

Inexpensive Word Processors For VIC And 64

COMPUTER'S GAZETTE™

\$2.50
October 1983
Issue 4 Vol. 1, No. 4
63380 \$3.25 in Canada

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

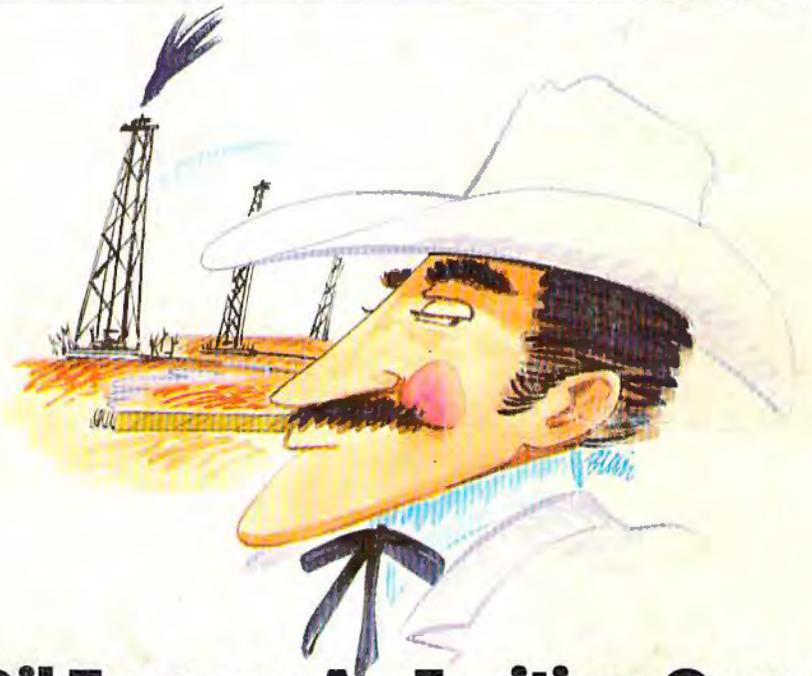
Speeding Up The VIC-20

A simple programming technique can speed up your games and other programs – without machine language.

Educational Games Aardvark Attack & Word Match



In Aardvark Attack, mutant space creatures are threatening your cities with alphanumeric weapons.... Can you find the right letter-number combinations to defuse the bombs? Or, test your concentration skills with Word Match.



Oil Tycoon: An Exciting Game For VIC And Commodore 64

So, you think the big oil barons have it made? Wait until you play this strategy game and have to cope with the problems

of exploration, limited drilling capacity, dynamite shortages, shrinking resources – even underground devils.

Also In This Issue

**How To Use
Files With
Disk And Tape**

**Horizons: 64
By Charles Brannon**

**Best-Selling
Software, Reviews,
And More**

Understanding Sound On The Commodore 64

The 64's sound is the best of any home computer, but it's hard to master. Part I of this new series explains how the built-in synthesizer works and includes programs so you can experiment yourself.



WORD PROCESSING HAS NEVER BEEN SIMPLER

*Coming Soon
for the
Commodore 64*



Brøderbund's Bank Street Writer turns your Apple or Atari computer into a powerful word processor, with many of the advanced features you'd expect to find only in an expensive business system. Powerful, yet purposefully simple, Bank Street Writer has no complex codes to memorize. The screen guides you every step of the way. It's everything you're ever likely to need in a word proces-

sor at a price you can afford. Here are just a few of its many features:

- Add, move, insert and erase blocks of text,
- Universal search and replace,
- Automatic centering and indent,
- Automatic word wrap, so you don't have to hyphenate or "return" at the end of each line,
- Potent print format routines all in memory,
- Disk storage and retrieve

functions with password protection, • Document chaining allows you to print documents of unlimited length, • Page headers and automatic page numbering — top or bottom, • Highlighting of text, • Upper and lowercase without additional hardware.

Brøderbund's Bank Street Writer comes complete with Tutorial and Utility programs, a comprehensive reference man-

Bank Street WRITER™

ual and a free back-up disk.

Student approved, the entire system has been extensively tested by Bank Street

College of Education and Intentional Educations.

Bank Street Writer. The ground-breaking, sensible combination of word processing power, thoughtful design, and exceptional value.

The First Word Processor For The Entire Family.

Hardware requirements: Apple version requires Apple IIe or 48K Apple II Plus or 48K Apple II with Applesoft in ROM or RAM, and a 16 sector

controller. Atari 400/800/1200XL version requires 48K (BASIC cartridge for use of tutorial). Both versions require only one disk drive.

 **Brøderbund Software**

17 Paul Drive, San Rafael, CA 94903, Telephone (415) 479-1170

Apple is a registered trademark of Apple Computer, Inc. Atari is a registered trademark of Atari, Inc. Commodore 64 is a registered trademark of Commodore Electronics Ltd.

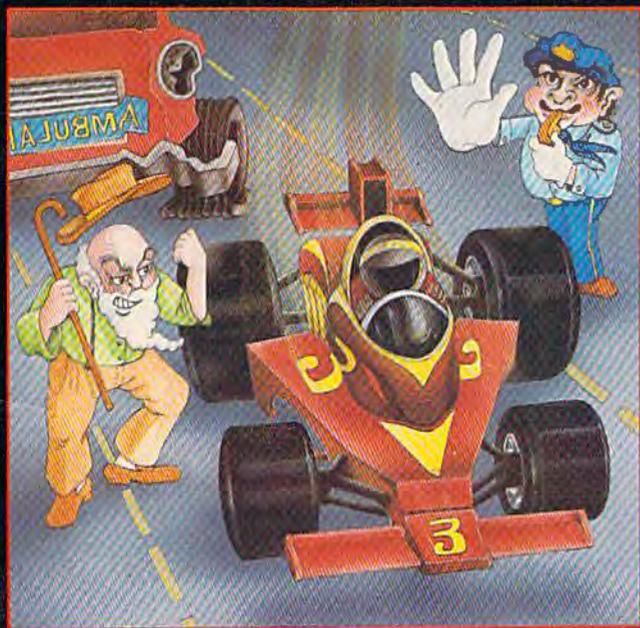
T&F
SOFTWARE

Two Hot New Action Games!

FOR COMMODORE 64

Speed Racer

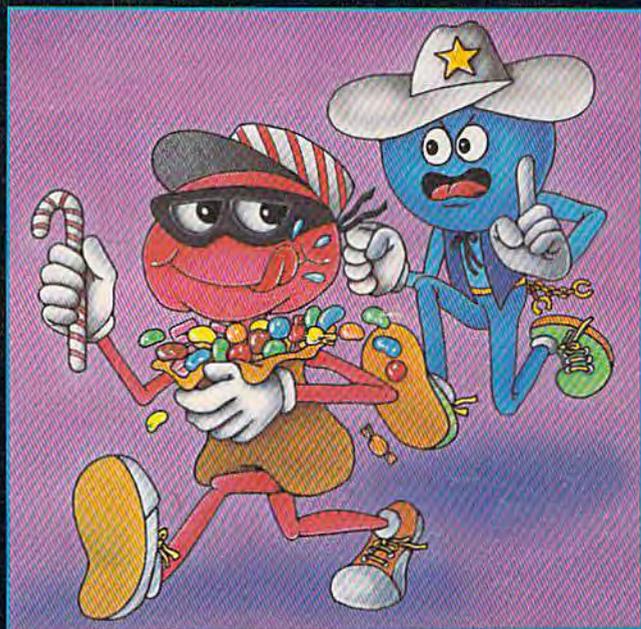
\$29.95



Feel like a devil today? Better adjust your halo. Start the ignition. It's up to you to decide... Okay, hit the accelerator. You can be the ultimate speed demon or put wings on your wheels! There's a pedestrian now... will you go for speed, no matter what pedestrians are in the way (for the devilish points)— or be an angel in a challenging obstacle course? The heavenly points may get you to heaven, but the devilish points may get you to... well, better make your decision— the time clock is running!

Candy Bandit

\$29.95



So your sweet tooth has gotten out of hand again? Well, this time the sheriff is after you and he's no sweetheart. There he is now! Quick! Grab all the candy in sight and dive for the doorway! Don't look now, the doors are rotating... better be good at getting out of sticky situations, 'cause if you hit the wall you're stuck with it! There's plenty of candy here and many more levels to cross, so get on the move, sugar!

Available at finer Software Stores everywhere.

OR CALL (213) 501-5845 FOR THE NAME OF YOUR LOCAL DEALER OR DISTRIBUTOR.

T&F
SOFTWARE

T&F Software Company 10902 Riverside Drive / North Hollywood, California 91602. (213) 501-5845

© COPYRIGHT 1983 CHRIS WARLING. SPEED RACER AND CANDY BANDIT ARE TRADEMARKS OF CHRIS WARLING LICENSED TO T&F SOFTWARE. COMMODORE 64® IS A REGISTERED TRADEMARK OF COMMODORE COMPUTER, INC.

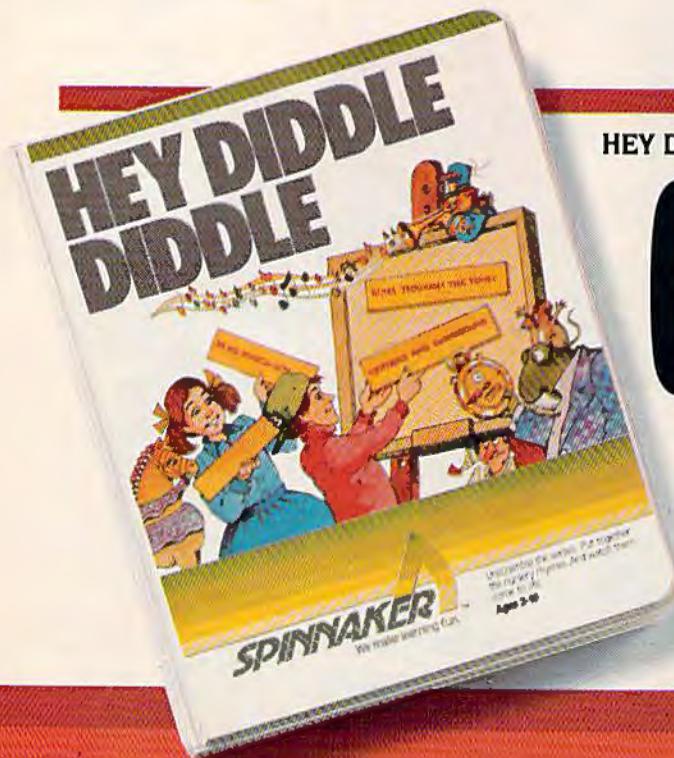
SPINNAKER'S LINE OF EARLY LEARNING GAMES IS GROWING AS FAST AS YOUR CHILD'S MIND.

Watching your kids grow up is a lot of fun. But making sure their minds grow as fast as their bodies is even more rewarding. That's where we can help. With a growing line of Early Learning Programs that are not only lots of fun to play, but also educational.

Some of the games you see on these two pages help exercise your child's creativity. Others help improve vocabulary and spelling skills. While others

improve your child's writing and reading abilities. And all of them help your child understand how to use the computer.

So if you're looking for computer programs that do more than just "babysit" for your kids, read on. You'll find that our Early Learning Programs are not only compatible with Apple®, Atari®, IBM® and Commodore 64™ computers, but also with kids who like to have fun.

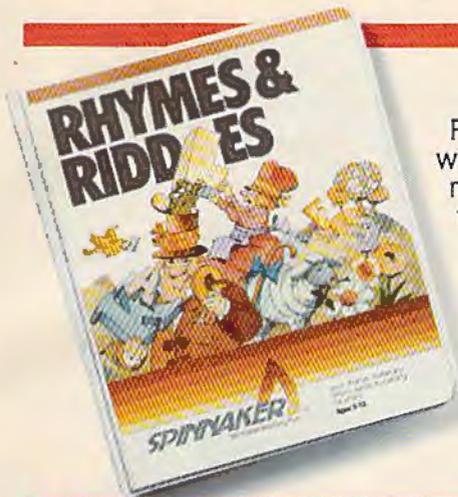


HEY DIDDLE DIDDLE™ Poetry in motion. Ages 3 to 10.



Kids love rhymes. And since HEY DIDDLE DIDDLE features 30 classic rhymes with full color graphics and the neatest computer music you've ever heard, it makes rhyme games more fun than ever before.

Plus, it makes it fun for kids to read, helps them understand how words and rhymes create poetry and lets them take fragmented thoughts and rearrange them to form coherent verse.



RHYMES & RIDDLES™ come to life. Ages 5 to 9.

RHYMES & RIDDLES will delight your children. Because when they successfully complete the rhymes, riddles, and famous sayings on the screen, they'll see



and colorful pictures. And RHYMES & RIDDLES not only teaches children the correct lyrics to nursery rhymes and famous sayings. It also helps kids learn to read and spell while they're having fun! That's why parents like RHYMES & RIDDLES, too!

KINDERCOMP™ Numbers, shapes, letters, words and drawings make fun. Ages 3 to 8.

KINDERCOMP is a game that allows very young children to start learning on the computer. It's a collection of learning exercises that ask your children to match shapes and letters, write their names, draw pictures, or fill in missing numbers. And KINDERCOMP will delight kids with color-



ful rewards, as the screen comes to life when correct answers are given.

As a parent, you can enjoy the fact that your children are having fun while improving their reading readiness and counting skills.



FACEMAKER™ makes faces fun. Ages 4 to 12.

FACEMAKER lets children create their own funny faces on the screen. Once a face is completed, your children will giggle with delight as they make it do all kinds of neat things: wink, smile, wiggle its ears, or whatever their imagination desires.

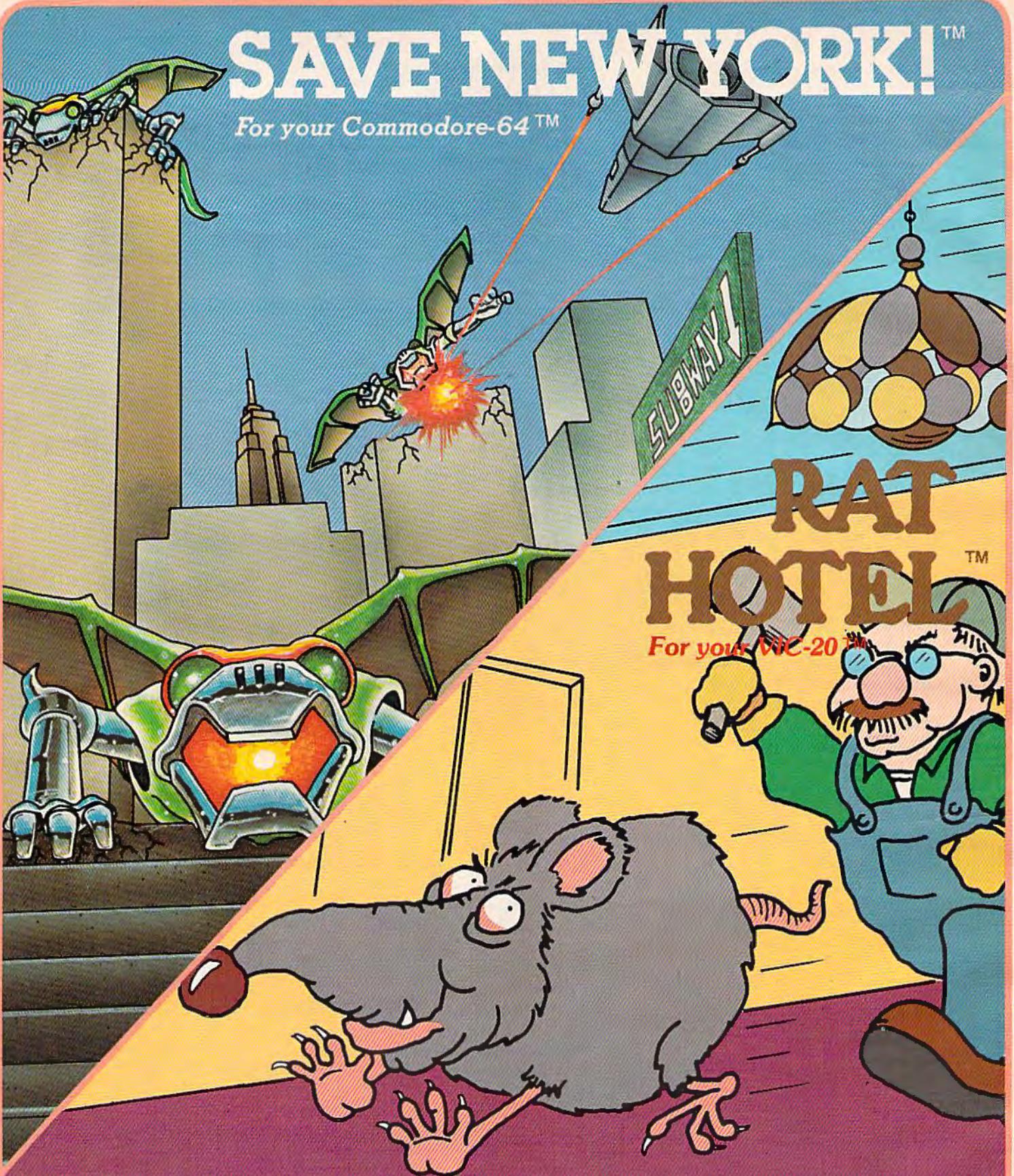


Plus, FACEMAKER helps children become comfortable with computer fundamentals such as: menus, cursors, the return key, the space bar, simple programs, and graphics. FACEMAKER won't make parents frown because their children will have fun making friends with the computer.



SAVE NEW YORK!™

For your Commodore-64™



RAT HOTEL™

For your VIC-20™

 **CREATIVE SOFTWARE**
A Division of ASCI, Inc.

RAT HOTEL™ and SAVE NEW YORK!™ are trademarks of Creative Software.

Commodore®, VIC-20®, and Commodore 64® are trademarks of Commodore Electronics, Ltd.

230 E. Caribbean Drive • Sunnyvale, CA 94089

FEATURES

The Anatomy Of Computers <i>Tom R. Halfhill</i>	23	*
Telegaming Today And Tomorrow <i>John Blackford</i>	32	*
The Automatic Proofreader: Banish Typos Forever! <i>Charles Brannon</i>	48	*
Bargain Software For The 64: Commodore's Public Domain Programs <i>John Blackford</i>	90	64

GAMES

Oil Tycoon <i>Gordon F. Wheat</i>	52	V/64
Re-Beep <i>Robert L. Lykins</i>	58	V/64
Inside View: Programmer Marc Blank <i>Kathy Yakal</i>	64	*

REVIEWS

A Survey Of Inexpensive Word Processors For VIC And 64 <i>Larry L. Bihlmeyer & Kathy Yakal</i> ..	94	V/64
<i>WordPro 3 Plus/64</i> <i>Dan Carmichael</i>	101	64
<i>Fast Eddie</i> For VIC And 64 <i>Tony Roberts</i>	102	V/64

EDUCATION/HOME APPLICATIONS

Computing For Kids: From Dinosaurs To Freckles <i>Fred D'Ignazio</i>	68	*
Aardvark Attack <i>Todd Heimarck</i>	74	V
Word Match <i>Andy VanDuyn</i>	80	V/64
Computing For Grownups: Giants And Dwarfs <i>Fred D'Ignazio</i>	84	*

PROGRAMMING

Hints & Tips: A SHIFTy Solution <i>Steven Darnold</i>	105	V/64
The Beginner's Corner: Program Transfer <i>C. Regena</i>	106	V/64
Machine Language For Beginners: Windows And Pages <i>Richard Mansfield</i>	112	V/64
Power BASIC: Improved Paddle Reader Routine <i>Dan Carmichael & Tom R. Halfhill</i> ..	117	V/64
How To Use Tape And Disk Files <i>Richard Mansfield</i>	118	V/64
Understanding Sound On The Commodore 64: Part I <i>Gregg Peele</i>	131	64
Speeding Up The VIC <i>Dan Carmichael</i>	134	V

DEPARTMENTS

The Editor's Notes <i>Robert Lack</i>	6	*
Gazette Feedback <i>Editors & Readers</i>	10	*
Simple Answers To Common Questions <i>Tom R. Halfhill</i>	18	*
HOTWARE: This Month's Best Sellers <i>Kathy Yakal</i>	42	*
Horizons: 64 <i>Charles Brannon</i>	124	64
VICreations: Keeping Time With The VIC <i>Dan Carmichael</i>	127	VIC
News & Products	136	*

PROGRAM LISTINGS

Bug-Swatter: Modifications & Corrections	142	*
A Beginner's Guide To Typing In Programs	143	*
How To Type In COMPUTE!'s Gazette Programs	144	*
Program Listings	145	*
Product Mart	156	
Advertisers Index	160	

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

THE EDITOR'S

notes

The acceleration of Commodore personal computer sales continues. Our reading indicates that VIC-20 sales are not slowing down at all, and Commodore 64 sales are increasing. Best estimates are that by the end of 1983 we'll have an installed base of between 2,000,000 and 2,500,000 VICs and 64s. That is a lot of users. What does it mean for you existing owners? Well, first of all, you'll have to balance your feelings about the declining prices of the hardware with the realization that if you'd waited you wouldn't have been this far along in learning to use your computer. More importantly, for the future, it means you'll see more and better software and support materials at more reasonable prices. That should be the true benefit of this rapid expansion in the installed base. Increasing quality and declining prices... we'll keep our fingers crossed.

By the time you read this, our first two books for the Commodore 64 will be released, plus our second and third books for the VIC-20. Among the September/October titles being released by COMPUTE! Books are *First Book of VIC Games*, *Second Book of VIC*, *First Book of the Commodore 64*, *VIC Games For Kids*, *First Book of Commodore 64 Games* and *Creating Arcade Games on*

the VIC. They're all of the same level of quality you've come to expect from COMPUTE! Publications, Inc. Check your local book or computer store for availability.

Automatic Proofreader, by Charles Brannon, appears in this issue. Those of you who have experienced problems with typing errors, etc., while entering programs will be quite pleased. This program literally checks *each* line of the program and lets you know if the line has been correctly entered. While the concept is not unique, the most useful part of the process is that it lets you know after each line is entered rather than waiting until all lines are entered. Thus, if a line is entered incorrectly, you can fix it immediately. Read Charles's article for full details.

Within the next few weeks, many of you will be receiving a reader survey (if you haven't already). Please take the few minutes necessary to fill out and return the questionnaire. It's invaluable to us in profiling you, our active readers.

Horizons: 64, our new column for 64 owners will now begin appearing each month. Horizons will be authored by Charles Brannon on a regular basis, replacing Larry Isaac's column, "64 Explorer." For you

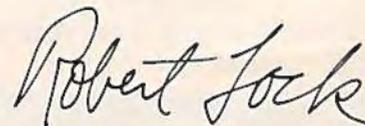
devoted fans of Larry's insight into the inner workings of the 64, don't despair, he's moved the column to COMPUTE! on a monthly basis. We felt that with this move, Larry could turn to the more technical side of the 64 where he excels.

Our growing editorial staff is in need of experienced writers. Our offices are located in Greensboro, NC, an excellent area to live and work. If you have a writing or journalistic background, and experience in the personal computer field, we'd like to see your résumé. Please send it along, in complete confidence, to:

COMPUTE! Publications, Inc.
Attn: Personnel Director
Post Office Box 5406
Greensboro, NC 27403

COMPUTE! has an excellent working environment, currently a staff of 80+, and as a division of American Broadcasting Companies (ABC) offers an excellent benefits package as well. We look forward to hearing from you.

Until next issue, enjoy your Gazette.



Editor In Chief

HEY!

**COM 64
VIC 20
APPLE
ATARI
OWNERS**



MEET

**SAMMY
LIGHTFOOT**
TM

OUR HOT NEW STAR!

SIERRAVISION™

TM designated a trademark of SIERRA ON-LINE, INC.

Sierra On-Line Building, Coarsegold, CA 93614

(209) 683-6858

 **Sierra
ON-LINE INC**

Publisher Gary R. Ingersoll
Editor in Chief Robert C. Lock
Publisher's Assistant Alice S. Wolfe
Senior Editor Richard Mansfield
Managing Editor Kathleen E. Martinek
Art/Design Director Georgia Papadopoulos

Editorial

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

Assistant Editors

Dan Carmichael (Publications), Stephen Levy, Gregg Keizer (Books), Lance Elko (Publications), Kathy Yakal, Editorial Assistant (Features)

Programming Assistants

Patrick Parrish, Gregg Peele, Jonathan Byrd, Dale McBane

Copy Editing/Proofreading

Juanita Lewis (Assistant), Becky Hall, Sarah Johnston, Linda Shaw

Administrative Staff

Vicki Jennings, Laura MacFadden, Carol Eddy, 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, Typesetting

Artists

Leslie Jessup, Cindy Mitchell (Publications), Janice Fary (Books); Todd Heimark, Promotions Assistant; Harry Blair, Illustrator

Operations/Customer Service

Carol Lock, Manager; Assistants: Patty Jones, Shannon Meyer; Dealer Coordinator, Fran Lyons; Assistants: Gail Jones, Sharon Minor

Customer Service Staff

Chris Gordon, Dorothy Bogan, Cassandra Robinson, Chris Patty, Rhonda Savage, Lisa Flaharty, Anita Roop, Mary Sprague, Carol Dickerson, Sharon Sebastian, Jim Coward (Warehouse Manager), Larry O'Connor, Chris Cain, Dai Rees, Jack McConnell

Data Processing

Leon Stokes, Manager; Joan Compton, Assistant

Accounting

W. Jerry Day, Manager; James M. Hurst, Comptroller; Assistants: Linda Miller, Doris Hall; Staff: Ruth Granger, 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

Vice President of Finance W. Jerry Day

Comptroller James M. Hurst

Executive Assistant Sonja Whitesell

Assistant Debi Nash

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.

Authors of manuscripts warrant that all materials submitted to COMPUTE!'s Gazette are original materials with full ownership rights resident in said authors. By submitting articles to COMPUTE!'s Gazette, authors acknowledge that such materials, upon acceptance for publication, become the exclusive property of COMPUTE! Publications, Inc. No portion of this magazine may be reproduced in any form without written permission from the publisher. Entire contents copyright © 1983, COMPUTE! Publications, Inc. Rights to programs developed and submitted by authors are explained in our author contract. Unsolicited materials not accepted for publication will be returned if author provides a self-addressed, stamped envelope. Where programs are included in an article submission, a tape or disk must accompany the submission. Printed listings are optional, but helpful. Articles should be furnished as typed copy (upper and lowercase, please) with double spacing. Each article page should bear the title of the article, date, and name of the author. COMPUTE! Publications, Inc., assumes no liability for errors in articles or advertisements. Opinions expressed by authors are not necessarily those of COMPUTE! Publications, Inc.

PET, CBM, VIC-20, and Commodore 64 are trademarks of Commodore Business Machines, Inc., and/or Commodore Electronics Limited. Other than as an independent supplier of quality information and services to owners and users of Commodore products, COMPUTE! Publications, Inc., is in no way associated with Commodore Business Machines, Inc., or any of its subsidiaries.

WordPro 3 Plus/64™

The Best Word Processor for your Commodore 64™

Now
available
for as low as
\$89.95



When choosing a Word Processor for your Commodore 64 computer, there's no reason to settle for anything but the best—in a word... WordPro™.

With over 30,000 happy WordPro clients churning out letters and documents all over the world, the WordPro Plus™ Series is unquestionably the #1 selling software package on Commodore computers! So when you choose WordPro, you know you're investing in a trial-tested program that's a real winner. And WordPro 3 Plus/64 is NOW available for your Commodore 64 computer at prices as low as \$89.95.

Designed for the novice user with no computer or word processing experience whatsoever, WordPro 3 Plus/64 brings a whole new dimension to the term "user-friendly." More than just easy to use, WordPro 3 Plus/64 is a commercial level word processor loaded with powerful features including: Auto Page Numbering,

Headers and Footers, Math Functions, Global Search and Replace, the Ability to Create Multiple Personalized Letters and Documents, Underlining, Boldface, Super and Subscripts and much, much, more.

Best of all, WordPro 3 Plus/64's powerful arsenal of features can be put to use almost immediately—by even the novice user. So whether you're a writer, in business, education, or just a hobbyist, you'll quickly become a WordPro Pro!

Invest in the best... WordPro Plus. In a class by itself.
Call us today for the name of the WordPro 3 Plus/64 dealer nearest you.

Professional Software Inc.

51 Fremont Street
Needham, MA 02194

(617) 444-5224
Telex: 951579

WordPro 3 Plus/64™ is a trademark of Professional Software Inc.

The WordPro Plus Series was designed and written by Steve Punter of Pro-Micro Software Ltd.

Some printers may not support certain WordPro 3 Plus/64 functions and/or require an interface. Please check with your dealer.

Commodore 64™ is a trademark of Commodore Electronics Ltd.

Dealer and Distributor inquiries are invited.

GAZETTE FEEDBACK

EDITORS AND READERS

Do you have a question or a problem? Or 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 for Commodore? "Gazette Feedback" wants to hear from you.

Pinning Down A Problem

I recently purchased a Commodore Video Monitor model 1701 to use with my Commodore 64 computer. The monitor came with a connecting cable that runs from the audio/video connector at the back of the computer to the audio/video terminals on the front of the monitor. The monitor user's manual mentions a three-jack cable that interfaces with the three terminals (audio, luma, chroma) on the back of the monitor. The interface is supposed to provide better screen resolution than the front connections.

The manual mentions that the computer must have an eight-pin audio/video connector to do this, and my computer has a five-pin arrangement. My question: Is there a cable available that will permit connecting a five-pin 64 to the monitor's three rear terminals, thereby improving the monitor's resolution? I have heard that such a device exists, but I have not seen it advertised anywhere. Can you provide any information on this subject?

Bruce D. Perine

We're glad you asked this question, because the answer is one of the best hints we've run across in some time. The following was conveyed to us by Associate Editor Jim Butterfield. Yes, you can connect your five-pin 64 to the Commodore 1701 color monitor while greatly improving the picture quality. And it can be done without an external interface. But first, a brief explanation of the 1701 monitor and what the various connections are for.

The two inputs on the front of the monitor (VIDEO and AUDIO) are easily connected to the Commodore 64 with the cables Commodore includes with the purchase of the monitor. The problem with these connections is that they do not allow you to get the best picture available from your 64. Without being too technical, this is because the VIDEO plug mixes two signals together, the chrominance and luminance. Briefly, the chromi-

nance is the "color" in the color signal, and the "luminance" is the brightness. When these signals are mixed together, it causes a slight degradation of both which produces a less than optimal picture.

However, the 1701 color monitor has three connections in the rear: CHROMINANCE, LUMINANCE, and AUDIO. This allows you to perform the hookup without mixing signals. The hookup can be made without an interface, but you will have to buy a new cable, or make one yourself.

Here's how to hook it up. First, turn off and unplug the computer and monitor. Second, flip the switch on the back of your monitor labeled "Signal Select" to the "Rear" position. When this switch is set for "Rear Select," the connectors on the front of the monitor are disabled and vice versa.

Now purchase an all-purpose "octopus" type computer hookup cable at your local computer or electronics dealer. This cable should have the standard five-pin DIN plug (see your Commodore 64 User's Manual) on one end, and four RCA-type plugs at the other. Connect three of the plugs to the CHROMA, LUMA, and AUDIO connectors at the rear of the monitor. The fourth is left unconnected. Although your cable color coding may be different, the ones we have here at COMPUTE!'s Gazette hook up as follows: white to CHROMA, red to LUMA, and black to AUDIO. If the connector colors on your cable are different, you can experiment with different hookup patterns until the best picture/audio combination is achieved. Switching plugs around shouldn't be harmful to the computer or monitor, but don't touch the center pin of any connector to any ground source or to any metal surface.

If you cannot find a general-purpose connecting cable at your local store, you can make one yourself or have your local Commodore dealer do it for you. Check the Commodore 64 Programmer's Reference Guide for complete details. Briefly, you need to wire three RCA-type plugs to the DIN connector at pins 1 (luminance), 3 (audio output), and 4 (video out). Pin 2 is your ground. The plug from pin 1 will connect to LUMA on the monitor, pin 3 to AUDIO, and pin 4 to CHROMA. No interface is required between the 64 and the 1701 monitor. After you have successfully completed all the connections, readjust the settings on your monitor for the best picture.

It can be well worth the time and cost to perform these new connections. Buying the pre-wired all-purpose

Presenting

the class

of 64.



The Commodore 64™ is one of the most exciting home computers in memory.

But memory isn't the only thing that's exciting about the 64. Because Tronix is here.

Class act.

The people who have been bringing out the best in the VIC 20™ (and Atari®, too) have graduated to the Commodore 64.

Which means that now you can enjoy fast action, complex strategies, interesting characters, superior sound effects and challenging, play patterns.

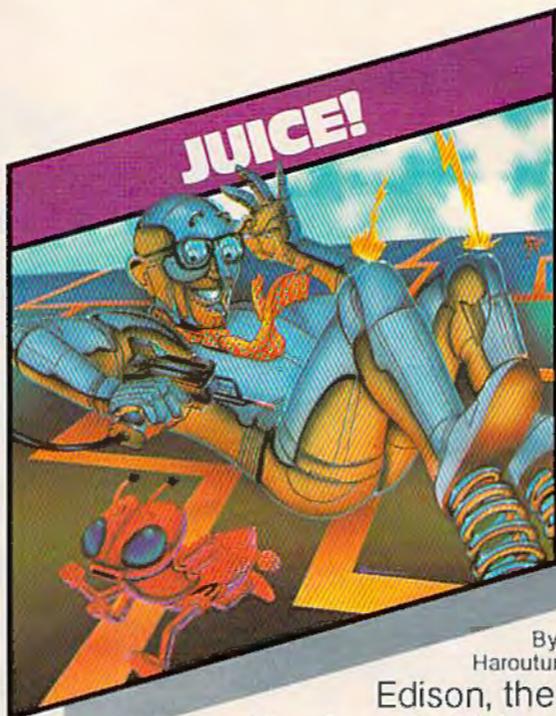
Just like VIC 20 and Atari owners. Only faster, more complex, and more challenging, too.

More memorable, in other words.

In a class by ourselves.

Of course, if you'd rather not take our word for it, you don't have to. The experts at Electronic Games have called *Kid Grid* for Atari "one of the most compulsive, utterly addictive contests in the world of computer gaming."

They haven't seen anything yet.



By Arti Haroutunian.

Edison, the kinetic android, leads a frustrating life.

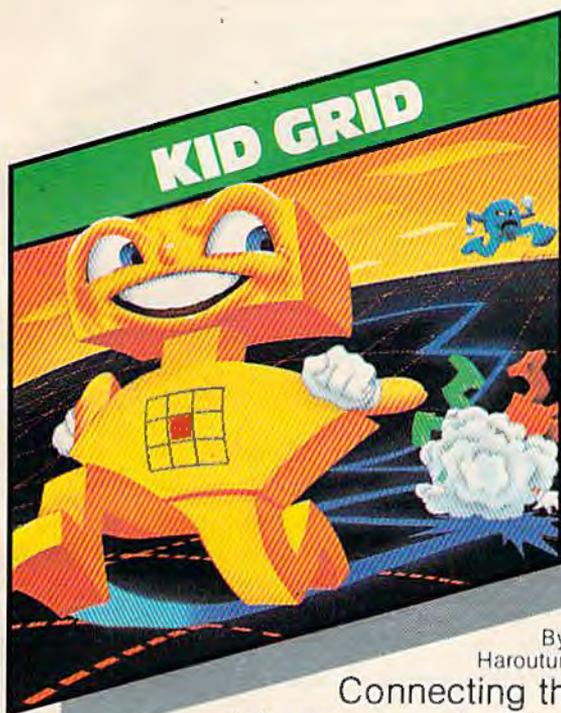
All he wants to do is build his circuit boards and go with the flow. But things keep getting in the way.

Nohms—a negative influence—bug him constantly. Flash, the lightning dolt, disconnects everything in his path.

And the cunning Killerwatt is out to fry poor Edison's brains.

You'll get a charge out of this one. And a few jolts, too!

(Suggested retail \$34.95)



By Arti
Haroutunian.

Connecting the dots on our colorful grid should be easy, right?

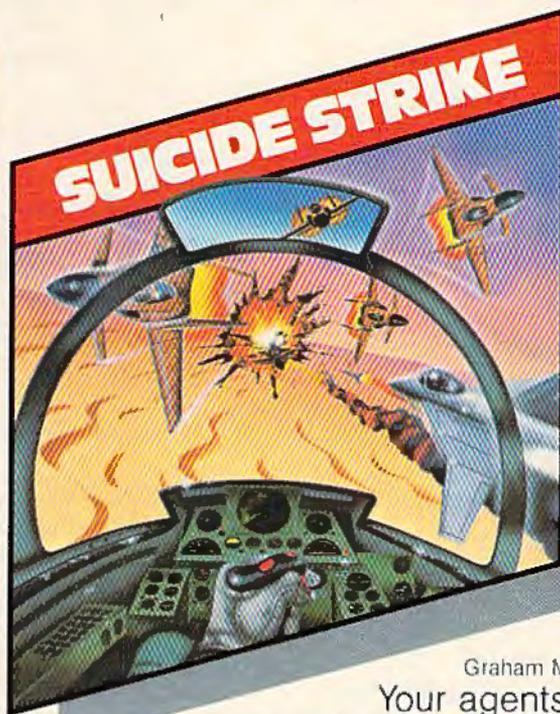
Wrong. Because the bullies are in hot pursuit!

Squashface, Thuggy, Muggy and Moose are their names. And *you* are their game. And what's more, they're faster than you are.

But you're smarter. And you control the stun button.

So keep your eyes peeled for the mysterious question mark and don't slow down at corners!

(Suggested retail: \$34.95)



By
Graham McKay.

Your agents risked their lives to find the enemy's secret headquarters.

Now you're risking yours to destroy it.

And they know you're coming. As you fly over water and across hundreds of miles of unfriendly territory, the action is thick, fast and three-dimensional.

Fighter aircraft. Surface-to-air missiles. Helicopter gunships. The attacks come from every direction.

Even from behind.

(Suggested retail: \$34.95)

TROLLIX™

8295 South La Cienega Blvd., Inglewood, CA 90301

VIC 20™ and Commodore 64™ are trademarks of Commodore Electronics Ltd.
Atari™ is a registered trademark of Atari, Inc.

cable or constructing it yourself should cost you no more than \$10, and believe us, it's well worth it. The improvements in picture sharpness, clarity, and color are magnificent. For more information on Commodore 64 video, see the new column "Horizons: 64" premiering this month.

Partial Screen Clears

I have a new Commodore 64. I have used a Radio Shack TRS-80 Model III for three years. I have three programs which use the split screen, containing calculated data at the top which is updated by questions on the bottom of the screen. Is there any way to change the HOME/CLR address on the Commodore 64 so that the lower part of the screen can be cleared without changing the upper section? Tandy MicroSoft BASIC allows CHR\$(30) to clear to end of line and CHR\$(31) to clear to end of screen. It also allows up to seven lines to be reserved from the CLS (clear screen) operation.

John R. Land

Commodore 2.0 BASIC (as found in the VIC-20 and 64) does not support partial clearing of the screen. However, you can write this option into your program with one FOR/NEXT loop and a POKE. The way to do this is to POKE blanks (screen display code 32) to the area of screen memory you want to clear. If, for instance, you would like to clear only the bottom half of your screen, include this line in your program:

```
60000 FOR A=1544 TO 2047: POKE A,32: NEXT A
```

Following is a short, simple machine language routine that you can add to your programs. When you want to clear the bottom three-quarters of your screen, include SYS49152 in your program; to clear the last half, SYS49162; and to clear only the last quarter, SYS49172. The machine language routine will LOAD into memory at 49152 and will not interfere with your BASIC program.

```
60000 FORA=49152TO49183:READB:POKEA,B:NEXT
T :rem 53
60010 DATA 162,0,169,32,157, 24, 5, 232
:rem 226
60020 DATA 208,250,162,0,169,32,157, 8
:rem 26
60030 DATA 6,232,208,250,162,0, 169, 32
:rem 19
60040 DATA 157,248,6,232,208,250, 96, 0
:rem 32
```

DOS Woes

When I first bought my VIC-20, I was very impressed with it, and I still am. But the more I work with the Disk Operating System (DOS), the less impressed I am. I have had some problems with the system, and I would appreciate your help.

When I use the "save and replace" (SAVE "@:filename") as outlined on page 13 of the 1541 User's Manual, more than three times it has started replacing the programs saved immediately before

it without changing the names in the directory. So eventually I have the same program under several different names, and I lose the original programs. I think this is a ROM problem. Because I purchased the disk drive by mail order, no local authorized service center is willing to work on it (because I did not purchase the drive from them). Can you help?

Stephen Johnson

First, don't have your drive repaired. The cause for the errors while using the "save and replace" command is in Commodore's DOS, not your drive.

Some of Commodore's disk drives through the years have had some problems with this option. The first drives to exhibit this problem were the dual 2040's. Although the updated DOS found in the VIC-1540 and 1541 disk drives was supposed to correct this problem, it has not. Problems with the save and replace command still occur now and then.

The best solution is simply to stay away from this command. Instead, save your programs with "generation" identifiers. For instance, use names such as "program.g1" or "program.g2". When you look at your directory, you will be able to tell which is the most recent update by the generation numbers. Erase earlier generations with the SCRATCH command.

It may be a bit more inconvenient this way to keep your disks clean of unwanted, outdated revisions, but it's a lot better than losing that favorite program of yours altogether.

WordPro Colors

I have recently purchased a word processor (WordPro 3 Plus/64) for my Commodore 64. I find that the software automatically chooses white text on light blue background rather than light blue text on a dark blue background as programmed by the manufacturer. Is there any way of choosing light blue text rather than white? The resolution on my set seems to work better with light blue text on a dark blue background.

Also, is it possible to make a backup disk of this program, or is it made not to be copied?

Robert A. Konkol

Yes, it is possible to change the color combinations while working with WordPro, and the color change options are part of the WordPro program. Instructions can be found on pages 2-17 of your WordPro 3 Plus/64 User's Manual. Briefly, it's done with the special function keys (F-keys). Press CTRL, then f-1, to change the text colors, press CTRL - F-3 to change the screen colors, and press CTRL - F-5 to change the border colors. (For more information on the WordPro 3 Plus/64 word processor, see the review in this issue.)

As to your second question, WordPro cannot be copied. This program, as well as the majority of other commercial programs available on disk, is engineered to be copy-proof. This is how companies protect their copyrights. ☐

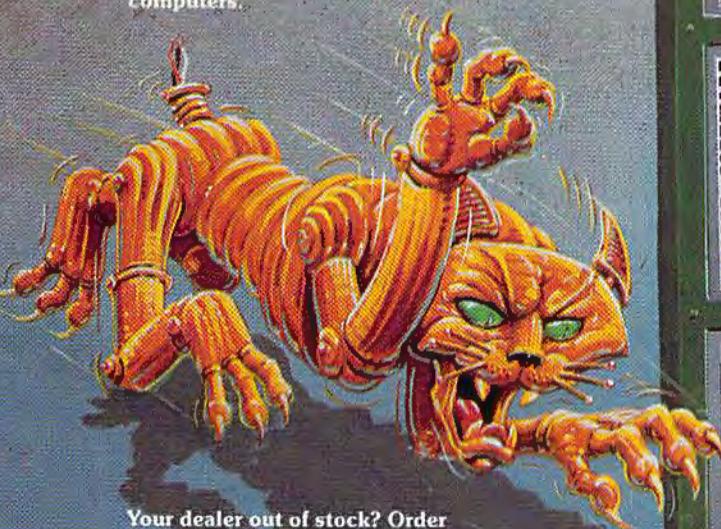
Tired of chasing your tail?

If you're looking for Commodore 64[®] or VIC-20[®] software, look no further than Synapse!



For Commodore 64[®] in disk or cassette: \$34.95. Also available — Slam Ball and Drelbs for the Commodore 64[®], and Astro Patrol, Squeeze and Harrier for the VIC-20[®]. Cartridge versions available soon.

Other titles available for the Atari 400/800[®] computers.



Your dealer out of stock? Order direct — send your check or money order including \$2 for shipping and handling. Or join the Synapse Elite! Write for free membership!



THE PHAROAH'S CURSE
A fortune — 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 avoid the booby traps standing between you and freedom?

SURVIVOR
The first multi-player cooperative space adventure. Alone or with your hand-picked crew (1 to 4 players) you must out-manuever the Xenogryph fleet and destroy their space fortresses. Can you train yourself and/or your crew to survive?

SHAMUS
The odor tells you the Shadow's there — in one of four levels of 32 rooms, each bristling with danger. You know it won't be a high school prom, but there's no turning back. Shamus — the sleuth adventure classic.

FT. APOCALYPSE
Your mission — fly your helicopter to capture fuel and weapons from the Kraalthan lords of inner Earth, free the enslaved masses and destroy the fortress itself. Will you triumph or be crushed by its fiendish defenses? Encounter Fort Apocalypse!

PROTECTOR II
You are the last hope! The Fraxullan Slimehordes are attacking your cities and carrying off their citizens. Can you get your people to safety as volcanoes erupt and enemy forces conspire to thwart your every effort?

synapse

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





SOMEWHERE, OUT THERE, A BEST-SELLING PROGRAM

WHERE IS IT?

Wherever it is, we want it. Maybe, just maybe, we're searching for your program, but we'll never find it unless you call us.

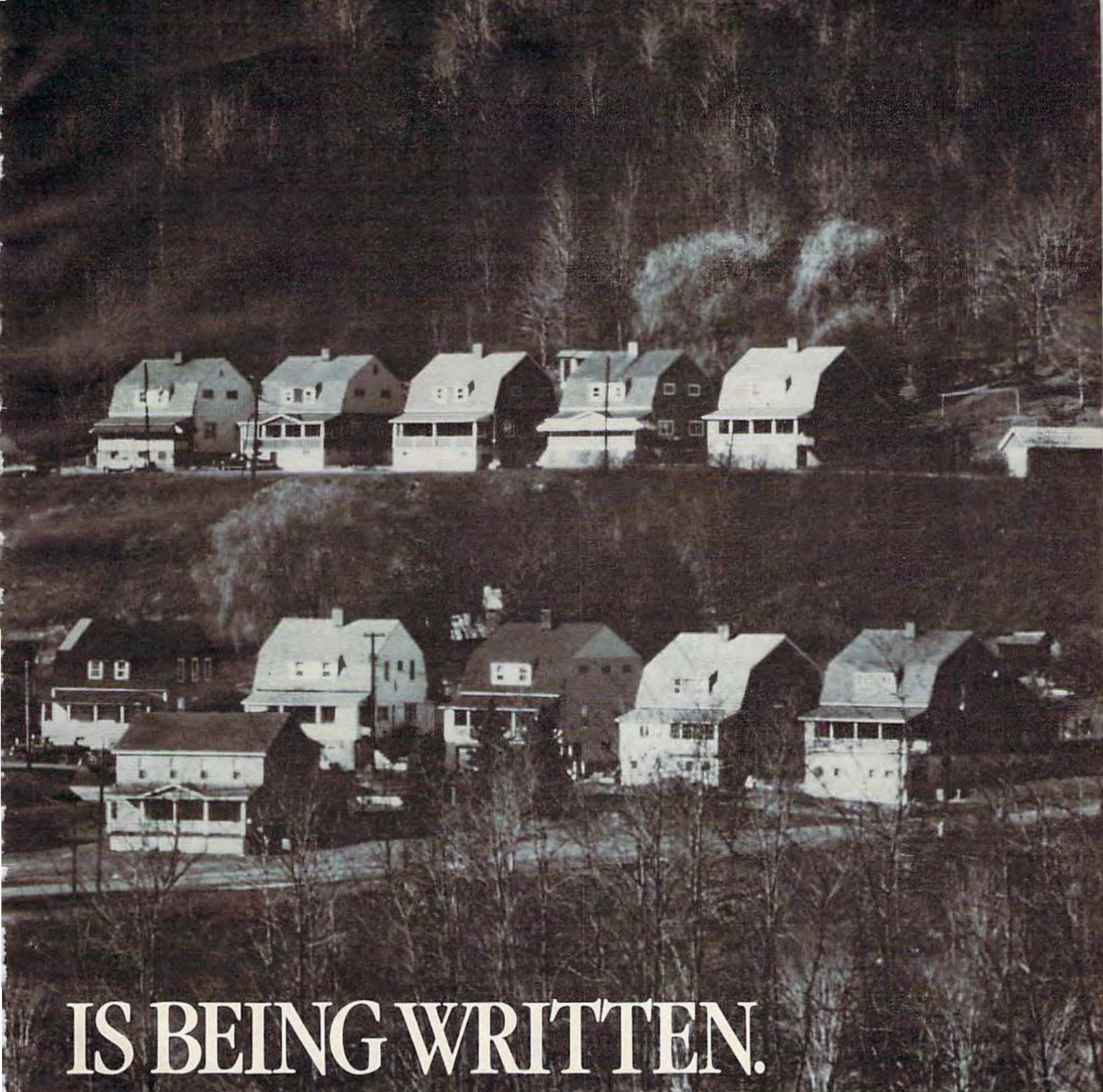
It has to be good, though. Because we're the Software Guild™, an organization devoted to finding the very best microcomputer programs for packaging and distribution under the Softsmith™ label. Hundreds of titles have already been licensed to the Softsmith library. But they're only the beginning. Our goal is to have the best program in major categories on every

popular machine. Of course, we can't do it without you.

If you're a program author or publisher, The Software Guild offers some distinct professional and monetary advantages.

First, you devote your time to what you do best: programming. You can leave the manufacturing, packaging, documentation, distribution and customer service to us.

Second, our revolutionary retail merchandising system will put your program before the public through the normal computer and software stores, plus record outlets, department stores, book shops, and more places where software has never before been available.



IS BEING WRITTEN.

Third, is royalties. Wider distribution means more substantial royalties. And, your Software Guild royalties start to accrue when the dealer makes his purchase in quantity, so you aren't left waiting while money trickles in.

Fourth is flexibility. We do not insist on the exclusive rights to your program. You can deal with other publishers and distributors, or market your program yourself, while it is in Softsmith distribution.

We know you're out there, working and dreaming, and we want to help make your dream come true. Our full staff of professional evaluators are waiting to review your best-seller.

**So call us, wherever you are.
Contact Regina Roberts at (415) 487-5200.**

**Or write:
The Software Guild
2935 Whipple Rd.
Union City, CA 94587**



The Software Guild™
(415)487-5200

SIMPLE ANSWERS TO COMMON QUESTIONS

TOM R. HALFHILL, EDITOR

QA

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

Q. Some of the programs published in *COMPUTE!'s Gazette* and other magazines are in separate parts. I mean, you have to save the programs one after the other on tape and then load them separately. The first part will load and show a screen message telling you to "PRESS PLAY ON TAPE" and then load the second part. But what happens if you have a disk drive? Can you use these programs on disk?

A. Yes, you certainly can use these *multistage* programs on disk as well as tape. In most cases, you won't even need to modify the programs. Try this:

First, type in the programs and SAVE them on the same disk with filenames that clearly indicate the order in which they should be loaded. For instance, "SPACE GAME 1" and "SPACE GAME 2". Then LOAD and RUN the first stage of the program as instructed in the article. When you see a screen message that says something like "PRESS PLAY ON TAPE," press the RUN/STOP key instead (*do not* press RUN/STOP-RESTORE). You should see a BREAK message and the READY prompt.

Now, LOAD and RUN the next stage of the program. If there is a third stage, repeat the process. In almost all cases, this should do the trick.

If you know something about BASIC programming, you can modify the programs so they automatically load the following stages from disk. Locate the lines which tell the computer to load the next stage from tape (usually found near the end of the program). Delete these lines and add a statement such as:

```
LOAD"SPACE GAME 2",8
```

Of course, this statement must be preceded by a line number, and you'll want to substitute your own filename for the example given. Also, make sure a disk with the subsequent stages is in the disk drive, or you'll get a FILE NOT FOUND error.

Multistage programs may seem inconvenient to use, especially with tape, but there's a good reason why programmers resort to this technique. By separating a long program into stages, it's possible to make it run on computers with limited memory, such as the unexpanded VIC. Commodore 64 users would almost never encounter a multistage program. But it's hard to write a complex game or other type of involved program to fit the VIC-20's 3.5K of available Random Access Memory (RAM). Such frills as screen instructions, which are viewed only once, do not need to occupy valuable memory while the main program is running. By dividing instructions and other setup functions into stages which are loaded first and then replaced, memory is conserved for more important tasks.

Q. Is there any way to salvage a cassette that gets jammed?

A. There's at least a chance. Radio Shack stores sell "cassette repair kits" that include an empty cassette shell and instructions. You'll have to take apart the jammed cassette, transfer the tape to the new shell, and assemble the new cassette with the screws provided. If the tape itself was not severely twisted or creased, everything may be okay.

If the program still refuses to load properly, the tape was probably damaged. To fix it, locate the length of creased tape. Try to flatten out the crease so it will make good contact with the recorder's read/write head. If this doesn't work, the tape is probably ruined.

If a jammed cassette causes the tape to actually

\$5 says you can't beat Gridrunner™

Gridrunner™ is the toughest, fastest, arcade quality game ever to challenge a Commodore™ or Atari® computer owner.

How tough is Gridrunner?

So tough that HesWare™ is offering \$5 just for taking the Gridrunner challenge. And you don't even have to beat the game to get the greenbacks. There's a check right inside every Gridrunner box, good for \$5 off your next HesWare purchase. You spend your check right in the store, on your choice of exciting HesWare action, education, and computer utility programs. Even HesWare peripherals.

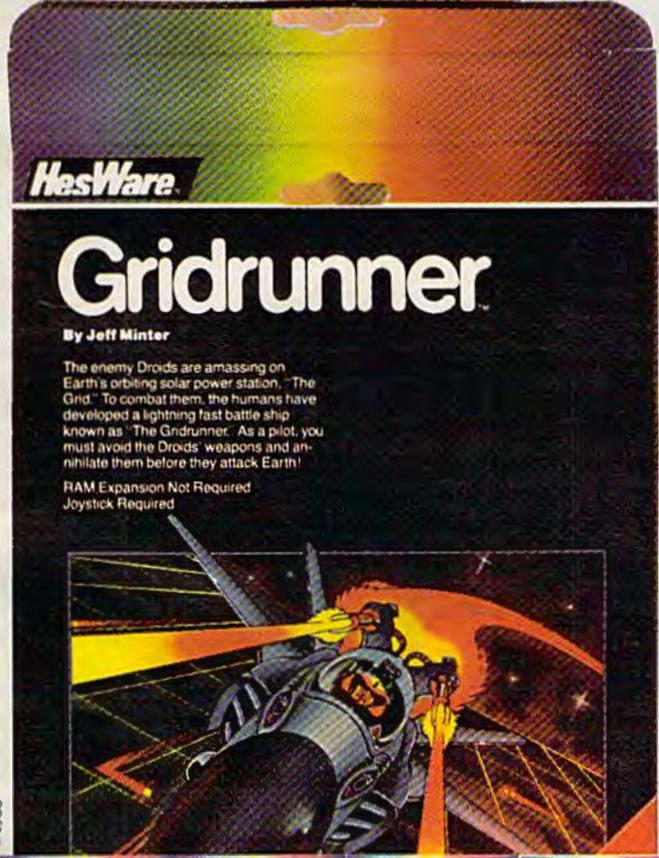
No one, not even the author, has ever reached even the 14th level of Gridrunner. But maybe you've got what it takes to go all the way to the 31st level (20 levels on VIC 20™ version). Maybe you can master the patterns of the X/Y Zappers. And stop the Gridsearch Droids before they mutate into lethal Pods.

The Gridrunner challenge. Just one of the ways that HesWare is expanding the computer experience. Look for all the HesWare products at your favorite software retailer.

Pleases the tough customer.

HesWare™

Human Engineered Software
150 North Hill Drive
Brisbane, CA 94005
800-227-6703
(in California 800 632-7979)
Dept. C20



© 1983

break, we're sorry to say the situation isn't too hopeful. Although tape can be spliced, an "inaudible" splice for audio purposes will almost never be good enough for the computer; the data is recorded too densely. It's worth a try, though, especially if the tape holds the only copy of an important program. Before discarding a tape that has snapped, check to make sure that the leader hasn't simply been pulled off the hub - this can nearly always be fixed.

These kinds of problems are good reasons for backing up all important programs and data. You should have at least two copies, *on separate cassettes or disks*, of everything you can't afford to lose. To be even safer, you should store the backups in a different place than the originals. ☺

What's your IQ? Sunsoft's IQ64, a 45-minute, 60 question program for age 9-up, tests and calculates IQ. Answers included, with explanation of the logic required to get them. **Beat the tests!** Valuable technique for improving your score on most IQ tests. Test yourself and others.

What's Your IQ?

IQ64

Creative Software for VIC 20® CBM 64®

Write for Free Catalog

Box 99
Alturas, FL
33820

sunsoft

For Com. 64
On Cassette \$19.95 ppd.
Disk \$24.95 ppd.
(FL Res. add 5% sales tax)
Check or M.O.

CURSOR

For your Commodore 64

For only \$12.95 each, our **CURSOR 64** tapes are your best buy for the Commodore 64. They take advantage of the color, sound, and sprites that make the 64 such a delight to use. Most of our packages include three excellent Basic programs on one cassette tape. The programs are not copy protected, so you can look at the source code, and learn how to make the 64 do its tricks.

We don't have room to describe all 25 of our **CURSOR 64** programs here. As a sample, you may want to order tape 64-5 with the exciting **Godzilla** program. You'll be challenged as you try to save Tokyo from from the rampaging Godzilla. Or try tape 64-3 with the popular **Miser** text adventure that will take you hours to solve (even if you cheat and read the program source).

We have super programs for the VIC 20, such as **Dungeon** (\$12.95), a visual adventure for 16K VICs. Our **VIXEL** programs are also popular with VIC owners. And, we still sell all 30 of the original **CURSOR** cassettes for the original PET and CBM.

Call or write for a catalog today. Be sure and tell us whether you have a 64, a VIC, or a PET. We welcome credit cards, and ship most orders the same day they are received. Dealer inquiries invited.

CURSOR 64, Box 6905
Santa Barbara, CA 93110
805-683-1585

Predict the Weather

On Your Vic 20™ or Commodore 64™ Computer

This exciting, new weather package allows you to learn, monitor, and predict the weather using the same equipment as the pros.

Be Your Own Weatherman

The new HAWS (Home Automatic Weather Station) combines a quality weather sensor with software to let you track weather conditions inside or outside your home. HAWS monitors weather data including dew point, temperature, humidity, and atmospheric pressure; plots historical data and graphically displays weather trends; determines the comfort and chill factors to help you dress; HAWS even forecasts the weather and compares your predictions to the local weatherman's.

HAWS uses the same sensor employed by weather services in 60 countries worldwide. The HAWS package costs only \$199.95 and includes the sensor, cassette or floppy disc program, 15-foot cable with connector for the computer, and a complete user's manual.

Send today or call toll free to order your HAWS package.



Ordering Information

Send \$199.95 in check or money order payable to Vaisala, Inc. Include name, address, telephone number, your computer model (VIC 20 or Commodore 64), and program preference (tape cassette or floppy disc).

Or call toll free to place your order.

Major credit cards accepted.

Dealer inquiries invited.

1-800-227-3800 ext. H-A-W-S

VIC 20 and Commodore 64 are trademarks of Commodore Electronics Ltd.

Learn/Teach Meteorology

More than a toy or game, HAWS provides the first opportunity to use your computer as a data sampler and data analysis system for meteorology, allowing the user to interact with incoming data to monitor and forecast weather conditions. HAWS includes an instructive software program and a complete user's manual that teaches meteorological terms and equations to allow anyone to quickly grasp weather concepts either at home or in the classroom. Simple plug-in components and easy hookup also means you can free up your computer at any time for other duties. HAWS is a great educational tool for anyone. Order today.



VAISALA

VAISALA INC.
2 TOWER OFFICE PARK
WOBURN, MA 01801

PET/CBM/COMMODORE 64

PaperClip

Professional Word Processor at a Breakthrough Price

PaperClip™ performs all the advanced features found in Word Processors costing much more. . .

- 1) Full screen editing.
- 2) Copy/Transfer sentences and paragraphs.
- 3) Insert/Delete sentences and paragraphs.
- 4) Headers/Footers/Automatic page numbering.
- 5) Justification/Centering.
- 6) User defineable keyphrases.
- 7) Supports both cassette and disk.
- 8) Variable data - Form letters.
- 9) Horizontal scrolling up to 126 characters.
- 10) Insert/transfer/erase

Also available for Commodore 64

columns of numbers. 11) Add/subtract columns of numbers. 12) Supports most dot matrix and letter quality printers. In fact, a printer set-up routine is supplied to take the best advantage of the printer at hand. 13) French and Math technical character sets available.

\$125⁰⁰
U.S.

Call or write for the store nearest you.

BATTERIES INCLUDED

71 McCaul Street
Toronto, Ontario
Canada M5T 2X1
(416) 596-1405



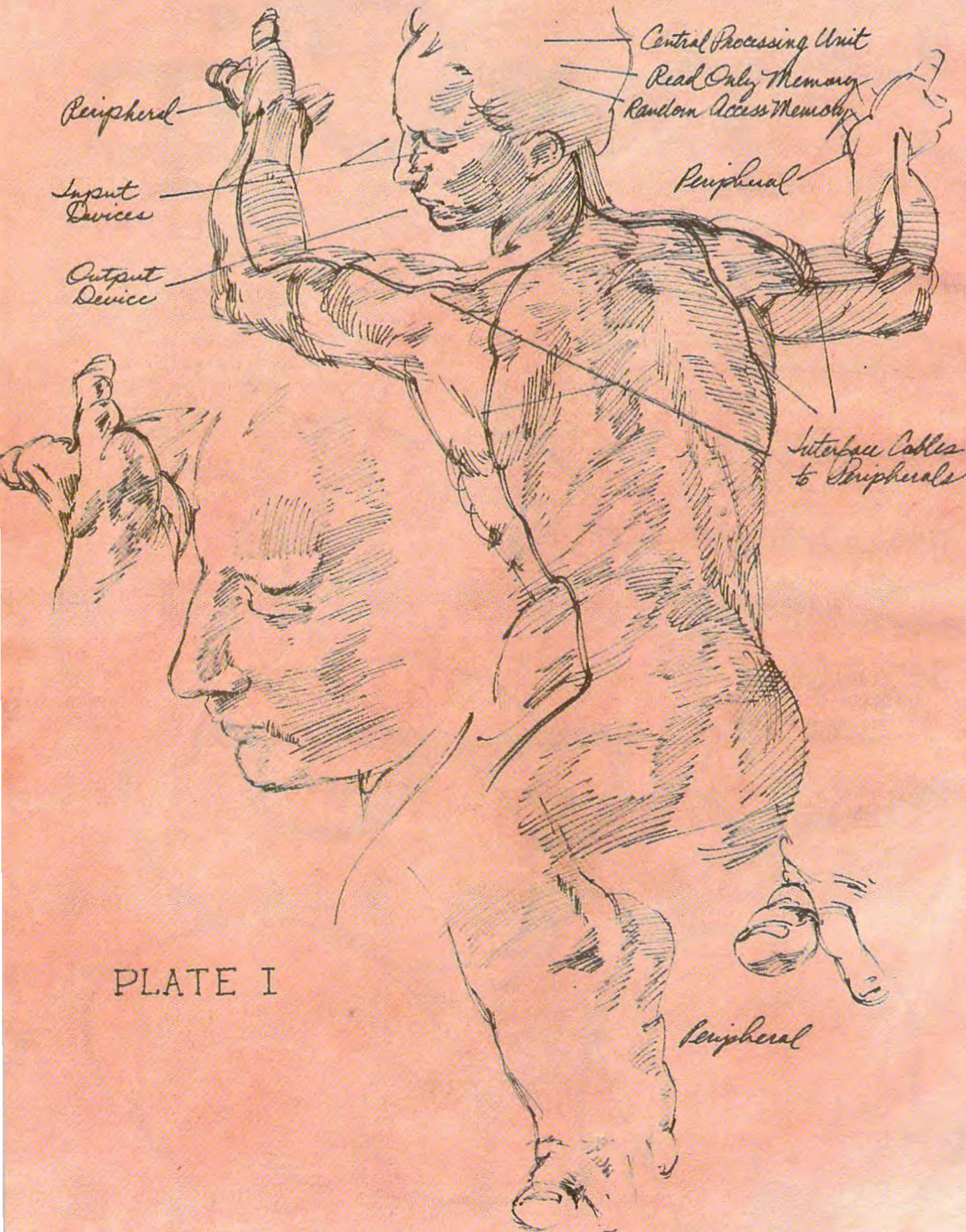


PLATE I

The Anatomy Of Computers

Tom R. Halfhill, Editor

Computers are easier to understand when you know what makes them tick. Here's how the parts of a computer work together – often invisibly – to create the results you see on the screen.

You don't have to be a mechanic or automotive engineer to drive a car. And you certainly don't have to be an electrical engineer or programmer to use a personal computer.

But a little knowledge about what's going on beneath the hood of your VIC-20 or Commodore 64 can go a long way when you're trying to fathom how a certain program works – or why it doesn't work. A cryptic error message such as “?DEVICE NOT PRESENT ERROR” makes a lot more sense when you understand how a computer interacts with its various devices. And even if you aren't interested in programming, a basic understanding of computers can make it clear why you have to type certain commands at certain times, or do other things just because the manual says so.

In many ways, computers are remarkably similar to the human brain, at least in terms of organization. Like the brain – which we call an “organ,”

although it is really several closely related structures – a computer is a system of interconnected subsystems.

Unlike the brain, however, which can perform many operations at once, most computers can do only one thing at a time. This might seem hard to believe, especially if you've ever played a fast-action computer game in which dozens of objects seem to be darting around the screen simultaneously. But it's true. Computers only *seem* to perform many operations at once because they work so quickly. Even the slowest home computer can easily carry out hundreds of thousands of instructions per second. Simultaneity is an illusion.

The main “brain” of a computer is the *Central Processing Unit*, commonly abbreviated CPU. The CPU performs or supervises all the major functions of a computer. One by one, it fetches the instructions written by human programmers, works the math, stores the results, and looks for the next instruction.

CPU size once determined computer size. Even today, the CPU of very large computers might occupy a box the size of a refrigerator. In early computers, those built in the 1950s and 1960s, the CPU sometimes occupied a whole room, or even a building. The breakthrough which made possible today's personal computers came in 1971, when engineers managed to squeeze an entire CPU onto a single “chip” of silicon smaller than a

finger nail. From this *microprocessor* was born the *microcomputer*. Generally speaking, a microcomputer is defined as a computer which uses a microprocessor CPU, is small enough to fit on a tabletop, and costs less than about \$20,000.

There are many types of microprocessors. The VIC-20's CPU is a microprocessor designated the 6502. It was designed in the early 1970s by MOS Technology, now a subsidiary of Commodore. The 6502 is an extremely popular chip because of its high speed and low cost (under \$5 in quantity). The Commodore PET, SuperPET, and 8032 models, as well as Apple and Atari computers, all use the 6502. The Commodore 64 uses a newer version of the 6502 called the 6510, identical in all important respects to its predecessor.

But a CPU alone does not make a computer. By itself, a CPU is like a disembodied brain – a small package of functionless “intelligence.” The CPU must be connected to a few other subsystems before it can qualify as a computer.

The next most important part is memory. The CPU already includes a very small amount of memory, but not enough to make it useful. So, the CPU is wired to a set of memory chips.

Memory followed the same evolution as CPUs – starting out as roomfuls of bulky vacuum tubes, then passing through the stages of transistors, integrated circuits, and finally silicon chips. In personal computers, there are two general types of memory chips: *Random Access Memory (RAM)*, and *Read Only Memory (ROM)*. There's a vital difference to remember between RAM and ROM – *RAM needs a constant flow of electricity to maintain its memory, while ROM holds its information even when the power is turned off.*

Whenever your computer is switched off or “powered down,” even for a split second, all the information held in RAM is instantly erased. Turning the power on again does not restore it. What's more, RAM happens to be where your programs are run. That's why, every time you switch on the computer, you must load in the program you want to use from a cassette tape or floppy disk, or else plug in a cartridge. The program, a series of instructions for the CPU, is permanently stored on the tape, disk, or cartridge. Typing the LOAD command copies the program from the tape or disk into RAM.

ROM, however, is quite different. Information is permanently “burned” into ROM chips by the manufacturer. You cannot change or erase the information in ROM. ROM chips are used inside computers to store information which the computer always needs and must never forget. ROM chips also are found inside plug-in program cartridges. Some manufacturers prefer to store

frequently used programs – such as games – on cartridges instead of on tapes or disks, which are more easily damaged or worn out. Cartridges are also more convenient. When you plug in a cartridge, its ROM chips (and the information they hold) become part of the computer, so there is no waiting for a tape or disk to load.

The amount of memory in a computer depends on the number and type of memory chips it has. When people compare memory between computers, almost always they are referring to RAM. Computers with more RAM can hold larger programs and more information, which generally makes them more powerful.

For easy comparisons, memory is measured in *kilobytes*, abbreviated K. A kilobyte is 1024 *bytes*. A byte consists of eight *bits*, or binary digits. If you're unfamiliar with the binary number system, it's best to think of a byte as one character – a letter, a number, or a symbol. A kilobyte of memory can hold roughly a thousand characters.

Comparing kilobytes of RAM is one way of estimating the relative power of various computers – *but not the only way*. The VIC-20 comes with 5K of RAM, expandable to 32K, and the Commodore 64 has 64K of RAM. Does this mean a Commodore 64 is more than 12 times as powerful as an unexpanded VIC? It's not that simple. When comparing computers, remember that many other features besides memory must be taken into consideration, and that some features may be more important to some people than to others.

Equipped with a CPU and memory, a computer is roughly equivalent to a human brain. But to make a computer (or a brain) really useful, several more parts are required.

As a body has appendages, a computer has *peripherals*. These are devices attached to the CPU which enable it to communicate with the outside world, and especially with humans. Peripherals come in two types: *input* devices and *output* devices (some do both).

You may be so familiar with some of these devices that you might not even think of them as peripherals. For instance, the keyboard. The CPU constantly scans this input device and checks if any keys are pressed. When you press a key, a keycode number is stored in a certain place in memory. The CPU reads this memory location and acts accordingly. Among the things it might do is display the character you typed on one of its output devices, the TV screen. The keyboard and the screen are the most basic input and output devices of the computer.

One of the most important keys is RETURN. It derives its name from the carriage return key or lever on typewriters, and it returns the cursor

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

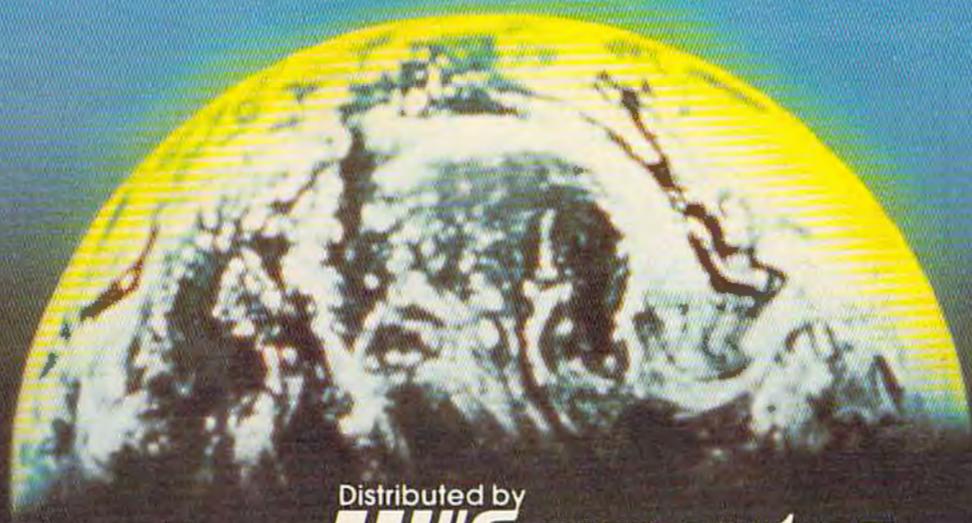
Versatile...customize your own print formats

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.



handic
software ab

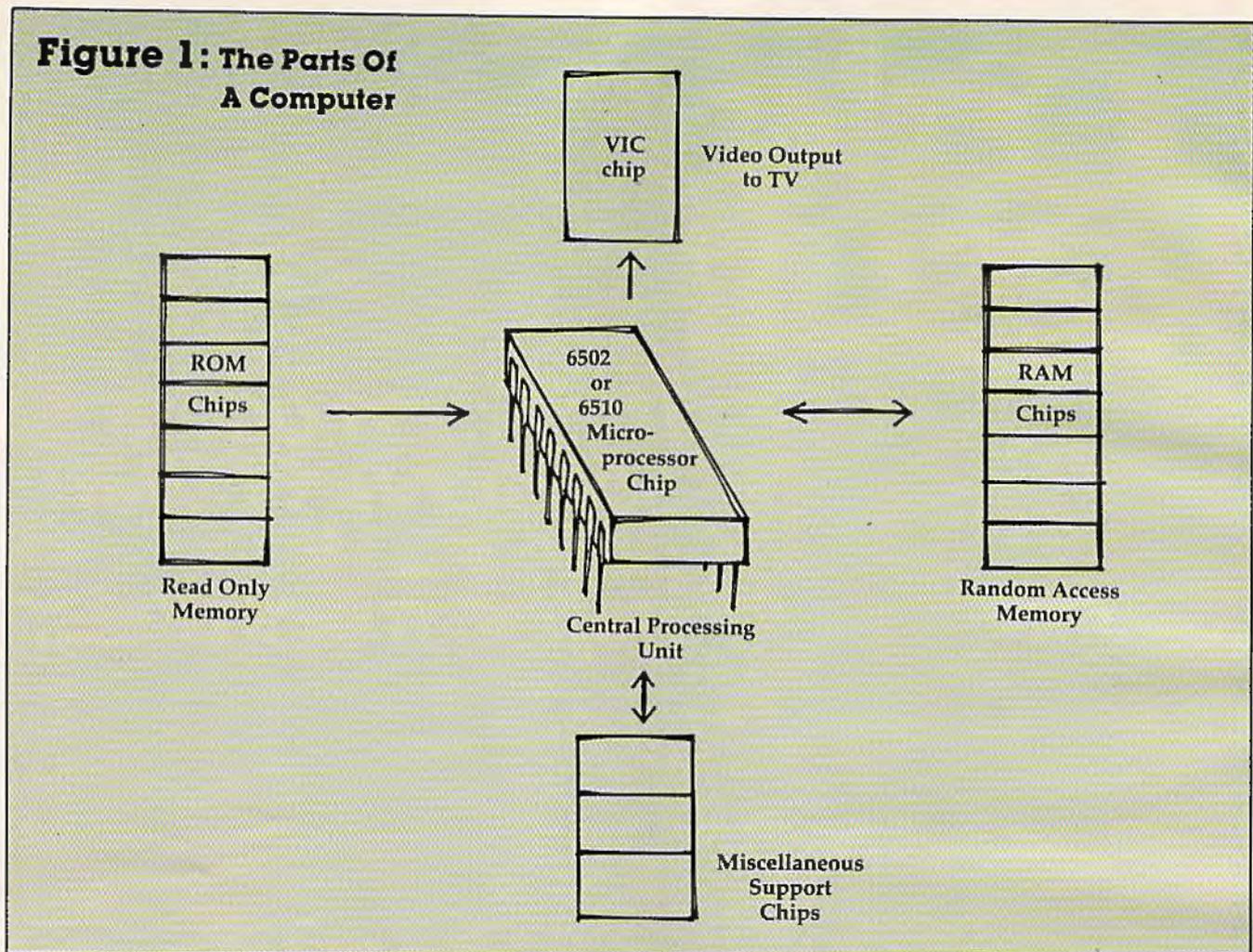
-a company in the Datatronic group-

Distributed by
**Computer
Marketing**

Services, Inc.

300 W. Marlton Pike, Cherry Hill, NJ 08002
609 795 9480

Figure 1: The Parts Of A Computer



(the moving white block) to the left screen margin when pressed. But it has an added function not found on typewriters – it tells the CPU to interpret whatever was just typed as a command.

For example, type the command LOAD, without pressing RETURN. The word appears on the screen, but the computer just sits there. The CPU knows you typed the letters L-O-A-D – after all, it read them from the keyboard and displayed them on the screen – but the letters are meaningless. The CPU ignores them.

Now press RETURN. Immediately, the computer displays the message, "PRESS PLAY ON TAPE."

By pressing RETURN, you told the CPU to accept the letters on that screen line as a command – specifically, a command to load a program from the cassette recorder. The CPU checked the recorder – similar to the way it checks the keyboard – and discovered the PLAY button was not depressed. Then it displayed the appropriate prompt. Until you press RETURN, the computer ignores what you type, allowing you to correct typing errors or change your mind.

The cassette recorder, of course, is another familiar peripheral – an input/output device.

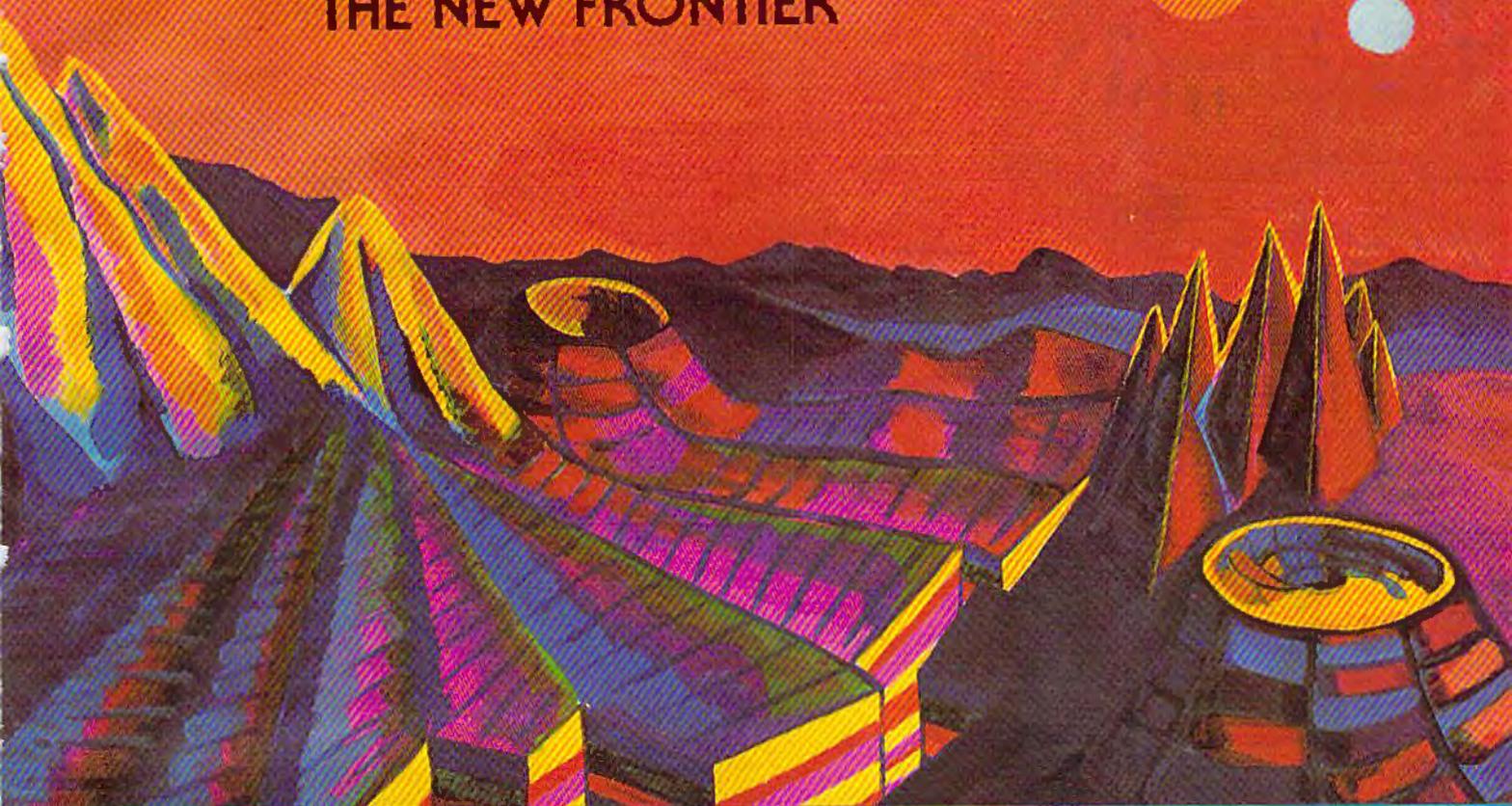
When loading a program from tape, it acts as an input device (remember that input/output is always from the computer's point of view). When you save a program on tape, the recorder becomes an output device.

You may have other peripherals in your computer system. A printer is an output device. A joystick or game paddle is input. A disk drive is both input/output. So is a modem. It's easy to see that without peripherals, the most powerful CPU and memory would be utterly helpless – the computer would be blind, deaf, and mute.

So far, we've confined this discussion to hardware, the parts of a computer that we can actually see and touch. But the hardware is just a collection of silicon chips, circuit boards, wires, metal, and plastic. It's like a human brain and body without life; it needs something more to make it work. What it needs is *software*.

Software is the programming which tells the CPU what to do and how to do it. Software is to hardware what the human mind is to the brain. If the software is poor, the computer may appear stupid, but the problem is really unexploited

LANDSCAPES OF THOUGHT . . . THE NEW FRONTIER



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.

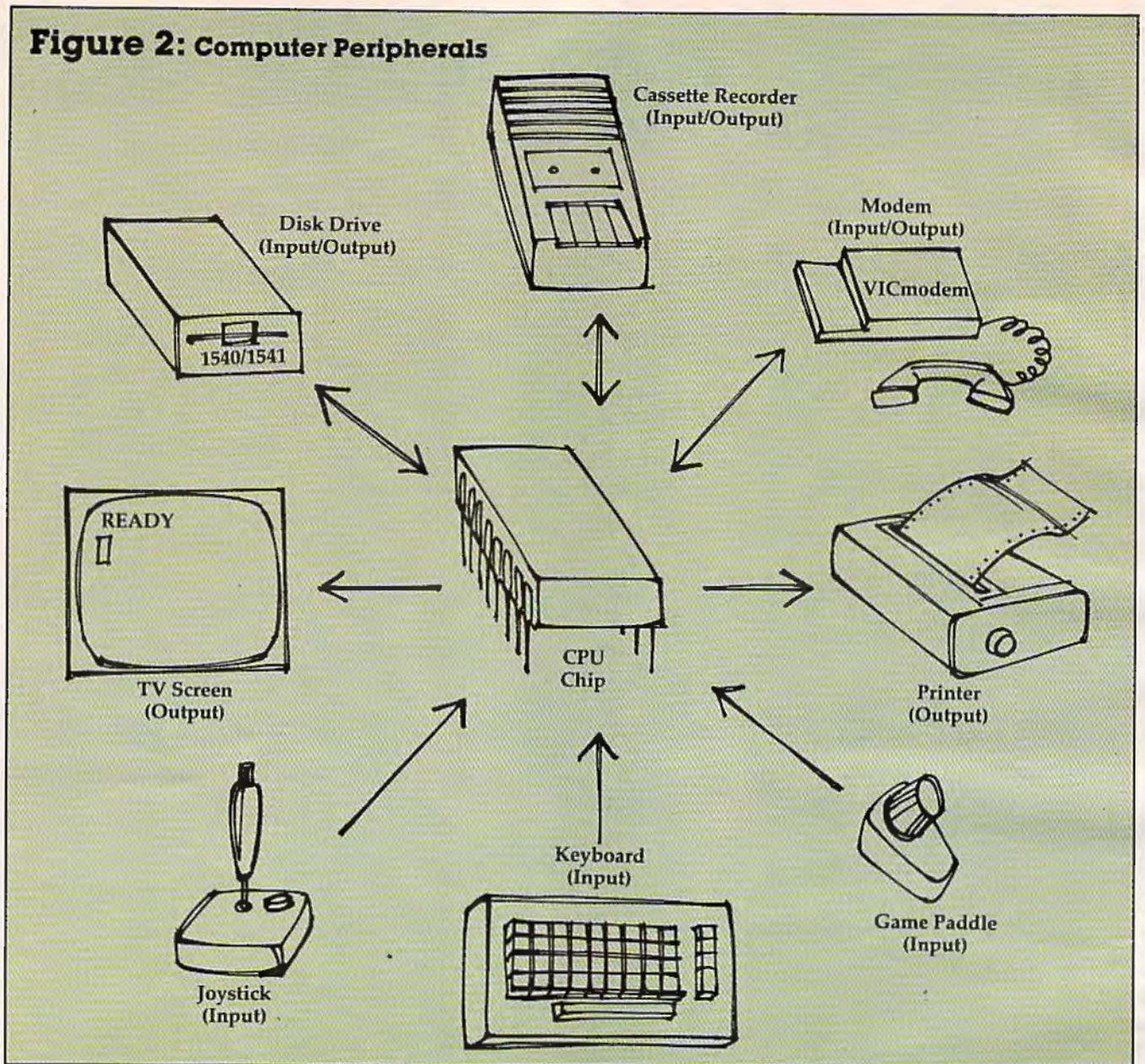
TAKE THE INITIAL STEP . . . THE TRI MICRO CHALLENGE

904 West Cypress Drive
Arlington Heights, IL 60005
(312) 394-2322

4122 E. Chapman, Suite 30
Orange, CA 92669
(714) 771-4038

901 Summir Hill Dr.
Knoxville, TN 37915
(615) 522-4824

Figure 2: Computer Peripherals



potential. It's like an intelligent human with no knowledge. No matter how good a computer is, it won't appear much better than its best software.

That's why software is such a critical issue in computing. In fact, if someone shopping for a computer has a certain application in mind, it often makes more sense to find the proper software first, and then buy whatever computer it takes to run it. Unfortunately, some people take the opposite approach and wind up disappointed.

There are two main types of software for computers – and one of them is almost invisible to most users. Computer professionals, those who work with the big machines, refer to these two types as *application software* and *system software*.

You're probably very familiar with application software. This includes virtually any kind of program you can run on a computer: games, word

processors, educational programs, spreadsheets, graphics and sound demos, you name it. Diverse as they appear, they share one characteristic in common – they allow the user to do something with the computer, to accomplish some purpose, whatever that purpose may be.

On the other hand, you might be somewhat less familiar with system software. You might not even know it exists at all. That's because system software runs "in the background," so to speak, performing housekeeping and other chores with little or no attention from the user. Without system software, the computer could not function.

Returning again to our brain analogy, system software is roughly equivalent to the human involuntary nervous system. Every moment of your life, your brain supervises routine housekeeping tasks that keep you alive: it regulates your heart

THIS PRINTER COST JUST \$119.95*

Introducing the new Alphacom 42.
High quality dot matrix printer for
Commodore and Atari home computers.

- Print program listings, charts, graphics, letters - most anything you create with your computer.
- Full 48-column width.
- Ultra quiet operation.
- Fast -- two lines per second.
- No maintenance -- 90 day limited warranty.
- Complete with paper and instructions.

For the name of the dealer nearest you,
call toll free 800-538-7047
(in California 800-325-4895).

*Intelligent interface cable for
Commodore or Atari sells separately.

AlphacomTM

and lungs, oversees the functioning of every organ from the pituitary gland to the kidneys, and even keeps its own house in order by allocating brain cells for memories and other purposes. Yet, all of these very sophisticated operations – operations that require a roomful of our best machines to duplicate artificially – occur without a single conscious thought. If we had to consciously direct all these operations, we could do nothing else. By regulating these functions in the background, the brain preserves our conscious minds for virtually anything else we care to think about or do.

A computer works almost exactly the same way. System software – in particular, a program called the *operating system* – performs all the small but significant tasks required to keep the computer functioning. Without any conscious effort or perhaps even awareness on your part, the operating system program runs constantly in the background, even when other programs are running. Fortunately, this saves you a lot of tedious work.

For instance, when you save or recall a program from disk or tape, the operating system takes care of the messy details involved in transferring the data to or from the external device. Typing SAVE or LOAD seems simple enough, but only because the operating system is doing all the dirty work. It's sort of like your brain communicating with your arm. You can move your arm with a casual thought, and subconscious areas of your brain handle all the complicated details of coordinating dozens of muscles and tendons. Because we aren't consciously aware of this going on, we take it for granted. So it is with the operating system.

Also like the brain, the operating system allocates memory to maintain order. When you type in a program, what keeps the last line you typed from being stored in the same memory space as the previous line? The operating system. Actually, in this case the operating system is working together with another piece of system software, BASIC. Yes, the BASIC language is a program just like any other, except that it runs in the background. There are other "invisible" programs, too. If you have a disk drive, it requires a *disk operating system*, usually abbreviated DOS. To keep things working smoothly, DOS works hand in hand with the computer's own operating system for input/output operations.

System software, of course, is not written in BASIC (after all, BASIC itself is one of these programs). Instead, system software is written in *machine language* – literally, the language of the machine. Machine language consists of binary coded commands recognized by the CPU. Each type of CPU chip has its own machine language, usually incompatible with others. The CPU does not understand BASIC any more than it under-

stands English. When you run a program written in BASIC, BASIC translates or *interprets* each command for the CPU, converting it into machine language. Usually this happens much faster than we can notice. However, very complex programs – such as fast-action games with lots of animation – can run very slowly if written in BASIC. That's why practically all commercial games and other programs are written directly in machine language. This is harder than programming in BASIC, but since the computer doesn't have to interpret each command, execution is hundreds or even thousands of times faster.

If you are interested in learning more about machine language, see "Machine Language For Beginners," a regular column in *COMPUTE!'s Gazette*.

If the operating system, BASIC, and DOS are programs, you may be wondering why you can't recall ever loading these programs into your computer.

Remember RAM and ROM? System software is usually permanently burned into the ROM chips – the ones that never forget. Whenever you switch on the computer, these programs are up and running automatically. But this is only for convenience. It's important to realize that the computer's memory could consist entirely of RAM, in which case you'd have to manually load the operating system and BASIC from disk or tape each time you switched on the computer, just as you do with any other program.

In fact, this configuration is possible with the Commodore 64. It has 64K of RAM, and some of this RAM space is normally overlaid with ROM (which is why there is only about 39K of RAM free for programming). A few POKES can disable the ROM and give you the full 64K of RAM to play with – but your program will have to take care of all the complex housekeeping once handled by the now-absent operating system. And since BASIC is gone, too, your program must be written entirely in machine language. Only the most advanced programmer can handle this.

So, if system software is analogous to the human involuntary nervous system, it's easy to see why application software is comparable to the brain's conscious thinking. Freed by the operating system and other background programs, the computer can focus the remainder of its power on executing whatever application program you care to run – anything from the most sophisticated data base to *Space Invaders*. The brain-computer analogy shouldn't be carried too far, but it's safe to conclude that, like a brain, a computer will appear only as "intelligent" as whatever is on its mind. ☐

FROM ADVENTURES

GYPSUM CAVES



Daylight Never Felt So Good.

Gypsum Caves is the new computer challenge from AdVENTURES. More than just another 2 minute shoot-'em-up, Gypsum Caves requires timing, common sense, and concentration. One game may last hours or even days.

The player attempts to negotiate the twists and turns of the caves, using objects found along the way to traverse the obstacles and

solve the riddles leading to the mysterious final room. Color graphics and sound complete the experience.

Gypsum Caves
by Brian Wagner

C64 or VIC 20

Introductory Price

Cassette.....\$14.95

Disk.....\$16.95



AdVENTURES, Inc.

8718A RICHMOND HIGHWAY
ALEXANDRIA, VIRGINIA 22309

CALL TOLL FREE

1-800-835-2222

In Washington D.C. area call

(703)360-0301

TELEGAMING

Today And Tomorrow

John Blackford

"Telegaming" means playing computer games with two or more computers linked electronically, usually over phone lines with modems. Already, there are telegames which dozens of enthusiasts can play at the same time, exchanging moves across the country. But as home computers grow ever more powerful, and as data communications speed up, what's in store? The immediate prospect: improved versions of existing games. On the horizon: wholly new concepts in telegaming.

Jommy's tendrils twitched in irritation – someone was trying to interfere with him, someone who knew his true identity. His irritation grew to worry, then fear. He'd been in the underground for three years without discovery. *How* could ... *who* could have leaked the secret that he was a member of the telepathic super race of Slans, part human, part mutant?

Jommy's worry grew intolerable. When he could stand no more, he uttered the words that he somehow knew had saved him before. He whispered: *GAME END*.

He felt the familiar blackness, the dizzying sense of dislocation. As his eyes cleared, he recognized the small room piled with baseball gear and the yellowing paper copies of his father's old computer magazines. A familiar voice was calling: "John, John Cross, you take off those vidphones and get in here for dinner this minute."

You probably won't see a game such as *Slan* anytime this side of 2001, but advanced telegaming is definitely on its way. With the number of home computers in the United States at four million and rising fast, there's a growing pool of computerists who are searching for new uses for their equipment. Telegaming could attract many of them because it allows people to communicate with others over great distances – through the medium of their computers.

A game such as *Slan* would be the ultimate in videogaming – a convincing simulation of reality, with a complete town or even nation in high-resolution graphics as the playfield. Each character in the game would have a unique personality created by artificial intelligence programs. Some would be computer-generated automatons. Others would be game players who, within the bounds permitted by the character, would be free to act as they pleased in the game world.

Computers linked via high-speed data lines could display the game action to your eyes through special "vidphones." Sound exciting, or kind of scary? Let's hope there'll always be an OFF switch in case the illusion gets *too* real.

But telegaming today is ages from anything like that – it's still in the horse and buggy stage. Today's game designers are thinking not so much of what can be done someday as what can be done tomorrow.

Despite all the recent advances in computer technology, we are still only a few years past the times when the first computer games were furiously played late at night on university and cor-

COMPUTE!'s First Book of VIC Games

Authors: COMPUTE! Magazine Contributors

Price: \$12.95

On Sale: Now

The VIC-20 is a versatile computer. Its programmable color, graphics, and sound can add a lot to game programs.

Over the past few years, COMPUTE! Magazine has published a wide variety of games for the VIC. But some back issues are hard to find or unavailable.

That's why the editors of COMPUTE! have chosen the best games, revised them, and added previously unpublished games, putting them together into *COMPUTE!'s First Book of VIC Games*. Each game has been tested and debugged and is ready to type into a VIC-20.

First Book of VIC Games contains fast-action arcade games that require quick reflexes, as well as strategy games that test logical skills. For \$12.95 you get two dozen games, including:

Time Bomb — You hear the time bomb ticking, and you have to find your way through the maze to defuse it. But the maze is larger than the screen, and you can't always see where the dead ends are.

Closeout — The local department store is having a sale. You try to snatch as many sale items as possible, while avoiding the horde of bargain hunters who are trying to thwart you.

Cryptic Numbers — A good logic game. The computer picks a pattern of numbers that you have to guess. After each turn you learn how close you were.

Air Defense — Missiles are falling out of the sky onto your city. Aim carefully; you get only one shot at each missile.

Thunderbird — Your goal is to break out of the playing field by using the thunderbird that controls the satellite.

Sky Diver — Put on your parachute, jump out of the plane, and try to land on one of the targets. Watch out for wind currents that may blow you off course.

Deflector — A ball is bouncing around the screen. You can aim it toward targets by strategically placing deflectors that change its direction.

Hidden Maze — Lost in a maze, you're trying to get out. But it is dark, and you can see only a few spaces in front of you.

Outpost — Your small fortress is under siege. You have two types of lasers and some torpedoes. Unfortunately, the energy supply is dwindling and the computer is on the blink. The supply ship may (or may not) show up in time to make repairs.

First Book of VIC Games is more than just a book of program listings. Each program is annotated and explained; you can modify the games if you like or use the many programming techniques in your own games. Also included is a useful program you can use to draw mazes for games you write. Three chapters show you how to develop a game program. Another tells you how to take advantage of the VIC's sound, graphics, and color capabilities. The index lists references where you can learn more about programming. And *First Book of VIC Games* is spiral bound to lie flat while you are typing in programs.

Copy Cat	
Mark and Dan Powell	94
Outpost	
Tim Parker	97
Cryptic Numbers	
C.G. McGaffin	105
Word Hunt	
M Eric Jansing and Bob Meyers, Jr.	112
Lost Fox	
Warren Pugh	120
Pharaoh's Treasure	
Clark and Kathryn H. Kidd	128
Part 5: Scrolling	135
Grand Prix Foo	
J Mark Vittek	137
Part 6: Dexterity	143
Thunderbird	
Dave Sanders	145
Juggler	
J Doug Ferguson	153
Deflector	
Frank J. Tynio	158
Jumping Jack	
Paul Burger	
Skydiver	
J Alan Crossley	
The Hawkmen of Dindrin	
J Esteban V. Aguilar, Jr.	
Appendix A: Creating Your Own	
Charles Bond	
Appendix B: Writing Your Own	
Dan Carmichael	
Appendix C: A Beginner's Guide	
Typing In Programs	
Listing Conventions	
Index	

Special Requirements: J = joystick M = memory expansion

Table of Contents

Foreword	v
Part 1: Playing Games With Your VIC	1
VIC Features: Color, Graphics, Sound, etc.	
Dan Carmichael	3
Writing Your First Game	
Richard Mansfield	9
Writing A Simulation Game	
Richard Mansfield	14
Writing An Arcade Game	
Richard Mansfield	19
Part 2: Maze Games	23
Time Bomb	
J Doug Smoak	25
Hidden Maze	
J Gary Boden	29
(Translated for the VIC by Charles Brannon)	
Superchase	
J Anthony Godshall	33
Lochinvar's Maze	
Clark and Kathryn H. Kidd	38
Part 3: Action Games	43
Closeout	
L.L. Beh	45
(Translated for the VIC by Charles Brannon)	
Marble Hunt	
J Ronny Ong	51
Balloons	
Aaron Bobick	55
Richthofen's Revenge	
J Marc Sugiyama, Todd Koumrian, Chris Metcalf	59
Chameleon	
J Clark and Kathryn H. Kidd	75
Air Defense	
T.L. Wahl	80
Part 4: Brain Testers	87
MathMan	
Andy Hayes	89

Special Requirements: J = joystick M = memory expansion

iii

To order directly, call

TOLL FREE
800-334-0868
(919-275-9809 in NC)

ORDER NOW

Available at computer dealers and bookstores nationwide. Or send a check or money order to COMPUTE! Books, P. O. Box 5406, Greensboro, NC 27403.

Add \$2 shipping and handling. Outside the U.S. add \$5 for air mail, \$2 for surface mail. All orders prepaid, U. S. funds only.
©1983, COMPUTE! Publications, Inc. VIC-20 is a trademark of Commodore Electronics Ltd.

**WE UNLEASH THE
POWERFUL GRAP**



THE WORLD'S MOST ADVANCED GRAPHICS TECHNOLOGY.

You'll never see Infocom's graphics on any computer screen. Because there's never been a computer built by man that could handle the images we produce. And, there never will be.

We draw our graphics from the limitless imagery of your imagination—a technology so powerful, it makes any picture that's ever come out of a screen look like graffiti by comparison. And nobody knows how to unleash your imagination like Infocom.

Through our prose, your imagination makes you part of our stories, in control of what you do and where you go—yet unable to predict or control the course of events. You're confronted with situations and logical puzzles the like of which you won't find elsewhere. And you're immersed in rich environments alive with personalities as real as any you'll meet in the flesh—yet all the more vivid because they're perceived directly by your mind's eye, not through your external senses. The method to this magic? We've found the way to plug our prose right into your psyche, and catapult you into a whole new dimension.

Take some tough critics' words about our words. SOFTALK, for example, called ZORK® III's prose

"far more graphic than any depiction yet achieved by an adventure with graphics." And the NEW YORK TIMES saw fit to print that our DEADLINE™ is "an amazing feat of programming." Even a journal as video-oriented as ELECTRONIC GAMES found Infocom prose to be such an eye-opener, they named one of our games their Best Adventure of 1983.

Better still, bring an Infocom game home with you. Discover firsthand why thousands upon thousands of discriminating game players keep turning everything we write into instantaneous bestsellers.

Step up to Infocom. All words. No graffiti. The secret reaches of your mind are beckoning. A whole new dimension is in there waiting for you.



INFOCOM™

The next dimension.

Infocom, Inc., 55 Wheeler St., Cambridge, MA 02138

For your: Apple II, Atari, Commodore 64, CPM 8*, DEC Rainbow, DEC RT-11, IBM, NEC APC, NEC PC-8000, Osborne, TI Professional, TRS-80 Model I, TRS-80 Model III.

porate mainframes. At first, even TV-type monitors were rare; the early text-only games were played out on terminals which used paper printouts instead of screens.

Later, minicomputers began to find their way into small businesses, and enterprising people – who may once have played *Star Trek* on campus – began selling computer time to eager game players. Some of these games were the ancestors of telegames, and they worked like this:

You would order a game by mail or purchase it in a store. The package included a rule book and

People will become extremely agile in interfacing in hundreds of ways with games achieving total physical involvement.

a mailing address. By a certain date, you mailed in your move. The game company collected the moves made by players around the country and ran the game program on their computer with all the new moves added. The computer printed out the results, and the results were mailed back to all the players – who then sent in the next move.

And so the game would proceed, in ponderous two-week or monthly steps, a remarkable combination of high-tech and old-tech.

These kinds of games still have their adherents, and a company by the name of Flying Buffalo has been running them for 13 years, growing all the while. Based in Scottsdale, Arizona, Flying Buffalo now has several thousand players around the United States engaged in an increasing number of games. *Star Web*, a space game, is currently quite popular, though *Star Lord*, with its color printouts of each move, is starting to catch on.

Founder Rick Loomis hopes to speed up the games by adding a bit more high-tech. Right now, a small percentage of players send in their moves via "electronic mail," by hooking their personal computers or communications terminals over phone lines into The Source. Loomis wants to increase the percentage and improve the games. "We're looking at a way to call in moves by phone and get updates on moves already made," he says.

Even with electronic mail, games such as

those offered by Flying Buffalo proceed slowly. Interest is generated by the strategy involved and the overall concept of playing against scores of opponents. What you miss in action on the screen, you can make up for by getting deeply into the game. Mastering the strategy gives a feel for the game's scope.

However, a game of this type could evolve into a more realistic simulation with the addition of sophisticated screen graphics. Players could study an expanded game area (much larger than a single screen), even though the positions of the game pieces would change, say, only once weekly or monthly.

Altogether different is the arcade-type game; it is played in "realtime" (with instant response), typically by one or two players against the computer. The telegame version could be played on a host computer, such as the mainframes operated by CompuServe, or in concert with another personal computer at a remote location.

"The most exciting possibility is where you get multiplayer games," says Bernie DeKoven, a games designer for the Children's Television Workshop.

At present, the most established games of this type are to be found on CompuServe. In addition to the company's list of single-player games are *MegaWars* and *SpaceWars*, two space games that permit many players at once to interact in realtime. The host computer has a vast 3-D map of space on which it tracks the players. Each player sees only a local sector, but when two or more players come within range of each other, the host computer signals them. They can radio each other, fight, or run.

SpaceWars is better for beginners, because of its streamlined command structure. *MegaWars*, with extensive commands and complex rules, is nearly impossible to master in one sitting. Still, it attracts regulars who become so familiar with the game that they can instantly recognize the user ID of many other players (each CompuServe subscriber has a unique user ID).

"We have a guy who works for us who loves *MegaWars*," says Larry Shelley, CompuServe's manager of entertainment technology. "But every time he would sign on, the other players would recognize his ID as someone who was in-house from CompuServe – and they would gang up on him. If someone got in trouble, he would call in the coordinates of our guy's planet, and people would come in and blow it away."

Shelley thinks this sort of thing is actually one of the reasons for the popularity of multiplayer telegames. Arcade games have instantaneous response and fast action, but are usually played



LAST NIGHT, 39 MUSICIANS HAD A COMPU SERVE CONFERENCE, SO DID 31 M.D.S, 49 SPORTS FANS AND 640 APPLE POLISHERS, AND NO ONE HAD TO LEAVE HOME.

The Electronic Forum, Cheaper than Long Distance and Much More Rewarding.

Every night on the CompuServe Information Service, professional and social groups discuss a wide range of subjects. From what's new in medical technology to what's nouvelle in continental cuisine.

And every day more computer owners who share a common interest are discovering this exciting new way to exchange ideas and even transfer hard copy data.

And besides electronic forums, they leave messages for each other on our national bulletin board, "talk" informally on our CB simulator, and communicate via CompuServe's electronic mail.

But best of all, in most cases, CompuServe subscribers get all of these state of the art communications options, plus a world of on-line information and entertainment for the cost of a local phone call plus connect time.

To become part of this flexible communications network, all you

need is a computer, a modem and CompuServe. CompuServe connects with almost any personal computer, terminal, or communicating word processor.

To receive an illustrated guide to CompuServe and learn how you can subscribe, contact or call:

CompuServe

Consumer Information Service, P.O. Box 20212
5000 Arlington Centre Blvd., Columbus, OH 43220

800-848-8199

In Ohio call 614-457-0802

An H&R Block Company

in isolation by a single person. "The advantage of multiplayer games is the people-to-people interaction," he says.

Software designer Greg McNickle of Uni-tronics believes telegaming can support "love relationships, friendships, everything." He says, "Imagine you've drawn something on the screen that you like - and it goes into a network where others can draw and add to the original image. So you have two or more individuals who are relating to each other's art and thus are invited toward each other - maybe to get in touch in person."

The main hindrance to telegames now isn't a lack of willing players, but a lack of money. Equipment is expensive. An information service must purchase powerful computers, defraying the cost with subscriptions and connect fees. Creating new types of games may require new equipment, improved communications lines, or expensive high-resolution screens for home users. It might even require upgrading the entire telephone system, which wasn't designed for high data volume. "The concept is there," says DeKoven. "But I guess it takes awhile for the technology to catch up."

Another problem is the lack of standardization between computer types. "Software should be compatible between machines," says Terry Bradley, a vice president and co-founder of Sirius Software. He hopes the next generation of home computers will have standard voice and graphics chips to aid the transfer of games between machines. "Right now it is a tiny market," says Bradley. Sirius will write software for telegaming once the market develops, he says, but the company isn't out to create the market.

One company that is already selling telegaming software is Adventure International. The game, *Combat* is a tank battle that's played between two home computers equipped with modems. The unique thing about it is that people with different computer types can still play one another. Each player loads a version of *Combat* designed for the particular computer. Because the commands are standardized, different versions can communicate via phone, allowing the players to engage in a realtime battle with simple graphics.

To get around the limitation of slow data transfer over phone lines, designers are searching for fresh ideas that won't require exorbitant cash outlays. CompuServe recently announced an improved type of multiplayer game that has color graphics and true perspective. If the enemy's ship flies across your bow, you'll see it flash across your screen - but his view will show your ship moving away on the left side of his screen. If you

accelerate, objects will begin to pass by more rapidly. CompuServe's Shelley says all this takes place at a leisurely transmission rate of 300 baud. The secret, he adds, has to do with getting objects to move on the various screens without sending graphics information over the phone lines - which would slow the pace to a crawl.

Simutron, of Vista, California, plans to get around the telephone bottleneck by eliminating it from their system. Instead, the company has designed a franchise system to distribute such games as *Star Trek*, licensed to them by Paramount. Each franchise would contain 16 to 32 intelligent terminals tied to an on-site computer. Action would be fast, arcade-quality, and completely shared among the terminals. High-quality computer graphics backed by special effects from videodiscs would combine to form a multiscreen presentation at each player's station. There's even a provision for voice and video communication among stations. You can call up your Klingon enemies in the heat of battle (and see their ugly faces) to discuss surrender terms.

"We feel we are taking one of the first steps toward the electronics of the future," says Simutron marketing director Dave Jenkins. The system is essentially complete, the interior design of the franchise outlets is finished, and the final touches are being added to the computer graphics. The holdup, again, is capital. People are excited by the idea, but are reluctant to put up money for such a new concept. Right now, Simutron is negotiating to combine the centers with the restaurants of a large chain.

If the effort does get off the ground, Jenkins says Simutron could hold national tournaments, using special high-speed communications links between centers. The cost of this would rule out a permanent hook-up, and besides, Jenkins thinks people would rather play with their friends than a stranger in another city.

Another way to get around the expense of topnotch telegames is to open them up to audience participation. DeKoven envisions a sports analogy where some game players would become expert, or even go professional. Viewers around the country could tune in for a fee to watch their favorite videogame stars do battle in high-resolution graphics. "People could follow the games on their screens, perhaps even interact in some way - possibly inform a player of danger," he says.

At the expert level, players could control the game on many levels - heart rate, alpha brain waves, and eye movement might each control different aspects. "People will become extremely agile in interfacing in hundreds of ways with games," says DeKoven, achieving "total physical involvement."

Robbers of the Lost Tomb™

Perilous adventure in Search of the Sacred Tablets

As a special archeological consultant to the CIA, your mission is to recover four sacred tablets from a lost 100-room tomb in Egypt. You have located the tomb, but now face the perils that await you inside. You will be confronted by snakes, ghosts, bottomless pits, and mummies, with only determination and cleverness to make your mission a success.

3-D graphics, ten skill levels. Game can be saved and continued later.



A competitive game of financial speculation.

You are a savvy Wall Street investor speculating in stocks, real estate, precious metals, minerals and high risk/high return ventures. You have \$1,000,000 to invest that will put you on Easy Street—or into the Poorhouse! If your cash is running low, your banker or another trader may give you a loan, but their interest rates may be very high.

You can buy a company and collect a fat paycheck, but be careful, you may be bought out, or the taxes can kill you.

Wall Street is a competitive investment game based on realistic financial models for 1-4 players. No special investment knowledge required.

WALL STREET™



Realistic deep space adventure to save Earth.

You, the captain of the Starship Columbia, attempt to save Earth from the infamous Scyons. Your ship is equipped with warp and hyper light-drive, phasers, photon torpedoes, an advanced tracking/viewing system and the most sophisticated on-board computer in the Star Fleet.

Their capabilities are reduced each time your ship is hit by enemy fire. Can you stop the enemy ships and destroy their Starbase?

Realistic action and thinking game (not just move and shoot) with full graphics and game save feature.

Star Battle

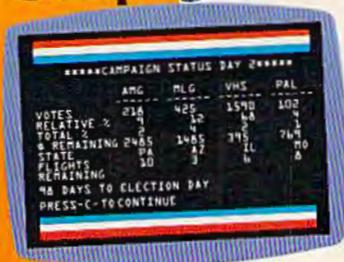


You have been nominated for the Office of President of the United States. Now the work begins! You must formulate and conduct a nationwide campaign to win the confidence and support of American voters.

You will start with \$2,500,000 to support your campaign activities. You have many options on how it is spent and where you will travel. If your campaign account is reduced to zero, you will go bankrupt.

At the end of the campaign, the voters of America will make their final decision. Will you be the next Commander-in-Chief?

Presidential Campaign™



TIMEWORKS provides software for Commodore 64 Computers in five categories: Entertainment, Education, Programming, Home Management and Business Systems.

Your favorite dealer should be stocking TIMEWORKS programs by now, but if he doesn't have what you want, just let us know.

TIMEWORKS™

Challenges YOU with these 4 GREAT STRATEGY GAMES

For your Commodore 64

If you're looking for more out of your personal computer than shooting at a bunch of space bugs, look to TIMEWORKS.

Timeworks, masters in the development of "strategy" programs, will challenge your gaming skills to their maximum!

You can stay alive if you don't think, but . . . you won't stay alive long!

Can you accept our challenge?

Write for the FREE illustrated TIMEWORKS catalog.

TIMEWORKS, INC.,
405 Lake Cook Road, Deerfield, IL 60015
(312) 291-9200



TIMEWORKS™

Downloading Games:

A Step Toward Telegaming

Phone lines can be used to distribute games as well as play them. Games and other programs can be *downloaded* from a remote computer to the user's personal machine. This has some advantages. When you play the game on a host computer, you pay an hourly fee for connect time, the time actually spent on-line. But if the game is downloaded, you can play it at your leisure.

Establishing this two-way link for distributing software may be an intermediate step toward full-fledged telegaming. For although it will be some time before sophisticated realtime telegaming is practical in the average home, downloading software on a mass scale is possible today.

"What the consumer will experience most readily is downloaded software," says Bernie DeKoven, games designer for the Children's Television Workshop. DeKoven feels that many of the possibilities in telegaming require too much expensive technology to be likely to succeed in the immediate future.

Several companies are readying plans to distribute games and possibly other software over the phone system. Control Video Corporation recently announced plans to sell a modem that plugs into the Atari 2600 video game machine (of which there are about 11 million in American homes). The service, called Gameline, would transmit popular games for a fee. The game programs have built-in counters limiting their use to a certain number of plays. After the allotment is used up, the game stops working. This keeps the retailers happy, because people who like the game can still purchase a permanent version locally.

Downloaded software could be distributed in other ways, too. Cable TV makes a good medium for transmitting games because coaxial cable carries a tremendous amount of data - making possible games with superior graphics. Since game graphics eat up so much memory, a delivery system employing low baud rates (transmission speeds) would take much too long to download extended

graphics. Not so with cable.

Starting December 1, some cable TV customers will be able to subscribe to the Games Network, a new system for downloading computer games into homes. For \$14.95 a month, subscribers will lease an Apple-compatible terminal with 64K of memory. A menu of 20 to 40 games displayed continuously on the TV screen will show what's available. Each month, the selection is updated with new games.

To receive a game, you type a choice on the terminal, and the Games Network transmits the program through the cable. The program is sent in coded form during the *vertical blanking interval*, the split-second that elapses between frames on the TV set (visible as a black horizontal bar that rolls up or down your screen when the vertical hold is out of adjustment). By sending the game during the blanking interval, the broadcaster avoids disrupting the menu display. As the signal comes in, the terminal decodes it, and the game is ready to play. It cannot be stored permanently, however - it must be downloaded for each playing session.

This kind of two-way cable has many possible applications. Several power companies are even looking at the technique as a means of reading meters without having to send anyone out to a customer's house. Since the power companies could save considerable sums this way, there's more incentive for two-way cable. And that could spread such offerings as the Games Network.

Another possible means of distributing games is over FM radio. "The FCC has released so many new bands for FM, it's now possible to devote stations to the continuous broadcast of games," says Terry Bradley, a vice president and co-founder of Sirius Software. The station could repeatedly broadcast its entire selection of games, day and night. Using a "radio modem" and decoder, the computer could locate the desired program, decode it, and store it in memory for later use.

But Bradley suspects this type of mass distribution would be vulnerable to airwave piracy. If the radio modem/decoder could be copied fairly easily, anyone could receive the signals, not just subscribers. "There's no way to control it," he says. "It's like satellite TV."

Bradley thinks one solution would be to program commercials into the games - perhaps during the intermissions between levels.

But none of this will take place – according to scientist and futurist Robert Jastrow – “until fiber optics get into the home.”

Why fiber optics? Fiber optics are bundles of glass fibers through which light can be flashed, transmitting massive amounts of data at stupendous rates. In some cities, slender fiber optics are replacing bulky copper cables for telephone trunk lines, though it could be the end of the century or beyond before fiber optics enter the home. When they do, data transfer will jump from hundreds of bits per second to megabits.

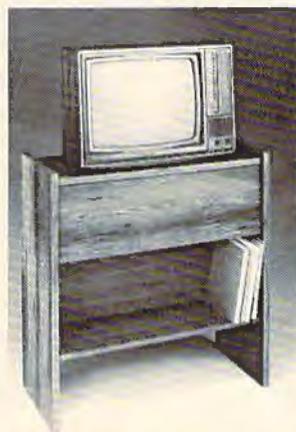
At that point, audio communication changes to video all over the country,” says Jastrow. “People will be able to communicate by video in realtime, which will have a really decentralizing effect on our country. We’ll return to the old idea of the cottage.”

Thus, we may be headed for an era when work, shopping, information gathering, and recreation will all be centered around the home – borne on flickering threads of light. “Pretty soon our society is going to get on a real information high,” says Sirius’s Bradley. “Now, man is so mobile. We just hop around this planet. But we are using up our resources. The home is going to be designed more for pleasure, and people will spend more time at home.”

Such an era would be conducive to tele-gaming. With powerful computers in every home and communications lines capable of flashing photo-quality images and graphics around the world, massive nationwide or worldwide tournaments could flourish. If you wished, you could follow the action around the globe, watching, as hour by hour new players awoke fresh from a night’s sleep and signed on to play. @

ARE YOU A SMART BUYER?

For **\$89.95** this is a smart buy if you're looking for a place to store your computer, peripherals, and accessories without spending a fortune.



The CS 1632 computer storage cabinets compact yet functional design fits almost anywhere while housing your computer monitor, joysticks, software, books and peripherals all for only \$89.95. The slide out shelf puts the computer at the right height and position for easy comfortable operation. The fold up locking door keeps unwanted fingers off the key board when not in use. To store joysticks just turn them upside down and slide them into the inverted storage rack. Twist tabs on the back of center panel allow for neat concealed grouping of wires, while power packs rest hidden behind center panel on shelf.

The slide out software tray has room for 14 cartridges or cassettes and up to 30 diskettes. Most brands of software will fit between the adjustable partitions with a convenient hook for the spare key at rear. Stand fits Atari 400 & 800, Commodore 64 & VIC 20, Ti 99/4A and TRS-80.

Cabinet dimensions overall 36" high x 33-7/8" wide x 16" deep. Cabinet comes unassembled. Assembly requires only a screwdriver, hammer, and a few minutes of your time.

Choice in simulated woodgrain, of warm golden oak or rich natural walnut finish.

To order CS1632, send \$89.95 to:
P.O. Box 446 West Linn, OR 97068
For Fast Phone Orders Call
Toll Free 1-800-547-3100
Inside Oregon Call (503) 635-6667



Name _____
Address _____
City _____ State _____ Zip _____

Golden oak finish Natural walnut finish

My personal check, cashiers check or money order is enclosed.

Bill my VISA # _____ Exp. Date _____

Bill my Mastercard # _____ Exp. Date _____

Card Holders Signature _____

Immediate shipment if in stock. If personal check is sent, allow additional 2 weeks. Prices subject to change. Shipment subject to availability. Cabinet shipped unassembled in 2 cartons. Ships UPS fit. collect FOB Portland, Oregon.

FREE VIC-20 SOFTWARE CATALOGUE

WIDEST SELECTION AVAILABLE AT DISCOUNT PRICES

We offer one-stop shopping for all of your VIC-20 software – the newest, the latest, and even the “hard to find.”

SEND TO:

Jay Sun Enterprizes, Incorporated

Dept. No. 62

2 Linda Court, Albany, NY 12208



HOTWARE

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

Kathy Yakal, Editorial Assistant

This Month		Last Month	This Month		Last Month
Commodore 64 Entertainment			VIC-20 Entertainment		
1	<i>Jumpman</i> (Epyx)	1	1	<i>Choplifter</i> (Creative)	1
2	<i>Zork I</i> (Infocom)	2	2	<i>Graverobbers</i> (Victory)	-
3	<i>Frogger</i> (Sierra On-Line)	-	3	<i>Gridrunner</i> (HesWare)	3
4	<i>Temple of Apshai</i> (Epyx)	3	4	<i>Shamus</i> (HesWare)	2
5	<i>Zork II</i> (Infocom)	-	5	<i>Adventure Pack I</i> (Victory)	-
6	<i>Repton</i> (Sirius)	-	6	<i>Annihilator</i> (Victory)	-
7	<i>Gridrunner</i> (HesWare)	-			
8	<i>Turmoil</i> (Sirius)	-	VIC-20 Home/Business/Utility		
9	<i>Zork III</i> (Infocom)	10	1	<i>Household Finance</i> (Creative Software)	5
10	<i>Deadline</i> (Infocom)	-	2	<i>HES Writer</i> (HesWare)	3
			3	<i>HES Mon</i> (HesWare)	-
			4	<i>Home Office</i> (Creative)	2
			5	<i>Turtle Graphics</i> (HesWare)	1
			6	<i>TOTL Label</i> (TOTL)	-
			7	<i>6502 Professional Development Kit</i> (HesWare)	7
			8	<i>Quick Brown Fox</i> (Quick Brown Fox)	-
			VIC-20 Educational		
			tie	<i>Computer Coach</i> (BEST)	-
			tie	<i>Type Attack</i> (Sirius)	-
			2	<i>Touch Typing Tutor</i> (Taylormade)	3
			3	<i>Flash 'n Spell</i> (Qumax)	5
			4	<i>Flash 'n Math/Multiplication</i> (Qumax)	-
Commodore 64 Home/Business/Utility					
1	<i>WordPro 3 Plus/64</i> (Professional)	1			
2	<i>HES Mon</i> (HesWare)	-			
3	<i>Data Manager</i> (Timeworks)	2			
4	<i>Money Manager</i> (Timeworks)	2			
5	<i>6502 Professional Development Kit</i> (HesWare)	-			
6	<i>Personal Finance Assistant</i> (Rainbow)	-			
7	<i>HES Writer</i> (HesWare)	6			
8	<i>Household Finance</i> (Creative)	-			
9	<i>Inventory 64</i> (Computings)	-			
10	<i>TOTL Text</i> (TOTL)	5			
Commodore 64 Educational					
1	<i>Kinder Comp</i> (Spinnaker)	2			
2	<i>Facemaker</i> (Spinnaker)	3			
3	<i>Hey Diddle Diddle</i> (Spinnaker)	4			
4	<i>Touch Typing Tutor</i> (Taylormade)	5			
5	<i>Coco</i> (HesWare)	1			



nüFEKOP

P.O. Box 156, 21255 Hwy. 62,
Shady Cove, OR 97539

1-800-525-2529



Software for the VIC 20™
and Commodore 64™

This month we examine some of the factors that either make a software product a best seller or banish it to the bargain bins. We're also continuing to look at some of the trends that have emerged over the summer.

You've probably seen numerous best seller lists for books, movies, records, TV shows, and other forms of entertainment. Usually they stay almost the same for weeks or even months on end as you look in vain for any significant changes.

"Geez, when is that Wayne Newton album going to move up from No. 39? It's been there for weeks!" Or, "Why doesn't someone knock that Richard Simmons book out of first place?"

Not so with home computer software. For a number of reasons, a game that was on top of the list one month can fall right off the charts the next. And vice versa. What are the reasons?

Availability/Visibility. Say there's this great game made by a small company with very little funds for marketing and even less for advertising. The company could try to get some local stores to sell it or make it available by mail order. Both of these methods work, but chances are not good that it would get the exposure necessary to really make it move.

Now let's say the game is bought by someone who works for a major distributor. The distributor sees it, starts to carry it, recommends it to his retailers, and (if it's truly a great program) suddenly it starts selling. The effectiveness of marketing and distributing, especially in a still-maturing market such as home computer software, is tremendously important. Visibility and availability are absolutely essential to success.

Technical Problems. Again, because this is still a very young industry, there are a number of technical problems related to both hardware and software that affect the market. If a computer undergoes a series of upgrades that subtly change certain operating characteristics — as the Commodore 64 has — a game programmed for one model may not work properly on another. Technical problems can also affect supply of software. One distributor complained last month that he could not get a single copy of one of the current best sellers because the manufacturer was having trouble with cartridge production. This had a definite impact on the HOTWARE list.

Other Factors. Various other things may influence a program's market performance: whether its visual impact leads individual retailers to run demo copies on computers in the store; the quality of the program's packaging; the reputation of the software publisher; "word of mouth" advertising, especially through user groups; pricing; and even, to some extent, best seller lists such

as HOTWARE.

Sophisticated Packaging

We're beginning to see a higher level of sophistication in the way software, particularly game software, is being packaged. A good example is Infocom, which was singled out by one distributor we contact every month. Electronic Arts, a new company whose games have not yet appeared on the HOTWARE list, is another.

Educational Software

Educational software is beginning to pick up. In spite of all the computers being used in classrooms these days, and for educational purposes in the home, educational software does not seem to move as well as games or business/utility programs. For one thing, there has been much less to choose from, especially compared to entertainment software.

Companies such as Spinnaker are changing that. Programs like *Facemaker* and *Kinder Comp* (both of which appear on this month's HOTWARE list) are often praised by our sources. In the first week that one of our sources stocked Spinnaker programs, they outsold all his other educational software combined.

Trend To Strategy Games

Racking up 100,000 points or gobbling up all the little dots or saving Earth is a heroic accomplishment, but based on the sales trends we're seeing, gamers are looking for challenges that involve more brains and strategy. This is not to say that action games are out; they will always have a following. But strategy games are definitely moving in.

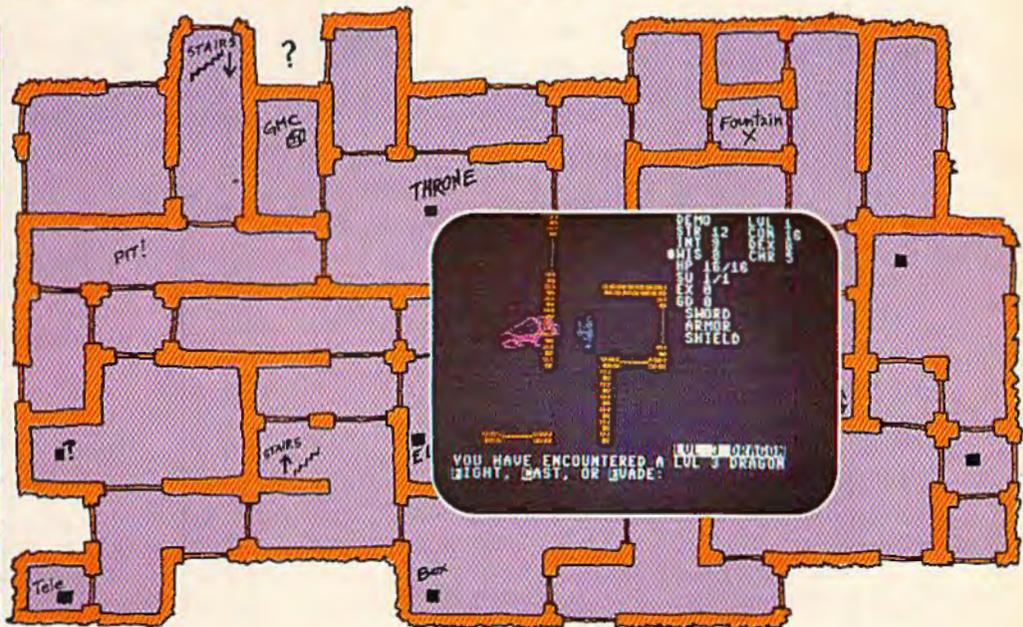
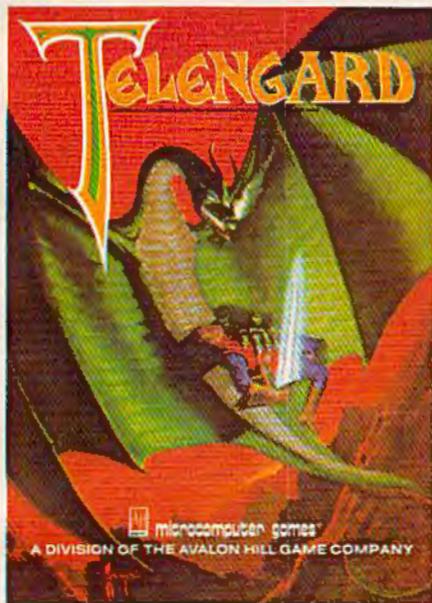
Commodore 64 HOTWARE

Jumpman and *Zork I* continue to hold first and second place in the entertainment category. *Temple of Apshai* slipped to fourth place, and its former third-place position was snapped up by a new entry this month: Sierra On-Line's *Frogger*.

Sirius Software is creating some competition for Epyx and Infocom, which have been dominating our HOTWARE list. Last month's *Fast Eddy* and *Squish 'em* dropped off the list this month, but were replaced by *Repton* and *Turmoil*. *HesWare's Gridrunner* is back on the list again, taking the No. 7 position.

In the home/business/utility category, *WordPro 3 Plus/64* retains its No. 1 position, in spite of all the competition coming into play. New Commodore 64 owners are hungry for home/business-oriented programs, and there are plenty of software companies willing to supply them. Timeworks, which had two best-selling games last month, stays on the charts with *Data Manager*

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. 1/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. 1/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. 1/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 1/III/IV (16K) cassette for \$16.00. Atari (32K), IBM (64K) and TRS-80 Models 1/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.

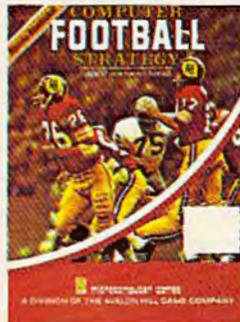
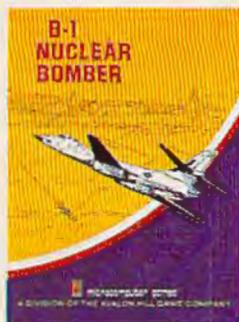
microcomputer games®

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.



New VIC-20* Releases!

More fun than humans should be allowed.

CRATER RAIDER™

The earth is directly in the path of a speeding asteroid. Fearless Raider Rick has just stepped onto the alien surface with orders from Captain Fargo himself to blast the asteroid out of existence before it smashes the world.

You must guide Rick over the asteroid surface. He must leap over craters. Avoid deadly aliens and meteorites. And do it all without running out of oxygen.

In the end, you may succeed in helping Rick place his bomb. But a fiery death awaits him if you lack the skill and nerve necessary to get him back to his ship before the awesome blast!

CYCLON™

Calling all future fighter pilots. Captain Fargo needs you! If you can defend your ship against the attack of enemy star-cruisers, control of the sky is yours. But beware! Creatures of the night will come at you from all sides . . . firing at you with light missiles and white-heat vapor rays. You can take only a few hits or you'll be destroyed. Only a steady eye and rapid-fire reactions can save you and your ship. The challenge is yours. Defeat is agony.

Created by Alan Pavlish

• Introducing two new red hot releases from the Game Brains™ at Boone: Cyclon™ and Crater Raider!™ Like all Boone games they feature: Rapid action • Super smooth animation • Intense sound and color • Multiple levels of difficulty • And professional Hi-Res graphics. And when you buy a Boone product you get more than just a game. We have **poster offers**. Memberships to Captain Fargo's **Fan Club**. And updates on all new releases • Cyclon™ and Crater Raider™ are at your dealers now! Demand the best. Demand Boone.

BOONE

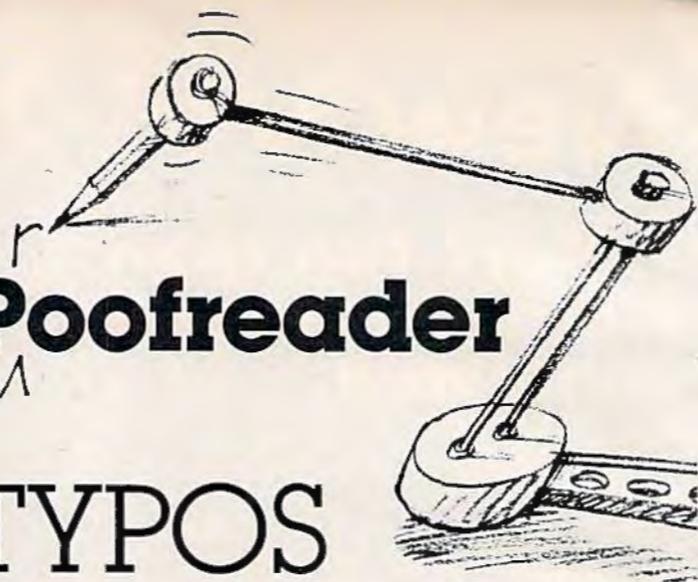
2900-A Bristol Street, Suite 102, Costa Mesa, California 92626 U.S.A.

* VIC-20 is a registered trademark of Commodore Electronics, Limited

The Automatic Proofreader

BANISH TYPOS FOREVER!

Charles Brannon, Program Editor



The vast majority of letters and telephone calls we receive from readers concern our program listings. Many readers have trouble getting the programs to work. All listings are generated with a computer and a printer directly from fully tested, working versions of the programs, yet many readers continue to experience problems. To solve a lot of frustrations on both ends, *COMPUTE!'s Gazette* introduces "The Automatic Proofreader" – a revolutionary new way of entering programs that alerts you *instantly* if you've made a typing error.

We all know it's hard to type in a program correctly the first time. Seemingly trivial typing errors can cause dreaded ERROR messages, or even a *system crash* (the keyboard will not respond to RUN/STOP-RESTORE). Usually the only way to recover from such a crash is to reset the computer by turning it off, then on again – wiping out the memory and all your typing in the process.

Even when you locate and correct the mistyped lines, there always seem to be more errors lurking in the hundred-odd lines of the program. Sometimes you feel like giving up.

Elusive Errors

Some errors are almost impossible to spot, espe-

cially for beginners who know little or nothing about programming. For instance, can you spot the mistake in this line?

```
100 PRINT RIGHT$("00" + MID$(STR$(V),2,3)
```

Here's how it should read:

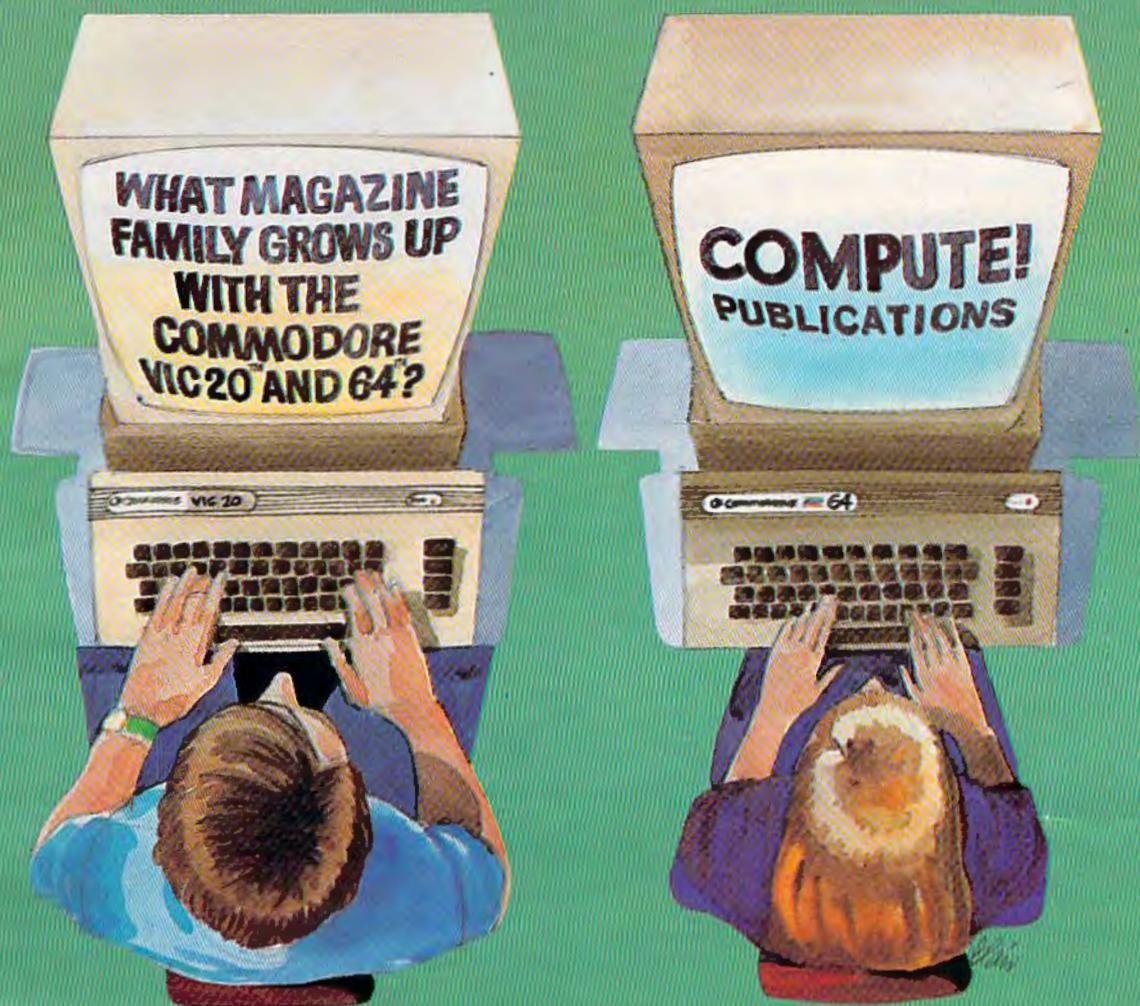
```
100 PRINT RIGHT$("00" + MID$(STR$(V),2,3)
```

Did you catch the difference? A right parenthesis was missing after the number 2. (A left parenthesis must always have a matching right parenthesis. If you add up all the parentheses in a statement, you should get an even number.)

An Impossible Dream?

The strong point of computers is that they excel at tedious, exacting tasks. So why not get your computer to check your typing for you? An impossible dream?

Not with "The Automatic Proofreader." Nestled within your VIC-20 or Commodore 64, the Proofreader automatically checks every line you type in. It displays a number at the top of your screen. This number, called the *checksum*, corresponds to the line you've just typed. It represents every character in the line summed together. A matching number in the program listing lets you compare it to the checksum that the Proofreader displays. A glance is all it takes to confirm that you've typed the line right.



Our newest magazine, *COMPUTE!'s Gazette for Commodore*, is written for the beginning consumer of personal computing. Each monthly issue will bring you interesting features, exciting news, intriguing new products, and more.

You'll find software news, best seller rankings in the recreational and educational areas, and interviews, overviews, and industry views.

Tutorials for beginners, advanced games for non-programmers, and introductory help for fledgling computer users.

And best of all you'll still find **COMPUTE!**, our monthly resource and applications magazine for intermediate and advanced users.

COMPUTE!'s Gazette for Commodore and **COMPUTE!**. We won't out-grow you... we'll grow with you.

Use the attached post card or call Toll Free 800-334-0868 today to start your subscription to *COMPUTE!'s Gazette for Commodore*.

12 monthly issues, Subscription Price \$20 US, \$25 US in Canada, elsewhere, Air Mail, \$45 US.

Other than as an independent supplier of quality products regarding the Commodore personal computer systems, **COMPUTE!** Publications is in no way associated with Commodore Business Machines, Inc.

Commodore, VIC-20, and Commodore 64 are trademarks of Commodore Business Machines, Inc., and/or Commodore Electronics Limited.

The Automatic Proofreader is a small machine language program that resides in a relatively safe area of memory, the cassette buffer. It will remain there until you turn off your machine, or run another program that uses the cassette buffer. Loading or saving BASIC programs from tape or disk will not affect it.

Entering The Automatic Proofreader

If you have a VIC, type in Program 1. Program 2 is for Commodore 64 users. There's only one small catch – the Proofreader can't check *itself*, so be extra careful to type it in correctly in the first place. Since it is a machine language program, be especially diligent. Watch out for typing extra commas, a letter O for a zero, and check every number carefully. Fortunately, the Proofreader is a short program, so you should have no trouble.

When you've typed in The Automatic Proofreader, SAVE it on tape or disk at least twice *before running it for the first time*. If you mistype the Proofreader, it may cause a system crash when you first run it. By SAVEing a copy beforehand, you can re-LOAD it and hunt for your error. Also, you'll want a backup copy of the Proofreader because you'll use it again and again – every time you enter a program from COMPUTE!'s Gazette.

When you RUN the Proofreader, the program will be POKEd safely into memory. Then press RETURN on the line the cursor is sitting on to activate the Proofreader. If you ever need to reactivate it, just enter the command SYS 828 and press RETURN.

Using The Proofreader

Now, let's see how it works. LIST the Proofreader program, move the cursor up to one of the lines, and press RETURN. If you've entered the Proofreader correctly, a number will appear at the top-left of your screen.

```
10 A=1:B=72:PRINT"SCORE=";SC :rem 199
```

Checksum
Don't type this

Try making a change in the line, hit RETURN, and notice that the number has changed. All VIC and 64 listings in COMPUTE!'s Gazette now have a number appended to the end of each line, for example "rem 123". *Don't enter this statement*. It is just for your information. The "rem" is used to make the number harmless if someone does type it in. It will, however, use up memory if you enter it, and it will cause the checksum displayed at the top of the screen to be different, even if you entered the rest of the line correctly.

Just type in each line (without the printed



"Automatic Proofreader" displays a checksum number in the upper-left corner of the screen that tells you immediately if you've typed a program line incorrectly. Just compare the checksum to the REM number in the printed listing.

checksum), and check the number displayed at the top of the screen against the checksum number in the listing. If they match, go on to the next line. If they don't, there's a mistake. You can correct the line immediately, instead of waiting to find the error when you RUN the program.

The Proofreader is not picky with spaces. It will not notice extra spaces or missing ones. This is for your convenience, since spacing is generally not important. But occasionally proper spacing is important, so be extra careful with spaces, since the Proofreader will catch practically everything else that can go wrong.

There's another thing to watch out for: if you enter the line by using abbreviations for commands, the checksum will not match up. But there is a way to make the Proofreader check it. After entering the line, LIST it. This eliminates the abbreviations. Then move the cursor up to the line and press RETURN. It should now match the checksum. You can check whole groups of lines this way.

When you're done with the Proofreader, disable it by pressing RUN/STOP-RESTORE (hold down the RUN/STOP key and press RESTORE). If you need it again, enter SYS 828. It will then be ready once again to act as your personal typing aid.

Checksum programs are not new in computer magazines. But until now, there was nothing like The Automatic Proofreader – it shows you *instantly*, as soon as you've entered the line, if you've made a typo. We hope that the proofreader makes your program entry both faster and easier, and that you'll never have to face another frustrating ERROR message.

See program listings on page 145. ☐

For All Walks of Life



MIRAGE CONCEPTS offers you a step in the right direction by presenting the All New **DATABASE MANAGER** and ... **WORD PROCESSOR** programs, the most powerful and easy to use software available for the Commodore 64.

DATABASE MANAGER

**The Most Powerful
Database Management System**

- 100% Machine Language
- Free Form Design and Input
- Sort on Any Field/Any Level
- Calculated Fields
- Max. Record size = 2,000 Characters

WORD PROCESSOR

**80 Column Screen Display
Without Additional Hardware**

- 100% Machine Language
- Over 70 Single Keystroke Commands
- Printed Page/Line/Character Counters
- True Word Wrap
- Search, Replace and Block Operations

FOR THE COMMODORE 64



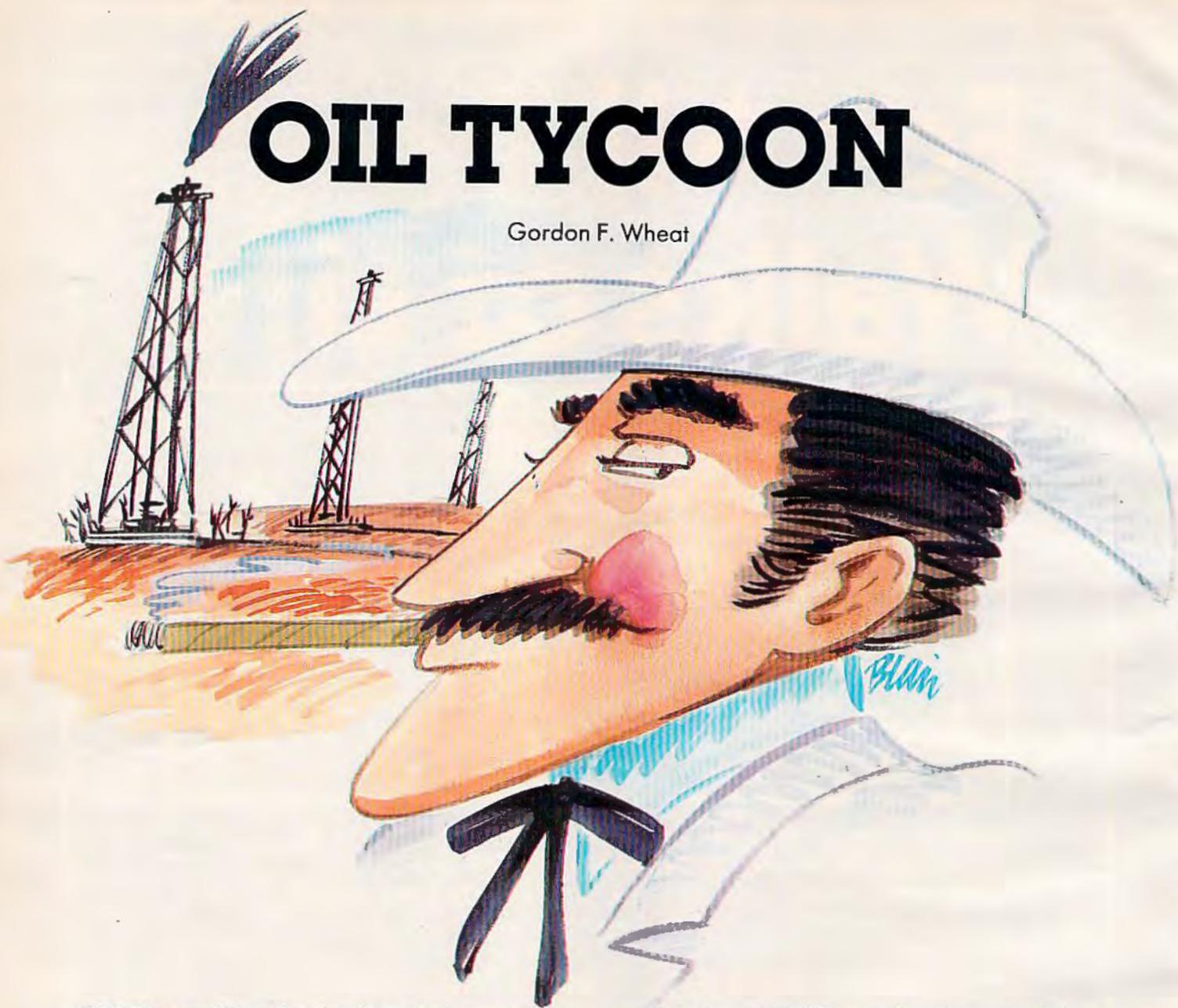
MIRAGE CONCEPTS, INC.
"A Step Ahead!"

2519 W. Shaw, Suite 106 / Fresno, CA 93711 / Customer Support: (209) 227-8369
Order Number: (800) 641-1441

Order Number (in Calif.): (800) 641-1442

OIL TYCOON

Gordon F. Wheat



"Oil Tycoon" is a fascinating strategy game with multiple difficulty levels and hundreds of play possibilities. For the unexpanded VIC and the Commodore 64. It requires one joystick.

You are P. J. Uing and you are about to make big money in the petroleum business, but drilling for oil is not as easy as it sounds. There are obstacles you must overcome in order to make a profit. There are shale formations that grind away your pipe. You can blast through them, but your dynamite is limited. Pockets of natural gas sometimes collect where you have previously pumped out the oil. Hit one of these and your oil rig goes up with a bang. There are also "devils" that live in the oil. They take a dim view of your draining their caverns. But you won't give up - because you are the Oil Tycoon.

I designed "Oil Tycoon" to be as much fun for parents as it will be for children. Since the game is not based on reaction time but rather on strategy, it helps even the score for the "arcade dropouts." Your strategy will slowly build, and before long you will be rolling in cash or attaining high scores, however you wish to look at it.

Loading Procedure

Oil Tycoon will run on an unexpanded VIC, and there's another version for the 64. The VIC version fits in 5K of memory because it is actually two separate programs. The first program displays a brief review of the control features and a few simple warnings, along with the message "PLEASE WAIT FOR FURTHER INSTRUCTIONS." At this point it POKES into memory the custom character information and the machine language portion of the game used for reading the joystick position. It protects this area of memory from BASIC, then

THE INCREDIBLE
NEW PROGRESSIVE GAME FROM
SYDNEY.

EVOLUTION

ONLY THE STRONG SURVIVE.



6 games in 1

You start as an amoeba trying to advance up the evolutionary chain to become a human. To attain this goal you will have to go through 6 distinctively evolutionary steps:

- You're an amoeba fighting microbes while trying to eat DNA.
- You're a tadpole eluding fish to catch waterflies.
- You're a rodent chased by snakes while looking for cheese.
- You're a beaver attacked by alligators while building a dam.
- You're a gorilla protecting his food from monkeys.
- You're a man battling genetic mutants in an elastic background!

Hailed by leading reviewers as one of the most exciting games available.
EVOLUTION is truly different. Try it today!

Created by Don Matrick and Jeff Sember.
©Sydney Development Corporation

Available at your local dealer or directly from Sydney.

Do you have the instincts and reflexes to survive and evolve to each higher life form? It's a challenge that grips you as no other game!

- Up to 99 levels
- Either a keyboard or joystick control
- Written in machine language
- Colorful high-resolution graphics
- Keeps track of top 10 scores
- Full convenience controls
- Arcade sound
- Even an intermission!

Play Evolution on Apple II, Apple II Plus, Commodore 64, IBM PC or Coleco Cartridge.

IBM, Apple and Coleco are registered trademarks of International Business Machines, Apple Computer Inc. and Colecovision respectively.



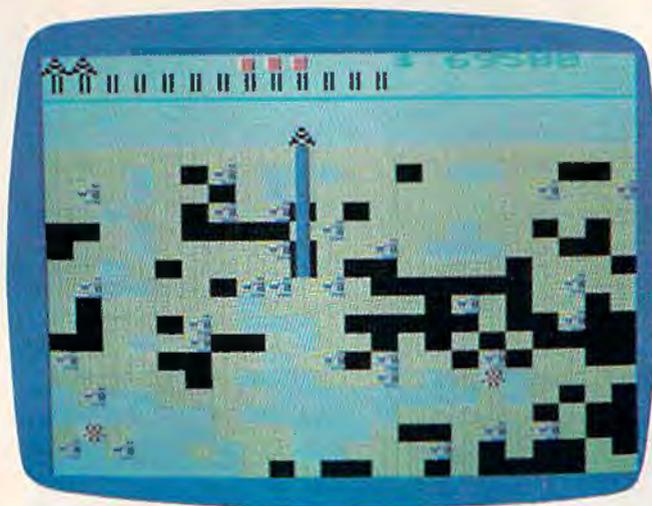
Sydney

Dataproducts, Inc.

129-444 Camino Del Rio South
San Diego, California, U.S.A. 92108
(619) 298-5886

In Canada:

600-1385 West Eighth Avenue
Vancouver, B.C., Canada V6H 3V9
(604) 734-8822 Telex 04-54357



Drilling into an underground reservoir of oil in the VIC version of "Oil Tycoon." Note the little red devils lurking in the pumped-out caverns.

LOADs and RUNs the second program, erasing itself in the process. When this is completed, the message "PRESS STOP ON TAPE" appears at the bottom of the screen and the program waits until you comply.

Because of the Commodore 64's much larger memory, the 64 version is one completely self-contained program.

Difficulty Levels

The next screen displays the high scores attained for each of the eight difficulty levels. The program will return to this screen after each game. Your score and the difficulty level of the game you have just completed are displayed at the top of the screen.

At the bottom of the screen you will see "DIFF. LEVEL 12345678." Choose the difficulty level by moving the joystick left and right and pressing the fire button when the number of the difficulty level you want is blinking. Level one is primarily for small children. I would recommend that seasoned gamers begin with level two. The higher the difficulty level, the more difficult the game becomes. The various conditions for the eight difficulty levels are as follows:

Level	Sticks of Dynamite per Oil Rig	Pieces of Shale	Invisible Shale
1	3	20	No
2	2	20	No
3	3	30	No
4	2	30	No
5	4	20	Yes
6	3	20	Yes
7	4	30	Yes
8	3	30	Yes

Playing Oil Tycoon

After you choose the level, the oil field is drawn on the screen. It will be different for each game;

you should never see the same screen twice. For each game, you receive five oil rigs, each of which has 20 lengths of pipe and a number of sticks of dynamite, depending on the difficulty level you choose.

In the upper-left corner of the screen are the oil rigs you have remaining. In the upper-right corner is your score. Between these are the sticks of dynamite you have remaining for the oil rig now in play. The second line displays the unused lengths of pipe for the oil rig now in play. As you drill, this pipe will be used one length at a time and will be replaced as you withdraw your drill. The lower portion of the screen is the playing field. Yellow squares are dirt, black squares are oil, and the irregular squares are shale.

Move the joystick left and right to position your oil rig over the column you want to drill through. To drill, pull the joystick down. To withdraw the drill, push the joystick up. You cannot move the oil rig while there is drilling pipe in the ground. You cannot bore through shale, devils, or off the bottom of the screen. If you try, your drill will be ground up, and you will lose that length of pipe for the oil rig in play. This becomes very important in difficulty levels above four, for the shale is invisible and looks like dirt. At these levels, it is very easy to lose most of your drilling pipe before you realize that you are trying to drill through shale.

Also try to avoid drilling through empty spaces from which you have previously pumped oil. Natural gas can collect in these empty spaces and may cause an explosion when you try to drill through them again.

Controlling the fire button takes some getting used to, because it does three things. As you bore, if the end of the drilling pipe is in oil or an empty space, pressing the fire button causes your oil rig to start pumping. If the end of the pipe is in dirt, pressing fire drops a stick of dynamite down the pipe. If you are not drilling, or if you have fully withdrawn the pipe, pressing fire replaces your current oil rig with one of your remaining rigs. Be careful - it is easy to lose valuable rigs. Replacing your oil rig with a new one is useful mainly when you have used up your allotted dynamite for the rig in play, or if you do not have enough pipe remaining to reach pools of oil near the bottom of the screen.

Use your dynamite to blow up shale, devils, or dirt. Note that when you drop dynamite down the pipe, it will continue to fall until it hits one of these three obstacles. This means that if there is oil or empty space directly below the tip of the drill, the dynamite will fall out of the bottom of the pipe and through this space until it hits shale, a devil, or dirt.

QUICKSILVA

IS HERE

AMERICA

QUICKSILVA

Awesome software which extends your computer's potential to the maximum. Enjoyed by millions in Europe, now Quicksilva comes to America.

QUICKSILVA

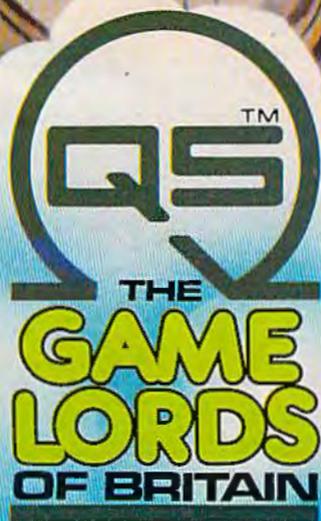
Britain's leading manufacturer and distributor of video games and other software. Programs available for the **Timex-Sinclair 1000** and **2000™**, **VIC-20™** and **Commodore 64™**, **BBC™** and **Dragon™**, **Atari 400** and **800™**.

Distributor

inquiries invited for USA and Canada: Please contact us for further information

Dealer

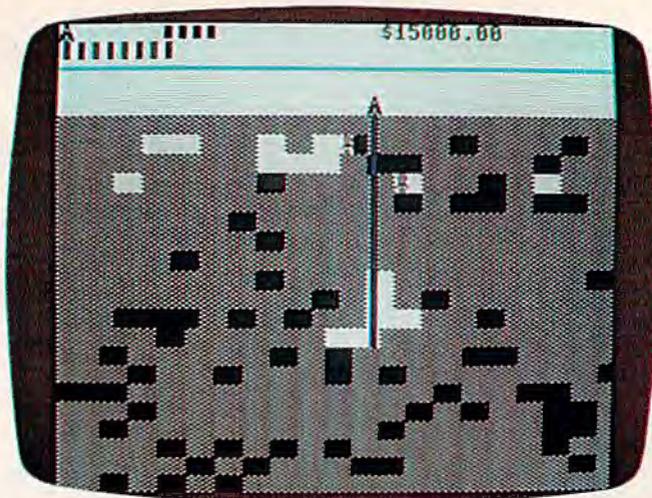
inquiries invited for USA and Canada: Please contact us for further information



QUICKSILVA INC.
426 West Nakoma
San Antonio, TX 78216
Tel: (512) 492-8054

Please send me a free color catalog
I currently own or plan to buy a _____ computer
I enclose a stamped, self-addressed envelope
Name _____
No./Street _____
City _____
State _____
Zip _____ G1





Extending the drilling pipe toward deep reserves of oil in "Oil Tycoon," 64 version.

Pumping Oil

When you pump, all of the oil in adjacent spaces to the sides and above the level of the drill bit will be pumped out. In other words, all squares of oil connected to the one you are pumping will also be pumped out only if they lie directly *above* or *to the sides* of the oil being pumped. Any squares of oil *below* those which are being pumped out will remain where they are.

If you uncover a devil while pumping, it will blow up your oil rig. If you try to pump a pool of oil which is at or below the level of an uncovered devil, and which is directly connected to the devil's space, it will also blow up your rig.

The deeper the oil, the more it is worth when you pump it out. An extra oil rig is awarded for each \$100,000 you acquire. In addition, if you pump out all the oil on the screen and then retract your pipe, you will be awarded an extra oil rig and a new screen is drawn.

Entering The Program – VIC Version

REM (REMark) statements were excluded in Program 2 to conserve memory. For those who are interested in studying the routines, a summary is presented at the end of this article.

If you do not want to go through the trouble of typing the entire game into your computer, simply send \$3 and a blank tape in a stamped, self-addressed cassette mailer to:

Gordon Wheat
200 S. 7th St.
Denton, MD 21629

To enter the VIC version of Oil Tycoon into your computer, type in Program 1. SAVE the program on tape and VERIFY it. Now remove that tape, without rewinding it, and place a second tape in the cassette. SAVE and VERIFY the program on this tape. As before, do not rewind this

tape and do not RUN the first program. Type NEW to erase the first program and type in Program 2.

It is *very important* that all BASIC statements be abbreviated when entering the second program or you will quickly run out of memory. Look in your manual to see how BASIC statements are abbreviated. SAVE and VERIFY this program on both tapes. You should now be ready to play Oil Tycoon.

After LOADING the first program, do not press STOP on the cassette recorder; it will stop by itself. When the first program is RUN, it will LOAD and RUN the second program.

This is the first game program I have written, and I have been programming for only nine months, so any comments or ideas would be welcome.

Special thanks to Rick Capacio for his many hours of testing.

Breakdown of Routines – Program 2 (VIC Version)

Lines	Routine
1-4	Game initialization.
5-23	High score screen, difficulty selection.
24-25	New oil rig.
26-29	Drill.
30-33	Secondary loop.
34-39	Primary loop.
40-45	Withdraw pipe.
46-60	Pump.
61-68	Upper screen update.
69-77	Drop dynamite.
78	Natural gas.
79-81	Exploding pipe and rig.
82	Bell sound.
83-84	Explosion sound.
85-86	Devil.
87-92	Screen setup.
93	Explosion picture.
99	Drilling sound.

See program listings on page 145. 🐱

FOXSOFT™ Presents... SpryteByter™

For the Commodore 64™

The user affectionate sprite development program. Menu-driven, mono/multicolor sprites, joystick/keyboard, tape/disk. 20K w/FAST machine language routines. Over 60 commands: ROTATE (any angle 0 - 360), INVERT/OBVERT, SHIFT, SYMMETRY, AND/OR, REVERSE, REVIEW, MOVIE (animation). Create and edit up to 128 sprites per file. For programming efficiency and FUN! Includes the Game Maker - automatically prepares a base for game development.

Cassette \$29.95 (U.S. Funds)
Disk \$34.95

FOXSOFT™
P.O. Box 507
Deer Park, Texas 77536
(713) 473-6723



A Division of Foxfire Systems, Inc.

PHANTOM Software presents

The
ATTACK
of the

PHANTOM KARATE DEVILS™

ARCADE ACTION

The diabolical Ninjas have murdered the Master and his daughter!

You must avenge the foul crime!

Fight your way through successive doors to different worlds and different weapons!

Horror martial arts arcade action animation!

From the master of light, sound and action!

Joystick required.

\$34.95

Just released for the Commodore 64®. Also available - Surf, and Particle Beam War.

See your local dealer, or order direct from:

PHANTOM Software

1116-A 8th St. • Suite 155 • Manhattan Beach, CA 90266 • (213) 379-8686

Send Check or Money Order.

Specify Tape or Disk. Add \$2.00 for shipping. Calif. residents add 6.5% tax.

Re-Beep

For VIC And 64

Robert L. Lykins

"Re-Beep" is a *Simon*-type game written originally for the unexpanded VIC-20. We've added a translation for the Commodore 64.

"Re-Beep" is a game for the VIC-20 and Commodore 64 that will truly keep you on your toes. An increasing amount of concentration is required to keep your score rising. You must duplicate the ever-lengthening tone sequence the computer gives you by pressing the special function keys in the correct order.

If you correctly duplicate the sequence, your score will increase by one. (You receive one point for each beep in the pattern.) The computer will then add a note to the old pattern, and you must then attempt the longer sequence. The computer starts with one note, which is easy enough. Soon, however, you will be hearing a befuddling series of beeps. Can you hold out for the maximum 127 notes the computer can play? Probably not. I feel lucky if I manage to score 20 points. For the memory experts, however, there is a way to increase the note capacity to 255. We'll discuss this later.

When your memory fails, all is not lost. The computer will sound a buzzer, tell you to try again, and then replay the sequence for you. Who says a computer can't be humane? If, despite the trauma of blowing your first try, you regain your concentration and properly play the sequence, the game

continues. If you can't do it the second time either, you get the raspberry and the computer starts a new sequence.

Advanced Features

Several features incorporated into this *Simon*-type game make it better than many. First, it remembers your high score until you erase the program or turn off the computer. Some patterns are easier to remember than others, and you may find that you do not score nearly as high on one game as on another. The computer keeps and displays your high score so you will have a goal to shoot for in succeeding games.

A second feature is difficulty selection. You may select from three levels which determine the speed at which the notes will be sounded. Beginners and young children will probably do best on level one. Level three requires a quick wit, so level two is a good compromise. It is not slow enough to become boring, nor so fast that it will make you blink and say, "What was that?"

Perhaps this game's best feature is that it has a two-player option. Most computer games seem designed for only one player. With *Re-Beep*, you may elect to play with another person. If so, the computer will ask the name of each player and provide a separate scoreboard for each. The high scores are also displayed separately.

Player one begins, and his scoreboard number

Get the players' games from CDS!

WITCH WAY



Can Wally fight his way to the top and save his true love??? The way looks simple enough, but . . . uh oh . . . LOOK OUT FOR THE WITCH!!!

It's a multi—level, multi-screen boggler! Super game power requires an 8K expander!

Strap on your lasers, squad, because this one is going to stretch you to your limits!

Changing screens and fast-paced, non-stop action keep you long on fun and short on fingernails!

BUG SPREE



ROAD TOAD



Can our hero make it across the freeway without getting that run-down feeling?

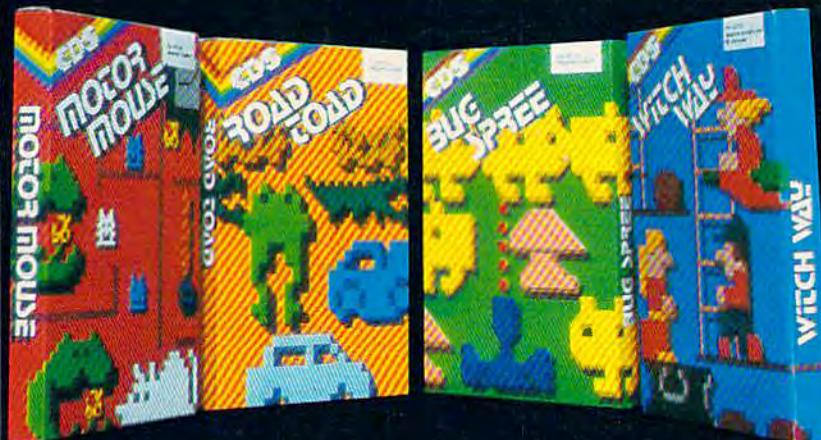
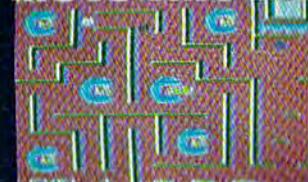
And if he does . . . does he know he can't swim?!?

It's the thrill of victory and watch out for the alligators!

Keep your eyes open — there's a tasty treasure in cheeses just ahead! But . . . there's hungry cats around every corner!

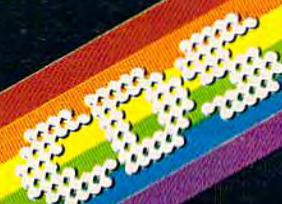
One wrong move, and you're hickory dickory dead!

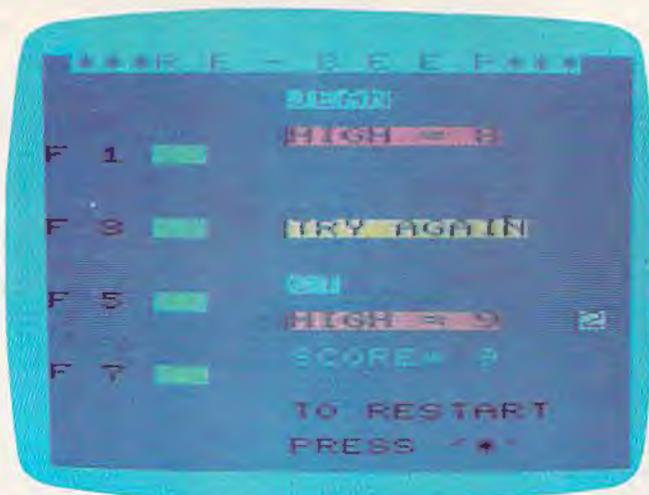
MOTOR MOUSE



The CDS winners for the Commodore VIC 20. (Also some for Commodore 64) Suggested retail \$29.95 US (cassette). Ask for them at your Commodore store. Or write to us. Dealer inquiries also welcomed.

Commercial Data Systems Ltd.,
730 Eastview Avenue, Regina, Canada, S4N 0A2
(306) 525-3386





In this VIC game of "Re-Beep," player CT has just been tripped up by a nine-tone pattern – but he gets a second chance.

(1) is lit until he loses. The computer then lights the second scoreboard number (2) and begins a new sequence for player two. When player two's concentration fails, play is switched back to player one and his scoreboard. Play thus alternates between the two scoreboards.

If only one person wishes to play, the computer will skip the name request, display only the top scoreboard, and will not light a scoreboard number. This allows maximum concentration on the task at hand.

Opposing teams could be formed if more than two wish to play. Each scoreboard will hold 12 characters for the name or names, but if two are used, they should not be separated by a comma due to the computer's INPUT characteristic of disregarding anything after a comma. A slash (/) should work fine, however.

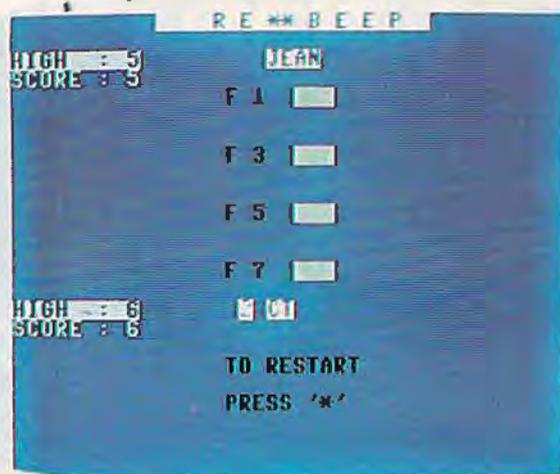
How It Works – VIC Version

This program employs a technique known as *string concatenation* – the addition of two strings. (A "string" is a group of characters.) In this case, STR\$(R) is added to S\$, the string containing the information the computer uses to play the series of notes. R is a random number from one to four, inclusive, corresponding to one of the four function keys, and is selected by line 230. It must be converted into a string by STR\$(R) so that it can be used in a sequence of numbers.

For example, if S=0, S\$="", first R=3, then R=4, then:

Numeric Addition	String Concatenation
S=S+R	S\$=S\$+STR\$(R)
S=0+3=3	S\$=""+"3"="3"
S=3+4=7	S\$="3"+"4"="34"

In this example, R first corresponds to function key F5 (3), then to F7 (4). Adding three and four numerically results in the number seven, only one numeral which has no corresponding



"Re-Beep" for the Commodore 64 uses the built-in synthesizer to generate tones.

key. But concatenating the strings as in line 240 provides a sequence of selected R values which do have a corresponding function key and tone.

Using lines 260 to 300, the computer plays a series of tones and lights up the green rectangles corresponding to the function keys. It does this by converting each number in S\$ into a numeric value (Q) in line 270. Line 290 sends the program to one of four note-playing and rectangle-lighting subroutines, depending on the value of Q. The handy ON-GOSUB statement replaces four IF...THEN statements. If Q=1, the program GOSUBs to the first line number, 480. If Q=2, it GOSUBs to the second, etc.

The NEXT statement in line 300 repeats the process if line 260 indicates there is more (depending on the LENGTH of S\$). Perhaps you noticed in the string concatenation example that the numerals were preceded by spaces. This is because STR\$(R) puts a blank space in front of the numeral, and a LENGTH check will bear this out: LEN(STR\$(4))=2. Of necessity, then, the FOR-NEXT loop beginning in line 260 starts with 2 and STEPs 2 so that line 270 won't read a blank. If you wish to slow the game, you can start the loop with 1 and eliminate the STEP portion of the statement. This will result in Q having a value of 0 every other time, which will not play a note. Leaving in the STEP portion will result in line 270 reading blanks only, and line 290 will never execute a tone subroutine.

After all the notes in S\$ have played, lines 310-350 get the player's response on the function keys, play the appropriate notes with the same subroutines, and build F\$. Line 370 compares the LENGTH of the player's string (F\$) and the computer's string (S\$). If they are the same LENGTH, it means the player has played as many notes as the computer and further comparisons are made. If not, the program returns to line 310 for more player input.

If our word processing software is so great, why are we giving it away?



It's our way of introducing you to DATA 20.

As the leader in price/performance peripherals for Commodore 64™ and VIC 20™, we want you as a loyal customer. So to encourage you to sample our add-ons, we're giving away our WORD MANAGER software when you purchase any DATA 20 DISPLAY MANAGER or VIDEO PAK to expand your Commodore to 80 columns.



most commands one-key simple, eliminating awkward prompts and menus.

What you see is what you print.

With our professional 80-column format, your printed product duplicates screen output precisely. You see centering, left justification and other features as they will print. So you'll save time, save paper, and get the exact results you want!



What's so great about WORD MANAGER?

The table tells the tale. This DATA 20 exclusive gives you powerful features found only on the most expensive word processing systems including mail merge, block move, search and replace. And we've written our word processing in machine language for fast execution and low memory requirements.

Compare the Top Three

	Mail Merge	Feature Strip	Works with Any Printer*	Tape & Disk Capabilities	Full Screen Editing	80-Column Format
WORD MANAGER	•	•	•	•	•	•
WordPro®	—	—	—	—	—	—
Quick Brown Fox™	—	—	•	—	—	•

*Most standard serial or parallel printers require interface, not supplied.

Best of all, WORD MANAGER is exceptionally easy to use. A self-adhesive feature strip for function keys makes

WORD MANAGER is really something—for nothing! Get it free with your DISPLAY MANAGER or VIDEO PAK from DATA 20. See your dealer or write: DATA 20 CORPORATION, 23011 Moulton Parkway, Suite B10, Laguna Hills, CA 92653.

DATA 20

CORPORATION

Price/Performance Peripherals

Commodore 64 and VIC 20 are trademarks of Commodore Electronics, Ltd. Quick Brown Fox is a trademark of Quick Brown Fox. WordPro is a registered trademark of Professional Software, Inc.

Line 380 determines whether or not the player's sequence is correct. If not, it allows the player to try again if E=0, then changes the value of E to 1. This causes the program to skip the "Try Again" routine if the player fails the second time.

Line 400 catches this and sends the program to the end-of-game routine. If the program can get by lines 380 and 400 without being diverted, the player has played the sequence correctly, and the program enters the scoring routine. The program then adds another numeral to S\$ and the tone sequence lengthens. The process repeats.

For Mnemonists

Allowing STR\$ to put blank spaces in S\$ and F\$ actually wastes half the memory available for the tone sequence, limiting it to 127 notes, though this quantity should prove to be more than adequate for most players. Perhaps a few readers have really extraordinary memory capabilities. If so, the following will increase the challenge of the game. If not, at least it illustrates what can be done to solve the waste problem and may be useful in other applications.

To fill S\$ and F\$ with useful numbers (and obtain 255-note capacity), only the numeral and not the blank space in STR\$ should be added. This is accomplished by using the RIGHT\$ function as illustrated in lines 240 and 320-350 below. In this instance, the farthest right character from STR\$, the numeral, is added to the tone string instead of the whole of STR\$.

Change the following lines for 255 notes:

```
240 S$=S$+RIGHT$(STR$(R),1)
260 FORL=1TOLEN(S$)
320 IF Z$="{F1}" THEN GOSUB 480:F$=F$+RIGHT$(STR$(1),1)
330 IF Z$="{F3}" THEN GOSUB 540:F$=F$+RIGHT$(STR$(2),1)
340 IF Z$="{F5}" THEN GOSUB 600:F$=F$+RIGHT$(STR$(3),1)
350 IF Z$="{F7}" THEN GOSUB 660:F$=F$+RIGHT$(STR$(4),1)
```

Other Techniques

Level of play is determined by the value of LV (1-3), INPUT early in the program (line 50). Certain lines in the program employ delay loops that incorporate LV. LV is squared and is then used to divide the loop length number. On level one, the number is divided by one - no change. If LV=2, the number is divided by four (LV²), substantially reducing the delay. And on level three, the number is divided by nine.

Loops are also employed to print multiple items on the screen. The title display is created in this manner by line 40. Different print colors are obtained by POKEing 646,L. Lines 150 and 160 print the function keys' F numbers and matching

green rectangles. Using this technique can be a memory saver.

Note that line 130 uses a WAIT statement rather than the more familiar 130 GETA\$:IF A\$=" " THEN 130. You should experiment with this before putting it in your own programs, however, because the results are somewhat unpredictable. (See "Hints and Tips" in this issue.) Memory location 197 contains keyboard information. Using WAIT 197,64 will cause the program to wait until any key is pressed, including the RETURN key, which may still be down from INPUTing in line 60 or line 80. This problem is solved by using number 32 instead of 64. Now, about half the keys will cause the program to continue, including the space bar. The RETURN key will have no effect. Using another number may cut out more keys or may be ineffective in stopping the program at all.

You may have noticed that some PRINT statements do not have ending quotation marks. They are unnecessary on the VIC and 64 at the end of a line, unless used to define the length of a series of blank spaces.

Also unnecessary many times is the REVERSE OFF command. If the PRINT statement is not followed by a semicolon, REVERSE is automatically switched OFF when the statement ends. Line 769 is a REMark, but without the REM. It is unnecessary because the program never reaches this line, and so never detects the syntax error. The lines following it are subroutines, and line 760 sends the program to a line above it. These techniques can also save memory.

Readers who would like a tape copy of this program (VIC version only) may send \$5 for a copy returned postpaid or \$3 with a blank tape and a self-addressed, stamped mailer to:

Robert L. Lykins
P.O. Box 8140
Anchorage, AK 99508

See program listings on page 148. 

GENEALOGY

PRO-
GENY

for your **COMMODORE 64** \$49.95

NEW SOFTWARE

AN EXCELLENT GENEALOGY PROGRAM DEVELOPED TO CONFORM TO LDS STANDARDS

COMPLETE

FANTASTIC

WITH

RECORDS

for 4 generations

up to 10 children

per generation

VISA • MASTER CARD • COD'S ACCEPTED • DEALER INQUIRIES WELCOME

A-1 SERVICES
7103 W. Clearwater H-229 • Kennewick, WA 99336
(509) 783-4980

Write For Free Vic Catalog

NEW

Write For Free 64 Catalog



VIC™ Software VIC™



CRICKET

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



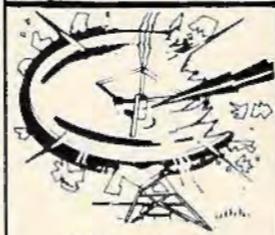
BUG BLAST

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



PARATROOPER

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



TARGET COMMAND

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



MOW

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



COSMIC CRUZER

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



ALIEN INVASION

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



SPACE PAK

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

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



SNAKE OUT

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

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



HEAD ON

ComputerMat • Box 1664A • Lake Havasu City, AZ 86403

Add \$1.00 For Shipping

Marc Blank

The Programmer Behind *Zork*

Kathy Yakal, Editorial Assistant

Don't call Infocom a "software publisher." Or its creative staff "game programmers." This month's "Inside View" looks at the rather unusual evolution of a staff of game designers and the unique products they are creating.

Take a look at any software best-seller list. Chances are you will see a great number of games that involve gobbling up little dots, or shooting at something that's trying to annihilate you, or working your way through mazes.

There is another kind of computer game that has developed quite a following over the last few years: the adventure game. "We're the only people committed to that sort of game," says Marc Blank, 28, vice-president of Infocom and the programmer behind *Zork*. "I'm happy to be doing something that no one else is doing."

To date, Infocom has seven products on the market: *Zork I, II, and III*, *Starcross*, *Deadline*, *Suspended* and *Witness*. All adventure games. And all successful. "Our adventures are more like books than games," says Blank. "They are a valid form



Marc Blank.

or entertainment, a new kind of fiction."

Early Inspiration

Blank's personal interest in adventure games goes back to when he was an undergraduate at the Massachusetts Institute of Technology in the mid-1970s. He, along with people all over the country, played the original *Adventure* (written by Don Woods and Willie Crowther, who were then at Stanford) on huge main-frame computers. *Adventure* required a tremendous amount of memory – about one megabyte.

This original adventure game was based loosely on the Dungeons and Dragons theme – a fantasy that requires its players to take on the personas of other characters as they engage in an imaginary trek through a castle, seeking treasure and warding off monsters.

The major interaction in this large-scale fantasy game was two-word commands typed in by the players on their own terminals at home and transmitted through a modem over the phone lines. The computer played the role of the dungeon master; it knew where all the treasure was

PROBABLY, the
FASTEST GAME
YOU'LL EVER PLAY!

BLITZ

FOR THE COMMODORE 64®

Out of thin air they begin their rampage.
Wave after wave they tumble toward you
when you least expect them!

Buy BLITZ and other fine products of Grapevine Software at your local dealer, or order direct.

Grapevine Software, Inc.

(WE SPECIALIZE IN FAST DELIVERY)

P. O. BOX 14843, LENEXA, KS. 66215

Order hotline (913) 888-0501

® COMMODORE 64 is a registered trademark of Commodore Business Machines.

Suggested retail price **\$24.95**

Plus \$2.00 postage and handling
(Kansas residents add 4% tax)

Available on diskette or cassette.

We accept check, money order or



Dealer and Distributor inquiries invited.

hidden and all the danger lurked, and would execute the players' commands and tell them the results of their actions.

One of the problems with this initial version, according to Blank, was the computer's lack of vocabulary. Because it would accept only two-word commands, the computer made some decisions that would have made the game more challenging had they been left up to the player. For example, you could enter the command, "Open door," and if there was more than one door near you, the computer would decide which one you meant.

The Birth Of Zork

Marc Blank believes that one of the motivations for programming is to see if you can do something better than what's already been done. So he started to work on an adventure game of his own.

Using MDL, a computer language invented at MIT, Blank and some of his acquaintances wrote the original version of *Zork* on a PDP-10 (a mainframe). Blank had by this time finished his undergraduate studies and was attending medical school at Albert Einstein in New York.

The mainframe version of *Zork* first became available in June 1977.

Blank graduated from medical school in 1979 but decided not to pursue that profession, opting for what he considered a more creative field. He and a few other people spent the next year developing a language that they could use to program adventure games like *Zork* on the new microcomputers.

Memory limitations of micros forced them to cut the original version of *Zork* in half. But, says Blank, the new game was actually more complex. It took up about 70K (which does not mean that you need a computer with that much memory to play *Zork*; the program is set up so it calls on different sections at different times).

Blank believes an important element of adventure games is making the players feel like there's no computer there – that they're actually participating in the fantasy. One of the ways this was accomplished was by developing an English language parser that would allow the computer to respond to more than two-word commands.

"An adventure game is only as good as its parser, that part of the program through which the player communicates with the game's environment," says Blank. "If the parser gets in the way of the player's creative expression, even the best-plotted game can become slow, tedious, and frustrating."

The original *Zork*, programmed for the Apple and the Radio Shack TRS-80, had a 600-word vocabulary, which helped accomplish Blank's goal of communicating with the game itself. Later In-

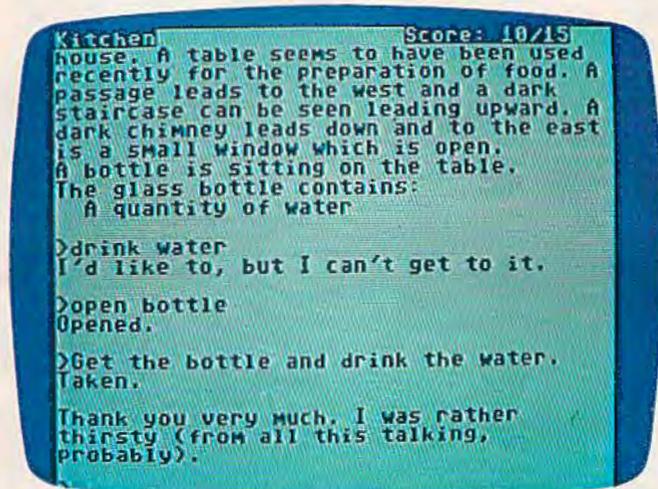
focom adventures have even larger vocabularies.

Providing An Alternative

In a market as volatile as the microcomputer software industry, it's highly unusual for one publisher to dominate the best-seller lists. Infocom has managed to do that. In its four years of existence, the company that Marc Blank helped create has yet to produce an unsuccessful product. Why?

"They're good. Very entertaining," says Blank. "After all, the classics stay in print, don't they? Besides, peoples' imaginations don't go out of style."

Blank doesn't see adventure games as a replacement for arcade games – merely an alternative. "I like arcade games as well as anyone, but a computer can handle much more than games," says Blank. "People like to see themselves as characters in a story. We're committed to giving them those stories."



Pausing for refreshments in a game of *Zork* on the Commodore 64. Note the program's amusing response to the compound sentence "Get the bottle and drink the water."

NEW!

COMPUTER TUTOR

Animax presents its effective and proven method of learning computer programming in a simple and easily understood process. Starting with a very small program, you'll learn to expand the program simply, a step at a time, by gradually introducing information.

VIC-20 \$14.95

SEND FOR OUR
FREE CATALOG
WE HAVE MANY LINES
OF SOFTWARE
ALSO PERIPHERALS
SPECIAL 'SALE' ITEMS

ANIMAX COMPUTER

1111 Las Vegas Blvd. South
Las Vegas, NV 89104

THE PROGRAM STORE

Guarantee: We will ship your order for items in this ad within 48 working hours or you get a 20% rebate.
(Books/non-released items excluded. Gift certificate issued. Offer expires October 10, 1983)

SALE!

SUBMARINE COMMANDER

from Thorn EMI

Your mission: destroy all enemy merchant shipping in the Mediterranean. Locate enemy ships using your Sonar and periscope, attacking when they're within firing range. But watch your instrument panel carefully to monitor your fuel, oxygen, battery charge and Sonar levels, so you'll be ready for instant action — diving to avoid enemy depth charges, or firing your own.

#20181 VIC 20 Rom Cartridge
\$30.95 \$31.96
20% off NOW thru Oct. 10

ZORK I, II, or III

from Infocom

You can communicate in complete English sentences in these interactive adventures with a vocabulary of over 600 words! Each of these literate games will keep you entertained for 50 hours or more.

Zork I, The Great Underground Empire. Discover 20 treasures, and fight for your life! Zork II, The Wizard of Frobozz: The Wizard will attempt to confound your quest with his capricious powers. Zork III: Brand New Adventure!

19268 Zork I C64 Disk \$39.95
19257 Zork II C64 Disk \$39.95
19246 Zork III C64 Disk \$39.95

JOY SENSOR

from Suncom

Exciting breakthrough in game controllers! Touch sensitive with no stick. Just the right combination of control and responsiveness. Moves are executed much faster — the slightest touch is all it takes.

#31059 \$34.95

DELTA DRAWING

from Spinnaker

The perfect program for kids of all ages. Let's you have fun drawing and coloring pictures. Uses simple, single key commands. Introduces computer programming concepts to first-time users. Color your world!

C64 Rom Cartridge \$39.95



COLOR DISKETTES

GET ONE COLOR DISKETTE FOR ONLY \$1.00 WITH THIS COUPON AT ANY OF OUR PARTICIPATING STORES (coupon not redeemable through mail order)

The whole disk is colored — not just the envelope! It's so hard to describe, we want you to see it. Try these premium quality disks in 5 bright colors. Try a different color for each subject or person. Available in boxes of ten, all one color for \$34.50.

#40262 Green #33242 Orange
#37460 Red #29865 Yellow \$34.50
#33534 Blue
#18515 Assorted Colors \$39.50

Name _____
Address _____
City _____ State _____ Zip _____
Type of Computer _____ CG11

SALE!

SNOOPER TROOPS

by Tom Snyder from Spinnaker

As Snoop Trooper, you're a detective assigned to solve mysteries. You drive around town in your SnoopMobile, with wrist radio, SnoopNet computer, camera for Snoop-Shots, and notebook. Full color graphics and sound.

Case #1: The Granite Point Ghost
Someone is trying to scare the Kim family. Who—or What? And Why? Ages 10 to adult.

#208011 C64 Disk, ~~\$30.95~~ \$31.96
20% off NOW thru Oct. 10



BANK STREET WRITER

from Broderbund

The first word processor designed for the whole family! Every function and command is fully and clearly prompted on the screen. Time Magazine says "The key to Bank Street Writer's success is ease of use. Yet for all its simplicity, it is powerful."

16007
C64 Disk \$69.95



PIPES

from Creative Software

How much money will it take? This original concept game develops economic and relative distance skills for 6th to 12th graders. The waterworks man must connect all the houses to the main water tank. But, he's on a budget and he has only so much pipe. Requires joystick.

29595 Vic-20 Rom Cartridge \$39.95



PRACTICALC

SALE!

from Computer Software Associates

Get down to business! Devise budgets and make business projections instantly. Keep track of expenses, investments and inventory or alphabetize lists and rearrange long rows of numbers. 22 Math functions, features changeable column width, graphics, sort, search, move, insert, delete, replicate and print. Practicalc makes it practical to play with numbers.

Vic-20 16K Tape ~~\$30.95~~ \$33.96 15% Off
Vic 20 16K Disk ~~\$44.95~~ \$38.21 NOW
C64 16K Tape ~~\$40.95~~ \$42.46 thru
C64 16K Disk ~~\$54.95~~ \$46.71 Oct. 10

ULTIMA ESCAPE FROM MT. DRASH

by Keith Zabolon from Sierra Venture

It's a game of life and unless you can prevent it, a game of death. Three views spread action before you. 15 mountain levels honeycombed with mining tunnels and caverns. Use your magic spells then fight your way to freedom. You have three lives in this great adventure — but squander none. The life you save will be your own!

Vic 20 8K Tape \$19.95



VIC MUSIC COMPOSER

from Thorn EMI

Compose and play your own music the electronic way! Just pick your note, position it on the staff and press return. Enter score and edit without numbers or letters! Playing time up to 30 minutes (or 4 1/2 hours with 16K). Also features three voices, controllable tempo and volume and the ability to save score.

43085 Vic 20 Rom Cartridge \$39.95



THE PROGRAM STORE	
now open in Monmouth Mall	Rt. 35 Rt. 36
Garden St. Wyckoff Rd.	Monmouth Mall Traffic Circle Eatontown, NJ

Over 2500 Programs for TRS-80, ATARI 400/800, APPLE, IBM, VIC 20 & C64

VISIT OUR STORES

Tenley Mall, 4200 Wisconsin Ave., NW, Washington, DC
Harvard Square, 13 Dunster St., Cambridge, MA
W. Bell Plaza, 6600 Security Blvd., Baltimore, MD
White Flint Mall, Rockville Pike, Rockville, MD
Cherry Hill Mall, Rt 38 & Haddonfield Rd, Cherry Hill, NJ
Monmouth Mall, Rt 35 & Wyckoff Rd, Eatontown, NJ

Willowbrook Mall, 1400 Willowbrook Mall, Wayne, NJ
Nanuet Mall, Rt 59 & Middletown Rd, Nanuet, NY
Olantangy Plaza, 829 Bethel Rd, Columbus, OH
Westmoreland Mall, Rt 30 East, Greensburg, PA
Montgomery Mall, 230 Montgomery Mall, North Wales, PA
Plymouth Meeting Mall, 500 Germantown Pike, Plymouth Meeting, PA
Century III Mall, SR 51 & SR 885, West Mifflin Borough, PA
Seven Corners Center, Falls Church, VA

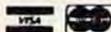
COMING SOON IN

CHICAGO ST. PETERSBURG
DENVER TAMPA
OKLAHOMA CITY TULSA

FRANCHISE OPENINGS IN SELECTED CITIES

To Order Call Toll Free 800-424-2738

For Information Call (703) 556-9778



Mailorders: List computer, item, item #, qty, tape/disk, rom, book, price, shipping, tax & total. Send check or M.O. for total purchase plus \$2.00 shipping and handling. VA add 4% sales tax. Charge cards — include all embossed information. List name, address, city, state, zip & phone.

THE PROGRAM STORE Dept. 11-10-3 Box 9502 4200 Wisconsin Avenue, NW Washington, D.C. 20016

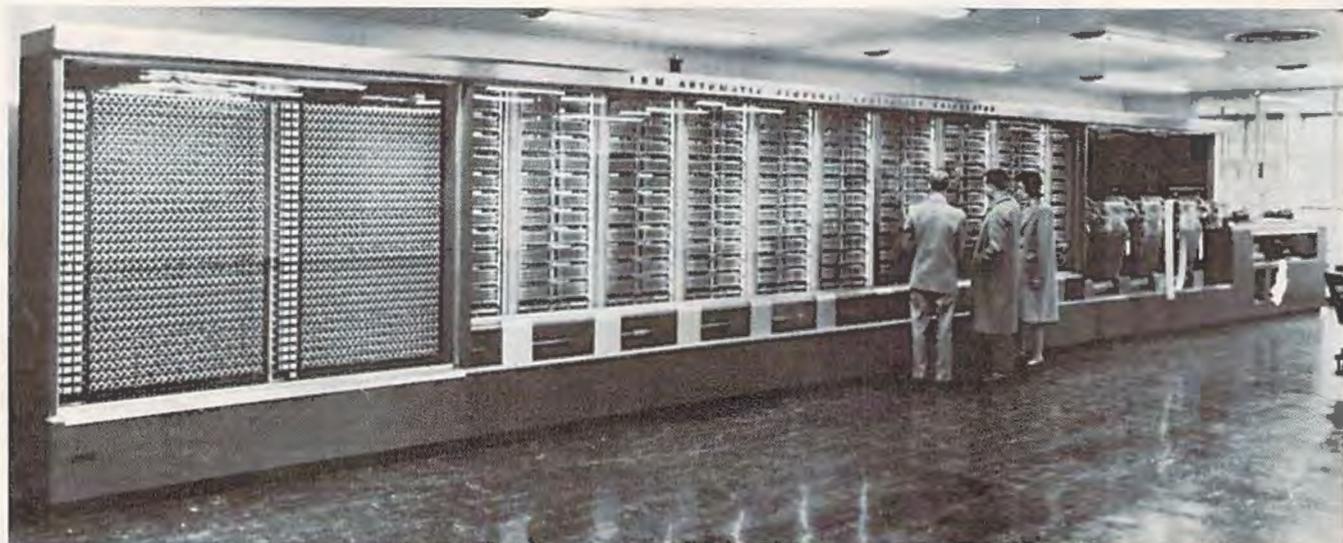


© 1983 THE PROGRAM STORE

COMPUTING

FRED D'IGNAZIO,
ASSOCIATE EDITOR

for kids



A "dinosaur" computer of the 1940s. When the IBM Mark I began working in 1944, it sounded like a roomful of knitters using metal needles. It went "clickety-clickety-clickety."

Courtesy of IBM.

From Dinosaurs To Freckles

Have you ever seen a dinosaur spit out numbers?

Forty years ago, dinosaurs inhabited Earth, just like in prehistoric times. The dinosaurs were enormous. Some were the size of your living room. Others were even bigger. They filled warehouses, laboratories, and entire city blocks. And when they were well fed, they spit out numbers.

The dinosaurs had metal skin. Inside their bodies were millions of wires, some the size of jungle pythons. The dinosaurs were controlled by thousands of hot, glowing vacuum tubes the size of big dill pickles. The vacuum tubes acted like traffic cops and routed the flow of electricity through the dinosaurs' wires.

The dinosaurs spit out numbers. They also ate them. The dinosaurs liked only two kinds of numbers: ones and zeros. Dozens of human beings fed them ones and zeros in long, caterpillar-like strings.

The humans hoped that after the dinosaurs

finished eating, they would say something wise. They hoped the dinosaurs would solve their problems. But the dinosaurs were slow. After weeks of eating bucket loads of numbers, the dinosaurs finally answered. Unfortunately, they were often wrong.

In some ways, these recent dinosaurs were unlike their ancestors. For example, the old prehistoric dinosaurs were mostly brawn. They had tiny brains, the size of a pea or a walnut. Like the old dinosaurs, the new dinosaurs were big. But their bigness was all brain.

The new dinosaurs were different in another way, too. The first dinosaurs were living creatures. They were *reptiles*. Their descendants include alligators, crocodiles, snakes, and lizards. These creatures are alive today.

But the new dinosaurs were not alive. They weren't even creatures at all. They were machines. They were the world's first *computers*!

VIC-20

\$99

commodore COMPUTER HARDWARE

COMMODORE 64™

\$229

- 1525 80 Column Printer \$219.00
- 1600 VIC Modem \$59.00
- 1610 VIC Term 40 \$49.00
- 1650 AD/AA Modem \$89.00
- 1701 14" Color Monitor \$249.00
- 1311 Joysticks (each)..... \$5.99
- 1312 Paddles \$11.99
- 1110 VIC 8K \$42.00
- 1111 VIC 16K \$69.00
- 1011 RS-232 Interface \$42.00
- 1211 Super Expander \$53.00



1541
SINGLE DISK DRIVE

\$249

1530
DATASETTE

\$ 69⁰⁰



1520
COLOR
PRINTER/PLOTTER
\$ 169

SOFTWARE

- commodore**
- 1906 Super Alien \$14.00
 - 1910 Radar Rat Race \$14.00
 - 1917 VooDoo Castle \$19.00
 - 1922 Cosmic Cruncher \$14.00
 - 1923 Gorf \$17.00
 - 1924 Omega Race \$17.00
 - 110 VIC Reference Guide \$15.00
 - CBM 64 Reference Guide \$18.00
- EASY BUSINESS SERIES**
C-64 Disks
- EasyCalc 64 \$59.00
 - EasyFinance 64 \$19.00
 - EasyMail 64 \$19.00
 - EasyScript 64 \$39.00
 - Word/Name Machine \$16.00
- PROGRAMMER SERIES**
C-64 Disks
- Assembler \$16.00
 - Logo \$39.00
 - Pilot \$39.00
 - Pet Emulator \$16.00
 - Screen Editor \$16.00
 - Video/Music Support \$15.00
- ART & MUSIC SERIES**
C-64 Disks
- Music Machine \$16.00
 - Music Composer \$18.00
 - Meta Music I \$39.00
- FLOPPY DISKS**
- Maxell \$32.00
 - Verbatim \$26.00
 - Elephant \$18.95

- CARDCO.**
- Light Pen \$32.00
 - Cassette Interface \$29.00
 - Parallel Printer Interface \$69.00
 - 3-Slot Expansion Interface(VIC) \$32.00
 - 6-Slot Expansion Interface(VIC) \$79.00

- ARTWORX**
C-64 Cassettes
- Bridge 3.0 \$14.95
- C-64/VIC 20 Cassettes
- Teacher's Pet \$11.95

- BRODERBUND**
VIC 20 Cassettes
- Martian Raid \$16.00
 - Shark Trap \$16.00
 - Multisound Synthesizer \$16.00

- COMMERCIAL DATA**
VIC 20 Cassettes
- Motor Mouse \$23.00
 - Centipede \$23.00
 - Froggee \$23.00
- C-64 Cassettes
- Froggee \$23.00

- CREATIVE SOFTWARE**
VIC 20 Cassettes
- Home Finance \$16.00
 - Home Inventory \$16.00
- VIC 20 Cartridges
- Astro Blitz \$29.00
 - Black Hole \$29.00
 - Trashman \$29.00
 - Choplifter \$29.00

- EPYX**
VIC 20 Cassettes
- Sword of Fargoal \$24.00
 - Rescue at Rigel \$24.00

- QUICK BROWN FOX**
VIC 20 Cartridges
- Word Processor \$49.00

- UMI**
VIC 20 Cartridges
- Amok \$30.00
 - Meteor Run \$40.00
 - Alien Blitz \$30.00
- VIC 20 Cassettes
- Viterm A \$16.00
 - The Alien \$16.00

- HES**
VIC 20 Cassettes
- Torg \$14.00
 - Skier \$14.95
 - Tank Wars \$14.95
 - Pak Bomber \$12.95
 - Dam Bomber \$12.95
 - Maze of Mikor \$14.95
 - Laser Blitz \$14.95
 - Pinball \$12.95
 - Tank Trap \$14.95

- VIC 20 Cartridges
- VIC Forth \$47.95
 - HES Mon \$29.00
 - HES Writer \$29.00
 - Aggressor \$31.95
 - Synthesound \$47.95
 - Shamus \$29.00
 - Protector \$32.00
 - Turtle Graphics \$31.95
- C-64 Cartridges
- HES Mon \$29.00
 - HES Writer \$35.00

- NUFEKOP**
VIC 20 Cassettes
- Alien Panic \$10.00
 - Race Fun-Drag Race \$16.00
 - The Catup \$10.00
 - Exterminator \$19.00
- C-64 Cassettes
- 3-D Man \$16.00

- ROMOX**
- Princess and Frog (20) \$24.00
 - Anteater (20/64) \$26.00
 - Typo (20/64) \$26.00
 - Whiz Kid (20/64) \$26.00

- RAINBOW**
C-64 Disks
- Personal Finance \$48.00
 - Writer's Assistant \$95.00

- MICROSPEC**
VIC 20 Cassettes
- Spelling Bee-Grades 2,3,4,5 or 6... \$8.00
 - Math Drill \$8.00
 - Portfolio Manager \$16.00
 - Data Manager \$16.00
- VIC 20 Disks
- General Ledger \$69.00
 - Mailing List Manager \$35.00
 - Inventory Package \$69.00
 - Payroll \$69.00
 - Data Base \$49.00

- C-64 Cassettes
- Black Box \$12.00
 - Color Sketch \$20.00
 - Match Maker \$16.00
- C-64 Disks
- Mailing List Manager \$45.00
 - Inventory Package \$79.00
 - General Ledger \$79.00
 - Data Base \$69.00
 - Black Box \$16.00
 - Color Sketch \$22.00
 - Match Maker \$20.00

- TRONIX**
VIC 20 Cassettes
- Galactic Blitz \$19.95
 - Swarm \$22.95
 - Sidewinder \$22.95

- VICTORY**
C-64/VIC 20 Cassettes
- Adventure Pack I(3 games)... \$12.00
 - Adventure Pack II(3 games)... \$12.00
 - Annihilation \$16.00
 - Grave Robber \$11.00
 - Kongo Kong \$16.00
 - Trek \$11.00

- PROFESSIONAL
SOFTWARE**
- Word Pro 64 \$65.00



computer mail order



east
800-233-8950
Dept.1006A IN PA call (717)327-9575
477 E. Third St. Williamsport, PA 17701

No risk, no deposit on C.O.D. orders. Pre-paid orders receive free shipping within the UPS Continental United States with no waiting period for certified checks or money orders. Add 3% (minimum \$3.00) shipping and handling on all C.O.D. and credit card orders. Larger shipments may require additional charges. NV and PA residents add sales tax. All items subject to availability and price change. Call today for our new catalog.

west
800-648-3311
Dept.1006A IN NV call (702)588-5654
P.O. Box 6689, Stateline, NV 89449

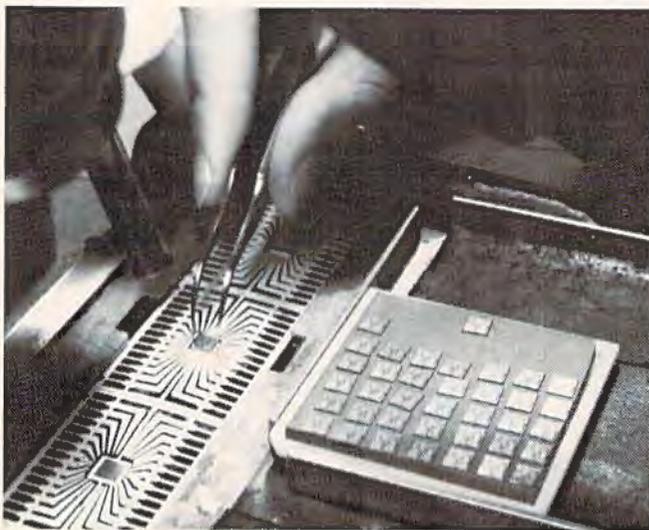


Engineer Mike Grieco at Bell Labs holds a wafer with 64 tiny chips. Behind him you can see a TV picture of the transistors on just one chip magnified 400 times.

Courtesy of Bell Laboratories.

The computers were almost as rare as dinosaurs. For several years after they were invented, there were only half a dozen computers scattered across the whole world. And, though they were big, they were sensitive and fussy creatures. Every time you turned them on, one or two of their vacuum tubes would explode from the surge of electrical power. Then it-sometimes took people several days to find the bad tubes among the thousands of good ones.

Almost as soon as computers were invented, scientists, business people, and military generals realized that computers, one day, could become important machines. Computers could help people conduct experiments, solve mathematical problems, process a company's records, and guide missiles, satellites, and spaceships. But, some-



"Brain" chips are lined up like soldiers on parade. A human factory worker uses tweezers to pick up the chips and place them in a protective metal package. The packages resemble spiders with 28 gold legs, so they are known as "bugs."

Courtesy of Texas Instruments Inc.

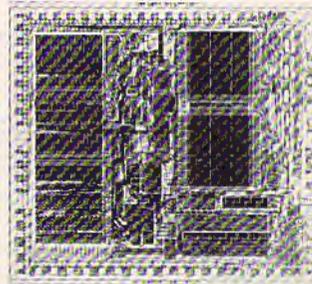
how, they had to become smaller, faster, cheaper, and more reliable.

No More Tubes

Then a breakthrough occurred. Two days before Christmas in 1947, scientists at Bell Laboratories in New Jersey invented the *transistor*. Transistors could function just like a computer's vacuum tubes. They could act like "magnifying glasses" and create a big electrical charge from a small charge. They could act like "traffic cops" and route charges through a computer's thousands of wires. And they could act like "light switches" and turn charges on and off.

Transistors could do everything vacuum tubes could do. They were also cheaper, smaller, faster, and more reliable.

The first transistors, used in computers in the late 1950s, were about the size of paper clips or small Tootsie Rolls. This was small, but it wasn't small enough. Scientists kept searching for new ways to make the transistors even smaller.



This is what a chip would look like under a microscope. Its thousands of tiny transistors and pathways resemble buildings and streets in a large city.

Courtesy of Motorola Inc.

In the early 1960s, scientists invented the *integrated circuit* (or IC). The integrated circuit could squeeze up to a hundred transistors onto a round surface the size of a small sugar cookie.

To make an IC, scientists grew a large *silicon crystal* in their laboratory. Silicon is an element — one of the basic building blocks of the universe, like oxygen, mercury, and iron. When you go to the beach, you see silicon everywhere, mixed in with the sand. It is the silicon that sparkles up at you when you run across the beach on a sunny day.

The silicon crystals in the scientists' labs resembled long, fat Italian sausages. The scientists sliced the crystals into thin wafers using an extremely sharp buzz saw. They took a photograph of lots of transistors' wires, then reduced (or shrank) the photograph until it was the size of one of the wafers. They placed the photograph on top of the wafer and dropped the wafer in a strong chemical bath. The chemical dug tiny "trenches" across the surface of the wafer. The trenches followed the wires in the photograph. When the chemical evaporated, the trenches were filled with metal. They had become transistors and incredibly tiny pathways for electricity.



Umbrella
software
INCORPORATED

UMBRELLA EDUCATIONAL SOFTWARE MAKES MATH FUN!

MATH MAGIC is a line of tutorial-style software that teaches your children the basics of mathematics. Working at their own pace, they can learn addition, subtraction, multiplication, and division of whole numbers and fractions.



Each program starts with examples that show how to perform the particular math function. The examples continue until your child feels comfortable with the lesson and moves on to the quiz. Then the quiz section tests and reinforces the concepts learned in the examples.

All examples and quiz questions are different every time the program is run, so you have a whole new program each time!

MATH MAGIC is constructive entertainment. Its use of color, graphics, music, and movement keep your children entertained — and learning.

For the VIC-20, 5K and 16K versions are available on the same cassette. Both disk and cassette are available for the Commodore 64.

Umbrella software is carried in software and department stores. If you can't find it in a store near you, order direct from USI by sending a cheque or money order for \$39.95 (\$45 CDN) to 53 Jill Crescent, Bramalea, Ontario, Canada L6S 3J1. Add \$2 for shipping and handling and allow 6 weeks for delivery. Ontario residents please add 7% sales tax.

When ordering, specify program number, VIC-20 cassette, or cassette or disk for the Commodore 64.

Program # 1. Level 3/4 Addition & subtraction - whole numbers
2. Level 4/5 Addition & subtraction - whole numbers
3. Level 3/4 Multiplication & division - whole numbers
4. Level 4/5 Multiplication & division - whole numbers
5. Level 3/4 Addition & subtraction - fractions
6. Level 4/5 Multiplication & division - fractions
7. Level 4/5 Addition & subtraction - decimals
8. Level 4/5 Multiplication & division - decimals

Dealer inquiries invited.

We solicit software for the VIC-20 and CBM 64. Royalties, license fees or purchases can be negotiated.

VIC-20 and Commodore 64 are registered trade marks of Commodore Business Machines Ltd.



ADVERTISEMENT

Growing computer industry expands authors' choices

The rapidly expanding personal computer industry offers greater opportunities for the software programmer and author in search of a publisher.

Yet the growth poses its own problem - the choice of a publisher.

Here is a list of questions to consider when looking for the publisher best-suited for your product:

-How large is the publisher's distribution network? A publisher with international connections can offer more exposure than companies limited to regional or national sales.

-How will your product be marketed and advertised? No matter how good the program is, if people don't know about it, it won't sell. Look for a publisher with a marketing budget large enough to give individual attention to the program.

-Does the publisher market programs for more than one computer? The days of limited selection in hardware are long gone. Limiting programs to one or two computers can limit sales and profits. Authors can increase their share of the marketplace by looking for a publisher devoted to converting programs to a variety of popular computers.

-Does the publishing house lend technical support to authors? Some publishers only accept programs ready for the marketplace. A lot of good ideas are lost in the long run. The publisher that offers assistance invests a greater stake in the product, the author and the success of the product.

-Does the publisher offer complete product support to consumers? In these times of consumer awareness, the company that has established a network to answer customer questions about its products fares better than those who do not offer this support.

Each of these services leads to greater sales which in turn lead to greater profits for the individual programmer.

Sierra On-Line, Inc. is committed to paving the way for an author's success.

Sierra On-Line's product line is distributed worldwide with production facilities in the United States, Japan, Australia, the United Kingdom and South Africa.

Sierra On-Line employs a well-financed, in-house marketing and advertising staff with a knack for creating tailor-made campaigns for products.

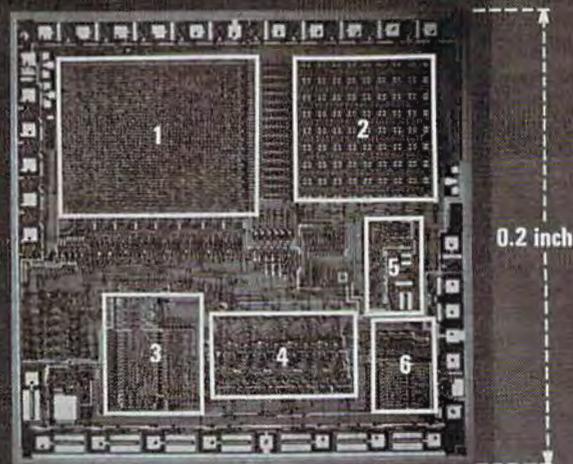
Each program is evaluated by experts, who may suggest enhancements to improve the product and to increase its appeal to customers.

Further, Sierra On-Line isn't limited to a single computer. The company closely monitors computer trends and makes existing products available for the most popular lines - all to the author's benefit.

A packet for authors with more information about the software submission process and our company is available by writing Sierra On-Line, Inc., Sierra On-Line Building, Coarsegold, CA 93614, or by contacting David Siri or Howard Luthy by phone at (209) 683-6858.

MOS MICROCOMPUTER

- 1 READ ONLY MEMORY
- 2 RANDOM ACCESS MEMORY
- 3 CONTROL DECODE
- 4 ARITHMETIC LOGIC UNIT
- 5 CLOCK
- 6 INPUT/OUTPUT DECODE



connect them to typewriters, TV screens, and tape recorders, they become *personal computers*!

Kids use personal computers to draw pictures, make music, do their schoolwork, and play games. Personal computers fit on top of a kitchen table.

Personal computers are small and easy to use. They use less power than a simple light bulb. Yet they are a million times more powerful than the dinosaur-sized computers of forty years ago.

The early computers weighed more than a basketball team of elephants. They were powered by up to 20,000 vacuum tubes and cost millions of dollars.

A personal computer might weigh less than five pounds. It might cost less than \$100. And its "brain" is a chip the size of a freckle.

An average chip is only .2 inches (1/5 of an inch) on a side. Yet it is made up of several complicated parts including a part that does arithmetic (#4 - Arithmetic Logic Unit), a "clock" (#5), a "brain" (#3, #4, #5, and #6 working together), and two kinds of memory (#1 and #2).

Courtesy of Texas Instruments Inc.

The scientists cut the round silicon wafer into little squares the size of a bread crumb. Each little square was called a *chip*. On its surface were dozens of transistors. The transistors criss-crossed the chip's surface, like a maze of tiny roads.

Computers On A Chip

During the 1960s and 1970s, scientists found ways to pack more and more transistors onto a single chip. Today, in the mid-1980s, scientists are able to build a chip with more than a *million* transistors.

The first chips were primitive. With only a couple of transistors, all they could do was turn lights off and on, or remember a couple of numbers, like 5 and 14.

Today's chips are completely different. They can do almost anything! A single chip can act as a computer "brain" and add a million numbers in only one second. It can act as a computer "memory" and remember a hundred thousand kids' birthdays. It can tell the time, control a car, guide a robot, or act as your opponent in an electronic game.

An entire computer can fit on a single chip. But chip-sized computers are too small and delicate for us to carry around in our pockets. To use them, we must connect them to something larger. We can wear them on our wrists inside digital watches. Or we can hide them inside dishwashers, arcade games, and microwave ovens. Or, if we



Chips are so small they could hide under your tongue, behind your ear, in your sock, or ride on the back of a ladybug.

Courtesy of Intel. 

VIC 20[®]
COMMODORE



KONGO KONG \$19.95
Climb ladders; avoid barrels the crazy ape is rolling at you. Rescue the damsel. Partially machine code for smooth, fast action. Keyboard or joystick.

LUDWIG'S LEMON LASERS \$14.95
You'd never think blasting lemons out of the sky could be so much fun! Fast machine code action. One or two players. Written by the demented doctor who gave us "Hospital Adventure". VIC 20 only.

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 has 4 screens.

VICTORY
SOFTWARE

ADVENTURES

The best adventures at the best prices! Controlled from the keyboard.

GRAVE ROBBERS \$14.95
Introducing the first GRAPHIC ADVENTURE ever available on the VIC-20! Explore an old deserted graveyard. Actually see the perils that lie beyond.

ADVENTURE PACK I (3 Programs) \$19.95
MOON BASE ALPHA—Destroy the meteor that is racing towards your base.
COMPUTER ADVENTURE—Re-live the excitement of getting your first adventure.
BIG BAD WOLF—Don't let the wolf gobble you up.

ADVENTURE PACK II (3 Programs) \$19.95
AFRICAN ESCAPE—Find your way off the continent after surviving a plane crash.
HOSPITAL ADVENTURE—Written by a medical doctor. Don't check into this hospital!
BOMB THREAT—Get back to town in time to warn the bomb squad of the bomb.

COMMODORE
64[®]



ANNIHILATOR \$19.95
Protect your planet against hostile aliens in this defender-like game. All machine code for fast arcade action. Joystick required.

TREK \$14.95
Commanding the bridge of your starship, you explore the galaxy, fending off the Klingon invasion with your phasers and photon torpedoes, at the same time conserving your limited time and energy.
Check your local dealer.

Send for free catalog
All programs fit in the standard VIC memory, and come on tape or disk.

Ordering—Please add \$1.50 postage & handling per order. PA residents add 6% sales tax. Credit card users—include number and expiration date.

VICTORY SOFTWARE CORP.
7 VALLEY BROOK ROAD
PAOLI, PA 19301
(215) 296-3787

PROGRAMS FOR THE COMMODORE 64 AND VIC 20

VIController

HOME CONTROL SYSTEM FOR THE VIC 20 & CBM 64

- Control up to 256 lights & appliances
- 9 levels of brightness
- Manual & time control software
- Uses BSR remote switches
- Plugs into user port

ONLY \$59⁹⁵

EXTENDED TIME CONTROL PROGRAM FOR CBM 64... \$9⁹⁵

COMvoice

NEW SPEECH SYNTHESIZER FOR VIC 20 & CBM 64

- Unlimited Vocabulary
- Automatic English to Speech Conversion
- New BASIC Command "SPEAK"
- Will Speak String Variables
- Speaks with Four Levels of Inflection
- Plugs into Expansion Port
- Built in Audio Jack

ONLY \$149⁹⁵

AS EASY TO USE AS A PRINT STATEMENT!

Call (215) 861-0850 to order
MasterCard or Visa Accepted
1444 Linden Street, Bethlehem, PA 18018

GENESIS
COMPUTER CORPORATION

YORK 10[™] CASSETTES DISKETTES



NEW!
LOWER PRICES
LONGER LENGTHS

DATA TRAC / C-06, C-12, C-24

From the leading supplier of Computer Grade Cassettes, new, longer length C-12's (6 minutes per side) provide the extra few feet needed for some 16K programs.

- Premium 5-screw shell with leader — BASF tape
- Internationally acclaimed. Thousands of repeat users.
- Error Free • Money back Guarantee

	C-06	C-12	C-24	HARD BOX
1 Dozen	7.00	7.50	9.00	2.50
2 Dozen	13.00	14.00	17.00	4.00

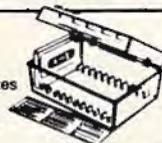
500 C-12's—38¢ each • w labels
Shipping \$17.500 add 4¢
500 Boxes 13¢ ea. • shipping \$10.500



TRACTOR FEED • DIE-CUT
BLANK CASSETTE LABELS
\$3.00/100 \$20.00/1000

CASSETTE STORAGE CADDY

Holds 12 cassettes w/o boxes
Includes edge labels and index card



\$2⁹⁵

BASF QUALIMETRIC



FLEXI-DISC
5 1/4" SSDD, Soft Sect.
Lifetime warranty!



\$26.95/10 \$120.00/50 \$215.00/100

MICRO CASSETTES in convenient short lengths

	MC-10	MC-20	MC-30
1 Doz.	16.50	18.00	19.00
2 Doz.	32.50	34.50	36.00

Fits Epson and Sharp micro drives



Same superior tape in premium shell with leaders. Includes box.

SHIPPING/HANDLING \$3.50
Any quantity (except 500 special)

NOTE: Outside 48 Contin. States shipping \$3.50 PLUS \$1 per caddy; per dozen cassettes; per dozen boxes; per 10 discs.

In Cont. U.S. shipments are by UPS unless Parcel Post requested.

California residents add Sales Tax

WRITE FOR FREE BROCHURE
ASK FOR QUANTITY DISCOUNTS

for IMMEDIATE SHIPMENT
on Credit Card Orders

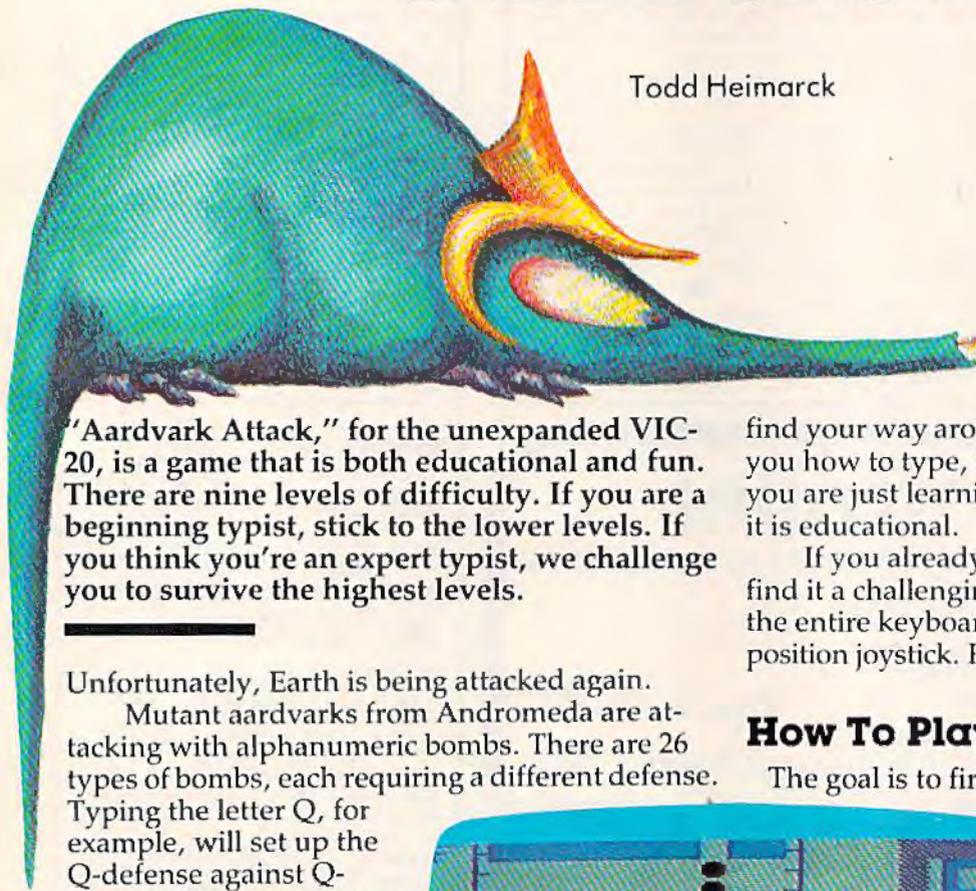
Call: 213/700-0330



YORK 10[™] Computerware
9525 Vassar Ave. #G Chatsworth, CA 91311

Aardvark Attack

Todd Heimarck



"Aardvark Attack," for the unexpanded VIC-20, is a game that is both educational and fun. There are nine levels of difficulty. If you are a beginning typist, stick to the lower levels. If you think you're an expert typist, we challenge you to survive the highest levels.

Unfortunately, Earth is being attacked again.

Mutant aardvarks from Andromeda are attacking with alphanumeric bombs. There are 26 types of bombs, each requiring a different defense. Typing the letter Q, for example, will set up the Q-defense against Q-bombs. The same applies to the other 25 letters. Also, the aardvarks are attacking your ten biggest cities (numbered 0 to 9). Once you set up the defense, you have to decide which city is being attacked.

Educational And Fun

You could say that "Aardvark Attack" helps you

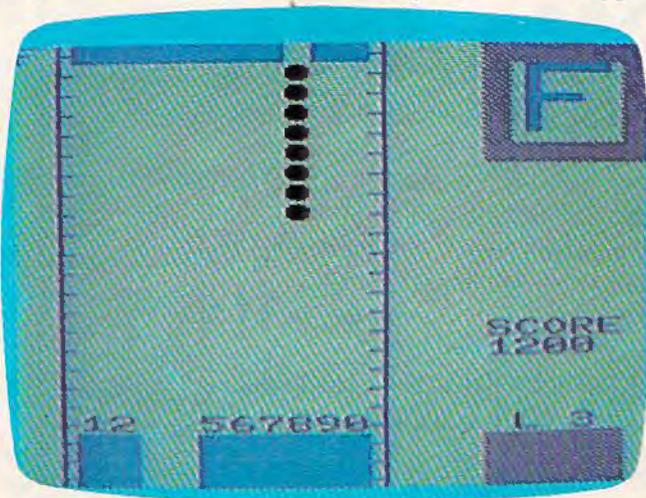
find your way around the keyboard. It won't teach you how to type, but it gives you good practice if you are just learning to type. From that viewpoint it is educational.

If you already know how to type, you will find it a challenging game. Aardvark Attack uses the entire keyboard, instead of a simple eight-position joystick. Fanatic game players will enjoy it.

How To Play

The goal is to first type the correct letter and then the correct number. The letter appears in a radar "window" in the upper-right corner of the screen. When it appears, you respond by typing it. If you make a mistake, try again. When you get the right letter, the falling bomb reverses colors. Then you look at the row of numbers at the bottom of the screen - representing your cities - and type the corresponding number to destroy the bomb.

You have a limited time before the bomb hits



An F-bomb plunges toward city No. 8 in "Aardvark Attack."

got ARCADE-GAME FEVER?

MICRODIGITAL offers 4-WAY RELIEF for your VIC 20!

RX

Exciting! Colorful! Definitely ARCADE-STYLE games that run on the VIC 20 without memory expansion using joystick or keyboard!

MICRODIGITAL

SNAKMAN

ARCADE-ACTION MAZE GAME



Joystick Optional
CASSETTE for VIC 20™
Cassette Unit Required

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.

MICRODIGITAL

PINBALL WIZARD

AUTHENTIC ARCADE-ACTION PINBALL GAME



CASSETTE for VIC 20™
Cassette Unit Required

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!

MICRODIGITAL

KRAMBLE!

ACTION-PACKED AIR-STRIKE GAME



Joystick Optional
CASSETTE for VIC 20™
Cassette Unit Required

FANTASTIC! THRILLING!

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 out-maneuvering rockets, wiggies, and meteor showers.

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! A fast machine-language program with 256 different grids to challenge you.

MICRODIGITAL

GRIDDER

ARCADE-STYLE GRID-CHASE GAME



Joystick Optional
CASSETTE for VIC 20™
Cassette Unit Required

VIC 20™ is a trademark of Commodore Business Machines, Inc.

MICRODIGITAL Games are available from your local retailer, or directly from:

Tech2 Software, Inc., P.O. Box 1110, Webster, NY 14580 • 716-872-0518 in NY • Toll Free 1-800-833-7384

Dealer inquiries invited

the ground, ranging from a few jiffies at the expert level to a few thousand jiffies for novices (a "jiffy" is a sixtieth of a second). Each level (there are nine) is about 30 percent faster than the previous one. The faster games score more points, because they're more difficult.

If you are a parent or teacher of very young children who are just learning their letters, you could act as their fingers. Have them call out the name of the letter for you to type. Beginning typists can practice at the lowest levels, while expert typists and game players will like the higher levels. It is a game for almost everyone.

Writing The Game

To be honest, I did not start out to write a game.

I wanted a program that would display larger than normal letters to use as headlines. My first program printed characters that were eight times larger. They were gigantic. But I could fit only four letters on the screen of a VIC-20.

Then I doubled the size of each character. I used custom characters and got the program to work. The only problem was, I had no memory left to do anything useful. It was like having a 20-gallon gas tank and living ten gallons from the nearest service station. By the time you fill the tank and drive home, it's time to go back.

I finally realized the simple solution was to quadruple the size of each character. I left the character generator in Read Only Memory (ROM) and used the graphics characters (the ones you get when you press the Commodore key and type "C" or "V"). The characters were four times as big as regular letters.

Unfortunately, a fourfold increase in size means a fourfold decrease in the number of characters per line. I could print only a five-letter word on each line. I forgot about headlines and used the program as part of a game.

A False Start

Could a single oversized letter be used in a game for beginning typists? Of course! I wrote a simple program that had the endearing quality of boredom. It was not fun to play.

Detour Into Machine Language

Rather than improving the playability of the game, I decided to work on the radar window. As the oversize letter was being calculated, the player could watch it being formed.

I wanted the letter to appear out of nowhere. The old "polar bear in a snowstorm" trick would work. I printed the character white on a white screen (which is impossible to read).

After the character is formed, you change the polar bear into a black bear. Machine language would make it fast. And I believed a friend who

said ML was easy.

I did not know how to program in machine language (but it's easy, right?), and I did not have an ML monitor (a utility to make ML programming much easier). I wrote the code, translated to hexadecimal, and translated to decimal. I POKED the numbers into the cassette buffer (because that's what everyone else does) and started it. But every time I SYSed, I missed. My VIC closed its eyes and ears and played dead. After a dozen tries, I was ready to throttle my friend who said machine language is easy.

I finally figured out that to jump backwards in ML, you have to *exclusive-or* the distance with 255. (If that makes no sense to you, consider your ignorance a blessing.) It worked! And the game was still boring.

Polishing It

My general theory of programming is that if it takes an hour to write a program, it takes ten hours to debug and polish it. Aardvark Attack needed a lot of polishing.

First I added extra columns for the bomb and improved the game graphics. As the complexity of the game increased, it got more interesting. I realized that children would never play a game that was impossible to win, so I added nine levels of play. I tacked on a scoring routine, instructions, and voilà – the game turned out to be interesting and fun to play.

This is how it works, for those who are interested in programming:

Line 10 takes you to the housekeeping subroutine that DIMs the arrays and reads the oversize character shapes.

12 jumps to the subroutine that POKEs the machine language routine into the cassette buffer (SYS 828 clears the window, and SYS 833 turns the polar bear into a black bear).

14-16 give you the instructions if you want them (from subroutine 1200).

18-19 print the title page on the screen.

20-24 set the level of play and the variable HF (How Fast).

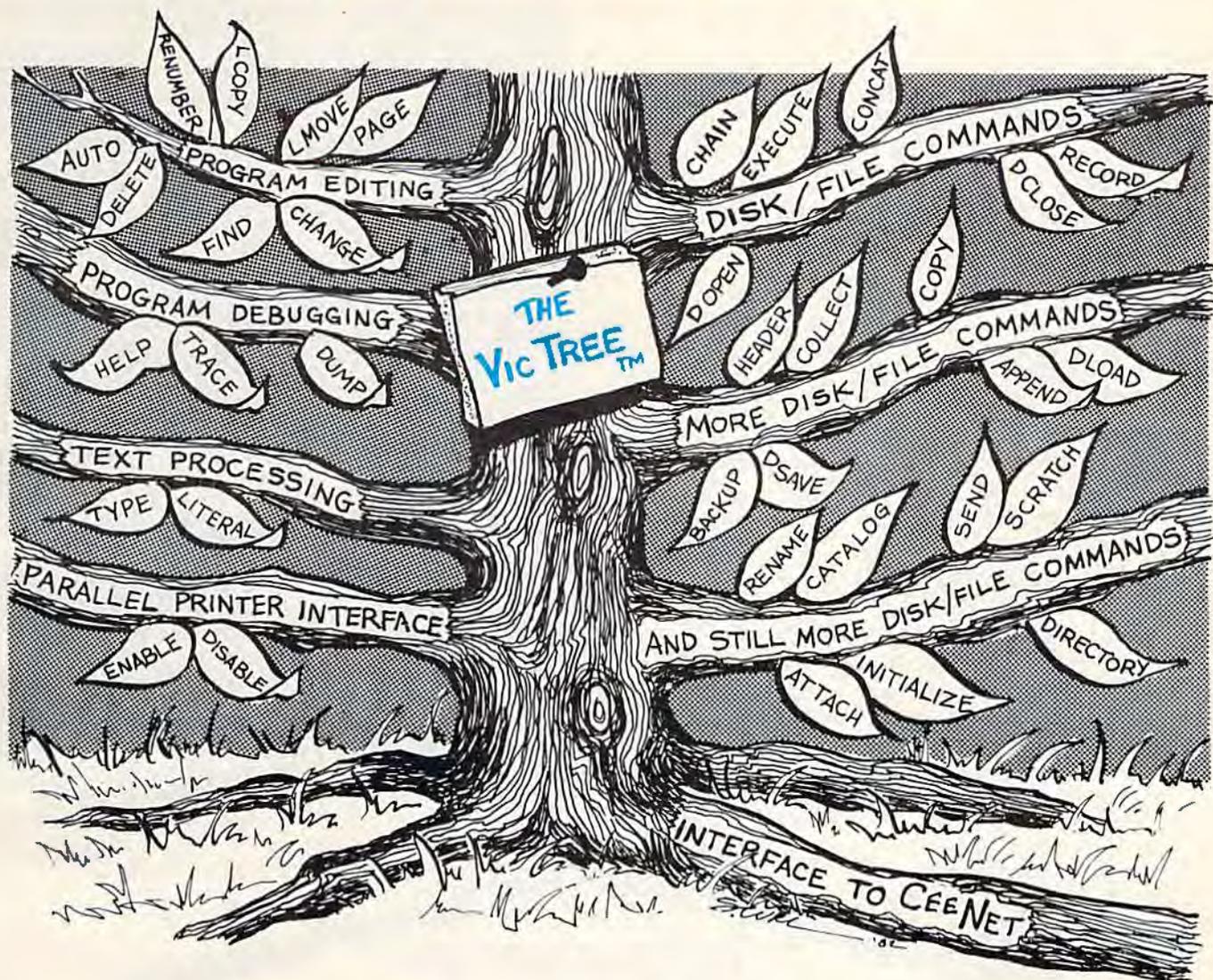
25-30 clear the screen and print the playing field. Subroutine 900 clears everything, and 925 clears the field between rounds. Programming hint: If you look at subroutine 900, you will find that it uses the same RETURN as subroutine 925. If you have two subroutines that do almost the same thing, you can put them together to save memory. The machine language program uses the same method.

32 blacks out the radar window.

40-63 pick a letter at random and set up the array that defines the oversize character shape for that letter.

70-74 change the asterisks to solid black spaces

Skyles Electric Works Presents



The VicTree™

- ...Leaves your new Vic (or CBM 64) with 42 additional commands.
- ...Branches out to most BASIC 4.0 programs.
- ...Roots into most printers.

New from Skyles: the VicTree, a coordinated hardware and software package that allows your Vic to branch out in unbelievable directions and makes it easier than ever to do BASIC programming, debugging and to access your disk. And the new VicTree provides routines to interface the Vic to the powerful CeeNet local network. 8kb of ROM—4kb for the BASIC commands, 4kb for disk commands and interfacing to CeeNet—plus 4kb of RAM for miscellaneous storage. Perfect not only for the new Vic but also for the Commodore 64. Unbelievably simple to use and to install, the VicTree gives you all the additional BASIC 4.0 commands to allow most BASIC 4.0 programs to work on your new Vic or CBM 64.

Now only \$89.95...or \$109.95 complete with Centronics standard printer cable. (Cable alone \$29.95.) Available now from your local dealer or order through your Visa or MasterCard toll free: (800) 227-9998 (California, Canada, Alaska, Hawaii: (415) 965-1735) or send check or money order directly to:



Skyles Electric Works

231E South Whisman Road
Mountain View, CA 94041
(415) 965-1735

and flash them (as a warning that attack is imminent).

80-98 POKE the oversize letter into the window.

100-200 are the attack routine. The ball character drops 18 spaces from top to bottom. After each step, there is a delay loop (from variable HF: How Fast). The program also checks for keyboard input. If the right letter and number are typed, it jumps to the scoring routine.

210-280 execute if the bomb drops to the planet. If the letter was correct, one space is erased. If neither letter nor number was typed, two spaces are erased. When defenses are destroyed and an alphanumeric bomb lands, everything is over.

300 figures out the score (if the player typed the correct letter and number) and goes back to clear the field for the next round.

320-328 are for the end of the game, when the planet has been lost. You have the option of playing again at whatever level you choose.

Note: If you use abbreviated BASIC commands, you should be left with a few hundred extra bytes of memory on an unexpanded VIC. You could use this memory for explosion noises or music. Or could add a high score counter (if your household is competitive).

See program listing on page 150. 

VIC 20[®] 37K

Now you can have the memory power of the 64, flexible memory control, expansion port and more.

RAMMASTER[™] 32
\$129.95

MOSAIC[™]
ELECTRONICS, INC.

Call for your nearest Mosaic Dealer
1-800-547-2807, In Oregon 653-7885

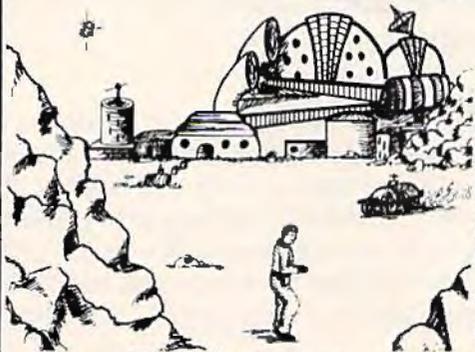
VIC 20 is a registered trademark of Commodore Business Machines, Inc.

DES-SOFT[™]

division of Data Equipment Supply Corp.

Quality Software For Commodore[™] Computers

Vic-20[™] Commodore[™] Pet 4064[™] C-128[™] B-700[™]



Space Trader

In the distant Galaxy of Ormeda the space merchant union holds the power. In their mighty ships, they reap the rewards of interstellar trade. As a new member of the union. You must ply your trade and amass a fortune to finance your search for the lost planet Alantia, which when found will bring untold wealth to the first union member to land there. First class adventure for hours of play.

VIC version 1 to 4 players

64 version 1 to 6 players

VIC-20 w/16K Exp.
Commodore 64

cassette - \$39.95
cassette - \$39.95, disk - \$42.95

This and other great games and programs are available from DES-SOFT, home of BONZO, HOPPER, LASER COMMAND and many other programs for Commodore Computers.

See your LOCAL DEALER for our Programs
Software Distribution Available

Dealers invited

Authors Wanted

(213) 923-9361

DES

DES - Data Equipment Supply Corp.
8315 Firestone Blvd. • Downey, CA 90241

(714) 778-5455

Vic-20, Commodore 64, Pet 4064, C-128, B-700 are trademarks of Commodore

CPI

PARALLEL PRINTER INTERFACE FOR VIC-20 & C-64

GROW WITH US!

EXPANSION PRODUCTS FOR YOUR MICROCOMPUTER

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

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

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

Line Feed, ASCII Conversion and Listing Legibility.

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

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

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

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

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

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

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



Lifetime Warranty available upon return of Product Warranty Card.

CPI LISTING LEGIBILITY TAGS

TAG	Is Printed For:
[CD]	Cursor Down
[CU]	Cursor Up
[CL]	Cursor Left
[CR]	Cursor Right
[HC]	Home Cursor
[CS]	Clear Screen
[RV]	Reverse On
[RO]	Reverse Off
[IN]	Insert

TAG	Is Printed For:
[DL]	Delete
[BLK]	Change to Black
[WHT]	Change to White
[RED]	Change to Red
[CYN]	Change to Cyan
[PUR]	Change to Purple
[GRN]	Change to Green
[BLU]	Change to Blue
[YEL]	Change to Yellow

TAG	Is Printed For:
[ORA]	Change to Orange
[BRN]	Change to Brown
[LTR]	Change to Light Red
[GY1]	Change to Grey 1
[GY2]	Change to Grey 2
[LTG]	Change to Light Green
[LTB]	Change to Light Blue
[GY3]	Change to Gray 3
[F1]	Function Key 1

TAG	Is Printed For:
[F2]	Function Key 2
[F3]	Function Key 3
[F4]	Function Key 4
[F5]	Function Key 5
[F6]	Function Key 6
[F7]	Function Key 7
[F8]	Function Key 8
[PI]	Pi Symbol

Call toll free for nearest dealer
1-800-527-5285



MICRO SYSTEMS DEVELOPMENT, INC.

(214) 241-3743

11105 Shady Trail • Suite 104 • Dallas, Texas 75229

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

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

All MSD Products Made In U.S.A.

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

Word Match

A Memory Game For VIC And 64

Andy VanDuyn

"Word Match," an educational game for one or two players, originally was written for the unexpanded VIC-20. A translated version has been added for the Commodore 64.

Loosely adapted from the old TV show *Concentration*, "Word Match" is designed to entertain and test the memory of one or two players. The object is to find and match pairs of words hidden behind rows of colored blocks.

Word Match is easy to learn. Players take turns selecting blocks, which disappear to reveal the words they conceal. An unsuccessful match means it's the next player's turn. Players who successfully match a pair of words gain another turn, and the matched blocks turn into the player's own color. To win the game, a player must match more pairs of hidden words than the opponent. The opponent, by the way, can be either another person or the computer itself.

Word Match is ideal for grade-school children because all the words are only three letters long. A total of 28 words are included in the program data. (Longer words will not fit on the VIC's screen, although the Commodore 64's 40-column screen format will allow longer words.)

You can customize the program with your own word list by amending lines 32 and 33 (VIC

version). Twenty-eight words seem to be the safe limit. If you vary from 28, you must change all occurrences of the number 28 in lines 30, 35, 36, and 38 (VIC version) to however many words you use. The standard words were chosen especially for children at early reading levels.

Using Word Match

When you first run Word Match, it asks for the players' names. After the second name is entered, the screen clears, and nothing seems to happen for a few moments. Don't be alarmed - the program requires some time to select the words and display the screen.

Although Word Match was designed primarily for two players, one person can compete against the computer by typing "VIC" as a player's name when the program starts (or "64" with the Commodore 64 version). The computer, however, is not as smart as you might think. It picks its blocks completely at random. A young child can have fun in this mode without becoming discouraged by an unbeatable opponent.

An interesting twist, incidentally, is to enter the computer's name for both players and then watch the machine play itself. Usually an out-of-memory error results after several rounds, but sometimes the computer actually beats itself!

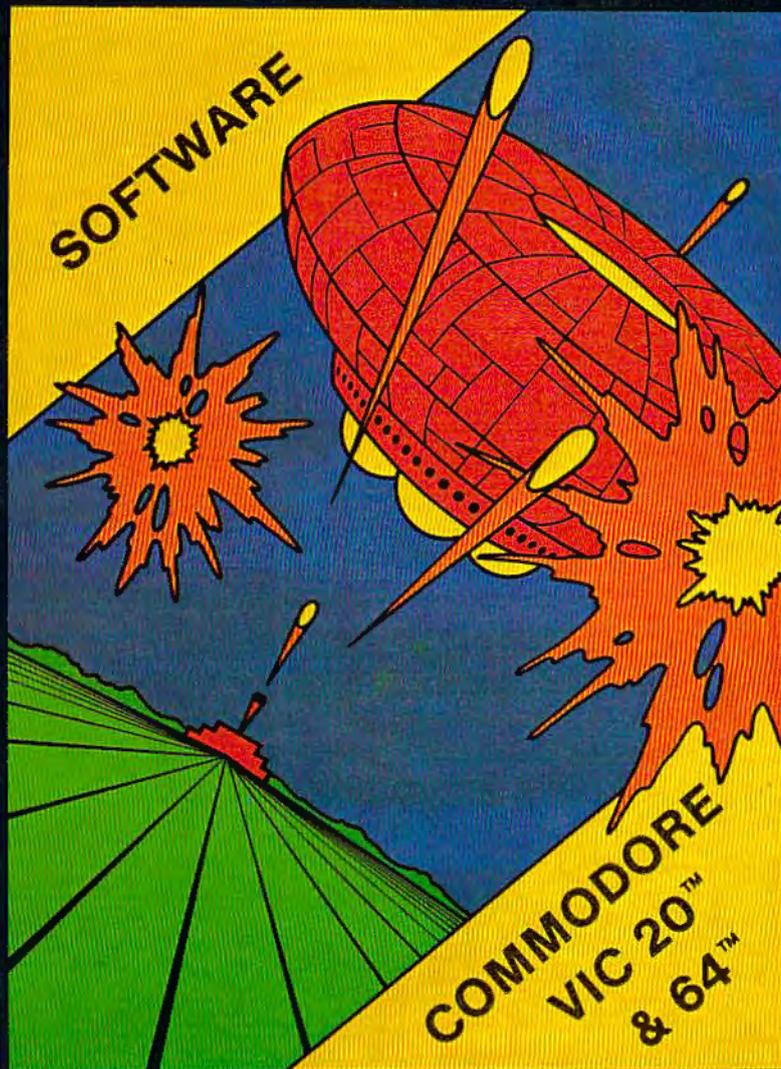
No delete function is allowed during answer



COMM * DATA
COMPUTER HOUSE, INC.

MILFORD, MICHIGAN

SOFTWARE



ARCADE STYLE GAMES

- Supercuda *
- Pegasus Odyssey *
- Ape Craze *
- Escape MCP *
- Maelstrom *
- Firing Line *
- Pakacuda *

OTHER GAMES

- Street Maze v
- Caves of Annod v
- Dragons & Treasure v
- Cribbage Partner †

EDUCATIONAL

- Toddler Tutor *
- Primary Math Tutor *
- Math Tutor *
- English Invaders Games *
- Gotcha Math Games *

POTPOURRI

- Basic Tools †
- Sketch & Paint *
- Multi-Level Marketing Manager (Direct Selling) †

On Shelves Everywhere -
Ask For Comm*Data

Dealer Inquiries Welcome.



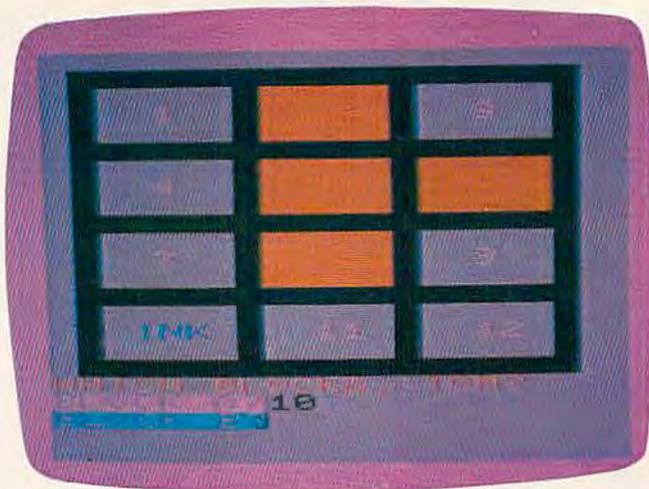
COMM * DATA
COMPUTER HOUSE, INC.

320 Summit Avenue
 Milford, Michigan 48042
 (313) 685-0113

† Commodore 64
 v VIC 20
 * Both



Arcade Style Games are High Res Full Machine Code.
 Commodore 64 and VIC 20 are Registered Trademarks of Commodore Business Machines, Inc.

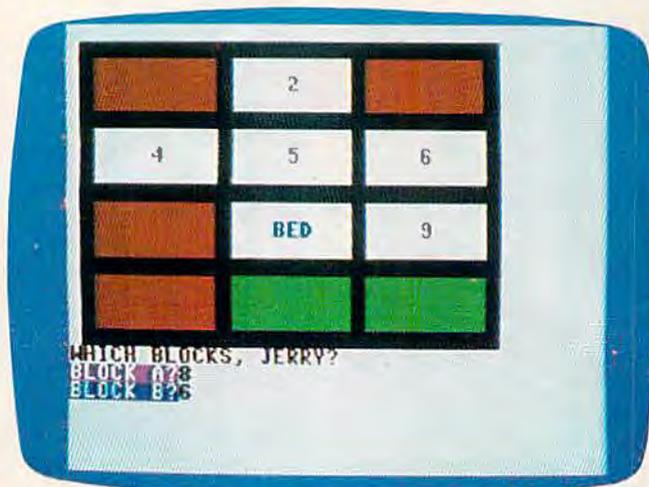


In this round of VIC "Word Match," the player has uncovered the word INK under block 10. Now he must remember which block is hiding the matching INK.

input. However, the program will not accept an answer larger than 12. If you make a typo when answering a prompt, just add an extra digit or two so the response is too large. Also, the program will not accept numbers for blocks which have already been matched.

If you don't feel like typing the program, I'll make a copy for you. Send a blank cassette, a stamped self-addressed mailer, and \$3 to:

Andy VanDuyne
40 Park Street
Norwood, NY 13668



"Word Match," 64 version. Is the matching word BED under block 6, as Jerry thinks?

Notes For Programmers

Here's a brief summary of how the VIC version of Word Match works:

Lines	Explanation
1-13	Start the program and secure the names of the players.
30	Dimension several arrays.

- 32-33 Store the words.
- 35-47 Pick and sort six words.
- 50-81 Set up the screen and store values to find each block later.
- 100-130 Get the answers.
- 132-140 Reveal the hidden words.
- 150-162 Give the response for no match.
- 200-238 Give the response for a correct match, set aside already matched blocks, and check to see if all matches have been made.
- 300-314 Declare the game over, who won, and ask about another game.
- 1000 Is the routine allowing the computer to play.

See program listings on page 151. ☺

Young People

COMPUTE!'s Gazette wants to know what today's young people are doing with computers. We want our readers to know, too. If you've written an interesting program for the VIC-20 or Commodore 64, share it with us.

COMMODORE-64™ and VIC-20™ users!

Meet an...
IMP
DOT MATRIX PLAIN PAPER PRINTER

Impact Printer
by Fidelity
Electronics
4" x 4.5" x 2"

IMPACT PRINTER
COMES COMPLETE
WITH ALL 20164
INTERFACES
CABLES

Short
on Price
and Size...
Long on Quality!



Features: High quality print head- MCBF equal to 500,000 lines, 5 x 7, 30cps impact dot matrix, 144 dots per line, 2.25" w plain paper roll and cartridge ribbon included. Up to 40 column width, lower case descenders, upper/lower case characters, can reproduce the entire 20/64 graphics set, dot addressable graphics, supports custom character capability, reverse character mode, permits user selection of two character sets. Transformer included. 90-day warranty. N.Y. residents add applicable sales tax.

All Major Credit Cards Accepted

\$129.95
Send Check or M.O.
+ \$6.95 Shipping
/Handling

DEALER
INQUIRIES
INVITED



"Call THE Printer Experts"
INSTITUTIONAL
COMPUTER
DEVELOPMENT
CORP.

For Information and Orders

Toll-Free 1-800-645-4710
(in N.Y., outside cont. U.S. 516-221-3000)

2951 MERRICK RD. DEPT. G10 BELLMORE, NY 11710

Vic 20 and Commodore 64 are trademarks of Commodore Electronics Ltd.

GET THE MOST OUT OF YOUR COMMODORE-64 WITH SOFTWARE FROM ABACUS



SCREEN GRAPHICS 64

- Adds 24 commands to BASIC.
- Plot points, lines, boxes, circles and fill in hires and multicolor.
- Define and animate sprites easily
- Includes demos, tutorial and manual.
- **\$24.95 FOR TAPE**
- **\$27.95 FOR DISK**



SYNTHY 64

- Full featured music and sound synthesizer.
- Easy entry and editing of notes and commands.
- Control ASDR, filters, waveforms etc.
- Includes sample music and manual.
- **\$29.95 FOR TAPE**
- **\$32.95 FOR DISK**



CHARTPAK 64

- Create Pie, Bar and Line charts in high resolution.
- Enter, edit, save and recall to/from disc.
- Choose any of 8 chart formats and design charts interactively.
- Produce hard copy onto 1515, 1525 or Epson printer.
- **\$42.95 DISK ONLY**



ULTRABASIC 64

- Turtle, hires, multicolor and sprite graphics.
- Sound and sound effects.
- Screen copy to 1515, 1525 or Epson printers.
- Includes demos, tutorial, manual.
- **\$39.95 FOR TAPE**
- **\$42.95 FOR DISK**



SKIER 64

- Arcade type game.
- Joystick or keyboard control.
- 3 different games.
- 3 different levels.
- **\$14.95 FOR TAPE**
- **\$17.95 FOR DISK**

TO ORDER NOW

PLEASE WRITE: ABACUS SOFTWARE
P.O. BOX 7211, Grand Rapids, MI 49510

For postage & handling, add \$1.50 (U.S. and Canada), add \$3.00 for foreign. Make payment in U.S. dollars by check,   money order or charge card. **FOR IMMEDIATE SERVICE PHONE 616/241-5510** Mich. Residents add 4% sales tax. Hours 9am -6pm EST.

FREE CATALOG

Ask for a listing of other software for your Commodore-64 or VIC-20.

YOU CAN COUNT ON 
Abacus Software

DISTRIBUTORS

Great Britain:
ADAMSOFI
18 Norwich Ave.
Rochdale, Lancs.

West Germany:
DATA BECKER
Merowingerstr. 30
4000 Dusseldorf
0211/312065

Great Britain:
CCI Software
167 Great Portland St.
London W1
01-636-6354

Sweden:
TIAL TRADING
PO 516
34300 Almhult
476-12304

Canada East:
KING MICROWARE LTD.
5950 Cole des Neiges
Montreal, Quebec H3S 1Z6
514/737-9335

Australia:
CW ELECTRONICS
416 Logan Road
Brisbane, Queens.
07-397-0808

Canada West:
L.S.I. Distributors Ltd.
810 W Broadway #163
Vancouver, BC V5Z 4C9
604/733-0211

New Zealand:
VISCOUNT ELECTRONICS
306-308 Church Street
Palmerston North
63-86-696

ACCOLADE COMPUTER PRODUCTS

HARDWARE

Commodore 64.....	\$419.95
1525-E Printer.....	\$329.95
1515 Disk Drive.....	\$329.95
BMC Color Monitor.....	\$349.95
Star Micronics	
Parallel Interface.....	\$69.95
Gemini 10.....	\$329.95
Gemini 15.....	\$536.95
24K Golden Ram.....	\$149.24
Vic Rabbit.....	\$39.95
Wico Joystick.....	\$22.50
Wico Joystick "Red Ball".....	\$25.00
HES Sound Box.....	\$12.50

BOOKS

Commodore Reference Guide.....	\$19.50
VIC Reference Guide.....	\$16.50
1st Book of VIC.....	\$9.50
2nd Book of VIC.....	\$12.95
1st Book of Commodore 64.....	\$12.95
Tricks for VICS.....	\$9.95

SOFTWARE (COMMODORE 64)

Avalon Hill		Sierra on Line	
B1 Nuclear Bomber.....	\$12.00	Frogger (disk).....	\$29.95
Midway Campaign.....	\$12.00	Sirius	
North Atlantic.....	\$12.00	Blade of Blackpoole.....	\$29.95
Nuke.....	\$12.00	Spinnaker	
Planet Miners.....	\$12.00	In Search of the	
Andromeda Conquest.....	\$13.50	Most Amazing Thing (disk)	\$29.95
Broderbund Software		Synapse	
Choplifter.....	\$26.95	Ft. Apocalypse.....	\$26.95
David's Midnight Magic.....	\$33.95	Survivor.....	\$26.95
Sea Fox.....	\$29.95	Pharaoh's Curse.....	\$26.95
Serpentine.....	\$29.95	UMI	
HES		Renaissance.....	\$29.95
HESMON 64.....	\$29.95	NO REFUNDS ON OPENED SOFTWARE	
HES Writer 64.....	\$33.95		
Royal			
Quick Brown Fox.....	\$59.95		

ACCOLADE COMPUTER PRODUCTS

4858 Coronado Avenue
San Diego, CA 92107
(619) 223-8599

Dealer inquiries invited

California residents add 6% Sales Tax
Add \$3.00 for shipping and handling (except hardware, add 3% of price
C.O.D. Charge \$1.50 C.O.D.'s, Cashiers Checks or Money Orders only
We accept Money Orders, Cashiers Checks,
personal checks must take 2 weeks to clear
Foreign orders paid in U.S. funds, add \$5.00 for shipping and handling
(or 5% of hardware price)

for grownups

Giants And Dwarfs

This installment of "Computing For Grownups," a bi-monthly column, looks at the different ways adults and children perceive computers. We also look at one family's approach to word processing.

Yesterday my seven-year-old daughter Catie went off to computer camp at Hollins College, here in Roanoke, Virginia. When she came home she could hardly wait to tell me about her day. "Computer camp was fun!" she exclaimed. "I thought we'd have to program all day, but we didn't. We did *lots* of things!"

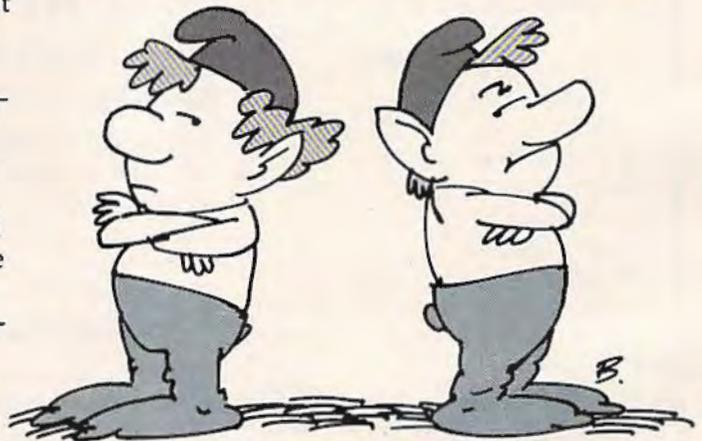
One thing Catie did was send electronic mail back and forth to her campmate, Ashley Bell. The girls used the Minerva terminals on Hollins College's DEC (Digital Equipment Corporation) computer system.

Using a *big* computer was a new experience for Catie. The only kind of computers she has ever seen are personal computers. Until yesterday she didn't even know what a big computer was. She thought it was really neat that she and her campmates were all using a computer – the same computer! She has grown up in a world of truly personal computing; *group* computing was a new experience for her. And she loved it.

For example, last night she wanted us to wire all our little computers together. Catie wanted to send games and electronic mail from her bedroom to her brother Eric's bedroom, and from the kids' bedrooms to my study, to the kitchen, the basement (kid's playroom), and even to the bathroom

("In case I want to tell you something while I'm taking a bath," Catie said).

I had to explain to Catie that the computers she was using at computer camp were really just terminals – "octopus arms" to a single giant computer. The computers in our house, I said, were different. They were like little dwarf computers –



dwarfs of every sort, color, and personality. The dwarfs were all different from each other. Most were not even on speaking terms. Getting them to talk to each other was not "just a quick project" as Catie called it.

Different Perceptions

All this talk about giants and dwarfs got me thinking. When it comes to computers, Catie and Eric's generation sees things just the opposite of my generation (adults in their 20s and 30s, and above). When I close my eyes and try to picture

\$40 Can Make A Home Computer A Serious Computer

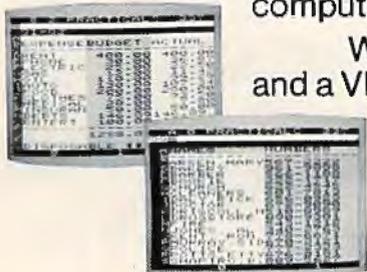
**If you own a
VIC-20™ or Commodore 64™,**

someday you may consider getting a more sophisticated computer.

That could cost you thousands of dollars. Or just \$40 (\$50 for PractiCalc 64).

Forty dollars will buy a PractiCalc software program for your VIC-20 and suddenly your VIC will be able to do many tasks that have made Apple® and IBM® computers so popular.

With PractiCalc and a VIC, you can devise budgets, and make business projections – instantly!



See what PractiCalc™ can do for you.

You can keep track of expenses, investments, and inventory.

Maintain and *instantly search** files.



Alphabetize lists, and rearrange long rows of numbers – instantly.

Even turn numbers into graphs.*

PractiCalc makes it practical to play with numbers, in a way you never could with pencil and paper. Sit down at your VIC, put in PractiCalc, and tasks that would normally take hours, take minutes.

PractiCalc. If you're tired of playing games, and want to get down to business.



PRACTICALC™

* Denotes features available only on PractiCalc 64 and PractiCalc Plus (for the Commodore VIC-20).

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

Apple® is a registered trademark of Apple Computers, Inc. IBM® is a registered trademark of International Business Machines, Inc.

Distributed by: **Micro Software International Inc**

The Silk Mill, 44 Oak St., Newton Upper Falls, MA 02164

(617) 527-7510

computers, I still see the big IBMs, Univacs, Honeywells, Burroughs, and other machines. When Catie closes her eyes, she sees VICs, Commodore 64s, Apples, Ataris, and small lap computers such as the Epson HX-20 and TI's CC-40.

Now that small computers are popping up everywhere in millions of people's homes, classrooms, and offices, we adults are beginning to change our impressions. More and more, we acknowledge that there are two kinds of computers — giants *and* dwarfs.

But kids still see only one kind of computer. And that's all they'll ever see, until they grow up and try to get a job. Then, *BOOM!*, they'll come face to face with their first computer giant. And they'll be ill-prepared for that experience.

As far as most kids know, the Computer Age began in 1977 and 1978 with the appearance of the first Apples, Commodore PETs, and Radio Shack TRS-80s. The memories of younger kids don't go back even that far.

For most kids the giant computers have disappeared. Or, they never existed. Giant computers are creatures from adult fairy tales that filter home from the office or workplace. Little kids see them occasionally on TV or in the movies because they are stereotypes. But they are vague, hazy creatures. Based on movies like *Superman III* and *War Games*, kids' images of big computers are certain to be extremely stilted and unrealistic.

Giant computers are not a tangible part of a child's everyday world. But they have not disappeared. They have faded from the popular consciousness because they are not as trendy, fun, or cheap as the little personal computers. And they are not poking their terminals into all of our homes.

Giant computers are not mass-media superstars. But they still run the world. Personal computers are the front men for the computer revolution, but the big mainframe computers are still there, locked in the back room, chugging away, churning out most of the world's work.

An Emerging Network

Pretty soon, mainframe computers will play a larger part in the life of our families. When we dial up an information network such as CompuServe or The Source, we are linking our personal computer with a mainframe computer. Information networks, libraries, mail systems, banks, and shopping catalogs will soon become a major adjunct to "personal computing."

In the next couple of years, small computers will cease to be little isolated atoms in the electronic universe. Instead they will become *nodes* linked in neighborhood, professional, and national networks. Personal computers are now autistic, shut off from each other. This is no way to gather in-

formation, learn new things, and get work done. Personal computers must communicate. And the big computers will act as the middlemen.

What's more, big computers have advanced computational abilities still sadly lacking in most smaller computers. As part of their computer education, our kids (even our smallest kids) should learn about these powerful machines.

Computer camps at universities are great places to learn more about large computers. Another place is Walt Disney's EPCOT Center (Experimental Prototype Community of Tomorrow), in northern Florida, near Disney World. When I found out that EPCOT did not feature personal computers in a "community of the future," I called to ask why. An EPCOT official explained that the designers of EPCOT had studied small computers, but they had decided that small computers were still not friendly enough. "Big computers can be much friendlier than small computers," she said. "Our big computers at EPCOT are fast, have gigantic memories to store millions of facts, and are capable of displaying beautiful, high-resolution pictures."

As I listened to her talk, I remembered the big computers I had grown up with. Maybe they were big and fast and were magicians with pictures, but they were also cold, unfriendly, and aloof. As a college student, the closest I ever came to an IBM 370 was when I pressed my nose up against the heavy-duty glass surrounding the computer room. I told this to the EPCOT woman.

She explained that their big computers were hidden away, but their terminals (like the octopus arms of the computer at Catie's computer camp) were all over EPCOT for everyone to use. "And we don't put up a barrier between people and our computers by making people use a keyboard," she said. "People can interact with our computers by operating simple controls, by touching the picture screens, and by talking to them. And the computers talk back."

Family Word Processing

I make my living by writing. I prefer to use *WordStar* on a personal computer to write faster and better. This has made me the default champion of "family word processing" here in our home in Roanoke.

I may be family champion for now, but there are several challengers on the horizon.

First, there is my wife Janet. Janet doesn't like *WordStar*. "It's too complicated," she says. "Using *WordStar*, you don't write a letter, you *program* it!"

Janet isn't an ex-computer programmer like me. Instead of running programs, she runs buses. And when she sits down to type a letter, she doesn't want to program. She does not want to

READ THE LABEL

THE FILING ASSISTANT

DATA BASE MANAGEMENT for the **COMMODORE 64**
This data management package allows you to create record formats, sort information, and produce reports. It includes the following features:

Design records up to 256 characters, up to 25 fields, (up to 35 characters per field)

Designate up to 10 two-level sorts
"Step through" records while displaying selected fields to screen

Add, copy, change, or delete records
"Find" a record by key field, or "locate" by record number
Set function keys to insert a frequently used word, phrase, zip code, etc.

No programming or code necessary. On-screen prompts lead to full operation in one to two hours.
THE FILING ASSISTANT contains a built-in mail label program that allows you to print a 1 to 6 line label. You can include more than one field per line and print up to four labels across the page. Labels to be printed can be selected on one or more fields.

The program also allows you to design your own report formats. Your reports may include:

Automatic record counting
Computation between fields
Totals and/or sub-totals per column
Record selection by one or more fields

TECHNICAL NOTE

This program supports the serial or the user port —you can configure just about any printer. It can be used with more than one 1541 disk drive or with the "C-64 Link-IEEE Interface" which allows you to work with the Commodore 2031, 4040, and 8050 disk drives.

THE FILING ASSISTANT is part of a series. It will integrate with **THE WRITER'S ASSISTANT** (word processing) and **THE SPREADSHEET ASSISTANT** (forecasting and financial analysis).

Even if you are a beginner **THE FILING ASSISTANT** will allow you to manage personal and business records. The **ASSISTANT SERIES** provides you with the most complete and practical information management package available for the Commodore 64.

RAINBOW
Computer Corporation

490 Lancaster Pike
Frazer, Pennsylvania 19355

go through an elaborate regimen of switch-flipping and button-pushing, as if she were Sally Ride preparing for blast-off on the space shuttle *Challenger*. She just wants to type a letter.

So Janet has abandoned *WordStar* in favor of another word processing program, *Text Wizard*. And now she's turning out whole piles of papers, résumés, and correspondence.

Then there's Catie. Catie does her word processing lying in bed.

Catie's computer is right beside her bed on a card table. Catie has a perfectly good chair to sit in, but she has swiveled her computer around to face the bed, and she types lying down, with her fat black cat draped across her back.

Catie has a simple explanation for the unusual way she has arranged her word processing workstation. "Mowie [the cat] wouldn't fit on the chair," she says.

Catie doesn't use *Text Wizard* or *WordStar*. Her favorite is *Bank Street Writer*. She cranks out page after page of very short stories, and notes to her parents, Eric, and Mowie. According to Catie, *Bank Street Writer* is the preferred word processor for seven-year-old girls, "because it's easy to fill up the little box on the screen, and it makes pretty letters."

(Although *WordStar*, *Text Wizard*, and *Bank Street Writer* will not run on a VIC or 64, many other word processors of similar quality are available. See "A Survey Of Inexpensive Word Processors For VIC And 64" in this issue.)

Gobbledygook Processing

Is that it? Are there any other family members who are challenging me for my position as the family's number-one word processor?

There couldn't be any body else, really. There's Eric and Mowie, but neither of them can read or write.

Mowie is truly out of the running. She's truly content to lazily nap on Catie's back. But Eric is another story.

Every morning before nursery school and every night right at his bedtime, I find him in the study pounding away on a computer. I'm not certain what Eric is typing, but the paper flies! As far as I can tell, Eric may not even be competing with the other members of the family. He may have created his own category - *gobbledygook processing*.

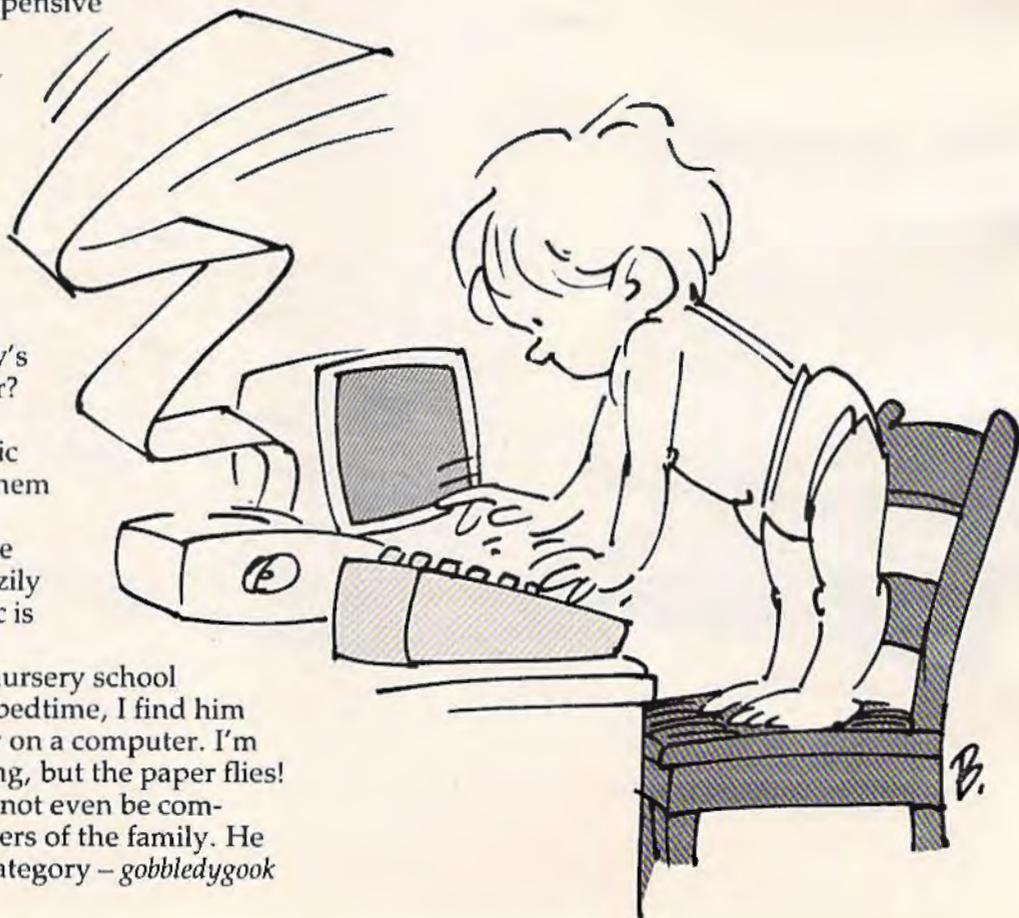
Eric's workstation is even more unusual than Catie's. He achieves maximum productivity when he is standing on the creaky wooden chair in my study and leaning over the computer. He usually does his typing in his bare feet, and this morning, in his underwear, too. (The increased ventilation probably keeps the ideas flowing).

I left him alone this morning for about 15 minutes. When I came back, he had a streamer of printer paper about six feet long sticking out of the computer. "Look at this, Daddy!" he exclaimed proudly. "Look at all the work I did!"

Eric doesn't have his own briefcase yet. So when he went off to school this morning, he had his work rolled up, fastened with a green rubber band, and dangling inside a plastic bag.

As soon as he got to his class, he was besieged by other kids asking to see the bag's mysterious contents. He pulled out the paper, unrolled it, and carefully explained how he made all the hundreds of random letters, numbers, punctuation symbols, and graphic characters that he and the computer processed.

The kids were impressed. They'll probably go home and tell their families. And, who knows, with Eric around, advanced gobbledygook processing might become very popular in Roanoke. Soon all the preschoolers could be doing it. @



COMMODORE 64

(more power than Apple II at half the price)

\$139.00*

- 170K DISK DRIVE \$179.00*
- TRACTION FRICTION PRINTER \$119.00*

(* with software savings applied)

COMMODORE 64 COMPUTER \$139.00

You pay only \$239.00 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 \$139.00!! LESS a \$49.50 BONUS PACK of 30 programs on tape or disk we give you absolutely FREE!!!

170K DISK DRIVE \$179.00

You pay only \$279.00 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 \$179.00. LESS a \$49.50 BONUS PACK of 30 disk programs we give you absolutely FREE!!!

TRACTION FRICTION PRINTER \$119.00

You pay only \$219.00 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 \$119.00.

80 COLUMN BOARD \$149.00

You pay only \$149.00 for this 80 Column Board when it is purchased with a COMMODORE 64 Computer or a Disk Drive or a Printer or a Monitor. If purchased alone the sale price is \$169.00. Included with this board is word processor pack, electronic spread sheet and mail merge data base on two tapes. List \$249.00. (Disk add \$10.00).

EXECUTIVE WORD PROCESSING PACKAGE

SCRIPT 64 EXECUTIVE WORD PROCESSOR is the finest available for the COMMODORE 64 Computer! THE ULTIMATE for PROFESSIONAL wordprocessing application. Featuring simple operation, powerful text editing with a customized word dictionary, complete cursor and insert/delete key controls, line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers. Included is a powerful MAIL MERGE When used with THE COMPLETE DATA BASE PACKAGE. List \$99.00. Sale \$79.00. Coupon Price \$52.00. (Disk only).

COMPUTER AND SOFTWARE SALE

WE HAVE THE BEST SERVICE WE HAVE THE LOWEST PRICES

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	Coupon
Executive Word Processor	\$99.00	\$52.00
Complete Data Base	\$89.00	\$46.00
Electronic Spreadsheet	\$89.00	\$46.00
Accounting Pack	\$89.00	\$32.00
Total 5.2 Word Processor—Plus		
Tape	\$69.00	\$37.00
Disk	\$70.95	\$42.00
Total Text 2.6 Word Processor—		
Tape	\$44.95	\$26.00
Disk	\$49.95	\$26.00
Total Label 2.6	\$24.95	\$12.00
Disk	\$29.95	\$15.00
Quick Brown Fox Word Processor	\$69.00	\$40.00
Programmers Reference Guide	\$20.05	\$12.50
Programmers Helper	\$69.00	\$40.00
Basic Tutor	\$29.95	\$15.00
Typing Tutor	\$29.95	\$15.00
Sprite Designer	\$16.95	\$10.00
Medicinemem	\$19.95	\$12.00
Weather War II	\$19.95	\$12.00
Music-Maker	\$19.95	\$12.00
EDU-Pack	\$24.95	\$13.00
3D Maze Craze	\$24.95	\$13.00
Professional Joy Stick	\$24.95	\$12.00
Light Pen	\$39.95	\$20.00
Deluxe Dust Cover	\$ 8.95	\$ 4.60

(and many other items)

Write or call for

Sample SPECIAL SOFTWARE COUPON!

PROFESSIONAL BUSINESS SOFTWARE EXECUTIVE QUALITY BY TIME WORKS!

The Cadillac of business programs for Commodore 64 Computers

Item	List	*SALE
Inventory Management	\$89.00	\$69.00
Accounts Receivable	\$89.00	\$69.00
Accounts Payable	\$89.00	\$69.00
Payroll Management	\$89.00	\$69.00
Cash Flow Management	\$89.00	\$69.00
Sales Analysis	\$89.00	\$69.00
General Ledger	\$89.00	\$69.00

(*COUPON PRICE \$59.00)

VIC-20

(a real computer at the price of a toy)

\$77.00*

- 40-80 COLUMN BOARD \$99.00*
- VOICE SYNTHESIZER \$69.00*

(* with Cassette and Gortek purchase)

VIC-20 COMPUTER \$77.00

You get the Commodore VIC-20 Computer for only \$77.00 when you buy at sale prices: The Commodore Data Cassette for only \$69.00 and the Gortek Introduction to Basic program for only \$19.95. TOTAL LIST PRICE \$302.95. SPECIAL PACKAGE SALE PRICE \$165.25.

40-80 COLUMN BOARD \$89.00

A fantastic price breakthrough for VIC-20 owners on this most wanted accessory!! "Now you can get 40 or 80 Columns on your T.V. or Monitor Screen." Plus we add a word processor with mail merge, electronic spread sheet, time manager and terminal emulator!! These PLUS programs require 8K or 16K RAM memory. (Disk add \$10.00).

VOICE SYNTHESIZER \$59.00

Votrax Based. Make your VIC-20 COMPUTER TALK! Has features equivalent to other models costing over \$370.00. You can program an unlimited number of words and sentences and even adjust volume and pitch. You can make adventure games that talk! A must for enhancing your programming creativity and pleasure.

60K MEMORY EXPANDER \$59.00

Sixslot — Switch selectable — Reset button — Ribbon cable. A must to get the most out of your VIC-20 Computer. Includes FREE \$29.95 adventure game.

8K RAM CARTRIDGE \$39.95

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 \$69.00

Increases programming power 4 times. Expands total memory to 41K (41,000 bytes). Memory block switches are an outside cover! Includes FREE \$29.95 adventure game!!

12" GREEN SCREEN MONITOR \$109.00

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 \$149.00

Premium quality AMBER VIDEO MONITOR With antiglare, (80 characters x 24 rows), exceptionally clear screen, faster scanning, 1000 lines. 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 ACCEPTED

PROTECTO ENTERPRISES

(WE LOVE OUR CUSTOMERS)

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

Bargain Software For The 64

Commodore's Public-Domain Programs

John Blackford

Last spring, Commodore Business Machines released more than 600 educational programs for the PET and Commodore 64 through dealers, who were to make copies for customers at a nominal charge. Now, Commodore has streamlined the offering, putting the best programs on 27 diskettes available nearly at cost. With each disk containing 10 to 20 programs, you can build a software library at rock-bottom prices. The disks are arranged by category (such as math, computer literacy, or business) and may be purchased individually at dealers.

Whenever a new computer appears, a common complaint is that there isn't much software for it. Apple computers were one of the first brands widely purchased by home users, and it took years for software developers to grind out a full line. Now there's plenty of software. The same was true for Atari, except that market pressure speeded up the development process. When the Commodore 64 was introduced, people were impressed with its graphics and sound, as well as the price, but wondered how long they would have to wait for a large selection of programs.

At first, programs were scarce. Commodore's early advertising for the 64 (in the summer of 1982) noted hopefully that the product "will have a

broad range of custom software" In other words, there was almost nothing yet. But as sales climbed, independents began rushing out games and utilities, and Commodore provided more of its own. By the spring of 1983, software was appearing in some quantity, and Commodore took the opportunity to release a collection of 656 educational programs originally written for the Commodore PET in the Canadian school system.

The idea was to offer the software as a public service at minimal cost. All the programs are in the *public domain* – not copyrighted and free to be reproduced by anyone. They were written for the PET by people in the Canadian schools – and since Commodore is the No. 1 educational computer supplier in Canada, there were lots to choose from. Student programmers there, in cooperation with Commodore of Canada, revised the programs to run on the 64.

Unfortunately, some dealers in the United States were reluctant to handle the material. Under the original plan, dealers were to purchase the complete set – some 50 disks at the time – and make copies available to customers for a small fee. But it looked like a headache to many dealers. Then it turned out that some of the programs wouldn't run properly on improved versions of the 64 (see "Commodore 64 Video Update," *COMPUTE!'s Gazette*, July 1983). The solution was a simple one-line addition to each program, but

PC-DocuMate™
Model CM-641
for the Commodore 64™



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

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

Ad no. 731 Copyright 1983, SMA.

Dealer Inquiries Invited.

busy dealers began to wonder how much of their time was going to be involved.

To insure that the programs would be widely distributed, Commodore revised the packaging this summer so dealers wouldn't be tied up with the copying. At the same time, the company went over each program, revising whenever necessary to make sure every one would run on all versions of the 64. Commodore's software team eliminated some programs that were similar to others in the group, and dropped some that weren't of the highest educational quality. The final set consists of nearly 400 programs on 27 disks (so far, there are no plans to make them available on tape). Each disk is now packaged separately - available for \$6.95 - with descriptions of each program on the back.

The disks are grouped in nine categories: business, geography, English, math, computer science, technology, science, history, and educational games. Some of the categories, such as math and English, are on more than one disk. There are seven English and eight math disks, with programs arranged loosely according to complexity. The three game disks have word-guessing puzzles, logic games, I.Q. simulations, and many other programs. Although they aren't available on tape, cassette users may copy them freely from someone with a disk drive, because the programs are not copyrighted and are unprotected.

Commodore is now working on yet another collection of educational programs, according to company spokesmen. The exact contents and the date of release are not yet definite, but the new batch will be available in the same format and at the same price as the revised disks. If all goes according to plan, they might be available before Christmas.

These public-domain educational programs are not being offered in isolation. Commodore is pushing software in general and educational programs in particular. Back in June, when the revised disks were announced, the company also slashed its regular software prices by up to 50 percent, and introduced 70 new programs, including word-processing and small-business packages.

Then, during the summer, Commodore announced an agreement with the Minnesota Educational Computer Consortium (MECC) to produce 100 educational programs. MECC, a leader in educational computing, will rewrite its 100 best programs for the 64. MECC will begin offering these versions to schools this fall and should have them all completed by the end of the school year, June 1984. Also, recognizing that the home and educational markets are merging, Commodore will make these programs available through both its dealer network and mass distributors.

Finally, Commodore is improving service to schools by sponsoring more seminars on educational computing and by designating some dealers as educational specialists - equipped and trained to give top-quality service to educational buyers.

This is good news for schools, but it doesn't leave out the home user, either. MECC's software will be available at a cost similar to games and other commercial software. And the public-domain material averages less than \$1 per program. At that price, you can get a baker's dozen of engaging programs for little more than the cost of a blank disk. 

Programmers

Have you written an exciting game? A utility that makes programming easier? An educational program for children? Any kind of useful home application program? If so, *COMPUTE!'s Gazette* wants to hear from you.

SUPER DISK

Floppy Disk Drive For VIC-20 & Commodore 64

Super Disk² is a Commodore compatible disk drive designed to interface to the various Commodore computers such as the PET¹, VIC-20¹ and the Commodore 64¹. The disk drive is compatible to the model 4040, 2031, 1540, and the 1541 disk drives and recognizes programs generated on any of these disk drives. The capacities are comparable to those found on the Commodore drives, and Super Disk² recognizes the full instruction set of the Commodore drives. Super Disk² offers RAM area within the disk unit, a serial and an IEEE bus interface.

Call Toll Free For Latest Price Information

1-800-527-7573

Also Available:

Gemini-10 w/Interface	\$399.	V3K RAM	25.
CPI Parallel Interface	65.	V8K RAM	45.
Expandoport 3 VIC	25.	V16K RAM	75.
Expandoport 6 VIC	75.	V24K RAM	105.
Expandoport 4 C64	65.	CIE (IEEE for C64)	95.

CATALOG OF OTHER HARDWARE & SOFTWARE AVAILABLE ON REQUEST.

We accept: VISA, Mastercharge, and AE

Southwest Micro Systems, Inc

2554 Southwell • Dallas, Texas 75229

(214) 484-7836

¹Trademark of Commodore Int. ²Trademark of MSD

Commodore Puts Excitement In Your Life

For Such A Small Price.



Commodore 64

Avalon Hill Game Company

180-701 B-1 Nuclear Bomber (C)	\$12
180-702 Midway Campaign (C)	\$12
180-703 North Atlantic Convoy Raider (C)	\$12
180-704 Nukewar (C)	\$12
180-706 Planet Miners (C)	\$12
180-712 Computer Stocks & Bonds (C)	\$15
180-719 Andromeda Conquest (C)	\$14
181-721 Computer Football Strategy (C)	\$12
181-732 Telengard (C)	\$16

Broderbund

David's Midnight Magic	\$23
Choplifter (CT)	\$34
Serpentine (CT)	\$27
Sea Fox (CT)	\$27

Datamost

Roundabout	\$20
Bilestead	\$20
Mating Zone	\$20

EPYX/Automated Simulations

14E-036 Jump Man (D)	\$27
----------------------	------

Human Engineered Software (HES)

HEE-307 6502 Professional Dev. System (C)	\$23
HEE-400 Retro Ball (Crt)	\$27
HEE-401 Hesmon (Crt)	\$27
HEE-402 Turtle Graphics II (Crt)	\$45
HEE-404 Heswriter 64 (Crt)	\$35
HEE-412 Gridrunner (Crt)	\$27

Infocom

63E-001 Zork I (D)	\$27
63E-002 Zork II (D)	\$27
63E-003 Deadline (D)	\$35
63E-004 Starcross (D)	\$27
63E-005 Zork III (D)	\$27

Sierra On-Line

54E-048 Frogger (D)	\$23
Jaw Breaker	\$20

Sirius Software

70E-036 Blade of Blackpoole (D)	\$27
70E-037 Type Attack (Crt)	\$27
70E-043 Repton (D)	\$27
70E-046 Critical Mass (D)	\$27
70E-424 Snake Byte (Crt)	\$23
70E-445 Spider City (Crt)	\$27
70E-447 Squish 'em (Crt)	\$23
70E-448 Final Orbit (Crt)	\$23

Spinnaker

SKE-001 Snooper Trooper #1 (D)	\$30
SKE-004 Facemaker (D)	\$23
SKE-006 Kindercomp (D)	\$20
SKE-008 Hey Diddle Diddle (D)	\$20
SKE-009 In Search of the Most Amazing Thing (D)	\$27
Fraction Fever (CT)	\$20
Alphabet Zoo (CT)	\$20
Delta Drawing (CT)	\$23

Synapse Software

SSE-011 Ft. Apocalypse (D)	\$23
SSE-016 Drelbs (D)	\$23
SSE-019 Survivor (D)	\$23
SSE-020 Pharaoh's Curse (D)	\$23
SSE-311 Ft. Apocalypse (C)	\$23
SSE-316 Drelbs (C)	\$23
SSE-319 Survivor (C)	\$23
SSE-320 Pharaoh's Curse (C)	\$23

United Microwave Industries (UMI)

92E-302 Renaissance (C)	\$27
92E-331 Motor Mania (C)	\$20

**We Accept
VISA & MasterCard**

Commodore 64 (With Factory Rebate) . . . \$219

VIC 20 . . . \$ 99

1525 Printer . . . \$229

1530 Datasette . . . \$ 59

1541 Disk Drive . . . \$249

1600 Modem . . . \$ 89

1701 Commodore Monitor . . . \$289

VIC 1311 Joystick . . . \$ 8

VIC 1312 Game Paddles . . . \$ 16

VIC 1210 3K Memory Expander . . . \$34

VIC 1110 BK Memory Expander . . . \$52

VIC 1111 16K Memory Expander . . . \$89

VIC 1011 RS 232 Terminal Interface . . . \$43

VIC 1211 Super Expander . . . \$59

VIC 1212 Programmer's Aid Cartridge . . . \$45

VIC 1213 Vicmon Machine . . . \$45

Language Monitor . . . \$45

VL 102 Intro to Basic Prog. I . . . \$21

Intro to Basic Prog. II . . . \$21

VT 106A Recreation Pack . . . \$45

VT 107A Home Calculation Pack . . . \$45

VIC 1600 Vicmodem . . . \$89

VM Programmer's Reference Guide . . . \$14



1095 E. Twain (702) 796-0296

Las Vegas, Nevada 89109

Call Toll Free

1-800-634-6766

Order Line Only

Information & Order Inquiries (702) 369-5523

VIC 20 Educational

Books

Kids and the Vic	\$ 18
Programmer's Reference Guide (Vic)	\$ 14
Programmer's Reference Guide (64)	\$ 18

Music

Vic Music Composer (CT)	\$ 29
HES Synthesound (CT)	\$ 49

Reading and Language Arts

Finger Spelling (D, C)	\$ 12
My Spelling Easel (Ages 3-10)	\$ 26

Programming Techniques

Intro to Basic Prog. I	\$ 22
Intro to Basic Prog. II	\$ 22
Programmer's Aid Cart.	\$ 22
Turtle Graphics/Hess (CT)	\$ 29
Groteck & Microchip	\$ 23

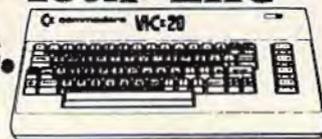
Social Studies/Science

Visible Solar System	\$ 23
Reaganomics (CT)	\$ 27

ORDERING INFORMATION AND TERMS:

For fast delivery send cashier checks, money orders or direct bank wire transfers. Personal and company checks allow 3 weeks to clear. C.O.D. orders (\$3.00 minimum) and 1% of all orders over \$300. School purchase orders welcome. Prices reflect a cash discount only and are subject to change. Please enclose your phone number with any orders.

SHIPPING: Software (\$2.50 minimum). Shipping — Hardware (please call). Foreign orders APO & FPO orders — \$10 minimum and 15% of all orders over \$100. Nevada residents add 5 3/4% sales tax. All goods are new and include factory warranty. Due to our low prices, all sales are final. All returns must have a return authorization number. Call 702-369-5523 to obtain one before returning goods for replacement. All returned merchandise is subject to a restocking fee and must come with their original packaging in order to be accepted. NO returns permitted after 21 days from shipping date.



VIC 20 Avalon Hill

Nuke War . . . \$12

Automated Simulations

Rescue at Rigel (C)	\$20
Ricochet (C)	\$15
Monster Maze (CT)	\$27
Sword of Fargool	\$27

Broderbund

Martian Raider	\$15
Multisound Synthesizer	\$15
Shark Trap	\$15
Sky Blazer (CT)	\$27
Sea Fox (CT)	\$27
A.E. (CT)	\$27

Creative Software

Black Hole (CT)	\$36
Trashman (CT)	\$36
Astroblitz (CT)	\$36
City Bomber & Minefield (CT)	\$20
Apple Panic (CT)	\$36
Choplifter (CT)	\$36
Serpentine (CT)	\$36
Videomania (CT)	\$36
Terraguard (CT)	\$36

VIC Software

Avenger	\$ 23
Superslot	\$ 23
Super Alien	\$ 23
Jupiter Lander	\$ 23
Draw Poker	\$ 23
Midnight Drive	\$ 23
Radar Rat Race	\$ 23
Raid on Fort Knox	\$ 23
Sargon II Chess	\$ 29
Cosmic Cruncher	\$ 23
Gorf	\$ 29
Omega Race	\$ 29
Sea Wolf	\$ 23
Adventureland	\$ 29
Pirate Cove	\$ 29
Mission Impossible	\$ 29
The Count	\$ 29
Voodoo Castle	\$ 29
The Sky Is Falling	\$ 23
Mole Attack	\$ 23
Bingo Speed Math	\$ 23
Home Babysitter	\$ 23
Visible Solar System	\$ 23
Personal Finance	\$ 29
Quick Brown Fox	\$ 65

HES Software

HES Mon (CT)	\$ 29
HES Writer (CT)	\$ 29
Synthesound Music Synthesizer (CT)	\$ 49
Turtle Graphics (CT)	\$ 29
Vic Fort (CT)	\$ 45
Victrak (C)	\$ 15
Predator (CT)	\$ 27

United Microware

Spiders of Mars (CT)	\$ 34
Meteor Run (CT)	\$ 34
Amok	(C) \$ 15 (CT) \$ 27
Alien Blitz	(C) \$ 17 (CT) \$ 27
Skymath (C)	\$ 12
Space Division (C)	\$ 12
Super Hangman (C)	\$ 14
The Alien (C)	\$ 17
3D Maze (C)	\$ 12
Kosmic Kamikaze (C)	\$ 17
Sub Chase (C)	\$ 15
Renaissance	\$ 34
Cloud Burst (CT)	\$ 27
Satellites & Meteorites (CT)	\$ 34
Outworld (CT)	\$ 34
Wordcraft	\$270

Sirius

Type Attack	\$27
Snake Byte	\$27

Thorn EMI

River Rescue (CT)	\$ 29
Mutant Herd (CT)	\$ 29

Tronix

Galactic Blitz (C)	\$17
Swarm (C)	\$20
Sidewinder (C)	\$20
Gold Fever (CT)	\$27
Deadly Skies (CT)	\$27

REVIEWS

A Survey Of Inexpensive Word Processors For VIC And 64

Larry L. Bihlmeyer and Kathy Yakal, Editorial Assistant

Word processing software and hardware for the Commodore 64 and VIC-20 is growing by leaps and bounds. Besides many new releases, older programs are being updated and re-released.

This all goes to show the competitive battle going on to capture buyers (you). At the same time, features usually found in more expensive word processing programs are working their way into lower-cost editions: color capabilities, word count calculations, addition/subtraction of columns or rows of numbers.

If you are shopping for a word processor for your VIC or 64, you can quickly become confused. Let's clear up the confusion and see what's available. In the process, we'll answer some key questions. Such as: What do you get for your money? Which programs support the RS-232 port? How do word processing programs on cartridges compare to those on tape and disk? Are there many low-cost word processors to choose from?

Define Your Needs

Before we look at the low-cost programs, you first need to know what your needs are and what equipment you'll be using. This is vital because many programs support only the serial port (device #4) on Commodore machines. Thus, if you use the RS-232 port (device #2) with a printer interface, you could end

up with a word processing program that won't work with your printer. Figure 1 shows the two possible printer hookups to a Commodore 64.

To determine your needs, make a list of how you would use a word processor if you had one. Remember that a word processor is more than just an electronic typewriter. A good word processing program can help you store information, prepare charts and newsletters, do form letters to use with mailing lists, and even do small budget sheets.

So make a list of what you expect a word processor to do. Are you going to jot short letters to your friends, or write a novel that rivals *War and Peace*? Do you need mailing list capability? Do you have a disk drive or a tape recorder?

Once you've defined your needs, list the kind of equipment you have or plan to buy which must be compatible with the word processor. What kind of printer (parallel or serial)? Will a printer interface be used, such as a Data 20 Printer Interface for the RS-232 port? Or will you use a Commodore printer connected to the serial output jack? Do you plan to add a disk drive in the future?

A Variety Of Features

When you've finished both these lists, it's time to see what word

processors match your needs and equipment. Table 1 lists word processing programs and some of their features. Table 2 lists the company addresses.

These programs basically fall into three price groupings: \$15-\$30, \$30-\$65, \$65-\$125. In general, the more you pay, the more features you get. But there may be a limit to what you might need. Maybe you don't need more than just "basic" word processing capabilities. This will, of course, depend on your needs list.

The programs in the \$15-\$30 range contain the basic word processing commands. For example, *TOTL.Text 2.0* (\$25) for the VIC-20 has 16 basic features, including page numbering, right and left margin control, centered title lines, tabs, full-screen editing, full cursor control, scrolling up and down, and editing of blocks of text. *TOTL.Text 2.5* (\$35), an enhanced version of 2.0, adds nine more features, such as headers and footers, keyboard input for form letters, and added printer controls. For the Commodore 64, you can buy *TOTL.Text 2.6+* (\$40), which has about 25 features and supports both the serial and RS-232 ports.

Word Processor Plus (\$25) provides good basic features including repeating keys, a standard letter format output, and a spool routine to print a series of text files.

The second price grouping (\$30-\$65) moves you up to more features, longer manuals in binders, and sample text files to help you learn the program. For example, *Quick Brown Fox* (VIC or 64) comes with a nice binder

PRICE BREAKTHROUGH!
A HIGH QUALITY PRINTER FOR ONLY

\$399.



THE NEW D-92 DUAL MODE MODULAR PRINTER

WE DARE YOU TO COMPARE!

But don't just look at the price, consider the features, reliability and flexibility of the D-92 dual mode modular printer.

FEATURES

- 7x9 Font For Data Processing printing
- 11x9 Font For Crisp Clear Business Letters
- 100 CPS Bidirectional Printing
- Short Line Seeking Logic
- 800 Character Buffer
- Six Different Character Sizes
- 100% Duty Cycle
- Parallel Interface

RELIABILITY

All *Data Impact Products* printers are built with superior materials right here in the United States. Each unit is inspected, tested and burned in at the factory to insure superior quality.

- Other measures of reliability
- 100 Million Character User-Replaceable Printhead
 - 5 Million Character Ribbon Cartridge
 - Easy Access and Serviceable Single Circuit Board
 - Full Factory Warranty

FLEXIBILITY

The D-92 was built with your future in mind. The highly modular design provides several upgradeable options such as:

- Adjustable Tractor Feed
 - Dot Addressable Graphics
 - 2K Buffer
 - X-ON/X-OFF
 - RS232 Serial Interface
 - 9600 Baud
 - Single Sheet Feeder
 - Sound Cover
- Naturally, *Data Impact Products* printers will interface with all popular computers whether it is IBM, Osborne, TRS, Apple, Atari, etc.

SPECIAL PROMOTIONAL DISCOUNT FOR COMMODORE 64 USERS

For more information call

1-800-327-1525



DATA IMPACT PRODUCTS, INC.

745 ATLANTIC AVE., BOSTON, MA 02110 TEL: 617-482-4214

TELEX: 951047 DIP INC BSN

REVIEWS

and a cassette tape with sample files to aid learning. It's written for the beginner and the instruc-

tions contain lots of illustrations. *Quick Brown Fox* is a "firmware" program, in that it comes

as a cartridge which slides into the cartridge slot at the right rear of the 64 or VIC. This means it

Table 1: Summary Of VIC-20/Commodore 64 Word Processors

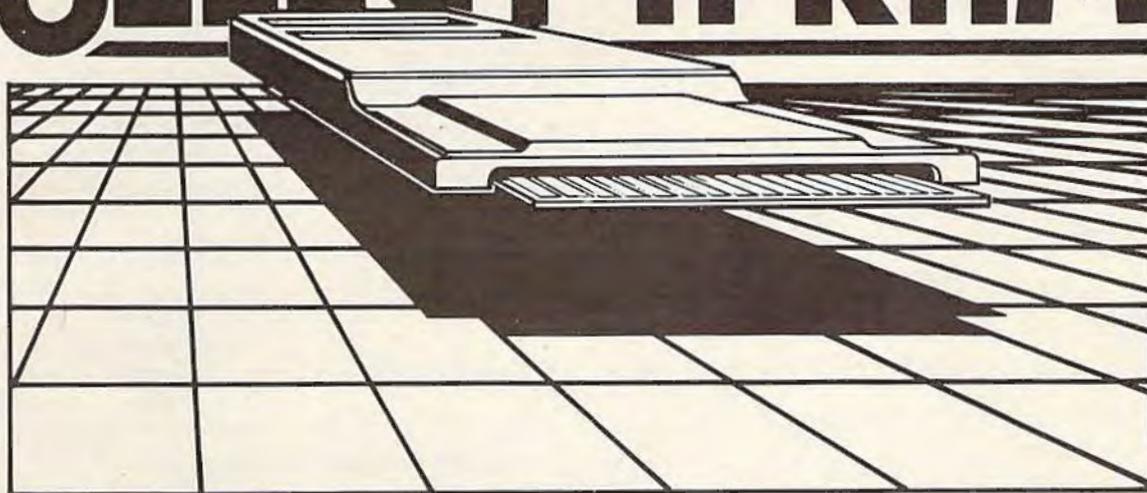
PRODUCT	VIC	64	TAPE	DISK	CART.	Price,\$*	COLOR	SERIAL†	RS-232	COMMENTS‡
Casual Writer	X		X			29	N	Y	N	Requires 8K expansion on VIC
EasyScript 64		X		X		79.95	Y	Y	Y	
The Editor	X	X	X	X		34.95	N	Y	N	Requires 8K expansion on VIC
HES Writer	X				X	39.95	Y	Y	N	
HES Writer/64		X			X	44.95	Y	Y	N	
Page-Mate	X	X	X	X		40	N	Y	Y	
PaperClip		X		X		125	Y	Y	Y	
Quick Brown Fox	X	X		X	X	65 (cart.)	N	Y	Y	
Smithwriter		X	X	X		49.95 (tape) 54.95 (disk)	Y	Y	Y	VIC version available soon
Script 64		X		X		99.95	Y	Y	Y	
TOTL.Text 2.0	X		X	X		25 (tape)	Y	Y	Y	Disk version is \$29
TOTL.Text 2.5	X		X	X		35 (tape)	Y	Y	Y	Disk version is \$39
TOTL.Text 2.6		X	X	X		40 (tape)	Y	Y	Y	Disk version is \$44
Un-Word Processor	X		X			20	N	Y	Y	
VIC-NIC	X		X	X		19.50	Y	Y	Y	Commodore 64 version available soon
Word Manager	X	X	X	X		Free with purchase of Data 20 Video Pak	N	Y	Y	Requires Video Pak
Word Mite Plus	X		X			14.95	Y	Y	N	
Word Mite 2	X		X	X		14.95 (tape) 16.95 (disk)	Y	Y	N	
Word Mite 2C		X	X	X		14.95 (tape) 16.95 (disk)	N	Y	N	
Word Pro 1 Plus/64		X	X	X		39.95	Y	Y	N	
Word Pro 3 Plus/64		X	X	X		89.95	Y	Y	N	
Word Processor Plus	X	X	X			25	N	Y	Y	
Word Wizard	X		X			34.95	N	Y	Y	Requires 8K expansion on VIC
Word Wonder	X	X	X	X		29.95 (VIC-20) (price for 64 version was not available at press time)	Y	Y		Requires 8K expansion on VIC
Wordcraft	X	X			X	99.95 without 8K expansion (VIC) 199.95 with 8K expansion; 64 version 149.95	Y	Y	Y	
Wordwiz	X		X			14.95	Y	Y	N	
Write Now	X	X			X	39.95 (VIC) 49.95 (64)	N	Y	N	
Writer's Assistant		X		X		125	Y	Y	Y	

* Suggested retail price at press time.

† Refers to whether program can be used with a printer connected to this port.

‡ Unless noted, VIC-20 version will run on an unexpanded VIC.

64K for VIC 20™ SELECT-A-RAM™



SELECT-A-RAM STANDARD FEATURES

- 8K BLOCKS SELECTABLE FROM THE KEYBOARD OR BY SOFTWARE COMMAND
- TWO EXPANSION SLOTS
- WRITE PROTECTION
- RESET SWITCH
- EXPANDABLE TO 192K WITH ADDITION OF 64K EXPANSION MODULES
- COMPATIBLE WITH ROM CARTRIDGES
- ONE YEAR WARRANTY ON PARTS AND LABOR
- 15 DAY MONEY BACK GUARANTEE

SELECT-A-RAM\$169.
64K
EXPANSION MODULE\$149.

TRADE-INS ACCEPTED

3K \$5 8K\$10 16K-\$20

OPTIONAL POWER SUPPLY FOR USE WITH ADDITIONAL 64K RAM MODULES OR MULTIPLE EXPANSION SLOTS \$25.

VIC 20 IS A TRADEMARK OF COMMODORE ELECTRONICS LIMITED

512-441-3202 PO BOX 43006 Austin, Tx. 78745-0001

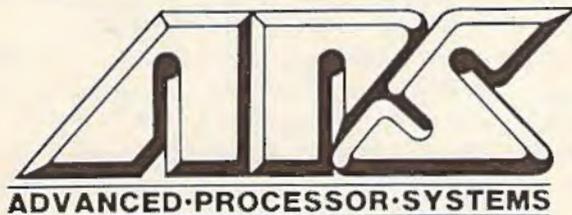


Table 2: Manufacturers Listing

PRODUCT	COMPANY ADDRESS	PRODUCT	COMPANY ADDRESS
Casual Writer	E. N. Publications R.D. 1 Worden, IL 62097	VIC-NIC	Type Thrift Dept. K Shelburne, Ontario, Canada L0N 1S0
EasyScript 64	Commodore Business Machines, Inc. 1200 Wilson Dr. West Chester, PA 19380	Word Manager	Data 20 Corporation 23011 Moulton Pkwy. Suite B10 Laguna Hills, CA 92653
The Editor	Powerbyte 2 Chipley Run West Berlin, NJ 08091	Word Mite	Nelson Software 2232 Ogden Ct. St. Paul, MN 55119
HES Writer	Human Engineered Software 71 Park Lane Brisbane, CA 94005	WordPro	Professional Software, Inc. 51 Fremont St. Needham, MA 02194
Page-Mate	AB Computers 252 Bethlehem Pike Colmar, PA 18915	Word Processor Plus	William Robbins Box 3745 San Rafael, CA 94912
PaperClip	Batteries Included 71 McCaul St. Toronto, Ontario Canada M5T 2X1	Word Wizard	Micro-Ware Dist., Inc. 1342 B Rt. 23 Butler, NJ 07405
Quick Brown Fox	Quick Brown Fox 548 Broadway Suite 4F New York, NY 10012	Word Wonder	Microspec 2905 Parts O'Call Ct. Plano, TX 75075
Smithwriter	Softsmith 2935 Whipple Ave. Union City, CA 94587	Wordcraft	UMI 3503-C Temple Ave. Pomona, CA 91768
Script 64	Pacific Coast Software 3220 S. Breo Canyon Rd. Diamond Bar, CA 91765	Wordwiz	World Electronics 177 27th St. Brooklyn, NY 11232
TOTL.Text	TOTL Software, Inc. 1555 Third Ave. Walnut Creek, CA 94596	Write Now	Cordco 313 Mathewson Wichita, KS 67214
Un-Word Processor	Midwest Micro Inc. 311 W. 72nd St. Kansas City, MO 64114	Writer's Assistant	Rainbow Computer Corporation 490 Lancaster Ave. Frozer, PA 19355

comes on instantly when you turn on your computer, so there is no waiting to load the program. However, the 64 version requires loading a short tape utility program before using a printer with the RS-232 port.

HES Writer 64 (\$45) also is a cartridge program. It has 15 program commands and 14 format controls (for printing), making it a complete package. It supports the Commodore serial port but not the RS-232 port at this time.

The third price group (\$65-\$125) puts you on the borderline

of full-feature business-type word processors. Two good examples are *PaperClip* (\$125) and *Writer's Assistant* (\$125). Both are for the Commodore 64 only and come on disks. *PaperClip* contains many advanced features, such as horizontal scrolling, addition/subtraction of columns or rows, column changes (edit whole columns at one time), and alphanumeric sorting. By the time you read this, it should be available in an updated form which supports the RS-232 port, and which has expanded printer files,

wider horizontal scrolling, and improved manuals and operation.

PaperClip comes with a "dongle" which fits into control port #1 (usually used for joysticks). This is for copy protection purposes — unauthorized copies will not run without the dongle.

A similar program, *Writer's Assistant* (\$125), comes on disk and contains several sample files. For example, a "Demo for Writer" file shows many of the printing features and a "Glossary Sample" file shows you how to store frequently typed information to

AARDVARK L.T.D.

TRS-80 COLOR COMMODORE 64 VIC-20 SINCLAIR/TIMEX TI99/4A

ZEUS



QUEST - A NEW IDEA IN ADVENTURE GAMES! Different from all the others. Quest is played on a computer generated map of Alesia. Your job is to gather men and supplies by combat, bargaining, exploration of ruins and temples and outright banditry. When your force is strong enough, you attack the Citadel of Moorlock in a life or death battle to the finish. Playable in 2 to 5 hours, this one is different every time. TRS-80 Color, and Sinclair, 13K VIC-20. Extended BASIC required for TRS-80 Color and TI99/A. \$19.95 each.

32K TRS 80 COLOR Version \$29.95.

Adds a second level with dungeons and more Questing.



WIZARDS TOWER - This is very similar to Quest (see above). We added wizards, magic, dragons, and dungeons to come up with a Quest with a D&D flavor. It requires 16k extended color BASIC, 13k VIC, Commodore 64, TRS-80 16k Extended BASIC, TI99/A extended BASIC. \$19.95 Tape, \$24.95 Disk.

Authors - Aardvark pays the highest commissions in the industry and gives programs the widest possible advertising coverage. Send a Self Addressed Stamped Envelope for our Authors Information Package.



ZEUS - It's fast and furious as you become the WIZARD fighting off the Thunderbolts of an angry ZEUS. Your Cone of Cold will destroy a thunderbolt and your shield will protect you - for a while. This is the best and highest speed arcade action we have ever done. Difficulty increases in wave after wave, providing hours of challenging fun and a game that you may never completely master. Commodore 64, Vic20 (16k expander), and 16k TRS-80 Color Computer. (ALL MACHINE CODE!) \$24.95 tape \$29.95 disk. (Tape will not transfer to disk.)



ADVENTURES!!!

The Adventures below are written in BASIC, are full featured, fast action, full plotted adventures that take 30-50 hours to play. (Adventures are interactive fantasies. It's like reading a book except that you are the main character as you give the computer, commands like "Look in the Coffin" and "Light the torch.")

Adventuring requires 16k on Sinclair, and TRS-80 Color. They require 8k on OSI and 13k on VIC-20. Now available for TI99. Any Commodore 64. \$19.95 Tape - \$24.95 Disk.

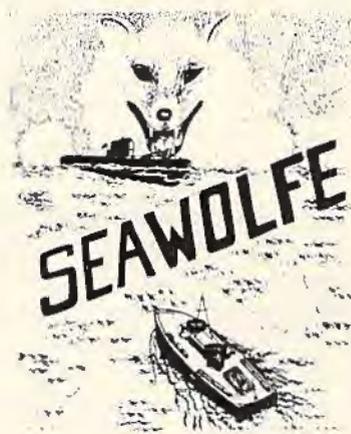
ESCAPE FROM MARS

(by Rodger Olsen)

This ADVENTURE takes place on the RED PLANET. You'll have to explore a Martian city and deal with possibly hostile aliens to survive this one. A good first adventure.

PYRAMID (by Rodger Olsen)

This is our most challenging ADVENTURE. It is a treasure hunt in a pyramid full of problems. Exciting and tough!



SEAWOLFE - ALL MACHINE CODE In this high speed arcade game, you lay out patterns of torpedoes ahead of the attacking PT boats. Requires Joysticks, at least 13k RAM, and fast reflexes. Lots of Color and Sound. A fun game. Tape or Disk for Vic20, Commodore 64, and TRS-80 Color. NOTE: tape will not transfer to disk! \$24.95 Tape - \$29.95 Disk.



Dungeons of Death - This is the first D&D type game good enough to qualify at Aardvark. This is serious D&D that allows 1 to 6 players to go on a Dragon Hunting, Monster Killing, Dungeon Exploring Quest. Played on an on-screen map, you get a choice of race and character (Human, Dwarf, Soldier, Wizard, etc.), a chance to grow from game to game, and a 15 page manual. 16k Extended TRS-80 Color, 13k VIC, Commodore 64. At the normal price for an Adventure (19.95 tape, \$24.95 disk), this is a giveaway.

Dealers - We have a line of about 100 original programs for the machines listed here. We have High speed Arcades, Quality Adventures, Word processors and Business Software for Small machines. Better yet, we have excellent Dealer support. Phone for information.

Send \$1.00 for Complete Catalogue - Please specify system on all orders - \$2.00 Shipping Charge on each order

AARDVARK L.T.D.

2352 S. Commerce, Walled Lake, MI 48088 / (313) 669-3110

Phone Orders Only: (800) 624-4327

Phone Orders Accepted 8:00 a.m. to 4:00 p.m. EST. Mon.-Fri.



avoid retyping it when used later.

Writer's Assistant also has a disk utility menu to help you copy a file, format a new disk, generate and list a directory, rename a file, and kill a file. When you first use it, you configure it to your system and it will then remember this each time you start up. Another nice feature is the "date" format. When you first start the program, it asks you the current date. Then, whenever a date is needed, it puts in the value you gave it.

Is It Comfortable?

By now, you can see the wide range of word processing programs available for the VIC and

64. Cartridge programs offer faster start-up, since they basically become part of your computer's operating system. However, they may not easily support your printer if you are using the RS-232 port.

One way to make your final selection is to narrow your choices down to two or three with the features you want, then contact each company or local dealer for specific information about the latest version, printer and interface support, cost, memory needs, and other criteria.

With this information, a final selection shouldn't be hard to make. Then, when you get the program home, give it a good

workout, allowing enough time to learn all the features carefully. Only then will you actually be able to rate the program for yourself. Ask yourself: Is the word processor fun to use? Since you'll be using it for creative purposes, it shouldn't inhibit you. After all, if it isn't fun to use, it'll just gather dust and soon be forgotten.

If the word processing program you select just doesn't "fit" right, return it for a refund or credit towards another program. Most companies will work with you to resolve any problems, perhaps by making updated versions available at a nominal cost. 

Friendly DUO

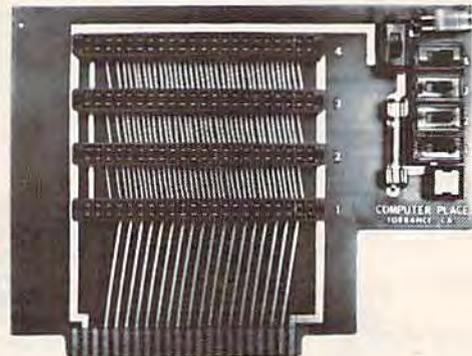


The CP Numeric Keypad is the best friendly companion of your Commodore 64 and VIC-20. It is designed with top quality, low profile key switches for smooth, reliable and low-cost data entry. It lets you zip through your numeric work sheet, input your numbers and figures comfortably, quickly, and more easily than ever before. The keypad easily connects in parallel with the existing keyboard connector. No additional software is required. The setup is simple. The usage is comfortable. And the price is very affordable at only \$69.95.



Computer Place (213) 325-4754

23914 Crenshaw Blvd., Torrance, CA 90505



The CP VIC-20 Expander is the one you have been waiting for. It incorporates all the features you've ever asked for. It has such unique built-in quality features as: Four high quality positively keyed connector slots for full memory expansion and utility cartridges; Gold-plated contact fingers for solid and long-lasting connection; An on-board RESET button that allows the restart of the VIC-20 without turning off the computer; Four individual slot ON-OFF control switches which are arranged for easy access and designed with fingertip control rather than pentip; An external power supply hook-up provision with a two-way power source switch; A fuse block for overload and short protection. It is priced at only \$54.95.

Dealer inquiries welcome.

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

WordPro 3 Plus/64

Dan Carmichael, Assistant Editor

One of the more useful tools to emerge from the computer revolution is the word processor.

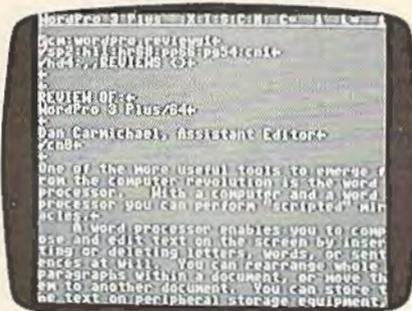
A word processor enables you to compose and edit text on the TV screen by inserting or deleting letters, words, or sentences at will. You can rearrange whole paragraphs within a document, or move them to another document. You can store the text on peripheral storage equipment, such as tape or diskette, to be recalled, edited, and printed at any time.

Some word processors even have a standard data bank of tens of thousands of words. The computer can use this "dictionary" to check your spelling or your syntax. All this can be done within the computer before ink ever touches the paper.

A Wealth Of Options

WordPro 3 Plus/64 is a word processor that is written to work with the Commodore 64 computer, a disk drive, and a printer. Although it does not contain all of the above options, it does have all the features that the home computerist or the small business user is likely to need. This, plus its budget price (about \$89), makes it a good buy.

Among *WordPro 3 Plus/64's* options is *insert/delete*, in which anything from a single letter to whole paragraphs can be easily inserted or deleted. The ability to work with *global* files allows you to link many files together



Editing text with WordPro 3 Plus/64.

for use with the various commands. This means you can print out a document much larger than the computer's memory by breaking it up into smaller files which are hooked together and treated as a single document. Another option is the *search and replace* command. This allows you to scan the entire text to search for and replace any words you wish. For instance, you might want to replace all occurrences of "Smith" with "Smythe." *WordPro* will do this automatically.

Options to format the printed output are also included. These include variables for page numbers, line spacing, centering lines of text, right and left justification, and the setting of tabs. *WordPro* for the 64 also supports subscripts, superscripts, and underlining – if these options are also supported by the printer.

For the small business user or for those interested in accounting applications, there is a *numeric mode*. In the numeric mode, *WordPro* automatically aligns columns of numbers by their decimal points.

Another advanced feature of *WordPro 3 Plus/64* is the "boilerplate" or *extra text mode*. The extra text mode is much like having an "alternate memory" area in *WordPro*. This enables you to call in or reuse a standard paragraph or a whole file. This

option can be used when generating form letters that contain the same standard paragraph. For example, when writing the form letter you can "call in" or add the standard paragraph to your text with a simple command.

The screen display on your TV or monitor can be adjusted with *WordPro*. You have the option of separately changing the screen background color and the print (text) color.

One option missing from *WordPro 3 Plus/64* is the ability to preview on the screen how the formatted output will appear on paper. This is because the screen display is limited to 40 columns while the printer output is set at 80, and *WordPro 3 Plus/64* does not support horizontal scrolling.

Other options include a small library of standard disk commands which include: *FORMAT*, *INITIALIZE*, *VALIDATE*, *DUPLICATE*, *COPY*, *RENAME* and *SCRATCH*.

A Few Flaws

Although a fairly good word processor, *WordPro 3 Plus/64* does have a number of flaws that could cause problems if you're not careful. In certain circumstances, if you press the wrong key at the wrong time, all



Pressing certain adjacent keys at the same time, such as Commodore-RUN/STOP, can erase all your text and restart the program.

your text can be lost.

For instance, the Commodore key on the Commodore 64 keyboard is used as a CTRL key. If you press the control key and then inadvertently press the RUN/STOP key (the key next to it), the computer will completely reset *WordPro*, and destroy any text you were working on. The same thing happens if you type a capital "Q" after the CTRL key is pressed.

These and other flaws revolve around one area of design of *WordPro 3 Plus/64*. The program does not ask, or double-check, to make sure you want to execute a certain option or command. In the previous example, it would seem more efficient to ask the user, "Are you sure you want to reset *WordPro*?" If the keys were indeed accidentally pressed, you could then recover with no loss. *WordPro* doesn't ask; it simply resets, and the text is gone. Because there are so many commands available which will erase or delete some or all of the text, such a "fail-safe" system would be welcome.

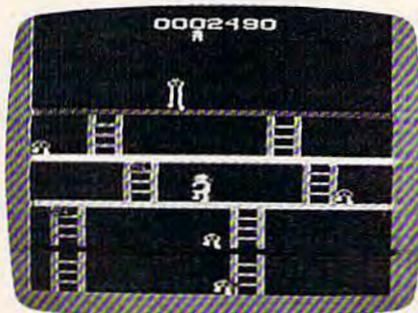
WordPro 3 Plus/64 comes with a relatively well-written instruction manual. The manual contains thorough explanations of each command, along with format illustrations, and some step-by-step examples. However, there is no quick reference card. A quick reference card was included with *WordPro* versions for other computers (PET, etc.) and should have been included with the Commodore 64 version.

WordPro 3 Plus/64
Professional Software, Inc.
51 Fremont Street
Needham, MA 02194

Fast Eddie For VIC And 64

Tony Roberts, Assistant Managing Editor

If you can run faster, jump farther, and climb higher, get ready to put yourself into the shoes of Fast Eddie, the protagonist in a new game by the same name from Sirius.



Eddie approaches one of the prizes in *Fast Eddie*.

It won't really matter, though, whether you can outdo your friends at the decathlon. For to play *Fast Eddie*, all you need is perfect eye-hand coordination and a comfortable joystick.

Versions of *Fast Eddie*, which was designed by Mark Turmell, are available for the Commodore 64, the VIC-20, and Atari. The VIC and 64 versions were programmed by Kathy Bradley.

In the game, you assume the persona of Fast Eddie, a somewhat barrel-shaped fellow in a green coat. Your goal is to collect prizes, which float near the ceilings of the first four floors of your building. Because of your superior leaping ability, it's no trouble for you to simply jump up and bring down a prize. A

touch of the fire button is all it takes.

Collect nine prizes, and a key appears above High-Top, the creature who lives up on the fifth floor. Capture the key and you move on to a new screen and new prizes.

Sneakers And Ladders

The Sneakers, short-legged relatives of High-Top, are the turned ankles in this track-and-field style game. These dancing semicircles with eyes guard the prizes and keep Eddie moving. Eddie can outrun the Sneakers, hop over them, or climb aboard a ladder to another floor. But if he is caught, Eddie is through, and one of the reserves takes over back on the first floor.

You have four Fast Eddies at the start of each game, and, if you have fewer than three in reserve when you complete a screen, you get an additional Eddie.

Generally, the ladders that connect the floors of Eddie's building are easy enough to negotiate, and while Eddie is climbing, he needn't worry about getting the boot from one of the Sneakers.

Most of the time, the ladders are staggered. After climbing up a floor, for example, Eddie must move right or left to board another ladder to another floor. Some ladders, however, are aligned. On these structures, it's



DEVELOP-20 DEVELOP-64

SOFTWARE DEVELOPMENT SYSTEMS

to

Help you develop your skills and the power of your computer.

These complete development systems for the VIC 20 and the Commodore 64 computers are tools for the professional and learning aids for the developing programmer. A must for anyone who wants to understand the internal workings of the computer or who wants to design fast-action graphics or other powerful machine language programs.

The Full-featured Assembler, Screen editor, Loader, Decoder and Debugger are accompanied by a tutorial on machine language, graphics programming and sound generation programming. The book also guides you through step-by-step instructions for the use of the tools and contains the most complete memory map available. A complete list is included of all the internal programs in ROM and the means by which you can call them from your own programs. Sample programs are fully explained.

All programs support disk, tape and printer output. A special limited-feature version is available for the 5K VIC 20.

Ask for Develop-20 and Develop-64 at your local software store.

French Silk

smooth
ware

To order direct send \$49.95 U.S. funds plus \$2.00 p&h to French Silk, PO Box 207, Cannon Falls, MN 55009. VISA/MC charges accepted (please include expiration date). Please specify Develop-20 or Develop-64 and the 5K version for the VIC 20 if so desired. Programs are distributed on cassette or diskette. Please specify your preference.

Dealer enquiries invited.

VIC 20 and Commodore 64 are registered TM of Commodore Business Machines Inc.



No one
delivers
more from a
VIC-20
than we do.
And
who are we?

We're Compuscope, Inc., a leading producer of computer peripheral products for the VIC-20.



We're proud to put our name on the most complete expansion interface board ever designed for the VIC-20 Personal Computer: The Compuscope SUPERMOTHER.

No other expander board supplies so much enhancement. With Compuscope's SUPERMOTHER, you can:

- Add up to 35K of memory to your VIC-20.
- Copy game cartridges and other software to protect yourself against lost programs.
- Freeze game action and hold a single frame until you're ready to continue.

No other expander board includes as many unique features. With Compuscope's SUPERMOTHER, you get:

- 8 switch selectable slots. Our closest competitor has only six. Run single or multiple VIC-20 program cartridges; add memory; run utility programs — all at the same time.
- System re-set button. Eliminate wear and tear on your VIC-20.
- Pause button. Stop a program in progress and start it up again at your leisure.
- Replaceable fuse. Protects your VIC-20's power supply from accidental damage.
- Write Protection Switch. Lets you make back-up copies of cartridge programs on tape or diskette.
- Fully buffered to insure accurate data transmission from the board to the VIC-20. Suggested Retail: \$149.95

COMPUSCOPE

6400 Signal Street, Tillamook, Oregon 97141 (503) 842-4431

SUPER 8K EXPANDABLE MEMORY CARTRIDGE

Simply plug into the VIC-20 expansion port and memory expands to 12K total, plus 3 unique functions, easily expandable to 16K, plug-in sockets, external memory switching and Write Protection.

SUPER 16K MEMORY CARTRIDGE

Easily expand your VIC-20 to 20K total, plus it also incorporates External Memory Switching and Write Protection.

EXPANDER EXPANSION INTERFACE

Several unique features makes this 4-slot board the perfect add-on: case design matches your VIC-20, System Pause Function, Write Protection System, Fully Buffered, and Gold Connectors throughout for efficient and long life.

REVIEWS

all too easy to zip past the intended floor, and wind up in deep, unexpected trouble.

Sneakers In All Sizes

Eight levels are available in *Fast Eddie*, each with five screens. If you complete the five screens of one level, you automatically move to the next higher level. You also can use the f5 key to start the game at any level.

At each level, the objective is the same: collect nine prizes and the key. The differences between levels can be found in the Sneakers.

At level one, a single Sneaker guards each of the four floors. At level two, you'll find a pair up on deck four. At level three, there is a pair on the second floor, another pair on the fourth, and an extra-wide model on the third floor.

In some cases, two Sneakers will be positioned side by side, requiring that Fast Eddie leap them in a single bound. In other cases, they'll be strewn far apart, making Eddie negotiate them in a series of jumps.

Beginning at level six, you'll see three Sneakers on some of the floors. If the three are close together, it will take a perfectly timed jump to clear the bunch. If they are spaced apart, you'll need a pogo stick to get across the screen.

He's Not Called Fast For Nothing

Once Fast Eddie gets going, he can really move. The program itself is fast and colorful, and the action is smooth. Inexperienced players will be able to enjoy the

lower levels of *Fast Eddie* and work their way up. Old hands at the joystick will find plenty here to challenge them.

When being guided by a practiced hand, Eddie will look inspired. His running, jumping, climbing, and countless close calls will leave you breathless and exhausted.

Fast Eddie
Sirius Software, Inc.
10364 Rockingham Drive
Sacramento, CA 95827
\$34.95 Commodore 64 disk
\$39.95 VIC-20 cartridge

COMPUTER CASSETTES
100% Error-Free • Fully Guaranteed



	12	24
LENGTH	PACK	PACK
C-05	79¢	69¢
C-10	89¢	79¢
C-20	99¢	89¢
Boxes	26¢	21¢

UPS \$3.00 Pkg. \$18.00 Case

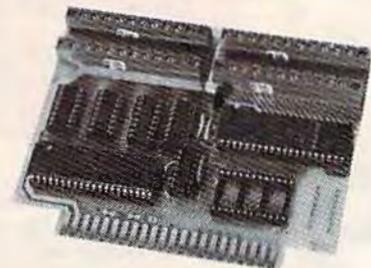
C-10's 39¢
(Min. 500 Case Lot)
w/labels ADD 4¢
w/boxes ADD 13¢

FOR ORDERS ONLY
1-800-528-6050
Extension 3005




MICRO-80™ INC.
2665-C Busby Road
Oak Harbor, WA 98277

NEW! Universal Input/Output Board for VIC-20/64

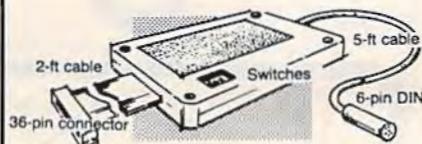


16-channel A/D converter & 1-channel D/A output; 16 high-current discrete outputs.

• University physics & electrical engineering labs and hospital applications.

VIC-20 uses MW-311V \$185.00
CBM-64 uses MW-311C \$225.00

MW-302: VIC-20/64 Parallel Printer Interface.



Works with all centronics type parallel matrix & letter printers and plotters—Epson, C.Itoh, Okidata, Nec, Gemini 10, TP-I Smith Corona, and most others. Hardware driven; works off the serial port. Quality construction: Steel DIN connectors & shielded cables. Has these switch selectable options: Device 4, 5, 6 or 7; ASCII or PET ASCII; 7-bit or 8-bit output; upper & lower case or upper only. Recommended by PROFESSIONAL SOFTWARE for WordPro 3 Plus for the 64, and by City Software for PaperClip.

MW-302 \$119.95

Dealer
inquiries invited.



Micro World Electronics, Inc.
3333 S. Wadsworth Blvd. #C105,
Lakewood, CO 80227
(303) 987-9532 or 987-2671

HINTS & TIPS

A SHIFTy Solution

Steven Darnold

If you've discovered a clever, time-saving technique, or a brief but effective programming shortcut, send it in to "Hints & Tips," c/o COMPUTE!'s Gazette for Commodore. If we use it, we'll pay you \$35.

Most programs need to pause at some point to give the user time to read instructions or other information on the screen. Often this is done by putting the computer into a loop:

```
50 GET GS : IF GS=" " THEN 50
```

and instructing the user to "Press any key to continue."

This approach, however, is somewhat clumsy. The loop requires a separate line all to itself, it adds a byte of variable garbage every time it is used, and it permits inexperienced users to break out of the program by pressing the RUN/

STOP key.

A much more elegant approach is to use WAIT 653,1 and instruct the user to "Press SHIFT to continue." On both the VIC-20 and the Commodore 64, memory location 653 contains a 1 whenever the SHIFT key is down. WAIT 653,1 is shorter, faster, and neater than the usual GET loop.

If there are several pages of instructions with a WAIT 653,1 at the end of each page, the user can skip through them simply by holding down the SHIFT key. If this is undesirable, the program can check to see that the SHIFT key is released each time. This is done with a WAIT 653,1,1.

Example:

```
10 PRINT "Press and release SHIFT to continue."
20 WAIT 653,1
30 WAIT 653,1,1
40 PRINT "Continued, OK" @
```

COLOR PROBLEMS? Solve Them With The Color Sharpener \$18.95

You're not alone. Thousands of Commodore 64 owners have "fuzzy" color on their TV. Most have interference lines crowding out their great graphics. Many have bought expensive monitors or new TVs, and often even that hasn't helped. But, most of us just lived with the problem. Now the engineers at Bytes & Pieces have a simple, inexpensive solution... The Color Sharpener. No soldering or wiring... just plug the Color Sharpener into your 64 and PRESTO! The interference disappears. Instantly. And if it doesn't work to your satisfaction, just send it back and we'll refund your purchase price in full.

DUST PROBLEMS? Solve Them With Matching Dust Covers for Computer, Tape and Disk. \$6.95-\$8.95

These are the deluxe covers for either the Commodore 64 or the Vic 20 made of brown leather grain Naugahyde, specially lined with a soft non-scratch liner, for a cover you just can't beat.

Don't waste your money on those cheap looking, clear plastic, static filled covers. Get the quality ones, custom fitted to your Commodore computers.

Available singly or as a matched set in beautiful brown simulated leather.

Commodore 64 and Vic 20 are registered trademarks of Commodore Computer Company.

ORDER TODAY!

Please send me the following:

Quantity	Item	Amount
_____	Color Sharpener @ \$18.95	\$ _____
_____	Computer Dust Covers @ \$8.95	\$ _____
_____	Computer Type:	
_____	1541 Disk Dust Covers @ \$7.95	\$ _____
_____	Dataset Dust Covers @ \$6.95	\$ _____
_____	Shipping & Handling	\$ 2.00
_____	5% State Tax (Wisconsin Residents only)	\$ _____
		TOTAL \$ _____

- Check or Money Order enclosed
 - Charge to my VISA or MasterCard
- VISA # _____
 MasterCard # _____
 Inner Bank # _____
 Expiration Date _____

Signature _____

SHIP TO:
Name _____
Address _____
City _____
State / Zip _____

Bytes & Pieces

Dealer Inquiries Invited
550 W. 68th Street, Wauwatosa, WI 53213, 414 / 257-3562

THE BEGINNER'S CORNER

C. REGENA

Program Transfer

My apologies to all those who were not able to RUN my previous sample programs on a Commodore 64! Until now, I didn't own a 64. Then I braved the early-summer Utah floods and crossed a newly formed river down the center of Salt Lake City to get to a computer store. I now have a new Commodore 64 sitting next to my VIC-20 so I can make sure my examples and sample programs work equally well on both computers.

Most of the BASIC programming techniques are the same for both computers. Differences are largely because the Commodore 64 has different memory locations and because the 64 has more rows and columns available on the screen than does the VIC. A full printing line on the VIC takes up only about half a line on the 64. The screen memory maps, therefore, use different numbers. Any numbers involved in POKE commands for graphics and colors will be different for the computers. Numbers used in the POKE commands for music are also different. In addition, the 64 has features available that are not possible with the VIC.

My previous columns have discussed graphics and music on the VIC. I usually like to start with graphics and music because they are features that make a home computer *fun*. Once you experiment with graphics and music, you can really be creative. In this column I'm going to go back and discuss some of the fundamentals of BASIC programming.

Each program line in a BASIC program has a line number. When you RUN the program, the computer executes each line in exact numerical order, *unless* ... unless you tell the computer otherwise. Directing the program to go somewhere else can be called "program transfer" or "branching" and often involves "logic" that really enables the computer to make decisions. Follow-

ing are some of the branching commands available in Commodore BASIC.

GOTO

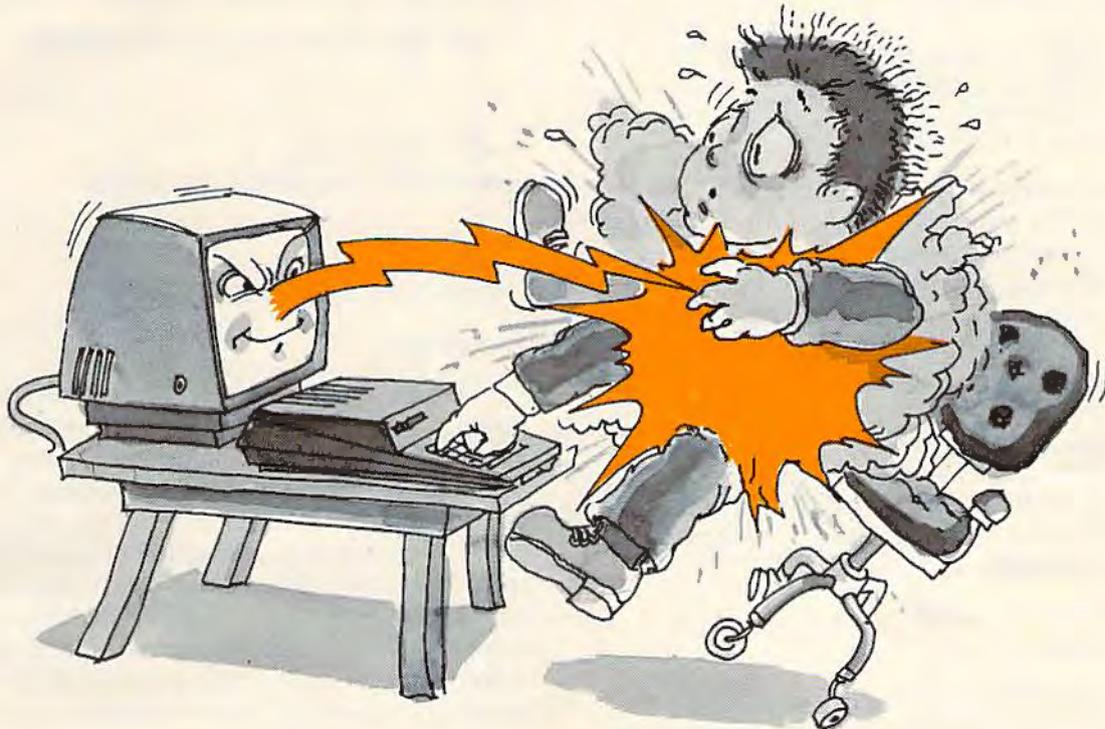
The most direct command to go to a different line is GOTO *n*, where *n* is a line number, such as GOTO 550. A command may tell the computer to skip several lines and GOTO a later line number, or to back up and GOTO a previous line number, or even to stay at a certain line number by a GOTO to itself. Here is an example:

```
10 REM PROGRAM STARTS HERE
20 PRINT "HELLO"
30 GOTO 70
40 PRINT "THIS IS LINE 40"
50 PRINT "PRESS RUN/STOP KEY"
60 GOTO 60
70 PRINT "THIS IS LINE 70"
80 GOTO 40
```

The computer starts executing the lines in order, starting with line 10 (which is actually ignored because of the REMark statement). Next is line 20, which prints a message. Line 30 says to GOTO line 70 without paying attention to any lines in between. Line 70 then prints a message. Line 80 branches again – this time GOTO 40. Line 40 prints a message, then line 50 prints a message. Line 60 says GOTO 60. The computer will just stay at line 60 (an "endless loop") until you press the RUN/STOP key.

You can probably see that using GOTO statements isn't the most efficient programming technique. It can make programs hard to understand.

LEARN TO TYPE OR GET BLOWN TO BITS.



MasterType™ and the Commodore 64™ make typing a blast.

Now anyone can learn to type and have hours of fun at the same time. With MasterType. We've combined the fast-action of blow 'em up video games with the best instructional program available. You either learn to type or the aliens ZAP your spaceship into oblivion. The results? Highly motivated and enjoyable learning.

MasterType is the best selling educational program available today.

And that's no surprise. Reviewers agree. InfoWorld® wrote:

"We had fun reviewing it, and we highly recommend it to those who want to learn typing in an unconventional but motivating way."

InfoWorld® also went on to rate MasterType as "excellent" in all four of its categories.

And now it's available for the Commodore 64™ for the first time.

MasterType teaches your fingers to fly.

Face it. If you're like most people, the most inefficient components on your computer are probably your fingers. But you can change all that with MasterType. In just a few easy lessons your fingers will be doing things you thought them incapable of.

MasterType. With 18 explosive learning levels. You'll either learn to type or get blown to pieces.

\$39.95. On disk only.

MasterType

Lightning Software®

P.O. Box 11725, Palo Alto, CA 94306
(415) 327-5280

Commodore 64 is a trademark of Commodore Electronics Limited.
InfoWorld review® 1982 CW Communications, Inc.

Many structured-programming advocates say you should rarely or never use a GOTO. Good program planning can at least minimize the GOTOs. Some of my early programming efforts used lots of GOTOs. My husband teasingly said it was good program security – no one could follow all the branching to figure out the program.

GOTO may also be typed GO TO (with a space between the words). The abbreviation is G shift O.

FOR-NEXT

A FOR-NEXT loop is used when you want to perform a process by repeating lines a certain number of times.

```

10 REM ** FOR-NEXT EXAMPLE **
20 FOR N=1 TO 8
30 PRINT N
40 NEXT N

```

Line 20 says to let the variable N start with the value of 1. Line 30 prints N. Line 40 says NEXT N, which means increment N by 1 and see if it is greater than the limit of 8 specified in line 20. If N is less than or equal to the limit, the computer goes back to line 30. Now the value for N is 2, and the computer prints "2" as N. The process continues until the limit of 8 is reached. The program then continues with the next line.

A FOR-NEXT loop with no commands between the FOR and NEXT just counts between the limits and can be used as a delay or timing loop. An example is:

```

20 FOR D=1 TO 1000
30 NEXT D

```

You do not always need to increment by 1. Use STEP to specify your own increment steps.

```

10 REM ** FOR-NEXT-STEP **
20 FOR N=1 TO 8 STEP 2
30 PRINT N
40 NEXT N

```

RUN this program to see the difference STEP makes. Try changing the 2 in line 20 to 3. You may even use a fraction such as .5. There are also times when you may want to use a negative step size. Try changing line 20 to:

```

20 FOR N=10 TO -6 STEP -2

```

All the numbers in the FOR statement may be variables and expressions, such as FOR N=X TO Y+5 STEP S.

To conserve memory, you may leave out spaces in the FOR and NEXT statements. However, if you use variables as the limits, you must have a space after the variable name. Examples:

```

20FORN=1TO8STEP2
20 FORN=X TOY+5 STEPS

```

You may also use abbreviations. FOR may be abbreviated F shift O, NEXT may be abbreviated N shift E, and STEP may be abbreviated ST shift E.

GOSUB

GOSUB means GO to a SUBroutine, then come back to execute the next line. A *subroutine* is a set of instructions that may be used several different times during the execution of the program. The subroutine may be placed anywhere in the program. The last statement of the subroutine is RETURN to branch back to the next statement after the GOSUB in the main program.

```

20 REM MAIN PROGRAM COMMANDS
.
.
.
80 GOSUB 300
90 REM PROGRAM CONTINUES
.
.
.
300 REM SUBROUTINE HERE
.
RETURN

```

The subroutine may consist of any number of lines, as long as the last command is RETURN. The GOSUB command specifies the line number of the first statement in the subroutine. A subroutine may be entered at different points.

Following is an example of how a subroutine is used. Lines 200-340 are a subroutine that draws a border using color C. If GOSUB 200 is used, the color C is set equal to 2. You may specify a different color C, then GOSUB 210 or GOSUB 220. A is the number to correlate screen memory position with color positions. A may be a number used in other calculations, then reset when the subroutine is entered.

Line 10 clears the screen. In the Commodore 64 version, line 15 changes the screen to a white background. Line 20 prints a sample title. Line 30 says GOSUB 200, which goes to the subroutine starting at line 200 and executes the statements until the command RETURN. Line 40 is the next line executed, which delays slightly. Line 50 and line 60 clear the screen and print a different sample title. Line 70 "primes" the subroutine by specifying color C=6. Line 80, GOSUB 220, goes to the subroutine starting with line 220, and executes until the RETURN command at line 340. Line 90 delays, line 100 clears the screen, and line 110 repeats the subroutine again, this time starting at line 200.

VIC-20 Version

```

5 REM ** GOSUB **
10 PRINT "{CLR}{BLU}"
20 PRINT TAB(5);"{6 DOWN}TITLE SCREEN"

```

THE ULTIMATE UTILITY

grafDOS ENHANCED DISK OPERATING SYSTEM
ADD 40 NEW commands to both Basic and DOS.

DOS COMMANDS		HIRES COMMANDS		LORES COMMANDS		MISC COMMANDS	
LOAD "file name"	CATalog	PLOT	FLIP	LGR	HLIN	VTAB	KEY
SAVE "file name"	INIT	HGR	WCHAR	LCOL	VLIN	HTAB	SOUND

PLUS MANY MORE...

ALSO INCLUDES MINIMON, a powerful machine language monitor.
Add another 20 commands for use in machine language!

- ★ Disassemble 6502 code
- ★ Move memory
- ★ Examine memory
- ★ Hunt memory
- ★ Text dump
- ★ Fill memory

PLUS MANY MORE...

ALL THIS FOR A PRICE YOU CAN'T BEAT \$39.95
MINIMON available separately for CBM-64 or VIC Disk.... \$19.95
 Tape.... \$15.95

DUST COVERS

Computer or disk	\$7.95
Old style datasette	\$3.95
New style datasette	\$3.95

NEW! Project Polaris

NEW all machine code game for your CBM-64.
Scrolling landscape as you battle against a myriad
of aliens.

How long can you survive?

Disk \$24.95

NEW BOOKS

	LIST	OUR PRICE
Elementary CBM-64	14.95	11.25
CBM-64 Users Guide	14.95	11.25
Sprite Graphics	15.95	11.95
32 Programs for CBM-64.....	19.95	14.95
Kids and the VIC.....	19.95	14.95
VIC 20 Users Guide	15.95	11.95
VIC Graphics	12.95	9.95
VIC Revealed	12.95	9.95
Stimulating Simulations.....	6.50	4.25
I Speak Basic To My VIC.....	8.45	6.75
32 Programs for VIC	19.95	14.95



INTERESTING SOFTWARE

21101 S. Harvard Blvd.

Torrance, CA 90501

(213) 328-9422

```

30 GOSUB 200
40 FOR D=1 TO 1500:NEXT
50 PRINT "{CLR}{RED}"
60 PRINT TAB(6);"{6 DOWN}GOSUB DEMO"
70 C=6
80 GOSUB 220
90 FOR D=1 TO 2000:NEXT
100 PRINT "{CLR}{BLU}"
110 GOSUB 200
120 END
200 C=2
210 A=30720
220 FOR S=7703 TO 7722
230 POKE S,90:POKE S+A,C
240 NEXT S
250 FOR S=7744 TO 8140 STEP 22
260 POKE S,90:POKE S+A,C
270 NEXT S
280 FOR S=8162 TO 8143 STEP -1
290 POKE S,90:POKE S+A,C
300 NEXT S
310 FOR S=8121 TO 7725 STEP -22
320 POKE S,90:POKE S+A,C
330 NEXT S
340 RETURN

```

Commodore 64 Version

```

5 REM ** GOSUB **
10 PRINT "{CLR}{BLU}"
15 POKE 53281,1
20 PRINT TAB(14);"{8 DOWN}TITLE SCREEN
30 GOSUB 200
40 FOR D=1 TO 1500:NEXT
50 PRINT "{CLR}{RED}"
60 PRINT TAB(15);"{8 DOWN}GOSUB DEMO"
70 C=6
80 GOSUB 220
90 FOR D=1 TO 2000:NEXT
100 PRINT "{CLR}{BLU}"
110 GOSUB 200
120 END
200 C=2
210 A=54272
220 FOR S=1065 TO 1102
230 POKE S,90:POKE S+A,C
240 NEXT S
250 FOR S=1142 TO 1942 STEP 40
260 POKE S,90:POKE S+A,C
270 NEXT S
280 FOR S=1982 TO 1945 STEP -1
290 POKE S,90:POKE S+A,C
300 NEXT S
310 FOR S=1905 TO 1105 STEP -40
320 POKE S,90:POKE S+A,C
330 NEXT S
340 RETURN

```

GOSUB may be abbreviated GO shift S, and RETURN may be abbreviated RE shift T.

IF-THEN

The IF-THEN statement is a conditional branching statement that makes the computer seem intelligent. The computer evaluates a condition or expression, then branches or takes actions accordingly. The branching occurs only if the condition exists, or if the expression is true. The IF-THEN

statement may be of the following forms:

```

IF expression THEN line number
IF expression THEN action

```

The *expression* may be a variable, string, number, comparisons, or logical operators. The *line number* is a line number of another statement in the program. Only if the expression is true will the program branch to the line number.

```

10 REM ** IF-THEN **
20 A=1
30 A=A+1
40 IF A<11 THEN 20
50 END

```

At line 40, if the value of A is less than 11, then the computer will branch to line 20. Another way of thinking or interpreting this statement is if the expression A<11 is true, then branch to line 20. RUN the sample program to see what happens.

Rather than a line number after THEN, you may specify an *action*, or several commands. Here is an example:

```

10 REM ** IF-THEN **
20 FOR A=1 TO 10
30 IF A<6 THEN PRINT A
40 NEXT A
50 PRINT "A =";A
60 END

```

In this sample program, the FOR-NEXT loop allows A to be from 1 to 10, but line 30 prints only the numbers less than 6. After the FOR-NEXT loop is completed, the final value of A is printed. (Note that A has been incremented 1 more than the limit of 10.)

String variables and string comparisons are allowed in IF-THEN statements. Here is a simple example.

```

10 REM ** STRING COMPARISON **
20 N$="HELLO"
30 M$="HI"
40 PRINT "ENTER 'HI' OR 'HELLO'"
50 INPUT A$
60 IF A$=N$ THEN PRINT M$:GOTO 80
70 PRINT N$
80 END

```

This time the action in line 60 actually consists of two commands – PRINT M\$ then GOTO 80. If the condition A\$=N\$ is not true, the computer goes immediately to the next line and disregards anything after THEN in the present line. This program will print either HELLO or HI depending on what you type in and enter.

Keep in mind that in programming there are many ways to accomplish the same results. For example, the first IF-THEN example could have been written as a FOR-NEXT loop to produce the same output. IF-THEN statements may be written in a variety of ways. The expression to be evaluated also may be written in many different ways.

For example, a condition $A < 6$ may be tested, but another way to write the same condition is $A \leq 5$ (A less than or equal to 5). Perhaps you would prefer to test the opposite condition, $A > 5$ or $A \geq 6$ (A greater than 5 or A greater than or equal to 6). By the way, "not equal to" is written \neq .

A word of warning: in general you may combine commands on one line by separating statements with the colon, such as `30 READ X:PRINT X`. If you are translating a program and combining lines to save memory or typing effort, do NOT combine an IF statement with the next line. If the condition tested is false, program control goes to the next line; and the IF-THEN statement with the command(s) following THEN must be kept separate from the next line which contains different actions.

Math Competency: Saving Money

This month I am including a sample program that illustrates the use of various branching statements. The program writes out a story problem or word problem in arithmetic. The type of problem involves division calculations. A person needs to save a certain amount of money for a major purchase; how much needs to be saved each week?

FOR-NEXT statements are used in lines 40-90 to read in DATA from lines 100-110. $N\$$ (n) is the name for the problem, and there are six possible names (three girls and three boys). There are three kinds of purchases that can be made. $A\$$ (n) is the item desired. The price is chosen randomly. $B()$ is the lowest base price for the particular item. A random factor from 1 to $F()$ is chosen to multiply by $M()$ to get the price of the item.

$R6$ is a random number from 1 to 6 to choose the person's name. $R3$ is a random number from 1 to 3 to choose the item.

Lines 470-510 are a subroutine that converts the price in raw form to dollars and cents. The subroutine may be entered at either line 480 or line 470. $C\$$ is the cost in dollars and cents.

The logic in lines 200-220 determines whether to print "HE" or "SHE" depending on the random subscript $R6$ - the first three subscripts refer to girls, and the other subscripts refer to boys. Another way of doing this would be:

```
200 P$="HE"
210 IF R6<4 THEN P$="SHE"
      (delete line 220)
```

After the student enters an answer, line 300 compares the INPUT answer with the calculated answer S ; if they are within one cent, the program branches to the "Correct" procedure. If the answer is incorrect, lines 310-340 show how to get the correct answer. Line 330 uses GOSUB 470 to convert the answer S to the dollars and cents form of $C\$$.

If the answer is incorrect, the student presses RETURN, and line 370 tells the computer to branch back to line 120 for another problem. If the answer is correct, lines 400-420 print the option to try again. The IF-THEN statements check the key the student presses and branch accordingly. If the key pressed is not Y or N, line 460 branches to line 430 to keep checking for a key pressed.

Commodore 64 owners, please add this line: `25 POKE 53281,1`. This command creates a white background so you can read the blue letters. The program works for both VIC-20 and Commodore 64 (with the addition of line 25 for 64 users).

See program listing on page 155. ☺

Writers

COMPUTE!'s Gazette is looking for well-written, clearly explained articles for beginning and intermediate users of VIC-20 and Commodore 64 personal computers. If you have an idea for a feature article or tutorial, submit a manuscript or send us a query letter.

This Publication is available in Microform.



University Microfilms International

Please send additional information

for _____ (name of publication)

Name _____

Institution _____

Street _____

City _____

State _____ Zip _____

300 North Zeeb Road, Dept. P.R., Ann Arbor, Mi. 48106

Windows And Pages

Last month we introduced the *disassembler*, a primary tool for machine language (ML) programming. With it, you can create ML equivalents of BASIC's LIST command. In other words, you can see a program on screen and follow its logic. Let's put the disassembler to work this month and also learn something about pages, datamakers, and ML "variables." If you don't have the disassembler program, you might want to send for a copy of the September 1983 issue of *COMPUTE!'s Gazette*.

One of the most effective ways to learn ML is to examine short routines in BASIC and then see how the same thing is accomplished in ML. After all, there are a fairly limited number of basic programming techniques in any language: looping, branching, comparing, counting, and a few others. And long programs are not created in a furious burst of nonstop programming. Rather, they are built by knitting together many small sub-programs, short routines which are as understandable in ML as they are in BASIC. In the months to come, we'll provide frequent, side-by-side BASIC-ML examples. Before you know it, you'll be able to think in both languages, and you'll have a working knowledge of ML.

Peering Into Memory

To start things off, type in either Program 1 (if you have a Commodore 64) or Program 2, for the VIC-20. These are called *BASIC Loaders*, and their function is to POKE a machine language program into RAM memory. The numbers in the DATA statements are the ML program. SAVE the program in case things go awry, then type RUN. Nothing seems to happen. You can then type

NEW because the little loader has done its job: a short ML program is now in memory from address 864 to 875.

Program 1: 64 Loader

```
800 FOR ADRES=864TO875:READ DATTA:POKE A
    DRES,DATTA:NEXT ADRES
864 DATA 162, 0, 189, 0, 0, 157
870 DATA 0, 4, 232, 208, 247, 96
```

Program 2: VIC Loader

```
800 FOR ADRES=864TO875:READ DATTA:POKE A
    DRES,DATTA:NEXT ADRES
864 DATA 162, 0, 189, 0, 0, 157
870 DATA 0, 30, 232, 208, 247, 96
```

Because of the color memory problem (you have to POKE values into the entire color memory before you can see things), RUN this short BASIC line before trying out the ML program and after each time you clear the screen:

```
FOR I=55296 TO 55552: POKE I,6: NEXT (64 version)
FOR I=38400 TO 38656: POKE I,6: NEXT (VIC version)
```

To see what this ML program does, you can just SYS to the start of it: SYS 864. If you typed in the DATA statements correctly, you'll see a collection of strange symbols on the screen. Now clear the screen and type in Program 3. When RUN, it allows you to see things happening. Some characters are flashing rapidly, some change only in response to things you typed on the keyboard, some do nothing. What you're looking at is the first 256 memory addresses in your computer. The "flashing" characters (160, 161, and 162, counting down from the top left corner of the screen) are your computer's clock. They're what

Commodore 64
and
VIC-20

SuperTerm

\$99⁹⁵

Telecommunications with a difference!

Unexcelled communications power and compatibility, especially for professionals and serious computer users. Look us over; **SuperTerm** isn't just "another" terminal program. Like our famous Terminal-40, it's the one others will be judged by.

- **UP/DOWNLOAD FORMATS**—CBM, Xon-Xoff, ACK-NAK, etc.
- **DISPLAY MODES**—40 column; 80/132 with side-scrolling
- **EMULATION**—42 popular terminal protocols
- **FUNCTION KEYS**—8 standard, 52 user-defined
- **BUFFERS**—Receive, Transmit, Program, and Screen
- **EDITING**—Full-screen editing of Receive buffer
- **FILE CONVERSION**—ASCII to PGM, PGM to ASCII
- **PRINTING**—Continuous printing with Smart ASCII and parallel printer; buffer printing with other interfaces or VIC printer
- **DISK SUPPORT**—Directory, Copy, Rename, Scratch, etc.
- **FLEXIBILITY**—Select baud, duplex, parity, stopbits, etc.

Program options are selected by menus and function keys. For maximum convenience, an EXEC file sets options on start-up. SuperTerm may be backed-up for safety. Software on disk or cassette, with special cartridge module.

Write for the full story on SuperTerm; or, if you already want that difference, order today!

Requires: Commodore 64 or VIC-20, disk drive or Datasette, and compatible modem. VIC version requires 16K memory expansion. Please specify VIC or 64 when ordering.

Just need UP/DOWNLOAD?

If you don't yet need SuperTerm's power, perhaps **Terminal-40 Plus** (VIC) or **'64 Terminal Plus** is right for you. We took our top-rated, smooth-scrolling terminal programs, added up/download, disk commands, and even more convenience. Then we put them on disk for fast loading, just like you wanted. Need we say more?

Only \$49.95 (VIC version requires 8K mem exp)

P.S. Trade in your original Terminal-40 or '64 Terminal and deduct \$10.00.

VIC 20 and Commodore 64 are trademarks of Commodore Electronics, Ltd.

Send for a free brochure.

(816) 333-7200



**MIDWEST
MICRO Inc.**

MAIL ORDER: Add \$1.50 shipping and handling (\$3.50 for C.O.D.); VISA/Mastercard accepted (card# and exp. date). MO residents add 5.625% sales tax. Foreign orders payable U.S.\$, U.S. Bank ONLY; add \$5 shphndlg.

311 WEST 72nd ST. • KANSAS CITY • MO • 64114

There's a New Chick in Town



... with a wing load of Quality Software for the Commodore 64™ and VIC 20™

Once you've compared our programs, their features and prices, you'll agree there's no competition in sight. You'll also discover another important reason to go TOTL... Customer Assistance After You Buy... Something nearly unknown in the low cost software field.

some features

Menu driven, Easy to use ■ Available on tape or disk ■ Compatible With Most Column Expansion Hardware ■ Built-in ASCII Translation for Non Commodore Hardware ■ Color Variables for Easy Modification ■ Machine language speed for Word Processing and Mailing List & Label software.

and there are 5 unique programs to choose from

1. **WORD PROCESSING** has the speed and versatility to produce documents, forms and letters in a straightforward approach that is easily and quickly learned.
2. **MAILING LIST AND LABEL** lets you organize your mailing lists, collection catalogs, menus, recipes and anything that demands listing or sorting.
3. **TOTL TIME MANAGER** helps you plan schedules and analyze events and activities by persons, project category and date. Ideal for project planning in the home or business.
4. **RESEARCH ASSISTANT** turns your computer into an advanced, automated indexing and cross reference system. A must for the student, educator or the research professional.
5. **SMALL BUSINESS ACCOUNTING** is a set of straightforward accounting programs. Frees the salesman, entrepreneur or service professional from time consuming record keeping tasks.



TOTL
SOFTWARE, INC.
quality you can afford

Ask your dealer about TOTL Software or send in the coupon for further details and ordering information

1555 Third Avenue, Walnut Creek, CA 94596

PLEASE SEND ME MORE INFORMATION ON TOTL SOFTWARE

Name: _____

Address: _____

Zip: _____

you get when you ask for TI\$.

872 bne 866
874 rts

Program 3: The Window

```
10 SYS864
20 GETK$
30 GOTO10
READY.
```

The computer divides its memory into groupings of 256 bytes, called *pages*. What you're seeing on screen is "zero page." Stop the program with the RUN/STOP key and type POKE 868,1. Then RUN the BASIC program again. Now you've changed the zero to a one, and you've changed the ML program so that it puts page one on screen. You can see any of the 256 pages in the computer by just POKEing the page number into address 868.

Comparing BASIC And Machine Language

How does this little ML program send the contents of RAM memory up to the screen? Let's show how we could do it in BASIC and then see how ML does it:

```
10 X=0
20 A=0+PEEK(X)
30 POKE 1024+X,A
40 X=X+1
50 IF X <> 256 THEN 20
```

Of course you would probably write a program like this using a FOR/NEXT loop, but we've distorted normal BASIC style a bit to more closely reflect the approach used in ML. Look at Program 4. It's the kind of disassembly you would see if you used a "monitor" program like Tinymon (published last year in COMPUTE! Magazine). The first column, starting with "0360" and containing a series of four-digit hexadecimal (hex) numbers, represents the addresses in memory where each ML instruction resides. (We'll get into hexadecimal arithmetic in a future column.) For now, it's enough that you understand that, in ML, memory addresses perform the same function as BASIC's line numbers do in a program LISTing.

Program 4: Monitor Disassembly

```
0360 A2 00    LDX #000
0362 BD 00 00 LDA $0000,X
0365 9D 00 04 STA $0400,X
0368 E8       INX
0369 D0 F7    BNE $0362
036B 60       RTS
```

Program 5: Disassembler

```
starting address (decimal)? 864
start address hex    0360
864 ldx # 0
866 lda 0 ,x
868 sta 1024 ,x
871 inx
```

After the "line number" address, you see some groupings of two-digit hex numbers. The first group is "A2 00." These are the actual numbers that the computer reads when it executes the ML program. These numbers are the most elemental form of machine language and sit in memory at the addresses indicated to their left. Finally, the "LDX #000" is the disassembly (the *translation*) of the ML "A2 00." LDX means "LoaD the X register." The X register is like a variable and the # symbol tells the computer to load the *number* zero into the X - as opposed to the number found at *address* zero. Without the #, X would be given whatever number was currently in address zero. The \$ means that the number is in hex notation, not decimal.

Now take a look at Program 5. If you have a copy of the disassembler program from last month's column, LOAD it. When it asks you for "starting address (decimal)", type in 864 and you'll see the same disassembly as illustrated in Program 5. Notice that 864 is translated into hex (0360). Program 5 is nearly identical to Program 4 except that the two-byte numbers between the address and the disassembly are not shown.

The second "line" in Program 5 "LoaDs the Accumulator" with the item in *address* zero + X. That is, if X is 5, then the item in 0+5 (address 5) is loaded into the accumulator. The accumulator is another "variable" in ML, used to hold things temporarily. Since we're trying to send all the items in zero page (addresses 0-255) up to the screen memory so we can see them, our next job is to "STore the Accumulator" at address 1024 + X. (1024 is the starting address of screen memory on the 64.) As you can see, we're making X do double duty here as an "index." It's acting as an offset for both the source items (in zero page) as well as the target to which we're sending those items (screen memory).

The next line raises, or *increments*, X by 1. INcrement X causes X = X + 1 to take place, so, this first time through the loop, X goes up from 0 to 1. The BNE means "Branch if Not Equal to zero." Branch is like a GOTO, but instead of giving a line number as its target, it gives an address in memory (866 in this case, the start of our loop). How does X ever get to zero if it's being INXed each time through the loop? No single-byte variable in ML can go higher than 255. (Likewise, no individual memory address in the computer can "hold" a number beyond 255. This is similar to the fact that no decimal digit can ever go higher than 9. After that, the digits "reset" to zero.) As soon as you've raised X to 255, the next time you INX, it resets itself to zero and starts over. So,

Now for the "64" **STCP** — 300/1200 Baud
Standard Terminal Communications Package

PFO IOD OOA CP<D1>D2 BELL = 12:30:00 10:14:36

Don't settle for non-standard Communications Protocol Access Micro Net, Source, Bulletin Boards, Local Mainframe, etc.



- Complete Package — Includes RS232 Interface Board and software (does not include modem)
- Communicates in Industry Standard ASCII
- Upload/Download to/from Disk
- Automatic File Translation
- Can be controlled from keyboard or user supplied basic or machine language program

Specify 30 or 4.0 ROMS or 8032 Commodore Computer 4040 or 8050 or PEDISK II Disk or CBM64 on 1541.

Price: \$129.95

ATARI AND PET EPROM PROGRAMMER

Programs 2716 and 2532 EPROMs. Includes hardware and software. PET = \$75.00 — ATARI (includes sophisticated machine language monitor) = \$119.95



Prowriter Printer — Excellent dot matrix print. Parallel = \$489.00
Serial = \$600.00 IEEE = \$589.00

NEW VIC RABBIT CARTRIDGE AND CBM 64 RABBIT CARTRIDGE



NEW FEATURE! DATA FILES!

"High Speed Cassette Load and Save!"

\$39.95

(includes cartridge and manual)



for VIC

Don't waste your Life away waiting to LOAD and SAVE programs on Cassette Deck. Load or Save 8K in approximately 30 seconds! Try it—your Un-Rabbitized VIC or 64 takes almost 3 minutes. It's not only fast but VERY RELIABLE.

Almost as fast as 1541 Disk Drive! Don't be foolish — Why buy the disk when you can get the Rabbit for much, much less!

Allows one to APPEND Basic Programs! Easy to install — just plugs in. Expansion Connector on rear of the VIC Rabbit. Works with or without Expansion Memory. Works with VIC or 64 Cassette Deck. 12 Commands provide other neat features. Fast Data Files - two data file modes. Also Available for 2001, 4001, and 8032.

More than just an Assembler/Editor!
Now for the "64"

MAE

FOR PET APPLE ATARI \$169.95 New Price \$99.95



It's a Professionally Designed Software Development System

Blast off with the software used on the space shuttle project!

- Designed to improve Programmer Productivity
- Similar syntax and commands — No need to relearn peculiar syntaxes and commands when you go from PET to APPLE to ATARI.
- Consistent Assembler/Editor — No need to load the Editor then the Assembler then the Editor, etc.
- Also includes Word Processor, Relocating Loader, and much more.
- Options: EPROM Programmer, unimplemented opcode circuitry.
- STILL NOT CONVINCED? Send for free spec sheet!

5 1/4 INCH SOFT SECTORED DISKETTES

Highest quality. We use them on our PETs, APPLES, ATARIs, and other computers. \$22.50/10 or \$44.50/20



EPROMS 2716 = \$4.50 2532 = \$7.50
Over 40 Commodore Programs by Baker (on 4040) = \$25.00



TRAP 65

TRAP 65 is a hardware device that plugs into your 6502's socket. Prevents execution of unimplemented opcodes and provides capability to extend the machines' instruction set. For PET/APPLE/SYM. Reduced from \$149.95 to \$69.95

Rana Disk Drive — 375
4 Drive Controller — 114

DC Hayes Smart Modem = \$235.00
DC Hayes Micro Modem II = \$289.00

Eastern House

3239 Linda Dr.
Winston-Salem, N.C. 27106
(919) 924-2889 (919) 748-8446
Send for free catalog!



Maximum Memory = Maximum Application!

Maximum Memory allows you to use more powerful programs for:

- EDUCATION • ENTERTAINMENT • MAIL LISTS
- BUSINESS APPLICATIONS • FINANCIAL RECORDS

APROPOS TECHNOLOGY
RAMAX™



You get up to a full 32k RAM with your VIC-20!



A perfect investment to give your family and yourself more enjoyment and use from your home computer! The ease of operation, the neat appearance, and the real POWER it adds to your VIC at this low price makes it a MUST for every VIC home!

SPECIAL Only \$124.95

Price includes shipping and handling within Continental USA. Foreign orders please add \$15.00. Calif. Residents add 6% sales tax.
10 DAY MONEY-BACK GUARANTEE. If not satisfied, simply return in original condition for your money back.

NEW! RAMAX JR.™

Already own an 8k Expander? Get the NEW RAMAX JR.™! Identical to the RAMAX™ except with 16k instead of 27k. Our instructions will show you how to use your 8k or 16k with JR. to get the full complement of memory!

SPECIAL \$109.95 Shipping Included

New Product! APROSPAND-64™

Gives your Commodore 64 full expandability! This superbly designed expansion module plugs into the 64 and gives you 4 switchable (single or in any combination) expansion connectors - plus fuse protection - plus a reset button!

only \$69.95 Shipping Included

APROPOS TECHNOLOGY

Contact Your Local Dealer.

Or Send Check or Money Order For the Total. Calif. residents add 6% tax.

Phone orders: Call **(805) 482-3604**
Foreign orders, add \$15.00
All items shipped from stock.
DEALER INQUIRIES WELCOME

WE SERVICE WHAT WE SELL!

VIC-20 & Commodore 64 are registered trademarks of Commodore International.

350 N. Lantana Ave., Suite 821
Camarillo, CA 93010

"line" 872 in Program 5 will throw us back to line 866 until we've been through the loop 256 times. Then, we'll finally get to line 874, where "ReTurn from Subroutine" sends us out of ML and back into BASIC where we left off. Notice that SYS-RTS has the same effect as GOSUB-RETURN, except that the former moves between BASIC and ML.

Making A Loader Automatically

Program 6 is another useful tool when you're working with ML. Loaders (Programs 1 and 2) POKE an ML program into RAM memory for you; Program 6, "Datamaker," goes in the other direction and translates an ML program from RAM into a BASIC loader. After you type it in and SAVE it, try an experiment. To make a loader out of "The Window," change line 1 to read S=864:F=875:L=9. S is the starting address of your ML and F is the finish. Then RUN. You'll see the loader created for you on screen. The Datamaker destroys itself after it's finished. (Note: Sometimes it doesn't complete its job, and you need to hit RETURN a couple of times to help it out.) Notice, too, that the line numbers created in the loaders made by Datamaker are also the addresses where the ML will be POKEd. And don't forget to change the starting and ending addresses in line 800 before SAVEing a finished loader.

Program 6: Datamaker

```

0 QK=198:QB=630
1 S=826:F=1023:L=9:REM>S&F=ADRES
2 PRINT"{CLR}{2 DOWN}":FORI=STOS+47STEP6
  :IFI>FTHENNEXT:L=3:PRINT"QK="QK":QB="Q
  B":GOTO6":GOTO5
3 PRINTI;"DATA";:FORJ=0TO5:PRINTPEEK(I+J
  )"{LEFT},";:NEXTJ:PRINTCHR$(20):NEXTI
4 PRINT"QK="QK"{LEFT}:QB="QB"{LEFT}:S="S
  +48"{LEFT}:F="F"{LEFT}:L="L"{LEFT}:GOT
  O2"
5 POKEQK,L:FORK=1TOL:POKEQB+K,13:NEXTK:P
  RINT"{HOME}":END
6 PRINT"{CLR}{2 DOWN}":FORM=0TO7:PRINTM:
  NEXTM
7 POKEQK,8:FORK=1TO8:POKEQB+K,13:NEXTK:P
  RINT"{HOME}":END
800 FOR ADRES=826TO1023:READ DATTA:POKE
  ADRES,DATTA:NEXT ADRES
  
```

Next month we'll take a closer look at some of the events illustrated on screen when you RUN "The Window." You might try substituting INPUTK\$ for GETK\$ in Program 3 to try to find out where your input from the keyboard is temporarily stored in the computer before you hit RETURN and BASIC analyzes it. If you have any suggestions or questions, please write to me c/o COMPUTE!'s Gazette. ☐

Hewitt's National Wholesale

Commodore 64.....	\$ 435.00
Vic-20.....	\$ 144.00
1541 Drive.....	\$ 335.00
16K RAM.....	\$ 65.95

Scientific Micro	
6-slot buffered	
expansion w-pur.....	\$ 89.00
Serial printer.....	\$ 44.95
interface w/cable	

Amdek Color I.....	\$ 299.00
NEC 12: Color.....	\$ 299.00
Taxan 12: Amber.....	\$ 130.00
USI 12" Amber.....	\$ 141.95
C.ITOH Prowriter I.....	\$ 399.00
Okidata ML-82A.....	\$ 401.50
Diablo 620.....	\$ 995.00
Smith Corona TP-1.....	\$ 599.50
Wico Joystick.....	\$ 20.00
Pointmaster joystick.....	\$ 12.00

Cardco printer interface.....	\$ 55.00
Cassette interface.....	\$ 27.50
3-slot expansion.....	\$ 27.50

Data 20 40/80 Video Pak.....	\$ 115.00
80 Video-Pak (64).....	\$ 286.00
280 Video Pak (64).....	\$ 128.95

Software	
Quick Brown Fox.....	\$ 54.00
Tronix Swarm.....	\$ 19.95
Sidewindr.....	\$ 19.95
Creative Choplifter.....	\$ 28.95
Apple-panic.....	\$ 28.95
UMI Outworld.....	\$ 32.95
Satellites & Meteorites	\$ 32.95

HES Hesmon.....	\$ 31.50
Vic Forth.....	\$ 46.95
Micro-ED Math Bid.....	\$ 6.95
VAP INVADERS.....	\$ 12.95
The Data Base.....	\$ 65.00
Vic-20 & 64	



Hewitt's National Wholesale of Albuquerque
2448 Menaul NE, Albuquerque, N.Mex. (505) 883-0984
1-800-821-9287

Prices subject
to change
without notice.

Improved Paddle Reader Routine For VIC And 64

Dan Carmichael, Assistant Editor
Tom R. Halfhill, Editor

This fourth installment of "Power BASIC," a continuing series of useful utilities and routines, is an enhancement of the first "Power BASIC" which appeared in the July 1983 issue of COMPUTE!'s Gazette. It works on the Commodore 64 or VIC-20, any memory size.

The "Power BASIC" in our Premier Issue was a paddle reader routine for the Commodore 64. The idea was to reduce the "jitter" in screen objects controlled by the game paddles. This jittering is caused by minor fluctuations in the paddle's readings. To calm down the jitter, author Bobby Williams wrote a short machine language routine which read the paddle 256 times in a split second, averaged the readings, and used the average for a final paddle value.

The routine worked fine, but some readers wanted more. One person in particular wrote an amusing letter - in the form of a poem - asking why we had not provided a version for the VIC-20. True, for some reason the VIC is not afflicted with a case of the paddle jitters as severe as the 64's, but it's distracting enough. Also, the original routine was for one paddle only, ignoring the second paddle.

So, to keep everyone happy, we present the "Improved Paddle Reader Routine."

Two BASIC Loaders

As before, you don't have to know anything about machine language to use these routines. They are published in the form of BASIC loaders - short BASIC subprograms which you add to your own BASIC programs. Using the POKE statement, they load decimal numbers into memory which correspond to the proper machine language commands.

The VIC version is stored in the cassette buffer, an area of memory normally unused during program execution. However, a SAVE or LOAD command will use the cassette buffer, overwriting the routine. If you make this routine a part of your regular program, there should be no problem.

The 64 version is stored in a normally safe area of memory, the 88 bytes from address 679 to 710 (decimal). This is not the same area where the previous paddle reader routine was stored. The earlier routine was stored in an often-used block of memory that we've decided to preserve for other purposes.

Be sure to type in the correct version, and as always when dealing with machine language, SAVE the program before the first RUN. This allows you to recover your work in case of a typing error that crashes the computer.

Reading The Paddles

Once the routine is added to your BASIC program, it must be activated with a SYS statement each time you want to read the paddles. To start the VIC version, use SYS 828 (the beginning address of the cassette buffer where the routine resides). To start the 64 version, use SYS 679.

With either version, you then read the paddles with a simple PEEK statement. To get the averaged reading of paddle 1, use PEEK(251); for paddle 2, use PEEK(252). Here's an example on the VIC:

```
100 SYS 828:P1 = PEEK(251):P2 = PEEK(252)
```

Here's an example on the 64:

```
100 SYS 679:P1 = PEEK(251):P2 = PEEK(252)
```

Note that these locations are different from the usual paddle locations. That's because the routine stores the averaged readings at 251 and 252, not at the customary locations (i.e., 54297 on the Commodore 64).

See program listings on page 155. ☺

How To Use Tape And Disk Files

Richard Mansfield, Senior Editor

After a few weeks with their computers, many people find themselves trying (and failing) to make *files* on tape or disk. Files are quite useful, even necessary in many kinds of programs, but you do have to be a bit patient with them at first. They're not as immediately obvious as other aspects of BASIC.

We'll take it step by step, and you'll soon have files going in and out of the computer like a pro. But before getting down to specifics, a brief historical note will demonstrate that any confusion you might have experienced when working with files is fully justified and puts you in good company. In the early days, files mystified nearly everyone.

Charming, But Slim

In 1978, the first true consumer computers – the venerable model 2001 Commodore PETs – were shipped with a charming, but slim, user's manual. This booklet, 49 pages long, was called *An Introduction To Your New PET (Revised)*. It included instructions on using the reverse field key, the cursor controls, and some elementary BASIC, along with tips on how to clean the PET. Nothing about files.

Also, there were very few books or magazines about personal computers at that time. And they said nothing useful about files either. The best sources of specific information were the few mimeographed user group newsletters. These early publications were full of techniques and debates about how to make files work.

To get a firm grip on OPEN, CLOSE, PRINT# and INPUT# (BASIC's file-handling words), the first thing we should do is clearly understand the general differences between programs and files.

Telling Them Apart

Tapes or disks can store two entirely different

things – *programs* and *files*. (Don't be confused if you should read something like this in a book: "Store your program files on tape." That terminology is both redundant and confusing. There is a crucial distinction to be made between programs and files.)

A BASIC program is a collection of lines, and each line contains instructions to the computer. These instructions are to be carried out during a RUN of the program. That is, the instructions are followed in order, from the lowest line number to the highest, after you type the word RUN. A data file, by contrast, is raw information, like a page in a telephone book; without any instructions about what to do with that information.

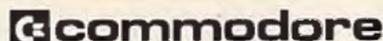
When programs are SAVED onto a disk or tape, they can later be LOADED back into the computer to be RUN any time in the future. Programs you type into the computer will stay there only as long as the computer is turned on. So, to build a library of programs, you must SAVE them on tape or disk. (Let's refer to tape or disk storage as *magnetic memory* from here on.)

When programs are SAVED to magnetic memory, it's as if the tape or disk were given a photo of the program that was in the computer at the time of the SAVE. BASIC keeps track of how large a program is – where it starts and ends in the computer's memory cells – so it knows just what to "photograph" when you ask for a SAVE.

BASIC doesn't help you out this way with your files; BASIC doesn't thoroughly supervise file storage and recall. You must do several things to create a file on magnetic memory and several things to get it back into the computer later. You establish the size of the file, the divisions between items in the file (called *delimiters*), and the order of the items. We'll illustrate this in a minute, but first let's visualize how programs and files differ:

A typical can of soup will have both a "file"

SJB DISTRIBUTORS. THE MOST COMPETITIVE PRICES ON COMMODORE.



NEW COMMODORE PRODUCTS

The Executive 64	Call
CBM C128-80	\$ 795
CBM BX700	2990
B Series Software	Call
CBM 1520 Plotter	169
CBM 1526 Printer	349

SOFTWARE FOR CBM 64

BUSINESS

Word Processing (WordPro 3+)	\$ 69
Quick Brown Fox	56
Writers Assistant	99
Spell Master	75
Calc Result	125
Basicalc II	95
Spread Sheet Assistant	99
Data Manager	70
M File (merge with WordPro)	89
Info Mast	139
64 Mailing List	28
The Manager	50
Home Accountant (continental)	75
Finance Assistant	45
Stock (investment analysis)	80
Agricultural Management	Call
General Ledger, A/R, A/P, P/R, Inv	Call

RECREATION

Assembler Package (cassette or disk, compiled, includes editor, loader, disassembler)	39
Sprite Master (access)	30
Neutral Zone (access)	35
Space Bell	19
Pet Emulator	30
Coco II (build your own games)	40
Vic Tree (programmers utilities)	75
Micro-Term (save to printer, disk)	39
Hesmon	35
Synthesound	45
Gothmog's Lair	30
Road Toad	15
Commodore Games	Call

INTERFACES & ACCESSORIES

80 Column Expander	\$159
VIC 1600 Modem	95
VIC 1650 (auto answer, auto dial)	150
VIC 1525 Graphic Printer	225
VIC 1530 Datasette Recorder	65
VIC 1541 Disk Drive	249
VIC Switch (connect 8 64's or Vics to printer, dd)	149
PET-IEEE cable	33
IEEE-IEEE cable (2m)	49

Parallel Interface (Epson, Okidata, IDS, NEC)	70
Programmers Reference Guide	18
Verbatim Diskettes (10 per box)	26
Hes Modem	75
ADA 1450	149
ADA 1800 (new)	129
Numeric Keypad	65

VIC PRODUCTS & ACCESSORIES

8K RAM Memory Expansion Cartridge	\$ 40
16K RAM	70
24K RAM	105
VIC 3 Slot Expander	27
VIC 6 Slot Expander	70
Cassette Interface	30
Gorf (64 also)	30
Omega Race	30
Arcade Joystick - Heavy duty w/2 firing buttons! Great for the VIC or 64	25
Auto Clock	125

MONITORS - GREAT RESOLUTION (64 OR VIC)

CBM 1701 Color Monitor	\$ 249
Amdek Color Plus	299
Panasonic TR-120 (w/speaker)	155
Panasonic CT-160	279
BMC (green screen)	95
Transtar 20 (high resolution green phosphor)	129
Video/Audio Cable	15

PRINTERS - LETTER QUALITY

CBM 6400, 40 cps	\$1450
Diablo 620, 25 cps	949
Transtar 140 (serial)	1395
Transtar 130, 16 cps (auto load, wp features!)	769
NEC 3500 Series	1600
NEC 7700 Series	2350

PRINTERS - DOT MATRIX

CBM 8023, 150 cps/graphics	\$ 545
CBM 4023 Printer	395
Epson FX Printer, 160 cps	549
Epson MX-80 FT w/graftrax	Call
Epson FX-100	859
Okidata 82A, 120 cps (serial and parallel)	429
NEC 8023A (parallel)	429
Okidata 92	559
Star Gemini, 10	329
Star Gemini, 15	499
Transtar 315 (hi-res, color)	575

COMMODORE BUSINESS SERIES

SuperPet (5 languages, 2 processors)	\$1059
CBM 8032 Computer, 80 Column	595

CBM Memory Expansion, 64K	259
CBM 8050, 1 mg. Dual Drive	995
CBM 8250, 2 mg. Dual Drive	1295
CBM D9060, 5 mg. Hard Disk	1995
CBM D9090, 7.5 mg. Hard Disk	2250
CBM 2031, 170K Single Drive (New)	395
DC Hayes Smart Modem	220

BUSINESS SOFTWARE-8032

WordPro 4+ or 5+	\$ 309
InfoPro	219
Administrator	489
VisiCalc (expanded)	199
BPI A/R, G/L, Job Cost, Inventory, Payroll	ea.325

MasterCard, Visa, Money Order, Bank Check

COD (add \$5) accepted.
Add 3% surcharge for credit cards.
In stock items shipped within 48 hours.
F.O.B. Dallas, Texas
All products shipped with manufacturer's warranty.
Prices are subject to change without notice.

**TO ORDER
CALL TOLL FREE
800-527-4893
800-442-1048**

(Within Texas)

Business Hours

Mon.- Fri. 8 to 6, Sat. 10-2

Write for free catalog.

GAME OF THE MONTH

Adventu-Writer (make your own adventure games) Join the Adventu-Writer Club \$ 49

PRODUCT OF THE MONTH

INTERPOD (intelligent IEEE RS232, serial interface for VIC or C64) \$ 179



SJB DISTRIBUTORS INC.

10520 Plano Road, Suite 206

Dallas, Texas 75238

(214) 343-1328

and a "program" written on the label:

Tomato Soup

Water, tomatoes, salt,
monosodium glutamate,
red color #7, oleoresin.

1. Open carefully.
2. Empty contents into pan.
3. Add one can of water.
4. Heat to a simmer.

Steps one through four are clearly a program of sorts. One clue that these steps are program-like is that each item starts with a number, indicating the order in which the operations are to be performed. The ingredients – standing by themselves as raw data – are a file. And, just as the ingredients "file" in the example above is acted upon by the cooking instructions program, a computer program acts upon a data file.

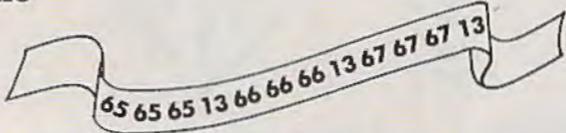
Here's a simple program which will create a tape file (there's a different format if you want to make a disk file: you change the device number in line 20 by typing OPEN 1,8,8,"0:FILE,S,W" – we'll get to the reason for the "0:" and the "S,W" later):

```
10 DATA AAA, BBB, CCC
20 OPEN 1, 1, 1, "FILE"
30 FOR I=1 TO 3
40 READ D$
50 PRINT#1, D$
60 NEXT I
70 CLOSE 1
```

PRINT# (usually pronounced "print-number") is an entirely different command from PRINT, and the punctuation, as always in programming, must be exact. Line 40 is interesting because we keep READING D\$ over and over to use it as a temporary holding place until we can PRINT# to a magnetic memory. D\$ isn't anything in itself (it varies, it's a *variable*). READ will pick out each datum from the DATA in line 10 in turn, keeping track of the last one that was READ.

In any case, after this program is RUN, the magnetic memory would contain a file. If we could look at that file on the tape the way we would look at a photograph, we would see a row of numbers. The number 65 stands for the letter A, and 13 represents a carriage return. Here's what the photograph would look like:

A Strip Of Tape Containing Our Example File



A data base manager is a program that manipulates data in files. Writing a large, flexible data base managing program is not a simple task – it

can involve sorting, searching, and other complex programming techniques. Nonetheless, handling Christmas card lists is not beyond beginning programming skills. Files do, though, represent something of a challenge. Your computer's manual contains information on the necessary punctuation and syntax for the BASIC commands which manipulate files. However, a brief overview might be of help.

OPEN, PRINT#, INPUT#, And CLOSE

While a program would be stored by the simple SAVE instruction, a file is stored by a combination of OPEN, PRINT#, and CLOSE. Likewise, a program is just LOADED, but a file is "loaded" into the computer with OPEN, INPUT#, and CLOSE. Files are a bit more complicated, but the trade-off is that you can do more manipulating with files, easier *appending* (adding to them), easier *merging* (making two files into one), and so on.

The command OPEN is generally used to communicate with a disk or tape drive. It's like pulling open a file cabinet drawer – once a file is OPENED, you can then get at the records inside. Here's what you would do to OPEN the file we created earlier. This time, instead of writing to it, we'll read from it.

OPENing Commodore Files

```
10 OPEN 1,8,8,"0:FILE,S,R"
```

The first number (1) means that this OPEN will hereafter be called #1. When you pull something out of it, you would use INPUT#1 (you can keep open up to ten files at one time). The second number (8) means disk drive (a 1 in this position would mean to open a file on the cassette drive). The second 8 is a secondary address which allows you to give additional instructions. With disk drives, just use 8.

The 0: specifies drive zero and the S means *sequential* file. The Commodore disks can create two other kinds of files: random and relative, but sequential is the simplest. Finally, the R means *read*, so you will be using INPUT# to get things out of this file. (A W here would mean *write*, and you would PRINT# to the file.) To make this "reading or writing" distinction for tape files, the secondary address is used: a 1 means write and a 0 means read. (10 OPEN 1,1,0,"FILE" would be the same as the example above, except it's for a cassette file. No drive number is specified, and the S is not necessary since cassette files can only be sequential files.)

Taking Something Out

Recall that we put things into a file with PRINT#. Going the other way, you get something out of an

HUNDREDS OF PROGRAMS AVAILABLE FOR THE COMMODORE 64 & VIC 20

Commodore 64



COMMODORE

Commodore 64 Computer	249.95
1541 Disk Drive	269.95
1701 Color Monitor	269.00
1525 Printer	249.95
1530 Datasette	69.95

HOME

Quick Brown Fox (CT)	47.50
Paper Clip (D)	96.25
WordPro 3 Plus (D)	67.95
CalcResult Advanced (D)	135.00
Hesmon (CT)	29.95
Home Accountant (D)	49.95

EDUCATIONAL

Facemaker (D)	26.25
Kindercomp (D)	22.50
In Search of the Most Amazing Thing (D)	29.95
Early Games (D/CASS)	22.50
Electronic Party (VIC 20/CASS)	22.50
Square Pairs (VIC 20/CASS)	22.50
Turtle Trax (VIC 20/CASS)	22.50

All Prices up to 30% OFF RETAIL

VIC 20



GAMES

Zork I, II, or III (D)	29.00
Deadline (D)	37.00
Starcross (D)	29.00
Jumpman (D/CASS)	29.95
Spritemaster (D/CASS)	26.95
Neutral Zone (D/CASS)	27.50
Temple of Apschai (D/CASS)	29.95

HARDWARE AND ACCESSORIES

Cardco Parallel Printer Int.	63.95
The Connection Parallel Int.	89.95
Cardco 3 Slot Exp. Board	31.95
16K Memory Expander (VIC 20)	57.00
Data 20 8K Display Mgr (40/80 col. plus Word Proc.)	119.95
Data 20 Display Mgr (40/80)	79.95
Zenith 12" Green Monitor	109.00
Amdek Color I Monitor	319.95
C. Itoh Prowriter 8510AP	395.95
Control Data Diskettes (10)	23.00

Write or call for FREE CATALOG. TO ORDER: CALL 1-714-951-5596

8:00 A.M. - 8:00 P.M. PST Mon.-Sat. or send check or credit card number, signature and expiration date.

CENTURY MICRO PRODUCTS

R.O. Box 2520, Mission Viejo, CA 92690

Visa/Mastercard add 3%. Personal checks allow 2 weeks to clear. CA residents add sales tax. Shipping and handling and \$3.00 (hardware extra). Prices subject to change.

SOUTHERN SOLUTIONS SOLID SECURITY

Your business is worth the difference. Compare our business software against theirs. Who's? Anyone's! Ours is better. It does more things.

With the unbelievable sales of the Commodore 64, a lot of companies are writing new accounting packages for Commodore computers. Do you really want the author of Cosmic Killer! * @ # writing your payroll?

Our PayMaster™ payroll package reflects the maturity that only years of heavy field use can bring. You can join thousands of others who use it with confidence.

General Ledger needs? Get our BusinessMan,™ it has more features, like budgeting and reports that you can design, than the others. Accounts Payable? Never write another check. Just let the computer.

Send us the coupon below for more information on Southern Solutions' quality business software, including head-to-head comparisons with the others.

SOUTHERN SOLUTIONS 01
P.O. Box P., McKinney, TX 75069
Phone 1-800-572-4548

Name _____

Address _____

City _____

State _____ Zip _____

Please send more information

Commodore 64 _____

8000 Series _____

B model _____

VIC 20 _____

VOICE WORLD'S 24K Golden RAM Expansion Chassis

ONLY \$149.00

- Programmer's dream—Game player's delight.
- Boosts VIC memory to 29K!
- 4 expansion slots with switches for instant cartridge selection—faster than a disk.
- Accepts any cartridge designed for the VIC 20®.
- System Reset Button.
- Plugs directly into your VIC 20®.
- 8 memory control switches—easy to configure in 8K banks for custom applications.
- Factory tested—one year limited warranty.



- Start address selection at 2000, 4000, 6000, A000 HEX.
- ROM mode switches for memory write protection and PROM, EPROM emulation.
- Memory banks hold programs/data even when de-selected.
- Gold-plated connectors/switch contacts for high reliability.
- Fused to protect your VIC 20®.

TO ORDER:

Send check or money order. Add 3.00 shipping and handling. California residents add 6% sales tax. COD DEALER INQUIRIES INVITED



VOICE WORLD
13055 Via Esperia
Del Mar, CA 92014
(619) 481-7390

VIC 20 is a registered trademark of Commodore Business Machines, INC.

OPENed file by using INPUT# in combination with a string variable to "hold" whatever comes from the file (they come back to the computer in the order they were PRINT#ed in a sequential file). To get the AAA back:

```
20 INPUT#1,A$
```

Then you could print A\$ to see the data AAA it holds:

```
30 PRINT A$
```

To get the rest of the data we stored, you could:

```
40 INPUT#1,B$:PRINT B$  
50 INPUT#1,C$:PRINT C$
```

After you are finished INPUT#ing or PRINT#ing from a file which had been OPENed as file #1, you would close it:

```
60 CLOSE 1
```

When you've finally CLOSED the file, you are free to use that file number (#1 in these examples) for some other file, with a different name. CLOSE is essential, however. Without it you could permanently lose part or all of a file, or even damage other files. Don't leave files open after you're finished with them.

INPUT# And PRINT# Hints

The INPUT# and PRINT# work very similarly to the way INPUT and PRINT work from the keyboard and to the screen. The only catch is that PRINT# needs some special handling. It's best to give it a line all to itself:

```
20 PRINT#1,A$  
30 PRINT#1,B$
```

The reason for putting PRINT# on its own line is that this is an easy way to separate items in a file: with carriage returns. Just as:

```
20 PRINT A$  
30 PRINT B$
```

causes B\$ to be on the line below A\$ on the screen (since using a new line forces a carriage return to take place) – a separate program line puts a carriage return symbol onto the tape or disk and keeps the data from running into each other. This kind of "separator" symbol is called a *delimiter*.

Manipulating Files

Our example program above, which reads data from magnetic memory into the computer, does work, but it's cumbersome. Files are usually written to or read from within loops. Here's a simple program to write a file to tape:

```
10 DATA BILL, SANDY, KATIE, LARRY  
20 OPEN 1,1,1,"NAMES":REM (A TAPE FILE)  
25 PRINT#1,4  
30 FOR I=1 TO 4  
40 READ A$
```

```
50 PRINT#1,A$  
60 NEXT I  
70 CLOSE 1
```

Since there are four names in this file, the loop counts up to four, READING a new A\$ from the DATA line each time through. Since PRINT#1 is by itself on line 50, it will send carriage returns to the tape each time it PRINT#s, separating the names on tape with delimiters. This way, there will be no question of something like BILLSANDY being stored.

When this file is later read into the computer, it would be very useful to know when the entire file ends, how big it is. There are two ways to do this. You could add the word "END" to the DATA line and then change line 30 to read: FOR I=1 TO 5. Or, you could put the *count* (the number of records for this file) on the tape or disk itself, as part of the file. See line 25 above for an example of this.

Here's a "reader" program which first pulls the count out of the file and then brings the records into the computer:

```
10 OPEN 1,1,0,"NAMES":REM (A TAPE FILE)  
20 INPUT#1,COUNT:REM THIS IS THE FIRST ITEM ON THE FILE  
30 FOR I=1 TO COUNT  
40 INPUT#1,A$  
50 PRINT A$:REM (TO THE SCREEN)  
60 NEXT I  
70 CLOSE 1
```

If you use the "END" technique, the reader program would not use line 20 and would add line: 45 IF A\$="END" THEN GOTO 70. If you plan to do significant manipulations with the file data, you might want to call the items into an array so that they can be worked with easily.

One final note about something which might not be immediately obvious: if you update a file, you cannot put it back on a disk using the same name. Here's why: it's first read off the disk and into memory because you want to make some changes. Before you OPEN-PRINT#-CLOSE it back onto the disk, you must first *scratch* (remove) the original file (it's in the computer now) so you can replace it with the updated one. For obvious reasons, you can't have two files on disk with the same name. This *scratching* is unnecessary for tape files, because the recorder will write over the old file (if you rewind the tape).

There are numerous ways to manipulate files. We've been dealing with *sequential* files, the most straightforward type of files; using INPUT#, the most straightforward access command; and delimiting with carriage returns, the simplest punctuation. Your manual contains information about more complex, sophisticated filing techniques, including special types of disk files, using GET#, and delimiting with commas or even using semicolons between items. 📄

COMPUTE!'s Gazette introduces a new feature this issue – "Horizons: 64," a monthly column exclusively for Commodore 64 users. "Horizons: 64" replaces our previous Commodore 64 column, "64 Explorer," which is moving to our companion magazine, COMPUTE!. Our new columnist is Charles Brannon, Program Editor. Brannon's experience with Commodore computers dates back to the early days of the Commodore PET.

Commodore 64 Video – The Saga Continues

In the July issue of COMPUTE!'s Gazette, we brought you some of the latest information on Commodore 64 video. The article, "Commodore 64 Video Update," covered radio frequency interference, "sparkle," and revisions to the VIC-II chip (which is responsible for 64 video). It seems the story isn't finished, however.

Suppressing Sparkle

"Sparkle" appears on most early-model 64s to varying degrees, and even plagues some current owners. Sparkle appears as tiny flickering specks within screen characters, closely resembling TV "snow." Besides the obvious annoyance, sparkle can interfere with sprites (animated screen objects). When a sprite "bumps into" the transient flickers, the VIC-II chip thinks a collision has occurred with another screen object. In a game program, this can unjustly "zap" your spaceship. Worse, sometimes sparkle is invisible, and who's going to believe you collided with something invisible?

If you're a programmer, it's a relatively simple matter to avoid sparkle: just relocate the character set. Moving the character set out of the default area removes the conflict that causes sparkle. Many games use a custom character set anyway, so in practice you may not encounter many problems.

If you're not a programmer, you may be able to reduce sparkle by simply switching to lowercase. In most 64s, either the uppercase or lowercase character set has more sparkle than the other. Just press both SHIFT and the Commodore logo key simultaneously to switch. If you're playing a

game that uses graphics characters (most of which are not available in lowercase), then this is obviously not a good solution.

The New 64s

The latest Commodore 64s (and VIC-20s too) have changed quite a bit. Video quality is much improved. RF interference (which distorts the TV image) is almost gone, due to added shielding (aluminized cardboard covers the circuit board, and there is a metal plate underneath). The characters seem crisper, the colors brighter.

If you opened the case of the 64 (not recommended; it will void your warranty), you would find that the number of chips has been reduced dramatically. This makes the machine run cooler, but more important, it cuts Commodore's costs. This is a major reason why Commodore can continue selling 64s for under \$200, from a previous high of \$595. And the price may continue to drop. A price tag of \$100 may not be as radical as it seems. Strangely, though, this may not happen simply because Commodore now has less competition in the under-\$200 price range. Few competing machines at that price can boast the standard 64K of memory.

Other Changes

The latest 64s incorporate two other changes – the five-pin audio/video socket now has eight pins, the power supply is larger (some components inside the 64 were moved to the power supply, making the computer run cooler), and the power plug has only three pins, although the socket has room for seven. On previous 64s, it was possible to mistakenly plug the power cord into the audio/video socket (a tragic mistake), since both are five-pin sockets. On the latest 64s, it is impossible. According to sources at Commodore, however, there are no extra functions assigned to the additional pins on the audio/video plug, and the standard five-pin cables still work just fine.

How Computer Video Works

There is a way, however, to take best advantage of the 64's video output – attach it to a monitor. The price of quality color monitors has been dropping of late. Video monitors have the same picture tube as any high-quality television. TV

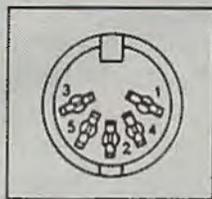
sets, of course, are designed to pick up only broadcast signals. To feed the 64's composite video signal into your set, it must be converted into a TV signal. In effect, you have a tiny television transmitting-station inside your 64 (the RF modulator). If the signal was much stronger, you wouldn't even have to make a physical connection. You (and your neighbors) would pick it up like any broadcast.

And there's the problem - the 64 has to convert its "pure" video signal into broadcast signals,

fordable alternative to TV sets and expensive color monitors. Discounted to under \$300, the Commodore 1701 Video Monitor has two connections, front and rear. The front connection is like any monitor, accepting composite video and audio (incidentally, the sound is excellent, with a decent-sized speaker). The rear connection, though, is special: there is circuitry to mix in the separate luminance signal.

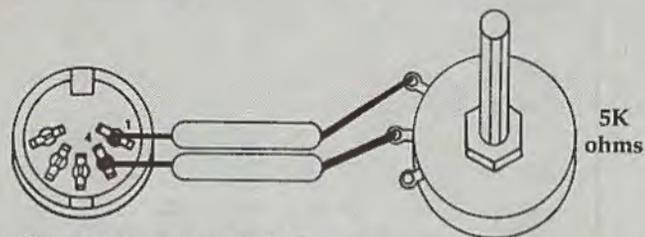
The result? Phenomenal. There really is no

Figure 1: Audio/Video Pinout (Rear of 64)



Pin 1: Luminance
Pin 2: Ground
Pin 3: Audio Out
Pin 4: Video Out
Pin 5: Audio In

Figure 2: Improved TV Connection:



From Pinout 4 to center terminal.
From Pinout 1 to any other.

which are fed into the TV's antenna through the switch box (which really doesn't do anything to the signal). The TV converts the signals with its tuner, and then controls the red, green, and blue electron guns that continually "paint" the TV image on the inside of your TV tube.

The tuner is susceptible to much interference, both from local stations, and stray signals from the computer (the tiny silicon switches within the chips work so fast, they generate a field with the same cycle rate as radio signals). You also lose clarity in the translation process. It's like recording a tape by placing the tape recorder near your stereo speakers. You get a much better recording by plugging your tape recorder directly into your stereo's output.

That's what the five-pin audio/video plug is for. Video monitors can accept the composite video signal directly, without having to go through a tuner. Without a tuner, the TV can't pick up any interference, and it doesn't have to translate the signal. The monitor then breaks down the composite video signal to control the electron guns.

There are two separate video outputs: chrominance and luminance. Luminance controls the brightness or darkness of a screen. It provides contrast. You can attach a monochrome (non-color) monitor with the luminance signal. Most color monitors use the composite video signal (which has a little luminance mixed in with it).

The Commodore 1701 Video Monitor

Thanks to a special deal with a Japanese TV manufacturer, Commodore is able to market an af-

parallel. All the problems the 64 has suffered with "color smearing" and bad contrast are solved. Almost any color combination looks great. It won't fix sparkle, however (sparkle is a problem with the computer, not the video display).

Many people who already own the video monitor don't know how to use the rear connection, since the monitor is packaged with a cable for the front connections (for the VIC's sake). If you're handy with a soldering iron, you can make your own cable, using Figure 1. You can also obtain an "octopus cable" which has the five-pin plug on one end and four RCA jacks on the other (like stereo connectors). The color scheme varies; you can't hurt your equipment if you try hooking up the four plugs by trial and error. Remember to flip the switch behind the monitor which selects the rear hookup. With the cables we've used (generically called an "audio/video cable"), the black plug goes into Audio, the white into Chroma, and the red into Luminance.

Super TV

If you're using your 64 with a TV, you're in for a treat, too. If you can make your own cable, or can find someone who can do it for you, you can improve the 64's picture on your set (although it won't improve ordinary TV reception). It involves mixing a little luminance into the color signal to improve contrast. The simplest technique is to just attach a wire (or paper clip!) between pin-sockets 1 and 4 on the back of your 64 (see Figure 1). Unfortunately, this is too much for the ordinary TV set. It "overdrives," and you get an extremely bright, distorted picture. Some sets work just fine, though, after you've adjusted the color and

contrast. However, the overly strong video signal "drowns out" the computer's sound.

A better way is to reduce the amount of luminance you mix in. This is done by putting a potentiometer (variable resistor) between pins 1 and 4. If you twist the wires tightly, you don't even have to solder. Commodore recommends using a 5K potentiometer. The dealer at your local electronics parts store (such as Radio Shack) can help you find one. See Figure 2. Once you've hooked it up, you can turn the knob on the potentiometer to adjust how much luminance you want. Most people agree that the resulting picture is far better.

Odds And Ends

This handy tip comes from Programming Assistant Eric Brandon: if you would like to fill color memory on current model 64s with any color almost instantly, set the background color (POKE 53281) to the color you want to fill with, then clear the screen. The clear screen routine does the job. You can then set the background color to some contrasting color. Thereafter, POKEs to screen memory don't require the corresponding POKE to color memory. If you've been doing this already (older 64s always fill color memory with white), insert the extra code so the program will work on everyone else's 64.

For example, to fill color memory with white:

```
POKE 53281,1:PRINT CHR$(147):POKE 53281,6
```

It has come to our attention, though, that Commodore has made yet another revision to the Kernal ROM (the operating system). As mentioned, Revision 1 always filled color memory with white when the screen is cleared. In Revision 2, color memory was filled with the background color (to deprive sparkle of its color). Finally, Revision 3 fills color memory with the color of the cursor (set with CTRL 1-8 or COMMODORE key 1-8). Both Revisions 1 and 3 will allow POKEs to screen memory without the corresponding POKE to color memory, since color memory is set to a color which contrasts with the background color. To be safe, and allow your software to run on all 64s, you may want to fill color memory by setting both the background color and cursor color to white, clearing the screen, and then resetting the background color to whatever you want to use.

Be sure to tune in next month. We've got quite a few interesting topics in mind. In future columns, we'll briefly review significant new hardware and software for the 64. This way, you'll find out about these products faster than the time it takes to do an in-depth review (which usually follows). If there's anything you'd like us to discuss, or if you notice any interesting hardware or software products, write us. 

GET THE BEST FOR YOUR COMMODORE 64 [At The Lowest Prices]

BUSINESS APPLICATIONS

• FINANCE CALC 64 • Disk	\$55.95
• DATA BASE 64 • Disk	59.95
• INVOICE EASE 64 • Disk	45.95
• FAMILY PAC 64 [3 in 1] • Disk [CHECKBOOK, RECIPE, EDU-GAME]	45.95
• PRO. MAILING LIST 64 • Disk	35.95
HESWRITER 64 • Cart.	29.95
HESMON 64 • Cart.	25.95
QUICK BROWN FOX • Cart. [PRO. WORD PROCESSOR]	49.95
WRITERS ASSISTANT [W.P.] • Disk	89.95
FILING ASSISTANT • Disk	89.95
INVENTORY PACKAGE • Disk	77.95
TOUCH TYPING TUTOR • Disk	19.95
DATACALC SPREAD SHEET • Disk	59.95
DATA BASE MANAGER • Disk	67.95
GENERAL LEDGER • Disk	77.95
PAYROLL SYSTEM • Disk	68.95
PAPERCLIP [W.P.] • Disk	99.95
M'FILE • Disk	94.95
CARDCO PRINTER INTERFACE	58.95

ENTERTAINMENT

• STUDIO 64 [MUSIC MAKER] • Disk	\$35.95
• BABIES OF THE DIRT • Disk	27.95
• GAME DESIGNER • Disk & Cass.	25.95
GRIDRUNNER • Cart.	21.95
TEMPLE OF APSHAI • Disk	25.95
UPPER REACHES OF APSHAI • Disk	14.95
CURSE OF RA • Disk	14.95
ANNIHILATOR • Cass.	16.95
MOTOR MANIA • Cass.	22.95
TELENGARD • Cass.	16.95
The Official	
FROGGER • Disk & Cass.	24.95
FORT APOCALYPSE • Disk & Cass.	27.95
ROBBERS OF THE LOST TOMB • Disk	19.95
JUMPMAN • Disk	25.95
SWORD OF FARGOAL • Disk & Cass.	25.95
PAKACUDA • Disk & Cass.	11.95
APE CRAZE • Disk & Cass.	19.95
PEGASUS ODYSSEY • Disk & Cass.	19.95
SUPERCUDA • Disk & Cass.	19.95
COMPETITION PRO. JOYSTICK	17.95

* From EN-TECH Software

Add \$2.00 shipping

Hundreds more available!!!



CALL **(213) 788-8866** OR MAIL TO:
9183 Mercedes Ave. • Arleta, CA 91331
SHOW US A BETTER PRICE AND WE'LL BEAT IT!



Keeping Time With The VIC

The Commodore VIC-20 has a realtime clock. In this month's column, we'll show you how to program it to do everything from simply telling the time to creating timers for games.

The Jiffy Clock

The realtime clock that is standard with all VIC-20s can be a very useful tool for games, programs, etc. The clock, which occupies three memory locations, is called a *jiffy clock* and is located at bytes 160 through 162.

Before we talk further, let's take a look at the jiffy clock while it's running. Enter, then RUN the following short machine language program. We'll use machine language here so we can see the clock running at just about its real speed. The program will display the three jiffy clock bytes (162, 161, 160) in the center of your screen. To stop the clock, press RUN/STOP-RESTORE.

```
1 FORA=828TO846:READB:POKEA,B:NEXT
10 PRINT"[CLR]":TI$="000000":POKE38628,6:
   POKE38630,6:POKE38632,6
20 SYS828
828 DATA 165,162,141,228,30,165,161,141,2
   30,30
838 DATA 165,160,141,232,30,76,60,3,234
```

What you are seeing displayed is not actually the numbers running by in the clock, but the screen POKE values of the numbers. For example, the screen POKE value of @ is 0, the value of A is 1, etc.

As you can see, the clock runs very fast, and

the speed is not the same as for a standard clock (one "click" every second). The first byte you see displayed (the byte moving the fastest) is byte 162 – the low-order byte of the jiffy clock. This byte is actually counting from 0 to 255 by ones. It does this in 4.266666 seconds. That is, it takes 4.266666 seconds for it to count 1,2,3,...255, then back to zero to start the cycle again. It increments, or counts, 60 times every second. That's why it's called a jiffy clock – a "jiffy" is 1/60 of a second.

The VIC performs a number of operations at this speed. For instance, 60 times every second it checks the keyboard to see if any keys have been pressed and updates the keyboard buffer if necessary. It also takes care of the cursor blinking routine.

The jiffy clock is like a simple three-digit counter. Each time byte 162 goes through its cycle and returns to 0, it "clicks" or increments the next byte (byte 161) by one. And every time byte 161 runs through its 0 to 255 cycle, it increments the next byte (160).

Telling Time With The VIC

The VIC's TI\$ and TI (*time*) functions are translations of the jiffy clock. TI\$ and TI are built into the BASIC that is in both the VIC-20 and the Commodore 64. The TI\$ function returns a six-character string in the same format as a standard clock: hours, minutes, seconds. The TI function returns a value in tenths of seconds.

For a demonstration of these two functions, enter and run (separately) the two following short programs. When you enter the first demonstration

program (TI\$), enter the current time in the format HHMMSS, where HH=hours, MM=minutes, and SS=seconds. For example, to enter the time 3:30 a.m., enter "033000".

The second demonstration program emulates a stopwatch. Press F1 to start, F3 to stop and display elapsed time.

TI\$ Demo

```
10 PRINT "{CLR}{DOWN}ENTER CURRENT TIME":P
  RINT"IN FORMAT: HHMMSS":INPUTTI$:PRINT
  "{5 DOWN}"
20 PRINT "{8 RIGHT}";TI$"{UP}":GOTO20
```

TI Demo

```
10 PRINT "{CLR}{4 RIGHT}VIC STOPWATCH":PR
  NT"{DOWN}PRESS F1 TO START":PRINT"PRE
  S F2 TO STOP{2 DOWN}"
20 GETA$:IFA$="{F1}"THEN TI$="000000":PR
  INT"{2 DOWN}TIME IN SECONDS ={DOWN}":G
  OT040
30 GOTO20
40 PRINT "{2 RIGHT}";TI/60"{UP}"
50 GETA$:IFA$="{F3}"THEN70
60 GOTO40
70 PRINT "{6 DOWN}PRESS A KEY TO REPEAT"
80 GETA$:IFA$=""THEN80
90 GOTO10
```

As you can see, when you use the VIC's TI\$ and TI functions, the jiffy clock is automatically converted into a realtime clock. We'll be using TI\$ and TI to create a nice clock display and to discuss the creation of timers for games. By the way, the time format the TI\$ function returns is that of a 24-hour clock. It's like military time, where 1400 hours would be 2:00 p.m. With the use of an IF/THEN statement or two, you can turn it into a standard 12-hour (a.m. - p.m.) clock.

Clocks And Timers

Enter the following program and RUN. The program will turn your VIC-20 into a colorful clock with sound. The program is very simple in that it does only two things: it POKES or PRINTs colors to the screen, and it displays the time. The colors that are POKEd to the screen while the program is running are done with machine language. It could have been done with BASIC, but it would run much slower. If you would like to change the speed of the color as it is POKEd to the screen, change variable SP in line 1 of the program, then RUN.

Program 1: Color Clock

```
1 POKE52,28:POKE56,28:CLR:SP=12:GOTO10
2 C=INT(RND(1)*N)+0:IFC=1THEN2
3 RETURN
10 GOSUB300:PRINT "{CLR}":SC=7680:CO=38400
  :POKE36879,25:N=8:O=160:Q=505:POKE7195
  ,SP
20 IF4*(PEEK(36866)AND128)+64*(PEEK(36869)
  )AND112)=4096THENSC=4096:CO=37888
```

```
40 FORA=0TOQ:GOSUB2:IFA=226ORA=248ORA=270
  THENA=A+10
50 POKESC+A,O:POKECO+A,C:NEXT:PRINT "{BLK}
  {9 DOWN}"
60 SYS7168:PRINTTAB(7)LEFT$(TI$,2);":":MI
  D$(TI$,3,2);":":RIGHT$(TI$,2);"{UP}":G
  OTO60
300 FORA=7168TO7199:READB:POKEA,B:NEXT
305 PRINT "{CLR}{DOWN} ENTER TIME IN FORMA
  T":PRINT "{DOWN} HHMMSS"
310 PRINT "{2 DOWN} WHERE HH=HOURS":PRINTT
  AB(7)"MM=MINUTES":PRINTTAB(7)"SS=SECO
  NDS"
320 INPUTTI$:RETURN
7168 DATA 160,0,174,104,144,173,105,144
7176 DATA 157,0,150,157,0,151,169,0
7184 DATA 170,157,249,150,232,224,9,208
7192 DATA 248,200,192,12,208,228,96,234
```

You might also want to study line 60 of the program. Using the LEFT\$, MID\$, and RIGHT\$ commands to manipulate strings (used here to separate the hours, minutes, and seconds in the jiffy clock) can be a very useful programming technique, and is well worth learning.

This clock program could also be turned into an alarm clock with one easy IF/THEN. For instance:

```
10 IF TI$="XXXXXX" THEN POKE 36878,15:
  POKE 36876,200
```

"XXXXXX" here represents the time, in hours, minutes, and seconds, when you wish the alarm clock to ring.

Using the jiffy clock to create a "countdown timer," as is often found in games, is actually very easy. Because the jiffy clock is able to count or run forward only, it cannot be directly programmed to count down. However, you can program a countdown timer by subtracting the values of the clock from a constant (a number value that doesn't change), then using the difference as your counter. For example, enter this program and RUN.

Program 2: Countdown Timer - Whole Seconds

```
1 PRINT "{CLR}{2 DOWN}"
10 TI$="000000":A=30
20 PRINT"COUNTDOWN TO 0:"TAB(15)A-VAL(TI$
  );"{LEFT} {UP}"
30 IFA-VAL(TI$)<=0THEN50
40 GOTO20
50 PRINT "{2 DOWN} TIME EXPIRED!!!"
```

Here we set the jiffy clock to zero (line 10, TI\$="000000"). Then the variable A (which represents a constant value of 30) is subtracted from the value of the clock (VAL(TI\$)). As the clock value gets larger, the difference in subtraction gets smaller, causing the countdown effect. You can change the variable A in line 10 to create a timer of any value you wish. Because this timer uses the TI\$ variable as the subtrahend, it will

decrement by a value of whole seconds.

If you wish to create a countdown timer that will work with values in fractions of seconds, you can use the same programming technique with the TI function. Remember that to get a proper time display, TI must always be divided by 60 (TI / 60). Enter and RUN this program:

Program 3: Countdown Timer – Fractions Of Seconds

```
1 PRINT "{CLR}{2 DOWN}"
10 TI$="000000":A=30
20 PRINT "COUNTDOWN TO 0:{2 DOWN}"
25 PRINTTAB(5)A-TI/60; "{LEFT} {UP}"
30 IFA-TI/60<=0THEN50
40 GOTO25
50 PRINT "{2 DOWN} TIME EXPIRED!!!"
```

Here, the technique is the same, except that TI was used as the subtrahend instead of TI\$, which returned a difference in fractions. In this program you can also change the variable A to any value you wish.

The built-in jiffy clock can be a very useful programming tool. You can program it to do everything from simple tasks like ringing an alarm when your favorite TV program is on to adding timers to your favorite games for added excitement and challenge. ☺

COMMODORE 64 \$199⁹⁵*

COMMODORE 64 only \$199.95*
* with the purchase of
one 1541 Disk Drive at \$299.95
one 1525E Printer at \$279.95
ALL FOR \$779.85



COMMODORE 64 only \$199.95*
* with the purchase of
one 1541 Disk Drive at \$299.95
one 1526 Printer (FAST!) at \$339.95
(includes ifc/cable dir. connect)
ALL FOR \$799.85

COMMODORE 64 only \$199.95*
* with the purchase of
one 1541 Disk Drive at \$299.95
one 1526 Printer (FAST!) at \$339.95
(includes ifc/cable dir. connect)
ALL FOR \$839.85

COMMODORE'S
SX-100 PORTABLE!

\$995⁰⁰

- * Full 64K
- * Color Monitor built-in
- * Disk drive built-in
- * FREE software package
- * Completely compatible with the Commodore 64
- * LOTS OF SOFTWARE AVAILABLE!

CALL US NOW –
PRICES MAY BE
EVEN LOWER!

COMMODORE 64 \$259.95
1541 Disk Drive 279.95
1525E Dot Matrix printer; inc. direct connect int/cable 269.95
1526 Dot Matrix printer; inc. direct connect int/cable 339.95
1701 14" Color Monitor, good quality 289.95
1530 Datasette program recorder 69.95
1600 Modem (for VIC-20 / Com. 64) 79.95
1650 NEW! Auto dial/Ans. modem 109.95

VIC-20 in stock-call for best price!
Software avail. for VIC-20 & Com. 64-Call us!

Accessories from DATA 20

Z-80 Card For Commodore 64 \$289.95
80 Column Card For Commodore 64 169.95
40 Column Card For VIC-20 99.95
40 Column Card w/8K mem built-in for VIC-20 139.95
Video Pack 64K For VIC-20 329.95

FREE WITH PURCHASE of each Z-80 card, 80 column, 40 column or Video Pack 64, you receive the following:

Word Master word processor software
Mailing List software
Telecommunications software

Due to the tremendous demand of these products, goods are subject to availability.
Place your orders now!

Olympic Sales Company
SERVING YOU SINCE 1947

Some of the goods shown not available at all stores. Call first! Products subject to availability. We are not responsible for typographical errors. Prices subject to change without notice. This ad supersedes all previous ads. Minimum ship. & handling \$5.95. All orders subject to verification.

Telex: 67 34 77 Toll-Free Phone Orders:
Toll-free (in CA) 800-252-2153 800-421-8045 (out of CA)
Order Desks open 6 days a week! 7:00 AM to 6:00 PM Mon-Sat
P.O. Box 74545 216 So. Oxford Ave. Los Angeles, CA 90004
Phone: (213) 739-1130 Cable: "OLYRAV" LSA

MAILPRO DATA ORGANIZER AND MAILING LIST PROGRAM FOR COMMODORE 64TM

COMPARE THESE FEATURES:

- fast file definition
- easy updating
- rapid printing with total format and record selection control
- WORDPRO compatible
- up to 4000 records on 1541

MAILPRO 64.....\$129⁹⁵

Also available for COMMODORE 8032 . . . \$179⁹⁵

Payment in U.S. funds with order or major credit cards. customs brokerage extra.

**PRO-LINE
SOFTWARE**
PRO-LINE SOFTWARE LTD.

(416) 273-6350

755 THE QUEENSWAY EAST, UNIT B
MISSISSAUGA, ONTARIO CANADA, L4Y 4C5

COMMODORE USERS

Join the largest, active Commodore users group.
Benefit from:

- Access to hundreds of public domain programs on tape and disk for your Commodore 64, VIC 20 and PET/CBM.
- Informative monthly club magazine **THE TORPET.**

Send \$1.00 for Program & Information Catalogue.
(Free with membership).

Membership	Canada	—	\$20 Can.
Fees for	U.S.A.	—	\$20 U.S.
12 Months	Overseas	—	\$30 U.S.

Toronto Pet Users Group
Department "G"

1912A Avenue Road, Suite 1
Toronto, Ontario, Canada M5M 4A1

* LET US KNOW WHICH MACHINE YOU USE *

FREE

WRITE FOR FREE C51
CATALOG OF VIC 20
and CMB 64 PRODUCTS

- SOFTWARE
- HARDWARE
- PROGRAMMING AIDS
- OPERATIONAL AIDS
- SUPPLIES
- MEDIA
- BOOKS

COMPATIBLE
SYSTEMS
INCORPORATED

P.O. Box 2070 • Dept. G
Saratoga, CA 95070
(408) 255-2024

★ ATTENTION ★
★ VIC USERS ★

FOR FIRST ISSUE OF
GAZETTE
3-SLOT EXPANSION BOARD

\$28.50

(FLA. RES. ADD 5% SALES TAX)
JULY ISSUE ONLY!!

We also do custom programming
for the VIC. Send us a description
of the program you want, we will
send more information and cost
for us to create the program.

Our catalog is in cassette form.
For the VIC 20
Send \$2.00 for a copy

DYTEK

(813) 323-6139
P.O. Box 241, Pinellas Park FL 33565

For Commodore 64™

"FAMILY" FINANCES

Complete personal bookkeeping system that makes
your budgeting, forecasting & reconciliation a breeze!
Gives you instant access to past & future payments
and incomes in levels of detail from yearly & monthly
summaries, to master accounts, to separate entries.

APRIL 03, 1983 10:23:15

MASTER MENU

1. PRINT REPORTS MENU
2. INCOME MENU
3. EXPENSE MENU
4. BALANCE CHECKBOOK MENU
5. BUDGET / FORECAST MENU
6. AUDIT ACCOUNTS MENU
7. AUDIT DETAILS MENU
8. END RUN

WHAT # DO YOU WANT? _

\$35.95 "Family Finances" Program

On high-quality 5 1/4" floppy diskette
& 50 page easy-to-understand manual.

\$2.95 Manual only, (credited to purchase).

Postage & handling included.
Mail check or money order to:

SOPHWARE

19123 Hamlin Street
Suite 4, Dept P6
Reseda, CA 91335

Commodore 64 is a trademark of
Commodore Electronics Limited

FACTORY SPECIAL

VIC - 20™
16K MEMORY
EXPANSION
\$49.95

Boosts VIC to 21K RAM
High Quality
GOLD Contacts
90 Day Warranty

Phone Order Hours:
10 AM - 9 PM MST Daily
(303) 245-9012

ASSEMBLY TECHNOLOGY
2692 Hwy 50 Suite 210
Grand Junction, CO 81503

Personal checks allow 3 weeks
Shipping & handling \$2.50
Colorado Residents add Sales Tax



VIC-20 IS A TRADEMARK
OF COMMODORE BUSINESS MACHINES



"SMART TERMINAL" TELECOMPUTING POWER FOR VIC - 20 COMMODORE 64

"Smart-Term" does more than convert
your VIC or 64 to a null terminal, it
gives you features other programs
don't offer, such as:

- A PET to ascii conversion test mode
- Transmits all ascii control characters
- Transmits 122 ascii codes
- Receives 92 ascii codes
- Has repeat key feature
- Allows you to enter and save four permanent messages (up to 80 characters each) for one key, transmission of code, password, names, messages, etc.
- Easy to read, smooth scrolling characters
- Fully menu driven for reliability and ease of use
- Transmits and receives in separate character colors (selectable)
- Many other features

One of the best telecommunications programs
available, "Smart-Term" converts your VIC or 64
into a SMART TERMINAL. Requires minimum 3K
expansion.

TO ORDER: Specify VIC-20 or 64;
TAPE: \$16.95 or
DISK: \$18.95
(u.s. funds) + \$1.50 P&H

TO ORDER SEND CHECK OR MONEY ORDER. CHECK
NEED THREE WEEKS TO CLEAR. NO C.O.D.'s TO U.S.
CANADIAN ORDERS ADD 25% FOR CDN. FUNDS.

BYTE - RYTE
P.O. BOX 205, STATION CART,
MONTREAL, QUEBEC
H4K 2J5 CANADA

DEALER INQUIRIES INVITED

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

CASSETTES !!!

FOR YOUR COMPUTER
DIGITAL

- Computer Grade
- Wide Dynamic Range
- 100% Error Free
- 5 Screw Housing
- Fully Guaranteed
- Carefully Packed

All Prices Include U. S. Shipping
Phone Orders Add \$2.50 C.O.D. Fee

COMPUTER TAPE PRICES

Length	25 LOT	100 LOT	1000 LOT
C-5	.45/11.25	.35/35.00	30/300.00
C-10	.50/12.50	.35/35.00	30/300.00
C-20	.55/13.75	.40/40.00	35/350.00

BASF DPS Tapes Add .05 Cents Per Tape

- Custom Lengths Available -

... Write For Volume Prices...

- Norelco Cassette Cases and Labels -

[with Cassette Orders Only]

12-249 Cases .20 Ea.	250- .13 Ea.
12 Labels for .20	120 for 1.70
1000 Pinfeed Labels	14.50

SEND MONEY ORDERS OR CHECKS TO:

CASS-A-TAPES

Box 8123-E
Kansas City, MO 64112
816-444-4651

Understanding Sound On The Commodore 64 Part 1

Gregg Peele, Programming Assistant

This series will explore the Commodore 64's versatile sound features – the best found on any home computer. This month, there's a utility program which makes it much easier to design sounds on the 64 and add them to your own programs. The author, an editorial programmer for COMPUTE!'s Gazette, also is a graduate student in music.

In the premiere issue of COMPUTE!'s Gazette ("Enlivening Programs With Sound"), I wrote of the many fascinating uses for sound effects in programs. Delving even deeper into the subject, let's now discuss the special sound features of the Commodore 64 and the ways you can use these features in your own BASIC programs.

The Amazing SID Chip

The Commodore 64 has three independent *voices* (sound channels), each having one of four possible *waveforms* (tone colors). These voices, produced by the MOS 6581 SID (Sound Interface Device) chip, can be set up to simulate almost any sound. In fact, the capability of the SID chip has been compared to music synthesizers costing more than the entire Commodore 64. To understand how to use the SID chip effectively, a brief discussion of the nature of sound is necessary.

Some Sound Theory

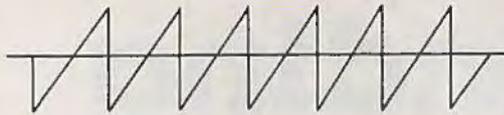
Most sounds in music and many sounds in nature have a defined *pitch*. Pitch is a way of describing how "high" or "low" a particular sound is.

The SID chip has a pitch range of nine octaves. This is about two octaves greater than a piano. When programming, these pitch values are formed from two *bytes* (a byte is a memory location which can hold a value of 0 to 255). This yields a range of more than 65,000 (256 x 256) possibilities of different pitch values for notes. The *pulse* waveform, one of the four waveforms available, allows an even broader range of pitch values.

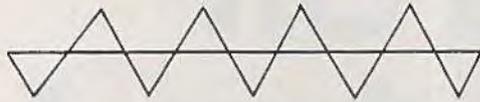
Waveforms

Since we've already mentioned waveforms a couple of times, maybe we should clarify exactly what a waveform is. Almost every sound consists of a pulsating motion generally referred to as vibration. Different materials vibrate in different patterns. This is one reason why the different instruments of the orchestra have unique tonal qualities. The SID chip is able to produce four different waveforms: triangle, sawtooth, pulse, and noise (see the figure). Each of these waveforms produces a unique sound and, along with pitch and envelope control, form the basis for sound synthesis on the Commodore 64.

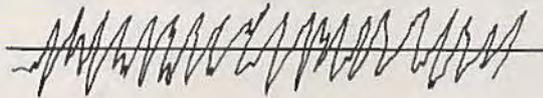
Commodore 64 Waveforms



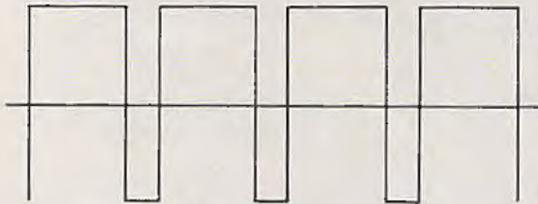
Sawtooth Waveform



Triangle Waveform



Noise Waveform



Pulse Waveform

A Stone's Throw

Sound waves, like waves from a stone thrown into a pond, constantly change. In fact, much of our ability to discern one sound from another is because of the unique pattern of change which "fingerprints" each sound. Some familiar examples are the different sounds produced when you strike something with a metal or rubber hammer. Much of the sound produced by the rubber hammer is absorbed within the hammer itself.

Envelopes

Most sounds follow a similar pattern through time. This pattern is the *envelope* (see photo of Program 1). First, the initial event which creates the sound sends the volume level rapidly upward. This section of the envelope, called the *attack*, may be the major defining factor of a sound. A hand clap consists almost entirely of the attack section.

After this initial attack, the volume level decreases during the *decay* section. After this decrease, the volume level stabilizes for a time in what is called the *sustain* section. The sound then begins its final descent which terminates in silence. This descent is the *release* portion of the sound.

The combination of attack, decay, sustain, and release is the envelope, sometimes called the

ADSR envelope. The SID chip provides a means to define the way a sound changes through time. This change is controlled with an *envelope generator*. The attack and decay sections are controlled within one byte – each using four bits (there are eight binary digits, or bits, in each byte). The values within this byte determine the rate that the volume changes through time. A low value for attack or decay indicates a short duration for that particular section. A larger value increases the duration of a particular section.

The sustain and release portions of the envelope also share one byte. However, sustain does not relate to a time value but to a volume level. The release section, like attack and decay, refers to a rate of change, and values for this section change the amount of time allocated for this change to occur.

Admittedly, all of this is not easy to understand at first. If you type in and run Program 1, you'll see and hear an animated demonstration of the ADSR envelope.

All Together Now

Producing sounds with the SID chip requires that certain *registers* (memory locations) within the chip contain values which represent the waveform, volume, and ADSR envelope. Also, there must be some provision for setting the length of the note. POKE commands in BASIC are used to place values for waveform, volume, and ADSR into their appropriate places.

The length of the sound is determined by using two BASIC FOR/NEXT loops as timers. The larger the value for the loops, the longer the length of the particular portion of the sound. The first loop determines the length of time allotted for the sustain portion of the sound, and the second loop determines the length of time allotted for the decay portion. The waveform byte turns the sound on. When turned off, it begins the decay, which ends the sound. One bit of that byte, referred to as the *gate bit*, is reserved for that purpose.

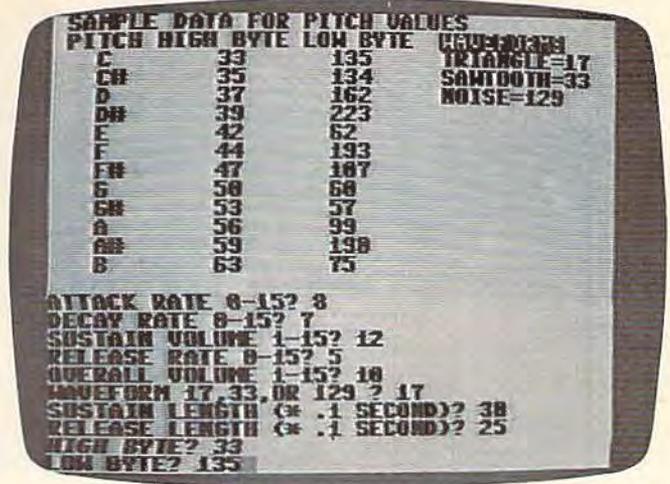
Here is the sequence of events: first the values for volume and ADSR are put in their proper places using the POKE command. Next, you turn on the sound by turning on the waveform byte with the gate bit set to 1. (This byte will always contain an odd value since the gate bit is the lowest bit in the byte.) Our FOR/NEXT loop is now used to provide a delay, which runs while the attack, decay, and sustain sections execute. When this loop finishes, we then replace the value that was in the waveform byte with an equivalent value minus one. This resets the gate bit and signals the release section to begin. The volume decreases until the sound is finally silent. Another FOR/NEXT loop allows the release section adequate time to execute.

An Example Program

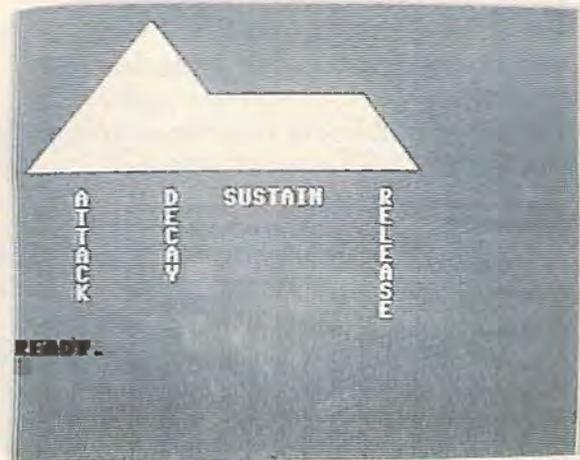
Does all of this sound hopelessly complicated? To best illustrate the waveforms, pitches, and the envelope generator, I have included a program that allows you to manipulate all the parameters mentioned and actually create your own sound routine for use in other programs. To use Program 2, merely enter the values for volume, waveform, ADSR (attack, decay, sustain, release), and values for the length of the sustain and release. (Remember, within the range of values given, the lower values represent either low volumes or shorter lengths of time for each section.)

You also must enter two values to define the pitch of the tone. These pitch values can be derived from the table of values displayed on the screen or from the tables in the *Commodore 64 Programmer's Reference Guide* (pages 384-86).

When you are prompted with the word "Again?", press "N" if you are pleased with the sound that you have produced, or "Y" if you wish to continue altering the sound. If you press "N", a subroutine will be created that you can add to your own programs. You will be prompted for the starting line number and the increment that you wish to leave between lines for the subroutine.



Program 1 visually and audibly demonstrates the "ADSR envelope" of a sound.



Program 2 makes it easier to experiment with sounds on the 64, and lets you add sounds to your own programs.

COMPUTE!'s Gazette Subscriber Services

Please help us serve you better. If you need to contact us for any of the reasons listed below, write to us at:

COMPUTE!'s Gazette
 P.O. Box 961
 Farmingdale, NY 11737

or call the Toll Free number listed below.

Change of Address. Please allow us 6-8 weeks to effect the change; send your current mailing label along with your new address.

Renewal. Should you wish to renew your Gazette subscription before we remind you to, send your current mailing label with payment or charge number or call the Toll Free number listed below.

New Subscription. A one-year (12-month) U.S. subscription to *COMPUTE!'s Gazette* is \$20 (2 years, \$36; 3 years, \$54. For subscription rates outside the U.S., see staff page). Send us your name and address or call the Toll Free number listed below.

Delivery Problems. If you receive duplicate issues of *COMPUTE!'s Gazette*, if you experience late delivery, or if you have problems with your subscription, please call the Toll Free number listed below.

COMPUTE!'s Gazette
800-334-0868
In NC 919-275-9809

Then your finished sound routine will appear on the screen. (Before you type "N", make sure you have saved the original program, because it will be erased.) You may now use this new sound routine in any program or save it on disk or tape for future use.

One Small Step

We have taken only the first step toward understanding the complexities and possibilities of the SID chip. The program uses only one of the Commodore 64's three voices, and we have yet to discuss some advanced applications of the SID chip's features. However, we have taken a large step in our quest to uncover the mechanics of sound synthesis on the Commodore 64.

See program listings on page 154. 

Speeding Up The VIC

Dan Carmichael, Assistant Editor

One animation technique frequently used in BASIC games is to repeatedly PRINT characters on the screen. This article shows how an easy-to-use machine language routine can speed up this process, and even make your keyboard respond faster *outside* of programs.

If you're writing games or programs which use the keyboard to move objects around the screen, the lack of speed may be your biggest complaint. However, if you're using the GET statement to move things about, there are ways to increase the speed greatly. This is done by manipulating the keyboard "controls" within the VIC-20 computer itself.

Keyboard Controls – How They Work

First, to make sure your VIC is set normally for this demonstration, you might want to turn it off and then on again to clear it.

Press the space bar, and continue to hold it down. The cursor will keep moving across the screen because the *operating system* – a control program inside the computer – tells the VIC to continue repeating this process, even though you pressed the space bar only once. Now press any alphabetical key, and continue to hold it down. We'll use the A key here (and from now on) for ease of reference. Even though you continue to hold it down, the A will not repeat itself. This is because the only keys that the VIC is programmed to repeat are the space bar, INSERT/DELETE, and the two cursor control keys.

Clear the screen by pressing SHIFT-CLR/HOME, and then enter POKE 650,128. Memory location 650 tells the operating system which keys to repeat. Normally it is set to 0, which allows

only the aforementioned keys to repeat. A value of 128 allows all the keys to repeat. Now if you press the A, it will repeat as the space bar did. Leave location 650 POKEd to 128 for now.

Speeding Up The Repeat

Press and hold the A key a few times, and notice that there is a pause of a fraction of a second before it starts to repeat. This pause is controlled by memory location 652, which is a *counter*. When you press the A key, this location contains a 15. Then it counts backward, in steps of ones, until it reaches 0, which signals the computer to begin the repeat process.

To shorten the pause, you might think you could simply POKE a number less than 15 into location 652. But because of the way the VIC's operating system works ("sweeping" through the computer 60 times every second resetting various parameters, etc.), location 652 will quickly be changed back to 15. However, you can use a program that will keep this location permanently loaded with a 0, thus eliminating the repeat pause. Enter Program 1 – a BASIC loader that will POKE a short machine language program into the cassette buffer (an area of usable memory). Verify it carefully, then run it by entering RUN 59998. Now the machine language program is POKEd into memory and ready to run. Enter SYS828 to start the machine language program.

Now if you press the A key, you will notice that it starts repeating immediately. With location 652 constantly reset to 0, there is no "countdown," and thus no pause.

By the way, if you make a mistake while entering one of the machine language programs and are forced to turn your VIC off/on to recover, remember to rePOKE 650,128 before continuing this article.

Another location which will help you speed up your program is memory address 651. This location is also a counter, and it determines the time delay between the printing of each character when repeating. Location 651 uses the same countdown technique that 652 does, except it starts at 4 instead of 15. While repeating, it counts down to 1, prints the character, and then cycles down again. In other words, it counts "4-3-2-1-PRINT character," "4-3-2-1-PRINT character," etc.

As with location 652, you cannot shorten the time delay by POKEing a value less than 4 into location 651. The operating system "sweeps" through 651 also, and restores it to 4 every sixtieth of a second. But again, we can load a program to circumvent this problem.

Type in Program 2, which is another machine language program. This program modifies both locations (651 and 652) and speeds up the whole repeat process. Verify your typing carefully, then enter RUN 59997 to POKE the machine language program into memory. Enter SYS828 to start the machine language program. Now press the letter A, and notice how much faster it repeats. Compare this to the normal speed by pressing the RUN/STOP and RESTORE keys simultaneously (to stop the machine language program) and then pressing the A key.

Program 2 can be added to your own BASIC programs and will help speed things up for you.

However, two things should be noted about this program. First, after the initial BASIC program has been run, and the machine language program has been successfully POKEd into memory, you may delete lines 59997-59999. They are not needed. Second, because the machine language program runs in the cassette buffer, you cannot use the cassette recorder while the machine language program is running. Press RUN/STOP-RESTORE to disable the program before using the recorder.

Program 3 is optional. It is a program that uses the GET statement to move the ball character (CHR\$(81)) around the screen. It is written to utilize the machine language speed-up routine. You can either add it to your existing BASIC program or build your own BASIC program around it.

How To Use Program 3

Carefully type in Programs 2 and 3. If you wish to save memory by changing the line numbers in Program 3, you may do so, but remember to change the corresponding GOTOs, etc. If you want to change the character that moves around the screen, this is controlled by the variable H in line 60000.

To run the program, first enter RUN 59997 to POKE the supporting machine language routine into memory, then enter RUN 60000 to execute

the BASIC program. These keys control the character's movement:

Key	Movement
W	←
R	→
P	↑
*	↓

Line 60050 is optional. Without it, the movement of the ball will increase in speed slightly, but the ball will blink, which you may or may not find desirable.

See program listings on page 155. ☐

COMPUTE!'s Gazette
Toll Free Subscription Order Line
800-334-0868
In NC 919-275-9809

COMSTAR AIR* SHIPPING WITHIN 2 DAYS
SEND \$1.00 FOR COMPLETE LIST

COMMODORE

GX 100 PRINTER (80 COLUMN)	225
PRINTER INTERFACE (PARALLEL)	59
TOTL LABEL (T) (VIC OR 64)	17
GRIDRUNNER (C) (VIC OR 64)	29
ELEPHANT DISKS (BOX OF 10)	21
VIC RABBIT (EASTERN HOUSE) (VIC OR 64)	35
HES MODEM (WITH SOFTWARE) (VIC OR 64)	69
HES MON ASSEMBLER (C) (VIC OR 64)	29
DUST COVER	7
QUICK BROWN FOX (C) (VIC OR 64)	54

COM-64		VIC-20	
WORDPRO 3 + (D)	69	16K RAM	59
VIDEOPAK 80 (80 COLUMN)	159	CARDBOARD (3 SLOT EXP.)	33
Z-80 VIDEOPAK (WITH CPM)	259	VIDEOPAK (40/80 COLUMNS)	89
6502 PROF. DEV. SYSTEM (T)	23	HESWRITER (C)	29
ROBBERS OF LOST TOMB (D.T)	21	TURTLE GRAPHICS (C)	29
LASER STRIKE (T)	22	VIC FORTH (C)	46
ELEMENTARY 64 (BOOK)	14	CHOPLIFTER (C)	33
64 FORTH (C)	46	SHAMUS (C)	29
JUMP MAN (D.T)	29	SCORPION (C)	29
KINDERCOMP (D)	23	SPIDER CITY (C)	29
FORT APOCALYPSE (D.T)	26	SWORD OF FARGOAL (T) 21K	23
ZORK I (D)	29	KIDS AND THE VIC (BOOK)	17
FROGGER (D.T)	26	VIC GRAPHICS (BOOK)	12
ANNIHILATOR (T)	18	NEWPORT PROSTICK	23
TEMPLE OF APSHAI (D.T)	29	TYPE ATTACK (C)	29

C = CARTRIDGE D = DISK T = CASSETTE * MOST ITEMS

COMSTAR **ORDERS ONLY: 800-558-8803**
P.O. BOX 1730 GOLETA, CA 93116 or send check or money order. VISA, MC add
(805) 964-4660 3%. Shipping—\$2 for software (call for
hardware). Call! add 6% tax. COD add \$2.50.

NEWS & PRODUCTS

Two-Keystroke Commands

Disk Support, a 1K machine language extension that adds 12 new commands to the VIC-20 or Commodore 64, is available from H & H Enterprises.

With the program, you can SAVE, SAVE WITH REPLACE, LOAD, VERIFY, DELETE, and RENAME disk files with two keystrokes. Other two-keystroke commands allow you to INITIALIZE, FORMAT, or RENAME a diskette, EXECUTE and program on the disk, print ERROR messages to the screen, and list the disk directory without affecting what's in memory.

Disk Support, which is compatible with memory expansion cartridges, works with single and dual disk drives. The program sells for \$14.95.

H & H Enterprises
5056 North 41st St.
Milwaukee, WI 53209

Detective Adventure

Shamus, a well-received Atari adventure program from Synapse Software, has been licensed by Human Engineered Software for the VIC-20.

In the game, Shamus battles hordes of robot henchmen while searching a series of treacherous

mazes for the keys that will lead him to the Shadow. The game, which is available on cartridge for \$39.95, requires an investment of time and practice to master.

HES also is introducing *Coco 2*, a game that teaches the fundamentals of computer game design, for the 16K VIC and 64. *Coco 2*, which introduces the user to control of color, sound, weapons, and objects, as well as scoring and game speed, is available for \$39.95 for the VIC version, and \$44.95 for the Commodore 64 version.

Human Engineered Software
71 Park Lane
Brisbane, CA 94005

The Magic Of Numbers

Arith-Magic, an interactive math study program that has been available for the PET, TRS-80, and Apple computers, is now available in a Commodore 64 version.

The package includes three programs that help students learn mathematical theory in a game-like setting. In *Diffy*, students work with the differences between successive pairs of numbers. In *Tripuz*, students learn the identity of three numbers hidden within a triangle. And *Magic Squares* produces nine-element squares in which the numbers in each row, column,

and diagonal add up to the same sum. In working with *Magic Squares*, the student develops an intuitive understanding of averages and arithmetic sequences.

Arith-Magic, produced by Quality Educational Designs, is available on tape and disk for \$35. Quality Educational Designs
P.O. Box 12486
Portland, OR 97212
(503)287-8137

Home Accounting, Auto Maintenance Software

Softsync, a company known for its Timex/Sinclair products, has jumped into the Commodore 64 market. Its first two products are *Personal Accountant* and *Computer Mechanic*.

Personal Accountant offers 144 user-defined accounts, including savings, checking, loans, mortgage payments, credit cards, and budgeting. The program also includes functions for detailed forecasting and the preparation of profit/loss statements. It is available for \$34.95 on disk, or \$29.95 on tape.

Computer Mechanic records service information for more than 20 makes and models of automobiles. The program

COMPUTE!'s First Book Of VIC

Authors: COMPUTE! Magazine contributors
Price: \$12.95
On Sale: Now

Finally, it's VIC's turn!

Users of other popular personal computers have been enjoying their **COMPUTE! Books: COMPUTE!'s First Book Of PET/CBM, Programming The PET/CBM,** and others.

Now, there's a book devoted exclusively to the Commodore VIC-20™ Computer: **COMPUTE!'s First Book Of VIC.**

The editors of **COMPUTE!** Magazine – the leading resource for the VIC-20 – gathered together the best VIC-20 articles published since the summer of 1981 and added some new material. The result is more than 200 pages of valuable information – information that goes beyond the instruction manuals. In the **COMPUTE!** tradition, it is carefully edited to be easily understood and useful for beginners and experts alike.

COMPUTE!'s First Book Of VIC is spiral-bound to lie flat, and includes ready-to-type program listings and articles such as "The Joystick Connection: Meteor Maze," "STARFIGHT3," "Train Your PET To Run VIC Programs," "Renumber BASIC Lines The Easy Way," "High Resolution Plotting," "Custom Characters For The VIC," "VIC Memory – The Uncharted Adventure," and "A Simple Monitor For The VIC."

At only \$12.95, less than most computer manuals, *COMPUTE!'s First Book Of VIC* is among the best resources a VIC user can own.

Available at computer dealers and bookstores nationwide. To order directly call TOLL FREE 800-334-0868. In North Carolina call 919-275-9809. Or send check or money order to **COMPUTE! Books**, P.O. Box 5406, Greensboro, NC 27403.

Add \$2 shipping and handling. Outside the U.S. add \$5 for air mail, \$2 for surface mail. All orders prepaid, U.S. funds only. VIC-20 is a trademark of Commodore Electronics Limited.

v Introduction	Robert Lock
Chapter One: Getting Started.	
3 The Story Of The VIC	Michael S. Tomczyk
11 Computer Genesis:	
From Sticks And Stones To VIC	Dorothy Kunkin Heller / David Thornburg
20 Super Calculator	Jim Butterfield
24 Large Alphabet	Doug Ferguson
26 Using A Joystick	David Malmberg
39 Extended Input Devices:	
Paddles And The Keyboard	Mike Bassman / Salomon Lederman
46 Game Paddles	David Malmberg
Chapter Two: Diversions – Recreation And Education.	
59 The Joystick Connection: Meteor Maze	Paul L. Bupp / Stephen P. Drop
67 ZAPII	Dub Scroggin
72 STARFIGHT3	David R. Mizner
78 Alphabetizer	Jim Wilcox
80 Count The Hearts	Christopher J. Flynn
Chapter Three: Programming Techniques.	
89 PRINTing With Style	James P. McCallister
97 Train Your PET To Run VIC Programs	Lyle Jordan
99 User Input	Wayne Kozun
103 Amortize	Amihai Glazer
106 Append	Wayne Kozun
109 Printing The Screen	C. D. Lane
113 The Confusing Quote	Charles Brannon
115 Alternate Screens	Jim Butterfield
119 Timekeeping	Keith Schleiffer
125 Renumber BASIC Lines The Easy Way	Charles H. Gould
127 Automatic Line Numbers	Jim Wilcox
129 Putting The Squeeze On Your VIC-20:	
Getting The Most Out Of 5000 Bytes	Stanley M. Berlin
141 An Easy Way To Relocate VIC Programs	
On Other Commodore Computers	Greg and Ross Sherwood
Chapter Four: Color And Graphics.	
147 Kaleidoscope And Variations	Kenneth Knox
148 High Resolution Plotting	Paul F. Schatz
154 VIC Color Tips	Charles Brannon
157 The Window	Charles Brannon
160 Custom Characters For The VIC	David Malmberg
Chapter Five: Maps And Specifications.	
173 How To Use The 6560 Video Interface Chip	Dale Gilbert
179 Browsing The VIC Chip	Jim Butterfield
186 VIC Memory – The Uncharted Adventure	David Barron / Michael Kleinert
189 Memory Map Above Page Zero	Jim Butterfield
Chapter Six: Machine Language.	
195 TINYMONI: A Simple Monitor For The VIC	Jim Butterfield
202 Entering TINYMONI Directly Into Your VIC-20	Russell Kavanagh
211 Index	

teaches the basics of auto mechanics and allows you to record service information on as many as 100 cars. The program is available for \$26.95 on disk, or \$21.95 on tape.

Softsync plans to introduce game and utility programs for the 64 in the near future.

Softsync, Inc.
14 East 34 St.
New York, NY 10016
(212)685-2080

Business Utility Package

Superbyte Software has gathered several business applications and utility programs together on disk in a package called the *Business Pack*.

Included in the \$100 package are: The Accountant, a general ledger, income statement, and balance sheet; Accounts Receivable/Payable, a journal for current and paid accounts; The Editor, a word processor; Spread Sheet Calc, a spread sheet/calculating program; Business Inventory, an inventory control system; Checkbook Mate, a checkbook maintenance and check-writing program; The Mailman, an address file.

In addition, the package contains the following utilities: a profit margin calculator, a business calendar and data base, and programs for linear regression analysis, depreciation, and amortization.

Business Pack is available for the Commodore 64 and 8K VIC-20.

Superbyte Software
2 Chipley Run
West Berlin, NJ 08091
(609)346-3063

Learn Russian

A beginning Russian course for the unexpanded VIC-20 is available from Russian Software.

The \$23.95 program provides the user with a Russian screen typing font and introduces the beginner to the Russian alphabet and basic vocabulary.

Russian Software
Box 36, 1744 W. Devon
Chicago, IL 60660

Business And Pleasure

T & F Software has released a checkbook program for the Commodore 64 and VIC-20, as well as a space action game for the 64 and a series of word search games for the VIC-20 and 64.

CheckEase!, which requires an 8K VIC or 64, can be used with multiple accounts. Checks can be deleted or the amounts can be changed, and the program will update all balance figures. Printouts can be made by check number, category, or by tax deductible items.

CheckEase! is available for \$24.95 for the VIC-20 version, \$29.95 for the 64 tape version, and \$34.95 for the 64 disk version.

Another new T & F program is *Space Sentinel*. In the game,

you defend the planet Earth against a group of aliens who hurl heat missiles at our polar ice caps. If you fail, the melting ice caps flood the planet. The game is available on disk for \$29.95.

The company's Search Series consists of *Word Search*, *Sport Search*, and *Arcade Search*, all on cassette for \$19.95.

Each game puts 374 letters on the screen and gives you ten minutes to find the 20 hidden words. There are three categories for each game.

T & F Software Company
10902 Riverside Drive
North Hollywood, CA 91602
(213) 501-5845

Auxiliary Keyboard

Gosub International has developed a 20-key auxiliary keyboard for the Commodore 64 or expanded VIC-20. The system consists of the keypad and a 330-byte driver program.

The Flexikey System is designed to enhance data entry on Commodore computers. The system allows the user to define key values. Nineteen of the 20 keys can be programmed with up to three values. The 20th key, the PROG key, is used to switch among the three modes.

In the first two modes, each key can be defined as any single key on the Commodore keyboard. In the third mode, the programmed function mode, the definitions may be up to three bytes long. On initialization, mode one is defined to be useful

as a calculator; mode two is set up with definitions useful to machine language programmers.

Keyboard definitions for the Flexikey System, which sells for \$69.95, can be saved and reloaded.

Gosub International, Inc.
501 E. Pawnee, #430
Wichita, KS 67211

Expansion For VIC

Century Micro has produced a 64K expansion cartridge for the VIC-20. The cartridge includes

64K of RAM organized as two sets of blocks 1,2,3, and 5. Programs can be stored and accessed in either set, and all eight banks are software selectable.

Century Micro's cartridge is available for \$199.95.

Century Micro
1832 Tribute Road
Suite 213
Sacramento, CA 95815
(916) 920-3656

Pair Of Printers

Cardco has developed two new printers for the VIC-20 and Commodore 64.

The Cardprinter/LQ1 is a letter quality daisy-wheel printer. It prints at 14 characters per second in either red or black and includes bold, shadow, and underline printing in normal or proportional modes. The printer is expected to sell for \$599.95. Options for a tractor feeder, cut-sheet feeder, or keyboard for direct printing are available.

The Cardprinter/DM1 is a small dot matrix impact printer. It is capable of printing 40 columns of text on 3-inch adding machine paper. Cardprinter/DM1, which will sell for \$149.95, has a print speed of 50 characters per second, and can print full



for VIC-20 and Commodore 64

ARE YOU A SMART BUYER?

MINI JINI™ for \$89.95 is a smart buy!

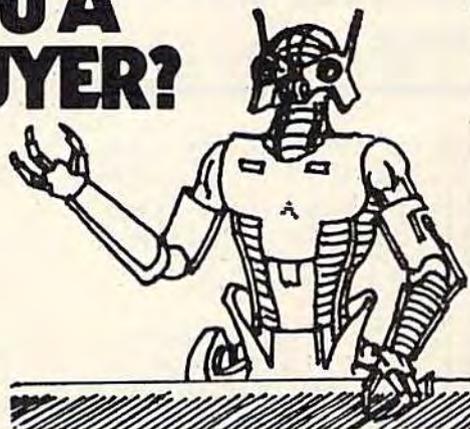
- Keep records for home, school, club, or office better and more quickly than by hand
- Hold 50-500 records on tape or disk
- Have the plug in ease of a cartridge
- Put addresses, books, and more in order
- Track appointments, meetings, valuables
- Print any number of reports and labels
- Do checkbook, class or sports statistics
- Make lists for letter writing software

Available now, in plain, simple English.

- Visa — Mastercharge — C.O.D.
- Dealer inquiry welcome

Immediate shipment if in stock. If personal check is sent, allow additional 2 weeks. Prices subject to change. Shipment subject to availability. Ships UPS fr collect.

Commodore 64 and VIC-20 are registered trademarks of Commodore Electronics, Ltd.



JINI MICRO-SYSTEMS, INC.

P.O. Box 274 • Riverdale, N.Y. 10463
PHONE: (212) 796-6200

Commodore graphics and full high-resolution dot addressable graphics.

Cardco, Inc.
313 Mathewson Ave.
Wichita, KS 67214
(316)267-6525

VIC Games

Synapse Software, a producer of games for Atari computers, has established the Showcase Software line for the VIC-20.

The initial games produced are *Astro-Patrol*, a shoot-em-up game; *Squeeze*, a humorous game set on a farm; and *Salmon Run*. Each game sells for \$19.95.

Synapse Software
5221 Central Avenue, #200
Richmond, CA 94804

Beat The Dealer

M-R Information Systems has produced a blackjack game for the VIC-20. *MicRo Blackjack*, which requires at least 3K expansion, is available on cassette for \$14.95.

M-R Information Systems, Inc.
P.O. Box 73
Wayne, NJ 07470
(201)696-3296

Computer Hypnosis

The Hypnotist II for the Commodore 64 has been released by Psycom Software International.

The program contains five major modules: introduction

and vital data gathering; relaxation and stress reduction through biofeedback; trance induction; neural reprogramming and suggestion; and return to consciousness.

The Hypnotist II will sell for \$59.90 and includes a biofeedback device which can be used with other Psycom products.

Psycom Software International
2118 Forest Lake Drive
Cincinnati, OH 45244

VIC's Voice

Speakeasy is a voice synthesizer designed to allow voice to be added to adventure and cartridge games on the VIC-20. It comes in a cartridge that plugs into the VIC's expansion port.

Discover With Benji

Benji, the dog made famous in children's TV adventure movies, has been incorporated into a series of educational computer games by Human Engineered Software.

In *Benji - Space Rescue*, the dog is sent on a rescue mission in space. Children playing the program will be introduced to the solar system while helping Benji complete his mission.

The game is available for the VIC-20 and Commodore 64 for \$44.95. Versions for other computers are planned.

Human Engineered Software
71 Park Lane
Brisbane, CA 94005



Benji, the movie star dog, has become a computer game star.

The synthesizer, produced by Personal Peripheral Products, can be programmed from BASIC or machine language by POKEing to only one address. The package includes an editor that allows the user to append, insert, and delete phonemes in strings to create phrases and sentences.

The 256 phoneme buffer can be stored on tape or disk. The *Speakeasy* cartridge, including the editor tape, sells for \$79.

Personal Peripheral Products
P.O. Box 3423 Fox Valley Mall
Aurora, IL 60505

Mapping Memory

The *Master Memory Map*, a reference guide to computer memory, is available in VIC-20 and Commodore 64 versions from Educational Software.

The book includes sections on PEEKing and POKEing, paddles and joysticks, color locations, single and multiple sound registers, graphics registers, and sprites.

The VIC version is available for \$9.95; the 64 version is available for \$14.95.

Educational Software, Inc.
4565 Cherryvale Ave.
Soquel, CA 95073
(408)476-4901

Mailing List

Galactic Software has announced a mailing list program that can double as a small data base manager.

'20 *Mailing List* allows alphabetizing on entry, sorting and searching in all fields, printing labels or complete records. Each entry can contain name, address, and three comment fields.

The program, which is menu driven, requires at least 16K expansion. It is available on tape for \$25.95, or disk for \$27.95.

Galactic Software
P.O. Box 10516
San Jose, CA 95157
(408)247-4434

Extra VIC Port

MFJ Electro Enterprises has produced an add-on port to allow the VIC-20 to use a second joystick.

The port is available for \$21.50 and includes programming instructions and a sample two-player game. The sample game requires 3K or 8K expansion to run.

MFJ Electro Enterprises
P.O. Box 13076
Kanata, Ontario
Canada K2K 1X3

VIC Graphics

Hayden Book Company has published *VIC Graphics*, a detailed explanation of the high-resolution graphics capabilities of the VIC-20.

The book, written by Nick Hampshire, includes 38 BASIC program listings on applications from art and games to education

and business. The programs require the use of the VIC Super Expander cartridge.

VIC Graphics, a 192-page book, sells for \$12.95.

Hayden Book Company, Inc.
50 Essex St.
Rochelle Park, NJ 07662
(201)843-0550

COMPUTE!'s Gazette for Commodore welcomes announcements of new products for VIC-20 and Commodore 64 computers, especially products aimed at beginning to intermediate users. Please send press releases and photos well in advance to: Tony Roberts, Assistant Managing Editor, COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, NC 27403.

New product releases are selected from submissions for reasons of timeliness, available space, and general interest to our readers. We regret that we are unable to select all new product submissions for publication. Readers should be aware that we present here some edited version of material submitted by vendors and are unable to vouch for its accuracy at time of publication. ☐

Writers,
programmers...

COMPUTE!'s
Gazette
is looking for
articles on the
VIC and 64.

Bug-Swatter:

Modifications And Corrections

• Several problems with the Commodore 64 version of the "Skydiver" game in our Premier Issue have been brought to our attention by readers. When tracking down the cause of the problems, we discovered that the Commodore 64 listing was not the programmer's final version. Rather than reprint the entire listing, we are printing the lines which need to be changed or added. This way, readers who have already typed in the program don't have to compare their version line by line with the correct version.

To fix Commodore 64 Skydiver, change or add these lines:

```

12 A(1)=1191:A(2)=1200:A(3)=1210
16 PRINT"{HOME}{3 RIGHT}SCORE:{3 SPACES}";
200 B=1144+A:T=INT(RND(TI)*8+1):T=T+1
220 POKEB,CH:POKEB,32:B=B+40
3010 IFP=1THENIFB=1831ORB=1832ORB=1833ORB
=1834 THENPOKEB,CH:GOTO4000
3020 IFP=2THENIFB=1842ORB=1843ORB=1844TH
ENPOKEB,CH:GOTO4050
3030 IFP=3THENIFB=1854ORB=1855ORB=1856ORB
=1857ORB=1858THENPOKEB,CH:GOTO4100
4000 PRINT"{HOME}{8 DOWN}{10 RIGHT}5 X";B
O;"=";5*BO
5040 FORI=1944TO2023:POKEI+T7,6:POKEI,160
:NEXT
5053 IFNJ>=NETHENBO=BO+50:PRINT"{HOME}
{5 RIGHT}{8 DOWN}{3 RIGHT}BONUS ADVA
NCE TO{RED}";BO:PRINT"{BLU}"
5056 PRINT"{HOME}{3 DOWN}{8 RIGHT}";"WIND
:";SD"TO ";D$:GOSUB50000
5057 FORK=1TO100:NEXT:PRINT"{HOME}
{3 DOWN}[25 SPACES]"
5060 FORI=1104TO1904STEP40:POKEI,96:POKEI
+39,96:NEXT
10100 FOR P=1 TO VA/10:SC=SC+10:PRINT"
{HOME}{BLU}SCORE:{RED}";SC:NEXT
12000 PRINT"{HOME}{8 DOWN}{6 RIGHT}SORRY
NO BONUS!":BA=BA-1
50010 PRINT"{HOME}{6 RIGHT}{4 DOWN}{RED}
5X{7 SPACES}10X{7 SPACES}2X{BLU}":P
=1:Z=P
50025 POKEA(P),PEEK(A(P))+128AND255:PRINT
50028 PRINT"{HOME}{5 DOWN}{9 RIGHT}";
50029 PRINT"{7 RIGHT}{DOWN}{2 SPACES}";TA
B(10);"{2 SPACES}{3 LEFT}";TM:IFTM=
0THENP=INT(RND(TI)*3+1):GOTO50100
50035 IFFR=0THEN50100
50120 PRINT"{HOME}{7 RIGHT}{13 DOWN} YOU
MUST LAND ON ";A$
60000 PRINT"{HOME}{7 DOWN}{10 RIGHT}GAME
OVER":IFSC>HITHENHI=SC
60100 POKE53281,1:POKE53280,6{3 SPACES}:
PRINT"{CLR}{4 DOWN}{11 SPACES}{BLK}
SKY DIVER"

```

Remember to consult last month's "Bug-Swatter" about proper spacing in line 100 for both

the 64 and VIC versions of Skydiver. Spacing is critical in this and many other game programs; some readers are mistakenly omitting the space immediately before the left-cursor symbol in line 120 of the VIC version. Also, the unexpanded VIC and 64 versions do not have sound effects — only the VIC Super Expander version.

• Speaking of proper spacing, our printer made it appear that quite a few spaces should be typed on line 6000 of the VIC-20 "Snake Escape," July issue. Actually, no spaces should be typed between the SHIFTed V's.

• There are several corrections to the Commodore 64 version of "The Viper," August issue. On lines 570 and 610, [LOWER] should be entered as CHR\$(14). This shifts the computer into lower-case mode. On line 690, the number 320 should be substituted for the open parens and CTRL-P. Here is the corrected version:

```

690 FORJ=1TODT:POKESC+80+I*320+MA(J)+C,3:
POKESC+MA(J)+80+I*320,160:NEXTJ

```

In some August issues, a tiny spec of dust introduced in the production process makes the SYS statement in line 1020 hard to interpret. The correct statement is SYS893. Finally, in line 1420, the printer apparently burped and threw a question mark into the DATA statement. The question mark should be omitted; the correct number is 197.

• In the September issue, there were two typographical errors in formulas in the "VICcreations" column. The last whole sentence at the bottom of page 78 should read: "(RND(1)*A)+B is the main body of our random number generator." On page 79, the second random number formula in the first column should read: "X=INT(RND(1)*100)+100." In both cases, an equals sign was incorrectly substituted for the last plus sign in the formulas.

• Reader Kim Pugh suggests a change to improve the Commodore 64 version of "Snake Escape," published in the July issue. To modify the program to work with a joystick plugged into port one instead of the keyboard, Pugh suggests changing these lines:

```

190 K=PEEK(56321)AND15:POKE198,0
200 IF K=11 THEN DR=-1:GOTO 250:REM LEFT
210 IF K=7 THEN DR=1:GOTO 250:REM RIGHT
220 IF K=14 THEN DR=-40:GOTO 250:REM UP
230 IF K=13 THEN DR=40:GOTO 250:REM DOWN

```

Delete line 4030 and change line 4040 to the following:

```

4040 PRINT"{DOWN}{BLK}PUSH THE JOYSTICK
IN THE DIRECTION YOU WISH TO MOVE."

```

We appreciate receiving both corrections and suggested modifications from readers. Please address them to:

Bug-Swatter
c/o COMPUTE!'s Gazette
P.O. Box 5406
Greensboro, NC 27403

A Beginner's Guide To Typing In Programs

What Is A Program?

A computer cannot perform any task by itself. Like a car without gas, a computer has *potential*, but without a program, it isn't going anywhere. Most of the programs published in *COMPUTE!'s Gazette* for Commodore are written in a computer language called BASIC. BASIC is easy to learn and is built into all VIC-20s and Commodore 64s.

BASIC Programs

Each month, *COMPUTE!'s Gazette* for Commodore publishes programs for both the VIC and 64. To start out, type in only programs written for your machine, e.g., "VIC Version" if you have a VIC-20. Later, when you gain experience with your computer's BASIC, you can try typing in and converting certain programs from another computer to yours.

Computers can be picky. Unlike the English language, which is full of ambiguities, BASIC usually has only one "right way" of stating something. Every letter, character, or number is significant. A common mistake is substituting a letter such as "O" for the numeral "0", a lowercase "l" for the numeral "1", or an uppercase "B" for the numeral "8". Also, you must enter all punctuation such as colons and commas just as they appear in the magazine. Spacing can be important. To be safe, type in the listings *exactly* as they appear.

Brackets And Special Characters

The exception to this typing rule is when you see the curved bracket, such as "{DOWN}". Anything within a set of brackets is a special character or characters that cannot easily be listed on a printer. When you come across such a special statement, refer to "How To Type In *COMPUTE!'s Gazette* Programs."

About DATA Statements

Some programs contain a section or sections of DATA statements. These lines provide information needed by the program. Some DATA statements contain actual programs (called machine language); others contain graphics codes. These lines are especially sensitive to errors.

If a single number in any one DATA statement is mistyped, your machine could "lock up," or "crash." The keyboard and STOP key may seem "dead," and the screen may go blank. Don't panic - no damage is done. To regain control, you have

to turn off your computer, then turn it back on. This will erase whatever program was in memory, so *always SAVE a copy of your program before you RUN it*. If your computer crashes, you can LOAD the program and look for your mistake.

Sometimes a mistyped DATA statement will cause an error message when the program is RUN. The error message may refer to the program line that READs the data. *The error is still in the DATA statements, though.*

Get To Know Your Machine

You should familiarize yourself with your computer before attempting to type in a program. Learn the statements you use to store and retrieve programs from tape or disk. You'll want to save a copy of your program, so that you won't have to type it in every time you want to use it. Learn to use your machine's editing functions. How do you change a line if you made a mistake? You can always retype the line, but you at least need to know how to backspace. Do you know how to enter inverse video, lowercase, and control characters? It's all explained in your computer's manuals.

A Quick Review

- 1) Type in the program a line at a time, in order. Press RETURN at the end of each line. Use backspace or the back arrow to correct mistakes.
- 2) Check the line you've typed against the line in the magazine. You can check the entire program again if you get an error when you RUN the program.
- 3) Make sure you've entered statements in brackets as the appropriate control key (see "How To Type *COMPUTE!'s Gazette* Programs" elsewhere in the magazine.)

*We regret that we are not able to respond to individual inquiries about programs, products, or services appearing in *COMPUTE!'s Gazette* for Commodore due to increasing publication activity. On those infrequent occasions when a published program contains a typo, the correction will appear in the magazine, usually within eight weeks. If you have specific questions about items or programs which you've seen in *COMPUTE!'s Gazette* for Commodore, please send them to Gazette Feedback, P.O. Box 5406, Greensboro, NC 27403.*

How To Type In COMPUTE!'s Gazette Programs

Many of the programs which are listed in *COMPUTE!'s Gazette* contain special control characters (cursor control, color keys, inverse video, etc.). To make it easy to know exactly what to type when entering one of these programs into your computer, we have established the following listing conventions.

Generally, any VIC-20 or Commodore 64 program listings will contain bracketed words which spell out any special characters: {DOWN} would mean to press the cursor down key. {5 SPACES} would mean to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing the other key), the key would be underlined in our listings. For example, S would mean to type the S key while holding the shift key. This would appear on your screen as a "heart" symbol. If you find an underlined key enclosed in braces (e.g., {10 N}), you should type the key as many times as indicated (in our example, you would enter ten shifted N's).

If a key is enclosed in special brackets, {key}, you should hold down the *Commodore key* while pressing the key inside the special brackets. (The Commodore key is the key in the lower left corner of the keyboard.) Again, if the key is preceded by a number, you should press the key as many times as necessary.

Rarely, you'll see a solitary letter of the alphabet enclosed in braces. These characters can be entered on the Commodore 64 by holding down

the CTRL key while typing the letter in the braces. For example, {A} would indicate that you should press CTRL-A. You should never have to enter such a character on the VIC-20, but if you do, you would have to leave the quote mode (press RETURN and cursor back up to the position where the control character should go), press CTRL-9 (RVS ON), the letter in braces, and then CTRL-0 (RVS OFF).

About the *quote mode*: you know that you can move the cursor around the screen with the CRSR keys. Sometimes a programmer will want to move the cursor under program control. That's why you see all the {LEFT}'s, {HOME}'s, and {BLU}'s in our programs. The only way the computer can tell the difference between direct and programmed cursor control is the quote mode.

Once you press the quote (the double quote, SHIFT-2), you are in the quote mode. If you type something and then try to change it by moving the cursor left, you'll only get a bunch of reverse-video lines. These are the symbols for cursor left. The only editing key that isn't programmable is the DEL key; you can still use DEL to back up and edit the line. Once you type another quote, you are out of quote mode.

You also go into quote mode when you INSERT spaces into a line. In any case, the easiest way to get out of quote mode is to just press RETURN. You'll then be out of quote mode and you can cursor up to the mistyped line and fix it.

Use the following table when entering cursor and color control keys:

When You Read:	Press:	See:	When You Read:	Press:	See:	When You Read:	Press:	See:
{CLEAR}	SHIFT CLR/HOME		{CYN}	CTRL 4		{7}	CTRL 7	
{HOME}	CLR/HOME		{PUR}	CTRL 5		{8}	CTRL 8	
{UP}	SHIFT ↑ CRSR ↓		{GRN}	CTRL 6		{F1}	F1	
{DOWN}	↓ CRSR ↓		{BLU}	CTRL 7		{F2}	F2	
{LEFT}	SHIFT ← CRSR →		{YEL}	CTRL 8		{F3}	F3	
{RIGHT}	→ CRSR →		{1}	CTRL 1		{F4}	F4	
{RVS}	CTRL 9		{2}	CTRL 2		{F5}	F5	
{OFF}	CTRL 0		{3}	CTRL 3		{F6}	F6	
{BLK}	CTRL 1		{4}	CTRL 4		{F7}	F7	
{WHT}	CTRL 2		{5}	CTRL 5		{F8}	F8	
{RED}	CTRL 3		{6}	CTRL 6				

The Automatic Proofreader

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs" and "A Beginner's Guide To Typing In Programs" that appear before the Program Listings. Also, see the article "Automatic Proofreader."

Program 1: The Automatic Proofreader For VIC

```
100 FOR I=828 TO 932:READ A:POKE I,A:NEXT
:PRINT"[CLR]{RVS}SYS 828{OFF} TO ACTI
VATE.{2 DOWN}"
110 POKE178,165:PRINT"SYS 828{HOME}":END
120 DATA169,75,141,36,3,169,3,141
130 DATA37,3,169,0,133,255,96,32
140 DATA14,242,133,252,134,253,132,254
150 DATA8,201,13,240,17,201,32,240
160 DATA5,24,101,255,133,255,165,252
170 DATA166,253,164,254,40,96,169,13
180 DATA32,210,255,165,214,141,165,3
190 DATA206,165,3,169,0,133,216,169
200 DATA19,32,210,255,169,18,32,210
210 DATA255,169,58,32,210,255,166,255
220 DATA169,0,32,205,221,169,0,133
230 DATA255,169,32,32,210,255,32,210
240 DATA255,173,165,3,133,214,76,98,3
```

Program 2: The Automatic Proofreader For The 64

```
100 FOR I=828 TO 932:READ A:POKE I,A:NEXT
:PRINT"[CLR]{RVS}SYS 828{OFF} TO ACTI
VATE.{2 DOWN}"
110 POKE178,165:PRINT"SYS 828{HOME}":END
120 DATA169,75,141,36,3,169,3,141
130 DATA37,3,169,0,133,255,96,32
140 DATA87,241,133,252,134,253,132,254
150 DATA8,201,13,240,17,201,32,240
160 DATA5,24,101,255,133,255,165,252
170 DATA166,253,164,254,40,96,169,13
180 DATA32,210,255,165,214,141,165,3
190 DATA206,165,3,169,0,133,216,169
200 DATA19,32,210,255,169,18,32,210
210 DATA255,169,58,32,210,255,166,255
220 DATA169,0,32,205,189,169,0,133
230 DATA255,169,32,32,210,255,32,210
240 DATA255,173,165,3,133,214,76,98,3
```

Oil Tycoon

Program 1: Oil Tycoon For VIC, Part I

```
10 REM OIL TYCOON :rem 5
20 PRINT"[CLR]":PRINT"{5 SPACES}INSTRUCTI
ONS":PRINT:PRINT"{PUR}JOYSTICK{BLU}:"
PRINT" RT & LT=MOVE RIG" :rem 138
30 PRINT" DOWN=DRILL":PRINT" UP=RETRACT P
IPE" :rem 80
40 PRINT:PRINT"{PUR}FIREBUTTON{BLU}:" W/ P
IPE;":PRINT" IN OIL OR SPACE=PUMP"
```

```
:rem 244
50 PRINT" IN DIRT=DROP DYNAMITE RETRACTED
=NEW MAN" :rem 110
60 PRINT:PRINT"WATCH OUT FOR {PUR}SHALE,
{3 SPACES}{RED}GAS {BLU}IN {YEL}EMPTY
{SPACE}SPACES"," {BLU}AND {RED}DEVILS
{SPACE}{BLU}IN {BLK}OIL" :rem 145
70 PRINT:PRINT"{BLU}PLEASE WAIT FOR"," FU
RTHER INSTRUCTIONS" :rem 57
80 POKE52,28:POKE56,28:POKE45,248:POKE46,
26:CLR :rem 28
90 FORA=7168TO7375:READB:POKEA,B:NEXT
:rem 70
100 DATA2,138,164,73,74,52,20,8,64,81,37,
146,82,44,40,16,24,24,36,60,90,102,23
1,153 :rem 25
110 DATA20,42,42,20,62,73,20,20,136,34,13
6,34,136,34,136,34,148,22,148,34,136,
34,136,34 :rem 209
120 DATA148,22,148,22,148,34,136,34,148,2
2,148,22,148,22,148,22,136,62,188,62,
188,62,188,22 :rem 197
130 DATA170,170,170,170,170,170,170,170,1
50,150,150,170,170,170,170,170,150,15
0,150,150,150 :rem 134
140 DATA170,170,170,150,150,150,150,150,1
50,150,150,190,190,190,190,190,19
0,150 :rem 7
150 DATA0,0,0,0,0,0,0,0,20,20,20,0,0,0,0,
0,20,20,20,20,20,0,0,0,20,20,20,20,20
,20,20,20 :rem 36
160 DATA20,60,60,60,60,60,60,20,0,60,60,6
0,60,60,60,0,0,0,0,255,255,0,0,0
:rem 233
170 DATA218,118,181,153,110,93,197,65,65,
82,150,85,121,181,150,173,2,106,129,2
0,64,162,129 :rem 137
180 DATA2,169,128,141,19,145,169,0,133,13
6,34,136,34,136,34,136,34 :rem 229
190 FORA=7424TO7640:POKEA,PEEK(25600+A):N
EXT :rem 114
200 FORA=7464TO7529:READB:POKEA,B:NEXT
:rem 111
210 DATA169,128,141,19,145,169,0,133,1,13
3,2,169,127,141,34,145,162,119,236,32
,145 :rem 242
220 DATA208,4,169,1,133,1,169,255,141,34,
145,162,118,236,17,145,208,4,169,22,1
33,1 :rem 238
230 DATA162,110,236,17,145,208,4,169,1,13
3,2,162,122,236,17,145,208,4,169,22,1
33,2,96 :rem 124
240 LOAD :rem 182
```

Program 2: Oil Tycoon For VIC, Part II

```
1 REM PROG 2 :rem 127
2 PRINT:PRINT" PRESS STOP ON TAPE"
:rem 100
3 IFPEEK(37137)<100THEN3 :rem 108
4 POKE36879,30:POKE36878,47:DIMA%(21):W=7
768 :rem 235
5 IFZ>B%(T)THENB%(T)=Z :rem 58
6 POKE36869,240:PRINT"{CLR}{RED}
{3 SPACES}"T,"$Z*100"{BLU}" :rem 81
7 PRINT:PRINT" LEVEL","HIGH SCORE":rem 83
8 FORA=1TO8:PRINT:PRINT"{3 SPACES}"A,"$B
%(A)*100:NEXT:PRINT:PRINT" DIFF.LEVEL?
{SPACE}12345678{GRN}":T=1 :rem 11
9 SYS7464:POKE38852+T,6:T=T+PEEK(1)-PEEK(
2):IFT<LORT>8THENT=1 :rem 13
```

```

10 POKE38852+T,7:L=3:IFT/2=INT(T/2)THENL=
  2 :rem 8
11 S=20:IFT=3ORT=4ORT>6THENS=30 :rem 210
12 N=24:IFT>4THENN=25:L=L+1 :rem 111
13 IFPEEK(37137)>100THEN9 :rem 165
14 POKE36869,255 :rem 108
23 PRINT"[CLR]":M=5:Z=0:K=0:GOSUB87
  :rem 222
24 POKEW+X,14:X=10:M=M-1:P=20:Y=L:GOSUB82
  :IFM<0THEN5 :rem 238
25 GOSUB61:GOTO34 :rem 40
26 A=(R*22)+W+X:C=PEEK(A):P=P-1:GOSUB67
  :rem 122
27 IFC=NORC=3ORA>8185THENFORA=1TO3:GOSUB9
  9:NEXT:GOTO30 :rem 38
28 IFRND(1)<.06ANDC=14THEN78 :rem 133
29 FORB=1TO3:POKEA,C+B:GOSUB99:NEXT:R=R+1
  :rem 122
30 SYS7464:IFPEEK(1)=22ANDP>0THEN26
  :rem 112
31 IFPEEK(2)=22THEN40 :rem 207
32 IFPEEK(37137)<100THEN46 :rem 213
33 GOTO30 :rem 2
34 SYS7464:A=PEEK(1):B=PEEK(2):IFA=22THEN
  R=1:GOTO26 :rem 112
35 IFB=22THEN34 :rem 112
36 IFPEEK(37137)<100THEN24 :rem 213
37 IFA>0ORB>0THENPOKEW+X,14:X=X+A-B:IFX>2
  1THENX=21 :rem 173
38 IFX<0THENX=0 :rem 178
39 POKEW+X,2:GOTO34 :rem 173
40 IFR=1THEN34 :rem 73
41 R=R-1:B=(R*22)+W+X:C=PEEK(B):FORA=1TO3
  :POKEB,C-A:GOSUB99:NEXT :rem 216
42 P=P+1:GOSUB67:IFR=1THEN44 :rem 230
43 GOTO30 :rem 3
44 FORA=W+44TO8185:IFPEEK(A)=9THEN34
  :rem 188
45 NEXT:M=M+1:FORC=1TO3:GOSUB82:NEXT:GOSU
  B87:GOSUB61:GOTO34 :rem 126
46 J=Z:Q=R-1:FORA=0TO21:A%(A)=0:NEXT:B=(Q
  *22)+W+X:A=PEEK(B):IFA=7THEN69 :rem 42
47 A%(X)=1:POKE36877,252:POKE36878,36:V=W
  +X-22:IFA=12THENPOKEB,17:Z=Z+Q:POKEV,0
  :rem 11
48 E=0:F=20:D=1:G=1:I=1:GOSUB52:POKEV,1:E
  =21:F=1:D=-1:G=D:I=D:GOSUB52 :rem 147
49 E=0:F=21:D=1:G=-22:I=0:GOSUB52:POKEV,0
  :IFC=6THEN85 :rem 193
50 IFH=0THENPOKEV,14:POKE36877,0:POKE3687
  8,47:GOSUB82:GOSUB61:GOTO30 :rem 237
51 Q=Q-1:GOTO48 :rem 130
52 IFC=6THENRETURN :rem 187
53 H=0:FORA=ETOFSTEPD:IFA%(A)=0THEN60
  :rem 45
54 B=(Q*22)+W+A+G:C=PEEK(B) :rem 234
55 IFC=9ORC=12THENPOKEB,C+5:H=1:Z=Z+(Q+(A
  BS(I)-1)):A%(A+I)=1:GOTO59 :rem 204
56 IFC=14ORC=17THENA%(A+I)=1:H=1:GOTO60
  :rem 58
57 IFC=3THENC=6:RETURN :rem 173
58 A%(A+I)=0:GOTO60 :rem 31
59 IFRND(1)<.02ANDC<>12THENC=6:RETURN
  :rem 33
60 NEXT:RETURN :rem 191
61 PRINT"[HOME]"$"SPC(13)"$ "Z*100 :rem 99
62 A=INT(Z/1000):IFA=K+1THENK=K+1:GOSUB82
  :GOSUB82:M=M+1 :rem 109
63 IFM<1THENPOKE7680,14:GOTO65 :rem 84
64 FORA=7680TO7679+M:POKEA,2:NEXT:POKEA,1
  4 :rem 88
65 IFY=0THENPOKE7687,14:GOTO67 :rem 107
66 FORA=7687TO7686+Y:POKEA,19:NEXT:POKEA,
  14 :rem 163
67 IFP<1THENPOKE7702,14:RETURN :rem 146
68 FORB=7702TO7701+P:POKEB,17:NEXT:POKEB,
  14:RETURN :rem 159
69 A=W+X:B=240:IFY<1THEN30 :rem 55
72 A=A+22:C=PEEK(A):POKEA,C+1:IFC=14ORC=9
  THENPOKEA,C+4 :rem 18
73 POKE36875,B:FORD=0TO200:NEXT:D=PEEK(A+
  22) :rem 149
74 IFD<>4ANDD<>NANDD<>3ANDA<8164THENB=B-5
  :POKEA,C:GOTO72 :rem 249
75 POKE36875,0:GOSUB93:POKEA+30742,15
  :rem 145
76 IFC<>14ANDC<>9THENR=R-1 :rem 85
77 Y=Y-1:GOSUB65:GOTO30 :rem 182
78 FORB=1TO2:POKEA,C+B:GOSUB99:NEXT:GOSUB
  93:B=150 :rem 123
79 R=R-1:POKE36878,36:IFR<1THENPOKE36878,
  47:GOTO81 :rem 38
80 POKE36877,B:A=(R*22)+W+X:C=PEEK(A):POK
  EA,C+1:FORD=0TO200:NEXT:POKEA,C-3:B=B+
  5:GOTO79 :rem 31
81 POKEW+X,23:GOSUB83:GOTO24 :rem 1
82 FORA=47TO32STEP-1:POKE36878,A:POKE3687
  6,237:FORD=1TO25:NEXTB,A:POKE36876,0:P
  OKE36878,47:RETURN :rem 1
83 POKE36877,220:FORD=47TO32STEP-1:POKE36
  878,D:POKE36879,26:FORE=1TO70:NEXT:POK
  E36879,31 :rem 112
84 NEXT:POKE36877,0:POKE36878,47:POKE3687
  9,30:RETURN :rem 178
85 Z=J:POKEB,3:POKEB+30720,2:POKEV,14:FOR
  A=0TO40:POKE36876,240:POKE36878,230:FO
  RB=1TO5:NEXT :rem 67
86 POKE36878,0:FORD=1TO5:NEXTB,A:POKE3687
  6,0:B=150:GOTO79 :rem 223
87 FORA=7790TO8185:POKEA,4:POKEA+30720,15
  :NEXT:B=220:C=7812:FORA=1TO2:FORD=1TO8
  0 :rem 102
88 E=(RND(0)*B)+C:IFPEEK(E)=9THEN88
  :rem 27
89 POKEE,9:POKEE+30720,8:NEXT:B=154:C=803
  2:NEXT:FORA=1TOS :rem 21
90 B=(RND(1)*374)+7812:C=PEEK(B):IFC=9ORC
  =NTHEN90 :rem 95
91 POKEB,N:NEXT:FORA=0TO109:POKE38400+A,0
  :NEXT:FORA=0TO21:POKE38444+A,3:POKE772
  4+A,20:NEXT :rem 67
92 FORA=0TO3:POKE38407+A,2:NEXT:RETURN
  :rem 162
93 POKEA,21:POKEA+22,22:GOSUB83:POKEA,14:
  POKEA+22,14:RETURN :rem 120
99 POKE36874,200:FORE=1TO10:NEXT:POKE3687
  4,0:RETURN :rem 167

```

Program 3: Oil Tycoon For 64

```

100 PRINT"[CLR]";IFPEEK(14336)=2ANDP
  EEK(14805)=24THEN195 :rem 250
105 POKE53280,6:POKE53281,6:POKE53270,8
  :rem 197
110 PRINTTAB(14)"INSTRUCTIONS"SPC(28)"
  [12 T]":PRINT"[DOWN]JOYSTICK:"
  :rem 244
115 PRINT"[DOWN] RIGHT AND LEFT = MOVE RI
  G" :rem 75
120 PRINT" DOWN = DRILL":PRINT" UP = RETR
  ACT PIPE" :rem 128
125 PRINT"[2 DOWN][2 SPACES]WHEN YOU PUSH
  THE FIRE BUTTON AND THE :rem 111

```

```

130 PRINT"PIPE IS DOWN IN OIL OR IN SPACE      315 GETA$:IFR=1ANDA$=" THEN375 :rem 238
    THE" :rem 147 320 GOTO290 :rem 105
135 PRINT"PUMP IS TRIGGERED.{2 SPACES}IF      325 : :rem 212
    {SPACE}THE PIPE IS DOWN" :rem 133 330 : :rem 208
140 PRINT"IN DIRT, DYNAMITE IS DROPPED.      335 REM DRILLING AND GAS EXPLOSIONS
    :rem 109 :rem 150
145 PRINT"{2 DOWN}WATCH OUT FOR SHALE AND    340 A=R*40+W+X:C=PEEK(A):P=P-1:GOSUB675
    GAS IN EMPTY","SPACES AND DEVILS IN      :rem 60
    {SPACE}OIL." :rem 116 345 IFC=NORC=3ORA>2023THENFORA=1TO3:GOSUB
150 PRINT"{2 DOWN}PLEASE {CYN}WAIT{7} F      730:NEXT:GOTO290 :rem 170
    OR FURTHER INSTRUCTIONS." :rem 155 350 IFRND(1)>.06ORC<>14THENFORB=1TO3:POKE
155 POKE52,56:POKE56,56:CLR:AD=14336        A,C+B:GOSUB730:NEXT:R=R+1:GOTO290
    :rem 75 :rem 150
160 FORA=ADTOAD+207:READB:POKEA,B:NEXT:PO    355 FORB=1TO2:POKEA,C+B:GOSUB730:NEXT:GOS
    KE56334,PEEK(56334)AND254:POKE1,51      UB735:B=0 :rem 158
    :rem 69 360 R=R-1:POKE54296,4:IFR<1THENPOKE54296,
165 FORA=AD+256TOAD+471:POKEA,PEEK(38912+   15:POKEW+X,23:GOSUB715:GOTO375
    A):NEXT:POKE1,55 :rem 165 :rem 106
170 POKE56334,PEEK(56334)OR1 :rem 69 365 POKE54273,B:POKE54276,129:A=R*40+W+X:
175 PRINT"{UP}{2 SPACES}PRESS ANY KEY WHE    C=PEEK(A):PK=PEEK(A+54272):POKEA,C+1
    N READY TO BEGIN. " :rem 58 :rem 244
180 IFPEEK(197)=64ANDPEEK(653)=0ANDPEEK(5   370 POKEA+54272,15:FORD=0TO200:NEXT:POKEA
    6320)=127THEN180 :rem 34 ,C-3:POKEA+54272,PK:B=B+10:GOTO360
185 : :rem 216 :rem 247
190 : :rem 212 375 POKEW+X,14:X=20:M=M-1:P=20:Y=L:R=1:GO
195 PRINT"{CLR}":POKE53280,6:POKE54296,15    SUB705:IFM<0THEN205 :rem 182
    :DIMA(40):W=1184:JS=56320 :rem 180 380 GOSUB645:GOTO290 :rem 200
200 POKE53282,6:POKE53283,0:POKE53270,24:   385 : :rem 218
    POKE54291,0:POKE54292,240 :rem 232 390 : :rem 214
205 FORI=0TO2:POKE54276+I*7,8:NEXT:POKE53   395 REM DRILLING UP :rem 127
    281,3 :rem 247 400 R=R-1:B=R*40+W+X:C=PEEK(B):FORA=1TO3:
210 POKE54284,0:POKE54285,240:POKE54277,0   POKEB,C-A:GOSUB730:NEXT :rem 222
    :POKE54278,240:IFZ>B*(T)THENB*(T)=Z    405 P=P+1:GOSUB675:IFR<>1THEN290 :rem 190
    :rem 154 410 FORA=W+80TO2023:IFPEEK(A)=9THEN290
215 POKE53272,21:PRINT"{CLR}{DOWN}{RED}",    :rem 14
    T,"{2 SPACES}$"MID$(STR$(Z*100),2)".0    415 NEXT:M=M+1:FORC=1TO3:GOSUB705:NEXT:GO
    0{BLU}" :rem 89 SUB590:GOSUB645:GOTO290 :rem 124
220 PRINTTAB(8)"{DOWN} LEVEL{6 SPACES}HIG    420 : :rem 208
    H SCORE{DOWN}" :rem 251 425 : :rem 213
225 FORA=1TO8:PRINT,A,"{2 SPACES}$"MID$(S   430 REM DYNAMITE, GUSHERS, DEVILS :rem 22
    TR$(B*(A)*100),2)".00":PRINT:NEXT      435 J=Z:Q=R-1:FORA=0TO21:A*(A)=0:NEXT:B=Q
    :rem 179 *40+W+X:A=PEEK(B):IFA<>7THEN480
230 PRINT"{DOWN} DIFFICULTY LEVEL? 123456    :rem 117
    78{GRN}":T=1 :rem 223 440 A=W+X:B=40:IFY<1THEN290 :rem 102
235 POKE56194+T,0:T1=T:T=T+(PEEK(JS)AND4)   445 A=A+40:C=PEEK(A):POKEA,C+1:IFC=14ORC=
    /4-(PEEK(JS)AND8)/8:T=(7ANDT-1)+1      9THENPOKEA,C+4 :rem 70
    :rem 76 450 POKE54273,B:POKE54276,33:FORD=0TO200:
240 IFT<>T1THENPOKE56194+T1,6 :rem 241 NEXT:D=PEEK(A+40) :rem 191
245 POKE56194+T,1:L=3:IFT/2=INT(T/2)THENL   455 IFD<>4ANDD<>NANDD<>3ANDA<1984THENB=B-
    =2 :rem 59 2:POKEA,C:GOTO445 :rem 96
250 S=20:IFT=3ORT=4ORT>6THENS=30 :rem 7 460 POKE54276,8:GOSUB735:POKEA+54312,15
255 N=24:IFT>4THENN=25:L=L+1 :rem 168 :rem 244
260 GETA$:IF(PEEK(56320)AND16)=16ANDA$<>C   465 IFC<>14ANDC<>9THENR=R-1 :rem 135
    HR$(13)THEN235 :rem 124 470 Y=Y-1:GOSUB665:GOTO290 :rem 81
265 POKE53272,31:PRINT"{CLR}":POKE53280,9   475 : :rem 218
    :POKE53281,1:M=4:Z=0:K=0:GOSUB590     480 A*(X)=1:POKE54273,40:POKE54276,129:PO
    :rem 217 KE54296,4:V=W+X-40 :rem 91
270 POKEW+X,14:X=20:P=20:Y=L:R=1:GOSUB705   485 IFA=12THENPOKEB,17:Z=Z+Q:POKEV,0
    :GOSUB645:POKE198,0 :rem 185 :rem 7
275 : :rem 216 490 E=0:F=38:D=1:G=1:I=1:GOSUB530:POKEV,1
280 : :rem 212 :E=39:F=1:D=-1:G=D:I=D:GOSUB530
285 REM MAIN LOOP OF PROGRAM :rem 143 :rem 56
290 A=PEEK(JS):IF(AAND4)=0ANDR=1THENPOKEW   495 E=0:F=39:D=1:G=-40:I=0:GOSUB530:POKEV
    +X,14:X=X+(X>0) :rem 192 ,0:IFC<>6THEN515 :rem 155
295 IF(AAND8)=0ANDR=1THENPOKEW+X,14:X=X-(   500 Z=J:POKEB,3:POKEB+54272,2:POKEV,14:FO
    X<39) :rem 58 RA=0TO40:POKE54280,88:POKE54283,17
300 POKEW+X,2:IF(AAND2)=0ANDP>0THEN340     :rem 233
    :rem 30 505 POKE53283,14:POKE54296,6:FORB=1TO5:NE
305 IF(AAND1)=0ANDR>1THEN400 :rem 129 XT :rem 86
310 IF(AAND16)=0THEN435 :rem 39 510 POKE54296,0:POKE53283,0:FORB=1TO5:NEX

```

```

TB,A:POKE54283,0:B=0:GOTO360 :rem 134
515 IFHTHENQ=Q-1:GOTO490 :rem 238
520 POKEV,14:POKE54276,8:POKE54296,15:POK
E54283,2:GOSUB705:GOSUB645:GOTO290
:rem 17
525 : :rem 214
530 IFC=6THENRETURN :rem 236
535 H=0:FORA=ETOFSTEPD:IFA%(A)=0THEN570
:rem 152
540 B=Q*40+W+A+G:C=PEEK(B) :rem 201
545 IFC=9ORC=12THENPOKEB,C+5:H=1:Z=Z+Q+AB
S(1)-1:A%(A+I)=1:GOTO565 :rem 144
550 IFC=14ORC=17THENA%(A+I)=1:H=1:GOTO570
:rem 159
555 IFC=3THENC=6:RETURN :rem 224
560 A%(A+I)=0:GOTO570 :rem 131
565 IFRND(1)<.02ANDC<>12THENC=6:RETURN
:rem 83
570 NEXT:RETURN :rem 245
575 : :rem 219
580 : :rem 215
585 REM INITIALIZE THE DISPLAY :rem 111
590 PRINT"{HOME}{5 DOWN}[8]";:FORA=1TO9
9:PRINT"DDDDDDDD";:NEXT:PRINT"DDDDDDDD
"; :rem 147
595 POKE2023,4:POKE56295,15:B=400:C=1264:
FORA=1TO2:FORD=1TO40 :rem 82
600 E=INT(RND(0)*B/2)*2+C:IFPEEK(E)=9ORPE
EK(E+1)=9THEN600 :rem 61
605 POKEE,9:POKEE+1,9:NEXT:B=360:C=1665:N
EXT:FORA=1TOS :rem 121
610 B=INT(RND(1)*340)*2+1264:C=PEEK(B):IF
C=9ORC=NTHEN610 :rem 246
615 POKEB,N:POKEB+54272,10:NEXT:FORA=0TO1
99:POKE55296+A,0:NEXT:FORA=0TO39
:rem 15
620 POKE55376+A,3:POKE1104+A,20:NEXT
:rem 62
625 FORA=0TO3:POKE55337+A,2:NEXT:RETURN
:rem 213
630 : :rem 211
635 : :rem 216
640 REM UPDATE SCREEN INFORMATION :rem 71
645 PRINT"{HOME}[GRN]"SPC(23)"$"MID$(STR$(
Z*100),2)".00" :rem 167
650 A=INT(Z/1000):IFA=K+1THENK=K+1:GOSUB7
05:GOSUB705:M=M+1 :rem 4
655 IFM<1THENPOKE1024,14:POKE55296,14:GOT
O665 :rem 184
660 FORA=1024TO1023+M:POKEA,2:POKEA+54272
,0:NEXT:POKEA,14:POKEA+54272,0
:rem 207
665 IFY=0THENPOKE1031,14:POKE55303,0:GOTO
675 :rem 132
670 FORA=1031TO1030+Y:POKEA,19:POKEA+5427
2,0:NEXT:POKEA,14:POKEA+54272,0
:rem 16
675 IFP<1THENPOKE1064,14:POKE55336,0:RETN
:rem 141
680 FORB=1064TO1063+P:POKEB,17:POKEB+5427
2,0:NEXT:POKEB,14:POKEB+54272,0
:rem 23
685 RETURN :rem 131
690 : :rem 217
695 : :rem 222
700 REM MUSIC AND OTHER SUBROUTINES
:rem 180
705 POKE54276,17:FORA=15TO0STEP-1:POKE542
96,A:POKE54273,86:FORB=1TO25:NEXTB,A
:rem 196
710 POKE54276,8:POKE54296,15:RETURN
:rem 82
715 POKE54276,8:POKE54276,129:POKE54273,9
1:FORD=15TO0STEP-1:POKE54296,D
:rem 205
720 POKE53281,1:POKE53280,2:FORE=1TO70:NE
XT:POKE53280,6:NEXT :rem 142
725 POKE54276,8:POKE54296,15:POKE53280,9:
RETURN :rem 40
730 POKE54287,20:POKE54290,8:POKE54290,12
9:POKE54290,128:RETURN :rem 181
735 POKEA,21:POKEA+40,22:GOSUB715:POKEA,1
4:POKEA+40,14:RETURN :rem 221
740 : :rem 213
745 : :rem 218
750 REM CHARACTER DATA :rem 39
755 DATA2,138,164,73,74,52,20,8,64,81,37,
146,82,44,40,16,24,24,36 :rem 188
760 DATA60,90,102,231,153,20,42,42,20,62,
73,20,20,136,34,136,34,136,34,136,34
:rem 226
765 DATA148,22,148,34,136,34,136,34,148,2
2,148,22,148,34,136,34,148,22,148
:rem 128
770 DATA22,148,22,148,22,136,62,188,62,18
8,62,188,22,170,170,170,170,170
:rem 27
775 DATA170,170,170,150,150,150,170,170,1
70,170,170,150,150,150,150,150,170,17
0
:rem 73
780 DATA170,150,150,150,150,150,150,150,1
50,150,190,190,190,190,190,190,150,0,
0
:rem 65
785 DATA0,0,0,0,0,0,20,20,20,0,0,0,0,0,20
,20,20,20,0,0,0,20,20,20,20,20,20
:rem 94
790 DATA20,20,20,60,60,60,60,60,60,20,0,6
0,60,60,60,60,60,0,0,0,0,255,255,0,0,
0
:rem 14
795 DATA218,118,181,153,110,93,197,65,65,
82,150,85,121,181,150,173,2,106,129,2
0
:rem 115
800 DATA64,162,129,2,169,128,141,19,145,1
69,0,133,136,34,136,34,136,34,136,34
:rem 7

```

Re-Beep

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs" and "A Beginner's Guide To Typing In Programs" that appear before the Program Listings. Also, see the article "Automatic Proofreader."

Program 1: Re-Beep For VIC

```

20 A=240:B=225:C=195:D=135:S=36875:R=RND(
-TI):POKE36878,9:POKE36879,10:W=1
:rem 248
30 PRINT"[CLR]" :rem 199
40 FORL=3TO7STEP2:POKE646,L:PRINTSPC(L+1)
"{4 DOWN}[RVS]RE-BEEP":NEXT:FORM=1TO30
00:NEXT :rem 36
50 INPUT"[CLR][WHT]{3 DOWN} PLAY LEVEL (1
-3)";LV:IFLV<1ORLV>3THEN50 :rem 145
60 INPUT"[CLR]{3 DOWN} 1 OR 2 PLAYERS";P
:rem 175

```

```

70 IFP<>LANDP<>2THEN60 :rem 85
80 IFP=2THENINPUT "{DOWN}NAME 1";N1$:INPUT :rem 85
  "{DOWN}NAME 2";N2$ :rem 75
89 REM CUT EXCESS NAME LENGTH :rem 239
90 IFLEN(N1$)>12THENN1$=LEFT$(N1$,12) :rem 77
100 IFLEN(N2$)>12THENN2$=LEFT$(N2$,12) :rem 120
110 PRINT "{CLR}{CYN}{RIGHT}{RVS}***R E - :rem 160
  {SPACE}B E E P***{2 DOWN} :rem 160
120 PRINT "{RVS}{GRN}HIT SPACE BAR TO BEGI :rem 160
  N :rem 251
130 WAIT197,32 :rem 251
140 PRINT "{2 UP}{22 SPACES}";:POKE36879,1 :rem 1
  07 :rem 173
149 REM SET UP PLAY FIELD :rem 173
150 PRINT "{BLK}":FORL=1TO7STEP2:PRINT"F"L :rem 167
  "{3 DOWN}":NEXT :rem 204
160 PRINT "{HOME}{4 DOWN}{GRN}":FORL=1TO4: :rem 198
  PRINT "{4 RIGHT}{RVS}{2 SPACES} :rem 99
  {3 DOWN}":NEXT :rem 200
170 PRINT "{2 UP}{9 RIGHT}{BLK}TO RESTART :rem 213
  :rem 236
180 PRINT "{DOWN}{9 RIGHT}PRESS '*':rem 212
189 REM PRINT NAMES AND POKE PLAYER NUMBE :rem 254
  R IF TWO PLAYERS :rem 128
190 IFP=2THENPRINT "{HOME}{2 DOWN} :rem 172
  {9 RIGHT}{RVS}{CYN}"N1$:PRINT" :rem 82
  {9 DOWN}{9 RIGHT}{RVS}"N2$ :rem 221
200 IFP=2THENPOKE7788,177:POKE8008,178 :rem 242
  :rem 246
209 REM LIGHT APPROPRIATE PLAYER NUMBER :rem 190
  :rem 185
210 IFW=1THENPOKE38728,6:POKE38508,1 :rem 210
  :rem 109
220 IFW=-1THENPOKE38728,1:POKE38508,6 :rem 125
  :rem 8
229 REM RANDOM TONE STRING FORMATION :rem 8
  :rem 17
230 R=INT(RND(1)*4)+1 :rem 117
240 S$=S$+STR$(R) :rem 121
250 FORM=1TO750/LV↑2:NEXT :rem 167
259 REM VIC PLAYS IT'S STRING :rem 167
260 FORL=2TOLEN(S$)STEP2 :rem 62
270 Q=VAL(MID$(S$,L,1)) :rem 30
280 GETZ$:REM CLEARS EXTRANEIOUS CHARACTER :rem 109
  S :rem 125
290 ONQOSUB480,540,600,660:FORM=1TO75/LV :rem 125
  ↑2:NEXT :rem 210
300 NEXT :rem 109
309 REM PLAYER ATTEMPTS A MATCH :rem 125
310 GETZ$:IFZ$=""THEN310 :rem 8
320 IFZ$="{F1}"THENGOSUB480:F$=F$+STR$(1) :rem 8
  :rem 8
330 IFZ$="{F3}"THENGOSUB540:F$=F$+STR$(2) :rem 8
  :rem 8
340 IFZ$="{F5}"THENGOSUB600:F$=F$+STR$(3) :rem 17
  :rem 17
350 IFZ$="{F7}"THENGOSUB660:F$=F$+STR$(4) :rem 117
  :rem 121
360 IFZ$="*"THENRUN :rem 167
369 REM PLAYER TONE STRING/VIC TONE STRIN :rem 167
  G COMPARISON :rem 62
370 IFLEN(F$)<>LEN(S$)THEN310 :rem 30
380 IFF$<>S$ANDE=0THENF$="" :E=1:PRINT" :rem 109
  {HOME}{9 DOWN}{9 RIGHT}{YEL}{RVS}TRY :rem 125
  {SPACE}AGAIN":GOSUB770:GOTO250:rem 62
390 PRINT "{HOME}{9 DOWN}{9 RIGHT} :rem 30
  {9 SPACES}" :rem 179
399 REM FAILS SECOND TRY :rem 179
400 IFF$<>S$ANDE=1THEN720 :rem 204
409 REM SCORING (W=-1 INDICATES PLAYER TW :rem 52
  O) :rem 52
410 E=0:F$="" :IFW=1THENS1=S1+1:IFH1<S1THE :rem 53
  NH1=S1 :rem 88
420 IFW=-1THENS2=S2+1:IFH2<S2THENH2=S2 :rem 86
430 PRINT "{HOME}";:IFW=-1THENPRINT" :rem 53
  {10 DOWN}"; :rem 103
440 IFW=1THENPRINT "{4 DOWN}{9 RIGHT}{PUR} :rem 140
  {RVS}HIGH ="H1:PRINT "{DOWN}{9 RIGHT} :rem 180
  {GRN}SCORE="S1 :rem 252
450 IFW=-1THENPRINT "{4 DOWN}{9 RIGHT} :rem 120
  {PUR}{RVS}HIGH ="H2:PRINT "{DOWN} :rem 242
  {9 RIGHT}{GRN}SCORE="S2 :rem 138
460 FORM=1TO750/LV↑2:NEXT :rem 186
470 GOTO210 :rem 254
479 REM NOTE PLAYING SUBROUTINES :rem 126
480 POKE38514,1:POKE38515,1 :rem 253
490 POKES,A :rem 136
500 GOSUB780 :rem 183
510 POKES,0 :rem 119
520 POKE38514,5:POKE38515,5 :rem 9
530 RETURN :rem 123
540 POKE38602,1:POKE38603,1 :rem 17
550 POKES,B :rem 143
560 GOSUB780 :rem 189
570 POKES,0 :rem 125
580 POKE38602,5:POKE38603,5 :rem 20
590 RETURN :rem 120
600 POKE38690,1:POKE38691,1 :rem 120
610 POKES,C :rem 120
620 GOSUB780 :rem 120
630 POKES,0 :rem 120
640 POKE38690,5:POKE38691,5 :rem 120
650 RETURN :rem 120
660 POKE38778,1:POKE38779,1 :rem 120
670 POKES,D :rem 120
680 GOSUB780 :rem 120
690 POKES,0 :rem 120
700 POKE38778,5:POKE38779,5 :rem 120
710 RETURN :rem 120
720 POKE36874,159:FORM=1TO999:NEXT:POKE36 :rem 120
  874,135:FORM=1TO1500:NEXT:POKE36874,0 :rem 11
  :rem 11
730 SI=0:S2=0:S$="" :F$="" :E=0:REM RESET :rem 155
  :rem 155
740 PRINT "{HOME}";:IFW=-1THENPRINT" :rem 90
  {10 DOWN}"; :rem 90
750 PRINT "{6 DOWN}{9 RIGHT}{10 SPACES}":I :rem 183
  FP=2THENW=-W:REM SWITCH PLAYERS :rem 105
  :rem 226
760 GOTO210 :rem 24
769 BUZZER/TIMING SUBROUTINES :rem 110
770 POKE36874,135:FORM=1TO250:NEXT:POKE36 :rem 24
  874,0:RETURN :rem 24
780 FORM=1TO600/LV↑2:NEXT:RETURN :rem 110

```

Program 2: Re-Beep For 64

```

100 REM RE-BEEP{2 SPACES}64 :rem 191
110 S=54272:R=RND(-RND(0)):FORI=0TO4:READ :rem 191
  H(I),L(I):NEXT:S$="" :rem 89
120 FORI=0TO21:POKES+I,0:NEXT :rem 59
130 POKES+24,15:POKE53280,2:POKE53281,0:W :rem 168
  =I:D$="{HOME}{25 DOWN}" :rem 249
140 PRINT "{CLR}" :rem 251
150 FORL=3TO7STEP2:POKE646,L:PRINTSPC(L*2 :rem 251
  +5)"{4 DOWN}{RVS}{2 SPACES}RE-BEEP " :rem 251
  NEXT :rem 251

```

```

160 FORM=1TO1500:GETA$:IFA$=""THENNEXT      NHI=S1                                :rem 60
      :rem 62
170 INPUT"{CLR}{WHT}{3 DOWN} PLAY LEVEL (   580 IFW=-1THENS2=S2+1:IFH2<S2THENH2=S2
      1-3)";LV:IFLV<1ORLV>3THEN170 :rem 247      :rem 95
180 INPUT"{CLR}{3 DOWN} 1 OR 2 PLAYERS";P    590 IFW=1THENPRINT"{HOME}{2 DOWN}{PUR}
      :IFP<>1ANDP<>2THEN180 :rem 61      [RVS]HIGH{2 SPACES}:"H1:PRINT"{GRN}SC
190 IFP=2THENINPUT"{DOWN} NAME 1";N1$:INP   600 IFW=-1THENPRINTLEFT$(D$,16)"{PUR}
      UT"{DOWN} NAME 2";N2$ :rem 125      [RVS]HIGH{2 SPACES}:"H2:PRINT"{GRN}SC
200 N1$=LEFT$(N1$,12):N2$=LEFT$(N2$,12)     ORE:"S1                                :rem 11
      :rem 50
210 PRINT"{CLR}"SPC(10)"{CYN}{RVS}         610 GOSUB760:GOTO340                    :rem 190
      {4 SPACES}R E ** B E E P{2 SPACES}   620 REM PLAY NOTES                      :rem 59
      {2 DOWN} :rem 139
220 PRINTSPC(9)"{RVS}{GRN}HIT SPACE BAR T   630 WF=32:IFFGTHENPRINTLEFT$(D$,NT*3+2)SP
      O BEGIN" :rem 51                    C(20)"{RVS}{WHT}{3 SPACES}":WF=16
230 WAIT197,32:POKE198,0 :rem 99
240 PRINTSPC(9)"{UP}{22 SPACES}";:POKE532   640 VC=VC+7:IFVC=21THENVVC=0            :rem 162
      80,3:POKE53281,6 :rem 59
250 REM SET UP SCREEN :rem 204
260 PRINT"{BLK}":FORL=1TO7STEP2:PRINTSPC(   650 POKES+VC+5,48:POKES+VC+6,170:POKES+VC
      15)"F"L"{2 DOWN}":NEXT :rem 53      ,L(NT):POKES+VC+1,H(NT) :rem 172
270 PRINT"{HOME}{3 DOWN}{GRN}":FORL=1TO4:   660 POKES+VC+4,WF+1:GOSUB750:POKES+VC+4,W
      PRINTSPC(20)"{RVS}{3 SPACES}{2 DOWN}"   F :rem 100
      :NEXT :rem 209
280 PRINTSPC(15)"{2 DOWN}{BLK}TO RESTART    670 IFFGTHENPRINTLEFT$(D$,NT*3+2)SPC(20)"
      :rem 96      [RVS]{GRN}{3 SPACES}{CYN}" :rem 177
290 PRINTSPC(15)"{DOWN}PRESS '*' :rem 253
300 REM PRINT NAMES AND POKE PLAYER NUMBE   680 RETURN :rem 126
      R IF TWO PLAYERS :rem 185
310 IFP=2THENPRINT"{HOME}{2 DOWN}{RVS}     690 FG=0:NT=0:GOSUB630:GOSUB760:NT=2:GOSU
      {CYN}"SPC(18)N1$:PRINT"{12 DOWN}{RVS}   B630:GOSUB760 :rem 129
      "SPC(18)N2$ :rem 56
320 IFP=2THENPOKE1120,177:POKE1640,178    700 S1=0:S2=0:S$="":F$="":E=0 :rem 247
      :rem 208
330 REM LIGHT APPROPRIATE PLAYER NUMBER     710 IFP=2THENW=-W:REM SWITCH PLAYERS
      :rem 207
340 IFW=-1THENPOKE55392,6:POKE55912,1      :rem 61
      :rem 172
350 IFW=1THENPOKE55912,6:POKE55392,1      :rem 105
      :rem 128
360 REM RANDOM TONE STRING FORMATION        720 GOTO340
      :rem 250
370 R=INT(RND(1)*4)+1 :rem 133
380 S$=S$+STR$(R) :rem 177
390 GOSUB760 :rem 185
400 REM VIC PLAYS IT'S STRING :rem 209
410 FORL=2TOLEN(S$)STEP2 :rem 239
420 NT=VAL(MID$(S$,L,1)) :rem 68
430 FG=1:GOSUB630:FORA=1TO75/LV↑2:NEXT     730 REM BUZZER/TIMING :rem 87
      :rem 158
440 NEXT:POKE198,0 :rem 62
450 REM PLAYER ATTEMPTS A MATCH :rem 106
460 GETZ$:IFZ$=""THEN460 :rem 137
470 FORI=1TO4:IFZ$=MID$("F1}{F3}{F5}{F7}   740 FG=0:NT=2:GOSUB630:RETURN :rem 77
      ",I,1)THENNT=I:I=10 :rem 139
480 NEXT:IFI>10THENFG=1:GOSUB630:F$=F$+ST   750 IFFGTHENFORM=1TO600/LV↑2:NEXT:RETURN
      R$(NT):GOTO510 :rem 158
490 IFZ$=""THENRUN :rem 121
500 REM PLAYER TONE STRING/VIC TONE STRIN   760 FORM=1TO400:NEXT:RETURN :rem 9
      G COMPARISON :rem 108
510 IFLEN(F$)<>LEN(S$)THEN460 :rem 169
520 IFF$=S$THEN570 :rem 15
530 IFE=1THEN690 :rem 168
540 IFE=0THENF$="":E=1:GOSUB760:PRINT"     770 DATA 21,31, 14,24, 15,210, 16,195, 18
      {HOME}{DOWN}"SPC(15)"{YEL}{RVS}TRY AG   ,209 :rem 217
      AIN":GOSUB740 :rem 172
550 PRINT"{HOME}{DOWN}"SPC(15)"{9 SPACES}
      ":GOSUB750:POKE198,0:GOTO390 :rem 60
560 REM SCORING :rem 148
570 E=0:F$="":IFW=1THENS1=S1+1:IFH1<S1THE

```

Aardvark Attack

```

10 GOSUB800
12 GOSUB995
14 PRINT"{CLR}{2 DOWN} INSTRUCTIONS (Y/N
   )?"
15 GETG$:IFG$=""THEN15
16 IFG$="Y"THENGOSUB1200
18 PRINT"{CLR}{2 DOWN}{RVS}{3 SPACES}AAR
   DVARK ATTACK{4 SPACES}{OFF}{DOWN}
19 PRINT"{DOWN} ALPHANUMERIC WEAPONS
   {2 DOWN}"
20 PRINT"{2 DOWN}{4 SPACES}WHICH LEVEL?
   {7 SPACES}{DOWN}(1=EXPERT{3 SPACES}9=
   NOVICE)"
22 GETHF$:IFHF$=""THEN22
23 IF(HF$>"9"ORHF$<"1")THEN22
24 HF=INT(2.5↑(VAL(HF$)-1))
25 SC=0:GOSUB900
30 GOSUB925:REM **** NEW LETTER
32 FORI=0TO3:FORJ=0TO3:C(I,J)=0:NEXTJ:NE
   XTI:REM *** CLEAR OLD LETTER
40 L=INT(RND(1)*26+1):B=32768+L*8:F=0
45 FORI=0TO3
48 F=ABS(F-1)
50 T=PEEK(B+2*I+1-F)
53 FORJ=0TO3
55 M=(TANDFN(M(J)))/(4↑J):C(I,J)=C(I,J)+IN
   T(M*(4↑F))
58 NEXTJ
60 IFFTHEN48
63 NEXTI
70 REM **** FLASHING
72 X=INT(RND(1)*101+20)

```

```

74 FORY=1TOX:Z=INT(RND(1)*10):ZZ=7682+Z:
   POKEZZ,32:POKEZZ,160:NEXTY
80 POKE36879,27:SYS828
82 FORI=0TO3:FORJ=0TO3
84 P=7722-J+22*I:Q=S(C(I,J)):POKEP,Q
86 NEXTJ:NEXTI
90 LF=0:NF=0:FH=0:SH=0:SYS833:POKE7680,L
98 POKEZZ,32
99 REM *** START ATTACK
100 FORX=1TO18
105 GETG$:IFG$=""THENFORY=1TOHF:NEXTY:GO
   TO190
110 IFLFTHEN140
120 IF(ASC(G$)-64)=LTHENLF=1:FH=X:GOTO14
   0
130 FORY=1TOHF:NEXTY:GOTO190
140 IFNFTHEN300
150 IF(VAL(G$)-1)=ZTHEN180
160 IF(G$=""ANDZ=9)THEN180
170 FORY=1TOHF:NEXTY:GOTO190
180 NF=1:SH=X:GOTO300
190 POKE(7682+Z+X*22),81+LF*128:POKE(384
   02+Z+X*22),0
200 NEXTX
210 REM *** LOSE ROUND
220 FORXX=0TO3
221 PB=(8100+Z+(22*XX))
222 IF(PEEK(PB)<>32)THEN240
223 NEXTXX
230 GOTO 320
240 IFLFTHEN260
250 POKE(PB+22),32
260 POKEPB,32
280 GOTO30:REM *** NEXT LETTER
299 REM *** SCORING
300 SC=SC+INT((500-5*FH-2*SH)/SQR(HF)):G
   OTO30
319 REM *** LOSE ROUTINE
320 FORY=1TO300:NEXT:PRINT"{CLR}*****
   *****[DOWN] SORRY, YOU LOST
   ."
321 PRINT"{2 DOWN} YOUR SCORE:";SC
322 PRINT"{DOWN} AT LEVEL ";HF$
323 PRINT"{2 DOWN} PLAY AGAIN (Y/N)?"
324 GETY$:IFY$=""THEN324
326 IFY$="N"THENPRINT"{CLR}":END
328 GOTO18
800 DIMS(15):DIMC(3,3)
801 REM *** HOUSEKEEPING
805 DEFFNM(X)=3*(4↑X)
810 FORX=0TO15:READS(X):NEXT
815 DATA32,108,123,98,124,225,255,254
820 DATA126,127,97,252,226,251,236,160
825 RETURN
898 END
899 REM *** SCREENS
900 PRINT"{CLR}[2 SPACES]*****
   [3 SPACES]{HOME}{DOWN}":FORX=1TO110:
   PRINT" ";:NEXT
910 PRINT"{HOME}[19 DOWN][2 SPACES]12345
   67890[5 SPACES]L ";HF$;" ";
920 FORX=1TO3:PRINT"[2 SPACES][Q][RVS]
   [10 SPACES][OFF][W][3 SPACES]
   [5 +]";:NEXT
925 PRINT"{HOME} [Q]*****[W]";
930 FORX=7696TO7806STEP22:FORY=0TO5:POKE
   X+Y,102:NEXTY:NEXTX
940 FORX=7719TO7785STEP22:FORY=0TO3:POKE
   X+Y,160:NEXTY:NEXTX
950 FORX=38400TO38531:POKEX,6:NEXT:FORX=

```

```

0TO17:FORY=0TO9:POKE(7704+Y+X*22),32
   :NEXTY,X
955 FORX=7681TO8165STEP22:POKEX,107:POKE
   X+11,115:POKEX+30720,6:POKEX+30731,6
   :NEXTX
960 PRINT"[HOME][14 DOWN][16 RIGHT]SCORE
   ";
961 PRINT"[HOME][15 DOWN][15 RIGHT]";SC;
970 RETURN
994 END:REM *** 828&33 SYS
995 FORX=828TO867:READY:POKEX,Y:NEXT
999 RETURN
1000 DATA169,1,76,67,3,169,6,160
1001 DATA39,140,77,3,162,0,160,0
1002 DATA157,39,150,232,224,4,208,248
1003 DATA238,77,3,200,192,22,208,248
1004 DATA172,77,3,192,127,208,229,96
1200 REM *** INSTRUCTIONS
1210 PRINT"{CLR}[DOWN] [20 +] [DOWN] A
   NDROMEDAN AARDVARKS[2 SPACES]ARE AT
   TACKING EARTH."
1220 PRINT"[DOWN] THEY HAVE 26 KINDS
   [4 SPACES]OF BOMBS AND THEY'RE
   [2 SPACES]ATTACKING 10 CITIES!"
1230 PRINT"[DOWN] YOUR ALPHANUMERIC
   [5 SPACES]RADAR CAN SAVE EARTH."
1240 PRINT" FIRST: RECOGNIZE[13 SPACES]T
   HE BOMB (A-Z)"
1250 PRINT"[2 SPACES]THEN: SAVE
   [18 SPACES]THE CITY (0-9)"
1260 PRINT"[DOWN] [RVS]HIT ANY KEY TO PL
   AY[OFF]";
1270 GETG$:IFG$=""THEN1270
1280 RETURN

```

Word Match

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE's Gazette Programs" and "A Beginner's Guide To Typing In Programs" that appear before the Program Listings. Also, see the article "Automatic Proofreader."

Program 1: VIC Word Match

```

1 REM WORD MATCH
2 PRINT"{CLR}"SPC(247)"{PUR}WORD MATCH"
3 FORP=1TO2E3:NEXT:PRINTSPC(67)"{BLU}TOU
   CH A KEY..."
4 GETA$:IFAS$=""THEN4
10 DIMN$(2):PRINT"{BLU}[CLR]NAMES, PLEAS
   E1"
12 PRINT"{HOME}[15 DOWN]TO PLAY AGAINST
   THE[4 SPACES]COMPUTER, ENTER
   [SHIFT-SPACE]'VIC' AS A PLAYER."
13 PRINT"{HOME}[DOWN]":FORN=1TO2:PRINT"
   [DOWN]PLAYER"N;:INPUTN$(N):NEXT:PRINT
   "{CLR}"
20 S=36876:V=S+2:BK=V+1:POKES,0:POKEV,15
   :POKEBK,156:O=30720
30 DIMW$(12),R$(28),W1$(6),C$(2),SQ$(12)
   ,BK$(2)
32 DATACAR,CAT,BOY,HAT,HIT,TOP,ATE,EAT,P
   IT,PAT,GOT,HIM,HER,WHY,HOW,TIN,ILL,WH
   O,RUN,YOU
33 DATAACE,BED,INK,AIM,ART,TOT,TIE,END

```

```

35 FORN=1TO28
36 Z=INT(RND(1)*28)+1:IFR%(Z)<>0THEN36
37 R%(Z)=N:NEXT
38 FORN=1TO6:FORQ=1TOR%(N):READW$:NEXT:W
1$(N)=W$:RESTORE:NEXT:FORQ=1TO28:READ
W$:NEXT
39 C%(1)=2:C%(2)=5:BK%(1)=172:BK%(2)=236
40 FORN=1TO12:R%(N)=0:NEXT
41 FORN=1TO11STEP2
42 Z=INT(RND(1)*12)+1:Y=INT(RND(1)*12)+1
43 IFR%(Z)<>0ORR%(Y)<>0ORZ=YTHEN42
44 R%(Z)=N:R%(Y)=N+1
45 NEXT
47 FORN=1TO12:R%(N)=INT((R%(N)-1)/2)+1:W
$(N)=W1$(R%(N)):NEXT
50 FORN=1TO4
51 PRINT"[BLK] [RVS]{19 SPACES}"
52 FORZ=1TO3
53 PRINT" {RVS} {OFF}{5 SPACES}{RVS}
{OFF}{5 SPACES}{RVS} {OFF}{5 SPACES}
{RVS} {OFF}"
54 NEXTZ,N
55 PRINT" {RVS}{19 SPACES}"
56 PRINT"[HOME]{2 DOWN}{PUR}"
60 FORN=1TO9STEP3
62 PRINTTAB(3)NSPC(3)N+1SPC(3)N+2
64 PRINT"{2 DOWN}":NEXT
66 PRINT"{4 RIGHT}10{4 RIGHT}11{4 RIGHT}
12"
70 D$="[HOME]{18 DOWN}"
71 SP$="{21 SPACES}"
74 PRINTD$SP$SP$
80 FORN=1TO12:READSQ%(N):NEXT
81 DATA7726,7732,7738,7814,7820,7826,790
2,7908,7914,7990,7996,8002
100 REM GAME
105 X=1
110 PRINTD$"[RED]WHICH BLOCKS, "N$(X)?"
115 POKEBK,BK%(X)
117 IFN$(X)="VIC"THENGOSUB1000
120 PRINTD$"{DOWN}"SP$D$"{DOWN}{PUR}
{RVS}BLOCK A?{BLK}{OFF}";
121 GETA$:IFA$=CHR$(13)THENI=VAL(AN$):AN
$="" :GOSUB400:ON(I>12)+2GOTO120,124
122 IFA$<"0"ORA$>"9"THEN121
123 PRINTA$;:AN$=AN$+A$:GOTO121
124 ON(R%(I)=0)+2GOTO120,132
125 PRINTD$"{2 DOWN}"SP$D$"{2 DOWN}{BLU}
{RVS}BLOCK B?{BLK}{OFF}";:
126 GETA$:IFA$=CHR$(13)THENJ=VAL(AN$):AN
$="" :GOSUB400:ON(J>12)+2GOTO125,129
127 IFA$<"0"ORA$>"9"THEN126
128 PRINTA$;:AN$=AN$+A$:GOTO126
129 ON(R%(J)=0)+2GOTO125,130
130 IFI=JTHEN125
131 PRINTD$SP$SP$SP$SP$;:GOTO137
132 FORN=1TO3
135 POKESQ%(I)+N+22+O,6:POKESQ%(I)+N+22,
ASC(MID$(W$(I),N,1))-64:NEXT
136 ON(N$(X)="VIC")+2GOTO1040,125
137 FORN=1TO3
138 POKESQ%(J)+N+22+O,6:POKESQ%(J)+N+22,
ASC(MID$(W$(J),N,1))-64
139 NEXT
140 IFR%(I)=R%(J)THEN200
150 PRINTD$SP$D$TAB(6)"{RED}{RVS}NO MATC
H-{OFF}"
151 FORN=1TO30:POKES,240:POKES,240-3*N:N
EXT:POKES,0
152 FORP=1TO2E3:NEXT:PRINTD$SP$
153 I$=STR$(I):I$=RIGHT$(I$,LEN(I$)-1):J
$=STR$(J):J$=RIGHT$(J$,LEN(J$)-1)
154 POKESQ%(I)+23,32:POKESQ%(J)+23,32:PO
KESQ%(I)+25,32:POKESQ%(J)+25,32
155 FORN=1TOLEN(I$):POKESQ%(I)+23+N,ASC(
MID$(I$,N,1)):POKESQ%(I)+23+N+O,4:NE
XT
156 FORN=1TOLEN(J$):POKESQ%(J)+23+N,ASC(
MID$(J$,N,1)):POKESQ%(J)+23+N+O,4:NE
XT
160 IFX=1THENX=2:GOTO110
162 X=1:GOTO110
200 REM RIGHTANS
205 PRINTD$SP$SP$D$"{6 SPACES}{BLK}{PUR}
{RVS}MATCH1111{OFF}"
210 FORN=1TO5:FORZ=200TO240:POKES,Z:NEXT
Z,N:POKES,0
211 IFX=1THENS1=S1+1
212 IFX=2THENS2=S2+1
215 FORP=1TO2E3:NEXT
220 Q=SQ%(I):R=SQ%(J)
225 FORN=1TO3
230 FORW=QTOQ+4:POKEW+O,C%(X):POKEW,160:
NEXT:Q=Q+22:NEXT
231 FORN=1TO3
232 FORW=RTOR+4:POKEW+O,C%(X):POKEW,160:
NEXT:R=R+22:NEXT
235 PRINTD$SP$
237 CR=CR+1:IFCR=6THEN300
238 R%(I)=0:R%(J)=0
240 GOTO110
300 FORN=1TO5:FORZ=250TO150STEP-2:POKES,
Z:NEXTZ,N:POKES,0
305 PRINTD$"THE GAME IS OVER-
306 FORP=1TO2E3:NEXT
307 IFS1>S2THENPRINTD$SP$D$N$(1)" WINS!!
|"
308 IFS2>S1THENPRINTD$SP$D$N$(2)" WINS!!
|"
309 IFS2=S1THENPRINTD$SP$D$"IT'S A TIE!!
|"
310 FORP=1TO2E3:NEXT:PRINTD$"{DOWN}WANT
ANOTHER?(Y/N)"
311 GETA$:IFA$="N"THENPRINT"{CLR}{BLU}":
POKEBK,27:END
312 IFA$="Y"THENRUN10
314 GOTO311
400 POKES,249:FORP=1TO20:NEXT:POKES,0:RE
TURN
1000 REM VIC PLAYS
1005 I=INT(RND(1)*12)+1:ON(R%(I)=0)+2GOT
O1005,132
1040 J=INT(RND(1)*12)+1:IFJ=ITHEN1040
1050 IFR%(J)=0THEN1040
1060 PRINTD$SP$D$"VIC PICKS"I"AND"J"
{LEFT}."
1065 FORP=1TO2E3:NEXT:GOTO137

```

Program 2: 64 Word Match

```

100 POKES3281,1:PRINT"{CLR}"SPC(250)"
{BLK}{2 SPACES}WORD MATCH "
110 FORP=1TO2E3:NEXT:PRINTSPC(90)"{BLU}
{2 SPACES}TOUCH A KEY..."
120 GETA$:IFA$=""THEN120
130 DIMN$(2):PRINT"{BLU}{CLR}NAMES, PLEA
SE!"
140 PRINT"[HOME]{15 DOWN}TO PLAY AGAINST

```

```

    THE COMPUTER, "
145 PRINT"ENTER '64' AS PLAYER TWO"
150 PRINT"{HOME}{DOWN}":FORN=1TO2:PRINT"
    {DOWN}PLAYER"N;:INPUTN$(N):NEXT:PRIN
    T"{CLR}"
160 O=54272
161 S=54272:FORE=STOS+28:POKEE,0:NEXT
162 POKE54296, 15 :POKE54277, 66 :POKE54
    278, 210
163 POKE 54276, 17 :POKE 54272, 63
164 J=20:FORT=1TO 200:POKE54273,J:J=RND(
    0)*150+1:NEXT:POKE54276,16
165 FORT=1TO200:NEXT
170 DIMW$(12),R$(28),W1$(6),C$(2),SQ$(12
    ),BK$(2)
180 DATACAR,CAT,BOY,HAT,HIT,TOP,ATE,EAT,
    PIT,PAT,GOT,HIM,HER,WHY,HOW,TIN,ILL,
    WHO,RUN,YOU
190 DATAACE,BED,INK,AIM,ART,TOT,TIE,END
200 FORN=1TO28
210 Z=INT(RND(1)*28)+1:IFR$(Z)<>0THEN210
220 R$(Z)=N:NEXT
230 FORN=1TO6:FORQ=1TOR$(N):READW$:NEXT:
    W1$(N)=W$:RESTORE:NEXT:FORQ=1TO28:RE
    ADW$:NEXT
240 C$(1)=2:C$(2)=5:BK$(1)=172:BK$(2)=23
    6
250 FORN=1TO12:R$(N)=0:NEXT
260 FORN=1TO11STEP2
270 Z=INT(RND(1)*12)+1:Y=INT(RND(1)*12)+
    1
280 IFR$(Z)<>0ORR$(Y)<>0ORZ=YTHEN270
290 R$(Z)=N:R$(Y)=N+1
300 NEXT
310 FORN=1TO12:R$(N)=INT((R$(N)-1)/2)+1:
    W$(N)=W1$(R$(N)):NEXT
320 FORN=1TO4
330 PRINT"{BLK}{RVS}{31 SPACES}"
340 FORZ=1TO3
350 PRINT" {RVS} {OFF}{9 SPACES}{RVS}
    {OFF}{9 SPACES}{RVS} {OFF}{9 SPACES}
    {RVS} {OFF}"
360 NEXTZ,N
370 PRINT" {RVS}{31 SPACES}"
380 PRINT"{HOME}{2 DOWN}{PUR}"
390 FORN=1TO9STEP3
400 PRINTTAB(5)NSPC(7)N+1SPC(7)N+2
410 PRINT"{2 DOWN}":NEXT
420 PRINT"{6 RIGHT}10{8 RIGHT}11
    {8 RIGHT}12"
430 D$="{HOME}{18 DOWN}"
440 SP$="{39 SPACES}"
450 PRINTD$SP$SP$
460 FORN=1TO12:READSQ$(N):NEXT
470 DATA 1108, 1118, 1128, 1268, 1278, 1
    288, 1428, 1438, 1448, 1588, 1598,
    1608
480 REM GAME
490 X=1
500 PRINTD$"{RED}WHICH BLOCKS, "N$(X)"?"
510 POKEBK,BK$(X)
520 IFN$(X)="64"THENGOSUB1070
530 PRINTD$"{DOWN}"SP$D$"{DOWN}{PUR}
    {RVS}BLOCK A?{BLK}{OFF}";
540 GETA$:IFA$=CHR$(13)THENI=VAL(AN$):AN
    $="" :GOSUB1060:ON(I>12)+2GOTO530,570
550 IFA$<"0"ORA$>"9"THEN540
560 PRINTA$;:AN$=AN$+A$:GOTO540
570 ON(R$(I)=0)+2GOTO530,650
580 PRINTD$"{2 DOWN}"SP$D$"{2 DOWN}{BLU}
    {RVS}BLOCK B?{BLK}{OFF}";:
590 GETA$:IFA$=CHR$(13)THENJ=VAL(AN$):AN
    $="" :GOSUB1060:ON(J>12)+2GOTO580,620
600 IFA$<"0"ORA$>"9"THEN590
610 PRINTA$;:AN$=AN$+A$:GOTO590
620 ON(R$(J)=0)+2GOTO580,630
630 IFI=JTHEN580
640 PRINTD$SP$SP$SP$SP$;:GOTO680
650 FORN=1TO3
660 POKESQ$(I)+N+40+O,6:POKESQ$(I)+N+40,
    ASC(MID$(W$(I),N,1))-64:NEXT
670 ON(N$(X)="64")+2GOTO1090,580
680 FORN=1TO3
690 POKESQ$(J)+N+40+O,6:POKESQ$(J)+N+40,
    ASC(MID$(W$(J),N,1))-64
700 NEXT
710 IFR$(I)=R$(J)THEN810
720 PRINTD$SP$D$TAB(12)"{RED}{RVS}NO MAT
    CH-{OFF}"
730 REM NO MATCH
731 S=54272:FORE=STOS+28:POKEE,0:NEXT
732 POKE54296, 15 :POKE54277, 51 :POKE54
    278, 164
733 POKE54275, 8 :POKE54274, 100
734 POKE 54273, 2 :POKE54272, 135 :POKE5
    4276, 65
735 FORT=1TO 200 :NEXT:POKE54276, 64
740 FORP=1TO2E3:NEXT:PRINTD$SP$
750 I$=STR$(I):I$=RIGHT$(I$,LEN(I$)-1):J
    $=STR$(J):J$=RIGHT$(J$,LEN(J$)-1)
760 POKESQ$(I)+41,32:POKESQ$(J)+41,32:PO
    KESQ$(I)+43,32:POKESQ$(J)+43,32
770 FORN=1TOLEN(I$):POKESQ$(I)+41+N,ASC(
    MID$(I$,N,1)):POKESQ$(I)+41+N+O,4:NE
    XT
780 FORN=1TOLEN(J$):POKESQ$(J)+41+N,ASC(
    MID$(J$,N,1)):POKESQ$(J)+41+N+O,4:NE
    XT
790 IFX=1THENX=2:GOTO500
800 X=1:GOTO500
810 REM RIGHTANS
820 PRINTD$SP$SP$D$"{12 SPACES}{BLK}
    {PUR}{RVS}MATCH!!!!{OFF}"
830 REM MATCH!!
831 S=54272:FORE=STOS+28:POKEE,0:NEXT
832 POKE54296, 10 :POKE54277, 35 :POKE54
    278,163
833 POKE 54273, 33 :POKE54272, 135 :POKE
    54276,17
834 FORT=1TO 100 :NEXT
835 POKE 54273, 42 :POKE54272, 62
    {2 SPACES}:POKE54276,17
836 FORT=1TO 100 :NEXT
837 POKE 54273,50{2 SPACES}:POKE54272, 6
    0{2 SPACES}:POKE54276,17
838 FORT=1TO 600 :NEXT:POKE54276, 16
840 IFX=1THENS1=S1+1
850 IFX=2THENS2=S2+1
860 FORP=1TO2E3:NEXT
870 Q=SQ$(I):R=SQ$(J)
880 FORN=1TO3
890 FORW=Q-2TOQ+6:POKEW+O,C$(X):POKEW,16
    0:NEXT:Q=Q+40:NEXT
900 FORN=1TO3
910 FORW=R-2TOR+6:POKEW+O,C$(X):POKEW,16
    0:NEXT:R=R+40:NEXT
920 PRINTD$SP$
930 CR=CR+1:IFCR=6THEN960

```

```

940 R$(I)=0:R$(J)=0
950 GOTO500
960 FORN=1TO5:FORZ=250TO150STEP-2:POKES,
Z:NEXTZ,N:POKES,0
970 PRINTD$"THE GAME IS OVER-
980 FORP=1TO2E3:NEXT
990 IFS1>S2THENPRINTD$SP$D$N$(1)" WINS!!
1"
1000 IFS2>S1THENPRINTD$SP$D$N$(2)" WINS!
11"
1010 IFS2=S1THENPRINTD$SP$D$"IT'S A TIE!
11"
1020 FORP=1TO2E3:NEXT:PRINTD$"{DOWN}WANT
ANOTHER?(Y/N)"
1030 GETA$:IFA$="N"THENPRINT"{CLR}[BLU]"
:POKEBK,27:END
1040 IFA$="Y"THENRUN130
1050 GOTO1030
1060 REM SOUND FOR BEGINNING
1061 S=54272:FORE=STOS+28:POKEE,0:NEXT
1062 POKE54296,15:POKE54277,51:POKE5
4278,246
1063 POKE54276,17{2 SPACES}:POKE54273,
1{2 SPACES}:POKE54272,135
1064 FORT=1TO200STEP16{2 SPACES}:POKE54
273,T/2+50:NEXT:POKE54276,16:FORT=1
TO500:NEXT
1065 RETURN
1070 REM C-64 PLAYS
1080 I=INT(RND(1)*12)+1:ON(R$(I)=0)+2GOT
O1080,650
1090 J=INT(RND(1)*12)+1:IFJ=1THEN1090
1100 IFR$(J)=0THEN1090
1110 PRINTD$SP$D$"64 PICKS" I"AND"J"
{LEFT}."
1120 FORP=1TO2E3:NEXT:GOTO680

```

Understanding Sound

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs" and "A Beginner's Guide To Typing In Programs" that appear before the Program Listings. Also, see the article "Automatic Proofreader."

Program 1: Demonstration Of The ADSR Envelope

```

5 PRINT"{CLR}":POKE53281,12:POKE646,0
10 PRINTTAB(8)CHR$(18)CHR$(169)CHR$(223)"
{OFF}"
20 PRINTTAB(7)CHR$(18)CHR$(169)"
{2 SPACES}CHR$(223)
30 PRINTTAB(6)CHR$(18)CHR$(169)"
{4 SPACES}CHR$(223)
40 PRINTTAB(5)CHR$(18)CHR$(169)"
{6 SPACES}CHR$(223)
50 PRINTTAB(4)CHR$(18)CHR$(169)"
{19 SPACES}CHR$(223)
60 PRINTTAB(3)CHR$(18)CHR$(169)"
{21 SPACES}CHR$(223)
70 PRINTTAB(2)CHR$(18)CHR$(169)"
{23 SPACES}CHR$(223)
80 PRINTTAB(1)CHR$(18)CHR$(169)"
{25 SPACES}CHR$(223)

```

```

90 PRINT
100 PRINT"{4 SPACES}A{5 SPACES}D
{3 SPACES}SUSTAIN{4 SPACES}R
110 PRINT"{4 SPACES}T{5 SPACES}E
{14 SPACES}E
120 PRINT"{4 SPACES}T{5 SPACES}C
{14 SPACES}L
130 PRINT"{4 SPACES}A{5 SPACES}A
{14 SPACES}E
140 PRINT"{4 SPACES}C{5 SPACES}Y
{14 SPACES}A
150 PRINT"{4 SPACES}K{20 SPACES}S
160 PRINT"{25 SPACES}E
170 CL=55296:S=54272:W=S+4:AD=S+5:SR=S+6
:V=S+24
175 POKEV,15:POKEAD,202:POKESR,58:POKES,
135:POKES+1,33:POKEW,33
180 FORR=CLTOCL+5:FORU=RTOCL+1024STEP40:
185 POKEU,1:NEXT:NEXT
190 FORR=CL+6TOCL+12:FORU=RTOCL+1024STEP
40
195 POKEU,1:NEXT:NEXT
197 FORR=CL+13TOCL+23:FORU=RTOCL+1024STE
P40
198 POKEU,1:NEXT:NEXT
200 POKEW,16:FORR=CL+24TOCL+28:FORU=RTOC
L+1024STEP40
290 POKEU,1:NEXT:NEXT
300 FORT=STOS+28:POKET,0:NEXT

```

Program 2: Demonstration Of Waveforms, Pitches, And The Envelope Generator

```

5 POKE53281,1:POKE646,0
10 S=54272:FORE=STOS+28:POKEE,0:NEXT
15 PRINT"{CLR}[UP]":GOSUB200
20 INPUT"ATTACK RATE 0-15";AT:INPUT"DECF
Y RATE 0-15";DE:AD=16*AT+DE:POKE54277
,AD
25 INPUT"SUSTAIN{SHIFT-SPACE}VOLUME 1-15
";SU:INPUT"RELEASE RATE 0-15";RL:J=16
*SU+RL
30 POKE54278,J:INPUT"OVERALL VOLUME 1-15
";V:POKE54296,V
32 INPUT"WAVEFORM 17,33,OR 129 ";W:POKE5
4276,W
33 INPUT"SUSTAIN LENGTH (* .1 SECOND)";L
E:LE=LE*100
34 INPUT"RELEASE LENGTH (* .1 SECOND)";D
L:DL=DL*100
35 INPUT"HIGH BYTE";H:INPUT"LOW BYTE";L:
POKE54273,H:POKE54272,L
40 FORT=1TOLE:NEXTT
42 POKE54276,(W-1)
43 FORT=1TODL:NEXT
50 S=54272:FORE=STOS+28:POKEE,0:NEXT
60 PRINT"{HOME}[13 DOWN]{RVS}AGAIN?{OFF}
Y OR N"
70 GETA$:IFA$="Y"THENPRINT"{HOME}
{13 DOWN}[16 SPACES]":GOTO200
75 IFA$<>"N"THEN70
80 REM PRINT PROGRAM
85 INPUT"{CLR}STARTING LINE";SL:INPUT"IN
CREMENT";IN
86 PRINT"{CLR}"
88 PRINT"{3 DOWN}NEW{3 DOWN}"
89 PRINTSL;"S=54272:FORE=STOS+28:POKEE,0
:NEXT":SL=SL+IN
90 PRINTSL;"POKE54296,";V;":POKE54277,";

```

```

AD;":POKE54278,";J:SL=SL+IN
120 PRINTSL;"POKE 54276,";W;":POKE 54273
    ",H;":POKE54272,";L:SL=SL+IN
140 PRINTSL;"FORT=1TO";LE;":NEXT";":POKE
    54276,";(W-1);"{LEFT}:FORT=1TO";DL;":
    :NEXT"
150 SL=SL+IN:PRINTSL;"FORE=STOS+28:POKEE
    ,0:NEXT
155 PRINT"HOME}";:FORR=631TO644:POKER,1
    3:NEXT
160 POKE198,13
165 END
200 PRINT" SAMPLE DATA FOR PITCH VALUES"
205 PRINT" PITCH HIGH BYTE LOW BYTE
    {2 SPACES}{RVS}WAVEFORMS
210 PRINT"{3 SPACES}C{7 SPACES}33
    {6 SPACES}135{5 SPACES}TRIANGLE=17
220 PRINT"{3 SPACES}C#{6 SPACES}35
    {6 SPACES}134{5 SPACES}SAWTOOTH=33
230 PRINT"{3 SPACES}D{7 SPACES}37
    {6 SPACES}162{5 SPACES}NOISE=129
240 PRINT"{3 SPACES}D#{6 SPACES}39
    {6 SPACES}223
250 PRINT"{3 SPACES}E{7 SPACES}42
    {6 SPACES}62
260 PRINT"{3 SPACES}F{7 SPACES}44
    {6 SPACES}193
270 PRINT"{3 SPACES}F#{6 SPACES}47
    {6 SPACES}107
280 PRINT"{3 SPACES}G{7 SPACES}50
    {6 SPACES}60
290 PRINT"{3 SPACES}G#{6 SPACES}53
    {6 SPACES}57
300 PRINT"{3 SPACES}A{7 SPACES}56
    {6 SPACES}99
310 PRINT"{3 SPACES}A#{6 SPACES}59
    {6 SPACES}190
320 PRINT"{3 SPACES}B{7 SPACES}63
    {6 SPACES}75
335 PRINT
340 RETURN

```

Speeding Up The VIC

Program 1: BASIC Loader

```

59998 FORA=828TO848:READB:POKEA,B:NEXT:E
    ND
59999 DATA120,169,73,141,20,3,169,3,141,
    21,3,88,96,169,0,141,140,2,76,191,
    234

```

Program 2: Location Modifier

```

59997 FORA=828TO853:READB:POKEA,B:NEXT:E
    ND
59998 DATA120,169,73,141,20,3,169,3,141,
    21,3,88,96,169,1,141,139,2,169,0,1
    41,140,2,76
59999 DATA191,234

```

Program 3: Ball Character Movement

```

59997 FORA=828TO853:READB:POKEA,B:NEXT:E
    ND
59998 DATA120,169,73,141,20,3,169,3,141,
    21,3,88,96,169,1,141,139,2,169,0,1
    41,140,2,76
59999 DATA191,234

```

```

60000 A=7680:B=38400:C=8185:E=A:F=38905:
    G=B:H=81:I=32:POKE650,128:SYS828:P
    RINT"{CLR}":D=1
60010 GETA$:IFA$="R"THEND=1:GOTO600060
60020 IFA$="W"THEND=-1:GOTO600060
60030 IFA$="*"THEND=22:GOTO600060
60040 IFA$="P"THEND=-22:GOTO600060
60050 IFD=0THEN60010
60060 POKEA,I:A=A+D:B=B+D:POKEA,H:POKEB,
    6:D=0
60070 IFA<ETHENA=C:B=F:GOTO600060
60080 IFA>CTHENA=E:B=G:GOTO600060
60090 GOTO60010

```

Power BASIC

Program 1: VIC Paddle Reader

```

10 FORA=828TO859:READB:POKEA,B:NEXT
828 DATA 169,0,170,168,24,109,8,144
836 DATA 144,1,200,202,208,247,132,251
844 DATA 138,168,24,109,9,144,144,1
852 DATA 200,202,208,247,132,252,96,0

```

Program 2: 64 Paddle Reader

```

10 FORA=679TO710:READB:POKEA,B:NEXT
679 DATA 169,0,170,168,24,109,25
686 DATA 212,144,1,200,202,208,247
693 DATA 132,251,138,168,24,109,26
700 DATA 212,144,1,200,202,208,247
707 DATA 132,252,96,256

```

The Beginner's Corner

Math Competency: Saving Money

```

10 REM MATH COMPETENCY :rem 102
20 REM SAVING MONEY :rem 150
30 PRINT"{CLR}{BLU}" :rem 230
40 FOR C=1 TO 6 :rem 213
50 READ N$(C) :rem 135
60 NEXT C :rem 232
70 FOR C=1 TO 3 :rem 213
80 READ A$(C),B(C),M(C),F(C) :rem 146
90 NEXT C :rem 235
100 DATA SALLY,HEIDI,NANCY,BRENT,DAVID,CH
    UCK :rem 57
110 DATA BIKE,80,5,7,STEREO,90,5,14,COMPU
    TER,100,10,10 :rem 22
120 PRINT"{CLR}{BLU}" :rem 22
130 R6=INT(6*RND(0)+1) :rem 182
140 PRINT N$(R6);" WANTS TO BUY A":rem 77
150 R3=INT(3*RND(0)+1) :rem 178
160 PRINT A$(R3);"." :rem 12
170 T=B(3)+M(R3)*INT(F(R3)*RND(0)+1)
    :rem 170
180 GOSUB 480 :rem 181
190 PRINT"IT WILL COST ";C$;"." :rem 200
200 P$="HE" :rem 20
210 IF R6>=4 THEN 230 :rem 29
220 P$="SHE" :rem 105
230 W=10*INT(4*RND(0)+1) :rem 15
240 PRINT"IF ";P$;" SAVES FOR" :rem 141
245 PRINTW;"WEEKS," :rem 169
250 PRINT"HOW MUCH WILL ";N$(R6)" :rem 99

```

```

260 PRINT"NEED TO SAVE EACH"      :rem 104  450 IF{2 SPACES}E$="N" THEN 520      :rem 38
265 PRINT"WEEK?"                  :rem 217  460 GOTO 430                          :rem 106
270 PRINT"{BLK}"                  :rem 250  470 T=S+.005                          :rem 109
280 S=(T/W)/100                   :rem 21   480 T=INT(100*T)                       :rem 120
290 INPUT ANS                      :rem 13   490 T$=STR$(T)                            :rem 20
300 IF ABS(ANS-S)<.01 THEN 380     :rem 64   500 C$="$"+LEFT$(T$,LEN(T$)-2)+"."+RIGHT$ :rem 168
310 PRINT"{RED}TOTAL COST ";C$    :rem 224  (T$,2)                                         :rem 118
320 PRINT"DIVIDED BY";W;"WKS ="   :rem 61   510 RETURN                                    :rem 26
330 GOSUB 470                      :rem 177  520 PRINT"{CLR}{BLU}"                          :rem 111
340 PRINTC$                        :rem 139
350 PRINT"{GRN}"                  :rem 135
360 INPUT "PRESS <RETURN>";E$     :rem 248
370 GOTO 120                       :rem 102
380 PRINT                          :rem 40
390 PRINT"{RED}CORRECT!"          :rem 188
400 PRINT                          :rem 33
410 PRINT"{BLK}ANOTHER PROBLEM?" :rem 87
420 PRINT"(Y/N)"                  :rem 142
430 GET E$                         :rem 224
440 IF E$="Y" THEN 120            :rem 44

```

BEFORE TYPING...
 Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs" and "A Beginner's Guide To Typing In Programs" that appear before the Program Listings. Also, see the article "Automatic Proofreader."



FREE OFFER! COMPUTER CASSETTES

58¢

FREE VIC-20 Compatible
 "World Capitals Game"
 with each order of
 20 or more C-10's

- C-10 Length
- 5 Screw Shell/Free Labels
- Lifetime money back guarantee
- Storage Box add 12¢ each
- \$2.00 shipping charge — any quantity (Canadian orders \$4.00 shipping)
- NJ Residents add 6% sales tax
- Send check or money order to

PARALLEL SYSTEMS

Box 772
 Blackwood, NJ 08012
 609-227-9634

GET OUT OF DEBT!

WITH YOUR
 VIC-20/C64
 "Bill Payer 1" \$14.95

organize bills/utilities
 computes paymts./due dates & more!

MENU DRIVEN

13 FUNCTION

Requires 16K

also available

"Financial Advisor" \$9.95

please specify tape or disc
 send check or M.O. to:

RJ Software

P.O. Box 985
 Folsom, CA 95610



SID says:

FREE
 parallel interface
 with any purchase!

Authorized
 Dealer

star
PRINTERS

*FOR COMMODORE PRODUCTS ONLY

STX-80 (Thermal) . . . 60 cps. \$175
 Gemini-10x 120 cps. \$315
 Gorilla Banana \$215

Send check or money order, plus \$11 (shipping/handling)
 Calif. add 6% tax

TO: COMPUTER OUTLET
 5857 Mission Gorge Rd. San Diego, CA 92120

SEND ME STX-80 Gemini 10X Gemini 15

Name _____ Phone _____

Address _____ Zip _____

Driver's Lic # _____ State _____ Exp _____

Allow 1 week for delivery. No C.O.D.

COMMODORE 64 OWNERS ONLY

• SHARE • LEARN • ENJOY •

- Monthly Newsletter
- Public Domain Software
- Reports of Recent 64 Articles
- Local Chapter Meetings
- Service Advice
- Bi-Monthly Magazine • Advice on Training

Send Name, address,
 phone no. and annual dues (\$25) to:

The Commodore 64 Users Group
 P.O. Box 572
 Glen Ellyn, Illinois 60137

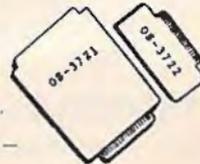
Or Call:

(312)790-4320 (weekdays
 9:00 am - 5:00 pm - Central Time)

"An independent not-for-profit organization".

MAKE YOUR OWN CARTRIDGES!

- Complete System •
- Programs 8K
- Cartridge to "AUTO-RUN" (opt) at Power-up — YOUR BASIC or Machine-Code Prgm.
- Prototype GAMES
- EDUCATIONAL use — NO Load Delay
- OS-3721 plugs into VIC-20
- Expansion socket on board
- Carts. Erasable & BLK Locatable



OS-3723 ZIF socket module	\$24.50
Allows programming 2764, 2732A, 2732, 2716, 2564, 2532, 2516 EPROMS	
OS-37A System (Pgm., 8K Cart)	\$88.50
OS-37B System (Pgm., ZIF mod) (Software Tape incl. Disk add \$2)	\$88.50
OS-3722 Blank 8K Carts.	\$24.50
Blank 2764 EPROMS	\$11.50

OTTO SYSTEMS
 8135 ENGINEER ROAD
 SAN DIEGO, CA 92111
 (619) 569-5665

Add \$4 Shipp. & Hndlg. — CA res. 6% tax



Reduction of an actual sign

The Banner Machine™

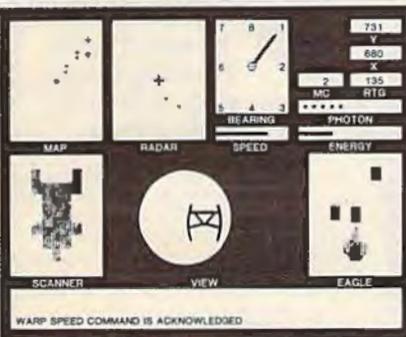
- For the Commodore 64 with tape or disk
- For the VIC-20 with 24K memory and disk
- Five fonts available; more coming
- Print on any Epson RX, FX, or MX with Graftrax; CBM 1525; Okidata 82A with Okigraph; or 8510 Prowriter
- Uses dot graphics—not Commodore block graphics
- Menu-driven program operates like a word processor
- Makes signs up to 13" tall by any length
- Makes borders of variable width up to 3/4 inch
- 8 sizes of letters from 1/4" to 8 1/2" high
- Proportional spacing
- Automatic centering; Right and left justifying; Tab

Order The Banner Machine™—\$49.95 from

Virginia
Micro
Systems

Virginia Micro Systems
13646 Jeff Davis Highway
Woodbridge, Virginia 22191

Phone (703) 491-6502



QUEST OF THE EAGLE

YOUR MISSION THIS TIME...SECURE PLUTONIUM AND DELIVER TO PLANET JEMSIQ...ENERGY LOW...RADAR SHOWS CRAFT APPROACHING...TRANSPORT ROOM TOO DAMAGED TO BEAM UP ENERGY...IS CRAFT FRIEND OR FOE?...

CAN YOU COMPLETE THIS MISSION AND ADVANCE TO MORE CHALLENGING MISSIONS OR WILL THEY DESTROY YOU?

FERIN ENTERPRISES \$28.75
COMMODORE 64 6310 UNDERWOOD AVE. S.W. SPECIFY CASSETTE OR DISKETTE
CEDAR RAPIDS IA. 52404

VIC-20 SOFTWARE VIC-20

Postage Paid
SOFTWARE

100% Machine Code
Money Back Guarantee

BOMBER RUN \$13.95 U.S.

Destroy Enemy Base with bombs, shoot down fighters with air to air missiles but beware of suicide jets. Clear enough territory to land, watch out for those unexploded bombs. Great colour graphics and sound.

SUPAVADERS \$13.95 U.S.

They're back. But this time you have a bigger territory to defend (screen scrolls). Their ships stay high, raining missiles, preparing the way for commando crews in landing craft. Fire in four directions.

MERLIN'S MAZE 3D \$13.95 U.S.

Find the seven treasures of Camelot. Collect Merlin's spells to increase your chance of success. Only they're invisible so good luck, lift wall. But it costs you energy. Solve logic problems to continue to next section.

CHADWELL'S SOFTWARE

#203, 4144A 97 St., Edmonton
Alberta, Canada T6E 5Y6

U.S. ORDERS WELCOME

DEALER INQUIRIES WELCOME

BUDGET AIDE \$69.95

Family budget assistance in money management, menu driven, chart of accounts, user define categories, integrated checkbook with reconciliation, color graph analysis of budget management and more.

DDB-ONE \$89.95

Relational data base for your 64. Minimal set-up time required with the self prompting aids. Search, Text Retrieval, Field Editing, Auto File Advance, Flagged Files, Any Print Format, and all this from the screen.

Dealer inquiries are welcomed.

(send check or money order and \$1.50 for handling)

To: MicroTechniques

P.O. Box 192

Chesterfield, MO 63017

HOW TO MAKE MONEY

with your
VIC 20

COMMODORE 64
PERSONAL COMPUTER

You've made the investment—now spend just \$4.95 more to learn how to get it all back—and more. New 1983 compendium of practical, proven methods for operating a profitable business right in your own home has just been published. Includes latest software listings. Sent postpaid the same day we receive your check for \$4.95.

Practical Applications
Box 336
Edwardsburg, MI 49112

SEND
ME



Name _____
Address _____
City _____
State _____ Zip _____ Check enclosed

THE VIDEO & COMPUTER PLACE INC

884 North Court Square • Medina, OH 44256
C-64®/VIC-20® CONSOLE UNIT!

Combine your C-64®/VIC-20® into one compact unit. The C-64®/VIC-20® console unit is designed to house keyboard, disc drive, datasette, and monitor.



Made of sturdy 1/2" acrylic with vents. available in:

Smoke Tint Clear
\$69.95 \$62.95

Ohio residents add 6% sales tax, \$4.00 for shipping and handling. C.O.D.'s, cashiers check or money order. Call (216) 722-0770 for Visa or MasterCard. Allow six weeks for delivery.

Name _____
Address _____
City _____ State _____ Zip _____
Specify clear or tint when ordering. Pat. applied for

INTERFERENCE PROBLEMS

on your VIC or 64?

AT LAST! A PROVEN CURE FOR THOSE ANNOYING, SWERVING LINES AND WAVERING PATTERNS WHICH SPOIL THE TV PICTURE WHILE YOU'RE TRYING TO ENJOY THE WONDERS OF YOUR VIC OR 64.

THESE EASY TO INSTALL DEVICES ARE GUARANTEED TO GREATLY REDUCE OR TOTALLY ELIMINATE ALL RF INTERFERENCE GENERATED FROM BOTH OUTSIDE SOURCES AND THE COMPUTER ITSELF.

TO GET A PERFECT PICTURE

SEND CHECK OR MONEY ORDER FOR \$11.95

(Cal. Residents Add 6 1/2% Sales Tax)

PICTURE-PERFECT

7321 FOUNTAIN AVE., LOS ANGELES, CA 90046

NEW FOR
VIC 20

16k with
Battery \$89
Backup



NO MORE DATA LOSS!

If power fails — data and programs are retained for up to 2 weeks!

No other 16k expansion can make this claim!

PLUS:

- FULL BLOCK SWITCHING
- WRITE PROTECT
- RESET SWITCH, AND MORE

FULLY GUARANTEED

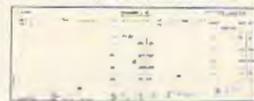
To order, or for free detailed application literature, write to:

ABARIS, INC.
PO Box 2501
Vancouver, WA 98668

Add \$3 shipping

Washington residents, add 6% sales tax.

NEW LEROY'S CHEATSHEET KEYBOARD OVERLAYS FOR YOUR VIC-20™



AT LAST! The information you need at your fingertips without going back to the manual. No need to memorize commands. These durable plastic coated overlays are designed for use by first time users, amateur enthusiasts, and trained professionals. Each overlay contains program starting locations, function key labeling, commands and warnings in bold letters, and additional helpful aids in center cutout.

ORDER TODAY!

- Please send me the following Leroy's Cheatsheet™ keyboard overlays
- | | |
|--|--|
| <input type="checkbox"/> Programmer's Aid™ | <input type="checkbox"/> Graphic Printer (1515 & 1525) |
| <input type="checkbox"/> Vicman™ | <input type="checkbox"/> UMI Wordcraft™ |
| <input type="checkbox"/> Super Expander™ | <input type="checkbox"/> HES Writer™ |
| <input type="checkbox"/> Vic Typewriter™ | <input type="checkbox"/> HES Vic FORTH™ |
| <input type="checkbox"/> Vicman 1™ | |

Send check or money order plus \$2.00 (postage and handling). PA residents add 6% sales tax.

Name _____
Address _____
City _____ State _____ Zip _____

CHEATSHEET PRODUCTS™ CG1083
P.O. Box 8299 • Pittsburgh PA, 15218

VIC-20 EXPANDER

FOUR-SLOT BUS EXPANDER BOARD

- ▶ PREMIUM SOLDER-MASKED BOARD
- ▶ GOLD-PLATED CONNECTORS
- ▶ BLOCK SELECT SWITCHES
- ▶ ON-BOARD RESET SWITCH
- ▶ SAFETY FUSE

\$19.00
BARE BOARD
INSTRUCTIONS



Bare Board / instructions \$19.00
Kit board, all parts \$33.00
Complete (assembled board) \$39.00

400 120 shipping

FROM: The Data Toolbox
P.O. BOX 4808 V
Las Vegas, Nevada 89127

PHONE ORDERS: (702) 848-3358

QUAD-SLOT

MORE MEMORY

MORE GAMES

VIC-20

DISCOUNT SOFTWARE (game, utility, educ., applications) for the VIC-20. Write for a full catalogue (also APPLE) — 30-day warranty on faulty merchandise — please pay in your country's currency. VIC on cassette only.

	U.S.A. -	U.K.
	CAN.	
SNAKMAN	\$9.00	£4.00
CRICKET	9.00	4.00
KRAZY KONG	9.00	4.00
ESCAPE	9.00	4.00
BOMBER	9.00	4.00
OTHELLO	9.00	4.00
ALIEN 2	9.00	4.00
RESCUE / NUFON	9.00	4.00
MOTHER * HEN	9.00	4.00
ASTRO WARS	9.00	3.00
ARTILLERY	9.00	3.25

DISCOUNT SOFTWARE

P.O. Box 1489
Niagara-on-the-Lake, Ont.,
Canada L0S 1J0



BYTES & PIECES

SOFTWARE ON SPECIAL!

Please specify machine and format
C = Cassette D = Disk X = Cartridge
\$1.00 credit for phone orders over \$100.

Commodore 64		LIST	OURS
Choplifter	X	44.95	32.26
Facemaker	D	34.95	24.86
Fort Apocalypse	X	34.95	24.86
Frogger	X	34.95	24.86
Gridrunner	X	39.95	28.56
Jumpman	D	39.95	28.56
Hepton	D	39.95	28.56
Robbers of Lost Tomb	C/D	24.95	19.46
Starcross	D	49.95	35.96
WordPro 3+/64	D	89.95	64.56
Vic 20			
AE	X	39.95	28.56
Apple Panic	X	39.95	28.56
Gridrunner	X	39.95	28.56
K-Razy Antics	X	49.95	35.96
Trashman	X	39.95	28.56
Type Attack	X	39.95	28.56

C.O.D. • Money Orders • Certified Checks • Personal Checks Allow 2 Weeks • N.Y.S. Res. Add Sales Tax
U.S. Orders Under \$100. Add \$2.00 P&H
All Canadian U.S. Funds \$3.00 P&H
Foreign Charges Only. Min. P&H \$6.00

SEND FOR FREE PRICE LIST

Source TCP 637 • Compuserve 72135, 1710
P.O. Box 525 Dept 20 • East Setauket, N.Y. 11733

TRANS-TERM

COMMUNICATIONS PACKAGE

CREATE, SEND, RECEIVE FILES
INCLUDES DOWNLOAD TO DISK

For Commodore 64 with Disk & VIC Modem **\$29.95**

DIAL-FILE

TELEPHONE DIRECTORY AND DIALER

INSTANT STORAGE, RETRIEVAL AND
DIALING OF OVER 140 NUMBERS!

For Commodore 64 with Disk, Sound Monitor or T.V. & Touch-Tone Phone **\$14.95**

AVAILABLE FROM

DayProm

computer, inc.

3460 S. Dixie Hwy.
Dayton, Ohio 45439
(513) 299-8555

DEALER CALLS INVITED!

Software For
Commodore 64



DATAFILE *\$15.95
A data-base management program which lends itself well to address lists, collections, club lists, etc. Records can be Sorted, Found, Saved, Edited, Updated, and sent to optional printer.

FLIGHT 64 *\$15.95
Your mission is to make an IFR flight, avoiding treacherous mountains and other hazards. Full color graphic instrument display. Topography changes with every flight. Use keyboard or joystick.

SPELLATHON *\$19.95
Unique spelling tutor for all ages. Make up your own word lists and save them to disk or tape. After drilling play "MORATHON", a letter scramble game included in the package.

*Prices are for cassette, add \$2 for disk.
*Check, MO, or COD. Add \$2 for shipping.
*See your dealer or order direct

FANTASY COMPUTERWARE
BOX 481
SIOUX FALLS, SD. DAK. 57101
(605) 335-7684



LEARN

Having trouble learning to use your computer?

Reference manuals don't teach. Most BASIC texts don't cover specific personal computers.

TIS solves these problems with step-by-step books tailored for your machine.

For PET/CBM

Understanding your PET/CBM \$14.95
Vol. 1: Basic Programming
PET Graphics \$ 4.95

For VIC

Understanding Your VIC \$11.95
Vol. 1: Basic Programming

Software for PET, VIC, & C64

Software products on cassette or floppy disk with complete instruction manual.

Cassette \$24.95
Diskette \$29.95

SW-1 MAIL B mailing list system
SW-2 CHECKBOOK record
SW-3 ACCOUNTS keep track of who owes you how much
SW-4 MEDIC create and maintain data files
SW-5 CALENDAR appointments, meetings at-a-glance

Money Back Guarantee. VISA/MC accepted.
All prices include UPS or 1st Class postage.

TIS INC

Total Information Services, Inc.
Box 921, Dept. G
Los Alamos, NM 87544



Advertise your program or product for the VIC-20 or 64 here and reach hundreds of thousands of readers.

GET EXACTLY
WHAT YOU WANT
for the
COMMODORE 64

DESCRIPTIVE CATALOG - \$1
(refunded on first order)

OCTOBER SPECIALS

5 1/4" BASF Qualimetric Disks \$28.00/box
ELECTRA Triga Command Joysticks \$14.95
VICTORY Annihilator \$15.50
SYDNEY DATA PRODUCTS Evolution \$29.95
ACCESS Neutral Zone \$26.95

MC/VISA Order Line: (409) 763-0291 add 3%
Leave name, address, order, card# & exp. date

Where It's At!

P.O. Box 27
Galveston, TX 77553

Send Check or MO + \$2.00 Shipping

Specify Disk or Cassette
Prices Subject to Change
Allow 3 Weeks




Educational Software
For The **COMMODORE**

VIC-20



Wide Variety Of Subjects
Available For All Ages

FOR **FREE BROCHURE** WRITE:

Schoolmaster
Programming Company
P.O. Box 194, Pomona, CA 91769

WITH OUR BASIC COMPILER
YOU WON'T BE LEFT
WAITING!
FOR C-64
\$29.95



SEND CHECK OR MONEY ORDER TO:

JOU LABORATORIES

2116 E. Arapaho, Box #371
Richardson, TX 75081

3-D OTHELLO

OJAI SOFTWARE
Offers for the unexpanded
VIC-20

An added dimension
to the game of Othello.

Play against friend
or computer

\$15 per cassette
(Joystick required)

Dealer inquiry invited.
Calif. Res. please add 6% sales tax.

OJAI SOFTWARE
P.O. BOX 1860
OJAI, CALIF. 93023

Gridrunner

\$27 POST PAID
(cart.)

ZORK I II (64disk) \$32ea.

Elem.Com.64 (book) \$14

Free Catalogue

Send check or M.O. to: *Ga. res. add 4% tax

FLEET Software

2936-H, N. Druid Hills Rd.
Atlanta GA 30329

Your Computer? C 64 VIC 20

Name

Street

City State Zip

R.I.S.T. Inc. ANNOUNCES

SPEECH SYNTHESIZER SALE

\$59.95

*ACT NOW
Receive

Phrase Finder Program \$5 VALUE FREE
Speech Synthesis Manual \$10 VALUE FREE
ORDER NOW SALE ENDS 9/30/83

Apple II, II+

TRS80 Models I, III

Commodore 64, VIC 20

ZX80/81 and TS1000

Regularly \$89.95

Now Only \$59.95 + \$4.00 sh/hd.

Complete or Starter Kits Available

10 Day Money-Back Guarantee

Send check or M.O. COD add \$1.50 to R.I.S.T. Inc.
Dept. GZ1083, P.O. Box 499 Ft. Hamilton Station
Brooklyn, NY 11209 212-259-4934
N.Y.S. RESIDENTS ADD 8% TAX

BIBLE Software

For Commodore 64™ Bible
learning games for home and
Sunday school. Action game
MESSAGE RUNNER
only \$16.95. Order or request
information to:

BIBLE Software

4169 S.E. Davidson
Albany, Oregon 97321

Parents...

EDUCATION SOFTWARE
FOR THE
VIC-20® COMPUTER

EduCare's home-computer learning
plan combines basic skills testing,
software rental and help for parents
in one comprehensive system.

GIVE YOUR CHILDREN
A HEAD START
ON TOMORROW.

CALL OR WRITE: (502) 821-0492
FAMILY COMPUTER SYSTEMS
66 Lucy Drive
Madisonville, KY 42431

Independent Distributor of Technicom Products

VIC 20/COMMODORE 64 ASSEMBLER

- Editor/Assembler Monitor Package
- Full Featured Assembler
- Outstanding Machine Language Text Editor
- Complete Machine Language Monitor including: Hex Dump, Disassembler, Load, Save, Change, Trace, etc. indispensable for Assembly Language debugging.
- Full Documentation
- Fully Copyable

PRICE \$50.00 (U.S. FUNDS) COMPLETE,
DISK OR CASSETTE

Minimum 8K Memory Expander required on VIC 20

VIC 20 8K ___ 16K ___ 24K ___ 32K ___ add on

memory Commodore 64 ___

Disk ___ Cassette ___

Name _____

Address _____

City _____ State _____ Zip _____

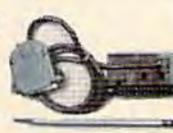
Send Check or Money Order to:
(Allow 3 weeks for checks)
MICOL Systems
P.O. Box 5150
Whittier, CA 90607-5150
MICOL
Quality Systems Software
DEALER INQUIRIES WELCOME

GET THE MOST FROM YOUR VIC-20/C64

CASSETTE INTERFACE
* USE ANY STANDARD CASSETTE RECORDER
* CONNECTS TO THE CASSETTE PORT
* CONTROLS THE CASSETTE MOTOR
* NEEDS NO BATTERIES
* COPY FROM RECORDER TO RECORDER
* THIS IS THE BEST ONE FOR LESS \$\$\$
* ONLY \$34.95 POSTPAID. ADD \$2.00 FOR SHIPPING OUTSIDE US. CANADA, MEXICO



THE MODEM INTERFACE
* CONNECTS TO THE USER I/O PORT
* NEEDS NO BATTERIES/SOLDSMERS
* CONNECTS ANY STANDARD MODEM
* USE MICROEM AUTODIAL ANSWER PATTERNS
* COMES WITH A FREE TYPE IN BASIC TERMINAL PROGRAM
* ONLY \$24.95 POSTPAID. ADD \$2.00 FOR SHIPPING OUTSIDE US. CANADA, MEXICO



CHARGE OR COD ORDERS CALL 1-800-227-3800

ASK FOR OPERATOR 225
PO BOX 12309 DEPT HD SEATTLE, WA 98111
BYTESIZE MICRO TECHNOLOGY (206) 236-BYTE
CALL OR WRITE FOR DEALER INFORMATION

1/2 PRICE INTRODUCTION Commodore & TI

Spreadsheet	19.95
Data Base	19.95
Word Processor	9.95
Payroll	9.95
Mailing List	9.95
Inventory	9.95
Games Pak*	19.95
Education Pak*	19.95
Business Pak*	19.95

(*Valu-paks have 5 programs)

VALORUM

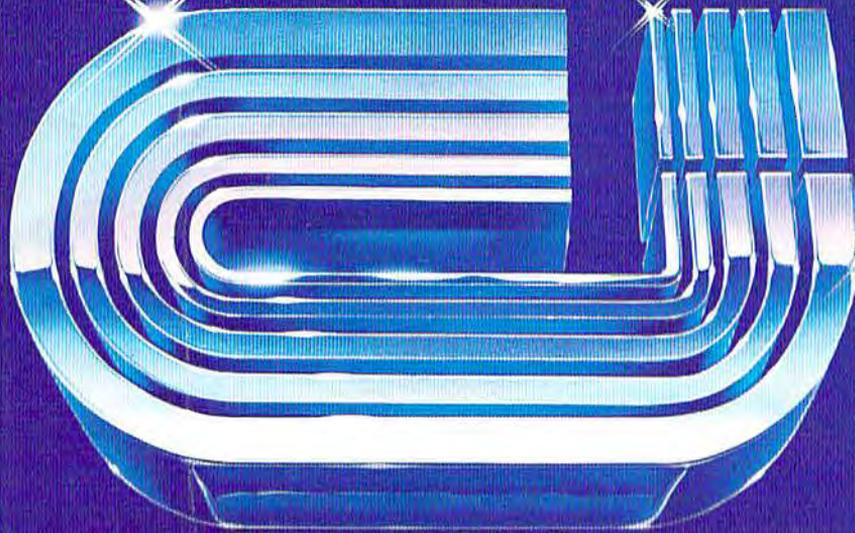
441 Clyde Ave.
Mtn. View, CA 94043
(415) 968-8500

ADVERTISERS INDEX

Reader Service Number/ Advertiser	Page	Reader Service Number/Advertiser	Page
102 Aardvark L.T.D.	99	Lightning Software	107
103 A-1 Services	62	129 Micol Systems	159
Abacus Software	83	Micro Digital	75
Abaris, Inc.	157	Micro World Electronix, Inc.	104
Accolade Computer Products	83	130 Micro-80	104
104 Advanced Processor Systems	97	Micro-Ware Distributing Inc.	46
AdVentures	31	Micro Software International Inc.	85
Alphacom	29	131 Micro Systems Development, Inc.	79
American Peripherals	123	132 MicroTechniques	157
105 Animax Computer	66	133 Midwest Micro Inc.	113
Apropos Technology	115	134 Miroge Concepts, Inc.	51
Assembly Technology	129	Mosaic Electronics, Inc.	78
106 Avalon Hill Game Company	45	Nüfekop	43
107 Batteries Included	21	OJAI Software	159
Bible Software	159	Olympic Sales	130
108 Boone	47	Otto Systems	156
109 Bröderbund Software	IFC	Parallel Systems	156
110 Byte-Ryte	129	Phantom Software	57
111 Bytes & Pieces	158	Picture Perfect	157
112 Bytes & Pieces	105	Practical Applications	157
113 Bytesize Micro Technology	159	135 Professional Software Inc.	9
114 Cardca, Inc.	IBC	The Program Store	67
Cass-A-Tapes	129	136 Protecto Enterprizes	89
115 Century Micro Products	121	Pro-Line Software	123
Chadwell's Software	157	Pro-Line Software	130
Cheatsheet Products	157	137 Pyramid Software International	123
116 Commercial Data Systems Ltd.	59	Quality Computer	46
Commodore Business Machines	8C	Quicksilva Inc.	55
Commodore 64 Users Group	156	Rainbow Computer Corporation	87
Comm*Data Computer House, Inc.	81	138 R.I.S.T. Inc.	159
Compatible Systems Incorporated	129	R J Software	156
Compuscope	103	Sierra On-Line, Inc.	7
Computer Mail Order	69	Sierra On-Line, Inc.	71
117 Computer Marketing Services, Inc.	25	SJB Distributors	119
118 ComputerMat	63	Schoolmaster Programming Company	158
119 Computer Outlet	93	139 Skyles Electric Works	77
Computer Outlet	156	Software Guild	16,17
Computer Place	100	Sophware	129
120 CompuServe	37	Southern Solutions	121
121 ComStar	135	140 Southwest Micro Systems, Inc.	92
Creative Software	4	Spinnaker	2,3
Cursor 64	20	Sunsoft	20
Data Equipment Supply	78	141 Sydney Dataproducts, Inc.	53
122 Data 20	61	142 Systems Management Associates	91
Data Impact Products, Inc.	95	Synapse	15
DayProm Computer, Inc.	158	143 T & F Software Company	1
The Data Toolbox	158	144 Timeworks, Inc.	39
123 Discount Software	158	145 Toronto Pet Users Group	130
Dytek	129	146 Total Information Services, Inc.	158
Eastern House	115	147 Toil Software, Inc.	113
124 Family Computer Systems	159	Tri Micro	27
Fantasy Computerware	158	Tronix	11,12,13
Ferin Enterprises	157	148 Viasala	20
Fleet Software	159	Valorum	159
Foxfire Systems, Inc.	56	149 Victory Software Corp.	73
125 French Silk	103	The Video & Computer Place Inc.	157
Genesis Computer Corporation	73	150 Virginia Micro Systems	157
Grapevine Software, Inc.	65	151 Voice World	121
Hewitt's National Wholesale	116	152 Umbrella Software Incorporated	71
House of Software	126	153 Ware II's AI!	158
Human Engineered Software	19	York 10 Computerware	73
126 Hytec Systems	41		
Infocom	34,35		
Interesting Software	109		
Institutional Computer Development Corp.	82		
127 Jini Micro-Systems, Inc.	139		
128 Jay Sun Enterprizes, Incorporated	41		
Jou Laboratories	159		

COMPUTE!'s First Book of VIC	137
COMPUTE!'s First Book of VIC Games	33
COMPUTE!'s Gazette	49

New From Cardco



Five Slot Expansion Interface for the C-64

The CARDBOARD/5 (CB/5) is an enclosed five slot, fully switch selectable, expansion interface for the Commodore 64™. This quality product allows the user to switch select any cartridge slot or combination of cartridge slots. Twenty-two color coded light emitting diodes give status indication. Each slot has four LEDs and two toggle switches for indication and control. Two master toggle switches allow the user to manually override any situation.

All Cardco products are individually tested to insure quality and reliability.



Some of the features of the CARDBOARD/5 are:

- high quality glass/epoxy circuit board
- gold plated contacts
- logic lines are switched by solid state IC switches
- full LED status indication
- convenient toggle switches

- full support under the board to prevent flexing
- full plastic enclosure to insure safety
- fused to protect your computer
- convenient reset button
- CARDCO, Inc.'s exclusive Lifetime Guarantee



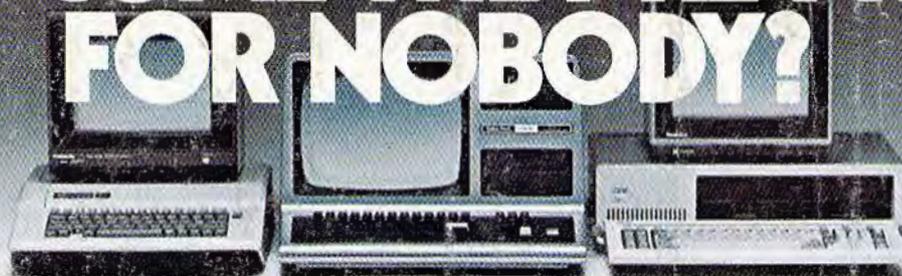
See a complete line of American made Cardco Products at a computer store near you, today.

313 Mathewson • Wichita, Kansas 67214 • (316) 267-6525

Commodore 64™ is a registered trademark of Commodore Business Systems, Inc.


cardco, inc.

IF PERSONAL COMPUTERS ARE FOR EVERYBODY, HOW COME THEY'RE PRICED FOR NOBODY?



A personal computer is supposed to be a computer for persons. Not just wealthy persons. Or whiz-kid persons. Or privileged persons.

But person persons.

In other words, all the persons whom Apple, IBM, and Radio Shack seem to have forgotten about (including, most likely, you).

But that's okay. Because now you can get a high-powered home computer without taking out a second mortgage on your home.

It's the Commodore 64. We're not talking about a low-priced computer that can barely retain a phone number. We're talking about a memory of 64K. Which means it can perform tasks most

\$1395*
APPLE® IIe 64K

\$999*
TRS-80® III 16K

\$1355*
IBM® PC 64K

other home computers can't. Including some of those that cost a lot more. (Take another look at the three computers above.)

By itself, the Commodore 64 is all the computer you'll ever need. Yet, if you do want to expand its capabilities some day, you can do so by adding a full complement of Commodore peripherals. Such as disk drives. Modems. And printers.

You can also play terrific games on the Commodore 64. Many of which

will be far more challenging than those you could ever play on a game machine alone. And as great as all this sounds, what's even greater-sounding

is the price. It's hundreds of dollars less than that of our nearest competitor.

So while other companies are trying to take advantage of the computer revolution, it seems to us they're really taking advantage of something else:

Their customers.

*Manufacturers' suggested list prices as of March 20, 1983. Monitor included with TRS-80 III only. Commodore Business Machines, P.O. Box 500R, Conshohocken, PA 19428; Canada-3370 Pharmacy Avenue, Agincourt, Ont., Can. M1W 2K4

commodore
COMPUTER

Apple is a registered trademark of Apple Computer, Inc. TRS-80 is a registered trademark of Tandy Corp. IBM is a registered trademark of International Business Machines Corp.



THE COMMODORE 64. UNDER \$600.

You can't buy a better computer at twice the price.