Telecommuting: Dawn Of The Electronic Cottage

COMPUTE!'s GAZETTE™

$2.50
December 1983
Issue 6 Vol. 1, No. 6
63380 $3.25 in Canada

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

SPIKE

Arcade-Action Game For Commodore 64

Written entirely in machine language, Spike is an outstanding arcade-style game with stunning high-resolution graphics — one of the best games we've ever published. Only the skillful can evade the random power spikes and escape the Grid.

Sprites Made Easy For Commodore 64

A simple program to add sprite commands to Commodore BASIC. Examples show how you can animate shapes on the screen in your own programs with a minimum of tricky PEEKs and POKEs.

Educational Games:

A Kid's View

A teenager speaks out on what youngsters like to see in educational computer games — and he includes his own game for the VIC-20 and Commodore 64 to show exactly what he means.

A SURVIVAL GUIDE FOR BEGINNERS

Lost in the woods without a compass? Here's a complete guide to finding help through user groups, computer classes, books and magazines, and your fellow computerists.

Also In This Issue

VIC Music Writer

Home Budget Planner

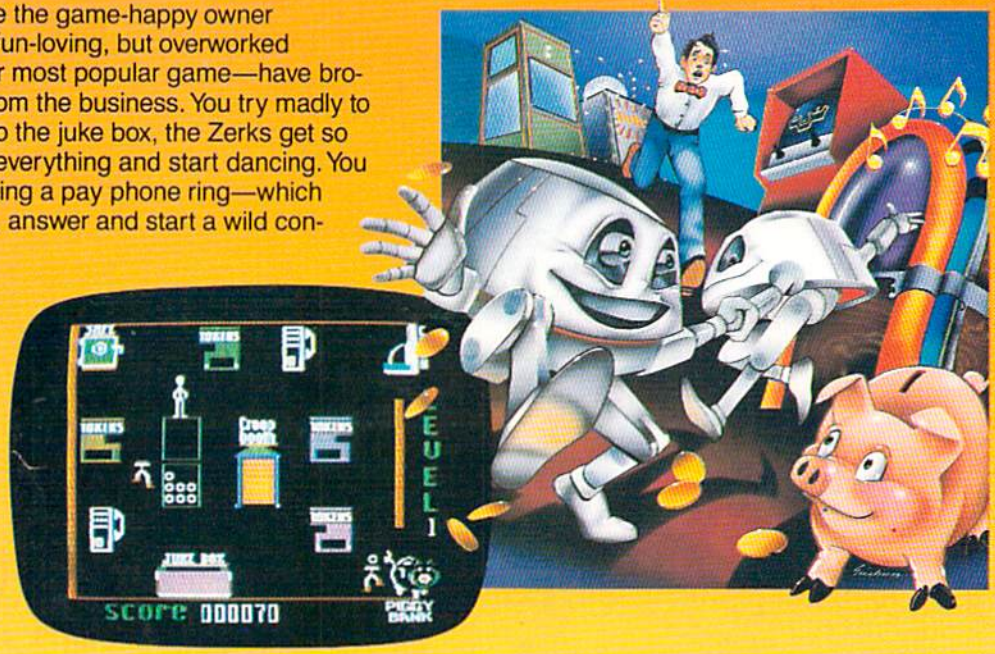
The Programmer Behind *Pipes*

***Space Duel:* Machine Language Game For VIC And 64**

0 12
74470 63380

A million laughs

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



and an endless challenge

LODE RUNNER™ Here's a game that will never stop challenging you. That's because Lode Runner is more than a spellbinding, fast-action game with its 150 different mind-boggling game screens. Lode Runner is also an easy-to-use Game Generator that lets you create your own games. Without any knowledge of programming, you can easily design unique Lode Runnner screens, then bring them to action-packed life. You will maneuver through scene after scene, running, jumping, drilling passages and outfoxing enemy guards in a secret underground hide-away as you pick up chests of gold stolen from citizens of the Bungeling Empire. There's no end to the thrills, chills and challenge. Of course, it's from Brøderbund! **For the Apple® II/II+/IIe; Atari® Computers; Atart 5200™ Super System; Commodore 64™ (disk and cartridge); VIC-20™ (cartridge); IBM® PC.**

Ask your Brøderbund dealer for sneak previews.

Brøderbund Software **Discover the Difference**

17 Paul Drive San Rafael, CA 94903

Apple II, II+, IIe are registered trademarks of Apple Computer, Inc. ATARI 400/800/1200 and 5200, Commodore 64 and VIC-20 and IBM are trademarks of Atari, Inc., Commodore Electronics, Ltd., and International Business Machines Corporation, respectively.

T&F SOFTWARE

CheckEase!™

Professional-Quality Checkbook:

For VIC-20 and Commodore 64

Now you have the power of a professional quality Check Register System. Maintain multiple checking accounts, complete with full checkbook reconciliation and 16 budget categories. Change or delete any check, check or deposit amount, or deduction and CheckEase! will automatically update all balance figures. Review checks forward, backward or by check number. Configure for RS232 or compatable Commodore printer. Post checks as they clear the bank. Upgrade data from cassette to disk. Print by check number, category or if item is tax deductable. Commodore 64 and VIC-20 users can even save months worth of check data in a format compatable with Commodore's *Personal Finance* package for later analyzation.

$24.95 cassette (VIC-20 min. 8K),

$29.95 cassette: Commodore 64, *Atari 400®/800®/1200 XL®

$34.95 disk: Commodore 64, *Atari 400®/800®/1200 XL®, *IBM PC, *APPLE II/IIplus/IIe®

SearchSeries™

First with Arcade-Quality Games:

For VIC-20 and Commodore 64

There are 374 letters on the screen. Concealed within are 20 words: 10 across and 10 down. You have 10 minutes. When you've found a hidden word, it changes color. Every game features a new screen. Over 300 different words and thousands of new games possible. **$19.95** on cassette.

WordSearch 3 categories: Capitals, Jumbled and Animals.

SportSearch 3 categories: Pro Teams, College Teams and Sport Games.

ArcadeSearch 3 categories: Home Video Games, Arcade Video Games and Famous Video Game Characters.

Space Sentinel™

For Commodore 64

Planet Earth is under attack by ruthless aliens who hurl heat missles at our polar ice caps. Will the Earth flood? As the orbiting Space Sentinel, the Earth's fate is up to you. If you can hold out against the merciless attackers, Earth's population will have time to escape and colonize a new home planet. Complete sprite & character graphics with 3-voice sound. **$29.95** on disk. Joystick, Diskdrive & Commodore 64® required.

*AVAILABLE 4TH QUARTER '83

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 1982, 1983 BY T&F SOFTWARE. SPACE SENTINEL IS A TRADEMARK OF MEGAGEM. CHECKEASE IS A TRADEMARK OF GMS SYSTEMS. SEARCH SERIES, ARCADESEARCH, WORDSEARCH, SPORTSEARCH ARE TRADEMARKS OF GEORGE DENNIS. VIC-20, COMMODORE 64 AND PERSONAL FINANCE ARE REGISTERED TRADEMARKS OF COMMODORE COMPUTERS, INC. AND CREATIVE SOFTWARE. ATARI 400/800/1200XL AND IBM P.C. ARE REGISTERED TRADEMARKS OF THEIR RESPECTIVE COMPANIES.

Meet the Sim Software Family

The Sim software family teaches, entertains, and makes many jobs easier. Its members perform like you've never seen before. Every Sim program can teach you a new trick. Even our application and game software deliver educational extras. **All at a very affordable price.**

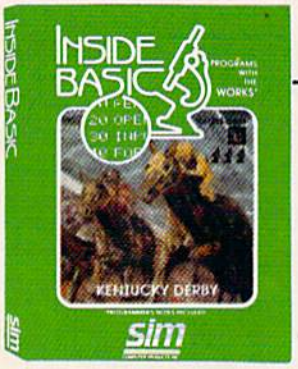
Sim gives you those special little touches which make our software such a great value. The INSIDE BASIC SERIES for example. We give you the ability to learn from the program. After you have bet on the horses in KENTUCKY DERBY, devised trivia questions to stump your friends with QUIZ ME, or created invoices for your hobbycraft sales with FORM GENERATOR, you just might want to see how the program was put together. So we've included the programmer's notes†. Budding programmers can use these notes to change the odds on the horse race, insert a special feature in a quiz, or add a custom wrinkle to a form. Sim gives you the power to do it.

ALL INSIDE BASIC programs come with both the Commodore 64 and VIC 20 versions on the same disk or cassette. If you plan to upgrade to the Commodore 64, *you won't lose your investment in software.* And if you have both computers you can use the program on either unit.

Take our software family home to your family. They'll love each other.

†Programmer's notes available free with response card and include program overview, line by line description, complete listing, variable chart, and suggested changes.

Entertainment



Kentucky Derby Bet on your favorite horses

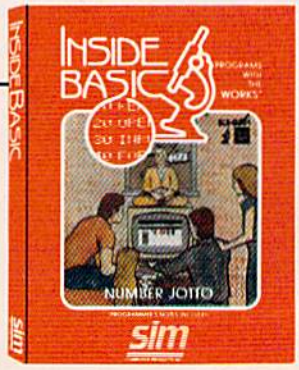
There's nothing more fun than a day at the races. Especially when you don't have to leave your living room. This popular program features colorful hi-resolution graphics and authentic sounds. Pick your favorite horse or ask Hot Tip Sam. Bet to win, place, or show and watch them gallop off! Experience the thrill as your horse crosses the finish line and your payoff appears on the tote board. KENTUCKY DERBY is an exciting game for all ages and may be played with up to four players.

Commodore 64/VIC 20+8K
(suggested retail: $19.95)*

Number Jotto Outwit your opponents

Deduction, logic, and patience are the skills you must master to win the game. The object is to discover your secret jotto number using the least number of tries. Each move is your probe that the computer must respond to with two hints. Think carefully, examine your guess chart on the screen, eliminate and choose wisely. Your opponent may show no mercy. NUMBER JOTTO is an ideal strategy game for the entire family and may be played with up to four people.

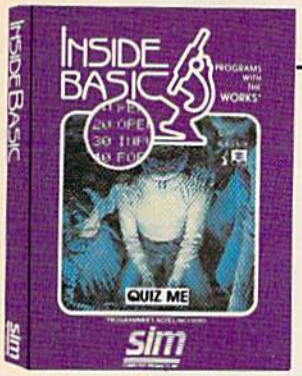
Commodore 64/VIC 20+8K
(suggested retail: $14.95)*



sim

COMPUTER PRODUCTS INC. Lee Park Office Complex • 1100 East Hector Street • Whitemarsh, PA 19428 • (215) 825-4250

Education



Quiz Me Test your knowledge and build study skills

QUIZ ME is a computer aided testing program. Using its powerful editor, parents and teachers can easily create a quiz for any subject. You can load, save, and print out your quizzes. Create as many quizzes as you like with up to 50 problems per quiz on the Commodore 64.

QUIZ ME is designed to allow multiple choice, fill in the blanks, and for those questions where spelling is not important, approximate answers. You can specify the number of tries per problem. There are advanced features that allow you to specify the time you have to answer and the number of points awarded for each problem. Upon completion of the quiz, automatic scoring, percentage scaling, and letter grading give the student his complete results.

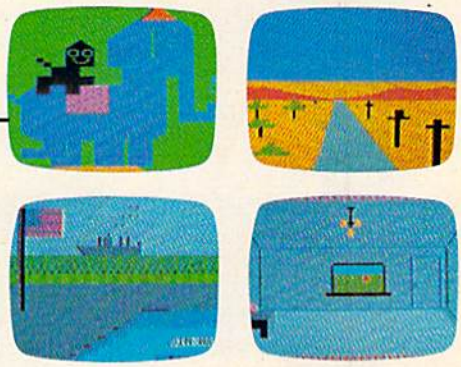
QUIZ ME gives continuous reinforcement and encourages you to try harder and learn more. QUIZ ME is an exceptional program for parents and teachers who wish to make learning more enjoyable.

Commodore 64/VIC 20+8K
(suggested retail: $19.95)*

Colorcraft Etch, sketch, and animate your way to a better understanding of computers.

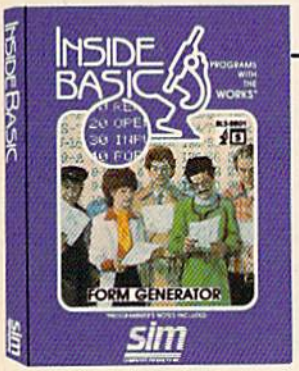
Using the keyboard, children can create their own fun-filled stories with full color graphics. COLORCRAFT will then take their story and animate it on the screen. Hours of enjoyment await, and the fun does not have to end today. You can save your story for tomorrow.

Plus, COLORCRAFT helps children and adults become familiar with computer basics like cursors, graphics and function keys, and simple word processing commands. After a child learns the fundamentals, there are advanced features like speed control and diagonal cursor movement. COLORCRAFT comes with an easy to follow user manual including a glossary of computer terms and a step by step sample animation. COLORCRAFT will teach and entertain your entire family while stimulating your children's creativity.



Commodore 64/VIC 20-memory expansion not required
(suggested retail: $24.95)*

Business/Home



Form Generator Input, calculate, and fill in the blanks

You can use your existing forms or create your own right on the screen. Applications include all types of business forms, invoices, vouchers, statements, and labels. FORM GENERATOR lets you set up a master which you can use to generate completed forms. Anytime you wish to print out a form, simply load in the master and run. FORM GENERATOR will ask you for the fill-in information needed to complete the form. Next, it will calculate and fill in the blanks. You can then print or save your completed form. It's that easy. You'll be amazed at the time you save and the professional look of your forms.

Requirements: Commodore 1525, 1526 or compatible printer.
16K memory expander recommended on the VIC 20.

Features: labels and formulas: add, subtract, multiply, divide
automatic information prompting
default input values
fixed decimal number formatting
repeat sequences (a must for invoicing)
multiple copy printing

Commodore 64/VIC 20+8K
(suggested retail: $29.95)*

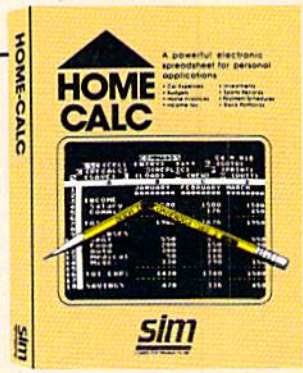
Home-Calc The lowest priced, easiest to use spreadsheet

Spreadsheets are one of the most popular programs and have many applications in the home: investments, payment schedules, home finances, car expenses, and more. The easy reading manual, simple instructions, and easy-to-execute commands make setting up a spreadsheet a snap. HOME-CALC doesn't confuse you with lots of fancy functions and commands. A beginner can have a home budget sheet working in an hour. If you're more sophisticated and want to use it in your business that's okay too. HOME-CALC is ready to handle "what if?, how much?, and bottom line" calculations. Load, save, and print spreadsheets.

Features: sum, replicate, recalculate
title and formula capability
add, subtract, multiply, and divide
selectable column width and number formats
machine language speed

Requirements: Commodore 1525, 1526 or compatible printer

Commodore 64
(suggested retail: $24.95)*



To Order: call or write.
Visa/Mastercard accepted, add $1.50. COD add $1.50.
All orders must include $2.00 shipping.
PA & NJ residents add 6% sales tax.

Look for Sim Software at your local dealer.

*Prices quoted are for cassette versions only. Add $5.00 for disk.

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

LAST NIGHT WE EXCHANGED LETTERS WITH MOM, THEN HAD A PARTY FOR ELEVEN PEOPLE IN NINE DIFFERENT STATES AND ONLY HAD TO WASH ONE GLASS...

That's CompuServe, The Personal Communications Network For Every Computer Owner

And it doesn't matter what kind of computer you own. You'll use CompuServe's Electronic Mail system (we call it Email™) to compose, edit and send letters to friends or business associates. The system delivers any number of messages to other users anywhere in North America.

CompuServe's multi-channel CB simulator brings distant friends together and gets new friendships started. You can even use a scrambler if you have a secret you don't want to share. Special interest groups meet regularly to trade information on hardware, software and hobbies from photography to cooking and you can sell, swap and post personal notices on the bulletin board.

There's all this and much more on the CompuServe Information Service. All you need is a computer, a modem, and CompuServe. CompuServe connects with almost any type or brand of personal computer or terminal and many communicating word processors. 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

December 1983 Vol. 1, No. 6

FEATURES

A Survival Guide For Beginners *Annette Hinshaw* ..... 20 *
Telecommuting: Dawn Of The Electronic Cottage *Gregg Peele* ..... 30 *
The Inner World Of Computers, Part 2: Why Computers Are Logical *Tom Prendergast* ..... 52 *
Getting Started With A Disk Drive, Part 2: First Steps *Charles Brannon* ..... 60 *
MLX: Machine Language Entry Program For Commodore 64 *Charles Brannon* 162 64

GAMES

Inside View: John Doering, The Programmer Behind *Pipes* *Kathy Yakal* ..... 70 *
Spike: All-Machine-Language Game For Commodore 64 *Eric Brandon* 74 64
Space Duel *Andy Hayes* 80 V/64
Bowling Champ *Joseph Ganci* 84 V/64
Saucer Shooter For VIC-20 *Ron Watts* ..... 88 V

REVIEWS

VIC/64 Rabbit *Roland L. Ryan* 92 V/64
Busicalc For VIC And 64 *Richard Devore* 96 V/64
Ski-er 64 *Eric Brandon* 98 64
Mini Jini For VIC And 64 *Gregg Peele* 100 V/64
Key Quest For VIC-20 *Tony Roberts* ..... 104 V

EDUCATION/HOME APPLICATIONS

Budget Planner *Charles B. Silbergleith* 108 V/64
The Note Name Game *Jeff Behrens* 112 V/64
Computing For Kids: Your Wish Is My Command *Fred D'Ignazio* ..... 116 *
Spelling Bee *Daniel Bonachea* 124 V/64
Educational Games: A Kid's View *Kevin Dewey* 126 V/64
Disk File Manager *Philip Dale* 130 V/64
VIC Music Writer *Robert D. Heidler* ..... 134 V
Thinking *Andy VanDuyne* 138 V/64
VIC Billboard *Andy VanDuyne* ..... 142 V

PROGRAMMING

The Beginner's Corner: Computer Choreography *C. Regena* 40 V/64
Tricks For Saving Memory *John Stilwell* 144 V/64
Machine Language For Beginners: Safe Places *Richard Mansfield* 154 V/64
Easy Screen Formatting *Edward Zobel* 160 V/64
Hints & Tips: Using The Period For Extra Speed *Mike Roth* 168 V/64
Power BASIC: Foolproof INPUT For VIC And 64 *Charles Brannon* 170 V/64
Sprites Made Easy *Paul F. Schatz* 184 64
Sprite Creation On The 64 *Gregg Keizer* 188 64

DEPARTMENTS

The Editor's Notes *Robert Lock* ..... 6 *
Gazette Feedback *Editors & Readers* ..... 10 *
HOTWARE: A Look At This Month's Best Sellers *Kathy Yakal* ..... 48 *
Simple Answers To Common Questions *Tom R. Halfhill* ..... 68 *
VICreations: Custom Characters On The Expanded VIC *Dan Carmichael* ..... 174 V
Horizons: 64 *Charles Brannon* 178 64
News & Products ..... 191 *

PROGRAM LISTINGS

A Beginner's Guide To Typing In Programs ..... 201 *
How To Type In COMPUTE!'s Gazette Programs ..... 202 *
The Automatic Proofreader ..... 203 *
The Bug-Swatter: Modifications & Corrections ..... 204 *
Program Listings 204 V/64

Product Mart 243
Advertisers Index 248

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

COMPUTE!'s Gazette is published twelve times each year by **COMPUTE!** Publications, Inc., Post Office Box 5406, Greensboro, NC 27403 USA. Phone (919)275-9809. Editorial offices are located at 505 Edwardia Drive, Greensboro, NC 27409. Domestic subscriptions: 12 issues, $20. Send subscription orders or change of address (P.O. Form 3579) to Circulation Dept., *COMPUTE!'s Gazette*, P.O. Box 5406, Greensboro, NC 27403. Second class application pending at Greensboro, NC 27403 and additional mailing offices. Entire contents copyright © 1983 by **COMPUTE!** Publications, Inc. All rights reserved. ISSN 0737-3716.

THE EDITOR'S *notes*

Because we've received numerous letters concerning the Commodore 1541 Disk Drive, I asked Tom Halfhill, Editor of COMPUTE!'s Gazette, *to write an editorial commenting on this matter.*

— Robert Lock

Although every monthly issue of COMPUTE!'s Gazette goes out to more than 200,000 people, in a way we consider each magazine a personal communication with each individual reader. In turn, many hundreds of you write personally to us each month. In this way we keep each other in touch with our problems, discoveries, opinions, and concerns.

For the past month (this is written in September), we have been receiving an unusual number of letters and phone calls on one particular topic: Commodore 1541 Disk Drives. We are hearing that 1541 drives are virtually unavailable, and that many drives purchased before the supply dried up suffer from reliability problems. Most of you who are writing or phoning us are doing so as a last resort — you have first sought answers from your dealers, or even Commodore itself, but have gotten few answers.

Commodore's official line — repeated both to you and to us — is that demand for 1541 disk drives has far exceeded the company's projections, leading to a supply crunch at the distributor level and scarcity in retail stores. Commodore promises the shortage will be relieved in a few weeks. Commodore's response to your other major concern — reliability — is that the 1541s suffer from no unusual problems.

To deal with the supply question first, there is little doubt that Commodore indeed underestimated the great demand for 1541s. A recent survey showed that 90 percent of new Commodore 64 owners bought a disk drive with their computer — a far higher percentage than anyone suspected. With hindsight this isn't surprising: 1541s retail for $250 – $300, hundreds of dollars less than disk drives for other computers.

But even this unexpected demand does not explain the nearly total absence of 1541s from dealers' shelves in August and September. At this moment COMPUTE! Publications sorely needs additional 1541s for in-house use, yet we can't find any to buy. After numerous phone calls over several days, we were able to locate only two units in the entire continental United States. If the problem were merely one of supply and demand, dealers would be telling us that their 1541s are selling as fast as they receive them from Commodore. Instead, dealers say they aren't receiving any 1541s from Commodore at all.

There have been lots of rumors and industry scuttlebutt to explain why 1541s are unavailable. At the risk of disappointing some people, we will not repeat the rumors here until we can find hard facts to support them. Unsupported rumors are potentially damaging — not only to Commodore, but also to the hundreds of Commodore dealers who are as blameless and frustrated as everyone else.

However, as many of you have concluded, there does appear to be a connection between the supply shortage and the reliability problems you have experienced. Commodore will not comment on the matter, but by all accounts (including those of readers, dealers, and our own experience), the 1541 drives are plagued with an abnormally high failure rate. As near as we can determine — our information comes largely from cooperative Commodore dealers — much of the trouble can be traced to a part designed to keep the drive properly aligned. One Commodore dealer who handles service for numerous states told us he has repaired several hundred drives recently, and this part was to blame in all but three cases. Of the seven 1541 drives at COMPUTE! Publications, four have succumbed to the same problem.

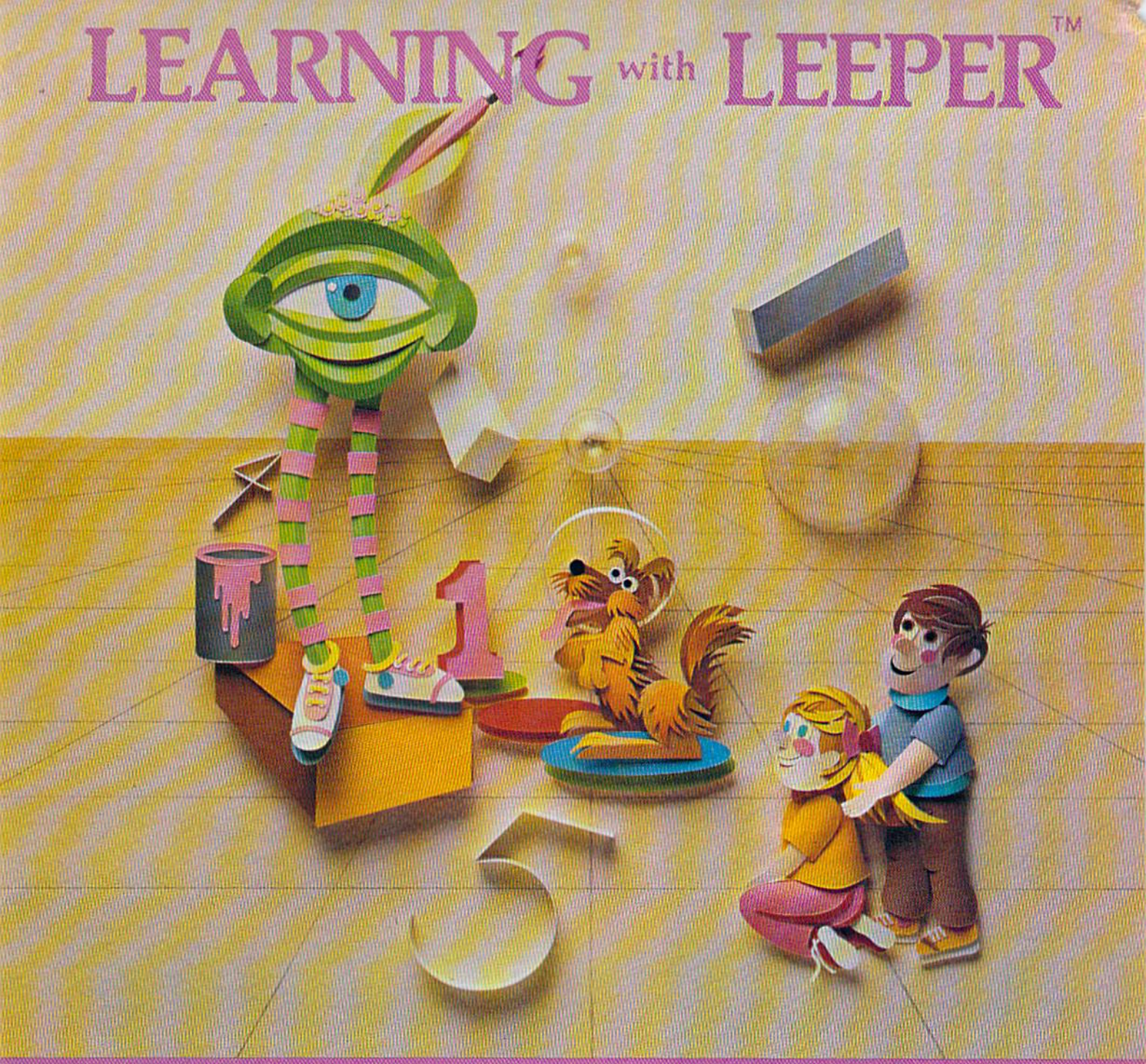
We have also learned, unofficially, that Commodore is aware of the problem and is trying to fix it at the manufacturing level. In the meantime, no 1541s are reaching the market. Users and dealers are frustrated and upset, and Commodore is deferring hundreds of thousands of dollars in potential sales.

It is, of course, possible to conclude that the 1541 situation may represent some serious general quality-control problems. The return rate for other equipment also seems to be relatively high.

If you are suffering from these problems, we urge you not to take your frustrations out on the dealers. Although as local representatives of Commodore they are easiest to blame, legitimate dealers will handle your problems in an honest and straightforward manner. Remember, high failure rates hurt them, too.

Since no one benefits from a situation like this — not the manufacturer, nor the dealer, nor the consumer — a solution will likely present itself soon. Until then, the owners of 1541 disk drives (and those who would like to buy them) can only join with the rest of us in wondering what, exactly, is happening.

LEARNING with LEEPER™



WHY WAIT UNTIL YOUR KIDS ARE IN SCHOOL?

Let Leeper give them a head start in reading, writing and math.
An award-winning collection of four preschool games for the Apple computer.

NOW AVAILABLE FOR COMMODORE 64 AND ATARI

CES 1983 SHOWCASE AWARD

Sierra ON-LINE

TM designates a trademark of Sierra On-Line, Inc.

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

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 Bikas Davis

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, Lance Elko (Publications), Stephen Levy, Gregg Keizer (Books), John Krause (Technical), Kathy Yakal, Editorial Assistant (Features)

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

Technical Assistant
Dale McBane

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

Administrative Staff
Vicki Jennings, Laura MacFadden, Julia Fleming, Randall Fosner (Books)

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

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

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

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

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

Data Processing
Leon Stokes, Manager; Joan Compton, Assistant

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

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

Sales Representatives

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

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

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

Sales Offices, The Thompson Company

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

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

Corporate Office:
505 Edwardia Drive, Greensboro, NC 27409

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

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

Chief Executive Officer Robert C. Lock
President Gary R. Ingersoll
Vice President of Finance Paul J. Megliola
Comptroller James M. Hurst
Executive Assistant Debi Nash
Assistant Carol Dickerson

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

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

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

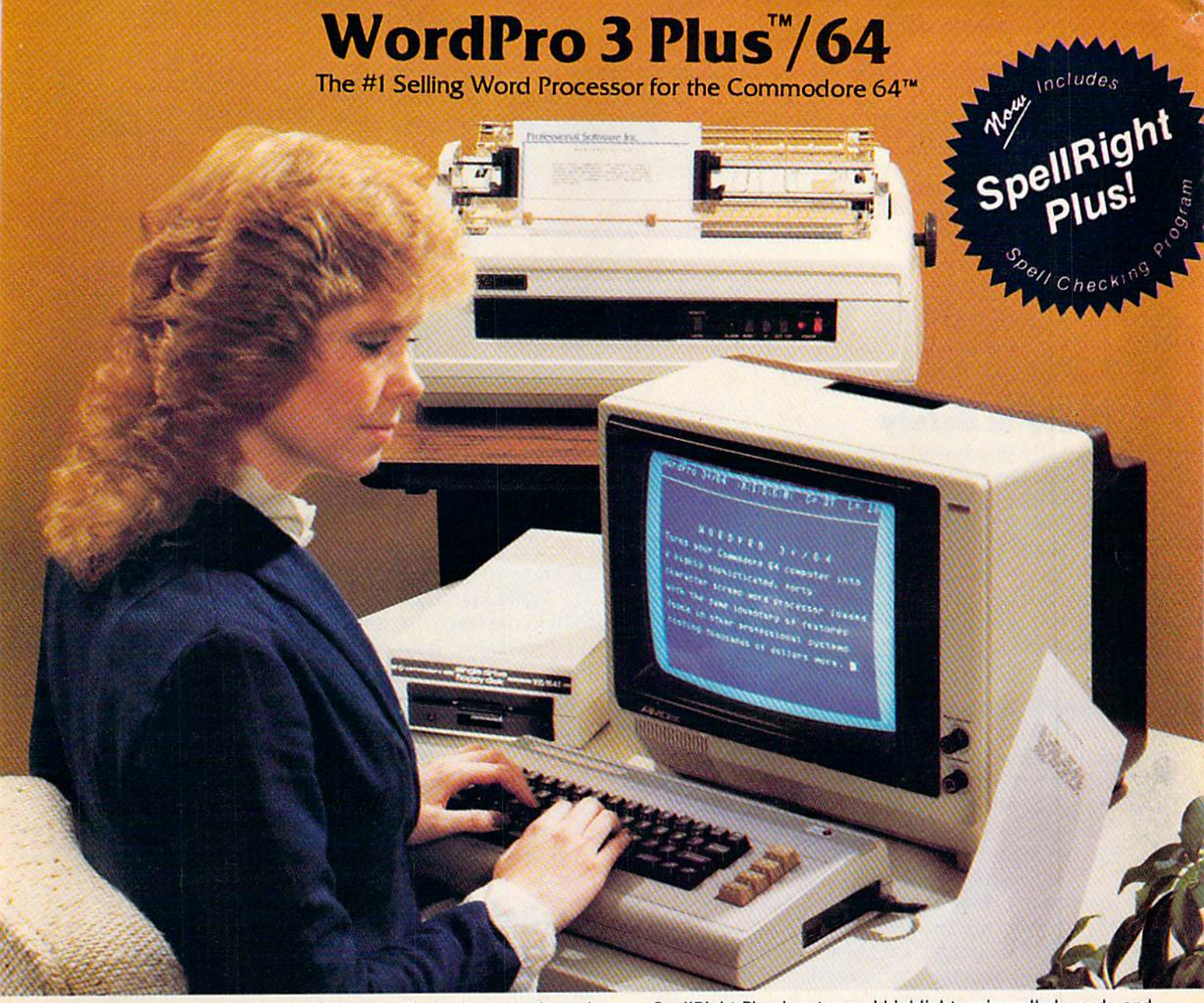
The COMPUTE!'s Gazette subscriber list is made available to carefully screened organizations with a product or service which may be of interest to our readers. If you prefer not to receive such mailings, please send an exact copy of your subscription label to: COMPUTE!'s Gazette, P.O. Box 961, Farmingdale,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

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 #1 Selling Word Processor for the Commodore 64™



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

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

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

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

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

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

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

Professional Software Inc.

51 Fremont Street
Needham, MA 02194

(617) 444-5224
Telex: 951579

Dealer and Distributor inquiries are invited.

WordPro 3 Plus™/64 and SpellRight Plus™ are trademarks of Professional Software Inc.
The WordPro Plus Series was designed and written by Steve Punter of Pro-Micro Software Ltd.
SpellRight Plus was designed and written by Dwight Huff and Joe Spatafora of SpellMaster Systems, Inc.
Some printers may not support certain WordPro 3 Plus functions and/or require an interface. Please check with your dealer.
Commodore 64™ is a trademark of Commodore Electronics Ltd.

Diskette Safety

I recently purchased a 1541 disk drive to use with my 64. I have a couple of questions about its use.

Is it harmful to store a disk in the drive when the drive is not in use?

When I power up my drive, the red read/write light comes on. Is it safe to leave a diskette in the drive during this?

Is it safe to use both sides of a single-sided diskette?

Dan Dabson

It is not a good idea to leave a diskette in the drive when it is not in use (powered off). You might forget to remove the disk before you turn the drive back on. When the drive is powered up, it is not ready for a disk. The read/write head could be in a bad location, and could be momentarily magnetized. The head might erase part of the disk or write bad data to it.

As for using both sides of single-density floppy disks, don't. *Here are a couple of reasons why. First is the danger of dust contamination. As you use the normal side, the disk always spins in one direction. Dust tends to collect in certain places inside the disk's protective jacket (that's the purpose of the felt liner). When you use the other side, the disk spins in the opposite direction. This could "spin" that dust out of the corners and onto the disk, causing great damage.*

Second, and most important, don't use that second side because it may already have been proven substandard. Most disk manufacturers produce disks in the following way. The disks are originally manufactured as double-sided disks with the same magnetic oxide coating and processing on both sides. The disks are then tested (both sides) to see if they meet specifications. If both sides test out OK (they're certified*), the disk is packaged and marketed as double-sided. However, if one side tests good, and the other side fails, the good side is labeled and sold as a single-sided disk. This means the second side may have been tested and rejected as bad. The manufacturers we contacted all stressed this point: if you use that second side of a single-sided floppy, you do so at your own risk.*

Also consider the possibility that if the disk is lost or damaged, you could lose double the amount of data.

Learning Machine Language

I own a VIC-20 and have been trying to learn machine language. I also have a VICMON (machine language monitor/assembler cartridge) and know about 14 mnemonic commands. My problem is that I don't know the other commands and how to use them.

What I would like to know is if there are books to help me learn machine language. I already have the *Programmer's Reference Guide* for the VIC. Are there any books for machine language?

Steven Booth

There are a number of good books available that will help you learn how to program in machine language. One is Richard Mansfield's Machine Language for Beginners, *by COMPUTE! Books. Also, see his monthly column in this magazine, "Machine Language for Beginners."*

Larger Screen For VIC

Could you publish a program that would turn the VIC's 22-character line length into 40 or even 64 columns? I understand about TVs versus monitors for screen clarity using more characters per line, etc. What I am looking for (and have failed in my attempts to program) is a BASIC program to allow the use of 40 or 64 characters per line.

I am not even thinking of graphics, and I understand that the VIC is not a 22-character Commodore 64. The reason for all this is that there is plenty of good, free software available to anybody with a library card. There is so much software out there for most any computer that uses Microsoft BASIC but doesn't require special graphics. The only trouble is that a lot of it uses and depends on many columns of data. Sure, I've tried to convert them to the VIC's screen configuration, but many times the result is complicated juggling of screen displays.

I'm sure many hackers with a VIC would appreciate a BASIC program to expand the VIC's screen. (I'm surprised Commodore doesn't

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.

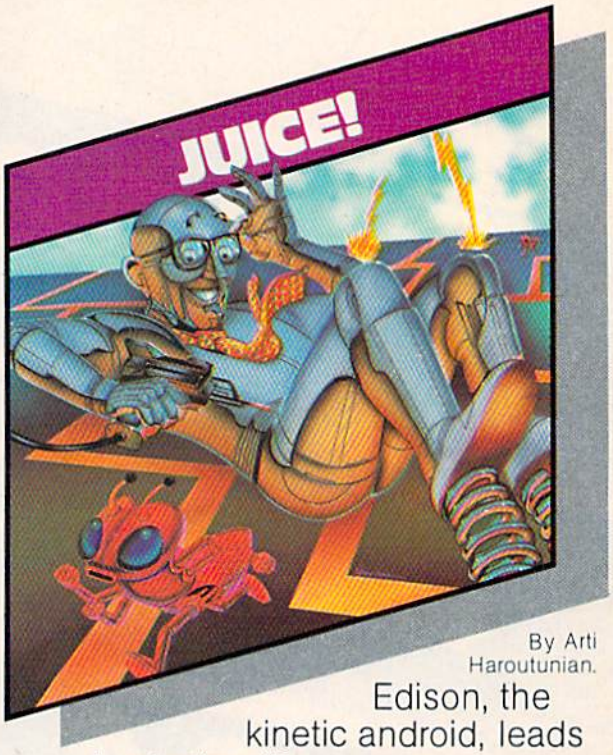
Just like VIC 20 and Atari owners. Only faster, more complex, and more challenging, too.

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.

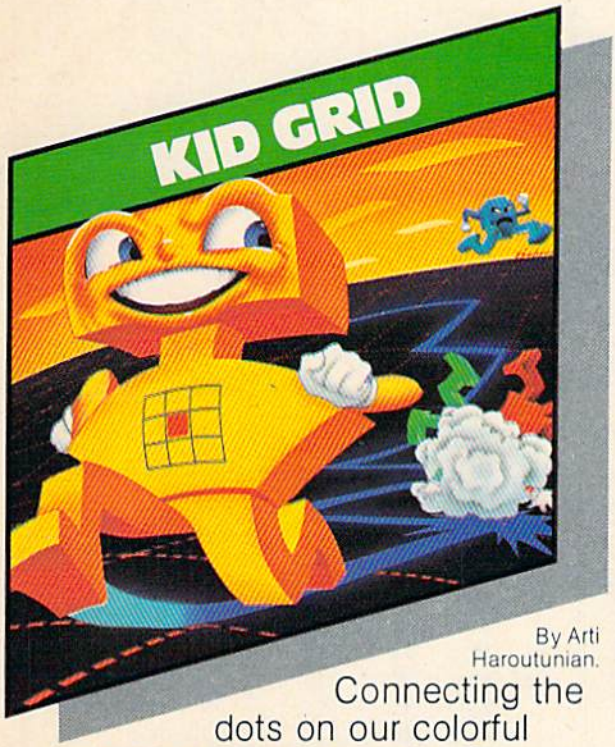
All he wants to do is build his circuit boards and go with the flow. But things keep getting in the way.

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?

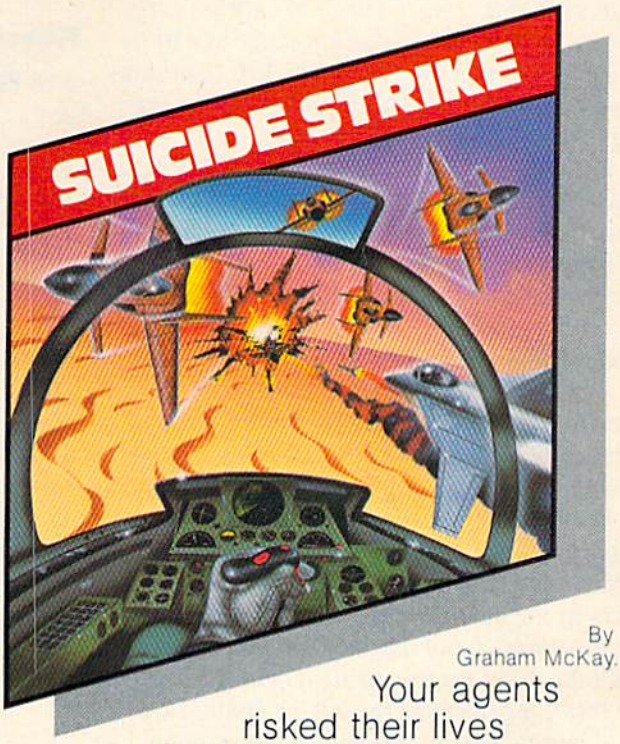
Wrong. Because the bullies are in hot pursuit!

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)

tronix™

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.

develop a ROM cartridge for this purpose.)

Brian Greer

Although it is possible to convert the VIC-20 screen to a width of 40 columns through programming, it would be impractical in BASIC. Such a program almost certainly would require some machine language to maintain decently fast key response. Also, the VIC would require memory expansion to leave enough room for the application program.

An example of a 40-column program for the VIC is Terminal-40 *from Midwest Micro Associates (Kansas City, Missouri). This was reviewed in our September 1983 issue. However,* Terminal-40 *is a telecomputing terminal program, not a general-purpose, 40-column converter.*

Commodore does not make a 40-column cartridge for the VIC, but a few independent companies do. Some of them advertise from time to time in COMPUTE!'s Gazette *or our parent magazine,* COMPUTE!. *One product even expands the VIC to a full 80-column width, although anything over 40 columns will require a special computer monitor, since standard TV sets cannot resolve characters that small. We may be reviewing some of these products in the near future.*

In the meantime, if any machine language programmers out there feel up to writing a general-purpose, 40-column utility for the VIC, COMPUTE!'s Gazette *would be glad to consider such a program for publication.*

Keycode Values

Charles Brannon's article in the September 1983 issue was most helpful in showing how to use the Commodore function keys in a program.

I have since noticed programs that also use the function keys without any mention of the particular key or the usual GET or INPUT statement that invites keyboard response. Hours of searching finally revealed a K=PEEK(197) statement.

My question is, where do these "key numbers" come from? Are these numbers decoded to generate the BASIC keyword and CHR$ codes? The *Programmer's Reference Guide* and other similar books have sketchy or no information on the mentioned techniques.

W. K. Brander

The memory location you mentioned (197) is the location to PEEK in both the VIC-20 and the Commodore 64 to detect the current key pressed. *When no keys are pressed, the value of location 197 is 64, and when a key is pressed, the value changes. The value will be the same even if the SHIFT or CTRL key is pressed simultaneously. In the 64, for example, pressing SHIFT/A, CTRL/A, or A all return a value of 10 in location 197.*

PEEK(197) can be used if, for some reason, you do not wish to use the GET or INPUT commands. A few IF-THENs can process the information the same way you would using GET.

Below is a table of the values returned by location 197 when a key is pressed on either the VIC-20 or the 64.

Keycode Values

KEY PRESSED	C64	VIC
A	10	17
B	28	35
C	20	34
D	18	18
E	14	49
F	21	42
G	26	19
H	29	43
I	33	12
J	34	20
K	37	44
L	42	21
M	36	36
N	39	28
O	38	52
P	41	13
Q	62	48
R	17	10
S	13	41
T	22	50
U	30	51
V	31	27
W	9	9
X	23	26
Y	25	11
Z	12	33
0	35	60
1	56	0
2	59	56
3	8	1
4	11	57
5	16	2
6	19	58
7	24	3
8	27	59
9	32	4
←	57	8
+	40	5
–	43	61
£	48	6
CLR/HOME	51	62
INST/DEL	0	7
@	46	53
*	49	14
↑	54	54
:	45	45
;	50	22
=	53	46
,	47	29
.	44	37
/	55	30
CRSR ↕	7	31
CRSR ↔	2	23
F1	4	39
F3	5	47
F5	6	55
F7	3	63
RETURN	1	15
STOP	63	24
NO KEY	64	64
SPACE BAR	60	32

Now developing a child's mind can be fun for the whole family.

Developing a child's mind is serious business. But with Spinnaker's Family Learning Games, helping a child learn new skills and concepts is fun for everyone in the family.

Take UP FOR GRABS.™ It's a fast-paced crossword game that will keep parents and kids on their toes. Quick—grab the letters you need off the rotating cube before someone else does! Place them in your playing area and build words fast for points. It's challenging, it's exciting, and it's actually helping your children develop their vocabulary and spelling skills.

Then there's FRACTION FEVER.™ It's got arcade action! Hop along on your pogo stick and find the right fractions, zap the wrong ones, look out for holes in the floor, and keep a close eye on the clock. Everyone in the family will want a turn—and it's a great way for kids to learn what fractions are and how they relate to each other.

And don't forget COSMIC LIFE™—an arcade-type game where you populate a planet using strategy, speed, and your ability to make quick decisions.

Find Spinnaker Family Learning Game cartridges at your local software retailer, and play them on your **Atari**® or **Commodore 64**™ home computer. And make learning fun for the whole family!

SPINNAKER™

We make learning fun.

©1983, Spinnaker Software Corp. All rights reserved. UP FOR GRABS, FRACTION FEVER and COSMIC LIFE computer programs are trademarks of Spinnaker Software Corp. Atari is a registered trademark of Atari, Inc. Commodore 64 is a trademark of Commodore Electronics Limited.

Colorless Color Monitor

I have an all-Commodore setup, and I have noticed a problem. When I switch off the 64 to clear and reset the computer, my Commodore 1701 color monitor reverts to black and white. Could you please tell me why this happens? I am using the three-lead connector located in the back of the monitor. I have checked the switch on the back of the monitor, and it is indeed switched to the rear position.

Also, I have noticed that when I use SYS64738 to clear memory, all it does is reset the BASIC pointers. Is there a command that will really reset my machine?

Ken Mehawk

For the problem of the 1701 reverting to black and white, we have no real solution. The problem might be with your equipment. However, we can offer these suggestions.

First, when you turn off the 64 (or any computer), wait a good ten seconds before you turn it back on. Some computers, when rapidly turned off and back on, behave strangely. Second, check all your cables and connections for shorts or breaks. Another thing to check is the adjustments (vertical hold, etc.) on the front panel of the 1701 monitor. Especially check the horizontal position. On some TV sets and monitors, if the horizontal position (or horizontal hold) is not centered just right, the color will drop off. If none of these suggestions help, take your 64 and 1701 monitor back to the dealer and have them check it out for you.

The SYS64738 you mentioned is indeed a system reset, but only a partial one. When you enter SYS64738, it does the following:

1) *Resets the BASIC pointers.*
2) *Reinitializes the VIC chip.*
3) *Resets the vector pointers.*
4) *Reinitializes zero page.*
5) *Clears memory from 679 to 767 and 828 to 1019.*
6) *Resets the first ten bytes of BASIC RAM memory.*

It does NOT:

1) *Erase all of BASIC memory.*
2) *Erase RAM memory from 49152 to 53247.*

The fact that it does not clear out BASIC memory, and memory from 49152 to 53247, can be a plus. If you are running a program, and the system becomes partially "hung," you can use this SYS to reset the computer without erasing your BASIC program or any machine language programs (like an assembler/monitor) that may be in 49152 – 53247. After you SYS64738 and type LIST, it may appear as though your BASIC program is gone, but it is not; only the pointers have been reset. You can restore that BASIC program by running the handy "VIC/64 Program Lifesaver," COMPUTE!'s Gazette, *November 1983.*

64 Mystery Bit

While browsing through the *Commodore 64 Programmer's Reference Guide*, I spotted something interesting on page 322 of the BASIC to machine language section. The description of the I/O assignment of location 53270, bit 5, is "ALWAYS SET THIS BIT TO 0!". I am curious to find out just what would happen if I didn't heed that warning. But I don't wish to risk my Commodore 64 in doing so.

J. Berger

Have no fear — you cannot damage a computer with a bad poke or a "bug-infested" program.

To quote the instruction manual (Personal Computing on the VIC-20) *included with the VIC, from page 80, "We want to repeat what we told you way back in chapter one:* There is no way you can hurt the computer by typing on the keyboard...not even with a POKE."

You could, of course, damage it if you have a heavy touch on the keyboard, but as mentioned, a bad POKE to a wrong location will not permanently damage your VIC or 64. You can temporarily mess things up pretty bad if you don't know what you're doing. For example, turn your computer off, then on, and enter POKE 788,0 for the VIC or POKE 1,0 for the 64. These POKEs may lock up the computer, but if they do, simply press RUN/STOP-RESTORE to recover. If this doesn't work, turning your computer off, then on again, will completely reset it back to normal. Don't be afraid to experiment, it won't hurt. Just don't do so with any valuable programs in memory, or you may lose them if you have to turn the computer off to reset it.

As to your original question, we ran tests with bit 5 of location 53270 both off and on, and it seemed to have no effect. To be safe, leave it set at zero.

Fuzzy About Function Keys

In your September 1983 issue of COMPUTE!'s Gazette, you had an article about how to use function keys. I didn't really understand it all that much, so I was wondering if you could send to me or publish a program using the function keys. I'll try to see if I can use the function keys properly:

```
10 PRINT "{CLR}PRESS FUNCTION KEY ONE (F1
   ) TO TYPE A{3 SPACES}CERTAIN NAME."
20 PRINT "WHAT IS THE NAME";
30 INPUT A$
40 PRINT:PRINT "NOW WHEN YOU PRESS F1, ";
   A$;" WILL PRINT ON THE SCREEN."
50 PRINT:PRINT "TRY IT NOW!"
60 GET B$:IF B$="{F1}" THEN PRINT A$
```

Is this the proper way to program the function keys?

Jack Farnsworth III

Your program is very close, but if you RUN it, you'll see that A$ (the string variable containing the name) does not print on the screen when you press the f1

Introducing a computer game that will bring out the railroad buff, the tycoon, the adventurer, and the kid in your kid.

TRAINS™ is one computer game that will really bring out the best in kids. Of all ages.

Because TRAINS is a Spinnaker game, which means it's a learning game that's really fun to play.

TRAINS puts kids in charge of an old-time railroad. And whether their railway empire gets bigger or goes out of business is entirely up to them.

As they juggle the challenges of picking up supplies and delivering to various industries, paying their employees, keeping the locomotive filled with coal, and making enough money to venture into new territories, kids are actually learning the economics of running a business.

They're learning to manage financial resources, and to use different kinds of information in setting priorities.

And best of all, they're having fun while they learn.

Look for TRAINS on disk at your local software retailer, and play it on your Apple,® IBM,® Atari,® or Commodore 64™ computers.

SPINNAKER™

We make learning fun.

©1983, Spinnaker Software Corp. All rights reserved. Apple, IBM and Atari are registered trademarks of Apple Computer, Inc., International Business Machines Corp. and Atari, Inc. respectively. Commodore 64 is a trademark of Commodore Electronics Limited. TRAINS Computer Program is a trademark of Spinnaker Software Corp.

function key. The program ends before it detects the keypress.

The solution is to program a loop *— a series of instructions that keeps the computer constantly circling around, waiting for input. Add these lines to your program:*

```
60 GET B$:IF B$<>"{F1}" THEN GOTO 60
70 IF B$="{F1}" THEN PRINT A$
```

Line 60 is the loop. The computer constantly executes line 60 as long as the condition is satisfied — that is, as long as B$ (the keyboard input) is "<>" or "not equal" to the f1 function key. When f1 is pressed, the condition is no longer met, so the computer continues to line 70. And line 70 prints A$, the person's name. Such loops are extremely common in programming. We suggest you reread the September article while sitting at your computer so you can type in and try the numerous programming examples.

VIC Games On The 64

I went to several computer and video stores and asked if you could play VIC-20 games on the 64. Their answer was no. Is there any way this is possible?

Thomas Maciejewski

Yes, you can run some VIC programs on the 64. However, most, if not all, commercial games and programs will not.

Most noncommercial VIC programs will run if they are converted. Because the BASIC in the VIC-20 and the 64 is the same, it can remain almost untouched. The PRINT statements might have to be rewritten because of the difference in screen sizes of the VIC and the 64.

But the biggest task in conversion is with the PEEKs and POKEs. Because the VIC and 64's color memory, screen memory, sound chip memory, etc. are different, these conversions could be extensive, depending on how many PEEKs and POKEs the program uses.

Of course, there are some programs that simply cannot be converted. For instance, a sophisticated sound program written for the 64 cannot be converted because the VIC doesn't have the SID (sound interface device) chip found in the 64.

VIC Scrolling With POKEs

I own a VIC-20 and would like to know if you could list any POKEs that could be used to make the screen scroll up, down, right, left, and diagonally.

Jeremy Kropp

There are two locations on the VIC-II chip that control the horizontal and vertical centering. The bytes (36864 and 36865 respectively) can be POKEd with different values to change the positioning of the screen. Although they offer only partial control of scrolling (you cannot scroll completely in all four directions), you can use them to create some interesting special effects.

Enter and then RUN this short sample program which will demonstrate the scrolling techniques:

```
10 POKE36879,27:PRINT"{CLR}{DOWN} {BLK}SC
   ROLLING DOWN"
15 FORT=1TO500:NEXTT
20 FORA=25 TO 130: POKE 36865,A: FORT= 1
   {SPACE}TO 5: NEXTT: NEXTA
30 PRINT"{CLR}{DOWN} {RED}SCROLLING UP"
40 FORA=130 TO 25 STEP-1: POKE 36865,A: F
   ORT= 1 TO 5: NEXTT: NEXTA
50 FORT=1TO1000:NEXTT
60 PRINT"{CLR}{DOWN} {BLU}SCROLLING RIGHT
   "
65 FORT=1TO500:NEXTT
70 FORA=5 TO 50: POKE 36864,A: FORT= 1 TO
    10: NEXTT: NEXTA
80 FORT=1TO500:NEXTT
85 PRINT"{CLR}{DOWN} {BLK}SCROLLING LEFT"
90 FORA=50 TO 5 STEP-1: POKE 36864,A: FOR
   T= 1 TO 10: NEXTT: NEXTA
100 FORT=1TO1000:NEXTT
```

Location 36864 normally contains a value of 5. POKEing integers larger than 5 into this location will scroll the screen to the right. If you POKE a value larger than 18, the screen will display garbage. Just POKE 5 to return the screen to normal.

The normal value in location 36865 is 25. POKEing a value larger than 25 will cause the screen to scroll down. The screen will seem to have disappeared with values of 130 and larger. Again, here you are also limited in that you cannot scroll up completely.

Diagonal scrolling can be accomplished using combinations of both 36864 and 36865.

Disk Drive Solutions

As a Commodore dealer in the province of Nova Scotia, I would like to respond to two items in the "Gazette Feedback" (August 1983).

• Disk drive conversion. Yes, the 1540 can be converted to a 1541 by replacing one ROM. We have had the 1541 conversion ROM for about six months (part #901229-01). There is also a conversion ROM to upgrade the 1525 printer to a 1525E to work with the Commodore 64.

• Dual drive lock-ups. We received a technical bulletin from Commodore indicating that the order of turning on the various pieces of equipment is important, besides changing the disk unit device numbers. The recommended order is as follows:

1) 64, 1541, 1525E.
2) 64, 1541, 1541.
3) 64, 1541, 1541 or 1525E (only one or the other may be on).
4) 64, 1541, 1541, 1526.

Sieg Deleu, President
Kobetek Systems Limited

An introduction to the modern art of programming using the ancient art of drawing.

DELTA DRAWING™ Learning Program lets kids enjoy drawing and coloring while they learn computer programming concepts. Even kids who have never used a computer before can learn to write simple programs and develop an understanding of procedural thinking. It's easy, clear, and fun!

With DELTA DRAWING you use single-key commands to create a picture. Press "D" to draw; press "R" to move right. And, as you draw, DELTA DRAWING keeps track of every command. So you can easily switch from your picture to the list of commands (a program!) that you've used to draw it. You begin by drawing pictures that produce computer programs, but soon you can learn to write programs that draw pictures.

DELTA DRAWING lets you save your pictures and programs on a disk or cassette. And you can print your drawings on a printer with graphics capability.

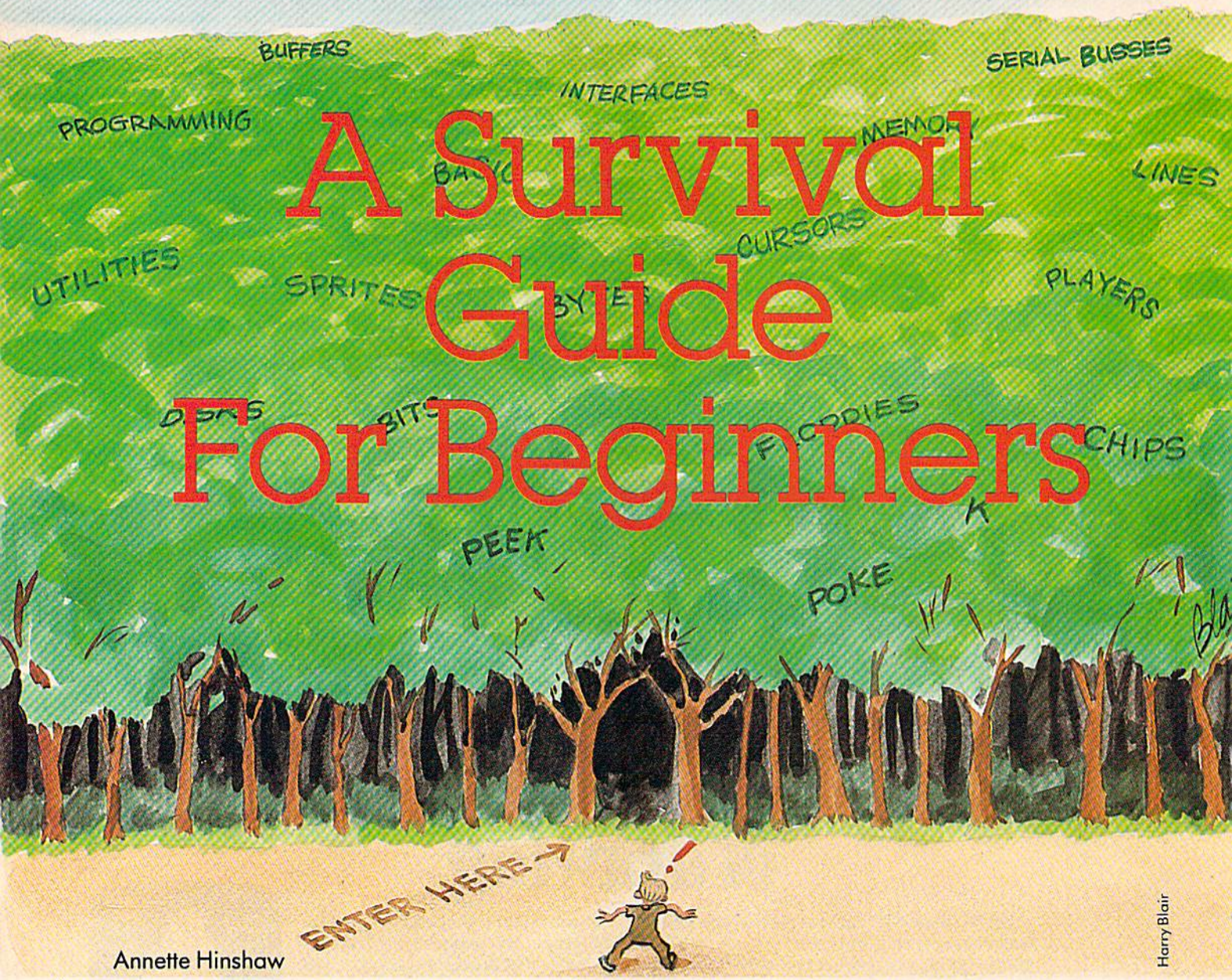
DELTA DRAWING Learning Program is available on disk for **IBM**® and **Apple**® computers, and on cartridge for **Atari**® and **Commodore 64**™ computers.

Look for DELTA DRAWING at your local software retailer.

SPINNAKER™
We make learning fun.

Apple, IBM and Atari are registered trademarks of Apple Computer, Inc., International Business Machines Corp. and Atari, Inc. respectively. Commodore 64 is a trademark of Commodore Electronics Limited. DELTA DRAWING Learning Program is a trademark of Spinnaker Software Corp.
©1983, Spinnaker Software Corp. All rights reserved.

A Survival Guide For Beginners



Harry Blair

Annette Hinshaw

Computing can often be confusing and frustrating for people just getting started. Here are some tips and bits of advice to help sort out the confusion.

With Commodore computers so inexpensive, many people who never before imagined owning a computer are buying them. When these computer novices get their equipment home, they inevitably find that making a computer do what they want it to is not always as simple as it looks. Hidden tricks and pitfalls seem to haunt newcomers. Whatever answers are in the book that comes with the machine escape them. Bewildered, they look around for help.

Help abounds. In fact, so much help is being offered to beginners that sometimes the problem is how to choose effectively from an array of classes, schools, books, magazines, and other sources of computer information. Fortunately, a little common sense and a look at the major sources of computer information help sort out the choices.

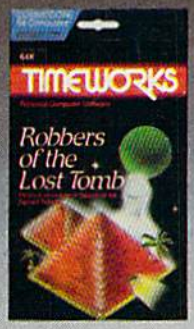
The first thing is to find out what you need to know. Most beginners need help in three areas:

1. Computer Literacy/Consumer Education. Prospective buyers or new computer owners wondering what to add to their systems need to know basic facts about what the machines will or won't do. General information on the pros and cons of different computer features or peripherals helps simplify purchasing decisions. Computer literacy information should provide immediately useful knowledge.

TIMEWORKS™ Has It All!

Very Definitely People-Friendly Software Programs for your Commodore 64 Computer.

ENTERTAINMENT



Robbers of the Lost Tomb

Perilous Adventure in Search of the Sacred Tablets. 3-D graphics, ten skill levels. Game can be saved & continued later.

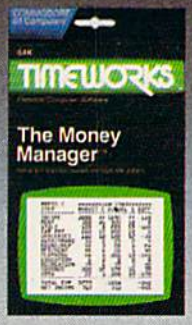
WALL STREET™

A competitive game of financial speculation based on realistic financial models for 1-4 players. No special investment knowledge required.

Presidential Campaign™

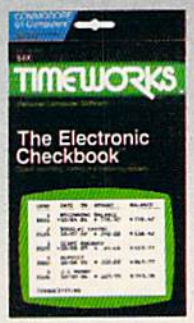
You have been nominated for the office of President of the United States. You must formulate & conduct a nationwide campaign to win the confidence & support of the American voters.

HOME MANAGEMENT



The Money Manager™

A Home & Business Budget and Cash Flow System.



The Electronic Checkbook™

A Check Recording, Sorting and Balancing System. Can be interfaced with THE MONEY MANAGER to transmit actual expense data directly to your Budget Program.

Data Manager

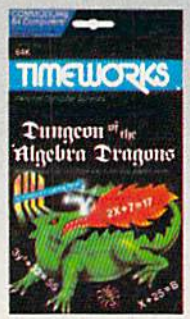
A General Information Storage and Retrieval System—with Exclusive "X-SEARCH" Feature.

PROGRAMMING

Programming Kit 1.

A Practical "How-To" Learning Approach to Basic Programming.

EDUCATIONAL



Dungeon of the Algebra Dragons

An Adventure-In-Learning Game, A Challenging and Enjoyable Way to Develop Algebra Skills.

BUSINESS SYSTEMS

Coming Next Month

A Series of 7 Management Information Programs flexibly designed to accommodate all small & medium size business accounting requirements.

Each Timeworks Program is designed to be extremely easy to use by anyone familiar or unfamiliar with computers, or even the principles of accounting. Create your own unlimited array of reports—easily & quickly. YOU select the information you want, and YOU determine the sequence of the Report Column Headings. All the features you need to business effectively and efficiently.

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 along!

Can you accept our challenge?

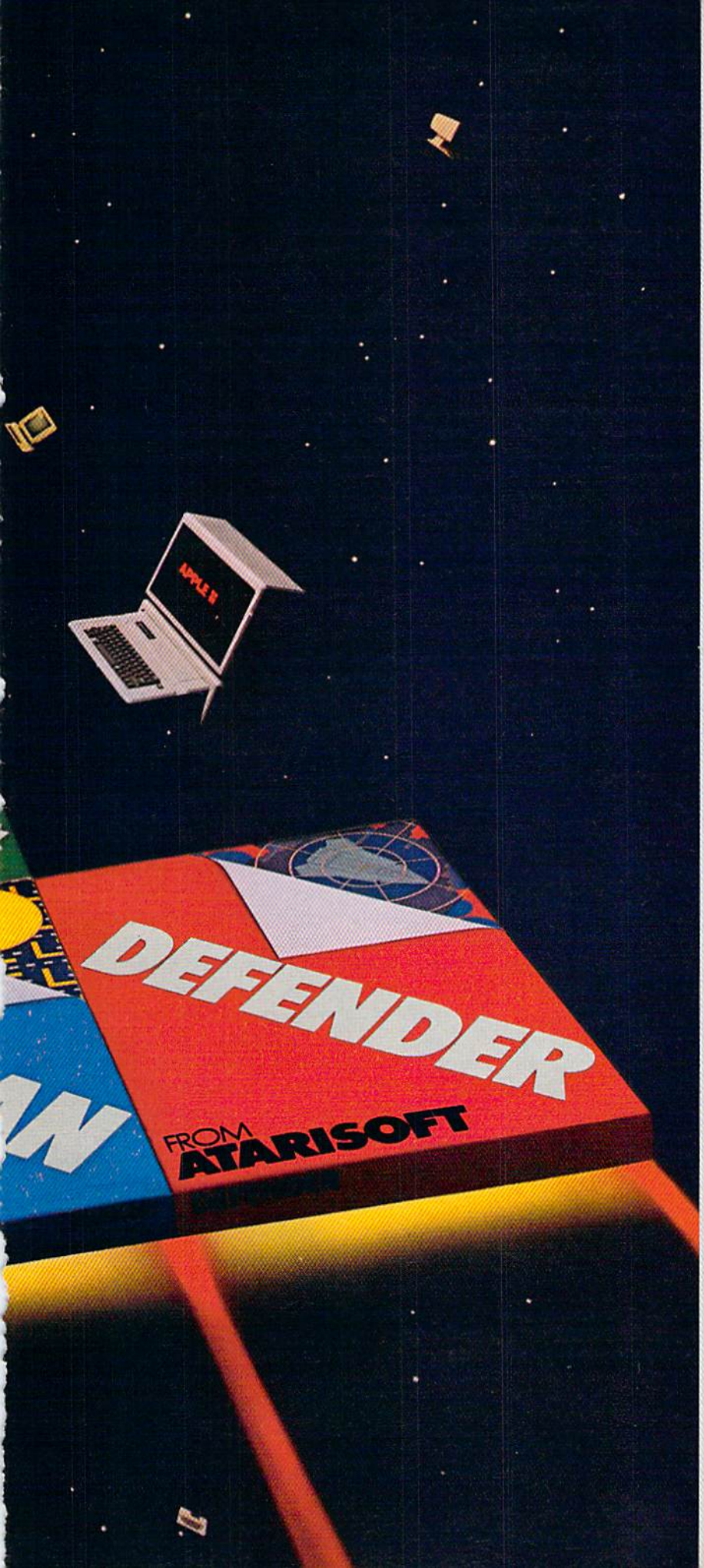
Write for the FREE illustrated TIMEWORKS catalog.

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

Your favorite distributor should be stocking TIMEWORKS programs by now. If he doesn't have what you want, just call us direct on our Toll Free Line: 800-323-9755 and we'll arrange to get it to you.

TIMEWORKS! You Deserve the Best!

NOW YOUR COMPUTER FITS THE ORIGINAL ARCADE HITS.



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

Introducing ATARISOFT.™ A new source for computer software.

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

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

So, start playing the original hits on your computer.

Only from ATARISOFT.

Some games also available on ColecoVision and Intellivision.

ATARISOFT™

Now your computer fits the arcade hits.

PAC-MAN and characters are trademarks of Bally Midway Mfg. Co. sublicensed to Atari, Inc. by Namco-America, Inc. DIG DUG is created and designed by Namco Ltd. manufactured under license by Atari, Inc. Trademarks and © Namco 1982. DEFENDER is a trademark of Williams Electronics, Inc. manufactured under license from Williams Electronics, Inc. STARGATE is a trademark and © of Williams 1981, manufactured under license from Williams Electronics, Inc. DONKEY KONG, Mario and NINTENDO are trademarks and © Nintendo 1981, 1983. ROBOTRON: 2084 is a trademark and © of Williams 1982, manufactured under license from Williams Electronics, Inc. SHAMUS is a trademark of Synapse Software Corporation, manufactured under license by Atari, Inc. PROTECTOR II is a trademark of Synapse Software Corporation, manufactured under license by Atari, Inc. PICNIC PARANOIA is a trademark of Synapse Software Corporation, manufactured by Atari, Inc. SUPER STORM is engineered and designed by Synapse Software Corporation, manufactured under license by Atari, Inc.
A Warner Communications Company. © 1983 Atari, Inc. All rights reserved. ATARISOFT™ products are manufactured by Atari, Inc., for use on the above referenced machines and are not made, licensed or approved by the manufacturers of these machines. COMMODORE 64, VIC 20, TEXAS INSTRUMENTS 99/4A, IBM, APPLE, COLECOVISION and INTELLIVISION are respectively trademarks of Commodore Electronics Limited, Texas Instruments, International Business Machines Corp., Apple Computer, Inc., Coleco Industries, Inc. and Mattel, Inc.

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

Name

Address

City State Zip

Telephone

PRODUCT OWNED: (Check one)

- ☐ TI-99/4A
- ☐ Commodore Vic 20
- ☐ IBM PC
- ☐ Intellivision
- ☐ Commodore 64
- ☐ Apple II
- ☐ ColecoVision
- ☐ Other

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

ASM 6

2. Computer Programming.
No one has to be a programmer to use and enjoy computers—ready-made programs are available for almost any task. However, even an elementary knowledge of programming helps beginners understand how the computer "thinks." With a little programming ability, they can better understand the possibilities and limitations of their new tools. They can become more skilled in programming if they want to and begin to modify or develop software for their peculiar needs.

Those who are afraid their questions will sound stupid or silly shouldn't worry about it.

Proficiency in programming requires time and practice. Not everyone is willing to invest in gaining it. But a beginners' programming class or self-teaching course is a good idea for newcomers, even if they don't pursue the skill to expertise. They can at least remove the mystique from programming and see for themselves what's going on inside their computers.

3. Access to Operating Information.
Beginners want to be able to find information on operating their computers as the need arises. If they can't make their printers work, or if they want to disable the RUN/STOP key, they need to be able to find out how to do it.

The best place to answer questions that are not in the users' manuals (or are buried where the novice has trouble finding them) is from a network of knowledgeable people. Second best (when you're looking for a particular answer) are books and magazines devoted to the computer involved.

Beginners should define the information they need as clearly and precisely as possible. The specific need is an important guide for choosing among available sources. Those who feel they don't know enough to ask a specific question, or are afraid their questions will sound stupid or silly, shouldn't worry about it. Almost all computer people have experienced similar problems and can often figure out what you want to know even when you can't define it yourself.

The rule of thumb for judging the value of any information source is twofold: First, ask "Do *I* need this information?" Second, ask "Can I *use* it?"

The second question is the most important. It doesn't matter whether a book or a class is good or bad. If you can't understand it, it's not useful to *you*. This is not because you are inadequate. More likely, it's beyond your stage of development or it's a poor source of information. You may grow into information above your skill level if your interests move in that direction. In the meantime, advanced material and poorly designed or inaccurate material may look the same to a novice.

New computer users should avoid anything—class, written material, or friendly advice—that doesn't make any sense at all. The information *must* include something you can effectively apply to your computer. You don't have to understand everything. If you can use a part of a class or a magazine article, you will eventually puzzle through the hard part if you persist. But the facts by themselves won't help unless they lead to actually *doing* something.

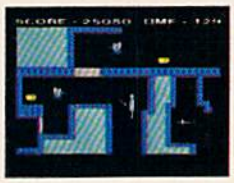
Computer classes are an obvious place to learn more about computers. Public schools and junior and four-year colleges are developing classes in adult (or continuing) education programs to meet the needs of the many new or prospective computer users. Some computer dealers and various private schools offer instruction; and local groups such as computer clubs, ham radio clubs, or the public library may sponsor classes as well.

Most classes offered in public education deal with computer literacy or beginning programming (usually in BASIC). Computer literacy courses can vary in scope. Some classes which purport to be for beginners include material that is useless or even discouraging to novices. A useful course will cover a basic vocabulary of words which are needed to learn about computers, such as *byte* and *software*. It will include discussions on what computers can do as well as some understanding of their limitations. The class also needs to address the trade-offs made from one machine to another on issues such as RAM memory, expandability, and availability of software and documentation.

A computer literacy class that spends significant time on the history of computers, binary math, or computer architecture is probably a waste of time for a newcomer. These subjects are valuable to advanced students; but for the novice, they can be discouraging because they reinforce the mistaken idea that understanding computers is only for the few.

Note that credit classes offered by colleges are not usually for beginners. A class called "Introduction to Computers" in a regular college curriculum may not deal with anything as small as a microcomputer. BASIC programming may require a strong math background. The classes

WELCOME TO APSHAI.
YOU'RE JUST IN TIME FOR LUNCH.



Boy, have you taken a wrong turn. One moment you're gathering treasure and the next you're being eyed like a side of beef.

You're in the Gateway to Apshai.™ The new cartridge version of the Computer Game of the Year,* Temple of Apshai.™

Gateway has eight levels. And over 400 dark, nasty chambers to explore. And because it's joystick controlled, you'll have to move faster than ever.

But first you'll have to consider your strategy. Is it treasure you're after? Or glory? You'll live longer if you're greedy, but slaying monsters racks up a higher score.

The Apshai series is the standard by which all other adventure games are judged. And novices will not survive.

They'll be eaten.

One player; Temple of Apshai, disk/cassette; Gateway to Apshai, cartridge, joystick control.

EPYX COMPUTER SOFTWARE

STRATEGY GAMES FOR THE ACTION-GAME PLAYER.

*Game Manufacturers Association, 1981

offered for real beginners, and especially home users, are usually noncredit.

A beginners' programming course is a worthwhile pursuit when it's designed for people who are really new to computers. Students are introduced to a few fundamental programming mechanisms and ideas such as variables, looping, and branching. They learn to use the most common "words" in computer language to write simple programs under the guidance of someone who can help when they get stuck. Seeing how the programs work (or don't work) educates newcomers in computer logic.

Be suspicious of any programming class that does not have computers in the classroom or offer hands-on practice.

A beginners' class shouldn't be too mathematical. It needs to cover basic math operators such as + and −, but not math functions such as SQR (square root) and ABS (absolute value). Almost all public education in computers has been handled by mathematicians, and even now some forget that trigonometric functions are not needed every day by most people.

Be suspicious of any programming class that does not have computers in the classroom or offer hands-on practice. Programming is almost impossible to learn as a theory, and the reinforcement by seeing how a particular program works when it is executed is essential to further understanding. Classes in schools are usually taught on whatever machine the school owns. When it's the same computer you have at home, the situation is ideal. When the machine is different, you should be prepared for frustrations. Programs written for the Apple usually don't work on the Commodore. However, computer logic is about the same in all home computers. Learning Applesoft BASIC when you have a VIC-20 is still better than not learning any programming at all.

Don't take a programming class if you don't have a computer that you can use outside of class. Programming is not a good introduction to computers unless it can be applied in personal use. Students who have a week between classes and don't practice in that time find that much of what they learn slips away between class periods. They may become discouraged or feel stupid. A computer literacy class is a better bet for people who haven't yet bought a computer.

Dealers' classes are often slanted toward the needs of their business-system customers. They are always machine-specific. A student can learn more about using his Commodore from a Commodore dealer than he can from a similar class in a school that uses TRS-80s.

Private or technical schools, especially those which teach only about computers, may be very responsive to the student's individual needs. They have to satisfy their customers because they continue to make a living by getting referrals and repeat business. They are sometimes expensive, though.

Miscellaneous groups vary a lot depending on the particular interests of the classes they sponsor. A Commodore users' group may offer the best programming class available for the VIC-20 or Commodore 64 owner. A ham radio club will probably offer strong hardware support. The public library may be able to get expert speakers on computer literacy.

When you're looking for an answer to a specific question, one of the best places to go is to a computer club. Such clubs bring together people with all levels of knowledge. Even experienced computer users come to clubs hoping to find sources for solving *their* computer problems. Within this information exchange network newcomers can usually find astonishing patience with their questions.

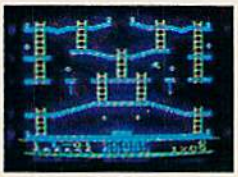
Computer clubs come in different flavors. A general club has the widest variety of members. It may lean toward hardware tinkerers or programmers. Sometimes the majority of the members will have a particular common interest, such as machine language programming or operating business computer systems. Again, you might want to shop around for a club that meets *your* interests and needs.

Finding computer clubs can be tricky, especially in metropolitan areas. Try asking the public library or the chamber of commerce. Check with any computer stores or electronic supply houses you can find. Ask anyone you know who has a computer, and check lists of local club meetings in newspapers and on radio and TV.

User groups or special interest groups (SIGs) are a more specific kind of computer club. Everyone in such a group will have one kind of computer, or be interested in a particular computer topic. Topics may range from computer languages like FORTH or LOGO to operating systems like CP/M to using computers for analyzing investments.

User groups for a particular machine are a major resource for beginners. The purpose of the

JUMPMAN'S A GREAT GAME. BUT YOU'VE GOT TO WATCH YOUR STEP.



Meet the Alienators. A fiendish bunch who've planted bombs throughout your Jupiter Command Headquarters.

Your job? Use your lightning speed to scale ladders, scurry across girders, climb ropes and race through 30 levels to defuse the bombs before they go off.

That's the kind of hot, non-stop action we've packed into the award-winning,* best-selling Jumpman,™ and into Jumpman Jr.,™ our new cartridge version with 12 all-new, different and exciting screens.

Both games force you to make tough choices. Should you avoid that Alienator, climb to the top and try to work your way down, or try to hurdle him and defuse the bombs closest to you before they go off?

If you move fast you'll earn extra lives. But if you're not careful, it's a long way down.

So jump to it. And find out why Jumpman and Jumpman Jr. are on a level all their own.

One to four players; 8 speeds; joystick control. Jumpman has 30 screens. Jumpman Jr. has 12 screens.

EPYX COMPUTER SOFTWARE

STRATEGY GAMES FOR THE ACTION-GAME PLAYER.

*1983 C.E.S. award winner.

group is to exchange information and software for a machine that all members own. You may be able to find someone who has successfully interfaced his Commodore 64 with the printer you're thinking about buying. Someone there may have tried that piece of software that sounds so good in the ads. User groups are so valuable to beginners (and all others) that you should consider trying to start one if none has been organized in your town.

So many new book and magazine titles are appearing that a new computer owner can easily feel overwhelmed. Using the rule of thumb "Can I *use* it?" helps thin the selection. When you ignore the material on applications that don't interest you and leave out the things you can't use, you bring the information to buy or read down to manageable proportions.

In general, the more specific a publication is to your needs, the better. A book on programming games on the VIC-20 is usually more helpful than a book on designing computer games, at least at first. Magazines for Commodore machines will have more information for the Commodore 64 or VIC-20 owner than general computer magazines. A magazine that is meant for beginning to intermediate users may be more immediately useable than a magazine that caters to computer professionals.

Books, even more than magazines, are easier to use when they are for your particular machine. A general text on BASIC programming will have commands not found on the VIC-20, or which work differently on the Commodore than the book suggests. A collection of business programs which were written to run on the IBM will be hard for the inexperienced to convert to a different machine.

So much information is available on computers that newcomers may have trouble keeping a sense of perspective. All too often, they come to the computer world expecting to fail, assuming that computers require special education or talent. That may have been true once, when home computers had to be assembled by the buyer, and hardly any software was available. Nowadays, the new "friendly" computers can be used effectively by anyone who will invest some effort in learning how.

Novices should remember that there are no stupid questions about computers. Some computer expert asked the same question when he was a beginner. He reached his expertise by persisting, learning a little at a time, and getting help from others. You can too.

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

PITSTOP.™
WHERE WINNING IS THE PITS.

You'll never make Grand Prix champion just driving in circles.

You've got to stop sometime. The question is when. Right now you're in the lead. But the faster you go, the more gas you consume. And the quicker your tires wear down.

If you do pull into the pits, though, you lose precious seconds. So it's up to you to make sure the pit crew is quick with those tires. And careful with that gas. Otherwise, poof! you're out of the race.

So what'll it be, Mario? Think your tires will hold up for another lap? Or should you play it safe and go get some new ones?

Think it over. Because Pitstop™ is the one and only road race game where winning is more than just driving. It's the pits.

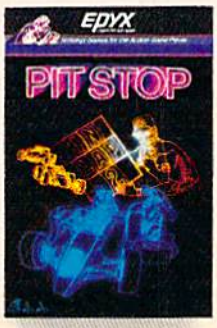
Goggles not included.

One or two players; 6 racecourses, joystick control.

EPYX COMPUTER SOFTWARE

STRATEGY GAMES FOR THE ACTION-GAME PLAYER.

See your retailer for available computer formats.



Telecommuting:

Dawn Of The Electronic Cottage

Gregg Peele, Assistant Programming Supervisor

The invention of the telephone a century ago opened a new age of remote communication, weaving the world together with a network of wires. Today, the invention of the microprocessor is revolutionizing our communication system. One of the spin-offs may be a return to the decentralized living of yesterday—people working at home on remote terminals or microcomputers instead of battling the morning and evening rush-hour traffic into the city. As this article shows, "telecommuting" is becoming a viable alternative.

From the barn behind his rural Wisconsin home, Rohn Engh publishes a newsletter that goes out to hundreds of people all over the nation. Published both on paper and in a new electronic edition, Engh's *THE PHOTOLETTER* pairs photo editors for magazines and other publications with photographers. Without microcomputers, Engh might still be caught up in metropolitan hustle and bustle.

Based in Osceola, Wisconsin, Engh left a big city to live and work in his slower-paced rural setting. In rustic surroundings, he has built his business from a small beginning to a newsletter with more than 1700 subscribers, each paying $75 per year. He feels that working at home has been not only profitable, but also has helped him strengthen family ties with his children. "In a time when many don't have time to participate with their children, our sons had us to be there for them."

To handle the accounting for his subscribers, Rohn Engh uses a Radio Shack TRS-80 Model II computer. Recently he put his newsletter on NewsNet, an electronic news and information service. Using his computer, he hopes to develop a network to connect thousands of photographers with his business.

Engh says the choice between pursuing a career in the big city or working out of his home in the country came down to a matter of opposing lifestyles: "I had to decide between making a living or making a life."

More and more people are making the same choice as Engh—to "telecommute" by computer from their homes instead of commuting by car or mass transit to the metropolis. Ironically, this computer-age phenomenon actually is a throwback to the decentralized work patterns of the pre-industrial age.

In the 18th century, before the Industrial Revolution, so-called cottage industries were common in agricultural areas where farmers experienced seasonal unemployment. In the winters,

Calc Result™

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

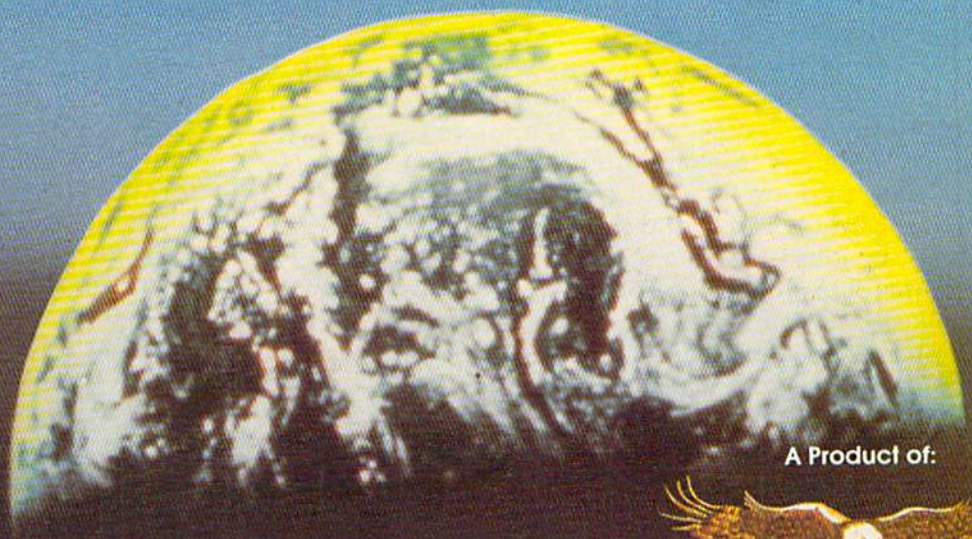
CALC RESULT...The one spreadsheet guaranteed to turn your Commodore into a powerful financial tool. Offering you every feature found on other more expensive programs for much less the cost.

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

Versatile...customize your own print formats

Distinctive...display beautiful color graphics

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



Developed by:

handic software ab

-a company in the Datatronic group-

A Product of:

BLUE SKY SOFTWARE
Ashland Office Center
Evesham & Alpha Avenues
Voorhees, NJ 08043
609/795-4025

Distributed by:

DES—DATA EQUIPMENT SUPPLY
213-923-9361

SOFTEAM
800-421-0814

COMPUTER MARKETING SERVICES, INC.
800-222-0585

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

Commodore 64 is a trademark of Commodore Business Machines

they made ends meet by making consumer goods at home. Middlemen tried to coordinate this loosely organized network of home producers, supplying raw materials and equipment, and collecting and selling the finished goods.

As demand increased, and the number of domestic producers grew, supply, supervision, and distribution became more difficult. The widely scattered nature of this loose network, in an age before mass transportation, made it economically inefficient. During the Industrial Revolution it was replaced by the factory system—collecting workers under one roof. Industrialization, in turn, led to mass centralization and urbanization. Production became vastly more efficient, but new problems cropped up.

As most of us who lurch out of bed to an alarm clock and fight rush-hour traffic realize, modern society clings to the habit of collecting workers under one roof even though it doesn't always seem necessary. Think about your job. Could you do some or all of your work at home? What would you need in order to do so? Communication and information jobs, and jobs requiring thinking and creativity skills with very little capital equipment, could just as well be done at home as in a distant office.

We may soon see history repeating itself. "The electronic cottage," a term borrowed from the 18th-century cottage industries, describes the computerized home workplace. Only this time, the problem of widely scattered workers is being solved with electronic communication.

Hundreds of thousands of employees at banks, insurance companies, and other businesses already are using computers or computer terminals at work. Recently, some businesses have started using remote terminals to link employees in their homes to the main office computer. These workers, dubbed "telecommuters" by researcher John Niles, perform their duties without having to make the daily trip to and from the office. Telecommuting jobs vary from those which are clerical in nature (data entry, word processing) to those in professional categories (lawyers, stockbrokers, insurance agents, programmers). Then there are workers who are physically handicapped, or who need or prefer to work at home. These people find that telecommuting balances the necessity to earn a living with the advantages of working in their own dwelling.

The University of California at Berkeley's Melvyl Division of Library Automation is implementing a huge project designed to make the library's services available to home users. Employees working on this project have the option of working at home rather than at the university. Already, 200 terminals have been distributed throughout the school and in the project members' homes.

Mary Engle, system analyst for the computing resources group, believes that employees with home terminals can use their time much more flexibly. "Having a terminal at home allows the employee to avoid the early-morning California traffic and still accomplish the same amount of work," she says.

Although the workers are separated by many miles, Engle says that communications are actually more efficient. Messages can be left for workers and supervisors without them ever having to come in contact with each other.

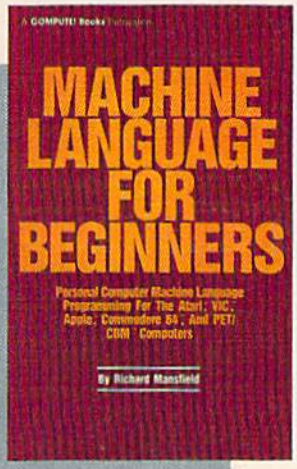
Rohn Engh and his wife, Jeri, using their computer in their barn/office. (Photo courtesy Robert Meier)

Telecommuting, however, raises many issues, and one of them could slow a trend away from central workplaces: working at home with computers is likely to alter many entrenched ideas about employer/employee relations. For instance, the absence of employees from the central workplace forces managers to devise new means of supervision. How does a boss know if an employee working at home is taking a 30-minute coffee break or chatting with the neighbor about the weather? Possible solutions include requiring employees to report to the office occasionally, or to pay them based on the amount of work they complete.

One company experimenting with telecommuting, Blue Cross and Blue Shield of South Carolina, assigns work in its "Cottage Keyer" program according to employee seniority. Only those employees who have proven themselves dependable may work at home.

COMPUTE! Books

AUTUMN 1983



$14.95
ISBN 0-942386-11-6

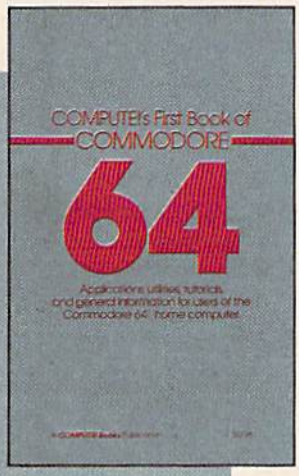
Machine Language For Beginners. Much commercial software is written in machine language because it's faster and more versatile than BASIC. *Machine Language For Beginners* is a step-by-step introduction to the subtleties of machine code. Includes an assembler, a disassembler, and utilities, to help beginners write programs more quickly and easily. Covers many popular home computers.

350 pages, paperback.
Spiral bound for easy access to programs.

$12.95
ISBN 0-942386-16-7

COMPUTE!'s Second Book Of VIC. This is just the book to follow the bestselling *First Book of VIC:* clear explanations of programming techniques, an extensive memory map, a mini-word processor, a system for creating sound effects, a custom character maker, a machine language assembler, and "Snake," an extraordinary all-machine language game.

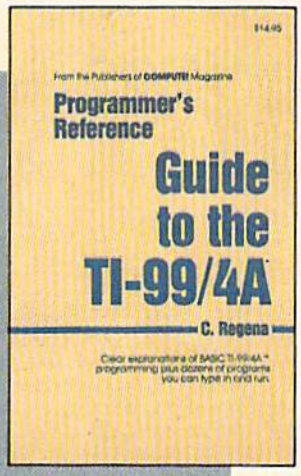
274 pages, paperback.
Spiral bound for easy access to programs.



$12.95
ISBN 0-942386-20-5

COMPUTE!'s First Book Of Commodore 64. An excellent resource for users of the 64, with something for everyone: BASIC programming techniques, a memory map, a machine language monitor, and information about writing games and using peripherals. Many ready-to-type-in programs and games.

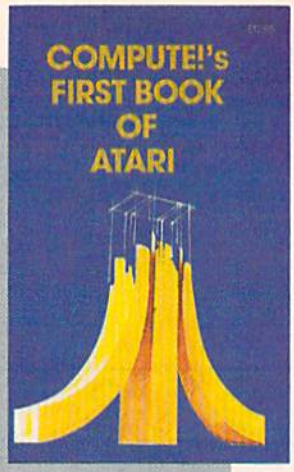
264 pages, paperback.
Spiral bound for easy access to programs.



$14.95
ISBN 0-942386-12-4

Programmer's Reference Guide To The TI-99/4A. Useful for everyone from beginners to experienced programmers. Contains instructions for programming in BASIC, plus more than 40 ready-to-type-in programs for this popular computer. Explanations and examples of variables, files, arrays, high-resolution graphics, music, speech, editing and debugging, conserving memory, and more.

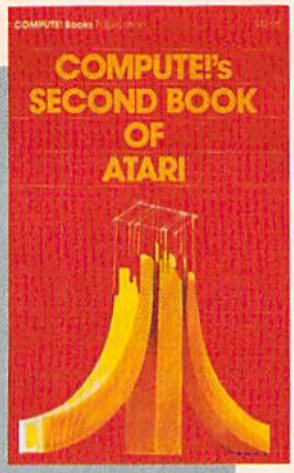
312 pages, paperback.
Spiral bound for easy access to programs.



$12.95
ISBN 0-942386-00-0

COMPUTE!'s First Book Of Atari. One of the most popular books for one of the most popular personal computers. Useful articles and programs include: "Inside Atari BASIC," "Adding A Voice Track To Atari Programs," "Designing Your Own Atari Graphics Modes," and more. For beginning to advanced Atari owners and users.

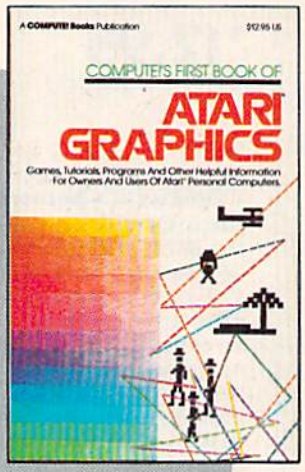
184 pages, paperback.
Spiral bound for easy access to programs.



$12.95
ISBN 0-942386-06-X

COMPUTE!'s Second Book Of Atari. Previously unpublished articles and programs selected by the editors of **COMPUTE!** Magazine. An excellent resource for Atari users. Contains chapters about utilities, programming techniques, graphics and games, applications, and machine language.

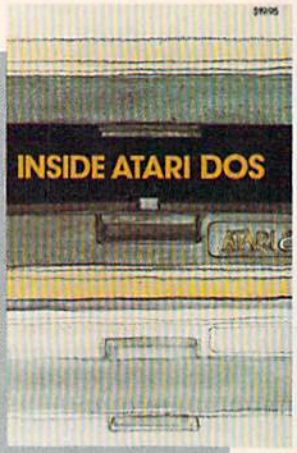
250 pages, paperback.
Spiral bound for easy access to programs.



$12.95
ISBN 0-942386-08-6

COMPUTE!'s First Book Of Atari Graphics. Atari programmers interested in graphics and color will find this book indispensable. Includes sections on using Atari graphics, "painting" the screen in 256 colors, mixing graphics modes, making high resolution graphs and charts, redefining character shapes, player/missile graphics, and much more.

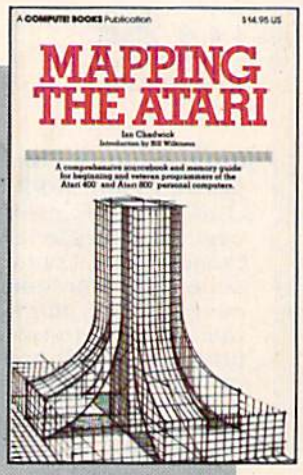
248 pages, paperback.
Spiral bound for easy access to programs.



$19.95
ISBN 0-942386-02-7

Inside Atari DOS. An invaluable programming tool for intermediate to advanced Atari programmers who own a disk drive. Written by Bill Wilkinson, designer of Atari's Disk Operating System, this book provides a detailed source code listing. A comprehensive guide to DOS structure.

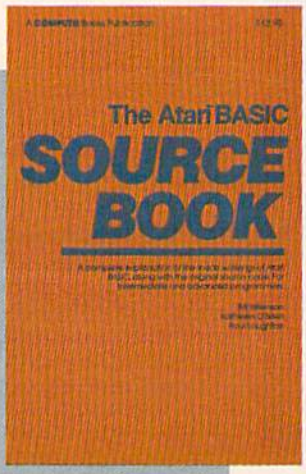
108 pages, paperback.
Spiral bound for easy access to programs.



$14.95
ISBN 0-942386-09-4

Mapping The Atari. A "treasure map" of ROM and RAM. This book supplies a comprehensive listing of memory locations and their functions. In addition, many applications are suggested, complete with program listings. For beginning to advanced Atari owners and users.

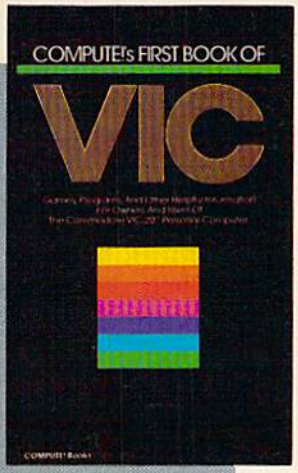
194 pages, paperback.
Spiral bound for easy access to programs.



$12.95
ISBN 0-942386-15-9

The Atari BASIC Sourcebook. From the computer's point of view, each BASIC command is actually a machine language miniprogram. Authors Bill Wilkinson, Kathleen O'Brien, and Paul Laughton, the people who actually wrote Atari BASIC, have compiled a complete annotated source code listing and a wealth of information on the internal workings of BASIC.

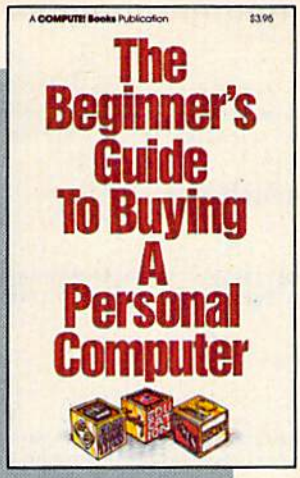
296 pages, paperback.
Spiral bound for easy reference.



$12.95
ISBN 0-942386-07-8

COMPUTE!'s First Book of VIC. The essential reference guide for owners and users of Commodore VIC-20, the computer in more homes than any other. *First Book of VIC* features games, educational programs, programming techniques, home applications, machine language, memory maps, and more.

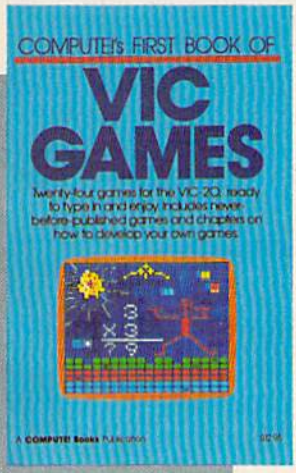
212 pages, paperback.
Spiral bound for easy access to programs.



$3.95
ISBN 0-942386-22-1

The Beginner's Guide To Buying A Personal Computer. This useful handbook is designed to teach the novice how to evaluate and select a personal computer. Written in plain English for prospective buyers of home, educational, or small business computers. Comes complete with personal computer specification charts and a buyer's guide to 35 computers.

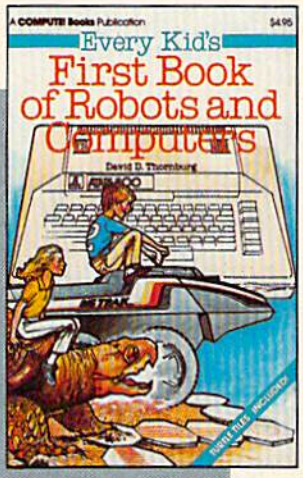
90 pages, paperback.
Revised and updated 1983 edition.



$12.95
ISBN 0-942386-13-2

COMPUTE!'s First Book Of VIC Games. Two dozen great games for just $12.95. Each has been tested and debugged and is ready to type in. Contains a variety of action games, mazes, brain testers, dexterity games, and more. Helpful hints and suggestions explain how each game was put together, strategies for winning, and ideas for modifying the games.

201 pages, paperback.
Spiral bound for easy access to programs.

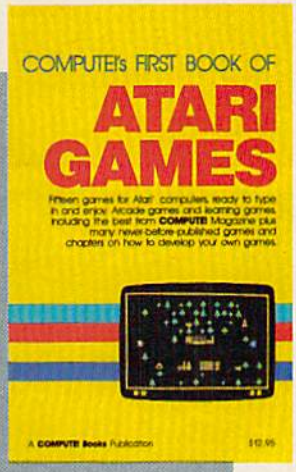


$4.95
ISBN 0-942386-05-1

Every Kid's First Book Of Robots And Computers. This book uses turtle graphics to introduce kids to robots and computers. Includes exercises for computer graphics languages such as Atari PILOT. Additional exercises allow readers to experiment with the Milton Bradley "Big Trak™." Children who don't have a computer can use the sturdy "Turtle Tiles™" bound into each book.

Big Trak is a trademark of the Milton Bradley Company.
Turtle Tiles is a trademark of David D. Thornburg and Innovision, Inc.

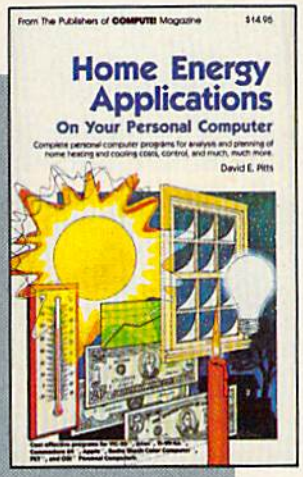
83 pages, paperback.



$12.95
ISBN 0-942386-14-0

COMPUTE!'s First Book Of Atari Games. Here are fifteen commercial quality game programs, ready to type into an Atari. The book contains fast machine language games that require quick reflexes as well as brain testers that feature strategy and logic. As a bonus, many programming techniques are explained in depth, so Atari owners can adapt them to their own games.

232 pages, paperback.
Spiral bound for easy access to programs.



$14.95
ISBN 0-942386-10-8

Home Energy Applications On Your Personal Computer. Written for homeowners who want to analyze energy costs. Includes many computer programs for adding up the costs and benefits of home improvements — weatherstripping, insulation, thermostat timers, air conditioning, storm windows, and so on. Programs will run on all popular home computers.

243 pages, paperback.
Spiral bound for easy access to programs.

New Releases October-December 1983

COMPUTE!'s First Book Of TI Games
$12.95
ISBN 0-942386-17-5
29 ready-to-type-in games, including mazes, chase games, thinking games, creative games, and many explanations of how the programs work.

COMPUTE!'s Second Book Of Atari Graphics
$12.95
ISBN 0-942386-28-0
Dozens of easy-to-understand explanations of rainbow graphics, animation, player-missile graphics, and more — along with artists utilities and advanced techniques.

Creating Arcade Games On The VIC
$12.95
ISBN 0-942386-25-6
Everything you need to know to write exciting fast-action games in BASIC on the VIC, from game design to techniques of animation, including complete example games.

VIC Games For Kids
$12.95
ISBN 0-942386-35-3
30 games written just for kids (though adults will enjoy them too). Action games and games to teach math, geography, history — learning has never been more fun.

COMPUTE!'s First Book Of 64 Sound & Graphics
$12.95
ISBN 0-942386-21-3
Clear explanations to help you use all the 64's powerful sound and video features. Plus great programs for music synthesis, high-res art, and sprite and character design.

COMPUTE!'s Third Book Of Atari
$12.95
ISBN 0-942386-18-3
Continues the COMPUTE! tradition of useful and understandable information, with programs from games to a word processor. Plus utilities and reference tables.

COMPUTE!'s First Book Of Commodore 64 Games
$12.95
ISBN 0-942386-34-5
Packed full of games: Snake Escape, Oil Tycoon, Laser Gunner, Zuider Zee. Arcade-action machine language games for fast hands; strategy games for sharp minds.

COMPUTE!'s Reference Guide To 64 Graphics
$12.95
ISBN 0-942386-29-9
A complete, step-by-step tutorial to programming graphics. You'll like the clear writing, the example programs, and the full-featured sprite, character, and screen editors.

Programmer's Reference Guide To The Color Computer
$12.95
ISBN 0-942386-19-1
An essential reference. Every command in regular and extended BASIC is fully defined, with ideas and examples for using them. Plus chapters on planning programs.

Creating Arcade Games On The 64
$12.95
ISBN 0-942386-36-1
The principles and techniques of fast-action game design, including custom characters, movement, animation, joysticks, sprites, and sound. With complete example game programs.

Commodore 64 Games For Kids
$12.95
ISBN 0-942386-37-X
Dozens of games for kids of all ages, making this an instant library of educational software. Learning, creativity, and excitement.

Things To Do In 4K Or Less
$12.95
ISBN 0-942386-38-8
Many entertaining and intriguing programs for small-memory computers like the unexpanded VIC, Color Computer, and TI-99/4A, with tips and hints for your own 4K programs.

Creating Arcade Games On The Timex/Sinclair
$12.95
ISBN 0-942386-26-4
Features five ready-to-type-in games, along with the principles of game design. Also serves as an excellent introduction to BASIC programming on the Timex/Sinclair.

Coming Soon (Early 1984)

- The VIC Tool Kit: Kernal & BASIC
- Mapping The VIC
- Mapping The 64
- The 64 Tool Kit: Kernal & BASIC
- Creating Arcade Games On The TI-99/4A
- All About The 64: Volume I
- TI Games For Kids
- The Anything Machine: TI-99/4A

Ordering Information

Please write or call for COMPUTE! Books Dealer Sales Policies and Discount Schedule:

COMPUTE! Books
Dealer Sales Department
P.O. Box 5406
Greensboro, NC 27403

Dealer Hotline
TOLL-FREE
800-452-4023
(919-275-9809 in NC)
8:30 AM — 4:30 PM, EST, M-F

Commodore 64 and VIC-20 are trademarks of Commodore Business Machines and/or Commodore Electronics, Ltd. Atari is a trademark of Atari, Inc. TI-99 is a trademark of Texas Instruments.

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

Other large companies experimenting with telecommuting include Control Data Corporation and the Aetna Insurance Company. Seattle Public Health Hospital employs eight to ten telecommuters involved in medical research and application programming. Larry Rothenburg, operations director at the hospital, believes telecommuting is becoming more and more popular. "People do it all the time. Here, it's so common it's not a big deal." Hospital researchers use home terminals to compile information for their research projects. Even nonadministrative employees use terminals to help meet deadlines and complete work after regular hours.

Some professional people are using home-based computers to set up their own businesses, preferring the privacy and friendly atmosphere of the home to the frenetic pace of the city. James Ward, once managing director in charge of bond trading at Dillon Read and Co., a securities firm in downtown New York, is now using a computer at home to sell corporate bonds and securities. Computer technology has given him the tools to keep track of both the rise and fall of securities prices and his growing clientele.

As telecommuting spreads, some of its more subtle consequences will become increasingly clear. Besides transforming the traditional workplace, it could also dramatically change the role of the home in post-industrial society. There are inherent drawbacks and benefits, depending on your point of view. Here are some possible advantages and disadvantages of telecommuting:

More efficient use of the potential workforce. Lots of human resources are going to waste these days because it costs money to hold a job. Telecommuting can reduce some of these costs. For example, many families today need two incomes, but sometimes both spouses cannot work full-time jobs because it requires buying a second car and/or paying for professional day care for the children. If one spouse were a telecommuter, a second car might be unnecessary. Other work-related expenses also could be avoided—gasoline and maintenance for the second car, a new wardrobe of dress clothes, lunches downtown, etc. Day care expenses also might be avoided, since the telecommuting spouse could care for the children at home (admittedly, this could be a disadvantage, depending on the kids).

Lower costs for employers. The cost of adding new employees is usually less if the employees are telecommuters. In terms of equipment, the company would have to install a remote terminal or microcomputer and perhaps a desk and additional telephone line in the employee's home. This equipment would be necessary even if the employee worked at the central office. The company saves money by not having to provide office space. Consider how much money a business would save if it could expand operations without having to lease or build new offices on expensive downtown or suburban commercial property. Plus, it's that much less space to heat and cool.

On the other hand, some of these costs are shifted to the employee. Room that could otherwise be used for living space must be devoted to work space. People who turn down the heat or air conditioning when the house is empty during the day would have to maintain it at more comfortable (and more expensive) levels. However, it's possible that some of these expenses could be written off on income taxes.

Changing social contacts. Before the industrial age, most people's social contacts were based on proximity—out of necessity, their friends were their neighbors. Today, for the office-bound, the workplace is the most important source of social contact. If people work at home all day, perhaps alone, they might feel isolated. Since most of the dynamics of human relations is from our interactions with others, telecommuters may lack the social stimulation that office employees enjoy. They might even be forced to make friends with their neighbors. Of course, if other family members were at home during the day, the family unit might grow stronger. And someday, part of the youngsters' education might involve staying at home and using *their* terminals.

More relaxed atmosphere, enhancing creativity and productivity. Some companies see telecommuting as a means of making best use of employee creativity. "Many companies want their engineers to take advantage of creative ideas that they may have at home," says Chris Leach of Network Products in Raleigh, North Carolina, a specialized telecommunications networking firm. "If an engineer comes up at midnight with a brilliant idea that may save the company money, companies want to be able to take full advantage of that idea at its conception."

Part-time versus full-time employment. Some companies might find it more efficient to hire part-time telecommuters, perhaps on a contract basis, instead of extra full-time staff. Advantages: Again, the company saves money by avoiding the need for additional office space; the company pays less for salaries and benefits, including health plans and pensions; and more part-time jobs are opened up for people who cannot work full-time. Disadvantages: Part-time employees lose out on benefits, including health plans and pensions; and fewer full-time jobs are opened up for people who need them. These opposing interests are not unique to telecommuting, but they may be exaggerated by telecommuting if it makes part-time

hiring more attractive to employers than full-time hiring.

In addition to the above effects—which are more immediate and immediately obvious— widespread telecommuting could have significant impacts in other ways as well. Futurist Alvin Toffler discusses some of the fascinating possibilities in his landmark book *The Third Wave*. Telecommuting on a very large scale could reverse the trend toward centralization that started with the Industrial Revolution. In a post-industrial, decentralized society where workers are connected by telecommunications instead of transportation systems, there may be relief from such problems as decaying cities, overburdened urban services, traffic jams, energy shortages, pollution, and concentrations of overpopulation.

In the 18th century, working at home provided the best of both worlds—the opportunity to be near one's family and to gain the financial security of regular income. Today's telecommuters have that same opportunity, plus the exciting chance to be pioneers—awakening in their electronic cottages to the dawn of telecommuting.

NEW!! REDUCED PRICING IN TIME TO ENJOY THE HOLIDAYS

DDB-ONE $79.95
Relative data base menu prompted with on screen tutorial. (Disk only)

BUDGET AIDE $49.95
Home budget management with color graphs and integrated checkbook. (Disk only)

cFILEs $29.95
Electronic File cabinet (Disk or cass.)

MICRO-WRITER $29.95
Easy to use word processing for the beginner or the experienced Commodore user. (Disk or cass.)

Plus many more

Dealer Inquiries Welcomed

Check, Money Order
VISA & MC Accepted
MO Residents Add
6% Sales Tax

MicroTechniques
P.O. Box 192
Chesterfield, MO 63017

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.

umbrella software INCORPORATED

Tax Pack™

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

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

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

Now you can use your VIC 20 to perform all the calculations on your Canadian T1 general tax form. *Taxpack* guides you easily through every aspect of the form with friendly prompts and a comprehensive instruction manual. This new software is available on cassette tape and will run on the standard 3.5k memory in your VIC 20 home computer.* *Taxpack* lets you tackle your income tax form at your own pace. A convenient save-and-restore function lets you record and review historical results. Professional editing features assure easy and accurate data entry. *Taxpack* puts the power of tax modelling and planning for subsequent years in your hands, today.

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

Special introductory offer
Order early and get your Taxpack for only $19.95! That's a ten dollar saving off our regular retail price of $29.95. If you're giving *Taxpack* for Christmas, we'll send you a special gift card to put under the tree. To use your *Visa* or *Mastercard*, phone us toll free; or, send your cheque or money order with the handy mail-order form attached. We'll confirm your order by return mail. Your up-to-date *Taxpack* cassette and manual will be shipped within 15 days of the release of the 1983 T1 general form.

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

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

1-800-268-6364

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

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

I Want Taxpack!

Please send me _____ Taxpacks @ $29.95		$_____
Discount $10 per unit for orders before Dec 31, 1983		-$_____
	Subtotal	$_____
Nova Scotia residents only, add 10% Sales Tax		+$_____
Add $2 per unit shipping and handling charges		+$_____
	Total	$_____

My Name _____

Address _____

City _____ Province _____

Postal Code _____ Telephone _____

☐ I am buying Taxpack as a gift. Please send me a gift card. Attached please find the name and address of the person(s) to receive Taxpack.

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

C. REGENA

Computer Choreography

In previous columns I have written about graphics and music. (For the Commodore 64 refer to Chapter 7 of the *User's Guide* for music.) Combining graphics with music, which I call "computer choreography," can be a lot of fun.

Synchronizing Sound With Graphics

After sound commands, we usually use a delay loop to play the sound for a certain length of time, then change the tone or turn off the sound. For example:

VIC-20 version

```
10 POKE 36878,15          Turns volume on.
20 POKE 36876,183         Plays a tone.
30 FOR D=1 TO 800:NEXT    Delays.
40 POKE 36876,0           Turns off tone.
```

Commodore 64 version

```
10 POKE 54296,15          Turns volume on.
11 POKE 54277,9           Sets attack/decay.
12 POKE 54278,128         Sets sustain/release.
20 POKE 54273,34:POKE     Plays a tone.
54272,75
25 POKE 54276,17          Sets waveform.
30 FOR D=1 TO 800:NEXT    Delays.
40 POKE 54276,16          Turns off waveform.
```

The above programs play a tone. Notice that while the computer is playing a tone it can also be doing something else. In this case the computer is performing line 30, counting to 800 for a delay loop. You could be making calculations instead. You could also be drawing graphics—using either PRINT or POKE statements.

Change line 30 above to:

```
30 FOR D=1 TO 40:PRINT TAB(D);"** HELLO **":NEXT
```

Now the computer prints a message 40 times while the tone plays. Try using different tones and printing different messages for a series of tones. Using the same idea, design a picture and PRINT graphics while you are playing music. Intermingle sound statements with graphics statements. You may still need delay loops to play the tones long enough.

I have enjoyed mixing graphics with music by drawing pictures to go with a song. If the song has words, you can make pictures appear exactly when appropriate with the lyrics. It takes a little practice, but soon you'll be able to judge how much you can

Program 4 draws a holiday message while playing a carol. (64 version; VIC version similar.)

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 40-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, 800-227-6703 (in California, 800-632-7979)

*Intelligent interface cable for Commodore or Atari sells separately.

Alphacom™

Award-Winning Hits for your Commodore

CHOPLIFTER*
For the Commodore VIC-20.

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

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

C R E A T I V E

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

with a Free Software Bonus.

SERPENTINE*
For the Commodore VIC-20.

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

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

S O F T W A R E

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

"CHOPLIFTER" AND "SERPENTINE" ARE LICENSED FROM BRODERBUND SOFTWARE, INC.

Get Creative!

SAVE NEW YORK™
For the Commodore 64.

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

S O F T W A R E

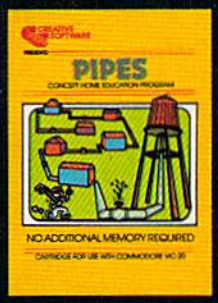
"VIC-20" AND "COMMODORE 64" ARE TRADEMARKS OF COMMODORE ELECTRONICS, LTD

© 1983 CREATIVE SOFTWARE

Get more out of your Commodore.

PIPES*
For the VIC-20 and Commodore 64.

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



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

C R E A T I V E

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

do between sound statements. It usually takes some experimentation to coordinate the graphics with the sound.

Try animation with music. Using PRINT statements or POKEing graphics, you need to erase an object in its old position and redraw it in its new position to make it appear to move. You could draw a background during introductory music, then draw a man and make him dance to the music.

With the Commodore 64 you can move sprites in your choreography. You may want to define your sprites while you're playing some music, then later, when it's appropriate in the music, make the sprite appear. Even later in the music you may want to move the sprite around. When you RUN the program, you will hear the music, but the computer is actually also defining sprites for later graphics.

If you have young children, you might try programming the music to some nursery songs, then adding graphics to draw the little characters or animals in the song. Draw a flag while you play a patriotic song. Use a song with a specific theme and draw objects to match the words. Compose your own music to go with a pretty scene of trees and mountains. Use your imagination to create your own choreographic production.

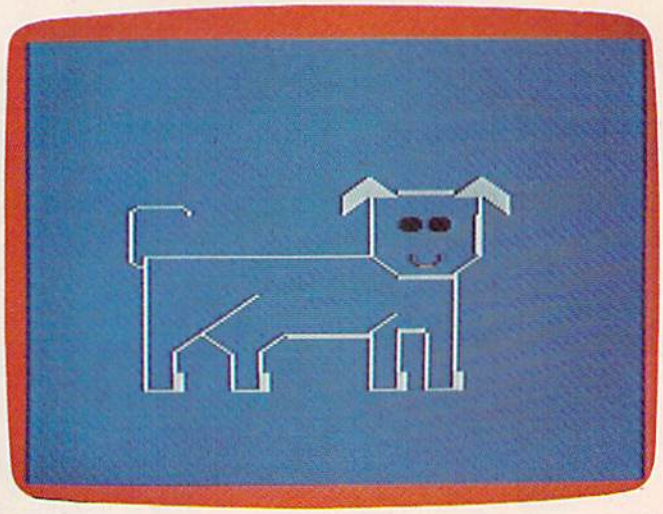
You don't have to be a musician to program music. Find some sheet music or get a book of popular songs. Usually the top note in the treble clef for each word of the song is the melody note. Translate the melody notes to numbers by using the charts in the *User's Guides* (tables of letter names of the musical notes with the corresponding POKE values). If you can't read music, get a beginning piano book (primer level). There are books of songs using single-note melodies with no accompaniment notes to worry about, and some song books have the names of the notes right with the notes.

You don't have to be an artist to program graphics. Scan children's coloring books for line drawings. You can probably find some really cute animals or objects that are quite easy to draw. Draw or trace the picture on graph paper, then match up the lines to the graphic symbols that are available on the computer. Another good source of pictures is in the sewing department of a store. Look for needlepoint or counted cross-stitch pattern books. These patterns are already drawn on squares, and you can use squares of different colors to create a picture.

An Example Of Choreography

Program 1 (VIC version) and Program 2 (64 version) illustrate how it is possible to combine music with POKE graphics in a program nicknamed "Dog."

Lines 10-20 are preliminary statements to get ready to play music. Line 10 turns on the volume to level 15. In the 64 version the attack/decay and sustain/release parameters are also set. Line 20 defines



Synchronizing graphics with sound, Program 1 draws a dog while playing a tune. (VIC version; 64 version similar.)

variables so later we can POKE values into voice 1. This month's programs use only the melody note in voice 1. Feel free to add accompaniment voices.

Line 30 plays the first note of the song. I usually program all the music first, then later add the graphics by inserting graphics statements between the music statements—with a lot of experimentation to get the choreography right. In Dog I started the sound statements with line 30, then incremented the line numbers by 20 for each successive sound statement, so the sound statements are on lines 30, 50, 70, 90, etc. Delay loops are set up in lines 820-830. Depending on how long the note should be played, the command would be GOSUB 820, GOSUB 825, or GOSUB 830. To test the song, I used the GOSUB method to delay between notes.

The next step was to draw the graphics. I made a simple line drawing of a dog on graph paper representing the screen memory locations of the computer and using lines that are available from the keyboard. The code numbers for the graphics symbols are found in the Screen Codes table in the Appendix (pages 141-42 of the *VIC-20 User's Guide* and pages 132-34 of the *Commodore 64 User's Guide*).

The final step of choreography is to combine the graphics with the music. Just start inserting graphics statements between the music statements. The number of graphics statements between music statements will determine how long a note will be played, so you need to make sure you don't have too many statements causing unwanted delays. In the case of Dog, I drew the dog in several steps between music statements and still needed some of the delay loops in lines 820-830 to keep the music playing at the right tempo. This programming step is the crux of choreography, and you may need to experiment with several sequences to get exactly what you want.

Line 810 is GOTO 810 so the computer picture

stays on the screen without the READY message. To stop the program press the RUN/STOP key. Since I've changed the screen color for this program, you won't be able to read the printing, so press RUN/STOP and RESTORE at the same time to recover the original screen color.

If you have trouble running this program, check for typing errors. There are a lot of numbers to be typed, so that is the most likely place for errors. If you use the "Automatic Proofreader" (elsewhere in this issue) for entering these programs, you should be safe. All the DATA statements contain numbers for graphics and will contain pairs of numbers—a screen location and a character number to POKE. All of the graphics commands (line numbers divisible by 20 or lines not ending in zero) contain POKE with a screen location number (four digits) and a character number (two or three digits).

All of the sound commands in the VIC-20 version start with POKES (which is "POKE S" without the space), a comma, then a note number. In the Commodore 64 version the POKE commands for sound are POKESH and POKESL (for sound high and sound low).

Program 3 (VIC version) and Program 4 (64 version) are my Christmas presents to you for this December issue. This program can be used as an electronic Christmas card for your friends who own Commodore computers.

Lines 2 to 5 are the preliminary POKE commands to create music. Lines 6 to 8 contain the delay subroutines to play a note a certain length of time. Again, I first programmed the music, then inserted the graphics. This program illustrates the use of PRINTed graphics. The RVS ON is used to get a solid green square. Press RUN/STOP to end the program, then RUN/STOP and RESTORE to get back to the original screen.

Until next month—happy holiday season!

See program listings on page 210.

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

sunsoft

Write for Free Catalog

Box 99 Alturas, FL 33820

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

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.

WANTED!
SOFTWARE AUTHORS

Broderbund Software is looking for new authors—both in-house and freelancers—to join its international team of programming wizards. If you have an original, machine language entertainment product for the home micro market, let us show you the advantages off working with our team of design, production and distribution specialists.

Call or write for a free Author's Kit or send us a machine readable copy of your work for prompt review under strictest confidence. You have nothing to lose and perhaps a great deal to gain.

Broderbund Software™

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

HOTWARE

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

Kathy Yakal, Editorial Assistant

Commodore 64 Entertainment

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

Commodore 64 Home/Business/Utility

This Month		Last Month
1	*WordPro 3 Plus/64* (Professional)	1
2	*Quick Brown Fox* (Quick Brown Fox)	3
3	*Inventory Manager* (Timeworks)	4
4	*PractiCalc* (Micro Software International)	–
5	*Money Manager* (Timeworks)	5
6	*Electronic Checkbook* (Timeworks)	–
7	*Household Finance* (Creative)	7
8	*PaperClip* (Batteries Included)	–
9	*TOTL.Text* (TOTL)	6
10	*Turtle Graphics* (HesWare)	2
11	*M File* (M Soft)	–

Commodore 64 Educational

This Month		Last Month
1	*KinderComp* (Spinnaker)	–
2	*Touch Typing Tutor* (Taylormade)	–
3	*Up For Grabs* (Spinnaker)	–
4	*Facemaker* (Spinnaker)	1
5	*Primary Math Tutor* (CommData)	–
6	*Alphabet Zoo* (Spinnaker)	–
7	*Typing Tutor* (Academy)	–
8	*Hey Diddle Diddle* (Spinnaker)	–

VIC-20 Entertainment

This Month		Last Month
1	*Gridrunner* (HesWare)	1
2	*Choplifter* (Creative)	6
3	*Shamus* (HesWare)	–
4	*Temple of Apshai* (HesWare)	–
5	*Kongo Kong* (Victory)	–
6	*Paratrooper* (Computer Mat)	–
7	*Exterminator* (Nüfekop)	–
8	*Robbers of the Lost Tomb* (Timeworks)	–
9	*Predator* (HesWare)	–
10	*Amok* (UMI)	2

VIC-20 Home/Business/Utility

This Month		Last Month
1	*Quick Brown Fox* (Quick Brown Fox)	1
2	*Turtle Graphics* (HesWare)	–
3	*HES Writer* (HesWare)	2
4	*HES Mon* (HesWare)	3
5	*Household Finance* (Creative)	5
6	*Home Office* (Creative)	–
7	*VIC Forth* (HesWare)	–

VIC-20 Educational

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

Best Of The 1983 Best Sellers

In the five months that HOTWARE has been tracking the software industry for Commodore 64 and VIC-20 computers, some programs have consistently won high positions. Here's a look at those programs and at the new structure this market is beginning to develop.

Commodore 64 Entertainment

First Place: *Jumpman* (Epyx)

December	1
November	1
October	1
September	1

Honorable Mention: *Temple of Apshai* (Epyx)

December	3
November	5
October	4
September	3
August	1

Commodore 64 Home/Business/Utility

First Place: *WordPro 3 Plus/64* (Professional)

December	1
November	1
October	1
September	1
August	3

Commodore 64 Educational

First Place: Spinnaker

December	1	(*KinderComp*)
	3	(*Up For Grabs*)
	4	(*Facemaker*)
	6	(*Alphabet Zoo*)
	8	(*Hey Diddle Diddle*)
November	1	(*Facemaker*)
	2	(*Kids On Keys*)
October	1	(*KinderComp*)
	2	(*Facemaker*)
	3	(*Hey Diddle Diddle*)
September	2	(*KinderComp*)
	3	(*Facemaker*)
	4	(*Hey Diddle Diddle*)

VIC-20 Entertainment

First Place: *Choplifter* (Creative)

December	2
November	6
October	1
September	1
August	1

Honorable Mention: *Gridrunner* (HesWare)

December	1
November	1
October	3
September	3
August	7

VIC-20 Home/Business/Utility

First Place: *Quick Brown Fox* (Quick Brown Fox)

December	1
November	1
October	8
August	1

VIC-20 Educational

First Place: *Touch Typing Tutor* (Taylormade)

December	1
November	2
October	2
September	3

Best Of The Best Sellers

Our year-end "Best Of The Best Sellers" is based on the last five months of 1983, not the entire year (HOTWARE debuted in August). It would have been difficult to rank Commodore 64 software before summer anyway, since there was not a great deal available.

Keep in mind that HOTWARE is based on actual unit sales figures obtained from participating retailers and distributors across the country. The rankings are not subject to editorial bias and do not represent a judgment of quality.

This month, we talked to some of the designers and distributors of these best sellers to find out why they think their programs have done so well, and what trends they see carrying over into 1984.

Divisions Of Labor

When a new industry emerges, its first products are usually conceived, manufactured, marketed, and sold by the same person or a small group of people. Eventually, when demand for the product becomes greater, its producers must take on more specialized jobs.

The software industry is beginning to develop that kind of structure. "It's not a cottage industry anymore," says Jim Connelley, a game designer for The Connelley Group in Mountain View, California.

NEW EXCITEMENT FOR COMMODORE 64*

J-Bird™

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

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

Ask for J-BIRD at your local computer store.

ORION SOFTWARE

© 1983 ORION SOFTWARE, INC. All rights reserved.

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

For your nearest dealer, or to order direct call: **1-800-821-8088.**

To order by mail send $29.95 for J-BIRD to: ORION SOFTWARE, P.O. BOX 2488, Dept. 1283, Auburn, Alabama 36831

MasterCard VISA

The Connelley Group is a good example of this evolution. Connelley founded Epyx Software a few years ago to produce and market microcomputer software. *Temple of Apshai* was one of those programs. "But as the company grew, I found I had little time left for product development," says Connelley. "The people who started the industry had to do a little bit of everything."

Now, Connelley and nine other game designers work in a think-tank type of environment. They spend their time conceptualizing and designing games for several different software publishers. They *don't* spend their time in marketing. Or sales. Or production. Just designing.

"The corporate environment is different from the think tank. We're trying to create a very creative environment here," explains Connelley. "The industry is moving toward a structure where there are advantages to separating authors from publishers. It almost had to happen."

Going It Alone

The new division of labor Connelley refers to is becoming more evident in the structure of many major software houses.

An exception to what is fast becoming the rule is Taylormade Software. Its *Touch Typing Tutor* has enjoyed a good deal of success; both the VIC-20 and Commodore 64 versions have held high positions on the HOTWARE list for the last several months.

Taylormade is not your typical East or West Coast software company. It's located in the Midwest — Lincoln, Nebraska — and it's basically a one-person operation: Marion Taylor, who has been programming computers for 28 years. "It's nice to know that one person can still do it alone," she says.

It might seem a bit strange that a typing tutorial would outsell programs dealing with more traditional educational subjects. Taylor thinks it makes a lot of sense. "One of the most popular uses of home computers is word processing," she notes. "Before you can do that, you have to learn to type. In fact, anything you use a computer for requires some knowledge of the keyboard."

Taylor attributes the success of her particular typing program to its wide age appeal and lesson-type format. "*Touch Typing Tutor* appeals to people from eight to 80," she says. "Its 19 lessons make use of color and an actual keyboard display to help teach you not to look at the keyboard while you're typing. And it's not a game — educational programs don't have to be game-like to appeal to people."

More Depth

Jumpman, which didn't even appear in August HOTWARE, leaped to the Number 1 position in September and has remained there ever since.

Randy Glover, who designed this best-selling game for Epyx Software, believes he knows why it's been such a success: "Depth of play. Some games look real nice and are fun for a while, but they don't ever really change. *Jumpman's* many levels provide great playability."

We awarded an Honorable Mention in the Commodore 64 entertainment category to *Temple of Apshai*, another Epyx game. *Temple* is a graphics/text adventure that requires great player involvement.

"It's a one-of-a-kind game," explains Glover. "It gets you very involved with your character, and you want to succeed with it. It also has a very long play time."

Glover believes the next year will see greater popularity for games which involve a lot more time and thought.

In addition, the more powerful personal computers, such as the Commodore 64, can support more complex programs. "A computer with 64K memory and a disk drive allows you to store and retrieve an enormous number of situations, like those in *Temple*," says Glover. "We will continue to make both kinds of games — arcade games and those with more depth — as long as people want them."

Other Trends

Here are some more trends that seem to be developing in the volatile Commodore software market:

- Full-line software houses. Many companies that started out publishing only one kind of software, such as games, are starting to branch out and find success in other areas. HesWare, Creative Software, and Sirius Software are examples of this.
- Commodore dealers are finding it increasingly difficult to compete with mass retailers and discount stores selling Commodore hardware and software at very low prices. Some dealers have stopped stocking the line entirely and have gone back to concentrating on business systems; some are trying to stay in the market by providing more service and support to customers.
- Competition is really heating up in the area of word processing packages. A large percentage of computer owners want to use their machines for word processing, and there are plenty of good programs available. Expect to see the best-selling programs in this area scramble as new ones enter the market.
- Software manufacturers are still trying to determine the most popular format for their products: disk, tape, or cartridge. Disks seem to be preferable — retailers are surprised at the tremendous number of Commodore owners who are adding disk drives to their systems.

The Inner World Of Computers

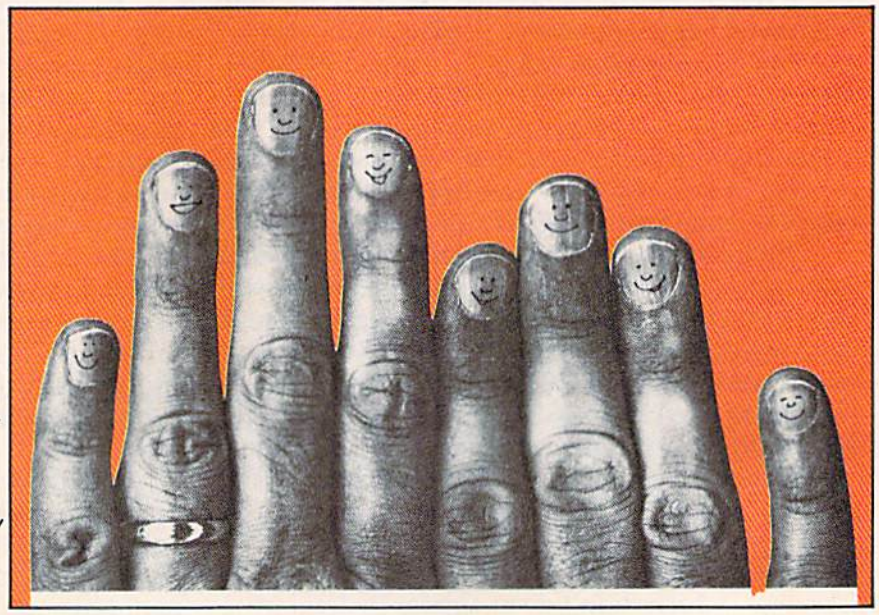
Part 2: Why Computers Are Logical

Tom Prendergast

Do you ever wonder what happens after you type RUN? What goes on inside the computer? How a machine can "think" just by manipulating numbers? This series shows how computers work by explaining computer math in a nontechnical way. It's especially recommended for those who are following our monthly column "Machine Language For Beginners."

We got some flak on last month's article telling about the magic patterns used by the little ELFS (ELectronic FingerS) to set tiny electronic switches inside the computer. The big complaint was that we didn't show any proof for the existence of the ELFS—just a drawing.

Sorry about that. Like all magical folk, ELFS are invisible, and we had to draw on our imagination. To the best of our knowledge, no one had ever seen an ELF, but just as we were about to give up hope of ever being able to present any hard scientific evidence, we got a nice long letter from an ELF thanking us for giving her family this long-delayed recognition. She enclosed a photo taken at a recent family picnic and the letter was signed "Anne Elf," so it must be authentic. We can't reproduce the letter because it was written in invisible ink, but the picture should give you a pretty good idea of what real ELFS look like.



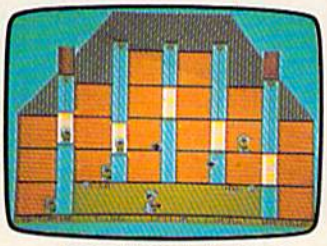
Rare photograph of ELFS gathered for a byte at family picnic.

First Star Has 4 New Games.

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

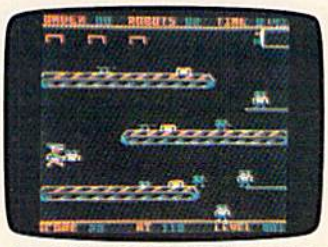
THE BAD NEWS? You can't play them all at once.

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



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

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



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

Atari, Vic-20 and TRS-80 Color are the registered trademarks of Atari, Inc., Commodore Business Machines, Inc., and Tandy Corporation respectively. Astro Chase, Bristles starring Peter the Painter, Flip and Flop, Panic Button, Boing!, are trademarks of First Star Software, Inc. Printed in USA. All rights reserved. © 1982 First Star Software, Inc.

FIRST STAR SOFTWARE INC

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

Another complaint was that the "magic patterns" we showed were nothing but sugar-coated binary.

OK, we admit that. We never said we weren't trying to teach you binary. But whether you want to call them magic patterns or binary patterns, the more you know about how the tiny electronic switches are turned on and off inside your computer, the better you'll be able to understand how a computer "thinks."

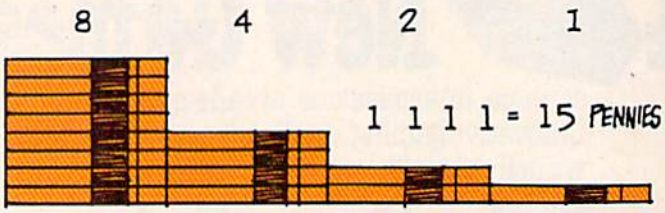
Years ago when computers were the size of a barn and had big banks of switches in front instead of a keyboard, the operators had to plan how to turn all those switches ON or OFF at various times while the computer was running. Finally, some genius—probably John Atanasoff—noticed that the little marks they'd jotted down for the different switch settings resembled binary, and presto!—computer programming was born.

Computers have shrunk a lot in size since then, but how a computer computes hasn't changed. You may think your VIC or 64 is adding 2+2, but the little ELFS inside are turning tiny microswitches ON and OFF like this:

Switch Patterns:	Off	Off	On	Off
	+Off	Off	On	Off
Binary =	0	1	0	0

If you worked with the "15-cent computer" last month (15 pennies in piles of 8,4,2, and 1) you'll know that 0100 is 4 (decimal) in binary.

Figure 1: The "15-Cent Computer"



The "8421 code" as it's sometimes called is enough to represent 16 different switch patterns (if you count 0000 as one of the patterns):

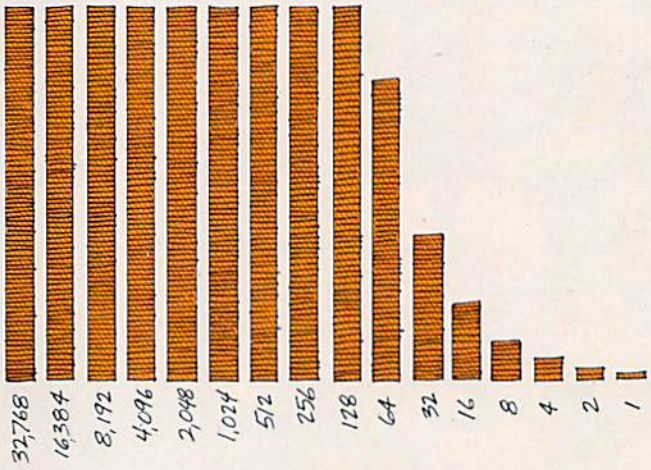
0000
0001
0010
0011
0100
0101
0110
0111
1000
1001
1010
1011
1100
1101
1110
1111

The VIC's color ROM uses these kinds of four-bit *nybbles*, and BCD (Binary Coded Decimal), which I won't confuse you with this month, uses *pairs* of nybbles, as does hexidecimal.

But the VIC and 64 use 16 bits for the AND, OR, and NOT operations we're going to show you. What are we going to do?

We could extend the penny idea to 16 places, but that would cost us $655.35—65,535 pennies, to be exact—because binary values double like rabbits every step to the left. We'd have 32,768 pennies in our leftmost pile, 16,384 in the next, and so on.

Figure 2: Pile Of 65,535 Pennies

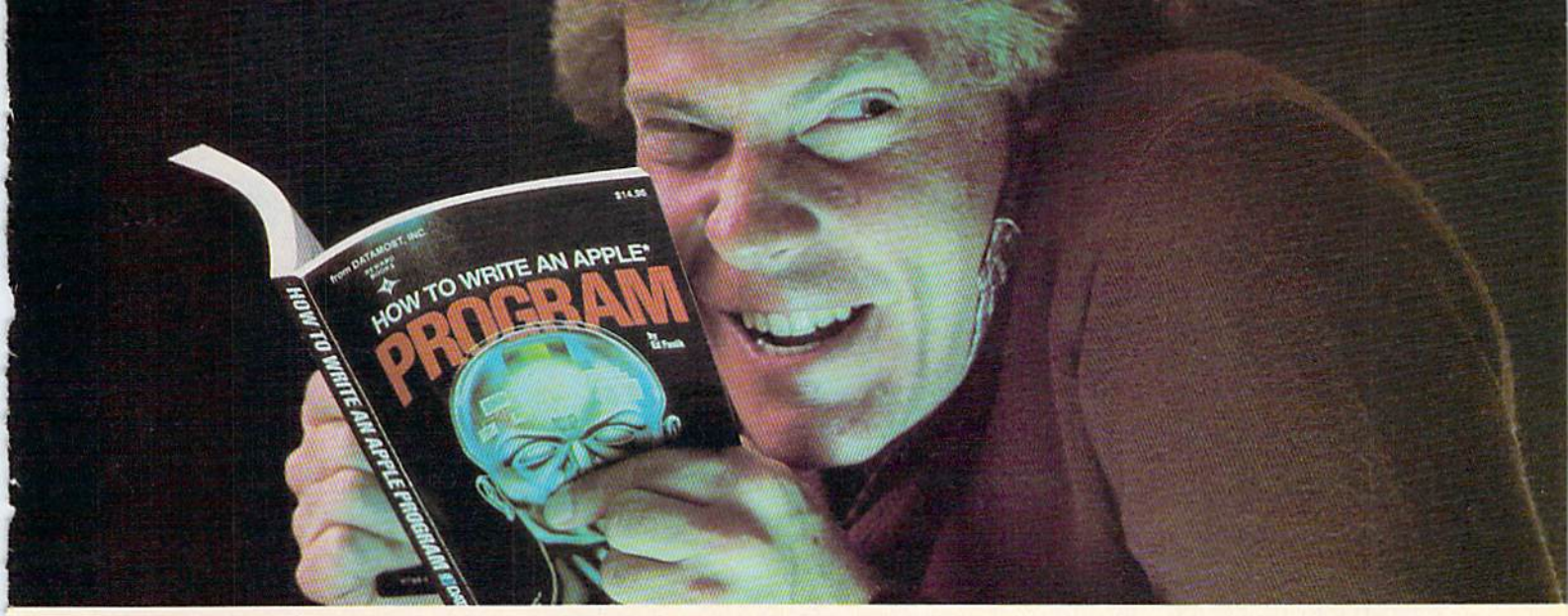


Fortunately, pennies are binary (all coins are, because they have two sides). If we agree that heads means ON and tails means OFF, flipping a penny over turns that particular switch ON or OFF. Let's begin with eight pennies because a BYTE (BinarY uniTs of Eight) is enough to demonstrate most of the patterns we're going to AND and OR (see Figure 3).

Notice that we've called 10000000 a pattern and not a binary number. Computers don't understand numbers, remember? Not even binary. And when you AND, OR, or NOT, you manipulate the individual bits—with no carries or borrowing—because AND, OR, and NOT aren't arithmetical operations.

The trouble with most computer books and manuals is that they throw binary and other complicated stuff at you before you're ready for it—things like "truth tables" and those weird diagrams of "logic gates" with arrows pointing every which way.

Take this, for instance, from the manual for the PET (it's repeated almost word-for-word in the *VIC-20 Programmer's Reference Guide*—so they must think it's a pretty good explanation). Actually, it's a very clear technical explanation, but that's the trouble—it's too technical. I'm a couple



Outsmart your computer.

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

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

All our books are incredibly easy to understand.

Which will make it incredibly easy to understand your computer.

What If You're Scared Of Books About Computers?

Don't be.

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

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

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

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

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

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

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

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

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

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

How To Get The Most Out Of Your Computer.

Get the most out of our minds.

Datamost books for every computer.

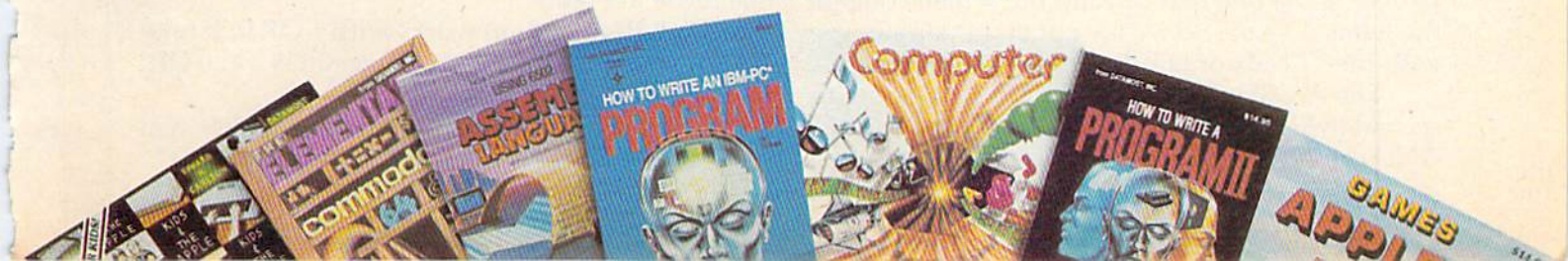
Everybody. Every level.

Pretty smart, huh?

DATAMOST™ INC

The most out of our minds.™

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



of years into computing and on my third computer, but I didn't have the haziest idea of what they were driving at until recently:

"Logical operators work by converting their operands to 16-bit, signed, two's-complement integers... The given operation is performed on these integers in bitwise fashion, i.e., each bit of the result is determined by the corresponding bits in the two operands.

"Thus, it is possible to use logical operators to test bytes for a particular bit pattern. For instance, the AND operator may be used to 'mask' all but one of the bits of a status byte...the OR operator may be used to 'merge' two bytes to create a particular binary value...and the NOT operator to form the two's complement of the bits of an integer plus one."

All right, so I knew that NOT, AND, and OR are *logical operators* — although sometimes they seem as logical as Alice in Wonderland. (*Alice in Wonderland*, by the way, was written by an English mathematician who was using Boolean logic long before computers were invented.) The *arithmetical operators* are +, *, −, and /, the signs for addition, multiplication, subtraction, and division; and the binary being operated on by the logical or arithmetical operators are the *operands*.

Figure 3: A Byte With One Bit Switched On

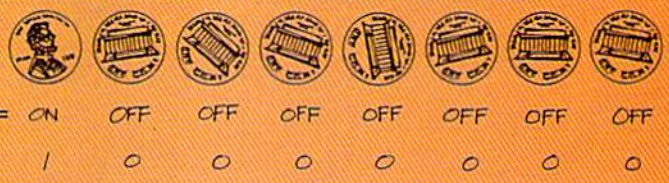


Figure 4: A Byte Holding The Screen Code For Letter A (65)

Figure 5: 65 AND 128 = 0

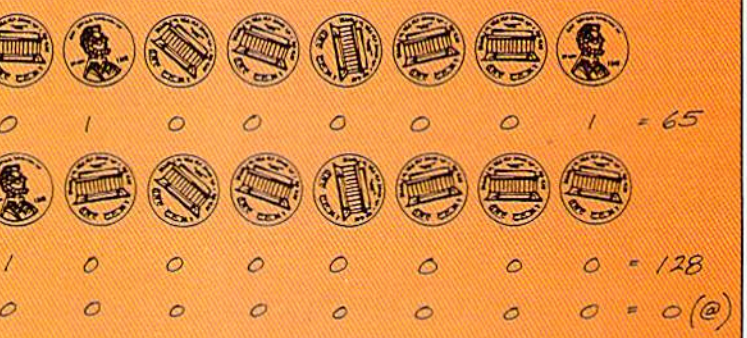
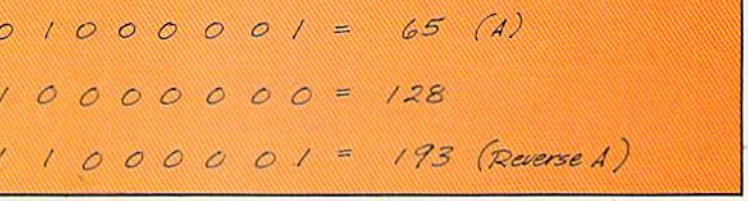


Figure 6: 65 OR 128 = 193



But here you are wading through all this "16-bit, two's-complement" stuff when all you wanted to find out was how a simple game program works! A line like this, for instance,

```
POKE 7724, PEEK(7724) AND 128
```

is an example of the *bit masking* they were talking about, so let's work through it bit by bit. The POKE 7724, PEEK(7724) is to read the pattern currently stored in the VIC's screen RAM at memory address 7724, and not the number 7724 itself. Let's say the pattern is the one that calls up the screen code for the letter A — 65. So we lay out eight pennies with their heads or tails like those in Figure 4.

The A will be ANDed with 128 so we put our second byte of eight pennies like those in Figure 5. AND is interested only in matching 1's and it ignores everything else. As you can see, no 1 in the top byte matches the lonesome 1 on the bottom, so the little ELFS switched every bit off—to zero. The letter A turns into the screen code for an "at" symbol: @.

An easy way to remember how the AND operation works is to think of all the straight lines making up the letters in AND as 1's, so that 1 AND 1 produces 1.

The OR operation on the letter A would look like those in Figure 6.

The OR operation works with 1 OR 0. If one bit is a 1, or both bits are 1, the result is a 1. 0 OR 0 results in 0.

By the way, don't confuse the inequality symbol <> with NOT. A line like "IF X<>15 THEN..."

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

It'll take about 30 seconds.

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

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

Our Music Will Have You Hearing Things.

Going out of your mind never sounded so good.

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

Our Graphics Will Have You Seeing Things.

You and everybody else.

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

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

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

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

We'll Torment You Right From The Start.

No time to settle down and get comfy.

The tension begins building the moment you boot the game.

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

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

What the fuss is all about.

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

By getting the most out of ours.

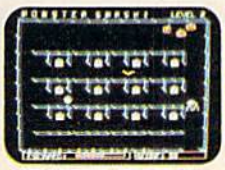
DATAMOST™ INC

The most out of our minds.™

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

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

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

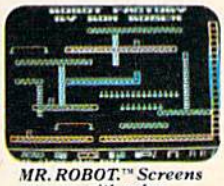


MONSTER SMASH.™ Deathly strategy. Mash the monsters! Let the visitors live.

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

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

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



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

should be read as "If X isn't equal to 15 then...."

NOT reverses every bit in a byte to its opposite. NOT 1 produces a 0, NOT 0 produces a 1. To put it simply, if you NOT 128, you flip every switch ON that was OFF, and every switch OFF that was ON:

NOT 10000000
Result: 1111111101111111

What's not so simple is that you end up with a minus result (−129) because, as it says in the manual, logical operators convert their operands to "16-bit, signed integers" and the 16th bit on the left does double-duty as a "sign" bit. A zero in that slot indicates that the number is positive, and a one indicates it's negative. This can get you into a whale of a lot of trouble if you're not careful, because you'll end up with an ILLEGAL QUANTITY ERROR.

NOT is useful to undo something you've done when combined with AND, as in: AND NOT 128. But you're probably confused enough as it is, so rather than go into the whys and wherefores of this, let's get to the keyboard and try a simple program demonstrating OR, AND, and AND NOT. Use Program 1 for the VIC and Program 2 for the Commodore 64.

(Note: If you've added memory to your VIC, the following line should be substituted for line 5:

5 PRINT CHR$(147):SC=4*(PEEK(36866)AND 128)

This relocates the start of screen memory, 7680 on the unexpanded VIC.)

Program 1: VIC Version

```
5 PRINTCHR$(147);:SC=7680          :rem 205
10 PRINT"{RVS}{RED}AMERICA THE BEAUTIFUL"
                                   :rem 212
20 FOR DELAY=1TO2000:NEXT           :rem 4
30 FOR I=1TO4:PRINT"{BLU}******{RED}
   {16 SPACES}{BLU}******":NEXT   :rem 174
40 FOR I=1TO7:PRINT"{RED}{22 SPACES}{WHT}
   :NEXT:FOR DELAY=1 TO 2000:NEXT :rem 59
50 FOR I=0TO285:POKESC+I,PEEK(SC+I)OR128:
   NEXT                            :rem 24
70 FOR I=0TO285:POKE SC+I,PEEK(SC+I)AND N
   OT 128:NEXT                     :rem 61
80 GOTO5                           :rem 214
```

Program 2: 64 Version

```
5 PRINTCHR$(147);:SC=1024:POKE53281,1
                                   :rem 136
10 PRINT"{RVS}{RED}AMERICA THE BEAUTIFUL"
                                   :rem 212
20 FOR DELAY=1TO2000:NEXT            :rem 4
30 FOR I=1TO4:PRINT"{BLU}******{RED}
   {34 SPACES}{BLU}******":NEXT   :rem 174
40 FOR I=1TO7:PRINT"{RED}{40 SPACES}{WHT}
   "                               :rem 8
45 NEXT:FOR DELAY=1 TO 2000:NEXT :rem 132
50 FOR I=0TO519:POKESC+I,PEEK(SC+I)OR128:
   NEXT                            :rem 24
70 FOR I=0TO519:POKE SC+I,PEEK(SC+I)AND N
   OT 128:NEXT                     :rem 61
80 GOTO5                           :rem 214
```

Lines 5 to 40 set up the title AMERICA THE BEAUTIFUL and the stars and stripes for the flag. Notice that the stars, however, are not reversed; they're blue stars on a white background. (The DELAY loop at the end of line 40 gives you time to observe this.)

Now the OR in line 50 reverses the stars to white on a blue background. Line 60 starts with a REM statement, so the ELFS ignore the instructions for the moment and jump to line 70, where the AND NOT undoes what the OR in line 50 did—reverses the reverses—and line 80 sends the program back to the beginning.

After you've run the program for a few minutes, hit the RUN/STOP and RESTORE keys. This interrupts the program. Now type LIST 60. When line 60 appears, put the cursor on the F in FOR and press the INST/DEL key four times to delete the REM. After you've hit RETURN to register the line change in program memory, type RUN and RETURN.

When the program is running this time, line 60 is not ignored, so the AND in line 60 changes the POKE value of every character or graphic that's been printed to zero, producing the symbol @ where stars or stripes were before.

Using AND or OR with word strings is limited pretty much to an either/or type of operation. If you have a line such as IF Y$="YES" OR Y$="Y" THEN, either the full word or just the first letter of "YES" would be an acceptable input and the program would carry out whatever follows the THEN.

If the line were IF Y$="YES" AND X=1, both statements would have to be true for the program to proceed.

The computer can evaluate any expression and return a number. For example, the expression 5<4 will give a zero (try PRINT 5<4). The expression 5>4 is true, and is equivalent to −1. You can embed an expression within a calculation to make use of the 0 or −1. For example:

$$V = (J+1) * -(J<2)$$

If the variable J was equal to 3 at this point in the program, the resulting arithmetic would be:

$$V = (3+1) * -(3<2)$$
or
$$V = (4) * -(0)$$
or
$$V = 0$$

If J equaled 1, the arithmetic would be:

$$V = (1+1) * -(1<2)$$
or
$$V = (2) * -(-1)$$
or
$$V = 2$$

See you next month with more about ELFSwitches and hexadecimal.

Commodore® owners:
"THE FUTURE IS HERE . . ."

Dealer And Distributor Inquiries Invited

Will your printer interface pass the Commodore® printer test? We don't think so!! Ours will.

The CONNECTION™ is truly the ultimate parallel interface for the VIC20™/COMMODORE 64™. This fully intelligent interface plugs into the disk (serial) socket just like the standard printer and you can easily assign it any device number. It will provide virtually TOTAL EMULATION of the Commodore® printer including all standard graphic characters (normal or inverse), column tabbing, dot tabbing, graphic repeat, dot addressable graphics, cursor up/down mode, and more. It responds to all of the standard commands (PRINT#, OPEN, CLOSE, etc.) to insure software designed for the Commodore® printer will operate with the CONNECTION™. In the TOTAL TEXT MODE, it will work with virtually EVERY PARALLEL PRINTER with standard Centronics configuration. All this plus:

1) A 2K Printer buffer
2) Full LED Status indicators.
3) Complete Built in self test
4) Printer reset switch
5) Adds Skip over perf, margin set, programmable line length, program list format commands to your printer.
6) No need for extra cost, special tape loader for graphics.
7) All features easily accessed from software
8) ASCII conversion, TOTAL TEXT, EMULATE, and TRANSPARENT Modes

To take full advantage of your printer's special features, please specify the printer type. Available for STAR MICRONICS, STX80, EPSON, OKI, NEC, PROWRITER, BANANA, SEIKOSHA, RITEMAN, GEMINI10X and others. ONLY $119.00 Complete (Additional ROMs are available if you should ever change printers)

MasterCard VISA

NOTE: We solicit hardware and software items for the VIC20 & CBM64. Royalties, license fees, or outright purchases can be negotiated. Commodore & VIC20 are trademarks of Commodore Business Machines.

micro WARE D 1342B RT 23
BUTLER, NJ 07405 201-838-9027

TYMAC SAYS,
"We'll Pay For Your Mistake"*

That's right, by providing you with a $50 credit toward our Connection™ interface. After receiving thousands of calls that asked "BUT WHAT DO WE DO WITH OUR OLD ONE?", we now have the answer. Send in your old interface plus a good reason why you want ours, and we will send you the Connection (LIST $119 less $50 Credit) for $69.00. This is strictly a one time offer and TYMAC CONTROLS CORP may WITHDRAW it at any time. It is only for END USERS that are dissatisfied with their interface and is invalid to all DEALERS and DISTRIBUTORS. Offer good only in the USA until 1/84. Offer void where prohibited or taxed. Connections sent prepaid MASTERCARD, VISA, or COD, plus shipping and handling. Send old boards to TYMAC OFFER, BOX 31, RIVERDALE, NJ 07457

**Payment is in the form of credit toward purchase.*

Getting Started With A Disk Drive

Part 2: First Steps

Charles Brannon, Program Editor

After a brief discussion of why you should make backup copies of important disks — and why some disks cannot be copied — we'll show you exactly how to get started with your new 1541 disk drive.

Last month, we discussed why it is so important to make backup copies of your disks. Since a disk can hold so much information — more than 170,000 characters — you have a lot to lose if something happens to the disk. You'll always want to make a working copy of an application program such as a word processor. You can then put the original disk (sometimes called the *system master*) in a safe place, secure in the knowledge that if anything goes wrong with the working copy, you still have your original disk.

This seems such an obvious, necessary procedure that many people rightly wonder why most software companies copy-protect their disks.

Software companies feel that they must copy-protect their disks to prevent illegal copies. They have reason to worry. They can lose considerable potential profit if people use copies of programs without paying for them.

In the past, the work of a craftsman was valuable because it was tangible and unique. It could not easily be copied by someone of lesser talent. But nowadays, computers are the equivalent of a "matter photocopier." How could you put a price on an automobile if you could make a copy of it one atom at a time, with energy as your only ingredient? Fantastic as it sounds, we are already at this stage with information. The so-called original program is no more valuable than its duplicate. The only difference between a blank disk and a $150 word processor is a phantom organization of magnetic fields on a three-dollar disk.

With software so easy to copy, it is hard to prevent piracy. The disk drive is designed to translate the patterns on a diskette into numbers that the computer can use. Copy protection allows this transfer, but also attempts to prevent you from reading the disk outside of the application. The methods used are as complex as the drive allows, but are usually quite effective in preventing a casual LOAD/SAVE or file copy. Unfortunately, sometimes the copy protection is so sensitive that even the original copy will not run if your disk drive is slightly out of alignment.

Companies must protect their software, but what about the individual who needs a backup copy? Many companies offer a replacement diskette if the original goes bad. Unfortunately, if the product becomes as indispensable to you as their ads claim it will, how can you tolerate the weeks it might take to replace the program?

Ideally, every computer could have a software-readable serial number. When you first used the program, it would check your serial number

SCRIPT 64

SCRIPT 64™ Makes Your World Letter Perfect

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

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

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

Developed by:

RTC

Richvale Telecommunications, LTD.

A Product of:

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

Distributed by:

Warehouse 1, Inc.
Eastern U.S. 800-253-5330
Western 800-255-0056

Computer Marketing Services, Inc.
800-222-0585

DES-Data Equipment Supply
213-923-9361

Also available for the IBM-PC.

Script 64, Commodore 64 and IBM-PC are registered trademarks of Richvale Communications LTD., Commodore Electronics Limited, and International Business Machines, Corp. respectively.

and offer to copy itself to a work disk. Anyone trying to use one of these copies on another computer would find that their serial number didn't match, and the program would not run. But mass-producing computers with individual serial numbers isn't very practical.

Perhaps the best solution is already in use. The software comes with a key that you must plug into your computer in some manner. On the VIC and 64, the key usually plugs into a joystick port, if unused, or into the cassette port. Other keys can be ROM chips that must be installed in expansion slots. The software will not run without the key installed, but you can make as many copies of the program as you want.

Selling software on cartridge is a similar, though more expensive approach to copy protection. Few people have the expertise to copy a cartridge.

The controversy is still raging, but your rights in the latest copyright law are clear. You have the right to a backup copy as long as you observe a few conditions: that the backup is part of an essential procedure in using the application and is used in no other way; that the copy is used solely for archival purposes; and that if you cease to own the right to use the program, you will destroy any archival copies.

If this is your first experience with a disk drive, you'll have to learn to treat it more carefully than the more rugged cassette recorder you're probably used to. Disk drives are delicate precision instruments.

Treat your drive very carefully when you bring it home (or anytime you move it). Do not subject it to jostling, bumps, or excessive vibrations. Any jar or shock can force your drive out of alignment, and it will have to be carefully readjusted by a service technician.

You should be sure to buy a box of blank disks, which should cost you about $30. Included with the drive are: a pencil-thick cable to attach the drive to your computer, a detachable power cord, a user's manual, and a demonstration disk. You may want to look at the demonstration disk and even run the disk performance test program, but the manual isn't very helpful on this for the novice. So before you do anything, read the rest of this article. The text is divided into levels of sophistication, so you can use your disk drive to whatever degree you want.

If you have no experience at all with disk drives, the first thing you'll want to learn is how to load programs.

Right away, you may buy software, such as games or a word processor. Properly documented software will have easy, step-by-step LOAD and RUN procedures. Usually, you just have to enter:

```
LOAD "*",8
```

The red disk drive light comes on, the drive spins, and if everything works OK, the screen says READY. Now type RUN.

The LOAD command you typed instructed the disk drive (an intelligent device) to search for and retrieve the first program on the disk. The use of the asterisk will be explained below.

Sometimes, you will need to give a specific filename to run the program, such as LOAD "BOOT",8 or LOAD "GAME",8. Also, you may not need to enter RUN, since some programs automatically RUN when they are loaded.

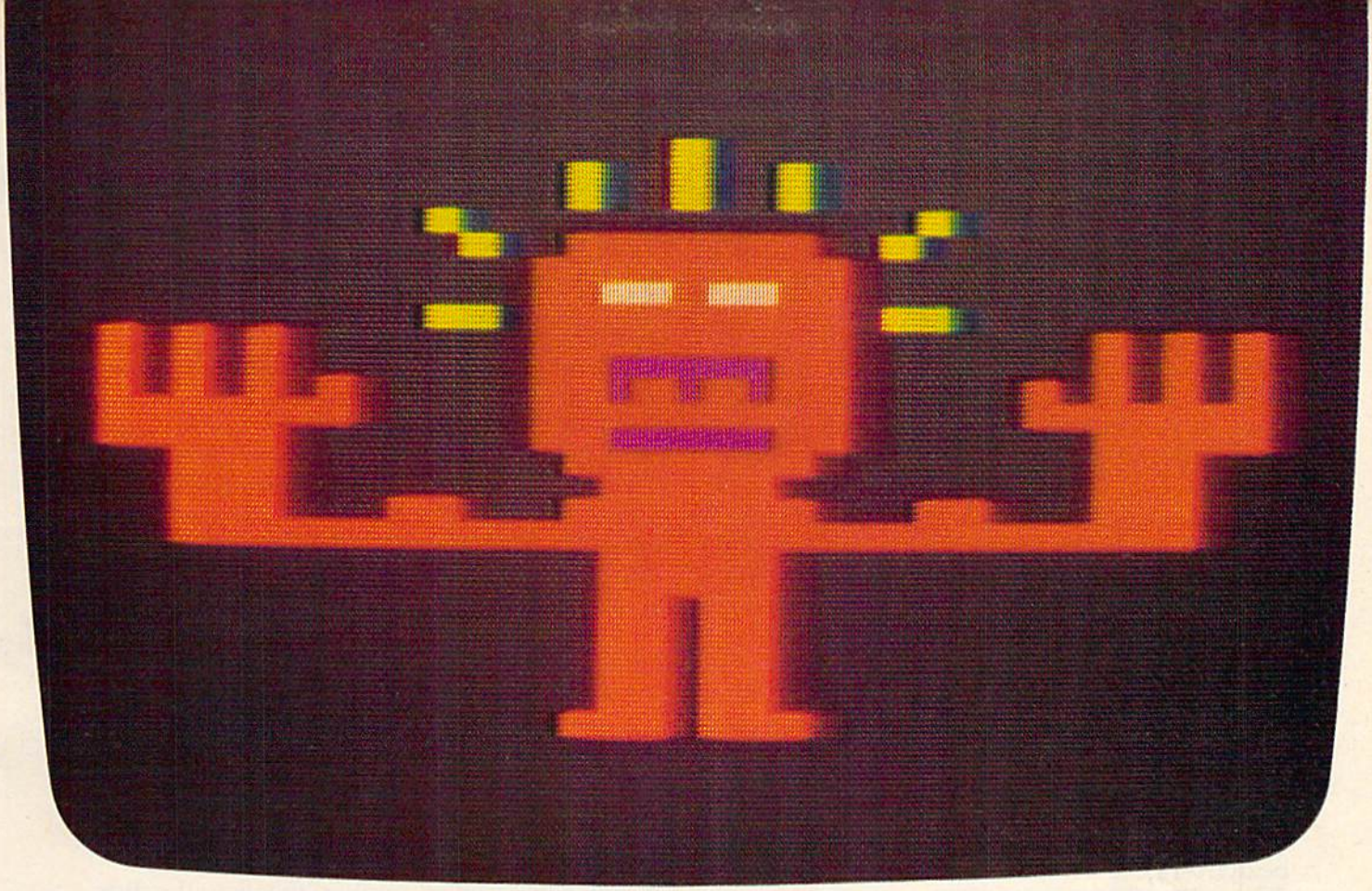
If you've followed the instructions explicitly, and the program still won't load, you need to check for errors. The red error light may be blinking. If you would like to check out the error, enter this one line program and RUN. The error message may seem cryptic, but it might help. We'll talk about the error messages later.

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

If you get an error, try to correct it. Make sure that the disk drive is powered and properly connected. Check to see you have the disk inserted properly (see photo), that the right disk is inserted, that the door closes smoothly, etc.

The proper way to insert a floppy diskette — holding it by the edge (face up with the notch on the left) and sliding it into the slot.

If you fail despite your efforts, the diskette itself may be damaged, or it may be incompatible with your disk drive (every drive is slightly different in terms of speed and alignment). Most companies will replace your disk. However, don't return the flashlight just because the batteries are dead. Make sure that the error is not yours. You'll learn more about the disk system as you read this article, so you may get some insights.



WOULD YOU SHELL OUT $1000 TO MATCH WITS WITH THIS?

MEET YOUR MATCH. MEET INFOCOM GAMES—PERHAPS THE BEST REASON IN SOFTWARE FOR OWNING A PERSONAL COMPUTER.

In fact, people have been known to purchase computers and disk drives solely for the purpose of playing our games. And they haven't been disappointed. Because Infocom's prose stimulates your imagination to a degree nothing else in software approaches. Instead of putting funny little creatures on your screen, we put you inside our stories. And we confront you with startlingly realistic environments alive with situations, personalities, and logical puzzles the like of which you won't find elsewhere. The secret? We've found the way to plug our prose right into your imagination, and catapult you into a whole new dimension.

If you think such an extraordinary experience is worth having, you're not alone. Everything we've ever written—ZORK® I, II, and III, DEADLINE,™ STARCROSS,™ and SUSPENDED™—has become an instant best-seller. For the simple reason that Infocom offers you something as rare and valuable as anything in software—real entertainment.

At last, you can fritter away your evenings playing a computer game without feeling like you're frittering away your computer investment.

Step up to Infocom. All words. No pictures. 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, CP/M 8, DEC Rainbow, DEC RT-11, IBM, NEC APC, NEC PC-8000, Osborne 1, TI Professional, TRS-80 Model I, TRS-80 Model III.

Loading programs is a one-way street. The real value of a disk drive is that it can hold volumes of *your* information, not just prepared material. The disk drive is a mass-storage device. Like RAM memory, you can read and write to it. The disk is slower than RAM, but is usually larger (170K versus 3.5K on a VIC!).

If you read last month's installment, you'll remember that the simplest access is at the sector level. You can read and write blocks of 254 characters. It's as difficult as it sounds, but fortunately, you should never have to use the disk at such a primitive level. Instead, your computer and disk drive work together as a team to let you create *files*.

A file is a hunk of information, not restricted to 254 characters. It's just a long sequence of numbers. Files can also hold characters, since characters can be represented by numbers, too. A file might be a program, a list, a letter you typed on a word processor, or just raw data. Every file has a name, so to access the file, you just give the disk drive its *file name*.

A filename can be almost any sequence of characters, including the alphabet, graphics characters, punctuation, etc. The filename can be up to 16 characters long. These are valid filenames: "PROOFREADER", "3D DEMO", "SUPERCHASE!", "DDOUBLE TTAKE". Some characters are reserved, such as the asterisk and the question mark. These are used as *wild cards*.

The question mark is used like the joker is in some card games. When searching for the filename on the disk, the disk drive compares the name you give it character by character with all the names on the disk. The question mark lets you allow for some ambiguity. If you are not sure about the filename, for example, you can substitute question marks for the characters you're not sure about. If you think the name might be "TRIX" or "TRIP", you can use the filename "TRI?". If you are searching for something like "HAPPY FACE" or "NAPPY-PACE" you can use "?APPY??ACE". In practice, the question mark isn't all that useful, as these contrived examples show.

Far more useful is the asterisk. It lets you leave off characters. For example, "BAS*" will match with "BASIC AID", "BASEBALL", "BASH", etc. The asterisk alone will match with anything, which is why you use it to load the first program on the disk, since the asterisk will match with the first thing it finds. Incidentally, the asterisk alone will also find the filename most recently accessed, not just the first file the disk finds. We'll talk about other variations on filenames later.

Before you can write to a disk for the first time, you must *format* it. Some application programs (such as word processors) let you do this from within the application, but you will usually do this from BASIC.

A blank disk straight out of the box is not ready for your disk drive. The disk drive does not know where to find the tracks and sectors, since the diskette is just a circular piece of magnetic-coated material. The disk drive must organize the disk into tracks and sectors by writing timing information all over it. This is in addition to whatever data you want to put on the disk. "Format" is the best description, but some people use the term NEW (as in wiping out a BASIC program), Header (like putting a title on a disk), or Initialize (prepare it for first use). Unfortunately, these terms also have other definitions, so they can be confusing. You should know what these people are talking about when they use the other terms, however.

To send commands to the disk, you have to open a *command channel*. Bear with us, because the procedures are very technical-looking. You can memorize what you need to know, but in future installments of this series, it will all become clear. To get ready, you need to enter:

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

This tells the computer you will use the number 15 (the first number) to talk to the disk drive, *device number* 8. The last number, also 15, is for the disk's sake. It tells the disk that the things you send it are commands, not data. All the commands are sent with the PRINT# statement (pronounced "PRINT-file"). Unlike the other BASIC PRINT command, you cannot use the question mark as an abbreviation for PRINT# (?# does not work). Instead, use P-SHIFT-R to abbreviate PRINT#. (For more information on abbreviations, see this month's "Horizons: 64.")

The format statement looks like this:

```
PRINT#15, "N:DISK NAME, ID"
```

The N stands for NEW, which is the word Commodore uses for format. You can even spell it out:

```
PRINT#15, "NEW:DISK NAME, ID"
```

This command completely erases a disk as it formats, so use it with caution. The colon (:) separates the command from the *parameters* that the command needs to function. The disk name uses the same format as the filename, and can be anything you choose. You should organize your disks. Don't just randomly place any file on any disk. Have a disk for games, a disk for utilities, a disk for your BASIC programs, a disk for your word processor, and so on. This makes it so much easier to find the right disk, and you might as well start organizing when you first get started. The disk name should describe what the disk will store.

Get the players' games from CDS!

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!

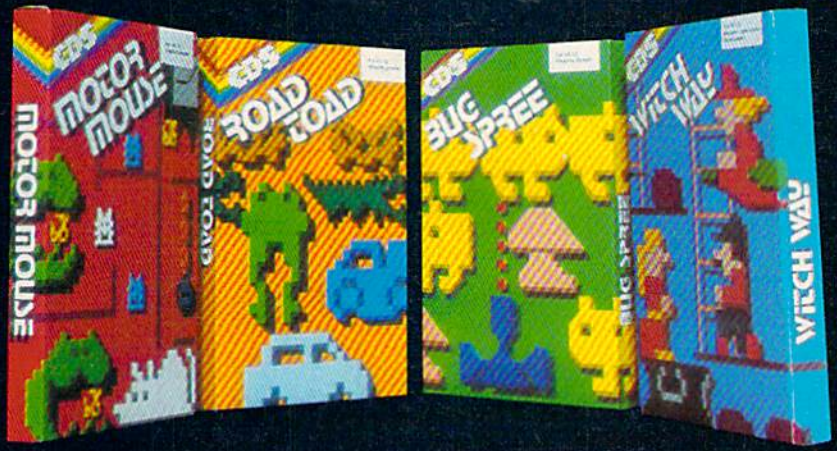
Can our hero make it across the freeway without getting that run-down feeling?

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!



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

VIC 20 and COMMODORE 64
Reg. trade mark of
Commodore Business machines.

The ID (identification) is a two-character code. It is not used like the disk name to organize your disks, but is primarily for the disk drive's sake. If every disk has a different ID code, the drive can detect if you've changed disks. This is very important for reliable operation. You can use unique IDs from 00-99 if you like, but you may want to pick them at random. *It is imperative that every disk have a unique ID number.* Ideally, none of your friend's disks should have the same ID numbers. In practice, just be careful. Don't be lax and call all your disks 01. We'll talk more about why the disks need to have unique IDs later, including how to read the ID from within your own programs.

There is an optional form of the NEW command that just lets you erase a disk. It doesn't format, it just wipes out a disk that was previously formatted. You can change the name if you want, but you can't change the ID without reformatting the disk. Just leave off the ID if you want to perform this erase function.

Now that the disk is ready to use, you may want to look at what's on it. Enter:

```
LOAD "$",8
```

When the computer comes back with READY, enter LIST. The *directory* (called a catalog on some systems) is a list of all the filenames. At the top of the list is the disk name and ID. To the left of each name is a number representing how many blocks of 254 characters the file uses. To get a rough estimate, divide the number by four to see how many kilobytes (K) the file uses. A 25-block program uses about 6K of disk space out of 170K.

To the right of each name is a three-character label, either PRG, SEQ, REL, or USR. These tell you what kind of file it is. You'll commonly see PRG (program) and SEQ (sequential or data) files. Again, we'll get into the distinctions when we talk about programming.

The last line of the directory tells you how many blocks are left on the disk. Divide by four to find how many kilobytes remain.

When you LIST the directory from a freshly NEWed disk, you'll see only the name and "664 BLOCKS FREE." If you divide it by four, you'll seem to have only 166K of storage. There is some overhead required by the disk drive. Naturally, the disk directory has to be stored somewhere. Other housekeeping information is also stored.

After you've formatted a disk, it's ready for you to store and retrieve programs and data. If you're ready to do this, enter a small program such as this:

```
10 PRINT "your name":GOTO 10
```

To copy the program from the computer to the disk, use the SAVE command. You may already be familiar with SAVE to tape. The only difference is that you add a comma and an eight to tell the computer that you want to SAVE to the disk drive (remember that the disk drive's device number is eight). Think of a filename. Remember to keep it under 16 characters and enter:

```
SAVE "0:file name",8
```

The "0:" is a new twist. It's a holdover from dual disk drives (two units in one case), where the first drive is numbered 0 and the second is numbered 1. You can leave out the "0:" and you won't get an error, but we've found it to be almost essential for reliable use. We can't go into detail here, but force yourself to remember the "0:" prefix and you won't be sorry.

Anyway, after you enter the SAVE command, the disk spins and the red light glows. This red LED is the busy light. Don't remove a disk while it is on or the computer won't get a chance to finish writing the file. If that happens, it never gets a chance to tie up loose ends, and the disk can be partially scrambled. This applies only to writing to a disk. There should be no problems if you remove a disk during a read or a LOAD.

After the red light goes out, the program is saved. If the light is blinking, something went wrong. You can use the short program we listed above to read the error, or just assume it's your mistake and try to figure out what you've done wrong.

Even if you don't get an error, you may want to confirm the SAVE. VERIFY is most useful with tape to insure that the program is properly saved, since the tape recorder cannot detect a write error during a SAVE. To VERIFY a disk SAVE, just add the ",8":

```
VERIFY "file name",8
```

VERIFY works similar to LOAD, but instead of going into memory, VERIFY compares with memory. When completed, VERIFY displays either OK (good news) or ?VERIFY ERROR (bad news).

You don't have to use the "0:" prefix with LOAD or VERIFY. You can use the asterisk wild card as a shortcut. Just VERIFY "*",8 to check the program you've just SAVEd to disk.

Now enter NEW, and LOAD the program into memory:

```
LOAD "file name",8
```

You don't have to use the "0:" prefix. If the file is not on the disk, or if you used the wrong name, or if there is a disk error, the computer displays "?FILE NOT FOUND." You may have to press the RUN/STOP key to get READY to come back. Attempt to find the cause of the error and try again. If necessary, LOAD "$",8 and LIST the

directory to get the right filename.

That's all for this month. Next issue we'll show how to simplify disk use with the DOS WEDGE and cover the other disk commands such as DELETE and RENAME. Until then, study your manual and see if some of it now makes more sense.

BYTES & PIECES

HOLIDAY SPECIALS!

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
Fast Eddie	D	34.95	24.86
Hesmon	X	39.95	28.56
Maxell Disks	D	55.00	29.50
Quick Brown Fox	D	64.95	46.56
Shamus	X	39.95	28.56
Story Machine	D	39.95	28.56
Suspended	D	49.95	35.96
Temple of Apshai	D,C	39.95	28.56
Zork 1,2, or 3	D	29.95	21.66
Vic 20			
K-Razy Patrol	X	39.95	28.56
Raid on Isram	C	19.95	14.26
Snake Byte	X	39.95	28.56
Swarm!	C	29.95	21.66
Turtle Graphics	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 $150 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
BYTES & PIECES (516) 751-2535
P.O. Box 525 Dept 10 • East Setauket, N.Y. 11733

MAILPRO 64
DATA ORGANIZER AND MAILING LIST PROGRAM FOR COMMODORE 64™

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.....$129.95
Also available for COMMODORE 8032 . . . $179.95
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 8
MISSISSAUGA, ONTARIO, CANADA, L4Y 4C5

TAX COMMAND

NOW YOUR COMMODORE OR VIC PUTS LINE-BY-LINE CONTROL OF TAX PREPARATION AT YOUR FINGER TIPS.

Calculations are automatic. All you do is enter your tax information. Tax Command does all mathematical calculations for you. **Built-in tax tables eliminate guesswork.** No more finding the right column down and right line across. Tax Command has the 1040 tax tables built right in. So it zeros in on your refund (or tax payment) amount automatically. **Tax Command is fast, easy!** It gives your computer more than just the 1040 tax form. Tax Command tells you when to income average, and has the forms you need. Plus Schedule A (Itemized Deductions, including medical), capital gains and losses, and more. Anyone who can read can use Tax Command. And the best feature of all . . . just $24.95 plus $2.00 for shipping and handling. Wisconsin residents add 5% tax. Specify computer type, tape or disk.

Practical Programs, Inc.

P.O. Box 93104-J • Milwaukee, WI 53203 • (414) 278-0829
Available at fine computer stores everywhere, or by ordering direct.

WHAT GOOD IS IT IF YOU CAN'T USE IT?

COMPLETE OPERATIONAL VIDEO TAPE GUIDE TO THE COMMODORE VIC-20
$39.95 INCLUDES TAX AND SHIPPING

This tape includes a simple explantion on hook up, keyboard functions and software use, along with basic programming.

NAME _____
ADDRESS _____
STATE _____ ZIP _____
VHS ☐ OR BETA ☐
CHECK, CASH OR MONEY ORDER
VIC FLIC • P.O. BOX 3108
MERCED, CA 95344

SIMPLE ANSWERS TO COMMON QUESTIONS

TOM R. HALFHILL, EDITOR

Q A

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. ***How well do personal computers match up against "dedicated" word processors for writing?***

A. Personal computers—depending on the particular system—can hold up very well when compared to dedicated word processors, especially when you consider the vast difference in cost.

For the uninitiated, a so-called *dedicated* word processor is a desktop computer or computer terminal designed to be used solely as a word processor, not as a general-purpose computer. Usually these units are found in offices, not homes. A single workstation costs about $5,000 to $10,000, depending on the printer selected.

Although dedicated word processors may be regarded as the ideal writing tools, a personal computer-based word processing system comes very close to satisfying the needs of most writers—while costing less than half as much.

Consider a word processing system built around a Commodore 64. At this writing, the 64 is available locally for $198, the 1541 disk drive for $260, and good word processing software for under $75. To this basic cost of about $535, you need to add either a dot-matrix printer or letter-quality printer, plus a printer interface. A good dot-matrix printer can be had for less than $500, and inexpensive letter-quality printers are available for around $600. Depending on the interface and cable needed, add another $100 or so. This brings the total cost to less than $1300, even for a letter-quality system. (If you bought everything at once from a single computer dealer, you might be able to negotiate an even lower price, especially if you're paying cash.)

Now, what advantages would a dedicated unit offer over this kind of system?

For one thing, the dedicated unit would be easier to get up and running. All the components should be matched to work together perfectly. When assembling a personal computer system with components from various manufacturers, usually there are compatibility problems to be overcome. For instance, the word processing software might allow underlining, but perhaps not with the particular printer. Ditto for subscripts and superscripts. Or maybe the printer does not mate as well with the interface as it should. (By the way, these kinds of headaches should be sorted out as much as possible *before* you buy all the parts, not after.)

Chances are the dedicated unit also would be easier to use, once you learned it. That's because it would have numerous dedicated keys for various functions, matched with the software. For example, to delete a sentence, the dedicated unit might have a special key labeled "Delete Sentence," and so on. Personal computer systems generally require you to memorize keystroke sequences for the same thing, such as CTRL-D-S for "Delete Sentence."

The dedicated unit also would offer greater disk storage (probably two drives), an integral 80-column video screen instead of a 40-column display on a TV set, and more advanced word processing functions, such as automatic footnote spacing and indexing, and maybe a spelling checker.

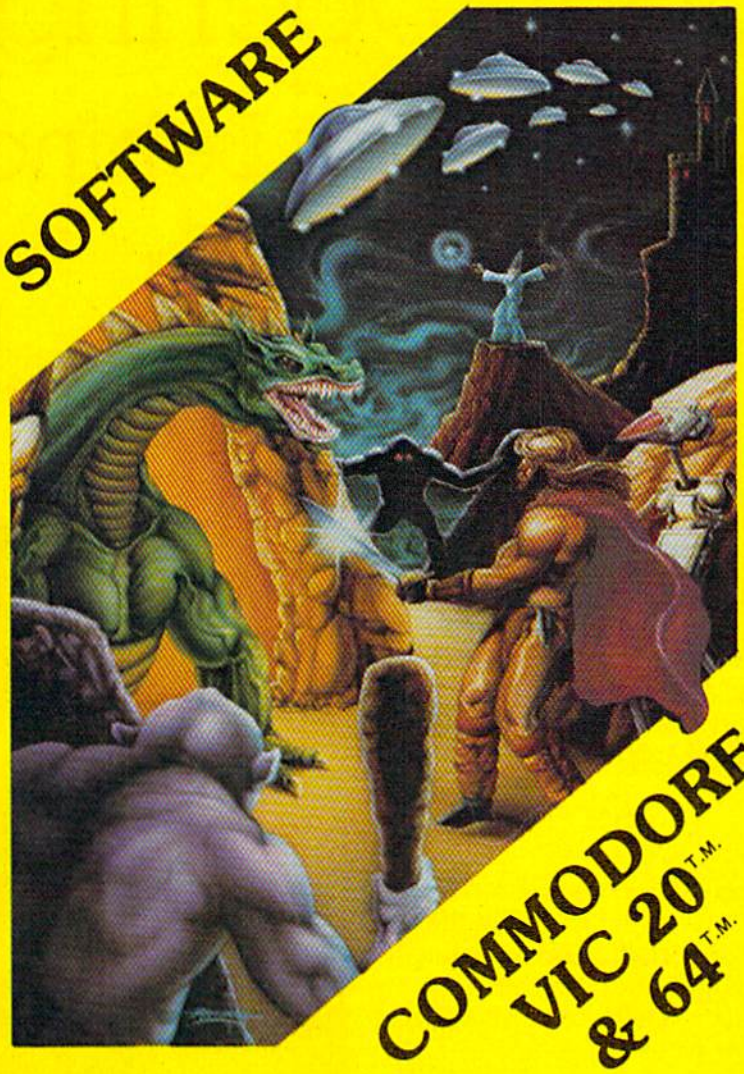
Of course, to compensate, you could add to the personal computer system a second disk drive ($260), a video monitor ($100), and even an 80-column converter (recently advertised for $159). Again, though, you might encounter compatibility problems between the 80-column board, software, printer interface, and printer.

Still, when all things are considered, the personal computer-based word processor will cost only a fraction as much as a dedicated word processor, and will offer more than enough utility for all but the most critical writing needs. In addition, the personal computer, as a general-purpose machine, can be used for many other tasks as well. For the average home user, student, and free-lance writer on a budget, the personal computer system is almost always the better buy.

COMM * DATA
COMPUTER HOUSE, INC.

ARCADE STYLE GAMES

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



HOME UTILITIES

- Home Accounting†
- Stock Accounting†
- Basic Tools†
- Multi-Level Marketing Manager (Direct Selling)†
- Cash Manager†

EXCITING NEW CONCEPTS IN EDUCATION

- Toddler Tutor*
- Primary Math Tutor*
- Math Tutor*
- English Invaders Games*
- Sketch & Paint*

Serving the Needs of Commodore Computers for Four Years. Call for the Dealer or Distributor Nearest to You.

COMM * DATA
COMPUTER HOUSE, INC.

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

†Commodore 64™
vVIC 20™
*Both

Arcade Style Games are High Res Full Machine Code.
Commodore 64 and VIC 20 are Registered Trademarks of Commodore Business Machines, Inc.

John Doering

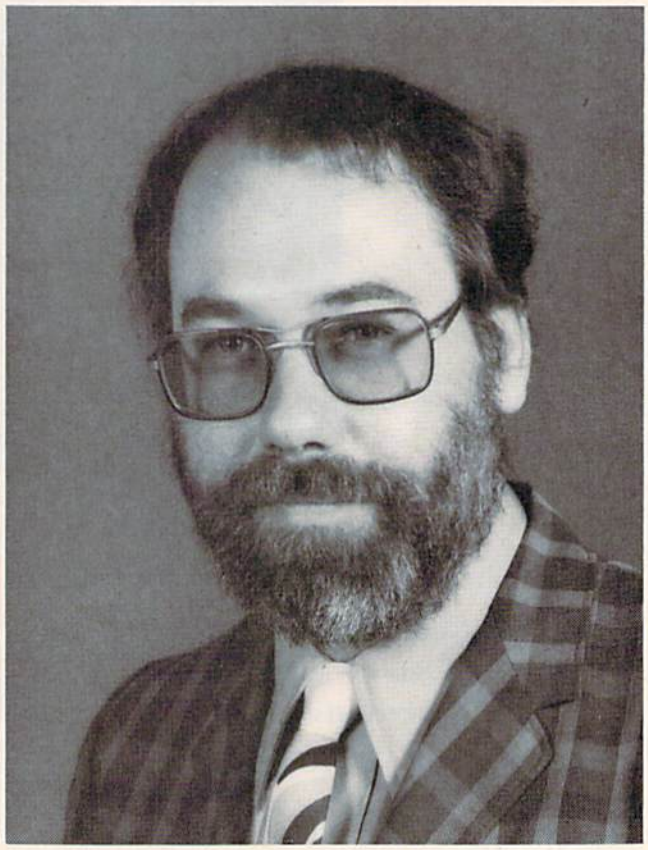
The Programmer Behind *Pipes*

Kathy Yakal, Editorial Assistant

It's not often that an independent software manufacturer has best-selling programs in different categories; most companies stick to a specialty, such as games, educational software, home applications, or business programs. This month's "Inside View" looks at one of the programmers at a company that has winners in every category: John Doering of Creative Software.

You're a utility engineer. Your job is to gather the correct water pipes from the factory, then connect them between the town's water supply and some of its homes. And you must accomplish your task using as little money and as few pipes as possible.

This is the premise of *Pipes*, an educational game from Creative Software. *Pipes* has been well-received by its young audience, and it won the CES Showcase Award for the best educational software program of 1983 at the Consumer Electronics Show in Chicago last June.



John C. Doering, vice-president, Research and Development at Creative Software, and the author of the award-winning educational program, Pipes.

The Birth Of *Pipes*

John Doering, the programmer behind *Pipes*, has been an electronics hobbyist since he was young, though his field of study in college and graduate school was philosophy. His interest in microcompu-

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

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

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

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

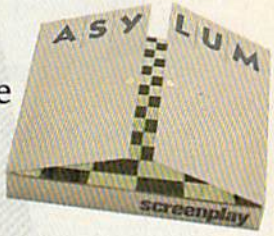
There's no one you can turn to for help. Almost every turn leads to a dead end. Or worse, vigilant guards stand in your way. If you can't outmuscle them, can you outthink them? Inmates line hallways offering help. But can they be trusted?

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

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

No wonder over 20,000 people bought *Asylum* last year, and *PC Magazine* recently named it one of the top ten games in the world.

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

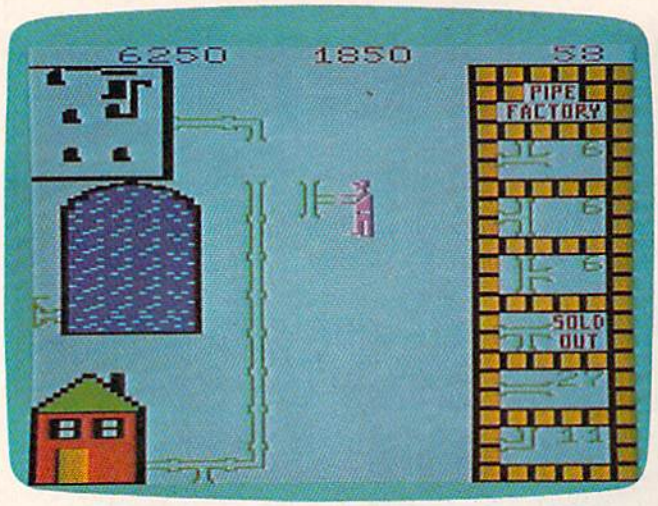


Asylum runs in 48K on the Atari, Commodore 64 and IBM PC computers. See your local software dealer.

screenplay

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

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



In Pipes, *Arlo the Plumber must select the correct pipes from the pipe factory and hook up several homes to the city's water system using a minimum of equipment and money. This educational program helps teach the concepts of planning, economics, and spatial relationships.*

ters was sparked when he bought a Commodore PET in 1977 and taught himself to program. At the time, he was working as an electrical engineer for a northern California company.

Then he met up with Paul Zuzello through a mutual friend. Zuzello shared his interest in programming and his appreciation for Commodore computers. So in June 1981, they formed Creative Software, of which Zuzello is now president.

Their first commercial programs were simple games and home applications for the PET. When the VIC-20 and Commodore 64 were introduced, they started creating programs for them, too. Creative Software also is starting a line of software for the Texas Instruments TI-99/4A, in addition to its Commodore products.

Doering got the idea for *Pipes* while wandering through a toy store. "I was trying to find out what kids were buying," he says. "Games where children have to put something together have always seemed very popular, like Erector sets and Tinker Toys."

When he finished programming his new game, Doering tested its appeal by bringing it to fourth, fifth and sixth graders at a local school. They liked it.

"Kids would crowd around while someone else was playing it and give suggestions," says Doering. "That was great help for me, because children are prone to giving lots of criticism when they don't like something."

Doering says the most difficult thing about programming *Pipes* was staying within the VIC-20's memory limitations. It barely fits into the unexpanded VIC. Doering expects the translation to the Commodore 64 to be much easier.

Fun Or Fruitful?

It is sometimes difficult to distinguish between software designed to educate and software designed to entertain. Doering believes that *Pipes* contains elements of both, but is mainly educational.

"*Pipes* is gamelike. It's fun to play using a joystick and it has color, graphics, and sound," he says. "But it also stimulates you to think about what you're doing.

"It's what I call concept education. There are a number of ways to achieve the goal. It forces you to try different methods and techniques."

Concept education, according to Doering, combines games and education to construct an enjoyable learning experience. Doering and his colleagues at Creative Software divide educational software into three categories: home concept education; courseware (software used in classrooms and other formal educational settings); and drill and practice (software that gives you a traditional test of some sort). Though educational software has not taken off as fast as games and home applications have for home computers, Doering thinks it will become as competitive. "I think educational software will be more immune to faddism than games were."

Doering also says that programming has much to offer to programmers as well as users. "I get a lot of personal satisfaction from designing software. There's a challenge to be met, and that always intrigues me.

"But beyond that, it's gratifying to see that a piece of my work can give pleasure to some other human being. We get lots of letters from grateful customers, so I know that I'm making an active contribution to someone else's education or enjoyment."

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

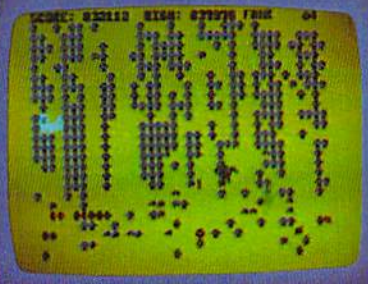
SEND FOR OUR
FREE CATALOG
WE HAVE MANY LINES OF SOFTWARE
ALSO PERIPHERALS
SPECIAL 'SALE' ITEMS

ANIMAX COMPUTER
1111 Las Vegas Blvd. South
Las Vegas, NV 89104

NÜFEKOP passes the buck!

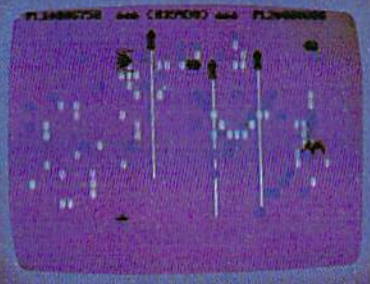
Since we can't decide which of these exciting Commodore 64™ games is more fun, we're passing the buck . . . to YOU!

Exterminator 64



Exterminator for the 64 by Ken Grant is the "big brother" to the very popular version produced for the VIC 20™. Animation by use of interrupt-driven sprites, exceptional use of audio capabilities and the use of approximately four times as much memory (to add more of the bugs responsible for the original Exterminator's fame) has produced a program which, from the moment it comes on screen, clearly states that the Commodore 64 has come of age. **$24.95** (available in cartridge or disk)

Widow's Revenge



This is another exceptional example of what the 64 can do. From the crawling of the web-slingers to the flapping wings of the egg-layers, author Doug Underwood has done an artist's quality job on animation. This program is similar in format to Exterminator . . . but, though of the same universe, worlds apart. **Widow's Revenge** is a one or two player game that you will find very hard to put away. **$24.95** (available in cartridge or disk)

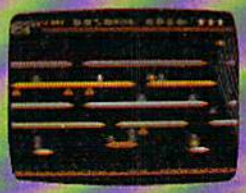
To be exact, we'll pass 6.4 bucks to you when you purchase both games. Mail us the warranty cards from both Exterminator 64 and Widow's Revenge and we'll send you 6.4 dollars! We also have two exciting new programs for the VIC 20™ . . .

Music Writer III by David Funte

This is an amazingly 'friendly', yet powerful program designed for a broad spectrum of usage. For the entertainment-seeker a more fine, fun way to enjoy your VIC 20™ than by typing in music could scarcely be found. For the music student, the speed of input, the powerful editing, the 500-note memory capacity (three products of pure machine code programming), the clear, pleasing graphic display and the 'save' features make this one a must. **$16.95**

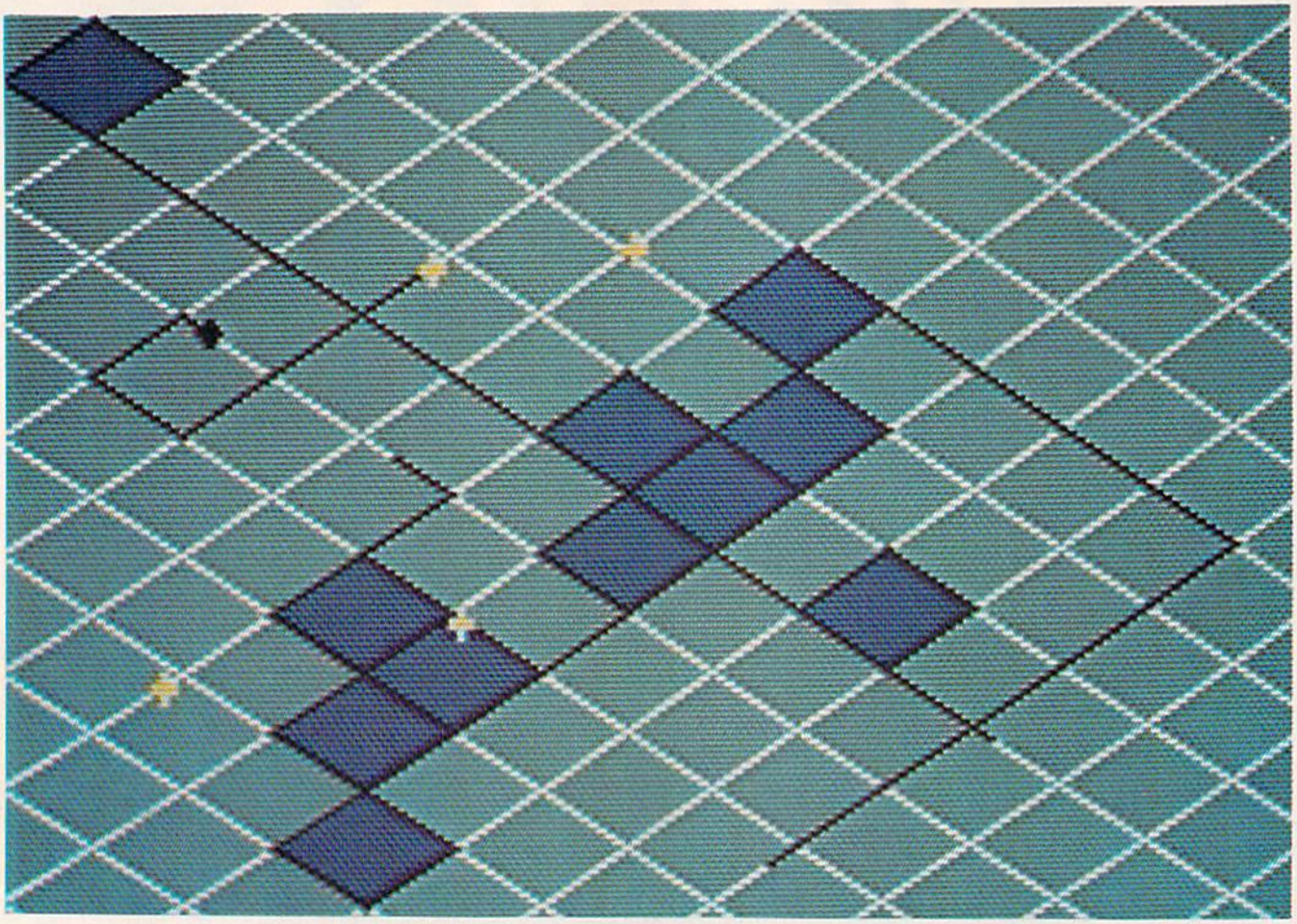
King's Ransom by Scott Elder

A demon's foul curse has condemned a king (who thought himself capable of striking a bargain with immortals) to an eternal half-existence in the five levels of the undead. The very gold coins the king had people put to death to possess now hold the only means of his escape. Help the reformed king collect these coins while jumping from moving level to moving level, carefully leaping over all obstacles encountered. Included is the short story, "The Thirteenth King." **$16.95**



NÜFEKOP

P.O. Box 156, 21255 Hwy. 62, Shady Cove, Oregon 97539 **1-800-525-2529**



SPIKE

All-Machine-Language Game For Commodore 64

Eric Brandon

COMPUTE!'s Gazette is proud to present its first game program written entirely in machine language. We feel that "Spike" is not only one of the best game programs ever published in a computer magazine, but that it also approaches commercial-quality software – a game for which you might expect to pay $30 or more. In addition, a new machine language entry program premiering this month, "MLX," virtually guarantees you can type in Spike without mistakes (details in article). Spike's author, Eric Brandon, is a Toronto college student who interned at COMPUTE! Publications during the summer.

It is a dark and stormy night, and you are diligently typing games into your Commodore 64.

Suddenly, just outside, you see a dazzling flash of light and almost at once hear the deafening retort of thunder. The lights dim, flicker, and wink out. A wave of dizziness overcomes you.

When you regain consciousness, you cannot recognize your surroundings. "This isn't my computer room," you think. A thousand theories about your situation fly through your head, but none is even close to the terrible truth.

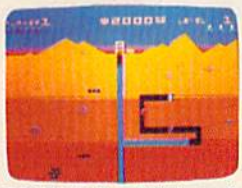
You are trapped inside the Power Grid.

To return to your own world, you must find and encircle your Commodore 64 computer. It is

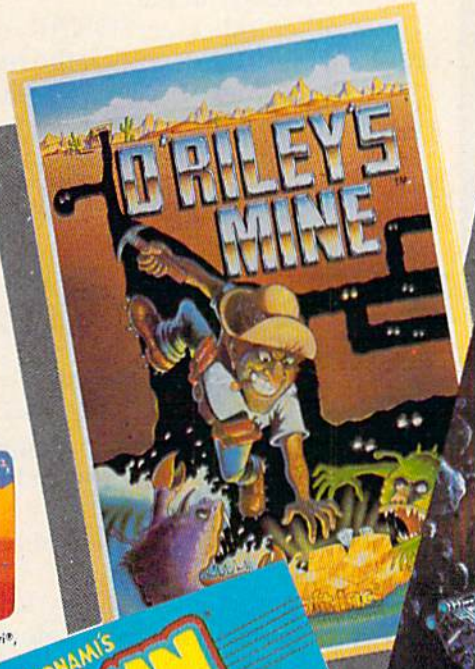
TURN YOUR COMMODORE-64 INTO THE HOTTEST ARCADE MACHINE IN TOWN

O'RILEY'S MINE™

You're a mad Irishman digging your way through an abandoned mine filled with oil, coal, gold, rubies, diamonds—and hungry creatures. You'll need the luck of the Irish to survive, but with so much at stake, it's a chance you're willing to take.

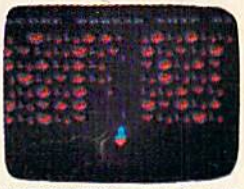


O'RILEY'S MINE™ available for Atari®, Apple® and Commodore 64®

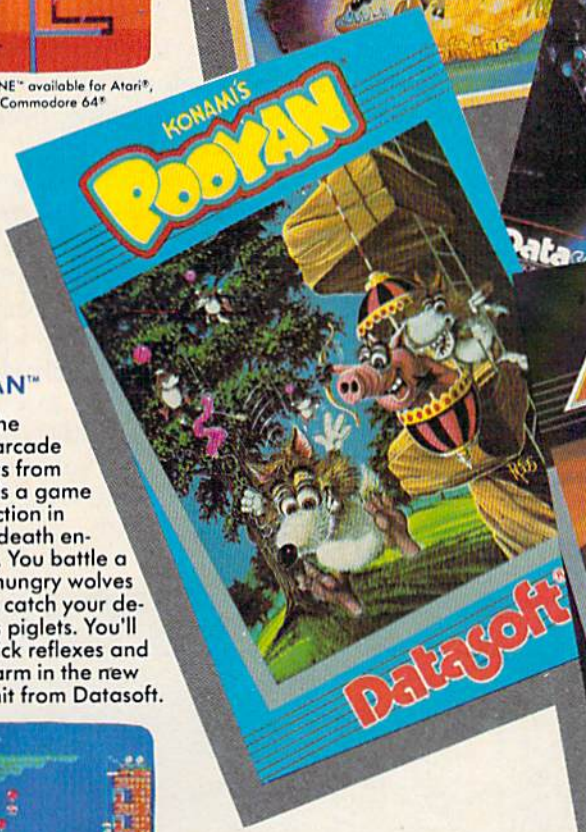


MOON SHUTTLE™

Your screen explodes with life-threatening action as you pilot your Moon Shuttle through outer space in this home version of the Nichibutsu® favorite. Awaiting you is The Prince of Darkness and his forces, which mysteriously multiply!



MOONSHUTTLE™ available for Atari®, Radio Shack Color®, Commodore 64®, coming soon for Apple®



POOYAN™

One of the biggest arcade game hits from Konami is a game of fast action in life-and-death encounters. You battle a pack of hungry wolves eager to catch your defenseless piglets. You'll need quick reflexes and a good arm in the new arcade hit from Datasoft.

POOYAN™ available for Atari®, Radio Shack Color®, Apple®, coming soon for Commodore 64®

GENESIS™

Balanced on the edge of disaster, you are the deadly King Scorpion defending your domain against fatally venomous spiders. Genesis captures all the intensity of Design Labs' arcade version of the first great battle on earth.

GENESIS™ available for Atari®, Apple®, IBM-PC®, and Commodore-64®.

Our reputation as one of the premier game manufacturers assures you of the highest quality attainable in action, strategy and graphics. For the hottest titles in entertainment, keep your eye on the leader—DATASOFT.

You'll Find The Best In Home Computer Software from Datasoft®

Pooyan™ is a trademark of Konami Industries Company, Ltd.

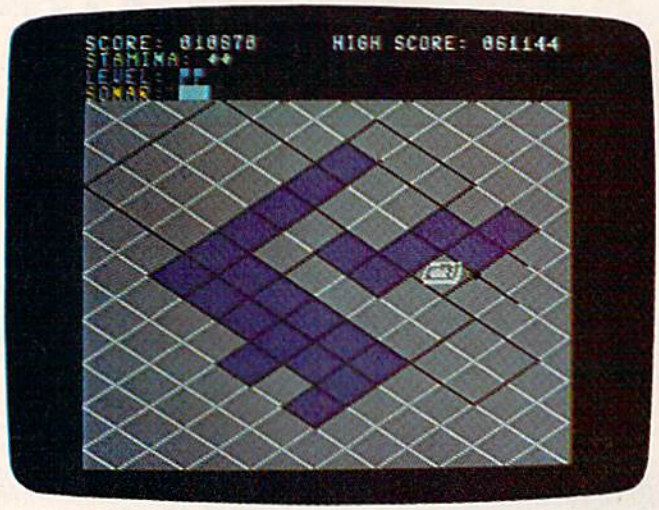
O'Riley's Mine® and Datasoft® are registered trademarks of Datasoft Inc.

Moon Shuttle® is a registered trademark of Nichibutsu, USA.

GENESIS™ and Design Labs are trademarks of Design Labs.

© 1983 DATASOFT INC.

9421 Winnetka Avenue, Chatsworth, CA 91311 (213) 701-5161



After filling in nearby squares, the player has found and uncovered the hidden Commodore 64.

not visible from where you are. but you know it is hidden inside one of the many grid nodes. Fortunately, you are carrying your pocket sonar, which always tells you how far from the 64 you are. The shorter the line displayed by your sonar, the closer you are to escaping.

You soon discover that the Grid is a dangerous place to be. Deadly power spikes travel up and down the wires. Touching one of the spikes results in a terrible shock. These shocks, though powerful, are very short, so you can endure up to four collisions with the spikes and still stand a chance to make it home.

Unfortunately, should you successfully reach your 64, you will find that the magnetic disturbance which trapped you on the Grid in the first place is worse than ever. You end up on the Grid again, but now it is coursed by even more power spikes.

Is there no escape?

Playing Spike

The recommended way to travel on the Power Grid is with a joystick in port two. The joystick may seem a bit awkward at first: since the Grid is tilted 45 degrees, the four cardinal directions (up, down, left, right) are likewise tilted.

When Spike first starts, you will have to make some decisions. You must decide the speed of the game and whether you want the Easy or Hard option. Pressing the RETURN key or the joystick button automatically chooses the Hard option and a speed of 5. If you want some other option, press the number of the speed you want (1 to 9) and the E key for an Easy game.

Another handy feature of Spike is the pause option. Pressing a SHIFT key pauses the action. Pressing SHIFT/LOCK freezes the game until SHIFT/LOCK is released.

You start each game with five lives. An indicator at the top of the screen, labeled STAMINA, keeps track of your remaining lives, not counting the one currently in play.

Another indicator, SONAR, shows your proximity to your invisible goal, the hidden Commodore 64 computer. The shorter the line, the closer you are to the 64.

The LEVEL indicator displays flags to show how many times you've found the 64 and advanced to a more difficult power grid.

When you start a new game, the Grid is patrolled by two power spikes. Another spike joins them on each succeeding level, up to a maximum of seven spikes.

To develop a winning strategy, it's vital to understand how the scoring works. The screen is divided into 112 grid nodes (diamond-shaped blocks). Your goal, the Commodore 64, is hidden in one of them, leaving 111 empty nodes. You gain survival points for traversing the Grid — ten points for each new side of a node you cross. If you box in a node by leaving your trail along all four of its sides, the node is colored blue. You'll want to box in as few nodes as possible, because it costs you bonus points later.

When you find the Commodore 64 by locating it with your sonar and encircling its node, you win bonus points and advance to the next level. The bonus is figured by multiplying the number of unboxed nodes times the bonus value for the current level. The bonus value starts at 40 for level one and increases by five for each additional level. For instance, if you find the 64 on level three after boxing in 11 nodes, you would win 5000 bonus points (100 unboxed nodes × bonus value of 50 = 5000). This would be added to the survival points you gained while searching the Grid.

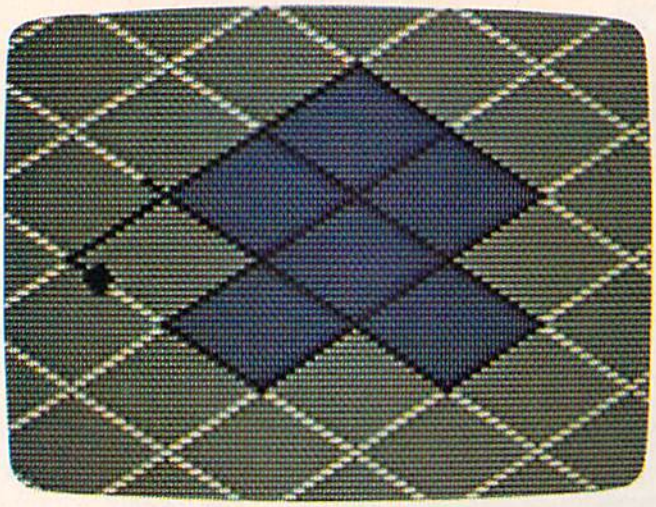
Close-up of a player pursued by a "spike" on the Power Grid, plus the game indicators: "Stamina" shows the number of lives remaining; "Level," the number of screens cleared; and "Sonar," the player's proximity to the hidden computer.

HAVE YOU FLOWN YOUR C-64 TODAY?

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

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

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



Before: *Using Sonar to zero in on the invisible computer, a player encircles a suspected node on the Power Grid....*

A HIGH SCORE indicator keeps track of the best game played during the current sitting.

Typing Spike

Unavoidably, Spike is a long program – more than 4K of pure machine language. Normally, it is very difficult to type in such a program without making a mistake. Also, in the past, a machine language monitor was necessary to enter such a program from a published listing in a magazine.

However, to make the typing as easy and as foolproof as possible, another landmark program debuts in COMPUTE!'s Gazette this month—"MLX." MLX, a machine language entry program, was written by Program Editor Charles Brannon to greatly simplify the task of typing ML programs from listings. It includes an instant checksum feature which does not let you continue until you've typed a line correctly. It also automatically types commas and lets you break up the job into several sittings.

After: *The node is encircled and the hidden computer revealed.*

Please read the directions for using MLX elsewhere in this issue. And be sure to save MLX, because it will be needed for future all-machine-language programs in COMPUTE!'s Gazette.

Here is the information you'll need to enter Spike with MLX:

Starting address — 32768
Ending address — 37295

Once Spike is saved on disk or tape, a special procedure is required to load the program.

For disk, enter:

```
LOAD"SPIKE",8,1
```

For tape, enter:

```
LOAD" ",1,1
```

When the program is loaded, run it by entering SYS 32768.

We think you'll agree that Spike is well worth the extra effort.

See program listing on page 213.

COMPUTE!'s Gazette
Toll Free Subscription Order Line
800-334-0868
In NC 919-275-9809

Merlin 64™

THE NEW MACRO ASSEMBLER FOR THE COMMODORE 64

$49.95* ON DISK

Easy to use for the Beginner or Professional, MERLIN is an extremely powerful Macro assembler and a sophisticated editor combined with many other utilities in a truly remarkable package. MERLIN'S Macro feature allows you to name frequently used routines in a listing, and then enter only the Macro name when entering text. Includes SOURCEROR, which generates labeled pseudo source code from raw Binary files.

Our Guarantee

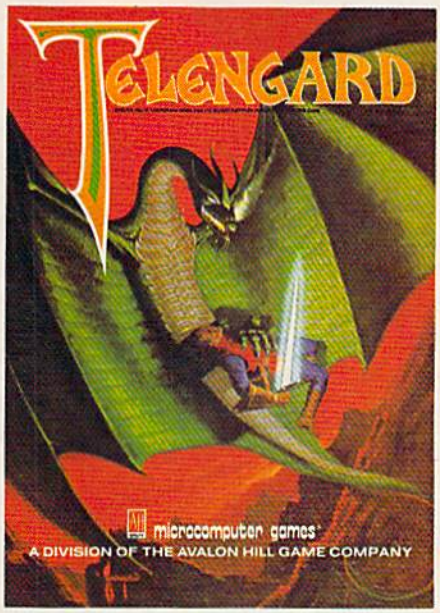
We're so confident that MERLIN is the most powerful assembler available for the Commodore 64 that, if you find a better assembler within 30 days of purchase, simply return the complete package for a full refund!

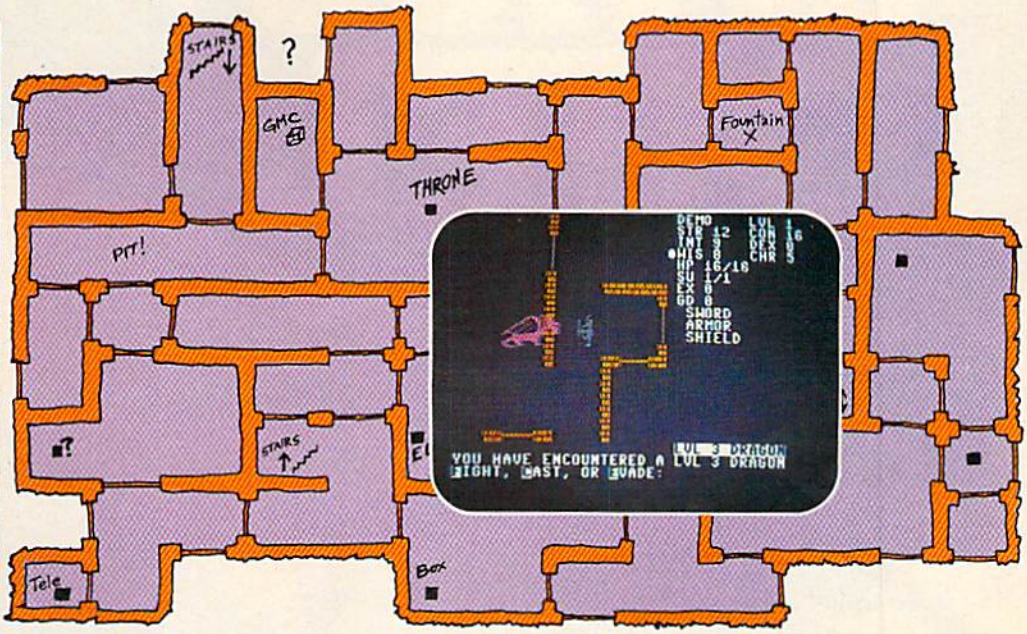
*Plus $3.00 Shipping
CA Res. add 6% Sales Tax.

Ask your local dealer for details or write us for a complete list of MERLIN's commands.

southwestern data systems
P.O. Box 582-G • Santee, CA 92071 • Telephone: 619/562-3221
Commodore 64 is a registered TM of Commodore Business Machines Inc.

Be Amazed!





Telengard: How low can you go?

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

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

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

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

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

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

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

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

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

microcomputer games®

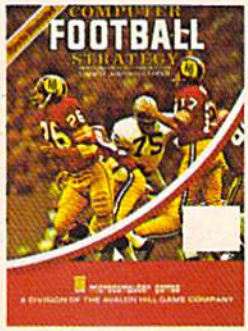
a Division of the

Avalon Hill Game Company

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

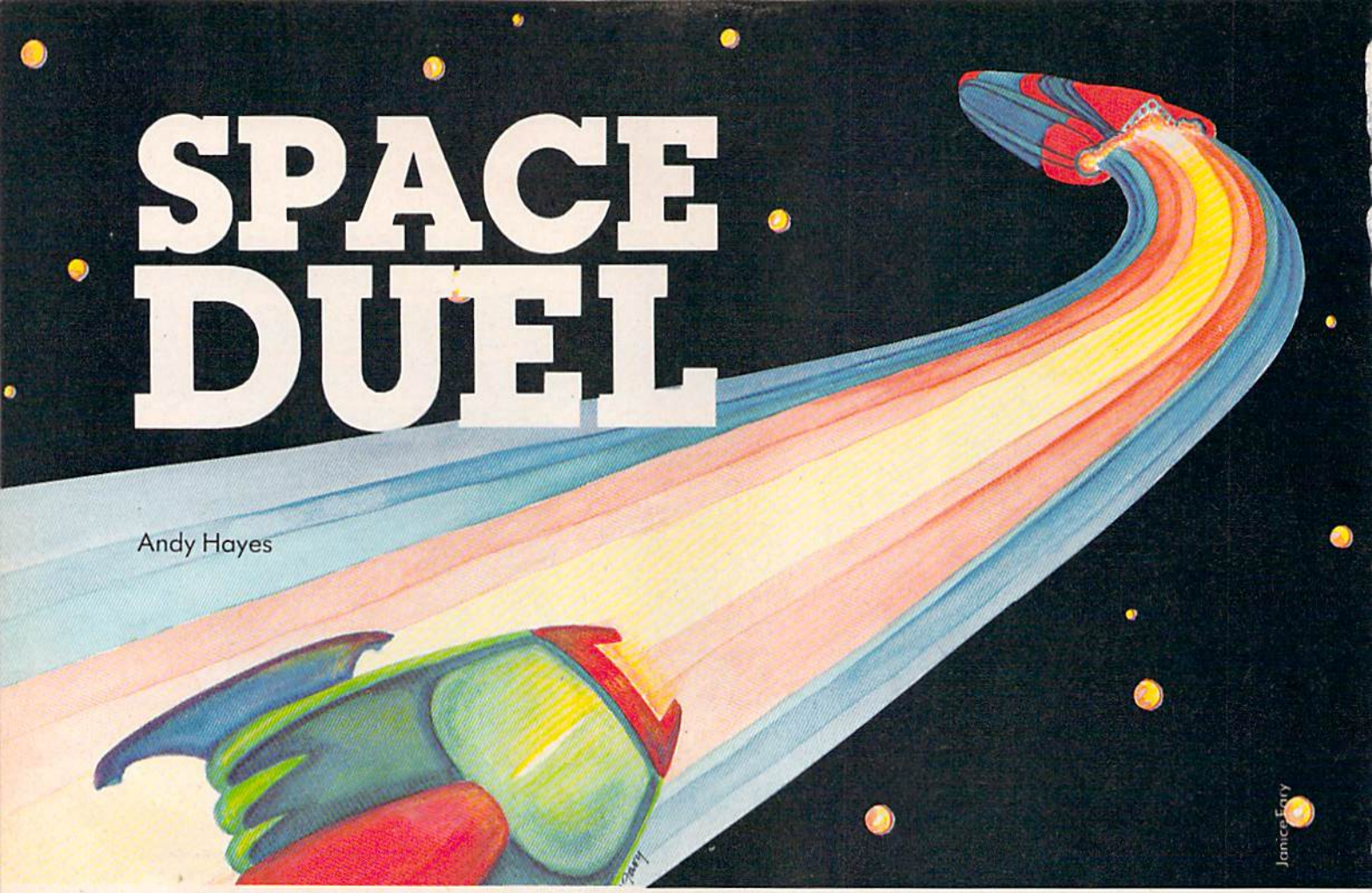
®Trademarks of Tandy Corp., Apple Computers, Commodore Business Machines, Warner Communications and International Business Machines.

AH QUALITY



SPACE DUEL

Andy Hayes



"Space Duel" is a two-player fast-action game for the unexpanded VIC-20 and Commodore 64. It requires a pair of paddle controllers. The Commodore 64 version, by Assistant Programming Supervisor Gregg Peele, is written entirely in machine language.

One of the problems encountered when programming games for the VIC-20 is the lack of a second joystick controller port (the Commodore 64 comes equipped with two). Since only one joystick can be plugged in, most games tend to be written for one player only.

But there's no denying the fun of two-player computer games. In a one-player game, your opponent is almost always the computer, which puts you at a great disadvantage whenever reaction time or logical thinking is being tested. Eventually the computer always wins. A two-player game, however, pits you against another human being, someone who shares all the same human frailties. Not only do you have a better chance to win, the game also lets more than one person play with the computer at a time.

There are only three ways to program simultaneous-action, two-player games for the VIC: a second joystick port can be added by building an interface to the user port (not a project for beginners); one or both players can use the keyboard for control (which tends to be clumsy); or the game can be written to take advantage of the paddle controllers.

Paddle controllers come in pairs, wired to a single joystick plug. Essentially they are potentiometers (variable resistors). Atari paddles or Commodore paddles will work with the VIC and Commodore 64, although the Commodore paddles are preferred because their range is better matched to the Commodore computers. However, the Atari paddles are more widely available, and many people who started out with the Atari 2600 VCS game machine may already have a pair of Atari paddles on hand. Either kind will work fine with "Space Duel."

Hi-Res Animation

Space Duel gives each player a spaceship at opposing sides of the screen. Players can move their spaceships up and down by rotating the paddle controller. (With the Commodore 64 version, the paddles should be plugged into port one.)

Try rotating the paddle knobs slowly while watching the spaceships closely. You'll notice that unlike most games for the VIC and 64, the objects do not move in rough increments of one character space. Instead, they scroll smoothly up and down the screen, one pixel at a time. This kind of high-resolution animation would be far too slow if programmed in BASIC. The VIC ver-

Tough competition.

The world may be short of oil. And short of jobs. But there's no shortage of entertainment. Arcades. Movies. Amusement parks. TV. Concerts. Records. You've got your choice. And every day, more of you are choosing HesWare™ computer games.

That's because only the best games earn the HesWare title. Tough, challenging, arcade quality action games like Gridrunner,™ Predator,™ Retro Ball,™ and Robot Panic.™

Mind-bending strategy and role playing adventures like Pharaoh's Curse™ and Oubliette.™

Zany new titles that have to be seen to be believed. Would you believe Attack of the Mutant Camels™??

You don't need an expensive computer to enjoy HesWare action, either. HesWare programs are available on cartridge, diskette or cassette for VIC 20,™ Commodore 64,™ Atari® and IBM® personal computers.

When you pick up a HesWare game, you know it's ready for the toughest test of all: beating out the tough competition for your attention.

HesWare games. Just one of the ways HesWare is expanding the computer experience. Look for them at your favorite software retailer.

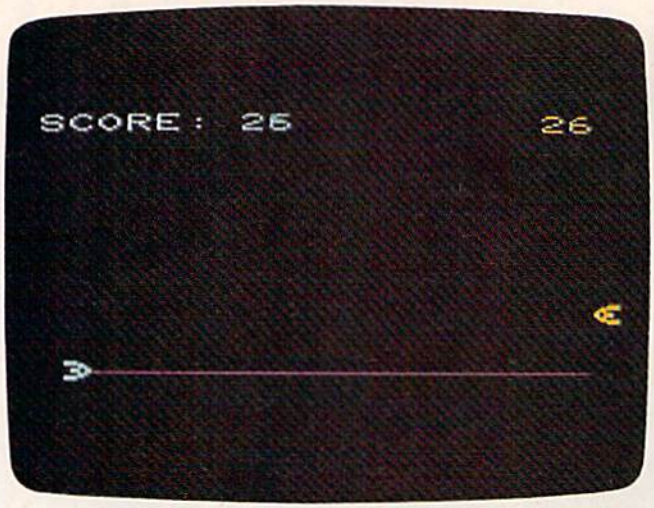
VIC 20 and Commodore 64 are trademarks of Commodore Electronics Ltd. Atari is a registered trademark of Atari, Inc. IBM PC is a registered trademark of International Business Machines. Pharaoh's Curse is a trademark of Synapse Software. Oubliette is a trademark of ISA Software.

Pleases the tough customer.

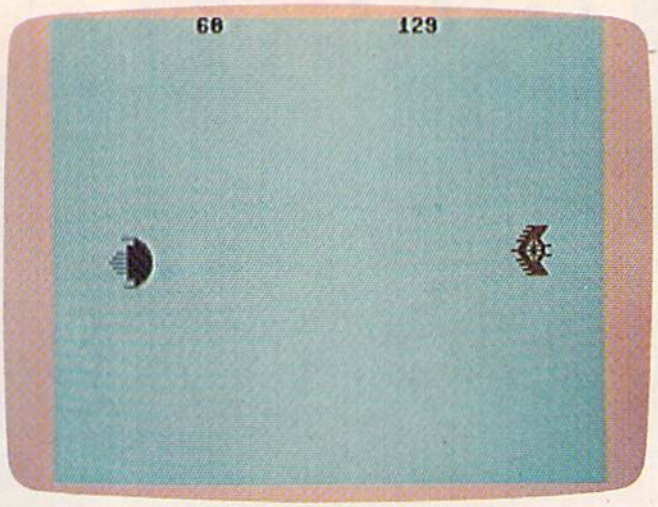
HesWare™

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

© 1983



With the score tied, player one fires his laser but misses his opponent's ship. (VIC version).



Both players jockey for position before firing their lasers. (64 version).

sion of Space Duel uses a machine language subroutine to attain this fine movement. The 64 version is written entirely in machine language and uses sprites.

Rotating the paddle knob quickly, though, reveals another kind of movement – extremely fast jumps. Because a paddle controller returns an absolute value to the computer (instead of the directional value of a joystick), it's possible to leap from one screen position to another with a flick of the wrist. You'll find both kinds of movement handy in Space Duel: rapid jumps to avoid enemy shots, and fine adjustments to carefully aim your own shots.

Dueling Spaceships

The object of Space Duel is simple: shoot the enemy spaceship more than it shoots you. To fire your laser, press the paddle fire button. Instantly, a red laser burst zips across the screen (at machine language speed) toward your target. A direct hit triggers an explosive sound effect and flashing screen colors.

Meanwhile, of course, you have to dodge laser bursts fired at your own spacecraft. Space Duel can get so fast that only the quickest players can keep track of what's going on.

Each hit on the enemy ship is worth ten points. However, to prevent reckless shooting, each laser shot also costs you one point. Therefore, a hit really nets you only nine points. Each player's score is updated in the top corners of the screen.

The game ends when one player scores at least 80 points (500 points in the 64 version). To play again, press one of the fire buttons or respond to the screen prompt.

Hint: In the VIC version, if the paddles don't seem to work right when you first run the program, try pressing RUN/STOP-RESTORE and restarting. This resets the computer and clears out certain memory garbage which can interfere with the controllers. Also be sure not to leave any buttons on the Datassette recorder pressed down, because this interferes with the left paddle.

To type in the machine language 64 version, you must use "MLX," a special machine language-entry utility (see article elsewhere in this issue). The information you need to enter the 64 version of Space Duel with MLX is: starting address 49152, ending address 50393. To start the game, enter SYS 49152.

See program listings on page 207.

COMPUTE!'s Gazette
Toll Free Subscription Order Line
800-334-0868
In NC 919-275-9809

COOL YOUR DISC DRIVE
with the "F2500" cooling fan for your Commodore 1540/1541 disc drive

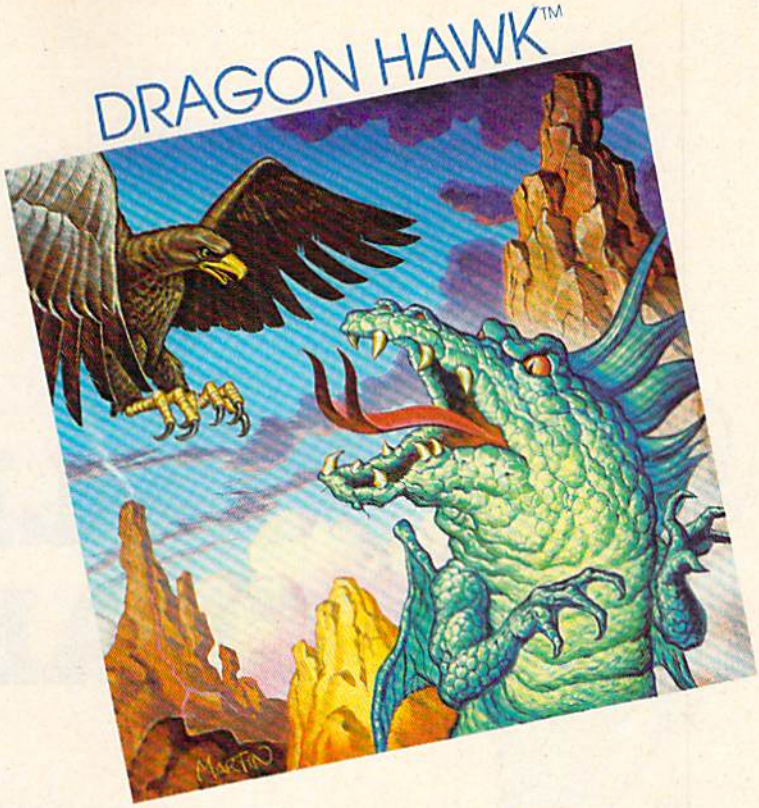
Protect your valuable programs from excessive heat buildup

A must for every disc drive owner

• Powerful fan cools critical components • Helps prevent disc & drive problems due to excessive heat buildup • Quiet operation • High volume air output • Low profile • Easy installation–no tools required • 90-day free replacement warranty • only $54.95 U.S. ($69.95 Can). *B.C. residents add 7% sales tax.

1540 and 1541 are registered trademarks of Commodore Business Machines Inc.

To order your F2500 disc drive cooling fan please send your cheque or money order for $54.95 plus $2 for shipping to:
Besco Products
203 - 8060 Granville Ave., Richmond, B.C. Canada V6Y 1P4
Telephone (604) 278-5115 ***DEALER INQUIRIES INVITED***



ANNOUNCING A NEW GAME SO ORIGINAL YOU NEED INSIDE SECRETS JUST TO SURVIVE...MUCH LESS WIN!

Now In Every Dragon Hawk Package: Free Strategy Cards.

Great new game—great new way to play. You are the Dragon Hawk, soaring to attack—and escape from—a host of flying monsters. Each time you press the trigger on your joystick, the hawk's wings flap, lifting you into position to dive, talons extended.

One pounce and another phoenix bird or flying iquana is reduced to a mere floating feather. But if you fail to get above your enemies... zap! You've had it! And you've got to avoid the massive lightning bolts, too.

Finally, on the seventh level, you come face to face with the dragon himself. But you won't be alone.

To get you there faster and make playing Dragon Hawk more fun than any Commodore 64 game ever, you'll have help at your finger tips. Strategy cards with key tips on crucial parts of the game are included free in your package.

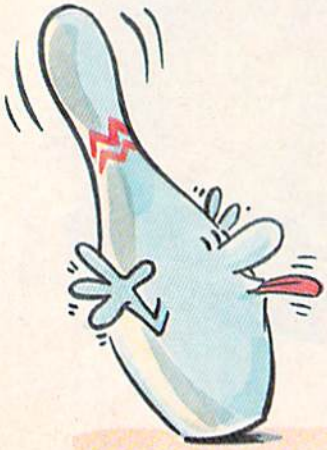
Get your claws on Dragon Hawk right away. It's a thrill so new and different you may never come down.

You'll find Dragon Hawk for the Commodore 64 with disk drive at your local dealer now, or write to UMI direct.

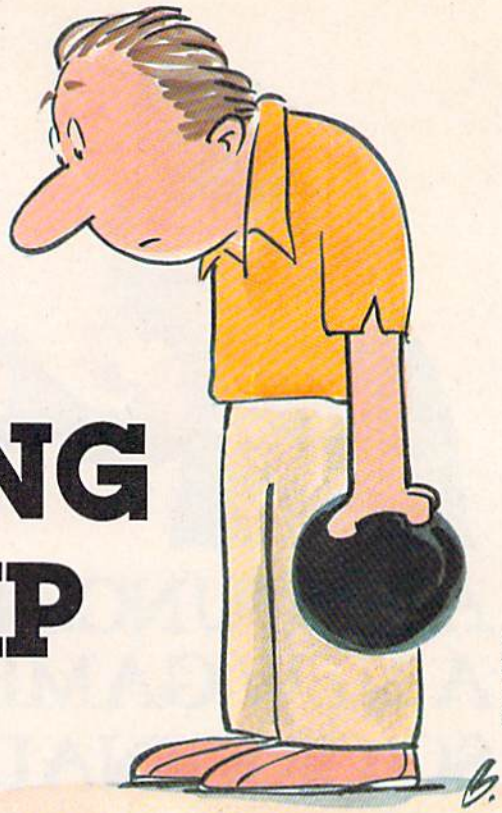
umi

United Microware Industries, Inc.
3503-C Temple Avenue
Pomona, CA 91768 (714) 594-1351

Commodore 64 is a trademark of Commodore Business Machines, Inc.



BOWLING CHAMP



Harry Blair

Joseph Ganci

"Bowling Champ," for one to three players, was originally written for the unexpanded VIC-20. We've included a version for the Commodore 64.

Some games like *Space Invaders* or *Adventure* create their own fantasy worlds, while others are simulations of reality. "Bowling Champ" is one of the latter.

It's not easy to take a game with countless physical variables, such as bowling, and reduce it to numbers so it can be re-created by a computer – especially a small computer. Compromises must be made. But Bowling Champ is a reasonable simulation of a game of ten pins, given the limitations imposed by the unexpanded VIC-20's 3.5K of free memory. The elements of skill and luck have been preserved, and the scoring is authentic.

Up To Three Players

When you first run Bowling Champ, it asks for the number of players. One, two, or three people can play.

Next you type in the players' names. To fit the names on the screen, the program truncates them to five characters (six on the Commodore 64).

Now you're ready for the first frame. The bowling ball rapidly moves up and down across the alley until you press the space bar. This rolls the ball down the alley and knocks over the pins, unless you've thrown a gutter ball. The trick is to time your release so the ball rolls down the center of the alley to score a strike.

In case you're unfamiliar with how a game of ten pins is scored, here's a brief summary:

A game consists of ten frames or turns. Each player gets one or two balls per frame. If you roll a strike – knocking down all ten pins with the first ball – you don't get a second ball, but the current ball's score is ten plus the total of your next two throws.

If some pins are left standing after your first ball, you get a second ball. If you knock down all the remaining pins, it counts as a spare, and the current ball's score is ten plus your next throw.

If any pins remain after your second ball (no strike or spare), the number of pins knocked down in that frame is added to your previous score.

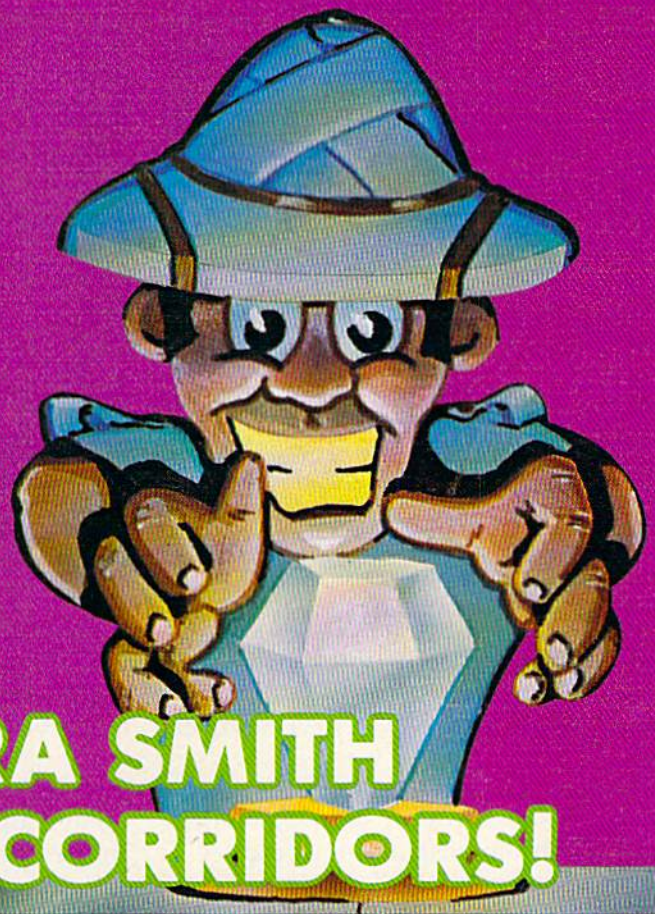
Rolling a spare in the tenth (last) frame gains you one extra ball; rolling a strike in the tenth frame gains two extra balls.

Therefore, a perfect game – ten strikes during regular play plus two strikes with the extra bowling balls—scores 300 points. Needless to say, this doesn't happen very often, either in real bowling or in Bowling Champ.

Programming The Game

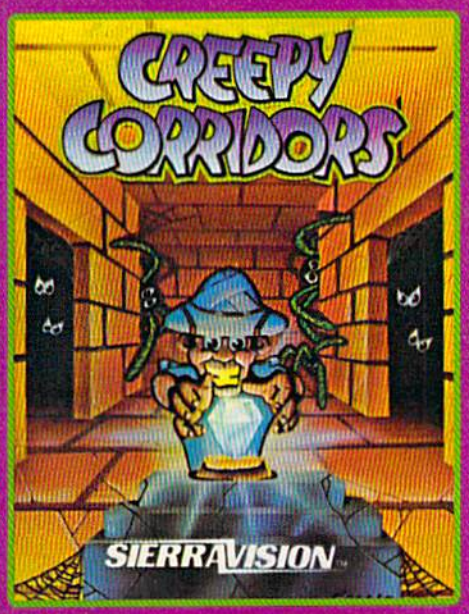
Bowling Champ was my first real attempt to write a good game in BASIC for my VIC-20. At first I thought it would be fairly simple to simulate a game

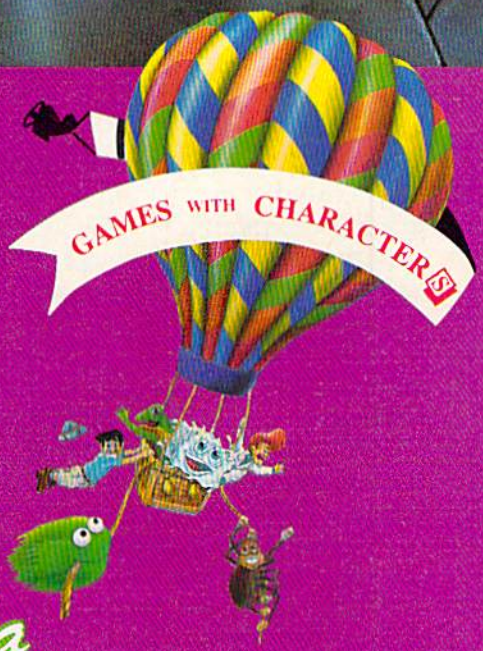
BUY 2 SIERRAVISION PRODUCTS GET 1 FREE



SAVE SIERRA SMITH IN CREEPY CORRIDORS!

Sierra Smith's a real jewel of an adventurer - 24 karats of bravery. Sierra Smith's about ready for the biggest adventure of his life inside Creepy Corridors. Legend has it that some pretty strange critters protect the riches in the maze. The risks are great, but so are the rewards if you survive - enough riches for Smith and you! Above all, be careful as you gather the treasures of Creepy Corridors. Those screams you hear might be your own!



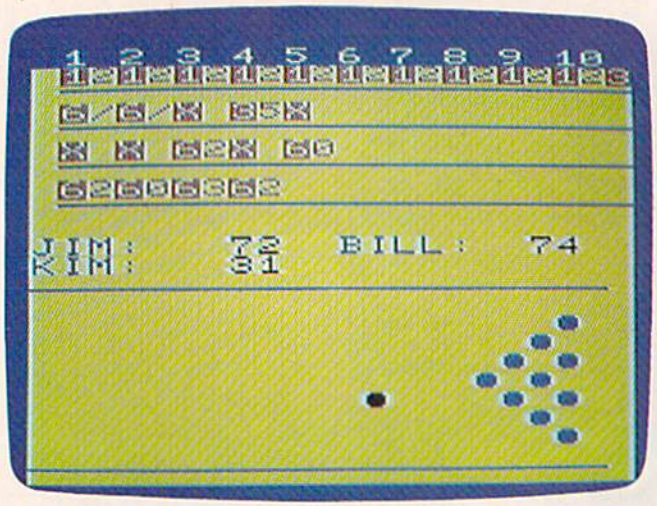


Sierra ON-LINE™

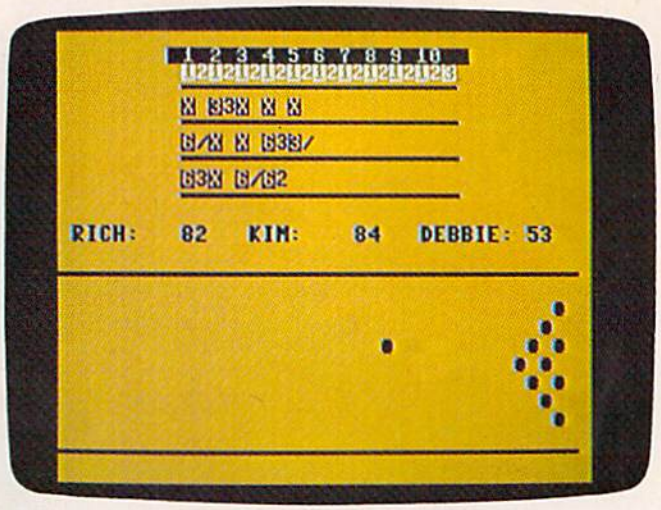
SIERRA ON-LINE BUILDING COARSEGOLD CA 93614
209 683 6858

ATARI • COM 64 • VIC 20

TM designates a trademark of Sierra On-Line, Inc.



Up to three people can play "Bowling Champ" (VIC version).



"Bowling Champ" (64 version).

like bowling, but I found myself quickly running out of memory as I tried to tell the VIC how to keep track of strikes and spares, how to calculate scores in bowling, and how to keep track of everything at the same time.

Another problem I found was the VIC's small screen size. I wanted to keep a constant log on the screen of each ball thrown, just as you would see on a regular bowling score sheet. But alas, with only 22 characters horizontally across the screen, I just wasn't able to record 20 ball scores with a box around each one. That's when I found a useful application for the REVERSE function (reverse video). At first I thought of it as just a way to pretty things up, but then I realized I could use it to reverse every other ball score on the screen so that each one could be easily distinguished from the one next to it.

With that problem solved, I attacked the next: how to keep track of strikes and spares and tally the scores correctly. At first I thought of just using a flag, a number that would tell the computer when to add extra points. But that got quite confusing and memory-consuming as I tried to keep track of each player's strikes and spares.

It took awhile, but finally the concept of screen memory clicked for me. If the screen locations were also memory locations, then I could tell if a strike or spare had been thrown simply by checking the correct spot on the screen where the symbol for a strike/spare had been recorded. This made things a lot easier and saved a lot of memory.

In short, the program counts the number of pins knocked down, checks for a strike or spare, and records the corresponding symbol on the score sheet. The program then checks to see if the last ball thrown was a spare or a strike; if either, calculations are performed according to standard bowling scoring rules. If a strike or spare is thrown in the tenth frame, the player is allowed to throw one or two extra balls. Every rule of scoring for regular bowling is followed. The only difference is that the computer does not wait until the end of a frame to update the score — it updates it after every ball.

Some new players find the ball moves too fast for them to aim. To slow it down, insert a delay loop (such as FOR X=1 TO 100:NEXT) at the beginning of line 440.

Program Outline

Here is a breakdown of both the VIC and 64 versions of the program:

10–110	Initialization; title is printed.
112–113	How many players? Up to three can play.
118–123	Players' names are typed in and are cut off after the first five letters (six letters on the 64) to fit the screen.
128–156	Screen setup.
160–225	Main part of the program. This includes:
	166 Change the screen and border colors for each player.
	174–194 Check to see if a spare has been thrown in the tenth frame and, if so, let the player throw one more ball.
	195–214 Check to see if a strike has been thrown in the tenth frame and, if so, let the player throw two more balls.
882–896	Final scores and an option to repeat the game are printed.

The program contains the following subroutines:

430–460	Bowling ball moves up and down until a key is pressed.
550–612	Roll the ball toward the pins, knock them down, and count to see how many have been knocked down.
1000–1100	Keep score on the screen with the proper symbol — the number of pins knocked down, the spare symbol, or the strike symbol.
1200–1300	Tally current score.

The VIC version takes up most of the memory, so don't add anything extra until you've typed it in as is. Consider the quotes at the ends of PRINT statements optional where they are not included.

See program listings on page 204.

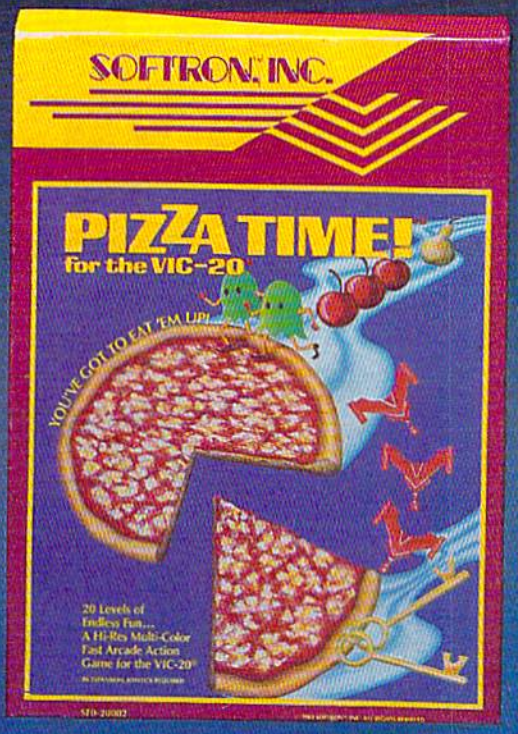
SOFTWARE BREAKTHROUGH
from SOFTRON, INC.

The Do It Yourself! Book™

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

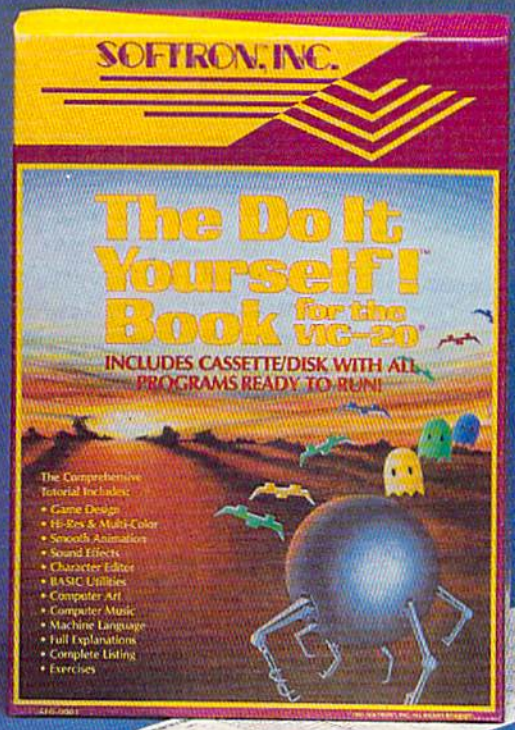
- Game Design
- Hi-Res & Multi-Color
- Smooth Animation
- Sound Effects
- Character Editor
- BASIC Utilities
- Computer Art
- Computer Music
- Machine Language
- Full Explanations
- Complete Listing
- Exercises

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



PIZZA TIME!™

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



Keyboard Soft/Lay ™

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

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

Ez/Disk™

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

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

Call the menu anytime...
All without losing your BASIC program in memory!
EZ to understand—unnecessary manual included!
The VIC 20® requires 8K expan. $29.95

Send Check, M/O plus $3 S/H. $2 extra for disk. (Except Ez/Disk™) N.Y. Residents, add 8¼% tax. Add $3 for COD.

The Do It Yourself! Book, Pizza Time! Keyboard Soft/Lay, Ez/Disk and Softron are trademarks of Softron, Inc. VIC 20 and Commodore 64 are trademarks of Commodore.

Saucer Shooter
For VIC-20

Ron Watts

"Saucer Shooter" is an action game for the unexpanded VIC-20 which makes exceptional use of custom characters and sound effects. Unplug (or disable) any memory expanders before using the program. It requires one joystick.

Surrounded by piles of atomic waste, the player's base is under attack by the hovering saucer.

"Saucer Shooter" is not only a fun game, it's also a good demonstration of what can be achieved with user-defined graphics (custom characters).

The custom character technique lets programmers redesign the standard VIC characters into any shapes desired. In Saucer Shooter, standard characters are customized to make an enemy saucer, a defending gun turret, flying shots, piles of atomic waste, explosions, and even 44-column screen characters. (For more information on this technique, see "Introduction To Custom Characters On The VIC And 64" and "How To Make Custom Characters On The VIC" in last month's COMPUTE!'s Gazette.)

A Hostile Saucer

After you type RUN, the title screen comes up and a short tune plays. Press the joystick fire button to start the game. The screen clears, there's a short pause as the program makes a few preparations, and the game begins.

The object is to defend yourself against the hostile saucer orbiting overhead. Your joystick controls a gun turret which moves across the bottom of the screen. The playing field is what is sometimes referred to as a "wraparound universe — if you move off the edge of the screen, you reappear on the other side.

Shots fired by the enemy saucer obey the same rule. Keep this in mind, because a shot that seems to be flying a whole screen away from you might wrap around and catch you by surprise.

Every orbit or so the saucer fires another shot at your turret. You can shoot back by pressing the joystick fire button. Hitting one of the saucer's shots in midair scores 100 points. A direct hit on the saucer scores 500 points. Both the current score and the high score for the session are printed at the top of the screen. *(Editor's Note: During testing of the game, our high score was 19,900.)*

You start the game with four turrets and an unlimited supply of bullets. However, only one bullet can be in flight at a time. Pressing the fire button cancels the previous shot and fires a new one. Since the program is written in BASIC, this was necessary to keep the action going at a fast pace.

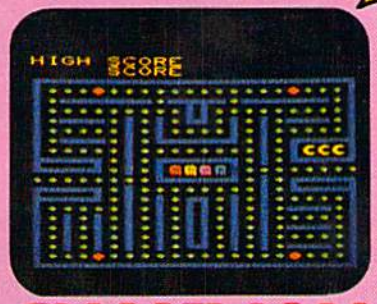
There's an important reason for blasting as many enemy shots in midair as possible: when

DECK THE HALLS

and your VIC 20

with ARCADE - STYLE games from MICRODIGITAL !

available NOW for Commodore 64



SNAKMAN

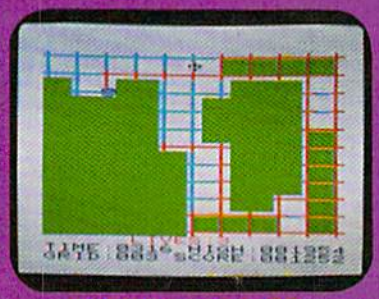
WATCH OUT!

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

available NOW for Commodore 64

EXCITING! JOYSTICK-CRUNCHING!

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



GRIDDER

available NOW for Commodore 64

THRILLING! FANTASTIC!

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

SKRAMBLE!

available SOON for Commodore 64

PINBALL WIZARD

JUST LIKE THE REAL THING!

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

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

FAST and SMOOTH! Programmed in machine language!

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

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

they miss your turret and hit the ground, they leave behind a small pile of atomic waste. If your turret collides with a pile, it blows up. As the game progresses, your territory gradually becomes littered with these piles of hazardous debris. There's not much you can do about them. Soon your maneuvering room is restricted, and you're at the mercy of the orbiting saucer.

Programmer's Notes

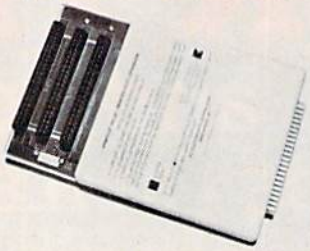
Lines 100 through 140 move the saucer from one side of the screen to the other. Lines 200 through 260 move the bullet and detect hits. Lines 300 through 360 read the joystick and move the turret, and line 400 reads the fire button.

I included the routine at line 410, because it's something I always look for in a game — it lets you move the turret twice as fast as the saucer. That way, you can outrun the blasts and track the saucer as if you were shooting skeets.

The remainder of the 400-series lines initialize new bullets, and lines 500 through 560 move shots fired by the saucer.

See program listing on page 233.

VIC® 20 OWNERS



Fulfill the expansion needs of your computer with the

RAM-SLOT MACHINE

This versatile memory and slot expansion peripheral for the Commodore Vic-20 Computer consists of a plug-in cartridge with up to 24KBytes of low power CMOS RAM and 3 additional expansion slots for ROM, RAM and I/O. The cartridge also includes a reset button (eliminates using the power-on switch) and an auto start ROM selection switch.

#RSM-8K, 8K RAM + 3 slots..... $ 84.50
#RSM-16K, 16K RAM + 3 slots .... $ 99.50
#RSM-24K, 24K RAM + 3 slots $119.50

We accept checks, money order, Visa/Mastercard. Add $2.50 for shipping, an additional $2.50 for COD. Michigan residents add 4% sales tax. Personal checks—allow 10 days to clear. * Trademark of Commodore.

K2 ELECTRONICS DESIGN CORPORATION
3990 Varsity Drive • Ann Arbor, MI 48104 • (313) 973-6266

FREE

WRITE FOR FREE CSI CATALOG OF VIC 20 and C64 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

COMPUTER CASSETTES

100% Error-Free • Fully Guaranteed

LENGTH	12 PACK	24 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

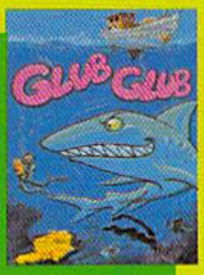
Christmas Special

Get one game FREE when you buy any 2 Showcase Software games for the VIC-20® at $19.95 each. But hurry! Offer ends Dec. 25, 1983.

ASTRO PATROL
In space there are no guarantees...All your training and superb equipment—will it be enough to save you from the alien hordes?

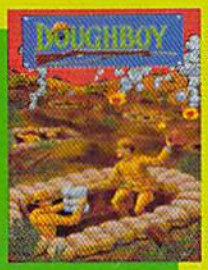
CHICKEN
A pesky old fox has found Ma Hen's eggs and she's trying to save them from his deadly clutches. Play action intense enough to challenge the most experienced arcade player.

SQUEEZE
The fields are dry. You hafta dig a heap o' ditches! But you better be nimble 'cause the bulls they gonna chase you down. So pick up your shovel and start diggin' your way to fun and fast action!



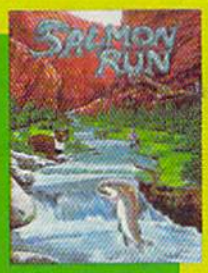
GLUB GLUB
The map was right! Under the boat the unmistakable glitter of gold. A king's ransom! But those dark forms can only be...sharks! Can you conquer your fear and avoid those dark marauders?

DOUGHBOY
The bugle call has sounded. It's time to hit the trenches for a fun-filled contest of bravery and tactics. Your mission: Recover the supplies that are scattered across the playfield while avoiding enemy troops.



PUSSYFOOTIN'
Meet Fearless Franklin the guard cat. His job: catching nasty grustlebirds and keeping things running smoothly for his hard hat buddies. But won't anything stand still?

SALMON RUN
Sammy the seafaring salmon is back to see his fishy fiancé. But he has to meet her upstream and there are waterfalls, hungry bears, anglers and bothersome birds at every bend. But Sammy is determined to give you hours of fishy fun!



Attach the end flaps and receipts from any 2 of the Showcase Software games shown here and indicate your choice of a free Showcase game. Or order direct using the handy coupon (add $2 shipping and handling). Phone orders accepted. Free game available only from Showcase Software.

SHOWCASE SOFTWARE
5221 Central Ave., Richmond, CA 94804
Here's my order for 2 Showcase Software VIC-20® games and my choice of free game.

Name_____
Address_____
City_____ State_____ Zip_____
Games Wanted:_____
_____
Free Game:_____
MasterCard/Visa No:_____

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

REVIEWS

VIC/64 Rabbit

Roland L. Ryan

If you feel left out when other people talk about the speed of their disk drives, perhaps a product from Eastern House Software coupled with that slow Datassette can be of some help to those of us on a tight budget. Or maybe some disk drive owners will want to dust off the Datassette to use as a backup to the disk drive that just so seldom—but at the wrong time—goes out.

Just what is the Rabbit? The CBM Rabbit from Eastern House Software is a cartridge that speeds up the transfer of data to and from the Commodore Datassette recorder. The stored program uses about one-fifth the length of tape used in the normal Commodore mode. What can this mean to you? The Rabbit allows much faster loading and saving of programs. For example, a 16K program will load in about one minute (compared to about 45 seconds for the 1540/1541 disk drive).

Three Ways To SAVE

Installation is simple. First plug the Rabbit cartridge into the user port and insert the trailing wire above the third connector on the cassette interface (cassette motor line). After turning on the computer, the Rabbit is linked (switched on) by a SYS 9*4096 command which provides the Rabbit a link with your computer's BASIC language. The Eastern House Software logo appears on the screen and informs you that the Rabbit is linked. Ordinary link-up of the Rabbit does not eliminate the use of the Datassette in the normal Commodore LOAD, SAVE, and VERIFY modes. Instead, the Rabbit adds its own load (*L), save (*S, *SS, and *SL) and verify (*V) commands to those of the Commodore. The Rabbit commands are an asterisk followed by the first letter of the Commodore command, which makes them easy to remember.

With the Rabbit installed, a program which takes four minutes to load from a cassette tape in the Commodore mode can be saved onto a new tape in less than one minute using the Rabbit SAVE (*SL) command. The three Rabbit SAVE commands all work in the same way, except that *SL gives a longer leader tone at the beginning of the save operation to make sure that the leader at the beginning of the cassette tape has passed by the record head before the program is saved. The *S and *SS commands give progressively shorter leader tones and can be used to save programs in the middle of the cassette.

The Rabbit commands *L, *S, and *V are used like the corresponding operations with the Commodore commands LOAD, SAVE, and VERIFY, except the wait is much shorter. The *V (verify) command does not compare the information on the tape with that in the computer's memory, but checks to see if the information on the tape can be read by the computer. This means the Rabbit will *V (verify) a taped program with nothing in the computer's memory.

At the end of a load (*L) or verity (*V) operation, the screen will display the length of the program, the starting address, the ending address, and the name of the program in reverse video. The length of the program and the addresses are in hexadecimal (hex) notation.

A list, or directory, of the programs on a tape may be seen by simply asking the computer to load a program that is not on the tape. By typing *L "*" followed by RETURN and stopping the Datassette at the end of the tape, a list of the programs or data files on the cassette will be displayed.

Additional Features

The Rabbit contains some math functions which will convert the hex notation used in the program lengths and addresses to everyday decimal numbers (*H) or convert decimal numbers to hex (*D). Example:

*H 0801 (RETURN) = 02049
*D 2049 (RETURN) = 0801
*H A1B1 (RETURN) = 41394

Hex address $0801 is the beginning address of all normal BASIC programs (on the Commodore 64) and will be listed each time the program is loaded. To LOAD a program or a machine language subroutine at a different address, you can use the command *L "Program Name",xxxx, where xxxx is the hex notation starting address of the program. The length and addresses are displayed on the screen at the end of the loading operation.

The Rabbit can also append a program to one already in the computer's memory provided there is no duplication of line numbers in the two programs. Appending is done by simply typing *A "PROGRAM NAME". The Rabbit will search the tape and append the new program to the one in the computer's memory. This procedure could be handy for those of us who like to

FCM™: The Filing, Cataloging and Mailing List Program that does everything.

FCM, formerly 1st Class Mail, is a lot more than just the best mailing list program you can buy. Because along with being the most flexible and easy-to-use mailing list program there is, FCM also handles a number of other tasks more easily than any other program of its kind.

You can use FCM for anything you'd keep on file. Like your address book, household bills, stamp or coin collections, Christmas card list (know who sent you a card last year), fishing gear inventory or medical records.

Or how about a list of important dates (FCM will let you flag them by name, date and occasion). Or maybe you'd like to use FCM for a guest list for a wedding. FCM will even record RSVP's, gifts and thank you notes.

What's more, FCM is incredibly easy to use.

Special Features

FCM lets you create your own mailing label. Which means you can make your labels look the way you want them to. You can even decide to print right on the envelope. Or add a special message line like "Merry Christmas" or "Attention: Sales Manager." FCM is extremely flexible.

And speaking of flexible, FCM lets you search and sort in any of 12 different categories. So you can organize mailings any way you want: by state, company name, zip code or whatever you like. If you're using FCM to catalog your home library, you might want to sort by title, author or category. It's completely up to you.

But one of the best parts about FCM is being able to create your own headings. Because that lets you store, file and catalog just about anything you'd like to keep tabs on.

The Form Letter Feature*

FCM is compatible with many word processing programs such as Screenwriter II, Applewriter I/II/IIe, Apple Pie, Pie Writer, WordStar/MailMerge and Magic Window I/II. Just a few simple commands and you can automatically combine your form letters with your mailing list for professionally formatted documents.

Stop by your Continental Software dealer. Or call us today to find out all about FCM. No matter what you're cataloging, from a household inventory for insurance purposes to a 25,000 person mailing list, FCM is the best program you can buy.

It's true, you still have to lick the stamp. But we're working on it.

Available for: Apple II/IIe, IBM PC/PC XT, Commodore 64, Texas Instruments Professional.

*Available on most versions.

For your free 64 page booklet, "Tips for Buying Software" and complete product catalog, please write Continental Software, Dept. GAZ, 11223 S. Hindry Avenue, Los Angeles, CA 90045, 213/417-8031, 213/417-3003.

Well, almost.

Continental
Software

A division of Arrays, Inc.

FCM is a registered trademark of Continental Software. Apple II/IIe, Applewriter I/II/IIe are registered trademarks of Apple Computer, Inc. Screenwriter II is a registered trademark of On-Line Systems, Inc. Apple Pie/Pie Writer are registered trademarks of Hayden Software. WordStar/MailMerge are registered trademarks of MicroPro Intl. Corp. Magic Window I/II are registered trademarks of Arrays, Inc. IBM PC/PC XT are registered trademarks of IBM Corp. Commodore 64 is a registered trademark of Commodore Business Machines, Inc. Texas Instruments Professional is a registered trademark of Texas Instruments, Inc.

work on long programs or develop games using sprites or graphics routines.

The Rabbit can test your computer's memory for storage retention (test 1) and for proper chip select operation (test 2) with the command *T followed by the test number, starting address, and ending address of the memory to be tested. Any errors will be displayed in reverse video.

The Rabbit also has other useful commands:
*E Execute–LOADs (*L) and RUNs the program.
*G xxxx—go to the machine language program at hex address xxxx.
* —go to to CBM monitor (a monitor must be in memory).
*Z —toggle lowercase versus graphics character set.
*K—(Kill the Rabbit) removes the link to BASIC.

When using programs already recorded in the Rabbit mode, the usual LOAD, SAVE, and VERIFY commands can be used in place of the Rabbit commands. This is done with a system command that disables the Commodore mode and replaces the Rabbit commands with those of the Commodore.

Data Files, Too

Another added feature of the Rabbit is its ability to use the Rabbit mode to generate data files. This feature means that waiting times for writes and reads of data transferred to and from the Datassette will be much shorter.

The Rabbit generates short and long data files. The short files use the cassette buffer memory and hold only 192 bytes of information before a pause to allow the computer to transfer the data to the Datassette is necessary. The long data files use 1K (1024) bytes of the computer's BASIC memory, which, of course, decreases available memory by 1024 bytes.

The Rabbit does not speed up the loading of programs already saved in the Commodore mode. These programs must be loaded as usual with the Commodore LOAD command and then resaved with the Rabbit commands. (Remember to use the *SL command for the first program on a new tape.) The Rabbit copy may then be used whenever you wish to load the program quickly.

Rabbit + Quickfind = Fast Tapes

If you are thinking about sitting down and resaving all your present program files in the Rabbit mode, why not go one step further—use the "Quickfind" program from the premier issue (July 1983) of COMPUTE!'s Gazette to make the resulting tape into a super job. Quickfind was adapted for the Commodore 64 and VIC-20 by Harvey Herman, Gazette associate editor. It allows you to rapidly locate any program on a cassette. Quickfind can be typed in, saved (*SL) onto a work tape, and then run. The only change that must be made to use the Rabbit with Quickfind is to change LOAD in line 335 to *E.

Following the instructions in the Quickfind article, LOAD each program into memory from the Commodore mode tape and SAVE (*S) them onto the Quickfind tape. When you are finished, rewind the tape and Execute (*E) the Quickfind program. The menu of programs on the tape will be displayed on the screen. Choose the desired program by number, press RETURN, and follow the instructions on the screen to PRESS FAST FORWARD ON CASSETTE. When the Datassette motor stops, the screen prompt will say PRESS STOP ON CASSETTE. Then the screen will say *E "Program Selected". Press RETURN and the PLAY button on the Datassette. It takes only about two minutes from the *E (Execute) "Quickfind" to the running of your selected program, even if the program is at the end of a C-30 cassette holding nine or ten programs of 16K bytes or less.

Rabbit Is Reliable

In my usage the Rabbit worked well, and I recommend it. There were no SAVE (*S) errors and very few LOAD (*L) errors with the Rabbit. Most of the few errors were caused by placing the Datassette too near the television set which I used as a monitor. (TV sets emit strong magnetic fields.)

The Rabbit documentation is well-written, with examples and a short demonstration program on Rabbit data file capability. The program shows how both short and long data files work.

In a telephone interview with Carl Moser, who wrote the Rabbit program for Eastern House, Moser stated that the Rabbit mode should be more reliable than even the normal Commodore mode. His reason is that the Rabbit checks both the leading and trailing edges of a tone to decide if it is a one or zero (files are stored on tape as a series of tones). The improved routines used by the Rabbit were worked out with recording studio equipment to give increased reliability at the faster speeds.

My only disappointment

PROBABLY, the FASTEST GAME YOU'll EVER PLAY!

BLITZ

FOR THE COMMODORE 64®

BLITZ INVADES EARTH!

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**

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.

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

with the Rabbit was that it would not make a Rabbit mode backup of protected commercial programs I already own (of course, neither will a disk drive). Moser stated that an updated version of the Rabbit which would make a backup copy of almost all programs was in preparation and should be available by the time this appears. The owners of the earlier 2.0 and 2.1 versions of the Rabbit may have them upgraded by Eastern House. A charge will be made for labor and the additional ROM needed for the upgrade.

My early 2.0 version of the Rabbit, of which only a small number were produced, had a few bugs. Eastern House was already aware of them. Execute (*E) and LOAD to a different address (*L "Program Name", xxxx) would not work. Moser says an upgrade of the 2.0 version to the 2.1 would be made by Eastern House for a handling fee (for more information contact Eastern House).

Low Cost, High Speed

In my opinion, the Rabbit's only drawback compared to a disk drive is that it still uses tape — meaning that the first programs or files on a cassette must be passed over to load or read the programs or files stored after them. Using the Quickfind program should help alleviate this problem.

The Rabbit allows the storage of up to 300K bytes of data files or programs on both sides of a C-30 tape. The 30-minute tape is the longest length recommended by Commodore for use in the Datassette. The Rabbit and Datassette combination may also be a very good backup to the disk drive, since it stores a large amount of data at relatively low cost. The Rabbit, which lists for $39.95, combined with your Datassette is the beginning of a low-cost mass storage system. Cassette tapes are inexpensive and easy to mail or store.

Does the Rabbit plus a Datassette equal a poor man's disk drive? Yes, I think so!

VIC/64 Rabbit
Eastern House Software
3239 Linda Drive
Winston-Salem, NC 27106
$39.95

Busicalc For VIC And 64

Richard Devore

If you do or need to do financial projections for home or business, *Busicalc* may serve your purpose much better than pencil and paper. Besides, you didn't buy your computer just to play games, did you?

Busicalc is a spreadsheet program for the Commodore 64, VIC-20, and PET/CBM computers (this reviewer examined the 64 version). It allows you to set up sales projections, budgets, bowling team averages, or any other figures in row and column format. It is particularly useful if you have variables for a "what-if" analysis. By typing in the changes and recalculating, the program shows what effect the changes will have on your end result. Each time the figures are changed, a hard copy may be made on a printer for later reference.

Changes may also be saved on disk. But be sure to have a formatted disk handy, because *Busicalc* does not allow you to format a disk once the program is loaded. Not having a formatted disk would leave you, at best, with a printout—which means the work would have to be redone once you left the program to format the disk.

Easy To Learn

The *Busicalc 64* package comes with a program disk, 36-page manual, and a licensing agreement. The agreement is pretty much standard—you never actually "own" the copy-protected program, but you are allowed to use it on one computer at a time. A backup copy may be obtained when the warranty registration card is returned with $10, a reasonable fee.

For the most part, the manual is complete and includes several tutorials on using the program. These progress from a simple sales projection of four rows and four columns to a 27-row by 9-column spreadsheet which starts with sales and computes the commission, net sale, costs of goods, and gross profits. The final example sets up a personal budget. This tutorial includes the normal income and expense items. After setting up the budget, you are shown how to work with it, something that is immediately practical.

Following each tutorial, you are taken step by step through the program's commands and functions. There are a few errors in the documentation, but they are eas-

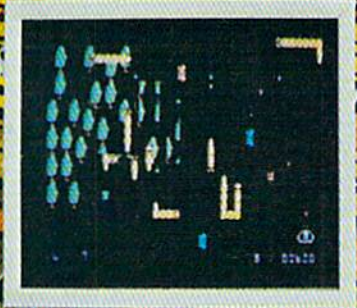
for the COMMODORE® 64

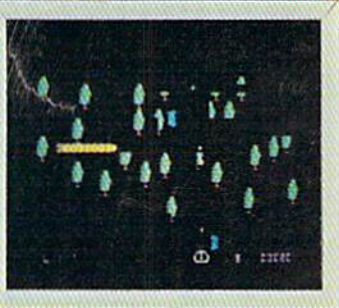
KILLER PILLER

ONLY *9.99

SUGGESTED INTRODUCTORY RETAIL PRICE

Take careful aim at the caterpillar eating it's way through your orchard... and ... FIRE! Uh oh... looks like your hit was not placed too well because where there was once one caterpillar there are now two... each growing at an alarming rate as they hungrily devour your trees. Will your next hit be on target or will their offspring, those devious killer moths, get to you first? And, if you think the killer moths are tough, just wait until you encounter their mutant cousins! But don't get tempted to overuse your spray because as sure-as-shoot'n those beasties will build up an immunity to it.





100% Machine Code
7 Screen Levels
2 Skill Levels

*CASSETTE VERSION
Disk version $12.75
Also available for Vic 20. Cassette only at $9.99

Write or phone for catalog—Dealers invited to order, see your local dealer or order direct from us. Check, M.O., Visa and Master Card welcome! Add $2.00 for Shipping.

CASTLE SOFTWARE

P.O. Box 350
New Castle, DE 19720
(302) 429-8565

ily recognized and compensated for. I was amazed at how quickly I could learn the program from the tutorials, and I feel they are well done.

Busicalc 64 does not make use of the 64's sound or color capabilities. On the 64, the maximum sheet size is 33 columns by 33 rows with an eight-character column width, or any row and column format that does not exceed 1100 eight-character blocks of information.

Formulas may be put into any block, addressing information in any other block. However, since the program performs all calculations from the top left of the sheet to the bottom by columns, working from left to right, if a value for a formula being worked is positioned beyond the formula (i.e., the formula is in column C and the value is in column E), the anwer will be wrong. This can be circumvented, but it is both inconvenient and apt to be overlooked.

Although the manual states that you may use formulas of up to 38 characters, brackets are not allowed. This slows things down greatly. For example, you cannot take a figure in column A, multiply it by a number, add that to a figure multiplied by a number in column B, and place the answer in column C. Instead, it would be necessary to add two columns to the sheet. These would hold the answers from each multiplication so you could add the figures in each of the two new columns by the formula and place this answer in what originally was column C.

Numerous Commands

I found *Busicalc* to be a simple-to-use spreadsheet program because of the control functions. They are accessed by the slash (/) key and appear at the top of your screen. The control functions are:

- *Jump*—Move directly from one block to another without scrolling.
- *Save*—Store all or any portion of the sheet to disk or tape.
- *Load*—Bring a saved file onto your worksheet from either a disk or tape.
- *Replicate*—This function, along with the math formulas, gives the program its power and makes it a lot quicker than pencil and paper. It allows you to copy any section of your worksheet to any other section of the sheet, making it unnecessary to type in the same information over and over.
- *Insert*—Squeeze in a row or column that you may find necessary after setting up the worksheet.
- *Delete*—The reverse of Insert, lets you remove an unneeded row or column.
- *Print*—Make a copy of the worksheet on paper.
- *Auto*—Keep the program from performing individual calculations until you finish your input, thus saving time while typing. May be toggled on or off as desired while control functions are being displayed.
- *Walk*—Select the direction the cursor will move upon pressing the RETURN key as you finish an entry. The selections are: up, down, right, left, and cancel.
- *Format*—Specify the spacing between adjacent columns. This is done by selecting the width of each column before the worksheet is printed. You may even choose not to print a column by setting its width to 0.
- *Memory*—Keep track of memory usage by showing available memory at the top of the screen. It also does a "garbage collection" each time it is used, thus helping to conserve memory.

I found *Busicalc* to be a useful program for real-world applications. It is also easy to learn. Although it does not have the calculation power of some other spreadsheet programs, it also costs less than the more powerful products.

Busicalc
Skyles Electric Works
231E South Whisman Road
Mountain View, CA 94041
Commodore 64 tape/disk $69
VIC-20 disk $59
VIC-20 tape $49

Ski-er 64

Eric Brandon

It's 102 degrees outside, but suddenly you find yourself transported to a ski resort in the Swiss Alps. This bit of magic is *Ski-er 64*, by Abacus Software, a fun and realistic downhill skiing game.

The resort has three runs: the Slalom, Giant Slalom, and the Alps. In the first two, when you pass the starting gate, a clock starts timing your run with 1/10-second precision. If you can go around all 40 gates on the course, without missing any, smashing into them, or going off the edge of the screen, you then pass through the finish gate, ending your run and stopping the clock.

The giant slaloms are wider apart than the regular slaloms, so they require tighter turns. For a really exciting run, however, you

Look at these Features

- Fully screen-oriented
- Horizontal and vertical scrolling
- Terminal mode — never seen before on a wordprocessor
- Supports Commodore disk and cassette handling
- Imbedded commands

Bliztext

Wordprocessor for Commodore 64

BLIZTEXT is a trademark of ELCOMP PUBLISHING, INC.

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

Dealer and Distributor inquiries are invited.

BLIZTEXT — SUPER WORDPROCESSOR for the Commodore-64

— ON SALE NOW! —

- Fully screen-oriented, up/down, left and right scrolling — Upper and lower case
- More than 70 commands
- Full I/O compatibility with Commodore peripherals Upper and lower case
- Works with practically every printer on the market, user definable printer control commands
- INCLUDE command allows handling large files on up to 4 diskettes or on cassette.
- Build in terminal software for electronic mail and networking. Telecommunications mode, upload and download, save on disk or cassette.
- Dynamic formatting, Imbedded commands
- Single keystroke for disk directory and error channel
- Program comes on disk or cassette
- Double line spacing, left and right margin justification, centering, page numbering, and practically everything one expects from a good wordprocessor.

AVAILABLE NOW!

Order # 4965 $89.00
Manual only (62 pages) $29.95

MACROFIRE - Editor/Assembler for the Commodore-64

ON SALE NOW
AVAILABLE IMMEDIATELY

One outstanding tool, consisting of 3 powerful elements combined into one efficient program!

1.) Fully screen-oriented Editor (more than 70 commands)
2.) Very fast assembler with macro capability
3.) Machine Language Monitor

Assembly can be started from the editor. Translates in 3 passes. More than 1,000 lables, screen oriented/no line numbers, scrolling, includes disk files.
Practically everything the serious machine language programmer needs everyday!

Manual only $19.95
Order # 4963 $89.00

THE GREAT BOOK OF GAMES, VOL.I, by Franz Ende

46 programs for the Commodore 64
Introduction to graphics and sound. How to program your own games. Walking pictures, animation, high resolution graphics, programming tips and tricks, hints and useful subroutines for the beginner and advanced programmer. This book is a MUST for every C-64 owner.
Come and get it — It's yours for only $ 9.95
Order # 182 128 pages $9.95
Programs from the book on disk.
Order # 4988 $19.95

MORE ON THE SIXTYFOUR, by H.-C. Wagner

How to get the most out of your powerful Commodore 64. Very important subroutines, tricks and hints in machine language for your C-64. How to modify DOS. How to connect a parallel and serial printer. How to design your own terminal program for communication and networking. Dig into I/O for cassette and disk.
Order # 183 $9.95
Programs from the book on disk
Order # 4989 $19.95

NEW PRODUCTS

Watch out for our new books, software and add-ons to come soon. ON SALE NOW! -- ORDER TODAY!

How to program in 6502 Machine Language on your C-64 , by S. Roberts (Introduction)
Order-# 184 $12.95

Commodore-64 Tune-up, Vol. I, by S. Roberts
How to expand and customize your C-64.
Order # 185 $12.95

Small Business Programs for the Commodore-64 by S. Roberts
How to make money using your C-64. Mailing list, invoice writing, inventory, simple wordprocessing and much more.
Order # 186 $12.95

Hardware Add-Ons:

Parallel printer interface KIT	Order # 4990	$ 19.95
Direct Connect Modem KIT	Order # 4991	Ask f.price
Universal Experimenter Board	Order # 4970	$ 9.95
Expansion Board, space for four experimenter boards(board only)	Order # 4992	$ 29.95

For your VIC-20

Tricks for VICs $ 9.95
Universal Experimenter board

HOFACKER

PAYMENT: check, money order, VISA, MASTER CARD, Eurocheck, ACCESS, Interbank
Prepaid orders add $3.50 for shipping (USA)
$5.00 handling for C.O.D.
All orders outside USA: add 15 % shipping, California residents add 6.5 % sales tax.

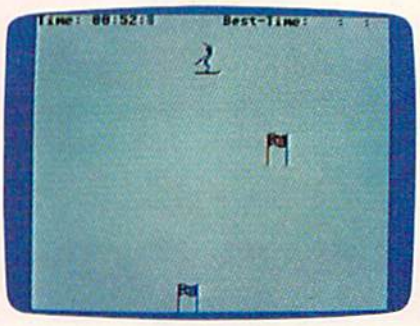
ELCOMP PUBLISHING, INC
53 Redrock Lane
Pomona, CA 91766
Phone: (714) 623 8314
Telex: 29 81 91

ELCOMP PUBLISHING, INC.
53 Redrock Lane
Pomona, CA 91766
USA
Phone: (714) 623-8314
Telex: 29 81 91

ELCOMP Computer (S) Pte. Ltd.
89 Short Street
Unit 03-07, Golden Wall Auto Centre
SINGAPORE 0718
Phone: 3382623, 3388228
Telex: 56516

Ing.W. Hofacker GmbH
Tegernseerstr. 18
D-8150 Holzkirchen
West-Germany
Phone: 08024 / 73 31
Telex: 52 69 73

Hurtling down the Alps in Ski-er 64.



Weaving around obstacles on the slalom slope in Ski-er 64.

can try the Alps. This involves skiing down the slope as fast as you can, without hitting any of the numerous trees on the course. A very nice three-dimensional effect is achieved by the game and it looks very realistic, especially on the Alps run. If you successfully navigate through this forest, you once again pass through a finish gate to freeze your time. To make it fair, three separate "best" times are kept by the game, one for each type of run.

Program Controls

The control is very precise once you're used to it. You can use either a joystick or the keyboard. With the joystick, turning right or left is achieved by tapping the stick in either direction. Holding it too long (more than about half a second) in either direction will turn you horizontally and stop your motion. When you are in this position, you can either turn back or ski some more, or you can push yourself forward with your poles. When you're going downhill, pushing forward speeds you up (you can go incredibly fast for a while before you're hit by a tree), and pulling back on the stick slows you down.

With the keyboard you have identical control, except that you use the cursor keys to turn, and the SHIFT and Commodore keys to control your speed.

Just to keep things interesting, programmer Jeff Hanson added three skill levels to each run. You choose these levels by pressing either f1, f3, or f5 before starting. The levels determine how far down from the top of the screen your skier will be, and consequently how much warning he has of objects appearing from the bottom. The first novice level is enough to keep me busy, and I can't imagine anyone would ever be bored with level three, the most difficult.

A short manual is included with the game, but all the instructions you need are right on the screen.

Ski-er 64
Abacus Software
P. O. Box 7211
Grand Rapids, MI 49510
$17.95 disk
$14.95 tape

Mini Jini For VIC And 64

Gregg Peele, Assistant Programming Supervisor

Do you remember why you first decided to purchase your own home computer system? Maybe you had dreams of totally automating the more tedious aspects of your life. All your records could be kept on disk—making record-keeping as simple as typing in the information and hitting a few keys to process the data. Keeping and organizing records is an important application for home computers and is accomplished through the use of a data base manager program. Such a program makes managing records easy with built-in commands for most data base functions.

Using A Data Base Manager

Data base management systems must be capable of performing three basic tasks: defining and organizing a file of records, storing data in the file, and manipulating the file.

First, users must be able to create defined files with specific record descriptions. Just like a filing cabinet, a computer file has records grouped together because of a common denominator. Individual records are further subdivided into categories called *fields*, which are determined by the creator of the file. A typical file record in an address file might look like this:

File Name Address File

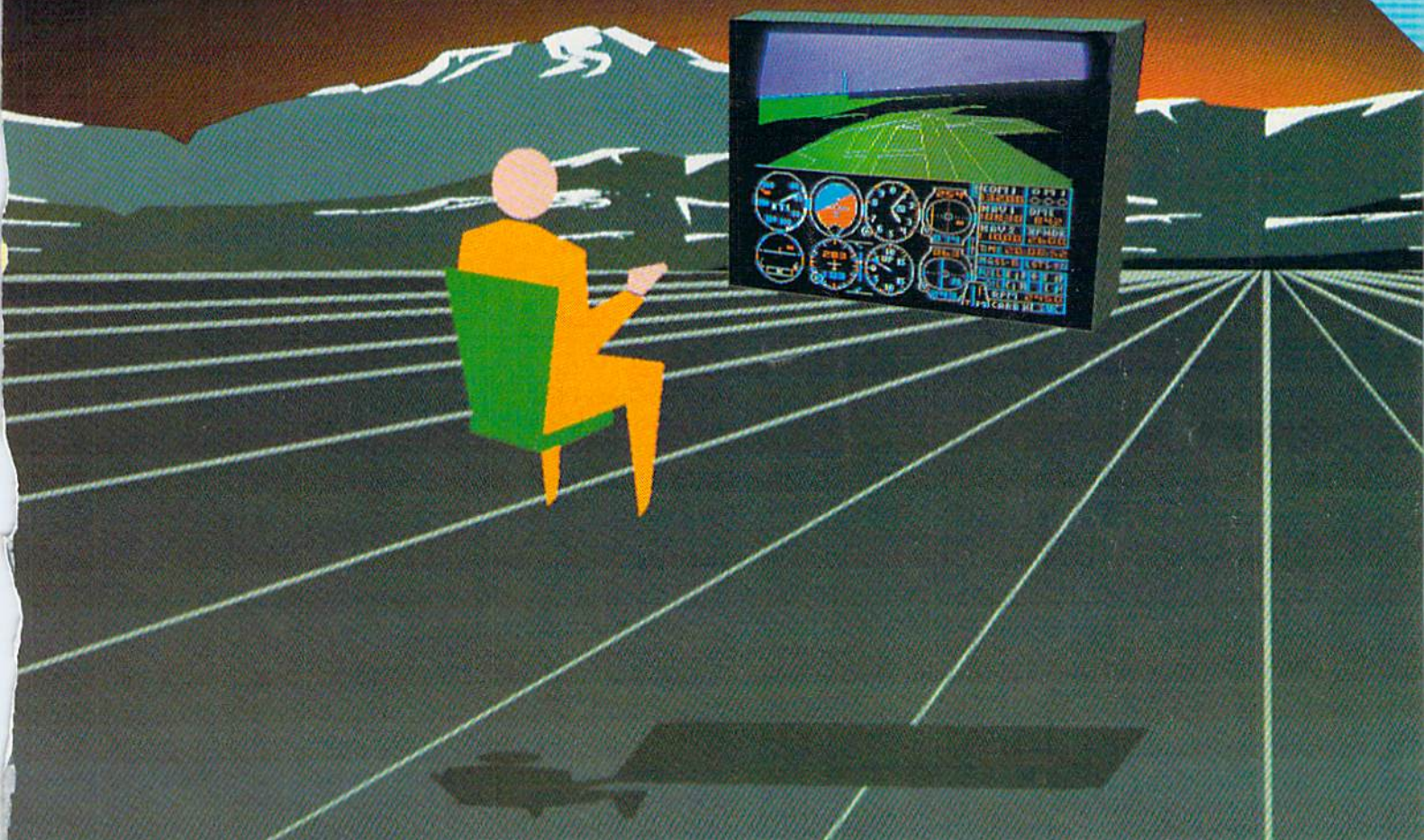
Record #1

Field Description

Last Name . . .	Doe
First Name . . .	John
Address	112 Mystery Place
City	Detroit
State	Michigan
Zip	57776
Account status	Paid

Flight Simulator II

For the Commodore 64™



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

See your dealer . . .

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

Order Line: 800/637-4983

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

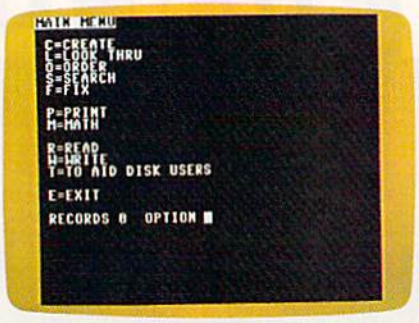
The first stage in using a data base file includes defining the name of the file, and the fields which categorize components of records. The definitions of the fields within records should be chosen carefully because they will be the means of sorting data.

The second stage in using a data base is the process of entering the data for each record. Most data base management programs prompt you with the field name that you have already defined, allowing you to fill in the slot with the appropriate data.

The third stage in your use of a data base management system is the actual manipulation of fields within records to produce reports, summations, or new interpretations of the information. For example, the address file mentioned previously could be sorted by the "Account status" field. We would then be able to print out all the names and addresses of only those people who have an outstanding balance. Similarly, fields can be alphabetized, added, subtracted, averaged, or multiplied by either a constant or another field within the record.

Data Base On A Cartridge

All these features and more are included in *Mini Jini*, a data base manager program for Commodore 64 and VIC-20 microcomputers. Available in cartridge form, *Mini Jini* starts automatically upon power-up—revealing a main menu. This menu contains options to create, review, alphabetize, find, fix, print, save, or load records from disk or tape. An option called "Mathpack" allows you to perform calculations on fields using either other fields or



The menu of options in the Commodore 64 version of Mini Jini.

constants. The results of these calculations may be stored in other fields.

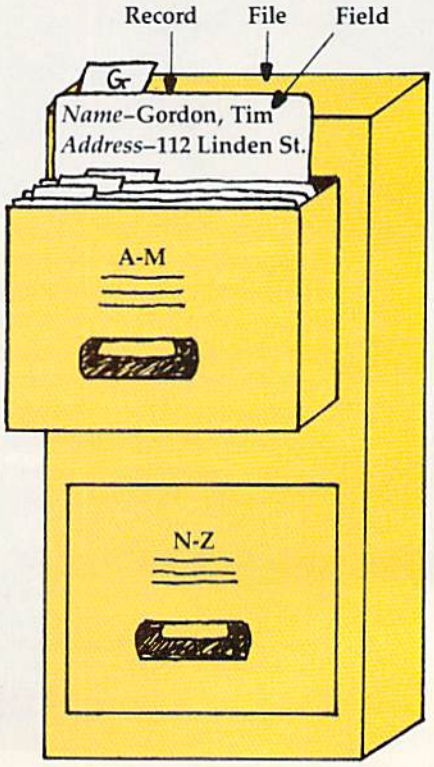
Creating file descriptions and entering data is very easy with *Mini Jini*. All points of data entry are carefully designed to be idiot-proof. Even if you make a mistake, you may return to the menu and fix your error. The documentation is also user-friendly. Designed to be used by computer novices, the manual contains clear, concise instructions and examples for every function. There is even a disk menu with prompts for viewing the disk directory and initializing and scratching files.

For an extra fee of $14.95 for disk or $9.95 for tape, a series of 79 predefined files is available. Although not a necessity, these predefined files may be helpful in designing your own data base. File descriptions include mailing lists, files for amateur radio operators, recipe files, and files for stocks and bonds.

One important consideration when purchasing data base software is the number of records your system can hold with its present memory capacity. *Mini Jini* allows you to store up to 350 characters per record on the VIC and 750 characters per record on the 64. Unexpanded VICs may store up to 50 45-character records. In comparison, the Commodore 64 has a capacity of 500 45-character records (with four fields or less) or 250 100-character records (with six to ten fields). A fully expanded VIC-20 can store as many records as a Commodore 64 (ten times the capacity of an unexpanded VIC). Files produced with *Mini Jini* are compatible with the *WordPro*, *Papermate*, and *BusyWriter* word processors.

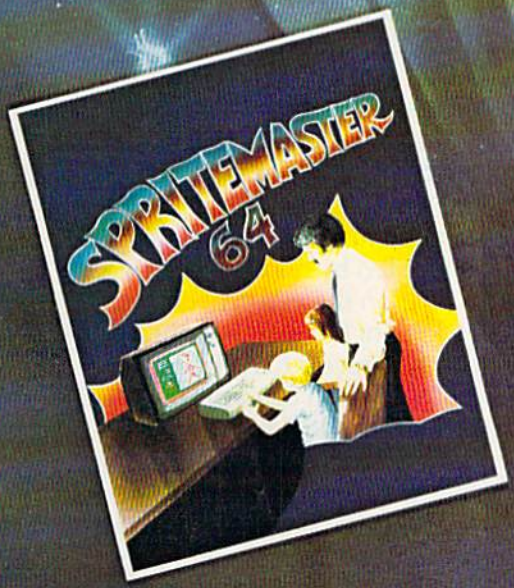
If you have a printer, you can print records by moving to the Print menu. From this menu, you may print all the data (including record numbers) by pressing P. Pressing R prints all the records in a report-style format, and pressing L prints your records in labels format. The manual provides a clear guide to the peculiarities of

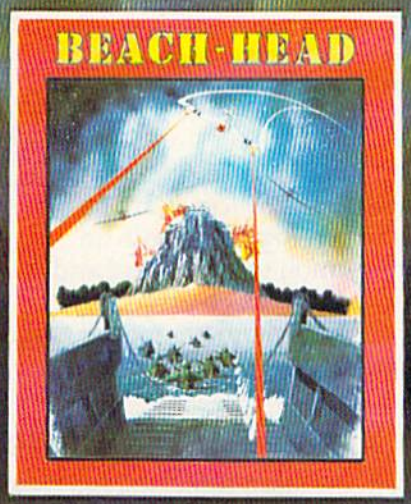
The Parts Of A Data Base

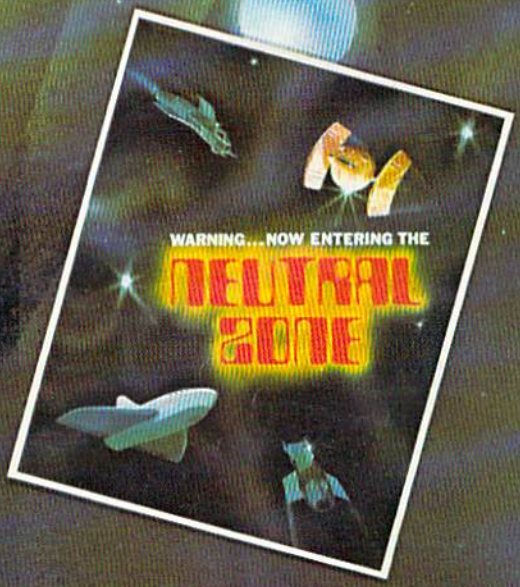


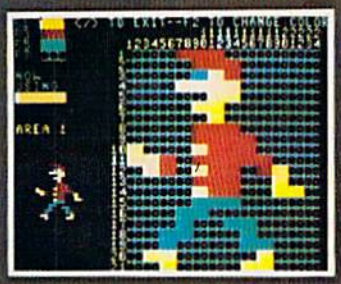
COMMODORE 64™ SOFTWARE

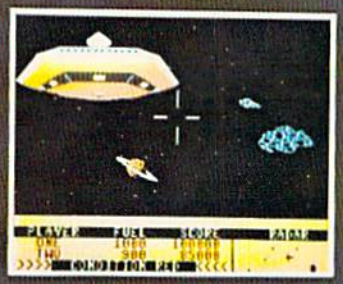
ACCESS











SPRITEMASTER™ is not just another sprite editor. It's the finest utility available for multicolor sprite animation and game programming. It will have you making full color animated objects in just minutes. People running, birds flying or tanks rolling are a snap with Spritemaster. It will **automatically** append your sprites to other programs. It's easy to use and understand and comes with a full 21 page instruction manual and samples of animated sprites to get you started. (Suggested retail price... $35.95)

GENERAL QUARTERS! BATTLE STATIONS! As chief commander of land and sea forces in the Pacific, your mission is to obtain a quick naval victory, and invade enemy territory with land forces. **BEACH-HEAD**™ is a 100% machine language game and offers multi-screen action with high resolution, three dimensional graphics. (Suggested retail price... $34.95)

NEUTRAL ZONE™ takes you to the outer edges of the galaxy, to ALPHA IV, a long range early warning station whose mission is to detect alien intruders from other galaxies.

NEUTRAL ZONE™ is the ultimate in high resolution, fast action, arcade quality games. It is written in 100% machine language and features smooth scrolling of the 360 degree panorama. The realism is unbelievable. (Suggested retail price... $34.95)

SPRITEMASTER™, NEUTRAL ZONE™ AND BEACH-HEAD™ ARE AVAILABLE AT YOUR LOCAL COMMODORE DEALER ON EITHER DISK OR TAPE.

ACCESS SOFTWARE INC

925 EAST 900 SOUTH, SALT LAKE CITY, UTAH 84105
TELEPHONE (801) 532-1134

printing with *Mini Jini* and how you can use *Mini Jini* files with compatible word processors.

Since *Mini Jini* has been constantly updated since it first entered the market, various versions exist—each with different features. To find out which version you have, hit the f5 key and the code number for your version will appear on the screen. Included with the software is a listing of the features unique to each version.

Mini Jini is an easy-to-use, well-documented data base program. Designed to be used by both beginning and advanced users, *Mini Jini* provides a low-cost, dependable means for microcomputer owners to save and organize records on tape or disk.

Mini Jini

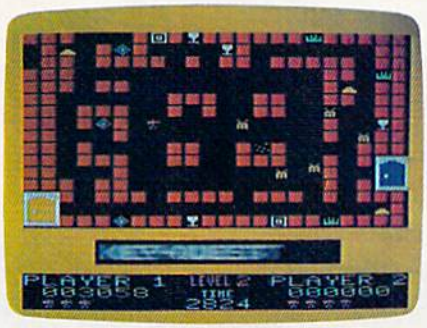
Jini Micro Systems, Inc.
P. O. Box 274 Kingsbridge Stn.
Riverdale, NY 10463
$89.95

Key Quest For VIC-20

Tony Roberts, Assistant Managing Editor

Deftly mixed color, special effects, and pace provide the potion from which a well-worn idea can gather the strength to rise again.

Key Quest, a product of Micro-Ware Distributing is a maze game and a chase game. It has treasures and monsters and keys that unlock doors leading to mazes more difficult than those that went before.



In quest of treasure, your hero (left-center) prepares to defend himself against an approaching yellow Gorb.

But in its blend of common ingredients, Micro-Ware has endowed *Key Quest* with an uncommon visual appeal and a liquid-like play challenging enough for a broad range of game players.

A Rainbow Of Colors

From the start, *Key Quest* is a treat for the eyes. The title screen slides in from the right, the unconventional horizontal scrolling commanding immediate attention. (The effect is used throughout the program for level changes and to reset the board when the inevitable collision with a monster occurs.)

The walls of the maze are built of brick, rich and red, on a black background. The treasures—gold bars, sapphires, emerald crowns, and silver chalices—almost glow from their protected recesses in the maze walls. The player is represented by a figure clad in regal purple, and the monsters stand out in gold. The entire playfield and the scoreboard below it contrast against an orange-yellow background.

There's color everywhere, but it's neither blaring nor boring. It is well-blended and a pleasure to look at. *Key Quest*'s only visual blemish may be the large block-lettered title that continually floats back and forth in a box above the scoreboard.

The Scenario

Many years ago, a master wizard traveled the land collecting treasure wherever he found it. Below his fortress, he built a dungeon in which to protect his riches. To guard his wealth, he created the Gorbs—powerful monsters that regenerate very quickly. The Gorbs, however, proved to be too powerful for the wizard himself, and the first time he sought to examine his treasure, he was eliminated by his own sentries.

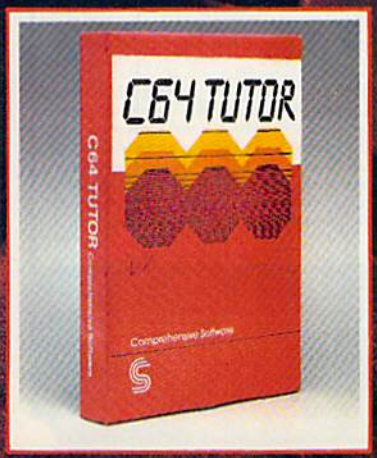
Upon the wizard's demise, the king of the land put out a call for adventurers to reclaim the riches that had been pillaged from the realm and its subjects. Plugging the game cartridge into your VIC-20 indicates your willingness to accept the challenge to restore the treasure. Armed with either a joystick or the keyboard, you delve into the underworld.

Hidden on each level of the dungeon is a key that opens the way to the next level. The key's location will be revealed to you once you have collected 12 of the treasures scattered about the maze. Once the key is visible, you must pick it up and make your way to the door. The Gorbs, which continuously emerge from the swirling cloud that marks their lair, serve to complicate the whole process.

Your Defense Is A Limited Offense

The fire button of your joystick will give you some help in fighting the Gorbs, but it is not universally effective. It fires only right or

BREATHE LIFE INTO YOUR C64



Now that you have it, put it to work. C64 TUTOR puts you in charge with a Commodore 64 tutorial, screen display editor, sprite editor, music synthesizer & programmer's calculator.

Use the tutorial to learn what your Commodore 64 can do. And how to do it. Create, edit & save one page of letters and/or pictures with the screen display editor. Enter sprites from the Commodore Manual. Or make up your own. Then edit and save them using the sprite editor. Sprite creation is quick, and easy. Play music with the music synthesizer. Use the programmer's calculator to add, subtract, multiply & divide in decimal, hexadecimal and binary. Includes AND, OR, XOR, Shift and 1's complement functions.

Great for new users. C64 TUTOR cures computerphobia and promotes computer literacy.

Take it from me, with a little power, the possibilities are endless.

Available for $29.95 at your computer dealer.

Comprehensive Software Support,

2316 Artesia Bl. Suite B.
Redondo Beach CA 90278
213/318-2561

left. If the Gorbs are above or below you, you'll have to run until you're in a more advantageous position.

Each of the treasures is hidden in an alcove along the walls of the dungeon. The master wizard, in a stroke of genius, protected these areas so the Gorbs would not disturb the treasure. In these nooks you'll find both safety and the most effective position from which to attack the monsters. A word of caution is in order here. If you point your joystick out of the alcove and fire, you begin moving in that direction and, in all probability, will be involved in a fatal collision with a Gorb.

Face into the alcove and fire, and you turn around and are able to defend your position without having to step into the hall. Shooting from an alcove gives you your best advantage against the Gorbs because your shots either hit a Gorb or a wall very quickly, giving you another shot. If you take aim at a Gorb that is down a long hallway, you have to wait until your bullet is spent before you're able to fire again.

The Gorbs are dangerous creatures. Touching one is always fatal, and a near miss is often just as tragic. In some cases, nothing happens if you briefly occupy a space adjacent to a Gorb, but at other times, the Gorb seems to fire a weapon of its own at you.

For safety, give the monsters a wide berth. The crafty Gorbs make a habit of hiding behind each other, disguising their numbers. Be watchful or you'll walk right into a Gorb you didn't realize was there.

At times, your best strategy is to stay hidden in an alcove for a while and shoot as many Gorbs as possible. This will give you a little maneuvering room when you return to treasure hunting.

Building Your Score

High point totals are based on how quickly you discover the hidden keys and move on to new levels of the dungeon.

You pick up points as you pick up treasure. Each of the four treasures has a value ranging from 25 to 100, and each Gorb you shoot is worth 50 points. It's not worth the effort to try to pick up 100-point gold bars as opposed to 25-point emerald crowns. Your best score comes as you accomplish your mission with time left on the clock.

As you enter each level, a time clock begins ticking backwards from 3000. When you leave a level, 100 points will be added to your score for each 100 units left on the clock.

Key Quest has four screens, and after you make your way through those the first time, the screens repeat, but with more and faster Gorbs in your way. A secret passage on each screen allows your player to be transported to the opposite side of the screen. Be certain the exit isn't surrounded by Gorbs.

Key Quest is an exciting and alluring game. It allows the player to develop patterns, but it doesn't become routine because there's more than one path to success. The game plays well and takes your joystick through a comprehensive workout.

Key Quest
Micro-Ware Distributing Inc.
Box 113
Pompton Plains, NJ 07444
$34.95

COMPUTE!'s Gazette

TOLL FREE Subscription Order Line

800-334-0868

In NC 919-275-9809

GemTech Laboratories

Effective software and peripherals for microcomputers

UNIVERSAL LABORATORY INTERFACE — An essential addition to any research or instructional laboratory, the ULI provides straightforward connection of experimental apparatus to micros. ULI features two 12 bit analog outputs, two 12 bit analog inputs, one 8 bit digital output port and one 8 bit digital input port. Access from BASIC is simple without POKEs or PEEKs. Existing XY recorders can be used as digital plotters, and oscilloscopes as hi-res graphics displays using included software. Available for PET/CBM, and soon for Commodore 64. $750.00

GRADEPRO — More than an averaging program, GRADEPRO is a flexible grade processor. It performs straight and weighted averages, permits counting lowest score less, and calculates class averages and standard deviations on each test. GRADEPRO generates bar graphs of grade distributions, and allows easy storage and retrieval of files on disk or tape. Classes can be arranged alphabetically or by score on any test. PROGRESS REPORT letters are generated AUTOMATICALLY!! Available for PET/CBM 32K, VIC 16K, Commodore 64, and soon for Apple 48K. $25.00

BIBLIOGRAPHER — An index card-type filing system for up to 350 bibliographic references per disk. References may be recalled by an author's last name or a combinaton of up to 10 user-defined keywords. Search display is available on CRT or printer or specific references may be transferred from CRT to printer during a search. Multiple file disks are easily handled to expand capacity. Available for Commodore 8032/4032 with dual disk and Commodore 64 or Apple 48K with single disk. $50.00

When ordering, specify system and include $2.00 shipping. Personal check, money order, MasterCard or Visa accepted.

GemTech Laboratories
731 Bundaberg Lane
Rural Hall, North Carolina 27045
(919) 377-2922

Sophisticated Software from Britain.

FREE UNIVERSE WITH EVERY TAPE*

*OFFER SUBJECT TO AVAILABILITY

AQUAPLANE
COMMODORE 64 SOFTWARE

Ski thru' Marine Maniacs, G&Ts, Regattas but beware the Great White Hungry!! AQUAPLANE is an unbelievable original Arcade Game.

PURPLE TURTLES
COMMODORE 64 SOFTWARE

A fully animated arcade game with Loveable Turtles, Cuddly Graphics and more Cuteness than you'll find in any other Commodore 64 game! A game for the young at heart and people who have tired of alien bashing.

QUINTIC WARRIOR
COMMODORE 64 SOFTWARE

Part Man, Part Superman the QUINTIC WARRIOR stands along against the sinister Crabmen and a Domed City gone mad in the distant future. Are you warrior enough to stand by his side in this MEGA- Arcade Game.

RING OF POWER
COMMODORE 64 SOFTWARE

The Colorful King has lost his mind and along with it the Crown Jewels! Now whosoever can find the Jewels shall be proclaimed King. Can you? RING OF POWER is a sophisticated adventure with a GRAPHICS or TEXT option.

TIMEX-SINCLAIR 1000, 1500 and 2000 and ACORN ELECTRON.

Send for Advanced Information on our new Timex-Sinclair and Electron Range.

SKYHAWK
VIC20 SOFTWARE

Attacking raiders scream out of the sky at you, you check your radar as an explosion blossoms at your side, you return their fire sending one of the attackers plummetting, the fuel gauge flashes a low fuel warning... SKYHAWK runs in 3K or 8K with a Joystick.

TORNADO
VIC20 SOFTWARE

Suddenly attacking Colony Fighters leap at me, I dive into their midst firing and still bombing the ground installations below, the sound of explosions rumbles away over the landscape... TORNADO runs on an unexpanded VIC20 + Joystick.

QS™

THE GAME LORDS OF BRITAIN

QUICKSILVA INC.
426 West Nakoma
San Antonio, TX 78216
Tel: (512) 340 3684

Please send me a free color catalog
I currently own or plan to buy a ..... computer
I enclose a stamped, self-addressd envelope
Name .....
No/Street .....
City .....
State .....
Zip C3

Budget Planner

Charles B. Silbergleith

This home budget program allows you to keep track of various household expenses and calculate totals quickly and easily. The same program works on either a Commodore 64 or VIC-20 (at least 8K memory expansion required).

In the dark days prior to automation, I would plan my budget by writing all my month's expenses on a sheet of paper, adding items, and adjusting amounts as I received a bill.

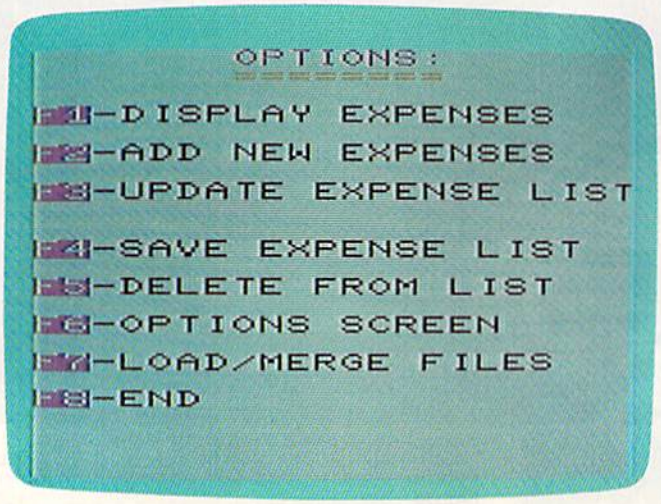
This process worked very well except for the number of revisions necessary for revolving credit accounts such as credit cards. Every time one of the item amounts changed, the grand total changed and needed to be recalculated. That was messy.

I decided to write a program which allowed me to make a list of my monthly expenses, to change amounts, and which provided a grand total of all items. I also wanted the program to save this list to tape and recall it.

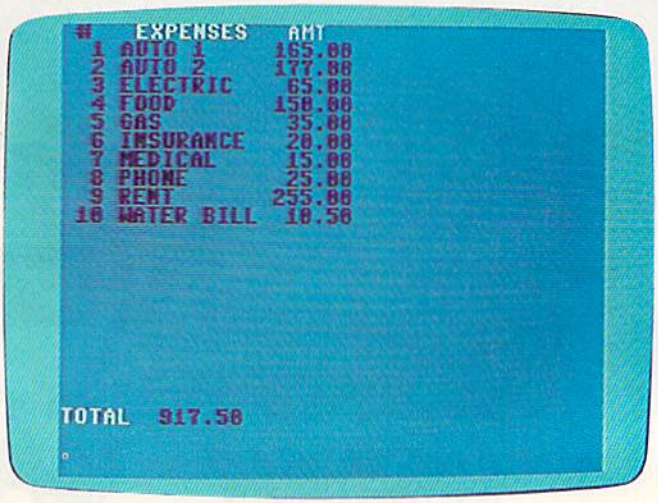
What was produced was a program that allowed me to maintain a list of expense items, add new items, change amounts, delete items, and it would quickly sort and sum all the amounts. This was useful in seeing whether new expenses could be incurred (could I really afford that new disk drive or not?), or whether bill consolidation would help.

Program Operation

First here are some basic characteristics of the program before I discuss how to use it. The list allows



The main menu in "Budget Planner" (VIC version).



A typical expense list made with "Budget Planner" (64 version).

COMMODORE 64 PROGRAMS

BUSICALC 3

BUSINESS
CALCULATION
PROGRAM

$129

The "TRUE 3-D"
Electronic Spreadsheet
for the Commodore 64

BUSICALC 1

BUSINESS
CALCULATION
PROGRAM

$69

A "BEST BUY"
Electronic Spread Sheet
for all Commodore's

BUSICALC 2

BUSINESS
CALCULATION
PROGRAM

$99

The MOST CAPABLE
Electronic Spread Sheet
for the Commodore 64

WE'RE HERE!

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

AVAILABLE NOW! Call 800 227-9998**
For the name of your nearest dealer,
detailed information or a catalog of products.
***California, Canada and Alaska, please call (415) 965-1735.*

In Europe: SUPERSOFT, Winchester House, Canning Road, Harrow Wealdstone, England HA3 7SJ, Tel. 01 861 1166

for entries of ten characters (maximum) per item and amounts of up to 9999.99. The list will be sorted, a total calculated over all item amounts, and the options menu displayed at the end of an add, update, or delete modification to the list. The sort is done by item name. You will be repeatedly prompted for the next add, update, or delete to the list until you type *END to one of the prompts for input. In fact, any function will terminate whenever you respond with an *END to a prompt.

Since the program was written for a VIC-20 (and converted for the Commodore 64 also), it uses the special function keys f1 through f8. Described below are the functions:

f1 **Display Expense List.** This function displays the list and a total of all item amounts at the bottom of the screen. Pressing f1 will display the next 20 items, and the cursor up and down keys scroll the list vertically. All function keys are available.

f2 **Add New Expense To The List.** This allows you to add a new item to the list. The program will not check for duplicates. However, it's simple enough to change or delete an item if you mistakenly duplicate one. Names are up to ten characters, and amounts should not be larger than + or − 9999.99. These restrictions are used to prevent the screen display from overlapping, wrapping around, or otherwise messing up on the 22-column VIC. Type *END to return to the menu screen.

f3 **Expense List Update.** The screen lists a number next to each item. This number is the item's index. Use this number for the ITEM # prompt. The item will be displayed and a new name or amount may be entered replacing the old data. Pressing the RETURN key without data when prompted for an ITEM NAME or AMT will leave the current data intact. Again, type *END to return to the menu.

f4 **Save The List On Tape.** The program asks for a FILE NAME. This should be any name that follows normal Commodore file naming conventions. This is the filename SAVEd on tape. Remember it.

f5 **Delete Items From The List.** The START AT and END AT prompts allow a block of items to be deleted by putting the starting and ending index numbers in the appropriate places. Leaving out the ending index will delete only the starting index number's item. Type *END when prompted for the starting index number to return to the main menu.

f6 **Display The Option Menu.** Function keys and their associated functions are displayed. See program lines 6030-6100 for details.

f7 **Load Or Merge A List.** A previously saved list can be loaded into memory or a list on tape can be merged with a list in memory. For the merge, an item on tape is compared to the items in memory, and if the item names match, their amounts are averaged together and replace the previous amount. If the item doesn't match, the item is added to the list.

f8 **End Of Program.** This function allows you to first save the list before actually ending the program—handy if you've forgotten to save the list before.

Technical Notes

The program is written using the modular concept of structured programming. This means that the program is written in order to isolate its various tasks. Common routines are separate from the routines that use them and are accessed by GOSUB statements.

The main routine (lines 200-299) calls various subfunctions at the user's request. A request to display the list (f1) calls a subroutine at lines 1000-1999; update (f3) calls lines 3000-3999, etc. Notice that each function key corresponds to a range of 1000 line numbers—f1 is lines 1000-1999; f2 is lines 2000-2999; f3 is lines 3000-3999, etc. This makes it easier to remember where things are in the program.

In addition, two utilities are included as separate modules for use by any function. These are the bubble sort, lines 500-599, and an accumulator, lines 300-399.

GOTO statements are kept to a minimum and are used only for branching within subroutines. While certain advocates of structured programming insist on GOTO-less code, I find it sometimes more cumbersome to eliminate all of them than to use a few. Again, the word to remember is *few*.

One last note. The variable SZ (line 20) controls the number of items that can be listed. Naturally, the more items on the list, the more memory is required. Since the computer will consume more memory as needed when the program runs, it is possible to make this variable too large and run out of room while working with the program. As an exercise, I suggest you add a function which will display the amount of memory left. Use the ? key to invoke it. I think you'll find it fairly easy to do given the way the program is organized.

See program listing on page 220.

Fast, Fast Relief From Expensive Software Blahs.

COMMODORE 64

HESWARE	List Price	But for You!
Attack Mutant Camel (CT)	$45	$29
Coco (CT)	$45	$29
Maze Master (CT)	$35	$23
Turtle Tutor (CT)	$40	$26
Turtle Trainer (CT)	$40	$26
Paintbrush (CT)	$30	$19
Home Manager (D)	$50	$33
Time & Money Manager (D)	$70	$45
Hesman 64 (CT)	$40	$26
Gridrunner (CT)	$40	$26
64 Forth (CT)	$60	$39
Turtle Graphics II (CT)	$60	$40
Multiplan (D)	$100	$79
Omnicalc (C&D)	$50	$37
Bengi (C&D)	$45	$28
Sword Point (C&D)	$35	$22
Attack Mutant Camel (CT)	$30	$19
SEGA		
Congo Bongo (CT)		
Buck Rogers (CT)	$40	$25
Star Trek (CT)		
EPYX		
Jumpman D&C	$40	$25
Temple of Apshai (C)	$40	$25
Upper Reaches Apshai (C)	$20	$13
Curse of Ra (C)	$20	$13
Starfire & Fire One (D&C)	$40	$29
Jumpman Junior (CT)	$40	$29
Lunar Outpost (D&C)	$40	$25
Dragonriders of Pern (D)		
Gateway to Apshai (C&D)	$40	$25
Pitstop (C&D)		
Crush, Crumble, Chomp (C&D)	$30	$19
SPINNAKER		
Alphabet Zoo (CT)	$35	$23
Cosmic Life (CT)	$35	$23
Delta Drawing (CT)	$40	$26
Delta Music (CT)	$40	$26
Facemaker (CT)		
Fraction Fever (CT)	$35	$23
Kids on Keys (CT)		
Kindercomp (CT)	$30	$19
Story Machine (CT)	$40	$26
Up For Grabs (CT)	$40	$26
SYNAPSE		
Protector (D&C)		
Shamus (D&C)		
Sentinel (D&C)		
Morgol (D&C)	$35	$23
Drelbs (D&C)		
Fort Apocalypse (C&D)		
Pharoah's Curse (C&D)		
CREATIVE		
Astroblitz (CT)		
Trashman (CT)		
Moondust (CT)		
Save New York (CT)	$35	$22
Pipes (CT)		
Spitball (CT)		
INFOCOM		
Planet Fall (D)		
Witness (D)	$50	$35
Enchanter (D)		
BRODERBUND		
Choplifter (CT)	$45	$29
Seafox (CT)	$40	$26
Serpentine (CT)	$40	$26
David Midnight Magic (D)	$35	$25
Bank St. Writer (D)	$70	$44
Lode Runner (D)		
Spare Change (D)	$35	$23
Drol (D)		

And Incredible Savings On:

Data 20 Word Manager (C)	Just $27
Data 20 Business Manager (D)	$89
Timeworks Data Manager (D&C)	$17
Timeworks Money Manager (D&C)	$17
Timeworks Programmer Kit (D&C)	$17
Continental Home Accountant (D)	$49
Lightning Mastertype (D)	$27
Sirius Wayout (D)	$27
Sirius Gruds in Space (D)	$23
Sublogic Pinball (C)	$20
Acess Neutral Zone (D&C)	$23
Practicalc (D&C)	$35
Programmable Spreadsheet	$55
Datamost Kids & The 64 (book)	$14
Commodore 64 Ref. Guide (book)	$17

(C) = Tape (D) = Disk (CT) = Cartidge

"$u¢h-A-Deal! $oftware."

903 S. Rural Rd. #102
Tempe, AZ 85281

TO ORDER FAST, FAST CALL TOLL FREE: 1-800-431-8697

For Information Only Call (602) 968-9128

Star Blasting Savings on the Latest Technology

HesModem	$49
Unitronics Wafter Drive Vic or C64	$119

COMMODORE VIC 20

WIZWARE	List Price	But For You!
Electronic Party (T)		
Square Pegs (T)		
Turtle Tracks (T)	$30	$19
Your Vic 20 (T)		
HESWARE		
Robot Panic (CT)		
Slime (CT)	$20	$13
Predator (CT)		
Torg (C)	$10	$ 9
Raid Israhm (CT)	$10	$ 9
Coco II (C&D)	$20	$14
Fort Apocalypse (CT)		
Lazer Zone (CT)		
Necromancer (CT)	$30	$19
Pharoah's Curse (CT)		
Attack Mutant Camel (CT)		
Kindercomp (CT)		
Facemaker (CT)	$40	$26
Story Machine (CT)		
SEGA		
Congo Bongo (CT)		
Buck Rogers (CT)	$40	$25
Star Trek (CT)		
BRODERBUND		
A.E. (CT)		
Seafox (CT)		
Mastertype (CT)	$40	$24
Lode Runner (CT)		
EPYX		
Temple of Apshai (C&D)	$40	$24
Sword of Fargoal (C)	$30	$19
SIERRA ON LINE		
Lunar Leeper (CT)		
Crossfire (CT)		
Threshhold (CT)	$30	$18
Cannonball Blitz (CT)		
CREATIVE		
Choplifter (CT)	$30	$19
Home Office (C)	$30	$19
Home Office (D)	$35	$22

Rock Bottom Prices on Peripherals!

	But For You!
MONITORS	
BMC 12" Green	Just $79
BMC 12" HiRes Green	$125
BMC 12" Amber	$89
BMC 12" HiRes Amber	$129
BMC 13" Composite Color	$259
DATA 20	
Vic 40-80 Display Mgr.	$79
C64 Video Pak 80 includes Word Mgr. Free	$149
Parallel Printer Interface	$45
CARDCO	
Vic 3 Slot Motherboard	$26
Vic 6 Slot Motherboard	$65
Vic 5 Slot C64 Motherboard	$45
Printer Utility Software	$17
WICO JOYSTICKS	
The Boss	$14
Bat Stick	$19
Red Ball	$21
Track Ball	$30
KOALAPAD	
Vic, C64, Atari	$79
PRINTERS	
Alphacom 40 Column	$119
Alphacom 80 Column includes Vic, C64, Atari cable	$179

ORDERING & TERMS: Send cashier check, money order; personal/company checks allow 3 weeks bank clearance. VISA/MasterCard accepted. Provide phone number with order. SHIPPING: Software add $3.00; Hardware add $10.00. Arizona residents add 6% sales tax. Returns must have authorization number (call 602-968-9128) for authorization number). All returned merchandise subject to restocking fee and **must** come with **all** original packaging. No returns allowed after 30 days from shipping date. Prices are for cash; VISA and MasterCard add 3%. Prices subject to change without notice. All products subject to availability from manufacturers and/or suppliers.

The Note Name Game

Jeff Behrens

"The Note Name Game" is an educational program which makes learning the notes of the musical scale easy and fun. Originally written for the unexpanded VIC-20, we've added a version for the Commodore 64.

Musical notation is like anything else—it's easy once you learn it, but learning it is not always easy.

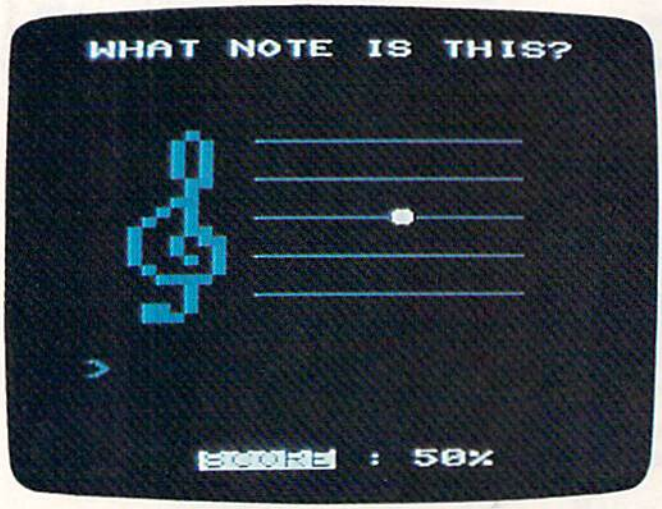
Sight-reading of notes is vital for anyone who wants to play a musical instrument, because instant note recognition is a must. That's the idea behind "The Note Name Game." My daughters, who are taking piano lessons, love playing it. Although it does not teach everything about musical notation, it does allow students to practice quick recognition of notes in the treble and bass clefs.

Treble Or Bass?

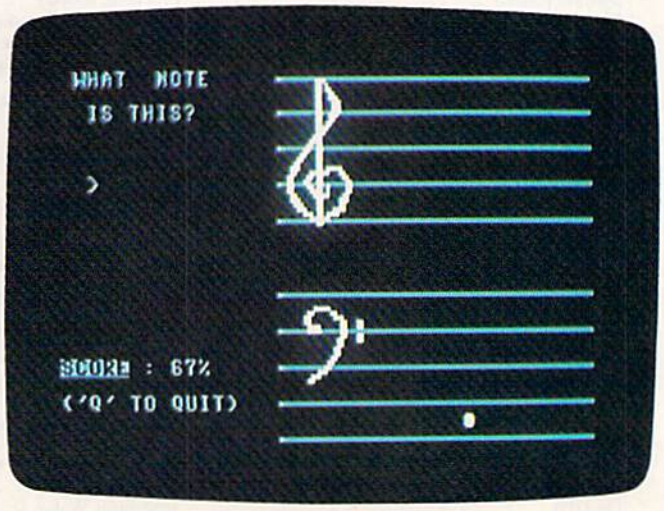
The program begins by asking whether you want to practice notes on the treble clef (enter a T), the bass clef (B), or a mixture of both (M). The program then selects a note at random and places it on the appropriate clef.

Next, the program asks for the letter name of the note displayed. If your response is correct, you are told so, and the next note is displayed. If your response is wrong, the correct answer is highlighted on the screen and the next note is shown. The program constantly updates your score and displays it on the screen.

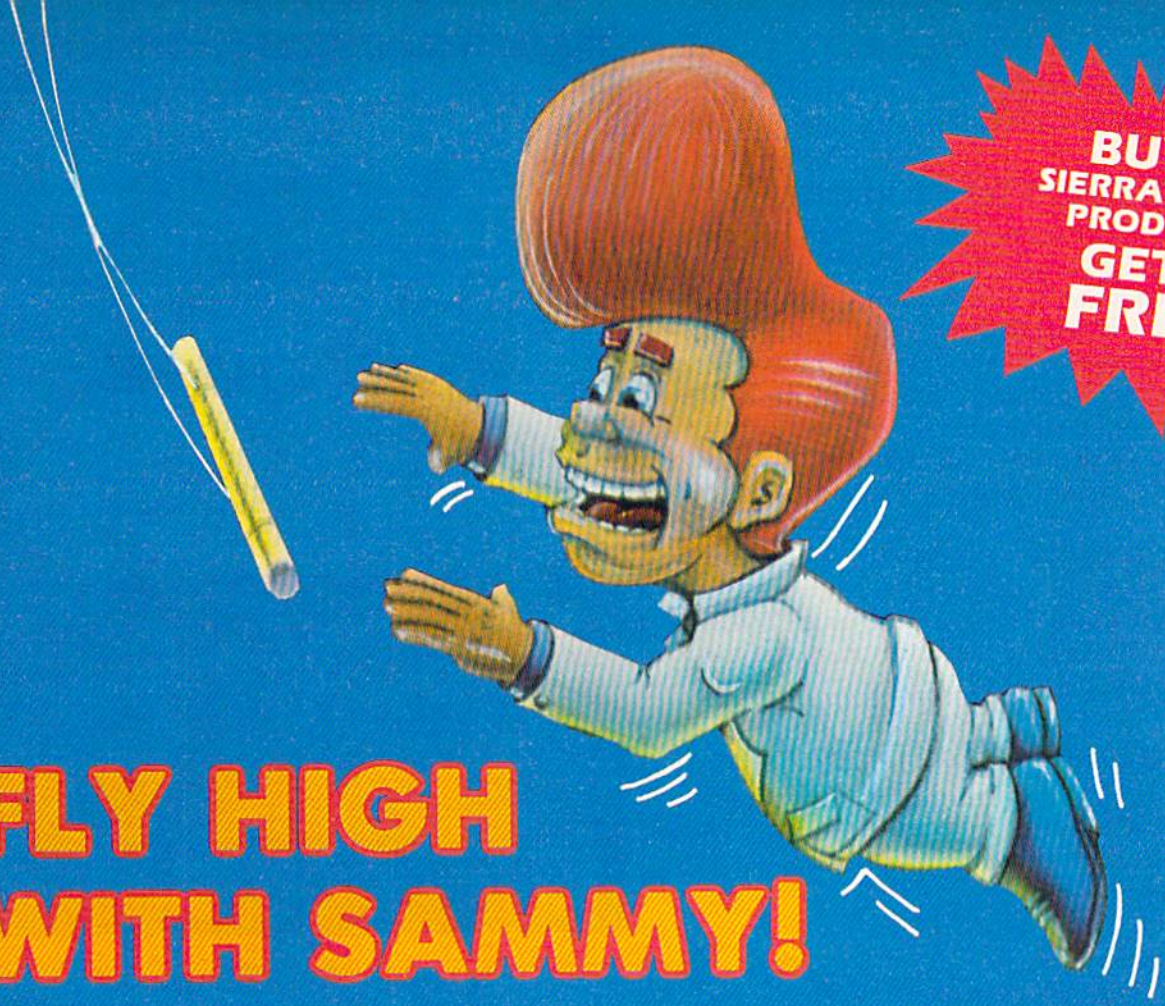
Notes are shown in sets of ten. If you wish to quit before finishing a set, type Q instead of the



Learning to recognize treble clef notes with "The Note Name Game," VIC-20 version.



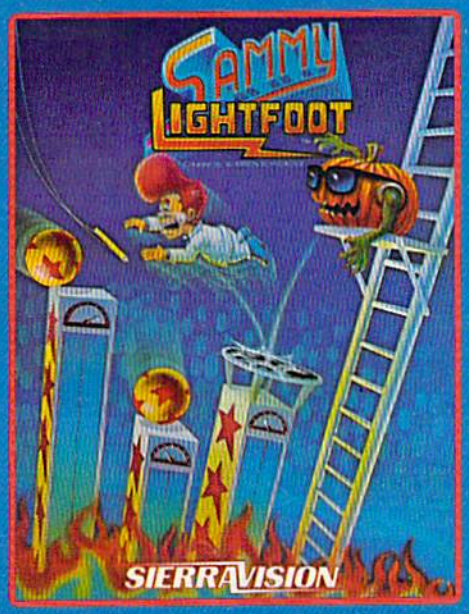
A bass clef note in the Commodore 64 version of "The Note Name Game."

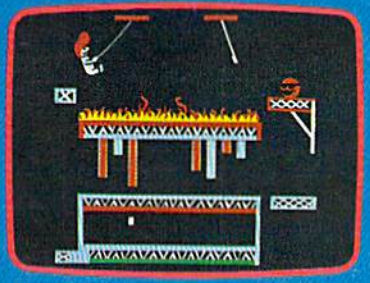


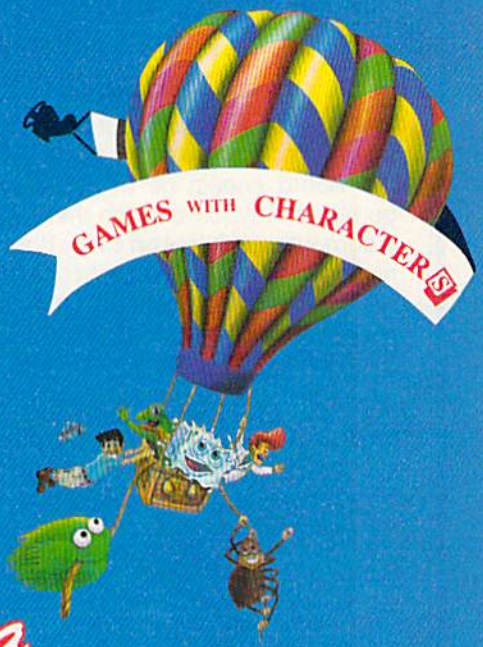
BUY 2 SIERRAVISION PRODUCTS GET 1 FREE

FLY HIGH WITH SAMMY!

Sammy Lightfoot's itching to break into show business. He's lined up an audition, and now you must put him through the toughest three rings of excitement this side of Barnum and Bailey. Run, leap, bounce and swing your way to the top in Scene One. Hop and glide through Scene Two. Dodge, duck and fly in Scene Three. The pace quickens through 12 levels of action, each with three scenes. Sammy Lightfoot's ready for the biggest break of his career. How about you?







Sierra ON-LINE™

SIERRA ON-LINE BUILDING COARSEGOLD CA 93614
209 683 6858

APPLE • ATARI • COM 64 • IBM • COLECO

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

answer. Whether you finish or not, the score is printed and you are asked if you want to play again.

Customizing The Program

Depending on personal preference, there are some changes you might want to make. With the VIC-20, I find the TV picture is sharpest when the screen and border are black and the cursor blue. You may, of course, specify any screen/border combination by substituting the appropriate number for the 8 in the POKE statement on line 25 of the VIC version (see your manual for possible combinations). Similar modifications are just as easy with the Commodore 64 version.

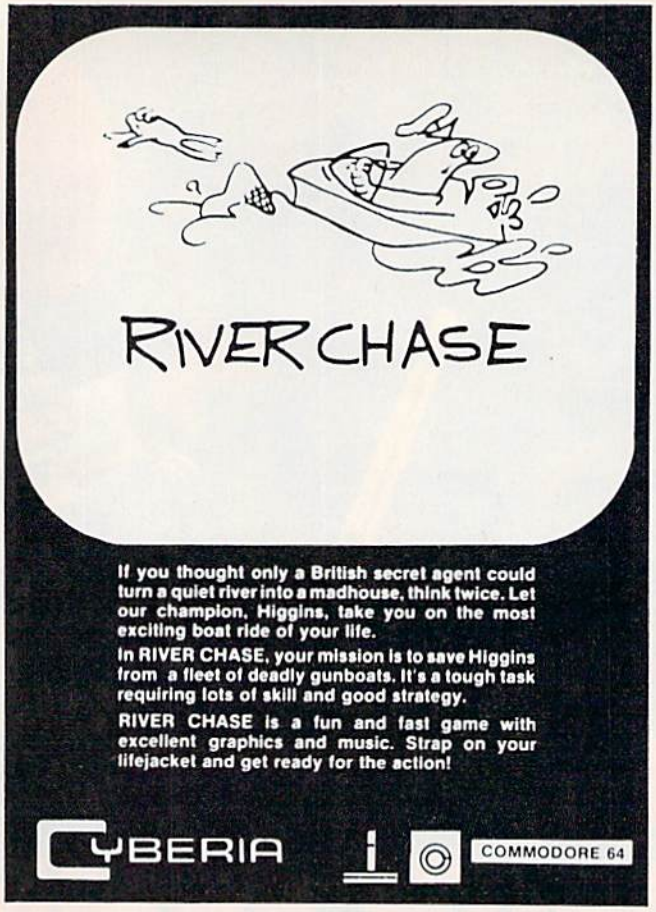
The variables R and W, respectively, are the number of right and wrong answers and are initialized to zero on line 5. The string variable N$(1,25) is a string array containing the note names and the POKE values for the sound registers.

Tape Copies — VIC Only

If you don't want to type the program, I'll make a copy of the VIC version for you. Please send a blank cassette, a self-addressed stamped mailer, and $3 to:

Jeff Behrens
1510 N.E. 57th Terrace
Gladstone, MO 64118

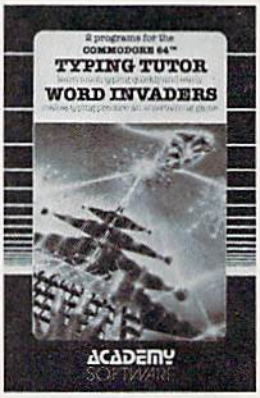
See program listings on page 238.



© 1983 CYBERIA
2330 Lincoln Way, Ames, IA 50010 (515) 292-7634
All Rights Reserved

VIC 20™ COMMODORE 64™

JOIN THE COMPUTER REVOLUTION WITH A MASTERY OF THE KEYBOARD!



In the age of the computer, *everyone* from the school child to the Chairman of the Board should be at home at the computer keyboard. Soon there will be a computer terminal on every desk and in every home. Learn how to use it right ...and have some fun at the same time!

Rated THE BEST educational program for the VIC 20™ by Creative Computing Magazine

TYPING TUTOR PLUS WORD INVADERS
The proven way to learn touch typing.

COMMODORE 64 Tape $21.95 COMMODORE 64 Disk $24.95
VIC 20 (unexpanded) Tape $21.95

Typing Tutor plus Word Invaders makes learning the keyboard easy and fun! Typing Tutor teaches the keyboard in easy steps. Word Invaders makes typing practice an entertaining game. Highly praised by customers:

"Typing Tutor is great!", "Fantastic", "Excellent", High quality", "Our children (ages 7-15) literally wait in line to use it.", "Even my little sister likes it", "Word Invaders is sensational!"

Customer comment says it all . . .

". . . it was everything you advertised it would be. In three weeks, my 13 year old son, who had never typed before, was typing 35 w.p.m. I had improved my typing speed 15 w.p.m. and my husband was able to keep up with his college typing class by practicing at home."

NEW!

IFR (FLIGHT SIMULATOR) CARTRIDGE FOR THE VIC 20
$39.95
JOYSTICK REQUIRED

Put yourself in the pilot's seat! A very challenging realistic simulation of instrument flying in a light plane. Take off, navigate over difficult terrain, and land at one of the 4 airports. Artificial horizon, ILS, and other working instruments on screen. Full aircraft features. Realistic aircraft performance — stalls/spins, etc. Transport yourself to a real-time adventure in the sky. Flight tested by professional pilots and judged "terrific"!

VISA Shipping and handling $1.00 per order. CA residents add 6% tax. MasterCard

ACADEMY SOFTWARE
P.O. Box 9403, San Rafael, CA 94912 (415) 499-0850

Programmers: Write to our New Program Manager concerning any exceptional VIC 20™ or Commodore 64™ game or other program you have developed.

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 existance 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.

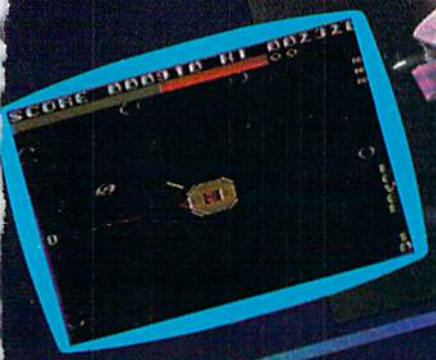
In the end, you may succeed in helping Rick place his bomb. But a fiery death awaits him if you lack the skill and nerve necessary to get him back to his ship before the awesome blast!

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 missles 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

FRED D'IGNAZIO,
ASSOCIATE EDITOR

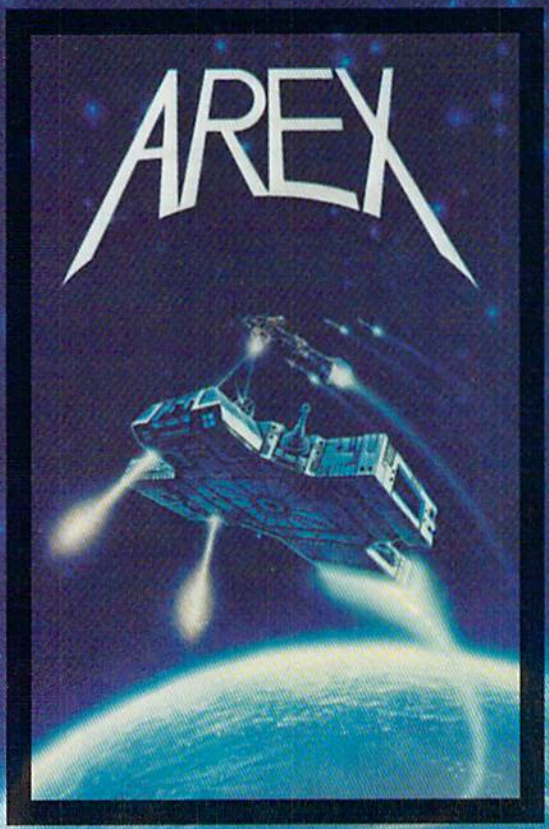
Your Wish Is My Command

What can a personal computer do? Nothing—unless you give it orders. The computer may have millions of transistors and be as swift as a bolt of lightning. But it is nothing more than a servant. And you are its king or queen. Like a good king or queen, you want to put your servant to work. But how do you give it orders?

The first computers understood only two numbers—ones and zeros. The ones and zeros that humans fed the old computers represented the pulses of electricity that whizzed through the computers. The ones represented the big

An artist taught a large computer to draw this picture of the space shuttle blasting off. (Courtesy Digital Graphics Systems.)

BECOME AN INTREPID SPACE ADVENTURER . . .



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

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

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

AREX

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

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

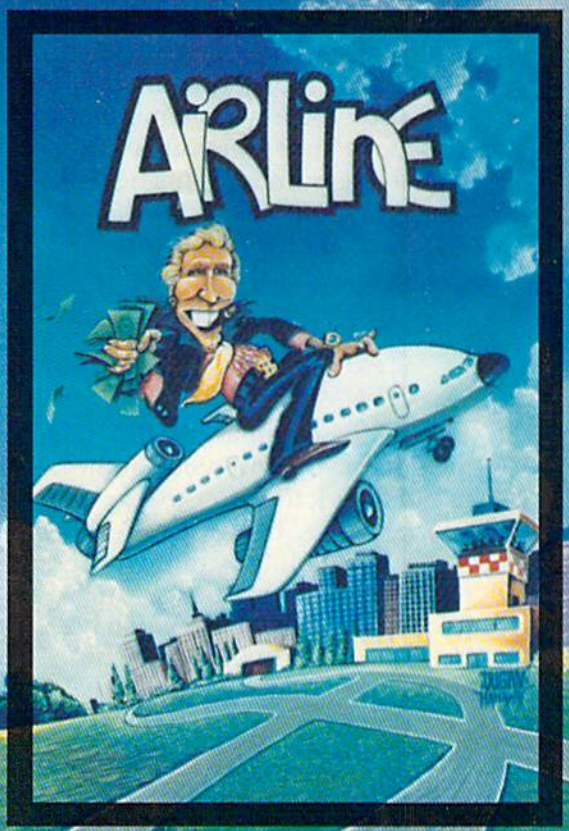
by George Schwenk
TRS-80 version by Dave Simmons
CoCo version by Roger Schrag

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

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

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

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



Published by

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

To order, see your local dealer. If he does not have the program, then call 1-800-327-7172 (orders only please) or write for our free catalog. DEALER INQUIRIES ARE INVITED!

pulses. The zeros represented the little pulses. Dozens of ones and zeros, strung together like pearls on a necklace, represented only a single computer command — like ADD 1 PLUS 1.

Today's personal computers can almost understand English. You feed them commands by pressing buttons on a keyboard wired to a chip. If you took off the top of the keyboard you would see dozens of little chips inside. The chips might be lined up on green plastic cards the size of graham crackers, or hidden inside black plastic cartridges.

Let's say you type the command PRINT "HI" into the computer. First, the computer translates your command into tiny pulses of electricity. Next, it obeys the command. Then it translates the answer back into English and prints it out on the TV screen. "HI" says the computer.

Writing Simple Programs

Now let's imagine that you want to do your math homework on a computer. As part of your homework, you have to multiply pairs of numbers. Your computer is great at multiplication. But you have to teach it how. You have to give it orders.

You think about what you want the computer to do. First, you want it to accept two numbers. Then you want it to multiply those two numbers. Last, you want it to print the answer so you can use it in your homework.

You sit down at the computer keyboard. You have to teach the computer with a language the computer understands. Your computer talks BASIC, like most other small computers.

You type in your commands one at a time. You make sure that you begin each command with a line number. This helps the computer keep the commands separate when it obeys them.

Here are the commands:

```
10 INPUT N1
20 INPUT N2
30 LET ANSWER = N1*N2
40 PRINT "THE ANSWER IS ";ANSWER
50 GOTO 10
```

All the commands work together to do one job—help you with your homework. When commands work together to do one job they have a special name. They are called a *program*.

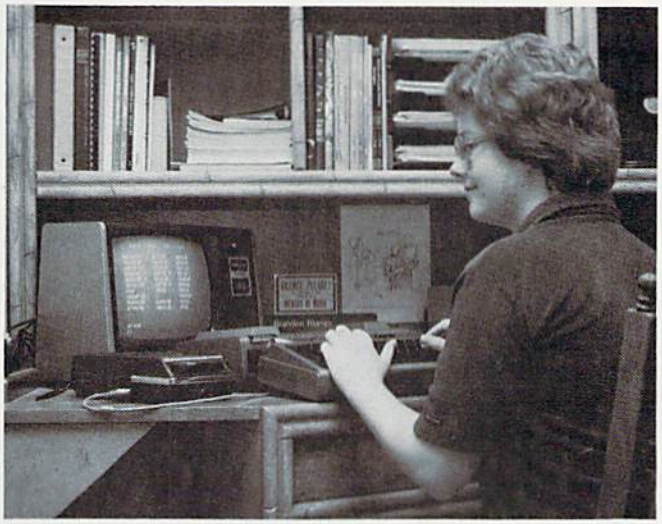
When you type in the program, it is stored in the computer's memory chip. To get the computer to obey your program, you have to get the memory chip to send it to the brain chip. To do that is simple. You just type RUN.

When you type RUN, the computer obeys the commands very quickly, but only one command at a time.

First, it obeys the command on line 10. The command on line 10 tells the computer to print a question mark on the TV screen and accept any number you type on the keyboard. Let's say you type 47. The computer stores the 47 in a little memory cubbyhole you've called N1.

Second, the computer obeys the command on line 20. This is just like the command on line 10. Except now you have the computer accept a number and put it into a cubbyhole you've called N2. You type in 82. The computer puts the 82 into the cubbyhole called N2.

Third, the computer obeys the command on line 30. Line 30 is where the computer performs its multiplication. The "times" sign in the computer's language looks like an asterisk (*). The computer takes the first number (the one stored in N1) and the second number (stored in N2) and multiplies them together.



Brandon Rigney programs his home computer to solve complicated problems like how many light bulbs should be installed in an office building. Sometimes Brandon turns his computer on before going to school, and the computer is still solving the problem when Brandon goes to bed that night. (Courtesy Brandon Rigney III.)

Now the computer has an answer. Where does the computer put the answer? You guessed it: into the memory cubbyhole you've called ANSWER.

Next, the computer obeys line 40 and prints the answer on the TV screen. It looks like this:

```
THE ANSWER IS 3854
```

What does the computer do next? It looks at line 50. Line 50 tells the computer to "go to" line 10. The computer jumps back to line 10 in your program and asks you for two new numbers. You type in the numbers. It multiplies the numbers together, then prints the answer.

Then what does the computer do? It looks at line 50 and jumps back to line 10 and asks you for *two more numbers*. It will keep multiplying two

AARDVARK *Action Software*

PRESENTS. . .

ZEUS

WITHOUT QUESTION, ABSOLUTELY —

The Fastest

ARCADE STYLE GAME

AVAILABLE, THAT WE KNOW OF.

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

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

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

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

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

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

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

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

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

STOCK #7006 TAPE: $24.95 DISK: $29.95

AARDVARK *Action Software*

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

HOURS OF FUN AND ENJOYMENT FROM THE "ADVENTURE PLACE"

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

CHARGE CARDS WELCOME VISA **1-800-624-4327** PHONE ORDERS ACCEPTED 8:00 A.M. TO 8:00 P.M. E.S.T. MON-FRI

AARDVARK *Action Software*

2352 S. COMMERCE RD. WALLED LAKE, MI 48088 313/669-3110

numbers for you forever—unless you turn it off or pull out its plug. Or else you can type NEW. The NEW command erases all the old commands in the computer's memory. Then you can feed the computer a new program and teach it something new.

Teach The Computer Anything

Our little program reveals lots of secrets about the computer. Now you know what some of the computer's commands look like. You see how you can combine the commands into a program to make the computer do some work for you. You see how the computer can do the same work over and over without ever getting tired or making mistakes. And you see that you can keep teaching the computer new programs.

What kinds of new programs?

Anything you want. There is no limit to what you can teach the computer. What would you like to teach the computer? What can you imagine?

Kids have taught computers to do all sorts of things. A boy I know named Larry teaches computers to play games. A girl named Claudia loves music, so she teaches her computer to play the songs she hears on the radio.

You can program the computer to teach you the alphabet, quiz you about the presidents of the United States, give you a spelling bee, or draw pictures of triangles and circles on the TV screen.

You can teach the computer to act like a simple calculator and spit out numbers. Or you can teach it to imitate other machines.

The computer is a great pretender! For example, some computers have been taught how to act like airplanes. The computer pretends it is an airplane, and you pretend that you are the pilot. To fly the "plane" you push buttons on its keyboard. The TV screen is the cockpit window.

Or you can teach the computer to do biology experiments and breed hundreds of honeybees. The computer speeds up the bees' lifetimes until they live just a few seconds. You get to see how the bee parents' colors, shapes, and abilities are passed on to their children. And their children's children.

Or you can play mad scientist and teach the computer to pretend it is your laboratory. You can conduct experiments with different chemicals. But, watch out! If you mix the wrong chemicals together, your "lab" might blow up. The computer might flash an explosion on the TV screen. From the TV speakers might come a loud "BOOM!".

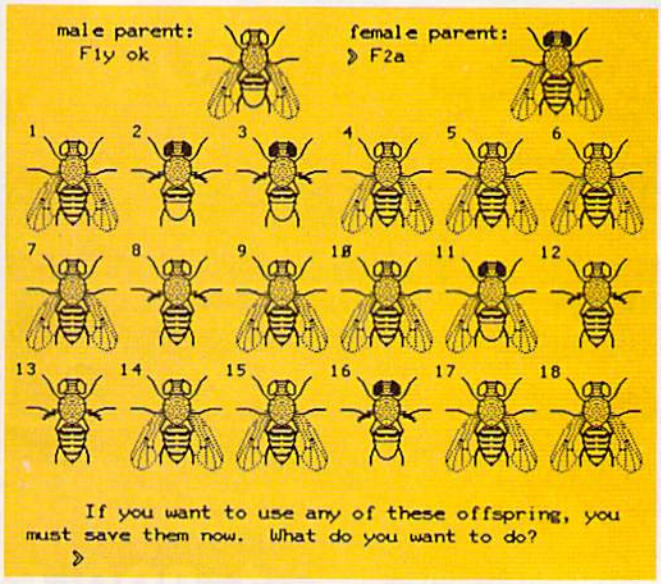
But all is not lost. It's all just pretend. The computer is ready for more. On the TV screen it types: WHAT EXPERIMENT SHOULD WE TRY NEXT?

Personal computers are good at experiments. But they can do a lot more, too. You can teach them to play games such as tic-tac-toe, checkers, backgammon, and chess.

Claudia Napfel and her father built one of the first home computers. Claudia uses the computer to do her homework and to play music. (Photo by Charlotte Knadle/courtesy Claudia Napfel.)

Or you can teach them to take you on an adventure game to a make-believe faraway planet. There are fabulous treasures on the planet. But the treasures are guarded by a fierce dragon. To win the treasures you must fight the dragon. The computer plays the part of the dragon. One warning: Computer dragons can be very, very tricky.

Or, if you are tired of playing games, why not teach the computer to draw pictures? Computers can draw pictures in all the colors of the rainbow. And the pictures move — just like in cartoons!



Would you like to become a famous bee breeder? This computer program lets you pretend you are breeding honeybees. (Courtesy PLATO Project, University of Illinois and Control Data Corporation.)

VICTORY SOFTWARE

INTRODUCES

THE EARTH WARRIOR SERIES

Programs for the VIC-20 and the COMMODORE 64.

All games available on TAPE or DISK.

All Arcade-Style games are packed full of MACHINE CODE.

METAMORPHOSIS $19.95

You stumbled into the nest of the Cyglorx and find yourself fighting off robot tanks guarding the Cyglorx eggs. You think you have everything under control and then the eggs start hatching. Commodore 64 version features 4 different screens.
Available for COMMODORE 64 and VIC-20. Played with JOYSTICK.

CREATOR'S REVENGE $19.95

The creator assembled a massive army of robots and insects to take revenge on the earth. Destroy insects, get treasures, and get the neutron bomb deactivator. Battle robots and destroy the neutron bomb before it annihalites your city. Miss and you must face the mutants. Features 4 different screens.
Available for COMMODORE 64. Played with JOYSTICK.

LABYRINTH OF THE CREATOR $19.95

Journey into the most complex and dangerous fortress ever build by the creator. You will encounter deadly robots, skulls, lakes, avalanches, false creators, and a creature who roams 256 rooms relentlessly pursuing you.
Available for COMMODORE 64. Played with JOYSTICK.

KONGO KONG $19.95

Climb ladders, avoid the barrels the crazy ape is rolling at you, and rescue the damsel. Commodore 64 version features 4 different screens!
Available for COMMODORE 64 and VIC-20. Played with JOYSTICK or KEYBOARD.

GRAVE ROBBERS $19.95

Introducing the first GRAPHIC ADVENTURE ever available for the VIC-20 or COMMODORE 64! With realistic audio-visual effects, you explore an old deserted graveyard and actually see the perils that lie beyond.
Available for COMMODORE 64 and VIC-20. Played with KEYBOARD.

BOUNTY HUNTER $19.95

An adventure in the Old West. Journey back with us into the days of Jessie James and Billy the Kid where the only form of justice was a loaded revolver and a hangman's noose. In this full-length text adventure, you play the role of Bounty Hunter, battling against ruthless outlaws, hostile Indians, wild animals and the elements of the wilderness with only your wits and your six gun. Average solving time: 20-30 hours. If you love adventures, this one is a real treat.
Available for COMMODORE 64 and VIC-20 (with 8K or 16K expander). Played with Keyboard.

CHOMPER MAN $19.95

Don't let the bullies catch you as you gobble the goodies! This program has 8 screens and still fits in the standard memory.
Available for COMMODORE 64 and VIC-20. Played with JOYSTICK or KEYBOARD.

Illustrations: Elizabeth Hauck

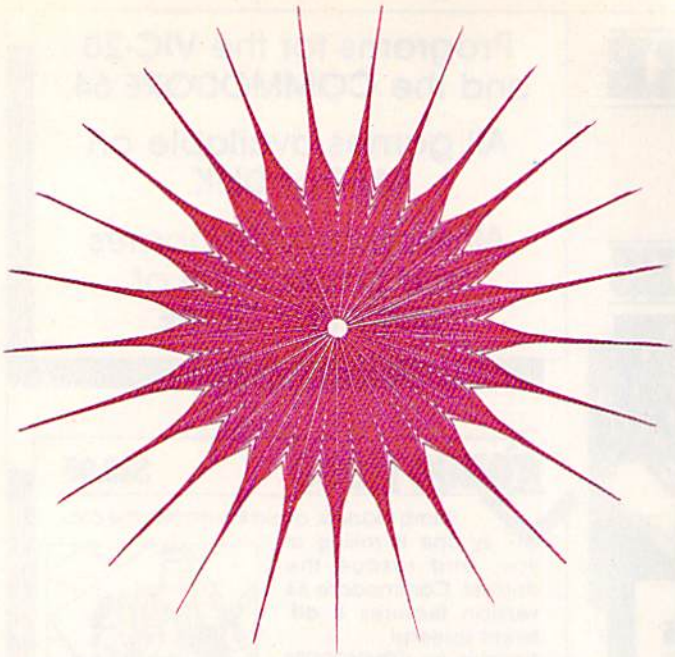
CAVE KOOKS $14.95

Earth's surface is threatened by collapse from a strange group of creatures who bore out the earth's crust to make their dens. Your objective is to enter the creature's habitat and spin the invaders to death.
Available for COMMODORE 64. Played with JOYSTICK.

Check your LOCAL DEALER or order directly.
ORDERING: We accept personal checks, money orders, VISA, and MASTERCHARGE. Charge orders please include number and expiration date. Overseas orders please use charge or have check payable through a U.S. bank. Add $1.50 postage and handling per order. PA residents please add 6% sales tax.

VISA

VICTORY SOFTWARE INC.
7 Valley Brook Road, Paoli, PA 19301
(215) 296-3787



This figure was drawn by a computer with a printer/plotter, following a program by the artist. (Courtesy of computer artist Joe Jacobson/idea by Christian Huebler.)

Kids are teaching computers to draw pictures of zooming race cars, running horses, and pictures of spaceships blasting off from the earth. What would you like your computer to do?

HOLIDAY SPECIALS

VIC-20

SAVE UP TO 33%

	List	Special	
CHOPLIFTER	39.95	**$26.95**	Cartridge
SHAMUS	39.95	**$27.95**	Cartridge
APPLE PANIC	39.95	**$27.95**	Cartridge
ANNIHILATOR	19.95	**$15.95**	Cassette or Disk
SIMON	7.95	**$6.95**	Cassette - req. 3K exp.
HANGMAN/MATH	11.95	**$8.67**	Cassette

Include $3.00 shipping & handling per order.
N.Y. State residents add applicable sales tax.
Send Check or Money Order to:
Jay Sun Enterprizes, Incorporated
Dept. No. 63
P.O. Box 8872, Albany, NY 12208

FREE CATALOGUE AVAILABLE

FANTASTIC NEW SOFTWARE for your **COMMODORE 64**

One or Two Joysticks Required

LARGEST SELECTION OF 64 SOFTWARE ANYWHERE !!!!

NEW FAST MOVING CYCLE GAME Play Against the Android or Another Human

LAZER BLAZER

Now Available

$24.95

GAMES ■ EDUCATIONAL
BUSINESS ■ PERSONAL
■ SOFTWARE ■

15 DAY FREE HOME TRAIL ON ALL MERCHANDISE
VISA, MASTER CHARGE & C.O.D. ORDERS ACCEPTED

FREE NEW CATALOG SENT WITH PURCHASE OR SEND $1.00 (Refunded with first order). (Indicate DISK or TAPE when ordering)

NEW

A-1 COMPUTER SERVICES
7103 W. CLEARWATER, H-312
KENNEWICK, WA 99336
(509) 783-4980

DEALER INQUIRIES WELCOME

For Commodore 64 TM

"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

and The Alien said..."Let Commodore Speak... and Sing!"

Yes, the VOICE BOX™ from The **Alien** Group, the world's ONLY *singing* speech synthesizer, now grants the power of speech to the VIC 20™ and the Commodore 64™ A commented, all-BASIC demo program gets the VOICE BOX talking right away, and, since it can be "taught" to say anything, the VOICE BOX has an unlimited vocabulary! The voice speaks with natural speech inflection controlled either from the program or from the precise, built-in Pitch control. *No other speech synthesizer has this feature!*

Want to add speech to a new or existing BASIC program! The VOICE BOX has FOUR ways to do it on VIC 20's of any memory size and on any Commodore 64: entirely from BASIC, or using one of the three machine language programs readily added to other programs—English text-to-speech, the same with the lip-synch "Alien" face added, or use of the 64 basic phonemes as input. A challenging spelling quiz that accepts new words (expanded memory required with VIC 20) is provided on the cassette supplied.

The VOICE BOX plugs directly into the computers user port, comes with built-in speaker, Volume and Pitch controls and lots of instructions from The **Alien** Group, the people who got Atari® and Apple® to speak!

Available at leading computer stores everywhere, or order direct by sending $95.00 to: The **Alien** Group, 27 W. 23rd St., NY, NY 10010. Specify whether for VIC 20, Commodore 64 cassette or Commodore 64 disk. Programs for a high-res talking human face and a comprehensive music and singing system available on separate cassette for $25.00 (expanded RAM necessary when used on VIC 20). Extra main cassette for either computer available for $19.00.

Vic 20 and Commodore 64 are trademarks of Commodore Electronics Ltd VOICE BOX is a trademark of The **Alien** Group.

THE PROGRAM STORE

Take a Christmas vacation to the Arcade Isle...

The Joyboard

from Amiga

We sell over fifty types of joysticks but this is the most unusual. All of your OLD games become a new challenge when you use your whole body to play! Yes, your entire body is at the controls — you lean and tilt in 8 possible directions to glide, dive and zoom through the universe of computer games. Heavy duty for up to 250 lbs and the special base allows use on virtually all surfaces.

The joyboard will work on any Commodore or Atari computer. There is a FREE cartridge for VIC-20 or Atari computer owners.

#43322 Joyboard w/VIC ROM $49.95
#35255 Joyboard w/Atari ROM $49.95

Joy Sensor

from Suncom

No more blisters, no more sore hands. This is the stickless "joystick" which uses touch sensitive panel. It also includes a rapid fire "button" and you can flip a switch to play in four directions, not the usual eight (great for Pac Man). It's brand new and will make a perfect gift.

#31059 Joy Sensor $34.95

We are so sure that you will like the Joy Sensor, we will give you a 30 day trial. If you don't like it, return it in salable condition and we will refund your money, no questions asked.

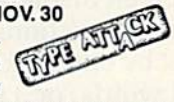
Shamus

from Synapse

One of the most popular arcade games ever created for the home computer. In the lair of the Shadow you go through each roomful of Robo-Droids, Whirling Drones and Snap-Jumpers. Intensive arcade action meant only for the experienced joysticker.

#40161 C-64 Tape ~~$34.95~~ $27.96
#35772 C-64 Disk ~~$34.95~~
#42130 Vic ROM ~~$39.95~~ $31.96
Also for Atari computers.
NOW 20% OFF UNTIL NOV. 30

Type Attack



by Hauser and Brock from Sirius

Giant group of letters are attacking you from the sky. Can you repel the alphabet invaders by typing the right combination of letters on the keyboard? Features dozens of pre-programmed lessons and a real-time words per minute bar. Have some fun fending off the letters while you learn to type.

#25344 VIC20 ROM $39.95
#11967 C-64 Disk $39.95

YOUR COMPUTER JUST GOT A WHOLE LOT SMARTER...

Frogger

Official Arcade Version

One of the most popular arcade games ever — now available for your home computer! Just as in the arcade, you must dodge heavy traffic and jump the moving logs in the stream to get home. Requires joysticks and a sense of humor.

NOW 20% OFF UNTIL NOV. 30
#19291 C-64 Tape ~~$34.95~~ $27.96
#19303 C-64 Disk ~~$34.95~~ $27.96
#10546 Vic Tape ~~$35.95~~ $28.76
#28460 C-64 ROM ~~$48.95~~ $39.16

Q*BERT

Official Arcade Version by Parker

All the action and excitement of the popular arcade game as Q*BERT hops up and down on the cubes of the pyramid changing colors as he lands. Color all the cubes and he moves to a new — and more difficult pyramid. But cagey creatures want to stop him from his fanciful mission so the one or two players will have some fast hopping to do!

#12676 C-64 ROM $48.95
#42972 Vic ROM $48.95
Also for Atari

Sammy Lightfoot

from Sierra On-Line

Here's your chance to be a star on the trapeze and trampoline. Jump higher and higher to escape bouncing balls, swing over chasms on your trapeze and grab the rope. Watch out for the pumpkin in sunglasses. In other scenarios you must dodge falling plungers and disappearing platforms, or falling hammers, puffballs and a flaming pit.

C-64 ROM
Disk $37.95

Moon Shuttle

from DataSoft

Pilot your moon shuttle to meet your destiny — The Prince of Darkness. Out maneuver spinning rockets, dodge life threatening man-o-wars, meteors, bomb launchers and expandos. Suddenly your flight becomes more perilous as enemy forces multiply. Test the outer limits of your instinct for survival.

#23263 C-64 Tape & Disk $29.95

FAMILY PLAY

You can play (and learn) with other family members or friends in any of these programs. Or you can practice against the computer.

ARCHON

by Free Fall from Electronic Arts

Abracadabra! In this original strategy game you move your mythical players, like wizards, on an ever changing board. Things are quiet until you attack an opponent's piece. Then you move instantly to a battlefield where the powers of your piece and your skill fight the opponent. (It's a hit in our office.)

#19404 C-64 Disk $39.95
Also for Apple, IBM & Atari

M.U.L.E.

by Ozark Softcape from Electronic Arts

A strategy, trading game in which four players attempt to settle a distant planet with the help of a machine they learn to hate: Multiple Use Labor Element. If you don't have four the program will gladly take the other positions. There are three game variations and handicaps available. Though it may be hard to imagine, this simulation is played entirely with joysticks, no keys. It is so popular around here that we have had many after work games!

#18919 C-64 Disk $39.95
Also for Atari

Tesseract Strategy

NEW!

by McCord & King from Electronic Arts

You are the leader of one of three Galactic Empires struggling for power through the use of diplomacy, money technology and even brute force. Game combines strategic thinking, arcade combat and enthralling science fictior effects. For 1 to 3 players.

#20776 C-64 Disk $39.95
Only for C-64

Pinball Construction Kit

by Budge from Electronic Arts

This is the hit program of the year in all of our stores. Not only can you play five different pinball games, but you can also create your own! Move bumpers, change the electronics, vary the sound effects, etc. With this program you will see why Bill Budge is a computer superstar.

#29573 C-64 Disk $39.95
Also for Apple & Atari

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

This is only a sampling of our sensational software!

CALL 800-424-2738 FOR OUR NEWEST PRODUCTS

UNDECIDED? NEED TO BUY A GIFT? The Program Store gift certificate may be purchased in any amount over $10.00. Give the perfect gift!

VISIT OUR STORES

Southwest Plaza, 8501 West Bowles Ave., Littleton, CO
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, Wayne, NJ
Nanuet Mall, Rt 59 & Middletown Rd, Nanuet, NY
Olentangy 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 TO:
CHICAGO
OKLAHOMA CITY
ST. PETERSBURG
TAMPA
TULSA

FRANCHISE OPENINGS IN SELECTED CITIES

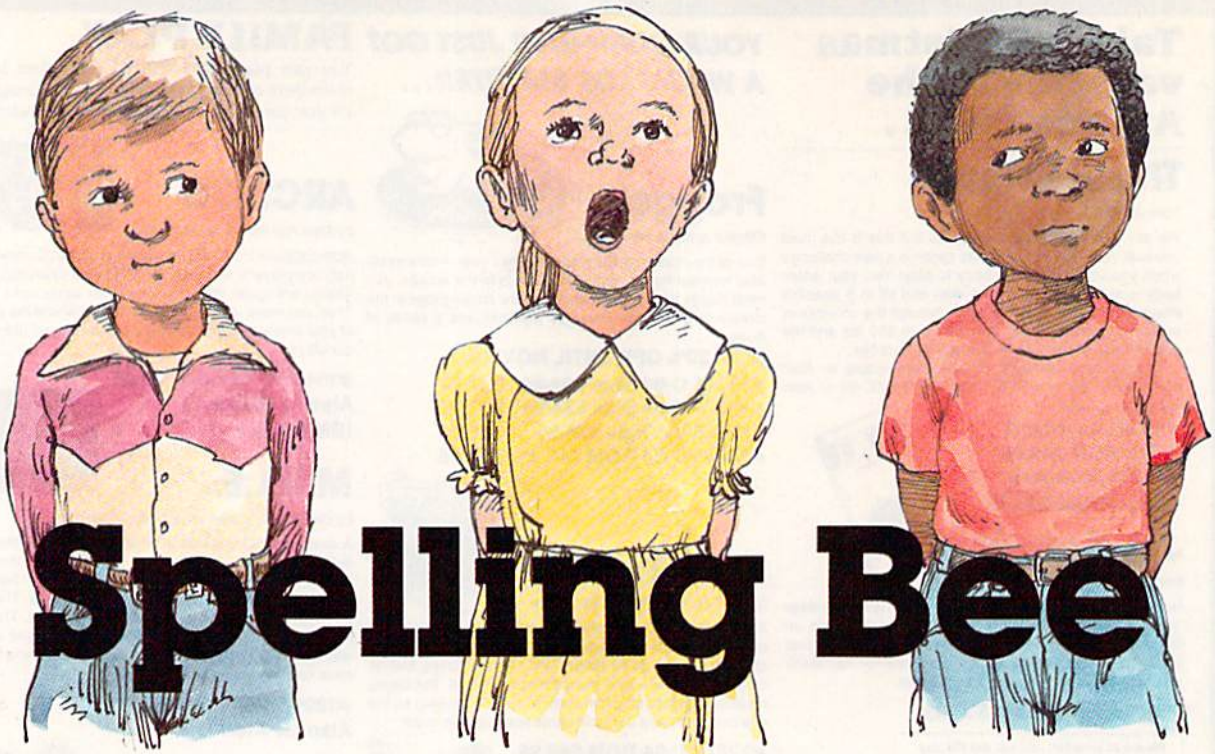
To Order Call Toll Free 800-424-2738 **For Information Call (703) 556-9778**

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®

© 1983 THE PROGRAM STORE

THE PROGRAM STORE Dept. 11-12-3 Box 9582 4200 Wisconsin Avenue, NW Washington, D.C. 20016



Spelling Bee

Harry Blair

Daniel Bonachea

"Spelling Bee" is an educational spelling game for the Commodore 64 and VIC-20. It requires a joystick and at least 8K of memory expansion on the VIC.

Remember using flash cards in spelling? The teacher flipped the card, let you glance at the word, and asked you to spell it correctly. It happened so quickly, the word appearing for only a moment or two. But it was good practice. You had to concentrate and think quickly. More importantly, you had to imagine the word in your mind, trying to visualize its letters as you spelled it aloud.

"Spelling Bee" is a game for the VIC-20 and Commodore 64 which handles the flash cards just as that teacher did long ago. A practice game for young children, it makes spelling entertaining while it educates. And because it uses a joystick instead of the keyboard, it eliminates some of the fear young children may have of typing in answers.

How To Use Spelling Bee

The program is easy to set up and play. After entering and saving the program, plug a joystick into port 2 (into the single port of the VIC) and type RUN. You can read the directions to younger children and let older children follow the directions themselves.

The computer will ask for your child's name; except for prompts in the instructions, this is the only time the keyboard is used. Throughout the rest of the game your child's name appears each time a message is displayed. Most children will delight in seeing their name shown on the screen. It's almost like a teacher talking to them!

Several screen displays appear, one after the other, with the instructions. Finally, the level of difficulty is set by entering 1 for easy words, 2 for medium-level words, or 3 for harder words. Choose the level you think best for your child's skills.

As soon as the skill level is chosen, a word appears on the screen. It will show for only two seconds, much like a teacher's flash card, and then it is replaced by a row of symbols and letters near the bottom of the screen. You'll see a pointer beneath these characters.

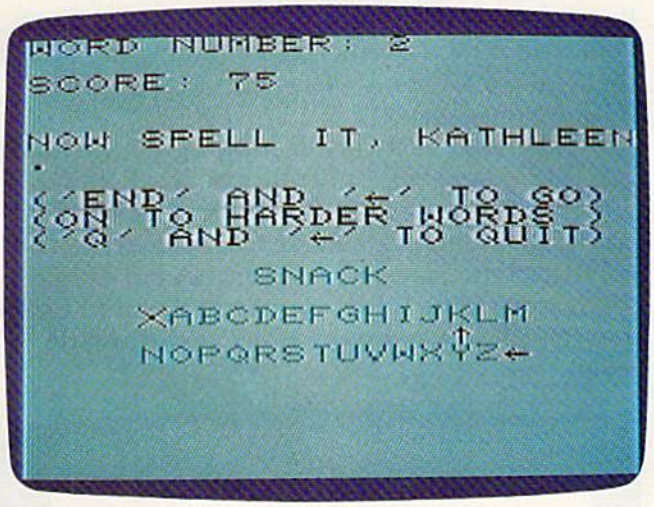
To spell a word, move the joystick left or right until it is directly under the letter you want. Pressing the fire button moves the letter above the alphabet row. It's important that you choose the letters in the right order, just as when you spell a word yourself. If you're satisfied with the spelling, move the joystick so that it's beneath the back-arrow symbol at the far right of the row. This enters your spelling, and the computer tells you whether it's correct or incorrect. To begin spelling the same word again (perhaps you changed your mind), just move the arrow under the red X at the

Variables Used In Spelling Bee

L$(L) = WORD TO BE SPELLED
NA$ = NAME OF PLAYER
S = SCORE
N = MISTAKE COUNTER
D$ = PLAYER'S SPELLING OF WORD
R = REVERSE FLASH REPETITION
SC = SCREEN LOCATION OF ALPHABET
CO = SCREEN COLOR OF LETTERS
CN = SCREEN CODE OF LETTERS
S1 = POSITION OF POINTER ON SCREEN
C1 = COLOR OF POINTER
B$ = EACH LETTER INPUT BY STUDENT
JV = VALUE READ FROM JOYSTICK
FR = FIRE BUTTON VALUE

other end of the row and press the fire button. The computer won't give you a second look at the word, though.

If a word is misspelled three times, the computer spells it correctly, flashes it several times,

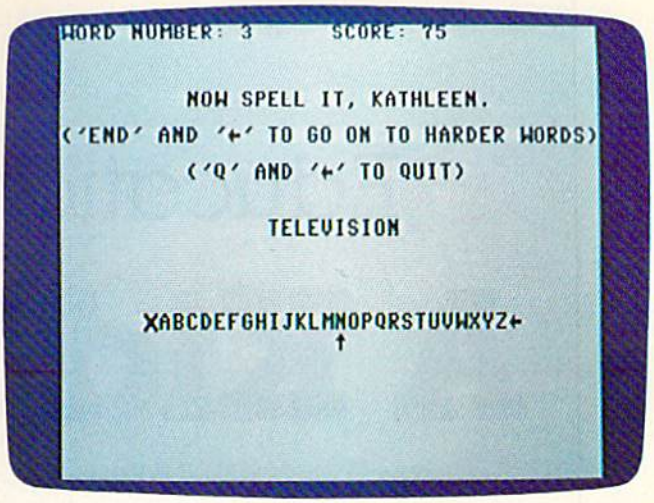


Spelling a medium-level word in the VIC version of "Spelling Bee."

and shows you the next word. The score is always displayed on the screen, and one point is subtracted for each word missed. A perfect score for a round is 75, the number you begin with.

You can quit the game at any time by entering Q with the joystick. If the present level is too easy, typing END lets you choose another level of words.

Moving the arrow with the joystick was easier for my daughter than typing on the keyboard. She was eager to spell the words when she could pick the letters herself, making them appear sud-



Spelling a hard-level word in the 64 version of "Spelling Bee."

denly as she pressed the fire button. It became more of a game to her, and she played it longer.

A Word To Programmers

There are a number of program alterations you can make. If you want to shorten the time the word is flashed on the screen, you can change the delay in line 1180. Altering it to FORY = 1 TO 500, for example, makes the words show for only a half-second.

I slowed down the joystick routine because my five-year-old daughter found it hard to stop the arrow on the correct letter. Older children may be able to handle a more responsive joystick. You can eliminate these delays by removing the FORT = 1 to 25:NEXT T in both lines 1500 and 1510.

New words can be inserted in the DATA statements in lines 230-300, as long as there is always a total of 75 words (25 in each level). This will be something you'll want to do once your child has played the game a number of times and mastered the existing words.

See program listings on page 224.

MANUAL
or
AUTOMATIC?
Don't wrestle with the Manual!
The BEST Keyboard **COACH** is the "Automatic," easy way to learn your C-64 or VIC20. Learn key functions and graphics. Audio, Visual, interactive & fun. Alpha-Speed Game included.
SEE IT! **HEAR IT!** **DO IT!**
Send check or money order to
$19.95 **B ★ E ★ S ★ T** (Mass Res. add $1.00 sales tax)
24 Munroe Street
Newtonville, MA 02160

Educational Games:

A Kid's View

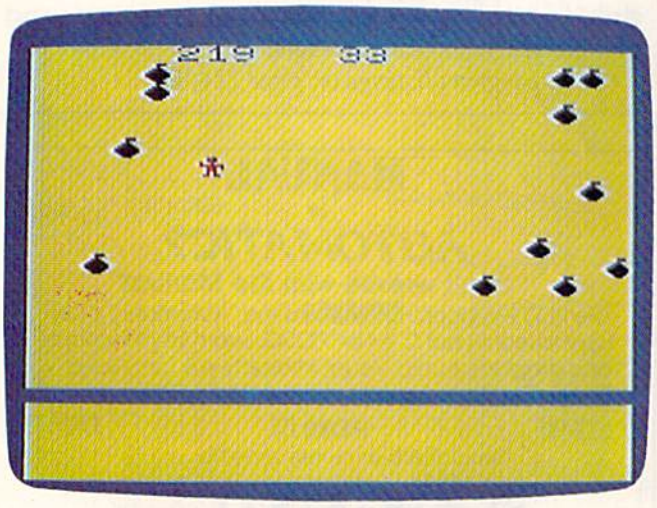
Kevin Dewey

Here's a kid's-eye view of educational computer games—what they should do, how they should teach, and why they should entertain. The writer concludes his article by presenting "BLAM!," a game for the unexpanded VIC-20 that demonstrates his concepts. We've added a version for the Commodore 64. A joystick is required.

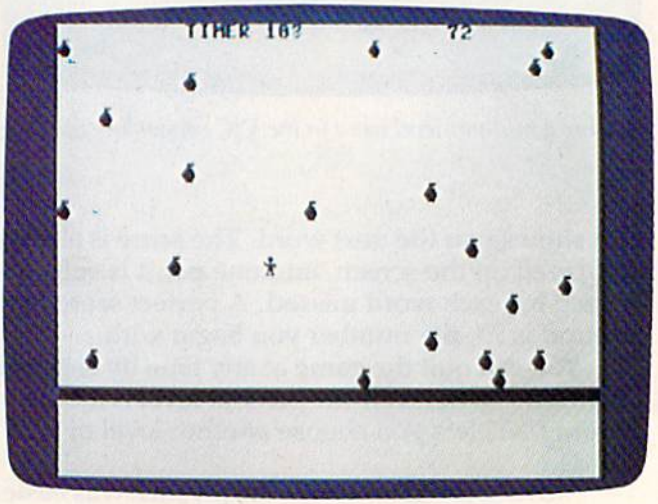
Have you ever tried to write an educational game? If you have, chances are you found it pretty hard. Sure, it's easy to make a simple addition and subtraction program, but education doesn't stop there.

There are many other areas to cover. I know. I'm only 12 and in the seventh grade. We have computers in our school and a variety of educational games. But, unfortunately, some of the games aren't too good. The main flaw that I see in them (and a lot of my classmates agree) is that they are too easy.

Take, for instance, a math program we had last year. There was only one skill level, and it was just basic multiplication with zeros on the end of the numbers to make it seem harder. The game itself had a very good concept but didn't teach you a thing (unless you're in the third grade, and the game was supposed to be sixth-grade level).



Defusing bombs to solve subtraction problems in a game of "Blam!" (VIC-20 version).



The player is surrounded by ticking bombs in "Blam!" (Commodore 64 version).

HERE'S SOME GREAT GIFT IDEAS FOR YOUR

COMMODORE-64

OR VIC-20 Computer

Every ABACUS SOFTWARE Package includes an attractive outer carton, a manual and a disk or cassette.

YOU CAN COUNT ON

Abacus Software

ULTRABASIC 64

- **TURTLE**, hires, multicolor and sprite graphics
- Sound and effects
- Hardcopy
- 50 Powerful Commands
- Includes demos, tutorial, manual
- **$39.95 FOR TAPE**
- **$42.95 FOR DISK**

SUPER DISK UTILITY 64

- Single Disk Copy (3 types) or Append
- Dump or Modify Any Disk Sector (Has Scrolling)
- Directory Display with scrolling
- BAM Display
- Printer Output
- Fast Machine Code
- **$22.95 DISK ONLY**

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**

CHECKBOOK MANAGER 64

- Menu/Function Key makes it very easy to use
- Complete editing
- Full checkbook balancing
- Printer Output
- **$22.95 DISK ONLY**

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
- **$42.95DISK ONLY**

SKIER 64

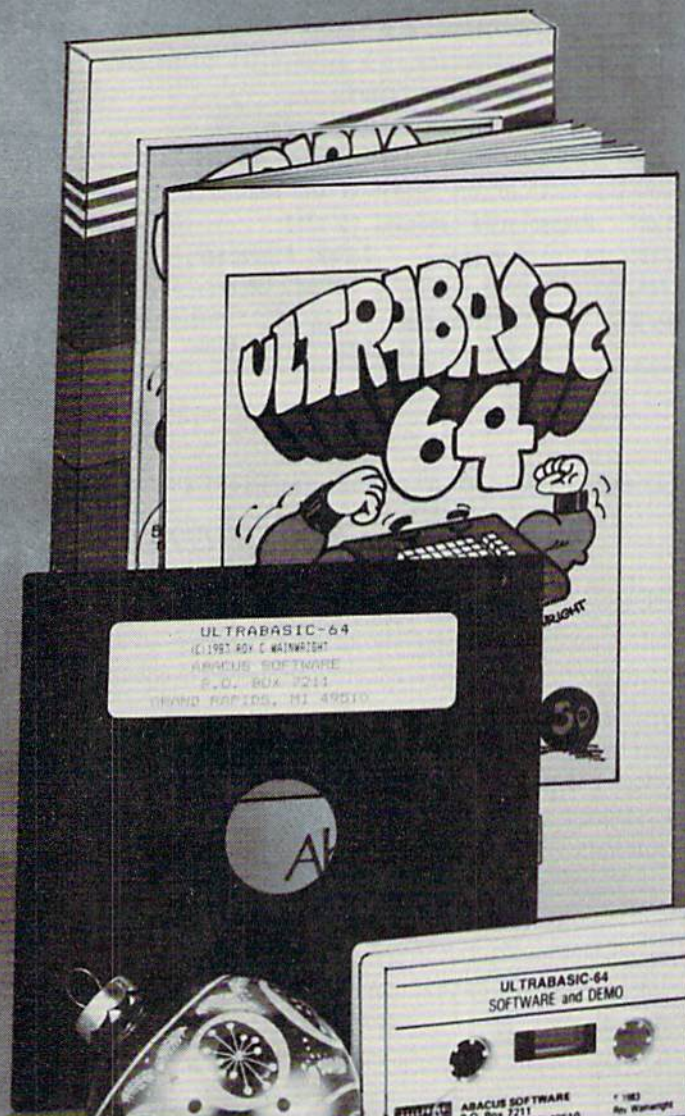
- Arcade type game
- Joystick or keyboard control
- 3 different games
- 3 different levels
- **$14.95 FOR TAPE**
- **$17.95 FOR DISK**

TINY FORTH

- Easily extendable language
- Based on fig-FORTH
- Commodore 64 or Vic-20 w/8k exp.
- **$19.95 FOR TAPE**
- **$22.95 FOR DISK**

GRAPHVICS

- Hires and multicolor graphics
- Fast ploting at machine language speed
- Two screens: graphics and text
- Save screen to tape/disk
- VIC-20 w/3k or 8k exp.
- **$19.95 FOR TAPE**
- **$22.95 FOR DISK**



DISTRIBUTORS

Great Britain:
ADAMSOFT
18 Norwich Ave.
Rochdale, Lancs

West Germany:
DATA BECKER
Merowingerstr 30
4000 Dusseldorf
0211/312085

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 Cote 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

TO ORDER NOW: Write Abacus Software P.O. Box 7211 Grand Rapids, Mich. 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. (Michigan Residents add 4% sales tax).

FOR QUICK SERVICE PHONE 616/241-5510

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

CHARGE CARD _____ NUMBER _____

FREE CATALOG Ask for a listing of other Abacus Software for Commodore-64 or Vic-20

Educational Guidelines

Now, if that is what comes from experts, how are ordinary people supposed to write good educational games? Programmers should keep in mind the following things:

1. You should make your game one that teaches someone something. After you've thought of your idea, ask yourself, "Is this *truly* educational or just a near miss?" This will help very much.

2. Your game should have varying skill levels. It should have levels to challenge the slowest to the fastest student.

3. Use good graphics so your game will be appealing to look at.

4. Have good sound effects. It is good for the player to get a rewarding sound or song if he or she is correct.

5. Most of all, make your game interesting and fun. How many kids want to sit and play a boring game, no matter how educational it is? Not very many. It is good, in some cases, to make your game half-arcade and half-education.

Those are five basic steps in making educational games. Try to follow them when writing one.

Now, here is a game I have made. I call it "BLAM!" It is educational and fun, and I hope you enjoy it.

Game Description

BLAM! is a half-arcade and half-educational game. You must maneuver your player around a building filled with bombs, while trying to disarm all the explosives. You move your player with the joystick and, once you've run into a bomb, disarm it with the keyboard.

You disarm bombs as follows: there is a number at the top of the screen next to the time clock. When you run into a bomb, another number appears at the bottom of the screen (under the blue line). You subtract this number from the one at the top and type your answer. If you are correct, the bomb disappears and you have one less bomb to disconnect. But if you subtract wrong, the bomb explodes! You can survive the explosions, but after three, the whole place falls apart. When you give a wrong answer, the computer also prints the correct answer at the top of the screen.

You get only five minutes to clear each story of bombs, because they are time bombs. When you clear a story, you go on to the next (which has ten more bombs than the one before). There are six stories in the building and, if you clear them all, you win the game.

There are also variable skill levels. At the beginning of the game, you choose a skill level from 1 to 100. Skill level one uses only numbers through 100, level two uses numbers through 200, and so on. Only very, very smart people should play on level 100.

Ways To Change BLAM!

You can raise the possible skill levels by changing the 100s in lines 5 and 6. You can vary the number of stories in the building by changing the 70 in line 131 to the number of stories you want multiplied by ten, plus ten. For example, to make a four-story building, change the 70 to 50.

See program listings on page 231.

Enter the World of ADVENTURE
The Sorcerer's of the Amazon
Enter the jungle to defeat the sorcerers.
The Catacombs of the Pharaohs
Pharaohs have sealed you in a pyramid, try to escape.
The Eerie Mansion
Explore the mansion and find the treasures.
The Deathprobe of the Srulizons
Free the earth of the threat of the Deathprobe!
Also: Monopoly 64 (special $5 off) (64 only)
Diet Comp.(4-20 only) Budget Minimizer.(64 only)
$19.95 T $24.95 D,(incl.$1.50 Post. CA res. 6% tax)
Mystic Software (619) 443-9776
P.O. Box 536 Lakeside, Calif. 92040

BIBLE *Software*

EDUCATION BIBLE Software emphasises Bible learning. Each program teaches a particular book or theme. An added feature with most of the programs is the option to enter your own questions on any subject.

ENTERTAINMENT BIBLE Software programs use the color, graphics, sprites, and sound capabilities of the Commodore 64 in a way that makes learning a challenging game.

JONAH and the WHALE True-False questions. User has the option to enter own questions. Player can go fishing with joystick. Score for correct answers and for fish netted. Second bonus program,NOAH and GOD's PROMISES.

MESSAGE RUNNER An exciting matching game from Matthew 5-7. User has option to enter own questions. Player runs by charging lions, deadly snakes, and alligators to deliver message. (Joystick required)

BIBLE OLYMPICS Bible quizzes were never as fun as they are in this learning game!

Send $16.95 per game plus $2.00 shipping and handling to BIBLE Software
4169 S.E. Davidson, Albany, OR. 97321
(specify Disk or Tape)

Finally! An Affordable Full-Size, Full-Feature PRINTER

SUG. LIST $299

$229.95!!

For your **VIC-20®, C-64® ATARI®**
Centronics Parallel Types
And RS-232 Serial Types

BASIC PRINTER
(Requires one
Option Below)

FEATURES:

- Full graphics capability.
- In the graphic mode, a column of graphic data can be repeated as many times as you want with a single command.
- Double width character output under software control (5 char. per inch).
- Print position addressable by character or dot (positioning control).
- Graphic character and double width character modes can be intermixed on a single line.
- Automatic printing. When the text exceeds the maximum line length no data is lost due to overflow.
- Self-test printing mode.
- Paper width is adjustable up to 10 inches. Standard plain paper.
- 50 cps print speed.
- 80 characters per line.
- 5 × 7 dot matrix.
- Full 2 yr. Warranty.
- Foreign character sets For U.S., U.K., Sweden, and Germany.

Any of these **Options** allow you to connect and print - cables included.

APROPRINT-2064™ (pictured) . . . .Add: $35.95
For Commodore **VIC-20 & C-64** - Cable included.

APROPRINT-4080™ . . . . . .Add: $45.95
For **all Atari Computers** - Cable included.

APROPRINT-1000™ . . . . . .Add: $29.95
RS-232-Serial - Name your computer

APROPRINT-8000™ . . . . . .Add: $29.95
Centronics type Parallel - Name your computer

ADD: $8.00 shipping (cont. USA), $35.00 (Canada, HI, AK)

(All other foreign orders Add $55.00 (shipped by Air)

The ONE VIC-20® Memory Expansion Board that DOES IT ALL!

Maximum Memory allows you to use more powerful programs for:
- EDUCATION • ENTERTAINMENT • MAIL LISTS
- BUSINESS APPLICATIONS • FINANCIAL RECORDS

APROPOS TECHNOLOGY

RAMAX™

Extension connectors allow other cartridges to be used!

Very low power usage requires no external power source!

Totally self-contained!

Memory allocations are fully switchable (see specifications)!

Built-in RESET switch!

Fuse protected!

6-months parts and labor warrranty

High reliability gold plated connectors!

To equal the total memory of RAMAX™ you would have to buy a 16k Memory Expansion, PLUS an 8k Expansion, PLUS 3k Expansion. THEN you would need a "mother board". With RAMAX™ you buy just ONE piece . . .at ABOUT HALF THE PRICE!

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 LOW PRICE!

Only $124.95

Price includes shipping and handling within Continental USA. Foreign orders please add $25.00. Calif. Residents add 6% sales tax.

10 DAY MONEY-BACK GUARANTEE
If not satisfied, simply return in original condition for your money back.

RAMAX Jr.™

Already own an 8k Expander? Get the NEW RAMAX Jr.™! Identical to the RAMAX™ except with 19k instead of 27k. Our instructions will show you how to use your 8k as BLK 3 with Jr. to get the full complement of memory!

Special Only $109.95
Shipping included

RAMAX™ Features and Specifications:

- Adds up to a full 27k bytes of additional RAM to the standard VIC-20's internal RAM of 5k.
- Built-in switch allows User selection of any combination of 5 areas or RAM memory*:
  BLK1 (8k: Adr. 8192-16383
  BLK 2 (8k: Adr. 16384-24575)
  BLK 3 (8k: Adr. 24576-32767)
  BLK 5 (Adr. 40960-49151, allows/disallows 8k ROM games)
  RAM (3k: Adr. 1024-4095)
  RESET (Resets computer without power off/on)
- Built-in electrical Fuse to protect equipment.
- Totally self-contained. No external power supply needed.
- Two (2) extension connectors allow ANY additional cartridges and/or devices designed for the VIC expansion port.
- Very low power consumption (.175 amp usual).
- High reliability gold-plated connectors are designed for long life.
- Complete Operating Manual.
- 6 month parts and labor warranty to original purchaser.
- Factory service.

*Many VIC-20 cartridges and programs require certain configurations of the memory (i.e certain games will only run on the unexpanded VIC while others require the upper portion of the expanded memory). With RAMAX™ you have switches that turn-on and turn-off portions of the memory to provide the right area of memory - all without plugging or unplugging. It's so easy!

TO ORDER:

Send Check or Money Order For the Total
Calif. residents add 6% tax.
Or Contact your Local Dealer
Phone orders Call **(805) 482-3604**

VISA All Prices U.S. Dollars MasterCard

CHARGE CARDS ADD 3%

DEALER INQUIRIES WELCOME

WE SERVICE WHAT WE SELL

VIC-20 & Commodore-64 are registered trademarks of Commodore International. Atari is a trademark of Atari Inc.

APROPOS TECHNOLOGY
1071-A Avenida Acaso
Camarillo, CA 93010

New Product!

APROSPAND-64™ Gives your Commodore 64 full expandability. This superbly designed expansion module plugs into the 64 & gives you 4 switchable (singly or in any combination) expansion connectors - plus fuse protection - plus a reset button! only **$54.95**
Shipping included

In Canada contact **TENTREX** Phone (416) 272-1198

APROPOS TECHNOLOGY

Disk File Manager

Philip Dale

"Disk Manager" works on both the Commodore 64 and expanded VIC-20. At least 8K memory expansion is recommended for the VIC—the more memory, the larger files you can copy.

Its own microprocessor, 2K RAM, and 170K disk format make the Commodore 1541 disk drive unusually flexible and economical. However, the 1541 has a number of limitations.

First, it's awkward to use, especially in direct mode, since it takes several statements for basic disk operations such as formatting, reading the error channel, and renaming and erasing files.

Second, some useful and needed functions have not been included. For instance, there's no built-in routine to copy a file from one disk to another. The COPY command can be used only to create a duplicate file on the same disk.

"Disk Manager" provides an easy-to-use, menu-driven system for managing program and data files on disk. You can select any of the basic disk commands just by typing in the operation number from the menu. In addition, three new functions are provided. The first copies any file (program, sequential, or random) from one disk to another disk. The second copies the DOS wedge program(s)onto a new disk in a single pass. And the third writes a copy of Disk Manager onto a new disk for backup.

Disk Manager Commands

To use any of the Disk Manager commands, just enter the number of the function you want and press RETURN.

1. Disk Directory. This function reads the directory without overwriting the BASIC program. If you want your own program to read the directory, you can use the techniques in the routine from lines 250 to 284. Press RETURN to get back to the menu.

2. Format New Disk. Your computer can't do anything with a new disk straight out of the box. First the disk has to be set up in a format that the 1541 can read. Part of formatting is naming the disk. This routine asks you for the name and name extender you want the disk to have. You should never give two disks the same name, and if you trade disks with friends, you should make sure that you aren't using the same disk name.

After you assign a name and extender, Disk Manager calls the built-in formatting routine (OPEN 15,8,15, "disk name") and then returns to the menu.

3. Initialize Disk. Use this command if a disk error is keeping you from performing a needed operation. It does not write to or alter the disk in any way. Instead, it resets the disk drive, as if you had just turned on the power.

4. Copy File on Same Disk. Use this command to create a backup copy of a file on the same disk. You will be asked for the source filename—the file you will be copying *from*. Then you'll be asked for the object filename—the name you want to give the new copy.

If the disk light is flashing when this function ends, the copy was unsuccessful. Use Command 11, *Error Status,* to find out why. The most common error is asking for a source file that doesn't exist. It's a good idea to write down filenames, so you don't forget you named the file "SOUNDS" instead of

It's time for your computer to grow up.

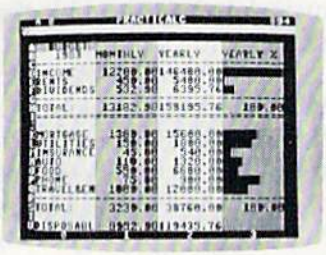
Meet PractiCalc.™ The world's most versatile spreadsheet at only $40.*

Games are fun when it's time to play. But at heart, your Commodore 64™ or VIC-20™ is a full-grown computer straining to gallop at the touch of your fingers.

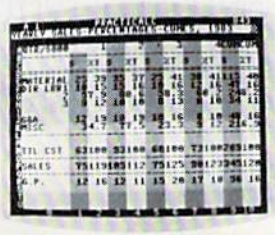
Commodore 64 and VIC-20. Not just for games...

But the problem is, most software's been designed for toys. Not for real computers. Until now.

Now comes PractiCalc. And there's not much in the world of grown-up computing it won't do. It'll keep addresses (in alphabetical or numerical order), phone numbers (likewise), make budgets and menus, project profits, keep track of expenses, inventories, investments, what have you. For your home, your school, your business.



Budgets, inventories, projections, you name it...



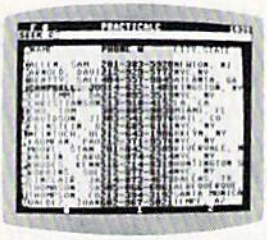
Spreadsheet analysis...

PractiCalc gives you everything you'd expect from a spreadsheet, like adding and subtracting, multiplying and dividing, calculating square roots, logarithms, exponential numbers and even trig functions. And PractiCalc gives you a lot more.

High or low resolution graphics...

Want to make a chart? Hit a key and the high or low resolution graphics of PractiCalc Plus or PractiCalc 64 will turn numbers into graphs. It'll even print out everything that shows on the screen.

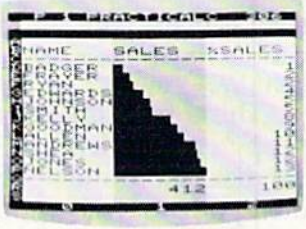
Want a lot of facts and figures at your fingertips? PractiCalc stores more than 2,000 cells in up to 100 columns and 250 rows. It'll sort them, search them, or shuffle them for you.



High-speed and wild card search...

You can add entries, delete them, or move them around –numerically or alphabetically, and instantly, of course. And you'll find PractiCalc unusually friendly, flexible, and forgiving.

All of which is a far cry from just playing with a joystick. Still, PractiCalc has one thing in common with a computer game. The price. Only $40.



Alpha or numeric sort...

PRACTICALC™ by COMPUTER SOFTWARE ASSOCIATES, INC.

Exclusively distributed by **Micro Software International, Inc.**
The Silk Mill, 44 Oak Street, Newton Upper Falls, MA 02164 • (617) 527-7510

*$40 is suggested retail price for tape version of PractiCalc-20 ($45 for disk version; PractiCalc Plus or PractiCalc 64 = $50 for tape version, $55 for disk).

© 1983 Computer Software Associates, Inc. Commodore 64™ and VIC-20™ are trademarks of Commodore Business Machines, Inc.

"SOUND" and get repeated error messages. Another likely error is asking for an object filename that already exists. This routine won't erase an existing file, which means you're protected against accidentally deleting something you want to save. If you *want* to overwrite a file, first use Command 8, *Erase File(s)*, to delete the file; then use Command 4 to make a new copy with the now unused name.

5. Copy File on New (Formatted) Disk. This function reads the file from the source disk and stores it in the computer's memory. The file is then written from RAM to the new disk. You have the option of making several copies of the same file.

There is a maximum file size of 66 blocks for the Commodore 64; maximum file sizes for the VIC are likely to be smaller, depending on how much memory is available. This command tells you how much memory is available. Sometimes garbage will have built up in the computer, wasting memory. Lines 7 and 8 test for the amount of free memory (and for the memory configuration in the VIC version). If garbage is tying up some of the available memory, so that you have less than the maximum possible memory for your machine configuration, you will be notified. The garbage can be eliminated by turning off the machine, LOADing and RUNning Disk Manager, and selecting Command 5 again.

After you have entered the filename, you will be asked to state what type of file it is—program, sequential, user, or relative. Then you are asked to put the source disk in the drive and press RETURN (if it is already in the drive, simply press RETURN). When the file has been loaded into memory, you will be asked to put the destination disk in the drive and press RETURN.

When the operation is over, you are asked if you want to make another copy of the *same file* on still another disk. If your answer begins with the letter Y, you will be prompted to insert the new destination disk and press RETURN. This allows you to make as many copies as you want on different disks without having to read the file from the original disk each time.

This routine is *not* fast. It takes about a minute to copy a six-block file. And be sure to format the new disk before attempting to copy files on it. Attempting to write to an unformatted disk will cause an error.

6. Copy DOS Wedge Program(s). You will be prompted to insert a disk containing the DOS wedge program(s).(For the VIC, the wedge program is the "VIC-20 Wedge," while the 64 wedge programs are "C-64 Wedge" and "DOS 5.1".) When you press RETURN, the wedge(s) is loaded into a buffer. Then you are prompted to insert the destination disk—a formatted disk that does not contain the wedge program(s)—and press RETURN; the routine puts the wedge file(s) on the new disk.

7. Rename File. You will be asked for the old filename. After you press RETURN, you will be asked for the new filename. After entering the new name, the routine executes the change.

8. Erase File(s). You are asked for the name of the file(s) you want to delete. You can erase more than one file at a time by using wild cards.

The wild card ? stands for any character in a particular position in the filename. For instance, if you erase ????TEST?, you will erase the files BYTETEST1, BYTETEST2, and DISKTEST5—but *not* the files NEWTEST5 (only three letters before TEST) or SOUNDTESTEDITOR (more than one character after TEST).

The wild card * stands for any number or combination of characters to the end of the filename. For example, if you say to erase NEW*, you will erase the files NEWGAME1, NEWGAME2, NEW, and NEWCOMER, but not the files NEVER and RENEW.

After running this routine, if you select Command 11, *Error Status*, the error number will contain the number of files deleted (it *won't* be a genuine error, even if *Error Status* says it is).

9. Validate Files. This is a housecleaning routine. It reorganizes the disk directory, cleaning up any isolated, unused blocks, and closing any files inadvertently left open.

10. Write Disk Manager. This routine simply saves the Disk Manager program then in memory. If Disk Manager is already on the disk, the version presently in memory will be saved over it.

11. Error Status. This routine checks to see what error is currently being reported. If no error is reported, you'll get error number 0 and the OK message. Remember that getting the error status changes it—if you run this routine twice in a row, the result the second time will always be 0 and OK.

12. Exit to BASIC. This ends the program in an orderly fashion, after PRINTing the message NOTE: DISKMANAGER PROGRAM IS STILL RESIDENT. This is to remind you that the program is still in memory. You can then LIST it, alter it, or get rid of it with a NEW command.

Tracing The Program

If you want to use some of these disk techniques in your own programs, it's easy to trace the way the program logic works. Check line 200. The starting line numbers of the subroutines are listed right after GOSUB, in the same order as the function numbers. Thus line 250 is the beginning of Command 1, *Disk Directory;* line 700 is the beginning of Command 12, *Exit to BASIC*.

The subroutine from 1000 to 1020 reads from a disk file into a buffer. The subroutine from 1050 to 1068 writes from the buffer to a disk file. Both subroutines are called by Commands 5 and 6.

See program listings on page 222.

COMPUTER MAIL ORDER

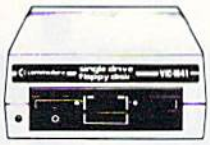
HOME COMPUTERS

VIC-20 $99

commodore COMPUTER HARDWARE

COMMODORE 64. $219

1525 80 Column Printer	$219.00
1600 VIC Modem	$59.00
1610 VIC Term 40	$49.00
1650 AD/AA Modem	$89.00
1702 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

$69.00

1520 COLOR PRINTER/PLOTTER

$169

PRINTERS

Epson (MX80 FT. MX100. RX80. FX80. FX100)	CALL
Okidata (82. 83. 84. 92. 93)	CALL
Star Gemini 10X	$299.00
Smith Corona TP-1	$469.00
C.Itoh Prowriter 8510P	$379.00
C.Itoh Gorilla	$209.00

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	$16.00
Meta Music I	$39.00

FLOPPY DISKS

Maxell	$32.00
Verbatum	$26.00
Elephant	$18.95

CARDCO.

Light Pen	$32.00
Cassette Interface	$29.00
Parallel Printer Interface	$69.00
3-Slot VIC Expansion Interface	$32.00
6-Slot VIC Expansion Interface	$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
Centipode	$23.00
Road Toad	$23.00

C-64 Cassettes

Road Toad	$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 Pak I(3 games)	$12.00
Adventure Pak 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

WEST

1-800-648-3311

In NV call (702)588-5654, Dept. 1206a
P.O. Box 6689, Stateline, NV 89449
Order Status #: 588-5654

CANADA

1-800-268-4559

In Toronto call (416)828-0866, Dept. 1206a
2505 Dunwin Ct., Unit 1B,
Mississauga, Ontario, Canada LSLIT1
Order Status #: 828-0866

EAST

1-800-233-8950

In PA call (717)327-9575, Dept. 1206a
477 E. Third St. Williamsport, PA 17701
Order Status #: 327-9576

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 $5.00) 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. We stock manufacturer's and third party software for most all computers on the market. Call today for our new catalog.

CANADIAN ORDERS: All prices are subject to shipping, tax and currency exchange fluctuations. Call for exact pricing in Canada.

VIC Music Writer

Robert D. Heidler

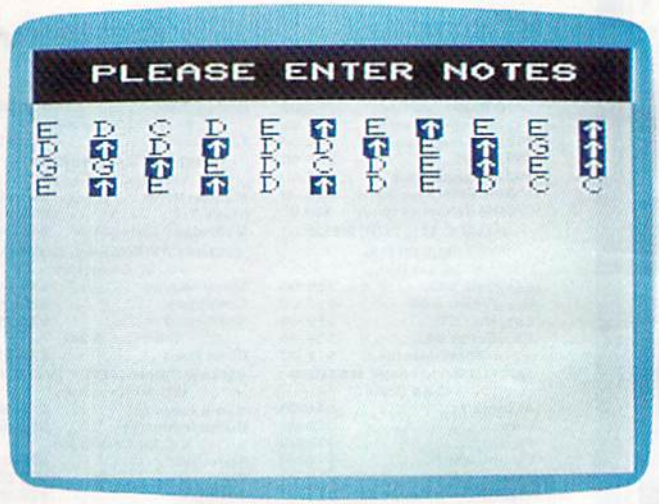
This flexible music-composition utility works on the unexpanded VIC-20. With it, you can compose and play songs, edit your music, and add the tunes to your own programs.

Music can be a welcome addition to a computer program, particularly if the program is educational or recreational in nature. (Who wouldn't like to have the theme from *Close Encounters of the Third Kind* playing softly in the background as your flying saucer glides across the screen?) Unfortunately, adding music to a program can be a long and complex task that many new programmers hesitate to attempt. That's where "VIC Music Writer" comes in.

VIC Music Writer is a program designed to make composing at your VIC keyboard *easy*. Here are some of its features:

1. VIC Music Writer allows you to easily enter any combination of notes from a two-octave range, and to hold each note for any duration.
2. It allows you to hear each note played as you enter it.
3. It allows you to hear your entire song played back at any time while you are composing.
4. It allows you to insert, delete, or change notes anywhere in the song at any time.
5. When your song is complete, VIC Music Writer will display the data necessary to reproduce your song in a program.

With this brief overview of the program's capabilities, let's explore in detail how to use VIC Music Writer.



Try entering this sample tune with "VIC Music Writer."

Entering Notes

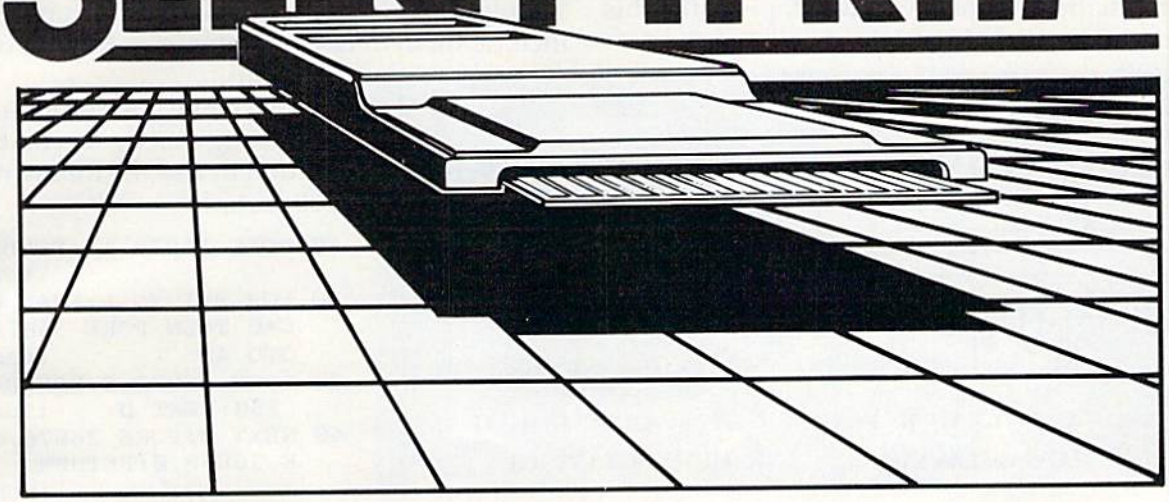
When you run the program, the words Please Enter Notes appear at the top of the screen. To enter a note, simply press any valid note key from A through G. The VIC will respond by sounding the corresponding note and displaying its letter name on the screen in blue.

To move to a higher octave, press the f1 special function key. Now, pressing any key A through G plays the note one octave higher. The note's name is printed on the screen in red. To return to the lower octave, press f3.

This program requires you to convert all flats to sharps (B-flat becomes A-sharp, etc.). To play a

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

MasterCard

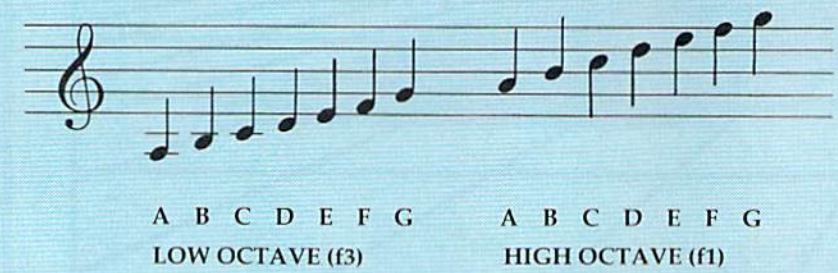
ADVANCED·PROCESSOR·SYSTEMS

VISA

sharped note, hold down the SHIFT key while pressing the key of the desired note. For example, to enter a C-sharp, hold down SHIFT and hit the C. The VIC will play a C-sharp note and the symbols C# are displayed on the screen.

If you aren't sure what note to use, press f5. This puts you in the search mode. You can now strike any combination of keys in either octave. The notes will sound as before, but no new notes will be added to the screen. When you have found the combination of notes you want, press f7. This returns you to the write mode.

Figure 1:
The Range Of Notes Possible With VIC Music Writer.



Duration

A note's duration is determined by the number of times the note is entered. Normally, I count each keystroke as one beat. Thus, pressing the C once plays and holds a C note for one beat. Pressing the C twice plays and holds the C for two beats. If you want to play two notes of the same pitch but you don't want the VIC to run them together, enter the first note, press the up-arrow key (next to RESTORE), and enter the second. The up-arrow key places a momentary break between the notes—just long enough to distinguish between them.

Sometimes you will want to count each keystroke as one-half beat and double the playback speed in your program. (This allows you to use eighth notes in a song written in 4/4 time, etc.)

If you want to place a rest in your song, press R. The duration of rests is handled in the same way as the duration of notes.

Any time you want the VIC to play back what you have written, press P. The computer plays your song, momentarily illuminating the symbol of each note as it is played.

Editing Your Song

To insert, delete, or change a note anywhere in your song, use the left-right cursor key to move the cursor back to where you wish to make the change. (While the cursor itself is invisible, the color of the notes will change as the cursor passes over them.) To change a note, simply position the cursor over the old note and press the key for the desired note. Insertions and deletions are made with the INSERT/DELETE key.

To clear a song from the screen, press the left-arrow key at the upper-left corner of the keyboard and then press the S key.

Data Display

When your song is complete, press the left-arrow key. This clears the screen and displays the data necessary to reproduce the song in your program. Simply copy these numbers off the screen and include them in DATA statements in your own program.

To make your program play your song exactly as you have written it, use the following subroutine:

```
10 POKE 36878,15:READA
                    :rem 201
20 FOR B=1 TO A:READ C:IF
   C=0 THEN POKE 36876,0:G
   OTO 40           :rem 142
30 POKE 36876,C:FOR D=1 TO
    250:NEXT D      :rem 217
40 NEXT B:POKE 36876,0:POK
   E 36878,0:RETURN
                    :rem 167
```

The value 250 in line 30 controls the playback speed. You can substitute your own number here. I suggest starting with 250 and then increasing or decreasing the tempo to suit your taste. If you want to synchronize any kind of graphics on the screen while the song is playing, you will want to decrease the value of 250 and place the instructions for the screen display between lines 30 and 40.

If you want to play a song several times in a program, you may want to include a RESTORE statement at the beginning of line 10.

Figure 2:
Sample Songs For VIC Music Writer.

"Mary Had A Little Lamb"

E D C D E ↑ E ↑ E E D ↑ D ↑ D D E
G ↑ G G E D C D E ↑ E ↑ E ↑ E D ↑
D E D C C P

"London Bridge"

f1 A B A f3 G F# G f1 A R f3 E F# G R F#
G f1 A R A B A f3 G F# G f1 A R f3 E E
f1 ↑ A A f3 F# D P

Typing The Program

When you are typing VIC Music Writer, leave out line 5 until you have tested your program to be sure you have typed it correctly. Line 5 disables the RUN/STOP key, preventing you from acci-

dentally destroying your work. To exit the program without turning off the power you must hit the left-arrow key.

Since this program uses a good deal of memory, I would advise typing it in without any spaces, apart from those within quotation marks.

If you want to save yourself a lot of typing, I would be glad to make a copy of the program for you. Send a blank cassette tape, a stamped, self-addressed tape mailer, and $3 to:

Robert D. Heidler
3409 Kingfisher Lane
Denton, TX 76201

While this program was written primarily to aid in writing programs, it is also a lot of fun to play around with. It is very user friendly, and the editing features make it a lot of fun to experiment with, as you change notes and durations to get different effects.

My seven-year-old daughter mastered the program in about ten minutes and now enjoys typing in the songs she learns at school and hearing the computer play them back. My two-year-old son isn't quite ready for serious composition, but he enjoys playing the keys like a piano to hear the music. I hope you find this program as useful and enjoyable as we have.

See program listing on page 234.

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).

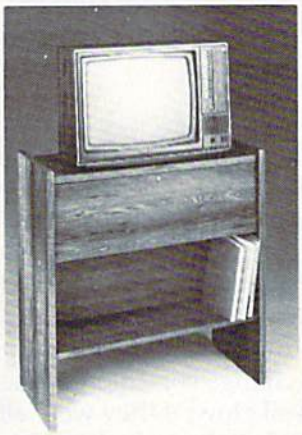
Membership Fees for 12 Months			
	Canada	—	$20 Can.
	U.S.A.	—	$20 U.S.
	Overseas	—	$30 U.S.

Toronto Pet Users Group
Department "G"
1912A Avenue Road, Suite 1
Toronto, Ontario, Canada M5M 4A1

* LET US KNOW WHICH MACHINE YOU USE *

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.

HYTEC SYSTEMS

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 frt. collect FOB Portland, Oregon.

THINKING

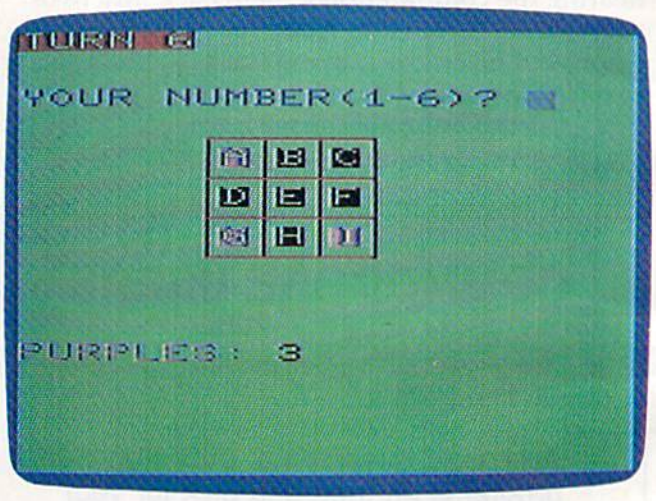
Andy VanDuyne

"Thinking"—and its advanced version, "Thinking Harder"—is a game of pattern recognition and memory that tests your ability to think logically. Originally written for the unexpanded VIC, we've added a version for the Commodore 64.

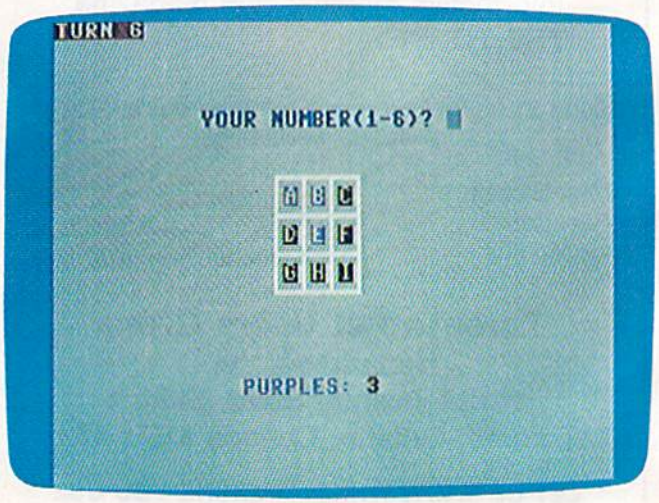
You have nine black boxes labeled from A to I in front of you. Your job is to make them all light up with a purple glow.

The trouble is, you can't get to them directly. Instead, you have a set of six switches, numbered from one to six. Each switch controls *three* of the boxes. When you choose switch 1, for example, boxes A, D, and H might change condition. If they were all dark, then they'll all glow; if they were all glowing purple, then they'll all go dark. And if A and D were purple and H was black, then A and D will go dark and H will glow purple.

The trouble is figuring out which switches control certain boxes. You know that there is a correct combination—three of the switches, toggled at once, will make all nine boxes glow. But which three? That's where luck and genius combine. It's possible to guess right with your first three choices. But if you aren't concentrating, it's also possible to get such a mishmash of purple and black boxes that it could take a hundred tries before the puzzle is solved.



Solving a puzzle in "Thinking," VIC version.



"Thinking," Commodore 64 version.

How To Play "Thinking"

After you have typed in "Thinking" and SAVEd it on tape or disk, RUN it and the game will begin. A

title screen and two screens of instructions appear first. Press any key to go on.

Nine black boxes lettered from A to I appear in the center of the screen. Below the boxes you can see the number of purple boxes, which is 0 at the beginning of the game. At the top of the screen is the number of turns you have taken, which is 1 at the start of the game.

The input line just above the black boxes asks you for a number from 1 to 6. Enter a number and press RETURN. Three boxes will immediately turn purple. The turn number will change to 2 and the count of purple boxes will change to 3.

Suppose you enter the number 5, and the A, B, and I boxes glow purple. You don't know about any of the other numbers, but you know that from then on, in that game, number 5 will toggle boxes A, B, and I. The pattern for each switch is randomly assigned at the beginning of each game, so that each time you play there'll be a new set of patterns. But the pattern for a particular switch will never change *during* a game.

If you choose a number and don't like what it did, choosing the same number again toggles the same three boxes and restores them to the way they were originally. In fact, in order to choose the same number, all you have to do is press RETURN without entering anything. Your last choice will be repeated. It will cost you a turn each time, though, just as if you had entered a new number.

When all nine boxes turn purple, the computer congratulates you, tells you how many turns you took, and asks if you want another game. If you choose to play again, a new set of patterns is randomly created.

Strategy And Frustration

At the beginning of every game there are always two perfect solutions. The puzzle can always be solved. Winning in three or five tries is entirely a matter of luck. Students in my school average between 9 and 25 turns—slightly better than the teachers. If you become totally lost, however, it can take dozens or even a hundred tries to solve the puzzle.

But if you think logically, you should soon become quite good at the game. I won't give away the whole strategy, but you might keep in mind that any two patterns that overlap (that change the condition of the same box) cannot possibly be in the same winning combination. And in the last turn before you win, you must always have exactly six purple boxes and three black ones.

Is It Too Easy?

If you become a master at Thinking, you might want to try Thinking Harder. In this version of the game, you have *nine* possible patterns instead of six. This makes it possible to get much more confused, and getting it right by luck alone is much less likely.

To play Thinking, type in Program 1 for the VIC-20 or Program 2 for the Commodore 64. To play Thinking Harder, remove the REM in line 2 and change the 6 in line 132 to a 9.

If Thinking Harder is too difficult, you can always reverse the changes and go back to Thinking again.

Tape Copies — VIC Only

If you don't want to type the program, I'll make a copy for you on tape (VIC version only). Send a blank cassette, self-addressed stamped mailer, and $3 to:

Andy VanDuyne
40 Park Street
Norwood, NY 13668

See program listings on page 218.

COMPUTE!'s Gazette
Toll Free Subscription Order Line
800-334-0868
In NC 919-275-9809

COMMODORE-64™ and VIC-20™ users!

Meet an... IMP

Impact Printer by Fidelity Electronics 4"×4.5"2"

DOT MATRIX PLAIN PAPER PRINTER

IMPACT PRINTER COMES COMPLETE WITH ALL 20/64 INTERFACES CABLES

Short on Price and Size... Long on Quality!

$129.95

Send Check or M.O. + $6.95 Shipping /Handling

Features: High quality print head- MCBF equal to 500,000 lines, 5 × 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

DEALER INQUIRIES INVITED

"Call THE Printer Experts"

For Information and Orders

INSTITUTIONAL COMPUTER DEVELOPMENT CORP.

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.

INTRODUCING AT $9.95 OR LESS.

HELLO...

Our name is VideoValue...and these are our video games from VideoQuest★...So much for the introductions...

Who are we...what are we doing here...you ask...

Well, we've only just met...but you have a right to know, I suppose...

We sell video game software...good games...for VIC-20★, Commodore 64★, Timex 1000★ and TRS 80 I LV2★ and III★ computer systems...that's what we're doing here...

But I never heard of you...you say...

You're right of course...but what else can we do?? What would you do if you had invested lots of time, money and effort developing an entire catalog of first quality games only to learn that major retailers have already bought everything for Christmas??...

A sad story...you say...

Maybe for VideoQuest...but not for us or you...Where else can you get these kind of prices??

Any 1 game	**$ 9.95**
Any 2 games	**$19.00**
Any 3 games	**$27.00**
Any 4 games	**$34.00**
Any 5 games	**$40.00**
Each additional game	**$ 7.50**

TO PLACE YOUR ORDER CALL our toll free number...(800) 227-3800, Ext. 528...

Major retailers...eat your hearts out...We have figured out your high-priced cartridge deal...To you we say...CASSETTES!!!

Excuse me...got a little carried away there...but at Christmas we all want a lot...get a lot...give a lot...

VideoValue and VideoQuest only want to get introduced to you...that's all...

Pardon me...I don't think I got your name...Just write or call...either will be fine...

And... have a Merry...

S. Dean Reynolds

Marketing Director

VideoValue

P.O. Box 2900
Rolling Hills Estates, Ca 90274

VIC-20 or Commodore 64

No.	Title and Game Description
603	**Adventure Trek.** Cross the burning desert, enter the dangerous forest, traverse raging torrents. Dangers lurk along the way. **3K Exp.* Joystick.**
527	**Artillary War.** This is a long range war in the desert. A fort, oasis, and sand dunes are your cover. Can you beat back the tank? **Keyboard.**
962	**Autocross.** Only those with the finest skills and nerves of steel will be able to negotiate this toughest of master courses. If you succeed, the world championship is yours!! **Keyboard.**
809	**Black Hole Disaster.** Does the "Black Hole" exist? You better believe it..and you're being pulled towards it!! Only your aim can save you. **3K Exp.* Keyboard.**
947	**Bombs Away.** You are commander of an aircraft. Can you avoid the missiles and flatten the alien city defenses? **Joystick/Keyboard.**
531	**Clowneries.** Help the clowns burst the balloons by bouncing them on the see-saw. The clowns go higher every time. **8/16K Exp.* Keyboard.**
606	**Dam Busters.** Navigate bombers and helicopters behind enemy lines on a top secret mission to destroy a major dam. **Joystick/Keyboard.**
842	**Dangers of the Deep.** You're out for a nice dip on a Sunday afternoon. Then suddenly they come from everywhere...sharks and octopi. They're all out to get you!! Will you survive? **Joystick/Keyboard.**
594	**Downhill Racer.** The gold medal is on the line. The course is icy and the dangers are everywhere. One mistake and you're out of it. Will you have the winning time? **Keyboard.**
572	**Drunken Driver.** Guide the intoxicated driver through traffic avoiding the obstacles, pink elephants and police helicopter. **3K Exp.* Joystick.**
638	**Escape.** Your star ship is caught in a deadly meteorite shower. Escape by exploding the drifting meteors before you are destroyed. Hyperwarp through space to bring your crew safely home. **3K Exp.* Joystick.**
831	**Evader.** Work through the maze without being consumed by the monsters. **Joystick.**
802	**Evil Ghost Train.** This train is bound for glory...or are you? There are passengers aboard with you...they've been on this run many times before. They're coming from every angle...ghosts, evil spirits, monstors and demons!! Now, it's you or them. **3K. Exp.* Joystick.**
571	**Explorer.** As captain of a star ship, it is your mission to seek out new peoples and planets. You will go where no person has ever gone before. Adventure and danger are your constant companions. **16K Exp.* Keyboard.**
881	**Friend or Foe.** You have only a microsecond to decide. Shoot too soon, and you may disintegrate a friend. **3K Exp.* Joystick.**
723	**Intruder.** They come from outer space, strange creatures threatening our planet. Who are they? What do they want? No time for questions now, only action will save you from the Intruders. **3K Exp.* Joystick.**

***Expanders for VIC-20 only.**

ORDER TOLL FREE (800) 227-3800 EXT. 528

VIDEOQUEST

Home Computer Games

VIC-20 or Commodore 64

No.	Title and Game Description
896	**Killer Hunter.** The "mob" has sent their best out to give you the "kiss of death". Like the comedian, he has many shapes and forms. Can you protect yourself, or are you destined for "cement shoes". **Keyboard.**
923	**Killer Torpedos.** A giant tanker is under attack!! The cargo is priceless. One torpedo and it's on its way to Davy's Locker. Watch out for the mines and iceberg. **3K Exp.* Joystick.**
504	**Labyrinthe.** Find your way through the underground maze. A mathematical-three-dimensional puzzle game. **3/8/16K Exp.* Keyboard.**
610	**Laser Battle.** You are under attack from the Plyonytes. Can you fend off the attack before your force field shields are disintegrated and you are destroyed? **Joystick/Keyboard.**
680	**Mars Attack.** You are counterattacking Mars in your star ship. Destroy the forton fireballs before they explode and destroy you. **Joystick/Keyboard.**
551	**Moonlanding.** You are landing on the moon for exploration. Suddenly you are attacked by Zurkons. Will you be destroyed? **16K Exp.* Keyboard.**
908	**Nightcrawler.** Quick movement and rapid fire will protect you from the attacking nightcrawler, spider and bugs. A centipede type game. **Joystick.**
599	**Nuclear Attack.** Nuclear war has been declared and you have been designated to destroy with your missiles the enemy silos. You have 30 rockets and 6 silos to destroy. Good Luck! **Keyboard.**
991	**Olympic Champion.** You're representing your country in the Olympic Equestrian event. Take your trusty steed through the speed, jumping and cross country competition to take home the coveted gold. **3K Exp.* Joystick.**
724	**Othello.** Master all your skill and concentration and try to beat the computer. **3K Exp.* Joystick.**
730	**Pari-Mutuals.** Race your mighty steed in the sport of kings. Come home a winner or suffer the agony of defeat!! **3K Exp.* Joystick.**
556	**Raid on New York.** Bomb the city of New York to provide a landing strip on which to land, repair and refly your bomber. **8/16K Exp.* Joystick.**
851	**Rabbit.** Cross the highway and canal avoiding the hazards. **8/16K Exp.* Joystick.**
689	**Road Demon.** You are one of California's finest—a California Highway Patrolman, "CHIPS". Apprehend the highway menace before he becomes another statistic, or makes you one! **Joystick.**
658	**Shooting Gallery.** Run up points as you shoot the birds and animals. Hit the musical notes and music begins. Hit the numbers to earn extra bullets. Careful, watch the clock. **3K Exp.* Keyboard.**
829	**Space Fight.** You are the pilot of a spaceship. You must destroy the enemy machines if you can, without being destroyed yourself. **Joystick/Keyboard.**
822	**They Come From Space.** The year is 2020 and you're on space patrol. Suddenly, you are attacked by alien invaders!! **Joystick.**

***Expanders for VIC-20 only.**

GAMES ON OTHER SYSTEMS

TIMEX 1000 + 16K		TRS 80 I LV2 and III	
508	BATTLE IN OUTER SPACE	515	DEATH STAR VEGA
800	BASE DEFENSE	587	DISARM
670	BRICK WALL	570	ELIMINATOR
770	CATCH 23	785	GALAXY
685	INDY 500	565	POWER FORCE
567	MAZE ESCAPE	734	SCHAZZAM
799	PILOT TRAINING		

TO PLACE YOUR ORDER CALL TOLL FREE (800) 227-3800 Ext. 528

PRICES INCLUDE SHIPPING & HANDLING

ORDER FORM

VideoValue
P.O. Box 2900
Rolling Hills Estates, Ca 90274

1 game $9.95 **2 games $19.00**
3 games $27.00 **4 games $34.00**
5 games $40.00
Each Additional Game $ 7.50

Circle Computer **VIC-20** **64**

Circle Game Numbers

603	531	638	723	680	730	829	527	606	831
896	551	556	822	962	842	802	923	908	851
809	594	571	504	599	689	947	571	881	610
991	658	724							

NAME _____

ADDRESS _____

CITY _____ **STATE** _____ **ZIP** _____

☐ **CHECK ENCLOSED** ☐ **MONEY ORDER ENCLOSED**

CHARGE TO: ☐ **VISA** ☐ **MASTERCARD**

ACCOUNT NUMBER: _____

EXPIRATION DATE: _____

SIGNATURE _____

★ Trademarkes of VideoQuest, Inc., Commodore Electronics, Ltd., Timex and Tandy., Corp., respectively.

ORDER TOLL FREE (800) 227-3800 EXT. 528

VIC Billboard

Andy VanDuyne

This program takes advantage of a little-used technique — doubling the height of the VIC-20's characters — to turn any TV screen into a repeating message display board. For the unexpanded VIC.

One of the interesting features of the VIC-20 is the large 8 by 16 (pixels) character size mode. The *VIC-20 Programmer's Reference Guide* says this normally would be used for high-resolution graphics. But it can also be used very effectively for text.

Possible uses include programs for very young children, people with vision problems, or situations in which you want larger, eye-catching text displays, such as window displays in stores.

"Billboard," the program accompanying this article, displays up to four messages beneath a main heading, all in the double-height, 8 by 16 text mode. It's a great attention-getter for small businesses, or for bazaars and fairs, parent-teacher nights, and other occasions.

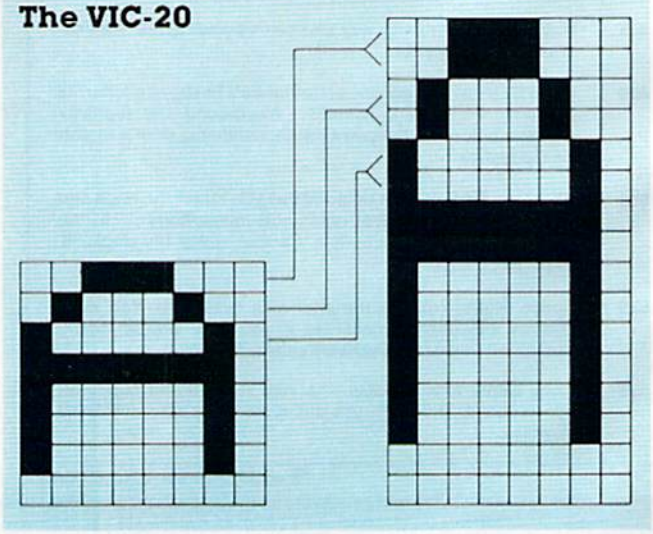
Using Billboard

The program itself is very easy to use, with prompts for all the input. After you enter all the messages and colors you want displayed, it switches to the double-height text mode and begins endlessly repeating the messages.

When you first run Billboard, it asks you for the heading or title. This will be automatically centered at the top of the screen and must be limited to 22 characters or less (the VIC-20's screen width). Then you choose the color in which you want the heading to appear. When choosing colors, be sure to pick a contrasting combination; if the text color is the same as the background color, the text will be invisible. Another caution: If you are entering text in all capitals with the SHIFT LOCK key, you must release SHIFT when typing a space. The character set for the large-size text mode has no shifted space character.

Next the program asks you to choose a screen/border color combination (please remember to contrast your text colors). Refer to the VIC owner's manual to find an interesting color combination for your display. To keep the screen/border combination included with the program, just press RETURN.

Double-Height Characters On The VIC-20



Now the program asks you to enter up to four messages. Each message can be up to four screen lines long. All the rules for entering strings apply, including no commas, colons, and, in this case, shifted spaces. Each message can be a different color.

Finally, after entering the last message, press any key to activate Billboard. One by one, your messages are spelled out beneath the heading in king-size characters.

You can edit your messages at any time by pressing the back-arrow key (at the upper-left corner of the keyboard) while a message is being displayed. Just follow the prompts; you can enter as many as four additional messages or change any previous message.

To end the program and restore text to normal, press RUN/STOP—RESTORE.

A Memory-Hungry Mode

One of the problems with the 8 by 16 text mode is the amount of memory the character set uses. Each 8 by 16 character needs 16 bytes of memory (as opposed to eight bytes in the standard mode), and since these are custom characters, they must be stored in Random Access Memory (RAM). Each character is moved down from the standard character set in Read Only Memory (ROM); and to achieve the double height, each ROM character must be stored twice.

While writing Billboard, I decided I wanted both upper- and lowercase letters. These include characters 0 through 90 in the ROM character table that begins at memory address 34816 (some editions of the *Programmer's Reference Guide* erroneously list this address at 33816). Since each double-height character uses 16 bytes, this adds up to 1456 bytes! The free memory ceiling would have to be lowered to address 6224. However, the VIC cannot be adjusted to find a character set at that address. There's another address in the neighborhood, though — 6144 — where the VIC can find a character set, if address 36869 is set to 254. Unfortunately, using this address means the new character set burns up even more memory — 1536 bytes — almost half the free memory available in an unexpanded VIC.

So you can see why memory has to be conserved in every way possible. That's why there aren't an abundance of REM statements to explain what's going on.

If you want to experiment with the large text mode without using Billboard, enter this program:

```
10 POKE 56,24:CLR
20 Z=0
30 FOR N=6144 TO 7678 STEP 2
40 POKE N,PEEK(34816+Z):POKE N+1,PEEK
   (34816+Z)
50 Z=Z+1:NEXT
```

Now RUN. Nothing will seem to happen for about half a minute. Be patient; the character set is being moved from ROM to RAM. Soon you'll see the usual READY message; again, it will look as though nothing has happened.

Next, type this line in direct mode (without a line number) and press RETURN:

```
POKE 36869,254:POKE 36867,PEEK(36867) OR 1
```

Double-height characters! You will notice that the bottom of the screen has disappeared, and the cursor may not be visible. Both are there, but they are below the screen limits of your TV or monitor. The number of visible rows has changed from 23 standard-size ones to 11½ big ones. Try pressing the CLR/HOME key to clear the screen. Now the flashing cursor is visible, though it looks a little strange. Try typing some characters — everything appears twice as tall. You can even LIST a program and enter new lines.

To bring things back to normal, press RUN/STOP—RESTORE. You can erase the short character set-relocating program from memory by typing NEW, but the character set itself will remain. Enter the POKE statements above to switch back to large characters.

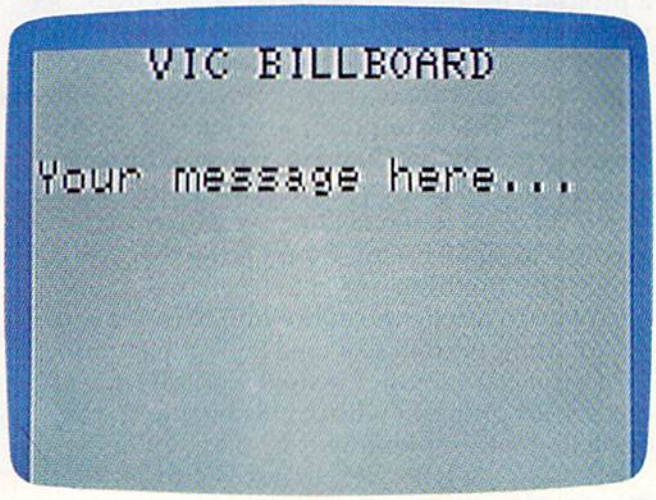
Remember: These programs are for the unexpanded VIC. You'll have to modify Billboard to use it on expanded VICs.

Cassette Copies

If you don't want to type Billboard, I will make you a copy on tape. Please send a blank cassette, self-addressed stamped mailer, and $3 to:

Andy VanDuyne
40 Park Street
Norwood, NY 13668

See program listing on page 231.



Up to four repeating messages can be displayed with "VIC Billboard."

Tricks For Saving Memory

John Stilwell

Writing programs to fit in an unexpanded VIC-20 is not easy — there's only 3.5K of free memory to work with. You should find the following tricks very useful. They also work on the Commodore 64, although with about 39K of free memory space available, the need is less acute.

Trick 1

Always use keyword abbreviations when entering a program (example: P-SHIFT-O for POKE). See your manual for a list of these abbreviations. This won't save any memory because of the abbreviations, but it will allow you to cram more statements into a line. This is important because every line takes up five bytes, then you start counting the statements. The only problem with this trick is that if the line, when listed, exceeds 88 characters on the VIC or 80 on the Commodore 64, you can't edit it. If something needs to be changed, you will have to retype the entire line. Also, if you submit the program to a magazine which publishes the listing, other people won't be able to enter your program without also using the abbreviations — something they may not know.

Trick 2

If the last thing on a line is an ending quotation mark of a PRINT statement, leave it off. It won't hurt anything as long as it's the last thing on the line. Besides less typing for you, it saves one byte for each quote you leave off. This may not seem like much, but everything adds up. Remember, the average line statement is 40 bytes long.

Trick 3

This one will save the greatest amount of memory. Use cursor controls whenever possible. Here are some examples:

```
10 PRINT
20 PRINT
30 PRINT
40 PRINT"HI MOM"
```

This program uses 34 bytes of memory. If the PRINT statements are replaced by down-cursor controls, there is a significant saving.

```
10 PRINT"{3 DOWN}HI MOM"
```

This accomplishes the same thing but uses 19 bytes, so we save a whole 15 bytes. Now we are getting somewhere. Look through your program and see how many times you can do this. You may be amazed. Oh, don't forget to leave the ending quotation mark off.

```
10 PRINT "{3 DOWN}HI MOM
```

This saves one extra byte.

Trick 4

This is a modification on Trick 3. Always use TABs instead of cursor controls if there are a lot of cursor controls. However, with TABs you are limited to moving from left to right and down.

To move to the right five columns, use TAB(5). To move down, add 22 for every row. For example, we will move to the right five columns and down ten rows:

(10 rows * 22) + 5 columns = 225, so use TAB (225).

Unfortunately, the TAB number must be less than 256. If you need to TAB further than 255, it is legal to stack TABs — TAB(255)TAB(25).

Instead of this:

```
10 PRINT "{10 DOWN}{5 SPACES}HI MOM"
```

Memory usage is 31 bytes. Try it this way:

(10 rows * 22) + 5 columns = 225

```
10 PRINT TAB(225)"HI MOM"
```

This now only uses 22 bytes. In comparison to Trick 3, nine bytes may not seem like much, but if the above program were written with ten PRINT statements, it would use approximately 77 bytes. So we would have saved 56 bytes by using TABs.

To know when to use TABs instead of cursor controls, you must look at the memory requirements. Cursor controls take one byte each. TABs take two bytes plus one byte for each digit in the TAB number.

Trick 5

If something looks strange with the TAB above, you are right. There is no semicolon between the TAB and the quote. It is not necessary. Since it doesn't affect the spacing, why use it? After all, it uses up one byte. You can also eliminate the semicolon between quotes and variables.

10 PRINT "A = ";A can be written as 10 PRINT"A = "A

Note that the semicolon must be used if the PRINT was changed to an INPUT.

10 INPUT"A = ";A

Trick 6

This trick is frowned upon by traditional programmers. Nevertheless, you can number a program by ones. You won't want to do this unless you have a renumber program. If you renumber the program by ones, starting with zero as the first line number, the program will take up less space. This is because all branching commands such as GOTO take one byte plus one for every digit of the address.

This trick has on occasion saved me a couple of hundred bytes. Unfortunately, modifying this program will be hard, since you can't insert any lines without renumbering.

Trick 7

Trick 7 does not hold for most computers. But with the VIC and 64, use PRINT statements instead of POKEs whenever possible. This is for three reasons.

First of all, POKE statements are so amazingly slow that it isn't funny. I recently rewrote the graphics in a program, changing the POKEs into PRINT statements. I was amazed. You would think that it was written in machine language. The speed difference is that great.

Second, POKE statements take up more memory than PRINT statements (in most cases). A POKE takes two bytes plus one for every digit of the numbers that go with it. That's an average of eight bytes for every character POKEd on the screen. In contrast, it takes one byte for the PRINT and one for each of the quotes and characters in-between. So, if you are creating graphics, you might save a lot of memory by using PRINT statements.

Third, when POKEing directly into screen memory on the VIC and late-model 64s, a corresponding POKE to color memory is necessary to make the character appear on the screen. This then requires two POKE statements for each character. It will be more economical (memory-wise) to use PRINT, which automatically takes care of color memory.

What data management program will make your Commodore 64 do all this?

Store and retrieve:

Address lists · Home expense records
Insurance records · Bills due by date
Car maintenance records
Appointment calendars
Christmas card lists
Investment records
Credit card records
and more

$39.95

Info-Manager

To order or for our free brochure, call:
(415) 459-1333
Dealer inquiries welcome

PYRAMID SOFTWARE INTERNATIONAL

Commodore 64 is a registered trademark of Commodore Electronics, Ltd

COMMODORE 64
(more power than Apple II at half the price)

$99.50*

- 170K DISK DRIVE $159.00*
- TRACTION FRICTION PRINTER $119.00*

(* with software savings applied)

COMPUTER AND SOFTWARE CHRISTMAS SALE

WE HAVE THE BEST SERVICE

WE HAVE THE LOWEST PRICES

VIC-20
(a real computer at the price of a toy)

$77.00*

- 40-80 COLUMN BOARD $89.00
- VOICE SYNTHESIZER $59.00

(* with Cassette and Gortek purchase)

COMMODORE 64 COMPUTER $99.50
You pay only $199.50 when you order the powerful 84K COMMODORE 65 COMPUTER! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your computer that allows you to SAVE OVER $100 off software sale prices!! With only $100 of savings applied, your net computer cost is $99.50!!

SOFTWARE BONUS PACK $29.95
When you buy the Commodore 64 Computer from Protecto Enterprizes you qualify to purchase ONE SOFTWARE BONUS PACK for a special price of $29.95!! Normal price is $49.95 (40 programs on disk or 24 programs on 5 tapes).

170 DISK DRIVE $159.00
You pay only $259.00 when you order the 170K Disk Drive! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your disk drive that allows you to SAVE OVER $100 off software sale prices!! With only $100 of savings applied, your net disk drive cost is $159.00.

TRACTION FRICTION PRINTER $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. Included with this board is word processor pack, electronic spread sheet and mail merge data base on two tapes. List $249.00. Coupon Price $139.00 (Disk add $10.00).

80 COLUMN WORD PROCESSING PACKAGE $79.00
SCRIPT 64 EXECUTIVE WORD PROCESSOR is the finest available for the COMMODORE 64 Computer! THE ULTIMATE for PROFESSIONAL wordprocessing application. DISPLAYS 80 COLUMNS IN COLOR. Featuring simple operation, powerful text editing with a customized 250 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 $59.00. (Disk only).

SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE COUPON with every COMMODORE 64 COMPUTER-DISK DRIVE-PRINTER-MONITOR we sell! This coupon allows you to SAVE OVER $100 OFF SALE PRICES! $200-$300 savings are possible!! (example)

PROFESSIONAL SOFTWARE COMMODORE 64

Name	List	Coupon
Executive Word Processor	$99.00	$59.00
Complete Data Base	$89.00	$46.00
Electronic Spreadsheet	$89.00	$46.00
Accounting Pack	$69.00	$32.00
Total 5.2 Word Processor—Plus		
Tape	$69.00	$37.00
Disk	$79.95	$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	$29.95
Basic Tutor	$29.95	$15.00
Typing Teacher	$29.95	$15.00
Sprite Designer	$16.95	$10.00
Medicinemen	$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 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 $99.00
Excellent quality GREEN PHOSPHOROUS VIDEO MONITOR with antiglare, 1920 characters (80 characters x 24 rows). Save your TV! a must for 80 column word processors. PLUS $9.95 for VIC 20 or Commodore 64 Cable.

12" AMBER SCREEN MONITOR $119.00
Premium quality AMBER VIDEO MONITOR With antiglare, (80 characters x 24 rows), exceptionally clear screen, faster scanning, 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 — C.O.D.

PROTECTO ENTERPRIZES
(WE LOVE OUR CUSTOMERS)

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

VIC 20

40-80 COLUMN BOARD

NEW

only $89.00

NEW

Now you can get 40 or 80 Columns on your T.V. or monitor at one time! No more running out of line space for programming and making columns. Just plug in this board and you immediately convert your VIC-20 computer to 40 or 80 columns! PLUS, you get a Word Processor, Mail Merge program, Electronic Spreadsheet (like VISICALC) and Terminal Emulator! These PLUS programs require only 8K RAM memory and comes in an attractive plastic case with instructions. List $149 **Sale $89**

"15 DAY FREE TRIAL"

- **We have the lowest VIC-20 prices**
- **We have over 500 programs**
- **Visa — Mastercharge — C.O.D.**
- **We love our customers!**

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

NEW

MAKE YOUR VIC-20 COMPUTER TALK

when you plug in our

ONLY **$59.00**

VOICE SYNTHESIZER

You can program an unlimited number of words and sentences and even adjust volume and pitch.
You can make: • Adventure games that talk • Real sound action games
This voice synthesizer is VOTRAX based and has features equivalent to other models costing over $370.00. To make programming even easier, our unique voice editor will help you create words and sentences with easy to read, easy to use symbols. The data from the voice editor can then be easily transferred to your own programs to make customized talkies.

"15 DAY FREE TRIAL"

- **We have the lowest VIC-20 prices**
- **We have over 500 programs**
- **Visa — Mastercharge — C.O.D.**
- **We love our customers!**

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

COMMODORE 64

80 COLUMN BOARD

$149.00*

The dream of seeing 80 columns on the screen at one time is now a reality. The Protecto Expansion Board converts your Commodore 64 to 80 columns! PLUS you get a word processor with database mailmerge, an electronic spreadsheet, and a terminal emulator. List $249. SALE $149. Coupon Price $139.00 (Disk Programs add $10.00).

80 COLUMN MONITOR SALE

	List	Sale
9" Screen - Green Text Display	$139	$ 79
12" Scrren - Green Text Display (anti reflective screen)	$199	$ 99
12" Screen - Amber Text Display (anti reflective screen)	$219	$119
14" Screen - Color Text Display	$299	$249

VIC 20 COMPUTER 40-80 COLUMN BOARD LIST $149.00 SALE $89.00

- ***15 DAY FREE TRIAL***
- ***WE HAVE LOWEST COMMODORE 64 PRICES***
- ***WE HAVE OVER 500 PROGRAMS***
- ***VISA • MASTERCHARGE • COD***
- ***WE LOVE OUR CUSTOMERS***

PROTECTO
ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

SANYO MONITOR SALE!!

9" Data Monitor

- 80 Columns × 24 lines
- Green text display
- East to read - no eye strain
- Up front brightness control
- High resolution graphics
- Quick start - no preheating
- Regulated power supply
- Attractive metal cabinet
- UL and FCC approved

- ***15 Day Free Trial - 90 Day Immediate Replacement Warranty***

9" Screen - Green Text Display	**$ 79.00**
12" Screen - Green Text Display (anti-reflective screen)	**$ 99.00**
12" Screen - Amber Text Display (anti-reflective screen)	**$119.00**
14" Screen - Color Monitor (national brand)	**$249.00**

Display Monitors From Sanyo

With the need for computing power growing every day, Sanyo has stepped in to meet the demand with a whole new line of low cost, high quality data monitors. Designed for commercial and personal computer use. All models come with an array of features, including up-front brightness and contrast controls. The capacity 5 × 7 dot characters as the input is 24 lines of characters with up to 80 characters per line.

Equally important, all are built with Sanyo's commitment to technological excellence. In the world of Audio/Video, Sanyo is synonymous with reliability and performance. And Sanyo quality is reflected in our reputation. Unlike some suppliers, Sanyo designs, manufactures and tests virtually all the parts that go into our products, from cameras to stereos. That's an assurance not everybody can give you!

SANYO

Official Video Products of the Los Angeles 1984 Olympics

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

Add $10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $20.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. Visa - MasterCard - C.O.D.

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

80 COLUMN PRINTER SALE—$149.00*

COM-STAR T/F

Tractor Friction Printer

only $219

(Parallel or Serial)

• Lowest price quality tractor friction printer in the U.S.A. • Fast 80 characters per second
• 40, 46, 66, 80, 96, or 132 characters per line spacing • Prints labels, letters, graphs, and tables
• List your programs • Print out data from modem services

*STX-80 COLUMN PRINTER—$149.00

Prints full 80 columns. Super silent operation, 60 CPS, prints Hi-resolution graphics and block graphics, expanded character set, exceptionally clear characters, fantastic print quality, uses inexpensive thermal roll paper!

DELUXE COMSTAR T/F PRINTER—$219.00

The Comstar T/F is an excellent addition to any micro-computer system. (Interfaces are available for Apple, VIC-20, Commodore-64, Pet, Atari 400 and 800, and Hewlett Packard). At only $219 the Comstar gives you print quality and features found only on printers costing twice as much. Compare these features.

- **BI-DIRECTIONAL PRINTING** with a LOGIC SEEKING CARRIAGE CONTROL for higher through-put in actual text printing. 80 characters per second.
- **PRINTING VERSATILITY:** standard 96 ASCII character set plus block graphics and international scripts. An EPROM character generator includes up to 224 characters.
- **INTERFACE FLEXIBILITY:** Centronics is standard. Options include EIA RS232C, 20mA Current Loop.
- **LONG LIFE PRINT HEAD:** 100 million character life expectancy.
- **THREE SELECTABLE LINE SPACINGS:** 6, 8 or 12 lines per inch.
- **THREE SELECTABLE CHARACTER PITCHES:** • 10, 12 or 16.5 characters per inch. 132 columns maximum. Double-width font also is standard for each character pitch.
- **PROGRAMMABLE LINE FEED:** programmable length from 1/144 to 255/144 inches.
- **VERTICAL FORMAT CONTROL:** programmable form length up to 127 lines, useful for short or over-sized preprinted forms.
- **FRICTION AND TRACTOR FEED:** will accept single sheet paper.
- **224 TOTAL CHARACTERS**
- **USES STANDARD SIZE PAPER**

If you want more try —

Premium Quality COMSTAR T/F SUPER-10X PRINTER—$299.00

More Features Than RX-80

For $299 you get all of the features of the Comstar T/F plus 10" carriage 120 cps, 9 x 9 dot matrix with double strike capability for 18 x 18 dot matrix. High resolution bit image (120 x 144 dot matrix), underlining, backspacing, left and right margin settings, true lower descenders, with super and subscripts, and prints standard, Italic, Block Graphics, special characters, plus 2K of user definable characters. For the ultimate in price performance the Comstar T/F Super 10" leads the pack!

Double Immediate Replacement Warranty

We have doubled the normal 90 day warranty to 180 days. Therefore if your printer fails within "180 days" from the date of purchase you simply send your printer to us via United Parcel Service, prepaid. We will IMMEDIATELY send you a replacement printer at no charge via United Parcel Service, prepaid. This warranty, once again, proves that WE LOVE OUR CUSTOMERS!

15 DAY FREE TRIAL

OTHER OPTIONS

Extra Ribbons	$ 5.95
Roll Paper Holder	32.95
Roll Paper	4.95
5000 Labels	19.95
1100 Sheets Fan Fold Paper	13.95

Add $17.50 shipping, handling and insurance. Illinois residents please add 6% tax. Add $40.00 for CANADA, PUERTO RICO, HAWAII, ALASKA 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 available!! Canada orders must be in U.S. dollars.

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

SUPER-10" ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

EPYX
TOP 10 GAME SALE

* BUY TWO — GET ONE FREE *

SPECIAL FREE GAME
Buy Two Epyx Games From Protecto And Get A Free Game

The Thinking Man's Paradise

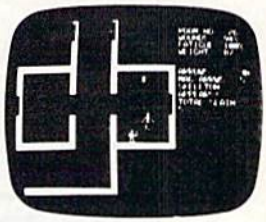
(Disk / Cassette)

- **Award Winning Games**
- **Fantastic Graphics**
- **Skill (not luck) Needed**
- **Already in top 10 charts**

COMMODORE - 64 / VIC-20

Buy Any Two Epyx Games From Protecto And Send The Proof Of Purchase Seals To Epyx And Epyx Will Send You A Free Game.

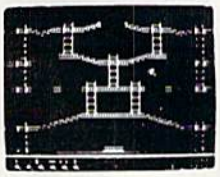
JUMPMAN
If you like Donkey Kong, you'll love Jumpman. Over 30 different screens with 8 speeds and 5 skill levels make this the fastest action game in the country. You must leap girders, climb ropes, and scale ladders to reach and diffuse bombs while avoiding robots, birds, bullets, explosives, crumbling walls, vanishing escape routes, and many other obstacles. (Truly a fantastic game!)
List $39.95 **Sale $27.95** (DISK ONLY)



TEMPLE OF APSHAI (computer game of the year)
This is the standard by which other adventure games are judged. Full color graphics portray the temple and all its contents - magic, monsters, doomed cities and damsels in distress. Do battle in real time with over 20 monsters, expansion modules will keep your adventure alive in the future.
List $39.95 **Sale $29.95**

SWORD OF FARGOAL
Search for the wondrous sword in the depths of an ever changing dungeon. Make yourself invisible, teleport to a new location, drink a healing potion or use enchanted treasures, but watch out for traps and hideous creatures who will try to stop you. (Fantastic dungeon adventure)
List $29.95 **Sale $21.95**

CRUSH CRUMBLE & CHOMP (Computer game of the year nominee)
Choose one of six monsters or create your own, and use your monster to destroy one of four unsuspecting cities. The cities aren't totally defenseless, they call on police, national guard, and even a mad scientist, complete with helicopter, to save humanity from the relentless threat.
List $29.95 **Sale $21.95**



JUMPMAN JUNIOR
The devilish ALIENATORS are back! And they have overrun the Jupiter Command Substation. In this cartridge format sequel to the best-selling Jumpman, players must leap through 12 all new screens featuring electrocution traps, moving walls, hellstones, and dangers much too bizarre to be believed. How many screens can you master? Twelve different screens, 8 speeds.
List $39.95 **Sale $27.95**

We have all Epyx games

PROTECTO
ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

tronix™

VIC-20

SUPER GRAPHICS GAME SALE

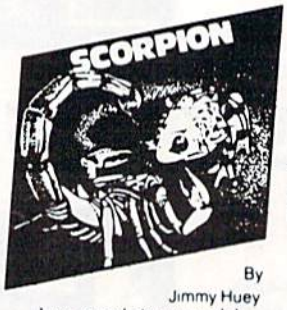
• Fast Action • Complex Strategies • Superior Sound Effects • Multiple Levels of Play • Nationally Advertiser — Top 10 Contenders!

Attack Crazy Aliens! — Tape
Galactic Blitz—the video sport where the aliens have 15 different play patterns and refuse to be taken out of the game! If you are merely spectators find another sport. Written in 100% Machine Code.
List $24.95 **Sale $16.95**

Dive Into A Frenzied Fight! — Tape
Think of all the space warriors anxious to whoosh into the most frenzied fight the far side of the galaxy's ever endured! They'll find it in Sidewinder—an incredibly fast and challenging game where players out-maneuver deadly Battle pods, dodge destructive Stalker bombs and go head-to-head with alien Oblitojets. Written in 100% Machine Code, with ten explosive battle levels.
List $29.95 **Sale $19.95**

Blast An Insect Invasion! — Tape
Dive into the most awesome all-out battle ever! In Swarm!, battle a barrage of deadly Android wasps and creatures never encountered before! The seering sound effects and fantastic speeds put Swarm! eons ahead of any space game for the VIC-20. 40 Levels. Written in 100% Machine Code.
List $29.95 **Sale $19.95**

When you purchase any one of the three cartridges below you get a coupon worth $5.00 off any other Tronix product purchased from Protecto before Christmas!

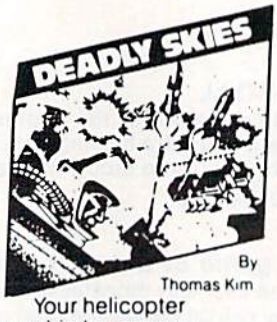


***Less $5.00 Factory Coupon**

By Jimmy Huey

In a predatory world of killer worms, dragons, stalkers, pods and fly traps, the scorpion prowls the maze in search of sustenance. Frogs and their eggs mean survival to the scorpion. But they can also mean instant death! — Cartridge

List $39.95 **Sale $26.95**



***Less $5.00 Factory Coupon**

By Thomas Kim

Your helicopter gunship hovers over the enemy's military bases and missile emplacements. Your mission is to destroy them. But as the sky fills with smart bombs and anti-aircraft fire, there's less and less room for a wrong move! — Cartridge

List $39.95 **Sale $26.95**

By Corey Ostman

Deep in the earth, a fortune awaits. But the dark passageways are filled with peril as well as profit. Runaway boxcars. Crashing boulders. A claim jumper with murder in his eyes. Be careful. But be quick – oxygen is in short supply! — Cartridge

List $39.95 **Sale $26.95**

Add $3.00 for postage. Add $6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D.

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)

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

Commodore - 64

WORD PROCESSING BREAKTHROUGH!

SCRIPT-64 EXECUTIVE WORD PROCESSOR (80 Columns in Color)

40 or 80 columns in color or black and white; turns your computer into a Business Machine!
Rated best by COMMODORE. This is the finest word processor available. Features include line and paragraph insertion/deletion, indentation, right and left justification, titles, page numbering, characters per inch, etc. All features are easy to use and understand. With tabs, etc. SCRIPT-64 even includes a 250 word dictionary/spelling checker to make sure your spelling is correct. The dictionary is user customizable to any technical words you may use. Furthermore, all paragraphs can be printed in writing and everyday letters a snap. To top things off, there is a 100 page manual and help screens to make learning how to use SCRIPT-64 a snap. This word processor is so complete we can't think of anything it doesn't have. When combined with the complete database you have a powerful mailmerge and label program that lets you customize any mailing list with personalized letters. List $99.95. **Sale $79.00.** *Coupon Price $59.00. (Disk only.)

SCRIPT-64 20,000 WORD DICTIONARY

Allows you to check spelling on 20,000 most often mispelled words! List $29.95. **Sale $19.95.** (Disk only.)

SCRIPT-64 DATABASE

This is a user friendly database that makes any information easy to store and retrieve. The user defines the fields and then can add, change, delete and search for any category he wants. When combined with the SCRIPT-64 Executive Word Processor you can search out any category (zip codes, hair color, etc.) and print super personalized letters. List $89.00. **Sale $69.00.** *Coupon Price $46.00. (Disk only.)

"WRITE NOW" WORD PROCESSOR

Finally, a word processor that is easy to use and easy to learn. This cartridge system has all the features of professional systems at only a fraction of the cost. Some features include: margin setting, word wrap, search and replace, centering, page numbering, user defined characters, plus ascii code set that allows you to use all the features of your printer. List $49.94. **Sale $44.95.** *Coupon $39.95. (Cartridge).

"WRITE NOW" MAILING LIST

600 names, addresses, etc. can be sorted and formulated in any order and by any category (zip code, name, etc.) for merging into the "write now" word processor. Fantastic speed. List $34.95. **Sale $24.95.** *Coupon $14.95. (Disk only.)

TOTAL WORD PROCESSOR PLUS 5.2

This top quality word processor was specially designed for PROTECTO ENTERPRIZES. Features include line and paragraph insert and delete, right and left justification, multiple copies, and line spacing. Extra functions include mailmerge, embedded footnotes, extra user defined character sets, plus a complete label program. List $69.90. **Sale $56.00.** *Coupon $37.00 Tape; $42.00 Disk.

TOTAL TEXT WORD PROCESSOR 2.6

This is a complete word processor program which allows you to create and format professional looking documents. Features include: page numbering, margin control, full screen editing and footnotes. Tape — List $44.95. **Sale $39.00.** *Coupon $26.00. Disk — List $49.95. **Sale $42.00.** *Coupon $29.00.

QUICK BROWN FOX WORD PROCESSOR

Nationally advertised all purpose word processor that uses menu control to let you manipulate your text. Includes the features most often asked for including right and left justification, wordwrap, and more. List $69.00. **Sale $59.00.** *Coupon $40.00. (Cartridge).

• 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

WE SHIP C.O.D. HONOR VISA AND MASTER CHARGE
ADD $3.00 SHIPPING FOR C.O.D. ADD $2.00 MORE
SPECIAL SERVICES:
One Day — Express Mail add $10.00

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

RICHARD MANSFIELD, SENIOR EDITOR

Safe Places

This month we'll start constructing a game. It will be written entirely in machine language (ML). After each small section is written, we'll test it and combine it with other modules until the game is complete. Along the way, we'll learn the meaning of the commands available to us in ML, as well as how to build a program from start to finish.

But first we've got to clear up an important issue: where do you put an ML program? BASIC programs always start in the same address in the computer's memory. An unexpanded VIC starts them at address 4096. VIC-20s with memory expansion start them at 4608. Commodore 64s start them at 2048. ML programmers, however, must decide where they want to put their programs. When you fire up the Assembler (see last month's column), the first thing it wants to know is the starting address. The choice is yours.

Nevertheless, there are some places you clearly can't put an ML program. ROM memory can't be POKEd or changed, so you can't store something there. Likewise, roughly the first 500 addresses are heavily used by the computer to keep track of the screen location of the cursor, current variable addresses, and many other things. The cassette buffer is safe enough (addresses 828-1019) *if you use a disk drive*. If you use cassettes, you will destroy what's in this buffer whenever you use the cassette drive.

Another consideration is that you will often want to have an ML program and a BASIC program coexist inside the computer. For example, many BASIC programs can be significantly speeded up by replacing slow sections, usually loops, with an ML program. SYS within BASIC sends control to the ML and RTS sends it back — similar to the way you use GOSUB within BASIC. Also, when we use the Assembler, we're creating an ML program, but the Assembler itself is in BASIC — they've got to be in the computer at the same time.

Where's the best place to put ML? On the 64, it's easy: you've got a block of memory from 49152 to 53247 (4096 cells, or 4K) which isn't disturbed by BASIC or the computer's operating system. We'll locate everything there from now on.

On the VIC, it's a bit more tricky. For one thing, the Assembler itself would use up all the available memory in an unexpanded VIC. And, when you add expansion memory to a VIC, several key memory locations shift around. For our purposes, we'll assume that you've added at least 8K of expansion memory. We'll set aside a zone at the top of your memory expansion (from 12288 on) which will give us a good amount of protected space for our ML programs.

Since BASIC uses up some RAM memory to build its arrays and variables, we've got to protect our ML zone from being overwritten while BASIC is active. In fact, the Assembler builds an array. If you want to assemble something with it, you've got to protect the newly created ML program from the Assembler itself. We can do this by fooling BASIC into thinking that its available RAM memory is less than it really is. This forces BASIC to build its variables below the zone we set aside. This is done by POKEing location 56 with a 48. When you've done that, your computer will not disturb RAM memory above address 12287.

To summarize, 64-users should always answer

Connect your computer to the air!

The "AIRWAVES" that is, they're literally crackling with interesting things to listen to. Did you know that you can get local and overseas news a day ahead of your daily paper's publication? Weather stations, news services, ships and "HAM" radio operators all use the SHORT-WAVE radio bands daily for radio-teleprinter and Morse code communication. The Microlog AIR-1 plugs into your computer just like a "game cartridge." The single board AIR-1 contains both program in ROM AND radio interface circuit. All you need is a typical short-wave receiver, with CW capability (BFO). Connect your radio speaker and off you go . . . tuning in the world of digital communications. Instead of "COSMIC BLIVETTES" on your video screen, you'll be watching text readout from all sorts of stations around the world . . . free for the listening . . . a whole new use for your home computer . . . SHORT-WAVE DXing on RTTY and Morse. The manual lists some suggested times and frequencies, and your standard printer can provide a permanent record of copy. The AIR-1 will even tell you what Morse speed you're copying and provide built-in send/receive code practice! For HAM radio use the AIR-1 will also send and receive RTTY/CW with AFSK/PTT and CW keying outputs. Convenient plug-in jacks make connection to your radio a snap. "On-Screen" tuning indicator and versatile program make it easy to use. The simple, one board design makes it inexpensive. And Microlog know how makes it best! If you've been looking for something to spice-up your computing, try the ultimate "peripheral" and connect your computer to the AIR-1.

The complete AIR-1 for the VIC-20 or "64" is $199. (With 4 mode AMTOR, $279.) See it at your local dealer or call Microlog Corporation, 18713 Mooney Drive, Gaithersburg, Maryland 20879.
TEL (301) 258 8400. TELEX 908153.

Note: VIC-20 is a trademark of Commodore Electronics, Ltd.

MICROLOG

INNOVATORS IN DIGITAL COMMUNICATION

49152 when their assembler or disassembler asks for the Starting Address. VIC users should have an expansion memory of at least 8K attached to their computer and should protect a zone of memory at the start of every ML programming session by typing: POKE 56,48. VIC users can then answer 12288 as the starting address of an assembly or disassembly.

Starting The Game

We're about ready to start putting together a game, but first let's add a convenience feature to the Assembler. Enter the line in Program 3 and you can then type XX if you've made a mistake when entering a line of ML. Give the address and you can then type the line in correctly. This is most useful if you notice an error after you've hit RETURN. You can correct it without having to restart assembly. Of course, you could also restart the Assembler by giving the address of the error as the Starting Address, but that's somewhat clumsy.

Now type in your version of the first part of our all-ML game (Program 1 or 2). Don't forget to tell the Assembler you're finished by typing the word END when you hit RETURN after typing RTS.

As we talk about the meaning of the ML commands within a program, we'll refer to the leftmost numbers (see Program 1 or 2) as *line numbers* since that's how they function. They are really addresses in memory, but it's fine to think of them the same way you think of BASIC's line numbers.

Let's briefly look at the ML. Both versions need to first set color memory by filling it with a color that will show up when something is POKEd into it. We load the Y register (registers are like variables) with a zero so it can count for us. The A register is then loaded with our color code (6 for the VIC, 8 for the 64, but you can select which color you want by changing these). Then we store the A value into color memory. On the VIC, we are storing into 37888 *plus* the value of Y. We raise Y by one (INY) each time through the loop created by the BNE (Branch Not Equal to zero) instruction. Y can only go as high as 255 so it eventually resets to zero, and we fall through the branch. For the VIC, we need to fill only two, 256-cell large blocks of memory (starting at 37888 and 38144). The 64 has twice as large a screen, so we fill four, 256-cell blocks (they're called *pages*.)

That accomplished, we can now put things on screen by using the STA command (like BASIC's POKE). Lines 12301 for the VIC and 49171 for the 64 are the start of our drawing loop. It's similar to the loop we used to fill color memory, but this time we want to draw a bar across the top and bottom of the screen. This will be part of a frame to contain the visual action of our game. This time we load A with 224, a solid square character, and proceed to store it as two lines. On the VIC we count up with Y until Y=22 (the number of characters on the VIC screen line); on the 64 we count up to 40. The RTS sends us back to BASIC.

After you've typed in your version, test it by typing SYS 12288 (for VIC) or SYS 49152 (for 64). You should see a top and bottom border appear across your screen. If you don't, you've made a mistake in typing and you should try again with the Assembler. Or, you could load in your Disassembler (September 1983) and compare your ML against Program 1 or 2.

If the program works correctly, you'll want to SAVE it so you don't have to reassemble it next month when we add to it. To do this, we'll make a BASIC loader out of our ML by using the "Datamaker" program (October 1983). Simply LOAD in Datamaker, change line 1 to read:

```
1 S=12288: F=12316: L=9    (for the VIC)
1 S=49152: F=49186: L=9    (for the 64)
```

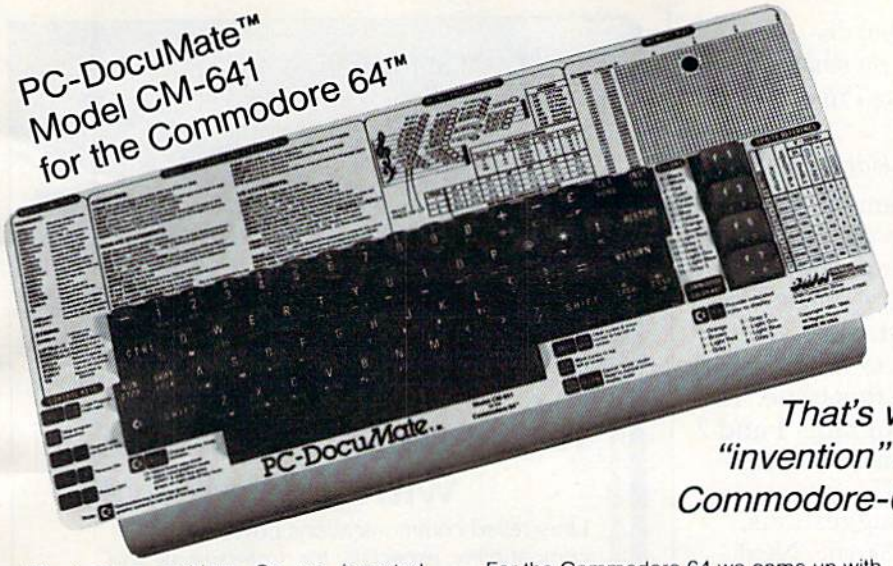
and change line 800 in the same fashion. Then RUN. Datamaker will create your loader and then remove itself. (You might need to hit RETURN a few times when Datamaker stops.) You can SAVE the loader and, whenever you want to recreate your ML, just LOAD it and RUN it. Programs 4 and 5 are examples of the finished loaders.

ML Mailbag

Here are a couple of letters I received recently:

> *I would suggest the following line changes to your August RAMtest program to include VICs with expansion RAM. Problems with RAM, though rare, are more likely to be with RAM expansion than with the internal RAM. Also, it would be useful to have the capability to test out new RAM packs. The following changes to Program 1: RAMtest, August 1983, p. 125, will allow testing on VICs with any memory configurations:*
>
> **VIC With 3K RAM Expansion:**
> **882 DATA 69, 32, 169, 4, 133, 58**
>
> **VIC With 8K RAM Expansion:**
> **882 DATA 69, 32, 169, 18, 133, 58**
> **894 DATA 24, 141, 0, 16, 145, 57**
> **936 DATA 230, 58, 165, 58, 201, 64**
>
> **VIC With 16K RAM Expansion:**
> **Lines 882 and 894 same as for 8K**
> **936 DATA 230, 58, 165, 58, 201, 96**
>
> **VIC With 24K RAM Expansion:**
> **Lines 882 and 894 same as for 8K**
> **936 DATA 230, 58, 165, 58, 201, 128**
>
> *Allan Wheeler*

Many thanks for this useful table of modifications.



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.

In reference to your column on disassembly (September 1983), how do you load in Program 2 without erasing Program 1 (RAMtest)?

Harry Metz

Disk users will have no problem since RAMtest is designed to reside in the cassette buffer. If you use cassette, however, anything coming into the computer from the cassette drive will cover up the buffer and destroy RAMtest. There were several letters asking about this, and the first part of this month's column deals with this issue. The solution is to change line 800 in Programs 1 and 2 (August 1983) to send the ML to the safe areas described above.

If you have any questions or suggestions, please write to me c/o COMPUTE!'s Gazette. Next month we'll build onto the all-ML game and talk some more about addressing modes.

See program listing on page 222.

COMPUTE!'s Gazette
Toll Free Subscription Order Line
800-334-0868
In NC 919-275-9809

SUPER DISK
Floppy Disk Drive For VIC-20 & Commodore 64

Super Disk[2] is a Commodore compatible disk drive designed to interface to the various Commodore computers such as the PET[1], VIC-20[1] and the Commodore 64[1]. 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 Disk[2] recognizes the full instruction set of the Commodore drives. Super Disk[2] offers RAM area within the disk unit, a serial and an IEEE bus interface. (Software programs included.)

Call Toll Free 1-800-527-7573 For Latest Price Information.
In Texas Call: (214) 484-7836

Also Available:

Gemini-10X w/Interface	$379.	TTX-1014 Daisy Wheel Printer	$499.
CPI Parallel Interface	59.	5-Slot C64 Expansion Board	55.
Gorilla Banana Monitor[3]	90.	Monitor Cable (lum pin)	10.
10-Key Pad for VIC & C64	60.	VIC 8K RAM	35.
CIE (IEEE for C64)	85.	VIC 16K RAM (Switchable)	55.

CATALOG OF OTHER HARDWARE & SOFTWARE AVAILABLE ON REQUEST. We accept: VISA, Mastercharge, and AE

Southwest Micro Systems, Inc
2554 Southwell • Dallas, Texas 75229

[1]Commodore Int. [2]MSD [3]Leading Edge

Commodore 64 and VIC-20

SuperTerm

$99.95

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.

(816) 333-7200

Send for a free brochure.

MIDWEST MICRO inc.

MAIL ORDER: Add $1.50 shipping and handling ($3.50 for C.O.D.); VISA/Mastercard accepted (card# and exp. date). MO residents add 5.825% sales tax. Foreign orders payable U.S.$, U.S. Bank ONLY; add $5 shp/hndlg.

311 WEST 72nd ST. • KANSAS CITY • MO • 64114

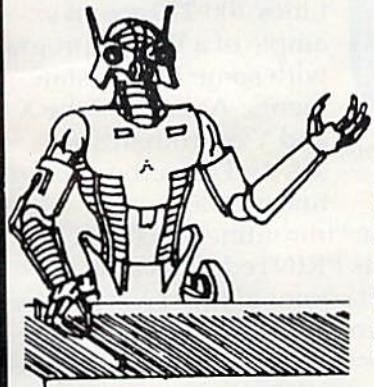
MINI JINI™

IS

HOT!

PLUG IN CARTRIDGE *for* **VIC-20** *and* **COMMODORE 64**

Anyone who keeps records can use ***MINI JINI*™ Record Keeper™.**



Record Keeper™

***MINI JINI* Record Keeper™** is a cartridge that plugs into a slot in the back of the computer. Push it in, turn on the power and you're ready to organize records.

***MINI JINI* Record Keeper™** is designed for the professional, the student, the educator, the housewife, the collector, the businessman or the person who is looking for an easy way to bring order in his or her life.

AVAILABLE IN SPANISH
***MINI JINI*™ Archivo Instante™**
Coming soon: *FRENCH, GERMAN and ITALIAN*

Application Templates $14.95 each
5-15 files with easy to use instructions.
Organize the Hamshack™ Classroom planning™
Party plan™

VISA MasterCard

MINI JINI™ users tell it like it is:

"Fantastic" "Easy" "Great for Amateur Radio"
"Just what the doctor ordered for my Amway business."
"I keep recipes at home and class records at school."
*"**MINI JINI*™ Record Keeper™** sets up a perfect file for handicapping horses."*

MINI JINI™ reviewers rave:

*"The **best**" "The **easiest**" The **max.**" "A **winner.**"*
"Just the ticket for those lists you keep."
*"Most people could learn **MINI JINI*™** in 20 minutes."*
*"The **ultimate** VIC (C-64) sequential database."*

MINI JINI™ dealers brag:

*"**MINI JINI*™** is on our top 10 hot list of best sellers."*
*"**MINI JINI*™** is a super duper database for the **Commodore 64** or **VIC-20.**"*

AVAILABLE NOW FROM YOUR LOCAL DEALER

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

JINI MICRO-SYSTEMS, Inc.

DATABASE MANAGEMENT SYSTEM DESIGN

BOX 274 KINGSBRIDGE STN., RIVERDALE, NY 10463 (212) 796-6200

Easy Screen Formatting

This routine makes screen formatting easy — without dozens of cursor controls.

Edward Zobel

Here is an easy way to position text on the screen. This method works on both the VIC-20 and Commodore 64. It avoids the often cumbersome typing of cursor movements within the quotes of a PRINT statement. You simply set the X and Y (horizontal and vertical) screen coordinates and then direct the program to the accompanying subroutine. After RETURN, the next PRINT statement is positioned at the chosen spot.

Remember that the Commodore 64 screen has 40 horizontal positions numbered 0 to 39 (the VIC has 22, numbered 0 to 21). These are the X coordinates. There are also 25 vertical or Y coordinates numbered 0 to 24 on the Commodore 64, and 23 Y coordinates numbered 0 to 22 on the VIC.

Wherever the cursor is currently positioned, the next PRINT statement is executed. So the trick is to move the cursor. There are two memory locations that will help us with this. Address 214 holds the Y position, and 211 holds the X position. POKEing values into these spots will put the cursor where we want it. There is just one catch. The POKE to 214 works only *after* something is PRINTed. We want it to work *before*. Let's look at the program to see how to get around this.

POKEing The Cursor Position

Lines 100-270 are an example of a BASIC program with some PRINT statements. At line 150 the X and Y coordinates are set, and then the subroutine is called.

The first line of the subroutine is 60000. Here the HOME command is PRINTed. This puts the cursor in the upper-left corner of the screen where both X and Y equal zero. In the next line, if Y is not set to zero, then its value minus one is POKEd into 214. The following PRINT command activates this POKE and moves the cursor down one line. This yields the proper Y value, since we subtracted one from Y when we POKEd into 214. If Y was set to zero, then none of this would happen and the cursor would stay at the top line of the screen.

Be sure to include the semicolon in line 60000 or the subroutine will not work properly. In line 60020 the X position is POKEd into 211. Nothing special is required here.

Type in the program and RUN it (the same version works on both the VIC and 64). You should see the word HELLO printed three times at the defined positions. This subroutine should be helpful in formatting menus and instructions in your own programs.

See program listing on page 240.

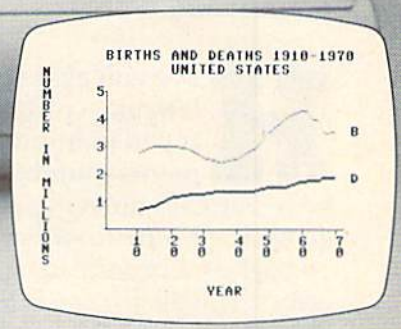
The Most Practical Software — Now Has Graphics

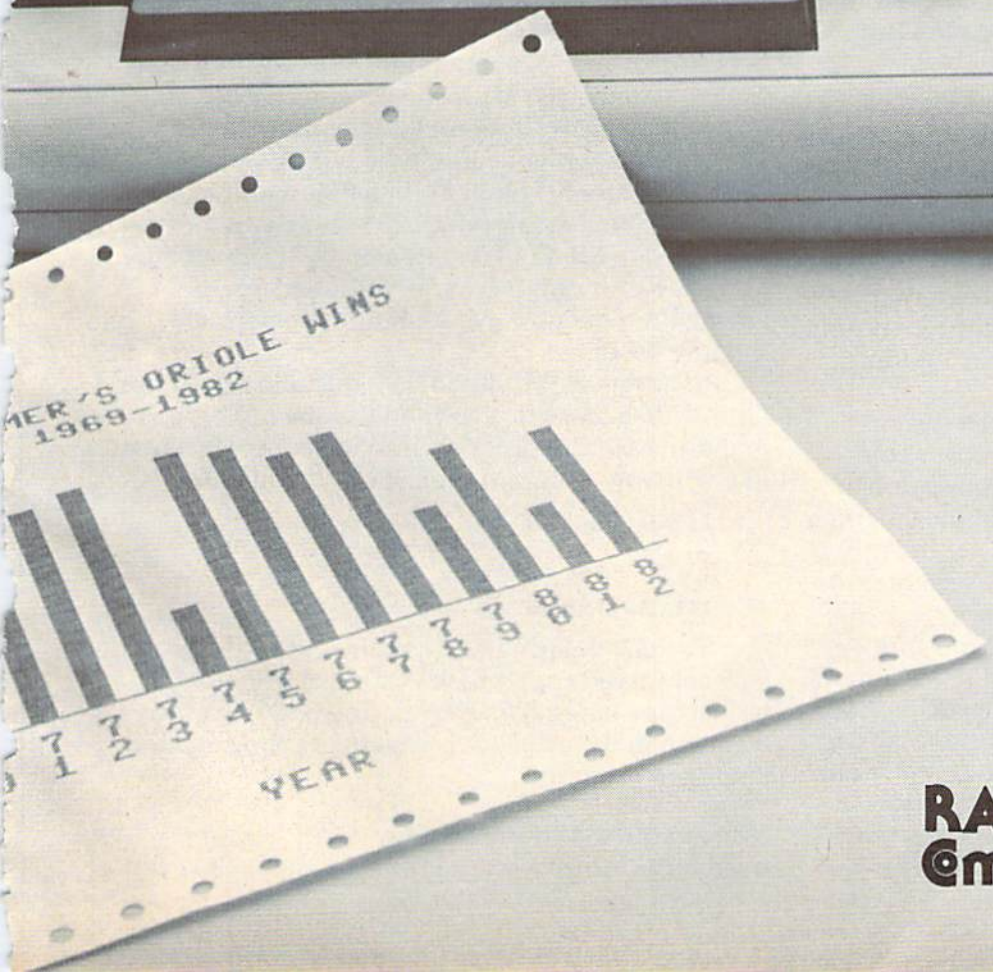
The **Graphics Assistant,** the latest addition to the ASSISTANT SERIES, lets you and your 64 produce charts and graphs in three formats. You can display them on screen or print them out. On screen display is 30 columns by 14 rows — about 60% of the screen. Print-out can be two sizes: a compact 4" x 4" or a full page, 7" x 9", display.

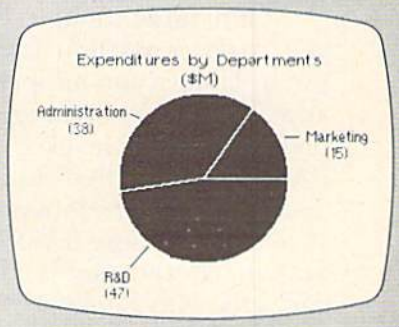
Bar chart format accepts up to 30 bars per chart; line chart allows 200 points per chart; pie chart can be sliced as thin as you desire. Vertical and horizontal labels are clearly displayed. On the pie chart a label with pointer is displayed outside the graph and indicates percentage or raw numeric data, i.e. Rainbow (73) or Graphics (141). You can assign range, limits, and values to create charts. Most importantly, however, you can retrieve data from files created by the **Spreadsheet Assistant.**

The ASSISTANT SERIES is now better than ever! You can now attach graphs to documents created by the **Writer's Assistant.** And produce comparison charts from data that has been calculated and replicated on the **Spreadsheet Assistant.**

The Graphics Assistant **$79.95**







RAINBOW Computer Corporation

490 Lancaster Pike
Frazer, Pennsylvania 19355

MLX

Machine Language Entry Program For Commodore 64

Charles Brannon, Program Editor

MLX is a labor-saving utility that allows virtually foolproof entry of all-machine-language programs published in COMPUTE!'s Gazette. You need to know nothing about machine language to use MLX—it was designed for everyone. Important: MLX is required to type in the machine language games in this issue, such as "Spike" and the 64 version of "Space Duel."

Have you ever typed in a long machine language program? Chances are you typed in hundreds of DATA statements, numbers, and commas. You're never sure if you've typed them in right. So you go back, proofread, try to run the program, crash, go back and proofread again, correct a few typing errors, run again, crash, recheck your typing.... Frustrating, isn't it?

Until now, though, that has been the best way to enter machine language into your computer. Unless you happen to own an assembler and are willing to wrangle with machine language on the assembly level, it is much easier to enter a BASIC program that reads the DATA statements and POKEs the numbers into memory.

Some of these *BASIC loaders*, as they are known, check to see if you've typed the numbers correctly with a *checksum*. The simplest checksum is just the sum of all the numbers in the DATA statements. If you make an error, your checksum will not match up. Some programmers make the task easier by calculating checksums every ten lines, so you can zero in on your errors. The Automatic Proofreader introduced in the October issue of COMPUTE!'s Gazette is a more sophisticated variation of the checksum concept.

But now there's an even better way than the Automatic Proofreader to enter programs written completely in machine language. "MLX" lets you type in long machine language listings with almost foolproof results. Using MLX, you enter the numbers from a special list that looks similar to BASIC DATA statements. MLX checks your typing on a line-by-line basis. It won't let you enter illegal characters when you should be typing numbers, such as an l for a 1 or an O for a 0. It won't let you enter numbers greater than 255 (which are not permitted in ML DATA statements). It *will* prevent you from entering the wrong numbers on the wrong line. In short, MLX should make proofreading obsolete!

In addition, MLX will generate a ready-to-use tape or disk file. You can then use the LOAD command to read the program into the computer, just like with any program. Specifically, you enter:

LOAD "program",1,1 (for tape)

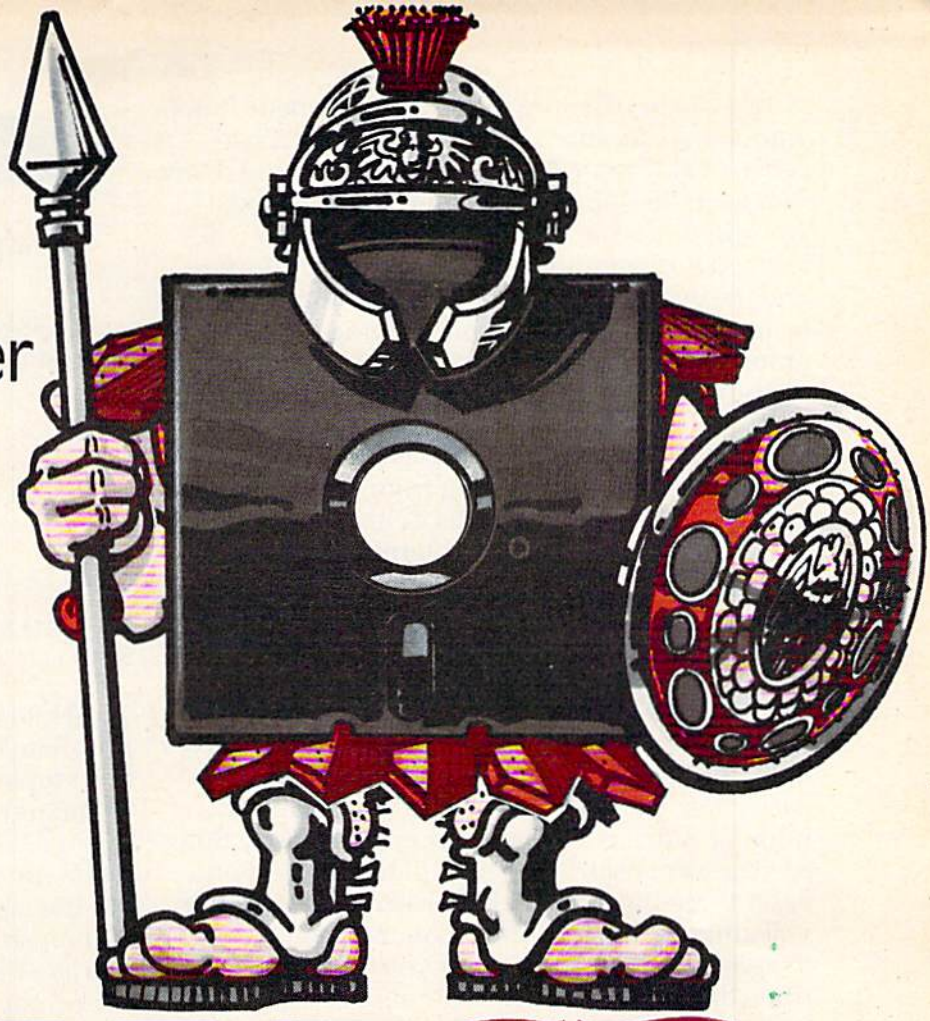
or

LOAD "program",8,1 (for disk)

To start the program, you need to enter a SYS command that transfers control from BASIC to machine language. The starting SYS will always be given in the article accompanying the machine language program.

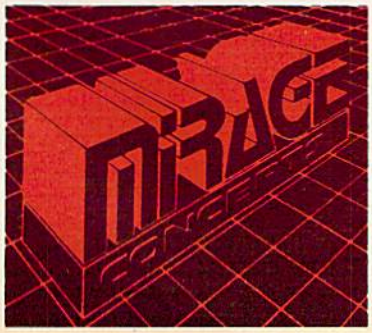
To get started, type in and save MLX (you'll need it for future ML programs published in COM-

Mirage Concepts' Awesome New Data Base Manager Jumps to Every Command...



THE REAL POWER BEHIND YOUR THRONE!

Be The Master of All You Survey In Your Home, Office, Classroom or Recreation! Mirage Concepts conquers all opposition with its newly introduced Data Base Manager. It's the easiest to use and most powerful data base program ever devised for the Commodore 64™. Mirage's potent new Data Base Manager puts you in full command to force all aspects of your stored information into any sequence or any format you desire. Assume your role as the rightful ruler of all your domain with Mirage Concepts Mighty Data Base Manager. **$99.95** each



TM-Commodore 64 is a Registered Trade Mark of Commodore Electronics, Ltd.

Available At Quality Computer & Software Dealers Nationwide

MIRAGE CONCEPTS, INC.

2519 W. Shaw Ave., #106 • Fresno, CA 93711 • (209) 227-8369

TELEPHONE ORDERS: (800) 641-1441 • In California (800) 641-1442

PUTE!'s Gazette). Be sure to use the Automatic Proofreader to make sure you've typed in MLX correctly—MLX can't check itself. When you're ready to type in the ML program, such as the "Spike" game in this issue, run MLX. The program will ask you for two numbers: the starting address and the ending address. These vital numbers can be found in the article accompanying the ML program. The Spike article, for example, gives a starting address of 32768 and an ending address of 37295.

Next you'll see a prompt. The prompt is the current line you are entering from the listing. Each line is six numbers plus a checksum. If you enter any of the six numbers wrong, or enter the checksum wrong, the Commodore 64 will ring a buzzer and prompt you to reenter the line. If you enter it correctly, a pleasant bell tone will sound and you proceed to the next line.

You are not using the normal Commodore 64 screen editor with MLX. For example, it will accept only numbers as input. If you need to make a correction, press the INST/DEL key; the entire number is deleted. You can press it as many times as necessary back to the start of the line. If you enter three-digit numbers as listed, the computer will automatically print the comma and prepare to accept the next number. If you enter less than three digits, by omitting beginning zeros, you can press either the comma, space bar, or RETURN key to advance to the next number. The checksum will automatically appear in inverse video; don't worry, it's highlighted for emphasis.

When testing MLX, we've found that it makes entering long listings extremely easy. With the audio cues provided, you don't even have to look at the screen if you're a touch-typist. We have tested MLX with people lacking any computer background whatsoever. No one has ever managed to enter a listing wrong with it.

When you finish typing, assuming you type the entire listing in one session, you can then save the completed program on tape or disk. Follow the screen instructions. If you get any errors while saving, you probably have a bad disk, or the disk is full, or you made a typo when entering the MLX program. (Remember, it can't check itself, though the Proofreader can.)

What if you don't want to enter the whole program in one sitting? MLX lets you enter as much as you want, save the whole schmeer, and then reload the file from tape or disk when you want to continue. MLX recognizes these few commands:

SHIFT-S: SAVE
SHIFT-L: LOAD
SHIFT-N: New Address
SHIFT-D: Display

```
MLX

A FAILSAFE MACHINE LANGUAGE EDITOR

STARTING ADDRESS? 32768
ENDING ADDRESS?
```

With "MLX," typo-proof entry of machine language listings is virtually guaranteed.

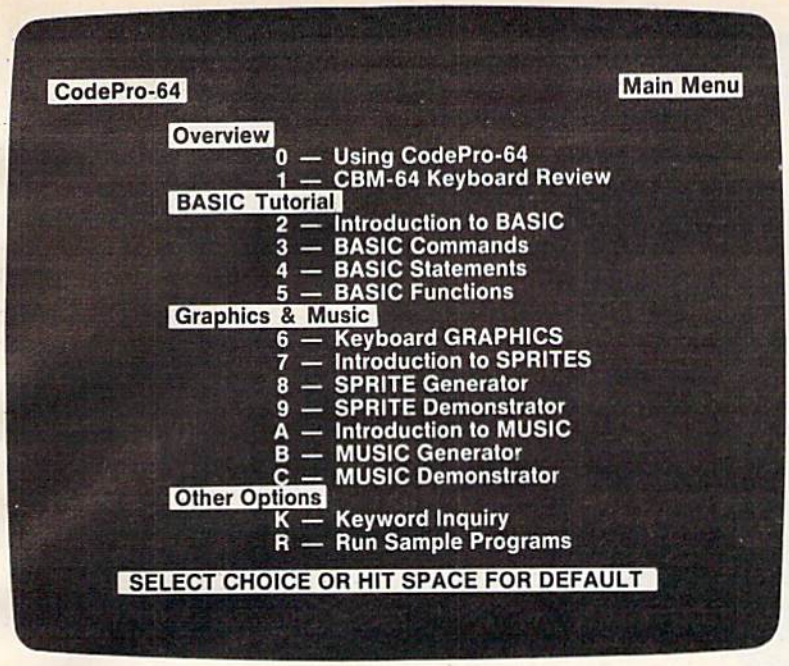
Hold down SHIFT while you press the appropriate key. You will jump out of the line you've been typing, so I recommend you execute these commands at a new prompt. Use the SAVE command to save what you've been working on. It will write the tape or disk file as if you've finished, but the tape or disk won't work, of course, until you finish the typing. *Remember what address you stop on.* The next time you run MLX, answer all the prompts as you did before, then insert the disk or tape. When you get to the entry prompt, press SHIFT-L to reload the file into memory. You'll then use the New Address command to resume typing.

Here's how the New Address command works. After you press SHIFT-N, enter the address where you previously stopped. The prompt will change, and you can then continue typing. Always enter a New Address that matches up with one of the line numbers in the special listing, or else the checksum won't match up.

You can use the Display command to display a section of your typing. After you press SHIFT-D, enter two addresses within the line number range of the listing. You can abort the listing by pressing any key.

The special commands may seem a little confusing, but as you work with MLX, they will become valuable. What if you forgot where you stopped typing, for instance? Use the Display command to scan memory from the beginning to the end of the program. When you see a bunch of 170s, stop the listing by pressing a key and continue typing where the 170s start. Some programs contain many sections of 170s. To avoid typing them, you can use the New Address command to skip over the blocks of 170s. Be careful, though, you don't want to skip over anything you *should* type.

You can use the MLX SAVE and LOAD com-



NEW! For the Commodore 64™
ANNOUNCING

CodePro-64™

A new concept in interactive visual learning . . .

Now you can learn to code in BASIC and develop advanced programming skills with graphics, sprites and music—**visually.** You learn by interacting with CodePro-64, a new concept in interactive visual learning.

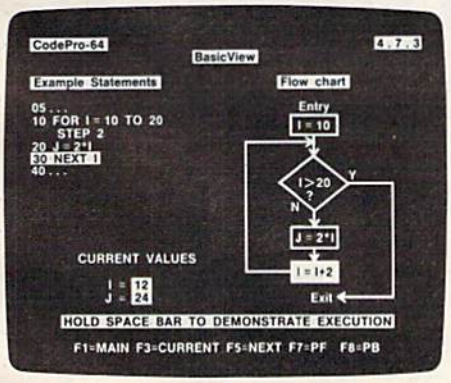
SEE PROGRAM EXECUTION

Imagine actually seeing BASIC statements execute. CodePro-64 guides you through structured examples of BASIC program segments. You enter the requested data or let CodePro-64 do the typing for you. (It will not let you make a mistake.)

After entering an example you invoke our exclusive **BasicView™** which **shows you how the BASIC program example executes.**

You step through and actually see the execution of sample program statements by simply pressing the space bar. CodePro-64 does the rest.

You see statements with corresponding **flow chart graphics** and variable value displays. You learn by visual examples.



EXTENSIVE TUTORIAL

CodePro-64's extensive tutorial guides you through each BASIC command, program statement, and function. You get clear explanations. Then you enter program statements as interactive examples. Where appropriate, you invoke BasicView to see examples execute and watch their flow charts and variables change.

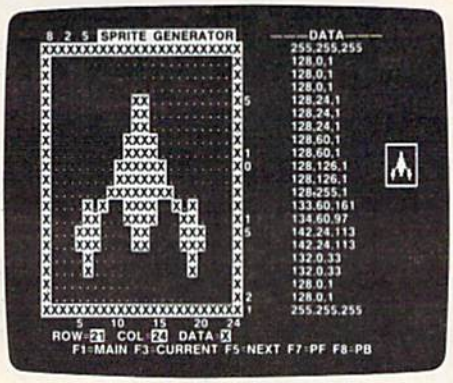
By seeing graphic displays of program segment execution you learn by visual example. You **learn faster and grasp programming concepts easier** with CodePro-64 because you immediately see the results of your input.

You control your learning. You can go through the tutorial sequentially, or return to the main menu and select different topics, or **use keywords** to select language elements to study. You can page back and forth between screens within a topic at the touch of a function key.

CodePro-64 **lets you follow your interests** and practice with interactive examples. But you can never get "lost". F1 will always return you to the main menu. Once you have practiced and mastered the BASIC language elements you move on to more advanced concepts. You learn about sprite and music programming.

SPRITE GENERATOR & DEMONSTRATOR

CodePro-64's sprite generator lets you **define your own sprites** on the screen. You learn how to define sprites and what data values correspond to your sprite definitions. (You can then use these values to write your own programs.) You can **easily experiment** with different definitions and make changes to immediately see the effects.



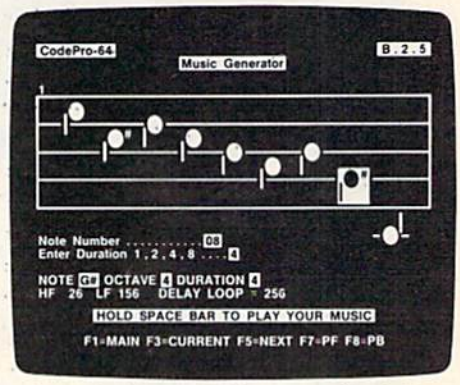
We also help you learn to program with sprites by giving you a **sprite demonstrator** so you can see the effect of changing register values. You can experiment by moving your sprite around in a screen segment, change its color or priority, and see the effects of your changes. You learn by visual examples.

MUSIC GENERATOR & DEMONSTRATOR

To teach you music programming CodePro-64 gives you an interactive music generator and demonstrator. First we help you set all your SID parameters (attack/decay, sustain/release, waveform, etc.). Then you enter notes to play and **we show your tune graphically as it plays,** note by note, on the scale. You learn by seeing and hearing the results of your input.

OUR GUARANTEE

We guarantee your satisfaction. You must be satisfied with CodePro-64 for the Commodore-64. Try it for 10 days and if for any reason you are not satisfied return it to us (undamaged) for a full refund. **No risk.**



Our music demonstrator **lets you experiment** with various combinations of music programming parameters and hear the results. You can **quickly modify any of the SID register values** to hear the effects of the change. For example, you could easily change waveform and attack/decay values while holding all other SID values constant. By seeing your input and hearing the result you quickly learn how to create new musical sounds and special sound effects.

AND MORE . . .

We don't have enough space to tell you everything CodePro-64 offers. You need to see for yourself. BASIC tutorials, graphics, sprites, music, keyboard review, sample programs—the main menu shown above gives you just a summary of the contents of this powerful educational product.

Whether you're a beginning programmer or an experienced professional, CodePro-64 will help you improve your Commodore 64 programming skills. We're sure because CodePro-64 was developed by a team of two professionals with **over 25 years** of software development experience.

CodePro-64 is a professional quality educational program for the serious student of personal computing. And it's **fully guaranteed.** Order yours today.

HOW TO ORDER

Order your copy of CodePro-64 today by mail or phone. Send only $59.95 plus $3.00 shipping and handling to:

SYSTEMS MANAGEMENT ASSOCIATES
3700 computer Drive, Dept. CA
Raleigh, N. C. 27609

Available on **diskette only.** MasterCard/VISA accepted. For faster service on credit card orders call (919) 787-7703.

Commodore 64 is a trademark of Commodore Business Machines, Inc.
Ad no. 733, Copyright 1983, SMA
Dealer inquiries invited.

mands to make copies of the completed ML program. Use LOAD to reload the tape or disk, then insert a new tape or disk and use the SAVE command to make a new copy.

One quirk about tapes made with the SAVE command: when you load them, the message "FOUND program" may appear twice. The tape will load just fine, however.

(Programmers will find MLX to be an interesting program in terms of protecting the user from mistakes. There is also some screen formatting. Most interesting is the use of ROM Kernal routines for LOADing and SAVEing blocks of memory. Just POKE the starting address [low byte/high byte] into 251 and 252, and POKE the ending address into 254 and 255. Any error code can be found in location 253—an error would be a code less than ten.)

We hope you will find MLX to be a true labor-saving utility. Since it has been thoroughly tested by entering actual programs, you can count on it as an aid for generating bug-free machine language. And be sure to save MLX; it will be used for future all-machine-language programs in COMPUTE!'s Gazette.

See program listing on page 229.

French Silk

DEVELOP-64

Powerful enough for the professional
friendly enough for everyone

An integrated Assembler / Editor / Loader / Decoder / Debugger
which comes complete with

Inside the Commodore 64

This step-by-step guide to machine language and assembly language programming will teach you what you don't already know and assist you to use what you do. Combined with the integrated set of software tools of Develop-64, it makes the ideal development system.

A total reference work on the Commodore 64, Inside the Commodore 64 gives you inside information on the inside of the machine: its graphics, its music synthesizer, its built-in software and the techniques for taking advantage of the many powerful features of this computer. A complete memory map is provided with information on how to call the internal programs from your own. Written as a programmer's guide with a machine language programmer's perspective, it will become your primary reference guide. If you are still learning you will find it your best teacher.

Priced at $19.95, Inside the Commodore 64
comes free with Develop-64 ($49.95),

Ask for them at your favorite software outlet.

Software for Commodore Personal Computers.

PO Box 207, Cannon Falls, MN 55009 (507) 263-4821

"THERE ARE TWO ABSOLUTELY INDISPENSABLE SOFTWARE TOOLS FOR THE COMMODORE 64™"

"PRO-LINE HAS THEM BOTH"

POWER 64
on disk adds POWER and MOREPOWER to ease your BASIC programming
POWER 64.....$99.95

PAL 64
on disk the 6502 machine code assembler used by the professionals
PAL 64.....$99.95
(PAL for B032 also available)

including shipping

GET THEM BOTH IN THE NEW TOOLBOX 64
POWER 64 and PAL 64.....$179.95

Payment in U.S. funds with order or major credit cards, customs brokerage extra

For your nearest dealer call:
(416) 273-6350

PRO-LINE SOFTWARE
755 THE QUEENSWAY EAST, UNIT 8
MISSISSAUGA, ONTARIO, CANADA, L4Y 4C5

ComputerAntics, Inc.

is **NOT** playing games with the

COMMODORE - 64

DREAM-DB
DATA RELATION EXECUTIVE
ACCESS MANAGER

DREAM-DB is a high-level Relational Data Base Management System, featuring an easy to use, English-like Command Language. Programming experience is not required to utilize DREAM-DB to generate almost any imaginable business, professional, or home computer application. Included with DREAM-DB are many facilities found only in sophisticated Data Base Management Systems:

- Data Relation Generator
- Report Generator
- Interactive Command Interpreter
- Screen Generator
- Menu Generator
- Program Editor and Compiler

NOTE: DREAM-DB requires the Disk Access Manager (D.A.M.)

$99.95

coming soon: DREAM-PLOT
DREAM-CALC
DREAM-WORD

D.A.M.
DISK ACCESS MANAGER

Expand your disk handling capabilities with D.A.M., an advanced access method with features normally found only on large mainframe computers:

- Sequential access with fixed and variable length records
- Direct access by record number
- Indexed access with key sizes up to 256 bytes long
- Support for multiple indices per data file
- Record sizes up to 32,000 bytes
- Up to 65,000 records per data file
- Multi-volume support to handle data files that are larger than the capacity of a single diskette
- File utilities to: build indices, create alternate indices, and to sort data files on any key
- D.A.M. interfaces to BASIC, assembler, and other languages
- Support is provided for program loads and saves, data files and text files

$99.95

THE DREAM-DB APPLICATION CASEBOOK

The Application Casebook features ten ready to run applications and a complete tutorial manual. Each application can be used as is, or can easily be customized by the user. The Application Casebook provides several models to guide users in creating their own applications.

Casebook applications:

- Appointment Scheduling
- Checkbook Balancing
- Telephone Directory
- Mailing List
- Budget Management
- Accounts Receivables
- Accounts Payables
- Check Writer
- Inventory Control
- Order Entry

NOTE: Application Casebook requires DREAM-DB

$99.95

THE DREAM PACKAGE

*** $150.00 ***

save $150.00 over separate purchase prices

This special package offer includes:

- Disk Access Manager (D.A.M.)
- Data Relation Executive Access Manager (DREAM-DB)
- THE DREAM-DB Application Casebook
- One year free membership in the DREAM-DB Users Group

Send for our free catalogue of Professional, Educational, and Business software for the Commodore-64

Dealer inquires welcome

Orders must be accompanied by check or money order and should be sent to:

ComputerAntics, Inc.
3170 Ronit Court
Yorktown Heights, New York 10598

N.Y. State residents please add 4.25% sales tax

HINTS&TIPS

Using The Period For Extra Speed

Mike Roth

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. If we use it, we'll pay you $35.

As you may know, variables are faster than regular numbers, but they take up memory. What you may not know is that Commodore computers have a built-in "variable" that is always equal to zero and cannot be changed. It is even faster than regular variables and doesn't take a bite out of memory (sorry). It's the period (.).

```
X=INT(RND(1)*506)
```

Look at the above statement. It could be made much more efficient, but many programmers leave it like that. Now look at the next example:

```
X=INT(RND(.)*506)
```

It doesn't look very different from the first example, but it is about 29 percent faster. Even if a zero were used in the RND statement in the first example, the period still would be about six percent faster.

This wonderful, but overlooked feature can be used for more than random numbers, however. The period (.) can be used in place of the zero anytime that the zero is used as the entire number. This means that if you want the variable X to equal zero,

```
X=.
```

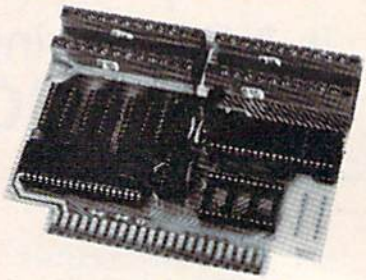
is correct. If you want X to equal 160, though,

```
X=16.
```

would *not* be correct. In the latter case, X would equal 16.

You now have a wonderful and easy-to-use trick which should significantly speed up many programs. Try going through a few programs and replacing the zeros with periods. You might be pleasantly surprised.

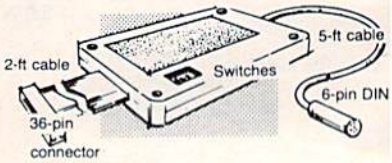
NEW!
Universal Input/Output Board for VIC-20/64



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 $205.00
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 ..... $ 79.95

Dealer inquiries invited.

VISA

Micro World Electronix, Inc.
3333 S. Wadsworth Blvd. #C105,
Lakewood, CO 80227
(303) 987-9532 or 987-2671

Write For FREE Catalog

VISA

(602) 855-3357

Call your order in and get a FREE program

NEW VIC SOFTWARE CBM 64

Call your order in and get a FREE program

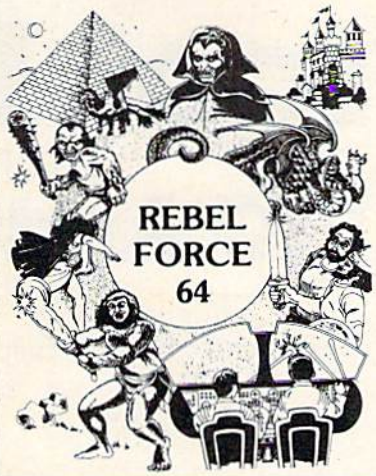
Write For FREE Catalog

MasterCard

(602) 855-3357

CRICKET

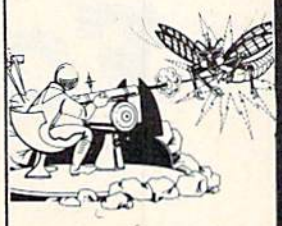
Software from ComputerMat will turn your VIC or 64 into a home arcade.



PROGRAMMERS CONTEST

Send Us Your Best VIC or 64 Program

Winners will receive royalties plus $1,000 in prizes.



BUG BLAST

PARATROOPER

TARGET COMMAND

VARG

POP TOP

MUSIC MAKER 64

MOW

COSMIC CRUZER

We have more games and programs than you can shake a joystick at!

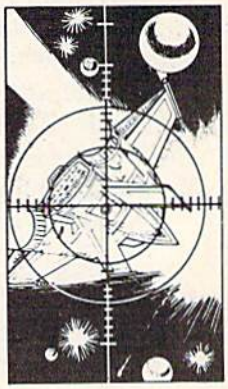
SHOGUN 64-VIC

CHRISTMAS SPECIALS

Buy 2 Programs and Get 1 Free!

For every 2 VIC or 64 programs you buy, we will send you a coupon for a third program free!

ALIEN INVASION



SPACE PAK

SNAKE OUT

64 ARCADE PAK

STOMPERS - 64

SUPER PAK - 64

HEAD ON

ComputerMat • Box 1664 M • Lake Havasu City, AZ 86403 *Add $1.00 For Shipping*

Foolproof INPUT

For VIC And 64

Charles Brannon, Program Editor

This month's "Power BASIC" — a continuing series of useful utilities and routines — overcomes some of the problems of the INPUT statement. The program included is a short machine language routine that requires no special knowledge of machine language. Easy to use, it reprograms BASIC's own INPUT routine on either the VIC-20 or Commodore 64.

Problems With INPUT

You are probably familiar with some of the problems with the INPUT statement. First, it will not properly handle input with commas and colons. If you entered the previous sentence, the computer would accept only the word "First" and ignore the rest of the line (as the computer warns you with ?EXTRA IGNORED). This is because the comma is used to separate multiple INPUTs on the same line, as in this example:

```
INPUT "ENTER NAME: FIRST,LAST";A$,B$
```

The colon, too, triggers an ?EXTRA IGNORED message. Yet it cannot be used to separate INPUT items, so it appears to be some kind of a bug (error) in the BASIC language itself.

You can get around these problems somewhat, but they become especially annoying when you are trying to read a file on tape or disk containing these characters. In a mailing list program, for instance, you need commas for address fields such as "Greensboro, NC, 27403".

There are other difficulties with the INPUT statement as well. Quotation marks are not handled correctly. Leading and trailing spaces are stripped away. INPUT also allows people to use all the cursor and color control keys. Theoretically, you can place the cursor anywhere on the screen where there is something you want to INPUT, and press RETURN. In effect, this is what happens when you edit a program (the same INPUT routine is used by both the system and BASIC). But it just makes no sense to allow cursor moves all over the screen when you simply want the user to answer a question. If the user accidentally presses a cursor key and then tries to move the cursor back, the entire line, including any prompts, is read.

This can also be a problem when you have carefully laid out a screen format with blanks or boxes into which the user is supposed to enter information. You have no way to control how many characters the user can type, so if your blank space is only ten characters long, there is nothing to prevent someone from typing more. Not only that, but also with the standard INPUT routine, someone can move the cursor out of the box you want them to use, clear the screen entirely, or otherwise destroy your carefully planned screen format.

Improving On INPUT

What we need, then, is a new INPUT routine that will not allow cursor moves. The DEL key should still let the user delete characters to make corrections, however. Additionally, the ideal INPUT routine should let your program limit the number of characters typed, and allow commas and colons.

The usual solution is to write your own INPUT routine using the GET statement, which fetches one key at a time from the keyboard. With such a simple statement as GET, however, you have to reinvent the wheel anytime you need such a protected INPUT routine. And it certainly isn't as easy to use as a simple INPUT statement.

GET SMART...FREE

...And Easy! Congratulations on your Commodore — now learn everything you can do with it! It's all in the FREE "Everything Book for Commodore Computers." Plus hundreds of quality name brand software, hardware, and accessory items. All compatible with your Vic 20 or C-64. All at super discount prices. From your friends at TENEX™, the home computer pro's.

$2.95 DUST COVER SUPER SPECIAL

Why for so little? Just so you will get to know us. The best quality (honest). Heavy gauge anti static translucent vinyl. Sewn seams to fit Vic-20 and C-64 consoles. Will accommodate cables and expansion cards. Attractive protection for your investment. #20638

only $21.95

Serious About Games?

Plug directly into your Commodore game ports for arcade style action with these famous WICO® joysticks.

Wico Joystick - Comes with fire buttons on handle and body, 5' cable.
Retail $29.95 #10252 ..... only **$21.95**

Famous Red Ball - The kind you find in arcades. Fire buttons on handle and body, 5' cable.
Retail $26.95. #10266 ..... only **$23.95**

NEW. "The Boss" - An incredible price that includes pistol-grip controller, fire button on handle, 5'cord.
#19707 ..... only **$15.95**

PRINTERS with Value, Quality, Compatibility

ALPHACOM

$109

- Silent Thermal Printer
- 80 Characters Per Second
- Fully V-20 and C-64 Compatibility
- High Resolution Print Head

Alphacom 42 is a 42 column wide printer.
#20529 ..... **$109.00**
requires . . .
Interface 42 cable for V-20 or C-64
#20534 ..... **$34.95**
Thermal Paper (42)
#20567 (2 rolls) **$4.75**

Alphacom 81 is a full 80 column printer.
#20372 ..... **$149.00**
requires . . .
Interface 81 cable for V-20 or C-64
#20586 ..... **$39.95**
Thermal Paper (81)
#20619 (2 rolls) **$9.50**

GEMINI 10-X from STAR

"Newest Technology!"

- High-speed, impact dot-matrix printer, 120 cps.
- Highest resolution on nine-wire printhead.
- Full 80 to 136 column line width.
- Bit image and block graphics.
- 7 character fonts and sub and superscripts.
- Uses ordinary paper.
- Friction or tractor feed.

#19661 ..... **$329.00**
requires . . .
Cardco parallel printer interface cable for V-20 or C-64. Automatically translates Commodore characters. Lifetime Guarantee.
#20623 ..... **$64.95**

The Elementary Commodore — 64

by William B. Sanders

Get a clear and easy-going introduction to programming C-64 BASIC. Learn to create music and graphics, store and manipulate data, use printers and other peripherals.
Loads of fun and useful programs like check-book balancers and file systems. Heavily illustrated.
#19642, 223 pages, 5"x7", soft cover, spiral bound **$12.95**

TENEX Computer Marketing Systems
Box 6578, South Bend, IN 46660
Please call 219-277-7726 with questions.

ORDER TOLL FREE 800-348-2778

MasterCard VISA

MAIL ME TODAY

(use this form or copy your own)

☐ Please send me the FREE "Everything Book for Commodore Computers" NO PURCHASE NECESSARY

Name _____

Address _____

City/St/Zip _____

Phone _____

Thank You!

Mail to: TENEX, Box 6578, South Bend, IN 46660

Pay by Check, ☐ Visa, or ☐ MasterCard

Card No. _____ Exp. Date _____

CAT. #	PRODUCT DESCRIPTION	HOW MANY	PRICE
	Shipping & Handling		$1.75
	Indiana residents only, add 5% sales tax		
	TOTAL		

Well, I certainly wouldn't bring such gloom to the scene without a solution. The accompanying program is the key. It works on both the VIC-20 and Commodore 64, and is a machine language routine that replaces the standard Commodore INPUT with a protected INPUT such as described above. The beauty of it is that after you GOSUB 60000, all INPUT (and INPUT#) statements are redefined. You don't have to understand how the machine language works in order to use it, and you don't have to rewrite any existing programs, other than to insert the GOSUB. You still have all the flexibility of the standard INPUT statement. Just add the subroutine to the end of your program.

The machine language program has a couple of niceties. After you GOSUB 60000, you can change the maximum number of characters allowed by POKEing memory location 252 with the length (don't POKE with zero, or more than 88). The cursor is an underline by default, but you can change the character used for the cursor by POKEing the ASCII value of the character you want into memory location 2. For example, to change the cursor into an asterisk, enter:

```
POKE 2,ASC("*")
```

When you use the routine to INPUT data from files, just remember that it strips away all control characters, from CHR$(0) to CHR$(31) and CHR$(128) to CHR$(159). This includes all special codes such as cursor controls, function keys, color codes, etc. You'll rarely write these to a standard data file, anyway.

You may be intrigued to find that this special INPUT routine even works in direct mode. You can still LIST and RUN, but cursor controls remain disabled. If you want the special INPUT routine out of your way, just press RUN/STOP-RESTORE.

See program listing on page 209.

* ! **BREAK AWAY FROM BASIC** ! *

6502 MACHINE LANGUAGE ASSEMBLER

for the serious users of VIC-20 and C-64 computers

PROFESSIONAL FEATURES INCLUDE:

- FULL SCREEN TEXT EDITOR for Program Entry or Word Processing
- STANDARD ASSEMBLER UTILITIES: Symbols, Labels, Arithmetic operators
- PLUS: - Extensive Error Checking and Reporting
  - Listing Control: On-Off, Pagenation, Symbol Table, etc.
  - Chaining for Unlimited Source length even with small memory size
- FULL CHOICE OF OUTPUT DEVICES: Printer, Disk, Screen, Memory, Tape
- SPECIAL MEMORY-TO-MEMORY MODE FOR SUPER FAST ASSEMBLY
- OBJECT CODE COMPATIBLE with standard PROM PROGRAMMERS to produce firmware

- ASSEMBLER/TEXT EDITOR supplied on disk or cassette. Specify VIC-20 or C-64 $32.95
- DOCUMENTATION ONLY (Refundable with order) $ 4.00
- ALSO DISKETTES 1540/1541 Certified Error free, Pack of ten $19.95

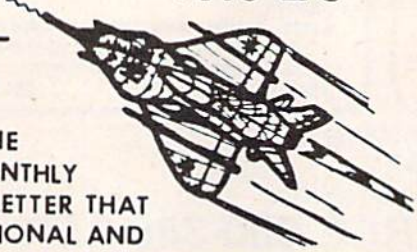
OSIRIS
413 PHEASANT LANE
SANTA ROSA, CA 95401
(707) 576-0808

Add $2.00 Postage
California residents add 6½ Tax
VIC-20 and C-64 trademarks of Commodore

NEW

WHEELER **SOFT-GUIDE** NEWSLETTER TMP

For The **COMMODORE 64™** Or **VIC 20™**



BUY THE RIGHT PROGRAM— THE 1st TIME—ALL THE TIME!

FOR LESS THAN THE PRICE OF ONE PROGRAM YOU CAN HAVE 12 MONTHLY ISSUES OF SOFT-GUIDE—A NEWSLETTER THAT REVIEWS GAMES, HOME, EDUCATIONAL AND PERSONAL PROGRAMS FOR THE VIC 20 AND COMM. 64, ONLY. ALL REVIEWS-NO ADS. THE CALL IS FREE-SUBSCRIBE NOW AND **SAVE 33% ON SOFT-GUIDE 20 OR 64 NEWSLETTER**

VISA-MASTERCARD ORDERS ONLY

CALL TOLL FREE 1-800-835-2246 EXT. 271

Kansas 1-800-362-2421 Ext. 271

If paying by check or money order

CHARTER SUBSCRIBERS Only $19.95 per year

SOFT-GUIDE 4974 N. Fresno St., Suite 303 Fresno CA 93726

Please allow eight weeks for processing. Thank you. rates/yr/computer u.s.

POWERBYTE MENU

BUSINESS AND HOME SOFTWARE

Commodore 64 — Vic 20
TRS Color — Adam

The Accountant	$29.95	Utility Bills	14.95
Accts. Rec./Pay.	26.95	Budgeting	15.95
Order Tracker	21.95	Screen Dump	12.95
Business Inventory	21.95	Calendar	16.95
The Bidder	18.95	Present Value	13.95
Calendar-Data Base	18.95	Checkbook	12.95
Billing solver	21.95	Home Budget	12.95
Client Tickler	21.95	Home Inventory	12.95
Vicky Calc.	14.95	Club Lister	16.95
Cash Flow	16.95	Medical Records	16.95
Linear Regression	18.95	Credit Cards	15.95
Depreciator	16.95	Super Shopper	12.95
Bar Chart	9.95	Savings Accounts	13.95
Mortgage Calculator	9.95	Travel Time	13.95
Mortgage Comparer	9.95	Tape Geni	14.95
P.E.R.T. My VIC	18.95	Tape Worm	14.95
Amortizer	24.95	Dear Diary	14.95
Taxman	18.95	Mother's Recipes	12.95
Loan Repayer	12.95	Metric Brain	12.95
Statistics	18.95	Track My Weight	14.95
Phone Directory	12.95	Jogger's Logger	14.95
Net Worth	16.95	Grade My Kids	16.95
Investments	14.95	Nuismatic Phanatic	16.95
Stock Ticker Tape	18.95	Lightning Sort	14.95
Profit Sharing Plan	18.95	Golf Scorecard	14.95
Syndicator	18.95	Math A Magician	15.95
Mailman	12.95	Temp. Converter	9.95

Specify Cassette or Disk (Disk $5.00 Extra)
Check, COD or Charge (Add $1.50 Post. & Hdl.)

FREE CATALOG

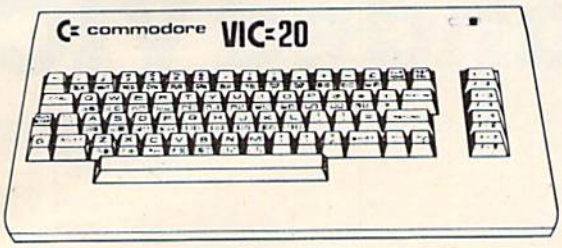
Powerbyte Software
Box 579-905 Lorien Drive
Gwynedd Valley, Pa. 19437
609-424-5485

GIVE YOUR VIC 20 or 64
the Best Software Available

FOR ONLY **$18**

//

70 PROGRAMS FOR YOUR VIC 20



ONLY **$18** (Shipping Included)

All on cassette tape
Great New Assortment of the
#1 Programs in the U.S.A.
EDUCATIONAL ° GAMES ° PROGRAM AIDS
HOME PROGRAMS AND MORE
All Programs Run on Standard VIC 20 Computer
BEAT THE HIGH COST OF SOFTWARE!

//

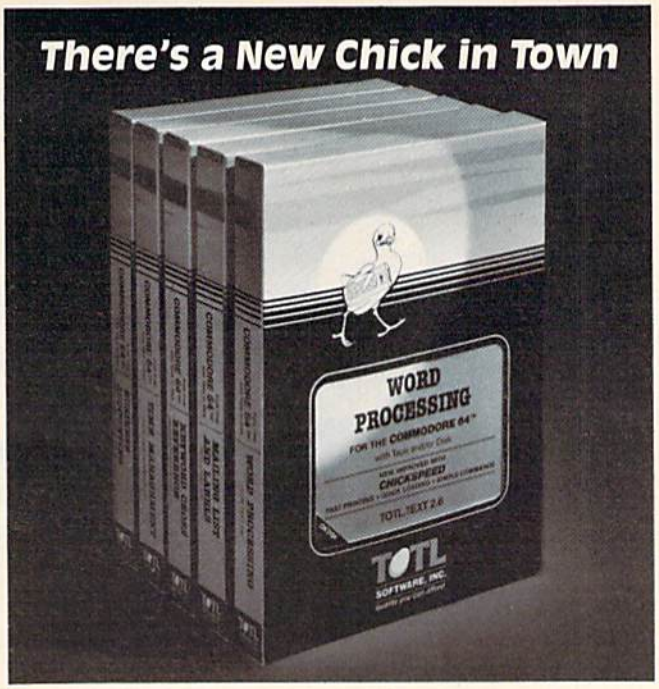
22 PROGRAMS FOR YOUR
COMMODORE 64 COMPUTER

ONLY **$18** (Shipping Included)

Incredible New Assortment of the
Finest Programs for Your 64!
BUSINESS PROGRAMS ° EDUCATIONAL
GAMES ° TEACHING AIDS
GEOGRAPHY ° SCIENCE & MORE

Specify Which Package of Programs (VIC 20 or 64)
Personal Checks or Money Orders Accepted - Canadian Orders in US Funds Please
Send to: MICRO - VIC - COMPUTERS, P.O. BOX 587, PITTSFIELD, MA 01202
Circle our Reader Service Number in the back of the magazine for a Free Brochure

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 catagory 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 _____

DAN CARMICHAEL, ASSISTANT EDITOR

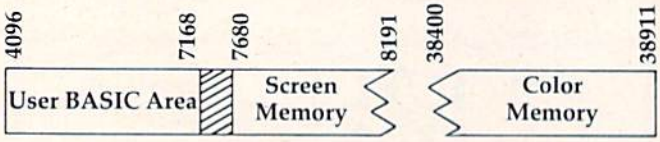
Custom Characters On The Expanded VIC

In this month's column, we'll show you how to set up the expanded VIC (8K or more) for custom characters.

The *VIC-20 Programmer's Reference Guide* has an entire section on creating custom characters on the unexpanded VIC. However, it only briefly touches upon how to set up the *expanded* VIC for custom characters. If you want to program custom characters on the expanded VIC, there are some important differences to learn.

Using custom characters in the unexpanded VIC is easy. The way memory is laid out is perfect for it. With BASIC programming memory running from 4096 to 7679, you can partition off, or "reserve," 512 bytes from the top of BASIC (7168 to 7679), enough for up to 64 custom characters. This, plus the fact that memory is neatly laid out (see Figure 1), makes the task easy.

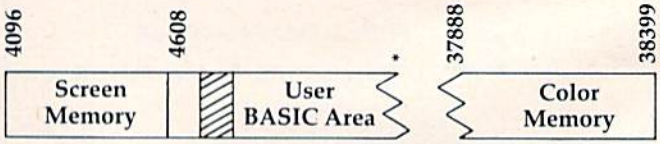
Figure 1:
Memory Map Of The Unexpanded VIC-20



▨ = Custom Character Area

However, getting the (8K or more) expanded VIC-20 set up for custom characters takes a little more work. As you can see in Figure 2, adding an 8K or larger memory expander to the VIC-20 moves things around a bit. The start of BASIC programming memory moves from 4096 to 4608, and the area where BASIC was in the unexpanded VIC (4096 – 4607) is now screen memory. The color memory starting address also moves from 38400 to 37888.

Figure 2:
Memory Map Of The Expanded (8K Or More) VIC-20

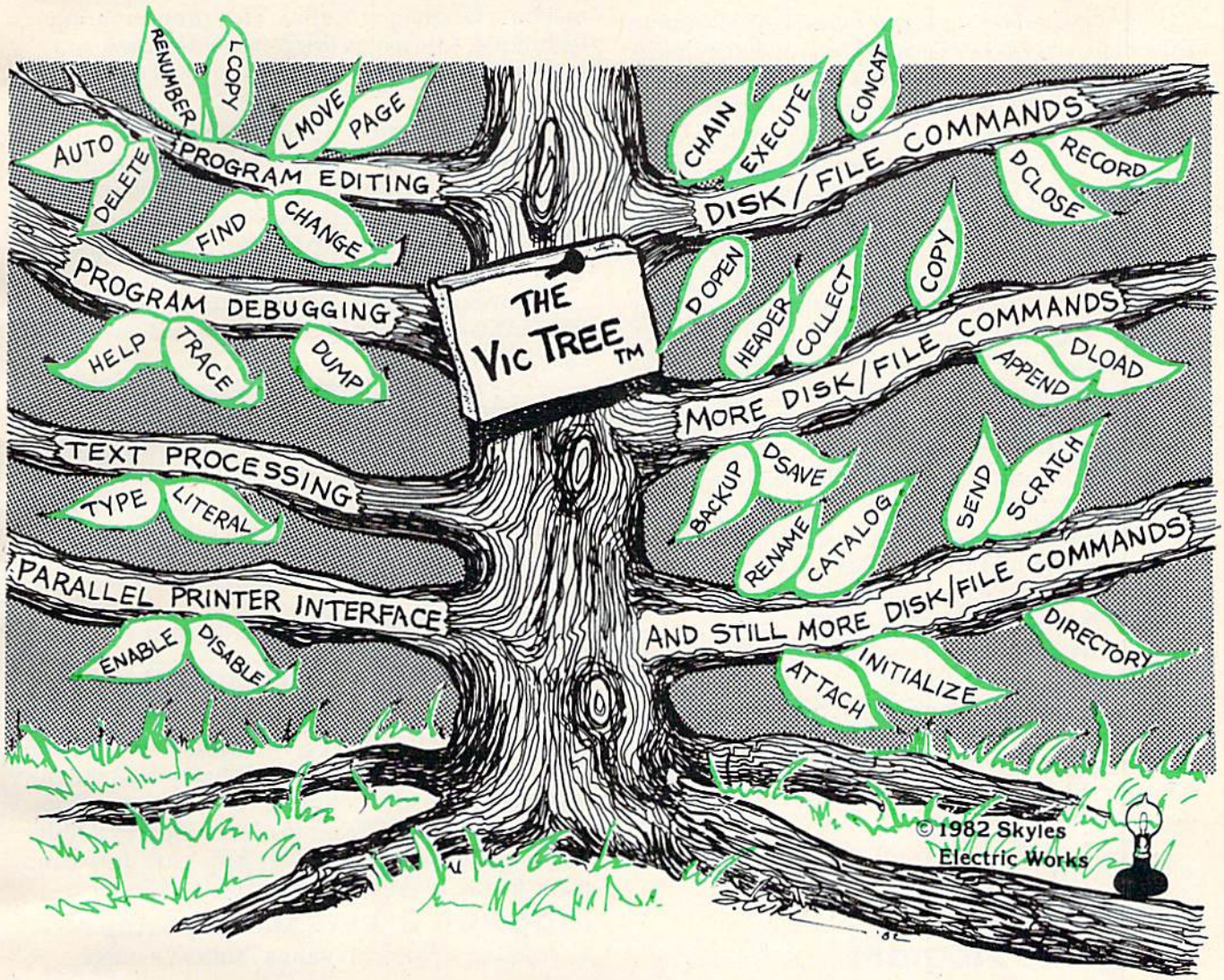


▨ = Custom Character Area = 5120 to 5632
*Depending on the size of memory expansion

Making custom characters in the expanded configuration should be easy. Just reserve 512 or more bytes at the top of BASIC memory as we did in the unexpanded VIC and go, right? Unfortunately, it's not that easy. The problem is that the VIC chip, the chip which determines where the VIC-20 gets its character information, cannot "see" expansion memory. Because of this limitation, we cannot put our custom characters anywhere in the VIC's expansion RAM.

The answer is to put the custom characters underneath the user BASIC area, in an area of memory accessible to the VIC chip. This is accomplished by moving BASIC memory up and reserving a block of memory for the custom characters.

Skyles Electric Works Presents



The VicTree™

...Leaves your new Commodore 64 (or Vic 20) 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 cartridge that allows your Commodore 64 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 Commodore 64 to all Centronics Parallel printers with an inexpensive cable. 8kb of ROM—4kb for the BASIC commands, 4kb for disk commands. Perfect not only for the new Commodore 64 but also for the Vic 20. Unbelievably simple to use with a 100+ page manual with many many program examples. Easy to install, plugs into cartridge port, the VicTree gives you all the additional BASIC 4.0 commands to allow most BASIC 4.0 programs to work on your new Commodore 64 and Vic 20.

And now with the BASIC command Commodore forgot!

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

Moving BASIC

The first part of our task is moving BASIC memory up a page or two (a *page* is a block of 256 bytes in memory). This is done with a few easy POKEs. First we'll POKE memory locations 43 and 44, which signal to the operating system where the *start of BASIC* is. When you add 8K or more expansion to the VIC, the values in 43 and 44 change to 1 and 18, respectively. This signals the system that the start of BASIC is at 4608. To make room for the custom characters, we'll POKE 43,1 and POKE 44,22. This tells the operating system that we now want the start of BASIC to begin at 5632.

Next we'll POKE memory locations 45 and 46. These two bytes tell the system where the *start of variables* is. The start of variables always stays a few bytes just past the end of your BASIC program, no matter how large the program grows. We'll POKE 45,3 and POKE 46,22.

Now we have to tell the operating system where we moved things. Bytes 641 and 642 signal where the *start of memory for the operating system* is. We'll POKE 641, 0 and POKE 642, 22.

The last thing we have to do is POKE zeros into the beginning of BASIC to signal the operating system that it's ready. We'll POKE 5632, 5633, and 5634 with zeros. These three zeros tell the system that this is the end of the BASIC program. Because there is no BASIC program in memory, the end *is* the beginning.

These POKEs will reserve 512 bytes (from 5120 to 5631) for our custom characters. This is enough memory to hold up to 64 characters.

Using The Program

Program 1 POKEs a short machine language routine into memory that sets all the necessary parameters in the expanded VIC for custom characters. The program simply performs all the POKEs we just discussed.

Program 1: Memory Setup

```
1 FORA=8192TO8224:READB:POKEA,B:NEXT
                                    :rem 6
2 PRINT"{CLR}{WHT}SYS8192:CLR{BLU}":POKE6
  31,19:POKE632,13:POKE198,2        :rem 62
5 DATA169,0,141,129,2,141,0,22,141,1,22,1
  41,2,22,169,1,133,43,169,3,133,45,169,2
  2,133                             :rem 97
6 DATA44,133,46,141,130,2,96,234   :rem 81
```

When you run Program 1, make sure no BASIC programs are in memory. You could lose all or part of the other program. Line 2 of Program 1 starts the machine language routine. It does this by PRINTing SYS8192:CLR at the top of the screen. Then, by POKEing CHR$(19) (cursor home) and CHR$(13) (carriage return) into the keyboard buffer (bytes 631–640), it fools the VIC into thinking you typed these commands from the keyboard. POKEing 198,2 tells the operating system to read the characters in the keyboard buffer, starting the machine language routine. This programming technique, known as the *dynamic keyboard*, is a very useful tool and will be discussed in a future column.

Type in Program 1, verify it carefully, and SAVE it. Be sure to SAVE it first, because after running, it will seem to disappear. Also check your DATA statements carefully, because an error in a machine language program can lock up your VIC.

Now enter RUN. After running, you are ready to LOAD in your BASIC program and create your custom characters.

To switch to the custom characters, POKE 36869,205. To switch back to standard character ROM, POKE 36869,192. If you wish to copy the first 64 characters from standard character ROM into your custom character area, add this line to your program:

```
10000 FOR P=5120 TO 5631: POKE P, PEEK
      (P+27648): NEXT
```

You can then change or delete them at will.

More Custom Characters

If 64 custom characters are not enough for you, you can enter Program 2. Program 2 works basically the same except it sets aside enough memory for 128 custom characters. They will reside from 5120 to 6143. With Program 2, the start of BASIC will move from 5632 to 6144, giving us the extra memory we need for 64 more characters.

Program 2: Extra Memory Setup

```
1 FORA=8192TO8224:READB:POKEA,B:NEXT
                                    :rem 6
2 PRINT"{CLR}{WHT}SYS8192:CLR{BLU}":POKE6
  31,19:POKE632,13:POKE198,2        :rem 62
5 DATA169,0,141,129,2,141,0,24,141,1,24,1
  41,2,24,169,1,133,43,169,3,133,45,169,2
  4,133                             :rem 105
6 DATA44,133,46,141,130,2,96,234   :rem 81
```

In Program 2, if you want to copy the first 128 characters from ROM into your custom character area, add this line to your BASIC program:

```
10000 FOR P=5120 TO 6143: POKE P, PEEK
      (P+27648): NEXT
```

Creating Custom Characters

Creating your custom characters is up to you. We won't go into the details here, but there are many good resources available, including the *VIC-20 Programmer's Reference Guide* and articles in last month's issue of COMPUTE!'s Gazette.

If you use Program 1, the 64 characters will go into memory between 5120 and 5631, and will correspond to screen POKE characters 0 (@) to 63 (?). If you use Program 2, the 128 characters will go into 5120–6143, and will correspond to characters 0 (@) to 127 (▚).

LOW COST SOFTWARE

Are you tired of paying high prices for your software? Let John Henry Software save you money! We distribute public domain software for your **Commodore 64™** or **VIC 20™** We've tested and documented each program to guarantee you hours of fun and useful learning experiences. We specialize in prompt delivery of your software, even if you order tapes, and we guarantee our product.

You'll also receive our free program reference book when you place your order.

COMMODORE 64

Group CG	26 Games for Everyone	$7.95
Group CP	30 Programming, Demo, Business and Home	$7.95
Group CE	16 Educational Programs	$7.95
Group CA	5 Adventure Games	$7.95

VIC 20

Group VG	62 Games for Everyone	$7.95
Group VP	54 Programming, Demo, Business and Home	$7.95
Group VE	35 Educational Programs	$7.95

When ordering, specify group and tape or disk.

Send check or money order payable to:

John Henry Software
P.O. Box 39021
Cincinnati, Ohio 45239

Don't wait! Order your software today! Or write for your free program reference book. You'll be glad you did!

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

STOP PLAYING GAMES

NEW Commodore 64 & VIC-20

- Calculate odds on HORSE RACES with ANY COMPUTER using **BASIC.**
- SCIENTIFICALLY DERIVED SYSTEM really works. TV Station WLKY of Louisville, Kentucky used this sytem to predict the odds of the 1980 Kentucky Derby. See the Wall Street Journal (June 6, 1980) article on Horse-Handicapping. This system was written and used by computer experts and is now being made available to home computer owners. This method is based on storing data from a large number of races on a high speed, large scale computer. 23 factors taken from the "Daily Racing Form" were then analyzed by the computer to see how they influenced race results. From these 23 factors, ten were found to be the most vital in determining winners. NUMERICAL PROBABILITIES of each of these 10 factors were then computed and this forms the basis of this REVOLUTIONARY NEW PROGRAM.
- SIMPLE TO USE: Obtain "Daily Racing Form" the day before the races and answer the 10 questions about each horse. Run the program and your computer will print out the odds for all horses in each race. COMPUTER POWER gives you the advantage!
- YOU GET: 1) Cassette.
  2) Listing of BASIC program for use with any computer.
  3) Instructions on how to get the needed data from the "Daily Racing Form"
  4) Tips on using the odds generated by the program.
  5) Sample form to simplify entering data for each race.

MAIL COUPON OR CALL TODAY

3G COMPANY, INC. DEPT. G **(503) 357-5607**
RT. 3, BOX 28A, GASTON, OR 97119

Yes, I want to use my computer for FUN and PROFIT. Please send me _____ programs at **$24.95 each.** Circle the cassette you need: PET/CBM, VIC-20, Commodore 64, Sinclair Timex 1000, Atari, TRS-80, Color Computer, or Apple (Apple Disk available—add $5.00)

Enclosed is: ☐ check or money order ☐ MasterCard ☐ Visa

Card No. _____ Exp. date _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

START USING YOUR COMPUTER FOR FUN and PROFIT!

COMSTAR

AIR* SHIPPING WITHIN 2 DAYS
SEND $1.00 FOR COMPLETE LIST

COMMODORE

GX 100 PRINTER (80 COLUMN) (BANANA)	199
CARDCO PRINTER INTERFACE (PARALLEL)	59
ALIEN GROUP VOICE BOX (D,T)	85
NEWPORT PROSTICK	23
ELEPHANT DISKS (BOX OF 10)	21
RABBIT (EASTERN HOUSE) (VIC OR 64)	35
HES MODEM (WITH SOFTWARE) (VIC OR 64)	59
HES MON ASSEMBLER (C) (VIC OR 64)	29
DUST COVER	7
QUICK BROWN FOX (C) (VIC OR 64)	49

COM-64

WORDPRO 3 + (D)	59
VIDEOPAK 80 (80 COLUMN)	159
Z-80 VIDEOPAK (WITH CPM)	259
6502 PROF. DEV. SYSTEM (T)	23
ROBBERS OF LOST TOMB (D,T)	21
PROG. REF. GUIDE (BOOK)	18
ELEMENTARY 64 (BOOK)	14
64 FORTH (C)	46
JUMP MAN (D,T)	29
PRACTICALC (SPREAD SHEET) (T)	39
FORT APOCALYPSE (D,T)	26
GOTHMOG'S LAIR (D,T)	34
FROGGER (D,T)	26
ANNIHILATOR (T)	18
TEMPLE OF APSHAI (D,T)	29

VIC-20

16K RAM	59
CARDBOARD (3 SLOT EXP.)	33
DISPLAY MANAGER (40/80 COL.)	89
HESWRITER (C)	29
TURTLE GRAPHICS (C)	29
VIC FORTH (C)	46
CHOPLIFTER (C)	29
SHAMUS (C)	29
SCORPION (C)	29
SPIDER CITY (C)	29
SWORD OF FARGOAL (T) 21K	23
KIDS AND THE VIC (BOOK)	17
VIC GRAPHICS (BOOK)	12
SUBMARINE COMMANDER (C)	31
TYPE ATTACK (C)	29

C = CARTRIDGE D = DISK T = CASSETTE * MOST ITEMS

COMSTAR
P.O. BOX 1730 GOLETA, CA 93116
(805) 964-4660

ORDERS ONLY: 800-558-8803
or send check or money order. VISA, MC add 3%. Shipping—$2 for software (call for hardware). Calif add 6% tax. COD add $2.50.

VIC & 64

AT LAST! The information you need, without always going back to the manual. These durable plastic coated overlays contain program starting locations, function key labeling, commands and additional aids in center cutout.

Please send me the following Leroy's Cheatsheet™ keyboard overlays

20	64		20	64	
☐		Programmer's Aid[1]	☐	☐	Graphic printer (1515 & 1525)[1]
☐		Vicmon[1]	☐		UMI Wordcraft 20[2]
☐		Super Expander[1]	☐		HES Vic Forth[3]
☐		Vic Typewriter[1]	☐	☐	HES Writer[3]
☐		Victerm 1[1]		☐	Wordpro 3 plus
	☐	Term 64[1]		☐	Easy Script[1]
☐	☐	Quick Brown Fox	☐	☐	Basic

CG1283

Send check or money order plus $2.00 (postage and handling). PA residents add 6% sales tax.

Name _____

Address _____

City _____ State _____ Zip _____

(1) Products of Commodore Business Machines, Inc. (2) Product of United Microware Industries, Inc. (3) Products of Human Engineered Software. VIC-20 is a Trademark of Commodore Business Machines, Inc.

CHEATSHEET PRODUCTS™
P.O. Box 8299 Pittsburgh PA. 15218

HORIZONS: 64

CHARLES BRANNON
PROGRAM EDITOR

Tricky Business

After working with your computer for a while, you will begin to discover certain tricky techniques. I'll take the opportunity here to assemble some of my favorite tricks and review some others you may have overlooked.

Abbreviations

You may already know that you can use abbreviations to enter BASIC commands. The abbreviation consists of enough letters to distinguish it from any other command, then a shifted character of the command. The most common abbreviation is ? for PRINT. Another is L SHIFT-I for LIST. See the table accompanying this article for other common abbreviations. A complete list can be found in Appendix D of the user's guide that came with your computer.

Just as the question mark expands out to PRINT when you LIST the program, the other abbreviations also appear in their unabbreviated form. The abbreviations are convenient when entering programs, but some programmers use them to save memory.

You may wonder why you need to worry about memory conservation with 64K (38K for BASIC, of course) of RAM to work with. First of all, you always want to make your programs easy to type in if you intend to publish them (and shorter is better). Second, there is a programming maxim that states that a complex program will always expand to fill available memory, no matter how much you have. There is much truth in this, especially when you have a lot of data to hold in RAM.

Every new line of BASIC has five bytes of overhead beyond the programming on that line. So every time you fit another statement on the same line, you save four bytes. This can make quite a difference in a long program.

Unfortunately, if the programmer has really "crunched" a line, it will LIST out to be longer than 80 characters. The computer doesn't mind; internally, it can hold up to 255 characters (each keyword uses only one byte). But since the screen editor can work with up to only 80 characters, these lines cannot be easily edited. You usually have to reabbreviate and retype the part of the line that spills over 80 characters. This is hard for many beginners, so if you submit a program to COMPUTE!'s Gazette or COMPUTE!, try to keep your line length under 80 characters.

Instant RUN

You know that SHIFT-RUN/STOP will LOAD, then automatically RUN the next program from tape. It does this by feeding the letters LOAD ‹RETURN›, then RUN ‹RETURN› into the keyboard buffer. The computer then displays and executes these two commands as if you typed them in. One novelty is to prevent the LOAD from executing, then using the RUN to run your program. For example, type the letter A first, then press SHIFT-RUN/STOP. The computer will display:

```
ALOAD
?SYNTAX ERROR
READY.
RUN
[the program starts]
```

The ALOAD caused a syntax error, but the RUN is still in the keyboard buffer, so the program runs. This may be more trouble than it's worth, but there is another application for disk users. Just type the LOAD command for disk, type a colon, and press RUN/STOP, like this:

```
LOAD "PROOFREADER",8:‹SHIFT-RUN/STOP›
```

The computer ignores any command after a LOAD (the second LOAD generated by RUN/STOP), but since the RUN is still in the keyboard buffer, your program will automatically run after a load. This is handy: you can run some errand while you're waiting for the program to load, then come back with the program ready to use.

Emergency Reset

You say your machine just locked up, and you didn't get a chance to SAVE the program? If RUN-STOP/RESTORE doesn't work, you still have a

IF IT'S FOR THE COMMODORE 64 AND IT'S GOOD, IT'S PROBABLY

ENTECH®

MANAGEMENT SYSTEM 64
This integrated business program gives you the computer power once reserved for large corporations. Capabilities include invoicing, inventory control, and customer mailing lists. Disk **$79.95**

FINANCE CALC 64
The leader in home and business financial analysis. You can have up to 1440 itemized expenses and print 1085 different financial reports and bar graphs. In addition, it keeps and compares as many as 12 budgets at once. Disk **$69.95**

DATA BASE 64
A perfect record system for any business or home. It can store up to 1200 records and has up to 20 fields for each one. A special label and report designer is included. It can also merge with popular word processors. Disk **$69.95**

GAME DESIGNER 64
Use to animate 16 sprites and design colorful background screens. Several game sub-routines included. Disk **$35.95**

STUDIO 64 SERIES
Anyone can now create music as beautiful as the most advanced programers could one year ago!! Just play and the computer will instantly write the music on the screen. Included are powerful features like block move, single note editing and scrolling. It will save and recall, add music to your own programs and print lead sheets. Disk **$39.95**

FAMILY PAK [3 in 1] **[ALL] $55.95**
Three of the finest home programs available:

- **CHECKBOOK EASE 64**
  Handles over 1300 transactions. Prints statements, and all types of checks, and 40 expense categories. **$39.95**
- **RECIPE KEEPER**
  Searches by ingredient, category or name. Calculates measurements for different serving amounts and prints copies.
- **SPACE MATH 64**
  Learn math, explore the universe, dance to the music and watch the show.

BABIES OF THE DIRT
An earthquake sucks you to the center of the earth. To escape you must battle the BABIES OF THE DIRT. But, don't miss or its doomsday! Watch out for their mother. **$39.95**

NOTE: PROGRAMS ARE COMPATIBLE WITH ALL PRINTERS AND UTILIZE FULL-SCREEN PROCESSING.

P.O. BOX 881, SUN VALLEY, CA 91353 • [213] 768-6646

GET THE BEST FOR YOUR COMMODORE 64

BUSINESS

* **FINANCE CALC 64** • Disk	$55.95
* **DATA BASE 64** • Disk	59.95
* **MANAGEMENT SYSTEM 64** • Disk	45.95
* **FAMILY PAC 64 (3 in 1)** • Disk (CHECKBOOK, RECIPE, EDU-GAME)	45.95
* **CHECKBOOK EASE 64** • Disk	35.95
HESWRITER 64 • Cart.	29.95
HESMON 64 • Cart.	25.95
QUICK BROWN FOX (W.P.) • Cart.	45.95
WRITERS ASSISTANT (W.P.) • Disk	59.95
FILING ASSISTANT • Disk	67.95
INVENTORY PACKAGE • Disk	77.95
TOUCH TYPING TUTOR • Disk & Cass.	19.95
MINI JINI (DATA BASE) • Disk	71.95
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
WORD PRO/3 (W.P.) • Disk	71.95
SPELL RIGHT PLUS (DICTIONARY) • Crt.	49.95
DELPHI'S ORACLE (DATA BASE) • Disk	125.95
TIME & MONEY MANAGER • Disk	55.95
OMNICALC (SPREADSHEET) • Disk	79.95
CARDCO PRINTER INTERFACE	54.95

EDUCATIONAL

HUNDREDS MORE AVAILABLE

SNOOPER TROOPERS I, II • Disk	$29.95
KINDERCOMP • Disk & Crt.	19.95
IN SEARCH OF MOST AMAZING THING • Disk	26.95
PROGRAMMING KIT I • Disk	19.95
FACEMAKER • Disk	22.95
KIDS ON KEYS • Crt.	29.95
FRACTION FEVER • Crt.	29.95
PRIMARY MATH TUTOR • Disk & Cass.	21.95
ENGLISH INVADERS • Disk & Cass.	21.95
DUNGEONS ALGEBRA DRAGONS • Disk & Cass.	19.95
UP FOR GRABS • Cart.	29.95
BENJI'S SPACE RESCUE • Disk	29.95

ENTERTAINMENT

* **STUDIO 64** (MUSIC MAKER) • Disk & Cass.	$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 • Disk & Cass.	16.95
PROTECTOR II • Disk & Cass.	24.95
TELENGARD • Cass.	16.95
FROGGER • Disk & Cass.	22.95
FORT APOCALYPSE • Disk & Cass.	22.95
ROBBERS OF THE LOST TOMB • Disk	19.95
JUMPMAN • Disk	25.95
SWORD OF FARGOAL • Disk & Cass.	25.95
PAKACUDA • Disk & Cass.	11.95
SURVIVOR • Disk & Cass.	22.95
PEGASUS ODYSSEY • Disk & Cass.	19.95
SUPERCUDA • Disk & Cass.	19.95
NEUTRAL ZONE • Disk & Cass.	27.95
CENTROPODS • Disk & Cass.	13.95
SPACE PATROL • Cass.	19.95
MOON PATROL • Cass.	19.95
B-1 BOMBER • Cass.	11.95
KONGO KONG (DONKEY KONG) • Disk & Cass.	14.95
COMPETITION PRO. JOYSTICK	17.95

POLICY
All orders are shipped U.P.S. Shipping charges are $2.00 for prepaid orders and $3.25 for C.O.D. For fast delivery send money order, certified check or credit card.
Please allow approximately three weeks for clearance on personal checks.
All items are subject to availability and price change. Thanks for ordering from House of Software! Call for free catalog!

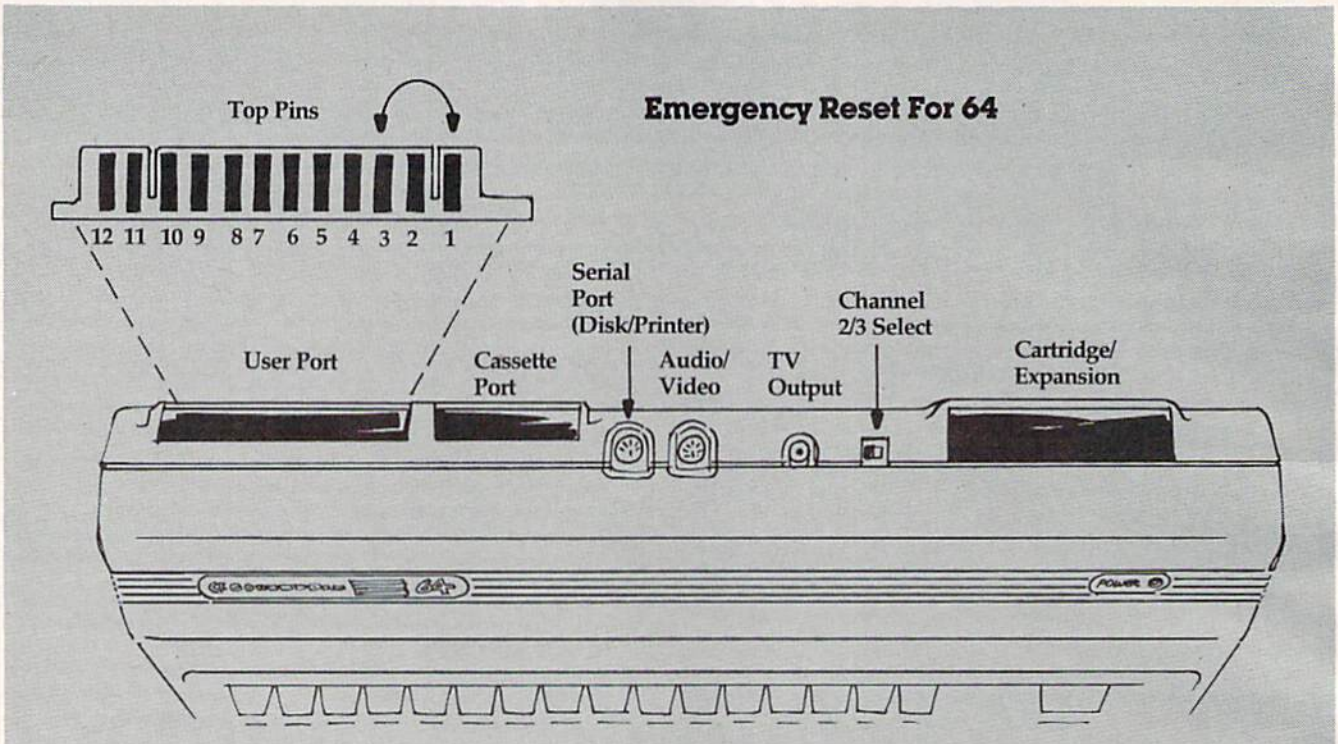
HOUSE of SOFTWARE®

*From EN-TECH Software

To Order Call:
(213) 768-8866
Or
Write To:
VISA MasterCard

HOUSE OF SOFTWARE
9183 Mercedes Ave.• Arleta, CA 91331

SHOW US A BETTER PRICE AND WE'LL BEAT IT!



Using a bent paper clip, connect pins 1 and 3 for an instant to reset the computer (see text).

chance. There are two pins on the user port (the one the modem plugs into, not the cartridge slot) that you can *briefly* connect to reset your Commodore 64 (see figure). When you ground pins 1 and 3 together, the machine hiccups, then gives you the "*** COMMODORE BASIC V2 ***" message, implying your program is gone. And it is.

When you type LIST, there is nothing to be seen. I'm not playing a cruel trick on you, however. If you have previously typed in the "Program Lifesaver" from the November issue of COMPUTE!'s Gazette, you can LOAD "UNNEW",1,1 from tape or LOAD "UNNEW",8,1 from disk, SYS 525, and CLR to recover your program. This *warm reset* or *warmstart* does not clear memory; it just resets BASIC's pointers and variables. The Program Lifesaver unNEWs the program. You can then SAVE your resurrected program to tape or disk. If the lock-up was caused by memory being scrambled, you will get back only a garbled version of your program. This technique is useful only if the program in memory was left untouched by the lock-up.

Note: If you ground the incorrect pins when attempting to reset the computer, there is a chance you could blow a fuse within the 64. Replacing the fuse is simple enough, but it involves opening the case, which voids the warranty. It is highly unlikely that grounding the wrong pins will permanently damage the computer, but if you have any doubts about this procedure, do not try it.

Case Closed

You probably know that SHIFT-COMMODORE (press both SHIFT and the Commodore logo key) switches the machine from upper- to lowercase and vice versa. You can also do this from within a program by PRINTing either CHR$(14) for lowercase or CHR$(142) for uppercase. You can also lock and unlock either mode by disabling the SHIFT-COMMODORE sequence. This prevents confusion if the keys are accidentally pressed. Just PRINT CHR$(8) to lock the switch, and PRINT CHR$(9) to reenable SHIFT-COMMODORE.

Faster BASIC

There are many tricks to speed up program execution, such as packing many statements on one line, deleting extra spaces and REMs, etc. You should know that GOTO and GOSUB do not jump directly to the target line, but must search for the line from the top of the program. Therefore, you can gain speed by placing much-used subroutines at the top of a program (use GOTO to skip over the subroutines when the program is run).

Other techniques seem obvious when you examine them. For example, this line will POKE asterisks to screen memory to form a line going

A simple way to increase the versatility of your 64 or VIC 20.

If you can't do as much as you'd like to with your 64 or VIC 20, then INTERPOD is exactly what you need. It will unlock your computer's hidden potential.

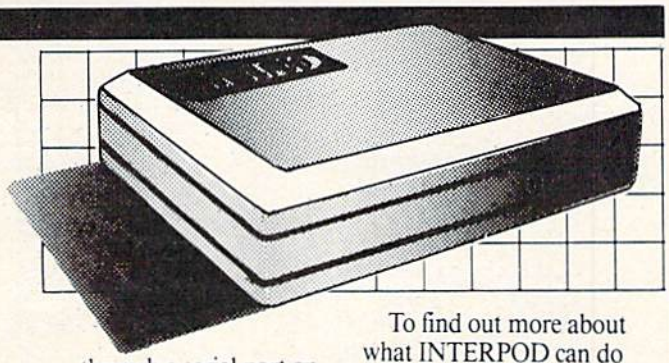
Just plug INTERPOD into the serial port of your computer and you're ready to access a vast array of peripherals that will allow you to run any professional quality software.

You'll be able to execute word processing, accounting, instrument control, and other excellent applications, and turn your 64 or VIC 20 into a very powerful system.

INTERPOD will also enable you to compile basic programs on 4040 or 8050 drives using Oxford's PETSPEED 64. And you'll be pleased to know that INTERPOD is transparent, so it won't tie up your computer's memory.

INTERPOD will allow you to access the following:

- Up to 30 IEEE 488 disk drives and printers.
- other IEEE instruments including volt meters, plotters, and other analog/digital peripherals.
- any RS232 printer or RS232 modem.
- the 1541 disk drive through a serial port on INTERPOD.
- a wide range of inexpensive IEEE and RS232 matrix and quality printers.



INTERPOD is priced at $180, quantity 1. *Order by December 15th and receive a $20 rebate.*

To find out more about what INTERPOD can do for you, or to order INTERPOD, contact:

Limbic Systems Inc.
1056 ELWELL COURT
PALO ALTO, CA 94303
(415) 964-8788

INTERPOD

ADD 60 COMMANDS TO YOUR COMMODORE 64 WITH:

grafDOS

An enhanced disk operating system adds 40 *NEW* commands to both **BASIC** and **DOS**! Includes easy to use Disk Commands, HIRES Graphics, LORES Graphics, Text and Sprites.

MINIMON

A powerful machine code monitor which adds 20 *NEW* commands to examine memory, disassemble, text dump, miniassembler and *MORE!*

ONLY 39^{95} **MINIMON available separately for $19.95**

DUST COVERS

Attractive, brown vinyl covers.

COMPUTER or DRIVE	$7.95
OLD STYLE DATASETTE	$3.95
NEW STYLE DATASETTE	$3.95
1525 PRINTER	$7.95

Send for our *FREE catalog* of the lowest prices for:

CBM-64 GAMES • NEW PRODUCTS
VIC-20 GAMES • BOOKS
AND MORE!

INTERESTING SOFTWARE
21101 S. Harvard Blvd.
Torrance, CA 90501
(213) 328-9422

Visa/MC/Check/Money Order — Add $2.00
CA residents add 6½% sales tax
DEALER INQUIRIES INVITED

Common Keyword Abbreviations

Keyword	Abbreviation
AND	A-SHIFT-N
ASC	A-SHIFT-S
CHR$	C-SHIFT-H
CLOSE	CL-SHIFT-O
CLR	C-SHIFT-L
CMD	C-SHIFT-M
DATA	D-SHIFT-A
DEF	D-SHIFT-E
DIM	D-SHIFT-I
FOR	F-SHIFT-O
GET	G-SHIFT-E
GOSUB	GO-SHIFT-S
GOTO	G-SHIFT-O
LEFT$	LE-SHIFT-F
LIST	L-SHIFT-I
LOAD	L-SHIFT-O
MID$	M-SHIFT-I
NEXT	N-SHIFT-E
NOT	N-SHIFT-O
OPEN	O-SHIFT-P
PEEK	P-SHIFT-E
POKE	P-SHIFT-O
PRINT	?
READ	R-SHIFT-E
RESTORE	RE-SHIFT-S
RETURN	RE-SHIFT-T
RIGHT$	R-SHIFT-I
RND	R-SHIFT-N
SAVE	S-SHIFT-A
SPC(	S-SHIFT-P
STEP	ST-SHIFT-E
STOP	S-SHIFT-T
STR$	ST-SHIFT-R
SYS	S-SHIFT-Y
TAB(	T-SHIFT-A
THEN	T-SHIFT-H
TIME	TI
TIME$	TI$
VERIFY	V-SHIFT-E

down the left side of your screen:

```
FOR I=0 TO 24:POKE 1024+I*40,42:POKE 55296+
I*40,1:NEXT
```

Each screen line is 40 bytes long, so the row number (0-24) is multiplied by 40 to reach each line. But addition is faster than multiplication in BASIC, so range the loop from 0 to 24*40 (960) with a STEP size of 40. The STEP, which defaults to one, is added to I when NEXT is executed. NEXT then checks to see if the variable I is greater than the number after TO in the FOR statement. So this line is faster:

```
FOR I=0 TO 960 STEP 40:POKE 1024+I,42:POKE
55296+I,1:NEXT
```

Techniques like these can speed up your program, but there is no better way to speed up a loop than to use variables in place of constants. For example, notice the difference in speed between this line:

```
FOR I=0 TO 999:POKE 1024+I,1:POKE
55296+I,1:NEXT
```

and:

```
SC=1024:CM=55296:FOR I=0 TO 999:POKE
SC+I,1:POKE CM+I,1:NEXT
```

(By the way, NEXT by itself is faster than NEXT with a variable, such as NEXT I)

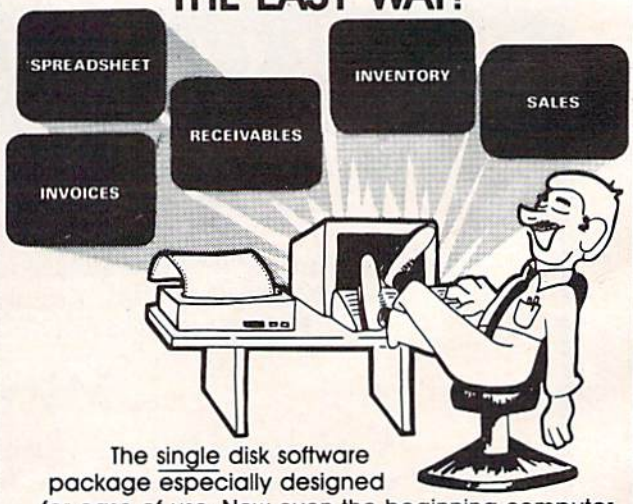
Finally, you can speed up a program by turning off the VIC-II chip, which steals time away from the 6510 microprocessor. Of course, when this happens, the TV screen goes blank. You can turn the VIC-II chip (and the screen) back on when you need to display again. In tests I've tried, the speed-up is about seven percent, not significant unless we're talking about a really long loop.

```
Disable VIC-II Chip: POKE 53265,PEEK(53265) AND 239
Enable VIC-II Chip: POKE 53265,PEEK(53265) OR 16
```

It's Up To You

This is your magazine. Many of our articles are from readers. But even if you don't submit articles, your opinions are valuable. Use the reader service cards to let us know what you think. Specifically, I want to make this column serve the best interests of the most people. Write and tell me what you want to see: more minireviews, more programming tips, less programming, sprites, color, sound, modems and telecommunications, hardware ideas, news and rumors, etc. It's really up to you!

RUN YOUR BUSINESS THE EASY WAY!



The single disk software package especially designed for ease of use. Now even the beginning computer user need not fear fully automating his business. The "Business Pack" takes care of everything; right at the point of sale! Invoices, receivables, inventory, sales tax, accounting, everything you need for only $179.95.

CONTACT
LOGISTIC ENGINEERING ASSOCIATES
FOR ALL YOUR 64 SOFTWARE
(619) 562-1047
SPECIAL DISCOUNTS FOR DEALERS AND DISTRIBUTORS

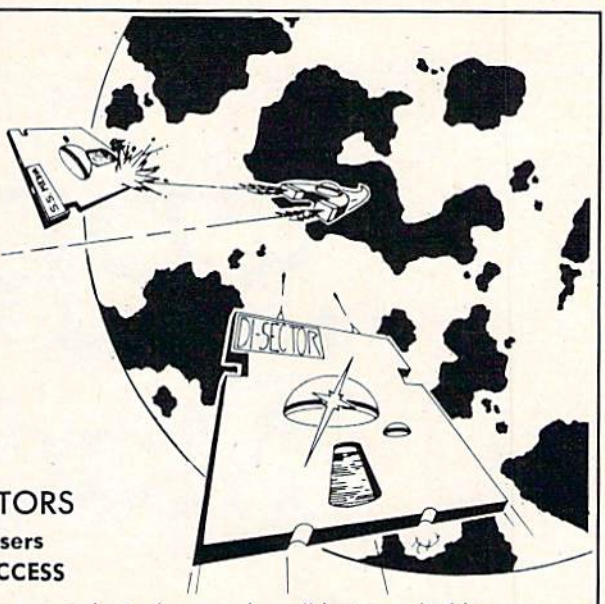
DI-SECTOR

To The Rescue

REPAIR - CUSTOMIZE - LEARN

from

STARPOINT SOFTWARE



AT LAST!! DIRECT INTERACTION with SECTORS

an absolute necessity for disk-based Commodore 64™* users

EXAMINE, MODIFY, and RESTORE by DIRECT SECTOR ACCESS

- ★ simultaneous HEX and ASCII display of sectors
- ★ dual cursor editing
- ★ modify in HEX, ASCII or DECIMAL
- ★ restore scratched/deleted files
- ★ repair lost, damaged, or "destroyed" files
- ★ complete operating instructions
- ★ many useful data recovery and modification tips
- ★ source code fully commented by author

Dealer Inquiries Invited

Program by Bruce Q. Hammond
Ad art by Steven M. Hettema

. . . WRITE OR PHONE . . .

STARPOINT SOFTWARE

Star Route 10 - Gazelle, CA 96034 (916) 435-2386

$39.95
on 5¼" diskette

VISA/MASTERCARD accepted

C.O.D. add $2

*Commodore 64 is a registered trademark of Commodore Business Machines

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

SPRITES Made Easy

by Paul F. Schatz

If you've always wanted to create sprites on your Commodore 64, but have been put off by all the complicated POKEs, this article is your answer. It lets you modify BASIC to add three new sprite commands to make the job much easier. An accompanying side article also explains the rudiments of sprite design.

One of the most powerful features of the Commodore 64 is its sprite animation ability. Sprites, also called MOBs (for Movable Object Blocks), are in effect graphics blocks which you can sculpt into any shape and move about the screen. Since they move independently of the screen image and move more smoothly than custom characters, they are often used when creating games or demonstrating animation.

Sprites are accessed from BASIC by a series of POKEs. The Video Interface Controller (VIC-II chip) holds several registers which you manipulate to create and move sprites on your screen. Manipulating these VIC-II registers can get complicated, however, especially for the beginning programmer, because the routines require numerous POKEs for each sprite. Turning on and off various sprite functions can become confusing. Crossing the invisible *seam* on the 64's screen is especially cumbersome.

A solution is to add some new commands to BASIC to control the sprites. This article provides a method for adding three new commands to BASIC which will allow you to control sprites more easily.

If you're unfamiliar with the methods used to design and create sprites on the 64, refer to the accompanying article, "Sprite Creation," before you continue.

Modifying BASIC

The Commodore 64 is a flexible computer and it's possible to use the Random Access Memory (RAM) under the BASIC Read Only Memory (ROM) for a modified BASIC. You make a duplicate of BASIC, place it in RAM, and then modify "RAM BASIC" to suit your needs. The technique was outlined by Jim Butterfield in his article "Commodore 64 Architecture," which appeared in the January 1983 issue of COMPUTE! Magazine. It was also used in my article "Commodore 64 Hi-Res Graphics Made Simple," which appeared in the August 1983 issue of COMPUTE!'s Gazette. Refer to these two articles for other uses of this same process.

"Sprite BASIC," which I'll call my BASIC modification program, replaces three old keywords, LET, WAIT, and VERIFY, with three new keywords, OFF, MOVE, and SPRITE. Notice that the new keywords are the same length as the ones they replace. A new keyword has to be mapped exactly into the old keyword's spot in the keyword lookup table. Program 1 is the BASIC program which moves the BASIC ROM code to RAM, modifies it, and loads the new machine language routines into a safe area of memory. Machine language is an excellent method of programming sprite movements, since it is both very fast and very efficient. (Sprite BASIC extends from $C000 to $C0E2 in the machine language buffer.)

TAXMAN

Commodore 64®

Make tax time easy with fast, accurate & generous software. Designed for professionals to compute lowest rate from tax tables, X, Y, Z & 5-year avg. Spreadsheet design prints results for Epson & other serial bus port printers. Tax forms included. Visa & MasterCharge accepted.

TAX DEDUCTIBLE

$59.95 plus postage

Order by 12-31-83 for $10 OFF!

Commodore 64 is a trademark of Commodore Business Machines. Epson is trademark of Epson America Inc. © Saura, 1982

SAURA

Computer Software & Consulting
7510 Foxridge Way
Anchorage, Alaska 99502
(907) 349-7485

C-64 USERS

Step Into A New Dimension of Action & Adventure

- BANDITS AT 4 O'CLOCK
- STARDATE 6000

∞ CALL **INFINITY SOFTWARE** ∞

AVAILABLE ON TAPE OR DISK FOR $29.00 ea.

536 CURIE DR., S.J., CA 95123
(408) 629-6208

COMMODORE 64 $199.95 *

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 14" color monitor 1701 $299.95
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!

$995.00

- ★ Full 64K
- ★ Color Monitor built-in
- ★ Disk drive built-in
- ★ FREE software package
- ★ Completely compatible with the Commodore 64
- ★ LOTS OF SOFTWARE AVAILABLE!

	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	$269.95
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

CALL US NOW — PRICES MAY BE EVEN LOWER!

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 supercedes all previous ads; minimum ships & handling $5.95; all orders subject to verification.

Due to the tremendous demand of these products, goods are subject to availability. Place your orders now!

Olympic Sales Company
SERVING YOU SINCE 1947

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

COMMODORE 64

American Peripherals

NEW ARRIVALS (disk or tape)

1030 LANGUAGE TRANSLATOR English to German. $10
584 PIANO-64 $19.95 Change your 64 to a piano.
126 TRAFFIC SIGNALS $14.95 Teach your child safety.
1240 POGO $24.95 Like Q-Bert.
596 TELLING TIME $24.95 Hi-res Round clock.
1249 TYPESETTER $49.50 Hi-res printing on 1525.
1276 ELIZA $19.95 Has conversation with you.
1016 ELECTRONIC GRADEBOOK Teacher special $24.95
574 LOCATION OF COUNTRIES Geography $14.95
575 CANCER $15.95 Kids and smoking.
762 ELEMENTARY ELECTRICITY 5th-9th gr. $24.95
1264 TRAVEL ABOUT AMERICA Series of 7 programs on Geog. and History $150.
578 SOUND EFFECTS $15.95 Demo and prog. aid.
139 STRATHCLYDE BASIC 12 lessons + test. $34.95
1014 GEOMETRY SERIES 20 progs. with hi-res Disk $300 Tape $400
128 TEST MAKER $24.95 Makes multi-choice tests.
1018 LARGE NUMBER ADDITION Great display $24.95
1275 VIC-20 EMULATOR $34.95 Run most VICs on 64.
1246 INTERRUPT MUSIC EDITOR Machine code. $29.95
1017 MORTGAGE $19.95 Does all loan calculations.
1015 ANIMAL-VEGETABLE 6yr.-10yr. $14.95
1285 MAESTRO $34.95 All conceivable music and sound functions in 1 program.
1280 WATTS and AMPS $14.95 Household elec. calcs.
580 MATCHING SHAPES I.Q. Builder $14.95

EDUCATIONAL (disk or tape)

644 Type Tutor $19.95
645 Assembly Language Tutor $14.95
687 Fractional Parts $14.95
902 Estimating Fractions $14.95
695 Tutor Math $14.95
870 Square Root Trainer $14.95
699 Counting Shapes $14.95
694 Money Addition $14.95
689 Math Dice 14.95
678 Speed Read $14.95
643 Maps and Capitals $19.95
645 Sprite Editor $19.95
904 Sound Synthesizer Tutor 19.95
696 Diagramming Sentences $14.95
690 More/Less $14.95
688 Batting Averages $14.95
802 TicTac Math $16.95
904 Balancing Equations $14.95
905 Missing Letter $14.95
864 Gradebook $15.00
810 French 1-4 $80.00
811 Spanish 1-4 $80.00
807 English Invaders $16.95
809 Munchword $16.95
812 Puss in Boot $20.00
813 Word Factory $20.00
660 Hang-Spell $14.95
905 Division Drill 14.95
906 Multiplic. Drill $14.95
907 Addition Drill $14.95
908 Subtraction Drill $14.95
910 Simon Says 14.95
911 Adding Fractions $14.95
912 Punctuation $14.95

EDUCATIONAL

Series on disk

Computer Science (30 pr.) $350
HS Biology (70 programs) $500
HS Chemistry (40 programs) $450
HS Physics (60 programs) $475
HS SAT Drill (60 programs) $99
Elem. Social Studies (18 pr.) $225
Elem. Science (18 programs) $225
Further French (12 pr.) $95
Further Spanish (12 pr.) $95
Statistics (12 programs) $95

ORDERING BLANK

To: American Peripherals
122 Bangor Street
Lindenhurst, NY 11757
516-226-5849

Ship to: Name
Street
Town, State, ZIP

Please send your complete 64K catalog. Over 600 programs.

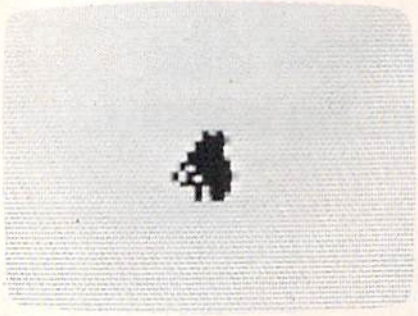
ITEM	DESCRIPTION (specify disk or tape)	PRICE

Charge to my credit card
.... VISA .... MASTER CARD
Account # .....
Exp. date .....

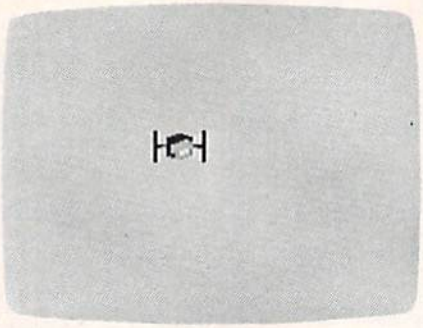
NY State Residents 7.25% tax $.....
COD add $2.00 $.....
foreign orders add $2.00 $.....
Shipping $..1.75...
Total Amount $.....

Signature .....

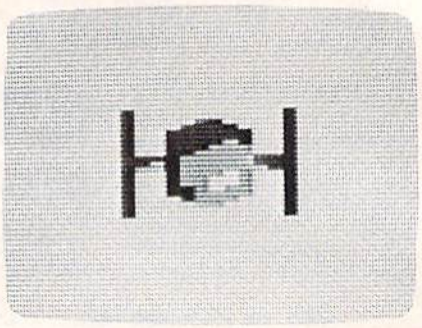
Commodore 64 is a trademark of Commodore Business Machines, Inc.



A close-up screen photo of the "butterfly" sprite created by Program 2.



Program 3 creates a "tie fighter" that can be maneuvered around the screen with a joystick.



Close-up of the tie fighter. Note how multicolor sprite graphics is used to simulate 3-D.

Sprite BASIC is loaded into the Commodore 64 by typing in and running Program 1. When typing it in, be as accurate as possible, since an incorrect number may cause the computer to crash when you type RUN. To clear this, you'd have to switch it off and on again, erasing anything you'd already entered. To be safe, SAVE the program before running it for the first time, and use the Automatic Proofreader.

It will take the computer a minute or so to run the program. Be patient. When the READY prompt appears again, type in:

```
POKE 1,54
```

This switches on Sprite BASIC. If you want to return to Commodore (your original) BASIC, simply type in:

```
POKE 1,55
```

Since you can switch from the old BASIC to Sprite BASIC within programs with these POKEs, your program can contain both the old and new BASIC command words.

Sprite BASIC is also switched off by pressing the RUN/STOP and RESTORE keys simultaneously. Because the new BASIC tokenizes the new keywords, make sure you have Sprite BASIC turned on as you enter your own program. The old keywords that were replaced cannot be used unless the old BASIC is switched back on.

The New Commands

After you've entered and switched on Sprite BASIC, you'll have three new commands available while you program sprites.

OFF ‹number›

This statement disables (turns off) the sprite designated by the number. Sprites are numbered from 0 to 7, so a number 8 or greater will give an ILLEGAL QUANTITY ERROR.

MOVE ‹number›, ‹number›, ‹number›

This new keyword enables (turns on) a sprite and places it at the desired location on the screen. The first number is the sprite's number (0-7). The next two numbers are the X and Y coordinates, respectively, of the sprite's upper-left corner. Because the sprite display area is larger than the screen area, the X coordinate must be 24 or greater, while the Y coordinate must be 50 or greater for the sprite to be fully visible. Allowed values for the X coordinate range from 0 to 511, although those greater than 344 are totally off the screen. Y values can range from 0 to 255, but numbers greater than 250 are completely off the screen. Any number greater than the accepted range will cause an ILLEGAL QUANTITY ERROR message.

SPRITE ‹number›, ‹number›, ‹number›, ‹number›

This new statement defines a sprite. The first number is the number of the sprite being defined. The second number is the 64-byte data block where the values used to actually draw the sprite are stored. This number can have values from 0 to 255. For example, sprite data stored in memory locations 832 to 895 (cassette buffer) is block 13 (832/64 = 13). The third number in this command is the color of the sprite. The color codes are:

0 Black	4 Purple	8 Orange	12 Med Gray
1 White	5 Green	9 Brown	13 Light Green
2 Red	6 Blue	10 Light Red	14 Light Blue
3 Cyan	7 Yellow	11 Dark Gray	15 Light Gray

The fourth number determines the size of the sprite. If the number is 0, the sprite is normal size. A 1 entered here doubles the sprite's width. If the number is 2, the sprite is doubled in height. Entering a 3 doubles *both* the width and the height.

Some Sample Programs

You're now ready to enter and run a couple of simple programs using Sprite BASIC. Both demonstrate how this new BASIC can be used for easy animation. The first program animates a sprite

big selection big savings

COMMODORE 64

COMPU-THINGS
Dome Business System (D) $44.95
CONTINENTAL SOFTWARE
Home Accountant (D) 56.95
CREATIVE SOFTWARE
Household Finance (D) 29.95
Household Finance (T) 25.95
Loan Analyzer (D) 16.95
Loan Analyzer (T) 12.95
Car Cost (D) 16.95
Car Cost (T) 12.95
Home Inventory (D) 16.95
Home Inventory (T) 12.95
Moon Dust (C) 29.95
Trashman (C) 29.95
EPYX
Temple of Apshai (D) 29.95
Upper Reaches of Apshai (D) 14.95
Curse of Ra (D) 14.95
Jumpman (D) 29.95
Sword of Fargoal (D) 23.95
Sword of Fargoal (T) 23.95
HES
Gridrunner (C) 29.95
HES Writer 64 (C) 37.95
Turtle Graphics II (C) 44.95
Retro Ball (C) 29.95
HES Mon (C) 29.95
Coco (D) 37.95
Benji's Space Rescue (D) 35.95
INFOCOM
Zork 1 (D) 29.95
Starcross (D) 29.95
Witness (D) 39.95
MAGIC CARPET
Weather War II (T) 14.95
Medicine Man (T) 16.95
Tombs (T) 21.95
Forced Encounter (D) 21.95
Forced Encounter (T) 18.95
COMPUTER SOFTWARE
PractiCalc 64 (D) 43.95
PractiCalc 64 (T) 39.95
NUFEKOP
3-D 64 Man (T) 14.95
PRO SOFTWARE
Word Pro 3 Plus (D) 71.95
RAINBOW COMPUTER
Writer's Asst. (D) 106.25
Filing Asst. (D) 106.25
Spread Sheet Asst. (D) 106.25
Personal Finance Asst. (D) 50.95
SIMS
Color Craft (T) 22.95
Color Craft (D) 26.95
SPINNAKER (Educational, Children)
Facemaker (C) 27.95
Fraction Fever (C) 27.95
Delta Music (C) 31.95
Kinder Comp (D) 25.95
Facemaker (D) 29.95
Hey Diddle Diddle (D) 25.95

SOFT PLUS
Meteor Madness (T) 18.95
Meteor Madness (D) 21.95
SIERRA-ON-LINE
Mr. Cool (C) 31.95
Frogger (D) 27.95
Frogger (T) 27.95
New Jawbreaker (D) 23.95
New Jawbreaker (C) 27.95
SIRIUS
Fast Eddie (D) 26.25
Turmoil (D) 26.25
Squish 'Um (D) 26.25
Snake Byte (D) 26.25
Type Attack (D) 29.95
Way Out (D) 26.25
Critical Mass (D) 26.25
Blade of Blackpoole 26.25
Repton (D) 31.95
SYNAPSE
Fort Apocalypse (D) 26.25
Fort Apocalypse (T) 26.25
Survivor (D) 26.95
Survivor (T) 26.95
TAYLORMADE
Touch Typing Tutor (T) 14.95
Touch Typing Tutor (D) 18.95
TIMEWORKS
Robbers of the Lost Tomb (T) 18.95
Robbers of the Lost Tomb (D) 18.95
Wall Street (T) 18.95
Wall Street (D) 18.95
Money Manager (T) 18.95
Money Manager (D) 18.95
Data Manager (T) 18.95
Data Manager (D) 18.95
Inventory Management (D) 63.95
Sales Analysis Management (D) 63.95
A/R Management & Invoicing (D) 63.95
A/P Management & Checkwriting (D) 63.95
TOTL
Totl. Text 2.6 (T) 34.95
Totl. Text 2.6 (D) 38.95
Totl. Label (T) 18.95
Totl. Label (D) 21.95
Time Manager (T) 29.95
Time Manager (D) 33.95
Research Assistant (T) 29.95
Research Assistant (D) 33.95
VICTORY
Adventure Pack 1 (T) 14.95
Adventure Pack 2 (T) 14.95
Grave Robbers (T) 14.95
Trek (T) 12.95
Annihilator (T) 16.95
Kongo Kong (T) 18.95
PROFESSIONAL SOFTWARE
Word Pro 3 Plus (D) 71.95
• HARDWARE •
Cardboard/6 89.95

COMMODORE 64

Cardram/16 67.95
Cardprint/a 67.95
Cardboard/3 33.95
Cardette/1 33.95
Cardriter/1 33.95
• BOOKS •
Elementary 64 11.25
Computer Playground 7.95
NEW ARRIVALS!!!!
Programer Kit 1 (D) 19.95
Electric Check Book (D) 19.95
Pin Ball Math (D) 19.95
Presidential Campagne (D) 19.95
Presidential Campagne (T) 19.95
General Ledger (D) 63.95
Educational
SPINNAKER
Alphabet Zoo (C) 27.95
Kids on Keys (C) 27.95
Kinder Comp (D) 24.95
Up For Grabs (C) 31.95
Cosmic Life (C) 27.95
Games
Protector II (T) 27.95
Protector II (D) 27.95
Neutral Zone (T) 27.95
Neutral Zone (D) 27.95
Dungeons of the Algebra Dragons (T) 19.95
Business
PROFESSIONAL SOFTWARE
Word Pro 3 Plus Spell Right (D) 79.95

Spell Right (D) 47.95
Quick Brown Fox (C) 51.95
GAME
Pro Sports Stats 71.95

NEW!! JUST ARRIVED!!!!
• HARDWARE •
Cardboard 5 Slot $69.95
Printer Utility Pkg. 15.95
Key Pad 31.95
Kraft Joy Stick 15.95
T.G. Joy Stick 23.95
• GAMES •
Choplifter (C) 35.95
Planet Fall (D) 39.95
Snakman (D) 23.95
Snakman (T) 19.95
Astroblitz (C) 31.95
Shamus (D) 27.95
Crossfire (TorD) 23.95
Moon Shuttle (D) 23.95
• BUSINESS •
Master Type (D) 31.95
Koala Pad w/Micro Illus. Comm. 64 79.95
Calc Result (D&C) 127.50
Paper Clip (D) 99.95

D = Disk T = Tape (or cassette)
C = Cartridge

TO ORDER: Send certified checks, money orders, or use your Master or Visa Cards and call **1-800-343-8019.** From inside New Hampshire call **(603) 542-6175.** Personal or company checks require two to three weeks to clear. All prices are subject to change without notice. Please include $2.00 for complete order. For C.O.D. add additional $1.70, 2-day air (UPS) add $4.00. FOREIGN ORDERS INCL. CANADA Please add $5.00 (US) Service fee and 10% ground and 15% by air.

Hours: Monday thru Saturday 8:00 to 10:00 Eastern Time.

UNIVERSAL SOFTWARE
The Best Software for Less
P. O. Box 955
Claremont, N.H. 03743

VISA MasterCard

CALL NOW • 1-800-343-8019 • TOLL FREE

Sprite Creation On The 64

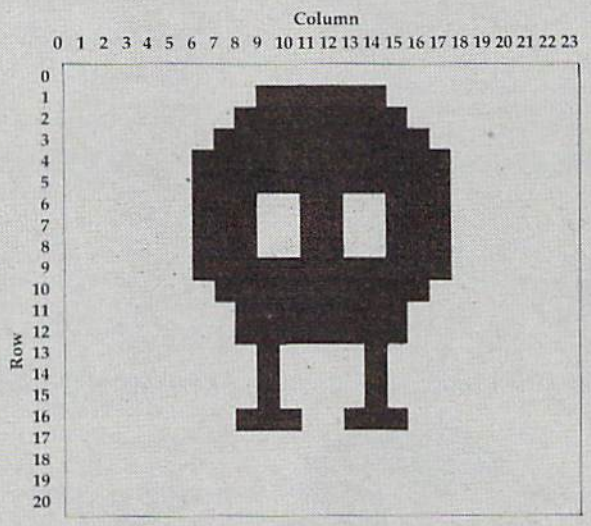
Gregg Keizer, Assistant Book Editor

Drawing Sprites

Creating a sprite is much like creating a custom character—it must be drawn. The 64 does not do this for you; you have to place the data information within a program for the computer to look at, and then *draw* the sprite on the screen.

A sprite is much larger than a custom character, consisting of a graphics block 24 pixels wide by 21 pixels high. A custom character is only an 8-by-8 pixel block. The information to draw a sprite uses more memory than a custom character because of its size, so fewer sprites can be displayed at a time. Eight sprites are available to you on the Commodore 64.

Just as when you create custom characters, you can use graph paper to design your sprites. Take a piece of graph paper and outline an area 24 blocks wide by 21 high. Simply fill in the blocks in the pattern to create a sprite. Figure 1 shows a sample sprite drawn in this way.

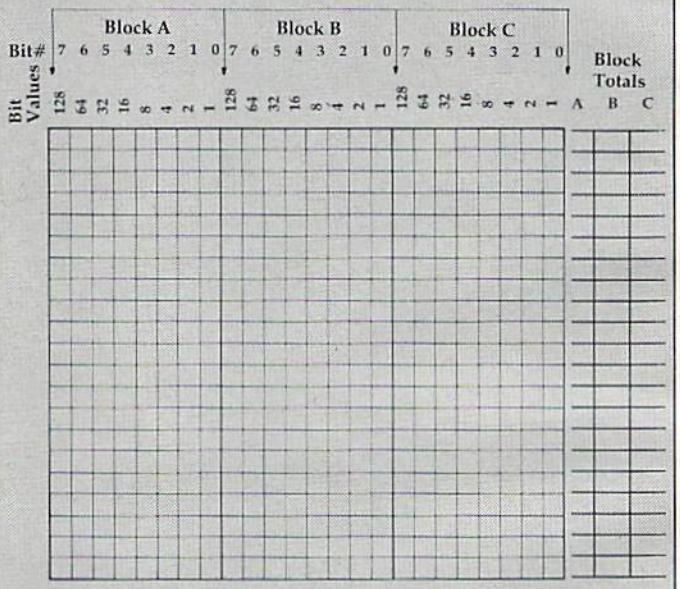


The blocks that are filled in will be *on*, or displayed in the color you later select for your sprite, while the empty blocks will be *off*, or shown in the screen's background color.

Drawing sprites is not enough for the computer, however. It cannot just look at something and display it on the screen. Instead, it needs numbers it can refer to which *tell* it what to create. You have to do this.

Bit Values

To come up with the numbers the 64 needs to draw your sprites, you'll have to do some addition. As when creating custom characters, to show some of a sprite's pixels *on* and others *off*, bits have to be set. It's not as hard as it sounds. Figure 2 shows you how it's done.

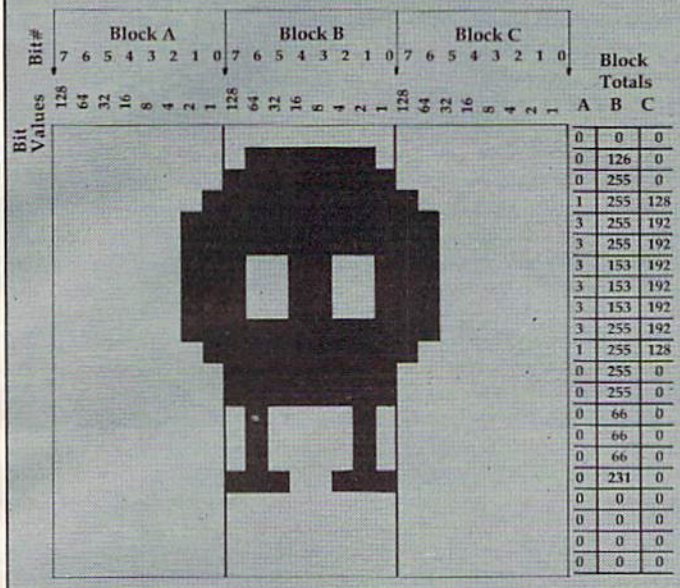


This is similar to the graph paper you used to design your sprite, only bit values have been assigned to each pixel. As in Figure 1, there are 24 columns and 21 rows. Each box represents one pixel in your sprite.

The similarity with custom characters ends here. Instead of only one eight-bit block in each row, a sprite has three. These have been named Block A, Block B, and Block C in Figure 2. When the 64 looks at the numbers to create a sprite, it starts with the eight-bit block in the upper-left corner, moves across the first row, and then jumps down to the left-most block on the next row. The last number it reads to create a sprite represents the bottom right corner of Block C.

Calculating the bit values to show a sprite is only a matter of adding together the values of

the bits you want *on*. Figure 3 shows the same sample sprite, but with its bit values computed.



The first row has none of its pixels on, so the bit value for all three bytes is 0. Row 2, however, has six bits in the Block B byte turned on. These bits, numbers 1 through 6, have a total bit value of 126 (2 + 4 + 8 + 16 + 32 + 64). The other two bytes, represented by Blocks A and C, are 0, since neither has any bits on.

Each byte is calculated in this same way. Remember that each row of a sprite consists of three bytes, and that each must be figured separately. Figure 2 makes this simple, for each byte has its own total column at the far right.

When you've finished computing the bit values for a sprite, you should have 63 numbers. These are the numbers the Commodore 64 will look at to display your sprite. Normally, you would insert them in a program in several DATA statements and have the computer READ from this table. For instance, using the numbers for the sample sprite, the DATA statements would look like this:

```
DATA 0,0,0,0,126,0,0,255,0
DATA 1,255,128,3,255,192,3,255,192
DATA 3,153,192,3,153,192,3,153,192
DATA 3,255,192,1,255,128,0,255,0
DATA 0,255,0,0,66,0,0,66,0
DATA 0,66,0,0,231,0,0,0,0
DATA 0,0,0,0,0,0,0,0,0,-1
```

(The -1 is used to fill up the 64-byte block each sprite occupies in memory. Without that additional number, you may get an error message.)

Every sprite you design is created like this. But once you have it designed, you have to POKE other values into the 64 to make it appear.

Normally, you would have to POKE values into the computer to do such things as enable the sprite (turn it on), locate the sprite's DATA in an available memory address, set its color, and finally, place it on the screen. This is where sprite creation becomes tedious. By modifying BASIC, you can get the Commodore 64 to do much of this for you. "Sprites Made Easy" gives a detailed description on how to make sprite control easier.

which appears as a butterfly by moving it as it changes its shape. Actually two sprites are used. The program displays first one, then the other, to simulate movement. To see this, LOAD and RUN SPRITE BASIC, type NEW, switch on the new BASIC, and enter Program 2. Before you RUN it, SAVE it on tape or disk.

A peculiarity of the Commodore 64 concerning sprites is that there are actually two separate sections of the screen for the X, or horizontal, coordinates. An invisible seam runs all the way down the screen immediately after the 255th X coordinate. Normally, you would have to POKE a value into an additional register each time a sprite moved across this seam. Notice, however, that you don't have to do this when you use Sprite BASIC. After you enter Program 2 and type RUN, it moves the sprite smoothly across the seam from left to right. This is one of the advantages of using something like SPRITE BASIC, for the computer does as much as possible for you.

To see a joystick-driven sprite, type in NEW and enter Program 3. Plug a joystick into port 2 and you'll be able to maneuver the tie fighter-shaped sprite across the screen.

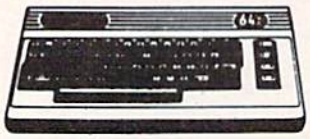
Just Starting

Using Sprite BASIC, you can create and move your own sprites with much more ease than if you had to POKE each register on your own. All you really have to do is design a sprite, calculate the DATA numbers, which allows the 64 to display it properly, and the new BASIC does all the rest.

This lets you concentrate on creating unique sprites, or in using them to your program's advantage. A game, for example, would be much easier to program, with sprites, using this new programming tool. Try some of your own sprites, perhaps simply replacing the DATA numbers in the sample programs with your own sprite information.

See program listings on page 240.

Happy Holiday Savings



Commodore 64
$219

Avalon Hill Game Company
B-1 Nuclear Bomber (C) ..... $ 12
Midway Campaign (C) ..... $ 12
North Atlantic Convoy Raider (C) ..... $ 12
Nukewar (C) ..... $ 12
Planet Miners (C) ..... $ 12
Computer Stocks & Bonds (C) ..... $ 15
Andromeda Conquest (C) ..... $ 14
Computer Football Strategy (C) ..... $ 12
Telengard (C) $16

Automated Simulations
Crunch, Crumble, Chomp ..... $ 20
Temple of Apshai ..... $ 27
Jumpman ..... $ 27

Broderbund
David's Midnight Magic ..... $ 23
Choplifter (CT) ..... $ 34
Serpentine (CT) ..... $ 27
Sea Fox (CT) ..... $ 27
Bank Street Writer ..... $ 45

Creative Software
Home Inventory ..... $ 12
Crisis Mountain ..... $ 20

Datamost
Swashbuckler (D) ..... $ 23
Aztec (D) ..... $ 27
Paint Wizard ..... $ 34

Human Engineered Software (HES)
6502 Professional Dev. System (C) ..... $ 23
Retro Ball (CRT) ..... $ 27
Hesmon (CRT) ..... $ 27
Turtle Graphics II (CRT) ..... $ 45
Heswriter 64 (CRT) ..... $ 35
Turtle Tutor ..... $ 27
Paint Brush ..... $ 20

Infocom
Zork I, II, III ..... Ea. $ 27
Deadline (D) ..... $ 34
Starcross (D) ..... $ 27
Witness ..... $ 34
Planetfall ..... $ 34

Sierra On-Line
Frogger (D) ..... $ 25
Crossfire ..... $ 15
Jaw Breaker ..... $ 20
Threshold (CRT) ..... $ 27
Sammy Light Foot (CRT) ..... $ 25

Sirius Software
Blade of Blackpoole (D) ..... $ 27
Type Attack (CRT) ..... $ 27
Repton (D) ..... $ 27
Critical Mass (D) ..... $ 27
Snake Byte (D) ..... $ 23
Bandits ..... $ 27
Squish 'em (CRT) ..... $ 23
Final Orbit (CRT) ..... $ 23

Spinnaker
Snooper Troops #1 (D) ..... $ 30
Facemaker (D) ..... $ 23
Kindercomp (D) ..... $ 20
Hey Diddle Diddle ..... $ 20
In Search of the Most Amazing Thing ..... $ 27
Fraction Fever (CRT) ..... $ 20
Alphabet Zoo (CRT) ..... $ 20
Delta Drawing (CRT) ..... $ 20

Synapse Software
Ft. Apocalypse ..... (D) $ 23, (C) $ 23
Drelbs ..... (D) $ 23, (C) $ 23
Survivor ..... (D) $ 23, (C) $ 23
Pharoah's Curse ..... (D) $ 23, (C) $ 23

1525 Printer $229
1530 Datasette ..... $ 64
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 8K Memory Expander $52
VIC 1111 16K Memory Expander $89
VIC 1011 RS 232 Terminal Interface $43
VIC 1211 Super Expander $59
VT 106A Recreation Pack ..... $ 45
VT 107A Home Calculation Pack ..... $ 45
VIC 1600 Vicmodem ..... $ 89
VM Programmer's Reference Guide ..... $ 14
Commodore Programmer's Ref. Guide $ 18

★★ *Stocking Stuffers* ★★

Koala Touch Tablet (Apple, IBM, Commodore, Atari) $85
Wico "BOSS" Joystick $15
Elephant Disk S/S $18
Flip & File Diskette Box $21

Educational

Books
Kids and the VIC ..... $ 18
Programmer's Reference Guide-VIC ..... $ 14
Programmer's Reference Guide-64 ..... $ 18

Reading & Language Arts
Super Hangman (C) ..... $ 14
Simon/Hess (C) ..... $ 13
Concentration (C) ..... $ 13
Home Babysitter ..... $ 23
Word Search ..... $ 15
Facemaker ..... 64-$ 23 VIC-$ 27
Kindercomp/64 ..... $ 20
Snooper Troops I/64 ..... $ 27

Mathematics
Sky Math (C) ..... $ 12
Space Division ..... $ 12
Bingo Speed Math (CT) ..... $ 23
Number Crunch (CT) ..... $ 23
Number Chaser ..... $ 17
Number Gulper ..... $ 17

Music
Fun with Music ..... $ 27
VIC Music Composer (CT) ..... $ 42
HES Synthesound (CT) ..... $ 49

Programming Techniques
Intro to Basic Prog. I ..... $ 22
Intro to Basic Prog. II ..... $ 22
Programmer's Aid Cart ..... $ 22
Turtle Graphics/Hess (CT) ..... $ 29
Gorteck & The Microchip ..... $ 23
Kids on Keys/64 ..... $ 23

Social Studies/Science
Visible Solar System ..... $ 23
Reagonomics (CT) ..... $ 27

Commodore Software

Avenger ..... $ 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 ..... $ 56

1-800-634-6766

Call Toll Free — Order Line Only — Ask for Operator CO64

Information & Order Inquiries
(702) 369-5523

We Accept VISA & MasterCard

COMPUTER OUTLET

1095 E. Twain, Las Vegas, Nevada
(702) 796-0296

VIC 20
$99

Avalon Hill
Tank Arcade ..... $ 12
Nuke War ..... $ 12

Automated Simulations
Rescue at Rigel (C) ..... $ 20
Ricochet (C) ..... $ 15
Monster Maze (CT) ..... $ 27
Sword of Fargoal ..... $ 27

Broderbund
Martian Raider ..... $ 15
Multisound Synthesizer ..... $ 15
Sky Blazer (CT) ..... $ 27
Sea Fox (CT) ..... $ 27
A.E. (CT) ..... $ 27

Creative Software
Black Hole (CRT) ..... $ 36
Astroblitz (CRT) ..... $ 36
Apple Panic (CRT) ..... $ 36
Serpentine (CRT) ..... $ 36
Choplifter (CRT) ..... $ 36
Terraguard (CRT) ..... $ 36
Household Finance ..... $ 20

HES Software
HES Mon (CT) ..... $ 29
HES Writer (CT) ..... $ 29
Synthesound Music Synthesizer (CT) ..... $ 49
Turtle Graphics (CT) ..... $ 29
VIC Forth (CT) ..... $ 45

Sierra On-Line
Apple Cider Spider (CT) ..... $ 27
Sammy Lightfoot (CT) ..... $ 27
Frogger ..... $ 27

Sirius
Type Attack ..... $ 27
Snake Byte ..... $ 27

Thorn EMI
River Rescue (CT) ..... $ 27
Submarine Commander ..... $ 27

Tronix
Galactic Blitz (C) ..... $ 17
Swarm (C) ..... $ 20
Sidewinder (C) ..... $ 20
Gold Fever (CT) ..... $ 27
Deadly Skies (CT) ..... $ 27

United Microware
Spiders of Mars (CT) ..... $ 34
Meteor Run (CT) ..... $ 34
Amok ..... (C) $ 15 (CT) $ 23
Alien Blitz ..... (C) $ 17 (CT) $ 27
Super Hangman (C) ..... $ 14
The Alien (C) ..... $ 17
Kosmic Kamikaze (C) ..... $ 17
Sub Chase (C) ..... $ 15
Renaissance ..... $ 20
Cloud Burst (CT) ..... $ 27
Satellites & Meteorites (CT) ..... $ 34
Outworld (CT) ..... $ 34
Wordcraft ..... $ 65

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. Charges for C.O.D. orders are $3.00 minimum or 1% for orders over $300. School purchase orders welcomed. Prices reflect a cash discount only and are subject to change without notice. Please enclose your phone number with any orders.* ***SHIPPING — Software:*** *$2.50 minimum.* ***SHIPPING — Hardware:*** *(Please call)* ***SHIPPING — 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 be accompanied by a return authorization number. Call 702-369-5523 to obtain one before returning goods for replacement.*

NEWS & PRODUCTS

Home Accounting Program

U.H.L. Research Associates has created a Commodore 64 version of its *Bill Writer/Summary* program.

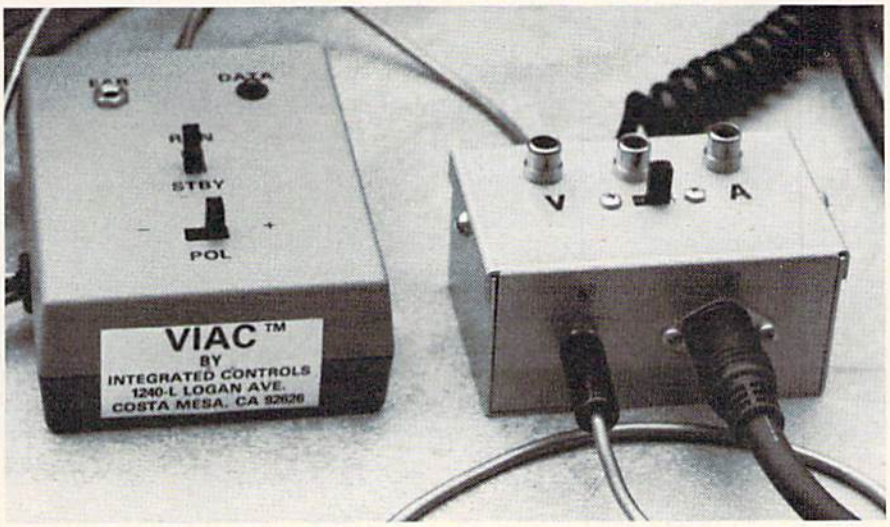
The program is designed as a home accounting system and check writer. Account data can be printed on screen or a printer, or saved to tape. No special checks are required if your printer can pull double 18-pound paper.

Bill Writer/Summary is available for the Commodore 64 or VIC-20 with 16K expansion for $29.95. An 80-column printer and cassette drive are required.

A more sophisticated version of the program is available for business use. *Business Billwriter/Summary* allows accounts to be separated into credit and debit categories. The business version, at $39.95, requires a Commodore 64 or a VIC-20 with 24K expansion, an 80-column printer, and a tape drive.

Also available from U.H.L. is *Home Math Analyzer,* which analyzes home loans, savings, and simple statistical data. The program, which sells for $19.95, is available for the 64 or VIC with 8K expansion.

U.H.L. Research Associates, Inc.
7926 Berner St.
Long Beach, CA 90808
(213) 493-1955



Integrated Controls' VIAC/VAAB Combo provides audio and video interfaces for the Commodore 64 and VIC-20 computers.

Audio And Video Interface

Integrated Controls has produced the VIAC/VAAB Combo, a system that allows VIC-20 or Commodore 64 owners to connect audio and video equipment to their computers.

The system lets users create programs that integrate voice or other audio sources for playback through the monitor speaker under program control. The VIAC/VAAB Combo sells for $64.95.

The elements of the combo also are available separately. The VIAC (VIC Interface to Any Cassette) provides an interface to any cassette recorder to LOAD/SAVE programs or make backup duplications of program tapes. The VIAC sells for $44.95.

The VAAB (Video/Audio Adapter Box) provides an easy connection to an audio/stereo system, video monitor, or video recorder. It sells for $24.95 assembled, or for $15.95 in kit form. Plans only are $5.95.

Integrated Controls
1240-L Logan Ave.
Costa Mesa, CA 92626
(714) 641-0181

Market Minder

Stock Helper is a Commodore 64 disk program designed to maintain a history of stock prices and market indicators.

The program, designed for

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 3.0 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

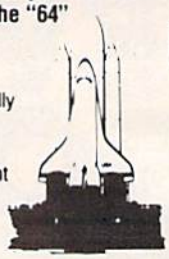
Almost as fast as 1541 Disk Drive! Don't be foolish — Why buy the disk when you can get the Rabbit for much much less!

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~~
Christmas Special - $59.95

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
- Coresident 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!

EHS's CBM 64 Monitor Cartridge
$25.00

Every Commodore 64 Owner should have this Machine Language Monitor to explore the interesting and exciting world of Machine Level Code If you can't think of a need for it now, someday you'll wish it was in your Software Library Commands include Display Registers Memory Disassemble, Assemble, Transfer, etc Over 20 Commands Cartridge and manual -$ 25 00

5¼ 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

Eastern House
3239 Linda Dr.
Winston-Salem, N.C. 27106
(919) 924-2889 (919) 748-8446
Send for free catalog!
VISA MasterCard

the "weekend investor," allows input and editing of up to 52 weeks of data on 100 stocks; input of prices in fractional, decimal, or eighths form; input of 52 weeks of data for 20 market indicators; display of price and indicator charts to screen or printer; sorting of stocks by market or name, and sorting of indicators by name.

The program sells for $30 plus $1.25 shipping. A VIC-20 version of the program is promised.

(M)agreeable Software, Inc.
5925 Magnolia Lane
Plymouth, MN 55442
(612) 559-1108

Learning The Keyboard

Boston Electronic Systems Training has released the *B*E*S*T Keyboard Coach* for the Commodore 64.

The audiovisual program uses colorful screen graphics and a cassette tape to lead the user around the 64's multifaceted keyboard.

The program includes "Alpha-Speed," a touch-typing training game. *The B*E*S*T Keyboard Coach* sells for $19.95.

Boston Electronic Systems Training, Inc.
24 Munroe St.
Newtonville, MA 02160
(617)969-2378

Music Synthesis Software

Electronic Lab Industries has produced a trio of programs to make use of the Commodore 64's sound capabilities.

Note Pro II allows you to control the pitch of each of the 64's three voices. The program offers high-speed play (up to 450 notes per second), eight-measure treble clef display, eight-octave range, ADSR control, and arrangement capabilities. The program sells for $46.95 on tape, or $49.95 on disk.

Note Pro I is a similar, but less sophisticated program. *Note Pro I* has a four-octave range, and it creates files that are compatible with *Note Pro II*. The program is available for $24.95 on tape, or $27.95 on disk.

Note Pro Bridge provides a machine language subroutine which lets you play *Note Pro* songs or sound effects from within your own programs. *Note Pro Bridge* sells for $24.95 on tape, $27.95 on disk.

Electronic Lab Industries
100 W. 22nd St.
Box 7167
Baltimore, MD 21218
(301) 366-8138

SJB DISTRIBUTORS. THE MOST COMPETITIVE PRICES ON COMMODORE.

commodore

NEW COMMODORE PRODUCTS

The Executive 64	Call
CBM B128-80	$ 825
CBM B256-80	1095
CBM BX700	2990
B Series Software	Call
CBM 1520 Plotter	169
CBM 1526 Printer	349

SOFTWARE FOR CBM 64

BUSINESS

WordPro 3+/64 w/Spell Right Plus	$ 79
Spell Right Plus	55
Calc Result (Advanced)	125
Calc Result (Easy)	75
Busicalc II	95
Mirage Concepts (Powerful Data Base)	95
M File (merge with WordPro)	89
Home Utilities	49
64 Mailing List (Galactic)	28
The Manager	50
Home Accountant (continental)	75
Code Writer (Writes Basic Programs)	95
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 Belt	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
Gothmogs 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
5 Slot Expander for 64	65
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	35

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
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
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, 10X	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	625
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)	295
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 (Texas Res. add 5% tax)
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.

SOFTWARE OF THE MONTH

Mirage Concepts
Machine Language Data Base
2000 Characters PL Record
200 Fields Per Record
Multiple Files Per Disk

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

HUNDREDS OF PROGRAMS AVAILABLE FOR THE COMMODORE 64 & VIC 20

Commodore 64

All Prices up to 30% OFF RETAIL

VIC 20

HOME/BUSINESS

Practicalc (D)	41.50
Bank St. Writer (D)	52.50
Smart 64 Terminal	31.95
Quick Brown Fox (CT)	47.50
Paper Clip (D)	96.25
WordPro SpellRight (D)	72.95
CalcResult Advanced (D)	135.00
Hesmon (CT)	29.95
Home Acct (Continental) (D)	49.95

EDUCATIONAL

Facemaker (D/CT)	22.95
Kindercomp (D/CT)	19.95
Delta Drawing (CT)	26.95
The Most Amazing Thing (D)	26.95
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
Hey Diddle Diddle (D)	19.95
Alphabet Zoo (CT)	22.95
Type Attack (D)	29.95

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 Apshai (D/CASS)	29.95

HARDWARE AND ACCESSORIES

Cardco Printer Interface	62.95
Printer Utility (Cardco)	15.95
The Connection Parallel Int.	89.95
Cardco 3 Slot Exp. Board	31.95
Cardco 5 Slot Exp. (C-64)	55.95
Data 20 Video Pak 80 (C-64)	143.95
Data 20 8K Display Mgr. (40/80 col. plus Word Proc.)	119.95
0 K Display Mgr. (40/80)	79.95
Zenith 12" Green Monitor	109.00
Brother/Dynax DX-15 (Letter Quality)	485.00
C. Itoh Prowriter 8510AP	375.00
Control Data Diskettes (10)	23.00

Write or call for FREE CATALOG. TO ORDER: CALL 1-714-951-5596

8:00 A.M.-6:00 P.M. PST Mon.-Sat. or send check or credit card number, signature and expiration date. Please include phone number.

CENTURY MICRO PRODUCTS
P.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 add $3.00 (hardware extra). Prices subject to change.

CROWN COMPUTER and Software

Trainers Corner Shopping Center
Rts. 309 & 663, Quakertown, Pa. 18951

Christmas gift idea?
We have something for everybody! Call us Toll Free.

FLIP N'FILE DISK STORAGE
15 Disk Storage 4.95
25 Disk Storage 8.95
50 Disk Storage 26.95

DUST COVER FOR
Vic-20 or C-64 8.95

SENTINEL DISKS
Lifetime Guarantee
Single Side Single Density
Box of 10 19.95

HES MODEM.
Vic-20 + C-64 54.95

CARDRITER/1 LIGHT. PEN
Vic-20 + C-64 54.95

CARDCO 5 SLOT EXP. BOARD
C-64 57.95

QUIT SMOKING
A Doctors Program To End The Smoking Habit
C-64 Disk 39.95

QUICK BROWN FOX Vic-20 + C-64

	LIST PRICE	OUR PRICE
WORD PROCESSOR		
Disk or Cass	64.95	53.95
SPINNAKER C-64 Educational Games		
Snooper Troops I or II (D)	39.95	29.95
Rhymes + Riddles (D)	29.95	22.95
Kindercomp (D or cart.)	29.95	22.95
Face Maker(D or cart)	34.95	26.95
Cosmic Life (cart)	34.95	26.95
Delta Drawing (cart)	39.95	31.95
Story Machine (cart)	39.95	31.95
Up for Grabs (cart)	39.95	31.95
MICRO SPEC – C-64		
Data Base Manager (D)	89.95	69.95
General Ledger (D)	99.95	79.95
Checkbook Manager (D)	69.95	55.95
Mailing List (D)	54.95	43.95
Data Manager (Tape)	49.95	39.95

LARGE SELECTION **FAST SERVICE**

In Pa. (215)538-1665
Out of Pa. (800)344-4499
SEND FOR FREE CATALOG

TERMS: Prices subject to change. VISA and MASTERCARD add 3%. Personal Checks allow 2 weeks to clear. C.O.D. on Certified Check. PA. Residents add 6% Sales Tax.

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.

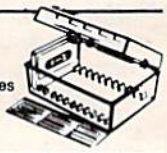
- Premium 5-screw shell with leader — BASF tape
- Internationally acclaimed. Thousands of repeat users.
- Error Free • Money back Guarantee

	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 add 4¢
Shipping $17/500
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
$2.95

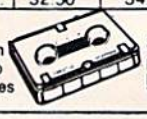


BASF QUALIMETRIC FLEXI-DISC
5¼" SSDD, Soft Sect.
Lifetime warranty!
$26.95/10 $120.00/50 $215.00/100

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

COMMODORE

CBM 64 ..... CALL
1541 DISK DRIVE ... $239

1701 Color Monitor .. $255
1525 Printer $239
1520 Color Ptr $169
Card ? (Infc) $60
Light Pen $29
1530 Recorder $59
1600 Modem $59
1650 Auto Modem ... $158
CMB 64 Ref Guide $18
The Connection (Infc) .. $85

64 SOFTWARE 64

ACCESS SOFTWARE
Neutral Zone (C/D) ... $26
Sprite Master (C/D) ... $27
AVALON HILL
B-1 Nuc. Bomber (C) .. $12
Nukewar (C) $12
Planet Miners (C) $12
Androm. Conquest (C) $14
Midway Campaign (C) $12
North Atl. Convoy (C) . $12
Comp. Stcks/Bnds (C) $15
Computer Football (C) $12
Telengard (C) $16
BATTERIES INCLUDED
Paper Clip (D) $89
BRODERBUND
Choplifter (R) $29
Serpentine (R) $27
Seafox (R) $27
David's Midnight (D) .. $23
COMMODORE
Easy File (D) $75
Easy Finance (D) $38
Easy Mail (D) $38
Easy Script (D) $75
Easy Schedule (D) ... $59
Logo (R) $75
Pilot (D) $75
Assembler (D) $38
Music Machine (D) ... $25
Music Composer (D) .. $25
Meza Music (D) $75
Video/Music Supt. (D) $38
Jupiter Lander (R) $25
Radar Rat Race (R) ... $25
Sea Wolf (R) $25
Kickman (R) $25
COMM-DATA
Pakacuda . (C) $14 (D) $18
Escp. MCP . (C) $14 (D) $18
Centropods (C) $14 (D) $18
COMPUTERMAT
Arcade-Pak (C) $18
Education-Pak (C) $18
CREATIVE SOFTWARE
Moondust (R) $25
Trashman (R) $25
Save New York (R) ... $25
Astroblitz (R) $25
Household Fin. (D) ... $25
DATA 20
Video Pak 80 ..... $139
Z80 Video Pak $229
EN-TECH
Finance Calc 64 ..... $56
Data Base 64 ..... $56
Invoice Base 64 ..... $34
EPYX
Temple of APS (D) ... $27
Upper Reach. APS (D) $14
Jumpman (D) $27
HES
HES Modem $59
6502 Prof.Dev.Sys.(C) . $22
Hesmon 64 (R) $27
Turtle Grapics II (R) .. $41
Heswriter 64 (R) $32
Gridrunner (R) $27
Retroball (R) $27
INFOCOM
Zork I, II or III (D) $27
Deadline (D) $27
Starcross (D) $27
JIN SAM
Mini-Jini (R) $75

GEMINI 10X .. $289
GORILLA $199
CITOH
Prowriter $345
Prowriter II $629
Starwriter $1149
Printmaster $1448
NEC
8023 A-C $409
3510 ..... $1375
3530 ..... $1579
3550 ..... $1779
7710/7730 ..... $1998
PROWRITER . $345
SMITH TPI ... $488
SILVER REED P $669
QUME 11/40 + ... $1299
OKI-DATA
Microline 82A $398
Microline 83A $638
Microline 84P $958
Microline 92 ..... $488
Microline 93 ..... $858
DIABLO
620R $939
630R $1719

COSMIC COMPUTERS
UNLIMITED

727 BREA CANYON RD., SUITE 16
WALNUT, CA 91789
ORDER LINES OPEN MON-SAT 8 am - 8 pm

(800) 626-7642

PLEASE FOR ORDERS ONLY
SORRY, NO COD'S

(714) 594-5204

FOR TECHNICAL INFO, ORDER INQUIRIES, OR FOR CALIFORNIA ORDERS

Add $2.50 shipping per software order in continental U.S. Add $5.00 shipping per software order for AK, HI, FPO-APO. Add $10.00 or 15% (whichever is greater) per software order for non-U.S. Call for cost of hardware shipping. Calif. residents add 6½% sales tax. Cashiers checks or money orders filled within 24 hours for items in stock. Personal checks require 4 weeks to clear. MasterCard and Visa OK for software only within continental U.S., add 3% surcharge. Include card no., expiration date and signature. Due to our low prices, all sales are final. All defective returns must have a return authorization number. Please call to obtain one before returning goods for replacement or repair. Prices & availability subject to change.

64 SOFTWARE 64

Script 64 ..... $77
Calc Result Prof. $114
Calc Result Easy $68
The Home Accountant $48
Delphis Oracle $114
Word Pro 3 with Spell $78
LOGISTIC
Datacalc 64 (C) $55 (D) $59
Home Journal (D) $55
MICROSPEC
Payroll System (D) ... $73
Inventory Pkg (D) $73
General Ledger (D) ... $73
Disk Data Mgr (D) $62
Mail List Mgr (D) $41
Checkbook Mgr (D) ... $39
M-SOFT
M-File (D) $89
ON-LINE
Frogger (D) $23
Jawbreaker (D) $17
PACIFIC COAST SOFT.
PCS (80 Ca BD, Word Proc, D.Base, Spreadsheet)
Account PAC (C/D) ... $25
File PAC (D) $30
Editor PAC (D) $39
Inquire PAC (D) $57
Happy Tutor Typng (D) $18
PROFESS. SOFTWARE
Wordpro 3 + /64 (D) ... $68
QUICK BROWN FOX
Prof.Word Proc. (R) ... $50
RAINBOW
Writers Assistant $95
Spreadsheet Assist. .. $95
File Assistant $95
SIRIUS
Blade/Blackpoodle (D) $27
Type Attack (D) $27
Repton (D) $27
Critical Mass (D) $27
Snake Byte (D) $23
Way Out (D) $27
Fast Eddie (D) $23
Turmoil (D) $23
Spider City (D) $27
Squish'Em (D) $23
Final Orbit (D) $27
Alpha Shield (D) $27
SKYLES ELEC. WORKS
Busicalc (C/D) $52
Busiwriter (D) $72
SPINNAKER
Snooper Troops 1 (D) . $29
Facemaker (D) $23
Kindercomp (D) $20
Hey Diddle (D) $20
Most Amaz. Thing (D) . $27
SYNAPSE
Fort Apocalypse (C/D) $23
Survivor (C/D) $23
Drelbs (C/D) $23
Pharoh's Curse (C/D) . $23
Protector II (D) $23
Morgal (D) $23
Shamus (D) $23
TAYLORMADE
Touch Typing Tutor 3.0 (D) $21
TIMEWORKS
Rbbrs/Lost Tomb (C/D) $21
Wall Street (C/D) $21
Money Manager (C/D) $21
Data Master (C/D) $21
Dungeons of Alg. Dragons (C/D) $21
TOTL
Text 2.6 ... (C) $32 (D) $34
Label 2.6 .. (C) $15 (D) $17
Time Manager 2.6 (C) . $24
Time Manager 2.6 (D) . $27
Resrch Assist. 2.0 (C) . $24
Resrch Assist. 2.0 (D) . $27
UMI
Motor Mania (C) $20
Renaissance (C) $27
VICTORY
Annihilator (C/D) $16
Kongo Kong (C/D) $16
Trek (C/D) $13
Adv. Pack #1 (C/D) ... $16
Adv. Pack #2 (C/D) ... $16
Grave Robbers (C/D) .. $13
Chomper Man (C/D) .. $18

Flight Simulator

An IFR flight simulator is among the three new products introduced by Fantasy Computerware for the Commodore 64.

Flight 64 is an IFR simulator that turns your screen into a flight panel with displays including radar, altimeter, artificial horizon, and vertical speed indicator. The topography changes with every flight in this $15.95 program.

Datafile is a data base management program designed for address lists, collections, and general record keeping. Up to 200 five-field records can be managed by the program which includes tape and disk output routines. *Datafile* sells for $15.95.

Spellathon, a spelling tutor for all ages, sells for $19.95. The program includes a letter-scramble game and lets you build and save your own word lists.

For disk versions of the above programs, add $2.

Fantasy Computerware, Inc.
P.O. Box 451
Sioux Falls, SD 57101
(605) 335-7684

Two-Player Space Game

Stellar Triumph, a machine language space-wars game for the Commodore 64, pits two players against each other amid asteroids, aliens, and mysterious force fields.

The playing environment — gravity, thrust, missile configurations, space objects, fuel, ammunition, and aliens — can be preselected by the players.

The screen display uses sprite and bitmapped graphics. *Stellar Triumph* is available on tape or disk for $25.

H.A.L. Labs
4074 Midland Road, Suite 23
Riverside, CA 92505

CP/M For The 64

A CP/M interface card for the Commodore 64 is available from Estes Engineering.

The card, which plugs into the expansion port, is sold in a variety of formats; the interface card with an 8-inch disk drive is available for $599; the interface card with a 5¼-inch disk drive is available for $499; and the interface card alone is available for $349.

Estes Engineering, Inc.
P.O. Box 753
Salina, KS 67402
(913) 827-0629

Numbers By Computer

The Math Teacher is a math tutorial program for students from first grade through junior high school. The program, for the Commodore 64, presents 25 math problems per session.

The Math Teacher, which sells for $39.95, covers addition, subtraction, multiplication, and division, and offers four skill levels.

CompuTech
P.O. Box 7000-309
Redondo Beach, CA 90277

Manage The Mail

The *Mail Management* program from Avastar Software combines mail file maintenance, letter processing, and custom letters into one program for the Commodore 64.

The menu-driven program includes flexible data entry routines and comes with a guide outlining sample transactions, a field dictionary, and an error message section.

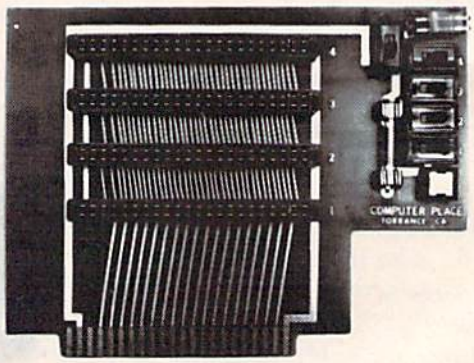
The program's report section allows for custom selection and sorting, and the program can maintain 600 records and five letters on one disk. It is available for $34.95.

Avastar Software Products
Box 203
Hasbrouck Heights, NJ 07604
(201) 592-5857

Language Translator

Household Spanish is a program designed to simplify communication between English- and Spanish-speaking people. It runs on the VIC-20.

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.

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.

Computer Place (213) 325-4754
23914 Crenshaw Blvd., Torrance, CA 90505

Dealer inquiries welcome.

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

WE DELIVER!

When it comes to software for your **Vic-20®** or **Commodore-64®**, Arena Company delivers! If you can't find what you're looking for here, ask for our **FREE CATALOG!** Or, order from us and find out what the word "service" really means!

ARENA CO.
30691 UTICA
ROSEVILLE, MI.
48066

(D)-Disk; C-Cassette; X-Cartridge

C-64 GAMES	List:	Ours:
Avenger (X)	11.95	10.00
Benji's Space Rescue (D)	44.95	32.34
Bob's Business (D)	14.95	10.95
Bonus Pack (D)	15.95	12.95
Brain Boggler (D)	16.95	12.49
Close Encounters (X)	32.95	23.95
Clowns (X)	15.95	12.95
Coco (C)	39.94	35.95
Crush Crumble Chomp (D)	29.95	21.95
Curse of Ra (C)	19.95	14.49
David's Midnight Magic (D)	34.95	22.95
Deadline (D)	42.95	35.95
Digger Bonk (D)	25.95	21.95
Dot Gobbler (X)	32.95	23.95
Fonetone (D)	14.95	10.95
Fort Apocalypse (D)	34.95	22.95
Forty Fathoms (X)	25.95	21.45
Frogmaster (X)	15.95	12.95
Fuego (D)	34.95	25.49
Games I (D)	6.95	5.49
Games II (D)	6.95	5.49
Games III (D)	6.95	5.49
Gorf (X)	19.95	16.49
Grand Master (X)	39.95	28.95
Gridrunner (X)	39.95	28.95
Guess What's Coming (D)	24.95	17.95
Jawbreaker (D)	29.95	21.95
Jumpman (C or D))	39.95	28.95
Jupiter Lander (X)	11.95	10.00
Kids No. 1 (D)	14.95	10.95
Kids No. 2 (D)	14.95	10.95
Lazarian (X)	19.95	16.49
Lemans (X)	11.95	10.00
Marathon (D)	19.95	14.49
Martian Raider (D)	19.95	14.49
Moon Dust (X)	39.95	28.95
Motor Mania (X)	39.95	28.95
Omega Race (X)	15.95	12.49
Pennant Drive (D)	34.95	24.95
Pharoahs Curse (C)	34.95	22.95
Pinball Spectacular (X)	19.95	16.49
Protector II (C)	34.95	25.49
Radar Rat Race (X)	11.95	10.00
Renaissance (X)	39.95	26.99
Retro Ball (X)	39.95	29.95
Save New York (X)	39.95	28.95
Sea Wolf (X)	15.95	12.95
Serpentine (X)	39.95	26.99
Shamus (C)	34.95	25.49
Shark Trap (D)	19.95	14.49
Spacegames (D)	24.95	17.95
Spitball (X)	39.95	28.95
Star Post (X)	11.95	10.00
Star Ranger (X)	16.95	13.95
Super Smash (X)	11.95	10.00
Survivor (C)	34.95	24.49
Sword of Fagoal (D)	29.95	21.95
Temple of Apshai (C)	39.95	28.95
Tooth Invaders (X)	16.95	13.95
Trashman (X)	39.95	28.95
Upper Reaches of Apshai (D)	19.95	14.49
Wizard of Wor (X)	19.95	16.49
Zork I (D)	39.95	26.49
Zork II (D)	39.95	26.49
Zork III (D)	39.95	26.49

C-64 BUSINESS/FINANCE	List:	Ours:
Accounts Payable	38.95	32.49
Accounts Receivable	38.95	32.49
A/P Checkwriting	99.95	65.95
A/R Billing	99.95	65.95
Car Costs (D)	19.95	14.49
Checkbook 64 (D)	24.95	17.95
Database Dialer (D)	24.95	17.95
Decision Maker (D)	19.95	14.49
Easy Calc 64 (D)	66.95	55.95
Easy File (D)	66.95	55.95
Easy Finance 64 (D)	17.95	14.95
Easy Finance II (D)	17.95	14.95
Easy Finance III (D)	17.95	14.95
Easy Finance IV (D)	17.95	14.95
Easy Finance V (D)	17.95	14.95
Easy Mail 64 (D)	15.95	12.95
Easy Plot (D)	49.95	41.95
Easy Schedule 64 (D)	79.95	69.95
General Ledger (D)	99.94	64.95
Home Accountant (D)	73.94	53.95
Home Inventory (D)	23.95	25.49
Household Finance (C)	29.95	21.95
Info Design GL/AR/AP (D)	249.95	192.95
Inventory Management (D)	99.95	64.95
Loan Analyzer (D)	29.95	21.95
Omnicalc (D)	99.95	71.95
Payroll (D)	99.95	64.95
Payroll Check Writing (D)	38.95	32.49
Time & Money Mgr. (D)	69.95	50.49

C-64 WORD PROCESSING	List:	Ours:
Bank Street Writer (D)	69.95	50.49
Easy Script (D)	38.95	32.49
Easy Script 64 (X)	38.95	32.49
Easy Spell (D)	17.95	14.95
HesWriter 64 (D)	44.95	32.49
Instedit (D)	19.95	14.49
Mini Word Processor (D)	19.95	14.95
Word/Name Machine (D)	15.95	12.95

C-64 EDUCATION/ENT.	List:	Ours:
Computer S.A.T. (D)	79.95	57.95
Computer Tutorial (X)	11.95	10.00
Easy Lesson & Quiz (D)	15.95	12.95
English 1-7 (D) Each	6.95	5.49
Facemaker (D)	34.95	25.49
Gortek & MicroChips (C)	21.95	17.95
Hey Diddle Diddle (D)	29.95	21.95
Intro to Basic Prog. (C)	17.95	14.95
Kindercomp (D)	29.95	19.95
Math I-8 (D) Each	6.95	5.49
Meta Music I (X)	99.95	83.95
Music Composer (X)	15.95	12.95
Music Machine (X)	15.95	12.95
Music Major (D)	39.95	28.95
Pipes (X)	39.95	28.95
Science 1-4 (D) Each	6.95	5.49
Snooper Troops I (D)	39.95	28.95
Snooper Troops II (D)	39.95	28.95
Step By Step (D)	59.95	43.95
Story Machine (X)	34.95	25.49
Visible Solar System (X)	16.95	13.95
Word Feud (X)	39.95	28.95

C-64 UTILITIES, ETC.	List:	Ours:
64 Forth (X)	69.95	50.49
6502 Pro. Develop. Syst.(C)	29.95	21.95
Assembler 64 (D)	15.95	12.95
Blue Print (X)	19.95	16.95
CP/M (D)	61.95	51.95
Delta Drawing (X)	59.95	43.95
Logo (D)	42.95	35.95
Nevada Cobol (D)	42.95	35.95
Pilot (X)	42.95	35.95
Screen Editor (D)	15.95	12.95
Simons Basic (X)	17.95	14.95
Turtle Graphics II (X)	59.95	43.49
Video/Music Support (X)	49.95	41.95
Graphics Machine (D)	19.95	14.95
Hes Modem Vic 20/C64	79.95	57.95
Sound Synthesizer (D)	19.95	14.49
Super Expander (X)	15.95	12.95

VIC-20 BEST SELLERS:

	List:	Ours:
AE (X)	39.95	26.99
Agressor (X)	39.95	29.95
Choplifter (X)	44.95	32.49
Pinball Spectacular (X)	16.95	13.95
Protector (X)	32.95	31.95
Raid on Fort Knox (X)	11.95	10.00
Rat Hotel (X)	39.95	29.95
Rescue at Rigel (C)	29.95	21.95
Robot Panic (X)	29.94	28.95
Save New York (X)	39.95	28.95
Serpentine (X)	38.95	28.95
Turmoil (C)	39.95	28.95
Video Vermin (X)	39.95	28.95
Voodoo Castle (X)	19.95	16.95
Coco (2) (C)	39.95	28.95
Gortek & Microchips (C)	20.95	17.95
Intro To Basic I (C)	20.95	17.95
Intro To Basic II (C)	20.95	17.95
Music Composer (X)	39.95	28.95
Pipes (X)	39.95	28.95
Vanilla Pilot (D)	38.95	32.49
Waterloo Basic (D)	38.95	32.49
Checkbook 20 (C)	24.95	17.95
Database Dialer (C)	24.95	17.95
Home Inventory (C)	14.95	10.95
Loan Analyzer (C)	14.95	10.95
Simple File (C)	29.95	21.49
Vic File (D)	19.95	16.95
Vicheck-13K (C)	24.95	17.95
Visicalc (32K D)	250.00	195.00
Hes Writer (X)	39.95	28.95
Vic Writer (D)	15.95	12.95
Wordcraft 20 Plus (X)	199.95	143.95
Commodore Artist (X)	$11.95	10.00
Graphics Machine (C)	19.95	14.95
Programmers Aid (X)	31.95	26.95
S A M Tutorial (C)	29.95	21.95
Turtle Graphics (X)	39.95	28.95
Vic Forth (X)	59.95	43.49
Vicmon Mach. Lang. (X)	31.95	26.49
Vic Super Expander (X)	69.95	55.49
Victerm I Term. Emulator(C)	9.95	8.49

VISA

ARENA COMPANY
30691 Utica Road
Roseville, MI. 48066

MasterCard

SHIPPING & PAYMENT INFO:

Visa & Mastercard accepted. Give complete card # and exp. date. For fastest service, send certified check or money order. (Personal checks, allow 3 weeks clearance). *ADD $2.00 FOR POSTAGE ON ALL ORDERS!* C.O.D., $3.00. Credit card customers can phone our order-recorder anytime: (313) 776-0542. You will be delighted with our service!!

* Commodore Business Machines, Inc.

Type a word in one language on the screen, and the program supplies the translation.

Household Spanish requires 8K expansion and includes a two-sided cassette with an English-Spanish vocabulary of more than 500 words. The program sells for $24.95.

RS Computer Programs
P.O. Box 9801
Marina Del Rey, CA 90292

Speed Reader

Speed Reader II, a program to increase reading speed and improve comprehension, is available for the Commodore 64 from Davidson & Associates.

The program includes a timed reading test, warm-up exercises to strengthen eye muscles and enlarge eye span, lessons in eye movement, column reading, and test reading.

Speed Reader II, which sells for $69.95, includes a data disk with 35 reading selections and an editor which allows the user to enter additional reading material. Additional data disks are available for junior high and upper elementary students.

Davidson & Associates
6069 Groveoak Place #14
Rancho Palos Verdes, CA 90274
(213) 378-7826

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.

CASHBOOK 1™

CASHBOOKKEEPING.....
for any small business with a Commodore 64™, & 1540/41 Disk Drive. (printer optional)
Hire Cashbook 1 as your new bookkeeper.
Send $65 or call toll free order desk 1-800-321-6927. 24-Hour Service

- Also -

The Computer Classroom™
Programs for VIC20™ and Commodore 64™ disk or tape. Write for listing. OR, try MOUSE TRAP MATH, for your VIC20™ (10.95 for tape) and we'll include listing.

ROCKY SOFTWARE ROCKY SOFTWARE
Box 310
Erie, Colorado 80516
(303) 652-2103

MEGA SOFTWARE
Guaranteed Mega Fun With Software for the Commodore 64.

MEGA DRAW
Use Commodore's hires abilities to draw on the screen using its 64K dots to compose your pictures.
•Precise drawings using the keyboard and/or joystick.
•16 line, 16 pad and 16 background colors.
•Erase lines and pad colors for corrections.
•4 size copies with the 1525 printer.
•Images saved or load on disk.
•Full Commodore character set.
•20 Drawing speeds for flexibility.
DISK ONLY $18.95

MEGA TREK
A hires game using sprites and sound. Mega Trek is not just a shooting game but it is also a logical game, needing logical thinkng to obtain high scores. Captain's log Star Date 2437.9. The Klingons have invaded a neutral system. You are the Enterprise, faced with a mission to seek out and destroy the Klingons and their captured planets.
Joystick Required
TAPE,$12.95•DISK,$15.95
Christmas Special—Get Both Games on Disk for $30.95
Send check or money order to:
MEGA SOFTWARE
P.O. Box 835
Port Orford, OR 97465

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

Software Gallery MAIL ORDER

WE'RE THE ONLY SOFTWARE AND COMPUTER STORE YOU'LL EVER NEED!

P.O. BOX 3354, CHERRY HILL, N.J. 08034

TOLL FREE (800) 992-3300 FOR ORDER ONLY

FOR INFORMATION & N.J. CALL (609) 424-7106

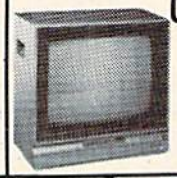
Disk Drive 1541

For the Vic 20 and CMD64. Fast high capacity storage and retrieval of data.

$245

CMD64 Computer	$229
VIC 20 Computer	$99
1525 Printer	$215
1526 Printer	$319
1530 Datasette	$64
1600 Modem	$59
1650 Modem	$88

1110	8K Memory Expander	$52
1111	16K Memory Expander	$68
1011	RS 232 Terminal Interface	$42
1211	Super Expander	$53
1212	Programmer's Aid Cartridge	$39
1213	Machine Language Monitor	$39
1311	Joystick	$7
1312	Game Paddles	$12



Color Monitor 1701

14" screen, outstanding resolution, special Commodore computer circuit.

Lower Price **$249**

PRINTERS

EPSON

RX-80	CALL
MX-80 FT	CALL
FX-80 & FX-100	Call

SMITH CORONA

TP-1	$525

OKIDATA

82-A	$395	92	$495
83-A	$634	93	$809
84-P	$949		

STAR

GEMINI 10	$314
GEMINI 15	$449

C-ITOH

PROWRITER	$360
PROWRITER 2	$645
STARWRITER	$1199
PRINTMASTER	$1545
GORRILA	$209

CARDCO

Parallel Printer Interface	$57
16K Expander	$59
6 Slot Expander Interface	$72
3 Slot Expansion Interface	$31
Video Pak 80	$150

FLOPPY DISK

Elephant SS/DD(10)	$25
Elephant SS/SD(10)	$18

Surge Protector

4 OUTLET	$37.95
6 OUTLET	$82.95

DATA 20

Z80 VIDEO & CPM	$249

MONITORS

AMDEK (300)	$154.95
COLOR I	$299.95
COLOR II	$589.95

WICO

The Boss	$15.95	Joystick	$22.50
Famous Red Ball	$25.95		
Track Ball	$49.95		

COMMODORE 64 TOP 20 SOFTWARE

Frogger	$25	Motor Mania	$22	Hes Mon	$28
Zork I	$27	Zork 3	$27	Heswriter	$34
Jumpman	$29	Grid Runner	$27	Facemaker	$26
Temple of Apshai	$29	Jawbreaker	$22	Wordpro 64	$77
Fort Apocalypse	$26	Starcross	$28	Shamus	$26
Deadline	$35	Suspended	$35	Quick Brown Fox	$48
Zork 2	$27	Repton	$29		

VIC 20

Shamus	$26
Choplifter	$29
Gortek	$21
Grid Runner	$27
Gold Fever	$27
Spider City	$28
Side Winder	$22

COMPUTER COVERS $6.99 ea. Reg. $15.95

Features heavy duty canvas with vinyl interior waterproof.

CMD64	$6.99
Vic 20	$6.99
Disk Drive	$6.99
EPSON MX-80	$7.99
EPSON MX-80 F/T	$7.99
OKIDATA 82/92	$7.99

We Carry a Large Selection of Commodore Software, call for FREE catalog with order...or send $1 (refundable with order) UPS shipping 3% for hardware and $3 for software. N.J. resident add 6% sales tax.

VISA MasterCard

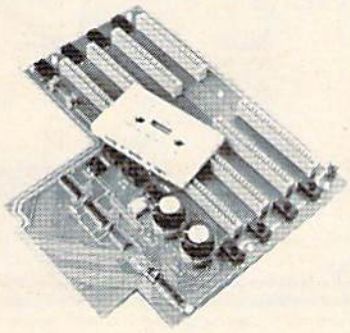
Note: Atari, Commodore, Epson, IBM, and Okidata are Registered trademarks.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE — MASTER CARD OR VISA ADD 3%

SUPERCHARGE YOUR VIC-20* WITH COMPUSCOPE'S SUPERMOTHER

$89.95

- ★ **COPY CARTRIDGES** Includes instruction manual System software
- ★ **ADD UP TO 35K**
- ★ **PAUSE SWITCH** Freezes program
- **-8 SWITCH SELECTABLE SLOTS** Run single or multiple VIC-20 program cartridges; add memory; run utility program — all at the same time
- ★ **SYSTEM RESET BUTTON** Provides "non-destructive" system restart
- ★ **FULL BUFFERING** Assures accurate data transmission
- ★ **REPLACEABLE FUSE** With safety cap
- ★ **WRITE PROTECTION** Provides easy cartridge emulation



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

THE 64 Expander

Designed for reliable operation using an 80 column converter and word processor software. **$79.95**

FEATURES:

- ★ Four Expansion Slots - 3 vertical, 1 horizontal.
- ★ Pause Switch
- ★ Fully Buffered Address and Data Lines
- ★ Power Switching on 3 Vertical Slots
- ★ One Horizontal Slot - for Large Expansion Cards
- ★ System Reset Button
- ★ Fuse Protected
- ★ Allows Use of DMA Controllers
- ★ Will Support Parallel Disk Drive
- ★ Write Protection
- ★ Gold Connectors
- ★ External Power Jack (power adapter optional)

MasterCard, Visa, Money Order, Bank Check

Add $2.50 shipping and handling, COD (add $2.00). All orders shipped within 24 hours.

TO ORDER CALL TOLL FREE (800) 821-9211

Within Oregon (503) 842-4431

COMPUSCOPE, 6400 Signal Rd., Tillamook, OR 97141

COMPUTE!'s Gazette Back Issues

JULY 1983: Commodore 64 Video Update, Snake Escape, Alphabug, VIC Marquee, Word Hunt, VIC Timepiece, product reviews, Learning To Program In BASIC, Quickfind, 64 Paddle Reader, Machine Language For Beginners, Enlivening Programs With Sound, Using Joysticks On The 64, Simple Answers To Common Questions, VICreations — Speedy Variables, 64 Explorer.

AUGUST 1983: Your First Hours With A Computer, Should You Join A Users Group, Guide To Commodore Users Groups, The Viper, Cylon Zap, product reviews, VIC/64 Mailing List, Word Spell, Global Scan For VIC/64, Machine Language For Beginners, VIC Title Screens, 64 Hi-Res Graphics Made Easy, VIC/64 Four-Speed Brake, Disk Menu, Using A 1540 Disk Drive With The 64, Playing Computer Music, Simple Answers To Common Questions, HOTWARE, VICreations — Caring For Disk Drives/Cassettes, 64 Explorer, News & Products.

SEPTEMBER 1983: Telecomputing Today, Telecomputing Glossary, Commodore's Nationwide Party Line, Commodore Bulletin Boards, Demon Star For VIC/64, Potholes, product reviews, Checkbook Reporter, States & Capitals Tutor For VIC/64, MiniTerm-20, TeleTerm 64, POKEing Graphics, Machine Language For Beginners, 64 Searcher, Better Commodore Input, Using The Function Keys, Simple Answers To Common Questions, HOTWARE, VICreations — Understanding Random Numbers.

OCTOBER 1983: The Anatomy Of Computers, Telegaming Today And Tomorrow, Commodore's Public-Domain Programs, Oil Tycoon, Re-Beep, product reviews, Aardvark Attack, Word Match, A SHIFTy Solution: The WAIT Command, Program Transfers, Machine Language For Beginners, Improved Paddle Reader Routine, How To Use Tape And Disk Files, Understanding 64 Sound — Part 1, Speeding Up The VIC, Simple Answers To Common Questions, HOTWARE, Horizons 64 — Improving 64 Video Quality, VICreations — Using The VIC's Clock, News & Products.

NOVEMBER 1983: Binary Numbers — Part 1, Getting Started With A Disk Drive — Part 1, Chicken Little, Martian Prisoner, product reviews, Munchmath, VIC Super Expander Graphics, 64 Aardvark Attack, 64 Timepiece, Connect The Dots, Custom Characters For VIC/64, Making Custom Characters On The 64, Making Custom Characters On The VIC, VIC/64 Program Lifesaver, Understanding 64 Sound — Part 2, Merging Programs On The 64, Tutorial On DATA, READ, RESTORE Statements, One-Touch Commands For The 64, VIC/64 Disk Defaulter, Machine Language For Beginners, Simple Answers To Common Questions, HOTWARE, VICreations — Animation With Custom Characters, Horizons 64 — Software And Hardware Reviews, News & Products, Automatic Proofreader.

Back issues of July, August, and September 1983 are $2.50 each. Issues from October forward are $3. Bulk rates are 6 issues for $15 or 12 issues for $30. All prices include freight in the U.S. Outside the U.S. add $1 per magazine order for surface postage. $4 per magazine for air mail postage. ALL BACK ISSUES ARE SUBJECT TO AVAILABILITY.

In the Continental U.S. call
TOLL FREE 800-334-0868
(in North Carolina call 919-275-9809)

Or write to:
COMPUTE!'s Gazette for Commodore Back Issues
P.O. Box 5406
Greensboro, North Carolina, 27403, USA

Prepayment required in U.S. funds. MasterCard, VISA, and American Express accepted.

North Carolina residents please add 4% sales tax.

COMMODORE 64 SOFTWARE

Broderbund	
Choplifter (CT)	30.40
Sea Fox (CT)	27.00
Serpentine (CT)	27.00
David's Midnight Magic (D)	27.00
Sky Blazer (D)	27.00
A.E. (D)	27.00
Load Runner (D)	27.00
Commodore	
Assembler 64 (D)	16.90
Logo (D)	47.90
Pilot (D)	47.90
Pet Emulator (D)	16.90
Screen Editor (D;	16.90
Bonus Pack (D,C)	16.90
CP/M 2.2 Operating System (CT)	69.00
Super Expander VSP (CT)	16.90
Easy Finance (1-5) (D)	19.35
Easy Calc 64 (D)	73.75
The Manager (D)	43.00
Easy Script (D)	43.00
Easy Mail 64 (D)	16.90
Easy Spell 64 (D)	16.90
Word/Name Machine (D)	16.90
Intro to Basic I (C)	19.35
Gortek & The Microchips (C)	24.80
Easy Lesson/Easy Quiz (D)	16.90
Music Machine (CT)	16.90
Codewriter (D)	47.90
Zork 1,2,3 (D)	29.50
Inventory Mgmt. (D)	43.00
Payroll/Checkwriting (D)	43.00
Accts. Payable (D)	43.00
Accts. Receivable (D)	43.00
General Ledger (D)	43.00

Continental	
The Home Accountant	50.72
Creative Software	
Car Costs	(C) 10.15 (D) 13.50
Decision Maker	(C) 10.15 (D) 13.50
Household Finance	(C) 13.50 (D) 16.90
Home Inventory	(C) 10.15 (D) 13.50
Loan Analyzer	(C) 10.15 (D) 13.50
Moon Dust (CT)	23.65
Astrobiltz (CT)	23.65

Trashman (CT)	23.65
Save New York! (CT)	23.65
Datasoft	
Moonshuttle (D, C)	20.30
Poo Yan (C, D)	20.30
Genesis (D)	27.00
O'Riley's Mine (D)	20.30
Epyx	
Temple of Apshai (D)	27.00

Upper Reaches of Apshai (D)	13.55
Curse of Ra (D)	13.55
Sword of Fargoal (D)	20.30
Jumpman (D, C)	27.00
Hes Software	
Hes Mon 64 (CT)	27.00
Turtle Graphics II (CT)	40.60
Hes Writer 64 (CT)	30.45
Gridrunner (CT)	20.25
Retro Ball (CT)	20.25

Benji Space Rescue (D)	30.45
Coco (D, C)	27.00
Micro Prose	
Floyd of the Jungle (D)	20.80
Hellcat Ace (D)	20.80
Sierra On Line	
Frogger (D, C)	23.65
New Jawbreaker (D)	20.30
Crossfire (D)	20.30
Sirius Software	
Squish 'Em (D)	23.65
Repton (D)	27.00
Blade/Blackpoole (D)	27.00
Critical Mass (D)	27.00
Type Attack (D)	27.00
Spinnaker	
Face Maker (D)	23.65
Hey Diddle Diddle (D)	20.30
Kindercomp (D)	20.30
Snooper Troops 1 (D)	27.00
Fraction Fever (D)	23.65
Amazing Thing (D)	27.00
Synapse	
Ft. Apocalypse (D, C)	23.70
Protector (D, C)	23.70
Survivor (D, C)	23.70
Shamus (D, C)	23.70
Timeworks	
Dungeons of Algebra Dragons (D, C)	19.10
Robbers of the Lost Tomb (D, C)	19.10
Wall Street (D, C)	19.10
Money Manager (D, C)	19.10
Electronic Checkbook (D, C)	19.10
Word Pro 3 +	**65.00**

VIC 20, T.I. 99 4A, RADIO SHACK, IBM-PC SOFTWARE LISTS AVAILABLE

commodore	
Commodore 64	239.95
1541 Disk Drive	239.95
1530 Datasette	61.30
1525 Printer	214.75
1701 Color Monitor	239.95
1600 Modem	50.50
Parallel Interface	60.00
3 Port Expander	30.00
6 Port Expander	75.00
64 Prog. Ref. Guide	17.00
Diskettes	
BASF 5¼" SSDD 2 pak	5.50
BASF Soft Box (10)	23.80
Joysticks	
Pointmaster	10.95
Pointmaster Pro	18.55
Fire Control	7.85
Wico Command Ctrl.	19.50
Wico "Boss"	13.50
Wico Red Ball	20.75

COLECO	
Coleco	
Adam Computer System	595.00
Adam Computer Module	445.00

To order call 1-800-527-8698 and send certified checks, money orders or personal checks (allow 2 weeks to clear), or use your VISA, Master Card or American Express. Inside Texas call 1-800-442-8717. Include $2 for postage and handling. (C.O.D. orders add $1.50) UPS Blue Label $3, Canada $6. Other countries include 10% for P & H. All products factory sealed with manufacturer's warranty. All returns require R.A.#. Prices subject to change without notice. Order desk hours: Mon-Fri 8-5, Sat 9-1 CST.

For additional information and to order, call Toll free:

Outside Texas **1-800-527-8698**

Inside Texas **1-800-442-8717**

SoftWare Warehouse Outlet

802 N. HIGH
SUITE H
LONGVIEW, TX.
75601

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, [k], 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}	C 7	
{HOME}	CLR/HOME		{PUR}	CTRL 5		{8}	C 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}	C 1		{F4}	f4	
{RVS}	CTRL 9		{2}	C 2		{F5}	f5	
{OFF}	CTRL 0		{3}	C 3		{F6}	f6	
{BLK}	CTRL 1		{4}	C 4		{F7}	f7	
{WHT}	CTRL 2		{5}	C 5		{F8}	f8	
{RED}	CTRL 3		{6}	C 6				

The Automatic Proofreader

"The Automatic Proofreader" will help you type in program listings from COMPUTE!'s Gazette without typing mistakes. It is a short error-checking program that hides itself in memory. When activated, it lets you know immediately after typing a line from a program listing if you have made a mistake. Please read these instructions carefully before typing any programs in COMPUTE!'s Gazette.

Preparing The Proofreader

1. Using the listing below, type in the Proofreader. The same program works on both the VIC-20 and Commodore 64. Be very careful when entering the DATA statements — don't type an l instead of a 1, an O instead of a 0, extra commas, etc.

2. SAVE the Proofreader on tape or disk at least twice *before running it for the first time*. This is very important because the Proofreader erases this part of itself when you first type RUN.

3. After the Proofreader is SAVEd, type RUN. It will check itself for typing errors in the DATA statements and warn you if there's a mistake. Correct any errors and SAVE the corrected version. Keep a copy in a safe place — you'll need it again and again, every time you enter a program from COMPUTE!'s Gazette.

4. When a correct version of the Proofreader is RUN, it activates itself. You are now ready to enter a program listing. If you press RUN/STOP-RESTORE, the Proofreader is disabled. To reactivate it, just type the command SYS 886 and press RETURN.

Using The Proofreader

All VIC and 64 listings in COMPUTE!'s Gazette now have a *checksum number* appended to the end of each line, for example ":rem 123". *Don't enter this statement when typing in a program.* It is just for your information. The rem makes the number harmless if someone does type it in. It will, however, use up memory if you enter it, and it will confuse the Proofreader, even if you entered the rest of the line correctly.

When you type in a line from a program listing and press RETURN, the Proofreader displays a number at the top of your screen. *This checksum number must match the checksum number in the printed listing.* If it doesn't, it means you typed the line differently than the way it is listed. Immediately recheck your typing. Remember, don't type the rem statement with the checksum number; it is published only so you can check it against the number which appears on your screen.

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.

Special Tape SAVE Instructions

When you're done typing a listing, you must disable the Proofreader before SAVEing the program on tape. Disable the Proofreader by pressing RUN/STOP-RESTORE (hold down the RUN/STOP key and sharply hit the RESTORE key). This procedure is not necessary for disk SAVEs, *but you must disable the Proofreader this way before a tape SAVE.*

SAVE to tape erases the Proofreader from memory, so you'll have to LOAD and RUN it again if you want to type another listing. SAVE to disk does not erase the Proofreader.

Replace Original Proofreader

If you typed in the original version of the Proofreader (October 1983 issue), you should replace it with the improved version below. We added a POKE to the original version to protect it from being erased when you LOAD another program from tape. The POKE does protect the Proofreader, and the Proofreader itself was not affected. However, a quirk in the VIC-20's operating system means that programs typed in with the Proofreader and SAVEd on tape cannot be LOADed properly later. If you LOAD a program SAVEd while the Proofreader was in memory, you see ?LOAD ERROR. This applies only to VIC tape SAVEs (disk SAVEs work OK, and the quirk was fixed in the Commodore 64).

If you have a program typed in with the original Proofreader and SAVEd on tape, follow this special LOAD procedure:

1. Turn the power off, then on.
2. LOAD the program from tape (disregard the ?LOAD ERROR).
3. Enter: POKE 45,PEEK(174):POKE 46,PEEK(175):CLR
4. ReSAVE the program to tape.

The program will LOAD fine in the future. We strongly recommend that you type in the new version of the Proofreader and discard the old one.

Automatic Proofreader For VIC And 64

```
100 PRINT"{CLR}PLEASE WAIT...":FORI=886TO
    1018:READA:CK=CK+A:POKEI,A:NEXT
110 IF CK<>17539 THEN PRINT"{DOWN}YOU MAD
    E AN ERROR":PRINT"IN DATA STATEMENTS.
    ":END
120 SYS886:PRINT"{CLR}{2 DOWN}PROOFREADER
     ACTIVATED.":NEW
886 DATA 173,036,003,201,150,208
892 DATA 001,096,141,151,003,173
898 DATA 037,003,141,152,003,169
904 DATA 150,141,036,003,169,003
910 DATA 141,037,003,169,000,133
916 DATA 254,096,032,087,241,133
922 DATA 251,134,252,132,253,008
928 DATA 201,013,240,017,201,032
934 DATA 240,005,024,101,254,133
940 DATA 254,165,251,166,252,164
946 DATA 253,040,096,169,013,032
952 DATA 210,255,165,214,141,251
958 DATA 003,206,251,003,169,000
964 DATA 133,216,169,019,032,210
970 DATA 255,169,018,032,210,255
976 DATA 169,058,032,210,255,166
982 DATA 254,169,000,133,254,172
988 DATA 151,003,192,087,208,006
994 DATA 032,205,189,076,235,003
1000 DATA 032,205,221,169,032,032
1006 DATA 210,255,032,210,255,173
1012 DATA 251,003,133,214,076,173
1018 DATA 003
```

Bug-Swatter:
Modifications And Corrections

• **Important:** If you are still using the original version of the "Automatic Proofreader" (October), please switch to the improved version published last month and in this issue. Carefully read the new instructions. VIC-20 tape users experiencing problems with the original version of the Proofreader should also read the corrective measures in the new Proofreader article.

• In the Commodore 64 version of "Oil Tycoon" (October), a comma is missing after the word "space" in line 130 on page 147. The program works fine without the comma, but since the Automatic Proofreader expects to see it, the checksum number won't match when you type the line. The comma was mistaken for a smudge of ink by our printers and removed from the page.

• The article "Potholes" for the VIC-20 and Commodore 64 (September) stated that the street commissioner's car leaves behind new potholes as it travels. This was in error. Once you clear a pothole from a street, it is not replaced unless you collide with the street commissioner's car and trigger a new screen. Also, many VIC readers called to say there were missing lines from the initialization program (Program 1), because the line numbers do not match the program description on page 66. The description is in error; the program works OK.

Reader Harry Metz sent us the following modification for the 64 version of Potholes. By adding these lines, the game works with a joystick plugged into port two instead of the keyboard:

```
300 JV=PEEK(56320)
305 JV=15-(JV AND 15)
310 IF JV=0 THEN HA=4:RETURN
315 IF JV=1 THEN P=0:GOTO 360
320 IF JV=2 THEN P=1:GOTO 360
330 IF JV=4 THEN P=2:GOTO 360
340 IF JV=8 THEN P=3:GOTO 360
```

• To modify "States & Capitals Tutor" (September) for disk, change the second number in the OPEN statements in line 5 (Program 1) and line 40 (Program 2):

```
5 OPEN1,8,0,"STATES"
40 OPEN1,8,1,"STATES"
```

• Reader Joel M. Rubin has modified "Commodore 64 Hi-Res Graphics Made Simple" (August) to speed up the initialization. The following three lines create a machine language subroutine that cuts the waiting time from 38 seconds to four seconds when you first type RUN:

```
30 FORI=828TO851:READN:POKEI,N:NEXT:SYS82
   8
32 DATA160,0,132,97,169,160,133,98,177,97
   ,145,97,200,208,249,230,98
34 DATA165,98,201,192,208,241,96
```

• The Commodore 64 version of "Cylon Zap" (August) lists the high scorers in the wrong order. Make this change:

```
2155 IFSC>=W2ANDSC<W1THENA5$=A4$:A4$=A3$:
     A3$=A2$:W5=W4:W4=W3:W3=W2:W2=SC:GO27
     40
```

Bowling Champ

(Article on page 84.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

Program 1:

Bowling Champ — VIC Version

```
10 POKE36878,15:L(1)=7747:L(2)=7791:L(3)=
   7835:C$(1)="{HOME}{10 DOWN}{6 RIGHT}"
                                  :rem 155
11 C$(2)=C$(1)+"{11 RIGHT}":C$(3)=C$(1)+"
   {DOWN}":C$=C$(1)               :rem 178
12 SC=36879:CO=30720:V1=36876:SC(1)=152:S
   C(2)=10:SC(3)=126              :rem 154
20 POKESC,27                      :rem 188
110 PRINT"{CLR}{BLU}"C$"{5 UP}{RIGHT}BOWL
    ING!"                         :rem 229
112 PRINT"{5 DOWN}HOW MANY PLAYERS (1-3)
                                  :rem 189
113 GETA$:A=VAL(A$):IFA<1ORA>3THEN113
                                  :rem 185
115 X$="NAMES":IF A=1 THEN X$="NAME"
                                  :rem 205
118 PRINT"{CLR}{DOWN}TYPE IN YOUR ";X$
                                  :rem 238
120 FORX=1TOA                      :rem 36
121 PRINT"{DOWN}PLAYER"X":";       :rem 84
122 INPUTA$(X)                     :rem 51
123 A$(X)=LEFT$(A$(X),5):NEXT     :rem 105
128 PRINT"{CLR}{UP}{RVS} {BLU}1 2 3 4 5 6
     7 8 9 10 {OFF}{PUR} ";:FORX=1TO10:PR
    INT"{RVS}1{OFF}2";:NEXT:PRINT"{RVS}3
    {OFF}";                        :rem 54
132 PRINT"{BLU} DDDDDDDDDDDDDDDDDDDDD
```

```
{DOWN}DDDDDDDDDDDDDDDDDDDDD":ON-(A=1)
GOTO138                          :rem 152
134 PRINT" DDDDDDDDDDDDDDDDDDDDD":ON-(A=2
)GOTO138                          :rem 87
136 PRINT" DDDDDDDDDDDDDDDDDDDDD  :rem 93
138 PRINTLEFT$(C$,11)+A$(1)":"    :rem 78
146 IFA>1THENPRINTTAB(10)+"{RIGHT}{UP}"+A
$(2)":"                          :rem 205
150 IFA>2THENPRINTA$(3)":"       :rem 249
154 PRINTLEFT$(C$,11)"{2 DOWN}{BLU}FFFFFF
FFFFFFFFFFFFFFF{DOWN}{RIGHT}{8 DOWN}E
EEEEEEEEEEEEEEEEEEE{2 UP}         :rem 94
160 FORQ=1TO10                    :rem 65
166 FORZ9=1TOA:POKESC,SC(Z9)      :rem 14
167 FORX=1TO10:READV:POKEV,81:POKEV+CO,6:
NEXT:RESTORE                       :rem 4
169 J=0:G=0                       :rem 69
170 GOSUB430:GOSUB550:P=L(Z9):GOSUB1000:L
(Z9)=P                           :rem 108
172 GOSUB1200                    :rem 221
174 ON -(L(Z9)/2=INT(L(Z9)/2))GOTO169
                                  :rem 43
175 IF(PEEK(L(Z9)-1)=47ANDQ=10)=0THEN195
                                  :rem 38
178 PRINTLEFT$(C$,11)+"{7 DOWN}"+A$(Z9)+"
, THROW"                          :rem 75
179 PRINT"ONE MORE!"             :rem 168
180 FORX=1TO3000:NEXT             :rem 37
182 PRINTLEFT$(C$,11)+"{7 DOWN}"+"
{13 SPACES}"                      :rem 18
183 PRINT"{13 SPACES}"           :rem 109
184 FORX=1TO10:READV:POKEV,81:POKEV+CO,6:
NEXT:RESTORE                       :rem 3
190 J=0:GOSUB430:GOSUB550:T(Z9)=T(Z9)+J:P
RINTC$(Z9);T(Z9)                 :rem 215
192 K=J+48:IFJ+PEEK(L(Z9)-1)-224=10THENK=
47                               :rem 204
193 IFK=58THENK=152              :rem 112
194 POKEL(Z9),K:POKEL(Z9)+CO,4:GOTO225
                                  :rem 54
195 U=0:IF(PEEK(L(Z9)-2)=152ANDQ=10)=0THE
N225                              :rem 76
198 PRINTLEFT$(C$,11)+"{7 DOWN}"+A$(Z9)+"
, THROW"                          :rem 77
199 PRINT"TWO MORE!"             :rem 194
202 FORX=1TO3000:NEXT             :rem 32
203 PRINTLEFT$(C$,11)+"{7 DOWN}"+"
{13 SPACES}"                      :rem 12
205 PRINT"{13 SPACES}"           :rem 104
206 L(Z9)=L(Z9)-1                :rem 147
207 FORX=1TO10:READV:POKEV,81:POKEV+CO,6:
NEXT:RESTORE                     :rem 255
209 J=0:GOSUB430:GOSUB550:T(Z9)=T(Z9)+J:P
RINTC$(Z9);T(Z9)                 :rem 216
210 K=J+176:IFK=186THENK=152     :rem 109
211 POKEL(Z9),K:POKEL(Z9)+CO,4:L(Z9)=L(Z9
)+1                               :rem 83
213 IFPEEK(L(Z9)-1)=152THENFORX=1TO10:REA
DV:POKEV,81:POKEV+CO,6:NEXT:RESTORE
                                 :rem 147
214 U=U+1:ONUGOTO209,225         :rem 159
225 NEXTZ9:NEXTQ                  :rem 53
230 GOTO882                      :rem 112
430 N=8123:I=22                   :rem 20
440 POKEN,32:N=N+I:IFN<7988ORN>8124THENI=
-I                               :rem 135
460 POKEN+30720,0-(PEEK(SC)=10):POKEN,81:
GETA$:ON-(A$="")GOTO440:RETURN
                                 :rem 179
550 N=N+1:GETA$                   :rem 78
554 IFPEEK(N)<>81THEN595         :rem 166
558 Q2=N:GOSUB610                  :rem 1
560 POKEV1,150:POKEN-1,32:POKEN+CO,0-(PEE
K(SC)=10):POKEN,81:POKEV1,0      :rem 73
562 FORW=1TO3                     :rem 31
566 IFPEEK(N-21*W)=81THENQ2=N-21*W:GOSUB6
10                               :rem 74
569 IFPEEK(N+23*W)=81THENQ2=N+23*W:GOSUB6
10                               :rem 77
572 NEXT                         :rem 221
595 H=H+1:POKEV1,150:POKEN-1,32:POKEN+CO,
0-(PEEK(SC)=10):POKEN,81:POKEV1,0
                                 :rem 180
597 IFH=18THEN612                :rem 234
600 FORSS=1TO50:NEXT:GOTO550      :rem 31
610 J=J+1:POKEV1,210:POKEQ2,32:FORK=1TO50
:NEXT:POKEV1,0:FORK=1TO40:NEXT:RETURN
                                  :rem 11
612 H=0:POKEN,32:POKEN-1,32:RETURN:rem 86
882 PRINTC$;"{LEFT}{DOWN}{2 LEFT}{2 DOWN}
{PUR}FINAL SCORES{DOWN}{BLU}" :rem 36
883 PRINT"{5 RIGHT}"A$(1);T(1):IFA>1THENP
RINT"{RIGHT}{DOWN}{4 RIGHT}"A$(2);T(2
)                                 :rem 18
884 IFA=3THENPRINT"{DOWN}{5 RIGHT}";A$(3)
;T(3)                            :rem 189
887 PRINT"{DOWN}{3 RIGHT}AGAIN (Y/N)?"
                                 :rem 166
894 GETA$:IFA$=""THEN{5 SPACES}894
                                 :rem 109
895 IFA$="Y"THENRUN              :rem 152
896 PRINT"{CLR}":POKE36879,27:END :rem 43
1000 G=J:IFP/2<>INT(P/2)THENG=G+176
{5 SPACES}                        :rem 51
1002 IFG=186THENG=152            :rem 192
1004 IFP/2=INT(P/2)THENG=G+48{11 SPACES}
                                 :rem 192
1006 IFG+PEEK(P-1)-224=10THENG=47:rem 109
1012 POKEP,G:POKEP+CO,4:IFG=152THENP=P+1:
G=0                              :rem 199
1100 P=P+1:RETURN                  :rem 21
1200 REM ** SCORING *              :rem 58
1201 T(Z9)=T(Z9)+J               :rem 230
1205 T(Z9)=T(Z9)-J*(PEEK(L(Z9)-2)=47)
                                  :rem 20
1210 T(Z9)=T(Z9)-10*(PEEK(L(Z9)-3)=47ANDP
EEK(L(Z9)-2)=152)                :rem 213
1220 IFL(Z9)=7746ORL(Z9)=7790ORL(Z9)=7834
THEN1290                          :rem 93
1225 T(Z9)=T(Z9)-J*(PEEK(L(Z9)-4)=152)
                                  :rem 69
1227 T(Z9)=T(Z9)-J*(PEEK(L(Z9)-3)=152)
                                  :rem 70
1228 T(Z9)=T(Z9)-J*((PEEK(L(Z9)-5)=152AND
PEEK(L(Z9)-3)=152))               :rem 72
1230 T(Z9)=T(Z9)-J*(PEEK(L(Z9)-6)=152 AND
 PEEK(L(Z9)-4)=152ANDPEEK(L(Z9)-2)=1
52)                              :rem 159
1290 PRINTC$(Z9);T(Z9)             :rem 23
1300 RETURN                      :rem 164
2200 DATA 8007,8028,8049,8051,8070,8072,8
093,8095,8116,8139               :rem 157
```

Program 2:

Bowling Champ — 64 Version

```
10 L(1)=1193:L(2)=1273:L(3)=1353:C$(1)="
{HOME}{11 DOWN}{8 RIGHT}"        :rem 186
11 C$(2)=C$(1)+"{13 RIGHT}":C$(3)=C$(2)+"
{13 RIGHT}":C$=C$(1)              :rem 85
```

```
12 BO=53280:SC=53281:CO=54272:SC(1)=15:SC
   (2)=0:SC(3)=7:BO(1)=13:BO(2)=2:rem 120
15 BO(3)=9                          :rem 241
17 FORT=COTOCO+24:POKET,0:NEXT:POKECO+24,
   15:POKECO+5,17:POKECO+6,241:POKECO,30
                                    :rem 128
18 POKECO+1,10                      :rem 19
110 POKEBO,6:POKE SC,7:PRINT"{CLR}{BLU}"C
   $"{5 UP}{8 RIGHT}BOWLING!"       :rem 110
112 PRINT"{5 DOWN}{9 RIGHT}HOW MANY PLAYE
   RS (1-3)                         :rem 194
113 GETA$:A=VAL(A$):IFA<1ORA>3THEN113
                                    :rem 185
115 X$="NAMES":IF A=1 THEN X$="NAME"
                                    :rem 205
118 PRINT"{CLR}{3 DOWN}{4 RIGHT}TYPE IN Y
   OUR ";X$                         :rem 132
120 FORX=1TOA                       :rem 36
121 PRINT"{DOWN}{5 RIGHT}PLAYER"X":";
                                    :rem 229
122 INPUTA$(X)                      :rem 51
123 A$(X)=LEFT$(A$(X),6):NEXT       :rem 106
128 PRINT"{CLR}{DOWN}{8 RIGHT}{RVS} {BLU}
   1 2 3 4 5 6 7 8 9 10{2 SPACES}{OFF}
   {WHT} ":PRINT"{9 RIGHT}";        :rem 73
129 FORX=1TO10:PRINT"{RVS}1{OFF}2";:NEXT:
   PRINT"{RVS}3{OFF}"               :rem 245
132 PRINTTAB(8)"{BLU} DDDDDDDDDDDDDDDDDDD
   DD":PRINTTAB(9)"{DOWN}DDDDDDDDDDDDDDD
   DDDDDD"                          :rem 139
133 ON-(A=1)GOTO138                 :rem 54
134 PRINTTAB(8)" {DOWN}DDDDDDDDDDDDDDDDDD
   DDD":ON-(A=2)GOTO138             :rem 200
136 PRINTTAB(8)" {DOWN}DDDDDDDDDDDDDDDDDD
   DDD                              :rem 206
138 PRINTLEFT$(C$,12)+" "+A$(1)":"
                                    :rem 190
146 IFA>1THENPRINTTAB(14)+"{UP}"+A$(2)":"
                                    :rem 180
150 IFA>2THENPRINTTAB(27)"{UP}"+A$(3)":"
                                    :rem 138
154 PRINTLEFT$(C$,12)"{2 DOWN}{BLU}FFFFFF
   FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF"
                                    :rem 108
156 PRINT"{9 DOWN}EEEEEEEEEEEEEEEEEEEEEE
   EEEEEEEEEEEEEEEE"                :rem 9
160 FORQ=1TO10                      :rem 65
166 FORZ9=1TOA:POKESC,SC(Z9):POKEBO,BO(Z9
   )                                :rem 169
167 FORX=1TO10:READV:POKEV,81:POKEV+CO,6:
   NEXT:RESTORE                     :rem 4
169 J=0:G=0                         :rem 69
170 GOSUB430:GOSUB550:P=L(Z9):GOSUB1000:L
   (Z9)=P                           :rem 108
172 GOSUB1200                       :rem 221
174 ON -(L(Z9)/2=INT(L(Z9)/2))GOTO169
                                    :rem 43
175 IF(PEEK(L(Z9)-1)=47ANDQ=10)=0THEN195
                                    :rem 38
178 PRINTLEFT$(C$,12)+"{7 DOWN}"+A$(Z9)+"
   , THROW ONE MORE!"               :rem 130
180 FORX=1TO3000:NEXT               :rem 37
182 PRINTLEFT$(C$,12)+"{7 DOWN}"+"
   {23 SPACES}"                     :rem 19
183 REM{2 SPACES}PRINT"{13 SPACES}"
                                    :rem 81
184 FORX=1TO10:READV:POKEV,81:POKEV+CO,6:
   NEXT:RESTORE                     :rem 3
190 J=0:GOSUB430:GOSUB550:T(Z9)=T(Z9)+J:P
   RINTC$(Z9);T(Z9)                 :rem 215
192 K=J+48:IFJ+PEEK(L(Z9)-1)-224=10THENK=
   47                               :rem 204
193 IFK=58THENK=152                 :rem 112
194 POKEL(Z9),K:POKEL(Z9)+CO,4:GOTO225
                                    :rem 54
195 U=0:IF(PEEK(L(Z9)-2)=152ANDQ=10)=0THE
   N225                             :rem 76
198 PRINTLEFT$(C$,12)+"{7 DOWN}"+A$(Z9)+"
   , THROW TWO MORE!"               :rem 156
202 FORX=1TO3000:NEXT               :rem 32
203 PRINTLEFT$(C$,12)+"{7 DOWN}"+"
   {23 SPACES}"                     :rem 13
206 L(Z9)=L(Z9)-1                   :rem 147
207 FORX=1TO10:READV:POKEV,81:POKEV+CO,6:
   NEXT:RESTORE                     :rem 255
209 J=0:GOSUB430:GOSUB550:T(Z9)=T(Z9)+J:P
   RINTC$(Z9);T(Z9)                 :rem 216
210 K=J+176:IFK=186THENK=152        :rem 109
211 POKEL(Z9),K:POKEL(Z9)+CO,4:L(Z9)=L(Z9
   )+1                              :rem 83
213 IFPEEK(L(Z9)-1)=152THENFORX=1TO10:REA
   DV:POKEV,81:POKEV+CO,6:NEXT:RESTORE
                                    :rem 147
214 U=U+1:ONUGOTO209,225            :rem 159
225 NEXTZ9:NEXTQ                    :rem 53
230 GOTO882                         :rem 112
430 N=1827:I=40                     :rem 24
440 POKEN,32:N=N+I:IFN<1624ORN>1868THENI=
   -I                               :rem 124
460 POKEN+CO,-(PEEK(SC)=240):POKEN,81:GET
   A$:ON-(A$="")GOTO440:RETURN      :rem 78
550 N=N+1:GETA$                     :rem 78
554 IFPEEK(N)<>81THEN595            :rem 166
558 Q2=N:GOSUB610                   :rem 1
560 POKECO+4,17:POKEN-1,32:POKEN+CO,-(PEE
   K(SC)=240):POKEN,81:POKECO+4,16
                                    :rem 43
562 FORW=1TO3                       :rem 31
566 IFPEEK(N-39*W)=81THENQ2=N-39*W:GOSUB6
   10                               :rem 92
569 IFPEEK(N+41*W)=81THENQ2=N+41*W:GOSUB6
   10                               :rem 77
572 NEXT                            :rem 221
595 POKECO+4,17:H=H+1:POKEN-1,32:POKEN+CO
   ,-(PEEK(SC)=240):POKEN,81:POKECO+4,16
                                    :rem 150
597 IF H=36 THEN 612                :rem 234
600 GOTO550                         :rem 105
610 J=J+1:POKECO+4,33:POKEQ2,32:FORT=1TO5
   0:NEXT:POKECO+4,32:RETURN        :rem 150
612 H=0:POKEN,32:POKEN-1,32:RETURN:rem 86
882 PRINTC$;"{3 DOWN}{PUR}FINAL SCORES
   {DOWN}{BLU}"                     :rem 77
883 PRINT"{9 RIGHT}"A$(1);T(1):IFA>1THENP
   RINT"{DOWN}{9 RIGHT}"A$(2);T(2)
                                    :rem 250
884 IFA=3THENPRINT"{DOWN}{9 RIGHT}";A$(3)
   ;T(3)                            :rem 49
887 PRINT"{DOWN}{7 RIGHT}AGAIN (Y/N)?"
                                    :rem 26
894 GETA$:IFA$=""THEN{5 SPACES}894
                                    :rem 109
895 IFA$="Y"THENRUN                 :rem 152
896 SYS2048                         :rem 116
1000 G=J:IFP/2<>INT(P/2)THENG=G+176
                                    :rem 51
1002 IFG=186THENG=152               :rem 192
1004 IFP/2=INT(P/2)THENG=G+48       :rem 192
1006 IFG+PEEK(P-1)-224=10THENG=47:rem 109
1012 POKEP,G:POKEP+CO,4:IFG=152THENP=P+1:
   G=0                              :rem 199
```

```
1100 P=P+1:RETURN                          :rem 21
1200 REM ** SCORING *                      :rem 58
1201 T(Z9)=T(Z9)+J                         :rem 230
1205 T(Z9)=T(Z9)-J*(PEEK(L(Z9)-2)=47)
                                           :rem 20
1210 T(Z9)=T(Z9)-10*(PEEK(L(Z9)-3)=47ANDP
     EEK(L(Z9)-2)=152)                     :rem 213
1220 IFL(Z9)=1272ORL(Z9)=1352ORL(Z9)=1432
     THEN1290                              :rem 57
1225 T(Z9)=T(Z9)-J*(PEEK(L(Z9)-4)=152)
                                           :rem 69
1227 T(Z9)=T(Z9)-J*(PEEK(L(Z9)-3)=152)
                                           :rem 70
1228 T(Z9)=T(Z9)-J*((PEEK(L(Z9)-5)=152AND
     PEEK(L(Z9)-3)=152))                   :rem 72
1230 T(Z9)=T(Z9)-J*(PEEK(L(Z9)-6)=152 AND
      PEEK(L(Z9)-4)=152ANDPEEK(L(Z9)-2)=1
     52)                                   :rem 159
1290 PRINTC$(Z9);T(Z9)                     :rem 23
1300 RETURN                                :rem 164
2200 DATA 1661,1700,1739,1741,1778,1780,1
     819,1821,1860,1901                    :rem 129
```

Space Duel

(Article on page 80.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

Program 1: Space Duel For VIC-20

```
0 PRINT"{CLR}":FORI=6656TO6891:READA:POKE
  I,A:NEXT                                 :rem 188
1 GOSUB200:PRINT"{CLR}"                    :rem 225
3 POKE4,0:POKE2,0:POKE3,0                  :rem 225
4 FORI=7167TO7600:POKEI,0:NEXTI:POKE36869
  ,255                                     :rem 247
7 FORI=1TO8:POKE7662,0:NEXT                :rem 195
8 A$="{2 RIGHT}{PUR}222222222222222222
  {2 RIGHT}"                               :rem 178
9 C$="{2 RIGHT}{PUR}333333333333333333
  {2 RIGHT}"                               :rem 199
10 B$="{HOME}{22 DOWN}"                    :rem 209
11 D$="{2 RIGHT}{BLK}{18 SPACES}{2 RIGHT}
   ":POKE36879,8:F=80                      :rem 82
30 FORI=7747TO8099STEP22:POKEI,J:J=J+1:NE
   XT                                      :rem 206
35 FORI=7747+30720TO8099+30720STEP22:POKE
   I,3:NEXT                                :rem 163
40 J=33:FORI=7766TO8118STEP22:POKEI,J:J=J
   +1:NEXT                                 :rem 239
45 FORI=7766+30720TO8118+30720STEP22:POKE
   I,7:NEXT                                :rem 161
46 PRINT"{HOME}{RVS}{WHT}SCORE:"           :rem 27
50 SYS6656                                 :rem 59
52 PRINT"{HOME}{6 RIGHT}{RVS}{CYN}"PEEK(2
   )"{LEFT} ";TAB(17);"{YEL}"PEEK(3)"
   {LEFT} "                                :rem 165
54 FORT=1TO30:NEXT                         :rem 145
55 SYS6811                                 :rem 57
56 ONPEEK(4)GOSUB80                        :rem 154
57 SYS6864:ONPEEK(5)GOSUB100               :rem 214
58 SYS6772                                 :rem 66
60 GOTO50                                  :rem 4
80 A=PEEK(0)+33+3                          :rem 123
82 B=INT(A/8)-1:D=(A-B*8)+2                :rem 166
84 POKE7566+D,255                          :rem 170
90 IFD<7THENPRINTLEFT$(B$,B);A$:SYS6832:P
   RINTLEFT$(B$,B);D$:POKE7566+D,0
                                           :rem 117
91 H=PEEK(2)-1:IFH>-1THENPOKE2,H:GOTO93
                                           :rem 133
92 H=0                                     :rem 32
93 IFD>7THENPRINTLEFT$(B$,B+1);C$:SYS6832
   :PRINTLEFT$(B$,B+1);D$:POKE7566+D,0
                                           :rem 52
94 IFPEEK(7432+PEEK(0)+3)<>0THENGOSUB120
                                           :rem 93
95 RETURN                                  :rem 78
100 A=PEEK(1)+33+3                         :rem 165
102 B=INT(A/8)-1:D=(A-B*8)+2               :rem 207
103 POKE7566+D,255                         :rem 210
104 H=PEEK(3)-1:IFH>-1THENPOKE3,H:GOTO106
                                           :rem 221
105 H=0                                    :rem 75
106 IFD<7THENPRINTLEFT$(B$,B);A$:SYS6832:
    PRINTLEFT$(B$,B);D$:POKE7566+D,0
                                           :rem 163
107 IFD>7THENPRINTLEFT$(B$,B+1);C$:SYS683
    2:PRINTLEFT$(B$,B+1);D$:POKE7566+D,0
                                           :rem 96
109 IFPEEK(7168+PEEK(1)+3)<>0THENGOSUB140
                                           :rem 147
110 RETURN                                 :rem 114
120 POKE36878,15                           :rem 100
121 FORI=255TO130STEP-2:POKE36877,I:POKE3
    6879,INT(RND(1)*7)+8:NEXT              :rem 225
122 POKE2,PEEK(2)+10                       :rem 86
123 IFPEEK(2)=>FTHEN150                    :rem 83
124 POKE36879,8:POKE36877,0:RETURN:rem 41
140 POKE36878,15                           :rem 102
141 FORI=255TO130STEP-2:POKE36877,I:POKE3
    6879,INT(RND(1)*7)+8:NEXT              :rem 227
142 POKE3,PEEK(3)+10                       :rem 90
143 IFPEEK(3)=>FTHEN150                    :rem 86
144 POKE36879,8:POKE36877,0:RETURN:rem 43
150 PRINT"{HOME}{RVS}{WHT}SCORE:" :rem 71
152 PRINT"{HOME}{6 RIGHT}{RVS}{CYN}"PEEK(
    2);TAB(18);"{YEL}"PEEK(3):POKE36877,0
                                           :rem 233
154 POKE36879,8                            :rem 62
156 PRINT"{HOME}{2 DOWN}{RVS}{GRN}GAME OV
    ER!"                                   :rem 73
157 POKE198,0:WAIT198,1:RUN                :rem 103
200 POKE36879,8:POKE36869,240:PRINT"{CLR}
    "                                      :rem 15
210 PRINT"{RVS}{YEL}{23 SPACES}{OFF}
    {4 SPACES}{CYN}SPACE{2 SPACES}DUEL
    {4 SPACES}{YEL} {RVS} {OFF}"; :rem 88
220 PRINT"{RVS}{YEL}{22 SPACES}"  :rem 21
240 PRINT"{4 DOWN}{BLU}{2 SPACES}HIT ANY
    {SPACE}KEY TO PLAY"                    :rem 89
250 POKE198,0:WAIT198,1:RETURN             :rem 76
260 DATA173,8,144,74,133,0,234,170,169,24
    0,157,0,28,232,169,252,157,0,28,232
                                           :rem 208
262 DATA169,14,157                         :rem 174
265 DATA0,28,232,169,59,157,0,28,232,
    169,59,157,0,28,232,169,14,157,0,28,2
    32,169,252                             :rem 116
270 DATA157,0,28,232,169,240,157,0,28,173
    ,9,144,74,133,1,170,169,15,234,157,8,
```

```
    29                                  :rem 161
275 DATA 232,169                         :rem 27
280 DATA63,157,8,29,232,169,112,157
    ,8,29,232,169,220,157,8,29,232,169,22
    0,157,8,29,232                      :rem 221
290 DATA169,112,157,8,29,232,169,63,1
    57,8,29,232,169,15,157,8,29,96,251,4,
    24,66,252                            :rem 84
300 DATA166,0,169,0,160,0,157,0,28,232,20
    0,192,9,208,247,166,1,169,0,160,0
                                         :rem 82
305 DATA157,8,29,232                     :rem 13
310 DATA200,192,9,208,247,96,3,255,179,
    252,81,119,1,111,174,17,145,224,110,2
    40,5,169,0                          :rem 183
320 DATA133,4,96,169,1,133,4,96,253,162,2
    24,56,169,14,141,14,144,162,255,142
                                        :rem 211
325 DATA11,144,202                      :rem 155
330 DATA160,0,200,192,74,208,251,224,128,
    208,241,169,0,141,11,144,96,119,111,1
    59                                  :rem 135
335 DATA163,169                          :rem 27
340 DATA127,141,34,145,174,32,145,169,255
    ,141,34,145,224,119,240,5,169,0,133
                                        :rem 205
345 DATA5,96,169,1                      :rem 175
350 DATA133,5,96,219                     :rem 13
```

Program 2:

Space Duel For Commodore 64

```
49152 :169,055,141,000,208,169,230
49158 :002,141,016,208,169,032,062
49164 :141,002,208,032,070,196,149
49170 :169,147,032,210,255,169,232
49176 :012,141,033,208,169,192,011
49182 :141,248,007,169,193,141,161
49188 :249,007,169,193,141,249,020
49194 :007,169,003,141,021,208,079
49200 :169,000,141,134,002,169,151
49206 :000,141,039,208,169,002,101
49212 :141,040,208,169,000,160,010
49218 :000,145,000,200,192,024,115
49224 :208,249,169,015,141,024,110
49230 :212,169,017,141,005,212,066
49236 :169,246,141,006,212,169,003
49242 :050,141,000,212,141,001,123
49248 :212,169,000,160,000,153,022
49254 :060,003,200,192,060,208,057
49260 :248,169,000,170,168,024,119
49266 :109,025,212,144,004,200,040
49272 :140,060,003,202,208,243,208
49278 :169,000,170,168,024,109,254
49284 :026,212,144,004,200,140,090
49290 :062,003,202,208,243,169,001
49296 :000,205,060,003,240,007,147
49302 :144,005,169,000,141,060,157
49308 :003,169,180,205,060,003,008
49314 :176,005,169,180,141,060,125
49320 :003,169,000,205,062,003,098
49326 :144,005,169,000,141,062,183
49332 :003,169,180,205,062,003,034
49338 :176,005,169,180,141,062,151
49344 :003,024,173,060,003,105,048
49350 :050,141,001,208,024,173,027
49356 :062,003,105,050,141,003,056
49362 :208,056,173,060,003,074,016
49368 :074,074,024,105,001,141,123
49374 :090,003,056,173,062,003,097
49380 :074,074,074,024,105,001,068
49386 :141,092,003,169,000,141,012
49392 :091,003,173,090,003,010,098
49398 :046,091,003,010,046,091,021
49404 :003,010,141,072,003,173,142
49410 :091,003,141,073,003,173,230
49416 :072,003,010,046,091,003,233
49422 :010,046,091,003,024,109,041
49428 :072,003,141,090,003,173,246
49434 :091,003,109,073,003,141,190
49440 :091,003,024,173,090,003,160
49446 :105,005,141,090,003,173,043
49452 :091,003,105,004,141,091,223
49458 :003,169,000,141,093,003,203
49464 :173,092,003,010,046,093,217
49470 :003,010,046,093,003,010,227
49476 :141,074,003,173,093,003,043
49482 :141,075,003,173,074,003,031
49488 :010,046,093,003,010,046,032
49494 :093,003,024,109,074,003,136
49500 :141,092,003,173,093,003,085
49506 :109,075,003,141,093,003,010
49512 :024,173,092,003,105,005,250
49518 :141,092,003,173,093,003,103
49524 :105,004,141,093,003,173,123
49530 :090,003,133,251,173,091,095
49536 :003,133,252,173,092,003,016
49542 :133,253,173,093,003,133,154
49548 :254,173,001,220,041,004,065
49554 :240,003,076,077,194,160,128
49560 :000,169,067,145,251,024,040
49566 :165,252,105,212,133,252,253
49572 :169,002,145,251,056,165,184
49578 :252,233,212,133,252,200,172
49584 :192,030,208,229,056,165,032
49590 :251,233,080,141,064,003,186
49596 :165,252,233,000,141,065,020
49602 :003,024,165,251,105,040,014
49608 :141,066,003,165,252,105,164
49614 :000,141,067,003,056,173,134
49620 :064,003,229,253,141,068,202
49626 :003,173,065,003,229,254,177
49632 :013,068,003,176,061,056,089
49638 :173,066,003,229,253,141,071
49644 :068,003,173,067,003,229,011
49650 :254,013,068,003,144,042,254
49656 :032,121,195,024,173,078,103
49662 :003,105,010,141,078,003,082
49668 :173,079,003,105,000,141,249
49674 :079,003,056,173,078,003,146
49680 :233,244,141,068,003,173,110
49686 :079,003,233,001,013,068,163
49692 :003,144,003,076,015,195,208
49698 :162,255,160,015,136,208,202
49704 :253,202,208,248,173,078,178
49710 :003,013,079,003,240,014,142
49716 :173,078,003,208,003,206,211
49722 :079,003,206,078,003,032,203
49728 :149,195,160,030,169,032,031
49734 :145,251,136,192,000,016,042
49740 :247,173,001,220,041,008,254
49746 :240,003,076,012,195,160,000
49752 :000,169,067,145,253,024,234
49758 :165,254,105,212,133,254,193
49764 :169,006,145,253,056,165,126
49770 :254,233,212,133,254,200,112
49776 :192,030,208,229,056,165,224
49782 :253,233,080,141,064,003,124
49788 :165,254,233,000,141,065,214
49794 :003,024,165,253,105,040,208
49800 :141,066,003,165,254,105,102
```

```
49806 :000,141,067,003,056,173,070
49812 :064,003,229,251,141,068,136
49818 :003,173,065,003,229,252,111
49824 :013,068,003,176,060,056,024
49830 :173,066,003,229,251,141,005
49836 :068,003,173,067,003,229,203
49842 :252,013,068,003,144,041,187
49848 :032,121,195,173,076,003,016
49854 :105,010,141,076,003,173,186
49860 :077,003,105,000,141,077,087
49866 :003,056,173,076,003,233,234
49872 :244,141,084,003,173,077,162
49878 :003,233,001,013,084,003,039
49884 :144,003,076,068,195,162,100
49890 :255,160,015,136,208,253,229
49896 :202,208,248,173,076,003,118
49902 :013,077,003,240,014,173,246
49908 :076,003,208,003,206,077,049
49914 :003,206,076,003,032,149,207
49920 :195,160,030,169,032,145,219
49926 :253,136,192,000,016,247,082
49932 :076,109,192,169,147,032,225
49938 :210,255,169,000,141,021,046
49944 :208,160,012,162,010,032,096
49950 :240,255,160,000,185,236,082
49956 :195,200,032,210,255,192,096
49962 :044,208,245,165,197,201,078
49968 :064,240,250,165,197,201,141
49974 :025,240,008,165,197,201,122
49980 :039,208,238,096,096,076,045
49986 :000,192,169,147,032,210,048
49992 :255,169,000,141,021,208,098
49998 :160,012,162,010,032,240,182
50004 :255,160,000,185,025,196,137
50010 :200,032,210,255,192,044,255
50016 :208,245,165,197,201,064,152
50022 :240,250,165,197,201,025,156
50028 :240,008,165,197,201,039,190
50034 :208,238,096,096,076,000,060
50040 :192,162,255,238,032,208,183
50046 :202,208,250,169,129,141,201
50052 :004,212,162,255,160,115,016
50058 :136,208,253,202,208,248,113
50064 :169,128,141,004,212,160,190
50070 :011,162,000,024,032,240,107
50076 :255,169,032,032,210,255,085
50082 :160,012,162,000,024,032,040
50088 :240,255,169,032,032,210,082
50094 :255,160,026,162,000,024,033
50100 :032,240,255,169,032,032,172
50106 :210,255,160,027,162,000,232
50112 :024,032,240,255,169,032,176
50118 :032,210,255,160,010,162,003
50124 :000,024,032,240,255,174,161
50130 :078,003,173,079,003,032,066
50136 :205,189,160,025,162,000,189
50142 :024,032,240,255,174,076,255
50148 :003,173,077,003,032,205,209
50154 :189,096,080,076,065,089,061
50160 :069,082,032,049,032,087,079
50166 :073,078,083,013,013,032,026
50172 :032,032,032,032,032,032,188
50178 :032,032,072,073,084,032,071
50184 :089,032,084,079,032,080,148
50190 :076,065,089,032,065,071,156
50196 :065,073,078,032,032,080,124
50202 :076,065,089,069,082,032,183
50208 :050,032,087,073,078,083,179
50214 :013,013,032,032,032,032,192
50220 :032,032,032,032,032,072,020
50226 :073,084,032,089,032,084,188
50232 :079,032,080,076,065,089,221
50238 :032,065,071,065,073,078,190
50244 :032,032,160,000,185,084,049
50250 :196,153,000,048,200,192,095
50256 :147,208,245,096,001,255,008
50262 :000,000,003,192,000,003,028
50268 :240,000,063,248,000,063,194
50274 :252,000,063,254,015,255,169
50280 :254,000,063,255,063,255,226
50286 :255,000,063,255,255,255,169
50292 :255,000,063,255,063,255,239
50298 :255,000,063,255,015,255,197
50304 :254,000,063,254,000,063,250
50310 :252,000,063,248,000,003,188
50316 :240,000,003,192,000,255,062
50322 :000,255,000,127,252,000,012
50328 :015,248,001,255,240,000,143
50334 :063,224,007,255,192,000,131
50340 :255,128,031,245,192,003,250
50346 :228,224,007,213,127,015,216
50352 :142,048,255,255,240,015,107
50358 :142,048,007,213,127,003,210
50364 :228,224,031,245,192,000,084
50370 :255,128,007,255,192,000,007
50376 :063,224,001,255,240,000,215
50382 :015,248,000,127,252,255,079
50388 :255,013,013,013,013,013,020
```

Power Basic

(Article on page 170.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

```
60000 IF PEEK(830)=133 THEN 60020:rem 145
60010 FORI=828TO977:READA:POKEI,A:NEXT
                                  :rem 127
60020 SYS 828:RETURN              :rem 179
60030 DATA 169,000,133,252,169,080
                                  :rem 135
60040 DATA 133,251,169,164,133,002
                                  :rem 131
60050 DATA 169,083,141,036,003,169
                                  :rem 142
60060 DATA 003,141,037,003,096,152
                                  :rem 127
60070 DATA 072,138,072,165,252,208
                                  :rem 144
60080 DATA 007,032,116,003,169,000
                                  :rem 123
60090 DATA 133,253,166,253,189,000
                                  :rem 143
60100 DATA 002,133,254,198,252,230
                                  :rem 129
60110 DATA 253,104,170,104,168,165
                                  :rem 133
60120 DATA 254,096,160,000,132,252
                                  :rem 127
60130 DATA 165,002,032,210,255,169
                                  :rem 130
60140 DATA 157,032,210,255,032,228
                                  :rem 131
60150 DATA 255,240,251,164,252,133
                                  :rem 135
60160 DATA 254,169,032,032,210,255
                                  :rem 135
```

```
60170 DATA 169,157,032,210,255,165
                                  :rem 145
60180 DATA 254,201,013,240,043,201
                                  :rem 119
60190 DATA 020,208,013,192,000,240
                                  :rem 120
60200 DATA 211,136,169,157,032,210
                                  :rem 129
60210 DATA 255,076,118,003,041,127
                                  :rem 132
60220 DATA 201,032,144,196,196,251
                                  :rem 137
60230 DATA 240,192,165,254,153,000
                                  :rem 131
60240 DATA 002,032,210,255,169,000
                                  :rem 120
60250 DATA 133,212,200,076,118,003
                                  :rem 123
60260 DATA 230,252,153,000,002,169
                                  :rem 125
60270 DATA 032,032,210,255,096,013
                                  :rem 129
```

The Beginner's Corner

(Article on page 40.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

Program 1: Dog — VIC Version

```
1 REM DOG                          :rem 239
10 POKE36878 ,15                     :rem 50
20 S=36876
30 POKES,201                       :rem 164
40 PRINT"{CLR}":POKE36879,106:F=30720:GOS
   UB820                            :rem 18
50 POKES,191                       :rem 174
60 FOR I=1TO12:READP,C:POKEP,C:NEXT:GOSUB
   830                              :rem 21
65 DATA7868,79,7847,111,7848,111,7871,80,
   7893,106,7915,106,7937,78,7958,119,795
   7,119                           :rem 239
66 DATA7934,77,7912,101,7890,101 :rem 118
70 POKES,175                       :rem 178
80 FOR P=7959 TO 8047 STEP 22:POKEP,101:N
   EXT:GOSUB820                     :rem 20
90 POKES,170                       :rem 175
100 POKE8069,117:POKE8068,76:POKE8046,101
    :POKE8024,101                   :rem 34
105 POKE8001,111:POKE8023,101:POKE8045,10
    1                               :rem 57
107 POKE8067,117:POKE8066,76:POKE8044,101
    :POKE8022,101:GOSUB830         :rem 118
110 POKES,175                      :rem 221
120 FORP=7933 TO 7926 STEP -1:POKEP,99:NE
    XT:GOSUB830                     :rem 23
130 POKES,183                      :rem 222
140 FOR I=1 TO 10:READP,C:POKEP,C:NEXT:GO
    SUB830                          :rem 66
142 DATA8000,78,8021,119,8020,119,8019,11
    9,8018,78,8040,101,8062,117,8061,76
                                   :rem 247
144 DATA8039,101,8016,77           :rem 218
150 POKES,0:POKES,183              :rem 248
160 FOR I=1 TO 6:READP,C:POKEP,C:NEXT:GOS
    UB830                           :rem 25
165 DATA7973,78,7994,78,8015,78,8037,101,
    8059,117,8058,76               :rem 129
170 POKES,170                      :rem 222
180 FOR P=7948 TO 8036 STEP 22:POKEP,101:
    NEXT:POKE7926,79:GOSUB830      :rem 31
190 POKES,147:GOSUB820             :rem 56
210 POKES,201:GOSUB825             :rem 45
230 POKES,207                      :rem 220
240 POKE7891,81:POKE7891+F,0:POKE7892,81:
    POKE7892+F,0:POKE7935,74:POKE7935+F,2
                                   :rem 18
245 POKE7936,75:POKE7936+F,2:GOSUB820
                                  :rem 160
250 POKES,201:GOSUB825             :rem 49
270 POKES,195:GOSUB825             :rem 63
290 POKES,191:GOSUB825             :rem 61
310 POKES,183:GOSUB825             :rem 55
330 POKES,201:GOSUB820:GOSUB820   :rem 127
350 POKES,191:GOSUB825             :rem 58
370 POKES,195:GOSUB825             :rem 64
390 POKES,201                     :rem 221
400 POKE7846,223:POKE7845,233:POKE7867,10
    5                             :rem 107
405 POKE7849,233:POKE7850,223:POKE7872,95
    :GOSUB820                     :rem 151
410 POKES,191:GOSUB825             :rem 55
430 POKES,175:GOSUB825             :rem 59
450 POKES,170:GOSUB825             :rem 56
470 POKES,175:GOSUB825             :rem 63
490 POKES,183                     :rem 231
500 POKE7925,74:POKE7903,93:POKE7881,93:P
    OKE7859,85:POKE7860,64:POKE7861,73:GO
    SUB820                        :rem 187
510 POKES,170:GOSUB825             :rem 53
530 POKES,147:GOSUB820             :rem 54
550 POKES,201:GOSUB825             :rem 52
570 POKES,207:GOSUB820             :rem 55
590 POKES,201:GOSUB825             :rem 56
610 POKES,195:GOSUB825             :rem 61
630 POKES,191:GOSUB825             :rem 59
650 POKES,183:GOSUB825             :rem 62
670 POKES,175:GOSUB820:GOSUB820   :rem 144
800 POKES,0:POKE36878,0            :rem 75
810 GOTO 810                      :rem 107
820 FOR D=1 TO 200:NEXT           :rem 225
825 FOR D=1 TO 100:NEXT           :rem 229
830 FOR D=1 TO 100:NEXT:RETURN    :rem 251
840 END                           :rem 115
```

Program 2: Dog — 64 Version

```
1 REM DOG                          :rem 239
10 POKE54296,15:POKE54277,17:POKE54278,13
   0                              :rem 101
20 SH=54273:SL=54272:W=54276       :rem 47
30 POKESH,37:POKESL,162:POKEW,17 :rem 228
40 PRINT"{CLR}":POKE53281,3:POKE53280,2:F
   =54272:GOSUB820                :rem 113
50 POKESH,31:POKESL,165:POKEW,17 :rem 227
60 FOR I=1 TO 12:READ P,C:POKEP,C:NEXT:GO
   SUB830                          :rem 21
65 DATA1366,79,1327,111,1328,111,1369,80,
   1409,106,1449,106              :rem 115
66 DATA1489,78,1528,119,1527,119,1486,77,
```

```
   1446,101,1406,101                    :rem 131
70 POKESH,25:POKESL,30:POKEW,17         :rem 175
80 FOR P=1529 TO 1689 STEP 40:POKEP,101:N
   EXT:GOSUB820                         :rem 12
90 POKESH,23:POKESL,181:POKEW,17 :rem 230
100 POKE1729,117:POKE1728,76:POKE1688,101
    :POKE1648,101                       :rem 36
105 POKE1607,111:POKE1647,101:POKE1687,10
    1                                   :rem 72
107 POKE1727,117:POKE1726,76:POKE1686,101
    :POKE1646,101:GOSUB830              :rem 120
110 POKESH,25:POKESL,30:POKEW,17 :rem 218
120 FOR P=1485 TO 1478 STEP -1:POKEP,99:N
    EXT:GOSUB830                        :rem 15
130 POKESH,28:POKESL,49:POKEW,17 :rem 233
140 FOR I=1 TO 10:READP,C:POKEP,C:NEXT:GO
    SUB830                              :rem 66
142 DATA1606,78,1645,119,1644,119,1643,11
    9,1642,78,1682,101                  :rem 174
144 DATA1722,101,1721,76,1681,101,1640,77
                                        :rem 24
150 POKESH,28:POKESL,49:POKEW,17 :rem 235
160 FOR I=1 TO 6:READP,C:POKEP,C:NEXT:GOS
    UB830                               :rem 25
165 DATA1561,78,1600,78,1639,78,1679,101,
    1719,117,1718,76                    :rem 96
170 POKESH,23:POKESL,181:POKEW,17 :rem 21
180 FOR P=1518 TO 1678 STEP 40:POKEP,101:
    NEXT:POKE1478,79:GOSUB830           :rem 19
190 POKESH,18:POKESL,209:GOSUB820 :rem 28
210 POKESH,37:POKESL,162:GOSUB825 :rem 25
230 POKESH,42:POKESL,62:POKEW,17 :rem 225
240 POKE1407,81:POKE1407+F,0:POKE1408,81:
    POKE1408+F,0                        :rem 246
245 POKE1487,74:POKE1487+F,2:POKE1488,75:
    POKE1488+F,2:GOSUB820               :rem 120
250 POKESH,37:POKESL,162:GOSUB825 :rem 29
270 POKESH,33:POKESL,135:GOSUB825 :rem 27
290 POKESH,31:POKESL,165:GOSUB825 :rem 30
310 POKESH,28:POKESL,49:GOSUB825 :rem 238
330 POKESH,37:POKESL,162:POKEW,17 :rem 23
340 FOR D=1 TO 200:NEXT:GOSUB820  :rem 50
350 POKESH,31:POKESL,165:GOSUB825 :rem 27
370 POKESH,33:POKESL,135:GOSUB825 :rem 28
390 POKESH,37:POKESL,162:POKEW,17 :rem 29
400 POKE1326,223:POKE1325,233:POKE1365,10
    5                                   :rem 68
405 POKE1329,233:POKE1330,223:POKE1370,95
    :GOSUB820                           :rem 112
410 POKESH,31:POKESL,165:GOSUB825 :rem 24
430 POKESH,25:POKESL,30:GOSUB825 :rem 228
450 POKESH,23:POKESL,181:GOSUB825 :rem 27
470 POKESH,25:POKESL,30:GOSUB825 :rem 232
490 POKESH,28:POKESL,49:POKEW,17 :rem 242
500 POKE1477,74:POKE1437,93:POKE1397,93:P
    OKE1357,85                          :rem 165
505 POKE1358,64:POKE1359,73:GOSUB 820
                                        :rem 85
510 POKESH,23:POKESL,181:GOSUB825 :rem 24
530 POKESH,18:POKESL,209:GOSUB820 :rem 26
550 POKESH,37:POKESL,162:GOSUB825 :rem 32
570 POKESH,42:POKESL,62:GOSUB820 :rem 232
590 POKESH,37:POKESL,162:GOSUB825 :rem 36
610 POKESH,33:POKESL,135:GOSUB825 :rem 25
630 POKESH,31:POKESL,165:GOSUB825 :rem 28
650 POKESH,28:POKESL,49:GOSUB825 :rem 245
670 POKESH,25:POKESL,30             :rem 145
680 POKEW,17:FORD=1TO200:NEXT:GOSUB820
                                        :rem 141
800 POKESH,0:POKESL,0:POKE54296,0:rem 241
810 GOTO 810                            :rem 107
820 POKEW,17:FOR D=1 TO 200:NEXT  :rem 53
825 POKEW,17:FOR D=1 TO 100:NEXT  :rem 57
830 FOR D=1 TO 100:NEXT:POKEW,16:RETURN
                                        :rem 78
840 END                                 :rem 115
```

Program 3:
Merry Christmas — VIC Version

```
1 REM MERRY CHRISTMAS                   :rem 82
5 POKE36878,15:S=36876:POKE36879,26:GOTO1
  0                                     :rem 192
6 FORD=1TO200:NEXT                      :rem 125
7 FORD=1TO200:NEXT:RETURN               :rem 152
10 PRINT"{CLR}{BLK}":PRINT"{2 SPACES}COMP
   UTE!'S GAZETTE{DOWN}"                :rem 61
15 POKES,159:GOSUB6                     :rem 163
20 PRINTTAB(10);"{YEL}UI":PRINTTAB(10);"J
   K"                                   :rem 151
25 POKES,183:GOSUB6                     :rem 161
27 POKES,0:POKES,183:GOSUB6             :rem 187
30 PRINTTAB(10);"{GRN}{RVS}£[*]"
                                        :rem 176
35 POKES,191:GOSUB7                     :rem 162
40 PRINTTAB(9);"{RVS}£{2 SPACES}[*]"
                                        :rem 107
45 POKES,183:GOSUB7                     :rem 164
50 PRINTTAB(9);"{RVS}£{2 SPACES}[*]"
                                        :rem 108
55 POKES,179:GOSUB7                     :rem 170
60 PRINTTAB(8);"{RVS}£{4 SPACES}[*]"
                                        :rem 108
65 POKES,167:GOSUB6                     :rem 167
70 PRINTTAB(8);"{RVS}£{4 SPACES}[*]"
                                        :rem 109
75 POKES,0:POKES,167:GOSUB6             :rem 192
80 PRINTTAB(7);"{RVS}£{6 SPACES}[*]"
                                        :rem 109
85 POKES,0:POKES,167:GOSUB6             :rem 193
90 PRINTTAB(7);"{RVS}£{6 SPACES}[*]"
                                        :rem 110
95 POKES,191:GOSUB6                     :rem 167
100 PRINTTAB(6);"{RVS}£{8 SPACES}[*]"
                                        :rem 149
105 POKES,0:POKES,191:GOSUB7            :rem 232
110 PRINTTAB(6);"{RVS}£{8 SPACES}[*]"
                                        :rem 150
115 POKES,199:GOSUB7                    :rem 217
120 PRINTTAB(5);"{RVS}£{10 SPACES}[*]"
                                        :rem 150
125 POKES,191:GOSUB7                    :rem 210
130 PRINTTAB(5);"{RVS}£{10 SPACES}[*]"
                                        :rem 151
135 POKES,183:GOSUB7                    :rem 212
140 PRINTTAB(4);"{RVS}£{12 SPACES}[*]"
                                        :rem 151
145 POKES,179:GOSUB6                    :rem 217
150 PRINTTAB(10);"{BLK}[2 +]"           :rem 7
155 POKES,159:GOSUB6                    :rem 216
160 PRINTTAB(10);"[2 +]"            :rem 120
165 POKES,0:POKES,159:GOSUB6            :rem 241
166 POKES,199:GOSUB6                    :rem 222
167 POKES,0:POKES,199:GOSUB7            :rem 248
168 POKES,201:GOSUB7                    :rem 209
169 POKES,199                           :rem 241
170 PRINTTAB(4);"{RED}MER";             :rem 59
172 GOSUB7:POKES,191                    :rem 212
174 PRINT"RY ";                         :rem 83
175 GOSUB7:POKES,183                    :rem 216
176 PRINT"CHRIST";                      :rem 119
```

```
177 GOSUB6:POKES,167                    :rem 219
178 PRINT"MAS{DOWN}"                     :rem 99
179 GOSUB6:POKES,159:GOSUB7             :rem 207
180 POKES,0:POKES,159:GOSUB7            :rem 239
182 POKES,167                           :rem 231
184 PRINTTAB(4);"HAP";                   :rem 25
186 GOSUB6:POKES,191                    :rem 216
188 PRINT"PY ";                          :rem 86
190 GOSUB6:POKES,179                    :rem 217
192 PRINT"NEW ";                        :rem 146
194 GOSUB6:POKES,183                    :rem 216
196 PRINT"YEAR!"                        :rem 195
200 POKE7844,170                         :rem 92
201 POKE7890,170                         :rem 94
202 POKE7909,170                         :rem 96
203 POKE7933,170                         :rem 94
204 POKE7974,170                        :rem 100
205 POKE7979,170                        :rem 106
206 POKE7998,170                        :rem 108
207 POKE8017,170                         :rem 92
208 POKE8024,170                         :rem 91
209 POKE8041,170                         :rem 91
210 POKE8044,170                         :rem 86
220 GOSUB6:GOSUB6                        :rem 58
230 POKE36878,0:POKES,0                  :rem 72
240 B=36879                              :rem 38
250 POKEB,29                            :rem 159
255 GOSUB6                               :rem 82
260 POKEB,26                            :rem 157
265 GOSUB6                               :rem 83
270 GOTO250                             :rem 105
300 END                                 :rem 106
```

Program 4:
Merry Christmas — 64 Version

```
1 REM MERRY CHRISTMAS                    :rem 82
2 FORL=54272TO54296:POKEL,0:NEXT :rem 221
4 POKE54277,9:POKE54278,128:W=54276
                                        :rem 225
5 POKE 54296,15:SH=54273:SL=54272:POKE532
  81,1:POKE53280,2:GOTO10               :rem 151
6 POKEW,17:FORD=1TO200:NEXT:GOTO8:rem 124
7 POKEW,17                               :rem 81
8 FORD=1TO200:NEXT:RETURN               :rem 153
10 PRINT"{CLR}{BLK}":PRINTTAB(11);"COMPUT
   E!'S GAZETTE{DOWN}"                    :rem 2
15 POKESH,25:POKESL,30:GOSUB6           :rem 74
20 PRINT TAB(19);"{YEL}UI":PRINT TAB(19);
   "JK"                                 :rem 169
25 POKESH,33:POKESL,135:GOSUB6          :rem 128
27 POKEW,16:POKESH,33:POKESL,135:GOSUB7
                                        :rem 214
30 PRINT TAB(19);"{GRN}{RVS}£[*]"
                                        :rem 185
35 POKESH,37:POKESL,162:GOSUB7          :rem 134
40 PRINT TAB(18);"{RVS}£{2 SPACES}[*]"
                                        :rem 155
45 POKESH,33:POKESL,135:GOSUB7          :rem 131
50 PRINT TAB(18);"{RVS}£{2 SPACES}[*]"
                                        :rem 156
55 POKESH,31:POKESL,165:GOSUB7          :rem 133
60 PRINT TAB(17);"{RVS}£{4 SPACES}[*]"
                                        :rem 156
65 POKESH,28:POKESL,49:GOSUB6            :rem 92
70 PRINT TAB(17);"{RVS}£{4 SPACES}[*]"
                                        :rem 157
75 POKEW,16:POKESH,28:POKESL,49:GOSUB6
                                        :rem 176
80 PRINT TAB(16);"{RVS}£{6 SPACES}[*]"
                                        :rem 157
85 POKEW,16:POKESH,28:POKESL,49:GOSUB6
                                        :rem 177
90 PRINT TAB(16);"{RVS}£{6 SPACES}[*]"
                                        :rem 158
95 POKESH,37:POKESL,162:GOSUB6          :rem 139
100 PRINT TAB(15);"{RVS}£{8 SPACES}[*]
    "                                   :rem 197
105 POKEW,16:POKESH,37:POKESL,162:GOSUB7
                                          :rem 7
110 PRINT TAB(15);"{RVS}£{8 SPACES}[*]
    "                                   :rem 198
115 POKESH,42:POKESL,62:GOSUB7          :rem 128
120 PRINT TAB(14);"{RVS}£{10 SPACES}
    [*]"                               :rem 198
125 POKESH,37:POKESL,162:GOSUB7         :rem 182
130 PRINT TAB(14);"{RVS}£{10 SPACES}
    [*]"                               :rem 199
135 POKESH,33:POKESL,135:GOSUB7         :rem 179
140 PRINT TAB(13);"{RVS}£{12 SPACES}
    [*]"                               :rem 199
145 POKESH,31:POKESL,165:GOSUB6         :rem 180
150 PRINT TAB(19);"{BLK}[2 +]"          :rem 16
155 POKESH,25:POKESL,30:GOSUB6          :rem 127
160 PRINT TAB(19);"[2 +]"              :rem 129
165 POKEW,16:POKESH,25:POKESL,30:GOSUB6
                                        :rem 211
166 POKESH,42:POKESL,62:GOSUB6          :rem 133
167 POKEW,16:POKESH,42:POKESL,62:GOSUB7
                                        :rem 218
168 POKESH,44:POKESL,193:GOSUB7         :rem 191
169 POKESH,42:POKESL,62:POKEW,17 :rem 236
170 PRINTTAB(4);"{2 DOWN}{RED}M E R
    {SHIFT-SPACE}";                     :rem 253
172 GOSUB8:POKESH,37:POKESL,162:POKEW,17
                                         :rem 13
174 PRINT "R Y{3 SPACES}";               :rem 83
175 GOSUB8:POKESH,33:POKESL,135:POKEW,17
                                         :rem 12
176 PRINT "C H R I S T ";               :rem 119
177 GOSUB6:POKESH,28:POKESL,49:POKEW,17
                                        :rem 228
178 PRINT "M A S !{DOWN}"               :rem 132
179 GOSUB6:POKESH,25:POKESL,30:GOSUB7
                                        :rem 118
180 POKESH,25:POKESL,30:GOSUB7          :rem 126
182 POKESH,28:POKESL,49:POKEW,17 :rem 240
184 PRINT TAB(5);"H A P ";               :rem 26
186 GOSUB6:POKESH,37:POKESL,162:POKEW,17
                                         :rem 16
188 PRINT "P Y {2 SHIFT-SPACE}"; :rem 150
190 GOSUB6:POKESH,31:POKESL,165:POKEW,17
                                          :rem 8
192 PRINT "N E W{3 SPACES}";            :rem 146
194 GOSUB6:POKESH,33:POKESL,135:POKEW,17
                                         :rem 11
196 PRINT "Y E A R !"                   :rem 195
200 POKE1284,170                         :rem 84
201 POKE1363,170                         :rem 83
202 POKE1405,170                         :rem 81
203 POKE1442,170                         :rem 83
204 POKE1484,170                         :rem 90
205 POKE1521,170                         :rem 83
206 POKE1526,170                         :rem 89
207 POKE1563,170                         :rem 91
208 POKE1600,170                         :rem 84
209 POKE1606,170                         :rem 91
210 POKE1642,170                         :rem 83
211 POKE1647,170                         :rem 89
212 POKE1679,170                         :rem 95
213 POKE1685,170                         :rem 93
```

```
220 GOSUB6:GOSUB6                          :rem 58
230 POKE54296,0:POKESH,0:POKESL,0:rem 238
240 B=53280                                :rem 23
250 POKEB,5                               :rem 105
255 GOSUB6                                 :rem 82
260 POKEB,2                               :rem 103
265 GOSUB6                                 :rem 83
270 GOTO 250                              :rem 105
300 END                                   :rem 106
```

Spike

(Article on page 74.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

```
32768 :169,005,141,190,207,169,113
32774 :072,141,180,207,032,019,145
32780 :144,169,007,141,201,207,113
32786 :169,040,141,200,207,169,176
32792 :012,141,199,207,169,000,240
32798 :141,039,208,162,024,157,249
32804 :000,212,202,224,255,208,113
32810 :248,169,070,141,254,207,107
32816 :169,120,141,253,207,169,083
32822 :255,141,015,212,141,182,232
32828 :207,169,128,141,018,212,167
32834 :169,064,141,136,002,169,235
32840 :001,141,246,207,169,019,087
32846 :032,210,255,169,000,141,117
32852 :032,208,173,014,220,041,004
32858 :254,141,014,220,165,001,117
32864 :041,251,133,001,160,000,170
32870 :185,000,208,153,000,080,216
32876 :185,000,209,153,000,081,224
32882 :185,000,210,153,000,082,232
32888 :185,000,211,153,000,083,240
32894 :185,000,212,153,000,084,248
32900 :185,000,213,153,000,085,000
32906 :185,000,214,153,000,086,008
32912 :185,000,215,153,000,087,016
32918 :200,208,205,165,001,009,170
32924 :004,133,001,173,014,220,189
32930 :009,001,141,014,220,169,204
32936 :198,141,000,221,169,008,137
32942 :141,024,208,032,183,128,122
32948 :076,219,128,120,169,127,251
32954 :141,013,220,169,001,141,103
32960 :026,208,169,000,141,018,242
32966 :208,173,017,208,041,127,204
32972 :141,017,208,169,119,141,231
32978 :020,003,169,140,141,021,192
32984 :003,088,096,032,225,128,020
32990 :076,249,128,169,089,133,042
32996 :252,160,000,133,251,169,169
33002 :000,145,251,200,208,251,009
33008 :230,252,166,252,224,128,212
33014 :208,243,096,169,016,160,114
33020 :000,153,000,064,153,000,110
33026 :065,153,000,066,153,000,183
33032 :067,200,208,241,169,022,147
33038 :141,248,067,169,006,153,030
33044 :000,216,153,000,217,153,247
33050 :000,218,153,000,219,200,048
33056 :208,241,032,182,137,032,096
33062 :043,129,076,187,129,032,122
33068 :133,139,169,001,133,002,109
33074 :169,050,141,255,207,172,020
33080 :255,207,162,000,032,239,183
33086 :139,232,224,151,240,005,029
33092 :136,192,030,208,243,173,026
33098 :255,207,024,105,020,141,058
33104 :255,207,201,200,144,225,032
33110 :169,010,141,255,207,174,018
33116 :255,207,160,200,032,239,161
33122 :139,136,232,224,151,208,164
33128 :247,173,255,207,024,105,091
33134 :020,141,255,207,201,151,061
33140 :144,229,169,190,141,255,220
33146 :207,172,255,207,162,000,101
33152 :032,239,139,232,224,151,121
33158 :240,005,200,192,200,208,155
33164 :243,173,255,207,056,233,027
33170 :020,141,255,207,201,022,224
33176 :176,225,169,020,141,255,114
33182 :207,174,255,207,160,030,167
33188 :032,239,139,200,232,224,206
33194 :151,208,247,173,255,207,131
33200 :024,105,020,141,255,207,160
33206 :201,151,144,229,096,169,148
33212 :096,133,252,169,032,133,235
33218 :254,160,000,133,251,133,101
33224 :253,177,251,145,253,200,199
33230 :208,249,230,252,230,254,093
33236 :166,252,224,127,208,239,148
33242 :177,251,145,253,200,192,156
33248 :064,208,247,032,155,139,045
33254 :032,166,135,032,145,143,115
33260 :169,007,141,021,208,173,187
33266 :030,208,076,212,140,173,057
33272 :000,220,141,252,207,041,085
33278 :001,208,043,032,030,139,195
33284 :240,003,032,186,138,173,008
33290 :253,207,201,030,208,003,144
33296 :076,173,130,173,254,207,005
33302 :201,150,208,003,076,173,065
33308 :130,238,254,207,206,253,036
33314 :207,173,252,207,141,249,239
33320 :207,076,173,130,173,252,027
33326 :207,041,002,208,037,032,061
33332 :030,139,240,003,032,186,170
33338 :138,173,253,207,201,200,206
33344 :240,107,173,254,207,201,222
33350 :000,240,100,238,253,207,084
33356 :206,254,207,173,252,207,095
33362 :141,249,207,076,173,130,034
33368 :173,252,207,041,004,208,205
33374 :037,032,050,139,240,003,083
33380 :032,186,138,173,253,207,065
33386 :201,030,240,063,173,254,043
33392 :207,201,000,240,056,206,254
33398 :254,207,206,253,207,173,138
33404 :252,207,141,249,207,076,232
33410 :173,130,173,252,207,041,082
33416 :008,208,034,032,050,139,095
33422 :240,003,032,186,138,173,146
33428 :253,207,201,200,240,019,244
33434 :173,254,207,201,150,240,099
33440 :012,238,254,207,238,253,082
33446 :207,173,252,207,141,249,115
33452 :207,032,155,139,162,255,098
33458 :160,000,200,208,253,232,207
33464 :208,250,032,024,136,032,098
33470 :144,136,032,036,137,032,195
33476 :029,135,032,030,139,208,001
```

```
33482 :008,032,050,139,208,003,130
33488 :032,181,133,032,217,130,165
33494 :076,247,129,173,030,208,053
33500 :041,001,208,001,096,206,005
33506 :199,207,104,104,032,200,048
33512 :143,174,199,207,232,169,076
33518 :032,157,040,064,076,212,051
33524 :140,173,241,207,010,141,132
33530 :207,207,176,008,169,000,249
33536 :141,206,207,076,011,131,004
33542 :169,001,141,206,207,173,135
33548 :207,207,024,105,013,141,197
33554 :014,208,173,206,207,105,163
33560 :000,024,106,106,141,206,095
33566 :207,173,016,208,041,127,034
33572 :013,206,207,141,016,208,059
33578 :173,240,207,024,105,041,064
33584 :141,015,208,169,001,141,211
33590 :046,208,169,023,141,255,128
33596 :067,162,254,154,173,021,123
33602 :208,141,205,207,169,129,101
33608 :141,021,208,032,081,143,186
33614 :032,081,143,032,081,143,078
33620 :169,000,141,202,207,169,204
33626 :004,141,203,207,173,203,253
33632 :207,074,144,008,169,010,196
33638 :141,204,207,076,113,131,206
33644 :169,020,141,204,207,173,254
33650 :203,207,141,245,207,169,006
33656 :010,141,244,207,032,252,238
33662 :135,172,242,207,174,204,236
33668 :207,204,240,207,208,008,182
33674 :236,241,207,208,003,076,085
33680 :154,131,032,055,134,208,090
33686 :003,238,202,207,173,204,153
33692 :207,024,105,020,201,160,105
33698 :240,010,201,150,240,006,241
33704 :141,204,207,076,113,131,016
33710 :238,203,207,172,203,207,124
33716 :192,020,208,166,160,000,158
33722 :185,195,132,032,210,255,171
33728 :200,192,021,208,245,169,203
33734 :000,174,202,207,032,205,250
33740 :189,169,032,032,210,255,067
33746 :169,042,032,210,255,169,063
33752 :032,032,210,255,169,000,146
33758 :174,200,207,032,205,189,205
33764 :169,032,032,210,255,169,071
33770 :061,032,210,255,169,032,225
33776 :032,210,255,173,200,207,037
33782 :141,245,207,173,202,207,141
33788 :141,244,207,032,252,135,239
33794 :174,242,207,173,243,207,224
33800 :032,205,189,169,032,032,155
33806 :210,255,169,146,032,210,012
33812 :255,173,200,207,201,070,102
33818 :240,006,024,105,005,141,035
33824 :200,207,173,242,207,056,093
33830 :233,010,141,242,207,141,244
33836 :221,207,173,243,207,233,048
33842 :000,141,243,207,013,221,107
33848 :207,240,020,144,018,162,079
33854 :253,160,000,200,208,253,112
33860 :232,208,250,162,011,032,195
33866 :035,134,076,034,132,234,207
33872 :169,000,141,021,208,169,020
33878 :096,133,252,169,032,133,133
33884 :254,160,000,133,251,133,255
33890 :253,177,253,145,251,200,097
33896 :208,249,230,252,230,254,247
33902 :166,252,224,127,208,239,046
33908 :177,253,145,251,200,192,054
33914 :064,208,247,169,007,141,190
33920 :046,208,173,254,067,141,249
33926 :255,067,162,039,169,032,090
33932 :157,120,064,202,224,007,146
33938 :208,248,160,006,185,216,145
33944 :132,153,055,138,185,223,014
33950 :132,153,062,138,136,192,203
33956 :255,208,239,032,145,143,162
33962 :173,205,207,056,042,141,226
33968 :021,208,032,166,135,169,139
33974 :000,174,201,207,157,080,233
33980 :064,238,201,207,076,212,162
33986 :140,159,019,017,017,017,051
33992 :029,029,029,029,029,029,118
33998 :029,029,029,018,066,079,200
34004 :078,085,083,032,010,030,018
34010 :040,060,080,110,130,040,166
34016 :080,170,050,090,140,160,146
34022 :142,217,207,140,216,207,079
34028 :200,032,055,134,201,003,093
34034 :240,093,232,032,055,134,004
34040 :201,002,208,085,202,202,124
34046 :032,055,134,201,002,208,118
34052 :076,173,216,207,024,105,037
34058 :019,168,032,055,134,201,107
34064 :002,208,062,232,232,032,016
34070 :055,134,201,002,208,053,163
34076 :173,217,207,024,105,009,251
34082 :170,173,216,207,024,105,161
34088 :009,168,032,055,134,201,127
34094 :002,208,032,200,200,032,208
34100 :055,134,201,002,208,023,163
34106 :173,217,207,056,233,009,185
34112 :170,032,055,134,201,002,146
34118 :208,009,136,136,032,055,134
34124 :134,201,002,240,001,096,238
34130 :174,217,207,172,216,207,251
34136 :236,241,207,208,012,152,120
34142 :024,105,010,205,240,207,117
34148 :208,003,076,245,130,162,156
34154 :011,032,035,134,169,003,234
34160 :133,002,169,255,141,246,034
34166 :207,141,214,207,172,216,251
34172 :207,200,238,246,207,173,115
34178 :246,207,201,019,240,044,063
34184 :201,010,144,006,206,214,149
34190 :207,076,149,133,238,214,135
34196 :207,173,217,207,024,109,061
34202 :214,207,141,215,207,173,031
34208 :217,207,056,237,214,207,018
34214 :170,202,232,032,239,139,156
34220 :236,215,207,208,247,076,081
34226 :125,133,096,172,253,207,140
34232 :174,254,207,192,040,240,011
34238 :016,192,030,240,012,224,136
34244 :150,240,008,152,056,233,011
34250 :020,168,032,230,132,172,188
34256 :253,207,174,254,207,192,215
34262 :030,240,021,224,000,240,201
34268 :017,224,010,240,013,152,108
34274 :056,233,010,168,138,056,119
34280 :233,010,170,032,230,132,015
34286 :172,253,207,174,254,207,225
34292 :192,030,240,021,224,150,077
34298 :240,017,224,140,240,013,100
34304 :152,056,233,010,168,138,245
34310 :024,105,010,170,032,230,065
34316 :132,172,253,207,174,254,180
34322 :207,192,200,240,011,192,036
```

```
34328 :190,240,007,224,150,240,051
34334 :003,032,230,132,096,189,200
34340 :000,064,201,057,240,004,090
34346 :254,000,064,096,169,048,161
34352 :157,000,064,202,076,035,070
34358 :134,152,072,138,072,169,023
34364 :096,133,252,169,000,133,075
34370 :251,138,072,074,074,170,077
34376 :152,072,074,074,074,168,174
34382 :202,224,255,240,014,165,154
34388 :251,024,105,008,133,251,088
34394 :144,242,230,252,076,078,088
34400 :134,136,192,255,240,016,045
34406 :165,251,024,105,064,133,076
34412 :251,165,252,105,001,133,247
34418 :252,076,097,134,104,041,050
34424 :007,168,136,192,255,240,094
34430 :009,230,251,208,247,230,021
34436 :252,076,122,134,104,041,093
34442 :003,170,169,192,141,247,036
34448 :207,202,224,255,240,009,001
34454 :078,247,207,078,247,207,190
34460 :076,145,134,200,173,247,107
34466 :207,049,251,141,221,207,214
34472 :173,247,207,041,001,208,021
34478 :015,078,247,207,078,247,022
34484 :207,078,221,207,078,221,168
34490 :207,076,168,134,104,170,021
34496 :104,168,173,221,207,096,137
34502 :169,000,141,220,207,169,080
34508 :255,141,219,207,174,220,140
34514 :207,232,236,219,207,240,015
34520 :061,173,220,207,024,109,242
34526 :219,207,106,141,218,207,040

34532 :141,245,207,141,244,207,133
34538 :032,252,135,173,242,207,251
34544 :056,237,222,207,141,221,044
34550 :207,173,243,207,237,223,000
34556 :207,013,221,207,240,026,142
34562 :144,009,173,218,207,141,126
34568 :219,207,076,208,134,173,001
34574 :218,207,141,220,207,076,059
34580 :208,134,173,220,207,141,079
34586 :218,207,096,173,241,207,144
34592 :056,237,254,207,144,003,165
34598 :076,048,135,173,254,207,163
34604 :056,237,241,207,141,245,147
34610 :207,141,244,207,032,252,109
34616 :135,173,242,207,141,236,166
34622 :207,173,243,207,141,237,246
34628 :207,173,240,207,056,237,164
34634 :253,207,144,003,076,088,077
34640 :135,173,253,207,056,237,117
34646 :240,207,141,245,207,141,243
34652 :244,207,032,252,135,173,111
34658 :242,207,024,109,236,207,099
34664 :141,222,207,173,243,207,017
34670 :109,237,207,141,223,207,210
34676 :032,198,134,173,218,207,054
34682 :074,074,074,170,168,169,083
34688 :160,157,127,064,202,224,038
34694 :255,208,248,173,218,207,163
34700 :041,007,170,189,158,135,072
34706 :153,128,064,169,032,153,077
34712 :129,064,153,130,064,096,020
34718 :101,116,117,097,246,234,045
34724 :231,160,173,027,212,041,240
34730 :015,201,013,176,247,024,078
34736 :105,001,141,241,207,173,020
34742 :027,212,041,007,024,105,086
34748 :001,141,245,207,169,020,203
34754 :141,244,207,032,252,135,181
34760 :173,242,207,141,240,207,130
34766 :173,241,207,041,001,208,053
34772 :009,173,240,207,056,233,106
34778 :010,141,240,207,173,241,206
34784 :207,141,245,207,169,010,179
34790 :141,244,207,032,252,135,217
34796 :173,242,207,141,241,207,167
34802 :173,240,207,024,105,030,253
34808 :141,240,207,096,169,000,077
34814 :141,242,207,162,008,078,068
34820 :245,207,144,004,024,109,225
34826 :244,207,106,110,242,207,102
34832 :202,208,240,141,243,207,233
34838 :096,096,162,006,032,086,244
34844 :136,208,049,032,106,136,183
34850 :208,044,173,027,212,201,131
34856 :064,176,008,169,014,157,116
34862 :183,207,076,080,136,201,161
34868 :128,176,008,169,013,157,191
34874 :183,207,076,080,136,201,173
34880 :192,176,008,169,011,157,009
34886 :183,207,076,080,136,169,153
34892 :007,157,183,207,202,224,032
34898 :255,208,197,096,189,055,058
34904 :138,024,125,062,138,141,204
34910 :250,207,008,104,041,001,193
34916 :141,251,207,076,085,139,231
34922 :189,055,138,056,253,062,091
34928 :138,144,011,141,250,207,235
34934 :169,000,141,251,207,076,194
34940 :085,139,189,062,138,056,025
34946 :253,055,138,141,250,207,150

34952 :169,000,141,251,207,076,212
34958 :085,139,238,182,207,173,142
34964 :182,207,205,181,207,240,090
34970 :001,096,169,255,141,182,230
34976 :207,162,006,189,183,207,090
34982 :041,001,208,029 189,062,184
34988 :138,201,030,208,003,076,060
34994 :030,137,189,055,138,201,160
35000 :150,208,003,076,030,137,020
35006 :254,055,138,222,062,138,035
35012 :076,030,137,189,183,207,250
35018 :041,002,208,023,189,062,215
35024 :138,201,200,240,073,189,225
35030 :055,138,201,000,240,066,146
35036 :254,062,138,222,055,138,065
35042 :076,030,137,189,183,207,024
35048 :041,004,208,023,189,062,247
35054 :138,201,030,240,043,189,055
35060 :055,138,201,000,240,036,146
35066 :222,055,138,222,062,138,063
35072 :076,030,137,189,183,207,054
35078 :041,008,208,020,189,062,022
35084 :138,201,200,240,013,189,225
35090 :055,138,201,150,240,006,040
35096 :254,055,138,254,062,138,157
35102 :202,224,255,208,128,096,119
35108 :162,006,169,128,141,247,121
35114 :207,189,055,138,010,176,049
35120 :059,105,014,008,072,138,188
35126 :010,170,104,157,002,208,193
35132 :138,074,170,040,173,247,134
35138 :207,073,255,045,016,208,102
35144 :144,003,013,247,207,141,059
35150 :016,208,189,062,138,024,203
35156 :105,041,072,138,010,170,108
35162 :104,157,003,208,138,074,006
```

```
35168 :170,078,247,207,202,224,200
35174 :255,208,194,076,134,137,082
35180 :024,105,014,072,138,010,215
35186 :170,104,157,002,208,138,125
35192 :074,170,173,016,208,013,006
35198 :247,207,141,016,208,076,253
35204 :080,137,206,246,207,208,192
35210 :035,169,010,141,246,207,178
35216 :173,248,207,201,021,240,210
35222 :008,169,021,141,248,207,176
35228 :076,164,137,169,020,141,095
35234 :248,207,162,006,157,249,167
35240 :067,202,224,255,208,248,092
35246 :173,141,002,201,001,240,164
35252 :249,096,162,006,169,007,101
35258 :157,040,208,169,020,157,169
35264 :249,067,202,224,255,208,117
35270 :241,162,036,169,003,157,198
35276 :120,216,202,224,255,208,149
35282 :248,162,039,169,032,157,249
35288 :000,064,157,040,064,157,186
35294 :120,064,157,080,064,202,141
35300 :224,255,208,239,160,000,034
35306 :185,069,138,032,210,255,099
35312 :200,192,011,208,245,160,232
35318 :000,185,088,138,032,210,131
35324 :255,200,192,043,208,245,115
35330 :160,007,185,080,138,153,213
35336 :000,080,136,192,255,208,111
35342 :245,200,185,131,138,032,177
35348 :210,255,200,192,040,208,101
35354 :245,160,000,185,170,138,156
35360 :032,210,255,200,192,016,169
35366 :208,245,160,000,185,080,148
35372 :142,153,000,069,200,208,048
35378 :247,173,030,208,096,010,046
35384 :030,040,060,080,110,130,250
35390 :040,080,170,050,090,140,120
35396 :160,158,019,017,017,017,200
35402 :083,079,078,065,082,058,007
35408 :126,126,126,126,096,096,008
35414 :096,096,154,019,017,017,229
35420 :076,069,086,069,076,058,014
35426 :032,032,032,032,032,032,034
35432 :032,032,032,032,032,032,040
35438 :032,032,032,032,032,032,046
35444 :032,032,032,032,032,032,052
35450 :032,032,032,032,032,032,058
35456 :032,032,032,005,019,083,075
35462 :067,079,082,069,058,032,009
35468 :048,048,048,048,048,048,172
35474 :032,032,032,032,032,032,082
35480 :072,073,071,072,032,083,043
35486 :067,079,082,069,058,032,033
35492 :048,048,048,048,048,048,196
35498 :153,019,017,083,084,065,079
35504 :077,073,078,065,058,032,047
35510 :218,218,218,218,173,249,196
35516 :207,041,001,208,009,238,124
35522 :254,207,206,253,207,076,117
35528 :247,138,173,249,207,041,231
35534 :002,208,009,238,253,207,099
35540 :206,254,207,076,247,138,060
35546 :173,249,207,041,004,208,076
35552 :009,206,254,207,206,253,079
35558 :207,076,247,138,173,249,040
35564 :207,041,008,208,006,238,176
35570 :254,207,238,253,207,032,153
35576 :155,139,162,255,160,000,095
35582 :200,208,253,232,208,250,069
35588 :032,024,136,032,144,136,252
35594 :032,036,137,032,217,130,082
35600 :032,030,139,208,165,032,110
35606 :050,139,208,160,032,181,024
35612 :133,096,173,254,207,024,147
35618 :109,253,207,141,250,207,177
35624 :008,104,041,001,141,251,074
35630 :207,076,085,139,173,254,212
35636 :207,056,237,253,207,144,132
35642 :011,141,250,207,169,000,068
35648 :141,251,207,076,085,139,195
35654 :173,253,207,056,237,254,226
35660 :207,141,250,207,169,000,026
35666 :141,251,207,173,250,207,031
35672 :056,233,010,141,250,207,217
35678 :173,251,207,233,000,141,075
35684 :251,207,048,028,173,250,033
35690 :207,013,251,207,240,020,020
35696 :173,250,207,056,233,020,027
35702 :141,250,207,173,251,207,067
35708 :233,000,141,251,207,076,008
35714 :102,139,096,169,002,133,003
35720 :002,162,159,160,031,032,170
35726 :239,139,200,192,200,208,040
35732 :248,202,224,150,208,241,141
35738 :096,173,254,207,010,176,046
35744 :029,105,015,141,000,208,146
35750 :173,016,208,041,254,144,234
35756 :002,009,001,141,016,208,037
35762 :173,253,207,024,105,041,213
35768 :141,001,208,076,207,139,188
35774 :024,105,015,141,000,208,171
35780 :173,016,208,009,001,141,232
35786 :016,208,076,178,139,169,220
35792 :002,133,002,174,254,207,212
35798 :172,253,207,032,055,134,043
35804 :201,001,208,005,162,012,041
35810 :032,035,134,174,254,207,038
35816 :172,253,207,032,239,139,250
35822 :096,072,152,072,138,072,072
35828 :169,096,133,252,169,000,039
35834 :133,251,138,072,074,074,224
35840 :170,152,072,074,074,074,104
35846 :168,202,224,255,240,014,085
35852 :165,251,024,105,008,133,186
35858 :251,144,242,230,252,076,189
35864 :007,140,136,192,255,240,226
35870 :016,165,251,024,105,064,143
35876 :133,251,165,252,105,001,175
35882 :133,252,076,026,140,104,005
35888 :041,007,168,136,192,255,079
35894 :240,009,230,251,208,247,215
35900 :230,252,076,051,140,104,145
35906 :041,003,170,169,063,141,141
35912 :247,207,165,002,010,010,201
35918 :010,010,010,010,202,224,032
35924 :255,240,012,074,074,056,027
35930 :110,247,207,110,247,207,194
35936 :076,082,140,200,072,173,071
35942 :247,207,049,251,145,251,228
35948 :104,017,251,145,251,104,212
35954 :170,104,168,104,096,173,161
35960 :025,208,141,025,208,041,000
35966 :001,240,077,169,012,160,017
35972 :059,162,024,142,022,208,237
35978 :141,033,208,140,017,208,117
35984 :141,024,208,173,018,208,148
35990 :201,081,144,016,169,000,249
35996 :141,018,208,173,017,208,153
36002 :041,127,141,017,208,076,004
```

```
36008 :206,140,169,000,141,033,089
36014 :208,169,200,141,022,208,098
36020 :169,027,141,017,208,169,143
36026 :004,141,024,208,169,081,045
36032 :141,018,208,173,017,208,189
36038 :041,127,141,017,208,076,040
36044 :049,234,104,168,104,170,009
36050 :104,064,169,070,141,254,244
36056 :207,169,120,141,253,207,033
36062 :162,039,169,032,157,120,133
36068 :064,202,224,007,208,248,157
36074 :032,155,139,032,029,135,244
36080 :173,199,207,201,007,240,243
36086 :057,032,248,141,032,024,012
36092 :136,032,144,136,032,036,000
36098 :137,162,255,160,000,200,148
36104 :208,253,232,208,250,162,041
36110 :249,160,000,200,208,253,060
36116 :232,208,250,173,000,220,079
36122 :041,016,208,220,162,013,174
36128 :169,032,157,040,064,232,214
36134 :224,039,208,248,173,030,192
36140 :208,076,247,129,162,039,137
36146 :169,013,157,040,216,202,079
36152 :224,255,208,248,160,000,127
36158 :162,000,189,041,064,157,163
36164 :040,064,232,224,037,208,105
36170 :245,185,037,142,141,077,133
36176 :064,152,072,160,000,162,178
36182 :000,200,208,253,232,208,163
36188 :250,104,168,173,000,220,239
36194 :041,016,240,010,200,192,029
36200 :043,208,211,160,000,076,034
36206 :062,141,162,000,189,007,159
36212 :064,221,031,064,240,018,242
36218 :144,021,162,005,189,007,138
36224 :064,157,031,064,202,224,102
36230 :255,208,245,076,145,141,180
36236 :232,224,006,208,225,162,173
36242 :005,189,031,064,157,192,016
36248 :207,202,224,255,208,245,213
36254 :173,000,220,041,016,240,080
36260 :249,032,073,145,032,182,109
36266 :137,162,005,189,192,207,038
36272 :157,031,064,202,224,255,085
36278 :208,245,169,096,133,252,005
36284 :169,032,133,254,160,000,168
36290 :133,251,133,253,177,253,114
36296 :145,251,200,208,249,230,203
36302 :252,230,254,166,252,224,048
36308 :127,208,239,177,253,145,081
36314 :251,200,192,064,208,247,100
36320 :032,145,143,169,007,141,093
36326 :021,208,141,201,207,169,153
36332 :040,141,200,207,169,012,237
36338 :141,199,207,076,212,140,193
36344 :162,000,189,006,142,032,011
36350 :210,255,232,224,032,208,135
36356 :245,096,005,019,017,029,159
36362 :029,029,029,029,029,029,184
36368 :029,029,029,029,029,029,190
36374 :029,029,029,080,082,069,084
36380 :083,083,032,066,085,084,205
36386 :084,079,078,135,129,141,168
36392 :133,160,143,150,133,146,137
36398 :032,046,046,032,016,018,236
36404 :005,019,019,032,002,021,150
36410 :020,020,015,014,032,020,179
36416 :015,032,016,012,001,025,165
36422 :032,001,007,001,009,014,134
36428 :032,046,046,032,000,000,232
36434 :000,000,000,000,000,000,082
36440 :000,000,000,000,000,000,088
36446 :000,000,000,000,000,000,094
36452 :000,000,048,000,000,048,196
36458 :000,000,252,000,000,252,098
36464 :000,000,048,000,000,048,208
36470 :000,000,000,000,000,000,118
36476 :000,000,000,000,000,000,124
36482 :000,000,000,000,000,000,130
36488 :000,000,000,000,000,000,136
36494 :000,000,000,000,000,000,142
36500 :000,000,000,000,000,000,148
36506 :000,000,000,000,000,000,154
36512 :000,000,000,000,000,001,161
36518 :140,000,000,216,000,000,010
36524 :112,000,000,112,000,000,140
36530 :216,000,001,140,000,000,023
36536 :000,000,000,000,000,000,184
36542 :000,000,000,000,000,000,190
36548 :000,000,000,000,000,000,196
36554 :000,000,000,000,000,000,202
36560 :000,000,000,000,000,000,208
36566 :000,000,000,000,000,000,214
36572 :000,000,000,000,000,000,220
36578 :000,000,000,000,096,000,066
36584 :000,240,000,001,248,000,209
36590 :000,240,000,000,096,000,062
36596 :000,000,000,000,000,000,244
36602 :000,000,000,000,000,000,250
36608 :000,000,000,000,000,000,000
36614 :000,000,000,000,000,000,006
36620 :000,000,000,000,000,000,012
36626 :000,000,000,000,000,000,018
36632 :000,000,000,000,015,255,038
36638 :255,023,224,049,016,000,085
36644 :001,035,102,051,102,219,034
36650 :051,075,108,103,199,254,064
36656 :102,128,000,014,255,255,034
36662 :252,255,255,248,000,000,040
36668 :000,000,000,000,000,000,060
36674 :000,000,000,000,000,000,066
36680 :000,000,000,000,000,000,072
36686 :000,000,165,162,007,169,069
36692 :000,157,000,212,202,224,111
36698 :255,208,248,169,141,141,228
36704 :024,212,169,005,141,005,140
36710 :212,169,218,141,006,212,036
36716 :169,150,141,001,212,169,182
36722 :139,141,000,212,169,017,024
36728 :141,004,212,160,140,162,171
36734 :000,232,208,253,200,208,203
36740 :250,169,016,141,004,212,156
36746 :232,208,253,200,208,250,209
36752 :096,160,000,169,000,153,210
36758 :000,212,200,192,008,208,202
36764 :246,169,143,141,024,212,067
36770 :169,008,141,005,212,169,098
36776 :243,141,006,212,169,129,044
36782 :141,004,212,162,255,142,066
36788 :001,212,202,160,255,136,122
36794 :192,001,208,251,224,001,039
36800 :208,241,169,128,141,004,059
36806 :212,096,162,000,169,000,069
36812 :157,000,212,232,224,008,013
36818 :208,248,169,143,141,024,119
36824 :212,169,017,141,005,212,204
36830 :169,213,141,006,212,169,108
36836 :002,141,003,212,169,100,087
36842 :141,002,212,169,005,141,136
36848 :001,212,169,135,141,000,130
36854 :212,169,065,141,004,212,025
```

```
36860 :169,252,160,000,162,000,227
36866 :200,208,253,232,208,250,073
36872 :024,105,001,208,245,169,248
36878 :064,141,004,212,096,162,181
36884 :000,142,033,208,142,032,065
36890 :208,189,206,144,240,007,252
36896 :032,210,255,232,076,027,096
36902 :144,234,173,190,207,105,067
36908 :048,032,210,255,169,157,147
36914 :032,210,255,032,228,255,038
36920 :208,010,173,000,220,041,196
36926 :016,208,244,076,091,144,073
36932 :201,013,240,019,201,049,023
36938 :144,233,201,058,176,229,091
36944 :072,056,233,048,141,190,052
36950 :207,104,032,210,255,162,032
36956 :000,160,000,232,208,253,177
36962 :200,208,250,173,000,220,125
36968 :041,016,240,249,189,050,121
36974 :145,240,007,032,210,255,231
36980 :232,076,108,144,173,180,005
36986 :207,032,210,255,169,157,128
36992 :032,210,255,032,228,255,116
36998 :208,010,173,000,220,041,018
37004 :016,208,244,076,167,144,227
37010 :201,013,240,017,201,069,119
37016 :240,007,201,072,240,003,147
37022 :076,131,144,141,180,207,013
37028 :032,210,255,234,056,169,096
37034 :010,237,190,207,010,073,129
37040 :255,024,105,002,141,177,112
37046 :130,141,251,138,141,004,219
37052 :141,173,180,207,056,233,154
37058 :069,074,073,001,141,181,221
37064 :207,169,001,133,204,096,242
37070 :014,147,017,017,159,018,066
37076 :029,029,029,029,029,029,130
37082 :029,032,032,032,032,032,151
37088 :032,032,017,157,157,157,008
37094 :157,157,157,157,032,211,077
37100 :208,201,203,197,032,146,199
37106 :032,045,032,005,032,194,070
37112 :089,032,197,082,073,067,020
37118 :032,194,082,065,078,068,005
37124 :079,078,013,029,029,029,005
37130 :029,029,029,029,159,018,047
37136 :032,032,032,032,032,032,208
37142 :032,013,013,013,013,013,119
37148 :029,029,029,029,029,029,202
37154 :158,211,080,069,069,068,177
37160 :032,040,049,045,057,041,048
37166 :063,032,159,000,013,013,070
37172 :013,029,029,029,029,029,210
37178 :029,158,197,065,083,089,167
37184 :047,200,065,082,068,063,077
37190 :032,159,000,120,173,013,055
37196 :220,009,129,141,013,220,040
37202 :169,000,141,026,208,169,027
37208 :234,141,021,003,169,049,193
37214 :141,020,003,088,169,021,024
37220 :141,024,208,169,027,141,042
37226 :017,208,169,199,141,000,072
37232 :221,169,004,141,136,002,017
37238 :169,000,141,021,208,032,177
37244 :019,144,169,064,141,136,029
37250 :002,169,198,141,000,221,093
37256 :169,008,141,024,208,169,087
37262 :216,133,252,160,000,132,011
37268 :251,169,006,145,251,200,146
37274 :208,251,230,252,166,252,233
37280 :224,220,208,243,032,183,246
37286 :128,169,255,141,182,207,224
37292 :096,253,208,232,162,140,239
```

Thinking

(Article on page 138.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

Program 1: Thinking — VIC Version

```
1 PRINT"{CLR}{10 DOWN}{7 RIGHT}{BLK}{RVS}
  THINKING{OFF}":G=6:B1=2:B2=17   :rem 253
2 REM PRINT"{DOWN}{8 RIGHT}{RVS}HARDER
  {OFF}":G=9:B1=3:B2=26           :rem 161
3 X=RND(0):FORP=1TO2000:NEXT:GOSUB2001:G$
  =STR$(G):GOTO1005               :rem 55
6 PRINT"{CLR}"SPC(225)"THINKING....."
                                  :rem 240
7 O=30720:S=36876:V=S+2:POKES,0:POKEV,15:
  POKEV+1,190                     :rem 94
10 FORN=1TOG:CH%(N)=0:NEXT:FORN=1TO9:C%(N
   )=0:NEXT:CO=0:Q=0              :rem 110
12 FORN=1TOG                      :rem 240
13 Z=INT(RND(1)*G)+1:IFCH%(Z)<>0THEN13
                                  :rem 203
14 CH%(Z)=N:NEXT                  :rem 196
25 FORB=1TOB1                     :rem 20
30 FORN=1TO9                      :rem 226
32 Z=INT(RND(1)*9)+1:IFZ%(Z)<>0THEN32
                                  :rem 142
34 Z%(Z)=N:NEXT                   :rem 149
36 FORN=1TO9:X=Z%(N):X$=RIGHT$((STR$(X)),
   1):P$(B)=P$(B)+X$:NEXT         :rem 212
38 FORN=1TO9:Z%(N)=0:NEXT         :rem 40
40 NEXTB                          :rem 229
50 P$=P$(1)+P$(2):IF G=9 THEN P$=P$(1)+P$
   (2)+P$(3)                      :rem 207
100 PRINT"{CLR}"                  :rem 245
105 FORN=1TOB2STEP3               :rem 191
110 P$(INT(N/3)+1)=MID$(P$,N,3):NEXT
                                  :rem 241
112 RESTORE:FORN=1TO9:READSQ%(N):NEXT:GOS
    UB 3000                       :rem 37
113 DATA7819,7821,7823,7863,7865,7867,790
    7,7909,7911                   :rem 158
114 FORN=1TO9:POKESQ%(N),N+128:POKESQ%(N)
    +O,C%(N):POKES,150+10*N: NEXT:POKES,0
                                  :rem 183
115 FORN=1TO9:IFC%(N)=4THENCO=CO+1:rem 67
116 NEXT:PRINT"{HOME}{16 DOWN}{PUR}PURPLE
    S:{BLK}"CO                    :rem 40
117 IF CO=9 THEN 200              :rem 241
118 CO=0:Q=Q+1                    :rem 14
130 PRINT"{HOME}{RVS}{RED}TURN"Q  :rem 64
132 INPUT"{HOME}{3 DOWN}{BLU}YOUR NUMBER(
    1-6){6 SPACES}{6 LEFT}";SE$   :rem 113
135 SE=VAL(SE$):IF(SE>G)OR(SE<1)THEN132
                                  :rem 81
136 SE=CH%(SE)                    :rem 8
140 FORN=1TO3                     :rem 14
150 W=VAL(MID$(P$(SE),N,1))       :rem 225
160 IFC%(W)=0THENC%(W)=4:GOTO180  :rem 95
```

```
170 IFC%(W)=4THENC%(W)=0            :rem 84
180 NEXTN                           :rem 38
188 GOTO114                         :rem 112
200 REM WIN                         :rem 100
205 FORN=1TO50                      :rem 66
210 POKES,INT(RND(1)*100)+150:POKEV+1,PEE
    K(S):NEXT:POKES,0:POKEV+1,204:rem 221
215 PRINT"{CLR}"SPC(48)"THAT'S IT!!!!"SPC
    (115)"YOU TOOK"Q"TURNS."        :rem 90
220 PRINT"{3 DOWN}WANT ANOTHER?(Y/N)
                                    :rem 39
225 GETA$:IFA$="Y"THEN6             :rem 75
230 IFA$="N"THENPRINT"{CLR}{BLU}":POKEV+1
    ,27:CLR:END                     :rem 230
235 GOTO225                         :rem 108
1000 REM INSTRUCTIONS               :rem 90
1005 PRINT"{CLR}{BLK}YOU WILL SEE 9 BLACK
     {2 SPACES}{DOWN}BLOCKS. BY ENTERING
     {SPACE}A                       :rem 117
1010 PRINT"{DOWN}NUMBER BETWEEN 1 AND"G$"
     {DOWN}YOU CAN CHANGE SOME OF{DOWN}TH
     EM TO {PUR}PURPLE{BLK}.{DOWN}"
                                    :rem 158
1012 PRINT"{RED}BUT, SOME {PUR}PURPLE
     {RED} ONES {DOWN}MIGHT TURN BACK TO
     {3 SPACES}{DOWN} {BLK}BLACK{RED}!"
                                    :rem 131
1015 PRINT"{DOWN}{BLU}EACH NUMBER YOU ENT
     ER {DOWN}WILL CHANGE THE COLORS
     {DOWN}IN ITS OWN WAY.          :rem 72
1020 GOSUB2000                      :rem 5
1025 PRINT"{CLR}TRY TO CHANGE ALL THE
     {DOWN}BLOCKS TO {PUR}PURPLE{BLU} IN
     {SPACE}AS{DOWN}FEW TRIES AS YOU CAN.
     "                              :rem 105
1030 GOSUB2000:GOTO6                :rem 175
2000 REM GET KEYPRESS               :rem 252
2001 PRINT"{HOME}{22 DOWN}"TAB(9)"{RVS}
     {BLU}TOUCH A KEY{OFF}";        :rem 109
2002 POKE198,0                      :rem 241
2005 GETA$:IFA$=""THEN2005          :rem 177
2010 RETURN                         :rem 163
3000 PRINT"{4 DOWN}"TAB(6)"{RED}{A}*
     {R}*{R}*{S}"          :rem 152
3010 PRINTTAB(6)"- - - -"           :rem 103
3020 PRINTTAB(6)"{Q}*+*+*{W}"
                                    :rem 72
3030 PRINTTAB(6)"- - - -"           :rem 105
3040 PRINTTAB(6)"{Q}*+*+*{W}"
                                    :rem 74
3050 PRINTTAB(6)"- - - -"           :rem 107
3060 PRINTTAB(6)"{Z}*{E}*{E}*
     {X}"                           :rem 4
3070 RETURN                         :rem 170
```

Program 2: Thinking — 64 Version

```
1 PRINT"{CLR}":POKE53281,1:PRINT"
  {10 DOWN}"TAB(15)"{BLK}{RVS}THINKING
  {OFF}":G=6:B1=2:B2=17             :rem 216
2 REM PRINT"{DOWN}"TAB(16)"{RVS}HARDER
  {OFF}":G=9:B1=3:B2=26             :rem 140
3 BO=53280:SC=53281:X=RND(0):FORP=1TO2000
  :NEXT:GOSUB2001:G$=STR$(G):GOTO1005
                                    :rem 81
6 PRINT"{CLR}":POKEBO,14:POKESC,13:PRINT"
  {10 DOWN}"TAB(14)"{GRN}THINKING....."
                                    :rem 154
7 O=54272:FORT=OTOO+24:POKET,0:NEXT:POKEO
  +24,15:POKEO+5,17:POKEO+6,167     :rem 71
10 FORN=1TOG:CH%(N)=0:NEXT:FORN=1TO9:C%(N
   )=0:NEXT:CO=0:Q=0                :rem 110
12 FORN=1TOG                        :rem 240
13 Z=INT(RND(1)*G)+1:IFCH%(Z)<>0THEN13
                                    :rem 203
14 CH%(Z)=N:NEXT                    :rem 196
25 FORB=1TOB1                       :rem 20
30 FORN=1TO9                        :rem 226
32 Z=INT(RND(1)*9)+1:IFZ%(Z)<>0THEN32
                                    :rem 142
34 Z%(Z)=N:NEXT                     :rem 149
36 FORN=1TO9:X=Z%(N):X$=RIGHT$((STR$(X)),
   1):P$(B)=P$(B)+X$:NEXT           :rem 212
38 FORN=1TO9:Z%(N)=0:NEXT           :rem 40
40 NEXTB                            :rem 229
50 P$=P$(1)+P$(2):IF G=9 THEN P$=P$(1)+P$
   (2)+P$(3)                        :rem 207
100 PRINT"{CLR}":POKESC,15          :rem 134
105 FORN=1TOB2STEP3                 :rem 191
110 P$(INT(N/3)+1)=MID$(P$,N,3):NEXT
                                    :rem 241
112 RESTORE:FORN=1TO9:READSQ%(N):NEXT:GOS
    UB 3000                         :rem 37
113 DATA1400,1402,1404,1480,1482,1484,156
    0,1562,1564                     :rem 59
114 FORN=1TO9:POKESQ%(N),N+128:POKESQ%(N)
    +O,C%(N):NEXT:POKEO+4,17:FORT=50TO100
                                    :rem 19
115 POKEO,T:POKEO+1,T:NEXT:POKEO+4,16:FOR
    N=1TO9:IFC%(N)=4THENCO=CO+1     :rem 50
116 NEXT:PRINT"{HOME}{19 DOWN}{13 RIGHT}
    {PUR}PURPLES:{BLK}"CO           :rem 212
117 IFCO=9THEN205                   :rem 246
118 CO=0:Q=Q+1                      :rem 14
130 PRINT"{HOME}{RVS}{RED}TURN"Q    :rem 64
132 INPUT"{HOME}{5 DOWN}{10 RIGHT}{BLU}YO
    UR NUMBER(1-6){6 SPACES}{6 LEFT}";SE$
                                    :rem 181
135 SE=VAL(SE$):IF(SE>G)OR(SE<1)THEN132
                                    :rem 81
136 SE=CH%(SE)                      :rem 8
140 FORN=1TO3                       :rem 14
150 W=VAL(MID$(P$(SE),N,1))         :rem 225
160 IFC%(W)=0THENC%(W)=4:GOTO180    :rem 95
170 IFC%(W)=4THENC%(W)=0            :rem 84
180 NEXTN                           :rem 38
188 GOTO114                         :rem 112
200 REM WIN                         :rem 100
205 FORN=1TO50                      :rem 66
210 POKEO+4,17:YT=INT(RND(1)*100)+150:POK
    EO+1,YT:POKEO,YT                :rem 196
212 POKESC,YT:POKEBO,YT+1:NEXT:POKEO+4,16
                                    :rem 133
215 PRINT"{CLR}":POKESC,4:POKEBO,2:PRINT"
    {7 DOWN}"TAB(13)"{BLK}THAT'S IT!!!!"
                                    :rem 97
217 PRINT"{3 DOWN}"TAB(11)"YOU TOOK"Q"TUR
    NS."                            :rem 5
220 PRINT"{DOWN}"TAB(10)"WANT ANOTHER (Y/
    N)?"                            :rem 244
225 GETA$:IFA$="Y"THEN6             :rem 75
230 IFA$="N"THENSYS2048             :rem 84
235 GOTO225                         :rem 108
1000 REM INSTRUCTIONS               :rem 90
1005 PRINT"{CLR}{DOWN} {BLK}YOU WILL SEE
     {SPACE}9 BLACK BLOCKS. BY ENTER-
     {DOWN}"                        :rem 182
1010 PRINT"ING A NUMBER BETWEEN 1 AND"G$"
     , YOU CAN"                     :rem 51
1011 PRINT"{DOWN}CHANGE SOME OF THEM TO
     {PUR}PURPLE{BLK}.{2 DOWN}"     :rem 57
```

```
1012 PRINT" {RED}BUT, SOME {PUR}PURPLE
     {RED} ONES MIGHT TURN BACK" :rem 148
1014 PRINT"{DOWN}TO {BLK}BLACK{RED}!"
                                :rem 117
1015 PRINT"{2 DOWN} {BLU}EACH NUMBER YOU
     {SPACE}ENTER WILL CHANGE THE"
                                :rem 237
1017 PRINT"{DOWN}COLORS IN ITS OWN WAY."
                                 :rem 23
1025 PRINT"{2 DOWN} {GRN}TRY TO CHANGE AL
     L THE BLOCKS TO {PUR}PURPLE{GRN}
                                :rem 172
1030 PRINT"{DOWN}IN AS FEW TRIES AS YOU C
     AN.":GOSUB2000:GOTO6       :rem 240
2000 REM GET KEYPRESS           :rem 252
2001 PRINT"{HOME}{23 DOWN}"TAB(14)"{RVS}
     {BLU}TOUCH A KEY{OFF}";    :rem 170
2002 POKE198,0                  :rem 241
2005 GETA$:IFA$=""THEN2005      :rem 177
2010 RETURN                     :rem 163
3000 PRINT"{7 DOWN}"TAB(15)"{WHT}{A}C
     {R}C{R}C{S}"           :rem 237
3010 PRINTTAB(15)"B B B B"       :rem 43
3020 PRINTTAB(15)"{Q}C+C+C{W}"
                                :rem 129
3030 PRINTTAB(15)"B B B B"       :rem 45
3040 PRINTTAB(15)"{Q}C+C+C{W}"
                                :rem 131
3050 PRINTTAB(15)"B B B B"       :rem 47
3060 PRINTTAB(15)"{Z}C{E}C{E}C{X}
     "                           :rem 61
3070 RETURN                     :rem 170
```

Budget Planner

(Article on page 108.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

```
10 REM DEF VARIABLES            :rem 173
20 SZ=100:I=-19                  :rem 52
30 R$=CHR$(13):TA=0               :rem 8
40 DIM A$(SZ),AE(SZ)             :rem 81
50 DEFFNRN(X)=INT(X*100+.5)/100 :rem 235
200 REM MAINROUTINE             :rem 193
210 GOSUB6000                   :rem 217
220 Z$="":GETZ$:IFZ$=""THENGOTO220
                                :rem 239
230 IFZ$=CHR$(133)THENI=I+20:GOSUB1000
                                :rem 206
235 IFZ$=CHR$(134)THENGOSUB3000  :rem 64
240 IFZ$=CHR$(135)THENGOSUB5000  :rem 63
245 IFZ$=CHR$(136)THENGOSUB7000  :rem 71
250 IFZ$=CHR$(137)THENGOSUB2000  :rem 63
255 IFZ$=CHR$(138)THENGOSUB4000  :rem 71
260 IFZ$=CHR$(139)THENGOSUB6000  :rem 70
265 IFZ$=CHR$(140)THENGOSUB8000  :rem 69
270 IFZ$=CHR$(17)THENI=I-1:GOSUB1000
                                :rem 116
275 IFZ$=CHR$(145)THENI=I+1:GOSUB1000
                                :rem 169
299 GOTO220                     :rem 113
300 REM ACCUM TOTALS            :rem 183
310 TA=0                        :rem 150
320 FOR J=1TOMX                 :rem 124
330 TA=TA+AE(J)                  :rem 73
340 NEXTJ                        :rem 32
399 RETURN                      :rem 133
400 REM LOAD FILES               :rem 11
410 INPUT"FILE NAME";F$          :rem 79
420 IFF$="*END"THENGOSUB6000:RETURN
                                :rem 160
450 OPEN1,1,0,F$                 :rem 75
455 PRINT"{RVS}{GRN}FOUND{OFF}{BLK}";F$
                                :rem 226
460 INPUT#1,MX                   :rem 79
470 FORJ=1TOMX                  :rem 130
480 INPUT#1,Y,A$(J),AE(J)       :rem 126
490 NEXTJ                        :rem 38
495 CLOSE1                       :rem 73
499 RETURN                      :rem 134
500 REM SORT BY NAME            :rem 125
505 IFMX=1THENGOTO599            :rem 75
510 PRINT"{2 DOWN}{5 RIGHT}{RVS}SORTING
    {OFF}"                      :rem 228
520 FORJ=1TOMX-1                :rem 220
530 FORK=J+1TOMX                :rem 245
540 IFA$(K)>A$(J)THENGOTO590    :rem 109
550 SM$=A$(K):SM=AE(K)          :rem 213
560 A$(K)=A$(J):AE(K)=AE(J)     :rem 147
570 A$(J)=SM$:AE(J)=SM          :rem 213
590 NEXTK                        :rem 40
595 NEXTJ                        :rem 44
599 RETURN                      :rem 135
1000 REM DISPLAY                :rem 187
1010 IF(I<1)OR(I>MX)THENI=1      :rem 92
1020 PRINT"{CLR} #"TAB(5)"{CYN}EXPENSES
     {BLK}"TAB(16)"{PUR}AMT{BLK}":rem 102
1030 FORJ=ITOI+19               :rem 252
1040 IFJ>MXTHENPRINT" ":GOTO1080 :rem 189
1050 PR$=STR$(AE(J)+.001):PR$=MID$(PR$,2,
     (LEN(PR$)-2))              :rem 196
1060 IFAE(J)=0THENPR$="0.00"     :rem 24
1065 J$=MID$(STR$(J),2)         :rem 220
1070 PRINTTAB(3-LEN(J$))J$;TAB(4)A$(J)TAB
     (21-LEN(PR$))PR$           :rem 244
1080 NEXTJ                       :rem 82
1090 TA$=STR$(TA+.001)          :rem 173
1100 TA$=LEFT$(TA$,LEN(TA$)-1)  :rem 132
1110 IFTA=0THENTA$="0.00"       :rem 123
1120 PRINT"{CYN}TOTAL {BLK}"TA$    :rem 1
1999 RETURN                     :rem 188
2000 REM ADD NEW                 :rem 89
2010 R=MX+1:N$="":E1$=""        :rem 213
2020 PRINT"{CLR}{3 RIGHT}ADD NEW EXPENSES
     "                          :rem 157
2030 PRINT"{DOWN}{12 RIGHT}ITEM #";R
                                :rem 226
2040 INPUT"{DOWN}ITEM NAME ";N$ :rem 168
2050 IFN$="*END"THENGOTO2999    :rem 143
2055 IFLEN(N$)>10THENN$=LEFT$(N$,10)
                                 :rem 25
2060 A$(R)=N$                   :rem 127
2070 INPUT"{DOWN}ITEM AMT{2 SPACES}";E1$
                                :rem 148
2080 IFE1$="*END"THENGOTO2999   :rem 186
2085 IFVAL(E1$)=0THENAE(R)=0:GOTO2100
                                :rem 148
2090 AE(R)=FNRN(VAL(E1$))       :rem 132
2095 IFAE(R)>9999.99THENAE(R)=9999.99
                                 :rem 99
2100 MX=MX+1                    :rem 166
2110 GOTO2010                   :rem 192
2200 MX=MX+1                    :rem 167
```

```
2999 GOSUB500:GOSUB300:GOSUB6000:RETURN
                                  :rem 217
3000 REM UPDATE                   :rem 106
3010 PRINT "{CLR}{BLU}EXPENSE ";"{RVS}UPD
     ATE{OFF}{BLK}"               :rem 213
3020 INPUT"{DOWN}ITEM # ";P1$     :rem 220
3025 IFP1$="*END"THENGOTO3999     :rem 198
3026 IF(VAL(P1$)=0)OR(VAL(P1$)<1)THENPRIN
     T"{2 DOWN}{4 RIGHT}{PUR}{RVS}INPUT E
     RROR{OFF}{BLK}":GOTO3020     :rem 225
3027 P=INT(VAL(P1$))              :rem 110
3030 N$="":E1$=""                  :rem 14
3040 IFP>SZTHENPRINT"MAX EXCEEDED":P=SZ:M
     X=P                          :rem 142
3050 IFP>MXTHENMX=P               :rem 235
3060 PR$=STR$(AE(P)+.001):PR$=MID$(PR$,2,
     (LEN(PR$)-2))                :rem 205
3065 IFAE(P)=0THENPR$="0.00"       :rem 37
3070 PRINTP;TAB(4)A$(P)TAB(21-LEN(PR$))PR
     $                            :rem 184
3080 INPUT"{DOWN}ITEM NAME";N$    :rem 173
3090 IFN$="*END"THENGOTO3999      :rem 149
3100 IFN$<>""THENA$(P)=N$         :rem 103
3105 IFLEN(A$(P))>10THENA$(P)=LEFT$(A$(P)
     ,10)                         :rem 210
3110 INPUT"AMT ";E1$               :rem 80
3120 IFE1$="*END"THENGOTO3999     :rem 183
3125 IFE1$=""GOTO3010             :rem 114
3130 IF(VAL(E1$)=0)AND(E1$<>"0")THENPRINT
     "{2 DOWN}{3 RIGHT}{RVS}{PUR}INPUT ER
     ROR{OFF}{BLK}":GOTO3110      :rem 41
3135 IFVAL(E1$)=0THENAE(P)=0:GOTO3800
                                  :rem 151
3140 AE(P)=FNRN(VAL(E1$))         :rem 127
3150 IFAE(P)>9999.99THENAE(P)=9999.99
                                   :rem 88
3800 GOTO3010                     :rem 200
3999 GOSUB500:GOSUB300:GOSUB6000:RETURN
                                  :rem 218
4000 REM SAVE FILE                :rem 247
4010 PRINT"{CLR}{3 RIGHT}SAVE EXPENSE LIS
     T"                             :rem 3
4020 INPUT"{2 DOWN}FILE NAME";F$ :rem 162
4030 IFF$="*END"THENGOSUB6000:RETURN
                                  :rem 209
4050 OPEN1,1,1,F$                 :rem 124
4060 PRINT#1,MX                   :rem 124
4070 FORJ=1TOMX                   :rem 178
4080 PRINT#1,J;R$;A$(J)R$;AE(J);R$
                                  :rem 146
4090 NEXTJ                         :rem 86
4100 CLOSE1                       :rem 108
4999 GOSUB6000:RETURN              :rem 63

5000 REM DELETE                    :rem 92
5005 DT=0:TM=0                     :rem 23
5010 PRINT"{CLR}{8 RIGHT}DELETE" :rem 197
5020 S1$=""                       :rem 240
5030 INPUT"{2 DOWN}START AT";S1$ :rem 196
5040 IFS1$="*END"THENGOTO5900     :rem 184
5050 DS=INT(VAL(S1$))             :rem 182
5060 S1$=""                       :rem 244
5070 IFDS=0THENPRINT"{DOWN}{6 RIGHT}{RVS}
     {PUR}INPUT ERROR{OFF}{BLK}":GOTO5020
                                   :rem 66
5080 S1$=""                       :rem 246
5090 INPUT"{2 DOWN}END AT";S1$     :rem 19
5100 IFS1$="*END"THENGOTO5900     :rem 181
5110 IFS1$=""ORS1$="0"THENDE=0:GOTO5200
                                  :rem 216
5120 DE=INT(VAL(S1$))             :rem 166
5125 IFDE>MXTHENDE=MX              :rem 98
5130 IFDE=>DSTHENGOTO5200          :rem 34
5135 PRINT"{2 DOWN}{2 RIGHT}{RVS}{PUR}0 O
     R NUMBER GREATER"             :rem 77
5140 PRINT"{2 DOWN}{2 RIGHT}THAN{OFF}
     {RED}";DE;"{RVS}{PUR}REQUIRED"
                                   :rem 34
5150 GOTO5080                     :rem 209
5200 IFDE=0THENDE=DS              :rem 216
5205 TM=DE-DS+1                    :rem 83
5207 DT=DT+TM                       :rem 7
5210 FORJ=DSTODE                  :rem 249
5220 A$(J)="{9 B}":AE(J)=0      :rem 201
5230 NEXTJ                         :rem 83
5240 GOTO5010                     :rem 202
5900 GOSUB500                     :rem 227
5910 MX=MX-DT                      :rem 27
5999 GOSUB300:GOSUB6000:RETURN    :rem 141
6000 REM OPTIONS MENU              :rem 11
6010 PRINT"{CLR}{7 RIGHT}{PUR}OPTIONS:
     {BLK}"                       :rem 136
6020 PRINT"{7 RIGHT}{YEL}========{BLK}"
                                  :rem 122
6030 PRINT"{DOWN}{RVS}{PUR}F1{OFF}{BLK}-D
     ISPLAY EXPENSES"             :rem 160
6040 PRINT"{DOWN}{RVS}{PUR}F2{OFF}{BLK}-A
     DD NEW EXPENSES"              :rem 63
6050 PRINT"{DOWN}{RVS}{PUR}F3{OFF}{BLK}-U
     PDATE EXPENSE LIST"           :rem 58
6060 PRINT"{DOWN}{RVS}{PUR}F4{OFF}{BLK}-S
     AVE EXPENSE LIST"            :rem 168
6070 PRINT"{DOWN}{RVS}{PUR}F5{OFF}{BLK}-D
     ELETE FROM LIST"              :rem 74
6080 PRINT"{DOWN}{RVS}{PUR}F6{OFF}{BLK}-O
     PTIONS SCREEN"                :rem 21

6090 PRINT"{DOWN}{RVS}{PUR}F7{OFF}{BLK}-L
     OAD/MERGE FILES"              :rem 93
6100 PRINT"{DOWN}{RVS}{PUR}F8{OFF}{BLK}-E
     ND"                          :rem 251
6999 RETURN                       :rem 193
7000 REM LOAD/MERGE               :rem 106
7010 PRINT"{CLR}{6 RIGHT}LOAD/MERGE"
                                  :rem 153
7020 PRINT"{DOWN}{5 RIGHT}EXPENSE FILES"
                                  :rem 199
7030 INPUT"LOAD OR MERGE (L/M)";AN$
                                  :rem 214
7040 IFAN$="L"THENMX=0:GOSUB400:GOTO7999
                                  :rem 190
7050 IFAN$="*END"THENGOSUB6000:RETURN
                                   :rem 31
7060 IFAN$<>"M"GOTO7030            :rem 29
7070 PRINT"{DOWN}{4 RIGHT}MERGE" :rem 148
7080 INPUT"{DOWN}FILE NAME";F$    :rem 154
7090 IFF$="*END"THENGOSUB6000:RETURN
                                  :rem 218
7120 OPEN1,1,0,F$                 :rem 124
7130 INPUT#1,T1                    :rem 96
7140 FORT2=1TOT1                  :rem 207
7150 INPUT#1,Y,T3$,T4             :rem 193
7160 FORJ=1TOMX                   :rem 181
7170 IFA$(J)=T3$THENAE(J)=INT(((AE(J)+T4)
     /2)*100)/100:T3$=""          :rem 199
7180 NEXTJ                         :rem 89
7190 IFT3$<>""THENMX=MX+1:A$(MX)=T3$:AE(M
     X)=T4                        :rem 211
7200 NEXT                           :rem 8
7210 CLOSE1                       :rem 113
7999 GOSUB500:GOSUB300:GOSUB6000:RETURN
                                  :rem 222
```

```
8000 REM END OF JOB                          :rem 243
8010 PRINT"{CLR}{4 RIGHT}END OF PROGRAM
     {2 DOWN}"                               :rem 71
8020 PRINT"WOULD YOU LIKE TO SAVE (Y/N)":
     INPUT AN$                               :rem 190
8030 IFAN$="*END"THENGOSUB6000:RETURN
                                             :rem 30
8040 IFAN$="N"THENGOTO8060                   :rem 19
8050 GOSUB4000                               :rem 17
8060 PRINT"{CLR}THANK YOU"                   :rem 165
8070 PRINT"{13 RIGHT}END"                    :rem 240
8080 END                                     :rem 167
```

Machine Language For Beginners

(Article on page 154.)

Program 1: VIC Version

```
12288  LDY   # 0
12290  LDA   # 6
12292  STA   37888 ,Y
12295  STA   38144 ,Y
12298  INY
12299  BNE         12292
12301  LDY   # 0
12303  LDA   # 224
12305  STA   4096 ,Y
12308  STA   4580 ,Y
12311  INY
12312  CPY   # 22
12314  BNE         12305
12316  RTS
```

Program 2: 64 Version

```
49152  LDY   # 0
49154  LDA   # 8
49156  STA   55296 ,Y
49159  STA   55552 ,Y
49162  STA   55808 ,Y
49165  STA   56064 ,Y
49168  INY
49169  BNE         49156
49171  LDY   # 0
49173  LDA   # 224
49175  STA   1024 ,Y
49178  STA   1984 ,Y
49181  INY
49182  CPY   # 40
49184  BNE         49175
49186  RTS
```

Program 3: Assembler Convenience

```
245 IFMN$="XX"THENPRINT"TO ADDRESS":INPUT
    DA:SA=DA:GOTO230
```

Program 4: VIC Loader

Remember to POKE 56,48

```
800 FOR ADRES=12288TO12316:READ DATTA:POK
    E ADRES,DATTA:NEXT ADRES
864 DATA 160, 0, 169, 6, 153, 0
870 DATA 148, 153, 0, 149, 200, 208
876 DATA 247, 160, 0, 169, 224, 153
882 DATA 0, 16, 153, 228, 17, 200
888 DATA 192, 22, 208, 245, 96
```

Program 5: 64 Loader

```
800 FOR ADRES=49152TO49186:READ DATTA:POK
    E ADRES,DATTA:NEXT ADRES
864 DATA 160, 0, 169, 8, 153, 0
870 DATA 216, 153, 0, 217, 153, 0
876 DATA 218, 153, 0, 219, 200, 208
882 DATA 241, 160, 0, 169, 224, 153
888 DATA 0, 4, 153, 192, 7, 200
894 DATA 192, 40, 208, 245, 96
```

Disk File Manager

(Article on page 130.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

Disk Manager For VIC And 64

```
3 POKE 49152,10:IF PEEK(49152)<>10 THEN C
  0=1:GOTO6                                  :rem 204
5 C0=2                                       :rem 23
6 DIM DOS%(65)                               :rem 215
7 FR=FRE(0):IF FR<0 THEN FR=FR+65536
                                             :rem 7
8 S=(FR-400)/2:M2=INT(S/256)+1               :rem 128
9 DIM TEMP%(S)                               :rem 18
10 PRINT"{CLR}";
15 PRINT"{2 SPACES}*****************"
                                             :rem 43
20 PRINT"{2 SPACES}*{2 SPACES}DISK MANAGE
   R{2 SPACES}*"                             :rem 173
25 PRINT"{2 SPACES}*****************"
                                             :rem 44
50 PRINT:PRINT"1.DISK DIRECTORY"             :rem 60
60 PRINT"2.FORMAT NEW DISK"                  :rem 117
70 PRINT"3.INITIALIZE DISK"                  :rem 182
80 PRINT"4.COPY FILE ON SAME DISK"
                                             :rem 228
85 PRINT"5.COPY FILE ON NEW (FORMATTED) D
   ISK"                                      :rem 165
88 PRINT"6.COPY BOTH DOS WEDGE PROGRAMS"
                                             :rem 202
90 PRINT"7.RENAME FILE"                      :rem 119
100 PRINT"8.ERASE FILE(S)"                   :rem 252
110 PRINT"9.VALIDATE FILES"                  :rem 135
120 PRINT"10.WRITE DISK MANAGER"             :rem 164
130 PRINT"11.ERROR STATUS"                   :rem 99
140 PRINT"12.EXIT TO BASIC":PRINT:rem 253
170 INPUT"CHOICE{4 SPACES}{4 LEFT}";CHOIC
    E                                        :rem 113
180 IF (CHOICE<1)OR(CHOICE>12)THEN PRINT"
    {UP}";:GOTO 170                          :rem 166
200 ON CHOICE GOSUB 250,300,350,400,800,1
    200,450,500,550,600,650,700              :rem 127
210 GOTO 10                                  :rem 45
250 REM *** DISPLAY DIRECTORY *** :rem 66
251 PRINT"{CLR}"                             :rem 252
252 OPEN 1,8,0,"$"                           :rem 80
253 GET #1,A$,B$                             :rem 241
254 GET#1,A$,B$                              :rem 242
256 GET #1,A$,B$                             :rem 244
258 C=0:IF A$<>""THEN C= ASC(A$) :rem 119
260 IF B$<>""THEN C=C+ ASC(B$)*256
                                             :rem 189
```

```
262 PRINT MID$(STR$(C),2);TAB(3); :rem 86
264 GET#1,B$:IF ST<>0 THEN 282     :rem 71
266 IF B$<> CHR$(34) THEN 264     :rem 145
268 GET #1,B$:IF B$<> CHR$(34) THEN PRINT
    B$;:GOTO 268                  :rem 56
270 GET #1,B$:IF B$= CHR$(32) THEN 270
                                  :rem 74
272 PRINT TAB(18);:C$=""          :rem 22
274 C$=C$+B$:GET #1,B$:IF B$<>"" THEN 274
                                 :rem 242
276 PRINT LEFT$(C$,3)            :rem 146
280 IF ST=0 THEN 254               :rem 7
282 PRINT" BLOCKS FREE "         :rem 77
284 CLOSE 1:PRINT:PRINT:PRINT"HIT ANY KEY
    TO RETURN"                   :rem 23
290 GET X$:IFX$=""THEN 290       :rem 135
295 RETURN                       :rem 128
300 REM *** FORMAT (NEW) DISK ***:rem 162
301 PRINT"{CLR}"                 :rem 248
305 PRINT"INSERT DISK TO BE":PRINT"FORMAT
    TED.":PRINT                  :rem 57
310 PRINT"INPUT DISK NAME":INPUT DISK$
                                 :rem 90
320 PRINT:PRINT"INPUT EXTENDER NAME":INPU
    T EXT$                       :rem 28
325 MACRO$="N0:"+DISK$+","+EXT$  :rem 190
330 OPEN 15,8,15,MACRO$          :rem 230
340 CLOSE 15:MACRO$="":RETURN    :rem 222
350 REM *** INITIALIZE DISK ***  :rem 149
355 PRINT"{CLR}"                   :rem 1
360 PRINT"INSERT DISK TO BE":PRINT"INITIA
    LIZED.":PRINT                :rem 202
370 PRINT"HIT <RETURN> TO":PRINT"INITIALI
    ZE":INPUT X$                 :rem 144
380 OPEN 15,8,15,"I"             :rem 226
390 CLOSE 15:RETURN              :rem 146
400 REM *** COPY FILE ON SAME DISK ***
                                 :rem 189
405 PRINT"{CLR}":PRINT:PRINT     :rem 139
410 PRINT"INPUT SOURCE FILE NAME":INPUT D
    ISK$                         :rem 33
420 PRINT:PRINT"INPUT NEW FILE NAME":INPU
    T NWS$                       :rem 207
425 MACRO$="C:"+NWS$+"="+DISK$   :rem 156
430 OPEN 15,8,15,MACRO$          :rem 231
440 CLOSE 15:MACRO$="":RETURN    :rem 223
450 REM *** RENAME FILE ***        :rem 81
455 PRINT"{CLR}":PRINT           :rem 201
460 PRINT"INPUT OLD FILE NAME":INPUT DISK
    $                            :rem 52
470 PRINT:PRINT"INPUT NEW FILE NAME":INPU
    T NWS$                       :rem 212
475 MACRO$="R:"+NWS$+"="+DISK$   :rem 176
480 OPEN 15,8,15,MACRO$          :rem 236
490 CLOSE 15:MACRO$="":RETURN    :rem 228
500 REM *** ERASE FILE ***         :rem 5
505 PRINT"{CLR}":PRINT:PRINT     :rem 140
510 PRINT"INPUT FILE NAME(S) TO DELETE":I
    NPUT DISK$                   :rem 75
520 PRINT:PRINT:PRINT"HIT ANY KEY TO DELE
    TE"                            :rem 2
525 GET X$:IF X$="" THEN 525     :rem 137
530 MACRO$="S0:"+DISK$           :rem 230
535 OPEN 15,8,15,MACRO$          :rem 237
540 CLOSE 15:MACRO$="":RETURN    :rem 224
550 REM *** VALIDATE FILES ***    :rem 55
555 PRINT"{CLR}":PRINT:PRINT     :rem 145
560 PRINT"WARNING:OPEN FILES ":PRINT"WILL
    BE DELETED"                  :rem 34
570 PRINT:PRINT:PRINT"HIT ANY KEY TO VALI
    DATE"                        :rem 158
575 GET X$:IF X$="" THEN 575     :rem 147
580 OPEN 1,8,15,"V"              :rem 188
590 CLOSE 1:RETURN                :rem 95
600 REM ** WRITE DISKMANAGER PROGRAM **
                                 :rem 235
605 PRINT"{CLR}":PRINT:PRINT     :rem 141
610 PRINT"INSERT DISK TO BE WRITTEN TO.":
    PRINT                        :rem 87
620 PRINT:PRINT:PRINT"HIT ANY KEY TO WRIT
    E DISK MANAGER"                :rem 1
622 GET X$:IF X$="" THEN 622     :rem 133
625 OPEN 1,8,15                  :rem 246
630 SAVE "@0:DISKMANAGER",8       :rem 64
635 CLOSE 1                       :rem 69
640 RETURN                       :rem 122
650 REM *** DISPLAY ERROR STATUS ***
                                 :rem 255
655 OPEN15,8,15                   :rem 46
660 INPUT#15,A$,B$,C$,D$         :rem 255
670 PRINT"{CLR}":PRINT:PRINT     :rem 143
680 PRINT"ERROR STATUS:{2 SPACES}"B$:PRIN
    T:PRINT"ERROR NUMBER:{2 SPACES}"A$
                                  :rem 65
690 PRINT:PRINT:PRINT"HIT ANY KEY TO RETU
    RN"                           :rem 55
695 GET X$:IF X$=""THEN 695      :rem 153
697 CLOSE 15:RETURN              :rem 156
700 REM *** RETURN TO BASIC ***   :rem 92
705 PRINT"{CLR}":PRINT:PRINT     :rem 142
710 PRINT "NOTE:DISKMANAGER PROGRAM IS ST
    ILL RESIDENT"                :rem 153
720 END                          :rem 112
800 REM *** COPY FILE ON NEW DISK ***
                                 :rem 133
801 PRINT "{CLR}"                :rem 253
802 CLOSE 15                     :rem 118
803 MAX=INT(S/256)                :rem 25
804 PRINT "{2 SPACES}MAXIMUM SIZE OF FILE
     WHICH CAN BE COPIED IS "MAX" BLOCKS"
    :PRINT                        :rem 70
806 IF MAX>=M2 THEN GOTO 809      :rem 22
807 PRINT "{2 SPACES}FOR MAXIMUM COPY SIZ
    E OF "M2" BLOCKS,";          :rem 104
808 PRINT "TURN COMPUTER OFF/ON AND RELOA
    D PROG."                     :rem 192
809 PRINT:PRINT"{2 SPACES}READ/WRITE RATE
     IS APPROXIMATELY 6 BLOCKS/MINUTE"
                                 :rem 187
810 PRINT:PRINT "INPUT NAME OF FILE TO BE
     COPIED"                     :rem 117
820 INPUT FILE$                  :rem 110
830 PRINT:PRINT "{3 SPACES}INPUT FILE TYP
    E:"                           :rem 95
840 PRINT "{5 SPACES}P PROGRAM"  :rem 213
850 PRINT "{5 SPACES}S SEQUENTIAL"
                                 :rem 188
860 PRINT "{5 SPACES}U USER"        :rem 3
870 PRINT "{5 SPACES}R RELATIVE"  :rem 30
880 INPUT TYPE$                  :rem 150
890 PRINT:PRINT "INSERT SOURCE DISK AND P
    RESS <RETURN>"               :rem 196
900 GET W$:IF W$="" THEN GOTO 900:rem 186
910 GOSUB 1000:REM READ FILE INTO TEMP
                                 :rem 165
920 PRINT:PRINT "INSERT DESTINATION DISK
    {SPACE}AND PRESS <RET>"       :rem 58
930 GET W$:IF W$="" THEN GOTO 930:rem 192
940 GOSUB 1050:REM WRITE FILE FROM TEMP$
                                  :rem 58
950 PRINT:PRINT "MAKE ANOTHER COPY";:INPU
    TW$                           :rem 32
```

```
960 IF LEFT$(W$,1)="Y" THEN GOTO 920
                                  :rem 131
970 GOTO 1100                     :rem 155
980 REM - CHECK FOR GOOD OPEN      :rem 82
985 INPUT#15,A$,B$,C$,D$           :rem 9
990 IF VAL(A$)=0 THEN RETURN      :rem 70
995 PRINT A$,B$,C$,D$:CLOSE 15:STOP
                                  :rem 232
1000 REM - READ FILE INTO TEMP%   :rem 163
1002 I=1                          :rem 122
1004 OPEN 15,8,15                  :rem 83
1006 OPEN 5,8,5,"0:"+FILE$+","+TYPE$+",R"
                                   :rem 85
1008 GOSUB 980                    :rem 234
1009 PRINT "{5 SPACES}NOW READING . . ."
                                   :rem 19
1010 GET#5,A$                     :rem 139
1012 TEMP%(I)=ASC(A$+CHR$(0))      :rem 48
1014 I=I+1                        :rem 241
1016 IF ST=0 THEN 1010             :rem 92
1018 PRINT:PRINT "FILE=? ";FILE$,"ST=";ST,
     "BYTES=";I:CLOSE 5:CLOSE 15 :rem 39
1020 RETURN                       :rem 163
1050 REM - WRITE FILE FROM TEMP%   :rem 17
1052 OPEN 15,8,15                  :rem 86
1054 OPEN 5,8,5,"0:"+FILE$+","+TYPE$+",W"
                                   :rem 93
1056 GOSUB 980                    :rem 237
1057 PRINT "{5 SPACES}NOW WRITING . . ."
                                   :rem 64
1058 J=1                          :rem 134
1060 PRINT#5,CHR$(TEMP%(J));       :rem 91
1062 J=J+1                        :rem 246
1064 IF J<I THEN 1060              :rem 31
1066 PRINT:PRINT "FILE= ";FILE$,"BYTES=";
     J:CLOSE 5:CLOSE 15           :rem 245
1068 RETURN                       :rem 175
1100 RETURN                       :rem 162
1200 REM ***COPY BOTH DOS PROGRAMS ***
                                   :rem 92
1205 PRINT "{CLR}":PRINT "INSERT SOURCE D
     ISK WITH WEDGE AND/OR DOS"; :rem 116
1210 PRINT " PROGRAM(S) AND PRESS <RETURN
     >"                            :rem 11
1215 GET W$:IF W$="" THEN GOTO 1215
                                   :rem 26
1218 TYPE$="P"                      :rem 3
1219 IF C0=1 THEN FILE$="VIC-20 WEDGE":GO
     TO 1235                      :rem 76
1220 FILE$="C-64 WEDGE":GOSUB 1000:rem 75
1225 FOR C=1 TO 64:DOS%(C)=TEMP%(C):NEXT
     {SPACE}C:REM MOVE C-64 WEDGE TO SMAL
     L BUFFER                     :rem 161
1230 FILE$="DOS 5.1"                :rem 5
1235 GOSUB 1000:PRINT:PRINT "INSERT DESTI
     NATION DISK AND PRESS <RET>":rem 229
1240 GET W$:IF W$="" THEN GOTO 1240
                                   :rem 22
1245 GOSUB 1050:IF C0=1 THEN RETURN
                                  :rem 203
1250 FOR C=1 TO 64:TEMP%(C)=DOS%(C):NEXT
     {SPACE}C                      :rem 46
1255 FILE$="C-64 WEDGE":I=64:GOSUB 1050:R
     EM WRITE C-64 WEDGE          :rem 113
1290 RETURN                       :rem 172
```

Spelling Bee

(Article on page 124.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

Program 1: Spelling Bee For VIC-20

```
1 POKE36879,30:PRINT"{BLK}":REM WHITE SCR
  EEN BLACK LETTERS                :rem 122
2 DIML$(75)                         :rem 57
3 ::::REM SPELLING BEE              :rem 41
4 PRINT"{CLR}"TAB(9)"{BLK}IU{YEL}" :rem 9
5 PRINTTAB(8)"U**I"             :rem 132
10 PRINTTAB(8)"-{BLK}WW{YEL}-"     :rem 40
15 PRINTTAB(8)"-{BLK}JK{YEL}-"     :rem 20
20 PRINTTAB(8)"J{S}{A}K"      :rem 134
25 PRINTTAB(7)"U*{X}{Z}*I"   :rem 31
30 PRINTTAB(6)"N-{BLK}{RVS}{4 SPACES}
   {OFF}{YEL}-M"                   :rem 185
35 PRINTTAB(5)"N -{4 SPACES}- M" :rem 235
40 PRINTTAB(4)"N{2 SPACES}-{BLK}{RVS}
   {4 SPACES}{OFF}{YEL}-{2 SPACES}M"
                                   :rem 184
45 PRINTTAB(3)"N{2 SPACES}N-{4 SPACES}-M
   {2 SPACES}M"                    :rem 133
50 PRINTTAB(3)"M N -{BLK}{RVS}{4 SPACES}
   {OFF}{YEL}- M N"                 :rem 83
55 PRINTTAB(4)"{T}{2 SPACES}J*{2 R}
   *K{2 SPACES}{T}"             :rem 86
110 PRINT"{BLK}{3 DOWN}HELLO! MY NAME IS"
                                    :rem 30
113 PRINT"{DOWN}{YEL}SPELLING BEE{BLK}."
                                   :rem 253
115 PRINT"{DOWN}WHAT IS YOUR NAME? ":PRIN
    T:GOSUB1630                     :rem 67
120 PRINT"{CLR}{5 DOWN}{4 RIGHT}WOULD YOU
     LIKE"                         :rem 109
122 PRINT"{DOWN}{5 RIGHT}INSTRUCTIONS"
                                   :rem 189
123 PRINT"{DOWN}{7 RIGHT}(Y OR N)?"
                                    :rem 27
125 GETA$:IFA$=""THEN125            :rem 83
130 IFA$="Y"THEN700                 :rem 40
135 IFA$="N"THEN320                 :rem 32
140 PRINT"{DOWN}YES OR NO ONLY PLEASE":FO
    RT=1TO1500:NEXTT:GOTO120       :rem 193
143 :                              :rem 210
145 REM SPELL AND FLASH WORD       :rem 123
147 :                              :rem 214
150 GOSUB1800:PRINT"{CLR}{BLK}{DOWN}THAT
    {SPACE}IS INCORRECT."          :rem 194
160 PRINT"{DOWN}THE CORRECT SPELLING"
                                   :rem 202
170 PRINT"{DOWN}IS:{RED}":FORT=1TO2000:NE
    XTT                            :rem 129
180 A$="{CLR}{RED}{9 DOWN}{6 RIGHT}":PRIN
    TA$;                           :rem 220
190 FORI=1TOLEN(L$(L)):PRINTMID$(L$(L),I,
    1);:FORJ=1TO500:NEXTJ,I        :rem 145
200 FORR=1TO20:PRINT"{CLR}";A$;"{RVS}";L$
    (L);"{OFF}":FORI=1TO15:NEXTI:PRINT"
    {CLR}";A$;L$(L)                :rem 143
210 FORI=1TO15:NEXTI:NEXTR         :rem 199
211 IFL$(L)=L$(25)THEN360:REM CATCH 3RD M
    ISTAKE ON LAST EASY WORD       :rem 244
212 IFL$(L)=L$(50)THEN360:REM CATCH 3RD M
    ISTAKE ON LAST MEDIUM WORD     :rem 130
```

```
213 IFL$(L)=L$(75)THEN360:REM CATCH 3RD M
    ISTAKE ON LAST HARD WORD      :rem 232
215 PRINT"{CLR}{10 DOWN}{2 RIGHT}HERE, TR
    Y ANOTHER.":FORT=1TO2000:NEXTT
                                  :rem 131
220 RETURN                        :rem 116
222 :                             :rem 208
225 :REM WORDS                    :rem 70
227 :                             :rem 213
230 DATACAT,DOG,ANT,AND,ANY,AN,AM,CAN,CAP
    ,TOP,STOP,POT,TAP,PAT,CAR,CART,ART
                                  :rem 95
240 DATAHAND,HAT,FOOT,BOOK,FLY,SKY,SAW,SE
    E                             :rem 233
250 DATASNAKE,SNACK,BOAT,MANY,LOOSE,LOSE,
    CHOOSE,CHOSE,CHASE,CHEESE,STOVE,STORE
                                  :rem 233
260 DATASTEAL,STAIRS,WHOLE,SCREW,WASHER,H
    ORSE,STEER,STONE,PLANT,RADIO,COUCH
                                  :rem 115
270 DATACHAIR,TABLE               :rem 174
280 DATASTEREO,STATION,TELEVISION,CUSHION
    ,CAUTION,FREEZER,WEATHER,WHETHER
                                  :rem 68
290 DATAWHOEVER,HAMMOCK,COMMITTEE,COMPUTE
    R,LICENSE,MONITOR,DICTIONARY,RECEIVE
                                  :rem 67
300 DATARECORD,SPEAKER,CURTAIN,PILLOW,WAT
    ERBED,WINDOW,THEATER,PIANO,LIVER
                                  :rem 240
310 :                             :rem 206
313 :REM NO INSTRUCTIONS REQUESTED
                                  :rem 185
315 :                             :rem 211
320 PRINT"{CLR}{4 DOWN}GREAT, ";NA$;".":P
    RINT"{4 DOWN}{6 RIGHT}LET'S GO!"
                                  :rem 138
330 PRINT:PRINT"{DOWN}{RIGHT}(PRESS {RVS}
    SPACE{OFF} BAR TO)"           :rem 194
335 PRINT"{DOWN}{5 RIGHT}(CONTINUE.)"
                                  :rem 242
340 GETA$:IFA$<>" "THEN340        :rem 142
350 GOTO990                       :rem 115
355 :                             :rem 215
360 PRINT"{CLR}{5}{5 DOWN}WASN'T THAT F
    UN?":GOTO1735                 :rem 58
365 :                             :rem 216
685 :                             :rem 221
690 :REM INSTRUCTIONS             :rem 114
695 :                             :rem 222
700 PRINT"{CLR}{4 DOWN}GREAT! NOW, ";NA$;
    ",":PRINT"{DOWN}ALL YOU HAVE TO DO"
                                  :rem 216
710 PRINT"{DOWN}IS FOLLOW THESE SIMPLE"
                                  :rem 44
715 PRINT"DIRECTIONS."            :rem 144
720 PRINT"{4 DOWN}(PRESS THE {RVS}SPACE
    {OFF} BAR)"                   :rem 82
725 PRINT"{DOWN}{3 RIGHT}(TO CONTINUE.)"
                                  :rem 94
730 GETA$:IFA$<>" "THEN730        :rem 148
740 PRINT"{CLR}FIRST,THE ALPHABET, A"
                                  :rem 66
742 PRINT"{DOWN}RETURN ARROW (←), AND"
                                  :rem 153
745 PRINT"{DOWN}A {RED}RED V{BLK} WILL BE
     PLACED"                      :rem 136
750 PRINT"ON THE LOWER HALF OF"   :rem 36
755 PRINT"{DOWN}THE SCREEN WITH A"
                                  :rem 161
760 PRINT"{DOWN}POINTER (↑) UNDER THE"
                                  :rem 174
765 PRINT"{DOWN}{RED}RED V{BLK}.
    {2 SPACES}THEN, A WORD"       :rem 231
770 PRINT"{DOWN}WILL BE FLASHED ONTO":PRI
    NT"{DOWN}THE SCREEN."         :rem 97
775 PRINT"{2 DOWN}(PRESS THE {RVS}SPACE
    {OFF} BAR)"                   :rem 58
780 PRINT"{DOWN}{3 RIGHT}(TO CONTINUE.)"
                                  :rem 95
785 GETA$:IFA$<>" "THEN785        :rem 168
790 PRINT"{CLR}{DOWN}USING A JOYSTICK, TY
    PE"                           :rem 186
795 PRINT"THE WORD BY PLACING"    :rem 44
800 PRINT"{DOWN}THE POINTER (↑) UNDER"
                                  :rem 169
810 PRINT"{DOWN}THE CORRECT LETTER AND"
                                  :rem 17
820 PRINT"PRESSING THE {RVS}FIRE{OFF}":PR
    INT"{DOWN}BUTTON."            :rem 167
830 PRINT"{DOWN}WHEN THE WORD HAS BEEN"
                                  :rem 194
840 PRINT"SPELLED CORRECTLY,"     :rem 89
841 PRINT"{2 DOWN}(PRESS THE {RVS}SPACE
    {OFF} BAR)"                   :rem 52
842 PRINT"{DOWN}{3 RIGHT}(TO CONTINUE.)"
                                  :rem 94
843 GETA$:IFA$<>" "THEN843        :rem 158
845 PRINT"{CLR}{DOWN}PLACE THE POINTER (↑
    )"                            :rem 44
850 PRINT"{DOWN}UNDER RETURN (←) AND"
                                  :rem 96
855 PRINT"{DOWN}PRESS THE {RVS}FIRE{OFF}
    {SPACE}BUTTON."               :rem 198
860 PRINT"IF YOU MAKE A MISTAKE" :rem 104
865 PRINT"{DOWN}BEFORE YOU FINISH, PUT"
                                  :rem 27
870 PRINT"THE POINTER (↑) UNDER" :rem 159
875 PRINT"{DOWN}THE {RED}RED V{BLK} AND P
    RESS"                         :rem 36
880 PRINT"{DOWN}THE {RVS}FIRE{OFF} BUTTON
    ."                            :rem 55
883 PRINT"{3 DOWN}(PRESS THE {RVS}SPACE
    {OFF} BAR)"                   :rem 75
885 PRINT"{DOWN}{3 RIGHT}(TO CONTINUE.)"
                                  :rem 101
890 GETA$:IFA$<>" "THEN890        :rem 162
895 PRINT"{CLR}YOU WILL THEN BE ABLE"
                                  :rem 9
898 PRINT"{DOWN}TO RE-SPELL THE WORD"
                                  :rem 143
900 PRINT"{DOWN}WITH NO PENALTY.
    {2 SPACES}YOU"                :rem 156
903 PRINT"{DOWN}WILL BE GIVEN THREE"
                                  :rem 46
905 PRINT"{DOWN}CHANCES TO GET IT"
                                  :rem 149
908 PRINT"{DOWN}RIGHT.{2 SPACES}IF YOU HA
    VEN'T"                        :rem 168
910 PRINT"GOTTEN IT RIGHT BY"     :rem 242
913 PRINT"{DOWN}THEN, I WILL TELL YOU"
                                  :rem 137
915 PRINT"{DOWN}THE CORRECT SPELLING."
918 PRINT"{2 DOWN}(PRESS THE {RVS}SPACE
    {OFF} BAR)"                   :rem 57
920 PRINT"{DOWN}{3 RIGHT}(TO CONTINUE.)"
                                  :rem 91
923 GETA$:IFA$<>" "THEN923        :rem 156
925 PRINT"{CLR}{DOWN}YOU WILL START WITH
    {SPACE}A"                     :rem 85
930 PRINT"{DOWN}SCORE OF 75 AND ONE"
                                  :rem 176
```

```
935 PRINT"{DOWN}POINT WILL BE DEDUCTED"
                                    :rem 14
940 PRINT"EACH TIME YOU MISSPELL" :rem 20
945 PRINT"A WORD."                :rem 30
950 PRINT"{2 DOWN}EASY, HUH?"     :rem 19
955 PRINT"{4 DOWN}(PRESS THE {RVS}SPACE
    {OFF} BAR)"                   :rem 92
960 PRINT"{DOWN}{3 RIGHT}(TO CONTINUE.)"
                                  :rem 95
965 GETA$:IFA$<>" "THEN965        :rem 168
990 S=0:L=0:PRINT"{CLR}{DOWN}HOW HARD WOU
    LD YOU"                       :rem 153
995 PRINT"{DOWN}LIKE YOUR WORDS,{DOWN}"
                                  :rem 201
1000 PRINTNA$;"?"                 :rem 191
1010 PRINTTAB(7)"{2 DOWN}{RED}1) EASY"
                                  :rem 188
1020 PRINTTAB(7)"{DOWN}{RED}2) MEDIUM"
                                  :rem 60
1030 PRINTTAB(7)"{DOWN}{RED}3) HARD{BLK}"
     :PRINT                       :rem 243
1040 PRINT"{2 DOWN}{5 RIGHT}('Q' TO QUIT)
     "                            :rem 31
1060 GETA$:IFA$=""THEN1060        :rem 177
1070 IFA$="1"THENPRINT"{CLR}":FORX=1TO25:
     GOTO1130:REM EASY            :rem 122
1080 IFA$="2"THENPRINT"{CLR}":FORX=26TO50
     :GOTO1130:REM MEDIUM         :rem 64
1090 IFA$="3"THENPRINT"{CLR}":FORX=51TO75
     :GOTO1130:REM HARD           :rem 165
1100 IFA$="Q"THEN1735             :rem 135
1110 PRINT"PLEASE TRY AGAIN,";NA$;".":PRI
     NT"YOU PRESSED ";A$:FORX=1TO2000:NEX
     TX:GOTO990                   :rem 100
1130 RESTORE:FORL=1TO75           :rem 211
1133 :                            :rem 2
1135 :REM READ THE WORDS          :rem 116
1138 :                            :rem 7
1140 READL$(L)                    :rem 239
1150 IFL=XTHEN1170                :rem 47
1160 NEXT                         :rem 7
1170 FORN=1TO3:REM MISTAKE COUNTER
                                  :rem 142
1180 LL=(22-LEN(L$(L)))/2:PRINT"{CLR}
     {GRN}{10 DOWN}";TAB(LL);L$(L):FORY=1
     TO2000:NEXTY                 :rem 231
1182 Z=L                          :rem 175
1183 IFL>25THENZ=L-25:IFL>50THENZ=L-50
                                  :rem 79
1185 PRINT"{CLR}{PUR}WORD NUMBER:";Z:PRIN
     T"{DOWN}SCORE:";75-S         :rem 156
1190 PRINT"{RED}{2 DOWN}NOW SPELL IT, ";N
     A$;".{BLK}"                  :rem 66
1200 PRINT"{DOWN}('END' AND '{RED}←{BLK}
     ' TO GO)"                    :rem 128
1203 PRINT"(ON TO HARDER WORDS )":rem 109
1205 PRINT"('Q' AND '{RED}←{BLK}' TO QUI
     T)"                          :rem 155
1210 GOSUB1390:PRINTCHR$(13):IFD$="END"TH
     EN990                        :rem 232
1220 IFD$="Q"THEN1735             :rem 141
1230 IFD$=""THEN1260:REM CATCHES CARRIAGE
      RETURN WITH EMPTY SET       :rem 36
1240 IFD$=L$(25)THEN1320:REM LAST EASY WO
     RD                           :rem 216
1241 IFD$=L$(50)THEN1320:REM LAST MEDIUM
     {SPACE}WORD                  :rem 102
1242 IFD$=L$(75)THEN1320:REM LAST HARD WO
     RD                           :rem 204
1250 IFD$=L$(L)THEN1300           :rem 252
1260 IFN=3THENGOSUB150:NEXTX      :rem 44
1270 GOSUB1800:PRINT"{5 DOWN}TRY AGAIN, "
     ;NA$:PRINT"THAT'S INCORRECT.":FORY=1
     TO3000:NEXTY                 :rem 153
1280 S=S+1                        :rem 10
1290 NEXTN                        :rem 89
1300 GOSUB1810:PRINT"{RED}{5 DOWN}
     {3 RIGHT}CORRECT! NOW TRY"   :rem 7
1305 PRINT"{7 RIGHT}ANOTHER.{BLK}":FORY=1
     TO2000:NEXTY                 :rem 83
1310 NEXTX                        :rem 92
1320 FORHT=1TO5:GOSUB1810:NEXTHT:PRINT"
     [3]{6 DOWN}CORRECT![5]":FORT=1TO
     2000:NEXTT:GOTO360           :rem 27
1380 RETURN                       :rem 172
1385 REM PRINT ALPHABET AND POINTER
                                  :rem 119
1390 PRINT:PRINTTAB(7):D$="":SC=4409:CO=S
     C+33792:CN=1                 :rem 140
1400 POKESC,CN:POKECO,5           :rem 163
1410 SC=SC+1:CO=CO+1:CN=CN+1:IFSC=4422THE
     NSC=4452:CO=SC+33792         :rem 130
1415 IFSC=4465THEN1430            :rem 247
1420 GOTO1400                     :rem 197
1430 POKESC,31:POKECO,2:POKESC-57,86:POKE
     CO-57,2                      :rem 154
1440 S1=4430                      :rem 85
1450 IFS1<4430THENS1=4487:REM MOVE POINTE
     R TO LEFT ARROW SYMBOL       :rem 80
1455 IFS1=4444THENS1=4474         :rem 178
1460 IFS1=4473THENS1=4443         :rem 172
1465 IFS1>4487THENS1=4430:REM MOVE POINTE
     R TO LETTER A                :rem 221
1470 C1=S1+33792                  :rem 52
1480 POKES1,30:POKEC1,2           :rem 74
1490 GOSUB1540                    :rem 24
1500 IFJV=8THENS1=S1+1:C1=C1+1:POKES1-1,3
     2:FORT=1TO25:NEXTT:REM MOVE RIGHT
                                  :rem 94
1510 IFJV=4THENS1=S1-1:C1=C1-1:POKES1+1,3
     2:FORT=1TO25:NEXTT:REM MOVE LEFT
                                  :rem 10
1520 IFJV=FRTHENGOSUB1570:IFB$=CHR$(13)TH
     ENPRINT"{BLK}":RETURN        :rem 20
1530 GOTO1450                     :rem 204
1533 :                            :rem 6
1535 :REM READ JOYSTICK           :rem 120
1538 :                            :rem 11
1540 POKE37154,127:REM DISABLE KEYBOARD
                                  :rem 38
1542 EW=PEEK(37152)AND128:POKE37154,255:R
     EM ENABLE KEYBOARD           :rem 214
1545 WE=PEEK(37151)AND16:FB=PEEK(37151)AN
     D32                          :rem 7
1548 JV=0:FR=16:IF WE=0THEN JV=4  :rem 103
1550 IF EW=0 THEN JV=8            :rem 167
1553 IF FB=0 THEN FR=0            :rem 134
1560 RETURN                       :rem 172
1570 H=PEEK(S1-22)                :rem 221
1580 GETB$                        :rem 20
1590 B$=CHR$(H+64)                :rem 161
1600 IFS1=4430THENPRINT"{CLR}{8 DOWN}":GO
     TO1390:REM START SAME WORD AGAIN WIT
     H NO PENALTY                 :rem 161
1605 IFB$="←"THENB$=CHR$(13):RETURN
                                  :rem 67
1610 PRINT"{GRN}";TAB(LL);B$;     :rem 142
1620 D$=D$+B$:FORT=1TO180:NEXTT:RETURN
                                  :rem 109
1624 :                            :rem 7
```

```
1625 REM NAME INPUT                    :rem 99
1626 :                                 :rem 9
1630 NA$=""                            :rem 254
1635 PRINT"[@]{LEFT}";                 :rem 28
1640 GETN$:IFN$=""THEN1640             :rem 211
1650 PRINTN$;                          :rem 6
1660 IFN$=CHR$(13)THENRETURN           :rem 208
1670 NA$=NA$+N$:GOTO1635               :rem 80
1671 :                                 :rem 9
1675 REM ANSWER INPUT                  :rem 23
1676 :                                 :rem 14
1680 A$=""                             :rem 181
1685 PRINT"[@]{LEFT}";                 :rem 33
1690 GETN$:IFN$=""THEN1690             :rem 221
1700 PRINTN$;                          :rem 2
1710 IFN$=CHR$(13)THENRETURN           :rem 204
1720 A$=A$+N$:GOTO1685                 :rem 181
1730 :                                 :rem 5
1735 REM DOUBLE CHECK                  :rem 205
1737 :                                 :rem 12
1740 PRINT"{CLR}{BLK}{5 DOWN}{RIGHT}IF YO
     U WISH TO STOP,"                  :rem 14
1745 PRINT"{DOWN}{7 RIGHT}PRESS {RVS}Q
     {OFF}."                           :rem 46
1750 PRINT"{DOWN}{2 RIGHT}IF NOT, PRESS T
     HE"                               :rem 3
1755 PRINT"{DOWN}{6 RIGHT}{RVS}SPACE{OFF}
      BAR."                            :rem 117
1760 GETA$:IFA$=""OR A$<>" "AND A$<>"Q" T
     HEN1760                           :rem 202
1770 IFA$<>"Q"THEN990                  :rem 163
1780 PRINT"{CLR}{5 DOWN}THANK YOU FOR PLA
     YING."                            :rem 37
1785 IFL<>0THENPRINT"{DOWN}{BLK}( YOUR SC
     ORE WAS";75-S;")"                 :rem 168
1790 PRINT"{DOWN}{BLK}{2 RIGHT}SEE YOU NE
     XT TIME!":END                     :rem 247
1800 POKE36878,15:FORZ=180TO145STEP-1:POK
     E36876,Z:NEXT:POKE36878,0:RETURN
                                       :rem 39
1810 POKE36878,15:FORZ=220TO255:POKE36876
     ,Z:NEXT:POKE36878,0:RETURN        :rem 139
```

Program 2:

Spelling Bee For Commodore 64

```
1 POKE53281,1:PRINT"[5]":POKE788,52:REM
   WHITE SCREEN,GRAY LETTERS,IGNORE STOP
   {SPACE}KEY                          :rem 6
2 DIML$(75)                            :rem 57
3 ::::REM SPELLING BEE                 :rem 41
4 PRINT"{CLR}"TAB(18)"{BLK}IU{YEL}"
                                       :rem 57
5 PRINTTAB(17)"U**I"                   :rem 180
10 PRINTTAB(17)"-{BLK}WW{YEL}-"        :rem 88
15 PRINTTAB(17)"-{BLK}JK{YEL}-"        :rem 68
20 PRINTTAB(17)"J[S][A]K"              :rem 182
25 PRINTTAB(16)"U*[X][Z]*I"            :rem 79
30 PRINTTAB(15)"N-{RVS}{BLK}{4 SPACES}
   {OFF}{YEL}-M"                       :rem 233
35 PRINTTAB(14)"N -{4 SPACES}- M"      :rem 27
40 PRINTTAB(13)"N{2 SPACES}-{RVS}{BLK}
   {4 SPACES}{OFF}{YEL}-{2 SPACES}M"
                                       :rem 232
45 PRINTTAB(12)"N{2 SPACES}N-{4 SPACES}-M
   {2 SHIFT-SPACE}M"                   :rem 245
50 PRINTTAB(12)"M N -{RVS}{BLK}{4 SPACES}
   {OFF}{YEL}- M N"                    :rem 131
55 PRINTTAB(13)"[T]{2 SPACES}J*[2 R]
   *K{2 SPACES}[T]"                    :rem 134
110 PRINT"[5]{3 DOWN}HELLO! MY NAME IS
   {SPACE}SPELLING BEE."               :rem 126
115 PRINT"{DOWN}WHAT IS YOUR NAME? ";:GOS
   UB1630                              :rem 183
120 PRINT"{CLR}{5 DOWN}{RIGHT}WOULD YOU L
   IKE INSTRUCTIONS (Y OR N)?"         :rem 163
125 GETA$:IFA$=""THEN125               :rem 83
130 IFA$="Y"THEN700                    :rem 40
135 IFA$="N"THEN320                    :rem 32
140 PRINT"{DOWN}{9 RIGHT}YES OR NO ONLY P
   LEASE":FORT=1TO1500:NEXTT:GOTO120
                                       :rem 198
143 :                                  :rem 210
145 REM SPELL AND FLASH WORD           :rem 123
147 :                                  :rem 214
150 GOSUB1800:PRINT"[4]{5 DOWN}
   {11 RIGHT}THAT IS INCORRECT.":rem 185
160 PRINT"{8 RIGHT}THE CORRECT SPELLING "
   ;                                   :rem 220
170 PRINT"IS:[5]":FORT=1TO1000:NEXTT
                                       :rem 235
180 A$="{CLR}[3]{10 DOWN}{15 RIGHT}":PR
   INTA$;                              :rem 108
190 FORI=1TOLEN(L$(L)):PRINTMID$(L$(L),I,
   1);:FORJ=1TO500:NEXTJ,I             :rem 145
200 FORR=1TO20:PRINT"{CLR}";A$;"{RVS}";L$
   (L);"{OFF}":FORI=1TO15:NEXTI:PRINT"
   {CLR}";A$;L$(L)                     :rem 143
210 FORI=1TO15:NEXTI:NEXTR             :rem 199
211 IFL$(L)=L$(25)THEN360:REM CATCH 3RD M
   ISTAKE ON LAST EASY WORD            :rem 244
212 IFL$(L)=L$(50)THEN360:REM CATCH 3RD M
   ISTAKE ON LAST MEDIUM WORD          :rem 130
213 IFL$(L)=L$(75)THEN360:REM CATCH 3RD M
   ISTAKE ON LAST HARD WORD            :rem 232
220 RETURN                             :rem 116
230 DATACAT,DOG,ANT,AND,ANY,AN,AM,CAN,CAP
   ,TOP,STOP,POT,TAP,PAT,CAR,CART,ART
                                       :rem 95
240 DATAHAND,HAT,FOOT,BOOK,FLY,SKY,SAW,SE
   E                                   :rem 233
250 DATASNAKE,SNACK,BOAT,MANY,LOOSE,LOSE,
   CHOOSE,CHOSE,CHASE,CHEESE,STOVE,STORE
                                       :rem 233
260 DATASTEAL,STAIRS,WHOLE,SCREW,WASHER,H
   ORSE,STEER,STONE,PLANT,RADIO,COUCH
                                       :rem 115
270 DATACHAIR,TABLE                    :rem 174
280 DATASTEREO,STATION,TELEVISION,CUSHION
   ,CAUTION,FREEZER,WEATHER,WHETHER
                                       :rem 68
290 DATAWHOEVER,HAMMOCK,COMMITTEE,COMPUTE
   R,LICENSE,MONITOR,DICTIONARY,RECEIVE
                                       :rem 67
300 DATARECORD,SPEAKER,CURTAIN,PILLOW,WAT
   ERBED,WINDOW,THEATER,PIANO,LIVER
                                       :rem 240
320 PRINT"{CLR}{5 DOWN}{8 RIGHT}GREAT, ";
   NA$;".{2 SPACES}LET'S GO."          :rem 147
330 PRINT"{DOWN}{4 RIGHT}(PRESS {RVS}SPAC
   E{OFF} BAR TO CONTINUE.)"           :rem 229
340 GETA$:IFA$<>" "THEN340             :rem 142
350 GOTO990                            :rem 115
360 PRINT"{CLR}[5]{5 DOWN}WASN'T THAT F
   UN?":GOTO1735                       :rem 58
700 PRINT"{CLR}{8 DOWN}{5 RIGHT}GREAT! NO
   W, ";NA$;", ALL YOU":PRINT"{DOWN}
   {2 RIGHT}HAVE TO DO IS ";           :rem 190
710 PRINT"FOLLOW THESE SIMPLE":PRINT"
   {DOWN}{2 RIGHT}DIRECTIONS."         :rem 247
720 PRINT:PRINT"{3 DOWN}{2 RIGHT}(PRESS T
```

```
    HE {RVS}SPACE{OFF} BAR TO CONTINUE.)"
                                    :rem 120
730 GETA$:IFA$<>" "THEN730          :rem 148
740 PRINT"{CLR}{5 DOWN}FIRST,THE ALPHABET
    , A RETURN ARROW (←),"          :rem 222
741 PRINT"AND A RED X WILL BE PLACED ON T
    HE"                             :rem 154
750 PRINT"LOWER HALF OF THE SCREEN WITH A
    "                               :rem 196
760 PRINT"POINTER (↑) UNDER THE {3}RED
    {SPACE}X{5}.{2 SPACES}THEN,"
                                    :rem 135
770 PRINT"A WORD WILL BE FLASHED ONTO THE
     SCREEN."                       :rem 177
780 PRINT"{2 DOWN}USING A JOYSTICK PLUGGE
    D INTO"                         :rem 11
790 PRINT"{RVS}CONTROL PORT 2{OFF} ON THE
     RIGHT SIDE OF THE"             :rem 68
800 PRINT"COMPUTER, SPELL THE WORD BY PLA
    CING THE"                       :rem 27
810 PRINT"POINTER (↑) UNDER THE CORRECT L
    ETTER"                          :rem 123
820 PRINT"AND PRESSING THE {RVS}FIRE{OFF}
     BUTTON.":PRINT:PRINT           :rem 236
821 PRINT"{2 RIGHT}(PRESS THE {RVS}SPACE
    {OFF} BAR TO CONTINUE.)"        :rem 128
822 GETA$:IFA$<>" "THEN822          :rem 152
830 PRINT"{CLR}{5 DOWN}WHEN THE WORD HAS
    {SPACE}BEEN SPELLED"            :rem 162
840 PRINT"CORRECTLY, PLACE THE POINTER (↑
    ) UNDER"                        :rem 228
850 PRINT"RETURN (←) AND PRESS THE {RVS}
    FIRE{OFF} BUTTON."              :rem 19
851 PRINT"{2 DOWN}IF YOU MAKE A MISTAKE B
    EFORE YOU"                      :rem 58
852 PRINT"FINISH, PUT THE POINTER (↑) UND
    ER THE"                         :rem 102
853 PRINT"{3}RED X{5} AND PRESS THE
    {RVS}FIRE{OFF} BUTTON.{2 SPACES}YOU"
                                    :rem 228
854 PRINT"WILL THEN BE ABLE TO RE-SPELL T
    HE WORD"                        :rem 120
855 PRINT"WITH NO PENALTY.":PRINT:PRINT
                                    :rem 37
860 PRINT"{2 RIGHT}(PRESS THE {RVS}SPACE
    {OFF} BAR TO CONTINUE.)"        :rem 131
870 GETA$:IFA$<>" "THEN870          :rem 158
880 PRINT"{CLR}{5 DOWN}YOU WILL BE GIVEN
    {SPACE}3 CHANCES TO GET IT"     :rem 214
890 PRINT"RIGHT. IF YOU HAVEN'T GOTTEN IT
     RIGHT"                         :rem 131
900 PRINT"BY THEN, I WILL TELL YOU THE CO
    RRECT"                          :rem 2
910 PRINT"SPELLING OF THE WORD.{2 SPACES}
    YOU WILL START"                 :rem 108
920 PRINT"WITH A SCORE OF 75 AND 1 POINT
    {SPACE}WILL BE"                 :rem 179
930 PRINT"DEDUCTED EACH TIME YOU MISSPELL
     A WORD."
940 PRINT"{2 DOWN}EASY, HUH?":PRINT:PRINT
                                    :rem 160
950 PRINT"{2 RIGHT}(PRESS THE {RVS}SPACE
    {OFF} BAR TO CONTINUE.)"        :rem 131
960 GETA$:IFA$<>" "THEN960          :rem 158
990 S=0:L=0:PRINT"{CLR}{6 DOWN}{2 RIGHT}H
    OW HARD WOULD YOU LIKE YOUR WORDS,"
                                    :rem 87
1000 PRINTTAB(8);"{DOWN}";NA$;"?":PRINT
                                    :rem 177
1010 PRINTTAB(15)"{3}1) EASY"   :rem 67
1020 PRINTTAB(15)"{3}2) MEDIUM":rem 212
1030 PRINTTAB(15)"{3}3) HARD{5}";"
    {3 DOWN}"                       :rem 126
1040 PRINTTAB(13);"('Q' TO QUIT)" :rem 51
1060 GETA$:IFA$=""THEN1060          :rem 177
1070 IFA$="1"THENPRINT"{CLR}":FORX=1TO25:
    GOTO1130:REM EASY               :rem 122
1080 IFA$="2"THENPRINT"{CLR}":FORX=26TO50
    :GOTO1130:REM MEDIUM            :rem 64
1090 IFA$="3"THENPRINT"{CLR}":FORX=51TO75
    :GOTO1130:REM HARD              :rem 165
1100 IFA$="Q"THEN1735               :rem 135
1110 PRINT"PLEASE TRY AGAIN,";NA$;".":PRI
    NT"YOU PRESSED ";A$             :rem 50
1115 FORX=1TO2000:NEXTX:GOTO990     :rem 192
1130 RESTORE:FORL=1TO75             :rem 211
1140 READL$(L):REM READ THE WORDS:rem 153
1150 IFL=XTHEN1170                  :rem 47
1160 NEXT                           :rem 7
1170 FORN=1TO3:REM MISTAKE COUNTER
                                    :rem 142
1180 LL=(40-LEN(L$(L)))/2:PRINT"{CLR}
    {GRN}{10 DOWN}"TAB(LL);L$(L):FORY=1T
    O2000:NEXTY                     :rem 172
1182 Z=L                            :rem 175
1183 IFL>25THENZ=L-25:IFL>50THENZ=L-50
                                    :rem 79
1185 PRINT"{CLR}{PUR}WORD NUMBER:";Z:PRIN
    T"{HOME}{20 RIGHT}SCORE:";75-S
                                    :rem 226
1190 PRINT"{3}{3 DOWN}{9 RIGHT}NOW SPEL
    L IT, ";NA$;".{5}"          :rem 218
1200 PRINT"{DOWN}('END' AND '{3}←{5}
    ' TO GO ON TO HARDER WORDS)":rem 135
1205 PRINT"{9 RIGHT}('Q' AND '{3}←
    {5}' TO QUIT)"              :rem 34
1210 GOSUB1390:PRINTCHR$(13):IFD$="END"TH
    EN990                           :rem 232
1220 IFD$="Q"THEN1735               :rem 141
1230 IFD$=""THEN1260:REM CATCHES CARRIAGE
     RETURN WITH EMPTY SET          :rem 36
1240 IFD$=L$(25)THEN1320:REM LAST EASY WO
    RD                              :rem 216
1241 IFD$=L$(50)THEN1320:REM LAST MEDIUM
    {SPACE}WORD                     :rem 102
1242 IFD$=L$(75)THEN1320:REM LAST HARD WO
    RD                              :rem 204
1250 IFD$=L$(L)THEN1300             :rem 252
1260 IFN=3THENGOSUB150:PRINT"{CLR}
    {10 DOWN}";TAB(10);"HERE, TRY ANOTHE
    R."                             :rem 116
1265 IFN=3THEN FORT=1TO2000:NEXTT:NEXTX
                                    :rem 246
1270 GOSUB1800:PRINT"{4}{6 DOWN}
    {2 RIGHT}THAT IS INCORRECT, ";NA$;".
     TRY AGAIN."                    :rem 31
1275 FORY=1TO2000:NEXTY             :rem 180
1280 S=S+1                          :rem 10
1290 NEXTN                          :rem 89
1300 GOSUB1850:PRINT"{3}{6 DOWN}
    {8 RIGHT}CORRECT! NOW TRY ANOTHER":F
    ORY=1TO2000:NEXTY               :rem 87
1310 NEXTX                          :rem 92
1320 GOSUB1850:PRINT"{3}{6 DOWN}";TAB(1
    5);"CORRECT!{5}":FORT=1TO2000:NEXT
    T:GOTO360                       :rem 79
1380 RETURN                         :rem 172
1385 REM PRINT ALPHABET AND POINTER
                                    :rem 119
1390 PRINT:PRINT:PRINTTAB(15):D$="":SC=16
    71:CO=SC+54272:CN=1             :rem 124
```

```
1400 POKESC,CN:POKECO,5                    :rem 163
1410 SC=SC+1:CO=CO+1:CN=CN+1:IFSC=1697THE
     N1430                                 :rem 225
1420 GOTO1400                              :rem 197
1430 POKESC,31:POKECO,10:POKESC-27,86:POK
     ECO-27,10                             :rem 242
1440 S1=1710                               :rem 83
1450 IFS1<1710THENS1=1737:REM MOVE POINTE
     R TO LEFT ARROW SYMBOL                :rem 73
1460 IFS1>1737THENS1=1710:REM MOVE POINTE
     R TO LETTER A                         :rem 209
1470 C1=S1+54272                           :rem 48
1480 POKES1,30:POKEC1,10                   :rem 121
1490 GOSUB1540                             :rem 24
1500 IFJV=8THENS1=S1+1:C1=C1+1:POKES1-1,3
     2:FORT=1TO25:NEXTT:REM MOVE RIGHT
                                           :rem 94
1510 IFJV=4THENS1=S1-1:C1=C1-1:POKES1+1,3
     2:FORT=1TO25:NEXTT:REM MOVE LEFT
                                           :rem 10
1520 IFJV=FRTHENGOSUB1570:IFB$=CHR$(13)TH
     ENPRINT"{5}":RETURN                   :rem 28
1530 GOTO1450                              :rem 204
1540 JV=PEEK(56320):REM CONTROL PORT 2
                                           :rem 211
1545 FR=JVAND16:REM FIRE BUTTON            :rem 158
1550 JV=15-(JVAND15):REM GET DIRECTION
                                           :rem 4
1560 RETURN                                :rem 172
1570 H=PEEK(S1-40)                         :rem 221
1580 GETB$                                 :rem 20
1590 B$=CHR$(H+64)                         :rem 161
1600 IFS1=1710THENPRINT"{CLR}{7 DOWN}":GO
     TO1390:REM SAME WORD AGAIN WITH NO P
     ENALTY
1605 IFB$="←"THENB$=CHR$(13):RETURN
                                           :rem 67
1610 PRINT"{GRN}";TAB(LL);B$;              :rem 142
1620 D$=D$+B$:FORT=1TO180:NEXTT:RETURN
                                           :rem 109
1624 :                                     :rem 7
1625 REM NAME INPUT                        :rem 99
1626 :                                     :rem 9
1630 NA$=""                                :rem 254
1635 PRINT"{@}{LEFT}";                     :rem 28
1640 GETN$:IFN$=""THEN1640                 :rem 211
1650 PRINTN$;                              :rem 6
1660 IFN$=CHR$(13)THENRETURN               :rem 208
1670 NA$=NA$+N$:GOTO1635                   :rem 80
1671 :                                     :rem 9
1675 REM ANSWER INPUT                      :rem 23
1676 :                                     :rem 14
1680 A$=""                                 :rem 181
1685 PRINT"{@}{LEFT}";                     :rem 33
1690 GETN$:IFN$=""THEN1690                 :rem 221
1700 PRINTN$;                              :rem 2
1710 IFN$=CHR$(13)THENRETURN               :rem 204
1720 A$=A$+N$:GOTO1685                     :rem 181
1730 :                                     :rem 5
1735 REM DOUBLE CHECK                      :rem 205
1737 :                                     :rem 12
1740 PRINT"{CLR}{5 DOWN}{5 RIGHT}IF YOU W
     ISH TO STOP, PRESS {RVS}Q{OFF}."
                                           :rem 162
1750 PRINT"{DOWN}{5 RIGHT}IF NOT, PRESS T
     HE {RVS}SPACE{OFF} BAR."              :rem 109
1760 GETA$:IFA$=""OR A$<>" "AND A$<>"Q" T
     HEN1760                               :rem 202
1770 IFA$<>"Q"THEN990                      :rem 163
1780 PRINT"{CLR}{5 DOWN}{10 RIGHT}THANK Y
     OU FOR PLAYING."                      :rem 71
1785 IFL<>0THENPRINT"{DOWN}{10 RIGHT}
     {BLK}( YOUR SCORE WAS";75-S;")"
                                           :rem 202
1790 PRINT"{DOWN}{12 RIGHT}{5}SEE YOU N
     EXT TIME!"                            :rem 16
1795 POKE788,49:END:REM RESTORES STOP KEY
                                           :rem 26
1800 SD=54272:FORZ=SDTOSD+28:POKEZ,0:NEXT
                                           :rem 87
1805 POKE54296,15:POKE54277,18:POKE54278,
     242                                   :rem 215
1810 POKE54276,33:POKE54273,4:POKE54272,4
     8                                     :rem 102
1815 FORZ=1TO700:NEXTZ:POKE54276,32:FORZ=
     1TO400:NEXT                           :rem 38
1820 FORZ=SDTOSD+28:POKEZ,0:NEXTZ:RETURN
                                           :rem 187
1850 SD=54272:FORZ=SDTOSD+28:POKEZ,0:NEXT
     Z                                     :rem 182
1855 POKE54296,15:POKE54277,42:POKE54278,
     250                                   :rem 216
1860 POKE54276,33:POKE54273,23:POKE54272,
     181                                   :rem 202
1865 FORZ=1TO200:NEXT:POKE54276,32:FORZ=1
     TO1250:NEXT
1870 FORZ=SDTOSD+28:POKEZ,0:NEXT:RETURN
                                           :rem 102
```

MLX—Machine Language Entry Program For Commodore 64

(Article on page 162.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

```
100 PRINT"{CLR}{RED}";CHR$(142);CHR$(8);:
    POKE53281,1:POKE53280,1                :rem 198
101 POKE 788,52:REM DISABLE RUN/STOP
                                           :rem 119
110 PRINT"{RVS}{40 SPACES}";               :rem 176
120 PRINT"{RVS}{15 SPACES}{RIGHT}{OFF}
    {*}£{RVS}{RIGHT} {RIGHT}{2 SPACES}
    {*}{OFF}{*}£{RVS}£{RVS}
    {13 SPACES}";                          :rem 250
130 PRINT"{RVS}{15 SPACES}{RIGHT} {G}
    {RIGHT} {2 RIGHT} {OFF}£{RVS}£{*}
    {OFF}{*}{RVS}{13 SPACES}";             :rem 35
140 PRINT"{RVS}{40 SPACES}"                :rem 120
150 V=53248:POKE2040,13:POKE2041,13:FORI=
    832TO894:POKEI,255:NEXT:POKEV+27,3
                                           :rem 223
160 POKEV+21,3:POKEV+39,2:POKEV+40,2:POKE
    V,144:POKEV+1,54:POKEV+2,192:POKEV+3,
    54                                     :rem 51
170 POKEV+29,3                             :rem 18
180 FORI=0TO23:READA:POKE679+I,A:POKEV+39
```

```
    ,A:POKEV+40,A:NEXT                    :rem 188
185 DATA169,251,166,254,164,255,32,216,25
    5,133,253,96                          :rem 125
187 DATA169,0,166,251,164,252,32,213,255,
    133,253,96                            :rem 14
190 POKEV+39,7:POKEV+40,7                 :rem 202
200 PRINT"{2 DOWN}{PUR}{BLK}{3 SPACES}A F
    AILSAFE MACHINE LANGUAGE EDITOR
    {5 DOWN}"                             :rem 130
210 PRINT"[5]{2 UP}STARTING ADDRESS?
    {8 SPACES}{9 LEFT}";:INPUTS:F=1-F:C$=
    CHR$(31+119*F)                        :rem 215
220 IFS<256OR(S>40960ANDS<49152)ORS>53247
    THENGOSUB3000:GOTO210                 :rem 235
225 PRINT:PRINT:PRINT                     :rem 180
230 PRINT"[5]{2 UP}ENDING ADDRESS?
    {8 SPACES}{9 LEFT}";:INPUTE:F=1-F:C$=
    CHR$(31+119*F)                        :rem 20
240 IFE<256OR(E>40960ANDE<49152)ORE>53247
    THENGOSUB3000:GOTO230                 :rem 183
250 IFE<STHENPRINTC$;"{RVS}ENDING < START
    {2 SPACES}":GOSUB1000:GOTO 230
                                          :rem 176
260 PRINT:PRINT:PRINT                     :rem 179
300 PRINT"{CLR}";CHR$(14):AD=S:POKEV+21,0
                                          :rem 225
310 PRINTRIGHT$("0000"+MID$(STR$(AD),2),5
    );":";:FORJ=1TO6                      :rem 234
320 GOSUB570:IFN=-1THENJ=J+N:GOTO320
                                          :rem 228
390 IFN=-211THEN 710                      :rem 62
400 IFN=-204THEN 790                      :rem 64
410 IFN=-206THENPRINT:INPUT"{DOWN}ENTER N
    EW ADDRESS";ZZ                        :rem 44
415 IFN=-206THENIFZZ<SORZZ>ETHENPRINT"
    {RVS}OUT OF RANGE":GOSUB1000:GOTO410
                                          :rem 225
417 IFN=-206THENAD=ZZ:PRINT:GOTO310
                                          :rem 238
420 IF N<>-196 THEN 480                   :rem 133
430 PRINT:INPUT"DISPLAY:FROM";F:PRINT,"TO
    ";:INPUTT                             :rem 234
440 IFF<SORF>EORT<SORT>ETHENPRINT"AT LEAS
    T";S;"{LEFT}, NOT MORE THAN";E:GOTO43
    0                                     :rem 159
450 FORI=FTOTSTEP6:PRINT:PRINTRIGHT$("000
    0"+MID$(STR$(I),2),5);":";            :rem 30
451 FORK=0TO5:N=PEEK(I+K):PRINTRIGHT$("00
    "+MID$(STR$(N),2),3);",";             :rem 66
460 GETA$:IFA$>""THENPRINT:PRINT:GOTO310
                                          :rem 25
470 NEXTK:PRINTCHR$(20);:NEXTI:PRINT:PRIN
    T:GOTO310                             :rem 50
480 IFN<0 THEN PRINT:GOTO310              :rem 168
490 A(J)=N:NEXTJ                          :rem 199
500 CKSUM=AD-INT(AD/256)*256:FORI=1TO6:CK
    SUM=(CKSUM+A(I))AND255:NEXT           :rem 200
510 PRINTCHR$(18);:GOSUB570:PRINTCHR$(20)
                                          :rem 234
515 IFN=CKSUMTHEN530                      :rem 255
520 PRINT:PRINT"LINE ENTERED WRONG : RE-E
    NTER":PRINT:GOSUB1000:GOTO310:rem 176
530 GOSUB2000                             :rem 218
540 FORI=1TO6:POKEAD+I-1,A(I):NEXT:POKE54
    272,0:POKE54273,0                     :rem 227
550 AD=AD+6:IF AD<E THEN 310              :rem 212
560 GOTO 710                              :rem 108
570 N=0:Z=0                               :rem 88
580 PRINT"[+]";                           :rem 79
581 GETA$:IFA$=""THEN581                  :rem 95
585 PRINTCHR$(20);:A=ASC(A$):IFA=13ORA=44
    ORA=32THEN670                         :rem 229
590 IFA>128THENN=-A:RETURN                :rem 137
600 IFA<>20 THEN 630                      :rem 10
610 GOSUB690:IFI=1ANDT=44THENN=-1:PRINT"
    {LEFT} {LEFT}";:GOTO690               :rem 172
620 GOTO570                               :rem 109
630 IFA<48ORA>57THEN580                   :rem 105
640 PRINTA$;:N=N*10+A-48                  :rem 106
650 IFN>255 THEN A=20:GOSUB1000:GOTO600
                                          :rem 229
660 Z=Z+1:IFZ<3THEN580                    :rem 71
670 IFZ=0THENGOSUB1000:GOTO570            :rem 114
680 PRINT",";:RETURN                      :rem 240
690 S%=PEEK(209)+256*PEEK(210)+PEEK(211)
                                          :rem 149
691 FORI=1TO3:T=PEEK(S%-I)                :rem 67
695 IFT<>44ANDT<>58THENPOKES%-I,32:NEXT
                                          :rem 205
700 PRINTLEFT$("{3 LEFT}",I-1);:RETURN
                                          :rem 7
710 PRINT"{CLR}{RVS}*** SAVE ***{3 DOWN}"
                                          :rem 236
720 INPUT"{DOWN} FILENAME";F$             :rem 228
730 PRINT:PRINT"{2 DOWN}{RVS}T{OFF}APE OR
    {RVS}D{OFF}ISK: (T/D)"                :rem 228
740 GETA$:IFA$<>"T"ANDA$<>"D"THEN740
                                          :rem 36
750 DV=1-7*(A$="D"):IFDV=8THENF$="0:"+F$
                                          :rem 158
760 OPEN 1,DV,1,F$:POKE252,S/256:POKE251,
    S-PEEK(252)*256                       :rem 137
765 POKE255,E/256:POKE254,E-PEEK(255)*256
                                          :rem 37
770 POKE253,10:SYS 679:CLOSE1:IFPEEK(253)
    >9ORPEEK(253)=0THENPRINT"{DOWN}DONE."
    :END                                  :rem 24
780 PRINT"{DOWN}ERROR ON SAVE.{2 SPACES}T
    RY AGAIN.":IFDV=1THEN720              :rem 171
781 OPEN15,8,15:INPUT#15,DS,DS$:PRINTDS;D
    S$:CLOSE15:GOTO720                    :rem 161
790 PRINT"{CLR}{RVS}*** LOAD ***{2 DOWN}"
                                          :rem 212
800 INPUT"{2 DOWN} FILENAME";F$           :rem 244
810 PRINT:PRINT"{2 DOWN}{RVS}T{OFF}APE OR
    {RVS}D{OFF}ISK: (T/D)"                :rem 227
820 GETA$:IFA$<>"T"ANDA$<>"D"THEN820
                                          :rem 34
830 DV=1-7*(A$="D"):IFDV=8THENF$="0:"+F$
                                          :rem 157
840 OPEN 1,DV,0,F$:POKE252,S/256:POKE251,
    S-PEEK(252)*256                       :rem 135
850 POKE253,10:SYS 691:CLOSE1             :rem 173
860 IFPEEK(253)>9 OR PEEK(253)=0 THEN PRI
    NT:PRINT:GOTO310                      :rem 92
870 PRINT"{DOWN}ERROR ON LOAD.{2 SPACES}T
    RY AGAIN.{DOWN}":IFDV=1THEN800
                                          :rem 172
880 OPEN15,8,15:INPUT#15,DS,DS$:PRINTDS;D
    S$:CLOSE15:GOTO800                    :rem 160
1000 REM BUZZER                           :rem 135
1001 POKE54296,15:POKE54277,45:POKE54278,
     165                                  :rem 207
1002 POKE54276,33:POKE 54273,6:POKE54272,
     5                                    :rem 42
1003 FORT=1TO200:NEXT:POKE54276,32:POKE54
     273,0:POKE54272,0:RETURN             :rem 202
2000 REM BELL SOUND                       :rem 78
2001 POKE54296,15:POKE54277,0:POKE54278,2
     47                                   :rem 152
2002 POKE 54276,17:POKE54273,40:POKE54272
```

```
    ,0                                  :rem 86
2003 FORT=1TO100:NEXT:POKE54276,16:RETURN
                                        :rem 57
3000 PRINTC$;"{RVS}NOT ZERO PAGE OR ROM":
     GOTO1000                           :rem 89
```

VIC Billboard

(Article on page 142.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

```
1 PRINT"{CLR}{DOWN}PLEASE WAIT...":POKE56
  ,24:CLR                               :rem 160
2 D=6144:E=7678:F=34816                 :rem 221
3 Z=0:FORN=DTOE STEP2                   :rem 64
4 POKEN,PEEK(F+Z):POKEN+1,PEEK(F+Z)
                                        :rem 158
5 Z=Z+1:NEXTN                           :rem 73
10 POKE36869,242                        :rem 100
20 PRINT"{CLR}{2 DOWN}WHAT IS THE HEADING
   {3 SPACES}(22-CHARACTER LIMIT)?":INPUT
   H$                                   :rem 108
22 PRINT"{2 DOWN}":GOSUB800:INPUT"HEADING
    COLOR";HC                           :rem 108
30 PRINT"{CLR}NUMBER OF ENTRIES?(4
   {3 SPACES}MAX.)":INPUT NE:IFNE>4THEN30
                                        :rem 84
32 PRINT"{CLR}USING THE CHART IN THE USER
   S MANUAL, PICK A{2 SPACES}CODE FOR SCR
   EEN AND{3 SPACES}BORDER";            :rem 12
33 PRINT" COLOR.":PRINT"{DOWN}(HITTING JU
   ST RETURN{3 SPACES}WILL USE THE PRESEN
   T{2 SPACES}SET UP.)"                 :rem 244
35 INPUTBK:IFBK=0THENBK=PEEK(36879)
                                        :rem 200
40 DIME$(4):DIMC%(4)                    :rem 45
50 FORN=1TONE                           :rem 62
60 PRINT"{CLR}ENTRY #"N                 :rem 77
70 INPUTE$(N)                           :rem 255
80 GOSUB800                             :rem 128
85 INPUT"{2 DOWN}COLOR";C%(N)           :rem 36
90 NEXTN                                :rem 246
100 PRINT"{CLR}TOUCH A KEY TO START
    {3 SPACES}DISPLAY. YOU CAN EDIT ANYTI
    ME BY PRESSING{3 SPACES}{DOWN}:rem 24
101 PRINT"{9 SPACES}←"                  :rem 194
105 GETA$:IFA$=""THEN105                :rem 79
150 REM DISPLAY                         :rem 144
160 POKE36869,254:POKE36867,PEEK(36867)OR
    1                                   :rem 150
170 POKE36879,BK                        :rem 145
200 FORN=1TONE                          :rem 107
210 POKE646,HC:PRINT"{CLR}"TAB(11-(LEN(H$
    ))/2)H$                             :rem 40
215 D=0                                 :rem 73
220 PRINT"{DOWN}":POKE646,C%(N)         :rem 178
230 FORZ=1TOLEN(E$(N)):PRINTMID$(E$(N),Z,
    1);                                 :rem 91
235 D=D+1:IFD=22THEND=0:PRINT           :rem 16
240 FORP=1TO100:NEXT                    :rem 232
250 GETA$:IFA$="←"THEN400               :rem 173
260 NEXTZ                               :rem 49
270 FORP=1TO4E3:NEXTP,N:GOTO200         :rem 213
400 REM EDIT                            :rem 158
405 POKE36869,242:POKE36867,PEEK(36867)AN
    D254:POKE36879,BK                   :rem 100
410 PRINT"{CLR}{BLU}DO YOU WISH TO ADD AN
    {2 SPACES}ANNOUNCEMENT?(Y/N)"       :rem 79
412 GETA$:IFA$="N"THEN450               :rem 161
414 IFA$="Y"THEN420                     :rem 44
415 GOTO412                             :rem 106
420 IFNE=4THENPRINT"NO ROOM FOR MORE.":FO
    RP=1TO2E3:NEXT:GOTO160              :rem 122
421 NE=NE+1                             :rem 86
422 PRINT"{CLR}ENTRY #"NE:INPUTE$(NE?)
                                        :rem 219
425 GOSUB800:PRINT"{DOWN}COLOR?":INPUTC%(
    NE)                                 :rem 35
430 GOTO160                             :rem 103
450 FORN=1TONE:PRINT"{CLR}#"N:PRINTE$(N):
    PRINT"COLOR="C%(N)"{3 DOWN}"        :rem 21
455 PRINT"EDIT (Y/N)"                   :rem 60
457 GETA$:IFA$="N"THEN470               :rem 172
458 IFA$="Y"THEN460                     :rem 56
459 GOTO457                             :rem 123
460 PRINT"CORRECTED ENTRY:":INPUTE$(N):GO
    SUB800:INPUT"COLOR";C%(N)           :rem 197
470 NEXT:GOTO160                        :rem 228
800 PRINT"{2 DOWN}0. BLACK":PRINT"1. WHIT
    E":PRINT"2. RED":PRINT"3. CYAN"
                                        :rem 14
802 PRINT"4. PURPLE":PRINT"5. GREEN":PRIN
    T"6. BLUE":PRINT"7. YELLOW"         :rem 103
805 RETURN                              :rem 125
```

Educational Games: A Kid's View

(Article on page 126.)

Program 1: BLAM!—VIC Version

```
4 GOTO500                               :rem 2
5 POKE36879,27:PRINT"{CLR}{7 DOWN}"TAB(5)
  "{RVS}{RED}SKILL LEVEL":INPUT"{DOWN}
  {5 RIGHT}(1-100)";A                   :rem 81
6 IFA<1ORA>100THEN5                     :rem 136
7 B=A*100:M=0:H=10                      :rem 198
8 Y=RND(0):GOTO30                       :rem 9
9 J=INT(RND(1)*I):PRINT"{HOME}{19 DOWN}("
  ;J;") EF NO.?":POKE198,0:INPUTK$
                                        :rem 192
10 K=VAL(K$)                            :rem 140
11 IFK+J=ITHENPRINT"{RVS}CORRECT!!"
                                        :rem 157
12 IFK+J<>ITHENPRINT"{RVS}WRONG...";:GOTO
   80                                   :rem 180
13 POKEC,32:M=M+1:IFM=HTHEN110          :rem 48
14 FORT=1TO10:POKEE-2,241:FORTT=1TO20:NEX
   T:POKEE-2,135:FORTT=1TO20:NEXT:POKEE-2
   ,0:NEXT
15 FORN=8098TO8163:POKEN,32:NEXTN :rem 53
16 GOTO60                               :rem 6
30 C=7911:D=38631:E=36878:POKEE,15:POKEE+
   1,126:DD=37154:P1=37151:P2=37152:POKE3
   6869,255                             :rem 136
31 PRINT"{CLR}":FORF=1TOH               :rem 136
32 G=INT(RND(1)*374)+22:V=PEEK(G+7680):IF
   (V<>32)OR(G=231)THEN32               :rem 91
33 POKEG+7680,1:POKEG+38400,0           :rem 111
34 NEXTF:PRINT"{HOME}{18 DOWN}{BLU}GGGGGG
   GGGGGGGGGGGGGGGG";:RESTORE           :rem 14
```

```
35 FORF=1TO30:READFF:POKEE-2,FF:FORT=1TO5
   0:NEXTT:POKEE-2,0:POKEE-3,FF:FORT=1TO5
   0:NEXTT                          :rem 79
36 POKEE-3,0:NEXTF:TI$="000000"   :rem 244
37 I=INT(RND(1)*B)                 :rem 254
38 POKEC,0:POKED,4                  :rem 70
40 POKEDD,127:P=PEEK(P2)AND128:J0=-(P=0)
                                    :rem 58
42 POKEDD,255:P=PEEK(P1):J1=-((PAND8)=0):
   J2=-((PAND16)=0):J3=-((PAND4)=0)
                                   :rem 108
44 KD=C                            :rem 119
45 IFJ1=1THENPOKEKD,32:C=C+22:D=D+22
                                   :rem 121
46 IFJ2=1THENPOKEKD,32:C=C-1:D=D-1:rem 25
47 IFJ3=1THENPOKEKD,32:C=C-22:D=D-22
                                   :rem 129
48 IFJ0=1THENPOKEKD,32:C=C+1:D=D+1:rem 21
49 DV=DV+1:IFDV=10THENPOKEE-2,135:POKEE-2
   ,0:DV=0                         :rem 172
52 IFPEEK(C)=7THENC=C-88:D=D-88    :rem 78
53 IF C<7702 THEN C=C+22:D=D+22    :rem 85
54 IFPEEK(C)=1THEN9                :rem 135
55 PRINT"{HOME}{5 RIGHT}";RIGHT$(TI$,3);"
   {2 SPACES}";I                   :rem 48
56 IFTI$>"000500"THEN200           :rem 35
60 GOTO38                          :rem 10
80 POKEC,4:FORT=15TO0STEP-1:POKEE-1,220:P
   OKEE,T:POKED,2:FORTT=1TO20:NEXTTT:POKE
   D,5                             :rem 47
81 FORTT=1TO50:NEXTTT:NEXTT:PRINT"{HOME}
   {RVS}CORRECT{OFF} EF!{RVS} NO.=";I-J:N
   N=NN+1                          :rem 252
82 IFNN=3THEN200                   :rem 198
83 FORT=1TO4000:NEXTT:PRINT"{HOME}
   {20 SPACES}":POKEE,15:POKEE-1,0:rem 14
84 M=M+1:IFM=HTHEN110              :rem 251
85 FORN=8098TO8163:POKEN,32:NEXTN:GOTO38
                                   :rem 26
90 .67/7.31                        :rem 252
110 POKE36869,240:PRINT"{CLR}{2 DOWN}
    {6 SPACES}GOOD WORK!!":M=0    :rem 245
120 POKEE-4,241:FORT=1TO1000:NEXT:POKEE-3
    ,241:FORT=1TO1500:NEXT:POKEE-2,241
                                   :rem 81
130 FORT=1TO3000:NEXT:H=H+10:POKEE-3,0:PO
    KEE-4,0:POKEE-2,0              :rem 237
131 IFH=70THEN600                  :rem 213
132 PRINT"{3 DOWN}{RIGHT}YOU GOT ALL THE
    {SPACE}BOMBSOUT OF THAT STORY, BUTTHE
     TERRORISTS PUT"               :rem 60
133 PRINT"EVEN MORE IN THE NEXT!":PRINT"
    {2 DOWN}{3 RIGHT}GET READY AGAIN!!":F
    ORT=1TO3000:NEXTT              :rem 50
134 POKEE-4,241:FORT=1TO1000:NEXT:POKEE-3
    ,241:FORT=1TO1500:NEXT:POKEE-2,241
                                   :rem 86
135 FORT=1TO3000:NEXT:POKEE-3,0:POKEE-4,0
    :POKEE-2,0:GOTO30              :rem 53
200 FORT=15TO0STEP-1:POKEE-1,220:POKEE,T:
    POKEE+1,47:FORTT=1TO50:NEXTTT:rem 216
205 POKEE+1,138:FORTT=1TO50:NEXTTT:NEXTT
                                   :rem 92
210 POKEE-1,0:POKEE+1,8:POKE36869,240:PRI
    NT"{CLR}{WHT}THE PLACE BLEW UP!
    {4 SPACES}GAME OVER!"          :rem 186
215 PRINT"{7 DOWN}PLAY AGAIN?"     :rem 181
220 GOTO612                        :rem 102
395 REM SOUND DATA                  :rem 40
400 DATA220,220,220,220,210,210,210,210,2
    20,220,220,220,230,229,228,227,226,22
    5,224,223                      :rem 169
405 DATA222,221,220,219,219,219,219,135,1
    35,135                         :rem 57
500 PRINT"{CLR}{9 DOWN}{4 RIGHT}A FEW MOM
    ENTS..."                       :rem 214
505 POKE52,28:POKE56,28:CLR:FORI=7168TO76
    79:POKEI,PEEK(I+25600):NEXT    :rem 134
510 FORF=1TO30:READX:NEXT          :rem 94
520 FORY=7168TO7168+64:READX:POKEY,X:NEXT
    Y:GOTO5                        :rem 102
524 REM CHAR DATA                  :rem 183
525 DATA56,56,144,254,58,56,40,108,28,16,
    56,124,254,254,124,56          :rem 52
530 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
                                   :rem 70
535 DATA215,254,124,255,255,223,147,161,0
    ,0,232,168,232,168,238,0       :rem 177
540 DATA0,0,234,174,238,170,170,0,255,255
    ,255,255,255,255,0,0,0,0,0     :rem 245
600 PRINT"{2 DOWN}YOU CLEARED THE BUILD-I
    NG OF BOMBS.YOU ARE AVERY GREAT PERSO
    N."                            :rem 220
605 FORT=135TO241STEP5:POKEE-2,T:FORTT=1T
    O50:NEXT:NEXT                  :rem 21
610 POKEE-2,0:PRINT"{3 DOWN}{4 RIGHT}PLAY
     AGAIN?"                       :rem 77
612 GETA$:IFA$=""THEN612           :rem 85
620 IFA$="Y" THEN5                 :rem 202
630 PRINT"{CLR}":POKE36879,27:END :rem 29
```

Program 2: BLAM!—64 Version

```
2 POKE53281,4:POKE53280,14         :rem 192
3 GOTO500                           :rem 1
4 SC=53281:BO=53280:POKESC,1:POKEBO,10:PR
  INT"{CLR}{9 DOWN}"TAB(15)"{RVS}{RED}SKI
  LL LEVEL"                        :rem 37
5 PRINT"{DOWN}"TAB(15)"(1-100) ";:INPUT A
                                   :rem 111
6 IFA<1ORA>100THEN4                :rem 135
7 PRINT"{2 DOWN}"TAB(11)"USE JOYSTICK POR
  T 2":FORT=1TO2000:NEXT:Y=RND(0):B=A*100
  :H=10                            :rem 151
8 W=54272:FORT=WTOW+24:POKET,0:NEXT:POKEW
  +24,15:POKEW+5,17:POKEW+6,241:GOTO25
                                   :rem 75
9 J=INT(RND(1)*I):PRINT"{HOME}{22 DOWN}
  {9 RIGHT}(";J;") BLAM NO. ";     :rem 229
10 POKE198,0:INPUTK$:K=VAL(K$)     :rem 44
11 IFK+J=ITHENPRINT"{RVS}{DOWN}{15 RIGHT}
   CORRECT!!{OFF}";                :rem 46
12 IFK+J<>ITHENPRINT"{DOWN}{16 RIGHT}
   {RVS}WRONG...";:GOTO80          :rem 149
13 POKEC,32:M=M+1:IFM=HTHEN110     :rem 48
14 FORT=1TO25:POKEW,71:POKEW+1,71:POKEW+4
   ,33:FORQ=1TO50:NEXT:POKEW+4,32:NEXT
                                   :rem 87
15 FORN=1910TO2015:POKEN,32:NEXTN :rem 29
16 GOTO38                          :rem 11
25 C=1524:D=55796                  :rem 126
27 PRINT"{CLR}":POKEBO,4:POKESC,1:FORF=1T
   OH                              :rem 67
28 G=INT(RND(1)*760)+40:V=PEEK(G+1024):IF
   (V<>32)OR(G=500)THEN28          :rem 85
29 POKEG+55296,0:POKEG+1024,66     :rem 173
30 NEXTF:PRINT"{HOME}{20 DOWN}{BLU}DDDDDD
   DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD";
                                   :rem 84
34 RESTORE                         :rem 139
35 FORF=1TO30:READL,Q:POKEW,L:POKEW+1,Q:P
   OKEW+4,17:FORT=1TO50:NEXT:POKEW+4,16
                                   :rem 194
```

```
36 POKEW+1,L-20:POKEW,Q:POKEW+4,17:FORT=1
   TO50:NEXT:POKEW+4,16:NEXT      :rem 209
37 TI$="000000":I=INT(RND(1)*B):PRINT"
   {HOME}{9 RIGHT}TIMER"          :rem 62
38 POKED,4:POKEC,65               :rem 129
40 JS=PEEK(56320):JS=15-(JSAND15):JS=JS+1
   :REM READ JOYSTK               :rem 173
41 KD=C:ONJSGOTO51,42,43,51,44,45,46,51,4
   7,48,49                        :rem 87
42 POKEKD,32:C=C-40:D=D-40:GOTO51:REM NOR
   TH                             :rem 85
43 POKEKD,32:C=C+40:D=D+40:GOTO51:REM SOU
   TH                             :rem 90
44 POKEKD,32:C=C-1:D=D-1:GOTO51:REM WEST
                                  :rem 169
45 POKEKD,32:C=C-41:D=D-41:GOTO51:REM NW
                                  :rem 116
46 POKEKD,32:C=C+39:D=D+39:GOTO51:REM SW
                                  :rem 132
47 POKEKD,32:C=C+1:D=D+1:GOTO51:REM EAST
                                  :rem 146
48 POKEKD,32:C=C-39:D=D-39:GOTO51:REM NE
                                  :rem 115
49 POKEKD,32:C=C+41:D=D+41:GOTO51:REM SE
                                  :rem 103
50 POKEKD,32:C=C-40:D=D-40:REM NORTH
                                  :rem 123
51 DV=DV+1:IFDV=10THENPOKEW+4,129:POKEW+4
   ,128:DV=0                      :rem 55
52 IFPEEK(C)=68THENC=C-160:D=D-160
                                  :rem 211
53 IF C<1064 THEN C=C+40:D=D+40   :rem 80
54 IFPEEK(C)=66THEN9              :rem 194
55 T$=RIGHT$(TI$,3):PRINT"{HOME}
   {15 RIGHT}";T$;"{10 RIGHT}";I :rem 219
56 IFT$>"500"THEN200              :rem 74
60 GOTO38                         :rem 10
80 POKEC,67:FORT=100TO1STEP-2:POKEW+1,T:P
   OKEW+4,129:POKED,2             :rem 179
81 POKED,5:NEXTT:FORTT=1TO50:NEXTTT:PRINT
   "{HOME}{RVS}{2 RIGHT}CORRECT{OFF} BLAM
   !{RVS} NO.=";I-J:NN=NN+1       :rem 213
82 POKEW+4,128:IFNN=3THEN200      :rem 172
83 FORT=1TO4000:NEXTT:PRINT"{HOME}
   {31 SPACES}"                   :rem 102
84 M=M+1:IFM=HTHEN110             :rem 251
85 FORN=1910TO2015:POKEN,32:NEXTN:GOTO37
                                  :rem 1
110 PRINT"{CLR}{DOWN}{14 RIGHT}GOOD WORK!
    !":M=0                        :rem 63
119 ER=28                         :rem 217
120 FORU=0TO3:POKEW+1,ER*U:POKEW,49:POKEW
    +4,17:FORT=1TO1000:NEXT:NEXT  :rem 181
130 POKEW+4,16:H=H+10             :rem 159
131 IFH=70THEN600                 :rem 213
132 PRINT"{6 DOWN}{3 RIGHT}YOU GOT ALL TH
    E BOMBS OUT OF THAT"          :rem 246
133 PRINT"STORY, BUT THE TERRORISTS PUT E
    VEN MORE"                     :rem 124
135 PRINT"IN THE NEXT.":PRINT"{4 DOWN}
    {13 RIGHT}SEE YA AGAIN!"      :rem 15
139 ER=28                         :rem 219
140 FORU=0TO3:POKEW+1,ER*U:POKEW,49:POKEW
    +4,17:FORT=1TO1000:NEXT:NEXT  :rem 183
145 POKEW+4,16                    :rem 18
150 FORI=1TO3000:NEXT:GOTO25      :rem 237
200 FORT=100TO0STEP-2:POKEW+1,T:POKEW+4,1
    29                            :rem 140
202 POKESC,INT(RND(1)*16):POKEBO,INT(RND(
    1)*16):PRINT"{CLR}"           :rem 175
204 NEXT:POKEW+4,128              :rem 187
210 PRINT"{CLR}":POKEBO,0:POKESC,0:PRINT"
    {5 DOWN}{11 RIGHT}{WHT}THE PLACE BLEW
     UP!"                         :rem 130
215 PRINTTAB(14)"GAME OVER!!"     :rem 142
218 PRINT"{7 DOWN}"TAB(11)"PLAY AGAIN (Y/
    N)?"                          :rem 173
220 GETA$:IFA$=""THEN220          :rem 75
225 IF A$="Y" THEN M=0:GOTO4      :rem 247
230 SYS2048                       :rem 98
400 DATA50,50,50,50,50,50,50,50,50,50,50,
    50,50,50,50,50,50,50,50,50,50,50
                                  :rem 248
403 DATA50,50,50,50,50,50,50,50   :rem 13
404 DATA70,70,70,70,70,70,70,70,70,70,70,
    70,70,70,68,66,64,62,60,58,56,54
                                  :rem 67
405 DATA52,50,48,46,44,42,40,38   :rem 38
500 PRINT"{CLR}{11 DOWN}"TAB(11)"{WHT}A F
    EW MOMENTS....."              :rem 179
505 POKE52,48:POKE56,48:CLR:POKE56334,PEE
    K(56334)AND254                :rem 210
506 POKE1,PEEK(1)AND251:FORN=0TO2047:POKE
    N+12288,PEEK(N+53248):NEXTN   :rem 84
510 FORF=1TO60:READX:NEXT:FORF=0TO31:READ
    X:POKEE+12808,X:NEXT          :rem 196
520 POKE 1,PEEK(1)OR4:POKE56334,PEEK(5633
    4)OR1                         :rem 134
523 POKE 53272,(PEEK(53272)AND240)+12
                                  :rem 185
525 DATA56,56,144,254,58,56,40,108,28,16,
    56,124,254,254,124,56         :rem 52
535 DATA215,254,124,255,255,223,147,161
                                  :rem 184
540 DATA255,255,255,255,255,255,0,0
                                  :rem 239
560 GOTO4                         :rem 8
600 REM YOU WIN!                  :rem 134
605 PRINT"{6 DOWN}{3 RIGHT}YOU CLEARED TH
    E BUILDING OF BOMBS."         :rem 123
610 PRINT"{DOWN}{3 RIGHT}YOU ARE A VERY G
    REAT PERSON.":PRINT"{3 DOWN}"TAB(13)"
    PLAY AGAIN?"                  :rem 135
612 GETA$:IFA$=""THEN612          :rem 85
620 IF A$="Y" THEN PRINT"{CLR}":M=0:GOTO4
                                  :rem 148
630 SYS 2048                      :rem 102
```

Saucer Shooter For VIC-20

(Article on page 88.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

```
1 GOTO6000                        :rem 48
5 PRINT"{CLR}":POKE36879,10:POKE38862,0
                                  :rem 112
10 FORI=7168TO7263:READX:POKEI,X:NEXT:FOR
   I=7264TO7679:POKEI,PEEK(I+25600):NEXT
                                  :rem 174
15 FORI=38400TO38421:POKEI,1:POKEI+66,1:N
   EXT                            :rem 165
```

```
20 POKE52,28:POKE56,28:CLR:POKE36869,255:
   GOTO40                          :rem 43
25 POKEZ1,15:POKEZ-1,220:POKEZ-1,0:POKEZ1
   ,0                              :rem 97
30 IFHI<SCTHENHI=SC               :rem 232
35 PRINT"{UP}"TAB(3)SCTAB(13)HI:P1=0:RETU
   RN                              :rem 26
40 L=8131:D=0:L1=7763:L2=L-22:S=0:D1=1:L3
   =L1+22+D1:B=2:P2=1              :rem 16
50 T=1:P=3:A=30720:P1=0:X=0:SC=0:Z=36877:
   Z1=Z+1:N=4:N1=8181             :rem 146
60 POKE37139,0:POKE37154,127:JA=37137:JB=
   37152                           :rem 55
65 FORI=7680TO7701:POKEI,32:NEXT  :rem 219
70 I=7680:POKEI,6:POKEI+1,7:POKEI+2,8:POK
   EI+10,9:POKEI+11,10:POKEI+12,11:GOSUB3
   0                               :rem 20
75 FORI=1TO3:POKEN1+I,T:POKEN1+I+A,5:NEXT
                                   :rem 94
80 FORI=38840TO38861:POKEI,4:NEXT:FORI=81
   20TO8141:POKEI,32:NEXT         :rem 179
90 FORI=38488TO38839:POKEI,7:NEXT:POKEL,T
                                   :rem 90
100 POKEL1,32:IFL1=7746ORL1=7767THENDl=-D
    1                             :rem 226
110 IFP2=1THEN130                 :rem 212
120 IFL-L1=368ORL-L1=391THENL3=L1+23:P2=1
                                  :rem 137
125 IFL-L1=390ANDL1=7746THENL3=L1+22:P2=1
                                  :rem 124
130 L1=L1+D1:IFPEEK(L1)=PTHEN240 :rem 121
140 POKEL1,S                      :rem 192
200 IFP1=0THEN300                 :rem 209
210 POKEL2,32:L2=L2-22:IFL2<7746THENP1=0:
    GOTO300                       :rem 83
220 IFPEEK(L2)=32THENPOKEL2,P:GOTO300
                                  :rem 23
230 IFPEEK(L2)=2THENPOKEL2,5:SC=SC+100:GO
    SUB25:POKEL2,32:P2=0:GOTO300 :rem 235
240 POKEL2,5:SC=SC+500:L1=7747+INT(RND(1)
    *10):P2=0:GOSUB30             :rem 114
250 POKEZ,220:FORI=15TO0STEP-1:POKEZ1,I:P
    OKE36879,I+10:FORJ=1TO50:NEXTJ:NEXTI
                                  :rem 164
260 POKEZ,0:POKEZ1,0:POKEL2,32:POKEL3,32
                                  :rem 190
300 IF(PEEK(JA)AND16)=0THEND=-1:GOTO340
                                   :rem 51
310 IF(PEEK(JB)AND128)=0THEND=1:GOTO330
                                   :rem 59
320 GOTO360                       :rem 103
330 IFL+D=8142THENPOKEL,32:L=8119:GOTO350
                                  :rem 200
340 IFL+D=8119THENPOKEL,32:L=8142:rem 190
350 POKEL,32:L=L+D:IFPEEK(L)=4THEN2030
                                   :rem 18
360 POKEL,T                       :rem 148
400 IF(PEEK(JA)AND32)=0THENPOKEL2,32:L2=L
    -22:P1=1:GOTO418              :rem 146
410 X=X+1:IFX=2THENX=0:GOTO500    :rem 106
415 GOTO200                       :rem 101
418 IFPEEK(L2)=2THEN230            :rem 83
420 POKEL2,P:L2=L2-22:POKE36878,15:FORI=2
    50TO210STEP-10:POKE36877,I    :rem 249
430 NEXTI:POKE36877,0:POKE36878,0:POKEL2+
    22,32:IFPEEK(L2)=2THEN230     :rem 191
440 POKEL2,P                      :rem 193
500 IFP2=0THEN100                 :rem 211
510 POKEL3,32:L3=L3+23:IFPEEK(L3)=PTHENPO
    KEL2,2:GOTO230                :rem 103
520 IFL3<8120THENPOKEL3,B:GOTO100:rem 251
530 P2=0:IFPEEK(L3)=32THENPOKEL3,4:GOTO10
    0                              :rem 40
540 IFPEEK(L3)=4THENPOKEL3,5      :rem 204
550 IFPEEK(L3)=32THEN100          :rem 128
560 POKEL3,5:P2=0                 :rem 211
2000 REM DESTRUCT                  :rem 20
2030 POKEL,5:N=N-1:N1=N1+1        :rem 227
2040 POKEZ,220:FORI=15TO0STEP-1:POKEZ1,I:
     FORJ=1TO50:NEXTJ:NEXTI        :rem 88
2050 POKEZ,0:POKEZ1,0:FORI=1TO2000:NEXT
                                  :rem 178
2060 POKEN1,32:IFN>0THENPOKEL,T:GOTO200
                                  :rem 187
2065 PRINT:PRINT"{RVS}GAME OVER--PRESS FI
     RE"                          :rem 218
2070 IF(PEEK(JA)AND32)=0THENPOKEL,32:POKE
     L1,32:POKEL2,32:POKEL3,32:PRINT"
     {CLR}":GOTO40                :rem 103
2080 GOTO2070                     :rem 204
5000 DATA0,153,189,231,189,153,0,0,8,28,2
     8,54,107,93,127,54           :rem 139
5010 DATA0,64,32,24,28,15,7,7,8,8,28,28,8
     ,0,0,0                        :rem 35
5020 DATA0,0,0,0,16,56,124,0,18,64,1,128,
     0,65,0,18                    :rem 161
5030 DATA5,226,162,128,231,37,164,231,117
     ,85,119,0,57,41,41,57         :rem 29
5040 DATA96,64,64,12,201,76,137,76,0,164,
     164,164,228,228,164,164      :rem 148
5050 DATA0,229,133,133,167,167,229,229,0,
     0,0,64,0,64,0,0              :rem 221
6000 PRINT"{CLR}{4 DOWN}{4 RIGHT}{RED}SAU
     CER SHOOTER"                 :rem 229
6010 PRINT"{4 DOWN}{RIGHT}{BLU}PRESS FIRE
      TO BEGIN"                   :rem 211
6020 POKE37139,0:POKE37154,127:JA=37137:J
     B=37152:HI=0                 :rem 209
6030 N1=230:N2=225:FORI=1TO1000:NEXT:X=36
     878:Y=X-4:POKEX,15            :rem 26
6040 FORI=1TO3:POKEY,N1:POKEY+1,N1:POKEY+
     2,N1:FORJ=1TO70:NEXTJ:POKEY,0 :rem 2
6050 POKEY+1,0:POKEY+2,0:FORJ=1TO50:NEXTJ
     :NEXTI:POKEY,N2:POKEY+1,N2   :rem 36
6060 POKEY+2,N2:FORI=1TO1400:NEXT:POKEY,0
     :POKEY+1,0:POKEY+2,0          :rem 41
6070 IFN1=230THENN1=228:N2=221:FORI=1TO16
     00:NEXT:GOTO6040             :rem 184
6080 IF(PEEK(JA)AND32)=0THEN5     :rem 184
6090 GOTO6080                     :rem 214
```

VIC Music Writer

(Article on page 134.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

```
5 POKE808,100                     :rem 193
50 DIMA%(209):PRINT"{CLR}":H%=1:POKE36878
   ,15                             :rem 79
90 PRINT"{RED}{RVS}{UP}{24 SPACES}PLEASE
   {SPACE}ENTER NOTES{24 SPACES}{OFF}
   {BLU}"                         :rem 107
```

```
100 FORL=1TO200:NEXT:POKE36876,0 :rem 179
102 B%=PEEK(197):IFB%=64THEN102  :rem 231
103 IFB%=39THENPRINT"{RED}";:H%=2:GOTO100
                                 :rem 164
104 IFB%=47THENPRINT"{BLU}";:H%=1:GOTO100
                                 :rem 166
105 IFN>N%THENN%=N               :rem 81
106 IFB%=55THEN600               :rem 249
108 IFPEEK(653)=1THEN200         :rem 107
112 IFB%=23THEN450               :rem 244
120 IFB%=13THEN300               :rem 236
130 IFB%=8THEN500                :rem 195
140 IFB%=7THEN375                :rem 205
145 IFN%=208THEN100              :rem 51
150 IFB%=35THENN=N+1:A%(N)=191:PRINT"B ";
    :IFH%=2THENA%(N)=223         :rem 225
152 IFB%=34THENN=N+1:A%(N)=195:PRINT"C ";
    :IFH%=2THENA%(N)=225         :rem 233
156 IFB%=18THENN=N+1:A%(N)=201:PRINT"D ";
    :IFH%=2THENA%(N)=228         :rem 231
160 IFB%=49THENN=N+1:A%(N)=207:PRINT"E ";
    :IFH%=2THENA%(N)=231         :rem 231
162 IFB%=42THENN=N+1:A%(N)=209:PRINT"F ";
    :IFH%=2THENA%(N)=232         :rem 230
166 IFB%=19THENN=N+1:A%(N)=215:PRINT"G ";
    :IFH%=2THENA%(N)=235         :rem 239
170 IFB%=17THENN=N+1:A%(N)=183:PRINT"A ";
    :IFH%=2THENA%(N)=219         :rem 232
174 IFB%=10THENN=N+1:A%(N)=50:PRINT"{RVS}
    R{OFF} ";                    :rem 177
176 IFB%=54THENN=N+1:A%(N)=0:PRINT"{RVS}↑
    {OFF} ";                     :rem 146
178 POKE36876,A%(N)              :rem 14
180 GOTO100                      :rem 99
200 IFB%=23THEN425:REM *SHIFTED KEYS*
                                 :rem 169
203 IFN%=208THEN100              :rem 46
204 IFB%=7THEN400                :rem 195
205 IFB%=34THENN=N+1:A%(N)=199:PRINT"C#";
    :IFH%=2THENA%(N)=227         :rem 17
210 IFB%=18THENN=N+1:A%(N)=203:PRINT"D#";
    :IFH%=2THENA%(N)=229         :rem 4
215 IFB%=42THENN=N+1:A%(N)=212:PRINT"F#";
    :IFH%=2THENA%(N)=233         :rem 3
220 IFB%=19THENN=N+1:A%(N)=217:PRINT"G#";
    :IFH%=2THENA%(N)=236         :rem 12
225 IFB%=17THENN=N+1:A%(N)=187:PRINT"A#";
    :IFH%=2THENA%(N)=221         :rem 9
230 POKE36876,A%(N)              :rem 3
250 GOTO100                      :rem 97
300 FORL=1TON:REM *PLAYBACK*     :rem 222
320 J=2*L+38486:J%=PEEK(J):POKEJ,5:POKEJ+
    1,5                          :rem 38
330 IFA%(L)=0THENPOKE36876,0:GOTO350
                                 :rem 104
340 POKE36876,A%(L):FORQ=1TO250:NEXTQ
                                 :rem 231
350 POKEJ,J%:POKEJ+1,J%:NEXTL    :rem 27
360 GOTO100                      :rem 99
375 IFN=N%ANDN=0THEN100:REM *DELETE*
                                 :rem 159
376 IFN=N%THENN=N-1:N%=N:PRINT"{2 LEFT}
    {2 SPACES}{2 LEFT}";:GOTO100 :rem 137
380 FORT=N+1TON%                 :rem 211
382 TP=2*T+7766:TC=2*T+38486     :rem 41
384 T1%=PEEK(TP+2):T2%=PEEK(TP+3):POKETP,
    T1%:POKETP+1,T2%             :rem 186
386 T3%=PEEK(TC+2)AND7:POKETC,T3%:POKETC+
    1,T3%                        :rem 10
388 A%(T)=A%(T+1):NEXTT          :rem 31
390 POKETP,32:POKETP+1,32:N%=N%-1:rem 131
395 GOTO102                      :rem 109
400 FORT=N%TON+1STEP-1:REM *INSERT*
                                 :rem 173
405 TP=2*T+7766:TC=2*T+38486     :rem 37
410 T1%=PEEK(TP):T2%=PEEK(TP+1):POKETP+2,
    T1%:POKETP+3,T2%             :rem 176
412 T3%=PEEK(TC)AND7:POKETC+2,T3%:POKETC+
    3,T3%                        :rem 2
414 A%(T+1)=A%(T):NEXTT          :rem 21
416 N%=N%+1:POKETP,32:POKETP+1,32:rem 178
420 GOTO102                      :rem 98
425 IFN=0THEN100:REM *CURSOR LEFT*:rem 32
427 N=N-1:Y=2*N+38488:Y%=PEEK(Y)AND7:IFY%
    =2THENPOKEY,7:POKEY+1,7      :rem 167
428 IFY%=6THENPOKEY,5:POKEY+1,5  :rem 181
430 FORL=1TO100:NEXTL:PRINT"{2 LEFT}";:GO
    TO102                        :rem 183
450 Y=2*N+7768:IFPEEK(Y)=32THEN100:REM *C
    URSOR RIGHT*                 :rem 168
452 Y=2*N+38488:Y%=PEEK(Y)AND7:IFY%=5THEN
    POKEY,6:POKEY+1,6            :rem 53
453 IFY%=7THENPOKEY,2:POKEY+1,2  :rem 174
455 FORL=1TO100:NEXTL:PRINT"{2 RIGHT}";:N
    =N+1:GOTO102                 :rem 45
500 PRINT"{CLR}{UP}DATA FOR SONG:";N;:REM
     *PRINT DATA*                :rem 217
520 FORL=1TON:PRINT"{LEFT},";A%(L);
                                 :rem 118
525 IFL=70ORL=144THENPRINT:PRINT"{RVS}
    {3 SPACES}PRESS ANY KEY TO{6 SPACES}C
    ONTINUE{11 SPACES}{OFF}";    :rem 234
527 IFL=70ORL=144THENM=PEEK(197):IFM=64TH
    EN527                        :rem 58
530 NEXTL                        :rem 35
535 PRINT:PRINT"{RVS}{RED}PRESS D TO REPE
    AT DATAPRESS S TO START AGAINPRESS X
    {SPACE}TO STOP{7 SFACES}{BLU}{OFF}"
                                 :rem 162
540 LL=PEEK(197):IFLL=41THENRUN  :rem 172
545 IFLL=18THEN500               :rem 47
547 IFLL<>26THEN540              :rem 113
550 POKE198,0:POKE808,112:STOP   :rem 16
600 FORL=1TO200:NEXT:POKE36876,0:REM *SEA
    RCH MODE*                    :rem 5
602 B%=PEEK(197):IFB%=64THEN602  :rem 241
603 IFB%=39THENPRINT"{RED}";:H%=2:GOTO600
                                 :rem 174
604 IFB%=47THENPRINT"{BLU}";:H%=1:GOTO600
                                 :rem 176
606 IFB%=63THEN100               :rem 248
608 IFPEEK(653)=1THEN650         :rem 121
610 IFB%=35THENSE%=191:IFH%=2THENSE%=223
                                 :rem 91
612 IFB%=34THENSE%=195:IFH%=2THENSE%=225
                                 :rem 98
614 IFB%=18THENSE%=201:IFH%=2THENSE%=228
                                 :rem 93
616 IFB%=49THENSE%=207:IFH%=2THENSE%=231
                                 :rem 99
618 IFB%=42THENSE%=209:IFH%=2THENSE%=232
                                 :rem 97
620 IFB%=19THENSE%=215:IFH%=2THENSE%=235
                                 :rem 94
622 IFB%=17THENSE%=183:IFH%=2THENSE%=219
                                 :rem 100
624 POKE36876,SE%:GOTO600        :rem 203
650 IFB%=34THENSE%=199:IFH%=2THENSE%=227
                                 :rem 106
```

COMPUTE! Back Issues

Here are some of the applications, tutorials, and games from available back issues of COMPUTE!. Each issue contains much, much more than there's space here to list, but here are some highlights:

Home and Educational COMPUTING! (Fall 1981 and Summer 1981 — count as one back issue): Exploring The Rainbow Machine, VIC As Super Calculator, Custom Characters On The VIC, Alternative Screens, Automatic VIC Line Numbers, Using The Joystick (Spacewar Game), Fast VIC Tape Locater, Window, VIC Memory Map.

May 1981: Named GOSUB/GOTO in Applesoft, Generating Lower Case Text on Apple II, Copy Atari Screens to the Printer, Disk Directory Printer for Atari, Realtime Clock on Atari, PET BASIC Delete Utility, PET Calculated Bar Graphs, Running 40 Column Programs on a CBM 8032, A Fast Visible Memory Dump, Cassette Filing System, Getting To A Machine Language Program, Epidemic Simulation.

June 1981: Computer Using Educators (CUE) on Software Pricing, Apple II Hires Character Generator, Ever Expanding Apple Power, Color Burst for Atari, Mixing Atari Graphics Modes 0 and 8, Relocating PET BASIC Programs, An Assembler In BASIC for PET, Quadra PET: Multitasking?, Mapping Unknown Machine Language, RAM/ROM Memory, Keeping TABs on a Printer.

July 1981: Home Heating and Cooling, Animating Integer BASIC Lores Graphics, The Apple Hires Shape Writer, Adding a Voice Track to Atari Programs, Machine Language Atari Joystick Driver, Four Screen Utilities for the PET, Saving Machine Language Programs on PET Tape Headers, Commodore ROM Systems, Using TAB, SPC, And LEN.

August 1981: Minimize Code and Maximize Speed, Apple Disk Motor Control, A Cassette Tape Monitor for the Apple, Easy Reading of the Atari Joystick, Blockade Game for the Atari, Atari Sound Utility, The CBM "Fat 40," Keyword for PET, CBM/PET Loading, Chaining, and Overlaying, Adding A Programmable Sound Generator, Converting PET BASIC Programs To ASCII Files.

October 1981: Automatic DATA Statements for CBM and Atari, VIC News, Undeletable Lines on Apple, PET, and VIC; Budgeting on the Apple, Atari Cassette Boot-tapes, Atari Variable Name Utility, Atari Program Library, Train Your PET to Run VIC Programs, Interface a BSR Remote Control System to PET, A General Purpose BCD to Binary Routine, Converting to Fat-40 PET.

December 1981: Saving Fuel $$ (multiple computers), Unscramble Game (multiple computers), Maze Generator (multiple computers), Animating Applesoft Graphics, A Simple Atari Word Processor, Adding High Speed Vertical Positioning to Atari P/M Graphics, OSI Supercursor, A Look At SuperPET, Supermon for PET/CBM, PET Mine Maze Game, Replacing The INPUT# Command, Foreign Language Text on The Commodore Printer, File Recovery.

January 1982: Invest (multiple computers), Developing a Business Algorithm (multiple computers), Apple Addresses, Lowercase with Unmodified Apple, Cryptrogram Game for Atari, Superfont: Design Special Character Sets on Atari, PET Repairs for the Amateur, Micromon for PET, Self-modifying Programs in PET BASIC, Tinymon: a VIC Monitor, VIC Color Tips, VIC Memory Map, ZAP: A VIC Game.

May 1982: VIC Meteor Maze Game, Atari Disk Drive Speed Check, Modifying Apple's Floating Point BASIC, Fast Sort For PET/CBM, Extra Atari Colors Through Artifacting, Life Insurance Estimator (multiple computers), PET Screen Input, Getting The Most Out Of VIC's 5000 Bytes.

August 1982: The New Wave Of Personal Computers, Household Budget Manager (multiple computers), Word Games (multiple computers), Color Computer Home Energy Monitor, A VIC Light Pen For Under $10, Guess That Animal (multiple computers), PET/CBM Inner BASIC, VIC Communications, Keyprint Compendium, Animation With Atari, VIC Curiosities, Atari Substring Search, PET and VIC Electric Eraser.

September 1982: Apple and Atari and the Sounds of TRON, Commodore Automatic Disk Boot, VIC Joysticks, Three Atari GTIA Articles, Commodore Disk Fixes, The Apple Pilot Language, Sprites and Sound on the Commodore 64, Peripheral Vision Exerciser (multiple computers), Banish INPUT Statements (multiple computers),

COMPUTE! Back Issues

Charades (multiple computers), PET Pointer Sort, VIC Pause, Mapping Machine Language, Commodore User-defined Functions Defined, A VIC Bug.

January 1983: Sound Synthesis And The Personal Computer, Juggler And Thunderbird Games (multiple computers), Music And Sound Programs (multiple computers), Writing Transportable BASIC, Home Energy Calculator (multiple computers), All About Commodore WAIT, Supermon 64, Perfect Commodore INPUTs, VIC Sound Generator, Copy VIC Disk Files, Commodore 64 Architecture.

March 1983: An Introduction To Data Storage (multiple computers), Mass Memory Now And In The Future, Games: Closeout, Boggler, Fighter Aces, Letter And Number Play (all for multiple computers), VIC Music, Direct Atari Disk Access, Automatic Commodore Program Selector, PET Quickplot, A Commodore Gotcha, VIC and Atari Memory Management, Friendly VIC INPUTs.

April 1983: Selecting The Right Word Processor, Air Defense (multiple computers), Commodore Structure BASIC, Retirement Planner (multiple computers), Dr. Video For Commodore, Atari Filefixer, Video 80:80 Columns For The Atari, VICword, Magic Commodore BASIC, A BASIC Hex Editor For VIC, VIC Music Theory.

May 1983: The New Low Cost Printer/Plotters, Jumping Jack (multiple computers), Deflector (multiple computers), VIC Kaleidoscope, Graphics on the Sinclair/Timex, Bootmaker For VIC, PET and 64, VICSTATION: A "Paperless Office," The Atari Musician, Puzzle Generator (multiple computers), Instant 64 Art, 64 Odds And Ends, Versatile VIC Data Acquisition, POP For Commodore.

June 1983: How To Buy The Right Printer, The New, Low-cost Printers, Astrostorm (multiple computers), The Hawkmen Of Dindrin (multiple computers), MusicMaster For The Commodore 64, Commodore Data Searcher, Atari Player/Missile Graphics Simplified, VIC Power Spirals, Un NEW For The VIC and 64, Atari Fast Shuffle, VIC Contractor, Commodore Supermon Q & A.

July 1983: Constructing The Ideal Computer Game, Techniques For Writing Your Own Adventure Game, SpeedSki And Time Bomb (VIC), Castle Quest And Roadblock (Atari), RATS! And Goblin (64), How To Create A Data Filing System (multiple computers), How To Back Up Disks For VIC And 64, Atari Artifacting, All About The Commodore USR Command, TI Mailing List.

August 1983: Weather Forecaster (multiple computers), First Math And Clues (multiple computers), Converting VIC And 64 Programs To PET, Atari Verify, Apple Bytechanger, VIC And 64 Escape Key, Banish Atari INPUT Statements, Mixing Graphics Modes On The 64, VICplot, VIC/64 Translations: Reading The Keyboard, Musical Atari Keyboard, VIC Display Messages.

September 1983: Games That Teach, Caves Of Ice, Diamond Drop, Mystery Spell, and Dots (multiple computers), VIC Pilot, Ultrasort (VIC, 64, PET), Easy Atari Page Flipping, Computer Aided Design On The TI, Relative Files On the VIC/64, Atari Fontbyter, TI Sprite Editor, All About Interrupts (multiple computers), Cracking The 64 Kernal, Making Change On The Timex/Sinclair, Build Your Own Random File Manager (multiple computers).

October 1983: Computer Games By Phone, Coupon File (multiple computers), Dragon Master And Moving Maze (multiple computers), Merging Programs From Commodore Disks, Atari Master Disk Directory, Sprites In TI Extended BASIC, Commodore EXEC, Multicolor Atari Character Editor, High Speed Commodore Mazer, Apple Sounds, Extra Instructions (multiple computers), Commodore DOS Wedges, Invisible Disk Directory For VIC And 64.

Back issues are $3 each or six for $15. Price includes freight in the US. Outside the US add $1 per magazine ordered for surface postage, $4 per magazine for air mail postage. All back issues subject to availability.

In the Continental US call TOLL FREE 800-334-0868 (919-275-9809 in NC)

Or write to:

COMPUTE! Back Issues
P.O. Box 5406
Greensboro, NC 27403 USA

Prepayment required in US funds.
MasterCard, VISA, and American Express accepted.
NC residents add 4% sales tax.

```
652 IFB%=18THENSE%=203:IFH%=2THENSE%=229
                                    :rem 98
654 IFB%=42THENSE%=212:IFH%=2THENSE%=233
                                    :rem 92
656 IFB%=19THENSE%=217:IFH%=2THENSE%=236
                                   :rem 106
658 IFB%=17THENSE%=187:IFH%=2THENSE%=221
                                   :rem 106
660 POKE36876,SE%:GOTO600          :rem 203
```

The Note Name Game

(Article on page 112.)

> BEFORE TYPING...
>
> **Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.**

Program 1:
The Note Name Game — VIC Version

```
5 DIMN$(1,25),A%(9,3),B%(5,3):R=0:W=0:RO%
  =13:SC=0                          :rem 94
7 FORJ=0TO3:FORI=0TO9:READA%(I,J):NEXT:NE
  XT                                :rem 28
8 FORJ=0TO3:FORI=0TO5:READB%(I,J):NEXT:NE
  XT                                :rem 26
10 FORI=0TO25:READN$(0,I):NEXTI    :rem 136
15 FORI=0TO25:READN$(1,I):NEXTI    :rem 142
25 POKE36879,8:PRINT"{CLR}{2 DOWN}
   {2 RIGHT}{BLU}{RVS}THE NOTE NAME GAME
   {OFF}"                           :rem 26
30 PRINT"{DOWN}{3 SPACES}I WILL PLAY A NO
   TE":PRINT"{DOWN}FOR YOU AND THEN SHOW"
                                   :rem 182
35 PRINT"{DOWN}YOU THE NOTE ON A":PRINT"
   {DOWN}STAFF.{2 SPACES}I WANT YOU TO"
                                    :rem 29
40 PRINT"{DOWN}TELL ME THE NAME OF":PRINT
   "{DOWN}THE NOTE."                 :rem 1
50 PRINT"{3 DOWN}INPUT {RVS}B{OFF} FOR BA
   SS,{RVS}T{OFF} FOR";"{DOWN}TREBLE, OR
   {SPACE}{RVS}M{OFF} FOR MIXED" :rem 100
55 GETE$:IFE$=""THEN55            :rem 255
60 IFE$<>"T"ANDE$<>"B"ANDE$<>"M"THEN55
                                   :rem 140
65 FORL=1TO10                      :rem 16
70 PRINT"{CLR}{WHT}{2 SPACES}WHAT NOTE IS
    THIS?{BLU}"                   :rem 108
75 PRINT"{HOME}{22 DOWN}{6 RIGHT}{WHT}
   {RVS}SCORE{OFF} :";SC;"{LEFT}%
   {2 SPACES}{BLU}{HOME}{4 DOWN}" :rem 91
80 RN%=INT(RND(0)*13)             :rem 153
82 IFRN%=RO%THEN80                 :rem 88
83 RO%=RN%                         :rem 51
85 CF%=INT(RND(0)*2)               :rem 85
90 IFE$="B"THENCF%=0              :rem 110
95 IFE$="T"THENCF%=1              :rem 134
100 ON CF%+1 GOSUB 3000,2000      :rem 105
105 POKE8023-RN%*22,81:POKE8023+30720-RN%
    *22,1                         :rem 225
110 B=RN%:IFCF%=1THENB=RN%+13     :rem 189
115 FOR Z=1TO500: NEXTZ: POKE36878,0
                                   :rem 38
120 PRINT"{3 DOWN}{2 RIGHT}> ";    :rem 74
125 GETGU$:IFGU$=""THEN125          :rem 9
130 IF (ASC(GU$)<65 OR ASC(GU$)>71) AND A
    SC(GU$)<>81 THEN PRINT"{4 UP}":GOTO12
    0                              :rem 26
135 PRINTGU$;                      :rem 33
140 IF GU$="Q" THEN160            :rem 124
145 IF GU$=N$(0,B) THEN GOSUB 500:rem 203
150 IF GU$<>N$(0,B) THEN GOSUB 600 :rem 5
155 IFR+W<>0THENSC=INT((R/(R+W))*100+.5):
    NEXT                          :rem 159
160 PRINT"{CLR}{5 DOWN}{RIGHT}YOUR SCORE
    {SPACE}WAS";SC;"{LEFT}%"       :rem 53
165 PRINT"{3 DOWN}{2 RIGHT}WOULD YOU LIKE
     TO":PRINT"{DOWN}{5 RIGHT}PLAY AGAIN"
    ;:INPUTY$                     :rem 239
170 IF LEFT$(Y$,1)="Y" THEN RUN   :rem 159
175 PRINT"{CLR}":POKE36879,27:END :rem 33

500 SD=36874:FORZ=SDTOSD+4:POKEZ,0:NEXT
                                  :rem 245
510 POKESD+4,15:PRINT"{2 DOWN}"; :rem 181
520 FOR Z=128TO255STEP2:PRINTTAB(8);"
    {DOWN}{WHT}{RVS}CORRECT{OFF}":POKESD,
    P                              :rem 75
530 PRINTTAB(8);"{UP}CORRECT{2 UP}{BLU}":
    POKESD+1,383-Z:NEXTZ          :rem 104
540 R=R+1:POKESD+4,0:FORZ=1TO1000:NEXT:RE
    TURN                          :rem 113
600 SD=36874:FORZ=SDTOSD+4:POKEZ,0:NEXT
                                  :rem 246
610 POKESD+4,15:PRINT"{5 LEFT}{WHT}SORRY
    {SPACE}THAT'S INCORRECT":PRINT"
    {7 RIGHT}IT WAS ";N$(0,B)      :rem 92
620 POKESD,158:FORZ=1TO750:NEXTZ  :rem 35

630 W=W+1:POKESD+4,0:FORZ=1TO950:NEXT:RET
    URN                            :rem 88
800 DATA 32,32,32,32,32,225,225,32,32,32
                                  :rem 152
801 DATA 32,32,32,32,255,32,32,127,32,160
                                  :rem 207
802 DATA 255,97,127,254,225,255,127,98,22
    5,255                         :rem 246
803 DATA 123,97,97,32,32,252,225,255,32,3
    2                              :rem 25
900 DATA32,118,32,32,32,32         :rem 34
901 DATA255,32,127,32,32,226      :rem 143
902 DATA127,32,97,32,255,32       :rem 102
903 DATA32,97,97,97,32,32          :rem 17
1000 DATAE,F,G,A                  :rem 114
1010 DATAB,C,D,E                  :rem 110
1020 DATAF,G,A,B                  :rem 113
1030 DATAC,C,D,E                  :rem 113

1040 DATAF,G,A,B                  :rem 115
1050 DATAC,D,E,F                  :rem 118
1060 DATAG,A                      :rem 149
1070 DATA207,209,215,219          :rem 206
1080 DATA223,225,228,231          :rem 201
1090 DATA232,235,237,239          :rem 211
1100 DATA240,195,201,207          :rem 193
1110 DATA209,215,219,223          :rem 199
1120 DATA225,228,231,232          :rem 196
1130 DATA235,237                   :rem 65
2000 SD=36874:FORZ=SDTOSD+4:POKEZ,0:NEXT
                                   :rem 34
2010 POKESD+2,VAL(N$(1,RN%+13)):POKESD+4,
     15                           :rem 171
2020 IFRN%=12THENPRINT"{2 UP}{12 SPACES}
     ***{DOWN}"                  :rem 43
2030 FORI=1TO5                     :rem 59
```

```
2040 PRINTTAB(8)"**********":PR
     INT:NEXT                          :rem 183
2113 SR=7793:CO=38513                  :rem 144
2115 FORI=0TO9:FORJ=0TO3:Z=I*22+J:POKESR+
     Z,A%(I,J):POKECO+Z,6:NEXT:NEXT
                                       :rem 22
2120 IFRN%=0THENPRINT"{12 SPACES}***"
                                       :rem 198
2130 PRINT"{UP}";:RETURN               :rem 125
3000 SD=36874:FORZ=SDTOSD+4:POKEZ,0:NEXT
                                       :rem 35
3010 POKESD,VAL(N$(1,RN%)):POKESD+4,15
                                       :rem 192
3020 IFRN%=12THENPRINT"{2 UP}{12 SPACES}
     ***{DOWN}"                        :rem 44
3030 FORI=1TO5                         :rem 60
3040 PRINTTAB(8)"**********":PR
     INT:NEXT                          :rem 184
3050 SR=7793:CO=38513                  :rem 145
3060 FORI=0TO5:FORJ=0TO3:Z=I*22+J:POKESR+
     Z,B%(I,J):POKECO+Z,6:NEXT:NEXT
                                       :rem 19
3070 POKE SR+26,46:POKESR+48,46:POKECO+26
     ,6:POKECO+48,6                    :rem 230
3100 IFRN%=0THENPRINT"{12 SPACES}***"
                                       :rem 197
3110 PRINT"{UP}";:RETURN               :rem 124
```

Program 2:

The Note Name Game — 64 Version

```
5 PRINT"{CLR}":V=53248:SD=54272:POKE646,1
  4:POKEV+32,0:POKEV+33,0:DIM N$(2,24):SC
  =0                                   :rem 71
6 NO%=25:POKEV+21,0                    :rem 69
8 FORI=SDTOSD+28:POKEI,0:NEXTI         :rem 219
10 FOR I=0TO24:READN$(0,I):NEXTI       :rem 135
15 FOR I=0TO24:READN$(1,I):NEXTI       :rem 141
20 FOR I=0TO24:READN$(2,I):NEXTI       :rem 138
25 :::REM READ SPRITE DATA             :rem 6
30 FOR I=0TO62: READQ: POKE832+I,Q: NEXTI
                                       :rem 138
35 FOR I=0TO62: READQ: POKE896+I,Q: NEXTI
                                       :rem 153
40 FOR I=0TO62: READQ: POKE960+I,Q: NEXTI
                                       :rem 141
45 :::REM TELL COMPUTER WHERE SPRITE IS
                                       :rem 137
50 POKE2042,13:POKE2043,14:POKE2044,15
                                       :rem 116
55 :::REM POSITION SPRITE ON SCREEN
                                       :rem 165
60 POKEV+4,160:POKEV+5,70              :rem 191
65 POKEV+6,158:POKEV+7,110             :rem 250
70 POKEV+8,158:POKEV+9,171             :rem 1
75 :::REM COLOR SPRITES                :rem 167
78 POKEV+41,1:POKEV+42,1:POKEV+43,1
                                       :rem 60
80 :::REM EXPAND SPRITES               :rem 228
85 POKEV+29,28:POKEV+23,28             :rem 3
90 :::REM SET SOUND PARAMETERS         :rem 100
95 POKESD+24,15:POKESD+5,4:POKESD+6,170:P
   OKESD+2,0:POKESD+3,9:POKESD+12,2
                                       :rem 164
96 POKESD+13,243:POKESD+19,0:POKESD+20,24
   5                                   :rem 206
100 PRINT"{CLR}{2 DOWN}";TAB(11);"{RVS}TH
    E NOTE NAME GAME{OFF}"             :rem 81
105 PRINT"{5 DOWN}{6 RIGHT}I WILL PLAY A
    {SPACE}NOTE FOR YOU AND"           :rem 79
110 PRINT"{DOWN}{3 RIGHT}THEN SHOW YOU A
    {SPACE}NOTE ON A STAFF."           :rem 47
115 PRINT"{DOWN}{3 RIGHT}I WANT YOU TO TE
    LL ME THE NAME OF":PRINT"{DOWN}
    {3 RIGHT}THE NOTE."                :rem 5
120 PRINT"{3 DOWN}{4 RIGHT}INPUT
    {2 SPACES}{RVS}B{OFF} FOR BASS, {RVS}
    T{OFF} FOR TREBLE,"                :rem 134
125 PRINTTAB(13);"{DOWN}OR{2 SPACES}{RVS}
    M{OFF} FOR MIXED."                 :rem 95
128 POKE198,0                          :rem 200
130 GETE$:IFE$=""THEN130               :rem 83
135 IFE$<>"T"ANDE$<>"B"ANDE$<>"M"THEN130
                                       :rem 233
190 FOR L=1TO10                        :rem 63
200 POKEV+21,0:PRINT"{CLR}{7}{2 DOWN}
    {RIGHT}WHAT{2 SPACES}NOTE":PRINT"
    {DOWN}{2 RIGHT}IS THIS?{HOME}":rem 94
205 M=25:S=0:IFE$="B"THENM=13          :rem 148
210 IFE$="T"THENM=13:S=12              :rem 170
215 RN%=INT(RND(0)*M+S)                :rem 48
217 IFRN%=NO%THEN215                   :rem 180
218 NO%=RN%                            :rem 95
220 GOSUB4500                          :rem 221
225 POKEV+21,28:PRINT"{HOME}{DOWN}":GOSUB
    750                                :rem 199
230 FORZ=1TO2:PRINT"{16 RIGHT}{24 SPACES}
    ";:NEXTZ                           :rem 2
235 GOSUB750:PRINT"{HOME}"             :rem 212
245 IFRN%=24THENPRINT"{HOME}{29 SPACES}
    ***{HOME}"                         :rem 248
250 IFRN%=12THENPRINT"{HOME}{12 DOWN}
    {29 SPACES}***{HOME}"              :rem 189
255 IFRN%=0THENPRINT"{HOME}{24 DOWN}
    {29 SPACES}***{HOME}"              :rem 91
260 POKE2014+54272-RN%*40,1:POKE2014-RN%*
    40,81                              :rem 223
265 PRINT"{HOME}{20 DOWN}('Q' TO QUIT)
    {HOME}"                            :rem 190
268 PRINT"{HOME}{18 DOWN}{RVS}SCORE{OFF}
    {SPACE}:";SC;"{LEFT}%{2 SPACES}{HOME}
    "                                  :rem 53
270 PRINT"{7 DOWN}{2 RIGHT}> ";        :rem 148
273 POKE198,0                          :rem 201
275 GETGU$:IFGU$=""THEN275             :rem 21
280 IF (ASC(GU$)<65 OR ASC(GU$)>71) AND A
    SC(GU$)<>81 THENPRINT"{8 UP}":GOTO270
                                       :rem 106
285 PRINTGU$                           :rem 236
290 IFGU$="Q"THEN 310                  :rem 127
295 IFGU$=N$(0,RN%)THENGOSUB400        :rem 83
300 IFGU$<>N$(0,RN%)THENGOSUB500       :rem 132
305 IFR+W<>0THENSC=INT((R/(R+W))*100+.5):
    NEXT                               :rem 156
310 POKEV+21,0:PRINT"{CLR}"            :rem 161
315 PRINT"{7 DOWN}{9 RIGHT}YOUR SCORE WAS
    ";SC;"{LEFT}%"                     :rem 174
320 PRINT"{5 DOWN}{4 RIGHT}WOULD YOU LIKE
     TO PLAY AGAIN";:INPUTY$           :rem 151
325 IFLEFT$(Y$,1)="Y"THENR=0:W=0:SC=0:GOT
    O100                               :rem 170
330 SYS2048:REM END OF PROGRAM         :rem 5
400 :::REM CORRECT                     :rem 56
410 POKESD+11,129                      :rem 176
420 FORI=536TO9094STEP256:PRINT"{3 DOWN}
    {RIGHT}{WHT}{RVS} CORRECT {OFF}{WHT}"
    :HI=INT(I/256):LO=I-HI*256         :rem 71
430 PRINT"{UP}{2 SPACES}CORRECT {4 UP}
    {7}":POKESD+8,HI:POKESD+7,LO:NEXTI
                                       :rem 244
440 FORT=1TO10:NEXT:POKESD+11,128:FORT=1T
    O900:NEXT:R=R+1:RETURN             :rem 59
```

```
500 :::REM INCORRECT                    :rem 208
505 POKESD+18,33:POKESD+16,0:POKESD+15,6
                                        :rem 103
510 PRINT"{DOWN}SORRY, THAT'S":PRINT"
    {DOWN}INCORRECT."                   :rem 225
515 PRINT"{DOWN}IT WAS: ";N$(0,RN%)
                                        :rem 94
520 FORT=1TO1000:NEXT:POKESD+18,32:FORT=1
    TO900:NEXT:W=W+1:RETURN             :rem 117
750 FORX=1TO5                           :rem 33
755 PRINT TAB(16);:FORI=1TO24:PRINT CHR$(
    99);:NEXT                           :rem 24
760 PRINT"{16 RIGHT}{24 SPACES}";:NEXTX:R
    ETURN                               :rem 100
780 PRINT"THE NOTE WAS:";N$(0,RN%)
                                        :rem 203
785 W=W+1:RETURN                        :rem 5
1000 :::REM TELL COMPUTER WHERE SPRITE IS
                                        :rem 225
1005 POKE2042,13:POKE2043,14:POKE2044,15
                                        :rem 213
1010 :::REM POSITION SPRITE ON SCREEN
                                        :rem 253
1015 POKEV+4,160:POKEV+5,70             :rem 32
1020 POKEV+6,158:POKEV+7,110            :rem 82
1025 POKEV+8,158:POKEV+9,171            :rem 98
1030 :::REM COLOR SPRITES               :rem 255
1035 POKEV+41,1:POKEV+42,1:POKEV+43,1
                                        :rem 150
1040 :::REM EXPAND SPRITES IN BOTH DIRECT
     IONS                               :rem 249
1045 POKEV+29,28:POKEV+23,28            :rem 96
1050 :::REM TURN ON SPRITES             :rem 104
1055 POKEV+21,28                        :rem 116
1999 END                                :rem 179
2000 PRINT:GOSUB 4970                   :rem 221
2005 FORZ=1TO2:PRINT"{16 RIGHT}
     {24 SPACES}";:NEXTZ                :rem 52
2010 GOSUB4970:PRINT"{HOME}"            :rem 53
4500 POKE SD+1,VAL(N$(2,RN%)):POKESD,VAL(
     N$(1,RN%)):POKESD+4, 65            :rem 108
4510 FORT=1TO 600 :NEXT:POKESD+4, 64
                                        :rem 26
4520 RETURN                             :rem 171
4970 FORX=1TO5                          :rem 89
4980 PRINT TAB(16);: FORZ=1TO24: PRINT CH
     R$(99);:NEXTZ                      :rem 183
4990 PRINT"{16 RIGHT}{24 SPACES}";:NEXTX:
     RETURN                             :rem 157
5000 DATAE,F,G,A,B,C,D,E,F,G,A,B,C,D,E
                                        :rem 68
5010 DATAF,G,A,B,C,D,E,F,G,A            :rem 22
5020 DATA71,152,71,12                   :rem 48
5030 DATA233,97,104,143                 :rem 155
5040 DATA48,143,24,210                  :rem 100
5050 DATA195,209,31,96                  :rem 117
5060 DATA30,49,165,135                  :rem 110
5070 DATA162,62,193,60,99               :rem 12
5080 DATA5,5,6,7,7                      :rem 165
5090 DATA8,9,10,11,12                   :rem 47
5100 DATA14,15,16,18,21                 :rem 142
5110 DATA22,25,28,31,33                 :rem 144
5120 DATA37,42,44,50,56                 :rem 154
5140 DATA0,224,0,0,208,0,0,216,0,0,204,0,
     0,206,0,0,199,0,0,199,0,0,199,0,0,20
     6,0                                :rem 54
5150 DATA0,204,0,0,216,0,0,240,0,0,224,0,
     1,192,0,3,192,0,6,192,0,12,192,0,24,
     192                                :rem 61
5160 DATA0,48,192,0,96,192,0,224,192,0
                                        :rem 121
5170 DATA48,111,128,97,248,192,195,96,96,
     198,96,48,195,104,48,193           :rem 246
5175 DATA232,48,96,248,96               :rem 27
5180 DATA112,96,224,56,96,192,28,99,192,7
     ,111,0,1,248,0,0,96,0,0,0,0,0,0,0,0,
     0,0                                :rem 97
5190 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
                                        :rem 33
5200 DATA 0,248,0,3,6,0,6,3,128,6,0,198,3
     ,192,198,3,192,192,0,0,198,0,1,134,0
     ,1                                 :rem 8
5210 DATA128,0,3,0,0,3,0,0,6,0,0,12,0,0,2
     4,0,0,112,0,1,192,0,3,0,0,0,0,0,0,0,
     0                                  :rem 142
5220 DATA0,0,0,0,0,0                    :rem 223
```

Easy Screen Formatting

(Article on page 160.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

```
100 REM CLEAR SCREEN, HOME CURSOR:rem 207
110 PRINT"{CLR}"                        :rem 246
120 :                                   :rem 205
130 :                                   :rem 206
140 REM SET X,Y POSITIONS FOR CURSOR
                                        :rem 207
150 X=5:Y=5:GOSUB 60000                 :rem 21
160 :                                   :rem 209
170 :                                   :rem 210
180 REM PRINT HELLO                     :rem 126
190 PRINT"HELLO";                       :rem 26
200 :                                   :rem 204
210 :                                   :rem 205
220 REM OTHER EXAMPLES                  :rem 89
230 X=0:Y=0:GOSUB 60000                 :rem 10
240 PRINT"HELLO";                       :rem 22
250 X=10:Y=10:GOSUB 60000               :rem 110
260 PRINT"HELLO";                       :rem 24
270 END                                 :rem 112
59970 :                                 :rem 72
59980 :                                 :rem 73
59990 REM SUBRT: POSITION CURSOR        :rem 17
60000 PRINT"{HOME}";                    :rem 21
60010 IF Y<>0 THEN POKE 214,Y-1:PRINT
                                        :rem 40
60020 POKE 211,X                        :rem 63
60030 RETURN                            :rem 217
```

Sprites Made Easy

(Article on page 184.)

Program 1: Sprite BASIC

```
10 A=0: REM INITIALIZE CHECKSUM         :rem 114
20 REM MOVE BASIC ROM TO RAM            :rem 80
30 FORI=40960TO49151:POKEI,PEEK(I):NEXTI
                                        :rem 217
```

```
40 REM CHANGE LET TO OFF                :rem 81
50 FORI=41150TO41152:READN:POKEI,N:A=A+N:
   NEXTI                                :rem 113
60 READL,H:POKE40988,L:POKE40989,H:A=A+L+
   H                                    :rem 254
70 DATA 79, 70, 198, 2, 192             :rem 120
80 REM CHANGE WAIT TO MOVE              :rem 1
90 FOR I=41189TO41192:READN:POKEI,N:A=A+N
   :NEXTI                               :rem 133
100 READL,H:POKE41008,L:POKE41009,H:A=A+L
   +H                                   :rem 9
110 DATA 77, 79, 86, 197, 19, 192:rem 123
120 REM CHANGE VERIFY TO SPRITE         :rem 108
130 FORI=41201TO41206:READN:POKEI,N:A=A+N
   :NEXTI                               :rem 157
140 READL,H:POKE41014,L:POKE41015,H:A=A+L
   +H                                   :rem 7
150 DATA 83,80,82,73,84,197,96,192
                                        :rem 163
160 REM READ IN NEW ROUTINES            :rem 145
170 FORI=49152TO49378:READN:POKEI,N:A=A+N
   :NEXTI                               :rem 192
180 IFA<>29989THENPRINT"ERROR IN DATA STA
   TEMENTS"                             :rem 59
190 END                                 :rem 113
200 DATA 80, 70, 83, 32,158,183,224, 8,17
   6, 31,189,219,192, 45, 21,208,141
                                        :rem 237
210 DATA 21,208, 96, 32,158,183,224, 16,1
   76, 14,134, 2, 32,253,174, 32,235
                                        :rem 222
220 DATA183,165, 21,201, 2,144, 3, 76, 72
   ,178,138, 72,166, 2, 32, 10,192
                                        :rem 70
230 DATA189,219,192, 45, 16,208,141, 16,2
   08, 70, 21,144, 9,189,211,192, 13
                                        :rem 28
240 DATA 16,208,141, 16,208,138, 10,170,1
   04,157, 1,208,165, 20,157, 0,208
                                        :rem 255
250 DATA166, 2,189,211,192, 13, 21,208,14
   1, 21,208, 96, 32,158,183,224, 8
                                        :rem 228
260 DATA176,193,134, 2,169,248,133,251,17
   3, 24,208, 41,240, 9, 12,133,252
                                        :rem 70
270 DATA173, 0,221, 73,255, 74,102,252, 7
   4,102,252, 32,253,174, 32,158,183
                                        :rem 65
280 DATA138,164, 2,145,251, 32,253,174, 3
   2,158,183,224, 16,176,146,138,153
                                        :rem 182
290 DATA 39,208,185,219,192, 72, 45, 29,2
   08,141, 29,208,104, 45, 23,208,141
                                        :rem 86
300 DATA 23,208, 32,253,174, 32,158,183,2
   24, 4,176,223,134, 2, 70, 2,144
                                        :rem 163
310 DATA 9,185,211,192, 13, 29,208,141, 2
   9,208, 70, 2,144, 9,185,211,192
                                        :rem 178
320 DATA 13, 23,208,141, 23,208, 96, 1, 2
   , 4, 8, 16, 32, 64,128,254,253
                                        :rem 171
330 DATA251,247,239,223,191,127         :rem 43
```

Program 2: Butterfly

```
10 READ SB: IF SB<0 THEN 180: REM READ SP
   RITE DATA                            :rem 207
20 LO= SB*64: FOR I= 0 TO 62            :rem 69
30 READ SD: POKE LO+I,SD: NEXT I        :rem 19
40 GOTO 10                              :rem 254
50 DATA 13: REM SPRITE DATA BLOCK 13
                                        :rem 193
60 DATA 14, 32, 0, 31, 112, 0, 63, 112, 0
   , 63, 186, 0                         :rem 235
70 DATA 127, 217, 128, 127, 237, 128, 63,
   247, 0, 63, 254, 0                   :rem 111
80 DATA 31, 252, 0, 15, 248, 0, 15, 240,
   {SPACE}0, 31, 224, 0                 :rem 31
90 DATA 31, 192, 0, 13, 128, 0, 0, 0, 0,
   {SPACE}0, 0, 0                       :rem 230
100 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
   0, 0, 0, 0                           :rem 227
110 DATA 14: REM SPRITE DATA BLOCK 14
                                        :rem 240
120 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 50
   , 0                                  :rem 6
130 DATA 60, 121, 128, 127, 125, 128, 255
   , 191, 128, 255, 239, 0              :rem 48
140 DATA 255, 254, 0, 255, 252, 0, 255, 2
   48, 0, 127, 240, 0                   :rem 41
150 DATA 63, 224, 0, 127, 192, 0, 62, 0,
   {SPACE}0, 28, 0, 0                   :rem 189
160 DATA 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
   0, 0, 0, 0                           :rem 233
170 DATA -1: REM END OF DATA            :rem 180
180 PRINT"{CLR}": POKE 53281,1: REM WHITE
   SCREEN                               :rem 37
190 X=0: Y=0: REM STARTING POSITION
                                        :rem 94
200 POKE 1,54: REM TURN ON SPRITE BASIC
                                        :rem 196
210 SPRITE 0, 13, 11, 0: REM DEFINE SPRIT
   E                                    :rem 180
220 MOVE 0, X, Y: REM PUT SPRITE 0 ON SCR
   EEN                                  :rem 127
230 FOR T = 0 TO 100: NEXT T: REM DELAY L
   OOP                                  :rem 5
240 SPRITE 0, 14, 11, 0: REM REDEFINE SPR
   ITE                                  :rem 79
250 FOR T = 0 TO 100: NEXT T: REM DELAY L
   OOP                                  :rem 7
260 X=X+3: Y=Y+ 3*(INT(RND(1)*3)-1)
                                        :rem 66
270 IF X>345 THEN X=0                   :rem 78
280 IF (Y<30) OR (Y>250) THEN Y=150
                                        :rem 237
290 GOTO 210                            :rem 103
```

Program 3: Tie Fighter

```
10 READ SB: IF SB<0 THEN 120: REM READ SP
   RITE DATA                            :rem 201
20 LO= SB*64: FOR I= 0 TO 62            :rem 69
30 READ SD: POKE LO+I, SD: NEXT I :rem 19
40 GOTO 10                              :rem 254
50 DATA 13: REM SPRITE DATA BLOCK 13
                                        :rem 193
60 DATA 192, 0, 3, 192, 0, 3, 192, 40, 3,
   192, 171, 3                          :rem 253
70 DATA 194, 171, 195, 194, 155, 195, 194
   , 90, 195, 194, 90, 195              :rem 95
80 DATA 194, 106, 195, 250, 170, 235, 254
   , 170, 239, 254, 170, 255            :rem 163
90 DATA 194, 171, 195, 194, 175, 195, 195
   , 191, 195, 195, 255, 195            :rem 202
100 DATA 195, 255, 195, 192, 255, 3, 192,
   60, 3, 192, 0, 3                     :rem 8
110 DATA 192, 0, 3, -1: REM END OF SPRITE
   DATA                                 :rem 8
```

```
120 X= 184: Y= 150: REM POSITION IN MIDDL
    E OF SCREEN                        :rem 89
130 PRINT"{CLR}":POKE 53281,3: POKE53280,
    3: REM CYAN SCREEN AND BORDER :rem 39
140 POKE 53276,1: REM MULTICOLOR SPRITE 0
                                       :rem 87
150 POKE 53285,15: POKE 53286,11: REM AUX
     COLORS                            :rem 59
160 POKE1,54: REM TURN ON SPRITE BASIC
                                       :rem 201
170 SPRITE 0, 13, 12, 1: REM DEFINE SPRIT
    E 0                                :rem 235
180 MOVE 0, X, Y: REM POSITION SPRITE
                                       :rem 115
190 GOSUB 300: IF J=15 THEN 190        :rem 44
200 GOTO 180:REM MOVE SPRITE           :rem 144
300 REM READ JOYSTICK                  :rem 3
310 J= PEEK(56320) AND 15: REM PORT 2
                                       :rem 95
320 IF (J AND 8)=0 THEN X=X+1: REM MOVE R
    IGHT                               :rem 130
330 IF (J AND 4)=0 THEN X=X-1: REM MOVE L
    EFT                                :rem 46
340 IF (J AND 2)=0 THEN Y=Y+1: REM MOVE U
    P                                  :rem 167
350 IF (J AND 1)=0 THEN Y=Y-1: REM MOVE D
    OWN                                :rem 60
360 IF Y<50 THEN Y=50: REM STAY IN RANGE
                                       :rem 175
370 IF Y>229 THEN Y=229                :rem 191
380 IF X<24 THEN X=24                  :rem 78
390 IF X>295 THEN X=295                :rem 197
400 RETURN                             :rem 116
```

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

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

PRODUCT MART

COMMODORE 64 OWNERS

FREE DATA BASE

Want a great data base program listing that's easy to enter and useful for keeping track of your personal records and files on your Commodore 64?

I'll send it to you FREE if you send me the name and address of your local home computer store. Send me three computer store names and I'll send you a FREE C-10 data cassette to save your new data base onto.

SOFTSYNC, INC.
14 East 34th. st. NEW YORK, N.Y. 10016

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

NEW! FOR *VIC 20*

16k with Battery Backup $89
($79 without battery backup)

NO MORE DATA LOSS!
If power fails — data and programs are retained for up to 4 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
(206) 694-3455
Add $3 shipping
Washington residents, add 6% sales tax.

DEALER INQUIRIES WELCOMED!

64K

SPRITE GRAPHICS DEVELOPMENT PACKAGE

Edit up to 128 normal or multi-color sprite images
Built-in "HELP" feature to maximize efficiency
35 powerful commands including invert and obvert
Machine code routines for high speed conversions
Interupt multiplexer allows display of up to 32 sprites simultaneously
Easy to read manual with complete documentation

Incredible Price!! **$19.95**
plus $1.50 shipping

Trilobyte Software a division of
Trilobyte Services, Inc.
P.O. Box 10043
Portland, OR 97210

Please specify disk or cassette

Joystick required

Trilobyte Services, Inc.

VIC 20™ Kidbit Software Present:

THE PLAY SCHOOL TAPES

Preschool learning programs, on cassettes for the unexpanded VIC

☐ Counting ☐ Little letter/Big Letter
☐ Alphabet Sequence ☐ Same/Different
$9.95 ea $15.95 for 2
$29.95 for all four Free Brochure ☐

Name _____
Address _____
City _____ St _____ Zip _____

Personal check or money order accepted
Calif. residents add 6½% sales tax

Kidbit Software
6116 Merced Ave #175
Oak. Ca.94611 (415) 339-2303

HUNDREDS OF PROGRAMS AVAILABLE FOR THE COMMODORE 64 & VIC 20

Avalon-Hill • HES • Epyx • Spinnaker • Infocom
Abacus • Sirius • Broderbund • Victory • Totl
and much more

ALL PRICES UP TO 30% BELOW RETAIL!

	RETAIL	OUR PRICES
Quick Brown Fox (64 or VIC 20)	65.00	47.50
Hesmon (64 or VIC 20)	39.95	29.95
Paper Clip (CBM 64) (D)	125.00	96.25
Jumpman (D or Cass.)	39.95	29.95
ACCESSORIES AVAILABLE ALSO Monitors • Printers • Expansion Boards		
CARDCO		
Cardboard/3 slot	39.95	25.95
Cardco Parallel Printer Interface	79.95	63.95
DATA 20		
Video Pak (8K mem., 40/80 col. includes free word processor)	149.95	119.95

Many more products also available for APPLE, ATARI, CP/M, IBM P/C

Write for FREE Catalog

SOFTWARE HOUSE
SOFTWARE SPECIALISTS
1503 S. Willow Pl. Broken Arrow, OK 74102

FLY Your Computer

FLIGHT SIMULATOR GAMES

Sky Pilot (8K VIC-20)	$18.00
Runway 20 (16K VIC-20)	$25.00
Runway 64	$25.00
Micro-Pilot (EPSON HX-20)	$18.00

ADD $2.00 FOR DISK VERSION

TORPEDO!

Submarine Battle Games
8K VIC-20 or Commodore 64 **$25.00**

SUSIE SOFTWARE
709 Wilshire Dr. Mt. Prospect, IL 60056
(312) 394-5165

VIC-20

MATH MENACE $9.00
Kids fight off alien invaders while drilling in ADDITION, SUBTRACTION, MULTIPLICATION and DIVISION.

HANG-IT-ALL $9.00
Hangman with an educational twist. Use your child's school spelling list, or the word list supplied with the program.

BLACKJACK $9.00
GREAT GRAPHICS! Las Vegas style. Double Down, Split-a-Pair, etc.

CHARACTER DESIGNER ..$9.00
Design CUSTOM CHARACTERS for use in your own game programs.

- ALL PROGRAMS RUN ON UNEXPANDED VIC! (3.5K)
- BUY ALL 4 PROGRAMS FOR $30.00 AND RECEIVE A BONUS PROGRAM ***FREE!***

ADD $1.00 FOR POSTAGE

MARSHMALLOW SOFTWARE
Box 3810, Bozeman, MT 59772

COMMODOR 64

"ABC" THE ALPHABET FOR PRESCHOOERS

TEACH YOUR CHILDREN THE ALPHABET EARLY WITH GRAPHICS AND SOUND

ONLY $18.95 ON CASSETTE
OR $21.95 ON DISK

VIC-20

(CASSETTES ONLY)
THE ALPHABET GAME .....$ 9.95 (ea)
LEARNING NUMBERS 0-50
PART I....$ 9.95 (ea)
LEARNING NUMBERS 51-100
PART II....$ 9.95 (ea)
PART I&II ARE AVAIL. IN: ENGLISH; SPANISH; FRENCH; AND GERMAN VERSIONS PLEASE STATE LANG
ANY 3 VIC-20 CASSETTES FOR ONLY $ 25.-
Check or Money order +$1.50 Post. N.Y.Res+7% tx.

THOR SOFTWARE
47 CHERNUCHA AVE.
MERRICK, N.Y. 11566

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. - CAN.	U.K.
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

VALU-WARE

VIC • C-64 • TI-99

Valu-Calc	29.95
Valu-File	29.95
Valu-Writer	29.95
Payroll	19.95
Mailing List	19.95
Inventory	19.95
Statistics	19.95
Personnel File	19.95
Checkbook	9.95
Budget	9.95

California Residents add 6.5% Tax
For FREE Catalog Write

Valorum
441 Clyde Ave. B
Mtn. View, CA 94043
(415) 968-8500

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. Sturdy ¼" acrylic.

Smoke Tint $69.95 **Clear** $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.

THE **VIDEO & COMPUTER PLACE** INC
844 North Court Sq.
Medina, OH 44256

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!

Advertise your program or product for the VIC-20 or 64 here and reach hundreds of thousands of readers.

VIC

6-PAK $14.95

1. ADDRESSFILE
2. PUZZLECUBE
3. MATCHMATE
4. BLACKJACK
5. MASTERBAFFLER
6. SLOT MACHINE

on *AUTO-LOADING* cassette that locates AND loads desired program automatically

HOURS OF FUN FOR EVERYONE

ALL PROGRAMS RUN ON 5K VIC

To order send $14.95
(Money Order for RUSH service)
to: BASIX SOFTWARE
P.O. BOX 30474
SANTA BARBARA, CA 93130

ETT 64

Electronic Typing Teacher

Educate!
Don't Intimidate.

Learn to type the correct way. Written by an educator for those who wish to be educated. For Commodore 64.

Cassette **$24.95**
Disk **$29.95**

Disk version has 64 lessons.

KNIGHT WRITER
P.O. Box 598
Westland, MI 48185
(313) 728-0946

DEALER INQUIRIES INVITED
C.O.D. EXTRA

CANADIANS!

IF YOU ADORE YOUR 64 — YOU'LL LOVE C.S.S.

CANADIAN SOFTWARE SOURCE provides you with Commodore 64 Home, Business, and Game Software. Compare our prices and amazingly fast* delivery to your door.

	Canadian $ Retail	C.S.S.
• Paperclip 64 (Batteries)	$ 150.00	$129.95
• Frogger (Sierra) (D)	$ 49.95	$36.95
• Temple of Apshai (Epyx) (T D)	$ 54.95	$44.95
• Home Accountant (Continental) (D)	$ 93.95	$74.75
• Jumpman (Epyx) (T D)	$ 54.95	$44.95
• Quick Brown Fox (QBF)	$ 79.95	$68.85
• Forbidden Forest (Cosmi) (T D)	$ 25.95	$21.95
• Fire Command-joy stick	$ 69.95	$59.95
• Acc t Rec Pay (Timeworks) ea (D)	$149.95	$99.95

GIGANTIC SELECTION of over 200 more popular Commodore 64 programs from the top 20 manufacturers. Write or phone for FREE catalogue or to place order.

CANADIAN SOFTWARE SOURCE
Box 340, Station "W", Toronto, Ont.
M6M 5B9
(416) 491-2942

Ontario residents add 7% sales tax. Send certified cheque or money order. VISA & MasterCard, please include card number, expiry date, and signature. Add $2.00 for shipping and handling.

*Delivery by U.P.S. within 3 days of order date if stocked by local suppliers.

AN INTRODUCTION TO THE COMMODORE 64 tm

Adventures in Programming

by Nevin B. Scrimshaw & James Vogel

Learn to write your own programs and have fun along the way! A master program with an electronic sound and light show included.

Paperback/ISBN 0-8176-3161-5/$11.95

ORDER YOUR COPY TODAY

BOOKS TO MAKE YOU COMPUTER-FRIENDLY from

BIRKHÄUSER BOSTON, INC.
Box 2007 J Cambridge, MA 02139
(617)876-2333

Commodore 64 is a trademark of Commodore Electronics

FREE CATALOG !

HOME, EDUCATIONAL, AND BUSINESS SOFTWARE FOR THE VIC AND 64

New Items....
Mailing List/64 Disk features sorting and mailing labels. $16.00
Typing Practice improves typing speed and accuracy. 64/disk $8.00
VIC/TAPE $6.00

Over 50 other titles!
Low-Priced! Practical!
Put your VIC or 64 to work with quality software from

Farthest Fringe S.A.
101 Highway Blvd.
N. Pekin, IL 61554

THE COMMODORE 64 tm MUSIC BOOK

by James Vogel & Nevin B. Scrimshaw

Learn to "play" your COMMODORE 64 tm as a musical instrument while you pick up professional programming skills along the way.

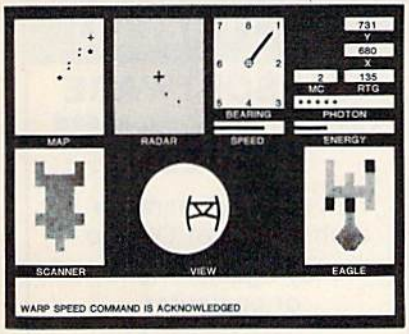
Paperback/ISBN 0-8176-3158-5/$14.95

ORDER YOUR COPY TODAY

BOOKS TO MAKE YOU COMPUTER-FRIENDLY from

BIRKHÄUSER BOSTON, INC.
Box 2007 J Cambridge, MA 02139
(617)876-2333

Commodore 64 is a trademark of Commodore Electronics



QUEST OF THE EAGLE

YOUR MISSION THIS TIME...*SECURE PLUTONIUM AND DELIVER TO PLANET JEMSIO...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?

COMMODORE 64 — FERIN ENTERPRISES, 6310 UNDERWOOD AVE. S.W., CEDAR RAPIDS IA. 52404 — $28.75 SPECIFY CASSETTE OR DISKETTE

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".

COMMODORE 64 MEAL MANAGER

Now you can easily create a shopping list on your Commodore 64. MEAL MANAGER is a disk system that is menus and panels which allows you to store your meals. Additional features:

AUTOMATIC ADJUSTING — MEAL MANAGER will adjust the quantity of the ingredients based on the number of servings.

VALUE TRACKING — It can help you keep track of your calories or cost.

SCREEN OR PRINTED OUTPUT — You can have a printed shopping list to take to the store.

MEAL MANAGER requires one disk drive.
Price — $24.95

MEAL ANALYZER

Now you can analyze your nutrient intake. MEAL ANALYZER has 730 ingredients and the nutrition value based on the government pamphlet "NUTRITIVE VALUE OF FOODS." Additional features:

ADJUST VALUES — You can change the values in MEAL ANALYZER or add up to 270 more of your own.

ADJUST RDA — You can change the recommended daily allowance table. You can have up to 20 different levels based on sex and age.

GRAPHIC OUTPUT — MEAL ANALYZER produces a character graph of the pe cent ages of the recommended daily allowance.

MEAL ANALYZER requires one disk drive and a printer.
Price — $24.95

Contact your local Commodore dealer or send money order or check to:

LarLin Software Co.
P.O. Box 249
Mountlake Terrace, WA 98043
Wash. residents add 8% sales tax

VIC 20™/COMMODORE 64™

Investment Portfolio Manager — for the Commodore 64 with disk drive or tape (printer optional), is menu driven and provides one summary page and nine detail pages. Each page can accept nine entries of up to $99,999 each. The program can handle over $8 million. The IPM is quick and makes it easy to track volatile assets such as stocks and stock options. The summary page displays the grand total and the per cent of grand total for each of nine investment categories. Price: $14.95

Disk Directory Manager — for the VIC 20 or Commodore 64 with 1540/41 disk drive and 1525 printer. The DDM is a handy utility which will read directly from the directories of diskettes and sort into an ordered list, over 1500 file names, file sizes, file types and disk ID's; and print a hard copy master directory. It is written completely in fast and efficient machine language. Price: $19.95

Dungeons — for the VIC 20 with 16k expansion and tape or disk. Create characters to explore a twelve level dungeon which contains 1200 individual rooms. After you purchase your weapon and armor, you will find vast treasures and do battle with over fifty types of monsters which you must slay for experience points. Your character also has the ability to cast numerous spells and you are given the option of saving the game to tape or disk as your character gains strength and experience. Excellent sound and three dimensional graphics add to the excitement. Price $19.95

Pak Alien — for the unexpanded VIC 20 with tape or disk. 100% machine language arcade-style game. Custom graphic characters and 100 levels of increasing difficulty. Guide your alien through a maze of interplanetary space particles dodging the seven evil-aliens and clear the board before the bonus timer runs out. Joystick or keyboard. Includes pause feature. Price: $14.95

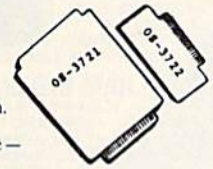
BYTES and BITS
524 E. Canterbury Ln.
Phoenix, AZ 85022

(602) 942-1475
Please specify tape or disk
Add $2.00 for postage and handling

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

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 Allows programming 2764, 2732A, 2732, 2716, 2564, 2532, 2516 EPROMS	$24.50
OS-37A System (Pgmr., 8K Cart)	$88.50
OS-37B System (Pgmr., 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 Shipg. & Hndlg. — CA res. 6% tax

DISCOVER YOUR VIC 20 tm

A Beginner's Guide to Real Programming

by Donald Kalm, Jr. & Nevin B. Scrimshaw

Learn the basics of programming and discover the hidden potential in both you and your VIC 20 tm

Paperback/ISBN 0-8176-3160-7/$10.95

ORDER YOUR COPY TODAY

BOOKS TO MAKE YOU COMPUTER-FRIENDLY from

BIRKHÄUSER BOSTON, INC.
Box 2007 J Cambridge, MA 02139
(617)876-2333

VIC 20 is a trademark of Commodore Electronics Ltd.

TREASURE

RAIDERS

ARK Innovations, Inc. for VIC 20™

$2.97

ARK INNOVATIONS, INC.
18133 SCHOOL ST.
P. O. BOX 155
AMADOR CITY, CA. 95601

VIC 20 is a trademark of Commodore Electronics Ltd

cassette uses joystick, 3.5 K

NEW! TAXI DRIVER
reading development: inquire

EXPAND YOUR VIC 20™ MEMORY!

Affordable Memory Expander lets you add 2K RAM Circuits as your needs increase. (Up to 35K.)

Mother Board with Instructions	$39.95
Mother Board & Sockets with Instructions	$54.95
Complete Kit with Cabinet (35K)	$159.95
Assembled & Tested Expander (35K)	$189.95
Each Add'l 2K Chip (Up to 280K paged RAM) (+1 Shipping)	$8.95

Send Check or Money Order to

PERIPHERAL DEVELOPMENT
P. O. Box 28247
St. Louis, MO 63132
(Add $5 S/H. Missouri residence add 5¾% tax)
Prices subject to change without notice.

Vic 20 is a trademark of Commodore Electronics, Ltd.

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 $2.50 FOR SHIPPING OUTSIDE US, CANADA, MEXICO

THE MODEM INTERFACE

- CONNECTS TO THE USER I/O PORT
- NEEDS NO BATTERIES, SOLDERING
- CONNECTS ANY STANDARD MODEM
- USE MODEM AUTODIAL, ANSWER FEATURES
- COMES WITH A FREE TYPE IN BASIC TERMINAL PROGRAM
- ONLY $34.95 POSTPAID. ADD $2.50 FOR SHIPPING OUTSIDE US, CANADA, MEXICO

CHARGE OR COD ORDERS CALL
(206) 236-BYTE

BYTESIZE MICRO TECHNOLOGY
PO BOX 12309 DEPT FG12
SEATTLE, WA 98111
(206) 236-BYTE

CALL OR WRITE FOR DEALER INFORMATION

Writers, programmers... *COMPUTE!'s Gazette* is looking for articles on the VIC and 64.

Spaceways have been cleared for intergalactic mining. Claim the

LODESTAR

Send $29.95 plus $2.50 (postage) TO:

DYNACOM TECHNOLOGIES
#17 254 PINEHOUSE DRIVE
SASKATOON, SASKATCHEWAN
CANADA, S7K 4X1
specify — Disc OR Cassette!

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

VIC 20
SOFTWARE

All programs run on a vic computer. Each program is on an individual cassette tape except for specials. All programs are guaranteed to run or will be replaced by a new tape if defective tape is returned within 10 days. Individual programs $3.00 each.

SET A: Mathematics		SET B: Science		SET C: Social Studies	
Add/Sub/Div/Mul	0101	Astronomy	0201	States & Capitals	0301
Math Instructor	0102	Chemistry	0202	History Review	0302
Add/Skill Level	0103	Density	0203	Hawaii	0303
Reverse/Numbers	0104	Life Expectancy	0204	American Flag	0304
Guess/Numbers	0105	Zodiac	0205	Othello	0305
SET D: Language		**SET E: Home-Management**		**SET F: Home-Management**	
Spelling	0401	Budget	0501	Mail List	0506
Scramble	0402	Inventory	0502	Sheet Music	0507
Typing	0403	Investments	0503	Check Book	0508
Word Processor	0404	Data Management	0504	Loan Calcul.	0509
Sym/Anonims	0405	Phone Directory	0505	Decisi./Maker	0510
				Address Book	0511
SET G: Space Games		**SET H: Gambling Games**		**SET I: Maze Games**	
Star Wars	0601	Black Jack	0606	Packman	0611
Asteroids	0602	Casino	0607	Maze Chase	0612
Invaders	0603	Poker	0608	Mazeman	0613
Lunar Lander	0604	Quick Draw	0609	Vicman	0614
Star Chaser	0605	Slot Machine	0610	Maze	0615
SET J: Auto Racing		**SET K: War Games**		**SET L: Sports**	
Grand Prix	0616	Tankers/UFO	0621	Football	0626
Forest Driver	0617	Artillary	0622	Golf	0627
Trail Ride	0618	Depth Charge	0623	Rugby	0628
Race	0619	Blaster	0624	Pinball	0629
Road Race	0620	War Fish	0625	Fishing	0630

"SPECIALS"

S001	You select any 1 set	9.95	S002	You select any 4 sets	19.95
S003	You select any 8 sets	29.95	S004	All 12 sets	39.95

ORDER FROM: **Satellite Technology**
Software Division A
4955 Monterey Dr.
Arcata, CA 95521

SHIPPING CHARGES: Add $1.50 shipping and handling ($3.50 for C.O.D.). If California residence add 6% sales tax. When ordering request stock number.

500 different programs available. For additional information, send a self-addressed stamped envelope to SATELLITE SOFTWARE, P.O. Box 4842, Arcata, CA 95521. Dealer discounts available.

---

2 + 1 EXPANDER

$24.95 (GOLD CONNECTORS)

2 FULL SERVICE EXPANSION CONNECTORS RIGHT ANGLE CONNECTOR: DAISY-CHAIN 2 + 1s TOGETHER
1 SPECIAL SWITCHED CONNECTOR FOR BLOCK ASSIGNMENTS

STORE SEVERAL PROGRAMS ON SAME CARTRIDGE

RAM BLOCK $29.95

8K MEMORY EXPANSION CARD, ASSEMBLED AND TESTED
BARE 8K CIRCUIT BOARD $9.95 FOR VIC 20

SCREEN PROMPTS
STORES BASIC OR MACHINE PROGRAMS
RE-USABLE CARTRIDGES

PLAY OVER THE PHONE OR LOCAL
VIC TO VIC OR C64
NO CONNECT CHARGES

CARTRIDGE PROGRAMMER

$79.95 USER FRIENDLY
WORKS WITH PROG.AID & V-MON
NO MEMORY EXPANSION REQUIRED
LOW COST

GAZETTE SPECIAL
7TH FLEET $29.95

SEND MESSAGES
SINK ENEMY SHIPS
SPY MODE
SET MINES

$49.95

MIGHTY 5

5 FULL SERVICE EXPANSION CONNECTORS
SOFTWARE CONTROL OF BLOCK ENABLE LINES
DUAL RESET SWITCHES: RESET VIC OR MIGHTY 5
(GOLD CONNECTORS) USES SEVERAL GAMES OR RAM CARDS AT ONCE

These and other fine products available from:
QUEUE PRODUCTS
(313) 846-6666
BOX 1655 / DEARBORN, MI 48121
— DEALER INQUIRY REQUESTED —

Micro Match™ SAVES MONEY

Don't Let Programs Gather Dust!

TRADE Original SOFTWARE with Documentation for ALL MICROS . . .

WE MATCH TRADERS
for only $5.00
GUARANTEED SATISFACTION

FOR UNLIMITED TRADING:
Ask about SOFTRADERS Worldwide Trading Directories

Send your system description, titles of all software wanted, titles of all software to trade and S.A.S.E. Send no money.

SOFTRADERS™ International
1610 Shomaker Drive
Murphysboro, IL 62966

WORDPROCESSING FOR THE VIC-20 AND C-64

Be more creative and efficient by using the *Scribe's* easy-to-learn menu-driven features. Within minutes use:

- Move
- Insert
- Delete
- Scroll
- Word wrap
- Center
- Formatted printing; Margin adjust; right justify; Single, double, or triple space
- With some printers: graphics, underline, and special characters

- Screen edit
- Up to 10 tabs
- Search and replace
- Save/load/merge files
- 1024 color combinations

For a limited time you can obtain the *Scribe* at a *Special Introductory Price:*

VIC-20 (Specify 16K or 24K version) ~~$29.95~~ **$16.95**
Commodore 64 version ~~$24.95~~ **$19.95**
Add $3.00 for discs. Specify your type and model printer.

Send a check or money order (including $3.00 for mailing) to:

***Scribe* Associates**
P.O. Box 292647, Dayton, OH 45429
Allow 3 weeks for personal checks
Ohio residents add 6% sales tax
VIC-20 and C-64 are trademarks of Commodore Business Machines, Inc.
Dealer Inquiries Welcomed

64 DISK-a-ZINE

• For Commodore 64 Users •

The magazine on a disc!
Menu driven • ready to run programs with games • articles • Kids Korner • business programs, and more!

SEND: CHECK OR MONEY ORDER
to
3118 Gilbert Dr.
Shreveport, La. 71104

$8. per issue per year $60.

Commodore 64 is a trademark of Commodore Electronics Limited

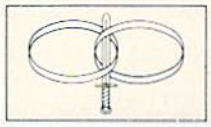
EXCALIBER ENTERPRISES

carries
SOFTWARE
for your

- **Commodore 64**
- **VIC-20**
- Texas Instruments 99-4/A
- Timex Sinclair 1000
- Atari Home Computers

Official Company and Third Party Software
Hardware Peripherals Also Available

For Your FREE Catalog
Circle Reader Card Number
Available in the Advertiser Index
or Write



Excaliber Enterprises
Dept. DG83
Box 4775
Riverside, CA 92514
(714) 359-8567

YOUR NIFTY LITTLE C-64 JUST BECAME A GRAPHICS POWERHOUSE

PROSCREEN 64

Finally! Unlock the powerful hi-res and multi-color hi-res graphics potential of your C-64. Now you can create professional graphics for games, graphs, or just for fun!

- Use all of Commodore's characters and/or characters of your own design. Use both C-64 fonts simultaneously.
- Characters may be normal or reverse, positive or negative, upright or rotated. All combinations may be used.
- Place characters anywhere on the screen, not just in the usual character cells. Overlap or erase without changing the background!
- Call hi-res routines from your BASIC program or create graphics in the immediate mode. Switch at will from hi-res screen to standard screen and back.
- Draw or erase with a joystick using any character as the stylus.
- Lines, circles, and arcs drawn automatically. PROSCREEN spline connects discrete dots with a smooth line!
- Machine code program uses not a single byte of user BASIC RAM.

If you're not convinced, send $5.00 (refundable upon Purchase) for users' guide to get the inside scoop. If you're sold, $34.95 gets the whole thing on tape, $37.95 on disk. Check or M.O. to:

WETHERBEE SOFTWARE
P.O. Box 4512, Ann Arbor, MI, 48106

VIC 20 COMMODORE 64

UMI / VIC 20

Spiders of Mars (C)	$29.95
Meteor Run (C)	$29.95
Amok (T)	$16.95
Sat & Met (C)	$29.95

UMI / New for C-64

Pennant Drive 2 player baseball strategy	$29.95
Motor Mania hi-performance racing game	$29.95
Fuego fight fire-throwing drones to save the space crew	$29.95

TOTL SOFTWARE

TOTL Text 2.6 (D)	$34.00
TOTL Label 2.6 (D)	$20.00

Send cash, check or money order to:
ARIES MARKETING CO.
P.O. Box 4196
4200 Shannon Drive
Baltimore, Maryland 21205
Md. residents add 5% state sales tax

'PUBLIC DOMAIN'™ — SOFTWARE —

Supporting all COMMODORE computers
Written by users, for users
★ GAMES ★ UTILITIES ★ EDUCATIONAL ★

VIC 20™
collection #1 – collection #2 – collection #3
collection #4 – collection #5
70+ programs per collection – Tape/Disk – $10.00

COMMODORE 64™
64 collection #1 – 64 collection #2
64 collection #3 – 64 collection #4
25+ programs per collection – Tape/Disk – $10.00

PET® / CBM®
5 Utility – Tapes/Disks – $10.00 each
11 Game – Tapes/Disks – $10.00 each
6 Educational – Tapes/Disks – $10.00 each

DINSET™: Reset Switch
Works on Vic 20 or Commodore 64 – $5.00

All prices include shipping and handling.
CHECK, MONEY ORDERS, VISA and MASTERCARD accepted.

For A Free Catalog Write:
Public Domain, Inc.
5025 S. Rangeline Rd., W. Milton, OH 45383
10:00 a.m. - 5:00 p.m. EST – Mon. thru Fri.
(513) 698-5638 or (513) 339-1725
VIC 20™, CBM® and Commodore 64™ are Trademarks of Commodore Electronics Ltd.
PET® is a Registered Trademark of Commodore Business Machines, Inc.

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;
- 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 ¾ inch
- 8 sizes of letters from ¾" to 8½" 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

CONVERSE WITH YOUR COMPUTER

AT LAST! A FULL IMPLEMENTATION of the original ELIZA program is now available to run on your Commodore 64!

Created at MIT in 1966, ELIZA has become the world's most celebrated artificial intelligence demonstration program. ELIZA is a non-directive psychotherapist who analyzes each statement as you type it in and then responds with her own comment or question—and her remarks are often amazingly appropriate!

Designed to run on a large mainframe, ELIZA has never before been available to personal computer users except in greatly stripped down versions lacking the sophistication which made the original program so fascinating.

Now, our new Commodore 64 version possessing the **FULL** power and range of expression of the original is being offered at the introductory price of only $25. And if you want to find out how she does it (or teach her to do more) we will include the complete **SOURCE PROGRAM** for only $20 additional.

Order your copy of ELIZA today and you'll never again wonder how to respond when you hear someone say, "Okay, let's see what this computer of yours can actually do!"

ELIZA IS AVAILABLE IN THE FOLLOWING FORMATS:
(Please specify Disk or Cassette)

1. Protected Version — $25
(Protected Version can be run but not listed or modified)
2. Un-protected Commodore 64 BASIC Source Version — $45
(Source Version can be listed and modified as well as run)

Both versions include a six page user manual.

Please add $2.00 shipping and handling to all orders
(California residents please add 6% sales tax)

ARTIFICIAL INTELLIGENCE RESEARCH GROUP
921 North La Jolla Avenue, Dept. G
Los Angeles, CA 90046
(213) 656-7368 (213) 654-2214
MC, VISA and checks accepted

Send for your

Programmer's **FREE**

POKE'R CARD

Handy 3"x6" reference card makes graphics programming a breeze! EZ to use format includes graphics, poke #'s, etc. Every ACE programmer should have one!

SEND NO MONEY

For prompt reply, send a stamped, self-addressed business-size envelope to:

PM PRODUCTS
4455 TORRANCE BLVD., #177
TORRANCE, CA 90503

or, mark the Reader Response Card.

FOR THE BEST DEAL AROUND. . .

get **PAL** (Programmer's Aids and Logs)

95 pages of programming aids, design worksheets, and info logs. Everything you need to create, design, and document your own programs. **INVALUABLE!** Beginner to Expert. Specify PAL-20 or PAL-64.

Send **$9.95** plus $2 shipping (CA add 6%)

EVERYBODY NEEDS A PAL!

ADVERTISERS INDEX

Reader Service Number/Advertiser Page

102 Aardvark Action Software 119
Abacus Software 127
Abaris, Inc. 243
103 Academy Software 114
104 Access Software, Inc. 103
105 Advanced Processor Systems 135
106 Adventure International 117
The Alien Group 122
Alphacom 41
American Peripherals 185
107 Animax Computer 72
108 A-1 Computer Services 122
109 Apropos Technology 129
110 Arena Co. 197
Aries Marketing Co. 247
111 Ark Innovations, Inc. 246
112 Artificial Intelligence Research Group .. 247
Assembly Technology 198
Atari, Inc. 22,23
113 Avalon Hill Game Company 79
Basix Software 244
Besco Products 82
B*E*S*T* 125
Bible Software 128
114 Birkhäuser Boston, Inc. 245
Birkhäuser Boston, Inc. 245
Birkhäuser Boston, Inc. 245
115 Blue Sky Software 61
116 Blue Sky Software 31
117 Boone Corp. 115
118 Bróderbund Software ..... IFC
119 Bróderbund Software 47
120 Bytes & Pieces 67
121 Bytes & Pieces 183
Bytes and Bits 245
122 Bytesize Micro Technology 246
Canadian Software Source 244
123 Cardco, Inc. ..... IBC
Castle Software 97
Century Micro Products 194
Cheatsheet Products 177
124 Comm*Data Computer House, Inc. 69
125 Commercial Data Systems Ltd. 65
Commodore 64 ..... BC
Commodore 64 Users Group 245
126 Compatible Systems Incorporated 90
Comprehensive Software Support 105
127 Compuscope 199
128 CompuServe 4
ComputerAntics, Inc. 167
Computer Mail Order 133
ComputerMat 169
129 Computer Outlet 190
Computer Place 196
Computer Software Assoc., Inc. 131
130 ComStar 177
131 Continental Software 93
Cosmic Computers 195
Cosmopolitan Software Services Ltd. ... 39
Creative Software 42,43
Creative Software 44,45
132 Crown Computer and Software 194
133 Cyberia 113
Datamost 55
Datamost 57
Datasoft 75
DayProm Computer, Inc. 244
134 Discount Software 244
Dynamic-Technologies 246
135 Eastern House 192
Elcomp Publishing, Inc. 99
Entech 177
EPYX 25

Reader Service Number/Advertiser Page

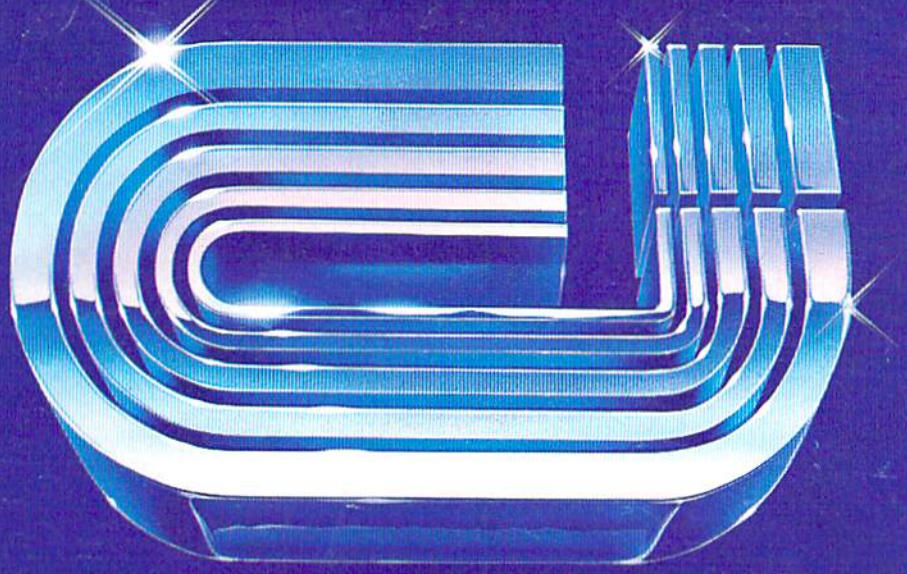
EPYX 27
EPYX 29
136 Excalibur Enterprises 247
Farthest Fringe S.A. 245
Ferin Enterprises 245
137 First Star Software Inc. 53
138 French Silk 166
GemTech Laboratories 106
139 Grapevine Software, Inc. 95
140 House of Software 179
Human Engineered Software 81
141 Hytec Systems 137
Infinity Software 185
Infocom 63
Institutional Computer Development Corp. 139
Interesting Software 181
142 Jay Sun Enterprizes, Incorporated 122
143 Jini Micro-Systems, Inc. 159
John Henry Software 177
Kidbit Software 243
144 Knight Writer 244
K2 Electronics Design Corporation 90
LarLin Software Co. 245
Limbic Systems, Inc. 181
Logistic Engineering Associates 182
Marshmallow Software 243
Mega Software 198
145 MicroDigital 89
146 Micro-80, Inc. 90
147 Microlog 155
148 MicroTechniques 38
149 Micro-Vic-Computers 173
Micro-Ware Distributing Inc. 59
Micro-World Electronix, Inc. 168
150 Midwest Micro Inc. 158
Mirage Concepts, Inc. 163
MMG Micro Software 77
Mosaic Electronics, Inc. 47
Mystic Software 128
Núfekop 73
OJAI Software 246
Olympic Sales Company 185
Orion Software 50
151 Osiris 172
Otto Systems 245
Parallel Systems 243
152 Peripheral Development 246
153 PM Products 247
Powerbyte Software 172
154 Practical Programs Inc. 67
155 Professional Software Inc. 9
The Program Store 123
Pro-Line Software 67
Pro-Line Software 166
156 Protecto Enterprizes 146,147
157 Protecto Enterprizes 148,149
158 Protecto Enterprizes 150,151
159 Protecto Enterprizes 152,153
160 Public Domain, Inc. 247
161 Pyramid Software International 145
Queue Products 246
Quicksilva Inc. 107
162 Rainbow Computer Corporation 161
Rocky Software 198
Satellite Technology 246
163 Saura Computer Software & Consulting . 185
Screenplay 71
Scribe Associates 247
Showcase Software 91
Sierra On-Line Inc. 7
Sierra On-Line Inc. 85
Sierra On-Line, Inc. 113

Reader Service Number/Advertiser Page

164 Sim Computer Products Inc. 2,3
64 Disk-a-Zine 247
SJB Distributors 193
165 Skyles Electric Works 109
166 Skyles Electric Works 175
Soft-Guide 172
Softsync Inc. 243
167 Softraders International 246
Softron, Inc. 87
168 Software Gallery 199
169 Software House 243
170 Software Warehouse Outlet 200
Sophware 122
Southwest Micro Systems, Inc. 158
Southwestern Data Systems 78
Spinnaker 15
Spinnaker 17
Spinnaker 19
Starpoint Software 183
171 subLOGIC Corporation 101
172 such-A-Deal! software 111
Sunsoft 47
Susie Software 243
173 Systems Management Associates 157
174 Systems Management Associates 165
175 Tenex Computer Marketing Systems ... 171
176 T & F Software Company 1
Thor Software 244
3G Company, Inc. 177
177 Timeworks, Inc. 21
178 Toronto Pet Users Group 137
179 Totl Software, Inc. 173
Trilobyte Services, Inc. 243
Tronix 11
Tronix 12,13
180 Umbrella Software Incorporated 38
181 United Microware Industries 83
182 Universal Software 187
183 Vaisala Inc. 28
Valorum 244
Vic Flic 67
184 Victory Software Inc. 121
Victrix & Co. 90
The Video & Computer Place Inc. 244
185 VideoValue 140,141
Virginia Micro Systems 247
Wetherbee Software 247
York 10 Computerware 194

COMPUTE! Books 33,34,35,36
Subscriber Services 242

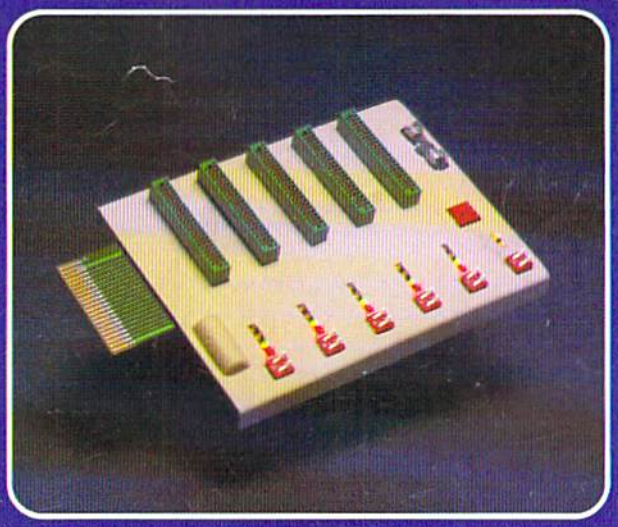
New From Cardco



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

cardco, inc.

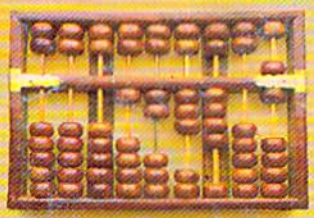
Commodore 64™ is a registered trademark of Commodore Business Systems, Inc.

It writes, rates, creates, even telecommunicates. Costs less, does more- the Commodore 64.

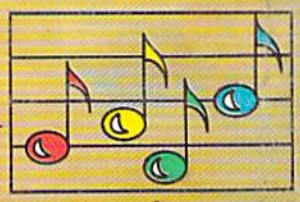
When Commodore introduced the 64, the industry suddenly realized that there would be a computer in every home, school and business years before anyone ever dreamed.

That's because Commodore 64 halved the price of high technology: while you can compare the 64's capabilities with those of any sophisticated business PC, you can compare its price with that of an average television.

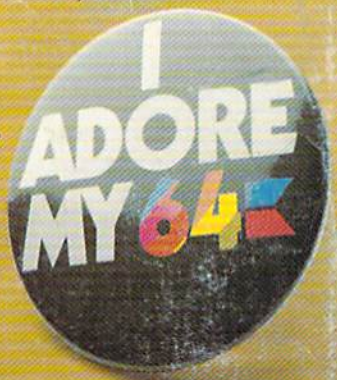
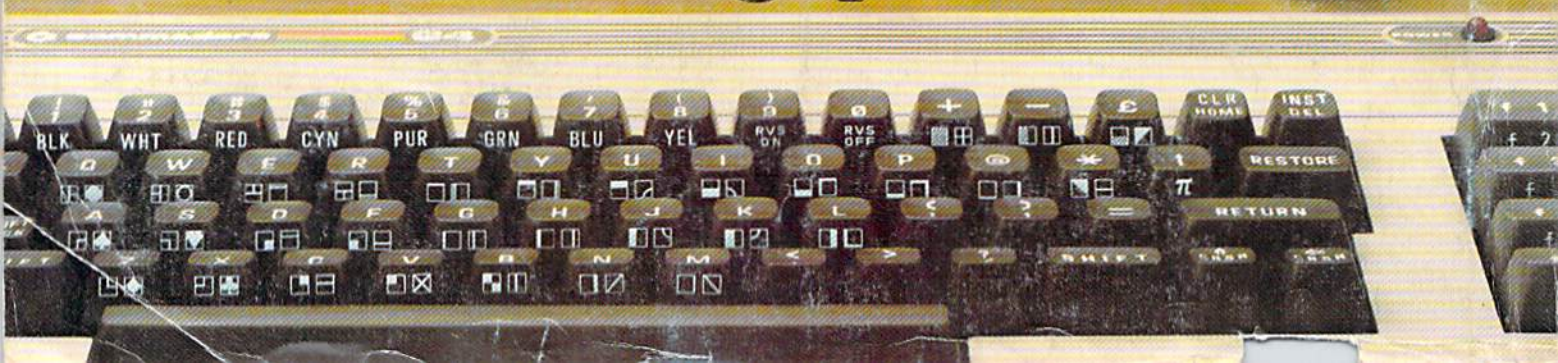
What can you do with it? Create with



its high resolution Sprite Graphics. Add a printer and type with it. Add a disk drive to use spread sheets and other financial programs. Learn and play music through your home sound system on the 64's professional quality music synthesizer.



Add a modem, and hook up with the vast computer networks through your telephone. In short, the Commodore 64 is the ultimate personal computer, at a price you can afford.



COMMODORE 64