge will ignore the quotes, spaces, and extraneous "PRG" business, and go to work.

One more wedge command: the % replaces LOAD "name",8,1. This is known as a *nonrelocatable* load. You would use the % key to LOAD machine language programs:

```
%UNNEW
```

It has an advantage over using BASIC's LOAD command. It will not change the end-of-variables pointer. What this means is that you won't get an ?OUT OF MEMORY ERROR after you use it. You can therefore use it to LOAD machine language without disturbing a BASIC program in memory.

Since the DOS wedge "wedges" into BASIC,

DECK THE HALLS

and your VIC 20

with ARCADE - STYLE games from MICRODIGITAL !

available NOW for Commodore 64

SNAKMAN

WATCH OUT!

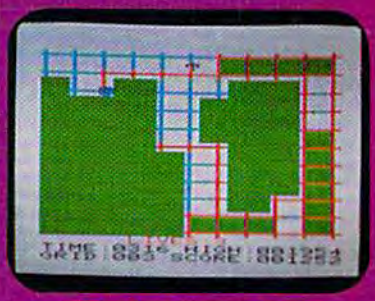
Your mission, should you decide to accept it, is to capture tokens and keep a sharp eye peeled for the gremlins that are chasing you. A fast, action-packed maze-and-chase game with high-resolution graphics and excitement-building sound.

available NOW for Commodore 64

GRIDDER

EXCITING! JOYSTICK-CRUNCHING!

A new generation of grid game with super color graphics and arcade - like sound. You are a lonely little painter who must completely paint increasingly complex grids before the nasty grid chasers catch you! There are 256 different grids to challenge you.



available NOW for Commodore 64

SKRAMBLE!

THRILLING! FANTASTIC!

A space game filled with exciting graphics and life-like sound! You've got to land your galactic fighter craft beyond the defenses of a hostile enemy while lasering and bombing through tunnels, caverns, and a city maze, and outmaneuvering rockets, wiggies, and meteor showers.

available SOON for Commodore 64

PINBALL WIZARD

JUST LIKE THE REAL THING!

An action-packed pinball game featuring 1 or 2 players, realistic gravity, flippers, high-resolution graphics, and super pinball sounds. You pull the plunger, flip the flippers, light the lights, and rack up the points. But watch out, you can TILT!

FAST and SMOOTH! Programmed in machine language!

FREE VIC 20/64 POCKET Reference Guide
Send SASE to TECH2

See your local retailer today or call MICRODIGITAL toll free at 1-800-833-7384 or in NY 716-872-0518.
TECH2 SOFTWARE, INC. • P.O. Box 1110 • Webster, NY 14580. Dealer inquiries invited.

it can make some programs RUN more slowly. If you want the wedge out of your way, just enter @Q (for Quit).

It's not easy to make a copy of the 64 version of the wedge, since it is in machine language. You should first SAVE the boot program "C-64 WEDGE" found on the demo disk, then type in and RUN the program accompanying this article, "Wedgemaker." It will SAVE the wedge from memory, so be sure you've already LOADed in the wedge from your demo/utility disk.

We've covered just about all the essential information this month. Remember that you can use many of these commands from applications such as word processors, too. Next month, we'll further our exploration by reading and writing our own data files. Until then, try out all the commands with a scratch disk until you get the hang of them.

Wedgemaker

```
10 REM 64 WEDGEMAKER                    :rem 139
20 OPEN1,8,1,"0:DOS 5.1"                :rem 218
30 POKE780,253:POKE253,0:POKE254,192:POKE
   781,90:POKE782,207:SYS65496          :rem 214
40 CLOSE1:END                            :rem 28
```

SHOOT THE WORKS with an ARROW™

Have you been spending too much time with your VIC? If it's because you are always waiting for your programs to load, Skyles Electric Works can help.

Enter the Arrow.

This cartridge can load programs off cassette at about eight times the normal speed. It can re-record a program *once* at up to eight times the density on tape. This means that you can get 200 kbytes of programs on a single C-20 tape. In the long run, you'll be able to put 10 tapes into one. The Arrow cartridge will pay for itself in the tape and the vast amount of leading time it saves.

And it's easy to use.

ARROW . . . . . adds 4 commands: ←S, ←L, ←V, and ←A that are used to SAVE, LOAD, VERIFY AND APPEND at a *high speed* (3600 baud).

ARROW . . . . . leaves the usual messages that appear on the screen.

ARROW . . . . . adds a message telling you the length of the program that has been loaded (or saved).

ARROW . . . . . keeps all of the usual shorthand fea'ures of program naming.

ARROW . . . . . starts automatically when you turn on your VIC-20 or CBM-64.

It gives the length of the program that it has loaded or saved. It can handle hexadecimal/decimal calculations: it even has a machine language monitor in it. Bull's-eye!

And advanced programmers can get an optional machine language assembler in the same cartridge. Even though it speeds up program loading it does not effect the tape recorder. It's an *extremely* reliable device.

If you want lightning fast cassette operations, shoot for the Arrow.

But this great device does more than cut down on loading time and tape space. It is a fine programmer's aid, too. With some sharp but simple program text editing commands, the Arrow might be the best bargain around in personal software for your VIC. The Arrow is always on target with auto line numbering and line deleting features.

ARROW . . . . . adds the following programming aids:

AUTOLINE numbering
RENUMBERING of lines
DELETE a line or group of lines
SEARCH with optional replace
MOVE a block of memory
COMPARE two blocks of memory
HEXADECIMAL/DECIMAL calculator converter
XIT two machine language monitor with: Display, Go, Register, Save, Load and Exit commands

Only $49.95 for the VIC or Commodore 64 version. The high-speed cartridge with machine language assembler costs just $89.95. And the easy-to-use Arrow comes with the clear Skyles manual.

AR20 (VIC-20), AR64 (CBM-64) $49.95
ARAS20 (VIC-20), ARAS64 (CBM-64) . 89.95

For CBM-64 and VIC owners only:

This is just 1 of 20 pages of the newest and biggest Skyles catalog, hot off the press.

We know you'll want this page, in its full 7¼ x 9 splendor, and another 19 pages of peripherals, software and books that will make your CBM-64 or VIC computer even nicer to live with. So, if we missed sending you your very own copy within the last few weeks, call us at **(800) 227-9998 (unless you live in California, in which case call (415) 965-1735.**

From Skyles Electric Works, the oldest and largest professional specialists in the business.

Skyles Electric Works
231-E S. Whisman Road
Mountain View, California 94041

Marion Taylor

The Programmer Behind *Touch Typing Tutor*

Kathy Yakal, Editorial Assistant

It's much harder to use a computer if you don't know how to type. Judging from the number of typing tutorials available these days, and the success of many of them, lots of people are learning to type for the first time on their home computer keyboards. Here's a look at the programmer behind one of the best-selling typing programs available for the Commodore 64 and VIC-20.

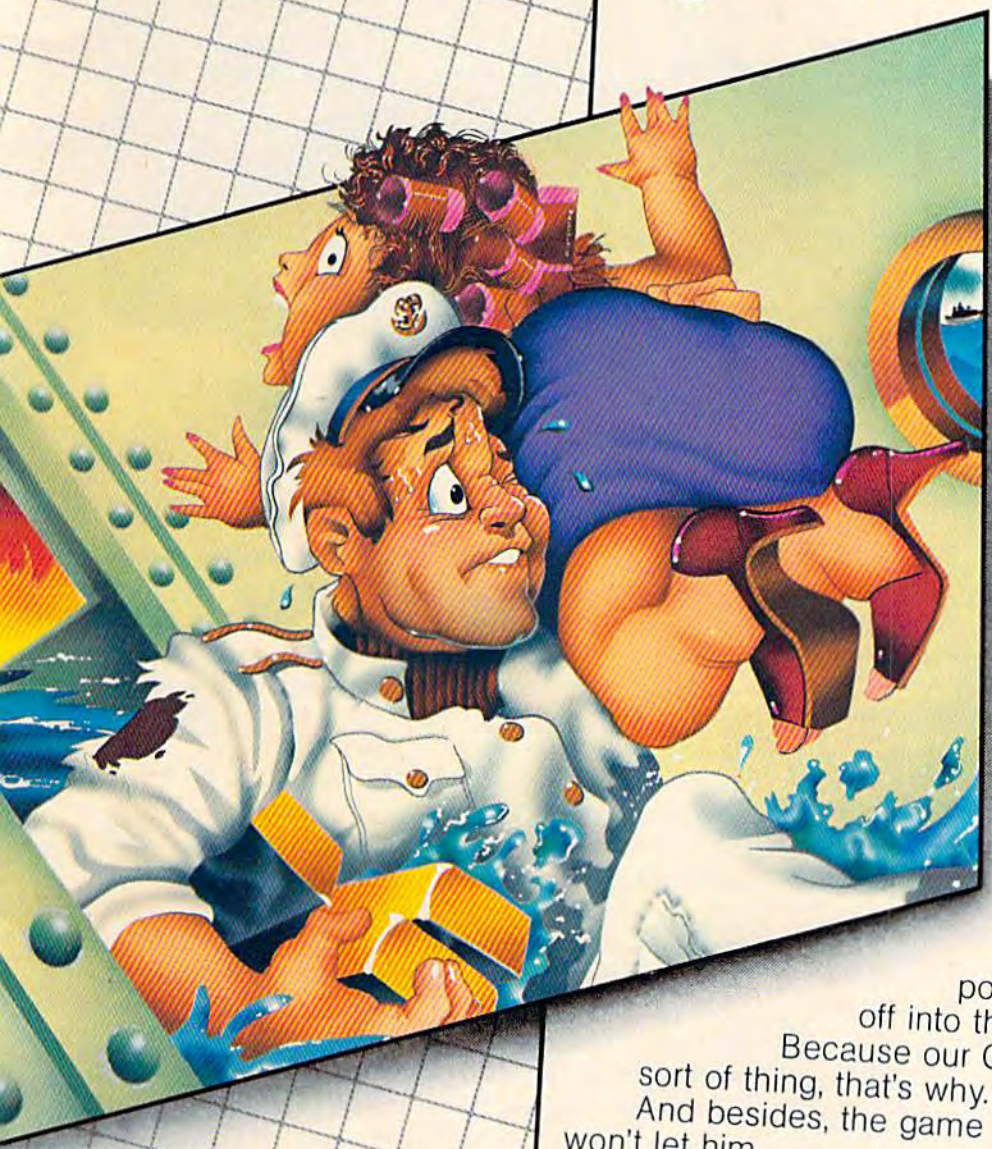
Marion Taylor, of Taylormade Software, displays several of her programs. (Photo by Humbarto Ramirez, Lincoln Journal-Star.*)*

The programmer is a woman. And she's been gainfully employed as a computer programmer for 28 years.

Those two facts make this month's subject of "Inside View" a bit unusual. "I'm old enough to be the mother of lots of these people who are programming best sellers, and the grandmother of some of the kids that are using the programs," says Marion Taylor of Taylormade Software, the programmer behind *Touch Typing Tutor.*

That's not the only thing that sets Taylor apart from the usual software author, who is typically a male under 30 years old. She's also a one-woman show. She works out of her home in Lincoln, Nebraska, and runs all aspects of her company: product development, marketing, and, of course, programming all of the products herself. That's becoming very unique in these days of rapidly expanding software companies and increasingly divided labor in the software industry.

Your ship has just come in.



Aboard the S.S. Slipshod, things are getting a little out of hand.

It seems that the navigator mistook an iceberg for Pittsburgh. With predictable results.

Soon, every stateroom on the ship will have an ocean view.

But never fear, 'cause Captain Clutch is here.

He'll stoke the boilers to keep the game afloat, lead the passengers to the lifeboats and rescue a few bars of gold along the way.

Why, you ask, doesn't the courageous Captain simply pocket the gold and row off into the sunset?

Because our Captain is above that sort of thing, that's why.

And besides, the game won't let him.

By the way, how long can you tread water?

Developed by Steve Morris.
Available on diskette
for your Commodore 64™

WATERLINE!

Ultrix™

8295 South La Cienega Blvd.
Inglewood, CA 90301 (213) 215-0529

Scientific Background

Taylor was graduated with a mathematics degree from Pomona College in California and started her programming career on the first-generation vacuum tube computers. "That was before the days of computer classes," she says. "The company that hired you also trained you.

"Those first computers were not able to perform both scientific and business functions. The next generation was able to, but that was still prior to the days of high-level languages [such as BASIC]. Basically, you could only perform one run a day of a given program."

Due to her husband's job with the military and her own changing career, Taylor moved around the country quite a bit, living and working in a total of six states. She worked for places like Westinghouse, the University of Wisconsin, and the Livermore Radiation Lab.

Shifting Gears

Then came a move to Lincoln, Nebraska, a job at the University of Nebraska, and the introduction of microcomputers. Taylor bought an Apple in 1979 and started writing programs on it in her leisure time.

But what started as a leisure-time hobby turned into a full-time obsession. "I found I couldn't work eight or nine hours a day, raise a family, and do all the programming I wanted to do on micros," Taylor says. "I decided to devote my work time to micros. That's where all the fun and creativity is."

Taylor didn't start out by programming games, as many programmers do. "I wanted to write programs that had lasting value. That led me to educational programming."

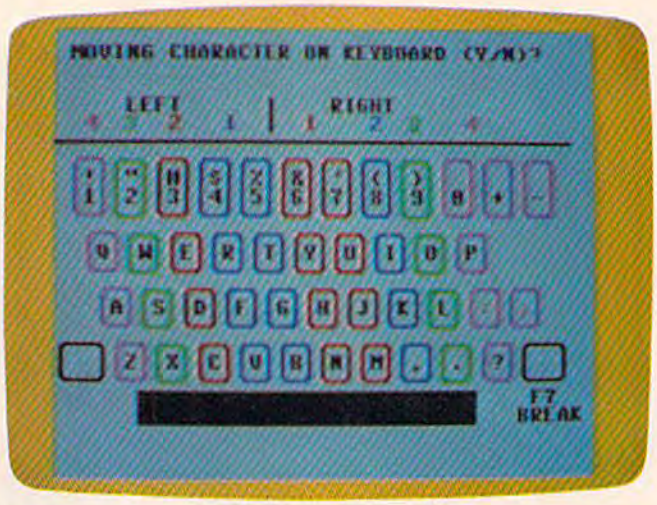
When the VIC-20 was introduced in 1981, Taylor switched her focus from Apple to Commodore because she liked its features, and because its low price made it very accessible to people. Then came the Commodore 64 and even more programming capability.

More Than Fun

So what makes a good educational program?

"First," says Taylor, "it has to be educationally sound. It has to have lasting value—it can't be so simple that it can be done in 15 minutes. The writer of the program has to be familiar enough with school methods so the children aren't confused." This, she says, can be something as simple as using an asterisk in place of the multiplication sign in a mathematical program. If children are not familiar with BASIC programming, they don't know what that means.

An educational program must also go beyond what a child can read in a book. "Micros have the potential to teach concepts in a more concrete way than books," she says.



Marion Taylor's Touch Typing Tutor.

Realizing that her sons had learned fractions in grade school but still didn't really understand them was an eyeopener for Taylor, and it led her to write another of her many programs, *Fun Fractions*. "I try to achieve a good balance between drill and instruction in what I write. That way, children can better understand what they're learning."

The graphics and sound capabilities of micros greatly enhance the educational process, says Taylor. She cites turtle graphics as an example of good educational software. "Children enjoy moving the turtle around the screen to build things, but they're really learning about loops, arrays, and other higher-level programming tools.

"But the fun aspect of a program is only one element of educational programs. Some of the programs on the market today deal only with that aspect and slight the educational side."

What's Next?

The volatile nature of the microcomputer industry today makes it difficult to do long-range planning, Taylor believes. "I'm always planning new programs, because that's what I like to do. But it's difficult to predict very far into the future as far as what specific programs I'll be doing."

And though she admits that right now she's a bit of a shock to people, being an old hand at programming and a woman, Taylor expects to see more of that in the future. "People have always said that boys are better at math and science than girls. They learn better hand-eye coordination from an early age because of the types of things that they are encouraged to do. Having computer training in the schools from an early age will change that." @

This Christmas, Atari and Commodore* owners will go out of their minds.

It'll take about 30 seconds.

Because once you boot a Datamost game on your Atari home computer, or your Commodore 64, you'll come face to screen with the most mind-blasting games ever.

And what better time to go out of your mind than Christmas?

Our Music Will Have You Hearing Things.

Going out of your mind never sounded so good.

Because now our games have music. You heard right. Music. Original Music. Throughout. And scored just for our newest releases. You'll go nuts over it.

Our Graphics Will Have You Seeing Things.

You and everybody else.

Because our games are so great-how great are they?-they're so great you'll want to play them again and again and again. And then your friends will go bonkers over them.

THE TAIL OF BETA LYRAE.™ Changes as you play. Unpredictable. Impossible to master. (No one has!)

And they'll want to play. And then your family will want to play. And then total strangers off the street will want to play and...

Mind-blowing arcade-quality action like this makes it one mad world, pal.

We'll Torment You Right From The Start.

No time to settle down and get comfy.

The tension begins building the moment you boot the game.

Terrific screen titles tease you with the game's objective, scenario, characters.

And while you wait, hand twitching over the Joystick, you'll find out what planet you're on.

What the fuss is all about.

Why you're involved. And perhaps of singular importance to you personally, how to keep from being obliterated. So get ready to get the most out of your mind.

By getting the most out of ours.

DATAMOST™ INC

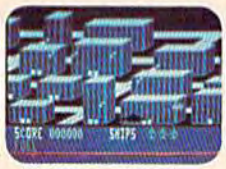
The most out of our minds.™

Datamost, Inc., 8943 Fullbright Ave., Chatsworth, CA 91311, (213) 709-1202

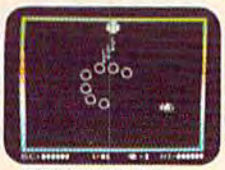
Atari is a trademark of Atari Computer. *Commodore 64 is a trademark of Commodore Business Machines, Inc. TM Registered Trademark of Datamost.

COSMIC TUNNELS.™ Four games in one. Four times the challenge! Incredible graphics.

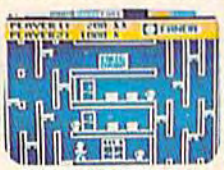
MONSTER SMASH.™ Deathly strategy. Mash the monsters! Let the visitors live.



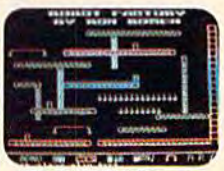
NIGHTRAIDERS.™ Strafe a city under siege with 3D angled selective firing!



ROUNDABOUT.™ Sharpens your shoot 'em up skills. 24 different game screens. Habit-forming!



COHEN'S TOWERS.™ You're the mailboy in a big city skyscraper. Work your way to the top.



MR. ROBOT.™ Screens scream with color, action and sound! Design your own screens, too.

Cave-In For VIC

Paul L. Bupp and Stephen P. Drop

"Cave-In" is an excellent three-dimensional maze game which uses a screen-flipping technique to swap screen displays. The game requires a joystick and runs on the unexpanded VIC-20.

When you play "Cave-In," you become the newly appointed foreman of a mining operation. After completing your initial inspection, you believe that a cave-in is imminent. You realize that you must explore every tunnel to find and rescue all of the miners.

Taking into consideration your unfamiliarity with the mine, you decide to make a map of the shafts as you travel.

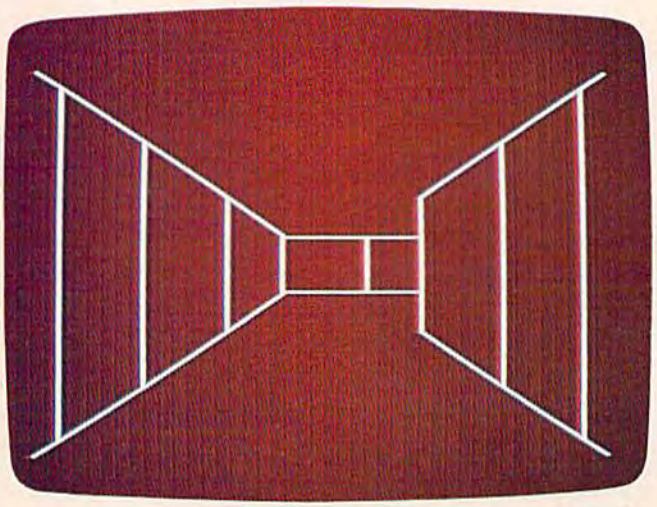
To refer to your map, push the fire button on the joystick. Push it again and you return to the mine. The dark circle on the map is where you started and must return to escape the mine safely.

Just as you expected, no sooner do you find the last miner and warn him of the danger than the cave-in begins. Now you have to get out before the falling rock traps you. Aren't you glad you made the map? (In the advanced game, however, you lose the map after the cave-in starts, so you must rely on your memory to recall the maze-like passages.)

Other Game Controls

You may view instructions at any time by pressing the f1 special function key. However, once you see the instructions, you face a fresh maze upon returning to the game. To travel through the tunnels, change directions by moving the joystick right or left, and then move forward by pushing the stick forward.

Observe some precautions when typing this program. First, it requires using the Commodore key at the lower left of the keyboard. Some of the graphics symbols must be typed while this key is held down (like the SHIFT key) to correctly print the characters needed to build the maze. Second, each line must be entered exactly as printed, without extra spaces to fit into memory. This program uses all but about 15 of the 3583 available memory locations. The program will *not* run correctly with any memory expansion boards. Third, you will probably need to abbreviate some keywords to enter a few of the lines in the program, such as line 52. See your manual for legal keyword abbreviations.



Peering down an underground corridor in "Cave-In."

If you have difficulty entering the game successfully, or if you prefer not to type the program, just send a blank cassette, self-addressed stamped mailer, and $3 to:

Paul L. Bupp
21724 124th Ave. SE
Kent, WA 98031

See program listing on page 198.

THE HOTTEST NEW GAMES FOR YOUR VIC 20® ARE FROM TYMAC®

Light up your VIC 20 with these hot new games. Arcade style action right in your living room. Exciting, challenging ways to get more fun out of your computer. Buy these cartridges now from your favorite computer products retailer.

Limited Time Offer: Send proof-of-purchase of any two of these games and $49.95 and receive TYMAC's EXPAND-O-RAM, a $119.00 retail value. EXPAND-O-RAM gives you two switchable cartridge slots and 16K of additional memory. See details inside each package.

TYMAC

TYMAC INCORPORATED
127 MAIN STREET
FRANKLIN, NJ 07416
201 827-4050

Hardhat Climber

Chris Lesher

"Hardhat Climber" is one of the best games we've seen for the unexpanded VIC-20 and is an excellent example of what can be accomplished with BASIC. We've included an adaptation for the Commodore 64.

You are standing at the bottom of four levels of girders, connected by ladders. At the top is a pile of 12 barrels and scattered along the girders are toolboxes. The object of "Hardhat Climber" is to walk around the girders and pick up every toolbox while avoiding the barrels that roll down at you. If you pick up all of the toolboxes you are rewarded bonus points, and you move on to a more difficult screen.

I wrote the VIC-20 version of Hardhat Climber almost entirely in BASIC, with only a short machine language routine to check the joystick. Using the stick, you can move the climber up, down, left, and right along the girders and ladders. Pressing the fire button makes your climber jump in the direction he was last moving. He can jump over barrels and holes in the girders.

Scoring

You score 150 points for every toolbox you pick up, 1000 points for jumping over a barrel, and 100 points for each barrel remaining after you have picked up all the toolboxes. The score is displayed in the upper-left corner of the screen. The number of the screen is displayed in the upper-right corner. The number of climbers you have left is displayed between the score and screen number.

You begin the game with three climbers and earn an extra one every 10,000 points. A climber is lost if he is hit by a barrel, walks off a girder, or has not picked up all the toolboxes by the time all 12 barrels have rolled off the pile. The game ends when you lose your last climber.

Many program lines in the VIC version are longer than the maximum limit of 88 characters. They must be entered by abbreviating the keywords and omitting the space between the line number and first keyword. The abbreviations may be found in the manual that came with the computer. If there is an error in any of these lines, the entire line must be retyped using the abbreviations again. Also be sure to save the program

If you've ever dreamed of playing the pro-tour golf circuit on the world's finest courses...

Or fantasized about getting ringside seats to all the championship fights in history...

Or drooled over the prospect of managing the best pro baseball teams of all time...

We've just answered all your hopes and wishes!

And SSI's 14-day "satisfaction or your money back" guarantee makes sure our games will help make your dreams of sports glory come true. In fact, the only way they won't is if you don't hurry to your nearest computer/software or game store and get these fine strategy sports games today.

For the APPLE® and COMMODORE 64™:

These games ($39.95 each) come on mini floppy disk for the APPLE® II with Applesoft ROM Card, Apple II Plus, Apple IIe, or Apple III.

Also on disk for the Commodore 64.™

Apple is a registered trademark of Apple Computer Inc.

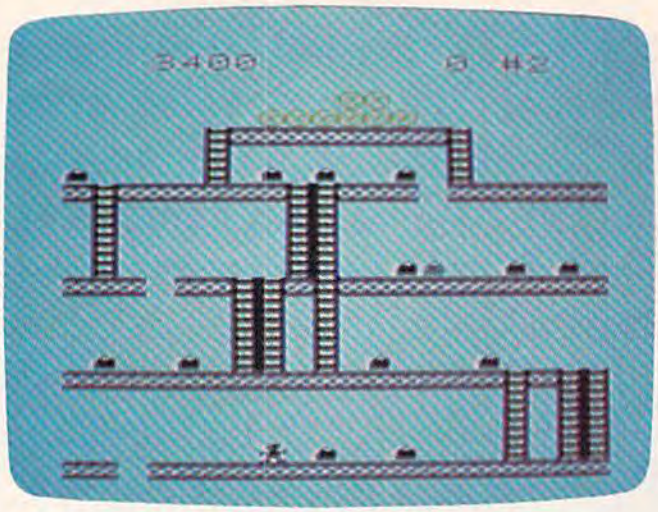
Commodore 64 is a trademark of Commodore Electronics, Ltd.

SSI

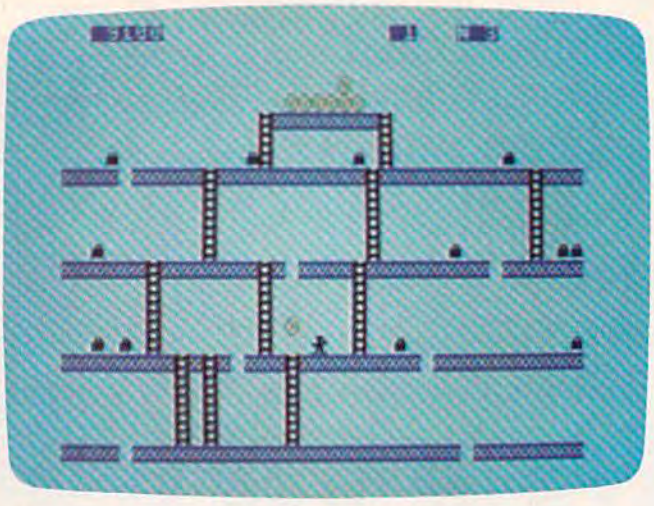
STRATEGIC SIMULATIONS INC

If there are no convenient stores near you, VISA & Mastercard holders can order direct by calling **800-227-1617, ext. 335 (toll free).** In California, call 800-772-3545, ext. 335. To order by mail, send your check to: Strategic Simulations Inc, 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043. (California residents, add 6.5% sales tax.) Please specify computer format.

WRITE FOR A FREE COLOR CATALOG OF ALL OUR GAMES



Collecting toolboxes on the first floor in a VIC game of "Hardhat Climber."



A falling barrel narrowly misses the player on the second floor (64 version).

before running it in case there is a mistake in the machine language in lines 106-108. If any of the numbers in these lines are mistyped, you could lose the program.

The VIC version lines, which are especially long, include lines 37, 56, 71, 73, 77, 81, 101, 102, 106, 107, and 108. Remember when you enter these lines with abbreviations while using the "Automatic Proofreader," the checksum number will not match up. (See "Simple Answers To Common Questions" in this issue.)

See program listings on page 195.

AARDVARK *Action Software*

PRESENTS. . .

ZEUS

WITHOUT QUESTION, ABSOLUTELY —

The Fastest

ARCADE STYLE GAME

AVAILABLE, THAT WE KNOW OF.

FAST AND FURIOUS. You become the wizard fighting off the thunderbolts of an angry Zeus. Multiple action. Are you good enough to keep up as the difficulty increases wave after wave. Hours of challenging fun. This is one game you may never completely master.

AVAILABLE ON: TRS-80C(16K), CMD 64, VIC 20(13K)
STOCK #1007 TAPE:$24.95 DISK: $29.95

PYRAMID... Our toughest and most intrigueing adventure. Average time though the pyramid is 50-70 hours. Clues everywhere and some very ingenious problems. This one is popular around the world.

AVAILABLE ON: TRS-80C (16K) CMD 64
VIC 20 (13K) TIMEX/SINCLAIR TI/99-4A
STOCK #5002 TAPE: $19.95 DISK $24.95

DUNGEONS OF DEATH. . . A serious D & D type game for you up to 6 players at a time. You get a choice of race and character, on screen mapping of the maze, a chance to grow from game to game, and a 15 page manual. Requires extended basic on TRS-80C.

AVAILABLE ON: TRS-80C(16K), CMD 64, VIC 20(13K), TRS-80C 32K DISC
STOCK #7001 TAPE: $19.95 DISK: $24.95

QUEST. . . A different kind of adventure. Played on a computer generated map of Alesia. You lead a small band of exployers on a mission to conquer the Citadel of Moorlock. Takes 2-5 hours to play and is completely different each time.

AVAILABLE ON: TRS-80C(16K) CMD 64
VIC 20(13K) TIMEX/SINCLAIR TI99/4A, EXTENDED BASIC REQUIRED ON TI
STOCK # 7007 TAPE: $19.95 DISK: $24.95

Quest is also available on TRS-80C as a 32K extra memory, extra fun adventure. It's a little more difficult, and will test the most experienced explorer of the kingdom.

STOCK #7006 TAPE: $24.95 DISK: $29.95

AARDVARK *Action Software*

IS AVAILABLE AT SOFTWARE RETAILERS EVERYWHERE. IF YOUR LOCAL COMPUTER OR SOFTWARE STORE DOES NOT CARRY IT — ASK THEM WHY NOT. SEND ONE DOLLAR FOR ILLUSTRATED CATALOG. DEALER INQUIRES INVITED.

HOURS OF FUN AND ENJOYMENT FROM THE "ADVENTURE PLACE"

TO ORDER: SEND AMOUNT INDICATED PLUS $2.00 SHIPPING, PER ORDER. INCLUDE STOCK NUMBER, QUANTITY DESIRED AND YOUR PREFERENCE OF TAPE OR DISK. BE SURE TO INDICATE TYPE OF SYSTEM, AMOUNT OF MEMORY, ETC. WHEN USING CHARGE CARD TO ORDER BY MAIL, BE SURE TO INCLUDE EXPIRATION DATE.

master charge **CHARGE CARDS WELCOME** VISA

1-800-624-4327

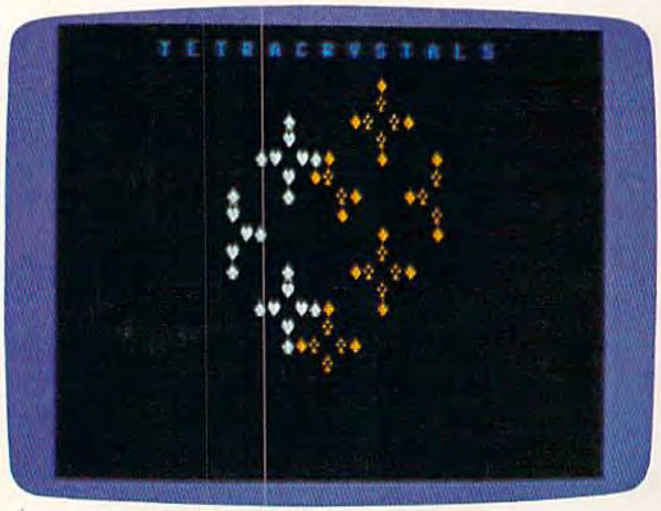
PHONE ORDERS ACCEPTED
8:00 A.M. TO 8:00 P.M. E.S.T. MON-FRI

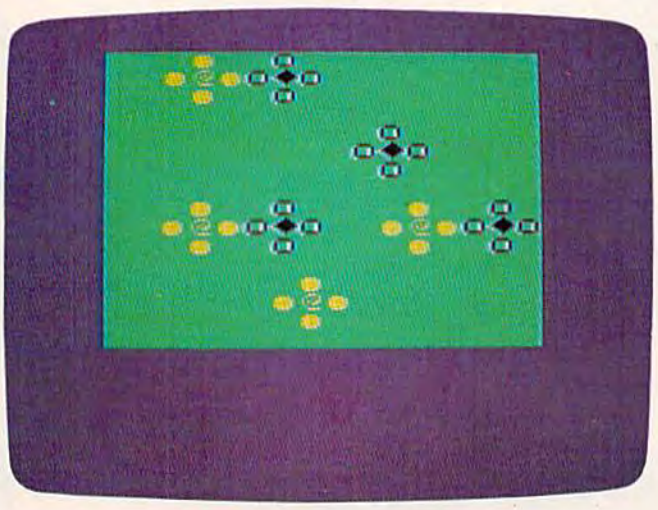
AARDVARK *Action Software*

2352 S. COMMERCE RD. WALLED LAKE, MI 48088 313/669-[illegible]

Tetracrystals Of Veluria

Todd Heimarck





This nonviolent, noncompetitive game for the unexpanded VIC-20 and Commodore 64 produces fascinating patterns of colorful crystals. It also incorporates some advanced programming techniques, including page-flipping, a very smooth method of animation.

The Story

The prospectors have failed. They searched every inch of the Velurian asteroid belt and discovered no minerals of commercial value, except for a strange type of ice crystal. These "tetracrystals" grow into large crystals when dropped in water and exposed to sunlight.

Crystal Growth

There are two ways the tetracrystals can grow. First, each one goes through four stages of growth: seed, monad, tetrad, and shell. After the fourth stage, the shell collapses and melts into plain water.

Second, a tetrad always tries to sprout four new seed-crystals at right angles to the tetrad. These seed-crystals draw energy from the tetrad (which is why it becomes a shell), and then go through the four stages of growth. When the seeds grow into tetrads, they sprout new seeds, and so on.

Limits To Growth

The new seeds will grow only if they have space, sunlight, and water. That means there are three limits to growth. First, a seed needs space to grow, so it cannot be put into a space that is already occupied. If a tetrad is right next to another crystal (in any stage), it will not plant a seed in that space. The other three seeds can still grow, unless they are affected by the limits on growth.

Second, a seed needs energy (sunlight) to grow. Tetrads and shells cast shadows that block

NEW EXCITEMENT FOR COMMODORE 64*

J-Bird™

Hop into excitement with J-Bird! As you rush to change the color of your 3-D pyramid of blocks you have to avoid the critters that are out to make a meal of you. You're going to love the exciting sound and animation of J-BIRD. There are magic balls, jumping frogs, frisky cats, coily snakes and a host of other obstacles out to do you in.

SPECIAL FEATURES INCLUDE: incredible graphics and sound; sound on/off option; two player option; joy- stick or keyboard operation; multiple difficulty levels; high scores saved on disk and cassette. These features make J-BIRD enjoyable for everyone.

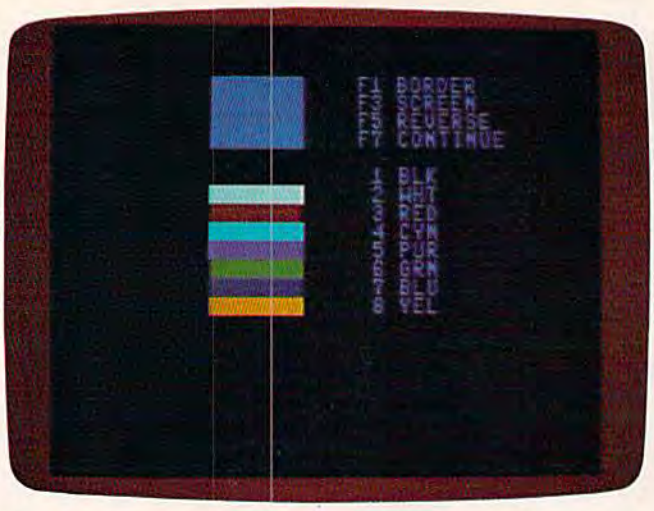
Ask for J-BIRD at your local computer store.

ORION SOFTWARE

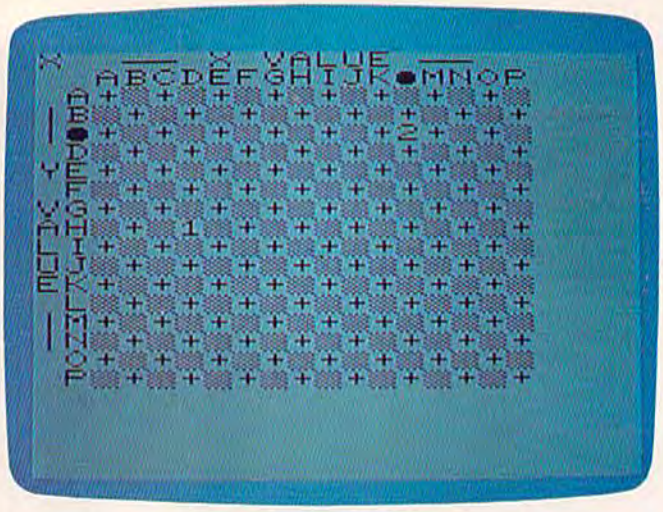
*COMMODORE 64 is a registered trademark of Commodore Electronics Limited.

For your nearest dealer, or to order direct call: **1-800-821-8088.**

To order by mail send $29.95 for J-BIRD to: ORION SOFTWARE, P.O. BOX 2488, Dept. 1283, Auburn, Alabama 36831.



The opening screen in "Tetracrystals" lets you choose your own screen/border color combination (Commodore 64 version; VIC similar).

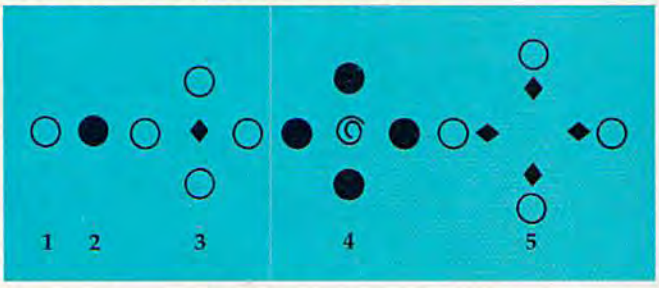


After selecting the speed and character set, you plant different kinds of crystals on a grid (VIC version; 64 similar).

sunlight from new seeds. A seed will not grow in a space right next to a tetrad or shell. This rule takes care of the problem of two tetrads trying to put seeds into the same space.

Third, a seed will grow only in water. A tetrad on the edge of the 16 × 16 grid cannot put seeds outside of the border (because there is no water there).

How A Crystal Grows



The seed-crystal in stage 1 becomes a monad in stage 2 and a tetrad in stage 3. In stage 3 it sprouts four new seeds, which then go through the stages. Note that in stage 5, the shell has disappeared and only four new seeds were generated by the four tetrads. That is because of the limits on growth. They are not allowed to put seeds in a space that is next to another tetrad or shell. All four of the tetrads tried to put a new seed in the center and all failed.

Tetracrystals is simple enough to play with paper and pencil, but you would have to erase and draw over and over again. Using the computer is quicker and easier.

How To Play

When the game first starts, you see eight color bars. You can change the screen color with the function keys:

f1 changes the color of the border.

f3 changes the color of the screen.

f5 switches "reverse" (inverse video) on and off.

f7 starts the game, after you have chosen the colors.

Before you press f7, notice which colors show up on the screen you pick. If you plant crystals that are the same color as the screen, they will grow, but they will be invisible.

Next you pick the speed. Zero, the lowest number, yields the fastest game. Then choose a character set (1, 2, 3, or 4); I prefer number 1.

Finally, you plant the crystals. In the upper-left corner of the screen you will see a prompt (X, Y, P, or C). Choose an X-coordinate (A through P), a Y-coordinate (A through P), plant the crystal (1 for a seed, 2 for a monad), and choose the color (type a number between 1 and 8; the color is the same as the color printed on the key).

Up until the point when you choose the color, you can cancel your choices by pressing f1. When you are ready to start the game, press f7.

Options During The Game

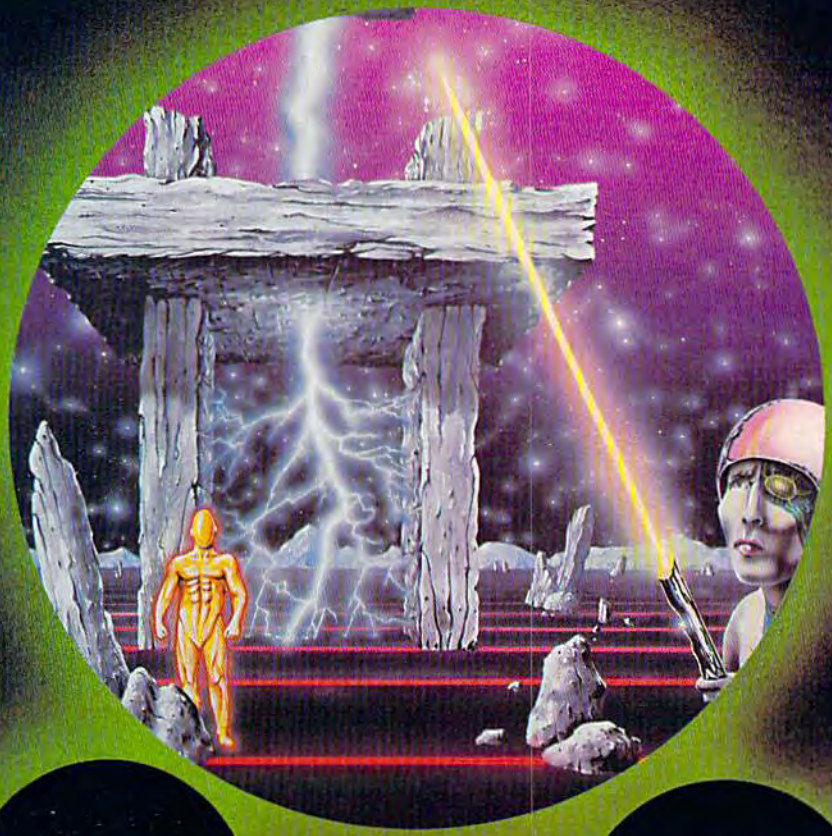
Seven of the function keys allow you to control growth during the game. The f1, f3, f5, and f7 keys (unSHIFTed) control the amount of sunlight that reaches the crystals. Press f7 twice to reduce the light (all growth will stop). After you freeze the picture (with f7), you can watch the growth step by step by pressing f7. If you want to go back to continuous growth, f1 restores the game to normal. The f3 key slows the growth and f5 speeds it up. If the growth is very fast, press f3 and a number from 1 to 9. The higher the number, the slower the growth. Press f5 (plus a number) to speed up the growth.

The f2 and f4 keys throw more seeds onto the field. The f2 key gives you a random-colored seed

Sophisticated Software from Britain.

FREE UNIVERSE WITH EVERY TAPE*

*OFFER SUBJECT TO AVAILABILITY



AQUAPLANE
COMMODORE 64 SOFTWARE

Ski thru' Marine Maniacs, G&Ts, Regattas but beware the Great White Hungry!! AQUAPLANE is an unbelievable original Arcade Game.

PURPLE TURTLES
COMMODORE 64 SOFTWARE

A fully animated arcade game with Loveable Turtles, Cuddly Graphics and more Cuteness than you'll find in any other Commodore 64 game! A game for the young at heart and people who have tired of alien bashing.

QUINTIC WARRIOR
COMMODORE 64 SOFTWARE

Part Man, Part Superman the QUINTIC WARRIOR stands along against the sinister Crabmen and a Domed City gone mad in the distant future. Are you warrior enough to stand by his side in this MEGA- Arcade Game.

RING OF POWER
COMMODORE 64 SOFTWARE

The Colorful King has lost his mind and along with it the Crown Jewels! Now whosoever can find the Jewels shall be proclaimed King. Can you? RING OF POWER is a sophisticated adventure with a GRAPHICS or TEXT option.

TIMEX-SINCLAIR 1000, 1500 and 2000 and ACORN ELECTRON.

Send for Advanced Information on our new Timex-Sinclair and Electron Range.

SKYHAWK
VIC20 SOFTWARE

Attacking raiders scream out of the sky at you, you check your radar as an explosion blossoms at your side, you return their fire sending one of the attackers plummetting, the fuel gauge flashes a low fuel warning... SKYHAWK runs in 3K or 8K with a Joystick.

TORNADO
VIC20 SOFTWARE

Suddenly attacking Colony Fighters leap at me, I dive into their midst firing and still bombing the ground installations below, the sound of explosions rumbles away over the landscape... TORNADO runs on an unexpanded VIC20 + Joystick.

QS™

THE GAME LORDS OF BRITAIN

QUICKSILVA INC.
426 West Nakoma
San Antonio, TX 78216
Tel: (512) 340 3684

Please send me a free color catalog
I currently own or plan to buy a ..... computer
I enclose a stamped, self-addressd envelope
Name .....
No/Street .....
City .....
State .....
Zip .....

at a random location. Press f4 (and a number from 1 to 8) and you will get a seed the same color as what is printed on the number key, planted randomly on the screen.

The f6 key stops the game and returns you to the beginning. "Tetracrystals of Veluria" uses part of memory for machine language routines, so if you want to stop playing altogether, it is a good idea to turn your computer off and then on again before you load another program.

To recap:

f1 continues the game (after f7 step by step).

f3 slows the growth (type 1–9 to continue).

f5 speeds up growth (type 1–9 to continue).

f7 allows step-by-step growth.

f2 plants a random-colored seed at a random location.

f4 plants a seed at a random location (choose the color with 1–8).

f6 starts a new game.

Strategies

Tetracrystals is a simple game. You can plant two types of crystals, up to eight different colors. There are two rules for growth and three limits on growth. Most children will understand how it works.

But like Reversi (also known as Othello), simple rules hide the many subtleties of play. The more you play it, the more interesting variations you discover.

There are no rules for winning or losing. I originally wrote Tetracrystals as a nonviolent, noncompetitive game.

If you don't like games without competition or winners and losers, you can make up variations. You and a friend can choose two different colors and plant crystals around the screen. If one color takes over the screen, that player wins. In some cases—if you start with symmetrical positions, for example—neither color will take over the screen and you would have to call it a tie game.

If you plant just one seed, it will spread to take over about half the screen, and then (because of the limits on growth) it will disappear. It is a good idea to start with at least two crystals.

In the reverse video option, the crystals leave behind traces of where they have been.

For some reason, crystals that start near the edges have a slightly better chance of surviving (remember this if you decide to play competitively). And usually, if you plant seeds *and* monads, one or the other will take over the screen; they don't coexist very well. Imagine the 16 × 16 grid as a chessboard, with alternating black and white squares, because it will make a difference if your starting positions are all on the same color squares or on opposite colors.

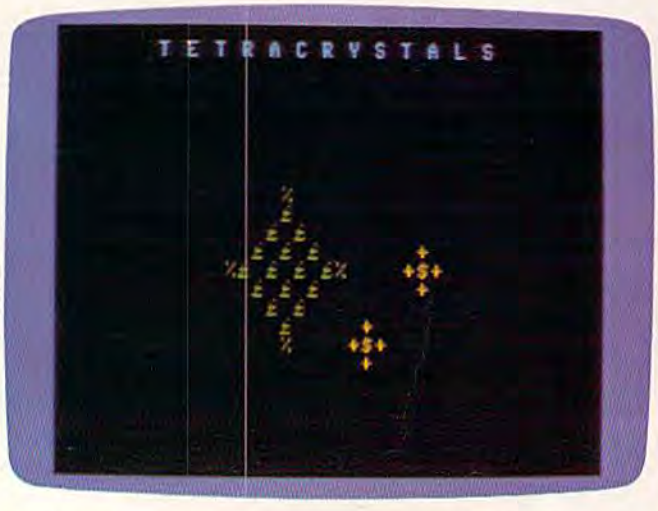
You can also try the sandwich maneuver. If you plant a seed somewhere on the grid and then plant seeds of different colors, one right above and one right below, I think you'll be surprised at the results. The crystal in the middle will usually crowd out the other two crystals.

Special Typing Instructions

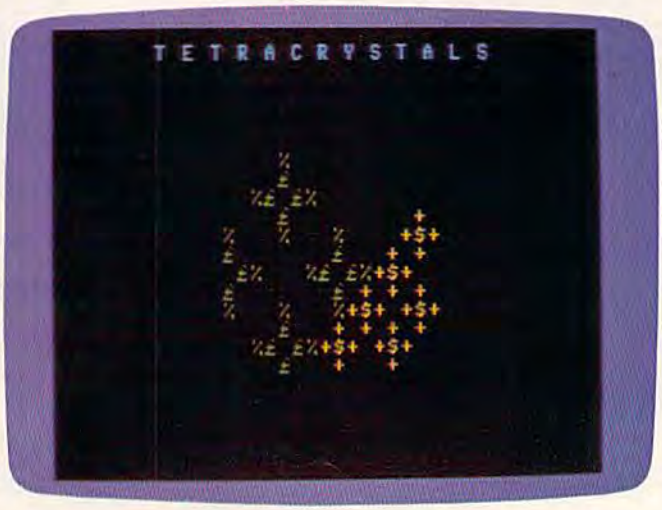
The VIC version of Tetracrystals needs two programs to run, and you must enter them in the correct order. Program 2 (the one with all the DATA statements) contains the machine language routines. Program 1 will not run without them.

Follow this procedure for the VIC version (note the minor program changes for disk below):

1. Type in Program 1 first, *but do not RUN*. Instead, SAVE it on tape or disk. If you're using tape, I recommend saving Program 1 as the first program on a fresh cassette. For tape, use the filename "CRYSTALS T1/JAN". For disk, use the

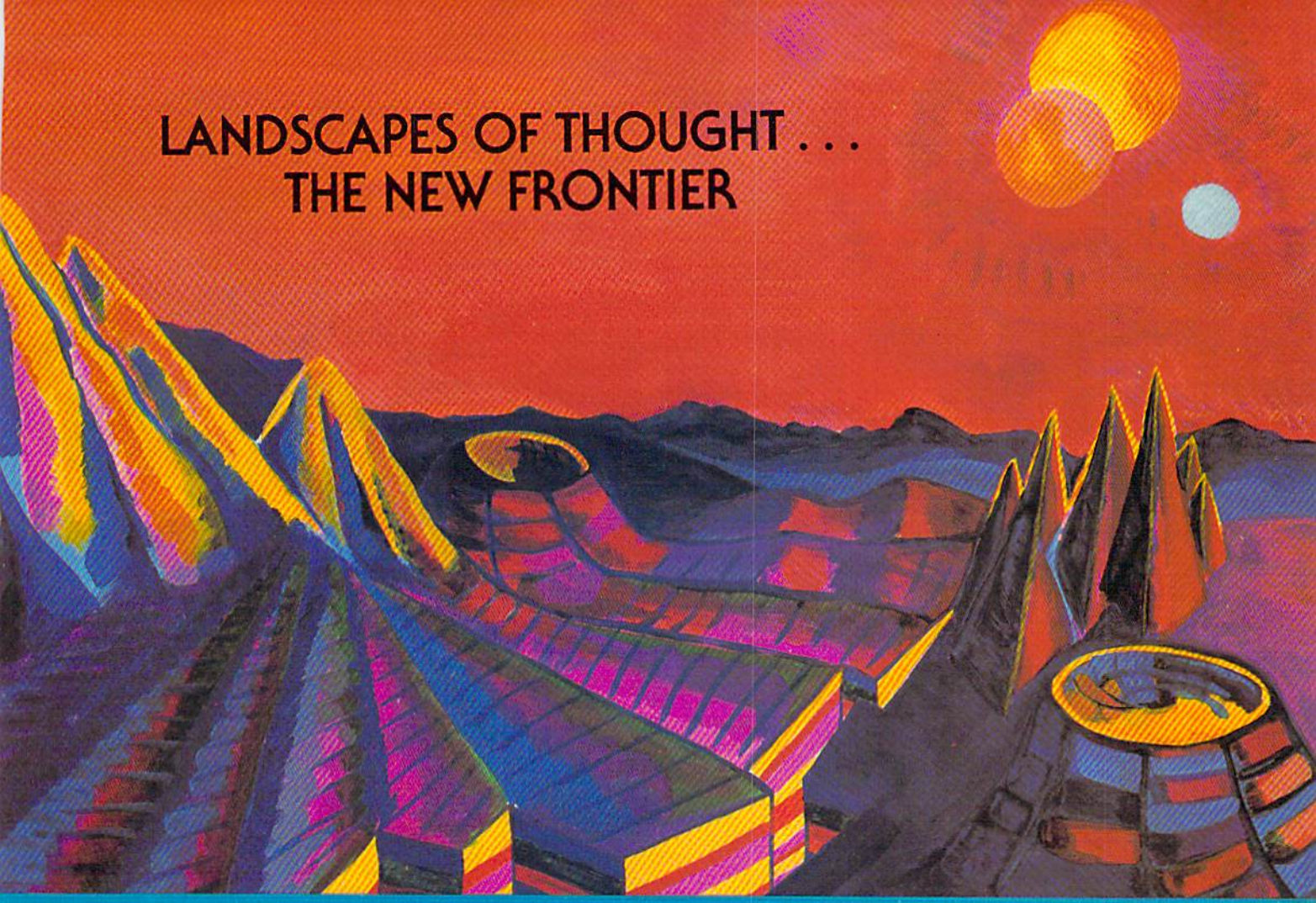


Crystals of various colors begin growing and interacting, as seen in these Commodore 64 screens...



...sometimes overlapping and crowding out other crystals.

LANDSCAPES OF THOUGHT . . .
THE NEW FRONTIER



TRI MICRO

INTERNATIONAL TRI MICRO

Software Designed to be Your Partner in Exploration

Tri Micro Software is your gateway to the new realms opened by personal computers. As the gate opens, experience a quantum leap in mind power:

- where you navigate through new channels of communication
- where you experience art through graphics
- where you can increase your daily productivity through financial management tools, list processing, and text editing
- where your thoughts integrate with the computer's speed in fast moving games and strategy solving.

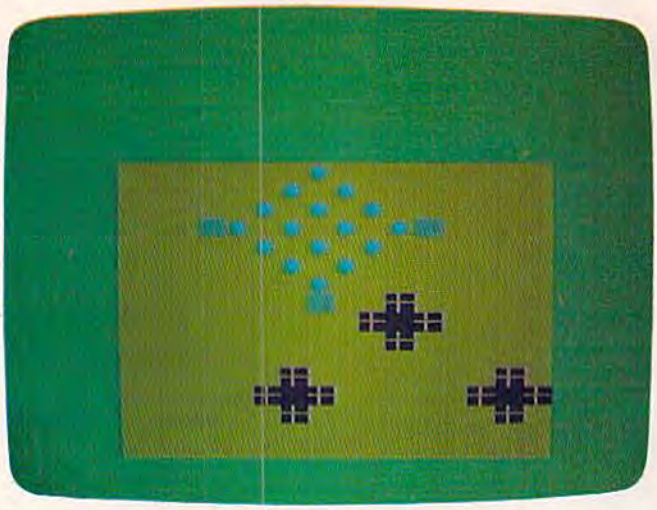
Encounter a host of other strange landscapes only dimly understood before.

TAKE THE INITIAL STEP . . THE TRI MICRO CHALLENGE

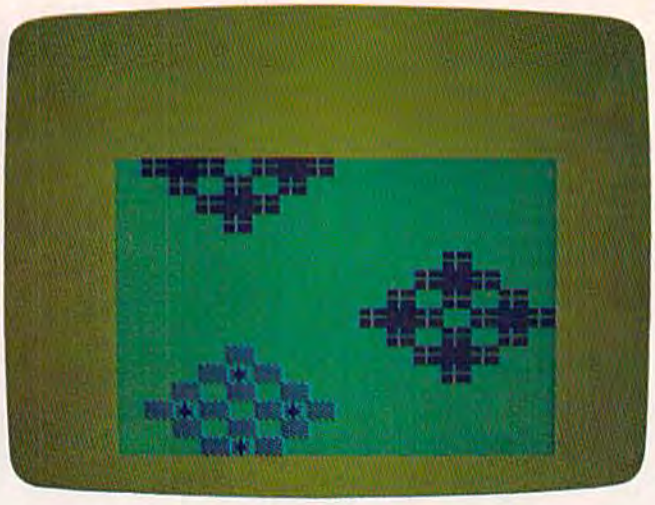
904 West Cypress Drive
Arlington Heights, IL 60005
(312) 394-2322

4122 E. Chapman, Suite 30
Orange, CA 92669
(714) 771-4038

901 Summit Hill Dr.
[illegible]
(615) 522-4824



Crystals divide and multiply in these VIC screens...



...forming larger crystals, and occasionally dominating all the space around them.

filename "CRYSTALS D1/JAN". Do not rewind the tape after saving.

2. Type NEW and press RETURN.

3. Type in Program 2. *Do not SAVE it yet.* Contrary to standard procedures, Program 2 should be RUN before it is SAVEd. When you type RUN, Program 2 first checks itself for typing errors and warns you of any mistyped DATA statements. If the DATA statements are entered correctly, the program waits for you to press a key to continue. Before continuing, make sure the tape or disk with Program 1 is in the cassette recorder or disk drive. With cassette, make sure the tape is positioned just past Program 1 (which is where it will be if you left it alone after SAVEing Program 1). Now, when you press a key to continue, Program 2 will begin creating a data file on your tape or disk. Program 2 automatically names the data file "CRYSTALS T3/JAN" for tape or "CRYSTALS D3/JAN" for disk. If you're using cassette, you will notice the tape stopping and starting by itself as the data file is created. This is normal. Do not press the STOP button on the recorder until the data file is finished and the screen says READY.

4. When the screen says READY, the data file is created. Now is the time to SAVE Program 2. Use the filename "CRYSTALS T2/JAN" for tape or "CRYSTALS D2/JAN" for disk. You won't need Program 2 again unless you want to create another data file, perhaps for backup.

5. Finally the game is prepared. To play, LOAD and RUN Program 1 (filename "CRYSTALS T1/JAN" or "CRYSTALS D1/JAN"). When you type RUN and press RETURN, Program 1 automatically begins reading the data file created by Program 2. (That's why it's so important to make sure the data file immediately follows Program 1 if you're using tape.) As the data file loads, you'll see numbers appearing on the screen. This is normal. When all the data is read by Program 1, the game begins.

If you press the RUN/STOP key while playing and want to restart the game, don't type RUN, because the program will look for the data file again. Instead, type RUN 13 (which starts running the program at line 13).

One more caution: Tetracrystals takes up almost all of the available memory in the VIC; there will be only a few bytes left. *It is vital to type in the programs exactly as listed.* Don't add any extra spaces. If your VIC gives you an ?OUT OF MEMORY error after the data file is read by Program 1, you can safely delete line 10 and lines 5000–5100 to play the game. Once these lines put the machine language into memory, you don't need them anymore (but don't SAVE the program after doing this).

Modifications For Disk

The 64 version works on either tape or disk. But the VIC programs, as listed, are designed for tape. A few minor changes need to be made for disk.

In Program 1, change line 5000 to:

```
5000 OPEN1,8,0,"CRYSTALS D3/JAN"
```

(This change tells the computer to read the data file from disk instead of tape.)

In Program 2, change these lines:

```
35 PRINT"GET DATA DISK READY[3 SPACES]HIT
   A KEY TO CONTINUE
40 OPEN1,8,1,"0:CRYSTALS D3/JAN"
```

(Line 35 alters the prompt to read "DATA DISK" instead of "DATA TAPE". Notice there is no closing quote on the PRINT statement; closing quotes are optional in Commodore BASIC, and leaving it off saves one byte of memory. Line 40 tells the computer to create a data file on disk

instead of tape, with the appropriate filename expected by line 5000 in Program 1.)

Page-Flipping

The animation here is not the usual erase-and-draw method.

In most games, when you want a character to move, you tell the computer where the character currently is and where it should be next. The computer erases the old character and then draws it at the new location. If the screen is full, you can see the changes being made, from the top-left corner to the bottom right.

Page-flipping is a much smoother method of animation.

I got the idea from "Alternate Screens" by Jim Butterfield in *COMPUTE!'s First Book Of VIC*.

Normally an unexpanded VIC uses two pages of memory (7680 to 8191) for screen memory. Memory location 648 is a pointer that tells the VIC where to find the screen. By POKEing 648 with a different number, you can change the location of screen memory.

In Tetracrystals, one screen is visible, the other hidden. While you are watching one screen, the computer is drawing the next picture on the hidden screen. When the new picture is ready, a couple of POKEs (lines 1100 and 1120) make the new picture visible. Then, while that screen is up, the next one is being drawn on the hidden screen.

How The Program Works—VIC Version

Line 10 protects the memory for the second screen and the machine language instructions. It jumps to subroutine 5000, which reads the ML instructions from tape.

Lines 13–20 set variables.

Line 60 jumps to subroutine 1100, which restores the screen to the normal location (beginning at 7680).

Line 100 jumps to subroutine 8200 (which sets the screen to the usual colors and restores it to a 22 × 23 size), then subroutine 6000 (which sets up the new screen color).

Lines 160–197 set up the speed and character set.

Lines 255–395 plant the crystals on the screen.

Lines 510–795 are the heart of the program—where the crystals grow. First there are three SYSes to ML routines. Since the visible screen has been cut down to 16 × 16 (256 bytes) and there are 512 available for each screen, that means there are 256 bytes below each screen. This is what I call the "shadow screen." The first SYS clears the shadow screen of the hidden screen. The second SYS controls the direct growth (seed to monad, monad to tetrad, and so on). The third SYS grows the brand-new seeds. Then BASIC takes over. The program goes through a delay loop (with the counter HF, for "How Fast") and checks for keyboard input. If one of the function keys has been pressed, it takes care of what needs to be done. Then, if the CP flag has been set, it stops until it gets the "step-by-step" instruction. Subroutine 1000 changes the random (but melodic) music. The last two SYSes translate from the shadow screen to the not-now-visible screen and to color memory. Finally, subroutine 1100 flips the screen memory to the other screen.

See program listings on page 191.

Look at these Features

- Fully screen-oriented
- Horizontal and vertical scrolling
- Terminal mode — never seen before on a wordprocessor
- Supports Commodore disk and cassette handling
- Imbedded commands

Bliztext

Wordprocessor for Commodore 64

BLIZTEXT is a trademark of ELCOMP PUBLISHING, INC.

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

Dealer and Distributor inquiries are invited.

BLIZTEXT – SUPER WORDPROCESSOR for the Commodore-64
– ON SALE NOW! –

- Fully screen-oriented, up/down, left and right scrolling – Upper and lower case
- More than 70 commands
- Full I/O compatibility with Commodore peripherals Upper and lower case
- Works with practically every printer on the market, user definable printer control commands
- INCLUDE command allows handling large files on up to 4 diskettes or on cassette.
- Build in terminal software for electronic mail and networking. Telecommunications mode, upload and download, save on disk or cassette.
- Dynamic formatting, Imbedded commands
- Single keystroke for disk directory and error channel
- Program comes on disk or cassette
- Double line spacing, left and right margin justification, centering, page numbering, and practically everything one expects from a good wordprocessor.

AVAILABLE NOW!

Order # 4965 $89.00
Manual only (62 pages) $29.95

MACROFIRE – Editor/Assembler for the Commodore-64
ON SALE NOW
AVAILABLE IMMEDIATELY

One outstanding tool, consisting of 3 powerful elements combined into one efficient program!

1.) Fully screen-oriented Editor (more than 70 commands)
2.) Very fast assembler with macro capability
3.) Machine Language Monitor

Assembly can be started from the editor. Translates in 3 passes. More than 1,000 lables, screen oriented/no line numbers, scrolling, includes disk files.
Practically everything the serious machine language programmer needs everyday!

Manual only $19.95
Order # 4963 $89.00

THE GREAT BOOK OF GAMES, VOL.I, by Franz Ende
46 programs for the Commodore 64
Introduction to graphics and sound. How to program your own games. Walking pictures, animation, high resolution graphics, programming tips and tricks, hints and useful subroutines for the beginner and advanced programmer. This book is a MUST for every C-64 owner. Come and get it – It's yours for only $ 9.95
Order # 182 128 pages $9.95
Programs from the book on disk.
Order # 4988 $19.95

MORE ON THE SIXTYFOUR, by H.-C. Wagner
How to get the most out of your powerful Commodore 64. Very important subroutines, tricks and hints in machine language for your C-64. How to modify DOS. How to connect a parallel and serial printer. How to design your own terminal program for communication and networking. Dig into I/O for cassette and disk.
Order # 183 $9.95
Programs from the book on disk
Order # 4989 $19.95

NEW PRODUCTS

Watch out for our new books, software and add-ons to come soon. ON SALE NOW! -- ORDER TODAY!

How to program in 6502 Machine Language on your C-64 , by S. Roberts (Introduction)
Order-# 184 $12.95

Commodore-64 Tune-up, Vol. I, by S. Roberts
How to expand and customize your C-64.
Order # 185 $12.95

Small Business Programs for the Commodore-64 by S. Roberts
How to make money using your C-64. Mailing list, invoice writing, inventory, simple wordprocessing and much more.
Order # 186 $12.95

Hardware Add-Ons:

Parallel printer interface KIT	Order # 4990	$ 19.95
Direct Connect Modem KIT	Order # 4991	Ask f.price
Universal Experimenter Board	Order # 4970	$ 9.95
Expansion Board, space for four experimenter boards(board only)	Order # 4992	$ 29.95

For your VIC-20

Tricks for VICs $ 9.95
Universal Experimenter board

HOFACKER

PAYMENT: check, money order, VISA, MASTER CARD, Eurocheck, ACCESS, Interbank
Prepaid orders add $3.50 for shipping (USA)
$5.00 handling for C.O.D.
All orders outside USA: add 15 % shipping, California residents add 6.5 % sales tax.

ELCOMP PUBLISHING, INC
53 Redrock Lane
Pomona, CA 91766
Phone: (714) 623 8314
Telex: 29 81 91

ELCOMP PUBLISHING, INC.
53 Redrock Lane
Pomona, CA 91766
USA
Phone: (714) 623-8314
Telex: 29 81 91

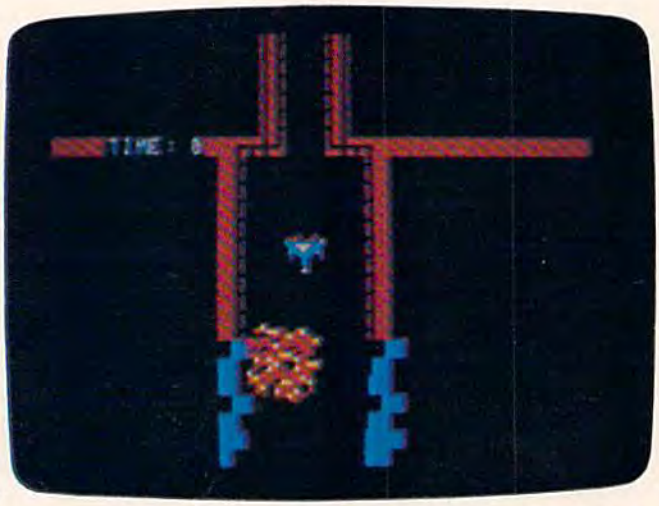
ELCOMP Computer (S) Pte. Ltd.
89 Short Street
Unit 03-07, Golden Wall Auto Centre
SINGAPORE 0718
Phone: 3382623, 3388228
Telex: 56516

Ing.W. Hofacker GmbH
Tegernseerstr. 18
D-8150 Holzkirchen
Phone: 08024 / 73 31

Canyon Cruiser

Thomas Catsburg

Originally written for the Commodore 64, "Canyon Cruiser" has been adapted for the unexpanded VIC-20 as well. The game works with either keyboard controls or a joystick.



A multicolored asteroid approaches the player's spaceship in "Canyon Cruiser" (64 version).

Commodore 64 owners are usually hungry for games. For a long time there was not much software to choose from, although the situation has improved considerably in recent months.

There are, of course, hundreds of games written for the older Commodore PET computers available. Using one of the PET emulators on the market, many of these games will run with little or no modification on the Commodore 64.

Unfortunately, these games do not take advantage of the Commodore 64's advanced features—such as sprites, custom characters, and synthesized sound. These features just weren't available on the PETs.

Updating An Old Favorite

"Canyon Cruiser" is an updated version of an old favorite on the PET. The idea is to guide your spaceship through a narrow canyon. The walls keep getting closer, naturally, so the game keeps getting harder.

Starting with this basic concept, I improved the Commodore 64 adaptation by making the spaceship a multicolored sprite and by adding a new twist—wandering asteroids. The asteroids, also sprites, cannot destroy your ship. But they do add to the visual confusion while passing by. In that sense they can be considered an additional hazard.

The VIC-20 lacks sprites, so all the shapes in the VIC version are created with custom characters.

Cruisin' For A Bruisin'

Canyon Cruiser transforms you into the pilot of a new spaceship. Your goal is to test the craft to its limits by flying it down the funnel-shaped canyon without crashing into the unyielding walls.

To control the spaceship from the keyboard, steer it left or right with the colon (:) and semicolon (;) keys. You can also use a joystick if you prefer (on the Commodore 64, plug the stick into port 2).

BREATHE LIFE INTO YOUR C64

Now that you have it, put it to work. C64 TUTOR puts you in charge with a Commodore 64 tutorial, screen display editor, sprite editor, music synthesizer & programmer's calculator.

Use the tutorial to learn what your Commodore 64 can do. And how to do it. Create, edit & save one page of letters and/or pictures with the screen display editor. Enter sprites from the Commodore Manual. Or make up your own. Then edit and save them using the sprite editor. Sprite creation is quick and easy. Play music with the music synthesizer. Use the programmer's calculator to add, subtract, multiply & divide in decimal, hexadecimal and binary. Includes AND, OR, XOR, Shift and 1's complement functions.

Great for new users, C64 TUTOR cures computerphobia and promotes computer literacy.

Take it from me, with a little power, the possibilities are endless.

Available for $29.95 at your computer dealer.

Comprehensive Software Support.

2316 Arresia Bl. Suite B
Redondo Beach, CA 90278
213/318-2561

cardco, inc.

It's time for your computer to grow up.

VIC-20 EXPANDER SALE!

• 8K RAM MEMORY EXPANDER (Free $16.95 Game)	$ 69.95	**$39.00**
• 16K RAM MEMORY EXPANDER "CARDCO" (Free $29.95 Adventure Game)	$ 99.00	**$55.00**
• 24K RAM MEMORY EXPANDER (Free $29.95 Adventure Game)	$159.00	**$79.00**
• 32K RAM MEMORY EXPANDER (Expands to total memory to 57K (57,000 bytes)	$199.00	**$95.00**
• 3 SLOT "CARDCO" SWITCHABLE EXPANDER BOARD	$ 39.95	**$29.00**
• 6 SLOT "CARDCO" SWITCHABLE **EXPANDER BOARD** RIBBON CABLE EXPANDER BOARD (Lifetime warranty)	$ 99.00	**$49.00**
• 40-80 COLUMN BOARD	$129.00	**$69.00**

VIC 20

40-80 COLUMN BOARD

SALE only $69.00 SALE

Now you can get 40 or 80 Columns on your T.V. or monitor at one time! No more running out of line space for programming and making columns. Just plug in this board and you immediately convert your VIC-20 computer to 40 or 80 columns! Comes in an attractive molded case with instructions!
List $129.00 **Sale $69.00**

FOR ONLY $19.95 you can get a 40-80 Column Board "WORD PROCESSOR" with mail merge and terminal emulator PLUS! AN ELECTRONIC SPREAD SHEET (like Visicalc) the word processor requires 8K—mail merge 16K! List $49.90. **Sale $39.90.** *If purchased with board only $19.95. (Tape or Disk.)

Add $3.00 for postage. Add $6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D.

PROTECTO
ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

SANYO MONITOR SALE!!

9" Data Monitor

- 80 Columns × 24 lines
- Green text display
- East to read - no eye strain
- Up front brightness control
- High resolution graphics
- Quick start - no preheating
- Regulated power supply
- Attractive metal cabinet
- UL and FCC approved

- *15 Day Free Trial - 90 Day Immediate Replacement Warranty*

9" Screen - Green Text Display	**$ 79.00**
12" Screen - Green Text Display (anti-reflective screen)	**$ 99.00**
12" Screen - Amber Text Display (anti-reflective screen)	**$119.00**
14" Screen - Color Monitor (national brand)	**$249.00**

Display Monitors From Sanyo

With the need for computing power growing every day, Sanyo has stepped in to meet the demand with a whole new line of low cost, high quality data monitors. Designed for commercial and personal computer use. All models come with an array of features, including up-front brightness and contrast controls. The capacity 5 × 7 dot characters as the input is 24 lines of characters with up to 80 characters per line.

Equally important, all are built with Sanyo's commitment to technological excellence. In the world of Audio/Video, Sanyo is synonymous with reliability and performance. And Sanyo quality is reflected in our reputation. Unlike some suppliers, Sanyo designs, manufactures and tests virtually all the parts that go into our products, from cameras to stereos. That's an assurance not everybody can give you!

SANYO

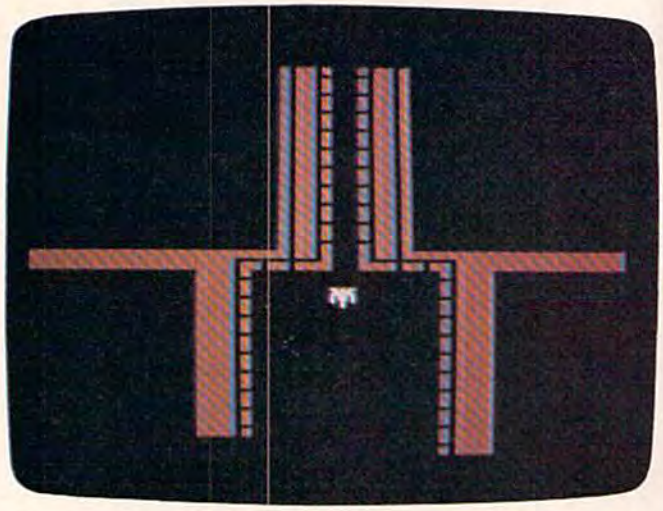
Official Video Products of the Los Angeles 1984 Olympics

• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
• BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

Add $10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $20.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. Visa - MasterCard - C.O.D.

PROTECTO
ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order



Leaving the base at the beginning of a game of "Canyon Cruiser" (VIC version).

The spaceship changes color to warn you that the canyon is narrowing.

At the end of the flight you will be ranked according to your skill. There are 11 ranks ranging from "Starter" to "Han Solo." If you want, you can change these ranks to anything you want by locating these lines in the program and modifying them. (But be sure to get the program working as published before tinkering with it.)

See program listings on page 188.

VICTORY SOFTWARE

INTRODUCES

THE EARTH WARRIOR SERIES

METAMORPHOSIS $19.95

You stumbled into the nest of the Cyglorx and find yourself fighting off robot tanks guarding the Cyglorx eggs. You think you have everything under control and then the eggs start hatching. Commodore 64 version features 4 different screens.
Available for COMMODORE 64 and VIC-20. Played with JOYSTICK.

CREATOR'S REVENGE $19.95

The creator assembled a massive army of robots and insects to take revenge on the earth. Destroy insects, get treasures, and get the neutron bomb deactivator. Battle robots and destroy the neutron bomb before it annihalites your city. Miss and you must face the mutants. Features 4 different screens.
Available for COMMODORE 64. Played with JOYSTICK.

LABYRINTH OF THE CREATOR $19.95

Journey into the most complex and dangerous fortress ever build by the creator. You will encounter deadly robots, skulls, lakes, avalanches, false creators, and a creature who roams 256 rooms relentlessly pursuing you.
Available for COMMODORE 64. Played with JOYSTICK.

BOUNTY HUNTER $19.95

An adventure in the Old West. Journey back with us into the days of Jessie James and Billy the Kid where the only form of justice was a loaded revolver and a hangman's noose. In this full-length text adventure, you play the role of Bounty Hunter, battling against ruthless outlaws, hostile Indians, wild animals and the elements of the wilderness with only your wits and your six gun. Average solving time: 20-30 hours. If you love adventures, this one is a real treat.

Available for COMMODORE 64 and VIC-20 (with 8K or 16K expander). Played with Keyboard.

CAVE KOOKS $14.95

Earth's surface is threatened by collapse from a strange group of creatures who bore out the earth's crust to make their dens. Your objective is to enter the creature's habitat and spin the invaders to death.
Available for COMMODORE 64. Played with JOYSTICK.

Programs for the VIC-20 and the COMMODORE 64.

All games available on TAPE or DISK.

All Arcade-Style games are packed full of MACHINE CODE.

KONGO KONG $19.95

Climb ladders, avoid the barrels the crazy ape is rolling at you, and rescue the damsel. Commodore 64 version features 4 different screens!
Available for COMMODORE 64 and VIC-20. Played with JOYSTICK or KEYBOARD.

GRAVE ROBBERS $19.95

Introducing the first GRAPHIC ADVENTURE ever available for the VIC-20 or COMMODORE 64! With realistic audio-visual effects, you explore an old deserted graveyard and actually see the perils that lie beyond.
Available for COMMODORE 64 and VIC-20. Played with KEYBOARD.

CHOMPER MAN $19.95

Don't let the bullies catch you as you gobble the goodies! This program has 8 screens and still fits in the standard memory.
Available for COMMODORE 64 and VIC-20. Played with JOYSTICK or KEYBOARD.

Illustrations: Elizabeth Hauck

Check your LOCAL DEALER or order directly.
ORDERING: We accept personal checks, money orders, VISA, and MASTERCHARGE. Charge orders please include number and expiration date. Overseas orders please use charge or have check payable through a U.S. bank. Add $1.50 postage and handling per order. PA residents please add 6% sales tax.

VISA — master charge

VICTORY SOFTWARE

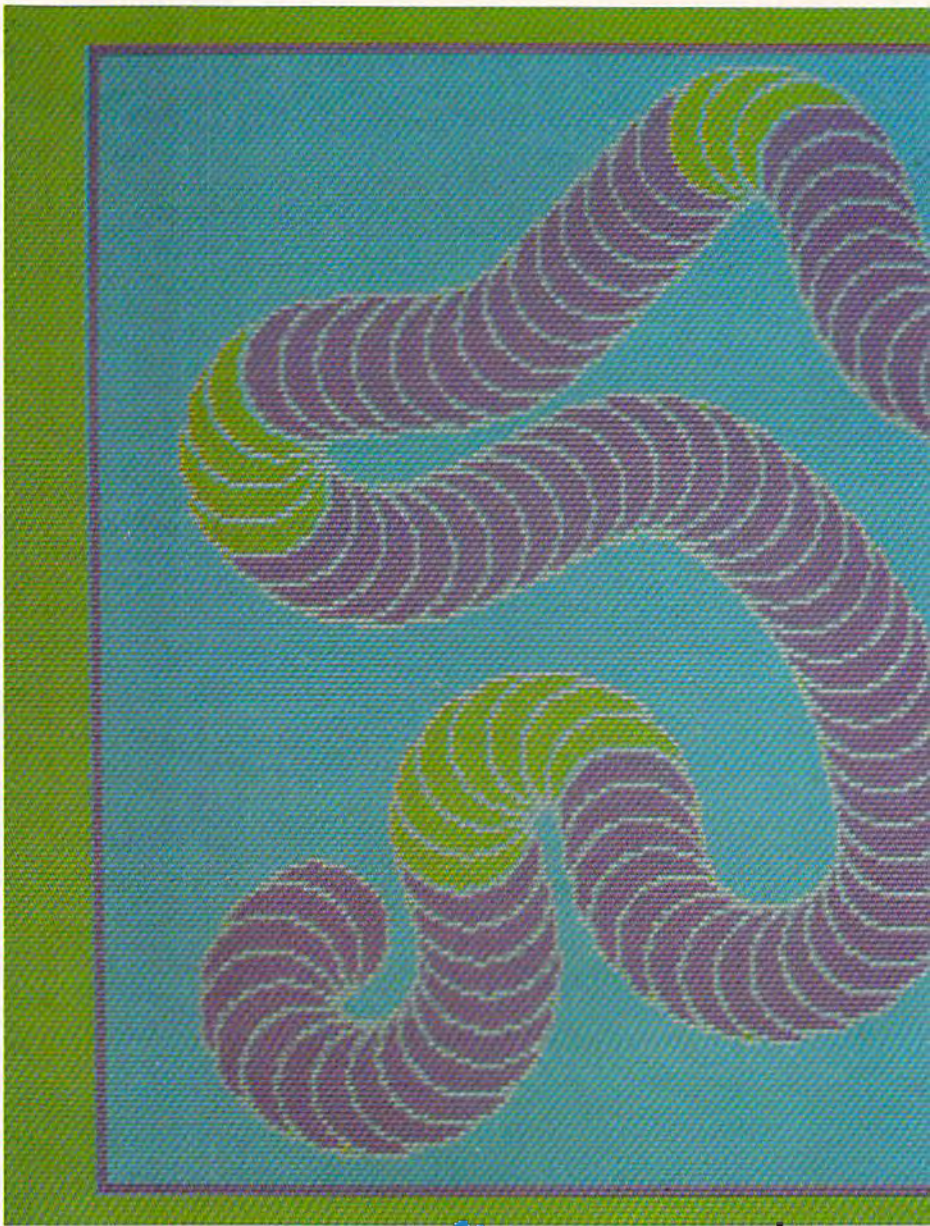
VICTORY SOFTWARE INC.
7 Valley Brook Road, Paoli, PA 19301
(215) 296-3787

COMPUTING
for families

New Family Learning Games

Fred D'Ignazio, Associate Editor

This month COMPUTE!'s GAZETTE is consolidating two previous columns—the monthly "Computing For Kids" and the bi-monthly "Computing For Grown-Ups"—into one new monthly column, "Computing For Families." Each month, Computing For Families will cover topics of interest to all members of home-computing families, both young and old. And as before, the column will be written by Fred D'Ignazio, himself the head of a home-computing household.

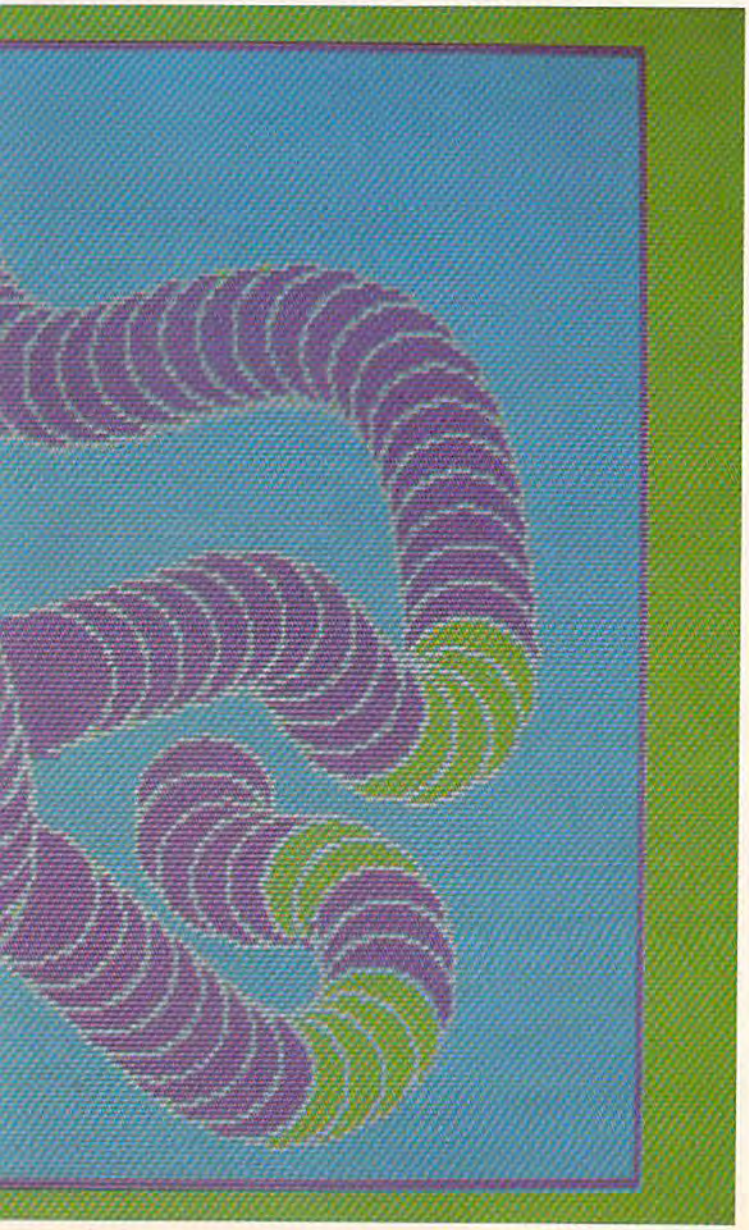


These colorful designs and the ones on following pages were created with Spinnaker Software's Delta Drawing.

Ambushing The Mailman

When I was a kid I used to belong to all sorts of mail-order book clubs. When I knew a book was coming I would rush home from school or spend an entire Saturday prowling around my front yard waiting for the mailman to pull up our driveway. It was a great feeling when he brought a big box addressed to me. I knew that a new book was inside the box. It didn't matter that I could never remember what book I had ordered. That was part of the fun.

Now I have two children (Catie, 8, and Eric, 4) who have followed in my footsteps. Catie and Eric get as excited as I did about receiving packages in the mail, and they are as good as I was at ambushing the mailman. On Saturday mornings, they lie in wait behind two big pine trees just outside the porch door. When the mailman arrives they spring out and grab all his packages and run into the house. They reach the living room, and they start ripping the packages apart.



But do you think they are looking for books?

Nope. They are looking for new computer learning games arriving in the mail. And they act like wild things until they unwrap the games, load them into the computer, and begin playing them.

Champions And Cheerleaders

Here, below, is a group of seven games that captivated me and my family. They are remarkably diverse and quite varied in the thinking and skill they demand from the human player. But they are similar in four key traits. First, they are just as much fun for adults as they are for kids. Second, they can be played at many different levels, so, with help from an adult, even a toddler can benefit from them. Third, the games are constructive and nonviolent. They let families build things rather than train them in creative destruction. Fourth, the games are much more fun when people play them together.

All these games encourage interaction among family members, schoolmates, and friends. At our house we almost always play the games together. The approach we use is to have one person step forward as the stalwart champion and have the other family members be coaches, cheerleaders, and the peanut gallery. At the end of each game we rotate all the roles.

Playground Or Swamp?

It was interesting to see Eric and Catie approach these new games. They never want to read any directions before starting. They equate direction-reading with "adult," "slow," "dense," and "boring." On their own, they never read directions—*unless they appear on the screen*. They just boot up a disk or plug in a cartridge. Then they start madly pressing buttons or swiveling a joystick or game paddle. Pretty quickly something begins happening. Then it's "play it by ear" all the way.

This sort of approach makes me very nervous. Nevertheless, I usually climb aboard for the ride, just to see where we'll all end up.

Most of the time, the kids wander through a program—*at a gallop*—and usually figure out what's going on. Then they begin playing with a passion.

But sometimes their approach is akin to turning down a blind alley and running, full-speed, into a brick wall. Then, with their noses out of joint, the kids turn around to me and announce, "Daddy, this is a dumb game!"

And, that's that. When the computer doesn't respond, when my kids feel powerless and out of control, they abandon the game. It's like watching their playground turn into a yucky swamp. While it's still a playground they love to race around



and use the equipment. But when suddenly the ground turns into sticky glue, the kids feel paralyzed.

I used to think they had reached a real dead end. Now I look at it as an opportunity to start doling out some game rules and special "power" buttons that get the game moving again and put the kids back in control.

Pipes

Pipes is available on cartridge for the VIC-20 ($29.95) or the Commodore 64 ($34.95). It won the 1983 CES (Consumer Electronics Show) Software Showcase Award for Home Education. It is made by:

Creative Software
201 San Antonio Circle
Mountain View, CA 94040
(408) 745-1655

Pipes is a game that never turns into a swamp. When the program begins there is a plumber, a house, and a water supply tank on the display screen. On the far right is a pipe factory with bins full of pipes of all shapes.

My kids were puzzled by *Pipes* at first. But that didn't stop them from leaning on the joystick and racing the little plumber around the screen. They learned how to use the "radar" display—a little window in the corner of the screen that lets you see the plumber, the house, the water tank, and the pipe factory, all at the same time. And, by randomly pressing the joystick buttons, they discovered they could buy pipes from the factory and hook them up to the house and the water tank.

The first couple of times we played the game the kids created some pretty weird plumbing. Pipes squirreled out of the house, then corkscrewed, pirouetted, and pretzeled themselves into oblivion. We found out how to turn on the water supply (by pressing the V key on the computer) and squirted water all over the ground with ecological abandon.

Eventually we ended up with some pretty decent plumbing. The pipes went in efficient right angles out of the water tank and into the house. When we turned on the water, it flowed in a direct route from the tank to the house.

After hooking up the plumbing to one house had become a snap, we graduated to a whole neighborhood with up to five houses. We even figured out how to do the plumbing with the cheapest pipe and save the most money.

Now the kids mostly play *Pipes* alone. The other day I went into the dining room and found Eric busy building a circular pipe network out of the water tank. I frowned and screwed up my face. "Why would you want to do that?" I asked him.

"Because," he said, not looking up, "this way the water never goes away."

Delta Drawing

My daughter Catie and I reviewed the Apple version of *Delta Drawing* in the June 1983 issue of COMPUTE! Magazine. Now Spinnaker Software has released *Delta Drawing* on cartridge for the Commodore 64 ($39.95). You can reach Spinnaker at:

Spinnaker Software Corporation
215 First Street
Cambridge, MA 02142
(617) 868-4700

The Commodore 64 version of *Delta Drawing* is significantly more powerful than the earlier Apple version. And the Apple version was a knockout.

Catie and I found *Delta Drawing* to be a lot like Logo—only upside down! To make the Logo turtle do something you have to define a procedure (or program) and type in lots of one- or two-letter commands. Then, when you're all done, you have to type the procedure name to make the turtle do its tricks.

This kind of programming is called delayed gratification. It requires a lot of patience—especially when you are only four years old.

Delta Drawing is just the opposite. The payoff comes at the beginning *and* at the end. Here's a typical session with Eric:

Eric plugs the *Delta Drawing* cartridge into the Commodore 64, and, a moment later, a triangle and a blinking dot appear in the center of an empty screen. The triangle is "DeeDee" the turtle. The dot is DeeDee's tail. DeeDee uses her tail to draw.

Eric starts DeeDee on a trip across the screen by pushing the D key (for Draw). DeeDee moves about a quarter of an inch up the screen, then stops. Behind her is a white line.

Eric pushes the D key again, then the R key (for turn right 30 degrees) three times. Then he

COMPUTERS ARE CREATING JOBS FOR NRI-TRAINED PEOPLE.

IF YOU'RE SERIOUS ABOUT MAKING MONEY IN MICROCOMPUTERS, NRI IS SERIOUS ABOUT SHOWING YOU HOW.

The U.S. Department of Labor projects job openings for qualified computer technicians will soon double. International Resource Development, Inc., estimates a 600% increase in these jobs in a decade. And most of these will be new jobs, created by the expanding role of computers.

NEVER HAS THERE BEEN A FASTER-GROWING FIELD OF TECHNOLOGY.

Many people are afraid of losing their jobs to computers, but thousands of jobs will be created for those who are prepared to meet the challenge.

With NRI training, you'll be prepared. You can have a profitable, exciting future as an expert who can handle the operational, programming and technical aspects of all kinds of microcomputers and microprocessors.

LEARN IN YOUR SPARE TIME.

NRI trains you in your own home, at your convenience...no classroom schedules to meet, no need to quit your job. As a class of one with complete course materials and the backing of a staff of professional electronics instructors, you'll get extraordinary hands-on training on the latest, most popular microcomputer: the new TRS-80™ Model 4 with Disk Drive. Designed to perform diverse personal and business functions and accept more software, the TRS-80 is yours to keep.

LEARN HOW TO USE, PROGRAM AND SERVICE STATE-OF-THE-ART MICRO-COMPUTERS.

Through your carefully designed NRI course, you'll get a wealth of practical experience. You'll build circuits... from the simplest to the most advanced...with your NRI Discovery Lab.® You'll use a professional 4-function LCD digital multimeter for analysis and troubleshooting. With NRI training you'll explore your computer's registers, memory and input-output ports. You'll even write programs to control the circuits you've designed and built. You'll perform hundreds of challenging experiments, always backed by a full-time faculty ready to help you personally.

When your NRI training is complete, you'll be a computer technician, ready for your first job — servicing, testing or programming all types of microcomputers — in a rewarding and challenging new career.

THE CATALOG IS FREE. THE TRAINING IS PRICELESS.

Send the coupon today for your FREE 104-page catalog. It's a valuable guide to opportunities and training in the high-tech revolution. You'll see how easily you become part of the growing high-tech world of microcomputers. If the coupon has been removed, write: NRI, 3939 Wisconsin Ave., Washington, DC 20016.

Your NRI course will include the new TRS-80 Model 4 with Disk Drive or the TRS-80 Color Computer with NRI Computer Access Card...plus a professional LCD multimeter, NRI Discovery Lab and hundreds of demonstrations and experiments. It's all yours to keep.

TRS-80 is a trademark of the Radio Shack division of Tandy Corp.

NRI McGraw-Hill

NRI School of Electronics
McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue
Washington, D.C. 20016

We'll give you tomorrow.
The catalog is free.
The training is priceless.

All career courses approved under GI bill. ☐ Check for details.

Please check for one free catalog only.
☐ Industrial Electronics
☐ Computer Electronics including Microcomputers
☐ Color TV, Audio, and Video System Servicing
☐ Electronics Design Technology
☐ Digital Electronics
☐ Communications Electronics • FCC Licenses • Mobile • CB • Aircraft • Marine
☐ Basic Electronics
☐ Small Engine Servicing
☐ Appliance Servicing
☐ Automotive Servicing
☐ Auto Air Conditioning
☐ Air Conditioning, Heating, Refrigeration & Solar Technology
☐ Building Construction

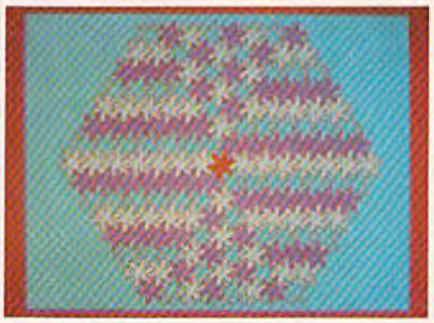
Name (Please Print) Age

Street

City/State/Zip

Accredited by the Accrediting Commission of the National Home Study Council





pushes the S key.

Eric has made DeeDee do something significant by pushing just five buttons. First, he has made DeeDee move and draw a line—as soon as he presses the button. (This is called immediate gratification.)

Second, he has just created a *program*. The program is extremely simple, but it will act as a building block for the shapes that Eric is planning to make DeeDee draw next.

Eric saves his program by pressing the S key. (At this point Eric's daddy likes to press the T—Text—key to see the actual commands Eric has given DeeDee. This reassures Eric's daddy that Eric is, in fact, creating a real program. Eric, however, is confident that he is programming even without seeing the list of commands. He can see that his programs are working by watching DeeDee whiz around the screen drawing the shapes he has dreamed up.)

When Eric presses the S key the screen goes blank and DeeDee reappears in the home position. With only a moment's hesitation, Eric presses the X and the 1 buttons to run Program 1. DeeDee spurts forward two paces and turns right. Behind her is the straight line.

Eric presses the X and 1 buttons three more times. When he is done DeeDee is back in her home position. She has just drawn a square. Eric types the R button to turn DeeDee 30 degrees to the right. Then he types an S to save his second program.

Next Eric presses the X and the 2 keys seven times to run Program 2 seven times. When he is finished he smiles. DeeDee has just created a flower made up of little boxes rotated around a central axis.

Is Eric done? Not yet. He likes flowers so much he wants them all over the screen, and he wants them in different colors. He presses a couple more keys and colors the flower petals orange and blue and green. Then he presses the M button and holds it down. DeeDee scoots up the screen. Eric presses the S button to save his third program.

Now he's finally ready to do his picture. To make the picture he uses the building block Programs 1–3 that he has just created. To fill the screen with colorful flowers, he has to press only two keys: the X and the 3. Each time he runs his third program, DeeDee draws a flower, colors it in, then zips to a new part of the screen.

Pretty soon Eric and DeeDee have filled the entire screen with flowers. Eric is done. He gets up from the computer and goes looking for his family to show off his latest creation.

The Tip Of The Iceberg

Delta Drawing is a spectacular learning game. I have described only a tiny bit of what kids can do with it. But the neatest thing about *Delta Drawing* is that children can explore all its powerful features, or they can spend hours on a single part of *Delta Drawing* and still not exhaust it. The program is made for children to explore. And if my children are any guide, they love doing it.

Kids On Keys

Kids on Keys is available from Spinnaker Software. The Commodore 64 disk costs $29.95; the Commodore 64 cartridge costs $34.95.

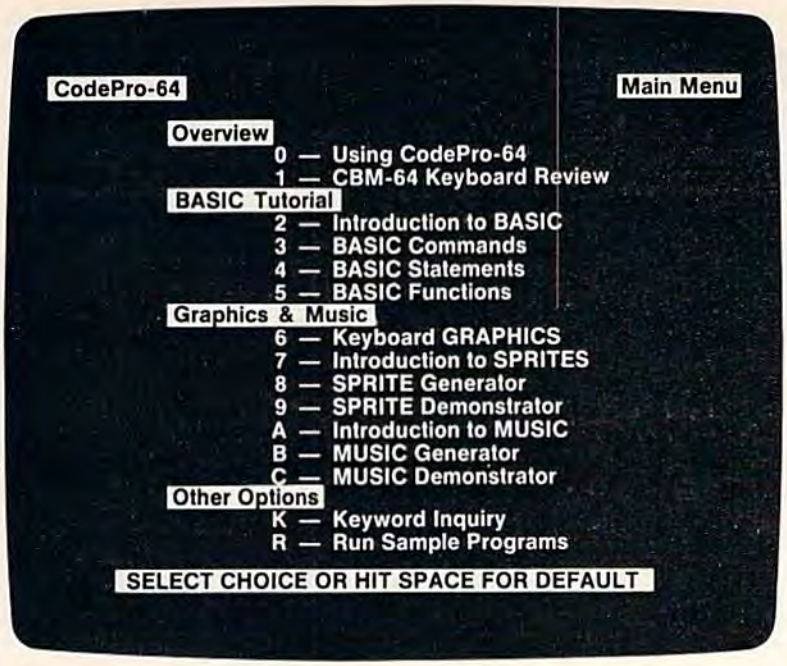
Kids on Keys is one of those programs that my family ought to like. It teaches all sorts of good things like the alphabet, shapes and colors, problem-solving, and, last but not least, the computer (or typewriter) keyboard.

It turns out that my family really does love *Kids on Keys*, but not because it teaches all that sound educational stuff. We love it for lots of little intangible reasons, like the neat music it plays. Or like the little person who whimsically floats up and down in a balloon. Or the way the letters we correctly identify make a loud *BURP!* and crumble like cookies. Or the funny way the cats, rabbits, boots, and faces fly off the screen after we correctly identify them.

Somehow, subtly, and disarmingly, *Kids on Keys* is charming. So we all love to play it. (Even though some of us are 34 years old, and we're supposed to already know our alphabet.)

And for those adults out there who are snickering in their sleeves, I dare you to try *Kids on Keys*, Game 3, Level 4. Just try to guess all those fragmented shapes, especially after they have changed color and scrambled their positions. Let me tell you, it is no laughing matter. Especially since the key word is quickly fading away.

How well-developed is *your* skill of pattern recognition? Play *Kids on Keys*, and you'll find out.



NEW! For the Commodore 64™
ANNOUNCING

CodePro-64™

A new concept in interactive visual learning . . .

Now you can learn to code in BASIC and develop advanced programming skills with graphics, sprites and music—**visually.** You learn by interacting with CodePro-64, a new concept in interactive visual learning.

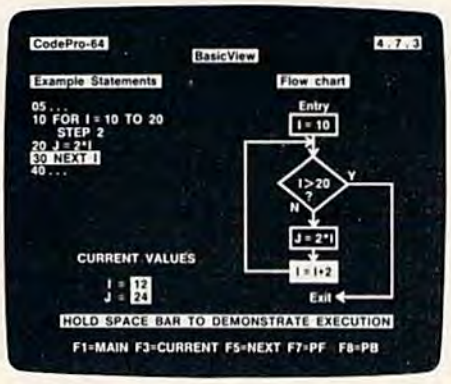
SEE PROGRAM EXECUTION

Imagine actually seeing BASIC statements execute. CodePro-64 guides you through structured examples of BASIC program segments. You enter the requested data or let CodePro-64 do the typing for you. (It will not let you make a mistake.)

After entering an example you invoke our exclusive **BasicView™** which **shows you how the BASIC program example executes.**

You step through and actually see the execution of sample program statements by simply pressing the space bar. CodePro-64 does the rest.

You see statements with corresponding **flow chart graphics** and variable value displays. You learn by visual examples.



EXTENSIVE TUTORIAL

CodePro-64's extensive tutorial guides you through each BASIC command, program statement, and function. You get clear explanations. Then you enter program statements as interactive examples. Where appropriate, you invoke BasicView to see examples execute and watch their flow charts and variables change.

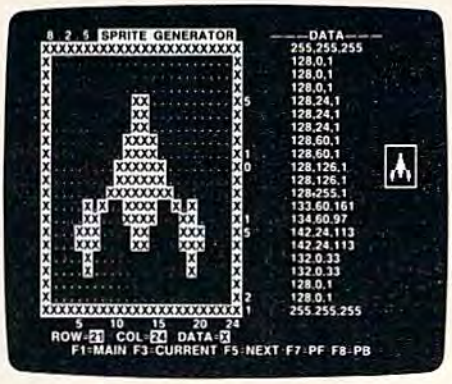
By seeing graphic displays of program segment execution you learn by visual example. You **learn faster and grasp programming concepts easier** with CodePro-64 because you immediately see the results of your input.

You control your learning. You can go through the tutorial sequentially, or return to the main menu and select different topics, or **use keywords** to select language elements to study. You can page back and forth between screens within a topic at the touch of a function key.

CodePro-64 **lets you follow your interests** and practice with interactive examples. But you can never get "lost". F1 will always return you to the main menu. Once you have practiced and mastered the BASIC language elements you move on to more advanced concepts. You learn about sprite and music programming.

SPRITE GENERATOR & DEMONSTRATOR

CodePro-64's sprite generator lets you **define your own sprites** on the screen. You learn how to define sprites and what data values correspond to your sprite definitions. (You can then use these values to write your own programs.) You can **easily experiment** with different definitions and make changes to immediately see the effects.



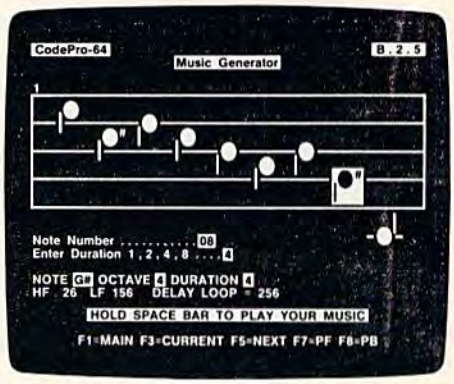
We also help you learn to program with sprites by giving you a **sprite demonstrator** so you can see the effect of changing register values. You can experiment by moving your sprite around in a screen segment, change its color or priority, and see the effects of your changes. You learn by visual examples.

MUSIC GENERATOR & DEMONSTRATOR

To teach you music programming CodePro-64 gives you an interactive music generator and demonstrator. First we help you set all your SID parameters (attack/decay, sustain/release, waveform, etc.). Then you enter notes to play and **we show your tune graphically as it plays,** note by note, on the scale. You learn by seeing and hearing the results of your input.

OUR GUARANTEE

We guarantee your satisfaction. You must be satisfied with CodePro-64 for the Commodore-64. Try it for 10 days and if for any reason you are not satisfied return it to us (undamaged) for a full refund. **No risk.**



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

AND MORE . . .

We don't have enough space to tell you everything CodePro-64 offers. You need to see for yourself. BASIC tutorials, graphics, sprites, music, keyboard review, sample programs—the main menu shown above gives you just a summary of the contents of this powerful educational product.

Whether you're a beginning programmer or an experienced professional, CodePro-64 will help you improve your Commodore 64 programming skills. We're sure because CodePro-64 was developed by a team of two professionals with **over 25 years** of software development experience.

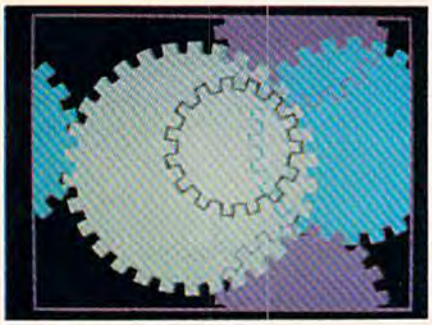
CodePro-64 is a professional quality educational program for the serious student of personal computing. And it's **fully guaranteed.** Order yours today.

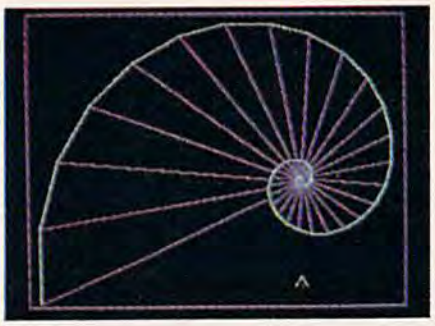
HOW TO ORDER

Order your copy of CodePro-64 today by mail or phone. Send only $59.95 plus $3.00 shipping and handling to:

SMA **SYSTEMS MANAGEMENT ASSOCIATES**
3700 computer Drive, Dept. CA
Raleigh, N. C. 27609

Available on **diskette only.** MasterCard/VISA accepted. For faster service on credit card orders call (919) 787-7703.





Alphabet Zoo

Alphabet Zoo is also available from Spinnaker Software. The Commodore 64 disk costs $29.95; the Commodore 64 cartridge costs $34.95.

Alphabet Zoo is a trip—a trip into a dark maze filled with colorful glowing letters. At the heart of the maze is a fox or a vase or a bottle of ink or a pair of socks (or dozens of other objects). Your goal is to guess the first letter in the object's name (like "f" for fox or "s" for socks). Then you run through the maze and chase down that letter. The letter skulks around the maze trying to elude you, but you can enter special doorways and take shortcuts through the maze. When you capture the letter, the computer plays a musical tune, you win points, and you get plopped down in a new maze with new letters and a new object.

Alphabet Zoo is very flexible. You and your child can play alone or together. You can choose to chase down capital letters, lowercase letters, or a mixture of both. Also, you can graduate to game 2 where you have to chase down entire words that match the picture in the maze's center.

There are six levels in each game. This lets your child work on different types of letters and words: easy and difficult consonants, vowels, etc., and words of anywhere from two to nine letters.

Alphabet Zoo is a valuable game for you and a child to play. It teaches all sorts of reading readiness skills, including letter recognition, letter sequence, and letter sounds. And having to chase the letters around the maze helps children develop fine motor skills that they will need when they begin writing.

All these things are terrific, but I've saved the best part for last. When you start each new trip into the alphabet maze, you get to choose your own player-creature. And the creatures are hilarious. One is a plump, pumpkin-like happy face. Another is a little, excited monster who keeps jumping up and down.

All the player-creatures are very lovable. Making them hop and bump their way around the maze hunting letters is a big part of the game's charm. And that's the secret of a good game. The game has worthwhile goals and desirable rewards. But it's also fun just playing. You and the child will still enjoy yourselves even if you never do track down one of those tricky letters.

Cosmic Life

Cosmic Life is available from Spinnaker Software. The cartridge for the Commodore 64 costs $34.95.

Cosmic Life originated long, long ago, in the mists of time, before the Apple, before the PET, and before the TRS-80.

In that long-ago time there was a math wizard named John Conway. Conway created a game called *Life*. In Conway's little world, creatures lived according to three very simple rules:

- Survival

  Every creature with two or three neighbors was happy and survived until the next generation.

- Death

  When a creature was surrounded by four or more neighbors the creature felt overcrowded, became sad, and died. If the creature had only one neighbor or no neighbors at all, the creature became lonely and died.

- Birth

  Whenever three creatures got together and shared an empty space, they produced a new creature for the next generation.

Conway published his game of *Life* in *Scientific American* over ten years ago. But it wasn't until recently that Ken Madell, the author of *Cosmic Life*, showed Spinnaker that he could convert Conway's intellectual parlor game into a fun computer learning game for kids and adults.

The creatures in *Cosmic Life* are known as Digi-Bugs, cute little *Pac-Man*-like creatures. They are born, they live, and they die according to Conway's original rules.

When you play *Cosmic Life* you begin with a barren, uninhabited planet. You pilot a joystick-controlled spaceship down to the planet and begin seeding it with Digi-Bugs.

Then prepare to be entranced. Digi-Bug colonies start popping up all over the screen. The little creatures grow, multiply, dwindle, and disappear, right before your eyes.

You can set everything in motion, then retreat to a cloud to watch the action, or you can dive your spaceship back down and continue to seed the planet's surface with new Digi-Bugs.

Pretty soon you will develop a real affection

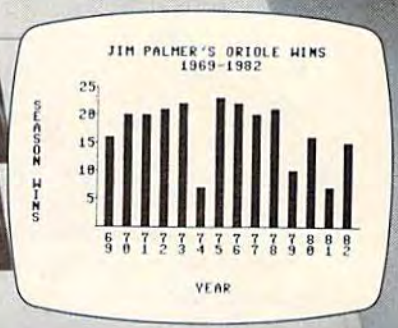
The Most Practical Software — Now Has Graphics

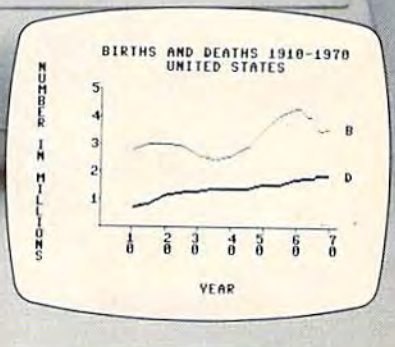
The **Graphics Assistant,** the latest addition to the ASSISTANT SERIES, lets you and your 64 produce charts and graphs in three formats. You can display them on screen or print them out. On screen display is 30 columns by 14 rows — about 60% of the screen. Print-out can be two sizes: a compact 4" x 4" or a full page, 7" x 9", display.

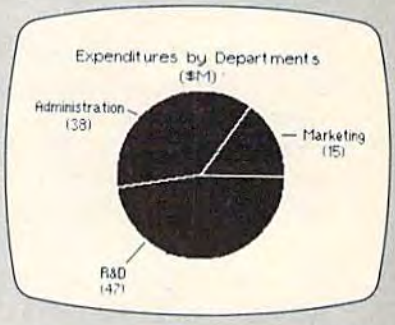
Bar chart format accepts up to 30 bars per chart; line chart allows 200 points per chart; pie chart can be sliced as thin as you desire. Vertical and horizontal labels are clearly displayed. On the pie chart a label with pointer is displayed outside the graph and indicates percentage or raw numeric data, i.e. Rainbow (73) or Graphics (141). You can assign range, limits, and values to create charts. Most importantly, however, you can retrieve data from files created by the **Spreadsheet Assistant.**

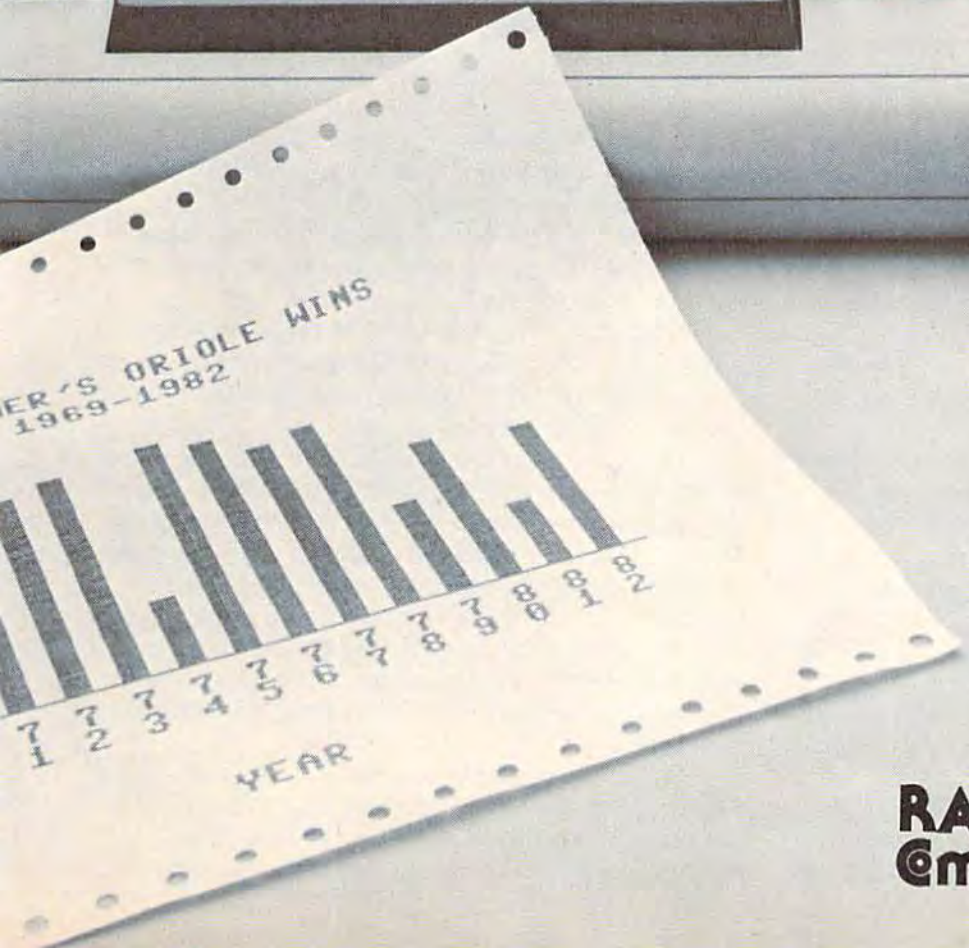
The ASSISTANT SERIES is now better than ever! You can now attach graphs to documents created by the **Writer's Assistant.** And produce comparison charts from data that has been calculated and replicated on the **Spreadsheet Assistant.**

The Graphics Assistant **$79.95**









RAINBOW Computer Corporation
490 Lancaster Pike

for the little creatures. You will learn what patterns help them grow and which patterns make them sad and vanish.

Something happens each Digi-Bug day. Each day lasts about four seconds. You can create a game of anywhere from 10 to 250 Digi-Bug days. At the end of each day the computer scores points based on how many Digi-Bugs are currently living on the planet. Your goal is to create settlement patterns for the Digi-Bugs that make them happy, fruitful, and fertile. But you have to keep a balance. If your Digi-Bug planet gets too crowded, the Digi-Bugs will start disappearing again.

Up For Grabs

Up for Grabs is also available from Spinnaker Software. The program costs $39.95 and comes on a cartridge for the Commodore 64.

Up for Grabs is supposedly for kids eight and up. But it is an instant swamp for kids, and maybe for adults, too. This is not to say that the program is not fun, because it is fun. But *Up for Grabs* is not an intuitively charming game like the other games above. It takes lots of practice and you'd better read the instruction book if you want to know what's going on.

Up for Grabs is an electronic *Scrabble* game. A cube spins around in the center of the screen. On each of the cube's faces is a letter. The letter rotates around, in view, then disappears. When the cube face comes around the next time, a new letter has replaced the old letter.

You pick a letter by pushing the button on your joystick. An arrow appears and points, in turn, at each of the letters on the cube that are visible. When the arrow points at the letter you want, you press the joystick button again.

There are four letter boards for up to four *Up for Grabs* players. Once you have chosen a letter, you can place it on one of the squares on your board by manipulating a row pointer and a column pointer.

When Catie and I first tried playing *Up for Grabs* without reading the directions, we got nowhere.

Later, my wife Janet and I played. Janet spent most of the first couple of games fuming and fussing at the computer. She claimed it was stealing her letters, putting them on the wrong squares on the board, and substituting other letters for the ones she'd chosen.

I had the same problem.

But then things started improving. We got better at manipulating the letters and the game boards. All of a sudden, we were hooked. We played game after game.

We kept playing. I looked at my watch. It was ten o'clock, it was a school night, and the kids were upstairs noisily dismantling their bedrooms. But Janet and I played on.

If you like *Scrabble* and you are a patient learner, you'll like *Up for Grabs*.

Tonight I'm going to talk to Catie. I'm going to try to persuade her to give the game a second chance. I think it's worth it.

Fraction Fever

Fraction Fever is available from Spinnaker Software. It costs $34.95 and comes on a cartridge for the Commodore 64.

This is one of the most frustrating yet most addictive games I have ever played. (Spinnaker recommends *Fraction Fever* for *people* eight and up. *Fraction Fever, Up for Grabs,* and *Cosmic Life* are the first three games in Spinnaker's Family Learning Game series.)

The game is not a swamp, it's just so darned tough!

When you enter the world of this game you become a little person on a pogo stick. You start bouncing the pogo stick around on the bottom floor of a crazy, 20-floor building.

As you bounce the pogo stick, using your joystick, you discover boxes beneath the floor at intervals. The boxes, some filled and some empty, represent fractional quantities. Your goal is to find a group of boxes that matches the fraction hovering in the top-center part of your screen. For example, let's say the fraction is ½. You would bounce your pogo stick until you found, say, four boxes together where two boxes were full and two were empty. When you bounce onto the square with these boxes you press the joystick button.

A neat thing happens. A *fraction elevator* springs out of the floor, picks you and your pogo stick up and carries you to the next floor. You bounce off the elevator and begin hunting boxes to match with a new fraction that is displayed at the top of the screen.

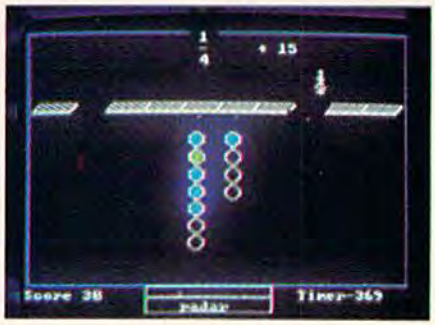
One of the best features of this game is the pogo radar. The little radar screen shows the floor you are on and the floor above and the floor below, each in a different color.

The radar is important because you can use it to estimate where you will find the boxes to match the fraction. The boxes are like distance markers. The fraction they represent is equal to the portion of the whole floor you have traveled, measured from left to right. For example, if you are trying to find boxes representing ¾, you can locate your little pogo-stick person on the radar, then bounce him three-quarters of the way along the floor to the right.

When you find the boxes—four of them, three full; or, perhaps, eight of them, six of them full—you have three visual matches for a particular fraction. First, you have the fraction itself (¾) in

Alphabet Zoo *by Spinnaker Software.*

Kids on Keys *by Spinnaker Software.*



Fraction Fever *by Spinnaker Software.*

the upper part of the screen. Second, you have the four boxes (three full out of a total of four). And, third, you can see the little pogo stick on the radar, and it is exactly three-quarters of the way along the floor (measured from left to right).

The radar is also important because it warns you that holes in the floor are close by. If your pogo-stick person drops through the hole, he falls to the next floor below. This doesn't hurt him, and he can summon the fraction elevator to go back up by matching a new fraction to new boxes. But he can only fall ten times. After that he runs out of pogo sticks.

Where did the holes come from? The only way to get points in this game is by punching holes in the floor with your pogo stick. You get points each time you punch a hole in the floor over a set of boxes that do *not* match the fraction that is appearing on the screen.

But watch out. You have to punch and run, or else you will drop through the hole you just created and fall down to the floor below.

And there's the rub. Those holes are a darned nuisance. The first few times I played *Fraction Fever* I deliberately punched lots of holes to score lots of points. But then my floors had holes everywhere, and I ended up falling down a hole before I could find the correct boxes and catch a ride upward on the fraction elevator.

So I changed my tactics. I tried to get to the topmost (20th) floor first. Then I planned to work my way backwards, punching holes and falling through the floor.

This tactic worked fine until the 16th floor. Then the boxes changed to partly filled beakers. I had to see if the current fraction matched the amount of liquid in the beakers, and then check to see if the partly filled beakers matched the portion of the floor I had traversed. By the time I went through all this estimating and guessing, my time would run out and I would have to hop off the current floor (or fall through a hole) and drop to the floor below. Then the timer would start again and I would try to match the fraction, the beaker, and the floor, and catch another ride upward on the fraction elevator.

Unfortunately, I kept timing out and falling through holes faster than I could estimate fractions. Pretty soon I was back near the bottom of the building with no more pogo sticks to bounce on.

Now I'm a veteran of *Fraction Fever*. Even so, I've never made it past the sixteenth floor, and I've never scored over 16 points.

But I'm going to keep trying. And because I'm persisting, I'm becoming a better fraction-guesser and a better pogo stick bouncer.

I just wish that Tom Snyder, the designer of this game (along with other Spinnaker best sellers, such as *In Search of the Most Amazing Thing* and *Snooper Troops*), would have been more generous with his point allotment. After scoring thousands of points with videogames, I found it quite hard to be content with scores like 6, 11, or 3.

Also, I would have loved it if Snyder had awarded me points for guessing the correct fraction rather than for punching holes in the floor whenever I spotted an incorrect fraction (or group of boxes representing a fraction).

Last, I wish that Snyder had designed the game with several levels, including three or four below the level the game operates at now. I can live with the knowledge that I've only made it to the sixteenth floor (that's 16/20 of all the floors, or 8/10, or 4/5, or four full boxes out of a total of five). But it would have made it easier for me to get Catie and Eric past the first floor.

I've caught a terminal case of fraction fever. Now I'm anxious to pass it on to my kids.

64 Electronic Notepad

Dan Carmichael, Assistant Editor

If you've ever collected so many games and programs on disk or tape that you lost track of how to use each one, then the "64 Electronic Notepad" is just what the doctor ordered.

Have you ever looked at a directory on a disk (or a list of programs on a tape) that was jam-packed with programs and realized that you had forgotten the instructions on how to run them? Or have you ever wanted a convenient way to store anything like notes on that program you're writing or a list of names and phone numbers? If so, then the "64 Electronic Notepad" is the program for you.

The Electronic Notepad contains the most basic functions of a word processor and the ability to store a screen full of information to either tape or disk. Don't leave yet; there's an added bonus: a built-in cipher that will, at the touch of a finger, scramble or unscramble your notes. It's a simple scrambler, but good enough to fool the average nosey person.

How To Use The Program

First, type in the program and SAVE it to tape or disk before running. Be extra careful when typing in the DATA statements; they're for a machine language program, and as with all machine language subroutines, a mistake in just one DATA statement can freeze up your computer.

After the program has been typed in accurately, type RUN, press RETURN, and wait a few seconds while the BASIC program loads the machine language routines into memory.

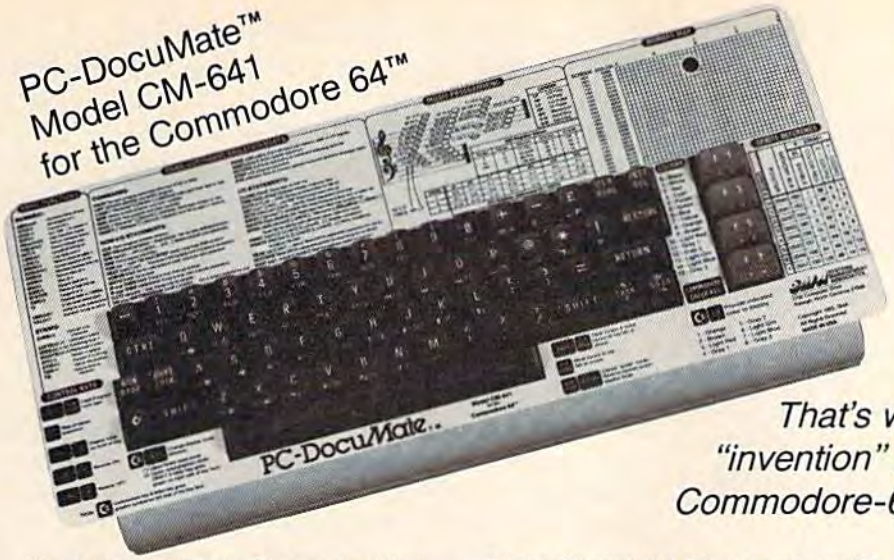
The first user prompt you will see is ENTER 2 SECRET CODES (0–255):. This is for the cipher part of the program. The scrambling of your notepad pages (which, by the way, is optional) is done twice, using two different numbers. Two scrambles will make it that much harder for the curious or the nosey to decode your secret notes. When you enter these two numbers (between 0 and 255), separate them by a comma. Don't be alarmed when you type in the numbers and they aren't seen on the screen. This is intentional. If there are other people around, they won't be able to see your secret codes as you type them in. If you want to see the numbers as you type them, you can delete *POKE 646, PEEK (53281)* from line 17 (be sure to remove the colon, too). Remember to separate the two numbers by a comma. As an example, you might enter *100,200*. If you won't be needing the cipher, enter two zeros.

The second user prompt that will be displayed is DISK OR TAPE?. Here you'll want to press either D or T. The program is written for one or the other, but not both at the same time. For example, if you're in the tape mode, you won't be able to get a disk directory with the program, even if you have a disk drive connected to the computer.

If you've typed in the program correctly, it should now be running, and you should see the options page. The options are:

View notepad page. Press the f1 key for this option. The program calls in a notepad page from either disk or tape and sends it directly to the screen for viewing.

Create notepad page. If you press f3, the program enters the basic word processor mode. Now



EUREKA!

That's what we said when our new "invention" solved all our VIC-20™ and Commodore-64™ programming problems

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

INCONVENIENT MANUALS

The user's guide was a nuisance and the programmer's reference manual was just plain inconvenient to use. We found the control key combinations confusing and the introduction to BASIC to be too "basic" for our needs. We needed a simple solution to our documentation problems.

So we decided to surround the keyboard of each PC with the information we wanted. We decided to print whatever we needed on sturdy **plastic templates** which would fit the keyboard of either the VIC-20 or Commodore 64.

SIMPLE SOLUTION

This was the simple solution to our problem. Now we could have the essential information right at our fingertips.

On the left side and top of the templates we put **BASIC** functions, commands, and statements. On the lower left we used **key symbols** to remind us of how to use SHIFT, RUN/STOP, CTRL and the "Commodore" key. Over on the bottom right side we put some additional keys to help remember about CLR/HOME and RESTORE. But we were still a little confused.

STILL CONFUSED

We found we were confused about music programming, color graphics, and sprites. On both the VIC-20 and the CBM-64 templates we carefully organized and summarized the essential reference data for **music** programming and put it across the top—showing notes and the scale. All those values you must POKE and where to POKE them are listed.

Then to clarify **color graphics** we laid out screen memory maps showing character and color addresses in a screen matrix. (We got this idea from the manuals.)

For the VIC-20 we added a complete memory address map for documenting where everything is in an expanded or unexpanded VIC.

For the Commodore 64 we came up with a really clever summary table for showing almost everything you ever need to know for **sprite** graphics.

GETTING EASIER

Now we had organized the most essential information for our VIC and 64 in the most logical way. BASIC, music, color graphics, and sprites all seemed a lot easier. Our initial problem was solved by PC-DocuMate™

But we have a confession to make.

WE CHEATED

We had solved this kind of problem before. In fact, many times before. You see, we at SMA developed the original PC-DocuMate for the IBM PC. We've made templates for IBM BASIC and DOS, for WORDSTAR™, VISICALC™ and other best-selling software packages for the IBM PC.

So we knew we could invent another PC-DocuMate™ to solve our problems with the VIC-20 and Commodore 64. Now our solution can be yours and you can join the thousands of satisfied users of our template products.

Take advantage of our experience and success with PC-DocuMate templates. Get one for your personal computer.

SOME SPECIFICS

Our templates for the VIC and 64 are made from the same high quality **non-glare** plastic as the more expensive IBM PC versions.

The templates are an attractive **gray** color and are imprinted with a special black ink which bonds permanently to the plastic. They are precision **die-cut** to fit your keyboard.

Unlike some other products we've seen in this category, PC-DocuMate templates are professionally and expertly designed. And they are fully guaranteed.

OUR GUARANTEE

We guarantee your satisfaction. **You must be satisfied** with your PC-DocuMate for your VIC-20 or CBM-64. Try it for 10 days and if for any reason you are not satisfied return it to us (undamaged) for a full refund. **No risk.**

SOLVE YOUR PROGRAMMING PROBLEMS WITH PC-DocuMate™

Order your PC-DocuMate today (by phone or mail) and solve your VIC-20 or CBM-64 programming problems. Send only **$12.95** and specify which computer you have. We pay for shipping and handling. Use the coupon below or call **919-787-7703** for faster service.

YES! Please RUSH me _____ VIC-20 templates and/or _____ CBM-64 templates at $12.95 each. I have enclosed $_____ by:

Check ___ Money order ___ MC/VISA ___

Name _____

Address _____

City _____ State _____ Zip _____

Card # _____ Exp. _____

Signature _____

Foreign orders (except Canada) add $5.00 US

Mail to: **Systems Management Associates**
3700 Computer Drive, Dept. J-1
P.O. Box 20025
Raleigh, North Carolina 27619

Canadians: Please send $18.95 CDN for each template to:

Systems Management Associates
55A Westmore Dr., Dept. J-1
Rexdale, ONTARIO M9V3Y6

Dealer inquiries invited

you can create a notepad page and save it to tape or disk with any filename you choose. While you're in this mode, pressing f1 performs the SAVE, and pressing f8 aborts the page and returns to the options page.

View disk directory. This option (called by pressing f5) displays the disk directory. The program will send it directly to the screen, and it will not affect the BASIC program in memory. While you're in the tape mode, you cannot get a disk directory.

Change program options. Pressing f6 restarts the program. This enables you to change your secret codes if you wish. You can also use this option to change to either disk or tape. Pressing f8 ends the program.

Using The Cipher Option

The scramble option runs all the time and is controlled by the back-arrow key at the upper-left corner of the keyboard. Pressing it once (if you entered your secret codes) will scramble the screen; pressing it again will unscramble.

To use the cipher option to scramble a page before saving, create the page as you normally would using the f3 *create notepad page* option. When you're ready to save the page, press the back-arrow (to scramble the page) and then press f1 to SAVE. The notepad page will then be saved to either tape or disk in the scrambled form.

To use the cipher to unscramble a notepad page, load the notepad page file as you normally would using the f1 *view notepad page* option. After the page has been loaded and is displayed on the screen, press the back-arrow to unscramble it. If you're using the same secret codes you did when you saved the page, the page will now be readable.

How The Program Works

The key to the Electronic Notepad is screen memory page-flipping. This is a technique where you can create one or more extra screens in RAM memory. When you're in the *create notepad page* mode, you're actually writing to the screen (1024–2047); but as soon as you press f1 for the SAVE, you "flip" to another screen memory page that has been set up past the end of the program in BASIC memory. This way you can display the user prompts, such as ENTER NOTEPAD PAGE NAME, without disturbing the page you've written. We'll come back to this later.

For you machine language programmers, the program uses some Kernal routines. The load-a-page option is done with the Kernal LOAD routine ($FFD5), and the save uses the Kernal SAVE routine ($FFD8). The display directory option can be found in the cassette buffer and is a machine language subroutine.

The cipher option can be found in an unused area of the 64's memory between 679 and 752 ($02A7 to $02F0). The subroutine works by looking at screen memory itself and then flipping the bits (with the EOR command) of the characters that are displayed on the screen. It does this alternately (every other byte of screen memory) with the two secret codes you entered. The first secret code is used to cipher all the odd bytes (1,3,5...), and the second code is used for the even numbers (2,4,6,...).

Hints And Tips

Remember your secret codes. If you use a different secret code when you save a notepad page than when you load it back in, the cipher will not correctly unscramble the page.

The word processor portion in the create mode is designed to be a very elementary word processor. You do not have full editing capabilities, and a few keys, like the CRSR left/right and the HOME/CLR, will not work. The inconveniences are minimal if you proofread the text as it is being created. If you make a mistake, use the DELETE key to backspace/erase and then make your corrections. To end a line, press RETURN. Don't use the last three positions (lower-right corner) on the screen. This can cause the screen to scroll, and you may lose the top one or two lines of your text.

Organization of the notepad page filenames can make things easier. For example, when saving to disk, you might want to end each filename with an EN, which stands for Electronic Notepad. That way, when you're looking at the disk directory, you'll automatically know that a filename like SPACE GAME.EN is the electronic notepad page of instructions on how to play "Space Game" on the same disk.

Don't scramble notepad pages unless absolutely necessary. The program was written using page-flipping for a specific reason. If you want to quickly load in a notepad page in the immediate mode, you can do it without running the Electronic Notepad program. First you have to fill color memory, then you can load in the notepad page. To do this, enter:

```
FORA=55296TO56319:POKEA,PEEK(646):NEXT:
LOAD"filename",dn,1
```

then press RETURN. Filename is the name of the Electronic Notepad page. The device number, dn, is 1 for tape or 8 for disk. If the page was scrambled before it was saved, you'll have to run the Notepad program to unscramble it.

You'll probably find that keeping notes or instructions on the same disks or tapes that contain your programs is a lot easier than shuffling papers and trying to keep track of handwritten notes.

See program listings on page 186.

HOW MUCH LONGER WILL YOU LAST?

How long can you endure? When will it end?... We're not talking about a new shoot'em up game for the Commodore 64, but Commodore's own disk operating system! Commodore made a great computer in the 64 but left its disk operating system out in the cold. If you've been waiting for a true disk operating system, here it is!... If you've been waiting for a great BASIC language enhancement that will let you utilize the Commodore's many special features, here it is! What is it? It's **grafDOS**, the great new utility from Xylex Software that allows the user to actually become friendly with the Commodore 64! **grafDOS** includes commands like DELETE, RENAME, CATALOG, RUN, etc. The BASIC allows you to do high resolution and low resolution graphics, sound, sprite program, plus much, much more for a total of 40 commands! Plus included in every package is MINIMON, a powerful machine language monitor that includes another 20 commands for use in machine language. The disk also comes with sample programs and demos including a great music generator! And all this together is only $49.95! How could you have lasted this long without it?

DON'T WAIT ANY LONGER!

Make your programming easier! **grafDOS** is available now at your local dealer or:

INTERESTING SOFTWARE
21101 S. Harvard Blvd.
Torrance, CA 90501
(213) 328-9422

Visa/MC/Check/Money Order
Add $2.00 shipping
CA residents add 6½% sales tax.
Dealer inquiries invited.

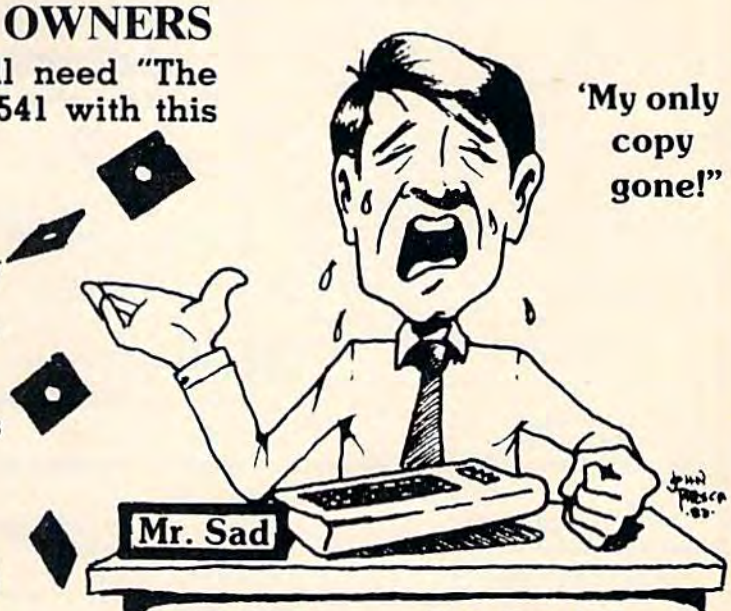
We'll back you up!

MasterCard VISA

ATTENTION COMMODORE 64 OWNERS

If you own a disk drive then you'll need "The Clone Machine". Take control of your 1541 with this package that includes:

1.) Complete and thorough users manual
2.) Copy with one or two drives
3.) Investigate and back-up many "PROTECTED" disks
4.) Copy all file types including relative types
5.) Edit and view track/block in Hex or ASCII
6.) Display full contents of directory and print
7.) Change program names, add, delete files with single keystroke
8.) Easy disk initialization
9.) Supports up to four drives



~~List $49.95~~ **Special intro $39.95**

Dealers & Distributors Inquiries Invited

CALL (201) 838-9027

MICRO WARE

**P.O. Box 113
Pompton Plains, N.J.
07444**

COMMODORE 64
(more power than Apple II at half the price)

$99.50*

- 170K DISK DRIVE $159.00*
- TRACTION FRICTION PRINTER $109.00*

COMPUTER AND SOFTWARE SALE

WE HAVE THE BEST SERVICE

WE HAVE THE LOWEST PRICES

VIC-20
(a real computer at the price of a toy)

$69.50

- 40-80 COLUMN BOARD $69.00
- 32K RAM EXPANDER $95.00

*** COMMODORE 64 COMPUTER $99.50**
You pay only $199.50 when you order the powerful 84K COMMODORE 64 COMPUTER! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your computer that allows you to SAVE OVER $100 off software sale prices!! With only $100 of savings applied, your net computer cost is $99.50!!

SOFTWARE BONUS PACK $29.95
When you buy the Commodore 64 Computer from Protecto Enterprizes you qualify to purchase ONE SOFTWARE BONUS PACK for a special price of $29.95!! Normal price is $49.95 (40 programs on disk or 24 programs on 5 tapes).

*** 170K DISK DRIVE $159.00**
You pay only $259.00 when you order the 170K Disk Drive! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your disk drive that allows you to SAVE OVER $100 off software sale prices!! With only $100 of savings applied, your net disk drive cost is $159.00.

*** TRACTION FRICTION PRINTER $109.00**
You pay only $209.00 when you order the Comstar T/F deluxe line printer that prints 8 1/2 x 11 full size, single sheet, roll or fan fold paper, labels etc. 40, 66, 80, 132 columns. Impact dot matrix, bi-directional, 80 CPS. LESS the value of the SPECIAL SOFTWARE COUPON we pack with your printer that allows you to SAVE OVER $100 off software sale prices!! With only $100 of savings applied your net printer cost is only $109.00.

80 COLUMN BOARD $119.00
Now you program 80 COLUMNS on the screen at one time! Converts your Commodore 64 to 80 COLUMNS when you plug in the 80 COLUMN EXPANSION BOARD!! List $199 **SALE $119** PLUS—you also can get an 80 COLUMN BOARD WORD PROCESSOR with mail merge, terminal emulator, ELECTRONIC SPREAD SHEET. List $49.00 **SALE $19.95** if purchased with 80 COLUMN BOARD!! (Tape or Disk)

80 COLUMNS IN COLOR
EXECUTIVE WORD PROCESSOR $69.00
This EXECUTIVE WORD PROCESSOR is the finest available for the COMMODORE 64 computer! The ULTIMATE for PROFESSIONAL Word-processing application! DISPLAYS 40 OR 80 COLUMNS IN COLOR or Black and White! Simple to operate, powerful text editing with a 250 WORD DICTIONARY, complete cursor and insert/delete key controls line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers! Includes a powerful mail merge. List $99.00 **SALE $69.00.** 20,000 WORD DICTIONARY - List $24.95 **SALE $19.95.** EXECUTIVE DATA BASE - List $89.00 **SALE $59.00.** (Disk only)

SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE COUPON with every COMMODORE 64 COMPUTER-DISK DRIVE-PRINTER-MONITOR we sell! This coupon allows you to SAVE OVER $100 OFF SALE PRICES! $200-$300 savings are possible!! (example)

PROFESSIONAL SOFTWARE
COMMODORE 64

Name	List	Sale	Coupon
Executive Word Processor	$99.00	$69.00	$59.00
Executive Data Base	$89.00	$59.00	$46.00
20,000 Word Dictionary	$24.95	$19.95	$14.95
Electronic Spreadsheet	$89.00	$59.00	$46.00
Accounting Pack	$69.00	$49.00	$32.00
Total 5.2 Word Processor			
Tape	$69.00	$56.00	$37.00
Disk	$79.95	$63.00	$42.00
Total Text 2.6 Word Processor			
Tape	$44.95	$39.00	$26.00
Disk	$49.00	$42.00	$29.00
Total Label 2.6			
Tape	$24.95	$18.00	$12.00
Disk	$29.95	$23.00	$15.00
Programmers Helper (Disk)	$59.00	$39.00	$29.95
Basic Tutor (Tape/Disk)	$29.95	$24.95	$15.00
Typing Teacher (Tape/Disk)	$29.95	$24.95	$15.00
Sprite Designer (Disk)	$16.95	$14.95	$10.00
Medicinemen (Tape)	$19.95	$17.95	$12.00
Weather War II (Tape)	$19.95	$17.95	$12.00
Professional Joy Stick	$24.95	$15.95	$11.00
Light Pen	$39.95	$19.95	$16.95
Dust Cover	$ 8.95	$ 6.95	$ 4.60

(See other items in our catalog!)
Write or call for Sample SPECIAL SOFTWARE COUPON!

EXECUTIVE QUALITY
PROFESSIONAL BUSINESS SOFTWARE

The Cadillac of business programs for Commodore 64 Computers

Item	List	*SALE
Inventory Management	$99.00	$59.00
Accounts Receivable	$99.00	$59.00
Accounts Payable	$99.00	$59.00
Payroll	$99.00	$59.00
General Ledger	$99.00	$59.00

(*COUPON PRICE $49.00)

VIC-20 COMPUTER $69.50
This 25K VIC-20 computer includes a full size 66 key typewriter keyboard color and graphics keys, upper/lower case, full screen editor, 16K level II microsoft basic, sound and music, real time floating point decimal, self teaching book, connects to any T.V. or monitor!

40-80 COLUMN BOARD $69.00
Now you can get 40 OR 80 COLUMNS on your T.V. or monitor at one time! No more running out of line space for programming and making columns! Just plug in this Expansion Board and you immediately convert your VIC-20 computer to 40 OR 80 COLUMNS!! List $129. **SALE $69.00.** You can also get an 80 COLUMN BOARD WORD PROCESSOR with mail merge, terminal emulator, ELECTRONIC SPREAD SHEET!! List $49.00. **SALE $19.95** if purchased with 80 COLUMN BOARD! (Tape or Disk).

32K RAM EXPANDER $95.00
This cartridge increases programming power over **8 times!!** Expands total memory to 57K (57,000 bytes). Block switches are on outside of cover! Has expansion port!! Lists for $199 **(OUR BEST BUY!)**

60K MEMORY EXPANDER $49.00
Sixslot — Switch selectable — Reset button — Ribbon cable — CARDCO. A must to get the most out of your VIC-20 Computer!

8K RAM CARTRIDGE $39.00
Increases programming power 2 1/2 times. Expands total memory to 33K (33,000 bytes). Memory block switches are on outside of cover! Includes FREE $16.95 game.

16K RAM CARTRIDGE $55.00
Increases programming power 4 times. Expands total memory to 41K (41,000 bytes). Memory block switches are an outside cover! CARDCO Includes FREE $29.95 adventure game!!

12" GREEN SCREEN MONITOR $99.00
Excellent quality GREEN PHOSPHOROUS VIDEO MONITOR with antiglare, 1920 characters (80 characters x 24 rows). Save your TV! a must for 80 column word processors. PLUS $9.95 for VIC 20 or Commodore 64 Cable.

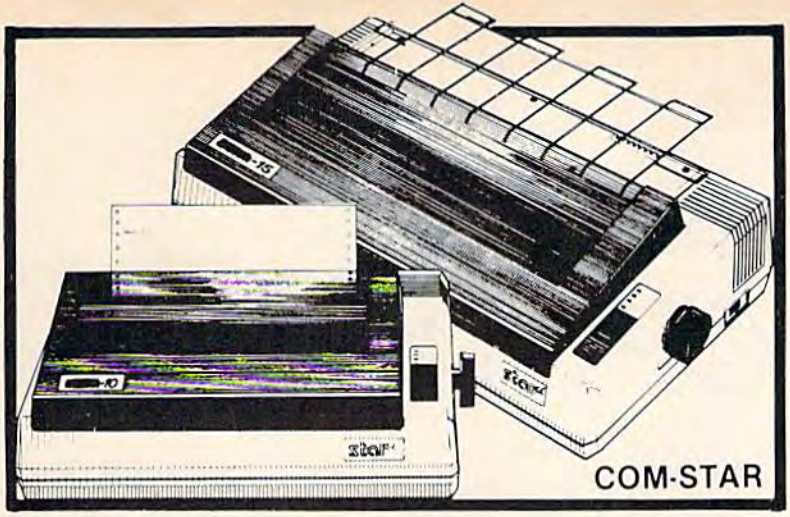
12" AMBER SCREEN MONITOR $119.00
Premium quality AMBER VIDEO MONITOR With antiglare, (80 characters x 24 rows), exceptionally clear screen, faster scanning. PLUS $9.95 for VIC 20 or Commodore 64 Cable.

• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
• BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

Add $10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $20.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. VISA — MASTER CARD — C.O.D.

PROTECTO
ENTERPRIZES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order



FANTASTIC PRINTER SALE

as low as **$149.00**

- *15 Day Free Trial - 180 Day Immediate Replacement Warranty*

	LIST	SALE
80 COLUMN THERMAL PRINTER — 60 CPS Bi-directional, dot matrix, prints 8½" letter size paper, full 80 columns, high resolution graphics, dot bit addressable, special symbols and true decenders! (Centronics parallel interface)	$199	**$149**
80 COLUMN TRACTOR-FRICTION PRINTER — 80 CPS Bi-directional, dot matrix, impact, prints single sheets, continuous feed paper, adjustable columns, 40 to 132 characters! Roll paper adapter $32.95. (Serial or Centronics parallel interface)	$399	**$209**
PREMIUM QUALITY 10" CARRIAGE T/F PRINTER — 120 CPS Bi-directional, impact, 9 x 9 dot matrix with double strike for 18 x 18 dot matrix. High resolution bit image (120 x 144 dot matrix) underlining back spacing, left and right margin settings, true lower decenders, with super and sub scripts. Prints standard, italic, block graphics, special characters, plus 24 of user definable characters and much more!! Prints single sheets, continuous feed and roll paper! (Centronics parallel interface)	$499	**$289**
PREMIUM QUALITY 15½" CARRIAGE PRINTER — 120 CPS Has all the features of the Premium Quality 10" Carriage T/F Printer above plus a 15½" carriage and more powerful electronic components to handle large business forms! (Centronics parallel interface)	$599	**$379**
HIGH SPEED PREMIUM QUALITY T/F 10" PRINTER — 160 CPS Save printing time with these plus features: 160 CPS speed, 100% duty cycle, 8K buffer diverse character fonts special symbols and true decenders, vertical and horizontal tabs. This is Red Hot Efficiency!!! (Serial or Centronics parallel interface)	$699	**$499**
HIGH SPEED PREMIUM QUALITY T/F 15½" PRINTER — 160 CPS Has all the features of the 10" Carriage high speed printer plus a 15½" carriage and more powerful electronics to handle larger business forms! (Serial or Centronics parallel interface)	$799	**$599**

PARALLEL PRINTER INTERFACES: (IN STOCK)

- For VIC-20 and COMMODORE 64 **$49.00**
- For all APPLE COMPUTERS **$69.00**
- For ATARI 400 and 800 COMPUTERS **$79.00**

NOTE: *Other printer interfaces are available at computer stores!*

SALE SALE

WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D.

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010

Phone 312/382-5244 to order

Alpha-Shoot

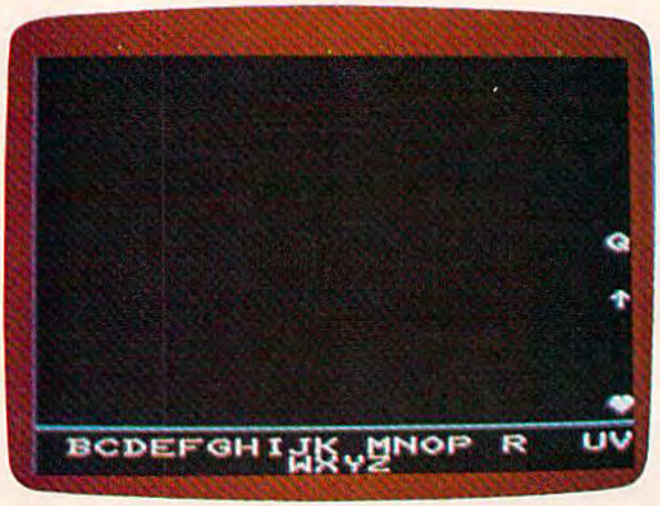
Neil T. Capaldi

The author wrote this educational game for the unexpanded VIC-20; we've added a version for the Commodore 64. It works with either keyboard controls or a joystick.

"Alpha-Shoot" is a game I wrote for my son to help him learn and recognize the letters of the alphabet.

The object of the game is to line up the heart-shaped character at the bottom of the screen with the letter displayed above. The heart can be moved left or right with the C and B keys or with the joystick. (With the Commodore 64 version, plug the joystick into port 2.)

Pressing the space bar or joystick fire button shoots an arrow up the screen. As each letter is hit, it explodes and is placed in alphabetic order at the bottom of the screen. When all the letters in the alphabet have been "captured" this way, the game redisplays the alphabet to the familiar children's tune of "Twinkle Twinkle Little Star."



Taking aim at a Q in the VIC version of "Alpha-Shoot."

Four Games In One

Alpha-Shoot has four possible variations. When you first run the program, it asks you to choose from these four options:

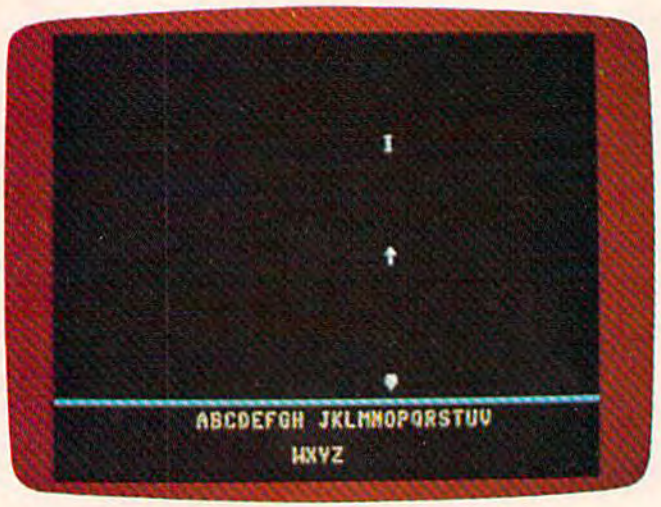
1. The letters of the alphabet are displayed randomly.

2. Letters are displayed in alphabetic order, A-Z.

3. The letter to be displayed can be selected from the keyboard.

4. Letters are displayed randomly and move across the screen.

Parents should select the variation they want and have the child name each letter as it appears on the screen. Also, children can learn alphabetic order by singing along as it is played.



"Alpha-Shoot," 64 version.

See program listings on page 199.