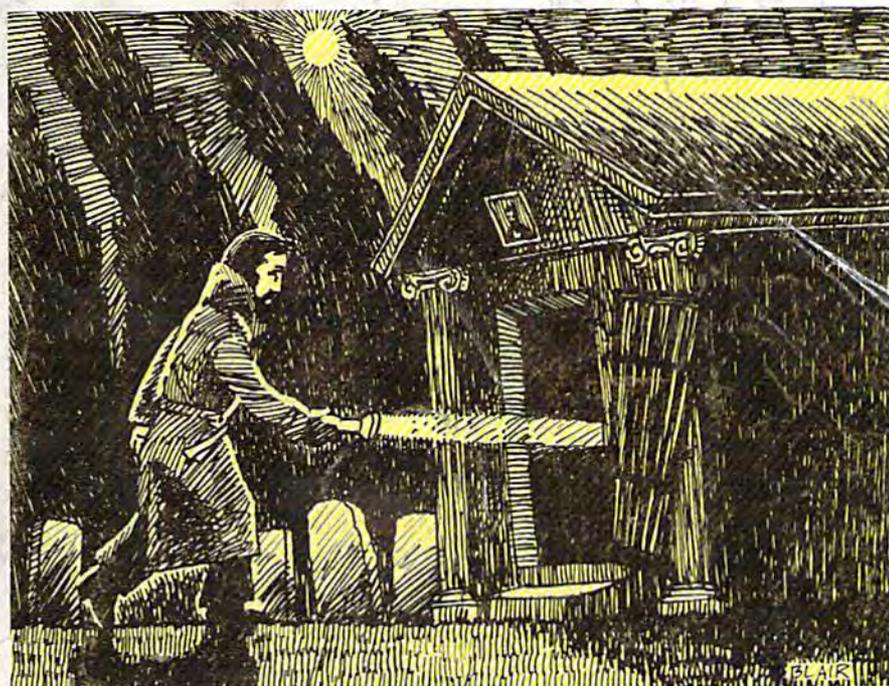


# COMPUTER'S GAZETTE

\$2.95  
February 1985 ©  
Issue 20, Vol. 3, No. 2  
02220 \$3.50 Canada

For Commodore VIC-20™ & 64™ Personal Computer Users



## The Forbidden Crypt

The treasure is for the taking, but aggressive bats, snakes, spiders, and ghouls do all they can to prevent you. A multi-level action game for the VIC, 64, Plus/4, and 16.

## Horizons

An in-depth look at the new Okimate-10 color printer.

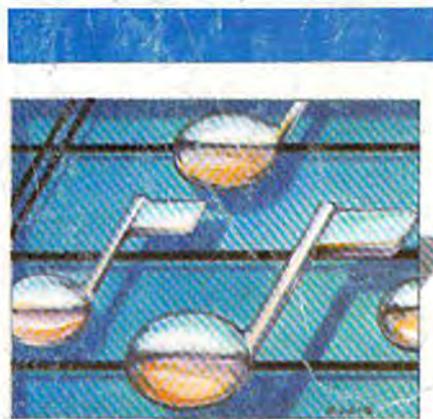
### Also In This Issue:

Machine Language  
For Beginners:  
Self-Modifying  
Programs

Inside View:  
Ryo Kawasaki  
User Group Update  
And More

## Address File

Get organized with this easy-to-use filing system which offers many extra features, such as an alphabetical sort, instant search, and simple menu operation. For the VIC and 64.



## Name That Note

Let your computer help your children learn the scales. A valuable educational program for the VIC, 64, Plus/4, and 16.

[www.commodore.ca](http://www.commodore.ca)



# RITEMAN R64.

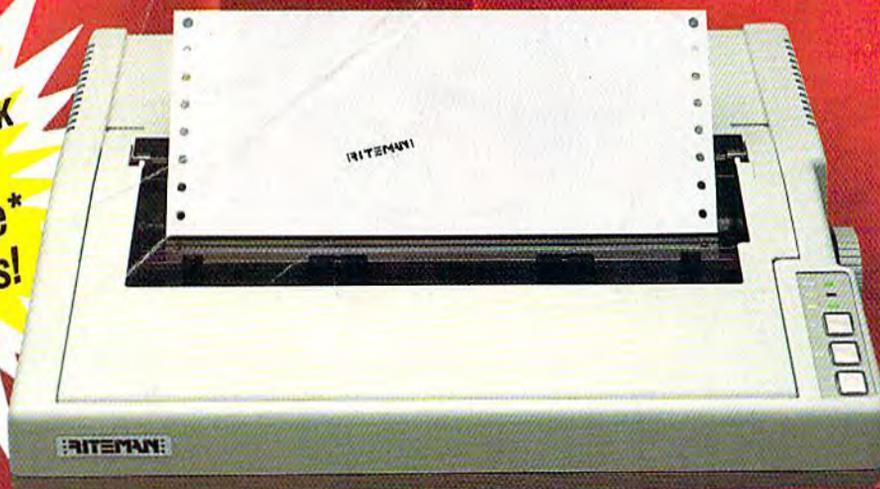
## IT MAKES THE RIGHT IMPRESSION!

Super impressive performance. Super impressive reliability. The Riteman R64 is the portable dot matrix impact printer for people who want to make the right impression!

Plug and software compatible with the Commodore 64\* — it's ready to run without any set-up hassles. It even has a second parallel port and comes with Epson\*\* software so it can be used with many other personal computer systems.

And the R64 prints at a healthy 120 cps with true descenders . . . on cut paper or continuous computer paper. Compact, hard-working, and backed by a full one-year warranty. The Riteman R64. Call toll free for the dealer or department store nearest you: Toll Free number (800) 824-3044 (outside Calif.), (800) 421-2551 (in Calif.).

Ready to work  
with your  
Commodore\*  
computers!



## RITEMAN R64

Check out these impressive specs

• PRINT METHOD .....	Impact Dot Matrix	NUMBER OF COLUMNS .....	Normal	80
• SOFTWARE COMPATIBILITY .....	(1) Commodore MPS-801, 803, VIC-1623 (see printing mode 3)	Compressed	132	
	(2) RITEMAN PLUS, EPSON MX-80 Type 3 G+ (see printing mode 2)	Expanded	40	
• PRINTING MODE .....	(1) Reversed, Expanded and combination	Compressed Expanded	66	
	(2) Normal, Expanded, Compressed, Italics, Double Strike, Emphasized, Underline, Super/Subscripts and combination	• LINE SPACING .....	1/8", 1/8", 7/72", N/72", N/216"	
• CHARACTER MATRIX .....	9 x 9	• PAPER FEED .....	Friction Feed	
• CHARACTER TYPES .....	ASCII	Sprocket Feed		
	Italics	Cut Paper	4 - 9"	
	Semi-graphics	Roll Paper	4 - 9"	
	Commodore Graphic	Fanfold Paper	9 1/2"	
• PRINT SPEED .....	120 CPS	4 - 10" (option)		
• LINEFEED SPEED .....	100 ms	• RIBBON LIFE .....	1 million characters	
• THROUGH PUT SPEED .....	63 LPM	• INKED RIBBON .....	Exclusive Cassette Ribbon (Black)	
• COPY .....	Original + 2	• HEAD LIFE .....	100 million characters	
		• INTERFACE .....	Serial (Commodore)	
		Parallel (Centronics)		
		• SIZE .....	2 7/8" (H) x 10 9/16" (D) x 14" (W)	
		• WEIGHT .....	11 lbs.	
		• WARRANTY .....	1 year (Parts and Labor)	
		• ACCESSORY .....	Printer Cable (Commodore)	
		• OPTION .....	Tractor Unit	

# RITEMAN

INFORUNNER CORPORATION  
Airport Business Center 431 N. Oak St. Inglewood, CA 90302

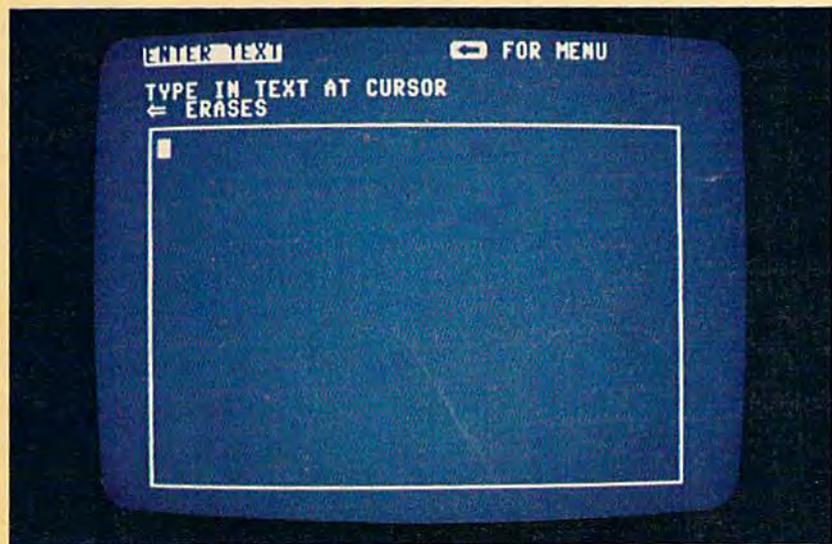
\*Commodore and Commodore 64, MPS-801, 803, VIC 1525, are registered trademarks of Commodore Business Machines, Inc.

\*\*Epson and Epson MX-80 are registered trademarks of Epson America Corp.

[www.commodore.ca](http://www.commodore.ca)

THE BANK STREET APPROACH TO WORD PROCESSING:

# "SIMPLIFY! SIMPLIFY! SIMPLIFY!"



Using the Bank Street Writer is almost as simple as sitting down with a blank sheet of paper—just load the program and start writing.

**I**n the weeks following its introduction, the Bank Street Writer became a leading best seller, and for some very simple reasons.

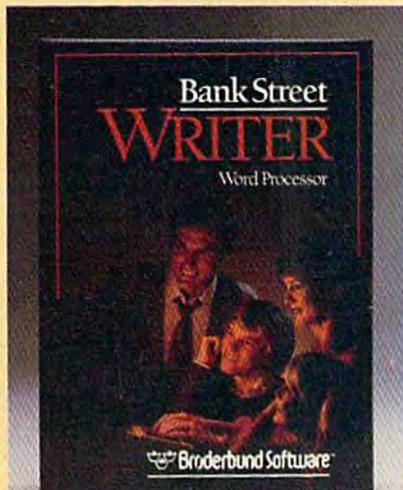
Here, finally, is a word processor that lives up to its promise to be easy to use. Most people (children included) can begin using it in a matter of minutes. Yet it puts you in full control of the powerful features most wanted in a sophisticated word processing program. All at a price that makes it as easy to buy as it is to use.

## SIMPLY MORE SIMPLE.

The Bank Street Writer was developed in association with the Bank Street College of Education in New York. Designed to be its own tutor, the Writer will guide you along with on-screen prompts and easy-to-follow menus so you can concentrate on *what* you're doing instead of *how*. On-screen prompts and selections are in plain English, so there's no memorizing complex computer codes, keys or symbols. You'll be writing, correcting and rearranging your words with just a few keystrokes.

## SIMPLY MORE POWERFUL.

For all its simplicity, the Bank Street Writer offers some very impressive features. You can center titles or indent with ease, and automatic word wrap lets you forget about pressing "return" at the end



of each line. Never worry about changing your mind—you can add, move, insert or delete single words, lines or even entire blocks of text and then restore the deleted copy if you want it back. Using the search and replace option, the Bank Street Writer will scan your document for a particular word, replace it with another, and then verify the replacement. And when you're ready to print, you can format your text in any way you'd like. Answer a few simple questions and you can set margins and line spacing. The Writer will number pages either at the top or bottom or not at all—whichever you prefer. You can easily save your text on a disk, then retrieve it later to re-read, print or do more editing.

And to make your writing letter perfect, soon there will be a spelling checker available for use with the Bank Street Writer. Bank Street Speller finds errors instantly and corrects them by looking up entries in its electronic dictionary.

## SIMPLY MORE AFFORDABLE.

Best of all, Bank Street Writer's suggested retail price of *\$49.95 for the Commodore 64* makes it simply the best word processing value around. And it comes with everything you need, including complete documentation and a free back-up disk, to begin simplifying your life today.

THE BANK STREET WRITER is also available for the Apple, IBM and Atari home computers. Apple is a trademark of Apple Computer, Inc. Commodore 64 is a trademark of Commodore Electronics, Ltd. Atari is a trademark of Atari Corp. IBM is a trademark of International Business Machines, Inc. For more information about Brøderbund and our products, write to us at: 17 Paul Drive, San Rafael, California 94903. © 1984 Brøderbund Software.

**SIMPLICITY. POWER. VALUE.  
IT MAKES GOOD SENSE.  
THE BANK STREET WRITER  
FROM BRØDERBUND.**

**Brøderbund™**

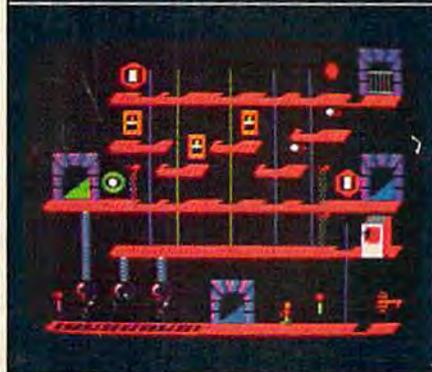


### RAID ON BUNGELING BAY™

When you shopped for a computer, you wanted one with a lot of intelligence. This game may lead you to regret that choice, as your friendly little computer becomes the brains behind the most fantastic enemy you will ever face: The War Machine.

A monstrous artificial intelligence directs an endless army of self-replicating robot weapons and a complex of factories hidden on six heavily defended islands. Even as you strike at one island, robots beyond your field of vision continue to multiply...to repair the damage you've done...to attack and destroy.

Before all of Humankind is crushed beneath the Bungeling Empire's iron heel, one faint hope remains: you in your helicopter.



### THE CASTLES OF DOCTOR CREEP™

Ever dream that you were locked in a haunted castle, wandering blindly through darkened corridors, never knowing what ghastly demons await you? Then you'll feel right at home in *The Castles of Doctor Creep*.

It's a maddening maze of 13 separate castles, more than 200 rooms in all. Sinister surprises await you behind every door: mummies and monsters, forcefields and death rays, trap doors and dead—very dead—ends. Remember where you've been and watch where you're going...there's got to be a way out *somewhere!*

Better hurry, or you'll wind up playing a rather unpleasant role in one of Doctor Creep's experiments.

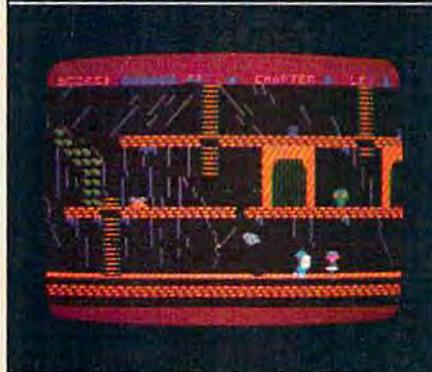


### SPELUNKER™

Who knows what fabulous treasures—and unspeakable dangers—await you in the world's deepest cave? This is one game you can really get into...and into...and into.

Wander through miles of uncharted passageways, swinging on ropes and ladders, tumbling over subterranean falls and plunging to the very depths of the earth on an abandoned mine railroad. Deadly steam vents and boiling lava pits threaten you at every turn. Chattering bats and the Spirits of dead Spelunkers beg you to join them, permanently.

Let's face it: you're in deep, deep trouble.



### WHISTLER'S BROTHER™

You're the star of a full-fledged arcade adventure—and the big question is whether it'll turn out to be a comedy or a tragedy. That's because your co-star and beloved brother, Archaeologist Fenton Q. Fogbank, is rather absent-minded and extremely accident-prone.

As you search for priceless treasures in steaming tropical jungles, ancient cliff villages, musty old tombs and glittering crystal caverns, you control both your character and your brother. The only way to keep him on track and out of trouble is to whistle and pray that he follows you to safety.

Poison arrows, runaway boulders, fearsome frogs and mysterious mummies are only a few of the hazards that'll make you wish you weren't your brother's keeper.



### STEALTH™

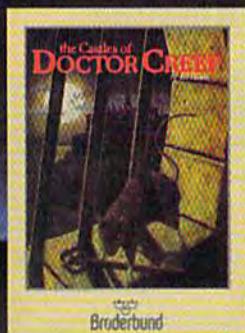
You're all alone on a strange and forbidding planet. On the distant horizon, looming thousands of meters above the blasted landscape, lies your destination: The Dark Tower, home of the mysterious Council of Nine, cruel overlords of a conquered world.

You must maneuver your Stealth Starfighter through an unending assault by the Council's automated arsenal—jets and heat-seeking missiles, photon tanks and anti-aircraft batteries, vaporizing volcanoes and deadly energy fields. Outgunned and outmanned, you must press ever onward, with only your stealth to rely on.

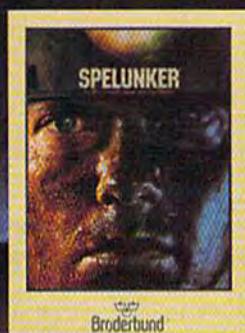
You must reach the Tower. You must destroy it. There's no turning back.



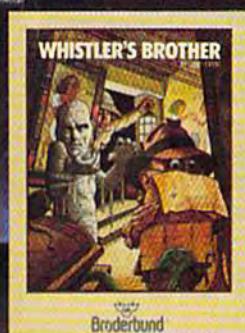
Broderbund



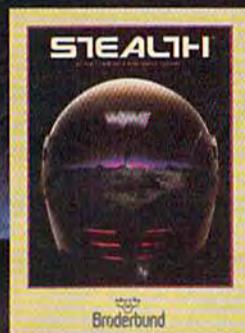
Broderbund



Broderbund



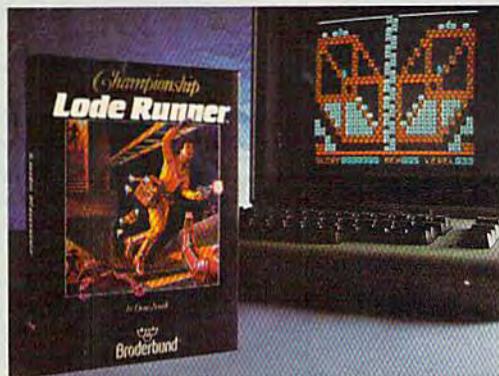
Broderbund



Broderbund

# NO MERCY

FOR COMMODORE.™



## CHAMPIONSHIP LODE RUNNER™

It has come to our attention that some of you out there think you're pretty good at *Lode Runner*, 1983's best computer game. For those foolhardy few, we offer a challenge of a higher order: *Championship Lode Runner*.

With fifty fiendish Treasury Chambers: more intricate, more elaborate, more insidious than anything you've seen before. You'll need lots of skill, lots of smarts, and every ounce of your lode-running experience to have any hope at all of survival.

And if you haven't yet paid your dues on the original *Lode Runner*, don't even think of attempting this championship round.

Broderbund™

# Quick.

**How many plates can the Juggler juggle?**



## Chinese Juggler

**T**hat depends on you. You are the Juggler and your act is the delicate art of plate spinning. Yours will be a tough act to follow if you succeed in matching colors and spinning plates on all 8 poles at the same time.

As your skill increases, so does the pace and the challenge of the game. You must act with speed and precision or the curtain will come down and your act will be all washed up!

Chinese Juggler is a refreshing departure from the usual shoot-em-ups and strategy games. It's fun, fast-paced and will delight players of any age. For Commodore 64. New from Creative Software.

**\$24.95**

**How do you moonwalk, snake and tut?**



## Break Street

**Y**ou'll soon become a break dancing expert with our latest bestseller, Break Street. Now that combination of gymnastics, mime, funk, and just plain show-off, leaves the sidewalks and comes home to your Commodore 64.

Individual play guides you through the footwork of moonwalk, backspin, windmill, tut, and the rest of those sidewalk moves. Slow motion and lively musical accompaniment help you perform each move step by step. String together a whole series of moves and record them for future replay.

Catch the beat of the street with Break Street. For individual or team play. New from Creative Software.

**\$24.95**

**The answers are at your finger tips.**

**What's the capital of Alaska?**



## Roll Call USA

**D**o you know? Get ready to outwit your family and friends with Roll Call USA's fun facts on states, capitals and major industries.

Roll Call USA combines history and geography facts into a colorful question and answer game that challenges your knowledge of the 50 states, their capitals, major industries and statehood dates.

Feel confident? Drill yourself with a Flash Test. The game is speeded up, so think fast. Your answers are tallied up at the end for a final score.

Roll Call USA, a game of USA trivia for team or individual play. For Commodore 64. New from Creative Software.

**\$14.95**

Call and order today! Use your Visa, MasterCard or personal check. Toll Free **1-800-331-7990** (outside California), **1-800-448-1001** (in California), or **1-408-745-1655**. **MONEY BACK GUARANTEE.** If not completely satisfied, return within 10 days for full refund.

"Commodore 64" is a trademark of Commodore Electronics, Ltd.

**CREATIVE SOFTWARE**

230 East Caribbean Drive, Sunnyvale, CA 94089

©1984 Creative Software

[www.commodore.ca](http://www.commodore.ca)

## FEATURES

Commodore 64 Music For Non-Musicians <i>Kathy Yakal</i> .....	30	64
Inside View: Ryo Kawasaki <i>Sharon Darling</i> .....	38	*

## REVIEWS

Sight & Sound Music Software <i>Arthur B. Hunkins</i> .....	82	64
The Factory and The Pond <i>Neil Randall</i> .....	88	64
Also Worth Noting .....	92	64

## GAMES

The Forbidden Crypt <i>Ted Reynolds</i> .....	53	V/64/+4/16
Cypher <i>J. L. Calvin</i> .....	56	V/64

## EDUCATION/HOME APPLICATIONS

Computing For Families: The Computer Piano Teacher <i>Fred D'Ignazio</i> .....	24	*
Address File <i>Robert D. Gunn</i> .....	60	V/64
Name That Note <i>Carlos Esteves</i> .....	62	V/64/+4/16
VIC Quiz Generator <i>George Trepal</i> .....	66	V

## PROGRAMMING

BASIC Magic: Beginning Computer Math <i>Michael S. Tomczyk</i> .....	46	V/64/+4/16
Hints & Tips: Disk Lock <i>Kevin Hawkins</i> .....	70	V/64
Machine Language For Beginners: Self-Modifying Programs <i>Richard Mansfield</i> .....	98	V/64
Power BASIC: Color Swap <i>Lee Noel, Jr.</i> .....	108	V/64
Debugging BASIC: Part 2 <i>Todd Heimarck</i> .....	113	V/64
Line Number Cross Reference <i>Heinz Wrosch</i> .....	118	V/64
Baker's Dozen: Part 2 <i>Lawrence Cotton</i> .....	120	64

## DEPARTMENTS

The Editor's Notes <i>Robert Lock</i> .....	6	*
Gazette Feedback <i>Editors And Readers</i> .....	10	*
Simple Answers To Common Questions <i>Tom R. Halfhill</i> .....	44	*
Horizons <i>Charles Brannon</i> .....	74	V/64/+4/16
News & Products .....	123	*

## PROGRAM LISTINGS

How To Type In COMPUTE!'s Gazette Programs .....	126	*
Bug-Swatter: Modifications And Corrections .....	127	*
Product Mart .....	150	*
Advertisers Index .....	160	*

\* =General, V=VIC-20, 64=Commodore 64, +4=Plus/4, 16=Commodore 16.

COMPUTE!'s GAZETTE is published monthly by COMPUTE! Publications, Inc., Post Office Box 5406, Greensboro, NC 27403 USA. Phone (919) 275-9809. Editorial offices are located at 324 West Wendover Avenue, Greensboro, NC 27408. Domestic subscriptions: 12 issues, \$24. Send subscription orders or change of address (P.O. Form 3579) to Circulation Dept., COMPUTE!'s GAZETTE, P.O. Box 961, Farmingdale, NY 11737. Second class application pending at Greensboro, NC 27403 and additional mailing offices. Entire contents copyright ©1985 by COMPUTE! Publications, Inc. All rights reserved. ISSN 0737-3716.

COMPUTE! Publications, Inc., One of the ABC Publishing Companies: ABC Publishing, President, Robert G. Burton; 1330 Avenue of the Americas; New York, New York 10019.

## THE EDITOR'S

## notes

I

am writing these notes on a distinctly non-winter day in early December. One could argue that the strangeness of this Christmas computer sales season is weather re-

lated, and perhaps that argument has as much merit as any of the others. The reality is that our selling season this year is a mere ghost of Christmas past, and (many argue) bodes poorly for Christmas future. Has the home computer market vanished? We're firmly convinced, in spite of sales figures to the contrary, that it hasn't. We may have collectively stumbled or slowed, but the industry, in a state of collective gyration, has its bright spots.

Early reports are that the Commodore 64 continues to sell quite well, thank you, notwithstanding the awaited debut of the Commodore Plus/4 and 16. Retailers are in a somewhat confused state, not quite sure what to push, what to pull, etc. We're seeing direct evidence of that confusion at the book retailing level.

Naturally, IBM's PCjr would pick a season such as this to begin a surge in popularity. Feedback we're getting indicates that retailers have had a very hard time keeping up with demand for the package IBM launched in early November. It's refreshing to see some market

segment struggling to meet orders. The crunch, as verified in *Wall Street Journal* stories almost daily, continues to reach less visible groups.

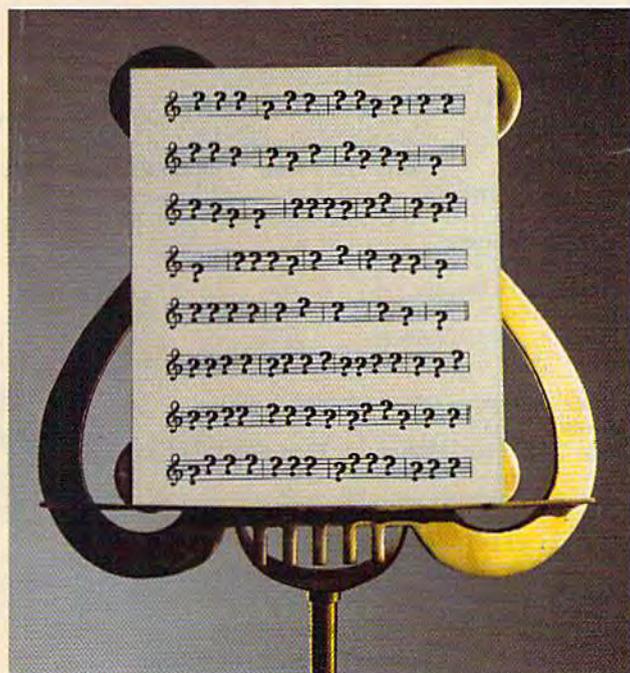
We've seen layoffs at software houses, shake-ups in sales forces, shrinking manufacturer budgets, and even evidence that such diverse suppliers as disk drive manufacturers are now falling victim to the shakeout. Since last we wrote, the slow-down has continued, and at this point the industry-critical Christmas rush has failed to materialize in size.

So where do we go from here? Is it over for the industry? Are we going to return to being a hobbyist fad? We think not. The millions of you who own and use home computers will be, in large part, responsible for the next wave of growth. Out of your ranks will come the software, the enthusiasm, the reality-based vision of computing that will make personal computing a durable reality. We're sure of it.

Robert Lock

Editor In Chief

# Compose music, even if you can't read a note.



With the Bank Street MusicWriter by Glen Clancy, you compose by computer.

It's so simple, people who don't know a pianissimo from a pizza can start composing in less than an hour.

All you do is match the sound that you hear in your head. And the MusicWriter writes it down.

But don't be fooled by the

simplicity. It's not a toy. It's a tool.

In fact, MusicWriter has everything you need to compose a serious symphony. It has repeats, endings and triplets. It has articulation and transposition. It can shape tones, store 75 staves, and play up to 4 voices.

But even if you don't know what all that means, it won't stand in your way. Because if you can hum a tune, you can write a tune.



**Bank Street MusicWriter from Mindscape** 

Compatible with Atari® and Commodore®. Mindscape, Inc., 3444 Dundee Road, Northbrook, Illinois 60062.

For more information, call 1-800-221-9884. In Illinois, 1-800-942-7315.

[www.commodore.ca](http://www.commodore.ca)

**Publisher** Gary R. Ingersoll  
**Editor in Chief** Robert C. Lock  
**Director of Administration** Alice S. Wolfe  
**Senior Editor** Richard Mansfield  
**Managing Editor** Kathleen Martinek  
**Editor** Lance Elko  
**Assistant Editor** Todd Heimarck  
**Production Director** Tony Roberts

**Editors**

Tom R. Halfhill, Editor, COMPUTE! Magazine; Stephen Levy, Editor, COMPUTE! Books Division; Gail Cowper, Production Editor; Ottis R. Cowper, Technical Editor; Charles Brannon, Program Editor; Selby Bateman, Features Editor

**Assistant Editors**

Gregg Keizer, J. Blake Lambert (Books); John Krause, George Miller, Philip Nelson (Technical); Kathy Yakal, Feature Writer; Sharon Darling, Research Assistant (Features), Randall Fosner, Assistant Managing Editor (Books); Mark Tuttle, Submissions Reviewer

**Editorial Programmers**

Patrick Parrish (Supervisor), Gregg Peele (Assistant), Tim Victor, Kevin Myktyyn, Gary Black, Kevin Martin, Rob Terrell

**Programming Assistants**

David Florance, Susan Doss, David Hensley

**Copy Editors**

Juanita Lewis, Joan Rouleau, Ann Davies

**Proofreaders**

Ethel Silver, Dwight Smith, Marty Selby

**Administrative Staff**

Susan Young, Vicki Jennings, Laura MacFadden, Julia Fleming, Iris Brooks, Jan Kretlow

**Production**

Irma Swain, Production Manager; Janice Fary, Art & Design Director, Lee Noel, Assistant Editor, Art & Design; De Potter, Mechanical Art Supervisor; Terry Cash, Carole Dunton, Typesetting

**Artists**

Leslie Jessup, Larry Sullivan, (Publications), Debbie Bray (Books); Harry Blair, Illustrator

**Associate Editors**

Jim Butterfield (Toronto), Harvey Herman (Greensboro), Fred D'Ignazio (Roanoke)

**Circulation**

Charles C. Post, Circulation Manager; Patty Jones, Assistant Circulation Manager; Fran Lyons, Single Copy Sales Supervisor; Jill Pope, Fulfillment/Subscription Supervisor

**Customer Service**

Philippa King, Customer Service Manager; Gail Jones, Dealer Sales Supervisor; Dorothy Bogan, Customer Service Supervisor; Dealer Sales Staff: Rhonda Savage, Debi Goforth; Customer Service Staff: Betty Atkins, Gayle Benbow, Rosemarie Davis, Chris Gordon, Mary Hunt, Liz Krusenstjerna, Jenna Nash, Chris Patty, Judy Taylor

Lonnie Arden, Warehouse Manager; Staff: Jim Coward, Jack McConnell, Larry O'Connor, Sam Parker, Eric Staley; Mary Sprague, Mail Room Coordinator.

**Data Processing**

Leon Stokes, Manager; Chris Cain, Assistant

**Accounting**

Paul J. Megliola, VP, Finance & Planning; R. Steven Vetter, Director, Finance & Planning; Robert Bean, General Accountant; Karen K. Rogalski, Financial Analyst; Staff: Jane King, Dale Roberts, Shannon Roesler

**Credit**

Barry L. Beck, Credit Manager; Staff: Sybil Agee, Susan Booth, Anne Ferguson, Pat Fuller, Doris Hall, Linda Miller, Mary Waddell

**Purchasing**

Gregory L. Smith, Purchasing Manager; Anna Harris, Assistant

**Promotion**

Mindy K. Kutchei, Promotion Manager; Caroline Dark, Assistant

**Advertising Sales**

Ken Woodard, Director of Advertising Sales; Bonnie Valentino, Assistant Advertising Manager; Patti Stokes, Production Coordinator; Joyce Margo, Production Assistant; Kathleen Hanlon, Sales Assistant

**Sales Representatives**

Jerry Thompson 415-348-8222  
Phoebe Thompson 408-354-5553  
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 Stokes, COMPUTE!'s GAZETTE  
324 West Wendover Ave., Suite 200, Greensboro, NC 27408

**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, Nevada 408-354-5553  
Northern CA 415-348-8222 or 408-354-5553  
Southern CA 213-378-8361  
Arizona 213-378-8361  
New Mexico 213-378-8361  
Colorado 303-595-9299

COMPUTE! Publications, Inc., publishes

**COMPUTE!** **COMPUTE! Books** **COMPUTE!'s GAZETTE**

**Corporate Office:**

324 West Wendover Ave., Suite 200, Greensboro, NC 27408

**Mailing Address:**

Post Office Box 5406, Greensboro, NC 27403

**Distribution Center**

500-A Radar Road, Greensboro, NC 27419

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, Finance & Planning** Paul J. Megliola

**Executive Assistant** Debi Nash

**Assistant** Anita Roop



**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) \$24. Canada, Mexico and Foreign Surface Mail \$30. 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.

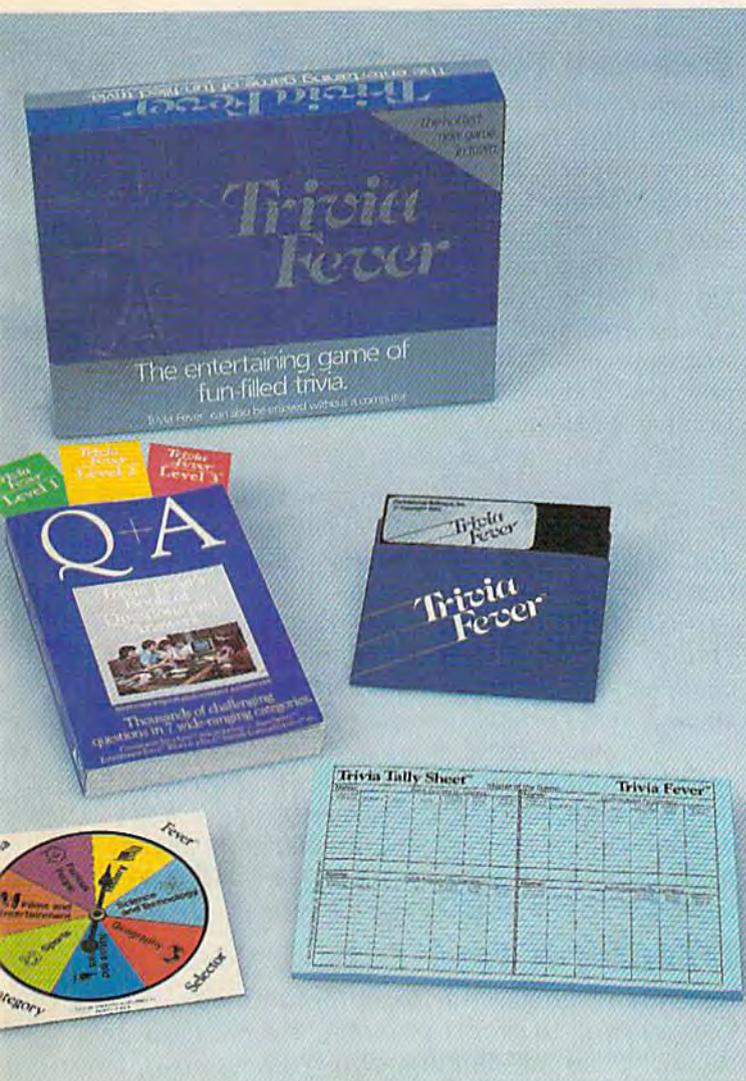
Authors of manuscripts warrant that all materials submitted to COMPUTE!'s GAZETTE are original materials with full ownership rights resident in said authors. By submitting articles to COMPUTE!'s GAZETTE, authors acknowledge that such materials, upon acceptance for publication, become the exclusive property of COMPUTE! Publications, Inc. No portion of this magazine may be reproduced in any form without written permission from the publisher. Entire contents copyright © 1984, 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. COMPUTE! Publications assumes no responsibility for damages, delays, or failure of shipment in connection with authors' offer to make tape or disk copies of programs published herein.

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.

Catch

# Trivia Fever™

**"The Hottest  
New Game In Town"**



Trivia Fever is absolutely unique — it's the only software entertainment package that can be enjoyed **with** or **without** a home computer! When played on your home computer, Trivia Fever is a refreshing alternative to all those shoot 'em up games. An elected "Master of the Game" uses the computer to randomly select subject categories, handicap players, generate questions and answers, keep score automatically, and more! Instructive by its very nature, Trivia Fever can be enjoyed by up to 8 individuals or teams. And when played without a computer, Trivia Fever has all the best features of the "popular" trivia games plus more — all without the cumbersome board, cards, and little game pieces. You can play in a car, on vacation, anytime, anywhere! And Trivia Fever is by far the best Trivia game available anywhere. Here's why:

Trivia Fever offers thousands of challenging questions in 7 interesting categories, so there's something for everyone. Each category has questions with 3 levels of difficulty, which score comparable points. What's more, Trivia Fever allows players to HANDICAP all those so-called "trivia experts" three different ways, giving everyone a chance to win. And players can easily control the length of play from quick thirty minute games to multi-hour party marathons!



Trivia Fever is unique, entertaining, educational, and most of all FUN. And at \$39.95, Trivia Fever is destined to quickly become the best selling software entertainment package of all time. There's even a \$5 rebate available to any non-computer users who return the computer diskette.

Trivia Fever can be enjoyed on the Commodore 64, IBM PC & PCjr and compatibles, Apple II series, and others. So don't delay. Catch Trivia Fever at your favorite software retailer today!

For additional information call 617-444-5224, or write to:

At \$39.95, Trivia Fever comes complete with Question and Answer Book, Category Selector, and Tally Sheets to be used when played without a computer.



P.O. Box 533  
Needham, MA 02194

Trivia Fever is a trademark of Professional Software, Inc.

[www.commodore.ca](http://www.commodore.ca)

### A Time-Saver

I am new to programming on the 64. The other evening I was working on a program when my wife (a professional programmer) came in to assist me. She came to the following four lines:

```
60 IFLEFT$(K$,1) = "A" THEN 200
70 IFLEFT$(K$,1) = "S" THEN 400
80 IFLEFT$(K$,1) = "M" THEN 600
90 IFLEFT$(K$,1) = "D" THEN 800
```

She typed the first line, hit RETURN, then cursor back up to the line, changed the line number, cursor through the line making the two changes, then hit RETURN. She then repeated this procedure for the remaining two lines.

I understand how this would work, but at the time I was very surprised. I think your readers would like to know about this timesaver.

John Stetar

*You've discovered a handy feature called onscreen editing, which can save some time. It's helpful when you're entering several similar lines, or when you make a mistake you have to correct.*

*In general, every time you press RETURN over a line, it's entered into memory. If there's a number in front, your computer assumes it's a line number, and adds it to the program in memory. If there's no line number, the statement is executed immediately.*

*Some computers require that you go into a special edit mode before fixing a line. You might have to type EDIT 100 to correct a mistake you made in line 100, for example. Onscreen editing makes things a lot easier. You simply cursor up to the line and fix it. And if you give it a new line number, it's added to the program in memory.*

### Foolproof Typing

I would like to know how to make Proofreader checksum numbers for programs which don't appear in COMPUTE! or COMPUTE!'s GAZETTE.

Tim Sitkiewicz

*If you're writing your own program or typing one from another magazine, Proofreader numbers won't be able to tell you if it's correct or not. The logic of Automatic Proofreader doesn't apply to the line you type unless you (or someone else) already have a*

*correct version of the line.*

*The programs published in the GAZETTE are fed into another program that adds up the ASCII values of the characters in the line, to generate a checksum. You can't start with a checksum and have the computer figure out what the line should be (Proofreader numbers range from 0 to 255, but there are many more than 256 different BASIC lines). Nor can you figure out what a checksum for a line should be, unless there's a correct version of the line to begin with, in which case you wouldn't need a checksum.*

### Software For The Blind?

I teach computer science at a high school and have a blind student in my class. His father recently purchased a Commodore 64. At the school, we have a word processor called *Braille-Edit* which runs on an Apple computer.

Is there a version of *Braille-Edit* for the 64? Do you know of any software for the blind that can be used with a 64? Do any of the current word processors for the 64 come with Braille manuals? Does COMPUTE!'s GAZETTE come in a Brailled version?

Linda S. Lamb

*Sorry, we know of no software specifically designed for blind users of the 64. Most computer programs display the important information on the screen of the TV or monitor.*

*Nor have we heard of any word processors with braille manuals. And the GAZETTE is not currently available in a Braille edition. Perhaps our readers know of some suitable software for the blind.*

*The good news is, there are a number of good speech-synthesis programs for the 64 which can pronounce English words. Some even say each key as it's typed on the keyboard, providing immediate feedback. Such programs could be used with a word processor or in a programming class.*

### NEWing A New Disk

Recently I purchased a dozen brand-name disks. When I tried to save a program, the red light on the drive started blinking, signifying an error. I read the error channel and the computer said "Drive Not Ready." I tried all twelve disks and

# GET YOUR FEET WET...



**... IN THE INFORMATION AGE WITH THE DOW JONES NEWS/RETRIEVAL® MEMBERSHIP KIT. SAMPLE A CONTINUOUS STREAM OF KNOWLEDGE AT A PRICE YOU CAN AFFORD.**

Now you and your whole family can experience the information age without getting in over your head.

For just \$29.95, the new Dow Jones News/Retrieval Membership Kit leads you step-by-step into entertaining and informative data bases. With **five free hours** to sample and explore, you can find a fact, shop at

home, get the scores, plan a trip, review a movie, choose a stock, or check world and business news. There's a lot more, too. All you need to get started is a computer and modem:

The Membership Kit is a big value that entitles you to:

- FREE password (\$75 value)
- Easy, step-by-step User's Guide
- FIVE FREE HOURS of unrestricted usage to explore the magic of this comprehensive service

- FREE subscription to *Dowline*, the magazine of Dow Jones News/Retrieval
- A special introductory offer!

Get your feet wet in the information age with the Dow Jones News/Retrieval Membership Kit. At \$29.95, you'll enjoy the dip without getting soaked. Available at your local computer retailer, or call Dow Jones at:

**1-800-257-5114**  
In New Jersey, Canada,  
Hawaii and Alaska  
1-609-452-1511



*"Toss away any preconception that Dow Jones News/Retrieval is a stuffy, one dimensional data base service designed only for an elite corps of stock analysts and Wall Street wizards. Far from it—Dow Jones News/Retrieval also provides entertaining movie reviews, current weather and sports reports, convenient electronic shopping and inexpensive electronic mail... Dow Jones News/Retrieval is informative, entertaining and well worth the money."*  
-Brad Baldwin, InfoWorld Magazine

**DOW JONES NEWS/RETRIEVAL®**

Copyright © 1984 Dow Jones and Company, Inc. All Rights Reserved. Dow Jones News/Retrieval® is a registered trademark of Dow Jones and Company, Inc.

[www.commodore.ca](http://www.commodore.ca)

got the same results. At first I thought it might be the disk drive, but I have no problems at all with the demo disk included with the 1541.

Are some disks incompatible with a Commodore system or am I overlooking the obvious?

Kathy Gauvin

*An eight-inch disk is incompatible with a 1541 disk drive, because it is too big for the door. But that's probably not the problem.*

*The demo disk works, so it would seem that you have a working 64 and disk drive. It's possible, but unlikely, that you got a bad batch of disks, in which case you could return them to the manufacturer or to the store where you bought them.*

*More than likely, however, you probably didn't format the disks. Saving to an unformatted disk won't work, and results in the error message you described. Here's how to format a disk:*

```
10 OPEN15,8,15
20 PRINT#15,"NEW0:diskname,id"
30 CLOSE15
```

*Line 10 opens the command channel to the disk. The NEW command in line 20 formats the disk, creating a directory, block allocation map, timing bytes, and so on. NEW0: can be abbreviated as N0: (that's a zero, not the letter O). It must be followed by a disk name of up to 16 characters, a comma, and a two-character ID for the disk. Make sure you use different IDs for different disks. You can also format a disk in direct mode (without line numbers), separating the commands with colons, as follows:*

```
OPEN15,8,15: PRINT#15,"N0:MYDISK,AA":
CLOSE15
```

*The NEW command completely erases any programs that might have been on the disk, although brand new disks are blank to begin with. Once the disk is formatted, you can save and load programs.*

## Copying GAZETTE Programs

My friend subscribes to COMPUTE!'s GAZETTE, just like me. Since we have both purchased it, isn't it OK for him to give me a copy of a program he typed in? Why should I spend hours typing it when he already did?

Todd Wolfe

*It's fine for your friend to give you a copy of the program, as long as each of you subscribes to the GAZETTE or has bought the magazine the program appears in. But you cannot legally make copies for people who have not bought the corresponding issue. Nor can you legally make copies of the programs and sell them.*

## Unusable Memory

I think I may have come across a way to get more memory out of a Commodore 64. Typing

POKE 642,0: SYS 58260 displays the usual opening message, except there are 40959 BASIC bytes free. Is this actual BASIC memory?

James Wolfe

*That combination of POKE and SYS resets some pointers for the start of BASIC. The equivalent SYS on a VIC is 58232. The technique can be very useful if you want to reserve some memory for machine language or custom characters. You can safely subtract memory from BASIC (by POKEing a number larger than 8 into 642 before the SYS), but the POKE and SYS can't be used to add memory. Here's why:*

*What you've done is put the start of BASIC down in zero-page. There's real memory there, but it cannot be used for a BASIC program. Zero-page comprises memory locations 0-255 and is full of pointers, vectors, and storage bytes which are essential to BASIC. If you started typing in a program, it would overwrite the usual values and would very quickly lock up your computer.*

*So this technique will not work to add BASIC memory to your 64. But you could fool a friend into thinking you have a computer with "extra" memory. Try the following line:*

```
POKE641,1: POKE642,0: POKE643,255: POKE644,255:
SYS58260
```

*VIC owners should change the last command to SYS58232. The line lowers the start of BASIC to location 1, raises the top of BASIC to 65535, and does the usual warm start. But the screen will say there are almost 64K bytes free. Unfortunately, though, that memory can't be used for a BASIC program.*

## The Not-So-High Cost Of Telecommunications

I own a VIC-20 and have just purchased a VICmodem. I know how to hook it up. My question is, do I have to pay outrageous amounts of money to join certain services to use my own modem? Please list specific services as well as their rates.

Walter Kimbrough

*There are three different ways to use a modem and, generally, only one will cost you money.*

*First, you can call a friend who owns a modem, and type back and forth or upload and download programs.*

*Second, you can sign up with a local bulletin board system (BBS). Most are free, but a few have a minimal membership fee. They're often sponsored by a user group or a computer store. Call a few computer stores in your area and you're likely to find the phone numbers of some local boards. Once you log on to a board, chances are good you'll find messages about other BBS's in your area, and across the country.*

# WordPro 3 Plus™/64

The #1 Selling Word Processor for the Commodore 64™

Now Includes

**SpellRight Plus!**

Spell Checking Program



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

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

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

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

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

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

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

## Professional Software Inc.

51 Fremont Street  
Needham, MA 02194

(617) 444-5224  
Telex: 951579

Dealer and Distributor inquiries are invited.

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.

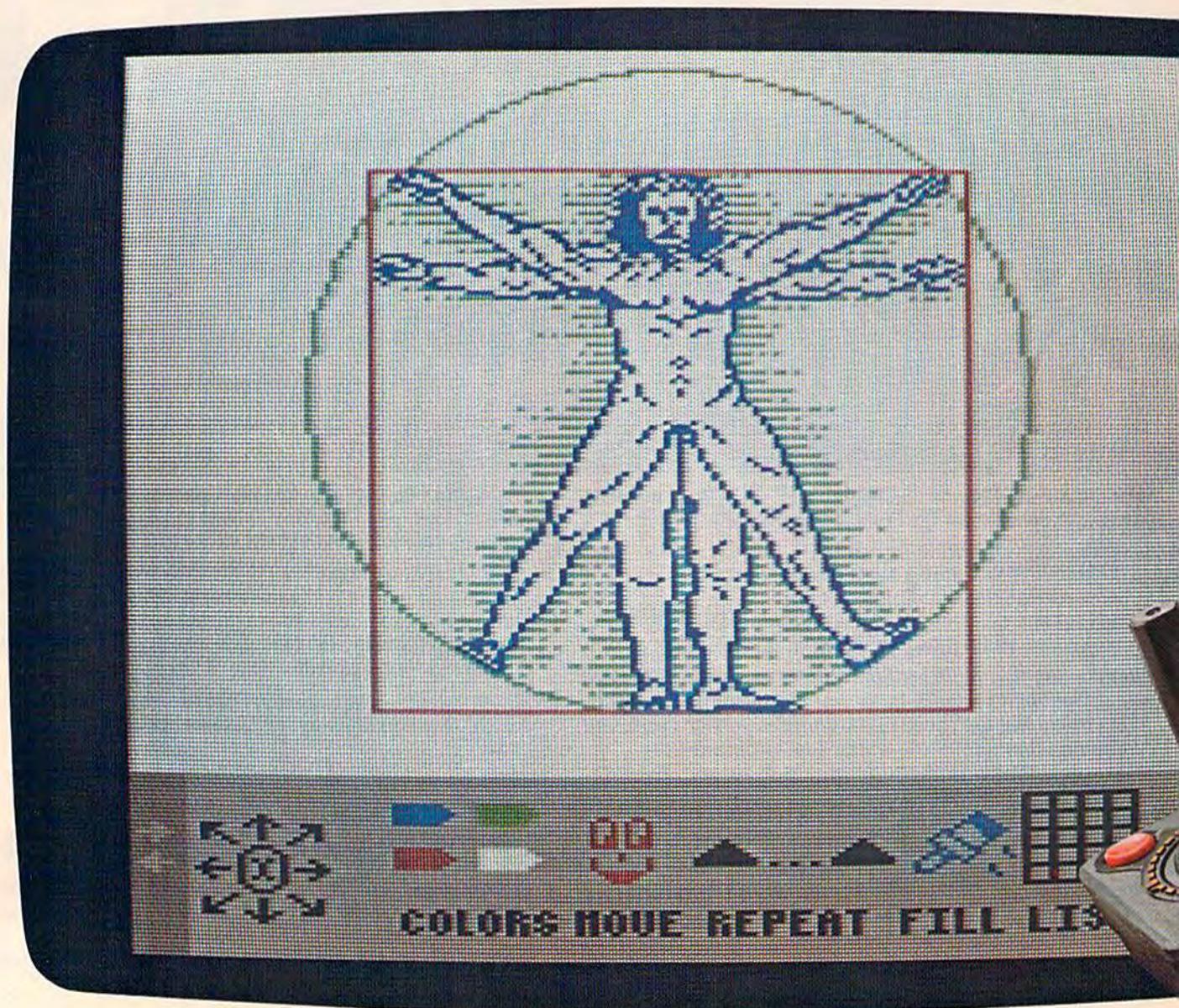
SpellRight Plus was designed and written by Dwight Huff and Joe Spatafora of SpellMaster Systems, Inc.

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.

[www.commodore.ca](http://www.commodore.ca)

# Computer prog da Vinci, Shakespe AI Capp would ha



# Programs for kids that are, Dickens and we loved.

If they were starting out today, this is what they could start with. Pixelwerks.

## THE OTHER WAY TO DRAW AND WRITE

Instead of a brush and canvas, a pen and paper, they'd create on a computer. Because Pixelwerks is the first medium that can keep up with their imaginations.

## MR. PIXEL'S PROGRAMMING PAINT SET

With Mr. Pixel's Programming Paint Set, da Vinci (or any 8-year old) could do more than paint a picture. He could also enlarge it, repeat it, move it around, and change colors. Instantly.

And at the same time, he would be developing his programming skills. Painlessly.

## SHOW DIRECTOR

On the other hand, Shakespeare would love to play around with Show Director.

He'd use it to create plots and think up one scene after another, and he'd get a big cast of characters, lots of backgrounds, props, and musical sound effects to act them out.

## BANK STREET STORYBOOK

Dickens wouldn't be able to keep his hands off Bank Street StoryBook by George Brackett.

Not only could he write his own story, but he could also illustrate the scenes and characters he sees in his mind.

## MR. PIXEL'S CARTOON KIT

Maybe Al Capp wouldn't be satisfied with cartoons that just sit on the page after he tried Mr. Pixel's Cartoon Kit. Because he could make his cartoons come to life by animating them. His characters could move around, and even react to each other.

Every kid has a touch of creative genius buried inside. The job of Pixelwerks is to bring it out, with more features, more options and more flexibility than other programs.

In short, we supply the tools. Kids supply the imagination.



**Mindscape**   
MINDSCAPE INC.

For more information, call 1-800-221-9884. In Illinois 1-800-942-7315.  
Compatible with Apple, Commodore and IBM. Pixelwerks is published by Mindscape, Inc., 3444 Dundee Road, Northbrook, IL 60062.

[www.commodore.ca](http://www.commodore.ca)

There are an estimated 4000-8000 BBS's currently operating in the United States.

Bulletin boards have a curious life cycle. Usually someone who owns an auto-answer modem decides to start one, sets it up, and posts messages on other boards as publicity. Since there are not any members yet, there aren't many messages either. Most start out as free boards—anyone who calls can join immediately at no charge. If a lot of people become members, more messages and discussions build up, which attracts more members. As the popularity increases, it becomes more and more difficult to get through—you can expect to hear a lot of busy signals calling a popular service.

A bulletin board that begins as a no-cost board may start charging a membership fee when it becomes too popular, to compensate for the time of the sysop, and to cut down on the number of calls (a lot of callers, like yourself, don't like to pay for telecommunications).

It's not feasible to publish the phone numbers of 4000-8000 bulletin boards in the GAZETTE, especially considering that many might not be around tomorrow or next week or next month. We know of one area code in California which had over 50 bulletin boards at last count.

You should realize that a no-charge board doesn't cost anything, unless it's out of town. Long distance charges (whether they're voice connections or bulletin board calls) can add up quickly. You don't pay for signing on to the BBS, but the phone company gets its share.

The third way to use your modem is to sign up with one of the major services: CompuServe, The Source, Dow Jones, or Delphi (expect more to sprout up as telecommunications becomes more popular). You'll generally pay a connect fee, \$6 or more per hour, depending on the time of day and baud rate. Most big services charge more during business hours (8-5) and 1200 baud sometimes costs more than 300. Some, like CompuServe, have numerous entry points—local phone numbers in cities of 50,000 or more—so you can avoid long-distance charges.

The charges for local and national BBS's are subject to change, of course, and even if you find \$6 per hour too expensive, there's a good chance you can find a free board in your city or area.

## Reading Datassette Keys

Is there any way to determine whether the keys (record, play, rewind, fast forward, stop, eject) on the Datassette are being pressed?

Jackson Moore

You can't read the individual keys, but you can use a PEEK to find out if the motor is on (or about to be on).

Bit 4 of location 1 on the 64 can tell you whether a key on the cassette drive is pressed. A value of zero means record, play, rewind, or fast forward is down.

You can use (PEEK(1)AND16) to check this bit. If its value is 16, the buttons are turned off. If it's zero, one of the four buttons is pressed. You can't tell which button is pressed, only that one of them is.

On the VIC, the equivalents are (PEEK(37137)AND64), and (PEEK(37151)AND64). You can check either 37137 or 37151 to see if a button is pressed on your Datassette. If the result is equal to 64, the Datassette is off, and if it's zero, the Datassette is on.

The WAIT statement can make the computer temporarily stop until a button is pressed:

```
WAIT 1,16,16 (64)
WAIT 37137,64,64 (VIC)
```

If you want the program to wait until the button is off, use:

```
WAIT 1,16 (64)
WAIT 37137,64 (VIC)
```

VIC owners can substitute 37151 for 37137 in either of the lines above.

## Lowering The Proofreader Checksum

Just one thing is wrong with the Automatic Proofreader. When you have a TV, you can't see the number in the upper lefthand corner. Is there a way to fix this?

Matthew Speakes

This problem does not affect most TVs, but if you can't see the Proofreader number, it can be fixed.

First, load your copy of Automatic Proofreader. Change the 17539 in line 110 to 17494. In line 970, change 018 to 013 and in line 976, change 058 to 018. Save the new program before running it. If you make this change, don't press RETURN over a line with the Proofreader checksum number; your computer will think you've entered a program line number.

An alternate solution for the 64 is to POKE 53265,31 before typing RUN. This may move the screen low enough to read the checksum number, although you'll lose part of the last screen line.

If you have a VIC, try POKEing a number larger than 25 into 36865. The larger the number, the farther down the screen moves.

## Wedge Commands

I use the 64 wedge extensively. I would like to hit one key and have the directory list. What POKES do I need?

David Lee

While the wedge is working, type @\$ or >\$ and the directory will list. And it won't affect any program currently in memory. The directory is read from the disk (but not loaded into memory) and printed to the screen.

The commercial-at (@) and greater-than (>) signs

# GET SERIOUS!

FOR COMMODORE  
AND THE NEW  
80-COLUMN DISPLAY FOR ATARI



Transform your C-64™ into a powerful, serious business computer with these three add-on tools.

## BusCard II

Mix and match the hardware peripherals of your preference. Increase your programming power with easier-to-use disk commands and machine language. All with one plug-in module.

- lets you use almost any combination of Commodore-compatible floppy or hard disk drives and Centronics-type parallel printers
- all interface functions and device allocations are set by switches on the BusCard II module; errors due to software incompatibility are eliminated
- includes BASIC 4.0, the same powerful language used in Commodore's top-of-the-line business computers, plus a machine language monitor

## B.I.-80 Column Adaptor for PaperClip and The Consultant

Double your screen capacity when using your favourite Batteries Included software programs. B.I.-80 turns your 40-column screen into a crystal-clear, high-visibility 80-column display. Works with PaperClip word-processor and The Consultant database manager—maximum readability and minimum eye-strain, even with a screen full of characters. It's the fast, easy, plug-in way to get twice the amount of data onto your monitor screen. And B.I.-80 also gives you the easier-to-use disk commands, with BASIC 4.0 language built right into the module.

- fully self-initializing, no commands to enter; just plug B.I.-80 into the cartridge slot and you're ready to run
- switch back and forth

- completely eliminates snow, fuzziness, hashing and interference
- easy-to-install module incorporates highest quality hardware components throughout; one-year manufacturer's warranty is standard
- comes complete with 80-column operating system and comprehensive documentation, including full description of BASIC 4.0 commands
- use with Commodore 1701 and 1702 color monitors, or any monochrome video monitor

**NEW!** B.I.-80 Column Adaptor coming soon for Atari XL computers!

## B.I. printer interface

Use the printer of your choice with your Commodore computer—just plug in this compact module, and you're instantly compatible! Take advantage of today's high-speed, high-quality printers with the B.I. Printer Interface.

- works with any Centronics-type parallel printer, which includes almost all major printers on the market
- completely self-contained and ready to run; no extras to buy, no hardware or software modifications to printer or computer are required
- all print functions are controlled by switches on the module; just set them once, and never worry about it again

USE THESE TOOLS WITH PaperClip, The Consultant, AND OTHER HARD-WORKING, HIGH-QUALITY SOFTWARE PROGRAMS FROM BATTERIES INCLUDED

BATTERIES INCLUDED

"The Energized Software Company!"

WRITE FOR A FULL COLOR BROCHURE

186 Queen St. West  
Toronto, Ontario,  
Canada M5V 1Z1  
(416) 596-1405

17875 Sky Park North, Suite P  
Irvine, California  
USA 92714

are used to send commands to the disk drive. >R0:FINAL=TEST, for example, takes a program called TEST and renames it to FINAL. Use @ or > without a command to read the error channel. The left arrow key, above CTRL, is used to save programs to disk. To load a program from disk, type a slash (unshifted question mark) followed by the program name. The up-arrow key loads and runs a program from disk.

Readers not familiar with the wedge can find it on the demo disk which is packaged with the 1541 drive. A short BASIC program loads the wedge and starts it running.

## Software/Interface Problems

I am one of those apparently rare ducks who has chosen not to buy a Commodore printer, in favor of a letter-quality RS-232 printer. But I cannot easily find programs offering an RS-232 option. I've bought an assembler/monitor to look at machine language programs, but still have not been able to redirect printing commands to device 2.

Warren W. McCurdy

*There are a few things you can do, but attempting to make changes to a machine language program should be your last resort.*

Some programs will never work on a letter-quality printer. A high-resolution screen dump program usually works by addressing individual dots on a dot-matrix printer. Your printer doesn't have any such dots, and won't recognize the hi-res information.

But most good word processors should let you input the type of printer you're using and the device number (an RS-232 peripheral is device 2). It may be necessary to do some POKEs before you run the program, to set the baud rate (the speed at which the computer sends signals to the RS-232 channel) and other parameters. You may also be required to print in "true ASCII," rather than Commodore ASCII, sometimes called PETASCII.

If the software documentation omits information about using an RS-232 printer, or the information is unclear, write or call the company that publishes the software. Many software publishers have excellent customer service departments, which can answer questions like yours. And contact the manufacturer of the printer and interface, describing the software and how you have your computer, interface, and printer hooked up. A user group, too, may be able to help.

Some RS-232 printers (Brother, for example) have two interface options: RS-232 or Centronics. There are Commodore-to-Centronics interfaces available with an emulate mode—which makes your printer act as if it were a real Commodore printer (with some exceptions, like high-resolution plotting).

If all else fails and you are an intermediate to advanced machine language programmer, you could try making modifications to the program. First, read

the section about the RS-232 port in the Programmer's Reference Guide. Then find the section about the Kernal routines. Three of them are used to open a channel—SETLFS, SETNAM, and OPEN. Use the hunt or search option in your ML monitor to find all instances of JSRs to those routines (assuming the software calls the Kernal routines). For example, JSR SETLFS would translate to 20 BA FF. Searching through a disassembly is difficult. You may not be able to make the necessary modifications.

## Perplexed By Duplex

I would like some information on the difference between half and full duplexing. I read about it in your November issue, but am still not sure what duplexing means.

Scott Orr

*Most bulletin boards and information services operate in full-duplex, so you can generally leave your modem and software set for full-duplex.*

Normally, pressing a key on the keyboard puts a character on the screen of your TV or monitor. The operating system polls the keyboard and decides what needs to be done (print a letter, stop the program, clear the screen, etc.).

But if you call a bulletin board in full-duplex, the software in charge reads the keyboard and sends a series of beeps over the phone line. It does not print anything on the screen.

At the other end of the phone line is a computer receiving the beeps you just sent out. It translates the beeps and then sends them right back to you. Your computer hears the beeps and, finally, prints the character on the screen, based on what came over the phone line. Every time you type something, it makes a round trip to the other computer and back to yours before being printed on the screen.

If your terminal software is set for half-duplex, the character does not make a round trip, the letter or number is sent through the phone lines and also prints to the screen (directly from your computer). This can cause ddoouubbbleedd lleetteerrss if the bulletin board thinks you're in full-duplex and automatically echoes all your characters.

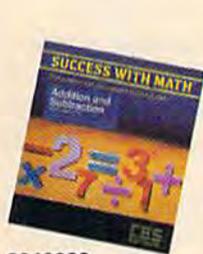
There are two advantages to full-duplex. First, you know the bulletin board received your message because every character goes full-circle. If there's electronic noise on the line, garbage appears on the screen. Second, when you log on and type a password, it can be made invisible (passwords are not echoed back), in case someone is looking over your shoulder, trying to get a peek at your password.

## Just Numbers In Memory

One day I was going to work on one of your MLX programs. I entered the POKEs, loaded MLX, and typed 2049 and 6842 for beginning and ending addresses. I then used the display

# TAKE ANY 2 FOR \$4.95 EACH

when you join the Columbia Software Club and agree to buy 4 selections at regular Club prices in the next 2 years



**0040022**  
Addition/Subtraction  
**0041012**  
Multiplication/Division  
Both available for  
C-64, Atari H.C.  
and Apple: disk.



**8035022**  
Zaxxon  
Adam, C-64: cart;  
Atari H.C.: disk  
and cart; Apple: disk.



**8172052**  
Master Type  
C-64, Atari H.C.:  
disk and cart;  
Apple: disk.



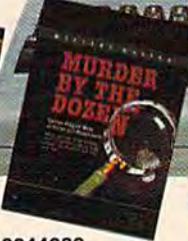
**8230052**  
Run For The Money  
C-64, Atari H.C.  
and Apple: disk.



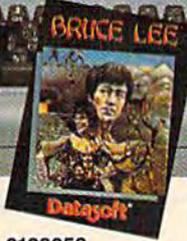
**8122062**  
Pitfall II  
Adam, Atari H.C.:  
cart; C-64:  
disk and cart.



**8100022**  
Choplifter  
C-64, Atari H.C.:  
disk and cart;  
Apple: disk.



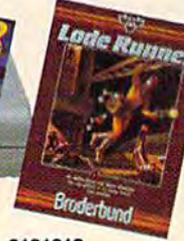
**0044082**  
Murder By  
The Dozen  
C-64, Apple: disk.



**8123052**  
Bruce Lee  
C-64, Atari H.C.  
and Apple: disk.



**8216032**  
Seastalker  
C-64, Atari H.C.  
and Apple: disk.



**8101012**  
Lode Runner  
C-64, Atari H.C.:  
disk and cart;  
Apple: disk.



**8090042**  
River Raid  
C-64: disk and cart;  
Atari H.C., Adam: cart.



**8105072**  
Zork II  
Atari H.C. and  
Apple: disk.



**8104082**  
Zork I  
Atari H.C. and  
Apple: disk.



**8150012**  
Summer Games  
C-64, Atari H.C.  
and Apple: disk.



**8149052**  
WarGames  
Adam: cart.



**8102002**  
Temple of Apshai  
C-64, Atari H.C.  
and Apple: disk.



**8215042**  
Beach-Head  
C-64, Atari H.C.:  
disk.

**8103092**  
Pitstop  
C-64, Atari H.C.:  
cart.

**8229082**  
Pitstop II  
C-64, Atari H.C.  
and Apple: disk.

Here's a great selection of sensational software for every member of the family—at super savings! You've seen these software selections in stores anywhere from \$19.95 and up—yet, now, you can have any two for the fantastic low price of only \$4.95 each! That's our way of introducing you to the Columbia Software Club—a brand-new service that delivers the best software for Atari® Home Computers, Apple®, Commodore 64™, and Adam™ systems.

**How the Club works:** about every 6 weeks (up to 9 times a year) you will receive the Columbia Software Club Magazine. In it you'll find out about an exciting variety of the newest software available: simple shoot-em-up adventures, more challenging strategy software, learning software to help the entire family acquire new skills—how to type, master basic math, budget your finances, and much more.

In addition, each issue of the magazine announces the "Pick-Hit Selection"—an outstanding software selection specifically for your system. If you want only this Selection, you need do nothing—it will be sent to you automatically. If you want one of the alternate selections—or nothing at all—just tell us so on the response

card always provided, and mail it by the date indicated. You'll always have ten days to make your decision. If you ever receive a selection without having had ten days to decide, you may return it at our expense.

The selections you order will be mailed and billed at regular Club prices—which currently begin at \$24.95 and are less than list prices! (A shipping/handling charge and applicable sales tax is added.) Remember, you don't have to buy a selection every time you hear from us—your only membership obligation is to purchase four selections, at regular Club prices, in the coming two years. And you may cancel membership at any time after doing so. If you decide to continue, you'll be eligible for our generous money-saving bonus plan.

**10-Day Free Trial:** we'll send you complete details of the Club's operation with your introductory selections. If you are not satisfied for any reason whatsoever, just return everything within 10 days for a full refund and you will have no further obligation. So act now!

All applications subject to review, and the Columbia Software Club reserves the right to reject any application or cancel any membership.

COLUMBIA SOFTWARE CLUB, Dept 2RL 102  
3000 North 35th Street, Terre Haute, Indiana 47811

Please accept my application under the terms outlined in this advertisement—and send me the 2 selections indicated below, for which I am enclosing check or money order for \$9.90 (that's \$4.95 for each selection). I agree to buy 4 more selections at regular Club prices in the next 2 years.

Write in numbers of the 2 selections you want

--	--

Send my selections for the following system (check one system only):

- ATARI® HOME COMPUTERS 2  APPLE® 3  
 COMMODORE 64™ 4  ADAM™ 5 (cartridges only)

If you have selected Atari Home Computer or Commodore 64 software—be sure to check the type of format you prefer (check one format only):

- CARTRIDGE A  DISK H

Name \_\_\_\_\_  
(please print) First Name Initial Last Name

Address \_\_\_\_\_ Apt. \_\_\_\_\_

City/State \_\_\_\_\_ Zip \_\_\_\_\_

Do you have a telephone? (check one)  Yes  No

Parent's Signature \_\_\_\_\_  
if under 18

Offer not available: APO, FPO, Alaska, Canada, Hawaii, Puerto Rico  
**WANT THIS CHARGED TO YOUR CREDIT CARD?** Fill in information below, we'll charge the \$9.90 and future shipments to your credit card—and credit your account with any returns.

American Express  VISA  MasterCard \_\_\_\_\_  
Interbank No. \_\_\_\_\_

Credit Card No. in full \_\_\_\_\_ Expiration date \_\_\_\_\_

Signature \_\_\_\_\_ 103

command, just to see what would happen. I saw a machine language program until line 5223. I saved the mysterious ML to disk, turned off the computer, and loaded the program. It was the BASIC MLX program. How did a machine language program turn into BASIC? Can you clear things up?

Peter Chu

*Either MLX was already in memory when you did the POKes, or you mistyped the POKes. You saw MLX looking at itself. And then you used MLX to save MLX.*

*Some computer users have the misconception that machine language (ML) is a series of numbers POKed into memory, while BASIC is made up of letters, numbers, and other characters. They're right about ML, but not about BASIC. A BASIC program may look like letters and numbers on the screen, but in memory it's numbers, just like machine language.*

*The following short program illustrates:*

```
10 REM 12345
20 X=PEEK(43)+256*PEEK(44):X=X-1
30 FORJ=0TO16:PRINTJ;J+X;PEEK(J+X):NEXT
```

*Make sure there's a space after the REM in line 10. Type RUN (it works on the 64, the Plus/4 and 16, or a VIC with any memory expansion). You'll see three columns of 17 numbers. Line 20 figures out where BASIC starts and line 30 PEEKs at the first 17 bytes of the BASIC program.*

*First there's a zero. Zeroes mark the divisions between lines, although they can be used for other purposes as well. There must also be a zero in the first byte, before the program starts. The next two bytes are the line link, a pointer to the next line of BASIC. On a 64, for example, you'll see a 13 and an 8. Type PRINT13+8\*256 and the result is 2061 (where the next line starts). Note the zero in 2060, marking the end of the first line.*

*Next you'll see the line number, in low-byte/high-byte format, a 10 and a 0 (10+0\*256 is 10). If you were to POKE an 11 into the low byte and LIST the program, you'd see that line 10 has been changed to 11.*

*Now the BASIC program begins. 143 is the token for REM. The three letters of REM have been condensed down to a single number. When you type RUN, BASIC uses this number to look up the corresponding BASIC command. Tokens are always numbers between 128 and 255. When the operating system sees this number, it looks up command 143 (REM) and finds that it should skip over the rest of the line. The computer looks for a zero, marking the beginning of the next line. If you typed LIST, it would look up the spelling of command number 143 and find the three letters R, E, and M. They would then be printed on the screen.*

*POKE a 153 into the location currently holding a 143, and LIST the program. You should see that REM*

*has been transformed into PRINT, because 153 is the token for PRINT.*

*Next is a 32, the ASCII value of a space, followed by 49, 50, 51, 52, 53. These five numbers, too, are ASCII values (for the characters 1-5). On the twelfth line you see a zero, marking the end of line 10. The next two bytes are the line link, again. The line link from line 10 pointed to the line link for line 20 (which in turn, points to the next one). And the 20 and 0 are the line number.*

*You could continue PEEKing memory, seeing how a BASIC program is changed into numbers, until you found a zero (marking the end of a line) followed by a line link of two zeroes. Three zeroes in a row mark the end of the program.*

*The numbers in memory are just numbers. They could be a BASIC program, an ML program, or variables of some kind. You and the computer decide how they'll be interpreted. Type RUN and the computer assumes there's a BASIC program in memory. SYS makes it begin executing a machine language program.*

## The Loop Doesn't Work

I own a Commodore 64 and am experiencing inconsistent results with FOR-NEXT loops when the step increments are not integers. For example, FORX=1TO55STEP6:PRINTX:NEXT works, but changing it to FORX=.1TO5.5STEP.6 (dividing everything by ten) does not. Here are the results of the two loops:

1	.1
7	.7
13	1.3
19	1.9
25	2.5
31	3.1
37	3.7
43	4.30000001
49	4.90000001
55	

Whole numbers work as expected, but not fractions. Not only does 5.5 not appear on the list, but what gives with the extra digits? Using real numbers in loops is a vital part of a program I am working on.

Richard Lake

*Imagine a person counting up to ten by thirds. But before beginning, the person (who doesn't know how to add fractions) converts 1/3 to .333 and finishes with 9.99 instead of 10. The result is incorrect and you can blame the laws of math for not allowing 1/3 to be translated into a decimal fraction.*

*Your computer is like that person who can't add fractions. Base ten numbers like .6 or .1 have to be translated into their binary equivalents in floating-point format before any math is done. You won't have problems with numbers like .5 or .25, because they are made up of powers of two. But other numbers may contain a slight inaccuracy. As you add up the numbers, the inaccuracy grows larger and larger, leading*

# The END of DINKETY-DINK-DINK.

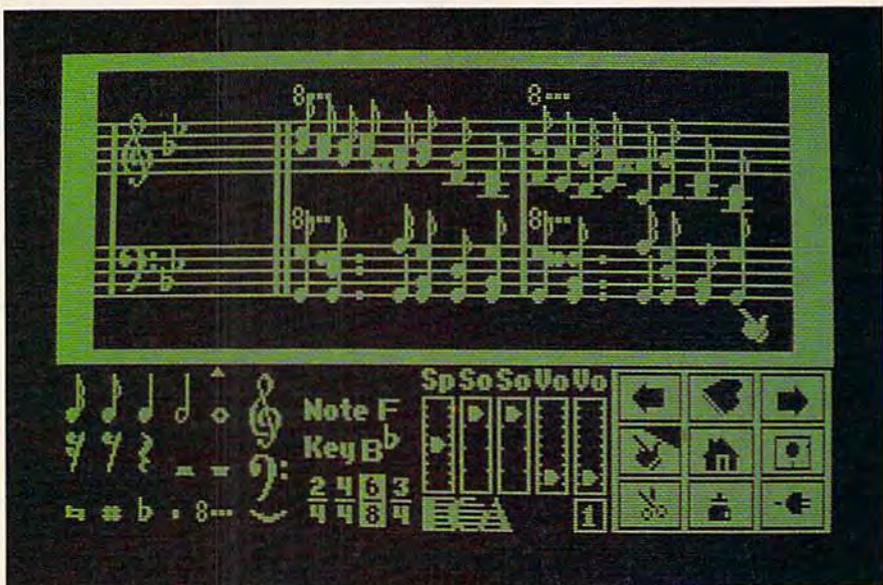
**A**nnouncing the first computer music program that actually sounds like music.

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

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

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

That's you at the right end of the staff of notes — the little hand. Move the joystick, and you move the hand. Use it to carry notes up to the staff. Lay in rests, signatures, clefs, then point



to the little piano in the lower right and listen, because you'll hear the whole thing played back.

Move those little scales in the middle up and down to vary the music's speed, sound quality, and volume. Use

the scissors to cut out whole measures, then use the glue pot to paste them in somewhere else. Got a printer? Great. Print the score out and show it off to your friends.

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

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

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

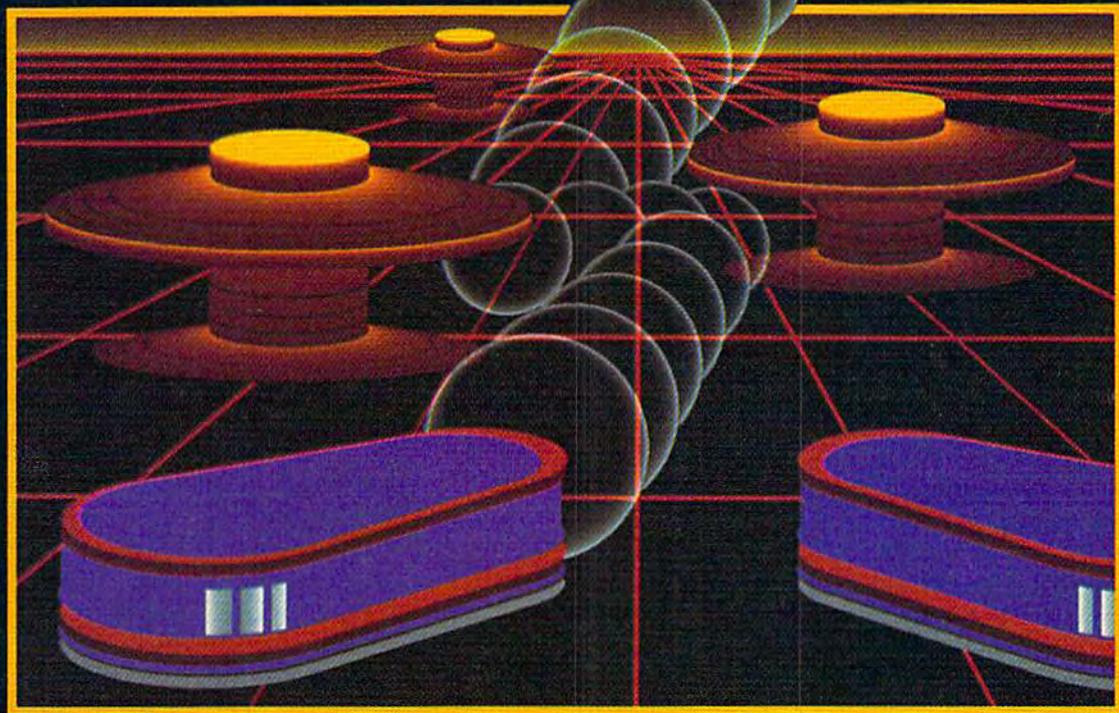


MUSIC CONSTRUCTION SET is now available for Apple II, II+, IIe, and Commodore 64 computers. The Apple version, with a Mockingboard<sup>™</sup> plays chords of up to six notes each. The Commodore version plays chords of up to three notes each. Apple is a registered trademark of Apple Computer. Commodore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



# TAKE A BREAK!

For  
Commodore 64™  
Computers



## WITH NIGHT MISSION **PINBALL**

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



**See your dealer . . .**

or write or call for more information.

**Order Line: 800 / 637-4983**

**subLOGIC**

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

[www.commodore.ca](http://www.commodore.ca)

# COMPUTING for families

## The Computer Piano Teacher

Fred D'Ignazio, Associate Editor

When I was a kid, I asked my parents for piano lessons on my eighth birthday. It was one of the biggest mistakes of my life.

The piano lessons completely changed my attitude about the piano. Before the lessons began, I had banged on the family piano every day. But, after my lessons began, I played less and less often, until, by my ninth birthday, I only played two days a week: the day before my lesson and the day of my lesson. All the other days I stayed as far away from the piano as I could.

### Playing For The Teacher

Why the big change? Before I started taking lessons, I was playing the piano for myself. After my lessons began, I was playing for the teacher. I played what she wanted me to play, how she wanted me to play, and when she wanted me to play it. I was on her schedule, not mine, and I resented it terribly.

But since I couldn't articulate my resentment at the time, I took the easy way out and became perverse. I "forgot" to practice. I "forgot" to show up on time for my lessons. I "forgot" my sheet music. I suffered through endless ailments that affected my fingers and hands. I complained of blurry vision, pains in my lower back, and even spent one summer trying to sneeze my way through every lesson.

I must have been pure torture for the endless stream of kindly women who had the misfortune of becoming my piano teacher. They would lecture me, harangue me, plead with me, and beg me to practice, but I never did. And instead I wasted their time and my time for six long years before my parents finally gave up and discontinued my lessons.

I was 14 when I stopped taking piano lessons, and in the 22 years since I stopped taking lessons, I've probably only sat down at the piano ten times.

### Catie's Turn

Now my nine-year-old daughter Catie is in-

terested in the piano, and she wants my wife and me to let her start taking lessons.

How can I explain to Catie that piano lessons killed my interest in the piano and smothered whatever ability I had to become a decent musician? How can I tell her how angry I am at myself, my parents, and all those poor innocent piano teachers? All I know is that when I see that Catie is interested in the piano, I am very, very wary.

### 1001 Ways To Play "Heart And Soul"

What makes it worse is that Catie is just like I used to be (before the lessons): She is a piano addict. She comes in from school every afternoon and heads straight for the piano. When she walks by the piano room door, she always slips into the room and plays a few bars of her favorite song, "Heart And Soul." In fact, she plays the song incessantly. We hear it early in the morning, late at night, and all day long on weekends.

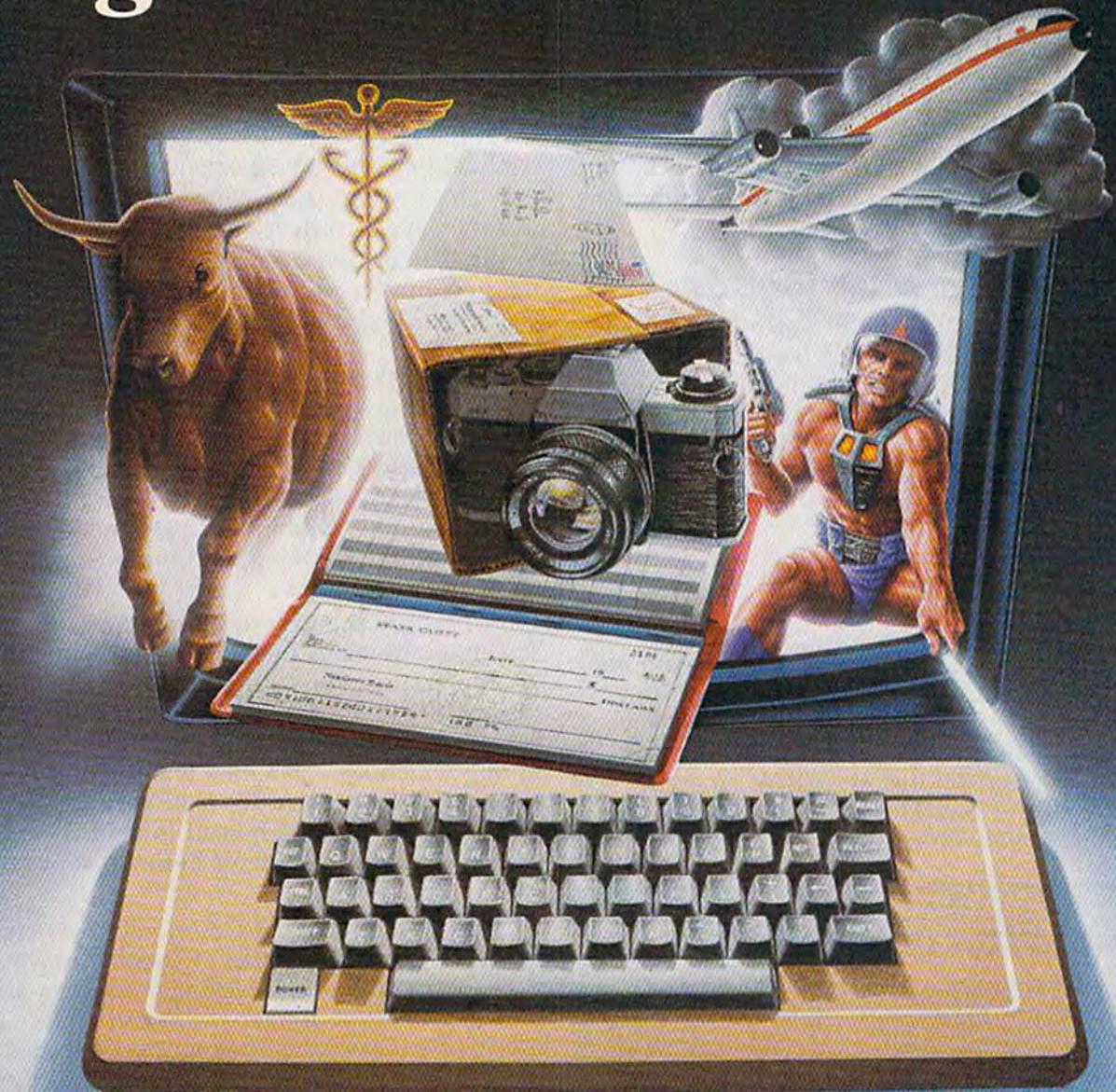
Catie doesn't play the song mechanically. Instead, she has become a "Heart & Soul" virtuoso. She plays it fast. She plays it slow. She plays it several octaves too high. She plays it several octaves too low. She reverses the chords. She adds new chords. She plays it (at last count) 23 different ways. And she adds a new variation every other day.

My wife Janet and I have heard "Heart And Soul" so many times, in so many ways, that we are climbing the walls. When Catie slips into the piano room and begins banging away, my wife and I sprint from the kitchen or study and slam the door shut. We are desperate parents.

Catie is driving both of us crazy. Yet we are very proud of her. We submit to this daily torture willingly because we value Catie's interest in the piano and her originality and experimentation.

We may soon invest in a couple pairs of extra-thick ear muffs, but we will not tell Catie how to practice, when to practice, or what to

**We don't care  
which computer you own.  
We'll help you  
get the most out of it.**



**CompuServe puts a world of information, communications, and entertainment at your fingertips.**

CompuServe is the easy to use videotex service designed for the personal computer user and managed by the communications professionals who provide business information services to over one fourth of the Fortune 500 companies.

Subscribers get a wealth of useful, profitable, or just plain interesting information like national news wires, electronic banking and shop at home services, and

sophisticated financial data. Plus, a communications network for electronic mail, a bulletin board for selling, swapping, and personal notices and a multi-channel CB simulator.

You get games on CompuServe, too. Classic puzzlers, educational, sports and adventure games and fantastic space games featuring MegaWars, the "ultimate computer conflict."

The videotex service for you, no matter which computer you own. To buy a Starter Kit, see your nearest computer dealer. To receive our informative brochure or to order direct, call or write:

**CompuServe**

Consumer Information Service, P. O. Box 20212  
5000 Arlington Centre Blvd., Columbus, OH 43220  
**800-848-8199** In Ohio Call 614-457-0802

 H&B Block Company  
[www.commodore.ca](http://www.commodore.ca)

practice. We've made it clear to her that the piano is her project, and what she does on the piano is her business.

## Interviewing Piano Teachers

We have thought about getting Catie a piano teacher. About two months ago, I interviewed five piano teachers, and finally gave up. All of them looked and sounded like my old piano teachers. They wanted Catie to play the same kinds of introductory pieces. They emphasized sight-reading and other mechanical skills in place of musical enjoyment, creativity, and originality. They didn't seem the least bit interested in Catie's interest in arranging and composing music. And they had no plans to teach Catie about the wider cultural and historical dimensions of music. Instead, the lessons would consist of 30 minutes a week of learning only those things the teachers wanted Catie to learn.

## A Special Teacher for Catie

I could imagine Catie's enthusiasm for the piano drying up after only a couple lessons. So I said good-bye to the teachers, and, instead, went out and bought a special piano teacher for Catie—the Colortone Keyboard. The keyboard works with our Commodore 64; it costs \$79.95 and is available from:

*Waveform Corporation*  
1912 Bonita Way  
Berkeley, CA 94704  
(415) 841-9866

The Colortone Keyboard is a flat membrane (touch-sensitive) plastic keyboard, measuring 9-1/2" by 15", with two octaves of piano keys and 14 special-function keys. It plugs into the first joystick port on the 64. A disk program comes with the keyboard and must be loaded before the keyboard will work.



Catie uses the keyboard to do six things she cannot do by herself on the piano. First, she plays the rainbow-colored "Touch Harp" strip above the piano keys and creates beautiful sequences of notes like waves breaking on a shore. Freeing her from pressing the individual keys on a regular piano keyboard enables her to create melodies based on many more notes and from more complex patterns of notes.

Second, when Catie creates her own music, certain keys are masked and are not playable. This helps her create songs that sound good without a great deal of painstaking effort. It's like putting Catie on a pair of musical roller skates. She creates songs twice as quickly as she does on a piano because she can play more notes easily (with her relatively short fingers), and she feels confident enough to experiment.

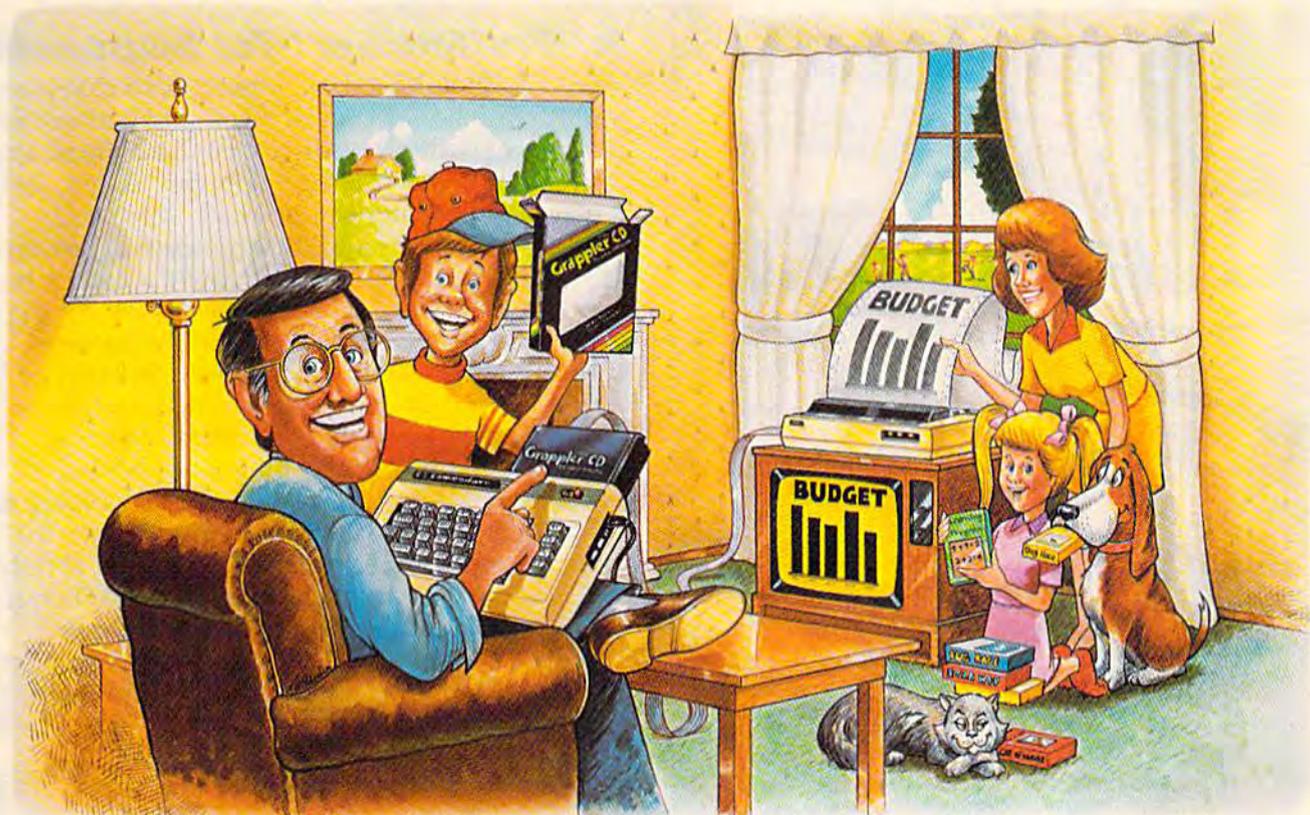
Third, when she creates a new song, she almost always records it and saves it to disk. Later in the day, or that evening, we hear Catie creating new music, and we hear a "recital" of songs Catie has composed, played, and recorded earlier in the day.

This ability to recall music she made earlier has helped give Catie a historical, or comparative, perspective when creating new music. Now she can browse through songs she created yesterday or last week, and relate them to what she is creating now. Often she creates new songs by borrowing, refashioning, and ornamenting portions of earlier songs.

Fourth, Catie gets to see the notes on the screen as she plays them. This has helped her get an appreciation for "written music" as opposed to music that she makes up herself or plays by ear. Catie has learned how to sight read music by noting which keys generate which notes on the screen. She has taken this skill back to the piano, where she is teaching herself to read sheet music and to copy down some of her own songs onto sheet music paper.

Fifth, thanks to the Colortone Keyboard and software, Catie now looks at creating music the same way she looks at writing a story on a word processor. She no longer whips out a piece of music, then abandons it, going on to something new. Instead, she edits, plays, and fiddles with everything she creates. She chooses from 12 musical scales and changes the scale of the piece up or down. She chooses from eight musical instruments and shifts back and forth between instruments. She speeds up the tempo of the music, or slows it down. And she fixes on certain bars in the music that she really likes, and she plays them over and over (like "Heart And Soul"). Later, she uses these bars as musical "ideas" in her new songs.

# "Now Your Commodore 64™ Can Print Like a Pro!"



**Grappler**™   
Printer Interface

## The Revolutionary Printer Interface for the Commodore 64™

### A New Era in Commodore Printing Power.

Grappler CD offers the first complete answer to your printer interfacing requirements, with many powerful capabilities unique in the Commodore marketplace. Complete signal translation allows many popular name brand printers to operate perfectly with the Commodore 64, or to imitate Commodore's own printer. Even Commodore's graphic character set can be reproduced on Epson, Okidata, Star, ProWriter and other popular printers.

Exclusive Grappler CD features provide a variety of graphic screen dumps, text screen dumps and formatting. No other Commodore interface can offer this.

If you own a Commodore 64...

If you're serious about quality, trouble free printing... You need the Grappler CD.

Contact your nearest Commodore dealer or call Orange Micro for a dealer near you.

### A Uniquely Intelligent Interface:

- Prints Screen Graphics Without Software
- Graphics Screen Dump Routines Include Rotated, Inversed, Enhanced and Double Sized Graphics.
- Full Code Translation From Commodore's PET ASCII to Standard ASCII, the Language of Most Printers.
- Complete Emulation of the Commodore 1525 Printer for printing of Commodore's Special Characters.
- Dip Switch Printer Selection for Epson, Star, Okidata, ProWriter and other popular printers.
- Conversion Mode for Easy Reading of Special Commodore Codes.
- Text Screen Dump and Formatting Commands
- 22 Unique Text and Graphics Commands

 **Orange Micro**  
Inc.

1400 N. LAKEVIEW AVE., ANAHEIM, CA 92807 U.S.A.  
(714) 779-2772 TELEX: 183511CSMA

© Orange Micro, Inc., 1983

 [www.commodore.ca](http://www.commodore.ca)

Commodore 64 and Commodore 1525 are trademarks of Commodore Electronics Limited.  
Epson is a registered trademark of Epson America, Inc.

# TRIVIA PLUS™



- ◆ Over 3,500 questions
- ◆ 8 fascinating categories
- ◆ No typing required
- ◆ Excellent graphics and sound (includes over 100 songs!)
- ◆ For 1 to 6 players
- ◆ In 'Trivia Plus' a good bluff may be the next best thing to the right answer

Commodore 64\*  
Disk \$24.95

## TYPING TUTOR + WORD INVADERS



### REVIEWERS SAY:

"This is the best typing tutor we have seen yet; ★★★★★"

INFO-64

"Computer aided instruction at its best." **Commander**

"This is an excellent program that makes typing practice an enjoyable pastime instead of boring drudgery."

DILITHIUM PRESS

Rated the BEST educational program for the VIC 20  
**Creative Computing**

### CUSTOMERS SAY:

"... delighted with my son's progress . . . he is the only one in his second grade class who touch types at the computer."

"Your Typing Tutor is an excellent program . . . our 4 children literally wait in line to use it."

"Thoroughly satisfied, can't believe how fast I've learned to type. I've never typed before."

In daily use by schools across the USA.

**NEW!** Commodore Plus/4 or 16 . . . Tape \$21.95 Disk \$24.95  
Commodore 64 . . . . . Tape \$21.95 Disk \$24.95  
VIC-20 (unexpanded) . . . . . Tape \$21.95

## IFR (FLIGHT SIMULATOR)



### REALISTIC AIRCRAFT RESPONSE

"Has a quality of realism which sets it apart from others, even those I've tested in flight school."

**Compute's Gazette**

"Great program!" **INFO-64**

"It is tremendous fun."

**Compute's Gazette**

"Flight tested by an air traffic controller, two skilled pilots and an elementary school class. Highly recommended by all."

**Midnite Gazette**

"This is an unbelievably realistic simulation of the difficulties facing a pilot in instrument fly-

ing. I'm a 747 pilot and I think that this simulation could do a lot to improve the reactions and instrument scan habits of even very experienced pilots." **747 pilot**

**NEW!** Commodore Plus/4 or 16 . . . Tape or Disk \$29.95  
Commodore 64 . . . . . Tape or Disk \$29.95  
VIC-20 (unexpanded) . . . . . Cartridge \$39.95

**ACADEMY SOFTWARE**

Shipping and handling \$1.00 per order CA residents add 6% tax.



P.O. Box 6277 San Rafael, CA 94903 (415) 499-0850

Last, she is developing a real sense of rhythm from strumming, tapping, and sliding up and down the harp strip and from synchronizing her own playing with the 12 preprogrammed songs that come with the Colortone software.

## A "Pre-Teacher" For Beginners

The Colortone Keyboard is not meant to replace a music teacher. It cannot teach many of the important ingredients of discipline, basic facts, and techniques about playing the piano. As yet, only a real piano teacher can do that.

On the other hand, when formal piano lessons come too early, they can stifle a child's interest in the piano. What has been play for the child becomes work. And the child's natural curiosity and creativity are blunted in favor of rote drills and the mastery of proper technique.

That's why computer products, like the Colortone Keyboard, can fill a real need for a child. They act as "pre-teachers" that prepare a child for formal lessons. They can give her the time and confidence to develop her own abilities and attitude toward playing the piano. When she has this foundation, she's ready for a teacher. Then she can take what the teacher has to offer and build it into her own schedule—her own plan—for mastering the piano.

## Now there's PASCAL for the Commodore 64. And at a mini price.

Kyan PASCAL is a full-featured implementation of PASCAL — not a subset! With these features:

- high-performance compiler and comprehensive set of error messages for faster debugging
- speeds up to 40 times faster than Commodore Basic
- built-in full screen editor
- support for files, pointers, record types, sets and ordinal types used in sophisticated data structures.
- plus, a comprehensive tutorial manual illustrating the speed and power of PASCAL through sample programs.

Kyan PASCAL lets you develop programs on your Commodore 64 that are transportable to most mainframes. So it's perfect for students and working at home.

### Try it for 15 days.

Order Kyan PASCAL, and if you're not completely satisfied, return the diskette and manual within 15 days for a full refund.

**Kyan PASCAL with complete tutorial manual . . . \$49.95**  
(Add \$4.50 per copy for postage and handling. \$9.50 outside North America. California residents add 6.5% sales tax.)

**To order, call 415/775-2923.**  
(VISA and MasterCard accepted.)

Or send check or money order to: **Kyan Software, Suite 183, 1850 Union Street, San Francisco, CA 94123.**  
Sorry, no C.O.D. orders accepted.

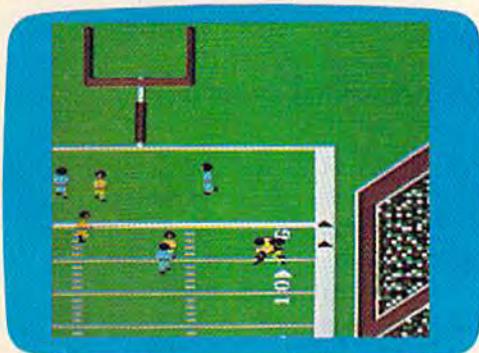
**kyan**

[www.commodore.ca](http://www.commodore.ca)

# FINALLY, A FOOTBALL GAME THAT'S IN A LEAGUE OF ITS OWN.

In 1983, Gamestar's STARBOWL™ FOOTBALL claimed BEST COMPUTER SPORTS GAME honors from Electronic Games magazine.

Instead of resting on our laurels, we were challenged to new heights. With award-winning STAR LEAGUE™ BASEBALL, ON-COURT™ TENNIS and now ON-FIELD™ FOOTBALL, the most innovative gridiron game ever created for the home screen.



## ON-FIELD™ FOOTBALL

Actual Commodore 64™ screen—Other versions may vary

## PLAYER PERSPECTIVE GRAPHICS™ MAKE THE DIFFERENCE

Most football games look pretty much alike. They stick you up in the pressbox and make you play the game from a distance. That's why we created Player Perspective Graphics™. It's an animation technique that lets you feel like you're on the field. So you're right in the middle of the action, not just watching it from the pressbox.

## PLAY VIDEO FOOTBALL LIKE YOU REALLY PLAY FOOTBALL

Most of us, frankly don't play pro-style football. We play pick-up games with friends on the beach

or schoolyard. That's why ON-FIELD™ FOOTBALL features wide open, 4-on-4 action. Multiple formations where you call (create) your own plays. And the ability to fine-tune your starting offense. So you can use the *same* plays and strategies you use when playing for real. It's the essence of football, finally brought to the home screen.

## CHALLENGE SUPERBOWL-QUALITY COMPUTER TEAMS

When you challenge a computer team you'll learn the real meaning of awesome. That's because "floating intelligence" lets the computer vary its play with yours. Which means it'll take more than luck or a few trick plays to beat these guys. Whether you're a rookie or a pro.



## ON-FIELD™ FOOTBALL

Actual Commodore 64™ screen—Other versions may vary

ON-FIELD™ FOOTBALL is available *now* for the Commodore 64™. Look for it at your local software dealer. Or write, GAMESTAR, Inc., 1302 State Street, Santa Barbara, CA 93101. Or call 805-963-3487.



**WE BRING SPORTS ALIVE**

---

# Commodore 64

---

# MUSIC

---

## For Non-Musicians

---

Kathy Yakal, Feature Writer

---

**It doesn't matter whether you've ever touched a musical instrument, or think "timbre" is something you yell when a tree falls. New music software and keyboards now available for the Commodore 64 are creating a world of music you can participate in even if you're untrained or inexperienced in music.**

---

**T**he theory may not yet be confirmed by research, but it seems that a lot of people who like computers like music. The act of writing a song and creating a computer program are not dissimilar; both involve taking a multitude of individual notes or commands that by themselves are unimpressive and combining them to create a cohesive whole.

Not everyone who likes music is a musician, and many computer owners have no interest in programming. Rather than compose their own songs or software, they buy the compositions of others.

"Three out of four people who buy traditional musical instruments quit after their fourth

or fifth lesson," says Bill Moulton, technical director at Waveform Corporation, a California company which produces music hardware and software. "Lots of people have dusty musical instruments in their closets."

And lots of people have computers, machines which are capable of producing musical sounds. As computers have simplified other tasks, many people see them as potentially powerful music machines. "I've seen studies done by major corporations that say 70-90% of the people would like to make music on their home computers if it was made easy," says Moulton. "The *if it was made easy* part is the crucial factor."

Thanks to companies like Waveform, it *is* becoming easy.

# INTRODUCING PLAYNET™



The Home Computer Network that puts the whole country at your fingertips.

© PLAYNET, INC. 1984

## PlayNet™ Brings People Together!

PlayNet brings you the excitement you've been waiting for your computer to deliver. With PlayNet's unique system, you can communicate with people all over the country.

Meet fascinating people, make new friends, exchange private messages, post public announcements, and play all our exciting games with people from coast-to-coast!

## You've Never Played Anything Like It!

PlayNet has many terrific games with full color graphics, and they're all interactive, including: Four-in-a-Row, Backgammon, Chess, Sea Strike, Checkers, Bridge, Capture the Flag, and more games coming all the time.

## Join The Telecommunications Revolution! Only \$2.00 An Hour On Line!

Now if you own a Commodore 64\*, a disc drive, and any compatible modem, like The Commodore VICMODEM\*, you can access PlayNet's wide range of services—Games, Bulletin Boards, Electronic Mail, File Transfer and more. Here's all it costs:

- \$2.00 an hour on-line—less than a long distance phone call.
- \$34.95 for the PlayNet Software Package which includes games and program disks, user's manual, monthly newsletter and 90 minutes on-line free.
- \$6.00 monthly service charge.

Let PlayNet put the whole country at your fingertips, every night from 6 PM to 7 AM and 24 hours a day Saturday, Sunday, and Holidays.

**PLAYNET**  
The network that has people talking.

Call PlayNet at  
**1-800-PLAYNET**

SEND TO PLAYNET, INC.  
P.O. BOX 596,  
WYNANTSKILL, N.Y. 12198-0607

31

YES! I WANT PLAYNET TO PUT THE WHOLE COUNTRY AT MY FINGERTIPS. I UNDERSTAND THAT MY SATISFACTION IS GUARANTEED FOR 30 DAYS. (or my full subscription price will be refunded upon return of the package) I may cancel my membership at any time by writing PlayNet.

Bill me on my charge card for \$34.95. No checks, cash or money orders accepted. Please send me the PlayNet Software, user manual, and 90 minutes of free on-line time.

Please print.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Check one:  MasterCard  Visa

Card # \_\_\_\_\_ Expiration date \_\_\_\_\_

Signature \_\_\_\_\_

\*Commodore 64 and VICMODEM are trademarks of Commodore International, Inc. [www.commodore.ca](http://www.commodore.ca)

**M**usical instruments have no time to get dusty if their owners are even casual musicians. Mastering an instrument takes more than understanding theory and learning to read music. Training your lips to play a note on a trombone, or your fingers to strum a guitar chord, requires a lot of physical ability and daily practice. And to do those things well can take years.

Small wonder, then, that so many people quit. "And once someone uses an instrument and can't get it right, there is a stigma. They won't pick it up again," says Moulton. To make music accessible to those people, "You've got to provide something that is both a lot of fun and entertaining and jumps all those hurdles that everyone thought was associated with learning music in the first place.

"The computer can jump the hurdles, like calculators helped kids learn their times tables. Teachers were afraid that they wouldn't learn them as well, but studies showed that those kids learned faster. Not that the computer should take the place of learning those skills, but it helps people not get discouraged, people who love music and have an ear for music and can hum a tune or whistle."

Waveform created the *Colortone Keyboard* (\$79.95) to help jump those hurdles. It's a touch-sensitive membrane keyboard with 25 piano-like keys (two octaves), a touch strip that performs as a musical harp, and

*Sequential Circuits' keyboard for the 64.*

14 function keys. Using the accompanying software, the function keys allow the user to choose from eight different instrument sounds (by touching the desired note on the keyboard or any spot on the harp) to play along with any of the 12 songs included.

A musical staff displaying the composition's notes scrolls by on the screen as the song plays. At the same time, a piano graphic shows which notes the user is playing. If the user wants to compose a tune, the background song can be turned off. Everything can be saved for later playback.

"When you sit down to play *Pacman*, at the lowest level you won't get shot out of the sky right away," says Moulton. "You have a little bit of a cushion, though you may not win the first time."

The same should be true with musical instruments, he believes. You shouldn't get shot out of the sky. "People are pretty shy about doing things that allow them to express

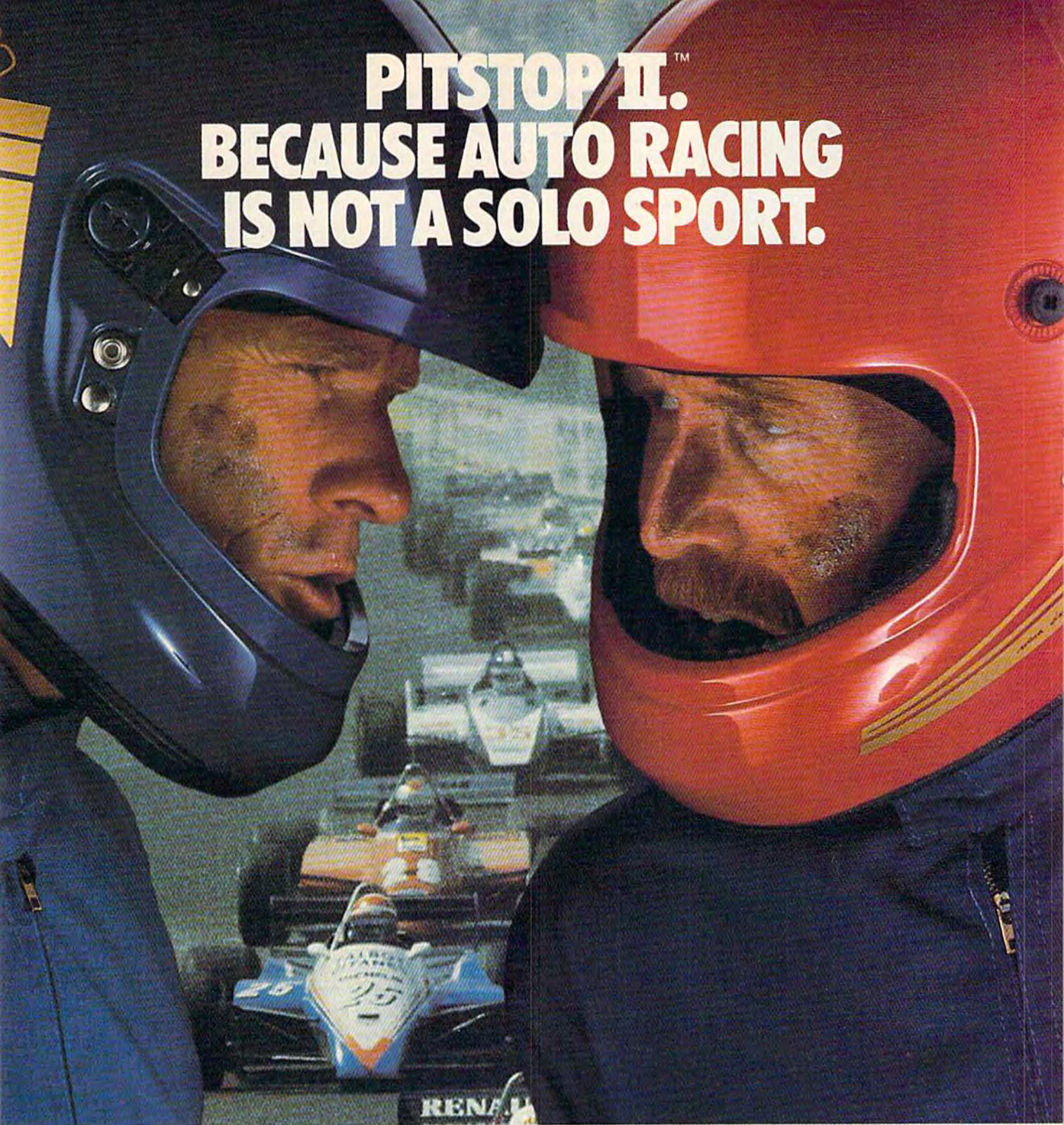
themselves, whether it's sports or something like music. People just want to know if they have talent. This way, if they do, they can get encouraged right away. And if they're inspired, they'll go on and learn more."

For more advanced music applications, the *Colortone Keyboard* can also be used in conjunction with the *Musicalc* series, Waveform's well-regarded music software.

**T**hink for a minute. Can you hum the tune Commodore uses in its television ads? A lot of their advertisements stress the music capabilities of the Commodore 64, and well they might: The SID chip is still the most sophisticated sound chip available on any home computer, largely



# PITSTOP II.<sup>TM</sup> BECAUSE AUTO RACING IS NOT A SOLO SPORT.



When we introduced Pitstop, we created action in the pits. Now, with PITSTOP II, EPYX introduces true competitive auto racing, both on the track and in the pits. Auto racing is not a one man sport. With PITSTOP II, you can now experience the thrill

of speed and competition as you battle your opponent in a race against the clock. Now, more than ever, the strategy of when you make a pit stop and your pit crew's speed and performance, combined with your skill on the track, will determine the winner.

A split screen shows you your position and that of your

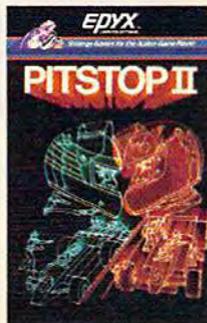
opponent, a digital clock displays time and a lap counter gives you your race position as you race against each other in pursuit of the checkered flag. You can also play against the computer or take a few practice laps as you prepare for the real head-to-head competition. Step up to PITSTOP II because auto racing is not a solo sport.

*One or two players: joystick controlled; disk or cassette.*

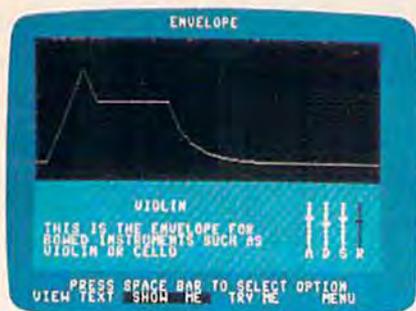


**EPYX**<sup>TM</sup>  
COMPUTER SOFTWARE

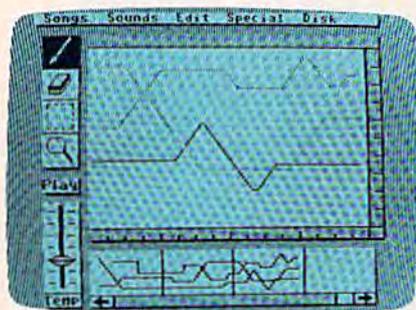
Strategy Games for the Action-Game Player



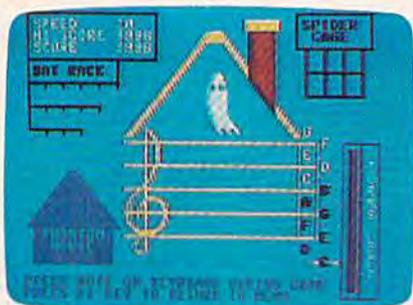
[www.commodore.ca](http://www.commodore.ca)



Sight & Sound's 3001: A Sound Odyssey is a complete tutorial on musical synthesis.



Passport's MacMusic uses a Macintosh-style screen display to make composition simple.



DesignWare has introduced the first package in its Music Teacher series. The Notable Phantom teaches children to recognize notes on a musical staff and match them with the correct note on a 1½ octave plastic keyboard overlay. Above is one of the package's three games. If the correct note is played in time, it turns into a bat and flaps its way back into the bat cage. A songbook containing 20 familiar tunes is included. (Suggested retail for keyboard and software is \$49.95.)

due to its three-voice, nine-octave range and its independently programmable features. What the commercials don't tell you is that you'll have to learn a couple dozen POKEs just to get a single note. The appeal of the new musical software is that it takes care of all the POKEs, freeing the computer owner from the petty programming details.

"A lot of Commodore owners were influenced to buy because of its musical capabilities," says Chris Albano, vice-president of marketing at Passport Designs, another company producing music software and hardware for the Commodore 64. "Our main goal is to bring as many musicians and non-musicians into using their Commodore for music as possible."

Passport is perhaps best known as the first company to ship MIDI (Multiple Instrument Digital Interface) software. MIDI, fast becoming an industry standard, allows synthesizers and drum machines to be hooked up to each other and to personal computers. It's still primarily for a professional market because of the cost of the keyboards, though Passport manufactures interface cards for the Commodore 64 and Apple II.

For non-musicians, Passport has designed *MacMusic* (\$49.95), its first consumer product. *MacMusic* features a Macintosh-style user interface, which features easy-to-use pull-down menus and icons. Using a joystick, you "draw" melodies on the screen and shape your own compositions, or modify popular pre-programmed tunes.

"It's a much easier way to look at music," says Albano. "Pitch goes up when the line on the screen goes up, and notes hold longer because they last longer on the screen."

If you want to be a good composer, however, you'll still have to study. "More than any-

thing, programs like this make music easy to create," says Albano. "Music theory won't change. Digital technology just allows people to have easier access."

*Computer Hitware* (\$19.95) is the first result of Passport's joint venture with Hal Leonard Publishing Corporation. Each disk in the series contains songs from groups like Duran Duran, The Police, and Bruce Springsteen. And you can do more than just sing along: You can create your own rock video by rearranging the screen graphics.

"As the technology increases, you can see the whole video and audio thing becoming one medium," says Albano. "Someone will be able to sit down with a synthesizer and a video machine and create a piece by themselves. That's much more of a multimedia event than watching four guys from London play guitars. The audience is going to become much more sophisticated—their eyes and ears will demand much more complex stimulation."

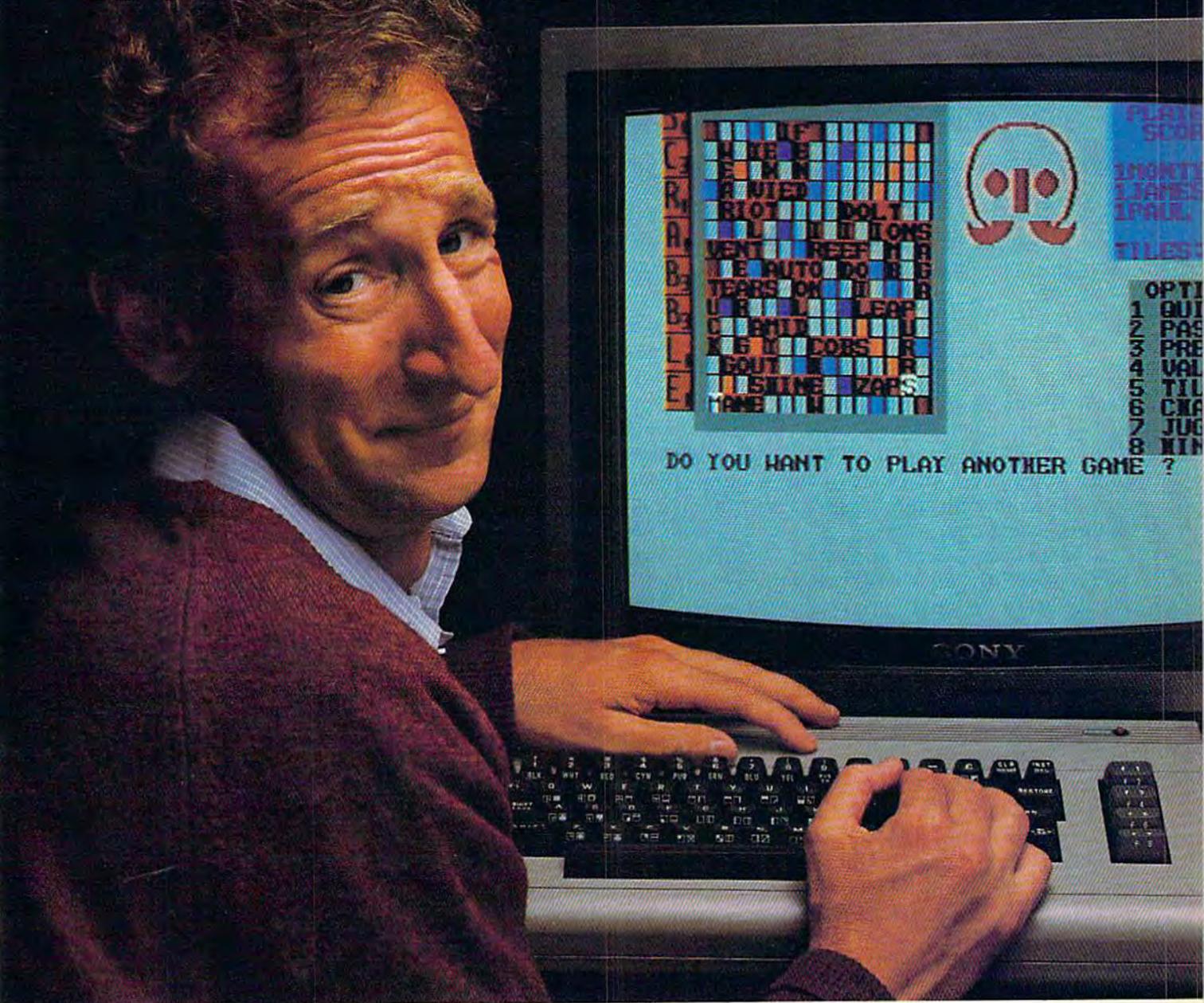
"Up until a year ago, there really wasn't any good music software for the Commodore 64," says Joe Billings, vice-president for marketing and sales at Sight & Sound Music Software. A 20-year-old music publishing company, Sight & Sound decided to start publishing music software about two years ago.

"We saw music being a new application for computers," says Billings. "I'll be honest with you: I'm a 30-year-old guy and I play games on my computer at home."

Billings believes that most people buy computers and then wonder what they can do with them. "We're hoping they can say, 'Oh! It's also an incredible musical instrument.'"

The problem with some music software, he says, is that you're using the computer keyboard instead of a regular piano

# SCRABBLE. THE COMPUTER VERSION. IT'S YOU AGAINST YOUR COMPUTER.



Now, through the magic of your computer you can play SCRABBLE® even when you don't have a human opponent handy. SCRABBLE®, the computer version, pits you (and up to two other players) against the computer in the most popular word game of all time. The computer program provides you and your computer-controlled opponent with seven letters, and the contest is on. The program displays the board status, tracks the score, and deals out new letters. You and your computer-controlled opponent try to maximize your

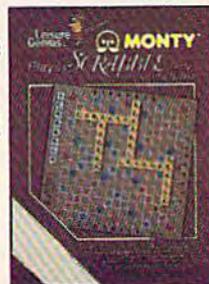
score on each word. There are four different levels of difficulty and, of course, there are double and triple letter and word scores. There's even a "hint" option when you're having problems. Now, you 100 million SCRABBLE® players have a new challenge: Are you good enough to beat your computer?

*One to three players. Keyboard-controlled disc or cassette.*

Marketed and Distributed by



[www.commodore.ca](http://www.commodore.ca)



Manufactured under license from Ritan Corporation owner of the registered trademark MONTY® and Selchow & Righter Company owner of the registered trademark SCRABBLE® and of the copyrighted rules of instruction and board



Plug Melodian's three-octave keyboard into your 64 and you can reproduce up to 16 instrumental sounds.

keyboard, so you don't necessarily hit the key corresponding to the note you want to play. "That doesn't teach you music. Once you have a keyboard, you turn the computer into a legitimate musical instrument."

To that end, Sight & Sound has released the *Incredible Musical Keyboard* (\$49.95), a package which includes a two-octave plastic keyboard overlay that fits over the top of the Commodore 64's keys, plus software which lets you perform a variety of musical options. Pressing one of the piano-like keys activates the computer key beneath it.

Sight & Sound enlisted jazz guitarist Ryo Kawasaki, among others, to help design software for the IMK. This software series, ranging in price from \$29.95 to \$49.95, includes the *Kawasaki Synthesizer*, which transforms your Commodore 64 into a programmable synthesizer and sound processor; the *Kawasaki Rhythm Rocker*, which creates space sounds and high-resolution graphics to the beat of electronic rhythms; the *Music Processor*, which lets you create, edit, record, and play your own musical compositions; and their latest, *3001: A Sound Odyssey*, a

complete music tutorial. Their new *Music Video Kit* lets you create your own music videos. (See a review of the Sight & Sound music software elsewhere in this issue.)

"The problem we have now is that the technology is there on the very high end—expensive synthesizers that you can hook up to your personal computer—but you need a \$500 interface and drum machine," says Billings. "On the low end, you have some excellent software."

"The next step is really going to be the person who comes out with a sound source or a peripheral keyboard with electronics to expand voicing capability. The price is going to have to be around \$200. Once that happens, it's like adding a printer, it's like adding a disk drive, it's like adding a monitor." Both Passport and another music company, Sequential Circuits, are expected to have relatively inexpensive keyboards available for the Commodore 64 by the time you read this.

In the next two or three years, Chris Albano believes, the sounds in personal computers themselves are going to be

phenomenal—real violins, real trumpets, real voices. "They're bringing the sounds onto very small chips, digitally recorded. It's only a matter of time before these computers have tremendous sound capability, and that's when you're going to see music software really expand in terms of what it can do."

*Passport Music Software*  
625 Miramontes St.  
Half Moon Bay, CA 94019  
(415) 726-0280

*Sequential Circuits, Inc.*  
3051 N. 1st St.  
San Jose, CA 95134  
(408) 946-5240

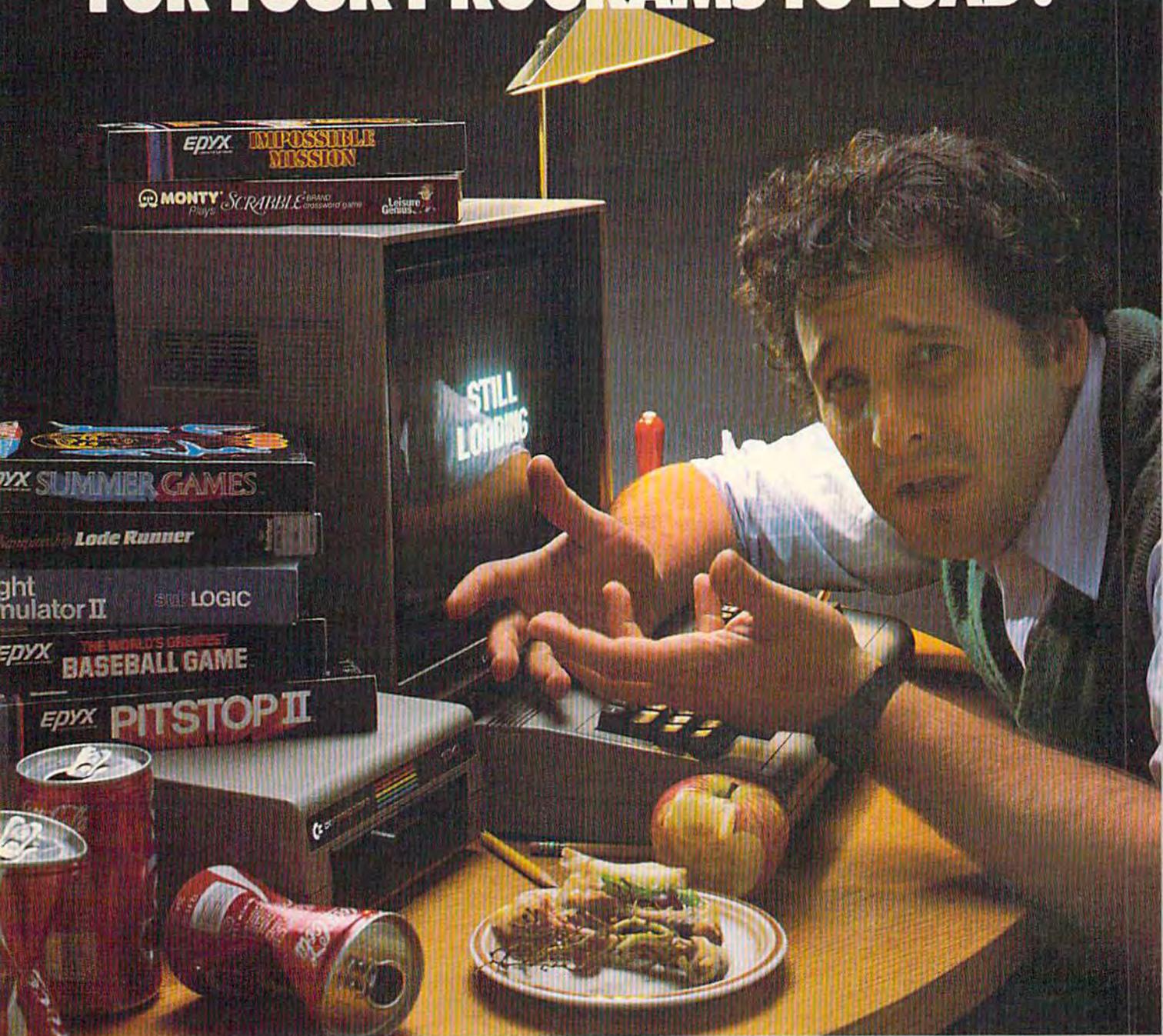
*Sight & Sound Software, Inc.*  
3200 S. 166th St.  
New Berlin, WI 53151  
(414) 784-5850

*Waveform Corporation*  
1912 Bonita Way  
Berkeley, CA 94704  
(415) 841-9866

*Melodian, Inc.*  
115 Broadway  
Suite 1202  
New York, NY 10006  
(212) 406-5163

*DesignWare*  
185 Berry St.  
San Francisco, CA 94107  
(415) 546-1866

# TIRED OF WAITING FOREVER FOR YOUR PROGRAMS TO LOAD?



## INTRODUCING THE FAST LOAD CARTRIDGE FROM EPYX.

You're tired of waiting forever for your Commodore 64 programs to load. But it's no use glaring at your disk drive. Calling it names won't help, either. It was born slow — a lumbering hippo. You need the FAST LOAD CARTRIDGE from Epyx. FAST LOAD transforms your Commodore 64 disk drive from a lumbering hippo into a leaping gazelle. With FAST LOAD, programs that once took minutes to load are booted up in a matter of seconds.

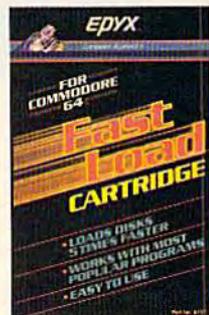
FAST LOAD can load, save and copy your disks five times faster than normal. It plugs into the cartridge port

of your Commodore 64 and goes to work automatically, loading your disks with ease. And that's only the beginning. You can copy a single file, copy the whole disk, send disk commands, and even list directories without erasing programs stored in memory.

And unlike other products, the FAST LOAD CARTRIDGE works with most programs, even copy protected ones, including the most popular computer games.

The FAST LOAD CARTRIDGE from Epyx. Easy to insert, easy to use and five times faster. So why waste time waiting for your disks to load?

*Speed them up with FAST LOAD!*



**EPYX™**

[www.commodore.ca](http://www.commodore.ca)

# Ryo Kawasaki, The Designer Behind The *Kawasaki Synthesizer* And The *Kawasaki Rhythm Rocker*

Sharon Darling, Research Assistant

A fascination with new technology coupled with a desire to expose non-musicians to the joys of synthesized music led jazz artist Ryo Kawasaki to develop two versatile music programs for the Commodore 64: the *Rhythm Rocker* and the *Kawasaki Synthesizer*.

**R**yo Kawasaki stood in a Manhattan computer store two years ago and had to argue with a salesman about buying a Commodore 64. Yes, he said, I'm sure. That's the computer I want.

What the salesman couldn't know as he talked to the slender Japanese-born jazz musician with the physics degree and 13 albums to his credit, was that Kawasaki had a vision. "I was interested in introducing what a synthesizer could do to the mass of non-musicians, so they would understand and enjoy synthesized music."

And what better computer to achieve that than the inexpensive Commodore 64 with its remarkable Sound Interface Device (SID) chip? Three months after buying his 64, Kawasaki emerged with his first programming effort—*The Composer*. That original concept has now been expanded and refined into

two music packages for the 64, the *Kawasaki Synthesizer* and the *Kawasaki Rhythm Rocker*, part of a series of integrated music programs marketed by Sight and Sound Music Software, Inc.

Understanding and enjoying music through a computer symbolizes for Kawasaki the underlying Japanese interpretation of music itself. "In Japanese, the music is done by two letters—one is the sound, and the second is the joy, or pleasure. It is two characters, so a joy and a pleasure of the sound is music. Music is not like notating a note or writing a score—that comes later. First you have to enjoy the sound, and that was my interest in the Commodore 64," he says.

Kawasaki saw the 64 as a good tool to bring music to the masses because of its programmable filter as well as the SID chip. "To me, the filter is the most important thing in making synthesized sound," he adds.

**T**he *Rhythm Rocker* and *Kawasaki Synthesizer* were designed to be easy enough for children ages six and up to operate. But the programs offer enough depth, variety, and flexibility to challenge and delight adults no matter what their musical backgrounds. With the *Kawasaki Synthesizer*, which comes

Dance Theater," where the star performers, the Kicker Brothers, kick-box in time to the music.

**I**n the keyboard mode, users can choose from 21 different sounds, ranging from organ, piano, and trumpet, to more exotic ones, such as space travel, outer space, waves, gun shots,

while cartoon characters tap their feet in time to the music. (For more detailed information, see the review elsewhere in this issue.)

The composer sequence has four different screens, and three-track recording capabilities. A sound editor can be used also to create an unlimited number of instrument sounds and special effects.

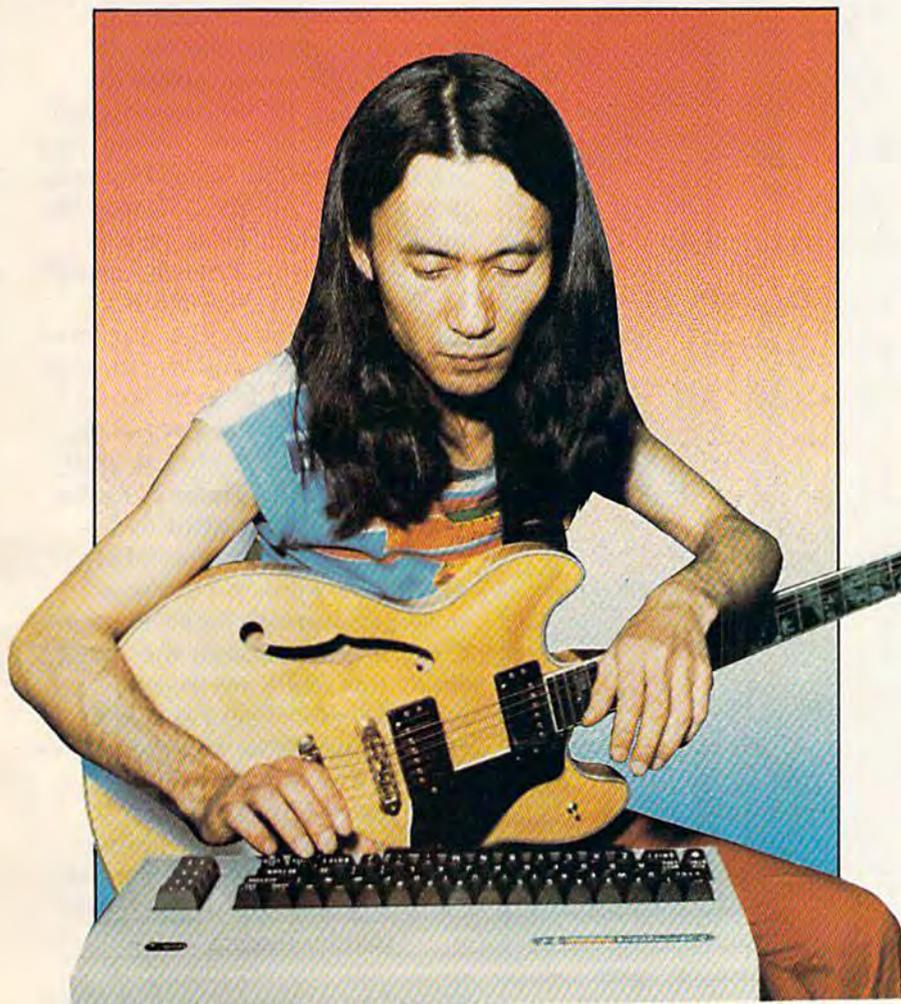
With the *Rhythm Rocker*, you have a choice of electronic percussion, bass, and synthesizer sounds. Melodies can be played and recorded over pre-programmed bass and rhythm patterns, and compositions can be complemented with high-resolution graphics.

The demonstration mode offers stunning geometric graphics, as well as a graphic interpretation of a keyboard, with keys flashing on and off the screen as notes are played.

Both the *Rhythm Rocker*, which retails for \$39.95, and the *Kawasaki Synthesizer*, which has a suggested retail price of \$49.95, can be used in conjunction with Sight & Sound's Incredible Musical Keyboard, an add-on overlay for the computer.

**I**t took Kawasaki about four months to come up with the prototype of his two programs. He started out programming in BASIC, but found it too slow for what he wanted to accomplish, so he switched to machine language. "Machine language is much easier than BASIC because I have been involved with electronics and hardware all my life, and it's just much easier to understand and to change, to transfer and to enhance," Kawasaki says.

That was his first encounter with computer programming. He demonstrated the prototype at a computer store in New York, and the owners liked it enough to start selling it. Within



Ryo Kawasaki

on two disks, users have two sequences from which to choose—the performer and the composer.

In the performer section, you can choose from eight different screens, allowing you to see a demonstration of songs written with the synthesizer; special keyboard effects, such as glissandos, vibratos, and slides; and a visit to "Kawasaki's Space

or mystery sound. By pressing another key, the waveform and octave can be changed to create more than 500 different sounds. Pressing B adds a bass and rhythm line to your composition.

The sounds are accompanied by graphics—keys on the screen change color to represent different notes being played,

two weeks, about 30 copies were sold, he recalls, "So I said 'Oh, maybe I can do something with it.' I started rewriting it, and I finished it in about July or August of 1983."

However, he didn't have as much luck with his second version of *Composer*. "I was looking for different people to sell the program, but everybody was more interested in a word processor or games, and they didn't have as much understanding of music programs at the time," he says.

A trip to an exhibition in Japan in the fall of 1983 led him to the people from Sight & Sound, who liked what they heard. They asked him to write a simpler version of the composer, which turned into the synthesizer. In March 1984, he started work on the *Rhythm Rocker*, finishing it in June.

The design of the programs harks back to Kawasaki's youth, when he first became interested in music. "I wasn't interested because [I was exposed to] Stravinsky or Mozart or Beethoven—I was interested because I had one of those toy pianos with a songbook, and the black keys were only painted on. I didn't even know what all those things stood for." He just wanted to see what different kinds of sounds he could elicit from his one-octave range toy, he remembers.

"That kind of experience got me into music," he recalls. "So my focus with the synthesizer is to get down to that level—so non-musical that even little people [children] can just play and express themselves, and you don't have to know anything—just enjoy the graphics and press some characters."

Most of the functions on his programs can be accessed by pressing only one key, to make operation even simpler, and to get down to the main purpose of the programs: to make music.

But the programs' simplicity

doesn't mean serious musicians can't benefit from the programs, says Kawasaki. "I'm a very serious musician, and I've been into electronics and synthesizers for a long time, and somebody else like that wouldn't mind having

“

**My mother wanted me to take piano lessons, but I never wanted to, because that is something you have to learn, like you have to learn to type, and to me, that has nothing to do with music.**

”

this program. I wouldn't expect how much they could seriously use it, but it would be something they could have." He has used his Commodore 64 on some of his albums, and in some of his concerts, especially to create sound effects.

**L**earning music with a computer might be more interesting to a child because it takes

away one of the more frustrating elements of learning a traditional instrument, such as a piano or trumpet—tedious practice sessions just to learn notes and basic patterns. To Kawasaki, the main point of playing a musical instrument should be to express something you feel inside.

"When I started playing [as a child], I played the ukelele or the harmonica or recorder or toy flute—something very simple—but at least you can express something. If you feel limitations, then it's time to go to something a little more sophisticated or complicated. When you start that though, what happens is it gets very boring, to me. My mother wanted me to take piano lessons, but I never wanted to, because that is something you have to learn, like you have to learn to type, and to me, that has nothing to do with music."

Just hitting the keys over and over until the chords and notes are learned is fine, Kawasaki says, "if you want to become a great instrumentalist. But if you want to be a composer, or want to express something in you through the music, that's not really necessary."

Kawasaki believes a computer could never completely replace a live musician, but he does feel there are definite applications for a non-human instrumentalist. "Session music, like for (commercial) jingles, or non-creative music, as I call it—that could be completely replaced by a computer. I've done a lot of jingle sessions, and they don't need you, they just need your skill," he says.

However, he adds, "there is a creative and expressive music that should always have the artist." When he uses rhythm machines or synthesizers, he says, "I would rather program them to do something a human being could never do—I would approach it as a new instrument, a new discovery, rather than trying to play something a human

# GREAT NEWS FOR OWNERS OF COMMODORE, APPLE, & ATARI COMPUTERS!

**Most printers don't work with Commodore or Atari. And to get one that does, costs too much. That's why the engineers at Blue Chip designed a new personal printer called the M120/10. If you own a computer read on:**

Of the ten high speed dot matrix printers most often used with Commodore, Apple, and Atari, none is less expensive than the Blue Chip M120/10. Or more powerful.

Fully equipped, it's about \$50 less expensive than a comparable, yet much slower Commodore printer. And in the vicinity of \$300 less than an Epson\* set-up to work with a Commodore.

Despite its low price, the Blue Chip M120/10 is not a stripped down, bargain basement printer.

In fact, when you judge it by the same stringent standards computer professionals use—by weighing total

performance against cost—it's difficult to find a printer that compares to the Blue Chip M120/10.

Top speed with a Blue Chip M120/10 is 120 characters per second. To beat that in any other make of printer, you have to spend about \$400 more.

Special print modes on an M120/10 include graphics; condensed, bold-faced and expanded characters; as well as superscripts and subscripts, and near letter quality characters. And to beat that in any other make of printer you have to spend nearly \$300 more.

And since it also has the IBM-PC\*, Apple MacIntosh\* and IIC\*, Serial, and Centronics interfaces\*\*, you can use the Blue Chip M120/10 with just about any computer you may eventually own.

The Blue Chip Personal Printer costs a lot less than anything similar... without compromise in quality. Highly powerful and relentlessly practical.

**See one today.** Blue Chip printers are available at Best Products, LaBelle's, Jafco, Dolgin's, Miller Sales, Rogers, Great Western catalog showrooms, and other fine stores. Or call (800) 556-1234 Ext. 540. In California, call (800) 441-2345, Ext. 540, for more information and name of your closest Blue Chip dealer.

## BLUE CHIP ELECTRONICS

2 West Alameda Drive/Tempe, Arizona 85282/(602) 991-9833

\*Commodore is a registered trademark of Commodore Business Machines Corp.

Epson is a registered trademark of Epson America, Inc.

IBM is a registered trademark of International Business Machines Corp.

Apple is a registered trademark of Apple Computer Inc.

\*\*Replacement interfaces sold separately.



[www.commodore.ca](http://www.commodore.ca)

being could play, because a human being has a certain quality, and a computer has a certain quality."

**T**he jazz music he performs, both solo and with his band, Golden Dragon, is perhaps the hardest form to replace with synthesized music, since much of the final outcome depends on improvisation and interaction between the members of the band, Kawasaki says. Composing for popular songs adapts more easily to synthesizers and computers, he adds, because "anything that can be done in written music can be very easily adapted to computer music, but if something is not in that area, like in jazz, it still requires a lot of human qualities."

Kawasaki approaches software writing the same way he approaches music—as a composer. "It is almost exactly as

when I compose music and when I perform instruments," he says. "I have some artistic goal I want to achieve while I am developing the software. What 'artistic' means, to me, is it has some feeling in the presentation of yourself, which communicates with other people's feelings, and that's a primary connection between the programmer and the people." That feeling, he hopes, will inspire creative energy among users of his programs.

Kawasaki is currently working on another program for the 64, a score writer. However, he says he doesn't know if he will finish it or not. For the past two years, he has been devoting his time to the computer, and he says he'd like to get back to recording albums and doing concerts. "I've been making music for 20 years, and I've only been computing two years, so I

would like to get back to music, and take a little rest from the computer until some new hardware comes out," he says.

His inspiration comes "from seeing some new toy. I don't get inspired because I like programming. I see a new toy, and I see how far I can go with this little toy, and that occupies me for a couple of years, and I do something, and then I wait until something else comes up."

Besides computers, anything scientific and creative interests Kawasaki, who came to the United States in 1973. The 36-year-old Tokyo native, who makes his home in an artists' building in New York City, opted for a career in music rather than physics because "I found it [physics] a little quiet, underground kind of thing. I like to be a little more flashy—I like to go out in front of people and express myself." 

# DI-SECTOR

Version 2.0

**EVERYTHING YOU EVER WANTED IN A DISK UTILITY . . . AND MORE!!  
FOR THE COMMODORE 64\***

- ★ Fully automatic back-up of almost any protected disk.
- ★ Copy files [PRG, SEQ, RND] with full screen editing.
- ★ Three minute back-up of standard disks [even many protected disks].
- ★ Format a disk in ten seconds.
- ★ View and alter sector headers.
- ★ Remove errors from any track/sector.
- ★ Edit sectors in HEX, ASCII — even assembler.
- ★ Create errors on any track/sector [20, 21, 22, 23, 27, 29] instantly.
- ★ Drive/64 MON, even lets you write programs inside your 1541.
- ★ All features are fully documented and easy to use.
- ★ None of our copy routines ever makes the drive head "kick."

**Yes, you get all of this on one disk for this low price! \$39.95**

. . . Continuing Customer Support and Update Policy . . .

\*Commodore 64 is a registered trademark of Commodore Business Machines

... WRITE OR PHONE ...  
**STARPOINT SOFTWARE**  
Star Route 10      Gazelle, CA 96034      [916] 435-2371

All orders add \$2.00 shipping/handling.  
California residents add 6% sales tax.  
COD orders add an add'l. \$3.00 shipping.  
Check, Money Order, VISA, and MasterCard accepted.

# "THE HOME ORGANIZERS

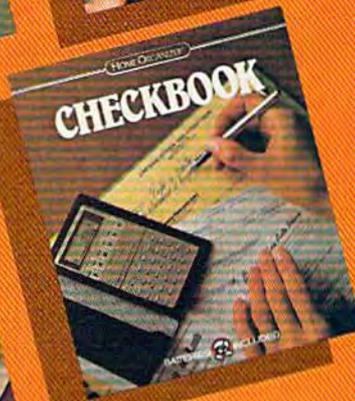
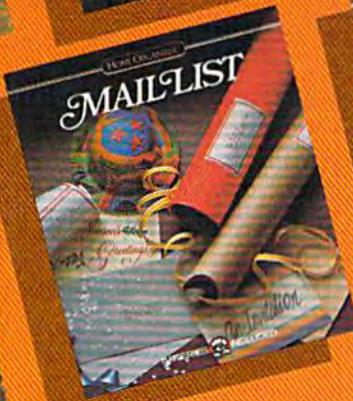
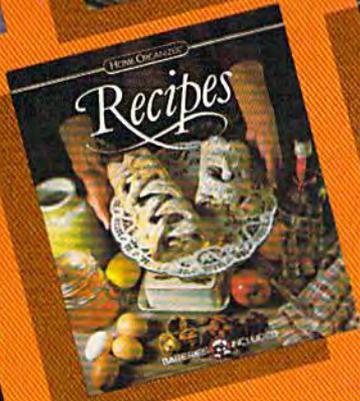
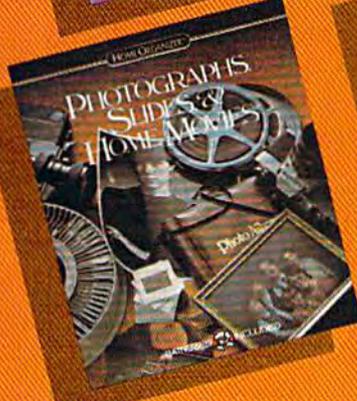
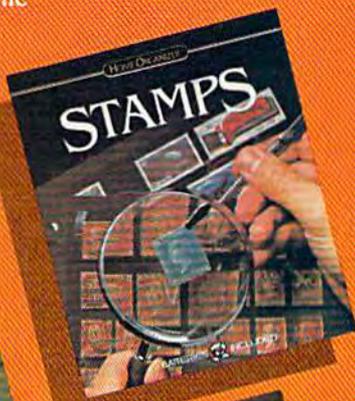
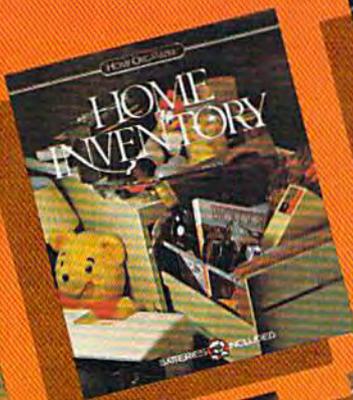
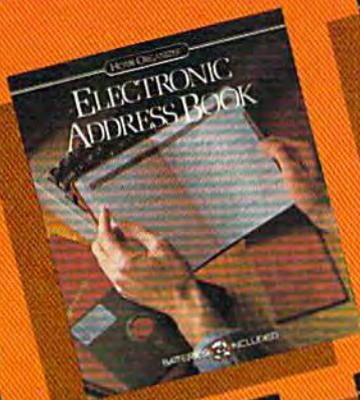
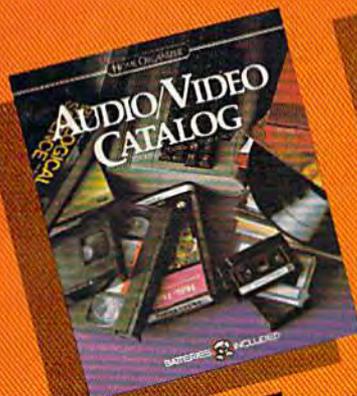
FOR  
COMMODORE  
64

ARE . . . INVALUABLE HELPMATES AND TIMESAVERS "

*"Based on the powerful CONSULTANT™, a professional database manager, the HOME ORGANIZER series is for those of us who want the same power that a larger program offers, but without the headaches. Each of these dedicated programs has the screens and formatted printer reports already set up for you. All YOU have to do is enter the information!"*

—Commodore Microcomputers Magazine\*

It's all there, right at your fingertips. And the HOME ORGANIZERS are more than just electronic file cabinets. Each program has special functions built right in, to help you better manage your personal and household affairs. Like automatic calculations as soon as you enter data, with the "Checkbook" program. Or weekly menu planning with "Recipes". And much much more, to save you time and help you to organize your life.



The second best thing about the HOME ORGANIZERS is that it's so easy to use. You don't have to program anything, or set up formats—it's all done for you. Just load the disk, follow the on-screen directions, and enter data. What's the best thing? The price. **ONLY \$29.95\***, an unbeatable price for programs that help you organize your home and your life in so many ways!

**BATTERIES INCLUDED**



**"The Energized Software Company!"**

WRITE FOR A FULL COLOR BROCHURE

\* MANUFACTURER'S SUGGESTED U.S. LIST PRICE.

\*FOR A REPRINT OF THE ARTICLE AS IT ORIGINALLY APPEARED WRITE TO US, WE WILL BE GLAD TO SEND YOU A COPY, WE'RE PROUD OF IT.

© 1984 BATTERIES INCLUDED. ALL RIGHTS RESERVED COMMODORE IS A REGISTERED TRADE MARK OF COMMODORE INTERNATIONAL INC. [www.commodore.ca](http://www.commodore.ca)

186 Queen St. West  
Toronto, Ontario,  
M5V 1Z1 Canada  
(416) 596-1405

17875 Sky Park North,  
Suite P, Irvine, California  
USA 92714

# SIMPLE ANSWERS TO COMMON QUESTIONS

TOM R. HALFHILL, EDITOR

## QA

Each month, COMPUTE!'s GAZETTE tackles some questions commonly asked by new Commodore users and by people shopping for their first home computer. If you have a question you'd like to see answered here, send it to this column, c/o COMPUTE!'s GAZETTE, P.O. Box 5406, Greensboro, NC 27403.

**Q.** Could you tell me which computer monitors are compatible with the Commodore 64? I intend to use my computer for word processing in 80 columns, but still would like the monitor to also display the standard 40 columns. I know a monochrome monitor is needed to display 80 columns of text clearly, but does an 80-column monitor also display 40 columns? And does a green-screen monitor work with the color Commodore 64? I need some type of monitor to reduce eyestrain.

**A.** Generally speaking, any monochrome or color monitor with standard *composite* input should work with your Commodore 64 (or nearly any computer, for that matter). All you'll need is the proper cable to connect the monitor to the computer. If necessary, you can make your own cable without too much trouble.

The number of columns displayed on a screen—that is, the number of characters in a horizontal line—is determined by the computer, not by the monitor. A Commodore 64 normally displays 40 columns by 25 lines. It will always display 40 columns by 25 lines, whether it's plugged into an ordinary TV set, a composite color monitor, or an 80-column monochrome monitor. When you see a monitor advertised as an "80-column monitor," it doesn't mean that's all you need to convert your display to 80 col-

umns. It simply means the monitor is capable of clearly resolving 80 columns. You still have to equip your computer with an 80-column video converter or run a special program (such as "Screen 80," COMPUTE!'s GAZETTE, September 1984).

Many people prefer 80-column screens for extended word processing and programming. For one thing, the screen displays twice as much information. And for word processing, an 80-column screen more closely resembles a sheet of paper in a typewriter, making it easier for you to envision how the document will appear when printed out. Some word processing programs have print-preview features which let you view the text on screen exactly as it will be printed on paper, so you can format subheadings, footnotes, running headers and footers, page breaks, outlines, and so on. When formatting isn't too important, 40-column displays can be perfectly adequate.

Unless your computer has a direct-drive video RGB (Red-Green-Blue) output—and Commodore computers do not—you'll most likely need a monochrome monitor to make 80-column displays easily readable without eyestrain. When a 64 is plugged into the rear connections of a Commodore 1701/1702 monitor, 80-column displays are acceptable, but not optimum. There are two ways to improve an 80-column display on a 1701/1702: Use the three rear connectors rather than the two front ones, and unplug the color signal (the one labeled Chroma). For long sessions of programming or word processing, you may want to buy a monochrome monitor as a second display device. Fortunately, prices of these monitors have declined sharply in recent years. They cost about \$69 to \$150.

Three display colors are available: ordinary black and white, green, and amber. Each has its advocates. Green is the most popular, but amber has gained ground recently. One study indicated that green was preferred for dimly lit rooms (as you might find at home) and amber for brightly lighted offices. Largely, though, it's a matter of personal preference. If possible, try all three before you buy.

The 16 colors on a 64 are a mixture of chrominance (color) and luminance (brightness). There are only four different luminance levels, which means you can choose four shades of green, or amber, for text and background colors.

Some monitors have a 40/80-column switch to adjust the width of the display so characters will appear properly proportioned in either mode. Others have a horizontal-width knob which does the same thing.

Most monochrome monitors have a standard phono jack (RCA jack) for composite video input. Since the Commodore 64 video output is a DIN jack, you'll need a cable to connect the two. The "octopus cable" that comes with Commodore 1702 monitors works fine—plug the luminance output into the monochrome monitor. You can also buy these cables at Commodore dealers and some video supply stores. Some octopus cables have five-pin DIN plugs, while others have eight-pin DINs. Newer Commodore 64s have eight-pin jacks, but the five-pin cables work with both older and newer 64s. If you aren't sure which phono plug on the octopus cable is the luminance output, experiment by plugging them into the monitor input one at a time until a readable display appears (you can't hurt anything by making a mistake).

If you can't find an octopus cable, it's not too hard to make a cable yourself. Five-pin DIN plugs and shielded cables are readily available at electronics parts supply stores such as Radio Shack. Refer to the video output pin map in the *Commodore 64 Programmer's Reference Guide*. Solder one end of the cable to the ground and luminance pins of the DIN plug, and the other end to the ground and positive contacts of the connector which fits your monitor. Be sure not to create a short-circuit by splashing solder across any two contacts, and keep the video cable as short as possible. If you can't solder very well or aren't sure about which pins to hook up, pay a little extra to have the cable made for you by an expert at a computer or video shop.

**Q.** In the October issue there was again a question regarding which element of a system to turn on first. I have one further question that has not been answered. Is there any problem in having all components hooked up to a

power strip and turned on at the same time? I live in an area where power surges and spikes are rare, so a protector is not necessary. So far I have used my Commodore 64, 1541, and monitor in this fashion with no apparent problems.

**A.** We thought we'd covered all possible bases on this question in the August and October columns, but we forgot about the power strips.

There's usually no problem with turning on a whole computer system in this fashion, even though the sudden draw of current creates a tiny power surge each time you do it. Some electronic devices have built-in buffer circuits to protect their delicate circuitry from power-on surges. When you leave the power switches on and control them from a power strip, you could be negating this feature. But since most home computer systems don't draw much current anyway, the small surge is usually nothing to worry about.

To be absolutely safe, you could separately switch on the device which draws the most power (i.e., the monitor or TV). However, we've never heard of any damage resulting from switching on an entire system with a power strip. If there are any isolated cases to the contrary, we'll be sure to hear about them. 

### 1541 DISK DRIVE ALIGNMENT PROGRAM

Finally, a complete disk drive alignment program! No special equipment needed! A two disk (program and calibration) program allows anyone with average mechanical skills to properly align the 1541 disk drive. Complete instruction manual. Don't be fooled by cheap imitations! This is the alignment program that works! See the review in the October issue of the Gazette.

\$44.95 + \$2.50 shipping (U.S.)

### PROGRAM PROTECTION MANUAL FOR THE C - 64 2ND EDITION

\$29.95 + \$2.50 shipping (U.S.)

### PROGRAM PROTECTION MANUAL VOLUME 2

COMING SOON

### PROGRAM PROTECTION NEWSLETTER

A monthly newsletter covering the latest advances in program protection. This will be a complete 'HOW' and 'WHY' approach to individual program protection schemes.

\$35.00 per year post paid in the U.S.

### OMNICLONE (C - 64 VERSION)

At last — a copy program that will not only copy the disk but is also unprotected and documented. This will copy the disk and automatically place errors 20, 21, 22, 23, 27 and 29 on the destination disk. Three passes, three minutes. The source code is included on disk and printed out. Learn about half tracking, high speed data transfer and much more . . . plus updates included in the newsletter.

\$35.00 + \$2.50 shipping (U.S.)

## C. S. M. SOFTWARE

P.O. Box 563, Crown Point, IN 46307

(219) 663-4335

VISA AND MASTER CARDS ACCEPTED  
DEALER INQUIRIES INVITED

# BASIC Magic

Michael S. Tomczyk

## Beginning Computer Math

Some people think computer math is hard just because it involves numbers. They're wrong. Math is *easier* to understand when you use a computer.

For example, some teachers still think students have to be a certain age to learn algebra—nonsense! Every time you use a variable in a computer program, you're using a type of algebra. If a child can use variables in BASIC programming, then he or she is already applying the principles of algebra.

The computer PRINTs the number on your screen. We can use the PRINT command to calculate, too, like this:

```
PRINT 1985+1
```

When you place a *calculation* or *formula* after the PRINT command, the computer automatically does the calculation and displays the answer (in this case, 1986).

Notice that number values are always PRINTed without quotation marks. Putting the

number *outside* quotation marks tells the computer that the number is a value and can be used in calculations.

Putting a number *inside* quotation marks tells the computer that number is part of a message and cannot be used as a value in calculations.

### Common Math Functions

Display numbers

Counting with FOR/NEXT

Addition

Subtraction

Multiplication

Division

Fractions

Decimals

Negative numbers

Exponents

Ratio analysis

Formulas

VAL = string to numeric

Random Numbers

### Short Examples to Try

```
10 A=100: PRINT A: PRINT"ONE HUNDRED="A"
```

```
10 FOR X=1 TO 100 STEP 2: PRINT X: NEXT
```

```
10 A=3: B=4: PRINT A+B
```

```
10 X=255: Y=55: PRINT X-Y
```

```
10 N1=10: N2=20: PRINT N1*N2
```

```
10 C=100: D=5: PRINT C/D
```

```
10 PRINT (2/3)*(3/2)
```

```
10 L=100000: I=.12: PRINT I*L
```

```
10 PRINT .12*100000: PRINT -.12*100000
```

```
10 PRINT 3^12
```

```
10 INPUT"DEBT";D: INPUT"EQUITY";E: PRINT"RATIO="D/E
```

```
10 INPUT X: DEF FNA(X)=X*.01: PRINT FNA(X)
```

```
10 PRINT"TYPE A NUMBER": INPUT X$: X=VAL(X$): PRINT X
```

```
10 FOR T=1 TO 20: PRINT INT(20*RND(1))+1: NEXT
```

But why do we say computer math is easy?

BASIC contains a whole set of built-in math functions you can use to solve all sorts of problems, from simple addition to trigonometry. That's what makes computer math so easy. In this lesson, we'll skip the "trig" and focus on the most common BASIC math functions.

Our examples are designed for *non-math* people and you should enjoy them even if you're not a math whiz. All of our programs work with the VIC-20, Commodore 64, Commodore 16, and Plus/4.

### Using PRINT To Display Numbers

The first thing you should know is that most calculations work with the PRINT command. Type this line and press the RETURN key:

```
PRINT 1985
```

message and cannot be used as a value in calculations.

Type these two lines and press RETURN after each line to see the difference (the first use is a *calculation*, the second use is a *message*):

```
PRINT 2+2
```

```
PRINT"2+2"
```

If you want to combine a number value or calculation with a word message, the number value or calculation has to go outside quotation marks and the message goes inside quotation marks, like this:

```
PRINT"THIS IS THE YEAR"1985"!"
```

In this example, the entire message goes on the same PRINT line. The *message* begins *inside* quotes, then we put the *number outside* quotes, then we go back *inside* quotes at the end to display the exclamation mark (!). Notice that the computer lets us go in and out of quotes on the same PRINT line.

# To teach your child to spell, we had to design software that talks.

## **Cave of the Word Wizard.™** A unique way to develop spelling skills using human speech and arcade action.

Software that tries to teach spelling by jumbled letters isn't a very good teacher. The software has to talk. Now it does. Only on *Cave of the Word Wizard* from Timeworks.

The Wizard talks like a human being, not like a robot. This fascinating character thrusts you into an intriguing adventure as he teaches spelling in the most effective way possible on a computer.

You have wandered into a mysterious cave, and the entrance has been sealed behind you. Suddenly the Word Wizard appears and informs you that in order to leave his cave you must find four magic crystals which have the power needed to open the cave entrance. You have only a flashlight to help you find your way through the cave, and your batteries are running low.

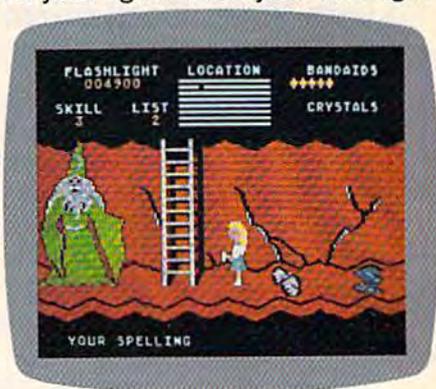
The Wizard is a funny old fellow who causes lots of mischief for anyone who enters his cave. He will appear often and ask you to spell a word—you will actually hear the old Wizard's voice!—and you cannot continue your search until you spell the word correctly.

The Wizard will use his magic powers to replenish the energy in your flashlight if you spell the

word correctly, but each time you are wrong he will draw energy from your light. When your flashlight runs out of energy you will be doomed to roam through the cave in darkness forever.

During your search you will be confronted

with spiders, rocks, snakes, and other dangerous obstacles that will make your quest for freedom even more challenging.



This state-of-the-art educational program includes 500 spoken words in 10 spelling skill levels and

makes full use of the sound capabilities of your computer. The

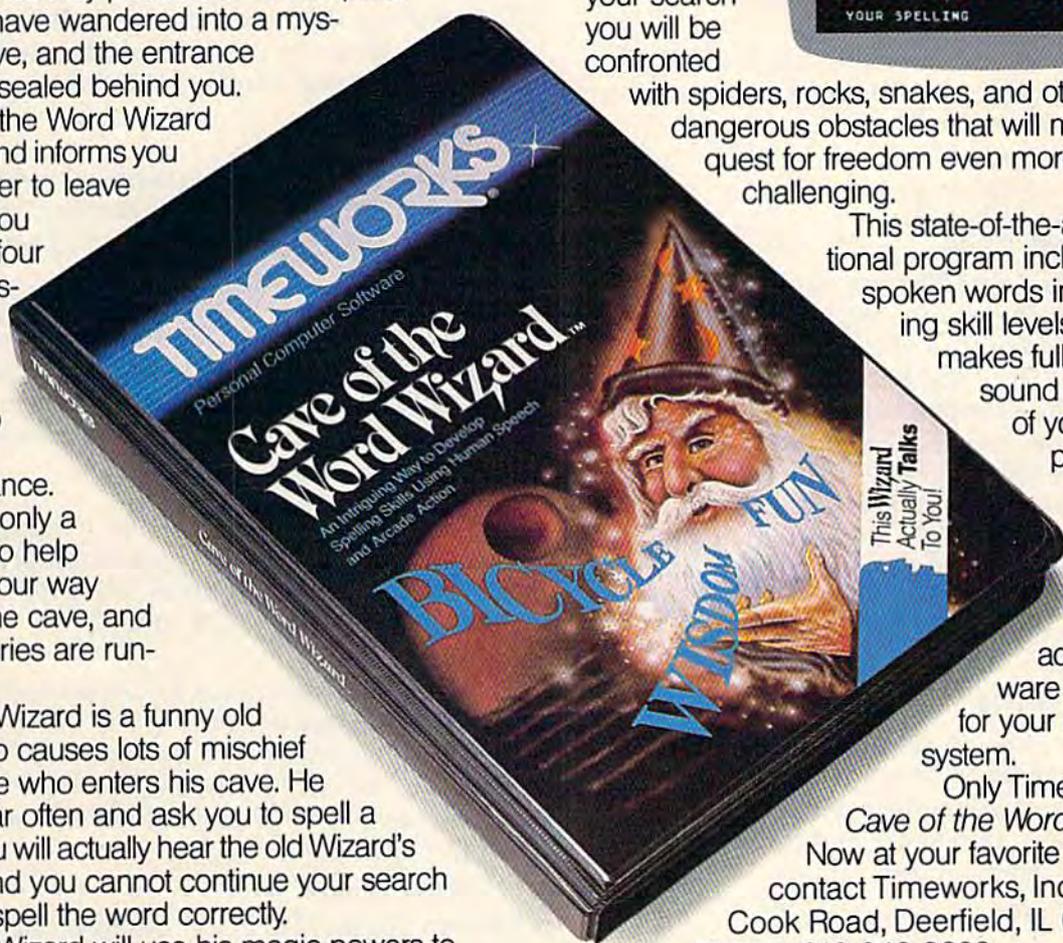
Wizard will talk to you in clear human speech. No additional hardware is needed for your computer system.

Only Timeworks offers *Cave of the Word Wizard*.

Now at your favorite dealer. Or contact Timeworks, Inc., 405 Lake Cook Road, Deerfield, IL 60015.

Phone: 312-948-9200.

**Available for Commodore 64\***



©1984 Timeworks, Inc. All rights reserved. Software Speech by Electronic Speech Systems  
©1984. \* Registered trademark of Commodore Computer Systems

### Timeworks Programs:

- Evelyn Wood Dynamic Reader
- Dungeons of Algebra
- Dragons
- Spellbound
- Computer Education Kits
- Robbers of the Lost Tomb
- Wall Street
- Star Battle
- Presidential Campaign
- Money Manager
- Electronic Checkbook
- Data Manager
- Word Writer

[www.commodore.ca](http://www.commodore.ca)

---

**REM:** You can PRINT numbers, calculations, and answers to math problems directly on your printer instead of the screen. For example, if you wanted to PRINT your number with your printer, you would type:

OPEN 4,4: CMD 4: PRINT 1984: CLOSE 4

---

## Using Your Computer As A Simple Calculator

Let's try some calculations. Computer math is the same as the math you learn in school or use at home or in business—with a few small differences that we'll point out as we go along.

To use your computer in *direct* (or *immediate*) mode as a calculator, just type in the calculation you want to print and press RETURN. Presto—your computer automatically gives you the answer. Here's how it works:

To add several numbers, use the PRINT statement followed by the numbers you want to add, as in these examples:

```
PRINT 500+1484
PRINT 1+2+3+4+5
PRINT (1+2+3+4+5)
PRINT 5000+25700
```

The first example adds two numbers and prints the answer. The second example adds several numbers (as many as you want) and also prints the answer. The third example shows that enclosing the calculation in parentheses gives you the same answer. The fourth example is especially important because it shows you that *computers do not use commas in numbers*. In ordinary math, you might type 5,000 or 25,700, but in computer math, you leave out the commas and type 5000 or 25700 without any commas.

Subtraction works just like addition. Here's an example:

```
PRINT 1984-10
```

If the number being subtracted is larger than the number you're subtracting it from, the answer will be a negative number. For example, if the temperature is 15 degrees and it falls 20 degrees, what is the temperature?

```
PRINT 15-20
```

The answer is minus five degrees (-5). So you see, you can have both negative and positive numbers (just like in regular math).

Multiplying numbers on your computer is a little different from multiplying by hand or with a pocket calculator because computers use the asterisk (\*) instead of the times sign (X) to multiply numbers. This eliminates confusion between the multiplication sign, the letter X and the X-

shaped graphics symbol. Here's an example:

```
PRINT 5*3
```

Let's try a real-life example. What if we wanted to buy a house for \$80,000 and the interest rate on the mortgage was 12 percent? How much interest would you pay? The answer is 12 percent times \$80,000. To show that on your computer, you'd type the following line:

```
PRINT .12*80000
```

Twelve one-hundredths (.12) is the same as 12 percent so .12 times 80,000 gives us our answer, which is \$9,600. Notice we write 80,000 as 80000 and the answer appears as 9600 because the computer doesn't use commas.

Computers use the slash (/) sign instead of the division sign (÷) to divide numbers. The number to the left of the slash is always divided by the number to the right, like this:

```
PRINT 15/3
```

The number 15 divided by 3 is 5. If you divide a smaller number by a larger number, the result will be a decimal number, like this:

```
PRINT 3/15
```

The answer to this calculation is .2, which is the same as 2/10, 20/100 or 20 percent. You can check the answer by multiplying 15 by .2 (the answer should be 3).

The answers to problems involving fractions are always given in decimal form by your computer. For example, the answer to 1 times 1/3 is 1/3, but the computer gives the answer in decimal form as .33333333. Try this example:

```
PRINT 2/3*3/2
```

This example demonstrates that if you multiply a fraction times its *inverse* (opposite) fraction—for example, multiply 2/3 times 3/2—the answer is 1. Try a few others (10/1 times 1/10, 14/7 times 7/14).

Sometimes you have to use parentheses to tell the computer which order to calculate the numbers. For example, if you want to divide two-thirds by two-thirds, the answer should be 1 because any number divided by itself equals 1. Try this example:

```
PRINT 2/3/2/3
```

The answer is .11111111 because this calculation doesn't say divide 2/3 by 2/3. It says divide 2 by 3, then divide the answer by 2, then divide that answer by 3—and the result is .11111111. Try it this way:

```
PRINT (2/3)/(2/3)
```

Now the answer is 1 because we used parentheses to tell the computer that we want it to take the number 2/3 and divide it by (/), the

# COMPUTE!'s GAZETTE DISK!



Get more out of your Commodore computer.

Start your subscription to *COMPUTE!'s Gazette Disk*. Each month you can receive a fully tested 5 1/4" floppy disk to run on either your Commodore 64 or VIC-20 personal computer. Each issue of *COMPUTE!'s Gazette Disk* will contain all the programs appearing in the corresponding issue of *COMPUTE!'s Gazette* magazine. So, now you can have all the quality programs found in each month's *COMPUTE!'s Gazette* ready-to-load on a disk. Send in the attached coupon and subscribe today!

Call toll-free **1-800-334-0868**  
or send your prepaid coupon to:  
**COMPUTE!'s Gazette Disk**  
P.O. Box 5406  
Greensboro, NC 27403

Subscription Form

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

COUNTRY \_\_\_\_\_

☐ 1 Year Subscription \$29.95  
☐ 2 Year Subscription \$52.95  
Individual Disk available

☐ Payment enclosed  
☐ Bill Me  
☐ Payment by check or money order payable to U.S. Commodore, Inc.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

COUNTRY \_\_\_\_\_

☐ 1 Year Subscription \$29.95  
☐ 2 Year Subscription \$52.95  
Individual Disk available

☐ Payment enclosed  
☐ Bill Me  
☐ Payment by check or money order payable to U.S. Commodore, Inc.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

COUNTRY \_\_\_\_\_

☐ 1 Year Subscription \$29.95  
☐ 2 Year Subscription \$52.95  
Individual Disk available

☐ Payment enclosed  
☐ Bill Me  
☐ Payment by check or money order payable to U.S. Commodore, Inc.

number 2/3. If you're ever in doubt as to whether the computer knows which order to calculate, use parentheses to separate the parts of the formula.

## The Order Of Calculation

If you have a long calculation involving many different math operations, your computer will always calculate in this order: *exponents first, multiplication and division second, addition and subtraction last*. If there are several math operations in the same category, it will calculate them from *left to right*.

As we've already said, you can make your computer calculate individual operations separately by enclosing them in parentheses. Try these examples (which all give the same answer):

```
PRINT (2↑2)/10+14
PRINT ((2↑2)/10)+14
PRINT (((2↑2)/10)+14)
```

First, the computer performs the exponent operation by taking 2 to the second power— $2^2$ ; second, the computer divides the answer by 10; and last it adds 14.

---

**REM:** Any calculation must contain the same number of left and right parentheses. If you don't "balance" the number of parentheses, you'll get an error when you try to perform the calculation.

---

You can change the result of a calculation line by putting parentheses around different parts of the calculation. Try this:

```
PRINT 2↑2/(10+14)
```

Now the computer first takes the exponent of 2 to the power of 2 (which is 4); second, it adds  $10+14$  (24); and last, it divides 4 by 24.

## Calculating With Numeric Variables

If you read our January column, you know we made a New Year's resolution to show you how variables work—so we're putting some special emphasis on numeric variables in our examples (see the reference chart at the beginning of this column).

If I tell the computer the variable A now equals the number 5, the computer now treats the letter A as if it were a 5—as in this example, which defines A as 5 and then prints the value of A:

```
A=5: PRINT A
```

A numeric variable can be a letter like A, two letters (like AB), or a letter and a number (like A2). Numeric variables are used to stand for numbers

and can be used in many creative ways.

Using a variable to stand for a number lets you use that number over and over again in various calculations.

If we define the variable A as the number 5, the computer will display the number 5 (the value of the variable) when we print A. You can also include variables in calculations and formulas, like this:

```
A=5: PRINT A: PRINT A+1: PRINT A+2
```

In this example, we define the variable A as 5, then we print A, which is the same as saying print 5. Next, we add 1 to the value of A and print the result, which is 6, then we add 2 to the value of A and print the result, which is 8.

## Some Practical Examples

Let's try some simple math problems. For example, how could we figure out what price we can pay for a new home? One way is to see how much the interest payments would be if we took out a mortgage. Our bank will give us a mortgage at 12 percent interest, so let's calculate how much interest we have to pay for houses costing between \$50,000 and \$120,000—in \$10,000 increments. This may sound a little complicated, but we can do the whole calculation in two program lines, like this:

```
10 FOR X=50000 TO 120000 STEP 10000
20 PRINT"INTEREST="X*.12"ON HOUSE
   COSTING"X: NEXT
```

Type RUN and press RETURN. Impressed? Computers can make math calculations very powerful, and fast, too. The first part of the FOR-NEXT loop tells the computer we're going to define X as a range of numbers from 50,000 to 120,000. STEP 10000 tells the computer to "step" through the range at intervals of 10,000 at a time. Line 20 displays the INTEREST= part of the message. Then we go outside quotation marks to multiply our first house price (\$50,000) times our interest rate (.12), which prints the answer. Then we print the rest of our message "ON HOUSE COSTING" and the X which at this point is 50000. The NEXT command tells the computer to go back and do it all over again—except this time X will be 60,000—then 70,000 and so on up to 120,000 where the program automatically stops because 120,000 is the top of the range defined by the TO part of the loop. You might note that we're using a 12% annual interest rate; if you were really planning to buy a house, you'd have to factor in periodic payments and the effects of compounding the interest.

Here's another practical example:

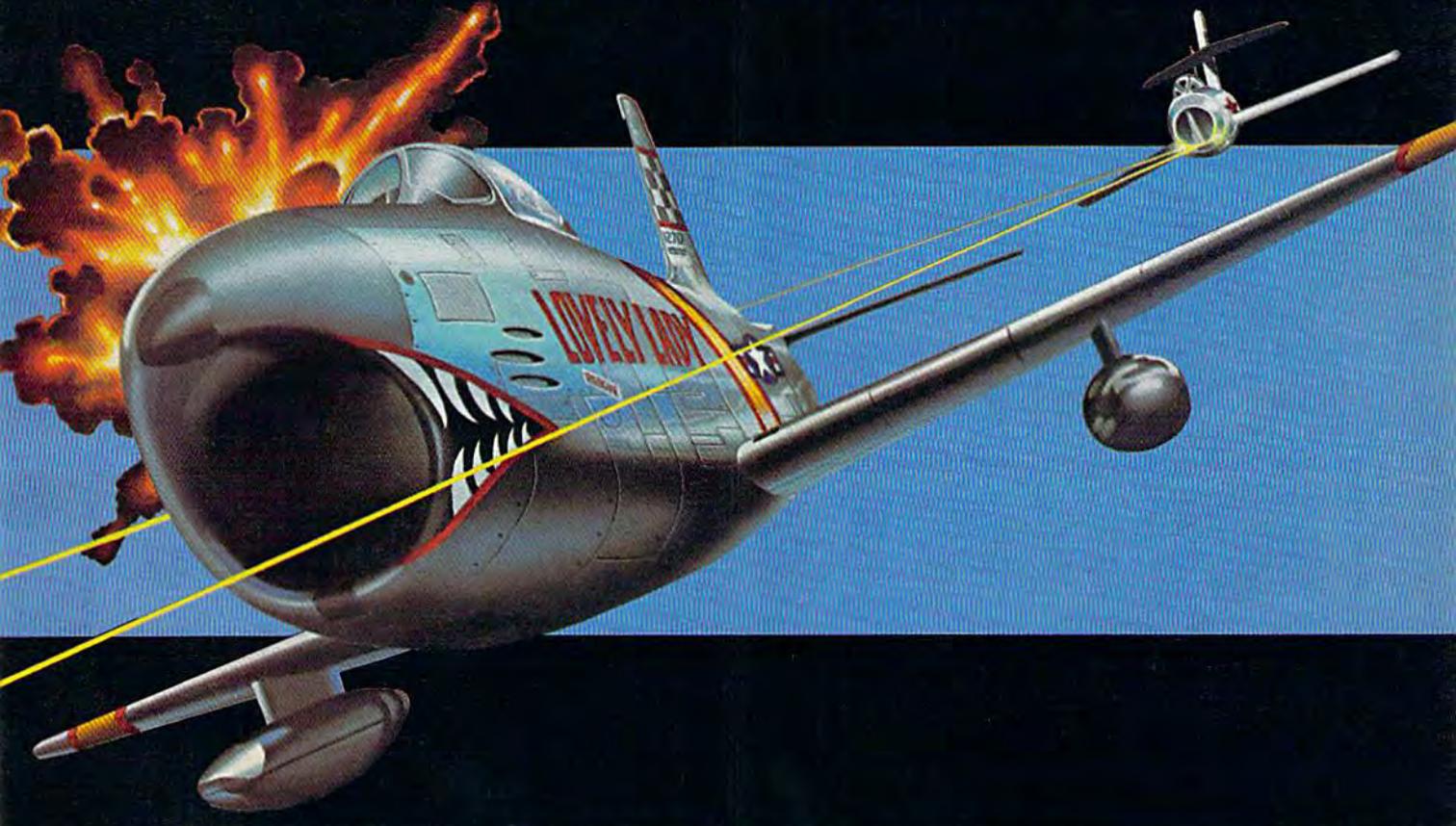
```
10 PRINT"ENTER A SAVINGS AMOUNT": INPUT S1
20 PRINT"ENTER AN INTEREST RATE": INPUT R1
30 PRINT"FIRST YEAR INTEREST IS:" S1*R1
```

# ONE-ON-ONE

JUST RELEASED!

## EXPERIENCE THE THRILL OF REALISTIC 3-D HEAD-TO-HEAD AERIAL COMBAT!

# MIG ALLEY ACE



The reviewers say that Mig Alley Ace is Great!! A real breakthrough in interactive simulations that is a "must" for all serious computer users — and it is now available for the Commodore-64, too!!

Mig Alley Ace excites, stimulates and challenges your fighter pilot instincts. It is the first simulator that allows you to challenge a friend to one-on-one combat and SHOOT HIM DOWN! Battle another human pilot, or computer controlled enemies, or, if you prefer, team up, and go after the enemy together as Flight Leader and Wingman!! Roll inverted, Split-S, Loop, Immelman or any maneuver you can, but don't let the enemy get a good shot on you! Outstanding action, superb 3-D graphics, and the deadly realism of 5 actual Korean War air battles make Mig Alley Ace a perfect addition to your software library!!

Mig Alley Ace is available in disk or cassette formats for both Commodore-64 and Atari Computers for a suggested retail price of only \$34.95. Our software is distributed nationally and available at your local retailer. Call or write for MC/VISA, Money Order, or C.O.D. orders. Add \$2.50 for postage and handling (Int'l add \$4.00 USA), MD residents add 5% sales tax.



Commodore-64 Screen Picture

### "GREAT REVIEWS"

"★★★★" — Excellent Family Computing

"MicroProse Software... did it all with MIG ALLEY ACE... the GRAPHICS ARE AMAZING!!!" *Info World* — Scott Mace

"Best Multi-Player Game of the Year"  Nominated, *Electronic Games*

"MIG ALLEY ACE is a must for any... game fanatic" Lee Papas, Editor — *Analog*

Experience the reality of these other great simulations from MicroProse:



Challenging and Exciting Air Combat from the Modern Electronic Cockpit!!

Heart Pounding, Accelerated Real-Time Double Turn-Of-War Soviet Invasion!!

Sensational Assault Operations for Daring Pilots!!

**MicroProse Software** 10616 Beaver Dam Road, Hunt Valley, MD 21030  
The Action is Simulated — the Excitement is REAL!! (301) 667-1151

[www.comprose.ca](http://www.comprose.ca)

40 PRINT TOTAL AFTER FIRST YEAR INCLUDING INTEREST IS:  $S1 + (S1 * R1)$

Line 10 prints the opening prompt message, followed by an INPUT statement which defines the number typed in as variable S1.

Line 20 prints another prompt message with an INPUT whose variable is defined as R1.

Line 30 prints a message followed by the first year's interest earned—the result of multiplying the variable S1 (savings amount) times R1 (interest-rate).

Line 40 prints another message followed by a calculation which shows the total savings plus interest earned (the total amount you have after adding the interest you earned). This time the result is obtained by adding the savings amount to the interest earned (note the result of the calculation is automatically printed because it's still part of the PRINT statement).

The examples we've seen here have hundreds of variations. They're just a beginning. You can perform all sorts of calculations for use in school, at home, or in business. Try it. You'll find it's easier than you thought.

Next month we'll continue with our discussion of computer math and include some advanced computer math techniques for beginners.

## SUPER FORTH 64+ \*

**TOTAL CONTROL OVER YOUR COMMODORE-64™  
USING ONLY WORDS**  
**MAKING PROGRAMMING FAST, FUN AND EASY!**  
MORE THAN JUST A LANGUAGE...

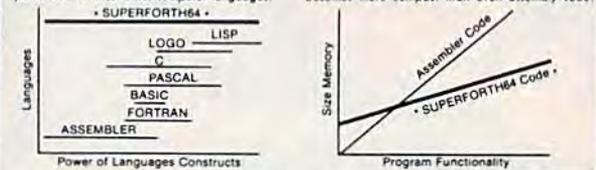
A complete, fully-integrated program development system.  
Home Use, Fast Games, Graphics, Data Acquisition, Business, Music  
Real Time Process Control, Communications, Robotics, Scientific, Artificial Intelligence

**A Powerful Superset of MYPFORTH/FORTH 79 + Ext. for the beginner or professional**

- 20 to 600 x faster than Basic
- 1/4 x the programming time
- Easy full control of all sound, hi res, graphics, color, sprite, plotting line & circle
- Controllable SPLIT-SCREEN Display
- Includes interactive interpreter & compiler
- Forth virtual memory
- Full cursor Screen Editor
- Provision for application program distribution without licensing
- FORTH equivalent Kernel Routines
- Conditional Macro Assembler
- Meets all Forth 79 standards\*
- Source screens provided
- Compatible with the book "Starting Forth" by Leo Brodie
- Access to all I/O ports RS232, IEEE, including memory & interrupts
- ROMABLE code generator
- MUSIC-EDITOR
- TURTLE GRAPHICS
- SPRITE-EDITOR
- Access all C-64 peripherals including 4040 drive and EPROM Programmer.
- Single disk drive backup utility
- Disk & Cassette based Disk included
- Full disk usage — 680 Sectors
- Supports all Commodore file types and Forth Virtual disk
- Access to 20K RAM underneath ROM areas
- Vectored kernel words
- TRACE facility
- DECOMPILER facility
- Full String Handling
- ASCII error messages
- FLOATING POINT MATH SIN/COS & SQRT
- Conventional user defined Commands
- Tutorial examples provided, in extensive 261 page cross referenced manual
- INTERRUPT routines provide easy control of hardware timers, alarms and devices
- USER Support

**SUPER FORTH 64™** is more powerful than most other computer languages!

**SUPER FORTH 64™** compiled code becomes more compact than even assembly code!



A SUPERIOR PRODUCT in every way! At a low price of only

Call: (415) 651-3160

\$96

PARSEC RESEARCH

Drawer 1776, Fremont, CA 94538

© PARSEC RESEARCH Inc. 1984

Commodore 64 & VIC-20 TM of Commodore

Take this ad to your local dealer. Phone orders also accepted. Immediate delivery! Dealer inquiries invited. CA residents must include tax.

# RABBIT

For the 64 or VIC

\$39.95

Alternative to the 1541 Disk Drive!

Load or save 8K in 30 seconds! It's less expensive than disk and can even be used as a backup to the flaky 1541!

Yes, the RABBIT is that and much more. Uses the Commodore cassette deck but loads and saves much, much faster than regular Commodore load/save. Think about it — loads or saves an 8K program in almost 30 seconds, 16K in 1 minute, etc. That's nearly as fast as the 1541 disk. RABBIT is on cartridge so it's always there. Also has other useful commands. Specify for use on the 64, or on the VIC 20 —

"It was the best purchase for my computer that I have ever made!"

"Congratulations on your 64 Rabbit. It's a super piece of work."

## MAE NOW THE BEST FOR LESS!

Please for your own protection consider the MAE first before you buy that other assembler. We've had numerous customers who wasted their money on some cheaper off brand assembler tell us how much better the MAE is. The most powerful Macro Assembler/Editor available for the Commodore 64 and other CBM/PET computers, and also for the ATARI 800/XL and Apple II/III.

MAE includes an Assembler, Editor, Word Processor, Relocating Loader, and more all for just \$59.95.

We could go on and describe the MAE but we thought you would like to read our customers' comments. The following are actual unedited comments from correspondence about the MAE:

"Excellent Development Package"

"I like MAE and wish that you had it on the Macintosh."

"Compares to DEC and INTEL."

"It is a superb program."

## AutoLoad/Directory

Cartridge for the 64.

This cartridge has 2 push-button switches on it that allow you to: 1) Load and then automatically run the first program on disk, and 2) Display the disk directory — either at the touch of a button! It may not sound like much but it is absolutely one of the most convenient accessories you can install on your 64. Housed in an attractive plastic cartridge complete with easy to install instructions, works with every software package (including menus and commercial software) we have tried and it doesn't take away any memory. Think about it the next time you type: **LOAD "\*" ,8,1 RUN** or **LOAD "\*" ,8 LIST**. Remember, it's only \$19.95.

## TelStar 64™

by Eastern House

A Communications Cartridge for the Commodore 64.

Upload/Download, Status Line, etc. Works with your Commodore 1600 or 1650 Modem. Auto-dialing, etc. when used with the new CBM 1650 Modem.

Cartridge and Manual — \$49.95

# Eastern House

3239 Linda Dr.  
Winston-Salem, N.C. 27106  
(919) 748-8446  
Send for free catalog!

VISA®

MasterCard

# The Forbidden Crypt

Ted Reynolds



You're a leading archaeologist who's happened on a fabulous treasure. But spiders, bats, snakes, and ghouls guard the riches. How long can you survive in the forbidden crypt? An action game for the VIC, 64, Plus/4, and 16. A joystick is required.

A local legend, long dismissed as mere myth, speaks of a great and powerful king who once ruled this area. While investigating the origins of this tale, you've discovered a cenotaph covered with unusual glyphs. They're difficult to translate, but seem to say something about the king and guardians and forbidden treasure. Undaunted, you open the door and enter. The door slams shut, leaving you stranded in the crypt.

Survival in "The Forbidden Crypt" is not easy. Each level contains four rooms into which you must enter and retrieve a treasure. That's easy enough, but avoiding the spiders, bats, snakes, and ghouls—guardians of the treasure—is not. And the only way to get to the next level is to claim the treasure from all four rooms.

## Thrown Into Action

Game play begins with an overview of the four rooms, each with two doors, one on the left and one on the right. Below the playing screen is Score, Level, and Lives. You're represented by the red dot on the screen, and you can begin in any room at any door. Using a joystick (port 2 on the 64, port 1 on the Plus/4 and 16), move into a room (hint: You'll have more success if you enter from the door on the right), and you're immediately thrown into the action. The screen changes to a full view of the room you've entered.

The treasure is often difficult to get to as the guardians, four per room, pursue you. Their touch is deadly. You can defend yourself by aiming the joystick at a guardian and pressing the fire button. A hit eliminates a guardian. In the 64 version, you have only three shots per room and the guardians move faster towards you after one of their companions has been eliminated.

After grabbing the treasure and avoiding the guardians, head for the exit. You must leave the door opposite the one you came in (either door in the VIC version). If you make it, you'll be back to the four-room overview, and the room you've just left will contain a mark to indicate that you've completed it. Sometimes, you'll be doing well just to escape the room, even without the treasure. In this case, you'll have to return to the room and try again. Remember, you can't get to the next level until you've found a treasure in each of the four rooms.

## Extra Lives

In the VIC version, you begin with ten lives, and you cannot earn bonus lives. In the other versions, you begin with five lives, but get an extra one for every four levels completed. Also, in the 64, Plus/4, and 16 versions, the guardians speed up after an extra life is awarded, so the game becomes increasingly difficult.

The Forbidden Crypt is not an easy game beyond the first few rounds. Success will come with some practice and devising a good strategy.

## Special Instructions For The VIC Version

The VIC version requires at least 8K expansion memory (16K or 24K will also work). There are three programs in all. Program 1 changes some

NEW FOR  
COMMODORE 64  
PLUS/4 AND SX-64

# TURBOPRINT/GT

HIGH PERFORMANCE PRINTER INTERFACE  
WITH OPTIONAL 16K or 32K TURBOBUFFER



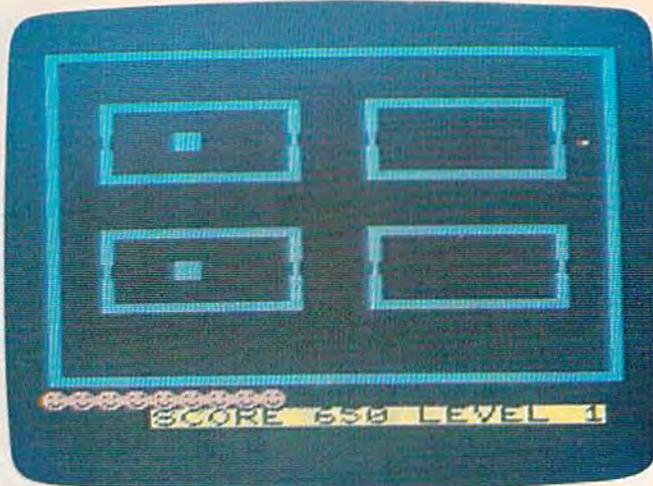
THERE IS NO  
COMPETITION

PRINTS ENHANCED COMMODORE GRAPHICS •  
GRAPHIC DUMP ROUTINES INCLUDED •  
OPTIONAL 16/32K PRINTER BUFFER • PRINTS  
4 TYPE FACES • EXTERNAL DIP SWITCH •  
SELECTION • TESTED BY MANUFACTURERS OF  
MOST POPULAR "CENTRONICS" TYPE PRINTERS  
AND TYPEWRITERS.

DEALER INQUIRIES INVITED

**Telesys**  
415-651-2970

43334 BRYANT ST., FREMONT CA 94539 TELEX 4992029



The player has completed two rooms and is about to enter the one at the upper right (VIC version).

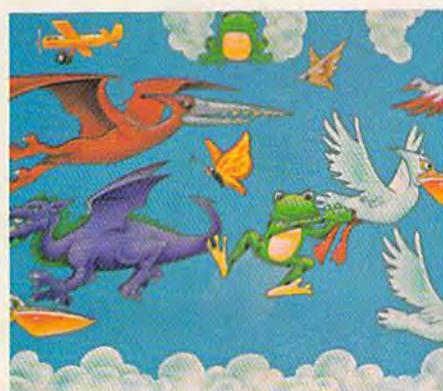
memory pointers to protect the memory used for redefined characters. In line 130 of Program 1, the line under the O means you should hold down the SHIFT key when you type the O (L SHIFT-O is the abbreviation for LOAD). Tape users should change the 8 in that line to a 1, as noted in the REMark in line 140. After typing Program 1, save it to tape or disk (do not run it yet). Then type in Program 2 and save it with the name "A" (so it will load properly). Tape users must change line 150 as noted in line 160. Type NEW, and enter the main program (Program 3), which must be saved with a filename of "B". Load and run the first program, which loads Program 2 (A). Program 2 redefines the characters and loads Program 3.

See program listings on page 132.



Four approaching ghouls stand between the player and the treasure (64 version).

# SO YOU THINK YOU GOT THE BEST OF FROGGER AND ZAXXON? SORRY.



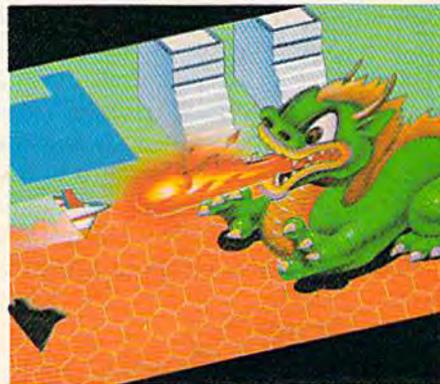
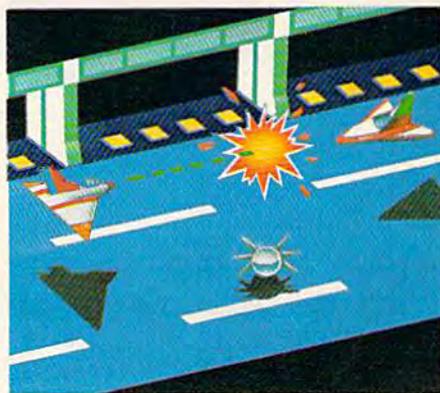
See, while you've been mastering them, we've been advancing them. Making them even more fun than before. So now we have two new mindblasters.

**Frogger II ThreeeDeep**, a three-screen nightmare. Starting with an undersea battle against deadly creatures and the cruel undercurrent. If you do make it to the surface, it just gets worse. The only hope is to leap into the sky where even more frog-eating monsters lurk.

And **Super Zaxxon**, taking you beyond the outer limits in your space fighter. Tunneling through enemy attack, firing at Zaxxon's forces, dodging mine layers.

And beyond the last electron barrier, the ultimate test. Zaxxon is now a killer dragon hurtling heat-seeking fireballs.

Hope we haven't scared you. But if Sega doesn't keep you ahead of the game, who will?

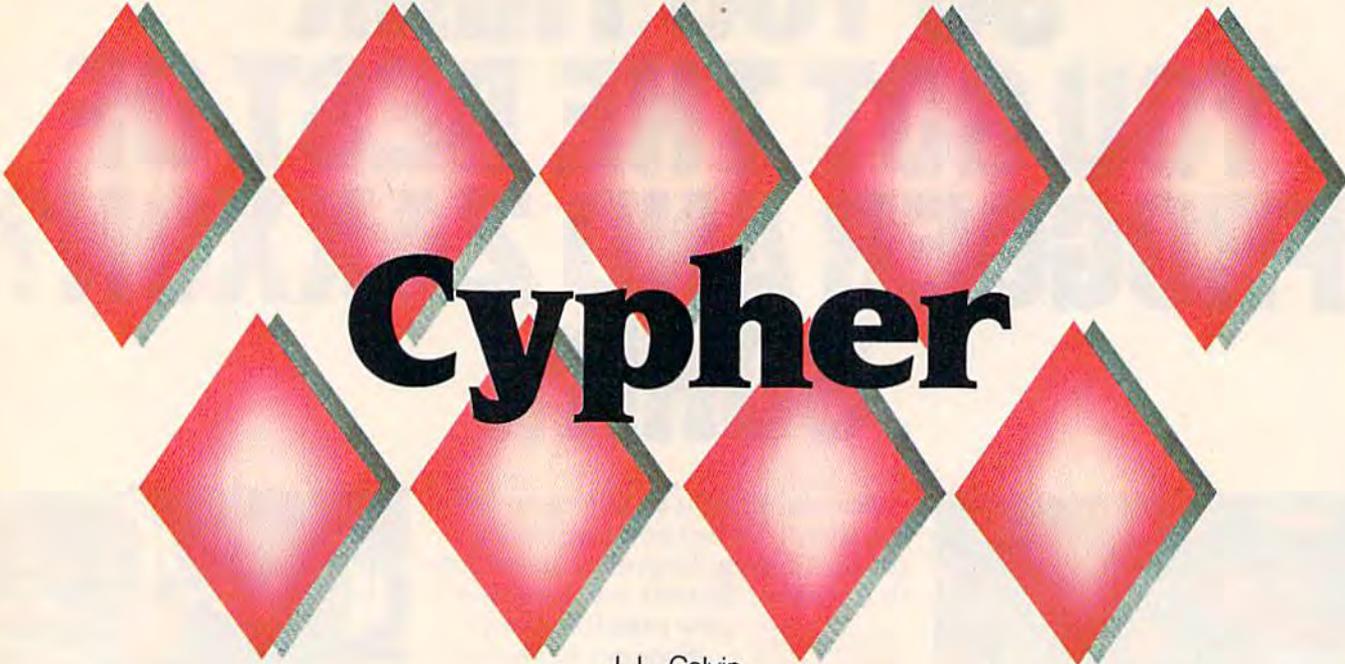


Atari 2600	Atari 5200	Atari Computers Cartridge	Atari Computers Diskette	Commodore 64 Cartridge	Commodore 64 Diskette	ColecoVision & ADAM	Apple II's	IBM PC	Sega Enterprises, Inc.	Parker Brothers	HesWare
NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW			
		NEW	NEW	NEW	NEW	NEW	NEW	NEW			FROGGER II
											SUPER ZAXXON

©1985 Sega Enterprises, Inc. FROGGER is a trademark of Sega Enterprises, Inc. THREEEDEEP is a trademark of Parker Brothers. ZAXXON is a trademark of Sega Enterprises, Inc. Game screens are illustrated.

## INTRODUCING FROGGER II THREEEDEEP AND SUPER ZAXXON.

[www.commodore.ca](http://www.commodore.ca)



# Cypher

J. L. Calvin

**Logic and a little luck will help you unlock the secret code in this game of deductive reasoning. Originally written for the 64, we've added a version for the VIC.**

This game of logic is based on the popular game *Master Mind*. After entering and saving the program, type RUN, and you'll be given the option of receiving instructions. When the game begins, six red diamonds appear in the top left-hand corner of the screen. Beneath these diamonds is a six-element color code. The object of the game is to figure out and duplicate this code in the least number of turns.

Enter your guess by using the color keys located at the top left of the keyboard. As each key is pressed, the color you've chosen appears on the screen, accompanied by a musical tone (the sequence of the eight colors plays a scale). After six keys have been pressed, the computer compares your guesses with the code hidden beneath the diamonds. Your score is then displayed to the right of your guess. The secret code can duplicate colors. For example, the code may contain two blues or three purples.

## Scoring

There are three symbols used in scoring each round. (These are also explained in the screen instructions.)

A plus sign (+) indicates that one of the

guessed colors is correct and in the right location (but this doesn't necessarily correspond to the location of the scoring marker).

A zero (0) means that one of the colors is correct, but its location is wrong.

An at sign (@) indicates that a color is not in the secret code.

For example, suppose a score reads ++00@@. This means that two of your guesses are the correct color and in the correct location, two of your guesses are the correct color but in the wrong location, and the other two guesses do not exist in the secret code. *Be sure to understand that the scoring marker locations do not correspond to the guess locations.*

You have 12 turns to determine the correct color combination. As you proceed, carefully study the scores of previous moves to logically deduce the secret code.

If you accidentally press the wrong key while entering a guess, you can use the DELETE key. This erases all previous guesses in the current move. You can also press the 9 key to instantly see the secret code and end (and lose) the game.

A score of nine or ten is very good, six, seven, or eight is exceptional, and five or less is just plain lucky.

If you're using a black-and-white TV or monochrome monitor, you'll need to make a few modifications so you can easily distinguish between colors. If you're using a 64, make the following changes in Program 1:

# YOUR COMMODORE 64™ CAN NOW USE STANDARD APPLE™ II+ HARDWARE AND SOFTWARE



## WITH THIS

At Mimic we believe that you and your computer should dictate the choices of hardware and software you can use.

The Spartan™ was developed to allow you to choose the hardware and software that best suits your needs.

Our goal in designing the Spartan™ was simple. To take what you already have and give you more.

Mimic Systems is proud to give you the Spartan™  
The Apple™ II+ emulator for the Commodore 64™

Spartan™ Suggested Retail Prices:

The Spartan™ (includes BUSS, CPU, and DOS cards) \$599.00

BUSS card \$299.00

CPU card (requires BUSS card) \$199.00

DOS card (requires BUSS and CPU card) \$199.00

(All prices in U.S. Funds. Freight not included.)

American Express, Visa and MasterCard accepted.

Commodore 64 and Commodore logo are trademarks of Commodore Electronics Ltd. and/or Commodore Business Machines, Inc. Apple II+ is a trademark of Apple Computer, Inc. Spartan™ is a trademark of Mimic Systems Inc. and has no association with Commodore Electronics or Apple Computer, Inc. The Spartan is manufactured by Mimic Systems Inc. under license granted by ATG Electronics Inc. of Victoria, B.C., Canada.



## MIMIC

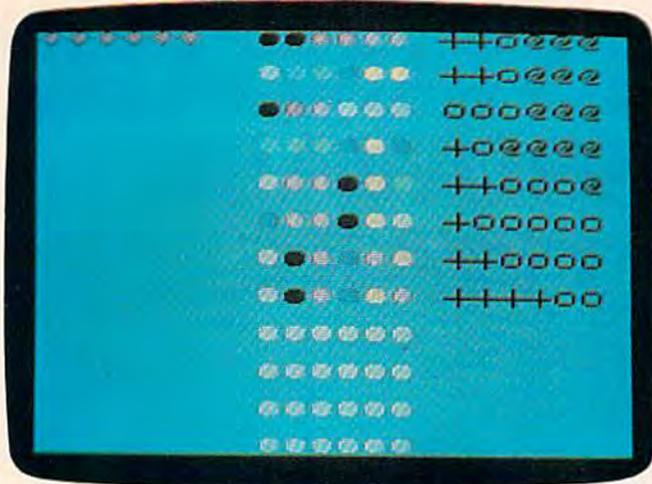
FOR INFORMATION WRITE:

MIMIC SYSTEMS INC.  
1112 FORT ST., FL. 6J  
VICTORIA, B. C.  
CANADA V8V 4V2

To Order Call:

**1-800-MODULAR**  
(663-8527)

[www.commodore.ca](http://www.commodore.ca)



One step away from victory in the VIC version.

Winning requires a combination of logic and lucky guesses (64 version).

```

410 POKEGLOC,Z(I)+49          :rem 161
430 GLOC=GLOC+2              :rem 123
670 GLOC=GLOC+68             :rem 189
810 POKEANS,A(T)+49          :rem 84
820 POKECANS,Ø              :rem 74
1Ø2Ø FORDE=I*2TO1STEP-1:POKEGLOC-DE,32:GO
      SUB151Ø:NEXTDE         :rem 219
1Ø4Ø GLOC=GLOC-(I*2)        :rem 111
  
```

```

410 POKEGLOC,ZØ(I)+49:GOSUB133Ø:GLOC=GLOC
+1:NEXT:FORI=ØTO7          :rem 142
670 GLOC=GLOC+38           :rem 186
810 POKEANS,AØ(T)+49      :rem 121
820 POKECANS,Ø           :rem 74
1Ø2Ø FORDE=ITØ1STEP-1:POKEGLOC-DE,32:GOSU
      B151Ø:NEXTDE         :rem 127
1Ø4Ø GLOC=GLOC-(I*1)     :rem 11Ø
  
```

For the VIC, make these changes in Program 2:

See program listings on page 129.

**THE BANNER MACHINE™ for the Commodore 64**  
 Makes signs up to 10" tall by any length.  
 Borders are variable, up to 1/4" wide.  
 Eight sizes of letters are available from 1/4" to 2 1/2" high.  
 Proportional spacing, automatic centering, right and left justification.  
 Standard, emphasized and compressed modes of print.  
 Save and print banners from disk.  
 Format banner and review before printing.  
 Choice of 15 textured backgrounds.  
 Gothic font included — optional FONT DISKS available.

COMPRESSED ITALIC  
 I TOMBOLA HOLIDAY  
 DATA TO OPTIMA  
 BOBBERG ERMELØE  
 COMING SOON!

Works only with: Epson MX 80 (with Graphics), RA, FX, JX, LQ, Gemini 10, 1ØK, and 15, Commodore MPS 8Ø1, 1525E, Baran, Pafanatic, P10Ø, Serapha GPTØØA, Wileman II, Pul, 15.

THE BANNER MACHINE \$49.95 Available on Disk only  
 Single Font \$19.95  
 FONT DISKS (each) \$39.95

**1541 PHYSICAL EXAM** \$39.95  
 IS YOUR 1541 HEALTHY?  
 OR WOULD ITS PHYSICAL EXAM  
 LOOK LIKE THIS ONE?

ACCURATE MICRO ADJUSTMENT  
 USES SCREEN DISPLAY NO SPECIAL TEST EQUIPMENT  
 DIRECTION OF STEPPER MOTOR MOVEMENT

SCALE — THOUSANDTHS OF AN INCH FROM TRACK  
 OUTSIDE OF TRACK C INSIDE OF TRACK  
 8-7-6-5-4-3-2-1 0+1+2+3+4+5+6+7+8  
 16  
 95  
 STOP CHECK — GOOD SPEED — 300Ø RPM

CHECKS MECHANICAL STOP POSITION  
 SCREEN READ OUT OF RADIAL HEAD ALIGNMENT  
 CHECKS SPEED & CLAMPING OF DRIVE

Package includes:  
 • True digital alignment disk with offset tracks  
 • Quiet Drive stops to reduce need for continued realignment

# Easy Guitar

## Learn to play guitar on your Commodore 64

Lessons & theory for all guitarists and soon-to-be guitarists

\$29.95 on disk plus \$1.00 shipping & handling  
 (206) 883-9257  
 VISA and MC Accepted or send check or money order to:

10636 Main St., Suite 414, Bellevue, WA 98004  
 Dealer inquiries welcome

[www.commodore.ca](http://www.commodore.ca)

**ditto**  
 COPY DISKS AUTOMATICALLY \$39.95

- Copies 99% of currently available Commodore 64 disks.
- Supports 1 or 2 1541 drives.
- Easy to use—menu driven.
- Future updates \$17.

**FLEX FILE** \$59.95  
 DATA BASE  
 with Report Writer and Mail Labels

- Easy to learn (takes about 2 hours) • save up to 1500 typical records on a 1541 disk drive.
- Sort on multiple keys & select records 9 ways.
- Print information on labels or in report format.
- Calculate report columns.
- Flexible structure, change record size, field number, ways the file can be ordered, etc. with ease.
- Compatible with many popular word processors to create form letters or reports. 1541 • 4040 • 9Ø31 Disk \$59.95

ORDER TOLL FREE 1-800-NON-SAT  
**800-762-5645**  
 Cardinal Software  
 13644 Jeff Davis Hwy 92101  
 Woodbridge, VA  
 Info. Call (703) 491-6502

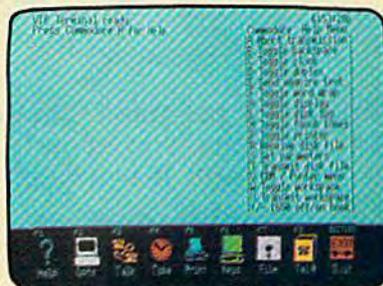
MasterCard VISA AMERICAN EXPRESS

# Unlimited Free Programs - Unlimited Fun! with **VIP Terminal**<sup>™</sup>

## A Powerful 80 Column Communication Program!

VIP Terminal is what you need to talk to the world! Communicate with friends, work, school, bulletin boards, even information services like CompuServe. Share programs, news, pictures, stock quotes - anything in writing. With your C64, any modem and VIP Terminal, you can master the information revolution — professionally!

VIP Terminal is power packed to get the job done! It features a professional 80 column display (40, 64 & 106 columns too!) to bring your C64 up to the industry standard - without any hardware modification! It works with all popular modems, and, with those that allow it, VIP Terminal will auto dial, and redial if the line is busy. It also will auto answer - even take messages! Of course you can send and receive programs and the like. And you can print what is coming on the screen. It has a 16-entry phone book for those often used numbers, and a 20-entry message file for frequently sent messages. It also has a powerful editor so that you can write messages to send later, or edit ones you have received. You can even save and use files as large as your disk!



## VIP Terminal Is Easy and Fun to Use!

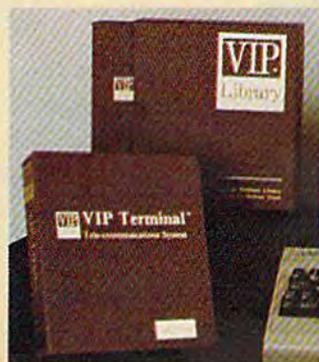
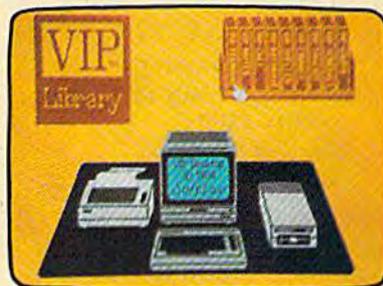
VIP Terminal makes full use of the potential of your C64 - you get color, graphics and sound. VIP Terminal uses menus and "icons," pictures of the tasks to be done. In fact, VIP Terminal can almost be totally controlled with a joystick. You can switch menus, change screen colors, change parameters, even dial your phone without ever touching your keyboard! Just move the hand to point to the colored icon, or the entry, press the fire button, and the change is made. Of course, it all can be done from the keyboard too!



Help is built right into the program so you can't get lost or confused. The manual is even capsulized on the disk for reference from the program when you need it. VIP Terminal also has a chiming clock for the quarter hour and the hour, and an alarm you can set. There's even a musical alarm to let you know when you have a call. VIP Terminal has put it all together to make the perfect communication program!

## Integration With VIP Desktop

VIP Terminal is connected to the whole VIP Library<sup>™</sup> of programs through VIP Desktop<sup>™</sup>. From VIP Desktop, you may access any of the other VIP Library programs that you own. The rest of VIP Library will meet your word processing, financial planning, data management and other essential home and business information management needs. All VIP Library programs feature high resolution graphics to give 80 columns on the screen without any hardware modification. They also give you icons and plenty of help. Quality and affordability are our number one concern!



## VIP Terminal ONLY \$59.95

Available at Dealers everywhere. If your Dealer is out of stock **ORDER DIRECT!**

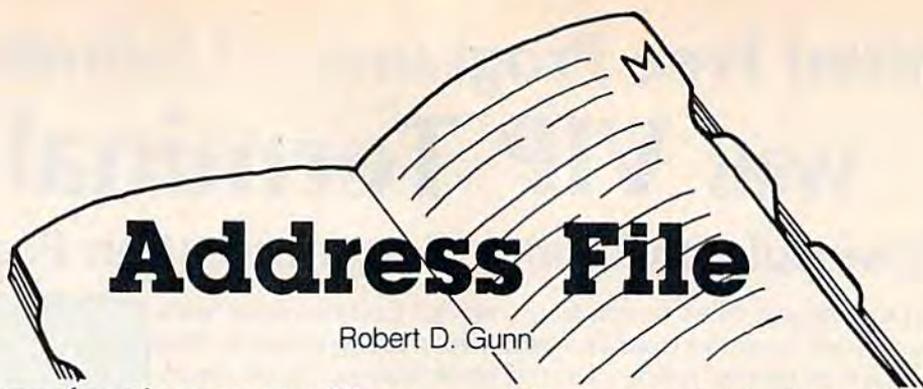
**1 - 8 0 0 - 3 2 8 - 2 7 3 7**

Order Status and Software Questions  
call (805) 968-4364

MAIL ORDERS: Shipping: \$3.00 U.S.; \$5.00 CANADA;  
\$15.00 OVERSEAS; Personal checks allow 3 weeks.

*SoftLaw*

132 Aero Camino  
Goleta, California 93117  
[www.commodore.ca](http://www.commodore.ca)



# Address File

Robert D. Gunn

**This short program functions as an address data base that's extremely easy to use and very efficient. It works on the VIC or 64 with disk or tape.**

If you collect slips of paper with addresses and phone numbers, or if you have an address book that gets more and more cluttered as you update addresses and scratch out old ones, it's time for a change. "Address File" provides instant access to names, addresses, and phone numbers. It offers some special features, such as an alphabetical sort and an instant find after you type in a person's last name.

Adding to or editing the file is simple. The entire program is operated from a menu, and responding to prompts is all that's needed.

It runs on a VIC (with or without expansion) or a 64, and automatically sets up the file on disk or tape. Just respond to the DISK OR CASSETTE? prompt when saving or retrieving a file.

## Simple Choices

After entering and saving the program, type RUN. The main menu appears:

1. RETRIEVE FILE
2. ADD/START FILE
3. EDIT FILE
4. DISPLAY FILE
5. SAVE AND END

To create the address file, choose option 2. A record number (#1 if you're starting a new file) appears at the top of the screen. You're then prompted for last name, first name, address, city/state (be sure to use the slash to separate the two), zip code, and telephone. The program gets information from INPUT statements, so avoid using commas in records. If you choose not to enter data in a field (for example, you don't have a phone number for a person), enter NONE. After entering each item, press RETURN. At the end of each record, you're then given a choice of Next (to continue entering data), Delete (to redo the record just entered), or End (to take you back to the menu).

When you're finished entering data, choose option 5 to save the file. Answer the DISK OR CASSETTE? prompt by pressing D or C, and the file is saved. Tape users should use a new cassette rewound to the beginning and keep this tape reserved only for this file. Disk users may wish to use a fresh disk reserved for this file only, especially if a growing file is anticipated.

After the file is created and saved, the next time the program is run, you'll want to select option 1 (be sure the right tape or disk is inserted). To continue adding to the file, choose option 2. A new record number will appear, continuing from the end of the existing file. (For example, if you made five entries, saved the file, then reloaded it, you'd see Record #6 when resuming.) If you wish to edit the file (for example, change an address or phone number), select option 3. You're then asked to enter a last name. All the current information for that individual is displayed and you're then given a choice:

1. LAST NAME
2. FIRST NAME
3. ADDRESS
4. CITY/STATE
5. ZIP CODE
6. TELEPHONE
7. DELETE ENTRY

Select any of the first six and the current information for that field is displayed along with a prompt for new data. Choose option 7 to delete a record.

Option 4, Display File, calls another screen from which you choose to see an alphabetical list of all names, an individual name (enter a last name), or return to the menu.

## Number Of Records

The program is written to accommodate 12 records on the unexpanded VIC and 200 on the 64. To increase the number of records, change the value of L in line 10. VIC users must use expansion memory to have more than 12 records. Commodore 64 users should note that only the second L value (at the end of line 10) need be changed if any increase in record number is desired.

See program listing on page 139.

**NEW**

**MY TALKING SOFTWARE IS DIFFERENT!**

**NEW**



**I CALL YOU BY YOUR OWN NAME IN EVERY ONE OF MY PROGRAMS!**

**\$19.95 EACH — ORDER NOW!**  
**1-800-328-2050 OR IN WASHINGTON 1-800-221-2878.**  
**(YOU CAN PAY MORE BUT YOU CAN'T GET MORE!)**

## Little People Software

Developed by Parents and Educators

... Hearing ... Seeing ... Doing  
In a way that makes **LEARNING**  
more fun and more effective

No Synthesizer Needed



**L. P. Money I**  
by Aaron Grant  
Teaches money values — one cent to one dollar — using a gum ball machine. Encourages money saving.

**L. P. Money II**  
by Tom Wanne  
Teaches money values — one dollar to one hundred dollars — using an ice cream machine. Encourages money saving.

**L. P. Shapes**  
by Doug Knapp  
Learn to recognize geometric shapes and how to spell their names.

**L. P. Traffic Signs**  
by Tom Wanne  
Teaches identification and meanings of traffic signs and signals. Increases safety awareness.

**L. P. Child Protection**  
by Tom Wanne  
Teaches children how to protect themselves against the possibility of being kidnapped. Excellent graphics.

**L. P. Colors**  
by Aaron Grant  
Teaches names and identification of colors and reinforces learning of colors and shapes.

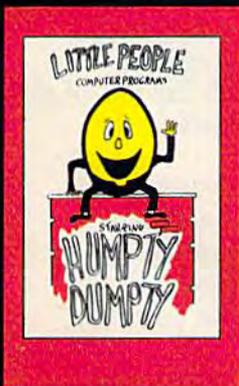
**L. P.'s Farm**  
by Aaron Grant  
Teaches names and identification of farm animals.

**L.P. Addition**  
by Doug Knapp  
Teaches addition using numeric figures and objects. Nine levels of difficulty. Great introduction to math.

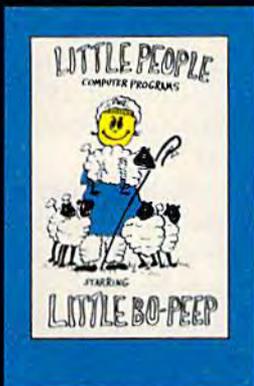
**L.P. Subtraction**  
by Doug Knapp  
Teaches subtraction using numeric figures and objects. Nine levels of difficulty. Great introduction to math.

**L.P. Opposites**  
by Tom Wanne  
Teaches opposites such as large, small; tall, short. Multiple choice quiz. Excellent graphics.

**L.P. Multiplication**  
by Aaron Grant  
Teaches multiplication using numeric figures and charts. Varying levels of difficulty.



**Humpty Dumpty**  
Alphabet program by Dave Paulsen  
Put Humpty together again and learn: the Alphabet, the Computer Keyboard, how to spell your Name ... and more.



**Little Bo Peep**  
Number program by Joe Sams and Scott Barker  
Bring Bo-Peep's sheep home and learn: to Count, to spell your Name, the Computer Keyboard ... and more.



**Computer Profit Systems, Inc.**

9661 Firdale Avenue  
Edmonds, Washington 98020

Creators of Data Deli™, Comp-u-tutor,  
Home Learning Systems

S.A.M. licensed from Don't Ask, Inc.  
\*Commodore 64 is a trademark of Commodore Business Machines

Mastercard and Visa

Save \$2.00 per program  
Shipping Charge by  
purchasing at your local  
software store.

**DEALER INQUIRIES INVITED**

# Name That Note

Carlos Esteves



**Learning the names of the notes of the treble and bass clefs is one of the more tedious exercises for beginning music students. Why not let your computer help? Originally written for the unexpanded VIC, we've added versions for the 64, the Plus/4, and the 16.**

The first stumbling block on the way to proficiency in reading music is learning the positions of notes in the treble and bass clefs. "Name That Note" is a teaching aid, designed to help the beginning music student develop instant recognition of notes. After entering the program, save a copy to tape or disk. Type RUN, and you'll soon see a prompt, asking you to choose treble, bass, or both. If you're just starting out, selecting the treble clef is the best choice. When this one is mastered, practice with the bass clef, then combine the two.

## Program Feedback

After selecting one or both clefs, a randomly generated note appears on the staff. The counter at the upper-left corner of the screen begins counting down from nine seconds. If you don't name the note by pressing the appropriate letter on the keyboard within this time limit, another note is chosen and the counter starts over. Another category, Misses (upper right of the screen), includes both wrong guesses and no guesses within the nine-second time limit.

A correct answer is rewarded by the playing of the note and a number of points added to Score (top center of screen). Promptness in

answering means a better score, but errors get no points at all. At the end of a round of 20 notes, the final score and number of misses is displayed with an option to play another round. Progress can easily be monitored by jotting down scores and comparing them.

## The Plus/4 And 16 Version

Because sound is handled the same way in the Plus/4 and the 16, Program 3 works for either machine. As in the VIC and 64 versions, re-defined characters are required. The custom character set is located at 15360 with the aid of a short machine language routine placed in the cassette buffer at 819.

When you run the program, any errors which occur after the characters have been re-defined will cause random garbage to appear on the screen. This is because the character-set pointers have been set to point at the custom characters.

At this point, there are several ways to retrieve your program (restore the character set pointers) and determine the cause of an error. One way is to press the RESET switch while holding down the RUN/STOP key. (*Note: Be careful when doing this since RESET alone performs a cold start of the computer and thus erases any program from memory.*) This operation puts you in the built-in monitor. Press X to exit BASIC. Then press the HELP key, and the statement where the error occurred will be printed (flashing) on the screen.

An easier way to recover from this situation is with the aid of a user-defined function key. Before you enter the program, define a function key so that when you press it, the character set pointers will position to their normal place.

# A Printer For All Reasons

## Search For The Best High Quality Graphic Printer

If you have been looking very long, you have probably discovered that there are just too many claims and counter claims in the printer market today. There are printers that have some of the features you want, but do not have others. Some features you probably don't care about, others are vitally important to you. We understand. In fact, not long ago, we were in the same position. Deluged by claims and counter claims. Overburdened by rows and rows of specifications, we decided to separate all the facts — prove or disprove all the claims to our own satisfaction. So we bought printers. We bought samples of all major brands and tested them.

### Our Objective Was Simple

We wanted to find that printer which had all the features you could want and yet be sold directly to you at the lowest price. We wanted to give our customers the best printer on the market today at a bargain price.

### The Results Are In

The search is over. We have reduced the field to a single printer that meets all our goals (and more). The printer is the GP-550CD from Seikosha, a division of Seiko (manufacturers of everything from wrist watches to space hardware). We ran this printer through our battery of tests and it came out shining. This printer can do it all. Standard draft printing up to a respectable (and honest) 86 characters per second, and with a very readable 9 (horizontal) by 8 (vertical) character matrix. At this rate, you will get an average 30 line letter printed in only 28 seconds.

### "NLQ" Mode

One of our highest concerns was about print quality and readability. The GP-550CD has a print mode termed Near Letter Quality printing (NLQ mode). This is where the GP-550CD outshines all the competition. Hands down! The character matrix in NLQ mode is a very dense 9 (horizontal) by 16 (vertical). This equates to 14,400 addressable dots per square inch. Now we're talking *quality* printing. You can even do graphics in the high resolution mode. The results are the best we've ever seen. The only other printers currently available having resolution this high go for \$500 and more *without* the interface or cable needed to hook up to your Commodore!

### Features That Won't Quit

With the GP-550CD your computer can now print 40, 48, 68, 80, 96, or 136 characters per line. You can print in ANY of 18 font styles. You not only have the standard Pica, Elite, Condensed and Italics, but also true Superscripts and Subscripts. Never again will you have to worry about how to print  $H_2O$  or  $X^2$ . This fantastic machine will do it automatically, through easy software commands right from your keyboard. All fonts have true descenders.

One of the fonts we like best is "Proportional" because it looks most like typesetting. The spacing for thin characters like "i" and "l" are given less space which "tightens" the word making reading easier and faster. This is only one example of the careful planning put into the GP-550CD.



Do you sometimes want to emphasize a word? It's easy, just use **bold** (double strike) to make the words stand out. Or, if you wish to be even more emphatic, underline the words. Or do both. You may also wish to "headline" a title. Each basic font has a corresponding elongated (double-wide) version. You can combine any of these modes to make the variation almost endless. Do you want to express something that you can't do with words? Use graphics with your text — even on the same line.

You can now do virtually any line spacing you want. You may select 6, 8, 7½ or 12 lines per inch. PLUS you have variable line spacing of 1.2 lines per inch to infinity (no space at all) and 97 other software selectable settings in between. You control line spacing on a dot-by-dot basis. If you've ever had a letter or other document that was just a few lines too long to fit a page, you can see how handy this feature is. Simply reduce the line spacing slightly and... VOILA! The letter now fits on one page.

### Forms? Yes! Your Letterhead? Of Course!

Do you print forms? No problem. This unit will do them all. Any form up to 10 inches wide. The tractors are adjustable from 4½ to 10 inches. Yes, you can also use single sheets. Plain typing paper, your letterhead, short memo forms, anything you choose. Any size under 10" in width. Multiple copies? Absolutely! Put forms or individual sheets with carbons (up to 3 deep), and the last copy will be as readable as the first. Spread sheets with many columns? Of course! Just go to condensed mode printing and print a full 136 columns wide. Forget expensive wide-carriage printers and changing to wide carriage paper. You can now do it all on a standard 8½" page.

### Consistent Print Quality

Most printers have a continuous loop ribbon cartridge or a single spool ribbon which gives nice dark printing when new, but quickly starts to fade after a while. To keep the printers' output looking consistently dark, the ribbons must be changed more often than is healthy for the pocketbook. The GP-550CD solves this problem completely by using a replaceable, inexpensive ink cassette which is separately replaceable from the actual ribbon. It keeps

the ribbon loaded with ink at all times. You only replace the ribbon when it truly wears out, not when it starts to run low on ink. Just another example of the superb engineering applied to the GP-550CD. (When you finally do wear out your ribbon, replacement cost is only \$10.95. Ink cassette replacement cost is only \$5.95, both postpaid.)

### The Best Part

When shopping for a quality printer with all these features, you could expect to pay around \$500 or more. *Not any more!* We have done our homework. You don't have to worry about interfaces or cables. Everything is included. We are now able to sell this fantastic printer for **only \$259.95!** The GP-550CD is built especially for the Commodore 64, VIC-20, Plus 4 and C-16. All Commodore graphics are included. This printer does everything the Commodore printers do but has more features. **You need absolutely nothing else to start printing — just add paper.** We also have specific models for other computers. Call for details.

### No Risk Offer

We give you a 15-day satisfaction guarantee. If you are not completely satisfied for any reason we will refund the full purchase price. A 1-year warranty is included with your printer. The warranty repair policy is to repair or replace and reship to the buyer within 72 hours.

### The Bottom Dollar

The GP-550CD is only \$259.95. Shipping and insurance is \$8.00 — UPS within the continental USA. If you are in a hurry, UPS Blue (second day air) is \$18.00. Canada, Alaska, Mexico are \$25.00 (air). Other foreign is \$60.00 (air). California residents add 6% tax. These are cash prices — VISA and MC add 3% to total. We ship the next business day on money orders, cashiers' checks, and charge cards. A 14-day clearing period is required for checks.

### TO ORDER CALL TOLL FREE

1-(800) 962-5800 USA  
or 1-(800) 962-3800 CALIF.

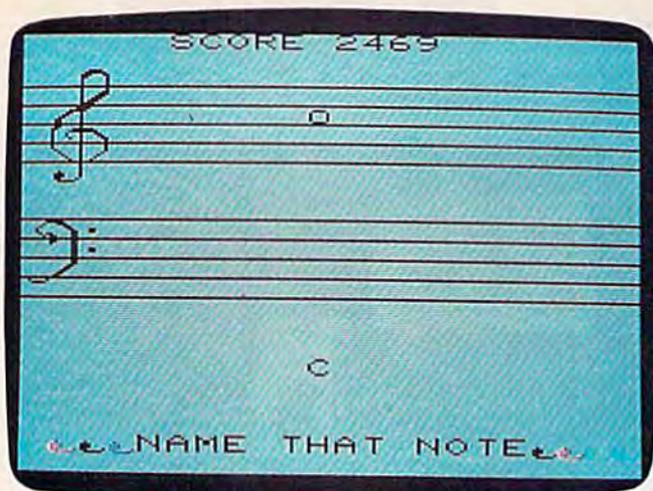
or send payment to:

### APROPOS TECHNOLOGY

1071-A Avenida Acaso  
Camarillo, CA 93010

Technical Info: 1-(805) 482-3604

 [www.commodore.ca](http://www.commodore.ca)



A correct answer (C) has added to the player's score.

Here's the line you need to enter in immediate mode to redefine the f1 key for our purposes:

KEY1, "POKE65298,196:POKE65299,208:" + CHR\$(13)

(Note: Since notes below the low A on the bass clef are not available on the Plus/4 and 16, the program will not select these notes.)

See program listings on page 142.



**NEW**

## CHORD-POWER FOR GUITAR

THIS DELUXE REFERENCE FEATURES:

- Quick Access to Over 8,000 Chords With Sound
- Chords Displayed on Color Graphic Guitar Fretboard with Each Note Played
- Chord Formulas Displayed Showing Corresponding Notes
- For Beginner to Professional
- Easy and Fun to Use - Just Enter Chord Desired and it Will be Displayed and Played

In addition to being an excellent chord reference, **CHORD-POWER** will help unravel the mysteries of chord construction and advance your chord and solo playing!

- Program Runs on C-64\* With Disk Drive -

ORDER TODAY! Check, Money Order or C.O.D.

**\$39.95** Plus \$2.00 Shipping and Handling.  
CA residents add 6% Sales Tax.

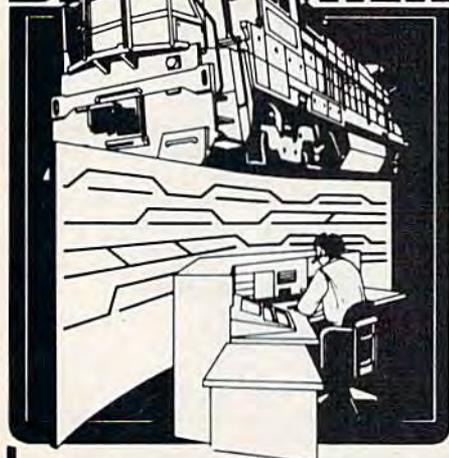
*NewArts Co.*

P.O. BOX 2700, HUNTINGTON BEACH, CA 92647

(DEALER INQUIRIES INVITED)

\*C-64 IS TRADEMARK OF COMMODORE BUSINESS MACHINES, INC.

## Be the TRAIN DISPATCHER



Color TV Recommended

**CHECK ONE:**

- Vic 20™ Tape  or Disk   
(Requires 16 K Memory Expander) ..... (\$24.95)  
Atari® 800 Tape  or Disk   
(Requires Basic) ..... (\$24.95)  
Atari® 400 Tape   
(Requires Basic) ..... (\$24.95)  
Commodore™ 64 Tape  or Disk  ..... (\$24.95)  
Apple II® Disk  ..... (\$29.95)  
Manual Only  (\$4.00 if purchased separately)

11C

Play this fast-paced computer video game that's so true-to-life that a major railroad indicated they use it in dispatcher training.

TRAIN DISPATCHER's 24 displays help you make crucial decisions, RAPIDLY. You're under pressure, but in control — throwing switches, clearing and cancelling signals, constantly maneuvering both east and west-bound trains. Keep the tracks clear ahead of all your trains and watch your score go up!

Action packed, yet non-violent, TRAIN DISPATCHER's 5 levels of play challenge players from age 8 to 80. Work your way up from "Cub Dispatcher" to Chief Dispatcher" or even "Trainmaster."

Created by designers of computerized traffic control systems for operating railroads, TRAIN DISPATCHER will increase your appreciation for actual railroad operations.

TRAIN DISPATCHER comes complete with Instruction Manual and keyboard template.

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

USA & CANADA add \$2.50 postage & handling (\$4.00 foreign) for each game ordered. All payments must be in USA funds, all foreign payments must be against USA banks. PA residents add 6% state sales tax. Or charge to:

Master Card  VISA Exp. Date \_\_\_\_\_

Card No. \_\_\_\_\_

Signature \_\_\_\_\_

### •• WORD GENIE •• C-64 WORD PROCESSOR

USER FRIENDLY WITH:

- Help screens
- Simple text commands
- Sample letter
- Menu driven

FEATURES:

- Disk Utility
- Printer commands
- Headings & Footnotes
- Double, Triple spacing
- Right justify
- Centering
- Page numbering
- Margin control
- Columns (tabs)
- Word search
- Merge files

IDEAL FOR:

- Personal letters
- Themes & Reports
- Business & Form letters

Priced at only

**\$39.95**

(Disk only - shipping included)

Send check or money order to:

**GENIE SOFTWARE**

P.O. BOX 416 DEPT. G.  
MALTA, OHIO 43758

Ohio residents please add \$2.20 sales tax.

Get more out of your Commodore with

# COMPUTE!'s GAZETTE<sup>®</sup>

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

## More fun



Martian Prisoner, The Viper, Skydiver, Snake Escape, Demon Star, Cyclon Zap, and Oil Tycoon are just a few of the ready-to-run games you'll find exclusively in *COMPUTE!'s Gazette* each month. Just type in the programs and watch your screen explode with colorful new computer game excitement.

Children will learn and develop new skills with States & Capitals Tutor, Wordmatch, Munchmath, Wordspell, Connect the Dots, Aardvark Attack, and Alfabug. Computing for Kids, a regular monthly feature, will uncover new ways to involve your children in computing.



## More challenge

Ready to tackle more advanced projects? In *COMPUTE!'s Gazette*, you'll learn how to use tape and disk files, how to program the function keys, writing transportable BASIC, how to make custom graphics characters, new ways to enliven programs with sound, one-touch commands for the 64, how to use machine language, speeding up the VIC-20—and much more!

## More programs

Programs to help you balance your checkbook, store your addresses, keep tax records, manage your personal business. You can create your own programs and games, improve your word processing, spreadsheets, and data base management, load and run faster with 64 Searcher, VIC/64 Program Lifesaver,



Quickfind, Word Hunt, Disk Menu, VIC Timepiece, The Automatic Proofreader and more.



## More buying guidance

You'll profit from comprehensive reviews of everything from data-quality cassette tapes to software to graphics plotters and modems. Virtually anything that's compatible with your Commodore is reported on in *COMPUTE!'s Gazette*. With this kind of expert help, every computer purchase you make can be the right one!

## Order now

All you do is mail the postpaid card bound into this issue. But don't delay! Subscribe now to start receiving every issue of *COMPUTE!'s Gazette*.

For Faster Service  
Call Toll-Free

1-800-333-6666 [www.commodore.ca](http://www.commodore.ca)

# VIC Quiz Generator

George Trepal

**The VIC can be a valuable educational tool for parents and teachers. Here's a short program that sets up and manages a quiz for almost anything you wish to teach. Simple instructions are included for those with expansion memory who wish to add more questions and answers.**

---

If you're a parent or teacher, "VIC Quiz Generator" can help you in teaching nearly any subject. The program asks questions, which the student then answers. You can opt for the order of questions to be generated randomly, so the student will have to learn the material rather than memorizing a sequence.

Questions are displayed one at a time, and the student's answer is then compared to the answer in the DATA statements, beginning at line 1000. If the answer is correct, the computer makes a note not to ask the question again. If an incorrect answer is given, the correct answer is shown, and the computer remembers to ask that question later in the quiz. After a second incorrect answer, points are deducted from the final score. No question is asked more than two times in the same quiz.

At the end of each quiz, a final score is given—a standard percentage score, 90% for nine of ten answered correctly, for example—and the student has the option to retake the quiz.

## Modifying Quiz Data

The program includes six sample questions and answers found in DATA statements 1000–1050. Also, note line 140, which defines S\$ as "WHO WROTE". The procedure for replacing these questions and answers and adding more is sim-

ple. After deciding what kind of quiz and data you wish to insert, LIST the program and replace the DATA beginning at line 1000 with your own. Note that each question must be preceded by a pound sign (#) and each answer with an asterisk (\*). Be sure to put the question and answer on the same line in the DATA statement (see line 1000 for an example of how this is done).

To add more questions, simply continue adding DATA statements, but *be sure the last line of the program is DATA 999*. This acts as a "flag" to tell the program that it's read *all* the data you've entered. Notice that line 1060 contains this flag. If you've created twenty DATA statements (questions and answers) and incremented the line numbers by ten, your DATA statements should run from 1000–1200 with the final line being 1200 DATA 999.

Whether or not you're using memory expansion, you'll have to make sure that your growing program fits into memory. After adding a number of DATA statements, press RUN/STOP-RESTORE, then type PRINT FRE(0) to see how many bytes remain. Any memory expansion will allow for a large quiz.

One other line you may have to change when modifying the program is line 140. If you're not creating a quiz about authors, you'll have to change S\$ to "WHO COMPOSED", "WHAT IS", or whatever phrase you need to make the question appropriate.

An interesting technique used by the program is found in lines 110 and 120. The variable N is defined by the number of DATA statements read in line 110. So the program DIMensions the number of questions and answers according to the number of DATA statements it counts. When 999 is read, N is set throughout the program.

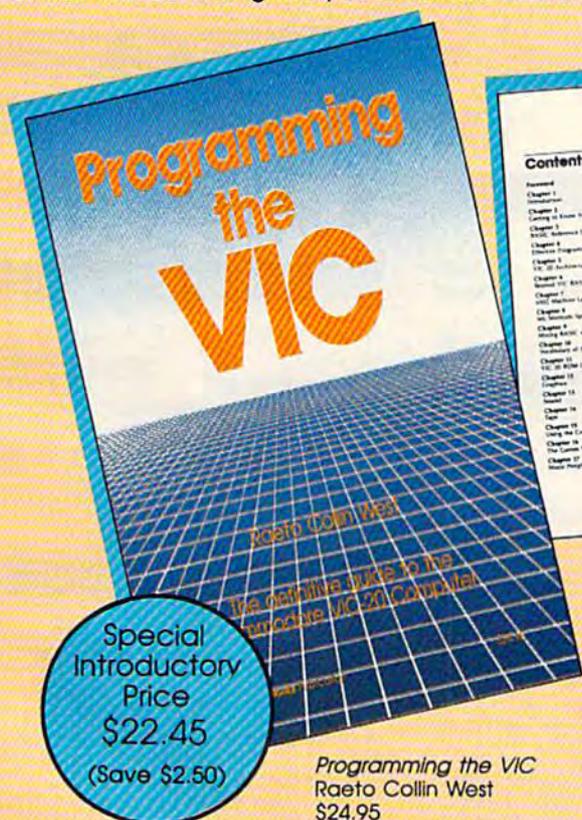
See program listing on page 145.

# Vic-20 Owners

## The ultimate reference book

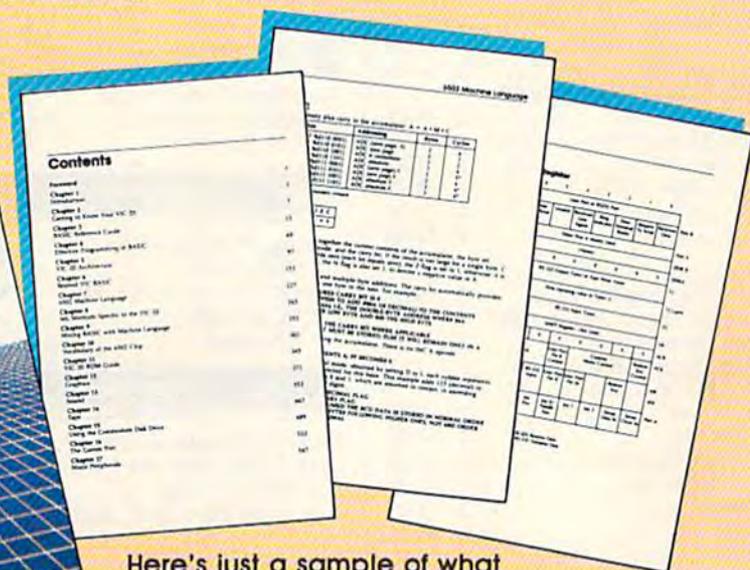
The complete encyclopedia for the Commodore VIC-20 is now available. COMPUTE! Books, one of the leading publishers of application-oriented consumer computer books, has released *Programming the VIC* by Raeto Collin West. And we offer this extraordinary volume to you at a very special introductory price of \$22.45 if ordered by December 15, 1984, a 10% savings off the regular price of \$24.95.

For \$22.45 you can own the *definitive* book on the VIC-20. There has never been a book published for the VIC-20 that gives you what this one does.



Special  
Introductory  
Price  
\$22.45  
(Save \$2.50)

*Programming the VIC*  
Raeto Collin West  
\$24.95  
ISBN #0-942386-52-3  
608 pgs.  
paperbound



### Here's just a sample of what *Programming the VIC* includes:

- Detailed descriptions of every BASIC command in the VIC's vocabulary
- Discussions and examples of BASIC and machine language programming techniques
- Comprehensive guides to VIC sound and graphics
- A thorough mapping of the VIC-20's ROM
- An annotated list of 6502 opcodes
- A practical guide to selecting and using printers, plotters, and modems

*Programming the VIC's* 17 chapters address virtually every programming situation that you, a VIC user, are likely to encounter. The book contains hundreds of examples and dozens of complete programs published in ready-to-type-in form.

Beginning to advanced programmers alike will find *Programming the VIC* to be an indispensable VIC resource. Whatever your programming level and whatever your VIC needs, this is a book that you'll refer to again and again.

Mail your prepaid coupon to: COMPUTE! Books, P.O. Box 5406, Greensboro, NC 27403 or call 1-800-334-0868 **\$22.45**

Yes! Send me \_\_\_\_\_ copies of *Programming the VIC* at \$24.95 per copy. \*Limited offer. Save 10% if you order by December 15, 1984.

All orders must be prepaid in U.S. funds.

Add \$3.00 shipping & handling per book. \_\_\_\_\_  
N.C. Residents add 4.5% sales tax. \_\_\_\_\_  
Total payment enclosed. \$ \_\_\_\_\_

Payment enclosed (check or money order).  
 Charge my  Visa  MasterCard  American Express

Acct. No. \_\_\_\_\_ Exp. Date \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Please allow 4-5 weeks for delivery.

752523G

# MICRO-SYS DISTRIBUTORS.

## **commodore**

### SOFTWARE FOR C-64

#### Business

Multiplan (Spreadsheet) .....	\$ 63.00
Calc Result (Advanced) .....	\$ 79.95
Superbase 64 .....	\$ 75.00
Mirage Concepts (Data Base) .....	\$ 89.00
Mirage Concepts (Word Processor) (40/80 column & 30K Dictionary) ..	\$ 89.00
B.I. Paperclip W/Spellpac (W/P) ..	\$ 85.00
Home Accountant (Continental) .....	\$ 45.00
Tax Advantage (Continental) .....	\$ 35.00
Info Designs G/L .....	\$ 19.95
Southern Solutions Accounting G/L, A/R, A/P, P/R, I/M .....	\$ 49.95
Tri Micro Accounting C64 & Plus 4 G/L, A/R, A/P, P/R, I/M .....	\$ 49.95
Smart64 Term + 3 .....	\$ 39.95
Hellcat Ace (game) .....	\$ 25.00
Solo Flight (game) .....	\$ 25.00

#### Utilities

Printer Utility Program (Cardco) ..	\$ 19.95
Disk Utility Program (Fast copy, File copy, Disassembler, For 1541) ..	\$ 49.95
Bits and Pieces (Backup & Utility, Screen Dump & More for MSD Drive) .....	\$ 49.95
Simon's Basic .....	\$ 39.95
80 Column Expander (Cartridge) ..	\$ 60.00
64 Relay Cartridge .....	\$ 45.00
Oxford Pascal .....	\$ 69.95
Tool 64 (Handic) .....	\$ 39.95
Graf 64 (Handic) .....	\$ 39.95
Stat 64 (Handic) .....	\$ 39.95
Forth 64 (Handic) .....	\$ 39.95

### ACCESSORIES

MSD Super Disk Drive (single) .....	\$ 349.00
MSD Super Disk Drive (dual) .....	\$ 575.00
Hayes Smart 300 Modem .....	\$ 229.00
Vic 1530 Datasette .....	\$ 65.00
Cardco Datasette .....	\$ 55.00
Cardco Numeric Key Pad .....	\$ 39.95
Alien Voice Box .....	\$ 95.00
When I'm 64 (Voice Box Sings) .....	\$ 25.00
Voice Box Dictionary .....	\$ 25.00

B.I. 80 Column Display .....	\$ 159.95
1541/Flash .....	\$ 89.95
Sock It To Me (For 8032) .....	\$ 29.00
6420 Westridge Modem (Auto Answer/Auto Dial) .....	\$ 89.95
Teleming (Auto Answer/Auto Dial) Modem With software .....	\$ 95.00
CBM 4023 Ribbons .....	\$ 10.95
CBM 1526 Ribbons .....	\$ 10.95
CBM 8023P Ribbons .....	\$ 8.75
CBM 6400 Ribbons .....	\$ 8.75
LQ1 Ribbons .....	\$ 8.75
Diablo Daisy Wheel .....	\$ 13.95
Abati Daisy Wheel .....	\$ 13.95
Flip N' File 10, 15, 25, 50 .....	Call
Power Strips (Surge Protector) .....	\$ 49.95
Computer Glow Care Kit .....	\$ 10.95
Disk Drive Cleaning Kit .....	\$ 10.95

### MONITORS

Panasonic TR120 (Amber) For Apple or IBM Computers .....	\$ 156.00
Green & Amber (For Apple & IBM) ..	\$ 85.00
RGB Monitor Cable: ET-101C (Apple) .....	\$ 33.80

### INTERFACES

BussCard II (Batteries Included) IEEE, Cartridge Slot, Basic 4.0 ..	\$ 159.95
BussCard Printer Cable .....	\$ 29.95
SuperBox 64 (Handic) IEEE, Reset, 3-Slot .....	\$ 139.95
Interpod (Intelligent IEEE & RS-232) .....	\$ 139.95
Cardco + G Parallel Interface .....	\$ 79.95
Cardco B Parallel Interface .....	\$ 49.95
The Connection (by Tymac) (Commodore Graphics + 2K Buffer) Epson, Gemini, Okidata, Panasonic .....	\$ 95.00
Turbo/GT (Telesys) With optional 16K or 32K Buffer .....	\$ 89.95
Vic Switch (Handic) .....	\$ 149.95
ADA1800 IEEE to Centronics .....	\$ 149.95
Pet to IEEE Cable .....	\$ 39.00
IEEE to IEEE Cable .....	\$ 49.00
Networking For C-64 & CBM .....	Call

### LETTER QUALITY PRINTERS

Abati (20 CPS) W/Interface .....	\$ 475.00
----------------------------------	-----------

### DOT MATRIX PRINTERS

Smith Corona Fastex 80 (80 CPS) ..	\$ 259.00
Smith Corona 100 (120 CPS) .....	\$ 315.00
Smith Corona 200 (140 CPS) .....	\$ 456.00
Smith Corona 300 (140 CPS, 15in) ..	\$ 589.00

### BUSINESS SOFTWARE — B128

Superscript II (40K Dictionary) .....	\$ 199.00
Superbase (Data Base) .....	\$ 199.00
Calc Result .....	\$ 199.00
Complete Accounting System From Software Design (G/L, A/R, A/P, P/R, I/M) .....	\$ 375.00

### BUSINESS SOFTWARE — 8032/8096

WordPro 4+ or 5+ .....	\$ 225.00
Calc Result .....	\$ 199.95
SuperBase (8096 only) .....	\$ 225.00
Complete Accounting System From Software Design (G/L, A/R, A/P, P/R, I/M) .....	\$ 375.00

### TERMS

Orders under 50.00 add 10.00 Handling fee  
MasterCard, VISA, Money Order, Bank Check  
COD (add 5.00)  
Add 3% For Credit Cards

All Products In Stock Shipped Within 24 Hours

F.O.B. Dallas, Texas  
All Products Shipped With Manufacturers  
90 Day Warranty

PRICES ARE SUBJECT TO  
CHANGE WITHOUT NOTICE.

## AUTHORIZED WHOLESALE DISTRIBUTOR FOR ALL COMMODORE BUSINESS MACHINE PRODUCTS.

BECOME A COMMODORE DEALER. AND SEE WHY IT'S THE BEST DEAL IN NEW COMPUTER PRODUCTS.

FOR PRODUCT CATALOG & PRICE LIST WRITE OR CALL MICRO-SYS DISTRIBUTORS.

ORDERS ONLY CALL  
1-800-527-1738

INQUIRIES & INFORMATION PLEASE CALL  
1-214-231-2645

# Micro-Sys

# D I S T R I B U T O R S

641 Presidential Drive • Richardson, Texas 75081 • 9:30 a.m.-6:30 p.m. (Mon.-Fri.) • 10:30 a.m.-2:30 p.m. (Sat.)

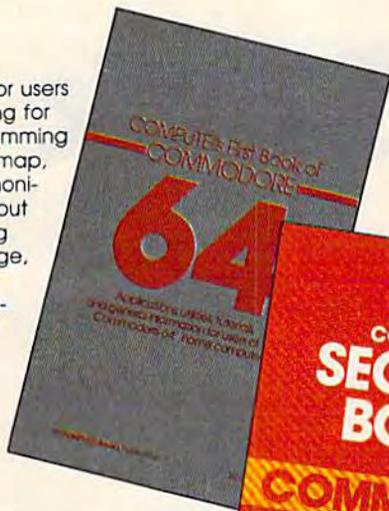
 [www.commodore.ca](http://www.commodore.ca)

# A SPECIAL OFFER from COMPUTE! Books

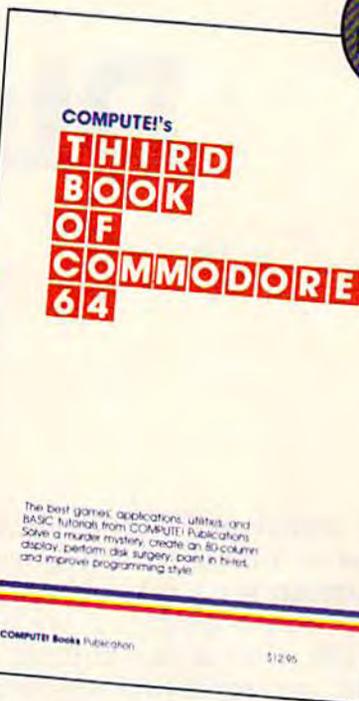
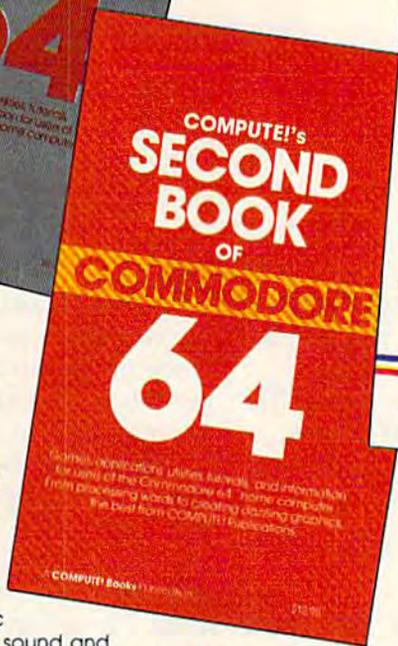
for Owners and Users of Commodore Computers

Buy any 2 of these books and receive a **15% Discount**. You pay \$22.00 and save \$3.90!  
Buy all 3 books and get a **25% Discount**. You pay only \$29.00, a savings of \$9.85!

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. This 264-page, spiral-bound book includes many ready-to-type-in programs and games. **\$12.95**



Continues in the tradition of the *First Book of Commodore 64* in presenting some of the best programs and articles from COMPUTE! Publications, many revised or never before published. There's something for almost any Commodore 64 user in this 289-page book: arcade and text adventure games in BASIC and machine language, a commercial software-quality word processor, a program which adds 41 new commands to BASIC, an electronic spreadsheet, tutorials about programming sound and graphics, and utilities for saving, copying, and retrieving files. **\$12.95**



NEW RELEASE!

A collection of outstanding games, applications, tutorials, and utilities from the most recent issues of *COMPUTE!* magazine and *COMPUTE!'s Gazette*, including several programs never before published. Commodore 64 users of all ages and experience will find this book informative, entertaining, and educational. Create an 80-column display, play educational and arcade-quality games, compose music, move sprites easily and quickly, and see how to program more efficiently and effectively. **\$12.95**

Buy Now—This Offer Expires March 31, 1985.

- Yes! I want to save money while I enjoy COMPUTE! Books.
- COMPUTE!'s First Book of Commodore 64, \$12.95
  - COMPUTE!'s Second Book of Commodore 64, \$12.95
  - COMPUTE!'s Third Book of Commodore 64, \$12.95

All Orders Must Be Prepaid  
 Payment Enclosed (check or money order)  
 Charge  MasterCard  VISA  American Express

Acct. No. \_\_\_\_\_ Exp. Date \_\_\_\_\_  
 Signature \_\_\_\_\_  
 Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_  
 State \_\_\_\_\_ Zip \_\_\_\_\_

To Order Call Toll Free 800-334-0868  
 (in NC call 919-275-9809)

or mail this coupon with your payment to:  
 COMPUTE! Books, P.O. Box 5406,  
 Greensboro, NC 27403

- Please send me:
- 1 Book for \$12.95
  - 2 Books for \$22.00
  - 3 Books for \$29.00

NC residents add 4.5% sales tax \_\_\_\_\_  
 Add \$2.00 per book for shipping \_\_\_\_\_  
 Total Paid \_\_\_\_\_

Please allow 4-6 weeks for delivery. 75264CG

## Disk Lock

Kevin Hawkins

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

---

Everyone knows that putting a piece of tape over a disk's write-protect notch will prevent it from being written to by the disk drive. You can load programs but not save, read files but not write to them.

The tab is easily removed by any user (which defeats the purpose of write-protection). And improperly positioned tape can be an annoying hindrance when inserting or removing disks. If the tape is loose, you may have to reach in with your fingers and pull the disk out.

In some applications, particularly those involving children, you may want to add an extra measure of protection.

### **Compatibility And DOS Flags**

The Disk Operating System (DOS) of the 1541 is a descendant of operating systems from previous Commodore disk drives. Commodore has managed to keep a good deal of compatibility between the different drives.

When a disk is formatted, it's organized into tracks and sectors. Track 18, Sector 0 is a control block on (most) Commodore disks. It contains the Block Availability Map, disk name, ID, and other important information.

Byte 2 of this sector contains a flag that indicates the version of DOS used to format the disk. Normally, you would find a value of \$41 (decimal 65, ASCII value of "A") here. This signals that the disk was formatted on a 1541 or a 4040. These two drives are format-compatible. A 1541 can read a disk formatted on the 4040, and vice versa. Theoretically, you can also write to a 4040 disk, although in practice it won't always work perfectly (because the 1541 is slower and may be aligned a little differently).

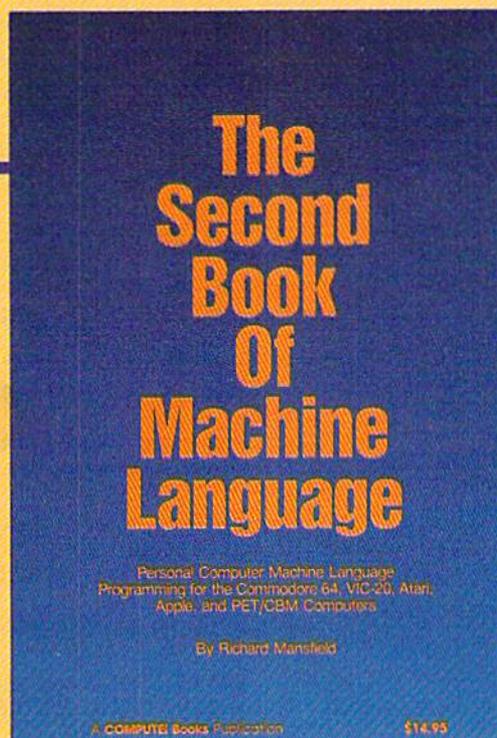
There was once a Commodore drive called the 2040 which put a few extra sectors on each disk. The DOS version flag at track 18, sector 0, byte 2 contains a \$01 if the disk was formatted on a 2040.

Disks from a 2040 are read- but not write-compatible with the 1541 format. You'll get an error 73 if you try to save a program or write to a 2040 disk from a 1541. The red light will start blinking because the 1541 refuses to write to a 2040-type disk.

### **Software Write Protection**

If we change this flag byte on the disk, we can fool the disk drive into thinking we are using a

# COMPUTE! Books



## SECOND BOOK OF MACHINE LANGUAGE

Richard Mansfield

The follow-up to the best-selling *Machine Language for Beginners*, this book leads the programmer deeper into the most powerful and efficient programming techniques available for personal computers. Fully tutorial, with easy step-by-step explanations, the book shows how to construct significant, effective machine language programs. Included is a high-speed, professional-quality, label-based assembler. Everything that's needed for optimized programming on the Commodore 64, Atari, VIC-20, PET/CBM, and Apple computers.

**\$14.95**

ISBN #0-942386-53-1

**COMPUTE!** Publications, Inc. 

One of the ABC Publishing Companies  
324 W. Wendover Avenue, Suite 200, Greensboro, NC 27408, 919-275-9809

To order your copy, call 1-800-334-0868.

2040 disk. The disk is effectively write-protected.

This is *not* the same as copy-protecting the disk. There is one exception: Programs such as *Copy-All*, which copy an entire disk to another, may work only until track 18. After the DOS flag is copied, the destination disk will be write-protected and subsequent files may be corrupted.

People can still copy individual programs, loading them and saving to another disk. But they won't be able to scratch anything from your disk, or add anything to what's there.

After altering the flag, you can open and read files, and load programs. You won't be able to save, write files, rename, scratch, or validate the disk. The only DOS command you can use is "N0:name,id" to reformat the disk (and you'll lose all programs and files on the disk).

## Unprotecting A Disk

Changing this byte is very easy to do with the Block-Read (U1) and Block-Write (U2) commands. But what happens if you change your mind and want to write to the disk again?

Putting a \$41 back into the flag would reverse the process, but the write-protection prevents you from making the change. It seems the only way to write to it again would be to reformat the disk.

We can do it, but first we must fool DOS again. This time we make the disk-drive think it is a 2040, using the Memory-Write (M-W) command. This command is similar to a POKE in BASIC. But instead of putting a number into the computer's memory, we're changing values inside the disk drive's memory. After doing the Memory-Write, a Block-Write restores the flag to normal.

## Using Disk Lock

Type in the program, but don't run it (yet). Save it first. You won't be able to save it to a locked disk.

It's very easy to use, and runs on the VIC or 64. Load it, put the disk you want to alter in the drive, type RUN, and the prompt "(L)OCK OR (U)NLOCK" will appear. Press either L or U and the program changes the flag byte. A second or two later, the program ends. If you want to lock or unlock another disk, change disks and type RUN again. That's all there is to it.

You might want to mark the disks you've locked by writing an "L" on the label. Use a felt-tip pen, rather than a pencil or ballpoint, to avoid damaging the disk. The primary value of "Disk Lock" is to prevent accidental scratching of important programs on archive or backup disks. Don't lock all your disks, or you won't be able to save anything to them.

A word of caution: The program contains some powerful disk commands, which might irretrievably garble information on a disk if entered incorrectly. Be sure to type the program exactly as listed. A comma or semicolon in the wrong place (or missing altogether) could cause many problems. After entering the program, test it on a new disk (or an unimportant one) before you begin to lock important disks.

```
10 OPEN15,8,15:PRINT#15,"I0":OPEN2,8,2,"#
   "                                     :rem 27
20 PRINT#15,"U1:";2;0;18;0:GOSUB1000
   "                                     :rem 10
30 PRINT#15,"B-P:";2;2                   :rem 188
40 PRINT"(L)OCK OR (U)NLOCK":INPUTA$:IFA$
   ="U"THEN70                             :rem 54
50 IFA$<>"L"THEN40                       :rem 246
60 PRINT#2,CHR$(1);:GOSUB1000:GOTO100
   "                                     :rem 177
70 PRINT#2,CHR$(65);:GOSUB1000           :rem 232
80 PRINT#15,"M-W";CHR$(1);CHR$(1);CHR$(1)
   ;CHR$(65)                               :rem 241
90 PRINT#15,"M-W";CHR$(2);CHR$(7);CHR$(1)
   ;CHR$(65)                               :rem 249
100 PRINT#15,"U2:";2;0;18;0:GOSUB1000
   "                                     :rem 58
110 CLOSE2:PRINT#15,"I0":CLOSE15:END
   "                                     :rem 154
1000 INPUT#15,EN,EM$,ET,ES                :rem 4
1010 IFENTHENPRINTEN,EM$,ET,ES           :rem 158
1020 RETURN                                :rem 163
```

Introducing



# KANGA!

for Commodore 64™  
Owners

only **9<sup>95</sup>**

**You'll hop right out of your chair playing this exciting new arcade-style video game! Challenging fun, seven treacherous levels of play, hours of fast, colorful entertainment!**

● ● ●

Please specify disk or tape.  
Send check or money order for \$9.95 to

**Future Computer Applications  
P.O. Box 6140  
Santa Fe, New Mexico 87502**

We pay shipping. Kanga is in machine language. joystick reqd.

BEFORE LOADING YOUR SOFTWARE  
MAKE A PERFECT BACKUP WITH

**NEW!**  
Version 2.2

# DiskMaker



with  
*MasterKey*

**99%  
EFFECTIVE**

## THE AUTOMATIC DISK BACKUP SYSTEM FOR YOUR 64 & 1541 DRIVE!

- Actually copies a FULL disk in only 4 MINUTES!
- Easiest to use – TOTALLY automatic copy utility
- State of the "ARTS" copy capability!
- UNLOCKS protected disks for backup copying
- Breaks through LATEST protection schemes
- Includes FAST copier, "ARTS" copier and TRUE Nibbler: you get 3 copiers for the price of 1
- HALF-TRACKING up to & including track 40!
- 100% machine code for fast, RELIABLE operation
- 4 min. copier AUTOMATICALLY puts "errors" on copy
- Fastest & most advanced copier you can buy
- Writes errors 20,21,22,23,27,& 29 WHILE COPYING!
- Transforms your 1541 into a SUPER-FAST copy drive!
- NO analysis required, just swap disks & NO damaging drive knock during errors or format
- Formats AS IT COPIES, detects & reproduces NON-STANDARD formats & I.D. mismatch, DOS flags
- PRODUCT SUPPORT tel. #, revisions, & upgrades

**OVER 500% FASTER THAN OTHER COPIERS!**



ONLY

**\$49.95**

To order CALL **805-687-1541 ext. 64**  
Technical line 805-682-4000 ext. 99



for entire system

For rush service call 24 hr. order line or send cashiers check/money order. Visa, MasterCard, & American Express include card# and exp. date. CA residents add 6% tax. Allow 2 weeks for clearance of personal & co. checks. Add \$3.50 shipping & handling for continental U.S./\$5.50 for UPS air. AK, HI, APO, FPO, CANADA add \$7.50. Other Foreign orders add \$8.50. All APO, FPO, & orders outside 48 states must be paid by certified U.S. funds. C.O.D.'s shipped to U.S. addresses only, add \$4.00. School orders welcome.

**DISKMAKER PAYS FOR ITSELF THE FIRST TIME YOU USE IT!**



Charles Brannon  
Program Editor

Perhaps no recent hardware product has piqued as much interest and curiosity as the Okimate-10 printer, first mentioned here in the CES feature story in the September GAZETTE. Three qualities of this printer are apparently responsible for the Okimate's appeal: low price (\$239 with Commodore interface); quiet, good quality printing (via a special nine-wire thermal transfer printing element); and most importantly, color. Readers became a little impatient, writing to ask us why we haven't reviewed the printer yet. An evaluation model arrived recently and we can now report on the features and shortcomings of the Okimate-10.

Removing the Okimate-10 from the packaging, you are first impressed by its small size. The printer is about two-thirds the height and somewhat less than the length and width of the 1541 disk drive, yet can transport full 8-1/2 × 11 inch paper, either a single sheet at a time using friction feed, or computer paper continuously. The manual says almost any smooth paper can be used; more on this later.

The printing technology, called *thermal transfer*, is fundamentally different, yet similar to existing printer technology.

Impact dot-matrix printers print by sweeping a vertical column of pins across the paper. When a dot needs to be printed, a solenoid behind the printhead forcibly strikes a tiny metal pin against the ribbon, transferring a bit of ink onto the paper. Text is printed a column at a time, each column being one dot wide, rather than a full character at a time (as in the case of letter-quality printers, which stamp out fully formed characters much like a typewriter). The disadvantage of impact printing is that these little pins stir up a

noise storm, screeching like fingernails scratching a chalkboard.

## Fire Writing

There are two variations of thermal dot-matrix printing. Characters are formed as in impact printing, one thin column per firing, but instead of using kinetic energy (the force of impact) to transfer ink from a ribbon, thermal energy (heat) is used to change the color of the paper. The ink is built into the paper, so to speak. One kind of thermal paper merely darkens when heated. The other kind of thermal paper is inherently dark, but coated with a thin white-sheened aluminum layer. The thermal element flash-heats tiny points in the printhead, which either darken the paper, or vaporize the light coating to reveal the underlying dark coloration. Thermal printing is whisper quiet compared to the staccato shriek of an impact printer. However, the special paper used in thermal printing is not only expensive, but thermal paper (not aluminized paper) can darken as it ages—quite quickly if kept in a hot environment.

Okimate's thermal transfer is a synthesis of existing technology. At the instant of printing, paper, ribbon, and printhead are forced together. Tiny hot points in the printhead glow for the briefest moment. In that moment, a small bit of waxlike ink is melted off the ribbon and fused to the paper. Alternatively, the ribbon can be left out, and you can use heat-sensitive paper, as with a thermal printer. Thermal transfer shares thermal printing's quiet manner, yet can print on ordinary paper.

Unfortunately, you can't use ordinary inked ribbons. Like carbon film ribbons, a thermal transfer ribbon is not re-usable. When a bit of

["Hi, we're from Europe. Where's the gold?"]

# A SECOND CHANCE to GET the NEW WORLD RIGHT.

**I**F COLUMBUS HAD LANDED IN NEW JERSEY; if Cortez had been nicer to Montezuma; if Pizarro had been a more generous soul, would the world today be any different?

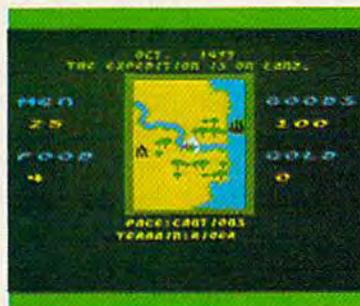
If you've ever wondered about things like that, you'll like *Seven Cities of Gold* very much indeed.

It's a kind of adventure. An unusually rich and technically impressive one with new continents to explore, natives to encounter, resources to manage and trade routes to establish. But beyond all the neat stuff *Seven Cities* throws up on the screen, there's something else happening here.

It feels quite odd to look at the map and see nothing. Of course you have to explore the more than 2800 screen new world in order to map it. But the way the natives act, the way you get older,



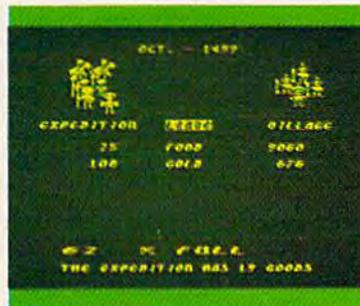
This is Europe, in scrolling 3-D graphics. You outfit, visit the Crown, launch your ships, and if you're cut out for this, you return later to tell all sorts of wild stories about what it's like over there.



There are over 2800 screens to explore in the new world. As you scroll through them, seasons change.



Animated natives surround you. They have no reason to trust you. The drum beat quickens.



Trading with the Aztecs is tricky. You could wind up with enough gold to build an empire. Or as soup.



Home again you view your maps, pat yourself on the back, and consider your place in history.

the way seasons change and your men behave, and the way your reputation precedes you gives you a sort of feeling that's unexpected in computer games. It's deeper. Maybe a little disquieting. It plays as much in your head as it does inside your computer.

*Seven Cities* does all this with the real world or, better still (since the "new" world really isn't anymore), it will construct any number of completely detailed hemispheres for you to try your hand with.

Designed by Ozark Softscape (the people who made *M.U.L.E.*, *Infoworld's* "Strategy Game of 1983"), *Seven Cities* is about as near a recreation of history as has ever been accomplished, with or without a computer.

Find it. Stomp around in it. See if you can't do a better job than all the celebrated figures who got us into the mess we have<sup>®</sup> to deal with today.

## SEVEN CITIES of GOLD™

from ELECTRONIC ARTS™



MACHINE REQUIREMENTS: *Seven Cities of Gold* is available for the Apple II, II+, IIe & IIc, Commodore 64 and Atari home computers. *Seven Cities of Gold* and M.U.L.E. are registered trademarks of Electronic Arts. Apple is a trademark of Apple Computer Corp. Commodore is a trademark of Commodore Business Machines, Inc. Atari is a trademark of Atari Computer Corp. For a free product catalogue, wind a stamped, self-addressed #10 envelope to: Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403.

[www.commodore.ca](http://www.commodore.ca)

ink is melted off, an inkless hole is left behind. If the ribbon were rewound and reused, there would be gaping white spaces in printed text. The black ribbon is good for about 75 average pages of text, according to Okidata. Replacement black ribbons cost \$5.95. So what money you save by using ordinary paper may be used up by the cost of new ribbons.

Even though thermal transfer can print on any paper, nobody makes any claims for the quality. Because the ribbon is sandwiched between the paper and printhead, close contact is required to smoothly transfer melted ink. Rough paper, such as bond, has too many nooks and crannies to permit good transfer. Rub a soft lead pencil across such paper and you can see this grain. Thermal transfer prints only on the raised surface of the grain, so printing on rough paper is spotty, as if the ribbon were worn out. We tried several kinds of common paper: the special glossy paper that comes with the Okimate Plug 'n Print interface kit, ordinary fanfold computer paper, smooth photocopy paper, letterhead (bond), and clear acetate. Only the acetate yielded a clear, sharp image (perfect for overhead projection). The print on the special smooth paper was acceptable, but a little lighter than desired. A sliding switch on the Okimate-10 lets you adjust the darkness of the print, but you would always want to leave it in the darkest setting.

All the other types of paper we tried gave unacceptable results, with the bond paper providing illegible print. Standard computer paper was too rough. Even the rather smooth photocopy paper looked like it was printed on by an impact printer with a worn-out ribbon.

We haven't found a commonly available source of extra-smooth paper, so even though you *can* use any paper, in practical terms you will most likely want to use the special paper provided by Okidata. Extra paper can be ordered from Okidata at \$9.95 for 250 sheets.

## Plug 'n Print

Okidata is to be congratulated for the consumer orientation of this printer, evidenced in both the style of the manual, and in the ease of setup. The basic Okimate printer is deaf and dumb, with a deep hole in its side. Unlike some printers which use a Centronics plug, requiring an external interface, the special Okimate interface is a cartridge which plugs into the side of the printer. After you plug in the interface, you snap a faceplate over the interface, then simply plug in the included Commodore serial cable, and you're in business. Don't look at the price of this printer (\$169.95) without the interface. If you already have a printer interface, it won't work with the

Okimate. Besides, the ribbons and glossy paper come with the interface.

After this installation, you basically have a thermal transfer MPS-801, with a few bonus features. The interface module completely customizes the printer, making it compatible with the codes and modes of the 1525 or MPS-801 printer. You can LIST programs to the printer at 60 characters per second (cps) and see all the graphics characters and cursor controls in the listing. The text is well-formed in a 9 × 9 matrix, with full descenders (tails) on the lowercase letters g, j, p, q, and y. The Okimate-10 uses the 1525/MPS-801 codes and secondary addresses for cursor up/down mode, elongated text, graphics mode, dot positioning, etc. Additional features include small characters, bold characters, forced paging, and automatic skip over perforation on fanfold paper. You can run all Commodore software confident that your printer will behave like the less glamorous MPS-801.

## A Rainbow Machine?

It seems I've neglected to mention the Okimate's strongest feature—color—but I'm not prepared to call this a color printer without some qualifications. It is a printer capable of color, and even though the quality of color images can be exceptional, there are several drawbacks.

The first problem is software support. It is not made clear in the manual how to program color yourself, and it's no piece of cake. The only software for color printing is a demonstration program and a color high-resolution screen printing utility. The demonstration program is attractive, and shows off the printer's skill at handling both black-and-white and color text and graphics. This program exists in versions for both the VIC and 64, though there is no software support as yet for the Plus/4 and Commodore 16 (the printer does work with these computers, although you might occasionally get ?DEVICE NOT PRESENT ERROR). The Plug 'n Print package contains the software, on both tape and disk. The tape holds a smaller version of the demo program, and lacks the color screen printing utility.

The screen printing utility reproduces 16-color multicolor and high-resolution graphics screens on the printer. It prints graphics produced and saved to disk by one of several supported commercial drawing programs. Packages currently supported are *Doodle!*, *KoalaPainter*, *Supersketch*, and *Peripheral Vision*. There is also an option for printing user-created pictures saved in a special format. The pictures are rather faithfully rendered, with most colors looking at least similar to the original. The biggest problem is that each

# Why settle for less when you can have Mo?



Now with upload/download capability.

## Introducing Mitey Mo, the ready-to-go modem that turns your Commodore 64® into a telecommunications giant.

Mitey Mo is the complete—and affordable—telecommunications system for your Commodore 64. It will open up a world of practical and exciting uses for your computer, and it will take you online faster and easier than anything else you can buy.

Now you'll be able to send and receive electronic mail, link up with community bulletin boards, play computer games with people in distant places, do electronic banking, and tap into library resources to find the material you need for your reports. All at your convenience.

Until Mitey Mo, Commodore's 1650 Automodem was the obvious choice when you went looking for a modem for the C-64. Like Mitey Mo, it has "auto-answer"—it receives data while unattended. And both modems are "auto dialers"—you dial right on the computer's keyboard. But that's about where their similarity ends.

Suppose you dial a number,

MODEM FEATURES	MITHEY MO	COMMODORE AUTOMODEM
Auto Dial	YES	YES
Auto Answer	YES	YES
Auto Redial	YES	NO
Software Included	YES	YES
Upload/Download Capacity	YES	NO
VT-52 Emulation	YES	NO
Menu Driven	YES	NO
28K Software Buffer	YES	NO
Printing Capability	YES	NO
Easy-to-Use Manual	YES	NO
Bell 103 Compatible	YES	YES
Multiple Baud Rates	YES	YES
Cables Included	YES	YES
Single Switch Operation	YES	NO
Warranty	1 year	90 days
Suggested Price	\$119.95	\$129.95

**Some mighty interesting features—ours and theirs. Yours to decide.**

and you find that it's busy. Mitey Mo has "auto redial"—it hangs up and redials immediately until it gets through. With the other modem you have to redial each time—and somebody with auto redialing can slip in ahead of you.

Mitey Mo is menu-driven. It lists the things you can do on the screen. Select a number and you're on your way. Since Automodem isn't menu-driven, you'll be hunting through the manual a lot.

Mitey Mo has only one switch, the customized software does the rest. Every family member will find it

easy to use. With the other modem you'll have to remember to check three switches, otherwise you may be answering when you mean to be originating.

Mitey Mo gives you access to 14 pages of memory (28,000 bytes) so you can store data and review or print it later. The other modem doesn't let you store or print anything.

Mitey Mo is half the size of the other modem. The very latest technology allows miniaturization and increased reliability, as well. Mitey Mo is so reliable, we gave it a full one-year warranty. The other modem gives 90 days, then you're on your own.

Not only will you find Mitey Mo mighty useful, you'll find it mighty reasonably priced. Call us at (415) 633-1899 and order your Mitey Mo today.



**USI** CDI/Computer Devices Int'l  
1345 Doolittle Drive  
San Leandro, CA 94577  
(415) 633-1899

[www.commodore.ca](http://www.commodore.ca)



Photo courtesy of Koala Technologies.



*The first picture above is a photo taken from the Commodore 1702 color monitor. Below is the same picture printed on the Okimate-10. Notice the minor differences in color and proportion. The Okimate-10 cannot exactly match the Commodore colors, and pictures tend to be printed wider on the paper than they are on the screen.*

printed line does not smoothly align with the next, which leaves thin horizontal gaps in the picture. These lines are not always noticeable, though, since printed sections sometimes overlap.

It's too bad there's not more software that works with or is available for this printer. It would be ideal if Okimate provided a "snap-shot" program that could capture and print graphics screens (including colored text, redefined characters, and sprites) from any program. It's also unfortunate that programming your own color is a tedious affair. To explain this, we need to delve into how the Okimate produces color.

## Secrets Of Okimate Color

The Okimate-10 seems to be essentially a black-and-white printer which has been adapted for color. With only minor changes and a special ribbon, any printer could be trained to print in color. The Okimate-10 capitalizes on a simple trick to generate its color, though this does not detract from the fact that color prints look excellent, though not comparable in quality to a photograph or color slide of a computer screen.

The review in this column of the late MCS-801 color printer pointed out that it generated color by printing across a four-color ribbon. The ribbon is installed at a 45-degree angle, permitting the head to strike all four colors in a single pass. This defines the nature of the MCS-801. It's a color printer that could act like a black-and-white printer, whereas the Okimate-10 is a black-and-white printer capable of color. The Okimate-10 uses a three-color ribbon, but cannot print in all colors in a single pass across the carriage.

The normal black ribbon is a single strip of waxy ink on

# Introducing The Gold Disk\* Subscription Series

# SOPHISTICATED SOFTWARE FOR LESS THAN \$10

The Gold Disk is a brand new way to get even more out of your Commodore 64<sup>®</sup>, because now, you can get all the programs you want and need at unbelievably low cost.

Every month, subscribers to the Gold Disk will receive a disk that contains a feature program that in itself, is worth the price of the subscription. In addition there are tutorials, games, a programming puzzle, music, sound effects, programmers' corner on each disk. A wealth of quality software for less than \$10.

#### Our January Issue includes:

- Word processing package
- Loan and mortgage program
- Learning Basic – Part II
- Multi-level 4 screen game
- Numbers game
- 8-Queen puzzle
- Music, crossword of the month
- Tips, sound effects with source code, editorial and more

In the months ahead, the feature programs include an Assembler, Word Processor, Information Management System, Micro Forth, Debugger, etc. Plus a great many other educational and entertaining programs.

To begin your subscription simply fill in the coupon below. The Gold Disk – all the programs you need at subscription prices.

**SUBSCRIBE NOW!**

The  
GOLD  
DISK

#### THE GOLD DISK SUBSCRIPTION SOFTWARE

2179 Dunwin Drive, #6, Mississauga, Ontario, Canada L5L 1X3

YES, Please send The Gold Disk for  6 months @ \$54.95\* + \$ 6 shipping & handling  
 12 months @ \$99.95\* + \$12 shipping & handling

Orders out of North America add \$4.00 per issue. Payment must accompany all orders. Allow 4 to 6 weeks for subscription start.

Name \_\_\_\_\_ Address \_\_\_\_\_

City \_\_\_\_\_ State Prov \_\_\_\_\_ Code \_\_\_\_\_

Check or money order enclosed  Visa  Mastercharge  American Express

Acct # \_\_\_\_\_ Exp. Date \_\_\_\_\_ Signature \_\_\_\_\_

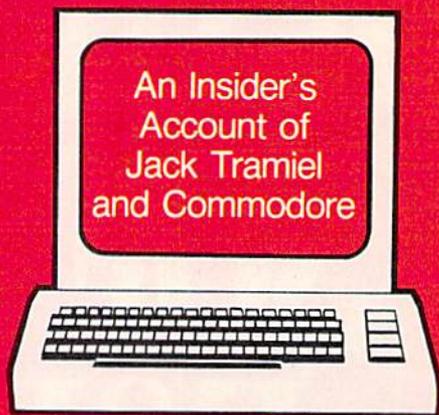
\*Trademark pending

<sup>®</sup>Commodore 64 is a registered trademark of Commodore Business Machines

\*All prices quoted are in U.S. funds. Canadian orders please allow for exchange. Ontario residents add 7% tax.

[www.commodore.ca](http://www.commodore.ca)

# THE HOME COMPUTER WARS



by Michael Tomczyk

\$16.95 hardback ISBN 0-942386-75-2  
\$9.95 trade paperback ISBN 0-942386-78-7

COMPUTE! Publications, the leading home computer publisher, brings you the exciting story of the home computer industry. This book takes the reader into a vivid, dramatic world where a powerful, brilliant businessman almost single-handedly fashions the American consumer computer industry.

A survivor of the Nazi Holocaust, Jack Tramiel took a tiny typewriter parts company and built it into a major American corporation. In the process, he became a modern corporate legend. Some of his vice presidents thought he was a saint; some thought he had the world's hardest heart. But few deny the brilliance of this complex entrepreneur.

For the past four years, Michael Tomczyk has been Tramiel's right hand man. Throughout Commodore's explosive rise to leadership in the computer field, Tomczyk was a close insider. And, most importantly, Tomczyk is a keen observer and takes you where the action is.

---

To order your copy, send the attached card, with your payment, to COMPUTE! Books, P.O. Box 5406, Greensboro, NC 27403 or call toll-free 1-800-334-0868.

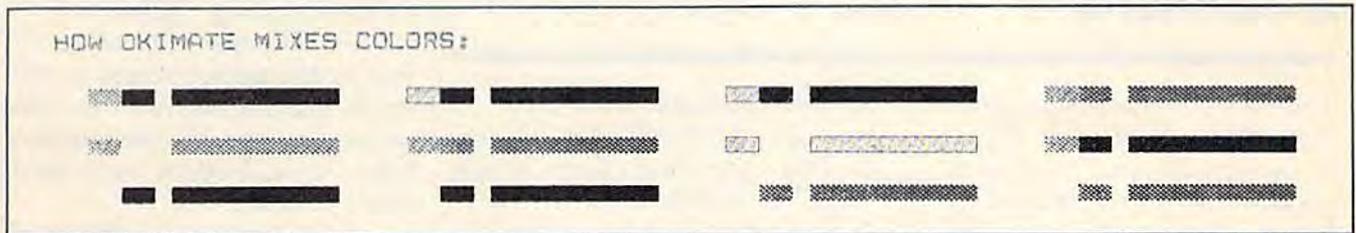
Add \$3.00 shipping and handling to hardback copy; add \$2.00 shipping and handling to trade paperback.

plastic. The color ribbon is a series of colors accessed sequentially. Each colored section is about eight inches long, the width of the paper. The series starts with a clear plastic leader, a length of yellow ribbon, then magenta, cyan, and a small unused black segment. This series is repeated over and over again in the ribbon. To print in color, the three basic colors are combined to give you seven secondary colors. Here's how it works: yellow + magenta = red, yellow + cyan = green, magenta + cyan = blue, and yellow + magenta + cyan = black.

To get all these colors, three sections of ribbon must be used. The printer returns the carriage after it prints in one color, then overstrikes in the next color. Therefore, it takes more than three

then cyan, etc:

With dot-programmable graphics, you can create colored pictures as well. The Okimate screen print program uses a trick known as *dithering* to create extra colors. Dithering places two colored dots side by side, rather than mixing them. From the right distance, a magenta dot next to a cyan dot looks like a fat purple dot. Television pictures work on a similar principle. Checkerboard patterns are either overlaid or interleaved to simulate light colors (alternate with white, which isn't an ink color but the lack of one, as long as you use white paper), or new colors such as apple green (alternate green and yellow). The accompanying figure shows how colors are mixed.



times as much time and ribbon to print a single line in color. All three segments must be used, even if you only want to print a single black dot. And if you only want to print in cyan, you still must skip past (and waste) the yellow and magenta segments. In practice, all three segments must be fed through, since the printer synchronizes itself with the yellow segment at the start of each new line.

To program color yourself, you send a command that tells the printer to feed ribbon until it finds the clear marker strip. This leader is immediately followed by a yellow segment. You know that the yellow segment is (not coincidentally) a full line wide, so you print whatever text or pixels you want in yellow, or whatever parts of text or pixels that should use yellow (as in red). Even if you don't print a full line, the printer is now in color mode, so it feeds in the magenta section next, discarding any remaining yellow. The printhead stays on the same line. Now you print the magenta portion or portions that require magenta, such as red. You overstrike yellow from the previous pass to create red. You continue with cyan, printing cyan sections or overlaying to give blue, green, and black. After the cyan section is used, the printer skips over the clear section and is ready to restart the next line in yellow.

You have to carefully coordinate your program so that it overstrikes properly. If you just dumped text out to the printer, it would print some of it in yellow, the next part in magenta,

With this technique, you could get well over 40 possible colors. The color screen print program does a fair job of dithering the seven secondary colors to give the 16 colors used on the Commodore 64.

The problems with Okimate color now become evident. Although the ribbon cartridge allows quick, easy, and clean ribbon installation, it limits the quantity of ribbon. If Okimate chose to use a longer ribbon, the printer would have to be physically bigger as well to hold a larger ribbon cartridge. Color printing must always use three segments of ribbon, more than 24 inches per printed line. This uses up a ribbon three times as quickly, a ribbon that can only print 75 pages in black. You get about 10 color pages per ribbon, by Okidata's estimation. Each ribbon costs \$6.69.

Due to inevitable ribbon waste, some have suggested that you get more like 6-8 pages of color printing on the average. Overall, though, the Okimate-10 is an inexpensive, good quality printer, suitable for everyday listings and word processing, as well as for art. Its low decibel operation lets you print late into the night without giving your family or roommates nightmares. True Commodore compatibility makes the Okimate-10 an alternative to the MPS-801 worth considering.

Okimate-10 with Plug 'n Print kit  
Okidata  
532 Fellowship Road  
Mt. Laurel, NJ 08054  
\$239

# REVIEWS

## **Sight & Sound Music Software**

Arthur B. Hunkins

The 64's advanced synthesizer chip, SID, has inspired a spate of music software, much of it good, some of it outstanding. Now comes another entry that stands with the best: *Sight & Sound Music Software*. Sight & Sound, the company, is entering the market with a bang—11 new disk-based software and hardware products. This is significant software, attractively produced, and accompanied—for the more complex packages—by superior documentation.

A sampling of these new products is reviewed here, including two of four Computer Song Albums (*On Stage* and *Music Video Hits*), a mini-musical-keyboard overlay (the "Incredible Musical Keyboard"), and two important performance and/or arranging packages—*Kawasaki Synthesizer* (a two-disk performer/composer package) and *Music Processor*. I also received demos of the *Kawasaki Rhythm Rocker*, *Music Video Kit*, and *3001 Sound Odyssey*, and I've included a more brief look at these, too.

The programming geniuses behind *Sight & Sound* are Peter Englebrite and Ryo Kawasaki. Although Mr. Englebrite's credentials are not given, Ryo Kawasaki is a well-known jazz

guitarist/arranger from New York City with considerable recording experience. (See "Inside View" elsewhere in this issue.) A recent live demonstration (at a national music merchandising show) of his *Rhythm Rocker* and *Synthesizer* programs running together on two 64s—with Kawasaki alternately performing on each—was very impressive. These packages clearly have commercial grade, live-performance applications.

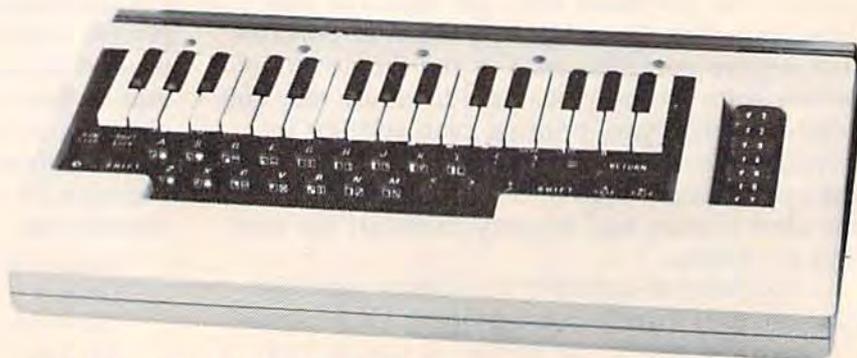
### **LPs On Disk**

Let's begin with Peter Englebrite's *Music Processor*, the creative vehicle behind a major projected series of "computer LPs," the Computer Song Albums. Each album (*Music Video Hits* and *On Stage* were the two

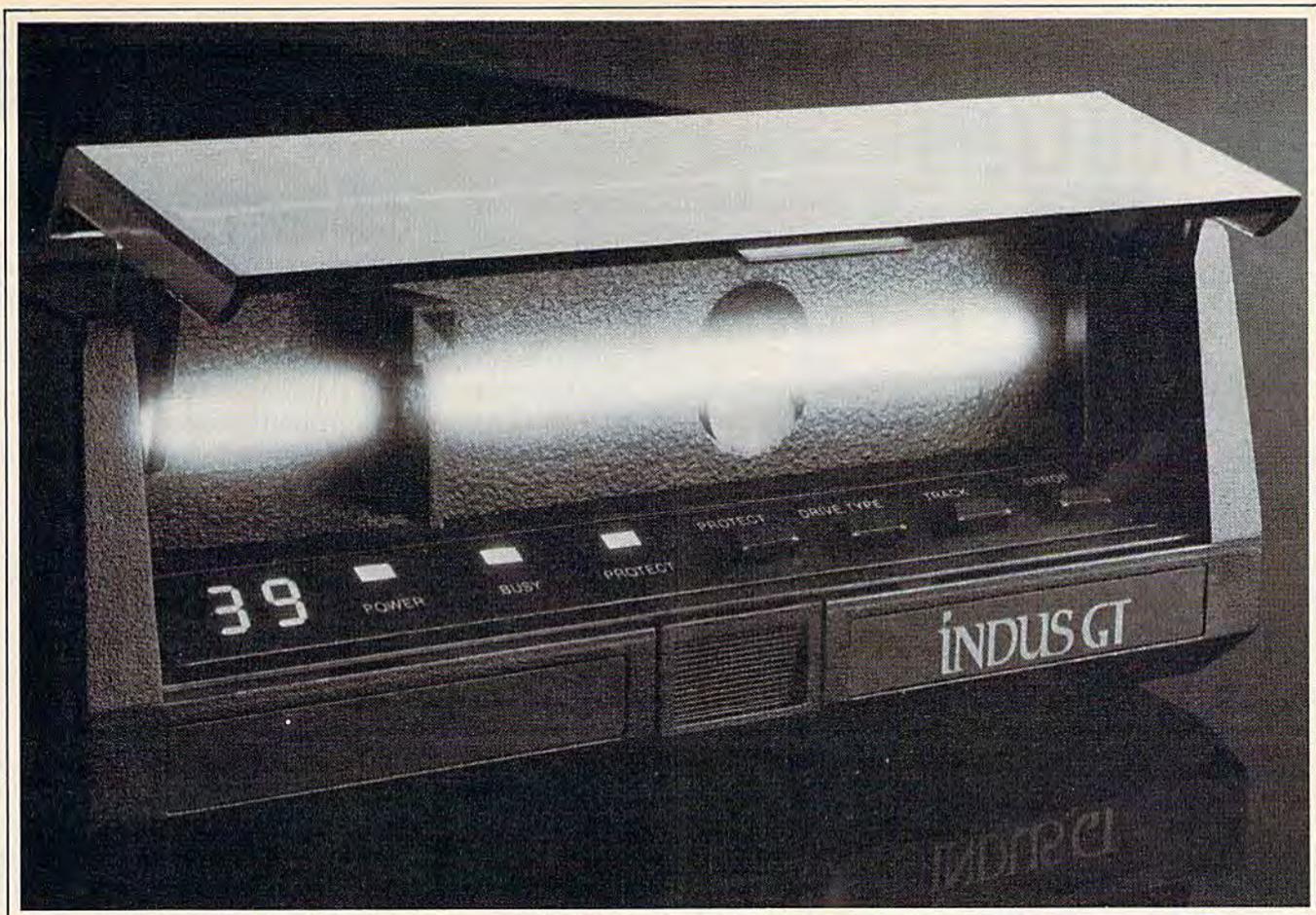
reviewed) consists of eight arrangements of current hit tunes. They can be played back singly, or continuously ("jukebox" mode). The user may select among ten preset voices (a different one for each of the three parts), and specify the tempo. Nine "special effect" settings are also available.

Aside from the dubious effects, the only point to question—the arrangements are otherwise quite good—is the instrument selection. Some of the choices are slightly off the wall. Most of the voicings are sustained; few short, lively options are included (this makes the arrangements somewhat bland, especially in conjunction with the unvarying volume and instrumentation).

Of course, instruments, tempo, and effects can all be varied "on the fly" by the user. Indeed, several important customizing options are available: Arrangements can be edited on the *Music Processor* (instruments



*The Incredible Musical Keyboard*



## What you get if you cross a Commodore 64 with a Ferrari.

**Y**ou get the incredible Indus GT™ disk drive. You get brains. You get beauty. But, that's not all you get. You get a disk drive that can handle 100% of Commodore's software. 400% faster.

You get the disk drive with the best service record around. With a one year warranty on parts and labor to prove it.

And, you get the only disk drive that comes with free software. Word processing. Spreadsheet. Database manager. Plus, a carrying case that doubles as an 80 disk storage file.

Most of all, you get luxury. From the sleek lines of its sound-proofed chassis to the responsive AccuTouch™ controls at the Indus CommandPost™. From the

LED display that keeps you in control of your Commodore to the air-piston operated dust cover that protects your disks and drive.

So, you know what you really get if you cross a Commodore 64 with a Ferrari? You get the best.



**INDUS™**

©Indus Systems, 9304 Deering Avenue, Chatsworth, CA 91311 (818) 882-9600. The Indus GT is a product of Indus Systems. Commodore is a registered trademark of Commodore Business Machines, Inc. Ferrari is a registered trademark of Ferrari North America, Inc.

[www.commodore.ca](http://www.commodore.ca)

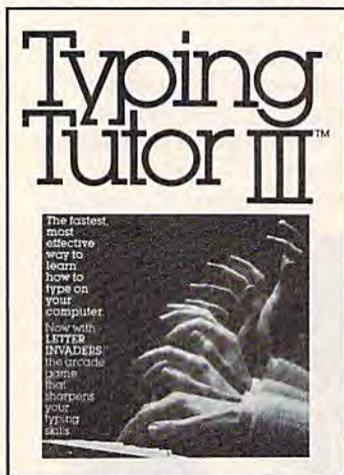
## IF YOU CAN'T TYPE, YOU CAN'T COMPUTE

Your computer productivity is directly proportional to your speed at the keyboard. That's why *Typing Tutor III™ with Letter Invaders™*:

- Automatically adjusts to your abilities and progress;
- Tests words, numbers, and full keyboard, as well as through a standard speed test;
- Features *Letter Invaders*, an arcade-style game that lets you take an entertaining break while sharpening your typing skills at the same time.

Called "the most miraculous of programs" by *The Whole Earth Software Catalog*.

Available for the IBM PC, Apple II/II+ /IIe/IIc, Apple Macintosh, and Commodore 64 wherever software is sold.



**BY KRIYA SYSTEMS™, INC.  
SIMON & SCHUSTER**

Typing Tutor III, Letter Invaders, and Kriya Systems, Inc. are trademarks owned by and licensed from Kriya Systems, Inc.

Simon & Schuster  
1230 Avenue of the Americas  
New York, NY 10020

and volume levels can be varied, for example), and animation may be added with the *Music Video Kit*. The normal video display is a treble and bass staff with the current notes/rests of the three voices displayed side by side (instead of vertically, as in musical score). For music with lyrics, the "sing-along" text is printed on the bottom two screen lines.

Englebrite's *Music Processor* is an excellent, powerful piece of composition/arranging software. Fourteen arrangements are included in the package, which is compatible with the *Music Video Kit*. A hint of this exciting potential is offered in the video accompaniment to *Kites* and *Squirm*, where the semi-abstract, hi-res color animation is simple, yet effective. *Music Processor* (like the *Kawasaki Synthesizer*) optionally makes use of the "Incredible Musical Keyboard" (see below), which is highly recommended. On the other hand, we should point out that *Music Processor* implements *all four rows* of the 64's keyboard as pitches, whereas the "Incredible Musical Keyboard" uses just the top two.

### A Choice Of 99 Instruments

A total of 99 instruments are available, ten of which can be used during actual performance, as with *Computer Song Albums*. Both an Edit and a Step mode are employed for note entry. Notes can either be typed in using the alphanumeric keys, or "played" as on a piano keyboard (the "Incredible Musical Keyboard" is indispensable here). In either case, music is entered a voice at a time; files of individual voices are saved,

then magically merged into a single score. You can even create special accompaniment files, which you can save, reload, and play along with.

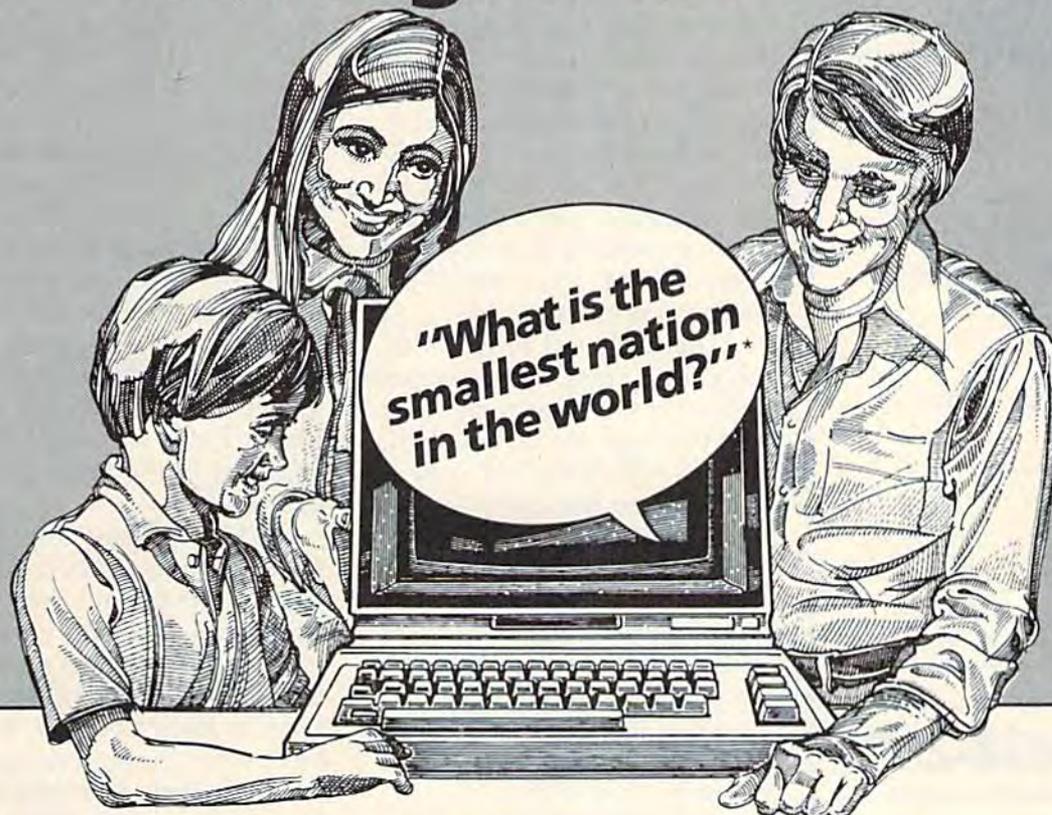
Many different commands and statement types are available in both modes. Instruments, tempos, text display and accentuation, colors, repeats, and other options can all be specified, and changed at any point in the arrangement. Step mode permits instant playback and editing, then moving either forward or backward to the next note.

As with *Song Albums*, a "jukebox" play mode is available. The program contains some powerful features not apparent (nor readily accessible) to the novice, but intriguing for the advanced programmer. Computer keys can be redefined for performance purposes. More importantly, the preset instruments *can be redefined*; the arranger can actually change any SID chip parameter through programming. It's not simple, but it is possible.

### "The Incredible Musical Keyboard"

It's open to debate just *how* "incredible" the "Incredible Musical Keyboard" (IMK) really is. This simple keyboard is clearly cost effective, mechanically reliable, and most useful for performing and coding data. It also comes with a very attractive post-90-day-guarantee replacement offer: \$10, or free with software order—which could be as low as \$25. IMK is a plastic, color-coordinated, nearly two-octave, miniature keyboard overlay that uses the top two rows of the 64's keys. The principle drawback is its tiny keys, which are shallow as well as

# Now you can turn your Commodore 64 into a talking trivia buff.



## Introducing TriviaTalker... for only \$39.95.

With the TriviaTalker disk your Commodore 64™ can play games of trivia along with you and your family. It asks you questions out loud using the sound interface device already in your Commodore. It corrects you when you're wrong and congratulates you when you're right. TriviaTalker comes with a built-in timed response scoring system. The faster you answer the multiple choice questions, the higher your score.

You can also confound the trivia pros by adding your own questions to the game. And that can make for some exciting, creative trivia parties or educational tutoring for your family.

TriviaTalker includes five different categories of trivia and knowledge: American History, Sports, Science, Entertainment, and Geography.

If you're not a trivia buff, for only \$19.95 the Votalker voice synthesis disk allows your Commodore 64 to speak with a truly unlimited vocabulary. It can say anything you can type. You can program the Votalker for other games, for education, for personal programs—applications as limitless as your mind (and mouth). (Votalker is already included in the TriviaTalker program.)

**To order call 1-800-453-4001** (in Utah 1-800-662-8666). VISA and MasterCard accepted. Or send a money order to Votalker, 1394 Rankin, Troy, MI 48083. U.S. dollars only. Please add \$2.00 for shipping and handling. Michigan residents add 4% sales tax. Allow 2-6 weeks for delivery.

\*The answer is San Marino.

# MICROTRIVIA

is

## Macro Fun!



For Family Entertainment  
Music • Graphics  
Over 1000 Questions

- sports
- history
- science (includes computers)
- geography
- music, movies, television
- literature & art
- grab bag
- special kids questions for ages 5-12

C64 version requires disk drive  
IBM PC version requires DOS and double-sided disk  
drive, color graphics adapter is optional

### 1-800-638-2000

Inside Md. call 1-800-831-4300

Microtrivia (a \$29.95)

C64  IBM

Postage & handling \$2.50  
(outside U.S. \$5.00)

Md. residents add 5% sales tax

Total

Payment Enclosed

MasterCard  Visa  Am. Exp.



Acct. # \_\_\_\_\_

Exp. Date \_\_\_\_\_

Please Print

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_



**Owl Software Corp.**

P.O. Box 809

Greenbelt, Md. 20770

## REVIEWS

narrow. To achieve any speed, a new playing technique is required. On the other hand, as Kawasaki has amply demonstrated, facility is not impossible to acquire; and many performers/arrangers will not be inhibited by this format in any case. The keyboard spans two octaves only, minus one note—from C to B. A top C is sorely missed; it's a real shame it wasn't included.

The keyboard program is polyphonic, playing up to three notes at once. It does exhibit, however, one crucial problem with chords: Some key combinations are not correctly encoded. This is not to be blamed on the keyboard or software; it's a problem caused by the way the computer reads keypresses. Although all triads work correctly, other combinations of notes can be disastrous: For example, a-c-d gives b-c-d, as does a-b-c; c-d-e gives d-e-f. Another apparent bug is that "held" voices sometimes retrigger when other voices move. All voices have the same tone color with IMK software (this is not required in *Kawasaki Synthesizer*—see below).

On the positive side, a considerable variety of menu options is available to the user during performance. You can choose slide or vibrato, one of three instruments (piano, synthesizer, or bass), specify volume and octave, or insert Pitch Bend, which slides upward only; it hops back down to the original pitch when released. The Slide is single speed-moderate (it gives unpredictable—if fascinating—results in chordal settings).

The real bonus in this pack-

age, however, is the comprehensive demo of Sight & Sound software. (For display purposes, the demos can run in perpetual rotation.) Indeed, IMK is probably worth getting just to look at all these goodies. Demos include: *Kawasaki Synthesizer*, *Kawasaki Rhythm Rocker*, *Music Processor*, *3001 Sound Odyssey*, and a Computer Song Album (the latter a complete rendition of "Sweet Dreams Are Made Of This," with highlighted, "bouncing ball" text.) *Music Processor* even includes a brief Music Video Kit animation not included in the *Processor* package itself.

The programs not otherwise reviewed here—*Kawasaki Rhythm Rocker* and *3001 Sound Odyssey*, a SID chip tutorial and panel synthesizer/composer—both appear to be outstanding. *Rhythm Rocker* permits bass and percussion programming against real-time melody performance (optionally on the IMK); it integrates hi-res, coordinated color graphics into a single program—a veritable media tour de force.

Equally impressive, in a different way, is *3001 Sound Odyssey*. This electronic music tutor is a catchy, animated introduction to digital hardware synthesis. The synthesizer portion of the program is a virtually complete implementation of SID; it includes not only filter enveloping (through ADSR3), but permits use of oscillator three as a control in the sub-audio range. This may well be the way to introduce electronic music concepts and experiences to young people. The method appears conceptually sound and powerful, as well as clever and inexpensive.

## The Kawasaki Synthesizer

*Kawasaki Synthesizer* is a two-disk package consisting of *The Performer* and *The Composer*. *The Performer* works with either the Commodore keyboard (top two rows) or the "Incredible Musical Keyboard." You can use vibrato, pitch bend (again, *up* only, hop down), or sweep (a giant sweep up, switching down on release). There are also a synchronized graphics/music demo, Kawasaki Space Dance Theatre, 21 preset instrumental/effects options, and 13 songs—including two "LPs" (which illustrate *The Composer's* multfile chaining mode). Each of the presets can incorporate any of the four waveforms, including noise, which are selectable independently of the instrument. You also choose monophonic or three-voice polyphonic mode, and have the option of playing the lead line to a "bass and drums" sequenced accompaniment. As with *Music Processor*, the program has some trouble decoding certain combinations of keys (chords).

A more important disk is *The Composer*. In contrast to the *Music Processor*, *The Composer* is sequencer-based. Time is marked in beats; each beat is a single sequencer stage where an event (or rest) can "happen." There are 255 stages per memory bank, and nine banks. Each voice requires a different bank, so that the (up to) three voices must divide up the nine banks. There are many possibilities.

Two main displays are used: the Keyboard Page and the Sound Editing Page. The Keyboard Page permits per-

formance using the upper rows of the 64 keyboard, or the IMK. You have options of accompaniment sequence, choice of waveform, keyboard octave, wah-wah, and vibrato. You can also select monophonic or polyphonic mode. Monophonic mode offers a split keyboard (in halves), with considerable distance between the two octaves. In contrast to other programs, *Synthesizer* implements different tone colors for polyphonic voices (when they have been previously defined on the Sound Editing Page). There are some limits to polyphonic mode, not the least of which seems to be a major bug: The notes apparently cannot be stuck together. In the split keyboard mode, there are also tradeoffs: no vibrato, and no polyphony.

On the Sound Editing Page, instruments are created and parameters set. Here is a wide range of options for recreating individual voicings (sets of three are saved as "sound files" independent of compositions). You can easily specify envelopes, filter and pulse-width settings, and effects (ring modulation and sync). You also make basic waveform selection, but only after opting for a separate Mixer page.

Most, though not all, of SID's capability is implemented here, including those features most useful and relevant to the traditional performer/arranger. Certain choices have been simplified: only eight preset pulse-widths, resonances, and filter cutoffs are provided. The user should also be aware that a certain number of sound parameters are *not* saved as part of a



The main menu for the Kawasaki Synthesizer.

sound file; these include octave selection, wah-wah, and vibrato, which must be manually entered. A big help is the presence of a "play note" key, which allows you to instantly hear a voice at any given point.

Note sequences (that is, compositions) are entered by playing keys one sequence step (beat) at a time. There is even a special *rest* key. Pitches are also entered one *voice* at a time. The sequence display is color-coded, with appropriate pitch names so that note files can be easily and accurately deciphered. Documentation is superb; and particularly when working from the Sound Editing Page, it is *required* for steering through the intricacies of note entry, editing, saving, bank switching, etc. (Numerous onscreen reminders help greatly, but additional aid is needed.)

## Performer Or Arranger?

To compare *Kawasaki Synthesizer* with *Music Processor* in terms of composing/arranging is difficult. They represent two quite different approaches and styles. *Synthesizer* appeals more to the keyboard performer; it is faster

# REVIEWS

and intuitive, more spontaneous. *Processor* is primarily designed for the arranger, and reflects a more abstract orientation. Here one might work from a score, do more pre-planning, be interested in greater programming power and flexibility. One important difference: Instruments and instrument defi-

nitions can be changed during a *Processor* arrangement; they remain fixed in *Synthesizer*. My advice is to pick the program that best suits your methods.

All of these products (Computer Song Albums excluded) are important software/hardware contributions to 64 music synthesis. They are rea-

sonably priced, brilliantly programmed, attractively packaged. They are useful to hobbyists, for an introduction to electronic music, as a vehicle for creative experimentation, even for commercial applications. *Sight & Sound's* approaches to "making music" are varied, and appeal to different needs. In summary, *Sight & Sound* means top quality music software. I highly recommend their products to all music enthusiasts.

*Sight & Sound Music Software, Inc.*  
3200 South 166th St.  
New Berlin, WI 53151

Music Video Hits (Computer Song Album)—disk, \$24.95

On Stage (Computer Song Album)—disk, \$24.95

Music Processor (disk), \$34.95

Incredible Musical Keyboard—plastic keyboard overlay and disk, \$49.95

Kawasaki Synthesizer (two-disk set), \$49.95



*New Technological Breakthrough!*

## ULTRABYTE DISK NIBBLER

The Ultimate Bit by Bit Disk Duplicator  
For The Commodore 64 and 1541 Disk Drive

ULTRABYTE DISK NIBBLER COPIES  
ALL SOFTWARE EXCEPT ITSELF

**SATISFACTION GUARANTEED**

Return for refund within 10 days  
if not completely satisfied

**\$ 39.95**

Introductory Price

plus \$ 3.00 Shipping and Handling  
MASTERCARD, VISA, CHECK, or M.O..  
Foreign Orders or COD Add \$ 2.00  
Calif. Add 6.5% (\$ 2.60) Sales Tax

BACKUP COPIES \$ 20.00 PLUS \$ 3.00 SHIPPING

Based on new proprietary Disk Operating System (DOS) that reads and writes bits on the disk independent of format. This process, called nibbling, treats disk errors, extra sectors, renumbered tracks and other protection schemes exactly the same as ordinary data.

- Simple to use. Just load and run
- Fast. Copies entire disk on single 1541 in 8 minutes
- One easy step. No separate analysis or error production
- Uses revolutionary Track Scan Technology to make an exact replica of the original disk.

Write or Call 24 Hour Order Line

ULTRABYTE (818) 796 - 0576  
P.O. Box 789 La Canada, CA 91011

SOFTWARE AUTHORS PLEASE WRITE

## The Factory And The Pond

Neil Randall

One of the more difficult problems in primary education is pattern recognition. It is an implied goal in all subjects, rather than an explicit single subject. But pattern recognition may be the most important part of all formal education, based as it is on systems of logic. The problem is that, by itself, it can be both boring and seemingly irrelevant.

Enter computers. As with so many other things, the computer can turn boring routine into exciting novelty. If the program is done well, the student will learn without realizing he

# STEVE PUNTER'S NEWEST C-64 WORD PROCESSOR

## FEATURING:

- 40 to 160 column video display
- Single pass double column output
- 100% proportional printing capability
- Double sided printing with margin offsets
- Over 30 printers fully supported
- "Bump free" loading – MSD – 2 compatible
- Automatic spelling corrections with Spellpro™

**49<sup>95</sup>**

Toll Free Order Line

**1-800-387-3208**



**PRO-LINE  
SOFTWARE**

755 The Queensway East, Unit 8, Mississauga, Ontario, Canada L4Y 4C5 . Phone 416-273-6350

## Even If You Never Prepared a Tax Return Before... **MANY HAPPY RETURNS**™.

Guides the Beginner or Expert C-64\* or VIC-20\* Owner to Tax Savings

Prepares Individual or Small Business I.R.S. and State Tax Returns



"I Got Many Happy Return\$!"

When Mailing Check or Money Order  
Please State Machine Type and Memory  
OPTIONAL PRINT TO STANDARD I.R.S. FORMS  
(FRICTION-FEED PRINTER IS REQUIRED)  
Add \$3.00 Shipping and Handling  
C.O.D. \$5 Extra FOB Cleveland  
3% Surcharge on Credit Card Orders  
DEALER INQUIRIES INVITED

### A Message from the Program Author:

Taxes are frequently Over-Paid. Regardless of who prepares your tax return . . . you, a brother, an uncle or spouse . . . even a professional tax preparer can unintentionally miss a credit, a deduction or choose a method of filing that costs you extra tax dollars.

Using "Many Happy Returns" can mean KNOWING you won't OVER-PAY your tax again! This program uses I.R.S.-approved strategies included in each program I've written since 1978. These strategies combine with the computer to eliminate costly human error and can result in Maximum Tax Savings for you.

Even if you've NEVER prepared a tax return or aren't familiar with computers, with "Many Happy Returns" guidance you can complete your tax return quickly and correctly. As when sitting down with a good professional tax preparer, the program presents a dialog of simple Yes/No questions, then analyzes the answers to determine the correct forms/schedules to file. Previous tax or programming experience is not required.

I feel this program can save you more than its cost, and, it comes with a MONEY-BACK GUARANTEE. You can enjoy KNOWING you paid the least tax this year.

**ORDER YOUR COPY TODAY! Thanks and . . .  
MANY HAPPY RETURNS!  
Bill Novak**

**Vertical Horizons, Inc.**  
2299 West Eleventh Street  
Cleveland, Ohio 44113  
(216) 696-5093

### Pathfinder Edition

Accommodates the needs of most taxpayers. Does 16 forms/schedules/credits including 1040, A, B, D, E, G, W, Child Care Credit, Alimony Payments, Minimum Tax, Marriage Credit, Income Averaging, and Political Contribution Credits. Does all Tax Table calculations (no need to look up tax as required with some programs). Itemized deductions, and more . . . **\$69.95**

### Pathfinder/Pro Edition

All above PLUS schedules C and SE for small Business, 2106 Employee Business Expense Credits, 2119 Sale/Exchange of Residence Credit. **\$99.95**

### State Tax Edition

Simultaneously performs with above editions to complete NY, CA, or OH State Tax Return. **\$14.95**

- Designed for Beginner or Expert Users
- Compares filing Joint/Separately
- Swaps dependents to find lowest tax
- Print to screen or I.R.S. forms
- Performs all math calculations
- Normal shipment within 24 hours
- Help a phone call away
- 1/2-Price on Enhanced Annual Updates
- Available for Commodore-64\* or 8k-plus VIC-20\* on Disc or Cassette
- Other forms/schedules available on request
- Disc Save of Info for Future Use
- Toll-free order hot line
- MONEY-BACK GUARANTEE

### COST IS TAX-DEDUCTIBLE

\*Trademark of Commodore Business Machines



To Order or for More Information

CALL TOLL-FREE

**1-800-547-3000**

ASK FOR TAX DEPT. A

or she has done so. And if the program is done exactly right, the student will return to it again and again.

*The Factory* and *The Pond* are two educational games for the 64 from Sunburst Communications which explicitly attempt to teach pattern recognition. According to the packaging, they're designed for ages seven and up, but Sunburst's flyer lists *The Factory* as nine to adult. No matter, for both are useable—with help from parents—by younger players as well.

## Learning By Creating

*The Factory* asks you to build a factory in order to make a product. The opening page asks you to choose one of three activities: Test a Machine, Build a Factory, or Make a Product. Testing a machine is essentially a demonstration of each of the three types of machines available. To build a factory, you combine machines to create a unique product. The game appears in the third option, Make a Product, where you are shown a product and asked to match it.

The product you begin with is simply a square of "raw material." With the help of three types of machines, you can turn this raw material into a finished product. The Punch machine lets you punch either round or square holes in the material. You can command the machine to punch one, two, or three evenly spaced holes. With the Stripe machine, you can paint a stripe across the middle of the material. Thin stripes, Medium stripes, or Thick stripes are all possible. Finally, the Rotate machine turns the material 45, 90, 135, or 180 degrees.



*The Factory teaches the child how to use machines to build a product.*

The idea is to use a combination of machines to create a unique product. When building a factory, you can use up to eight machines—in any combination of the above three types—to create an attractive product with stripes and holes. For instance, you can set up your factory so that the first machine will paint a thin stripe across the middle, the second machine will punch three round holes along that stripe, the third machine will rotate the material 90 degrees, the fourth will paint a thick stripe across the material, and so on. By combining the machines in the right order, it's possible to produce a very attractive product.

In Make a Product, the program gives you a ready-made product to copy. You must build a factory to produce that product. Three levels of difficulty allow you to tailor this activity towards just about any age group within the 6–16 range. A typical product in the Easy category would be one with a Thin stripe and a Thick stripe crossing at right angles. A Hard product would possibly have three stripes of varying thickness, three circular holes, and two square holes. The Hard series is instructive for any age group, including adults. It requires considerable thought to

reproduce the product exactly.

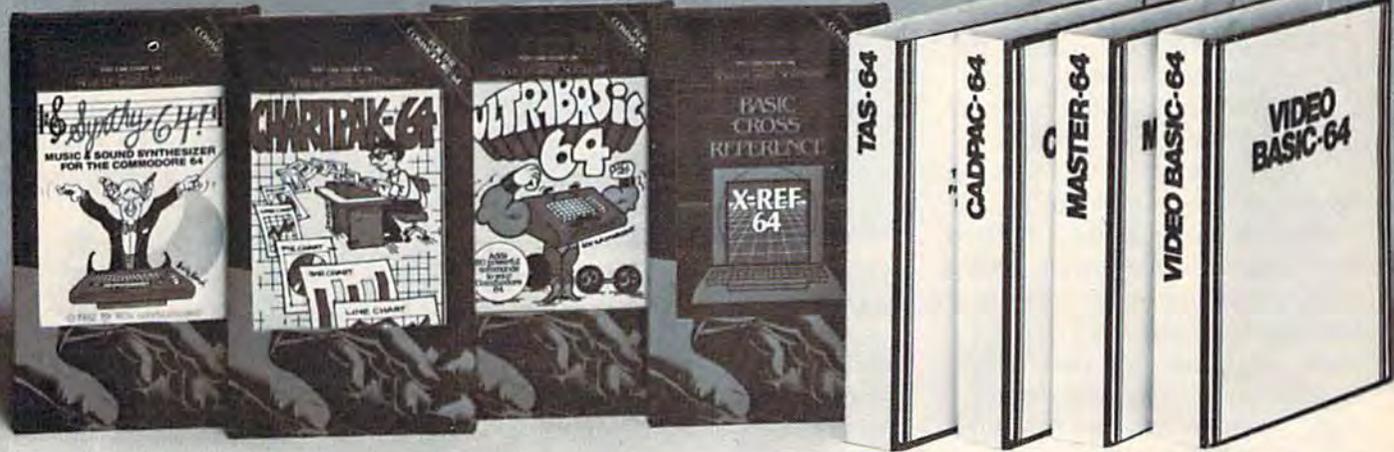
One of the better aspects of *The Factory* is the distinction between being creative and being tested. Make a Product is a test, to see how well you understand how machines work together. Build a Factory, by contrast, is purely creative: You may build factories and create products to your heart's content, without worrying about failure or frustration. Sunburst obviously understands that there is room in education for both types of activity. In this sense alone, *The Factory* is a superb educational program.

## A Frog Faces A Dilemma

*The Pond* is about a frog. What you do is help him find his way across a pond. He can get there only by hopping on lily pads, which are placed on the pond in some kind of pattern. You must tell the frog to hop a certain number of lily pads to the left, then a certain number to the right, then a certain number up, and so on. After you've given the frog the pattern, he'll follow it to see where he ends up. If you've been successful, he gets across the pattern; if not, he ends up in the water.

There are six different ponds, each representing a level of difficulty. Farmer Jane's ponds (the easiest) and Billy Bob's ponds require a two-step pattern. That is, the frog will have to jump a continuing pattern of, say, three to the right and one down. By repeating this pattern, the frog gets across the pond. The Puzzle ponds and The Lost Ponds are three-step patterns. The Maze ponds and the Twister ponds (the most difficult) are four-step patterns. A

# GET THE MOST OUT OF YOUR COMMODORE-64 WITH ABACUS SOFTWARE



## XREF-64 BASIC CROSS REFERENCE

This tool allows you to locate those hard-to-find variables in your programs. Cross-references all tokens (key words), variables and constants in sorted order. You can even add you own tokens from other software such as ULTRABASIC or VICTREE. Listings to screen or all ASCII printers.

DISK \$17.95

## SYNTHY-64

This is renowned as the finest music synthesizers available at any price. Others may have a lot of onscreen frills, but SYNTHY-64 makes music better than them all. Nothing comes close to the performance of this package. Includes manual with tutorial, sample music.

DISK \$27.95 TAPE \$24.95

## ULTRABASIC-64

This package adds 50 powerful commands (many found in VIDEO BASIC, above) - HIRES, MULTI, DOT, DRAW, CIRCLE, BOX, FILL, JOY, TURTLE, MOVE, TURN, HARD, SOUND, SPRITE, ROTATE, more. All commands are easy to use. Includes manual with two-part tutorial and demo.

DISK \$27.95 TAPE \$24.95

## CHARTPAK-64

This finest charting package draws pie, bar and line charts and graphs from your data or DIF, Multiplan and Basicalc files. Charts are drawn in any of 2 formats. Change format and build another chart immediately. Hardcopy to MPS801, Epson, Okidata, Prowriter. Includes manual and tutorial.

DISK \$42.95

## CHARTPLOT-64

Same as CHARTPAK-64 for highest quality output to most popular pen plotters.

DISK \$84.95

DEALER INQUIRIES ARE INVITED

## FREE CATALOG Ask for a listing of other Abacus Software for Commodore-64 or Vic-20

DISTRIBUTORS

**Great Britain:**  
ADAMSOFT  
18 Norwich Ave.  
Rochdale, Lancs.  
706-524304

**Belgium:**  
Inter. Services  
AVGillaume 30  
Brussel 1160, Belgium  
2-660-1447

**France:**  
MICRO APPLICATION  
147 Avenue Paul-Doumer  
Rueil Malmaison, France  
1732-9254

**New Zealand:**  
VISCOUNT ELECTRONICS  
306-308 Church Street  
Palmerston North  
63-86-696

**West Germany:**  
DATA BECKER  
Merowingerstr 30  
4000 Dusseldorf  
0211/312085

**Sweden:**  
TIAL TRADING  
PO 516  
34300 Almhuft  
476-12304

**Australia:**  
CW ELECTRONICS  
416 Logan Road  
Brisbane, Queens  
07-397-0808

Commodore 64 is a reg. T.M. of Commodore Business Machines

## CADPAK-64

This advanced design package has outstanding features - two Hires screens; draw LINES, RAYs, CIRCLES, BOXEs, freehand DRAW; FILL with patterns; COPY areas; SAVE/RECALL pictures; define and use intricate OBJECTS; insert text on screen; UNDO last function. Requires high quality lightpen. We recommend McPen. Includes manual with tutorial.

DISK \$49.95

McPen lightpen \$49.95

## MASTER 64

This professional application development package adds 100 powerful commands to BASIC including fast ISAM indexed files; simplified yet sophisticated screen and printer management; programmer's aid; BASIC 4.0 commands; 22-digit arithmetic; machine language monitor. Runtime package for royalty-free distribution of your programs. Includes 150pp. manual.

DISK \$84.95

## VIDEO BASIC-64

This superb graphics and sound development package lets you write software for distribution without royalties. Has hires, multicolor, sprite and turtle graphics; audio commands for simple or complex music and sound effects; two sizes of hardcopy to most dot matrix printers; game features such as sprite collision detection, lightpen, game paddle; memory management for multiple graphics screens, screen copy, etc.

DISK \$59.95

## TAS-64 FOR SERIOUS INVESTORS

This sophisticated charting system plots more than 15 technical indicators on split screen; moving averages; oscillators; trading brands; least squares; trend lines; superimpose graphs; five volume indicators; relative strength; volumes; more. Online data collection DJNR/S or Warner. 175pp. manual. Tutorial.

DISK \$84.95

AVAILABLE AT COMPUTER STORES, OR WRITE:

Abacus  Software

P.O. BOX 7211 GRAND RAPIDS, MICH. 49510

For postage & handling, add \$4.00 (U.S. and Canada), add \$6.00 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  
[www.commodore.ca](http://www.commodore.ca)

## REVIEWS

wide variety of patterns is available, so you will not likely see the same one too often. And the difficult patterns are indeed difficult; even adults will have trouble picking out the patterns without a fair bit of practice.

The number of steps in the pattern is the number of unique portions of a continuing pattern. The frog will follow that pattern until the last step, then return to the first step and start over again. In a two-step pattern, for example, you may enter one-right, three-down; the frog will hop one to the right, then three downward, one to the right again, three downward again, and so on. Naturally, four-step patterns are far more difficult to pick out; frequently the pattern is not complete on the screen when you start.

To help pick out the pattern, you may use the cursor keys to move the frog along the lily pads. After a few jumps, you should know it. In the hardest ponds, though, you may try several times before you finally understand the pattern. Often, as is the case in most pattern recognition exercises, the correct pattern is obvious only after you know it. If you're stuck, you can ask for help. The program will flash the correct pattern on the screen, or it will even show you the entire pond (at a different scale). Thus, frustration can be avoided.

The program is divided into practice and game. Practice is just that: You choose a pond and practice getting the frog across. The game portion is more involved, requiring that you complete three puzzles at each of the six ponds. You can play either solitaire or with another player.

Basically, the game portion



Pattern recognition is taught in *The Pond*.

involves losing as few points as possible. You start with 35, losing points each time you either move the frog manually or ask for help. For example, if you use the cursor keys to move the frog for seven lily pads—to find the pattern—you lose seven points. More seriously, if you ask to see the whole pond in the help menu, you lose 15 points. Thus, you lose the fewest points by asking for the least amount of help. At each new level, you get 35 new points to work with. By the time you reach the last two levels, you'll likely need all of them. The object of the game is simply to get through the Twister ponds first; if you succeed, the program provides a little graphic surprise.

Both *The Factory* and *The Pond* are appealing programs. Each has a Program Guide, a well-written, graphically detailed explanation of the program. The Program Guide leads you through the workings of the program in a tutorial fashion, so that getting into the game takes little time.

The programs may be too difficult for younger children to understand by themselves, at least without considerable practice. In both games, it may be necessary for a parent, or an older sibling, to start them off. After that, it will still be difficult

for a seven-year-old, but fine for a slightly older child. This is far from a criticism, though, since it is best for a parent to supervise educational software use, anyway. Children above the age of nine, however, should be able to use and enjoy both programs easily.

The *Factory* and *The Pond*  
Sunburst Communications, Inc.  
39 Washington Avenue  
Pleasantville, NY 10570  
\$34.95 each (disk)



## Also Worth Noting

### Eliza

*Eliza* is not a new product, but many readers may be unaware of this fascinating and instructive "computer psychotherapist" program which traces its history back to a mainframe computer at MIT.

In 1965, computer pioneer Dr. Joseph Weizenbaum created *Eliza* as a spoof of nondirective psychotherapy. *Eliza* asks questions, responds to your answers in nonjudgmental ways, and gently probes your thoughts and feelings. It remains an interesting experiment in artificial intelligence simulation, even if the program routines soon become obvious to you.

The Commodore 64 version of *Eliza* produced by the Artificial Intelligence Research Group has two attributes which make it well worth the \$45 purchase price. First, it's a full equivalent

# FOR '64 USERS ONLY!

## THE ANATOMY OF THE C-64

insider's guide to the lesser known features of the '64. Includes graphics, sound synthesis, I/O control, sample programs using kernel routines, more. For those who need to know, includes complete disassembled and documented ROM listings.

ISBN-0-916439-00-3 300pp \$19.95

## ANATOMY OF 1541 DISK DRIVE

unravels mysteries of using misunderstood disk drive. Details use of sequential, relative and random files. Includes sample programs: FILE PROTECT, DIRECTORY, DISK MONITOR, BACKUP, MERGE, COPY, others. Describes DOS kernel with disassembled and documented 1541 ROMS listings.

ISBN-0-916439-01-1 320pp \$19.95

## MACHINE LANGUAGE FOR C-64

write faster, more efficient programs in machine language. Specifically geared to '64 features. Learn all 6510 instructions. Includes 3 full length programs: ASSEMBLER, DISASSEMBLER and amazing 6510 SIMULATOR to "see" each operator on the screen.

ISBN-0-016439-02-x 200pp \$14.95

## TRICKS & TIPS FOR THE C-64

collection of easy to use programming techniques. Perfect companion for those hard to solve problems. Covers advanced graphics, ease data input, CPM, POKEs, BASIC enhancements, character sets, joystick/mouse simulation, transferring data between computers, more. A treasure chest.

ISBN-0-916439-03-8 280pp \$19.95

## ADVANCED MACHINE LANGUAGE FOR C-64

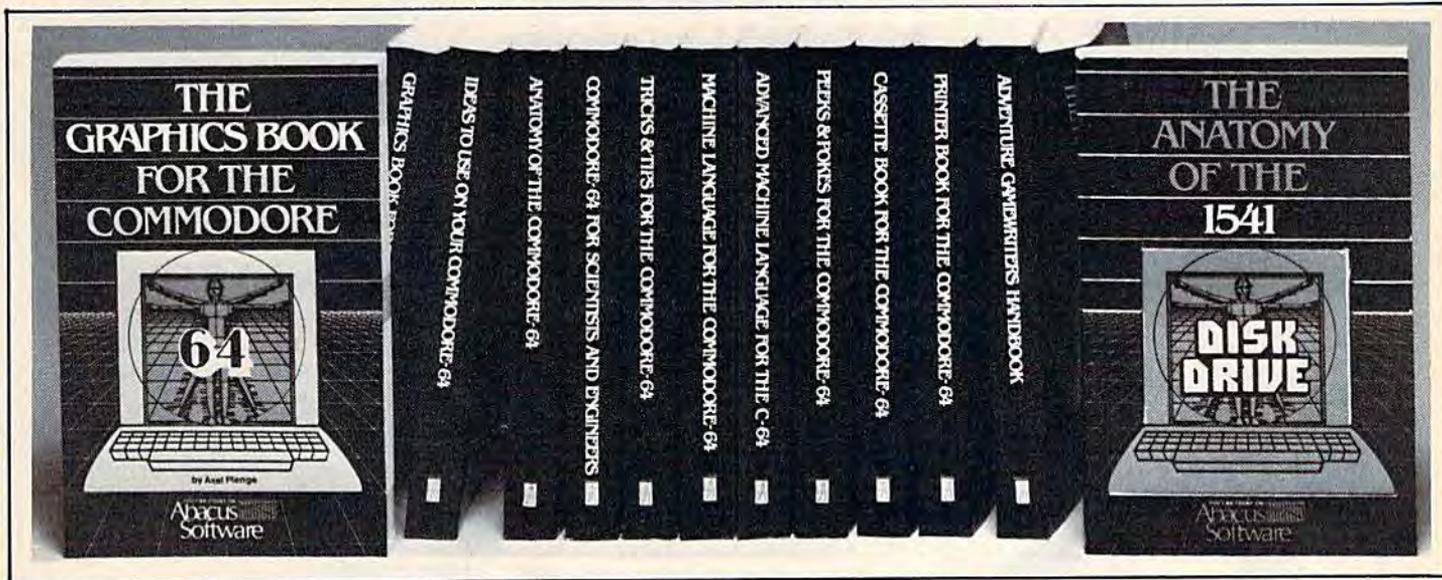
author L. Englisch clearly explains some very detailed subjects: interrupts, video controller, timer, real time clock, parallel and serial I/O, extending BASIC, tricks and tips from machine language, more.

ISBN-0-916439-06-2 210pp \$14.95

## IDEAS TO USE ON YOUR C-64

wondering what to do with your '64?, we suggest dozens of possibilities including complete program listings for many, many uses. Themes such as auto expenses electronic calculator, construction estimator, health diet plans, store window advertiser, computer poetry, party invitations and more.

ISBN-0-916439-07-0 200pp \$12.95



## CASSETTE BOOK FOR C-64 (or Vic 20)

all information needed to use and program datasette. Many exmple programs. Includes new operating system for fast loading and saving of files.

ISBN-0-916439-04-6 200pp \$14.95

## ADVENTURE GAMEWRITERS HANDBOOK

Writing adventure games! Here's a handbook with suggestions and hints for you. Includes an adventure program generator to simplify your projects.

ISBN-0-916439-14-3 220pp \$14.95

## GRAPHICS BOOK FOR C-64

from fundamentals thru advanced topics this is most complete reference anywhere. Covers character sets, moving sprites, drawing in HIRES and MULTICOLOR, using lightpens, handling IRQs, 3D graphics, projections, curves, animation. Dozens of examples.

ISBN-0-916439-05-4 350pp \$19.95

## PRINTER BOOK FOR C-64

for your understanding of MPS801, 1520, 1525, 1526, Epson and most dot matrix printer. Packed with examples and utilities. Learn hardcopy of text and graphics, secondary addresses, plotting in 3D, much more. With MPS801 ROM listings.

ISBN-0-916439-08-9 350pp \$19.95

## SCIENCE / ENGINEERING C-64

topics include linear/non Linear regression, CHI square, Fourier analysis, matrix calculations, more. Programs from physics, chemistry, biology, astronomy, electronics, etc. Describes variable types, computational accuracy, sort algorithms. Many program listings.

ISBN-0-916439-09-7 250pp \$19.95

## PEEKs AND POKEs FOR C-64

Fast and simple techniques for programming. Make your 64 do things that previously required much programming.

ISBN-0-916439-13-5 180pp \$14.95

## DEALER INQUIRIES ARE INVITED

### IN CANADA CONTACT:

The Book Centre, 1140 Beaulac Street  
Montreal, Quebec H4R1R8 Phone: (514) 322-4154

### AVAILABLE AT COMPUTER STORES, OR WRITE:

**Abacus Software**

P.O. BOX 7211 GRAND RAPIDS, MI 49510

Exclusive U.S. DATA BECKER Publishers

For postage & handling, add \$4.00 (U.S. and Canada), add \$6.00 for foreign. Make payment in U.S. dollars by check, money order of charge card. (Michigan Residents add 4% sales tax.)

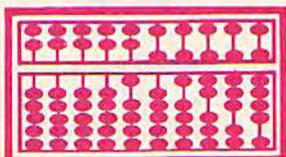


### FOR QUICK SERVICE PHONE (616) 241-5510

Commodore 64 is a reg. T.M. of Commodore Business Machines

You Can Count On

# Abacus



# Software

P.O. Box 7211 Grand Rapids, MI 49510

Exclusive U.S. Data Becker Publisher

www.commodore.ca

# REVIEWS

of the original MIT mainframe program, employing the same conversational power that makes *Eliza* seem so human. Some other versions available are reduced in power and therefore in function. Second, the BASIC source code is unprotected. You can break into the program anywhere and make all the changes you want. Add color and sound—even speech synthesis. Build the vocabulary. Personalize the program. It's also a good piece of work for beginning programmers to study.

Artificial Intelligence Research Group  
921 North La Jolla Avenue  
Los Angeles, CA 90046  
\$45

## Zenji

*Zenji* is a truly challenging maze game that combines the flavor of several Oriental board games with a two-dimensional version of the familiar rotating puzzle cube.

When the *Zenji* mazes first appear, they are disorganized and randomly oriented. Moving a disembodied Mandarin-style head (naturally), you must connect all the maze elements to the mysterious radiant *source*. When you reach a module that you wish to connect, position yourself in its exact center. Pressing the fire button and simultaneously moving the joystick left or right rotates the maze element—hopefully into contact with a section that's already connected to the *source*. You'll soon know if you've been successful, since the powerful green emanations from the *source* quickly flood any contiguous segments.

As you zoom around tying the maze together, you sometimes have the chance to pick up extra points. Don't slow down too much in quest of these ephemeral bonuses; you only have a short time to connect the maze. You're reminded of this not only by a screen timer, but also by an ominous increase in the tempo of the suitably atmospheric music.

In the midst of all this action, you have to figure out *how* to connect the maze. When you complete one, another maze—larger and more complex—appears. Your score is growing, but so are your problems. Eventually, in the larger mazes, you're avidly pursued by the Flames of Desire and some rapidly moving Sparks. If these touch you, you'll lose your head (and you only have four to play

with). Your only defense against these foes is to spin the module you're in. Thus, while the object is connection, the defense is disconnection. Perhaps *Zenji* is really an exercise in Eastern philosophy. Precision and patience play as great a part as strategy and swiftness.

Although final understanding of the *source* remains elusive, *Zenji* is an undeniably enjoyable game. Making progress is easy on the lesser levels. As you move into those realms where the *source* reveals more of itself, you'll find great challenges and perhaps ultimate peace-of-mind.

*Zenji* appears to be a multiplayer game, offering its mysteries to up to eight acolytes at a time. It also takes joysticks in both ports when set up for more than one player. There's no documentation concerning this, however.

Activision, Inc.  
Drawer 7286  
Mountain View, CA 94039  
\$31.95 (disk)  
\$34.95 (cartridge)

## VIP Terminal

*VIP Terminal* is a full-featured terminal program with such "extras" as 80-column display and support for up- and downloading. It uses a simple menu format to allow access to practically every possible communication configuration.

It would be difficult to find a communication situation that can't be handled with *VIP Terminal*. It supports nine different baud rates, programmable keys, three upload and download protocols, and autodialing for the 1650 Automodem. There's a built-in clock, a full screen editor, and many features which

[www.commodore.ca](http://www.commodore.ca)

## C-64 /VIC-20 RS-232 INTERFACE

\$ 39 95

MFJ-1238

Provides RS-232 voltage conversion for C-64/VIC-20 serial port. Use RS-232 printers, modems, speech synthesizers, other peripherals. Switch reverses transmit/receive lines. Use as null modem. 25 pin RS-232 connector. Plugs into user's port. 2¼x2¼ inches. C-64/VIC-20

## MODEM

\$ 49 95

MFJ-1237

High performance Texas Instrument single chip design. For C-64/VIC-20. Plug into user port. For single or multiline phones. Plugs into phone base. 300 baud. Direct connect. Originate/Answer Full duplex. Carrier detect LED. Crystal controlled. Includes Basic listing of Terminal Program.

Order from MFJ and try it. If not delighted, return within 30 days for refund (less shipping).

One year unconditional guarantee.

Order yours today. Call toll free 800-647-1800. Charge VISA, MC. Or mail check, money order.

CALL TOLL FREE . . . 800-647-1800

Call 601-323-5869 in MS, outside continental USA.

**MFJ ENTERPRISES  
INCORPORATED**

921 Louisville Road, Starkville, MS 39759

# SERIOUS 64 SOFTWARE

## INDISPENSIBLE TOOLS FOR YOUR COMMODORE 64



### PASCAL 64

Disk \$39.95

This full compiler produces fast 6502 machine code. Supports data Types: REAL, INTEGER, BOOLEAN, CHAR, multiple dimension arrays, RECORD, FILE, SET and pointer. Offers easy string handling, procedures for sequential and relative data management and ability to write INTERRUPT routines in Pascall Extensions included for hires and sprite graphics. Optionally link to ASSEM/MON machine language.

### ASSEMBLER MONITOR

This complete language development package features a macro assembler and extended monitor. The macro assembler offers freeform input, complete assembler listings with symbol table (label), conditional assembly. The extended monitor has all the standard commands plus single step, quick trace breakpoint, bank switching and more.

DISK \$39.95

### ADA TRAINING COURSE

This package introduces you to ADA, the official language of the Department of Defense and the programming language of the future. Includes editor, syntax checker/compiler and 110 page step by step manual describing the language.

DISK \$79.95

### DATAMAT-64

DISK \$39.95

This powerful data base manager handles up to 2000 records per disk. Select the screen format using up to 50 fields per record. DATAMAT 64 can sort on multiple fields in any combination. Complete report writing capabilities to all COMMODORE or ASCII printers.

### BASIC-64 COMPILER

DISK \$39.95

This is a full compiler that won't break your budget. Is compatible with Commodore 64 BASIC. Compiles to fast machine code and/or speedcode. Protect you valuable source code by compiling with BASIC 64.

### POWER PLAN 64

DISK \$49.95

This super spreadsheet features built in graphics. It's as simple to use as 1-2-. Power Plan 64 displays your choices on screen with help screens always available. Makes excellent graphs. Includes 300pp in depth user's manual.

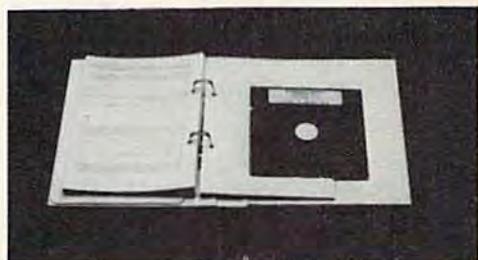
### TEXTOMAT-64

DISK \$39.95

This complete word processor displays 80 columns using horizontal scrolling. In memory editing up to 24,000 characters plus chaining of longer documents. Complete text formatting, block operations, form letters, on-screen prompting.

### OTHER NEW SOFTWARE COMING SOON!

All software products featured above have inside disk storage pockets, and heavy 3-ring-binder for maximum durability and easy reference.



### DEALER INQUIRIES INVITED

AVAILABLE AT COMPUTER STORES, OR WRITE:

**Abacus Software**

P.O. BOX 7211 GRAND RAPIDS, MI 49510

Exclusive U.S. DATA BECKER Publishers

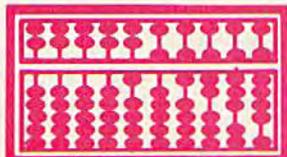
For postage & handling, add \$4.00 (U.S. and Canada), add \$6.00 for foreign. Make payment in U.S. dollars by check, money order or charge card. (Michigan Residents add 4% sales tax.)



FOR QUICK SERVICE PHONE (616) 241-5510

Commodore 64 is a reg. T.M. of Commodore Business Machines

You Can Count On  
**Abacus**



**Software**

P.O. Box 7211 Grand Rapids, MI 49510

Exclusive U.S. Data Becker Publisher

www.commodore.ca

allow you to customize your system for a particular communications situation. Documentation is thorough and presented very well.

The recently updated version of *VIP Terminal* now allows conversion from CBM ASCII to regular ASCII, and vice versa, as a part of the program. Also included has been a List Disk File feature to allow the user to print disk files which were virtually downloaded, but won't fit into the workspace for printing. The program will now work with the new Mitey Mo modem and the HES II modem as well as all other modems on the market.

In short, *VIP Terminal* is designed to give you maximum communications flexibility in an easy-to-use format. Written entirely in machine language, *VIP Terminal* is certainly worth consideration, especially if you use your computer for communication with many different systems.

*Softlaw Corporation*  
132 Aero Camino  
Goleta, CA 93117  
\$59.95 (disk)

## London Blitz

This is one of the more exciting and exacting computer games for the 64 to come along in a while. Spend an hour playing *London Blitz*, and you'll be hooked.

During World War II, the German Luftwaffe continually peppered England with bombs, many of which sat for hours, days, and even weeks before detonating. Members of the military bomb squads who were sent to disarm those unexploded bombs faced some of the most dangerous, sensitive, and complicated situations possible.

Avalon Hill has done a superb job of recreating the tension, excitement, and complexity which confronted these bomb disposal units. You race through the streets and expressways of London, locating and disarming unexploded bombs. There are five basic types of bombs, with several revisions of each type. A citywide map shows where bombs have dropped. Switch to the street screen, and find your way to the bomb site. Once you've arrived, you go about the delicate work of correctly decoding the bomb's numeric combination with the aid of an onscreen voltage tester. Virtually all of the action is controlled by joystick.

The tension quickly builds. As you begin working on a bomb, a timer beeps the remaining minutes and seconds available before explosion. You'll hear the shrill whistle of other incoming bombs which you must reach and disarm before they go off. The codes you must break for the first two types of bombs are not terribly difficult, but there are different sensitivities. If you rush, you're likely to end up in a cloud of smoke. Bomb types III, IV, and V get progressively more complex and sensitive.

You work your way from Lance Corporal through four other ranks to Second Lieutenant. A status screen shows your rank, a summary of the bombs dropped and disarmed, and your commanding officer's remarks about your competence. Take the time to thoroughly read the pages of documentation as the manufacturer suggests. You'll find *London Blitz* to be one of the most absorbing computer games in your collection.

*Microcomputer Games*  
*The Avalon Hill Game Company*  
4517 Harford Road  
Baltimore, MD 21214  
\$20 (cassette)  
\$25 (disk)

## Breakdance

For the 99 percent of us who never will—and never should—try to breakdance, Epyx has produced a colorful, musical simulation package with five different breakdancing games.

Using the computer's joystick, you'll soon be moonwalking, floor rocking, headspinning, popping, and floor flipping. The first game is a dance contest in which your onscreen character must mimic the moves of the neighborhood's hottest breaker. Game two pits you against an entire "rocket crew" of break dancers. Mimic their moves or you'll end up being danced off a dock and into the river. The third game is an even more strenuous exercise in matching the four-, six-, or eight-move routines of a computer controlled dancer.

One of the most enjoyable of the games is the fourth option, in which you choreograph your own dance. Choose from a menu of dance moves, change the speed of your dancer, and select from five different musical numbers. Finally, in the fifth game, you can put it all together in the Grand Loop as you go through all four games.

Epyx has put together a nice package of breakdancing scenarios with colorful, smoothly moving graphics, and lively music.

*Epyx, Inc.*  
1043 Kiel Court  
Sunnyvale, CA 94089  
approximately \$29-\$35 (disk)

# Enter the Age of Robotics

## The NOMAD robot! Fun and Educational!

- Complete with software
- Moves forward, reverse, left, right



- Stepper motor controlled
- Ultrasonic vision and ranging

**FUN!** Nomad has a mobile range of 25 feet. Accurate robot stepper motors control forward and reverse movement and left and right turning. Nomad's ultrasonic vision gives him the ability to detect objects, measure distance and sense motion. All of Nomad's circuitry and mechanics are contained within an aluminum chassis and tough plastic shell. The molded tray can be used to carry small items!

**EDUCATIONAL!** Teaching Nomad to find his way through a maze or trace geometrical shapes is a great way to teach programming logic to children and adults alike. And, Nomad's ultrasonic sight takes him beyond a standard "turtle". Nomad comes complete with his own robot language, and for the 64, BASIC enhancement software which adds new robot commands. A great way to make the transition from LOGO to BASIC!

Nomad comes complete with software on cassette or disk and a comprehensive user's manual for a retail price of just \$179.95.

Call 215-861-0850 to order direct or contact your local dealer.

Genesis Computer Corp. • P.O. Box 152 • Hellertown, PA 18055

Copies of articles from this publication are now available from the UMI Article Clearinghouse.

Yes! I would like to know more about UMI Article Clearinghouse. I am interested in electronic ordering through the following system(s):

- DIALOG/Dialorder     ITT Dialcom  
 OnTyme     OCLC ILL Subsystem  
 Other (please specify) \_\_\_\_\_  
 I am interested in sending my order by mail.  
 Please send me your current catalog and user instructions for the system(s) I checked above.

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Institution/Company \_\_\_\_\_  
Department \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Phone (\_\_\_\_) \_\_\_\_\_

**UMI Article Clearinghouse**

Mail to: University Microfilms International  
300 North Zeeb Road, Box 91 Ann Arbor, MI 48106



FOR COMMODORE 64™ and VIC 20™

TAX AID

TAX AID

USE **TAX AID**<sup>™</sup>  
TO PREPARE YOUR  
INCOME TAX RETURN

■ Developed by an experienced accounting firm, TaxAid is accurate, easy to use, and comes with a detailed manual. Your tax data is permanently stored on tape or disk. The cost is tax deductible and low cost yearly updates are available. ■ TaxAid is menu driven with advanced editing features and will prepare any IRS form 1040. Calculations are automatic and all tax tables including income averaging are built in. Results can be directed to the monitor or the printer.

Call or write for complete brochure

**TAX AID II**  
FOR VIC 20 WITH 16K

**TAX AID III**  
FOR COMMODORE 64

Disk or Cassette: \$29.95 + 1.50 shipping

**TAX AID SOFTWARE, INC.**

606 N. Second Avenue  
Two Harbors, MN 55616  
(218) 834-5012 or 834-3600



TAX AID

TAX AID

TAX AID

TAX AID IS A TRADEMARK OF TAX AID SOFTWARE, INC.

# MACHINE LANGUAGE FOR BEGINNERS

Richard Mansfield, Senior Editor

## Self-Modifying Programs

This topic isn't strictly for beginners. Self-modification is a rather sophisticated way to supercharge your programs, but beginners should be able to follow the ideas. In addition, we'll cover some associated topics such as how addresses are stored in ML, and present a useful fill routine which can be used in a variety of applications. The accompanying program, for example, will clear the high-resolution screen on the Commodore 64.

A subroutine which stores something into a large number of adjoining memory locations is called a *fill routine*. There are several ways to do it. To clear the high-res screen on the 64, for example, we'll want to stuff zeroes into the 8,000 bytes from address 8192 to 16191 (we'll assume that this is where your high-res screen is currently located).

One way to fill it would be to simply set up a series of STA instructions, each one using the ,Y addressing mode so that 256 bytes are filled at one time. We can fill, for example, a 512-byte large block of memory by this method:

```
      LDA #0
      LDY #0
LOOP   STA 8192,Y
      STA 8448,Y
      INY
      BNE LOOP
      RTS
```

Here we are putting a zero (the thing we're going to store in the bytes of memory during our fill) into the Accumulator and also setting the Y register to zero so it can act as a 256-event counter. The first time we go through the loop, a zero is stored into addresses 8192 and 8448.

Then we raise the Y register by 1 with INY and BNE (branch back if Y does not yet equal zero) to the LOOP again. Y will continue to count up until it goes past 255 and then resets itself to zero. At this point, we'll fall through the BNE and RTS back into BASIC or back to the JSR within machine language that called upon this subroutine.

### Risky Practices

Notice that the ,Y addressing mode *adds* the value of Y to the number. For example, when Y holds a 2, we'll be storing (STA) a zero into addresses 8194 (8192 + 2) and 8450. By this process, two blocks of 256 bytes are filled with zero.

However, to clear the high-res screen, we've got to fill 8,000 bytes and that would mean using the STA ?,Y (the ? means whatever address is appropriate) 32 times. There's an easier, faster way to fill large areas, but it's somewhat subversive. It's frowned upon in some programming circles. It's called *self-modifying code*, and many teachers and books warn you against using it.

Let's risk it, though, since it's a good way to achieve ultra-high-speed results in some programming situations. Essentially, we're going to dynamically change part of our ML program while it's running. We're only going to use STA ?,Y once instead of 32 times, and we're going to keep punching in new numbers which raise the address by 256.

Here's what it looks like in a complete program that will clear out the entire high-res screen of the 64:

# "...Darn near letter quality!"

The high quality, square dot technology used by Legend produces a character so clear, so crisp our users tell us it's "darn near letter quality!" We invite comparisons. In fact, we're so confident about our quality we'll be happy to send you an actual sample of legendary output, just for the asking. Legends are perfect for those important reports and proposals as well as regular office correspondence. The graphs and charts you create with Legend are stunningly good! All you have to choose is how fast you want to go. We use a top-quality carbon ribbon common to the world's most popular typewriter that makes each and every character clean and sharp. And we're so sure about the reliability of our Legends we guarantee our print head... for life!



The LEGEND 880 provides over forty fonts, all software-selectable and is rated at 80 cps but purrs along at a comfortable RTS of 104 characters per second. It's designed to work with all popular computers including IBM, most of the IBM-compatibles as well as Apple, TI and Commodore. And all this can be yours today at a really affordable price!



The LEGEND 1080, rated at 100 cps gives you the quality of the 880 at a faster RTS of 140 characters per second. And simple, easy-to-use switch settings bring forty fonts to your fingertips! True Epson compatibility means you can run all the popular software packages including Lotus 1-2-3, Symphony, Framework, Wordstar and more!



The LEGEND 1380 is perfect for high speed, high performance applications. Rated at 130 cps, it produces legendary print quality at an incredible RTS of 163 characters per second. Full IBM graphics compatibility along with downloadable character sets allows you to design your very own fonts and run all of the new IBM graphics software.

**Upgrade your printer buffer for only \$1.00.** For a limited time only you can upgrade the buffer in either your Legend 1080 or Legend 1380. See your dealer for all the details.

For more information about these and the full line of Legendary printers contact Legend Peripheral Products, 6041 Variel Avenue, Woodland Hills, Ca 91367. Telephone (818) 704-9100. Outside CA call toll-free 1-800-321-4484. Telex 662436.

## LEGEND PERIPHERAL PRODUCTS

Trademarks— IBM International Business Machines Corporation/ Epson - Epson America/ Lotus 1-2-3, Symphony/ Lotus Development Corporation/ Framework- Ashton - Tate/ Wordstar- MicroPro  
Apple - Apple Computer/ Commodore - Commodore Business Machines - TI - Texas Instruments  
Legend and RTS - Cal Abco, Legend Peripheral Products

[www.commodore.ca](http://www.commodore.ca)

## Clear The High-Res Screen

```

150 -----
160 ADDR/OPCODE/ADDR/LABEL/ MNEM  /ADDR/  COMMENTS
170 -----
180 864 169 32          LDA #32  SET UP THE PROPER STARTING ADDRESS
190 866 141 110 3      STA LOOP+2
200 869 169 0         LDA #0
210 871 141 109 3     STA LOOP+1
220 874 160 0         LDY #0
230 ----- MAIN LOOP
240 876 153 0 0 LOOP  STA 0000,Y    ** THE DUMMY **
250 879 200          INY
260 880 208 250       BNE LOOP
270 882 238 110 3     INC LOOP+2  HERE'S THE TRICK (SELF-MODIFICATION)
280 885 174 110 3     LDX LOOP+2
290 888 224 63        CPX #63    ARE WE AT THE HIGH BYTE LIMIT
300 890 208 240       BNE LOOP  IF NOT, RETURN TO CONTINUE FILLING
310 892 160 64        LDY #64    FILL UP THE LAST FRAGMENT
320 894 153 255 62FINI STA 16127,Y
330 897 136          DEY
340 898 208 250       BNE FINI
350 900 169 147       LDA #147
360 902 32 210 255    JSR 65490  PRINT THE CLEAR-TEXT-SCREEN CHARACTER
370 905 96           RTS

```

There's a lot of information packed into this kind of ML program listing. Before explaining the program, let's first explain the various zones of such listings.

### What Each Column Means

On the far left, you'll see line numbers from 150-370. These are used just like BASIC line numbers. (Notice line 160. It's inserted to help show the definitions of the various columns in this listing.)

The first column is called ADDR and is the address in the computer's memory where these various ML instructions are stored. Follow along line 180 to see what each of these columns means. Here we see 864. That's the starting address of this subroutine. A two-byte long ML instruction (LDA #32) will be placed into addresses 864 and 865.

The next column is the opcode (operation-code). In this case it's 169, which is the number that the computer recognizes as the LDA # command. The third field is another kind of address. It's the address upon which the LDA # will act. In this case, it loads the number 32 into the Accumulator (this kind of addressing is called *immediate addressing* because we're not loading from the computer's 32nd memory location; rather, the actual number 32 is being placed into the Accumulator).

What we've looked at is a representation of two of the bytes that will be in the computer's memory after this program is assembled: 169 32 will sit in addresses 864 and 865. The next field is called the LABEL field, but line 180 has no

label. (The only labels in this program are LOOP and FINI which are used as place markers to identify the start of the two loops in the program.)

### ML Commands

The next zone is called MNEM for *mnemonic*. Mnemonics are the three-letter commands which are used when programming in ML. STA, for example, stands for STore the Accumulator; INY stands for INcrement the Y register. Mnemonics are the ML equivalent of BASIC commands.

Following the mnemonics are the addresses upon which these commands act: to store, to load from, to branch to, etc. In line 180, we are loading the accumulator with the number 32. Finally, there are sometimes comments to remind us what is going on in a particular line.

The first part of this fill routine puts the number 32 into address 878 (lines 180-190) and then puts a zero into address 877 (lines 200-210). How do we figure out these numbers?

In ML, addresses are computed a special way. Most addresses are held in two bytes. You calculate an address by dividing the address by 256, putting the result into the *higher byte in memory* and putting the remainder into the lower byte. So, to calculate the ML form of the address 8192 (the first byte of the high-res screen), we divide 8192/256 and get 32. That's called the *high byte* of our address and we store it into the high byte of the two bytes following LOOP. There is no remainder, so we put a zero into LOOP+1. Now the STA 0000,Y in line 240 has been transformed into STA 8192,Y.

Why not just write STA 8192,Y at line 240 and be done with it? We'll get to that in a minute.

## Stuffing The Dummy

Now we're at the main loop of the program. The address bytes in line 240 are dummy bytes. We're going to be constantly changing them during the program run. However, the first time we come here when the program is started, we've just stored the ML address 8192 into the two bytes following the STA and so a zero (left in the accumulator after line 200) will be sent to address 8192. We've blanked out the first byte in the high-res screen. Only 7999 bytes to go.

Now we raise the Y register from zero to 1 and branch back to LOOP. Y is always added to the address in the STA ?,Y addressing mode, so this time we'll store the zero in the Accumulator into address 8192+1. And so forth until Y has gone past 255 and reset itself to zero. Then we fall through to line 270. (We've just filled up the first 256 bytes of the high-res screen.)

Line 270 is where the high byte of our STA address (line 240) will be raised by 1. When you raise the high byte of an ML address by 1, you are raising the actual address by 256.

We're now going to test this high byte to see if we're through filling the screen. Line 280 fetches the high byte into the X register and we compare it against the number 63. We want to raise the address 31 times. We're looking for a 63 because we started out with a 32 in the high byte:  $(63 - 32 = 31)$ .

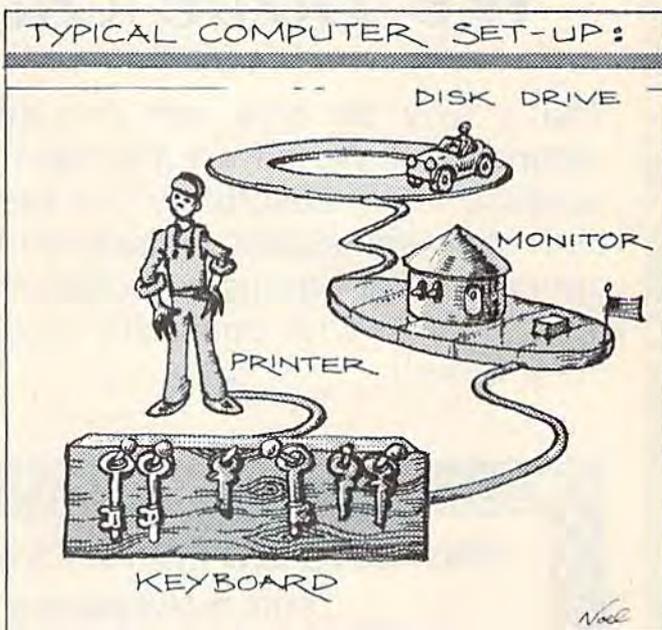
If we haven't yet incremented the high byte up to 63, we branch back to the LOOP and fill another 256 bytes. If we have reached 63, we fall through to line 310 where we load the Y register with 64 and count down (DEY) through this little loop to take care of the last 64 bytes which were not filled by our main loop. These 64 bytes were left over after we filled 256 byte blocks 31 times. (There are 8000 bytes in a high-res screen and  $256 * 31 = 7936$  so we have a few more bytes to fill.)

## Safety First

Finally, line 350 will load in the Commodore "clear-text-screen" character and we JSR to address 65490, which clears the text screen and gets rid of any residual garbage left after the high-res screen was cleared.

Now, why did we have to start this whole routine off by inserting the 8192 into the dummy address at line 240? If we didn't, we could only use the routine once. After the dummy has been incremented, if we didn't fix it at the start of the

subroutine, the next time you JSR'd to this subroutine you would be storing above the high-res screen because the dummy would be left pointing to address 16128. This is one of the reasons why self-modifying code is considered risky. It's worth remembering to initialize your dummy if you use self-modifying addresses in your programs.



## Program Your Own EPROMS

► VIC 20  
► C 64 **\$99.50**

PLUGS INTO USER PORT.  
NOTHING ELSE NEEDED.  
EASY TO USE. VERSATILE.

- Read or Program. One byte or 32K bytes!

OR Use like a disk drive. LOAD,  
SAVE, GET, INPUT, PRINT, CMD,  
OPEN, CLOSE—EPROM FILES!

Our software lets you use familiar BASIC commands to create, modify, scratch files on readily available EPROM chips. Adds a new dimension to your computing capability. Works with most ML Monitors too.

- Make Auto-Start Cartridges of your programs.
- The *promenade*™ C1 gives you 4 programming voltages, 2 EPROM supply voltages, 3 intelligent programming algorithms, 15 bit chip addressing, 3 LED's and NO switches. Your computer controls everything from software!
- Textool socket. Anti-static aluminum housing.
- EPROMS, cartridge PC boards, etc. at extra charge.

- Some EPROM types you can use with the *promenade*™
- |       |       |         |       |       |         |
|-------|-------|---------|-------|-------|---------|
| 2758  | 2532  | 462732P | 27128 | 5133  | X2816A* |
| 2516  | 2732  | 2564    | 27256 | 5143  | 52813*  |
| 2716  | 27C32 | 2764    | 68764 | 2815* | 48016P* |
| 27C16 | 2732A | 27C64   | 68766 | 2816* |         |

► \*Commodore Business Machines

\*Denotes electrically erasable types

Call Toll Free: 800-421-7731  
In California: 800-421-7748

**JASON-RANHEIM**  
580 Parrott St., San Jose, CA 95112



[www.commodore.ca](http://www.commodore.ca)

# **WE LOVE COMMODORE** and *We Love Our Customers*

That's why we only sell and support Commodore 64 and Vic 20 computers!! We have • the best prices • over 1000 programs • 500 accessories • absolutely the best service • one day express mail delivery • immediate replacement warranty • 15 day free trial • programming knowledge • technical knowledge • we are the only one in the U.S.A. with complete support for Commodore 64 and Vic 20 computers!!

**PROTECTO ENTERPRIZES** Box 550, Barrington, IL 60010

**SEND IN THIS COUPON TODAY FOR A FREE 64-PAGE  
"EXCLUSIVE COMMODORE-64 AND VIC-20 CATALOG" — PLUS OUR SPECIAL  
"BUY MORE—SAVE MORE COUPON"**

*(Save up to \$500 on software and accessories)*

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

## **No One! But No One! Can Compare**

TO

## **PROTECTO ENTERPRIZES**

TO ORDER WRITE OR CALL: PROTECTO ENTERPRIZES, BOX 550, BARRINGTON, IL 60010

**Call 312/ 382-5244**  
**8 to 5 Weekdays      9-12 Saturdays**

*(See Next 10 Pages)*



# COMPUTER AND SOFTWARE SALE

## COMMODORE 64

(with \$12.95 Bonus Pack Purchase)

# \$175<sup>00</sup>\*

- 170K Disk Drive \$199.00 \*
  - Tractor Friction Printer \$169.00\*
  - 13" Hi-Res Color Monitor \$199.00 \*
- \*less coupon discount

WE  
HAVE  
THE  
BEST  
SERVICE

WE  
HAVE  
THE  
LOWEST  
PRICES

## SUPER AUTO DIAL MODEM 64

(Best communications package in USA)

# \$79<sup>00</sup>

- Computer Learning Pad \$49.00
- New Voice Synthesizer \$59.00
- Commodore 64 Power for Vic-20 \$69.00

### SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE DISCOUNT COUPON with every COMMODORE 64 COMPUTER DISK DRIVE-PRINTER-MONITOR we sell! This coupon allows you to SAVE OVER \$500 OFF SALE PRICES!!

#### (Examples) PROFESSIONAL SOFTWARE COMMODORE 64

Name	List	Sale	Coupon
Executive Word Processor	\$99.00	\$49.00	\$39.00
Executive Data Base	\$69.00	\$35.00	\$24.00
20,000 Word Dictionary	\$24.95	\$14.95	\$10.00
Electronic Spread Sheet	\$59.95	\$49.00	\$39.00
Accounting Pack	\$49.00	\$39.00	\$29.00
Practical	\$59.95	\$44.95	\$36.95
Programmers Reference Guide	\$20.95	\$16.95	\$12.90
Programmers Helper (Disk)	\$59.95	\$39.95	\$29.95
80 Column Screen (Disk)	\$59.95	\$39.95	\$29.95
Flip & File: Disc: File	\$39.95	\$16.95	\$14.95
Deluxe Tape Cassette	\$89.00	\$49.00	\$39.00
Pro Joy Stick	\$24.95	\$15.95	\$12.00
Light Pen	\$39.95	\$16.95	\$14.95
Dust cover	\$8.95	\$6.95	\$4.60
Rogo Joe	\$29.95	\$19.95	\$16.95
Pitstop II: Epyx	\$39.95	\$29.95	\$26.00*
			*Plus One FREE
Music Calc	\$59.95	\$39.95	\$34.95
Filewriter	\$59.95	\$39.95	\$34.95

(See over 100 coupon items in our catalog)

Write or call for  
Sample SPECIAL SOFTWARE COUPON!

#### EXECUTIVE QUALITY PROFESSIONAL BUSINESS SOFTWARE

The Cadillac of Business Programs  
for Commodore 64 Computers

Item	List	SALE	Coupon
Inventory Management	\$99.00	\$49.00	\$35.00
Accounts Receivable	\$99.00	\$49.00	\$35.00
Accounts Payable	\$99.00	\$49.00	\$35.00
Payroll	\$99.00	\$49.00	\$35.00
General Ledger	\$99.00	\$49.00	\$35.00

#### \* COMMODORE 64 COMPUTER \$175.00

You pay only \$175.00 when you order the powerful 84K COMMODORE 64 COMPUTER! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your computer that allows you to SAVE OVER \$500 off software sale prices!! With only \$100 of savings applied, your net computer cost is \$175.00!

#### \* 170 DISK DRIVE \$199.00

You pay only \$199.00 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 \$500 of savings applied, your net disk drive cost is \$99.00

#### \* 80 COLUMN 80CPS TRACTION FRICTION PRINTER \$169.00

You pay only \$169.00 when you order the Comstar T/F deluxe line printer that prints 8" x 11" full size, single sheet, roll or fan fold paper, labels etc. Impact dot matrix, bidirectional. 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 \$500 of savings applied, your net printer cost is only \$69.00

#### \* 13" HI-RES COLOR MONITOR \$199.00

You pay only \$199 when you order this 13" COLOR MONITOR with sharper and clearer resolution than any other color monitors we have tested! LESS value of the SPECIAL DISCOUNT COUPON we pack with your monitor that allows you to save over \$500 off software sale prices! With only \$100 of savings applied, your net color monitor cost is only \$99.00 (16 colors)

#### 80 COLUMN BOARD \$99.00

Now you program 80 COLUMNS on the screen at one time! Converts your Commodore 64 to 80 COLUMNS when you plug in the 80 COLUMN EXPANSION BOARD! PLUS 4 slot expander! Can use with most existing software

#### 80 COLUMNS IN COLOR EXECUTIVE WORD PROCESSOR \$49.00

This EXECUTIVE WORD PROCESSOR is the finest available for the COMMODORE 64 computer! The ULTIMATE FOR PROFESSIONAL Word Processing DISPLAYS 40 or 80 COLUMNS IN COLOR or Black and White! Simple to operate, powerful text editing with 250 WORD DICTIONARY, complete cursor and insert/delete key controls line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers! Includes a powerful mail merge.  
List \$99.00 SALE \$49.00 Coupon \$39.00

#### SUPER AUTO DIAL MODEM \$79.00

Easy to use. Just plug into your Commodore 64 computer and you're ready to transmit and receive messages. Easier to use than dialing your telephone just push one key on your computer! Includes exclusive easy to use program for up and down loading to printer and disk drives. List \$129.00 SALE \$79.00.

#### NEW COMPUTER LEARNING PAD \$39.95

makes other graphics tablet obsolete. This new TECH SCETCH LEARNING PAD allows you to draw on your TV or Monitor and then you can print whatever you draw on the screen on your printers. FANTASTIC!! List \$79.95 SALE \$39.95

#### NEW VOICE SYNTHESIZER \$59.00

For Com 64 or VIC 20 computers. Just plug it in and you can program words and sentences, adjust volume and pitch, make talking adventure games, sound action games and customized talkies!! FOR ONLY \$19.95 you can add TEXT TO SPEECH, just type a word and hear your computer talk—ADD SOUND TO ZORK, SCOTT ADAMS AND AARDVARK ADVENTURE GAMES!! (Disk or tape)

#### COM-64 POWER FOR VIC-20 \$69.00

Just plug in our 32K RAM MEMORY EXPANDER and you get as much usable programming power as the Commodore 64 computer!! Master control switches on cover. Gold Edge connectors, five year warranty (FREE \$29.95 CARTRIDGE GAME)

#### FLOPPY DISK SALE .98¢

Lowest prices in the U.S.A!! Single sided, single density, with hub rings, quality guaranteed! (100 bulkpack .98¢ ea.) (Box of 10 \$12.00)

#### COM-64 4 SLOT EXPANSION BOARD \$39.95

Easy to use, switch selectable, reset button and LED indicator—saves your computer and cartridges  
List \$79.00 Sale \$39.95 Coupon \$36.95

#### 9" GREEN SCREEN MONITOR \$69.00

Excellent quality SANYO easy to read, 80 columns x 24 lines. Green Phosphorus screen with anti glare (metal cabinet) Saves your T.V. PLUS \$9.95 for connecting cable. Com 64 or VIC 20

#### 12" GREEN OR AMBER MONITOR \$99.00

Your choice of green or amber screen (metal top quality) SANYO 80 columns x 24 lines, easy to read anti glare! faster scanning! PLUS \$9.95 for connecting cable. Com 64 or VIC 20

#### PHONE ORDERS

8AM - 8PM Weekdays  
9AM - 12N Saturdays

- 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, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. 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!

VISA — MASTER CARD — C.O.D.

# PROTECTO ENTERPRISES

(WE LOVE OUR CUSTOMERS)

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

www.commodore.ca

# DAISY WHEEL PRINTER SALE!

# JUKI®

## DELUXE LETTER QUALITY "DAISY WHEEL PRINTERS"



Letter Quality Printer

# JUKI®

## DELUXE COMPUTER PRINTER

List Price \$399     **SALE \$249**

- Superb "Daisy Wheel" Computer Printer
- 100 Characters
- Bi-directional with special print enhancements-many type styles-\$18.95
- Pitch 10, 12, 15 CPI
- Print Speed up to 12 CPS
- Print line width: 115, 138, 172 characters
- 13" Extra large carriage
- Drop in cassette ribbon (replacement \$8.95)
- Centronics parallel RS 232 Serial interface built in (specify)

# JUKI®

## DELUXE "COMBINATION" PRINTER/TYPEWRITER

List Price \$499     **SALE \$299**

- Superb Computer Business printer combined with world's finest electronic typewriter!
- Two machines in one—just a flick of the switch!
- Superb letter quality correspondence—home, office, word processing!
- 13" Extra large carriage
- Drop in cassette ribbon—replacement \$8.95
- Precision daisy wheel printing—many type styles! \$18.95
- Pitch selector-10, 12, 15 CPS, Automatic relocate key!
- Automatic margin control and setting! Key in buffer!
- Centronics parallel of RS 232 Serial interface built-in (specify)



Letter Quality Printer/Typewriter

## 15 Day Free Trial - 90 Day Immediate Replacement Warranty

• COMMODORE 64 COMPUTER INTERFACE ONLY \$49.00

- ATARI INTERFACE \$79.00

ADD \$10.00 for shipping and handling!!

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. VISA — MASTER CARD ACCEPTED. We ship C.O.D.

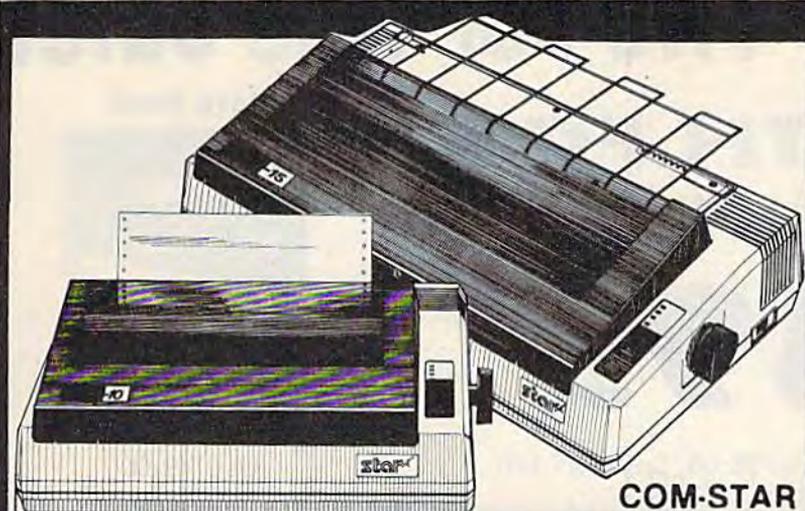
# PROTECTO ENTERPRIZES

WE LOVE OUR CUSTOMERS

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

[www.commodore.ca](http://www.commodore.ca)

# FANTASTIC COMPUTER PRINTER SALE!!!



## COM-STAR T/F

Tractor  
Friction  
Printer

only \$ **169\*\***

COM-STAR

- **Lowest Priced, Best Quality, Tractor-Friction Printers in the U.S.A.**
- **Fast 80-120-160 Characters Per Second** • 40, 46, 66, 80, 96, 132 Characters Per Line Spacing
- **Word Processing** • **Print Labels, Letters, Graphs and Tables** • **List Your Programs**
- **Print Out Data from Modem Services** • **"The Most Important Accessory for Your Computer"**

### \*\* DELUXE COMSTAR T/F 80 CPS Printer — \$169.00

This COMSTAR T/F (Tractor Friction) PRINTER is exceptionally versatile. It prints 8 1/2" x 11" standard size single sheet stationary or continuous feed computer paper. Bi-directional, impact dot matrix, 80 CPS, 224 characters. (Centronics Parallel Interface).

### Premium Quality 120-140 CPS 15 1/2" X COM-STAR PLUS+ Business Printer \$339.00

Has all the features of the 10" COM-STAR PLUS+ PRINTER, plus 15 1/2" carriage and more powerful electronics components to handle large ledger business forms! (Better than Epson FX 100) List \$599.

**SALE \$339.00**

### Superior Quality 15 1/2" COM-STAR PLUS+ H.S. High Speed 160 - 180 CPS Business Printer \$459.00

This Super High Speed COM-STAR+ 15 1/2" Business Printer has all the features of the 10" COM-STAR BUSINESS PRINTER with a 15 1/2" Carriage and more powerful electronic components to handle larger ledger business forms! Exclusive bottom feed. (Serial Centronics Parallel Interface) List \$799.00 Sale \$459.00

### Premium Quality 120-140 CPS 10" X COM-STAR PLUS+ Printer \$239.00

The COM-STAR PLUS+ gives you all the features of the COMSTAR T/F PRINTER plus a 10" carriage, 120-140 CPS, 9x9 dot matrix with double strike capability for 18x18 dot matrix (near letter quality), high resolution bit image (120 x 144 dot matrix), underlining, back spacing, left and right margin settings, true lower decenders with super and subscripts, prints standard, italic, block graphics and special characters. It gives you print quality and features found on printers costing twice as much!! (Centronics Parallel Interface) (Better than Epson FX80). List \$499.00 **SALE \$239.00**

### Superior Quality 10" COM-STAR+ H.S.

### HIGH SPEED 160-180 CPS Business Printer \$359.00

This Super High Speed Com-Star+ Business Printer has all the features of the 10" COM-STAR+ PRINTER with HIGH SPEED BUSINESS PRINTING 160-180 CPS, 100% duty cycle, 8K Buffer, diverse character fonts, special symbols and true decenders, vertical and horizontal tabs. A RED HOT BUSINESS PRINTER at an unbelievable low price (Serial or Centronics Parallel Interface) List \$699.00 Sale \$359.00

### Olympia

### Executive Letter Quality DAISY WHEEL PRINTER \$369.00

This is the worlds finest daisy wheel printer **Fantastic Letter Quality**, up to 20 CPS bidirectional, will handle 14.4" forms width! Has a 256 character print buffer, special print enhancements, built in tractor-feed (90 day warranty) centronics Parallel and RS232C Interface List \$699 **SALE \$369.**

• **15 Day Free Trial - 1 Year Immediate Replacement Warranty**

### PARALLEL INTERFACES

For VIC-20 and COM-64 — \$49.00 For Apple computers — \$79.00 Atari Interface—\$79.00 B-128 Commodore \$139.00

Add \$14.50 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$29.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. 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!

VISA—MASTER CARD—We Ship C.O.D. to U.S. Addresses Only

## PROTECTO ENTERPRISES (WE LOVE OUR CUSTOMERS)

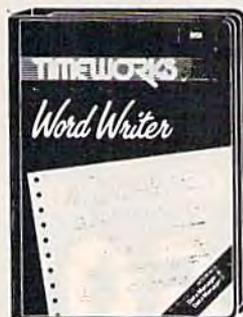
BOX 550, BARRINGTON, ILLINOIS 60010  
Phone 312/382-5244 to order

COM-STAR PLUS+ **ABCDEFGHIJKLMN OPQRSTUVWXYZ**  
Print Example: **ABCDEFGHIJKLMN OPQRSTUVWXYZ 1234567890**

**TIMEWORKS**  
Commodore 64 T.M.

# Two For One Sale!!

Word Processor



List \$49.00

## BOTH FOR ONLY

# \$49.00

(List price \$98.00. Save \$49.00)

Data Base



List \$49.00

**IF YOU CAN FIND A BETTER  
WORD PROCESSOR OR DATA BASE SYSTEM  
WE'LL BUY IT FOR YOU.**

### Word Writer (80 Columns in Color).

This menu-driven system includes:

A program which can be used by itself (stand-alone), or interfaced with Timeworks' Data Manager or Data Manager 2, enabling you to maintain and print out name and address lists, create individualized form letters automatically, and produce customized reports up to 20 columns wide, which can be incorporated into any text produced by the Word Writer.

### Data Manager 2

This system includes:

A menu-driven program that easily lets you store information on a wide variety of subjects — from general name and address lists, to research data. This program will also calculate and store any corresponding numerical data.

Quick access to important information. Items can be easily retrieved and printed by category, name, index code, date range, amount range, or any category of information stored in the system.

Timeworks exclusive X-Search, X-Sort and X-Chart features allow you to easily cross-search any of the categories. Or arrange your stored items in increasing or decreasing order, alphabetically, numerically or by date. Break down statistical information by up to ten indexed categories of your choice — and graphically review your results.



## Make Your 1985 Income Tax Report Easy!

This program includes:

- An easy to use menu-driven program that will enable you to prepare and complete your Federal income tax returns, yet requires no prior knowledge of computers or accounting.
- A CPA-tested manual, written in easy-to-understand, people-friendly English, abundantly illustrated to help make tax preparation and tax law understandable.
- Full prompting — you will be guided through the tax preparation process by thoughtful, easily-understood instructions (prompts) from your computer display screen.
- Password protection — To prevent unauthorized access to your confidential data.
- A Special Backup Feature — which quickly generates extra backup copies of your recorded information to guard against the loss of important data.

List \$49.00. **Sale \$39.95**

Add \$3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. 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!

VISA MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

**PROTECTO**  
**ENTERPRIZES** (WE LOVE OUR CUSTOMERS)

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

[www.commodore.ca](http://www.commodore.ca)

# COLOR MONITOR SALE!!!

(Lowest price in USA)

- Built in speaker and audio
- Front Panel Controls
- For Video Recorders
- For Small Business/Computers
- Apple-Commodore Atari-Franklin-etc.



13" Color Computer Monitor



- Beautiful Color Contrast
- High Resolution
- Separated Video
- Sharp Clear Text
- Anti Glare Screen
- 40 Columns x 24 lines
- Supports 80 Columns
- List \$399  
SALE \$199

*15 Day Free Trial - 90 Day Immediate Replacement Warranty*

## **12" XTRON SUPER HI-RESOLUTION "SWIVEL BASE" MONITOR** List \$249     **SALE \$119**

80 Columns x 24 lines, Super Hi-Resolution 1000 lines  
Green or Amber super-clear "Easy to Read" text with special anti-glare screen!

## **12" ZENITH HI-RESOLUTION GREEN OR AMBER TEXT DISPLAY MONITOR** List \$199     **SALE \$99**

80 Columns x 24 lines, Hi-Resolution-crisp clear easy to read text with anti-glare screen! A MUST for word processing.

## **12" MONITOR GREEN OR AMBER TEXT** 80 Columns x 24 lines, easy to read up front controls List \$159     **SALE \$79.95**

• 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

# Color Swap

Lee Noel, Jr., Assistant Editor

Frustrated by the time and trouble involved in making color changes to high-res program displays? "Color Swap" makes them instantly; and it works for the other graphics modes of your computer, too. For the VIC (with or without expansion) and 64.

---

"Color Swap" is a machine language graphics aid for your BASIC programs. Operating at high speed, it enables you to change colors at will—without LISTing and editing your program, and without waiting for the screen to rebuild. It works with any type of display—text, high-res, multicolor, sprites, and so on—and automatically adjusts itself to the screen configuration you've chosen.

To start, type in the appropriate version for your computer, Program 1 for the 64, or Program 2 for the VIC-20. Be sure to save a copy of the program before running it.

Next, run the program. If you have a correct version, you'll see a message with program instructions. If this is the first time you've used a machine language program, the SYS command in the final screen message may be unfamiliar to you. SYS XXXXX, a BASIC command that can be used in either direct or program mode, transfers control from the BASIC environment to the machine language program at address XXXXX.

Note where it tells you to SYS, then type NEW and press RETURN. Although you just erased the program from BASIC memory, it resides in a safe location (see below for details). You can load, save, and NEW lots of programs, but Color Swap remains ready to be activated at any time by the SYS call. The program can only be erased by turning off your computer, or by putting something else into its memory area.

## A Pair Of POKES

Once in place, the program is simple to use. It creates two new (pseudo) registers at addresses

700 and 701. Think of 700 as the Old Color Register, and 701 as the New Color Register. If you POKE these locations with two differing color codes and SYS to Color Swap, any displayed color that matches the value in 700 is changed to the color indicated at 701.

To make this clearer, here's an example. After loading and running Color Swap, load the program you want to experiment with, and bring up the desired screen display. Working in direct mode, you might enter

```
POKE700,6:POKE701,7:SYS XXXXX (where XXXXX is the Color Swap address)
```

If you enter this line and press RETURN, the program will find your display, look for blue (color code 6), and alter any it finds to yellow (code 7). This could, for example, change an entire blue sky to yellow, or cause the same transformation in a tiny redefined character. And the exchange of color takes place immediately—there's no waiting. If you don't like the effect, reverse the codes and SYS to Color Swap again.

As you go, make notes of the color codes that give the best results. Later on, you'll want to plug these tested values into the program you're working with. Color Swap acts directly on your computer, *not* on your programs; so you'll need either notes or a perfect memory.

Until you become thoroughly familiar with Color Swap, there are a number of points to keep in mind. The program is designed to change *every* occurrence of a particular color. This can be disconcerting at times. If you alter a blue sky and the current text color is also blue, both will be changed accordingly. (For a way around this problem, read on.) Moreover, it can be difficult to use Color Swap with multicolor mode on the VIC and with extended background color on the 64. The program works fine, but these display modes require that you know exactly what you're doing. Finally, for safety, stick to the standard Commodore color code numbers, 0-15. Note that Color Swap will not generally work in conjunction with other machine language programs, including utility cartridges like

# 1541 FLASH!

## It's No Flash in the Pan

The new Skyles Electric Works 1541 Flash! loads and saves programs and files to your Commodore 64 three times faster than an unenhanced Commodore disk drive can. Faster than any other Commodore single disk drive with an IEEE interface.

It gives your 1541 disk drive the speed of much more expensive drives—at three times its normal speed! The 1541 Flash! is faster than the MDS disk drives and any parallel interface, faster than the Commodore 2031. The Skyles Electric Works 1541 Flash! is one of the most exciting time-saving devices we've ever seen.

■ **It's Permanent**  
The Flash! is a permanent firmware installation in your Commodore 64 and 1541 disk drive. It has both a software (ROM) and a hardware component.

■ **It's Transparent**  
Best of all, the 1541 Flash! is transparent. Computer operations all remain unaffected as it speeds up every disk-related function. And there is nothing new to learn for the Flash! No special tricks or techniques. Once it's in, just watch it go. We have tested it on well over one hundred programs and it loads spectacularly fast.

■ **It's Flexible**  
And it's flexible. The 1541 Flash! adds 21 extra commands for the Commodore 64 user. These include a built-in "DOS WEDGE," eight editing and fast-transfer commands for the advanced programmer. Here is an example of what it can do: For programs that usually load with a "8,1" command, just hit Shift-Run-Stop. A large spreadsheet program like **BUSICALC 3** then loads in about 25 seconds. Through keyboard commands or a hardware "off" switch, you can even return to the old, slow loading method, if for some reason you really want to. Or you can ignore all its commands, and just enjoy the speedy disk operations.

■ **It's Serious**  
But if you are really serious about programming, the 1541 Flash! is a gold mine. For example, the manual will show you how to write software allowing data transfer to and from the disk drive at speeds up to 10 times the normal.

■ **It's Easy**  
Installation of the 1541 Flash! consists of plugging a small assembly inside the Commodore 64 and two small assemblies plug into the Commodore 1541. Except for a small percentage of Commodore 64s, no soldering is required. Assembly instructions include detailed pictures and drawings. And installation is—well, a flash.

■ **It's Available**  
Call Skyles Electric Works to place your order or to get more info on the 1541 Flash! Hurry up, though. They may be gone before you know it.  
**1541 FLASH! C-64/1541** ..... **\$89.95\***

\*There is an additional \$2.50 US and Canada, \$10.00 Europe and Asia, shipping charge per order. California residents add sales tax.

Skyles Catalogue Page 1

For CBM-64 and VIC owners only:

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

We know you'll want this page, in its full 7 x 10 splendor, and another 19 pages of peripherals, software and books that will make your CBM-64 or VIC computer even nicer to live with. So, if we missed

sending you your very own copy within the last few weeks, call us at **(800) 227-9998** (unless you live in California, in which case call **(415) 965-1735**).

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



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

the Super Expanders and BASIC extensions.

Color Swap is most effective with displays and programs that are fairly satisfactory apart from their colors. If you're in the early stages of developing a program and are using Color Swap concurrently, extra care is needed to keep track of which program is supplying color codes.

A little practice will make things clear. You can even start without a program by experimenting with the colors of your computer's standard display. If you ever do run into trouble, just reload your program and start over.

## A One-Way Trip

Blocks of machine language work like subroutines in BASIC. Color Swap is just simple chunks of machine language subroutines linked together in a particular sequence.

In this case, the arrangement is like towns (the subroutines) connected by a one-way street. If you want to avoid the town that changes text color, just get on the road at the next town. (With Color Swap, once you get on the one-way street, you're carried along to the very end—where control is returned to BASIC.)

The accompanying diagrams show how the program is laid out. The first few sections are changes which can be made from BASIC, usually by a POKE to one memory location. You can skip over some of these early portions, thus avoiding unwanted color changes.

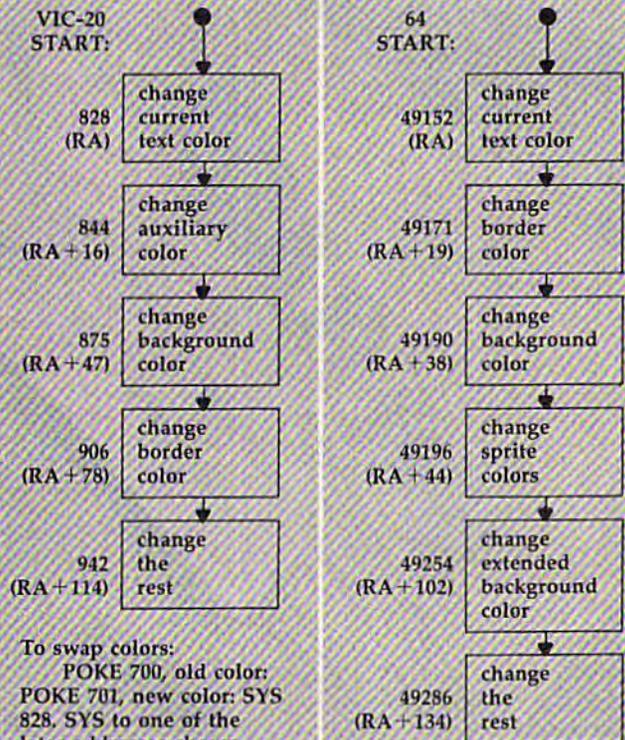
To make such a detour, just SYS to the address of the first needed town along the Color Swap route—having first POKEd 700 and 701 with the desired values, of course. This "multiple entry points" feature of Color Swap is obviously useful, and you may enjoy experimenting with it.

## Relocating The Program

Color Swap is relocatable. If the current location is inconvenient, the bulk of the program can be shifted to anywhere with free memory. Line 120 of the program contains the variable RA (Relocatable Address), which can be set to any desired value. However, if Color Swap is moved into the normal program area, you'll need to take steps to prevent it from being overwritten by BASIC.

Since the VIC has limited memory, a VIC user is given the option of placing Color Swap in the cassette buffer (locations 828–1019). Machine language programs placed in this buffer are protected from BASIC, but will be disrupted by cassette operations. So, to help VIC cassette users, the VIC version can perform a relocation, automatically placing and protecting Color Swap at the top of whatever memory configuration you have. VIC users have only to follow the prompts

### COLOR SWAP LOCATIONS



To swap colors:

POKE 700, old color;  
POKE 701, new color: SYS  
828, SYS to one of the  
later addresses shown  
above to avoid unwanted  
changes.

To check background:  
SYS 828: PRINT PEEK (785)

To check border:  
SYS 828: PRINT PEEK (786)

To swap colors:

POKE 700, old color;  
POKE 701, new color:  
SYS 49152, SYS to one of  
the later addresses shown  
above to avoid unwanted  
changes.

Note: If Color Swap is relocated, use the expressions given above to work out the new addresses—including RA, the new starting address. VIC tape users who relocate automatically with the loader *must* do this.

to make use of this option. (Those VIC users who wish to set RA themselves can delete lines 10–60, and should put their value for RA into the expression RA=RA at the start of line 120.) VIC users with disk drives may wish to select the cassette option when loading Color Swap. It will be POKEd into high memory, freeing the cassette buffer for other short machine language routines.

(Note: Color Swap works fine with the Super Expander if none of the Expander's special commands are used.)

Remember that in any relocation the target addresses of all the SYS calls have to be changed as well. The parenthetical expressions in the diagram show you how to do this. (RA is the value of the number that appears after SYS in the final message from your loader.) VIC tape users must make these calculations to employ the various entry points for Color Swap. If you move RA outside the values described above, make

**SUPER PRINTER PACKAGES**

Gemini 10X and Cardco + G ..... 329  
 Prowriter and Cardco + G ..... 414  
 No additional shipping charges on Printer Packages in Continental USA

**PRINTERS**

Alphacom 40C/Int. 99.95  
 Alphacom 80C/Int. 189.95  
 Epson ..... Call  
 Silver Reed ..... Call  
 Prowriter 8510 ..... Call  
 Legend ..... 239  
 Riteman ..... 289  
 Toshiba 1351 ..... Call  
 Toshiba 1340 ..... Call  
 Xiom -CM-550 ..... 279

# COMMODORE 64



THE POWER BEHIND THE PRINTED WORD.

Gemini 10X 249 Delta 15X ... 499  
 Gemini 15X 389 Radix 10X ... 549  
 Delta 10X ... 369 Radix 15X ... 629  
 Powertype ... 329

CBM 64 ..... Call  
 SX-64 ..... Call  
 1541 Disk Drive ..... Call  
 1526 Printer ..... 279  
 1530 Datasette ..... 66  
 1702 Monitor ..... Call  
 1650 AD/AA Modem ..... 89  
 RS 232 Interface ..... Call

**Call for Special Package  
 64 System Price**

**ANIMATION STATION TOUCH TABLET ... 59.95**

Bring the trivia craze home with **P.Q. The Party - Quiz Game** for the CBM 64-D . Call

**MODEMS**

Hayes Smart Modem 300 ..... Call  
 Mark VII/Auto Ans/ Auto Dial ..... Call  
 Mark XII/1200 Baud. Call  
 Prometheus ..... Call  
 Westridge AA/AD ... Call

**C O M M O D O R E 6 4 S O F T W A R E**

**ACCESS**  
 Neutral Zone-D/T ..... 23.95  
 Spritemaster-D/T ..... 23.95  
 Beachhead-D/T ..... 23.95  
 Master Composer-D ..... 27.95  
 Raid Over Moscow-D/T ..... 27.95  
 Scrolls Of Abaddon-D/T ..... 23.95

**ACCESSORIES**  
 WICO Joystick ..... Call  
 Flip 'n' File-D ..... 20.95  
 Flip 'n' File Cart ..... 20.95  
 Joysensor ..... 24.95  
 WICO Trakball ..... 37.95  
 KRAFT Joystick ..... 15.95  
 EIS Compuserve Kit ..... 64.95  
 VIDTEX ..... 29.95  
 Big Foot 16K Buffer ..... Call  
 Big Foot 32K Buffer ..... Call  
 Big Foot 64K Buffer ..... Call  
 Gemini 10X 8K Upgrade ..... Call  
 Monitors ..... Call  
 Compuserve Starter ..... 27.95  
 Elephant SS/SD ..... 17.00  
 Verbatim SS/DD ..... 20.00  
 Elephant SS/DD ..... 20.00  
 Ultra Magnetics SS/DD 18.00  
 Alien Voice Box II-D ..... 99.95

**ACTIVISION**  
 Hero-D ..... 24.95  
 Pitfall II-D ..... 24.95  
 River Raid-D ..... 24.95  
 Decathlon-D ..... 24.95  
 Star League  
 Baseball-D/T ..... 23.95  
 On-Field Tennis-D/T ..... 23.95

**AVALON HILL**  
 Call for Items and Prices

**BATTERIES INCLUDED**  
 Consultant-D ..... 69.95  
 Paperclip w/Spellpak-D ..... 84.95  
 Super Busscard II ..... Call  
 Home Inventory-D ..... 23.95  
 Recipe-D ..... 23.95  
 Audio/Video Cat-D ..... 23.95  
 Mail List-D ..... 23.95  
 Stamps-D ..... 23.95  
 B.I. 80 Card ..... Call  
 Home Pak-D ..... 37.95

**BRODERBUND**  
 AE-D ..... 23.95  
 Bank Street Writer-D ..... 49.95  
 Chopfiller-D ..... 23.95  
 Drol-D ..... 23.95  
 Loderunner-D ..... 23.95  
 Operation Whirlwind-D ..... 27.95  
 Mask of the Sun-D ..... 27.95  
 Dr. Creep-D ..... 20.95  
 Gumball-D ..... 20.95  
 Bungeing Bay-D ..... 20.95  
 Spelunker-D ..... 20.95  
 Stealth-D ..... 20.95  
 Whistler's Brother-D ..... 20.95

**CARDCO**  
 Cardprint/B ..... 47.95  
 Cardco + G ..... 64.95  
 Cardboard/5 ..... 59.95  
 Cardkey ..... 39.95  
 Cassette Recorder ..... 37.95  
 Printer Utility-D/T ..... 19.95  
 Write Now-Cart. .... 34.95  
 Mail Now-D ..... 27.95  
 File Now-D ..... 27.95  
 Graph Now-D ..... 27.95  
 Spell Now-D ..... 27.95  
 LQ-1 Printer ..... Call  
 LQ-2 Printer ..... Call  
 LQ-3 Printer ..... Call

**CBS SOFTWARE**  
 Call for Items and Prices

**COMMODORE**  
 Assembler-D ..... 39.95  
 Easy Finance I, II, III, IV-D ..... 19.95  
 Easy Calc-D ..... 34.95  
 Easy Mail-D ..... 19.95  
 Easy Script-D ..... 44.95  
 Easy Spell-D ..... 19.95  
 Logo-D ..... 57.95  
 The Manager-D ..... 39.95  
 General Ledger-D ..... 39.95  
 Accts. Rec.-D ..... 39.95  
 Accts. Pay-D ..... 39.95  
 Magic Desk-Cart ..... 39.95  
 Int. Soccer-Cart ..... 22.95  
 Magic Voice ..... 54.95  
 Suspect-D ..... 24.95  
 Cutthroats-D ..... 24.95  
 Simon's Basic-Cart ..... Call

**DYNATECH**  
 Adventure Writer-D ..... 41.95  
 Codewriter-D ..... 69.95  
 Dialog-D ..... 41.95  
 Elf System-D ..... 41.95  
 Home File Writer-D ..... 41.95  
 Reportwriter-D ..... 41.95  
 Menuwriter-D ..... 34.95  
 Spellwriter-D ..... 49.95

**ELECTRONIC ARTS**  
 Archon-D ..... 29.95  
 Pinball Construction-D ..... 29.95  
 M.U.L.E.-D ..... 29.95  
 Murder/Zinderneuf-D ..... 29.95  
 One On One-D ..... 29.95  
 Archon II-D ..... 29.95  
 Financial Cookbook-D ..... 37.95  
 Music Construction-D ..... 29.95  
 7 Cities Of Gold-D ..... 29.95  
 Standing Stones-D ..... 29.95

**EPYX**  
 Dragons/Pern-D/T ..... 27.95

**EPYX (cont'd)**  
 Oil Barons-D ..... 37.95  
 Pitstop II-Cart ..... 27.95  
 Puzzlemania ..... Call  
 Robots Of Dawn-D ..... 27.95  
 Summer Games ..... 27.95  
 Breakdance-D ..... 27.95  
 Barbie-D ..... 27.95  
 G.I. Joe-D ..... 27.95  
 Hot Wheels-D ..... 27.95  
 Impossible Mission-D ..... 23.95  
 World's Grest Baseball-D ..... 23.95

**FIRST STAR**  
 Astrochase-D/T ..... 20.95  
 Bristles-D/T ..... 20.95  
 Flip-Flop-D/T ..... 20.95  
 Spy Vs. Spy-D ..... 20.95

**HANDIC**  
 64 Forth-Cart ..... 29.95  
 64 Graf-Cart ..... 23.95  
 Stat 64-Cart ..... 23.95  
 Calc Result Easy-Cart ..... 34.95  
 Calc Result Adv.-Cart ..... 69.95  
 The Diary-Cart ..... 23.95  
 The Tool-Cart ..... 29.95  
 Bridge Cart ..... 29.95

**HESWARE**  
 Hesware ..... Call

**INSTA (CIMMARON)**  
 Insta-Writer-Cart ..... 39.95  
 Insta-Mail-D ..... 24.95  
 Insta-File-D ..... 49.95  
 Management Combo ..... 64.95  
 Insta-Calc-Cart/D ..... 31.95  
 Insta-Graph-D ..... 31.95  
 Insta-Speed-D ..... 99.95  
 Insta-Music-Cart/D ..... 79.95  
 Invest Combo ..... 74.95  
 Word Craft-D ..... 54.95

**INFOCOM**  
 Deadline-D ..... 29.95  
 Enchanter-D ..... 23.95  
 Infidel-D ..... 34.95  
 Planetfall-D ..... 24.95  
 Sorcerer-D ..... 34.95  
 Starcross-D ..... 29.95  
 Suspended-D ..... 29.95  
 Witness-D ..... 34.95  
 Sea Stalker-D ..... 24.95

**KOALA**  
 Gibson Light Pen ..... 69.95  
 Koala Touch Tablet-D ..... 69.95  
 Koala Touch Tablet-C ..... 74.95  
 Muppet Learn Keys-D ..... 54.95

**D-Disk T-Cassette Cart - Cartridge**

**MICROFUN**  
 Death in the Caribbean-D ..... 27.95  
 Dino Eggs-D ..... 27.95  
 The Heist-D ..... 23.95  
 Boulder Dash-D ..... 23.95  
 Short Circuit-D ..... 23.95

**MICROPROSE**  
 Floyd/Jungle-D ..... 23.95  
 Helicat Ace-D/T ..... 23.95  
 NATO Commander-D ..... 23.95  
 Solo Flight-D/T ..... 23.95  
 Spitfire Ace-D/T ..... 23.95  
 Air Rescue -D/T ..... 23.95  
 Challenger-D/T ..... 23.95  
 F-15 Strike Eagle-D ..... 23.95

**MISCELLANEOUS**  
 Ken Uston's Blackjack-D ..... 49.95  
 Quick Brown Fox-D/Cart. .... 34.95  
 Ultima III-D ..... 41.95  
 Flight Simulator II-D ..... 37.95  
 Night Mission/Pinball-D/T ..... 20.95  
 Home Accountant-D ..... 49.95  
 Step By Step-D/T ..... 44.95  
 Barron's Sat-D ..... 67.95  
 Telesat 64-Cart ..... 37.95  
 Castle Wolfenstein-D ..... 20.95  
 Mastertype-D/Cart ..... 27.95  
 Aztec-D ..... 27.95  
 Miner 2049er-Cart ..... 27.95  
 Strip Poker-D ..... 23.95  
 Astro Chase-D/T ..... 20.95  
 Flip Flop-D/T ..... 20.95  
 Beyond Wolfenstein-D ..... 23.95  
 Sam-D ..... 41.95  
 Mae Assembler-D ..... 49.95  
 Jupiter Mission-D ..... 34.95  
 Barron-D ..... 37.95  
 Tycoon-D ..... 37.95  
 Millionaire-D ..... 27.95  
 Kwik-Load-D ..... 16.95  
 Sargon III-D ..... 34.95  
 Air Rally-D ..... 20.95  
 Graphics Basics-D ..... 23.95  
 Hes Games-D ..... 23.95  
 Multiphan-D ..... 69.95  
 Omnewriter/Spell-D ..... 41.95  
 Bruce Lee-D/T ..... 23.95  
 Mancopier-D ..... 27.95  
 Meridian III-D ..... 27.95  
 Mastering The Sat-D ..... 104.95  
 Hes Forth-Cart ..... 31.95  
 Pogo Joe-D/T ..... 20.95  
 Movie Maker-D ..... 41.95  
 Typing Tutor III-D ..... 34.95  
 Space Taxi-D ..... 20.95  
 Vip Terminal-D ..... 41.95  
 Doodle-D ..... 27.95  
 Superbase-64D ..... 69.95

**PARKER BROTHERS**  
 Forgger II-Cart ..... 34.95  
 Gyrrus-Cart ..... 34.95  
 James Bond-Cart ..... 34.95  
 Popeye-Cart ..... 34.95  
 O'Bert-Cart ..... 34.95  
 Star Wars-Cart ..... 34.95  
 Montezuma's Revenge-C ..... 34.95

**SCARBOROUGH**  
 Mastertype-D/Cart ..... 27.95  
 Net Worth-D ..... 54.95  
 Songwriter-D ..... 27.95  
 Run For The Money-D ..... 27.95

**SCHOLASTIC**  
 Call for Items and Prices

**SCREENPLAY**  
 Call for Items and Prices

**SEGA**  
 Call for Items and Prices

**SIERRA ON-LINE**  
 Championship Boxing-D ..... 20.95  
 Dark Crystal-D ..... 27.95  
 Frogger-D/T ..... 23.95  
 Homeword Speller-D ..... 34.95  
 Homeword-D ..... 49.95  
 Mission Astroid-D ..... 20.95  
 Oil's Well-D ..... 23.95  
 Quest for Tires-D ..... 23.95  
 Threshold-D ..... 27.95  
 Time Zone-D ..... 74.95  
 Ultima II-D ..... 41.95  
 Ultima I-D ..... 23.95  
 Ulysses-D ..... 27.95  
 Wizard/Princess-D ..... 22.95  
 Homeword w/Speller-D ..... 69.95

**SPINNAKER**  
 Adventure Creator-Cart ..... 22.95  
 Aerobics-D ..... 27.95  
 Aft in the Color Caves-C ..... 22.95  
 Alphabet Zoo-Cart ..... 22.95  
 Delta Drawing-Cart ..... 22.95  
 Facemaker-Cart ..... 22.95  
 Fraction Fever-Cart ..... 22.95  
 Kids on Keys-Cart ..... 22.95  
 Kidwriter-D ..... 22.95  
 Snooper #1-D ..... 22.95  
 Snooper #2-D ..... 22.95  
 Story Machine-Cart ..... 22.95  
 Trains-D ..... 22.95  
 Grandma's House-D ..... 19.95

**SSI**  
 50 Million Crush-D ..... 27.95  
 Battle/Normandy-D/T ..... 27.95  
 Combat Leader-D/T ..... 27.95  
 Computer Baseball-D ..... 27.95  
 Cosmic Balance-D ..... 27.95  
 Eagles-D ..... 27.95  
 Fortress-D ..... 23.95  
 Germany 1985-D ..... 41.95  
 Knight/Desert-D/T ..... 27.95  
 Professional Golf-D ..... 27.95  
 RFD 1985-D ..... 23.95  
 Ringside Seat-D ..... 27.95  
 Tigers in the Snow-D ..... 27.95  
 Baltic 85-D ..... 23.95  
 Broadides-D ..... 27.95  
 Computer Football-D ..... 27.95  
 Questron-D ..... 27.95

**SYNAPSE**  
 Blue Max-D/T ..... 23.95  
 Delbs-D/T ..... 23.95  
 Fort Apocalypse-D/T ..... 23.95  
 Necromancer-D/T ..... 23.95  
 New York City-D/T ..... 23.95  
 Quasimodo-D/T ..... 23.95  
 Relax Stress Reduction Sys. .... 79.95  
 Slam-Ball-D/T ..... 23.95  
 Zaxxon-D/T ..... 27.95  
 Zeppelin-D/T ..... 23.95

**TIMWORKS**  
 Accounts Payable/Checkwriter-D ..... 41.95  
 Accounts Receivable/Invoice-D ..... 41.95  
 Cash Flow Management-D ..... 41.95  
 Data Manager 2-D ..... 34.95  
 Data Manager-D/T ..... 19.95  
 Dietron-D/T ..... 19.95  
 Dungeon Algebra Dragon-D/T ..... 19.95  
 Electronic Checkbook-D/T ..... 19.95  
 General Ledger-D ..... 41.95  
 Inventory Management-D ..... 41.95  
 Money Manager-D/T ..... 19.95  
 Payroll Management-D ..... 41.95  
 Evelyn Woods-D ..... 49.95

**TRILLIUM**  
 Amazon-D ..... 22.95  
 Dragonworld-D ..... 22.95  
 Farenheit 451-D ..... 22.95  
 Rendezvous w/Rama ..... 22.95  
 Shadowkeep-D ..... 22.95

**WAVEFORM**  
 Call for Items and Prices

**WINDHAM CLASSICS**  
 Below the Root-D ..... 19.95  
 Gulliver's Travels-D ..... 19.95  
 Swiss Family-D ..... 19.95  
 Wizard of Oz-D ..... 19.95

**Hundreds of items available for the CBM 64, please call**

To Order Call Toll Free **800-558-0003**  
 For Technical Info, Order Inquiries, or for Wisc. Orders **414-351-2007**

# Computability™

**NO SURCHARGE FOR MASTERCARD OR VISA**

Est. 1982

**NEW LOWER PRICES**

**NEW PRODUCTS**

**ORDERING INFORMATION.** Please specify system. For fast delivery send cashier's check, money order or direct bank transfers. Personal and company checks allow 2 weeks to clear. Charges for COD are \$3.00. School Purchase Orders welcome. In CONTINENTAL USA, include \$3.00 shipping per software order. Include 3% shipping on all Hardware orders, minimum \$3.00. Mastercard & Visa please include card # and expiration date. WI residents please add 5% sales tax. HI, AK, FPO, APO, Canadian orders — add 5% shipping, minimum \$5.00. All other foreign orders, please add 15% shipping, minimum \$10.00. All goods are new and include factory warranty. Due to our low prices, all sales are final. All defective returns must have a return authorization number. Please call 414-351-2007 to obtain an RA# or your return will NOT be accepted for replacement or repair. Prices and availability are subject to change without notice.

**COMPUTABILITY**  
 P.O. Box 17882  
 Milwaukee, WI 53217

**ORDER LINES OPEN**  
 Mon-Fri 11 AM - 7 PM CST  
 Sat 12 PM - 5 PM CST

provisions to protect the program.

Color Swap also offers VIC users a special convenience: separate background and border color registers. Ordinarily, VIC background and border colors are combined into one number in the register at 36879, and with certain displays, it can be difficult to tell what colors you're looking at. Now, a SYS to the start of Color Swap puts the color code for the background into address 785 and the code for the border into 786. These locations may then be PEEKed, returning the values at the time of the SYS call.

## A Special Case For VIC Programmers

Color Swap operates in such a simple way that it couldn't be extended to cover the reverse video mode on the VIC. However, for those programmers who use this single bit of memory, Program 3, VIC Inverter, is included. This program toggles the reverse bit from one value to the other each time you SYS 743.

Like Color Swap, this program can also be relocated by changing RA in the loader, although this will probably not be necessary: The Inverter is entirely independent of Color Swap, is safe from BASIC, and is not in the cassette buffer.

## Extending Its Usefulness

After a little experimentation with Color Swap, you'll find many uses for it. Although it was devised mainly as a direct mode method of editing displayed colors, it can be extended to many other applications.

For example, 64 users know that they can't POKE character codes directly to screen memory and see any effect unless they make corresponding POKES to color memory. As long as you know what code is in color memory, you can easily change it to contrast with the background by a SYS to Color Swap. With Color Swap in your 64 and the default display on screen, enter this in direct mode:

```
POKE700,6:POKE701,1:SYS49286:POKE1524,83
```

You should see a white heart appear near the center of your screen. POKE a few more character codes directly to screen memory. Convenient, isn't it?

Color Swap can also be added to programs as a subroutine. Although this may take a little thought, it can be worthwhile. As part of a larger program, Color Swap's speed enables it to flash windows of text and background on and off, make displays appear and disappear, and alter characters and sprites instantly.

See program listings on page 140.



# ATTENTION COMMODORE 64 OWNERS We'll pay for your mistake!

We know that it's difficult, especially since everyone is trying to come out with one. Now that error track protection is going the way of the dinosaur, you probably purchased an obsolete piece of software. Well we will give you \$25.00 credit\* for any original copy utility software disk that you would like to trade in for the "NEW REVISED CLONE MACHINE." Our program can now back up non-standard sectors with complete control, detect and reproduce density-frequency alterations, alter the number of sectors on a track, sync to particular reference sectors (including a single sync Bit copy) PLUS reformat a single track.

Other back up programs have only recently caught up with our ability to reproduce errors. Included is Fast Clone as well as all of the other standard Clone Features, we've even made it more user friendly too! THE CLONE MACHINE was the first utility of its kind and others followed. Well, we still feel that it's time for the others to try to play catch up again.

**OUR SPECIAL MSD VERSION  
NOW AVAILABLE TOO!!**

**STILL ONLY  
\$49<sup>95</sup>**

\*NOTE: Micro-W reserves the right to cancel this offer at any time without notice



Available from:

**Micro-W.**  
DISTRIBUTING, INC.  
1342B Route 23  
Butler, N.J. 07405  
CALL: (201) 838-9027

# Debugging BASIC: Part 2

Todd Heimarck, Assistant Editor

The first version of a program almost always contains a few errors. You have to find and eliminate the bothersome bugs before you can really finish the program. Last month, we looked at some mistakes programmers can make. This month we'll consider some built-in flaws (how a computer can do things wrong) and look at some useful debugging methods.

---

In Part 1, we covered some of the limits which affect memory and the stack on the VIC and 64. Variables, too, have limits. They can lead to a variety of problems.

You can employ three types of variables in a program: string, floating point, and integer. Certain restrictions apply to each of the three.

## Precision, Accuracy, Magnitude

Floating point (FP) numbers, so called because the decimal point can "float" to either end of the number, use up five bytes of memory. The variable name needs two additional bytes, so an FP variable fits into seven bytes of memory.

Three limits apply to floating point numbers: precision, accuracy, and magnitude.

Floating point numbers are allowed up to nine digits of precision. Go beyond nine and your computer automatically rounds to the nearest nine-digit number. The following program illustrates the limits of precision:

```
10 A$="1":B$=A$
20 FOR J=1TO20
30 A$=A$+B$: PRINTA$,VAL(A$)
40 NEXT
```

Note that we're working with strings, which can be longer than nine characters. But in line 30, the strings are converted to a VALUE, which succumbs to the nine-digit limit. After the loop runs nine times, we see the letter E, which represents exponentiation (for example, ten to the power of X). We've hit one of the limits. You can make calculations on large numbers, but they will be rounded to the nearest nine digits of significance.

Another limit, accuracy, sounds like it might

be the same as precision, but it's not. Limits on accuracy are built into almost any numbering system.

Computers calculate in binary (base two). Fractions which can be expressed as a combination of halves, fourths, eighths, sixteenths, etc. are accurate. Others have to be rounded to the nearest binary value.

People do the same thing with decimal fractions. The number 1/3 is translated to a never-ending series of threes, .333333 (and so on).

The limits on accuracy can sometimes lead to errors of rounding. Try the following program:

```
10 X=.1
20 FORJ=0TO50:Y=Y+X:PRINTY:NEXT
```

A couple dozen times through the loop and the answers start to vary from what they should be. The number in computer memory is just about one tenth, but is a little off. It's only an approximation. As the numbers add up, so does the slight inaccuracy.

Magnitude is the final limit. It's the culprit in OVERFLOW errors. The Commodore operating system stores floating point numbers in five bytes. What happens when all of the bytes fill up? The number is a little beyond ten to the 38th power, a one followed by 38 zeros. A VIC or 64 cannot count any higher.

You can force an OVERFLOW error with this program:

```
10 X=10: FORJ=1TO50: PRINTJ,X: X=X*10: NEXT
```

The program stops when the computer reaches a number beyond which it cannot count. Change X=10 to X=-10 to find the limit on the negative side.

How do these limits affect BASIC programs? Precision is not really a problem, unless you want to count past a billion. If you sacrifice precision, you can count a little beyond a billion billion billion before reaching the highest number allowed. Accuracy can adversely affect a lot of programs, however. In a financial program, for example, you might add and subtract some numbers, ending up with a number like \$ 517.120001 or \$ 517.119999 instead of

\$ 517.12. Such programs should include a rounding function,  $DEFFNR(X) = INT(X*100+.5)/100$  to strip off those extra numbers.

## Integer Limits

Integer variables have their own limits. Integer variables are always whole numbers and are signified in programs by a percent-sign (%) suffix. A%, B%, and Y8% are some examples. You can also use them in arrays—A5%(6), YZ%(15), P%(0), etc.

Magnitude, rarely a problem with FP numbers, can be a serious limit on integers. Integers are stored in only two bytes. The highest integer allowed is 32767, the lowest -32768.

Accuracy is never a problem with integers and the limits of precision never become a problem, either.

## String Limits

Strings, collections of characters, are subject to only two limits, both related to length.

First, when INPUT, a string cannot exceed 80 characters on a 64 (two screen lines worth), 88 characters (four screen lines) on a VIC. Second, strings cannot be more than 255 characters long. Concatenation (or adding together two strings) allows strings to exceed the input limit. This program demonstrates:

```
10 A$="Z"  
20 FORJ=1TO400: B$=B$+A$: PRINTJ,B$: NEXT
```

The string variable B\$ is not initialized and so begins as a *null string* (a string containing nothing) with a length of zero. Each trip through the loop adds the variable A\$, which holds the single letter Z. As B\$ grows larger and larger, it reaches the limit of 255 characters, and the computer prints an error message.

## File Errors

Sequential disk files operate much the same as tape files. You begin with the first item and continue until you reach the last. Reading and writing these files can lead to a variety of errors, some subtle, others not so subtle.

There's one command for writing (PRINT#) and two for reading (INPUT# and GET#). (Note there is no space before the "number" sign.) These three BASIC keywords differ from the usual PRINT, INPUT, and GET. If you abbreviate, don't use ?# for PRINT#, it won't work. P SHIFT-R is the correct short form for PRINT#.

If you open a file for reading and try to write to it or vice versa, you'll get a NOT INPUT FILE or NOT OUTPUT FILE error. If your disk drive is not plugged into the serial port, or not turned on, the computer will tell you DEVICE

NOT PRESENT. If you press play on a Datasette (to load a program), and leave it on play, then try to write a file, it will seem to work but the file isn't actually there. There's a sensor that can tell if a button is pressed, but it doesn't distinguish between play, play/record, or even fast forward or rewind. Writing a file while play (but not record) is pressed won't write anything.

You can close a file which is already closed, but you can't open a file which is already open. To be safe, you can precede an OPEN with a CLOSE. For example, CLOSE2: OPEN2,8,2, "filename,S,W" will make sure the file is closed before it is opened.

If you don't close a file before ending the program, you can run into big problems. A disk drive has its own microprocessor, which keeps track of open files. Open a file, write to it, and turn off your computer without closing the file; the result is a "poison" file, which can corrupt other files on the disk. Poison files are marked in the directory with an asterisk. You should never scratch a poison file, you have to use the validate command to get rid of it. Before you end a program, be certain to close all files.

## String Too Long

A very common file error is STRING TOO LONG, mentioned above.

For strings in a file which are longer than 80/88 characters, you'll have to use GET# rather than INPUT#. GET# reads in characters one by one. INPUT# bites off a chunk at a time. In many cases, GET# is more reliable than INPUT#.

Another mistake you can make is writing a file of strings and then trying to read back numeric variables. For example, PRINT#1,A\$ to write the file followed by INPUT#1,A when reading it.

## Checking Variables

Now let's see how you can track down and eliminate program bugs.

When you type RUN, all variables are cleared. Variable values then build up as the program runs. If the program stops, the variables are still intact, but you lose them the moment you change a line, or add a new one. Even if you simply press RETURN over a line, making no changes, you'll lose all variable values, until the program is run again.

Let's imagine a program which stops in the middle and says ILLEGAL QUANTITY IN 300. The first thing to do is type LIST300. You might then see something like this:

```
300 FOR A = S TO E: READ B: POKE A,B: CK%  
= CK% + B: NEXT
```

# CARTRIDGE-MAKER-64™

Create your own  
COMMODORE-64™ video game and program cartridges.

Follow the simple and easy screen instructions to:

- Copy your BASIC or ASSEMBLER programs to cartridge
- Copy your cartridge to diskette or cassette
- Copy from cartridge to cartridge
- Erase and reuse cartridges

CARTRIDGE-MAKER-64	\$129.00
CARTRIDGE-ERASER	\$ 59.00
CARTRIDGE-64 (16K)	\$ 25.00
CARTRIDGE-MAKER Kit	\$189.00

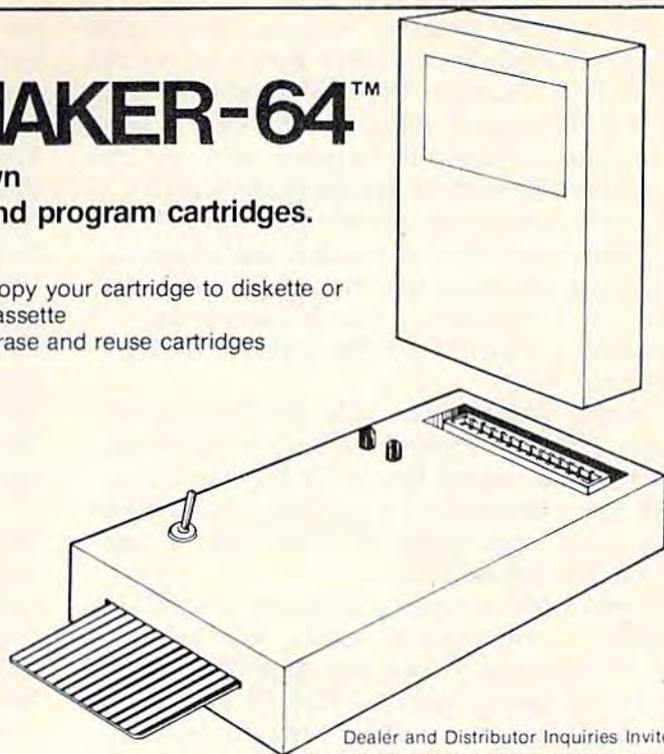
Includes: CARTRIDGE-MAKER-64  
CARTRIDGE-ERASER and 1 Blank  
CARTRIDGE-64 (16K each)

Purchase of 5 Blank  
CARTRIDGE-64 (16K each) \$115.00

Shipping \$3.00, if C.O.D. add \$2.00  
PA residents add 6% sales tax  
VISA-MASTERCARD-C.O.D.-CHECK  
Phone orders (215) 363-8840



Custom Programming Group, Inc.  
47-2A Marchwood Road • Exton, PA 19341



Dealer and Distributor Inquiries Invited  
CARTRIDGE-MAKER-64 & CARTRIDGE-64  
are TM of Custom Programming Group, Inc.  
COMMODORE-64 is a registered TM of Commodore  
Business Machines, Inc.  
CARTRIDGE-MAKER-64 is not intended for piracy of  
copyright materials.

## GET FAST RELIEF FROM IRS HEADACHES!

With TAX COMMAND Income Tax Preparatory Software Series!

On disk for Commodore 64: TAX COMMAND PROFESSIONAL: high-speed tax computation, with a wide variety of schedules, at your finger tips.

- Fast line-by-line Federal Tax information entry
- All mathematical calculations done automatically
- Built-in tax tables
- Prints on the official U.S. Tax forms
- Forget something? Tax Command Professional is flexible enough to quickly recalculate
- Cost of program is tax deductible

This menu driven program covers the 1040 Form, Schedule A, B, C, D, E, G, R, RP, SE, W, and Forms 2106, 2119, 2441, and 3903.

\$49.95

TAX COMMAND for income tax computation. On tape for Vic 20 & Commodore 64.

Tax Command is the abridged version of Tax Command Professional with the 1040 form Schedule A, income averaging and tax tables.

\$24.95

On disk for Commodore 64: NEW! TAX COMMAND PLANNER for quick, easy planning of tax strategies.

- Specifically designed for your tax planning
- Decide how to depreciate assets
- Whether to sell stock
- How to make contributions at the lowest cost
- Six different options for five years

\$49.95

Registered owners receive next year's update at a reduced cost.

Double Discount! Buy Tax Command Professional and Tax Command Planner for one low price of \$89.99.

Practical Programs Inc. stands behind its products, and will replace any defective disk.



Send me fast relief! Enclosed is my check or money order for the amount specified below plus \$2.00 for shipping and handling. Please send me:

- Tax Command Professional (\$49.95)  
 Tax Command (\$24.95)  Vic 20  Commodore 64  
 Tax Command Planner (\$49.95)  
 Double Discount! Send Tax Command Professional and Planner (\$89.99)

Credit card customers call (414) 278-0829.

Name \_\_\_\_\_ Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

CG-02-85

Mail to: Practical Programs, Inc. • P.O. Box 93104  
625 North Milwaukee Street • Milwaukee, Wisconsin 53203



Nobody copies better !!

You deserve to protect your software investment.  
You can with the first (and only)

**BIT-FOR-BIT DISK COPIER** for the C-64,  
1541 Disk Drive and now MSD!



Introducing...

**MR. NIBBLE™**

The next generation in archival  
methods is here today!

- No better disk copier at any price
- Easy-to-use — no complicated instructions
- Totally automatic — no knowledge of DOS required
- You'll LOVE MR. NIBBLE™ — if not, return within 10 days for full refund



FULL CIRCLE SOFTWARE, INC.

P.O. Box 1373  
Dayton, Ohio 45401  
Phone (513) 223-2102

\$49.95 includes shipping & handling  
(Ohio residents add 6% sales tax)



10 day return privilege

"When cloning and dissecting fail, turn to MR. NIBBLE™"

One of those variables holds an illegal quantity of some kind. Type PRINT B to discover the value of B. If it's larger than 255 or smaller than zero, B is the culprit. When you POKE a number into memory, it has to be between zero and 255. If B is 519, for example, the program would crash. In this case, the number is coming from a DATA statement. Maybe you left out a comma, or two lines got stuck together when you forgot to press RETURN after a line. Whatever the cause, you'll have to find the incorrect DATA statement.

Testing variables can help you find a good number of bugs, especially when you have duplicated variable names, like using the name J in two different sections of a program. But remember, as soon as you press RETURN over a line, all variables will be lost.

If you want to rerun a program and still preserve the current variable values, you can choose a line number (call it xxx) and type GOTOxxx, as long as you haven't pressed RETURN over a line. GOTO does not destroy variable values as RUN does.

## Simplify And Isolate

The most elusive bugs are the ones which don't happen right away. Rather, they appear after the program has run 20 or 30 times, seemingly without flaw. Just when you thought it was all finished, the program crashes—or locks up.

You must simplify and isolate, find the one situation that causes the problems. If possible, try to duplicate the error. If you know what happens just before a crash, you're halfway to finding the bug.

Besides PRINT (to check variables), there are four BASIC commands which are great aids when you're hunting down an elusive bug: STOP, CONT, REM, and GET.

Perhaps you've narrowed it down to a certain FOR-NEXT loop. An important variable, K8, is somehow being changed. So you add a line PRINT K8:STOP and every time the program reaches that line it prints the value of K8 and stops.

If you want to continue, type CONT. These two commands work in tandem, one stopping the program, the other starting it up again. While the program is temporarily stopped, you can examine any other variables you want, using PRINT.

## STOP Radar

STOP can also be used as a pointer. Start with a 100-line program with a bug (in this example, let's assume it's straightforward and doesn't use

any subroutines). The first line is 10, the last 1000, in increments of 10. Put a STOP halfway through the program, just before line 500. Run it and it crashes, before it even reaches line 500. You now know the problem—or at least one of them—happens somewhere in the first half of the program. Now put a STOP in line 250. This time the program stops, but not because of an error. You type CONT (for CONTInue) and again the computer freezes before getting to 500. With just a couple of lines, you've zeroed in on the general area of the bug. It's after 250, but before 500. A couple more STOPS and you can narrow the possibilities to just a few lines. STOP is like radar used to pinpoint the bug.

Now you suspect the bug is in a certain line. But you don't know for sure. The line does some calculations followed by a POKE or two. You can make the line invisible with a REMark. REM is usually used to add comments, because it makes the computer ignore everything up to the next line. But it's also good for temporarily removing a line, so the line, as usual, is ignored.

Finally, GET can sometimes substitute for the STOP-CONT debugging duo. If you'd rather halt the program temporarily, instead of stopping it, add a line XXX GET G\$:IF G\$ = "" THEN XXX. Whenever the line is executed, everything pauses until you press a key.

## Time Out To Clean The Blackboard

Have you ever written a program which usually runs well but sometimes pauses before starting up again?

You don't have a bug. You can put the blame on a process called *garbage collection*, especially if the program contains a lot of string variables.

As variables are defined, they are put into memory just after the end of the program. But strings can contain one letter or five or 160.

Say your program has a variable A\$ and you define it, A\$ = "HELLO, " + N\$ (where N\$ is a person's name). You've created a *dynamic string*. Later on, the program changes A\$ to "HELLO AGAIN, " + N\$. One way to store this new string on the memory blackboard would be erase the old one and put this one in its place. But the new A\$ is longer, so the computer would have to move a lot of memory around to make room. Instead, the computer marks the old variable as "garbage," drawing a line through it, and puts the new variable into an empty space.

But if memory fills up completely (from all the garbage strings), it's time to get rid of all the strings no longer being used. And that takes time. To illustrate, look at this program:

```

10 DIMA$(255)
20 FORX=1TO255: B=INT(RND(1)*26+65)
30 B$=CHR$(B): A$(X)=A$(X-1)+B$: PRINTB$
40 NEXT: GOTO20

```

Enter it and type RUN. It takes some time before available string memory fills with garbage. But eventually, you'll see the program pause while it frees up some space. There's nothing wrong with the computer, it's doing just what it's supposed to.

The process of garbage collection is another quirk of the operating system. Asking the computer how much free memory is left forces garbage collection. Add a line 25 F=FRE(0) to the program above, and all pauses are eliminated. (Actually there's a minuscule pause each time you ask for FRE(0), but it's not noticeable.)

## Lockup Bugs

If your VIC or 64 locks up, consider the possibility that your computer is *not* locked up. A FOR-NEXT loop that counts to a million takes a lot of time. So does POKEing a few thousand numbers into memory. And it's possible to write an inefficient sorting routine that takes hours, even days, to complete. In cases like these, you might want to demonstrate that there's no lockup by printing to the screen or changing border color once in a while.

## Hardware Errors

Hardware should be the last thing you blame. If something is not going right in a program, it's almost always the program's fault.

Hardware, especially moving parts as in a disk drive or printer, occasionally has problems. After many hours of use, disk drives can become misaligned; they'll read disks they've written to, but not disks formatted on other drives (commercial software for example). And the head on a cassette drive can become dirty or magnetized.

There's one operating system/hardware glitch you may run into if you use a VIC-20, Datassette, and 1526 printer (which is why the 1526's shipping box is labeled "For The 64 Only"). After a tape save, load, read, or write, the 1526 printer may be inaccessible. The computer, having just talked to the tape drive, doesn't want to open a line to the printer. SYS 64490 solves this problem, making the printer available again.

The Commodore 64 also has a bug in its operating system. Put the cursor at the bottom line of the screen, type more than 80 characters (hold the space bar down until it traverses more than two screen lines), and then try to delete back to the eightieth character. The program in

memory runs and the keyboard locks up. If you own a Datassette, you can get out of the lockup by pressing the left SHIFT key and the number 3 at the same time. Then press the tape PLAY button, followed by RUN/STOP. The bug seems to occur only with certain character colors.

Two rare bugs you may encounter involve disk access. The first is a documented problem with relative files. If you read a short record from a file that begins on a sector boundary and then later read a subsequent file that is longer than the first and spans two sectors, the second read may be corrupted because a pointer is not updated. The solution is to set the record pointer before *and* after reading a file.

The second is undocumented; it's one of those full moon bugs. The disk SAVE WITH REPLACE option works almost as it should. It scratches the old program and saves a good version of the replacement program. But it may corrupt another file on the disk, especially if the disk is almost full. So far, it has not been proved without a doubt that on a 1541 SAVE WITH REPLACE (SAVE"@:filename") is flawed. In fact, there are two people who have offered a reward to the person who proves the bug exists.

Nevertheless hardware rarely causes problems, although sometimes a memory chip burns out or a soldered connection breaks. Generally, if your computer works for a day or two after you buy it, it will work for years.

## MLX And Proofreader

The two GAZETTE typing aids, MLX and Automatic Proofreader, help immensely. But they can miss transposition errors.

Both programs work by adding up numbers. MLX, used for entering machine language programs, adds six numbers (plus the memory location). So you could type 000, 000, 000, 000, 013, 015 to get a total of 28. But 000, 000, 000, 000, 015, 013 also adds up to 28. MLX wouldn't know the difference. The checksum matches, but the numbers are wrong. Unfortunately, machine language is extremely sensitive to incorrect numbers and there could be big problems with the program.

BASIC is more forgiving than machine language—it usually tells you the type of error and the line number. The Proofreader is also forgiving. It adds up the ASCII values of the line and calculates the checksum. So if you type PRINT+AB, rather than PRINTA+B, the Proofreader checksum number will come out fine. PRITN is a small problem, because it causes a SYNTAX ERROR. But a POKE with transposed numbers can lead to trouble, 525 instead of 255, for example.

# Line Number Cross Reference

Heinz Wrosch

**This handy programmer's utility searches through a BASIC program for all GOTOs and GOSUBs, determining which lines call other lines. It can be useful when a program must be renumbered, or in debugging sessions. For the VIC (with or without expansion) and the 64. Also includes printer option.**

Part of what makes computers so powerful is their decision-making ability. The BASIC commands GOSUB, GOTO, and IF-THEN—what could be called forks in the road—make the decisions. When the program reaches a fork, it changes directions.

There are times when you need to find the points where a decision is made. You can delete a REMark, for example, but there will be problems if another line tries to GOTO that line. Or if you're renumbering a subroutine, you'll need to find which parts of the program GOSUB to that subroutine.

## Finding The Decision Points

If you own a printer, you can LIST the program and trace through it by hand, marking all branches and drawing arrows. But there's a simpler way.

"Line Number Cross Reference" does the tedious work for you. It's a machine language (ML) program that starts at the beginning of your program and prints out a complete list of where all the branches are. You choose whether the list goes to the screen or to a printer.

For example, if you type in the 64 version of Cross Reference, and use it on itself, your screen should look like this:

LINE NUMBER CROSS REFERENCE:

```
=====
LINE          REFERENCED AT
170           200
180           140 160
210           170
```

LISTING COMPLETE

It's a short list, because this program doesn't have to make a lot of decisions, all it does is POKE an ML program into memory. But such a list can be invaluable when you're tracing through a program, creating a flow chart, figuring out which part does what. Cross references are also useful when you need to renumber a program, or if you plan to delete a range of lines.

## Entering The Program

There are two versions of Cross Reference, one for the 64, one for the VIC (with or without expansion). After typing in the appropriate version, make sure you save it to tape or disk.

When you type RUN, the ML program is POKEd into free memory. The 64 version goes into the safe area beginning at 49152. The VIC version goes at the top of BASIC memory, which varies according to how much expansion memory is in place. The VIC version lowers the top-of-memory pointer to protect the program from interference by BASIC, so you should not run it more than once. You'll lose about 500 bytes every time you run the VIC version.

An internal checksum is calculated, and if you've typed the DATA statements correctly, a message with two SYS numbers will appear on the screen:

```
SYS 49518 (64)
SYS 49515 (64—output to printer)
SYS 7570 (unexpanded VIC)
SYS 7567 (VIC—output to printer)
```

VIC owners with expansion in place will see another (higher) set of numbers.

You'll need to remember the ML entry point, so write down the numbers. Next, type NEW to erase the BASIC loader (do not type NEW unless you've already saved the program, or it will be lost). You can load the program you want to examine, and type the SYS to start Cross Reference.

It's helpful, if you have a printer, to first LIST the program to the printer, and then do the appropriate SYS. That way, the cross references

appear on the same sheet of paper as the program listing.

## How It Works

To understand how such a utility works, it helps to know a little about how BASIC programs are stored in memory. When you type a program line, the BASIC keywords are tokenized (converted to a single number between 128 and 255).

In addition to tokenizing, the computer creates a line link and converts the line number to low-byte/high-byte format. In memory, a BASIC line looks like this:

```
( L )   line link low
( L )   link link high
( N )   line number low
( N )   line number high
( )     BASIC line, with tokens
.....
( )
( )
( 0 )   zero, marking end of line
```

There are several ways to create a branch in BASIC (xxx represents the line number):

```
GOTO xxx
GOSUB xxx
IF... THEN xxx
IF... GOTO xxx
IF... THEN GOTO xxx
ON... GOTO xxx, xxx, xxx
ON... GOSUB xxx, xxx, xxx
```

In each case, the line number comes after a GOTO, GOSUB, or THEN. There may also be a space separating them. The program has to search for the tokens representing these three keywords, and look at the numbers following them.

Line Number Cross Reference begins with the first line number, and searches through program memory looking for a branch. If it finds the token for GOTO (137), GOSUB (141), or THEN (167), it analyzes the rest of the line for a match (to the first line). (Note that you must use GOTO, not GO TO. The VIC and 64 tokenize GO differently than GOTO.) After checking every line for references to the first program line, it searches (again through every line) for a match to the second line, the third, the fourth, and so on to the last line.

Note that it tries to match only existing line numbers. If your program contains a GOTO 200 and you delete line 200, it will not show up on the list of cross referenced lines, because line 200 no longer exists. Thus, you should run Cross Reference *before* renumbering or deleting lines.

See program listings on page 146.

## WHATEVER HAPPENED TO FAY WRAY



**Kong  
should have  
backed her up  
with the NEW  
Copy Q**

In the software jungle,  
no copy program for the Commodore 64™  
works better or copies more at any price!  
**Copy Q** is the fastest, most reliable, and easiest-to-use.  
And **Copy Q** even comes with a backup!

The NEW **Copy Q** contains a TRUE INTELLIGENT NIBBLER which copies all the information on a disk and even the newest copy protection including half tracks, track 36+, varying data density, misordered and extra sectors, gap and sync tracks, and much more.

**Copy Q** is fully automatic. There are no parameters to set. You don't even need to swap disks when using two drives.

And **Copy Q** makes the FASTEST backups by using intelligent scanning, data compression, and super-fast data communication. Most disks are copied in just three minutes. And many disks that require extensive nibbling are copied in less than five minutes.

**Copy Q** contains other features found nowhere else. **Copy Q** revivins disks rather than erasing them. **Copy Q** also contains a utility that automatically backs up any data disk and removes all data errors in just two minutes.

It's a software protection jungle and your data and program integrity are at stake. So don't monkey around with the others. You can climb straight to the top with the NEW **Copy Q** by Q-R & D

Now only **\$39.95**  
Seven day money back guaranteed.

**Copy Q** and other fine Q-R & D products are available at B. Daltons, La Belles, and more than 300 dealers nationally. For the name of the dealer nearest to you or to order direct call:

**612 831-1088**



ONE WEST LAKE STREET, MINNEAPOLIS MN 55408 - 612 922-7628

# Baker's Dozen

## Part 2

Lawrence Cotton

**This month, we'll look at five interesting sound and graphics programs for the 64. Each is short and serves as a good example of what can be accomplished with just a few program lines.**

---

Last month, we looked at four short programs that demonstrate the color and graphics capabilities of the 64. We'll continue in the same vein this month, but we'll look at two new programs which integrate sound with graphics, and three which demonstrate some unusual sound effects. By studying the programs, you may see some techniques which you can use in your own programs. If you're more of a user than a programmer, you'll still enjoy these unusual sight and sound demonstrations.

### Music Patterns

This program performs differently every time you run it. Random-colored blocks fly around the screen, bouncing off borders, to the accompaniment of random tones. The result is interesting, sometimes even beautiful, visual and sound patterns. Occasionally, you may see and hear the patterns looping. If so, just press RUN/STOP and type RUN to start over. Give this one a few tries to see how interesting it can be. Let's look at the key lines in the program:

Line 1 clears the sound chip (0), turns up the volume (15), sets attack and decay to 4 (no sustain/release), and defines AA and BB as upper and lower frequency memory locations for voice 1.

Line 10 clears the screen (CHR\$147), PRINTs in white (CHR\$5), changes the screen and border color to black (53280,0 and 53281,0), sets the high pulse at eight, and defines CC (voice 1 turn on/off).

In line 20, C (unrelated to location 54272) represents the amount that must be added to screen memory to control a POKEd character's color. Note how C is added to K in lines 30, 100,

200, and 300.

Lines 20-28 generate random screen starting locations, number of characters generated (up to 11), frequencies H(1) through H(4) and L(1) through L(4), and character colors (omitting black and white); B represents a reversed space.

Lines 30, 100, 200, and 300 POKE the reversed spaces to the screen and turn the note (voice 65) on. K is incremented by adding +41, -41, +39, or -39.

Lines 40, 50, 110, 120, 210, 220, 310, and 320 check for screen borders and loop to the proper lines if a hit is detected.

Lines 60, 130, 230, and 330 turn the voice off and loop back to finish a series of blocks.

Finally, line 340 sends the program back to pick another number of characters generated, new frequencies, and colors.

### Bleep

"Bleep" is similar to Music Patterns, except we generate a new character each time the program runs, and the patterns build from the center of the screen (location 1524). Let's look at the key lines.

Lines 111-127 pick characters from a predetermined set. Feel free to insert your own CHR\$ values. Lines 200-210 pick random frequencies and colors, and lines 220-234 determine which direction the character will move.

Lines 300-310 check only the top and bottom of the screen, provide a short delay loop, and loop back (via line 360) to line 100. Lines 320-340 do all the POKEing—first frequencies, then characters and colors, then notes on and off after a short delay loop.

Line 350 loops back to pick a new frequency, color, and direction, but retains the same character.

### Chimes

Unlike the previous programs, "Chimes" is strictly a sound demonstration of ring modulation. After running the program, you'll hear a repeated set of chime effects and see voice 1 and 2

frequency values. Press the space bar to hear another set of chime effects and see the corresponding values. The REMs in the listing should help explain what the program is doing, but a few comments are in order.

We assign random frequencies to voices 1 and 3 (lines 70 and 100, respectively), then combine them in line 120. Location 54276, which normally turns on waveforms (by POKEing 17 for triangle, 33 for sawtooth, 65 for pulse or square, and 129 for noise), can be POKEd with other quantities to produce various effects.

## Tuba

Another sound-only program, "Tuba" plays a scale sounding, of course, like a tuba. It demonstrates the use of the 64's *resonant filter*, found at locations 54292-54296. After running the program, you are prompted to press a number from 0 (fast) to 500 (slow). This controls the speed at which the scale is played.

As in Chimes, the program listing contains several REMs which may be of assistance in understanding the program. Let's take a look at the key lines.

Line 40 controls the attack, decay, sustain, and release of the notes, and line 50 processes voice 1 through the filter.

Line 60 chooses which filter (see the REM), and line 75 lets you plug in variable D, the speed at which the tuba plays the scale.

Line 100 POKEs frequencies (from the data in line 160, read by line 90) into locations 54272 and 54273.

Line 120 turns the note on, and line 130 varies the cut-off frequency from 255 to 1 in steps of -10, adds a delay (D) to control the speed, then turns the note off.

Line 140 contains a suggestion (try others, too) in a REM statement, and line 160 contains musical note values from the 64 User's Manual. Feel free to experiment with these.

## Good Vibes

The final program this month, "Good Vibes," is a test program you can use as an aid in creating various sounds for your own programs.

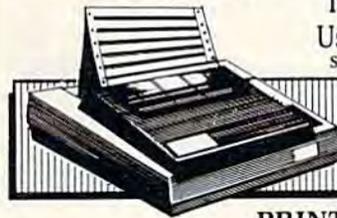
After running the program, a set of instructions appear. First, choose a voice (1-5). Press the space bar to play a random vibe over and over. Press any key (not the space bar) to hear a sound and list its values (low and high frequencies, and the step). You can also hold any key down to cycle through random sounds or press V to change to another voice.

Let's look at the key lines:

Lines 10-36 set up the sound chip, clear the screen, and remind you to turn up the volume.

# Our Customers Call Us The Commodore Consultants!

It's A Great Computer.  
Use It for All It's Worth!  
Send for Our Complete Catalog



**GEMINI 10X**  
120 CPS with  
Cardco + G **\$31900**

## PRINTERS

Powertype Daisywheel 18 CPS with Cardco B . . . . . \$369	Epson RX 80 with Tymac Connection . . . \$299
Okidata 92 160 CPS with Tymac Connection . . . . 449	Commodore MPS 802 . . . 279 Call for prices on other models.

**FREE STARTER KIT:** Be ready to print with 150 sheets laser-perf paper, 50 mailing labels & replacement ribbon with every printer combo.

## DISK DRIVES

MSD Super Drive . . . . . Call	Commodore 1541 . . . . . Call
Indus GT . . . . . Call	Phonemark Datasette \$29
One Kay Data Drive . . . . . Call	

## MONITORS

Teknika MJ10 . . . . . \$239	Sakata 12" Gr/Amb . \$99/109
Commodore 1702 . . . . . Call	

**COMPUSERVE STARTER KIT**  
with purchase of  
Westridge or Mighty Mo **\$1995**



## MODEMS

Westridge 6420 . . . . . \$79	VIP Terminal . . . . . \$44
Mighty Mo . . . . . 79	Vidtex . . . . . 27

## DATABASE MANAGERS

The Consultant . . . . . \$65	• NEW • NEW • NEW •
Super Base 64 . . . . . 59	PFS:File . . . . . \$59
The Manager . . . . . 35	PFS:Report . . . . . Call

## WORD PROCESSORS

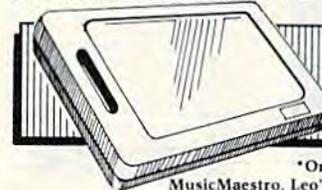
Paper Clip . . . . . \$59	Easy Script . . . . . \$35
w/speller . . . . . 79	Easy Spell . . . . . 17

## SPREADSHEETS

Calc Result Easy . . . . . \$35
Calc Result Advanced . . . . . 65
MultiPlan . . . . . 65

## ACCOUNTING

Commodore	G/L,A/P,A/R,INV,PR module \$34
• NEW: Peachtree	G/L,A/P,A/R . . . . . system 139



**CHALKBOARD**  
\*With Software  
Purchase **\$2900**

\*One or more at \$15: Leo's Links, BearJam, MusicMaestro, Leo's Paintbrush, LogicMaster, Programming

## ACCESSORIES

Com Cool Drive Fan . . . . . \$49	Com Cool Plus w/ surge \$69
-----------------------------------	-----------------------------

## BLACK NAUGAHYDE COVERS

C-64 or 1541 Drive . . . ea. \$5	1702 Monitor . . . . . \$10
MSD Drives 1/2 . . . . . 5/6	1525/MPS 801 . . . . . 7
Gemini 10X . . . . . 9	1526/MPS 802 . . . . . 8

MOST ORDERS SHIPPED WITHIN 48 HOURS! Advertised prices are for bank check or money order. VISA/MC orders add 3.5%. NO C.O.D. ORDERS. Personal or company checks delay orders 21 days. All sales are final - defective merchandise exchanged for same product only. Add 3% for shipping (\$2.50 min.) Please call for shipping on monitors. Ohio residents add 5.5% sales tax. Prices & availability subject to change. HOURS: MON-FRI 10 AM to 10 PM • SAT 10 AM to 5 PM • SUN Noon to 5 PM

# 800-638-2617

INFORMATION & IN OHIO 216/758-0009

# BIG BYTES

1301 BOARDMAN-POPLAR ROAD, POLAND, OHIO 44130  
[www.commodore.ca](http://www.commodore.ca)

Lines 40-120 POKE a waveform to location 54276 and clear the screen again.

Three random values are generated in line 130: C is the low frequency (lower limit of the vibe); D is the high frequency (upper limit); and E is the size of the step to be used in the FOR-NEXT loops.

Lines 200-220 check the keyboard to see which key is pressed. If the space bar is pressed, sound is generated from lines 280 and 290. If V is pressed, the program loops back to line 40 to get another voice.

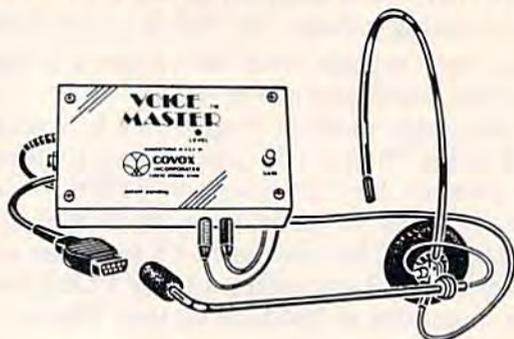
Lines 230-240 POKE voice 1 memory locations with limits, stepped either slowly (values around upper limit E) or quickly (values around lower limit E), first up (line 230), then down (line 240).

Line 250 PRINTs frequencies and steps to the screen, then turns the sound off by POKEing voice 1 locations with a zero.

You can write down or print out the frequencies and steps and use them in one of your own programs. A lot of wild sounds are possible.

Next month, we'll conclude our series with some interesting and colorful graphics programs. Until then, experiment with these sound programs. You may find that they can be a real aid in your own programming efforts. See program listings on page 148.

## THE AMAZING VOICE MASTER



- Record & playback speech *in your own voice*
- Recognize your spoken commands
- Hum or sing to compose or play music in real time — notes and chords!

All this and more for only: **\$89.95** Add \$4.00 for shipping & handling

*You won't believe it until you hear it!*

**ASK YOUR DEALER NOW FOR A VOICE MASTER DEMONSTRATION**

Or call (503) 342-1271 for a telephone demonstration and receive a FREE audio cassette demo tape.

Note: Early Voice Masters have trade in value! Call for details.



**COVOX INC.**

675-D Conger St., Eugene, OR 97402  
Telex 706017 (AV ALARM UD)

## TUSSEY MT. SOFTWARE and Peripherals

**Guaranteed Lowest Prices!**  
"Find a lower price and we'll beat it!"

Toll Free Order Line: **800-468-9044**  
Information and PA orders: 814-234-2236  
Phone lines open 10-8 Mon-Fri, 10-5 Sat

—Order with confidence. We honor manufacturer's warranties  
—UPS second day air available, \$3.00 extra on software

—We ship COD on everything except printers, monitors, and disk drives  
—Next day shipping on instock items

—We accept Mastercard and Visa  
—Free 20 page catalog available

### MONTHLY SPECIALS

Prices expire 2/31/85

Specials change every month  
Gemini 10X . . . . . \$249.00  
Tele Learning Modem (1650 Compatible) . . . . . \$77.99  
Mirage Prof. W.P., Database, and Report Generator . . . . . \$124.99  
Toolbox by Prolme . . . \$69.99

### PRINTERS

Gemini 10X . . . . . \$249.00  
Gemini 15X . . . . . \$377.00  
Delta 10, 160 cps, BK buffer . . . \$389.00  
Delta 15 . . . . . Call  
Powerpage 18cps, letter quality . . \$349.00  
Radix 10, Radix 15 printers from Star Micronics . . . . . Call  
All above printers come with a 1 year warranty, which we honor.  
Cardco 101 letter quality printer . . \$459.00  
Ritenan 10 . . . . . \$279.00  
Cardco 103 . . . . . Call  
Grappier CD printer interface . . . Call  
Panasonic KXP 1090 . . . . . \$239.00  
Panasonic KXP 1091 . . . . . \$299.00  
Xetec GPI . . . . . \$76.99  
Xetec SPI/B . . . . . \$99.99  
Xetec SPI . . . . . \$43.99

\*Epson and Okidata printers now in stock! Call for our low price!

### WORD PROCESSORS

WP64 by Prolme(d) . . . . . \$39.99  
Wordpro 3\*/64 w/Spellright(d) . . . \$59.00  
Paperclip(d) . . . . . \$59.00  
Paperclip w/spellpack(d) . . . . . \$76.99  
Cardco Write Now/64 (cart) . . . . . \$37.00  
Mirage Professional WP (d) . . . . . \$59.00  
Mirage Personal WP (d) . . . . . \$29.00  
Omni Writer/Speller(d) . . . . . \$45.00  
Word Writer(d) by Timeworks . . . . \$37.00  
Heswriter . . . . . \$16.00

### SPREADSHEETS

Calc Result Adv (d, cart) . . . . . \$67.00  
Calc Result Easy(cart) . . . . . \$33.99  
Hesware Multiplan(d) . . . . . \$65.00  
P.S. (Prog. Spreadsheet)(d) . . . . . \$54.99  
Practicalc 64(d) . . . . . \$36.00  
Practicalc 64(t) . . . . . \$34.00

### MONITORS

Zenith 12" Amber . . . . . \$97.00  
Zenith 12" Green . . . . . \$92.00  
Sakata SC100 Color Monitor . . . . . \$239.00  
Amdk Color 1 Plus . . . . . \$259.00  
Cable for monitors . . . . . \$9.95

### HARDWARE

MSD SD1, single disk drive . . . . . \$334.00  
MSD, SD2, double disk drive . . . . Call  
BI 80 batteries included 80 column card with . . . . . \$154.99  
Bus Card II by Batteries included . . . Call  
Indus disk drive . . . . . Call

Call or Write for our FREE 20 page catalog!

### CARDCO

Printer w/ graphics . . . . . \$67.00  
Printer interface/B . . . . . \$44.00  
Light pen . . . . . \$29.00  
Numeric keypad . . . . . \$35.00  
5 slot exp. interface CB/S . . . . . \$58.00  
Mail Now/64 . . . . . \$32.00  
Spell Now . . . . . Call  
File Now . . . . . Call  
Graph Now . . . . . Call

### UTILITIES

The Last One(d), a Basic program generator . . . . . \$64.00  
Pal 64 assembler by Prolme(d) . . . . \$39.99  
Power 64 Basic by Prolme(d) . . . . . \$39.99  
Toolbox 64, both Pal 64 and Power 64(d) . . . . . \$69.99  
Copy Plus by Blue Sky(d) . . . . . \$26.99  
SuperBasic 64 by Blue Sky(d) . . . . . \$29.99  
Add on Basic by Blue Sky(d) . . . . . \$29.99  
Canada A/M backup program . . . . . \$39.95  
Simon's Basic . . . . . \$39.95

### DATABASES

The Consultant (formerly Delphi's Oracle)(d) . . . . . \$63.99  
Mirage Database Manager(d) and Report Generator . . . . . \$69.99  
Superbase 64(d) . . . . . \$64.99  
Data Manager II(d) by Timeworks . . . \$37.00  
Practifile by MSId . . . . . \$37.00

### MODEMS

Commodore 1600 . . . . . \$56.00  
Commodore 1650 autoanswer, autodial . . . . . \$89.99  
Hesmodem I . . . . . \$45.00  
Hesmodem II . . . . . Call  
Tele Learning Modem (1650 Compatible) . . . . \$77.99  
Computer starter kit . . . . . \$26.95  
Westridge modem . . . . . \$76.95  
Mighty Mo, new modem from USI . . . . Call  
VIP terminal package by Soflaw . . . . . \$43.99  
Vidtex Terminal . . . . . \$29.99  
Vidtex terminal pack and Computer starter kit . . . . . \$49.99

### MISCELLANEOUS

Keypad w/printer(d) . . . . . \$65.00  
Spellpro 64(d) by Prolme . . . . . \$39.99  
Mailpro 64 . . . . . \$39.99  
Complete Personal Accountant(d) . . . \$54.00  
Verbatim Datadisc ss, dd disks (10) . . . \$23.99  
Maxell MD1 ss, dd disks (10) . . . . . \$21.99  
1541 Express by RTC . . . . . Call  
Smart Cable . . . . . Call  
Musicalc 1 . . . . . \$37.95  
Musicalc 2 . . . . . \$27.95  
Musicalc 3 . . . . . \$27.95  
SAM Software Automatic Mouth . . . . \$47.95  
Mirage Advanced Report Generator . . . \$39.95  
The House Accountant . . . . . \$46.95  
Timeworks Inventory, A/P/A/R, Cash Flow Management, General Ledger, Payroll Management . . . . . \$40.95 each  
64 Doctor . . . . . \$24.95  
FCM, First Class Mail . . . . . \$36.95  
Super Sketch . . . . . \$39.99  
Simon's Basic . . . . . \$39.95

DEALER INQUIRIES WELCOME

Tussey Mt. Software  
Box 1006  
State College, PA 16804

To Order By Mail — Send personal check, money order, or certified check. For fastest service send money order or certified check. Allow 2 weeks for personal checks to clear.  
Shipping & Terms — Add \$2.50 per order for shipping software and accessories. Add \$6.00 per order for COD. Add \$10.00 to ship printers and disk drives. \$8.00 to ship monitors. COD orders not accepted on printers and monitors. Foreign orders: APO, FPO, AK, and HI require additional amounts for shipping. We pay shipping on backorders. Orders shipped UPS unless noted otherwise. All prices reflect cash discount. Visa, Mastercard add 3%. Manufacturer's warranty honored with our invoice and original packaging. PA residents add 6% sales tax. Prices subject to change.

# NEWS & PRODUCTS



The \$399 Indus GT disk drive for the Commodore 64.

## Disk Drive For Commodore Computers

A 5-1/4 inch disk drive designed to be 100 percent compatible with Commodore 64 and VIC-20 software has been introduced by Indus Systems, Inc. The Indus GT reportedly operates up to 400 percent faster than comparable drives. Features include readouts that display track location, drive number, and error codes; buttons to control digital readouts; and electronic write-protect. Indus also is supplying a free software package that includes a data base, spreadsheet, and word processor with each disk drive.

Suggested retail price is \$399.

Indus Systems, Inc.  
9304 Deering Avenue  
Chatsworth, CA 91311  
(818) 882-9600

## 64 Disk And Memory Utility

For intermediate and advanced programmers, Quantum Software has developed *Peek A Byte 64*. The program is a full-featured disk editor with built-in monitor and disassembler as part of the software. It not only displays HEX values, but also ASCII and Pet ASCII.

*Peek A Byte 64* has a track/sector and computer memory display and editor with cursor control. HELP screens are available with a single key-stroke. Commands are designed

for simplicity. Keyboard errors and disk read/write errors are all reported, and the program does not lock-up the computer as do some sector editors.

The program resides in high memory, and is compatible with many BASIC programs and with the DOS Wedge 5.1. A tutorial manual is included.

Quantum Software  
P.O. Box 12716  
Lake Park, FL 33403-0716  
C.O.D. orders (305) 840-0249  
\$29.95 (disk)

## 64 Drawing System

The *Versawriter Drawing Tablet*, a hardware and software package that plugs into the user port of the Commodore 64, and which allows entry of graphics to the 64's medium resolution screen, has been released by Versa Computing, Inc.

More than 30 graphics commands are available with the system, including full editing, microscope, textwriter, and color fill, in more than 200 color options. Graphics produced with the system can be saved to disk for printing later.

Suggested retail price is \$149.

Versa Computing, Inc.  
3541 Old Conejo Road, Suite 104  
Newbury Park, CA 91320  
(805) 498-1956

# FANTASTIC!

## VIC-20 & C64 PRODUCTS

### CASSETTE INTERFACE & DUPLICATOR

# \$34.95



#10-101

Use any portable cassette recorder to load and save programs. Controls cassette motor to start and stop the tape. Allows you to connect two cassette recorders together to make backup copies.

### PARALLEL PRINTER INTERFACE

# \$39.95

#10-108



Connects to the User port. Allows you to use any Centronics standard parallel printer with a C64 or VIC-20. Translates PET to standard ASCII.

Several printing modes allow you complete control over printer. Print PET graphics/control characters as mnemonics and CHR\$ codes i.e. [CLR] or [174]. Virtually any printer with bitmap graphic ability can print actual graphics characters. Emulation of most all CBM printer functions. Software adds a PLIST command for BASIC program listing. Printer Driver software consumes no normal user memory space, and is compatible with most all popular software. Disk includes software for C64 and VIC-20.

### RS232 INTERFACE

#10-102

# \$39.95



Connects to the User port and provides full RS232 signals for modems and printers. 2 foot cable with male DB25 connector. Supports full complement of RS232 signals, including Ring detect. Comes with a type-in BASIC terminal program and printer hook up instructions.

### COMPLETE SERIAL PRINTER DRIVER

# \$29.95

For use with any serial printer. Gives you all the features of the Parallel Printer driver program described above. Prints data addressed to both device 2 and 4, allowing you to use programs which don't normally allow you to use a serial printer. Configuration program allows you to set up for graphics printing on any serial printer with bit-map capability.

#10-109

### VOLKSMODEM INTERFACE CABLE

# \$22.95

#10-103

Connects a Volksmodem to a C64 or VIC-20. Cable housing contains miniature circuitry to handle all signals. No other interface needed. Includes Type-in BASIC terminal program. Volksmodem not included.

C64 & VIC-20\* Commodore Volksmodem\* Anchor Automation

**TO ORDER:** See your local Dealer or call (206) 236-2983 or mail to the address below. One year unconditional guarantee. If not delighted, return it within 30 days for a full refund (less shipping). Phone orders mention this ad and get \$1.00 discount. Add \$1.60 each for shipping. \$1.65 extra for C.O.D. VISA & Mastercard welcome.



If you like these products, and want to see more, mark the reader's service card or send to get our FREE CATALOG containing dozens of other exciting products.

# Omnitronix

P.O. BOX 43 — MERCER IS., WA 98040

## NEWS & PRODUCTS



Cardco's MT/2 monitor tuner converts a computer monitor into a TV.

## Monitor Tuner

Cardco has introduced a monitor tuner that converts a computer monitor into a television set. The tuner is compatible with both color and monochrome monitors, and includes an audio output to a monitor or stereo system, a computer/TV switch, and a cable/antenna input.

The MT/2 monitor tuner retails for \$99.95.

Cardco, Inc.  
300 South Topeka  
Wichita, KS 67202  
(316) 267-6525

## Adventure, Strategy Games For 64

Strategic Simulations, Inc. has released several adventure and strategy games for the Commodore 64. New titles include:

*Rails West!*, a simulation of railroad development in the late 1800s; *Questron*, a fantasy role-

playing game; *Broadsides*, a simulation of Napoleonic naval battles; *President Elect*, a game based on the presidential elections from 1960 to the present; *Computer Quarterback*, a football simulation; and *Breakthrough in the Ardennes*, a simulation of the last major German World War II offensive.

All of the games retail for \$39.95 each, except *Breakthrough in the Ardennes*, which has a suggested retail price of \$59.95.

Strategic Simulations Inc.  
883 Stierlin Road, Bldg. A-200  
Mountain View, CA 94043-1983  
(415) 964-1353

## 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!"

READ WHAT THE EXPERTS SAY ABOUT OUR VERSION OF ELIZA:

"Much more than a mere game...You'll be impressed with ELIZA...A convincing demonstration of Artificial Intelligence."  
—PC MAGAZINE

"Delightful entertainment...An ideal medium for showing off your system."  
—MICROCOMPUTING MAGAZINE

"ELIZA is an astounding piece of software...A fascinating program to use and study."  
—BARON'S MICROCOMPUTER REPORTS

"ELIZA is a great way to introduce your friends to computers...A very funny party game."  
—PETER A. McWILLIAMS

"ELIZA is an exceptional program, one that's fun to use, shows off your machine, and has great historical interest."  
—POPULAR COMPUTING MAGAZINE

"This version of ELIZA is the best we have seen. As a party game, it is unmatched."  
—HOME APPLICATIONS FOR THE C-64

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 1/2% sales tax)

ARTIFICIAL INTELLIGENCE RESEARCH GROUP

921 North La Jolla Avenue, Dept. G

Los Angeles, CA 90046

(213) 656-7368 (213) 654-2214

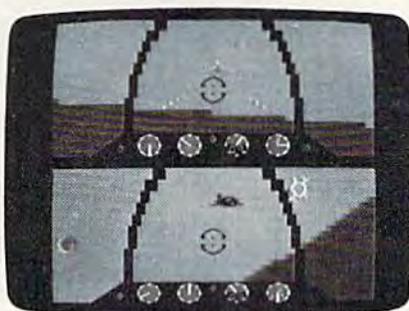
MC, VISA and checks accepted



## 64 Flight Simulation Game

*Mig Alley Ace*, a two-player flight simulation game which features separate cockpits on the same screen and three-dimensional graphics, has been released for the Commodore 64 by MicroProse Software.

Simulation pilots can fly their F-86 Sabrejets in battle against each other, or can choose to dogfight cooperatively



*Double cockpits on the same screen are one of the features of Mig Alley Ace, newly released for the Commodore 64 by MicroProse Software.*

against a flight of MIG-15s, defending United Nations troops during the Korean conflict of the

1950s.

Suggested retail price for *Mig Alley Ace*, on either disk or cassette, is \$34.95.

MicroProse Software  
10616 Beaver Dam Road  
Hunt Valley, MD 21030  
(301) 667-1151

*New product releases are selected from submissions for reasons of timeliness, uniqueness, available space, and general interest. Readers should be aware that News & Products often contains an edited version of material submitted by vendors. We are unable to vouch for its accuracy at time of publication.*

### TELEMESSAGE C-64 BULLETIN BOARD SYSTEM THE PROFESSIONAL APPROACH TO ELECTRONIC MAIL!

#### FULL FEATURED:

- \* Software clock and calendar
- \* Automatic start-up and shutdown
- \* Supports both visitors and members
- \* Stores up to 100 private messages
- \* Private file for msgs to the SYSOP
- \* Automatic Mail-search at logon
- \* Solid crash-proof design
- \* Automatic error recovery
- \* Easily customized by operator
- \* On-line membership application
- \* Operates in standard ASCII
- \* Capacity for 100 members
- \* Private and public messages
- \* Logs a record of each call
- \* Includes the popular CHAT mode
- \* Menu driven and easy to use
- \* Includes five support programs
- \* Detailed operations manual

#### SECURITY:

Our system has security features that rival the large information services. No need for concern about callers abusing or crashing TELEMESSAGE!

#### BUSINESS APPLICATIONS:

Many of our customers use TELEMESSAGE to advertise and process orders. With our system your customers can shop 24 hours a day!

#### HARDWARE REQUIREMENTS:

- 1 - Compatible with most auto answer modems including the Commodore 1650, Westridge and Hayes.
- 2 - Works with either the MSD SD-2 or two Commodore 1541 disk drives. (specify your disk drive model when ordering)

You get all of these features plus six programs, for only \$79.50 !  
Make payment by check or money order. (add \$3.00 for C.O.D. orders)

#### TAILORED SOLUTIONS

P.O. BOX 183, WASHINGTON, D.C. 20044

PHONE (703) 845-8576

DEALER INQUIRIES WELCOME!

# How To Type In COMPUTE!'s GAZETTE Programs

Each month, COMPUTE!'s GAZETTE publishes programs for the VIC-20, Commodore 64, Plus 4, and 16. Each program is clearly marked by title and version. Be sure to type in the correct version for your machine. Also, carefully read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

We publish two programs, appearing in alternating months, designed to make your typing effort easier: The Automatic Proofreader, and MLX, designed for entering machine language programs.

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

## Special Characters

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

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

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing another key), the

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

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

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

## The Quote Mode

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

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

When You Read:	Press:	See:	When You Read:	Press:	See:	When You Read:	Press:	See:
{CLR}	SHIFT CLR/HOME		{PUR}	CTRL 5		<		
{HOME}	CLR/HOME		{GRN}	CTRL 6		↑	SHIFT	
{UP}	SHIFT		{BLU}	CTRL 7		<b>For Commodore 64 Only</b>		
{DOWN}			{YEL}	CTRL 8		{1}	CTRL 1	
{LEFT}	SHIFT		{F1}	F1		{2}	CTRL 2	
{RIGHT}			{F2}	SHIFT F1		{3}	CTRL 3	
{RVS}	CTRL 9		{F3}	F3		{4}	CTRL 4	
{OFF}	CTRL 0		{F4}	SHIFT F3		{5}	CTRL 5	
{BLK}	CTRL 1		{F5}	F5		{6}	CTRL 6	
{WHT}	CTRL 2		{F6}	SHIFT F5		{7}	CTRL 7	
{RED}	CTRL 3		{F7}	F7		{8}	CTRL 8	
{CYN}	CTRL 4		{F8}	SHIFT F7				

# Bug-Swatter:

## Modifications And Corrections

• There are no bugs in "C/G Term" (November 1984). However, there are some additions and corrections for "C/G Bulletin Board" (December and January).

First, the article did not clearly state that as system operator (sysop), your user ID is 1000. You should use this ID number when you do maintenance and updates on the board, but you can't create a user file with this number. Other users will have ID numbers ranging from 1001 to 1999.

If you tried typing the two MLX programs, you may have encountered an UNDEFINED STATEMENT error in line 550. The explanation of how to type in the program neglected to mention that you must first move the start of BASIC to avoid overwriting the beginning of MLX. Before loading MLX, enter this line:

```
POKE 642,70:SYS 58260
```

Once you've saved the program to disk, turn the computer off and back on and follow the instructions in the December issue for setting up the message disk.

Finally, there are two situations where callers may be able to crash the bulletin board. The first happens when someone calls and hangs up before connecting with the board. The second occurs when the user chooses to leave a message and then presses f8 (to get out of message mode). Version 1.0, which appeared on the December GAZETTE DISK and in the December and January issues, contains these glitches. Version 1.1, on the January DISK, has been corrected and should be free of bugs.

To fix version 1.0, follow these instructions:

1. Load and run MLX, enter a starting address of 49152, ending address 49493, then enter this patch program. When you're finished, save it to disk.

```
49152 :169,157,141,165,009,169,042
49158 :239,141,069,015,169,234,105
49164 :141,120,023,141,121,023,069
49170 :141,122,023,169,004,141,106
49176 :037,034,169,033,141,038,220
49182 :034,169,076,141,008,010,212
49188 :141,166,015,141,043,017,047
49194 :169,062,141,009,010,169,090
49200 :189,141,167,015,169,211,172
```

```
49206 :141,044,017,169,087,141,141
49212 :010,010,141,168,015,141,033
49218 :045,017,169,156,141,105,187
49224 :008,169,086,141,111,008,083
49230 :160,000,140,152,192,162,116
49236 :158,134,251,162,192,134,091
49242 :252,162,062,134,253,162,091
49248 :087,134,254,172,152,192,063
49254 :177,251,145,253,238,152,038
49260 :192,174,152,192,224,181,199
49266 :144,239,169,001,162,008,069
49272 :160,000,032,186,255,169,154
49278 :005,162,153,160,192,032,062
49284 :189,255,169,001,133,251,106
49290 :169,008,133,252,162,244,082
49296 :160,087,169,251,032,216,035
49302 :255,000,000,048,058,066,065
49308 :066,083,169,000,170,168,044
49314 :032,219,255,173,003,221,041
49320 :041,239,141,003,221,173,218
49326 :001,221,041,016,201,000,142
49332 :208,010,169,000,170,168,137
49338 :032,219,255,076,106,087,193
49344 :032,222,255,224,028,144,073
49350 :222,076,232,009,032,204,205
49356 :255,162,002,032,198,255,084
49362 :032,228,255,201,000,240,142
49368 :040,201,019,208,006,141,063
49374 :102,072,076,138,087,201,130
49380 :022,208,003,141,102,072,008
49386 :032,204,255,162,002,032,153
49392 :201,255,169,002,032,210,085
49398 :255,032,210,255,174,102,250
49404 :072,224,000,208,010,032,030
49410 :222,255,224,014,144,194,031
49416 :076,232,009,162,000,142,117
49422 :003,070,142,001,070,142,186
49428 :002,070,076,081,010,234,237
49434 :234,234,234,174,240,071,189
49440 :169,000,157,021,001,238,106
49446 :240,071,174,240,071,224,034
49452 :010,208,238,174,239,071,216
49458 :096,162,000,142,014,071,023
49464 :169,000,174,014,071,157,129
49470 :164,069,238,014,071,174,024
49476 :014,071,224,085,144,238,076
49482 :032,112,030,032,048,046,118
49488 :076,046,017,000,000,000,219
```

2. Load "PATCHPROGRAM",8,1 (the program above).
3. Type NEW.
4. Load the original bulletin board with a ,8.
5. POKE a 234 into the eight bytes from 3473 to 3480. For example, POKE3473,234 and so on, up to POKE3480,234.
6. Put a blank, formatted disk into your drive, and SYS49152 to run the patch program.
7. A new version of the C/G Bulletin Board will be automatically saved to your disk, under the name "BBS".

The procedure above applies to the version published in the GAZETTE and the program on the December DISK. It does not apply to the January DISK, which was corrected. We regret any inconvenience this may have caused our readers.

• There are two errors in the 64 version of "Jump!" (November 1984). **POKES1,30** should be changed to **POKES+1,30** in line 740, and **POKES4,0** should be **POKES+4,0** in line 760. These typos do not affect the play of the game, but may cause problems with later **SAVEs** and **LOADs**. Thanks to reader Bill J. Pitre for discovering these two bugs.

• "Trek" (October 1984) works as listed, but several readers have reported an incorrect Automatic Proofreader checksum for line 3220:

```
3220 PRINT "{HOME}{11 DOWN}{10 RIGHT} .
      {5 SPACES} .{GRN} .{3 SPACES} .
      {3 SPACES}";:T1=TI:GOSUB920:GOTO95
      :rem 104
```

The period at the end of the first line was apparently taken for a scratch on the printer's negative and removed. This does not affect the program because after the **PRINT** statement is executed, there is a **GOSUB** to a routine that immediately clears the screen. 



**PEEK A BYTE™ 64**

**A DISK AND MEMORY EDITOR**  
 Peek A Byte is more than a disk editor - it features a C-64 memory display in HEX, ASCII, or screen code and a full page editor with cursor control.

**YOU CAN PEEK A BYTE...**  
 Change file or disk names, recover "lost" programs, compare disk data, display free sector map, convert HEX/decimal, read disk drive memory, disassemble disk or memory data, print most screen displays... and much more!

**IT'S EASY TO USE!**  
 All commands are simple, easy to remember keystrokes and **HELP** screens are always available. Complete error handling for key entries and disk read/write errors. Tutorial manual for beginners and pros!

**PEEK A BYTE IS FAST ML CODE**  
 Above **BASIC** and compatible with many **BASIC** programs, **ML** routines, and the **DOS Wedge 5.1**. Doesn't "lock up" the computer.

**QUANTUM SOFTWARE**  
 P.O. Box 12716, Dept. 4  
 Lake Park, Florida 33403

**ALL FOR \$29.95**  
 US POST PAID

PEEK A BYTE is a trademark of Quantum Software.  
 To order send check or money order, US funds. Foreign add \$4 for shipping and handling. Florida residents add 5% sales tax. For US COD orders add \$2. Phone orders call (305) 840 0249.

**DEMO PROGRAM**  
 See **COMPUTE!'s GAZETTE** February, 1985 Disk

## Dreams CAN come true!

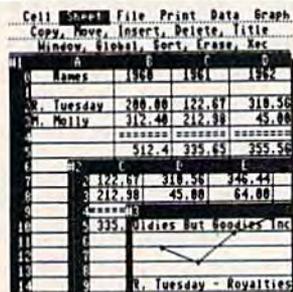
Back in June of 1983, Kelvin Lacy had a dream. He dreamed of creating one integrated program that would include a spreadsheet, business graphics and a database. A program with the power of Lotus 1-2-3. On the Commodore 64. People laughed! He had just finished OmniWriter/OmniSpell, to be marketed by HESWARE. Ignoring the skeptical, he began VIZASTAR.

Now, after 15 months, his dream has come true. VIZASTAR has a full-featured spreadsheet, as good as Multiplan. But much faster—faster than many spreadsheets on the IBM PC! It is written 100% in 6502 machine language code and is ALWAYS in memory. It is menu-driven, using the latest techniques in user-friendliness. It is compatible with virtually all printers and most word processors. Up to 9 windows can be open simultaneously, anywhere. Remarkably, 10K of memory is available for spreadsheet use.

The database is equally impressive. Create file layouts by simply painting a picture of the layout on up to 9 screens, showing where a field starts and ends; VIZASTAR does the rest.

Imagine the power of a spreadsheet integrated with a database. Now add graphics — bar, line, and multi-color pie and 3-D "skyscraper" graphs. You could access a customer's profile in the database, transfer the data to the worksheet, and let it calculate discounts, sales tax etc. and then transfer the updated data back to the database. Open up a window anywhere and display a graph of your data, instantly. This integration is the key to VIZASTAR's power—the **first and only** program of this kind on the C-64. All commands can be automated, so you can "program" your own applications and run them with one keystroke.

Trademarks: Lotus 1-2-3/Lotus Development. Commodore 64/Commodore Electronics Ltd. Multiplan/Microsoft.



Names	1/18	1/15	1/12
Tuesday	200.00	122.67	318.56
W. Molly	312.40	212.38	45.98
	512.4	335.05	355.56

Actual screen dump taken by VIZASTAR

VIZASTAR comes with a cartridge, a 1541 diskette with a backup, Reference and Tutorial manuals. VIZASTAR is normally \$119.97 but at a Special Introductory Price, it's now only \$99.97. We are so positive you will be delighted with VIZASTAR that we offer a **15 day money-back guarantee**. Try it risk-free! Compare VIZASTAR to any other spreadsheet or database.

So order today. Call or send a check or Money Order. Calif. residents add 6.5% sales tax.  
 Add P&H: UPS—\$3; COD, Canada—\$5

**SOLID STATE SOFTWARE**

1253 Corsica Lane, Suite C  
 Foster City, CA 94404  
 (415) 341-5606 (24 Hours)

Dealer & Distributor Inquiries Welcome

# Cypher

(Article on page 56.)

## BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

## Program 1: Cypher—64 Version

```
70 PRINT "{CLR}":POKE53280,6:POKE53281,12      :rem 147
80 GOSUB1210                                     :rem 172
90 PRINT:PRINT "{CLR} {WHT} {RVS} INSTRUCTION  :rem 7
   S ?{2 SPACES}Y/N{OFF}"
100 GETA$:IFA$=""THEN100                         :rem 69
110 IFA$="Y"THENGOTO1060                         :rem 143
120 IFA$<>"N"THEN100                             :rem 83
130 PRINT "{CLR}":DIMA(5),Z(5),S(5),RC(8),      :rem 109
   GC(8)
140 GLOC=1039:CGLOC=55311:ANS=1024:A$=""        :rem 231
   POKE54296,15
150 HF=54273:LF=54272:HP=54275:LP=54274:A      :rem 233
   D=54277:SR=54278:WF=54276
160 CANS=55296:SLOC=1053:X=0                   :rem 116
170 POKE649,1                                    :rem 199
180 FORK=1TO12                                   :rem 63
190 FORI=1TO6                                    :rem 17
200 POKEGLOC,81:POKECGLOC,11                   :rem 218
210 GLOC=GLOC+2:CGLOC=CGLOC+2                 :rem 27
220 NEXTI                                        :rem 28
230 GLOC=GLOC+68:CGLOC=CGLOC+68               :rem 149
240 NEXTK                                        :rem 32
250 GLOC=1039:CGLOC=55311                     :rem 164
260 FORL=0TO5                                    :rem 16
270 B=INT(RND(1)*8)                             :rem 28
280 RC(B)=RC(B)+1                              :rem 131
290 A(L)=B                                       :rem 248
300 POKEANS,90:POKECANS,2:GOSUB1510:ANS=A      :rem 92
   NS+2:CANS=CANS+2
310 NEXTL                                        :rem 31
320 ANS=1024:CANS=55296                       :rem 34
330 FORI=0TO5                                    :rem 11
340 GETZ$:IFZ$=""THEN340                       :rem 131
350 IFASC(Z$)=20THENGOTO1020                  :rem 151
360 IFASC(Z$)<49ORASC(Z$)>57THEN340            :rem 46
370 Z(I)=VAL(Z$)                               :rem 125
380 Z(I)=Z(I)-1                                :rem 30
390 IFZ(I)=8THEN800                            :rem 91
400 GC(Z(I))=GC(Z(I))+1                       :rem 203
410 POKECGLOC,Z(I)                             :rem 76
420 GOSUB1330                                   :rem 221
430 CGLOC=CGLOC+2                              :rem 1
440 NEXTI                                        :rem 32
450 FORI=0TO7                                    :rem 16
460 IFGC(I)<=RC(I)THENQ=Q+GC(I)               :rem 82
470 IFGC(I)>RC(I)THENQ=Q+RC(I)               :rem 35
480 NEXTI                                        :rem 36
490 FORK=0TO5                                    :rem 20
500 IFZ(K)=A(K)THENF=F+1                      :rem 136
510 NEXTK                                        :rem 32
520 IFQ=0THEN610                               :rem 170
530 IFF=0THEN580                               :rem 166
540 FORK=0TOF-1                                :rem 127
550 S(K)=91                                    :rem 48
560 NEXTK                                       :rem 37
570 IFF=QTHEN610                              :rem 197
580 FORK=FTOQ-1                               :rem 164
590 S(K)=87                                    :rem 57
600 NEXTK                                       :rem 32
610 FORK=0TO5                                    :rem 14
620 POKELOC,S(K)                              :rem 19
630 POKELOC+54272,0                          :rem 132
640 SLOC=SLOC+2                              :rem 150
650 NEXTK                                       :rem 37
660 SLOC=SLOC+68                              :rem 212
670 CGLOC=CGLOC+68                           :rem 67
680 I=0                                         :rem 84
690 X=X+1                                       :rem 232
700 IFF=6THEN800                              :rem 166
710 IFX=12GOTO800                             :rem 240
720 FORK=0TO5                                    :rem 16
730 S(K)=0                                      :rem 246
740 NEXTK                                       :rem 37
750 Q=0:F=0                                    :rem 71
760 FORK=0TO7                                    :rem 22
770 GC(K)=0                                    :rem 49
780 NEXTK                                       :rem 41
790 GOTO330                                    :rem 111
800 FORT=0TO5                                    :rem 24
810 POKEANS,81                                  :rem 63
820 POKECANS,A(T)                              :rem 0
830 GOSUB1420                                   :rem 226
840 ANS=ANS+2:CANS=CANS+2                    :rem 24
850 NEXTT                                       :rem 220
860 IFZ(I)=BOR(X=12ANDF<6)GOTO910           :rem 222
870 PRINT"":PRINT"":PRINT"                  :rem 134
880 PRINT "{BLK} YOU WON!!":PRINT "{DOWN}    :rem 252
   {BLK} MOVES:"X
890 GOTO920                                    :rem 117
910 PRINT "{BLK}{3 DOWN} YOU LOSE!!"         :rem 160
920 PRINT:PRINT                                :rem 239
930 PRINT "{14 DOWN} PRESS ANY KEY"          :rem 185
940 GETC$:IFC$=""THEN940                      :rem 97
960 PRINT "{CLR} {WHT} {2 DOWN} {2 SPACES}WOU :rem 146
   LD YOU LIKE TO TRY AGAIN ?{2 SPACES}
   {RVS}Y/N{OFF}"
970 GETA$                                       :rem 229
980 IFA$=""THEN970                             :rem 229
990 IFA$="Y"THENRUN90                          :rem 253
1000 IFA$<>"N"THEN970                         :rem 144
1009 PRINT "{CLR}":POKE54296,0                :rem 253
1010 POKE53280,14:POKE53281,6:PRINT "[7]":   :rem 161
   POKE649,10:END
1020 FORDE=I*2TO1STEP-1:POKECGLOC-DE,12:G    :rem 28
   OSUB1510:NEXTDE
1030 FORRE=0TO8:GC(RE)=0:NEXTRE              :rem 179
1040 CGLOC=CGLOC-(I*2)                        :rem 245
1050 GOTO330                                   :rem 149
1060 PRINT "{CLR}THIS IS A CODE BREAKING G   :rem 111
   AME. SIX OF{2 SPACES}"
1065 PRINT"EIGHT RANDOM COLORS WILL BE CH    :rem 78
   OSEN."
1070 PRINT"A COLOR MAY BE CHOSEN MORE THA    :rem 32
   N ";
1075 PRINT"ONCE.{3 SPACES}AFTER THE SIX D   :rem 101
   IAMONDS{SHIFT-SPACE}COVERING THE"
1080 PRINT"CODE APPEAR, ENTER YOUR GUESS   :rem 244
   {SPACE}WITH THE{2 SPACES}COLOR KEYS.
   "
```

```

1090 PRINT"AFTER YOUR SIX COLORS ARE ENTE
RED YOUR{2 SPACES}SCORE WILL APPEAR.
"
:rem 235
1100 PRINT"":PRINT"SCORING IS:"
:rem 137
1110 PRINT"+=CORRECT COLOR CORRECT LOCATI
ON"
:rem 248
1120 PRINT"0=CORRECT COLOR WRONG LOCATION
"
:rem 121
1130 PRINT"@=WRONG COLOR":PRINT""
:rem 42
1140 PRINT"THE SCORING MARKER LOCATIONS D
ON'T"
:rem 87
1145 PRINT"RELATE TO THE GUESS LOCATIONS.
"
:rem 62
1150 PRINT"":PRINT"YOU HAVE 12 TURNS, IF
{SPACE}YOU WISH TO SEE "
:rem 54
1160 PRINT"THE CODE AND QUIT THAT GAME EN
TER 9.":PRINT""
:rem 230
1170 PRINT"IF 5 OR LESS COLORS HAVE BEEN
{SPACE}GUESSED"
:rem 86
1175 PRINT"ENTER 'DEL' TO REMOVE THE GUES
S."
:rem 71
1180 PRINT"[DOWN]{RVS}{BLK}PRESS ANY KEY
[OFF]"
:rem 62
1190 GETRS:IFR$=""THEN1190
:rem 219
1200 GOTOL30
:rem 144
1210 PRINT"[WHT]{CLR}{10 DOWN}{9 RIGHT}
{RVS}{3 SPACES}{OFF} {RVS} {OFF}
{RVS} {OFF} {RVS}{3 SPACES}{OFF}
{RVS} {OFF} {RVS} {OFF} {RVS}
{3 SPACES}{OFF} {RVS}{3 SPACES}{OFF}
"
:rem 252
1220 PRINTSPC(9)"{RVS} {OFF}{3 SPACES}
{RVS}{3 SPACES}{OFF} {RVS} {OFF}
{RVS} {OFF} {RVS} {OFF}{O}{RVS}
{OFF} {RVS} {OFF}{2 O} {RVS} {OFF}
{RVS} {OFF}"
:rem 245
1230 PRINTTAB(9)"{RVS} {OFF}{4 SPACES}
{RVS} {OFF}{2 SPACES}{RVS}{2 SPACES}
{OFF}{2 SPACES}{RVS} {O} {OFF} {RVS}
{2 O}{OFF} {RVS}{3 SPACES}{*}{OFF}"
:rem 218
1240 FORD=1TO9:PRINT " ";NEXTD
:rem 63
1250 PRINT"{RVS}{3 SPACES}{OFF}{2 SPACES}
{RVS} {OFF}{2 SPACES}{RVS}{2 SPACES}
{OFF}{2 SPACES}{RVS} {OFF} {RVS}
{OFF}{RVS}{3 SPACES}{OFF} {RVS}
{OFF}{2 SPACES}{RVS} {OFF}"
:rem 185
1310 FORD=1TO2000:NEXT
:rem 60
1320 RETURN
:rem 166
1330 IFZ(I)=0THENHI=34:LO=75:GOTO1520
:rem 212
1340 IFZ(I)=1THENHI=38:LO=126:GOTO1520
:rem 7
1350 IFZ(I)=2THENHI=43:LO=52:GOTO1520
:rem 211
1360 IFZ(I)=3THENHI=45:LO=198:GOTO1520
:rem 18
1370 IFZ(I)=4THENHI=51:LO=97:GOTO1520
:rem 223
1380 IFZ(I)=5THENHI=57:LO=172:GOTO1520
:rem 17
1390 IFZ(I)=6THENHI=64:LO=188:GOTO1520
:rem 24
1400 IFZ(I)=7THENHI=68:LO=149:GOTO1520
:rem 18
1410 RETURN
:rem 166
1420 IFA(T)=0THENHI=34:LO=75:GOTO1520
:rem 198
1430 IFA(T)=1THENHI=38:LO=126:GOTO1520
:rem 249
1440 IFA(T)=2THENHI=43:LO=52:GOTO1520
:rem 197
1450 IFA(T)=3THENHI=45:LO=198:GOTO1520
:rem 4
1460 IFA(T)=4THENHI=51:LO=97:GOTO1520
:rem 209
1470 IFA(T)=5THENHI=57:LO=172:GOTO1520
:rem 3
1480 IFA(T)=6THENHI=64:LO=188:GOTO1520
:rem 10
1490 IFA(T)=7THENHI=68:LO=149:GOTO1520
:rem 13
1500 RETURN
:rem 166
1510 HI=45:LO=198
:rem 178
1520 POKEHF,HI:POKELF,LO
:rem 4
1530 POKEHP,0:POKELP,255
:rem 185
1540 POKEAD,9:POKESR,0
:rem 77
1550 POKEWF,65
:rem 46
1560 FORSO=1TO150:NEXTSO
:rem 23
1570 POKEWF,64
:rem 47
1580 RETURN
:rem 174

```

## Program 2: Cypher—VIC Version

```

90 POKE36879,232:GOSUB1210:PRINT:PRINT"
{CLR}{BLK}{RVS}{3 SPACES}INSTRUCTIONS
{2 SPACES}Y/N{2 SPACES}{OFF}"
:rem 14
100 GETA$:IFA$=""THEN100
:rem 69
110 IFA$="Y"THENGOTO1060
:rem 143
120 IFA$<"N"THEN100
:rem 83
130 PRINT"{CLR}":DIMA%(5),Z%(5),S%(5),RC%(
8),GC%(8)
:rem 38
140 GLOC=7688:CGLOC=38408:ANS=7680:A$="":
POKE36878,15
:rem 19
150 HF=36876:LF=36875
:rem 133
160 CANS=38400:SLOC=7695:X=0:FORK=1TO12:F
ORI=1TO6
:rem 11
210 POKEGLOC,81:POKECGLOC,1:GLOC=GLOC+1:C
GLOC=CGLOC+1:NEXTI
:rem 44
230 GLOC=GLOC+38:CGLOC=CGLOC+38:NEXTK:GLO
C=7688:CGLOC=38408
:rem 178
260 FORL=0TO5:B=INT(RND(1)*8):RC%(B)=RC%(
B)+1:A%(L)=B
:rem 246
300 POKEANS,90:POKECANS,2:GOSUB1510:ANS=A
NS+1:CANS=CANS+1:NEXTL
:rem 31
320 ANS=7680:CANS=38400
:rem 36
330 FORI=0TO5
:rem 11
340 GETZ$:IFZ$=""THEN340
:rem 131
350 IFASC(Z$)=20THENGOTO1020
:rem 151
360 IFASC(Z$)<49ORASC(Z$)>57THEN340
:rem 46
370 Z%(I)=VAL(Z$):Z%(I)=Z%(I)-1
:rem 169
390 IFZ%(I)=8THEN800
:rem 128
400 GC%(Z%(I))=GC%(Z%(I))+1
:rem 95
410 POKECGLOC,Z%(I):GOSUB1330:CGLOC=CGLOC
+1:NEXT:FORI=0TO7
:rem 191
460 IFGC%(I)<=RC%(I)THENQ=Q+GC%(I)
:rem 193
470 IFGC%(I)>RC%(I)THENQ=Q+RC%(I)
:rem 146
480 NEXTI:FORK=0TO5
:rem 213
500 IFZ%(K)=A%(K)THENF=F+1
:rem 210
520 NEXTK:IFQ=0THEN620
:rem 111
530 IFF=0THEN580
:rem 166
540 FORK=0TOF-1
:rem 127
550 S%(K)=91:NEXTK
:rem 25
570 IFF=QTHEN620
:rem 198
580 FORK=FQO-1
:rem 164
590 S%(K)=87:NEXTK
:rem 34
620 FORK=0TO5:POKESLOC,S%(K):POKESLOC+307
20,0
:rem 6

```

```

640 SLOC=SLOC+1           :rem 149  1150 PRINT"YOU HAVE 12 TURNS, IF YOU WISH
650 NEXTK                 :rem 37      TO SEE " :rem 43
660 SLOC=SLOC+38         :rem 209  1160 PRINT"THE CODE AND QUIT THATGAME ENT
670 CGLOC=CGLOC+38      :rem 64      ER '9'." :rem 41
680 I=0                   :rem 84  1170 PRINT"{DOWN}IF 5 OR LESS COLORS
690 X=X+1                 :rem 232      {3 SPACES}HAVE BEEN GUESSED":rem 103
700 IFF=6THEN800        :rem 166  1175 PRINT"ENTER 'DEL' TO REMOVE THE GUES
710 IFX=12GOTO800       :rem 240      S." :rem 71
720 FORK=0TO5           :rem 16  1180 PRINT"{5 SPACES}{RVS}PRESS ANY KEY
730 S%(K)=0             :rem 27      {OFF}" :rem 157
740 NEXTK                :rem 37  1190 GETR$:IFR$=""THEN1190 :rem 219
750 Q=0:F=0             :rem 71  1200 GOTO130 :rem 144
760 FORK=0TO7           :rem 22  1210 PRINT"{PUR}{CLR}{10 DOWN}{RVS}
770 GC%(K)=0           :rem 86      {2 SPACES}{OFF} {RVS} {OFF} {RVS}
780 NEXTK                :rem 41      {OFF} {RVS}{3 SPACES}{OFF} {RVS}
790 GOTO330             :rem 111      {OFF} {RVS} {OFF} {RVS}{3 SPACES}
800 FORT=0TO5          :rem 24      {OFF} {RVS}{3 SPACES}{OFF}";:rem 201
810 POKEANS,81         :rem 63  1220 PRINT"{RVS} {OFF}{2 SPACES}{RVS}
820 POKECANS,A%(T)     :rem 37      {3 SPACES}{OFF} {RVS} {OFF} {RVS}
830 GOSUB1420          :rem 226      {OFF} {RVS} {OFF}{O}{RVS} {OFF}
840 ANS=ANS+1:CANS=CANS+1 :rem 22      {RVS} {OFF}{2 O} {RVS} {OFF} {RVS}
850 NEXTT               :rem 48      {OFF}"; :rem 192
860 POKE198,0:IFZ%(I)=8OR(X=12ANDF<6)GOTO :rem 180
910 :rem 106  1230 PRINT"{RVS} {OFF}{3 SPACES}{RVS}
880 PRINT"{CLR}{3 DOWN}{2 SPACES}YOU WON :rem 118
{SPACE}IN"X"MOVES":PRINT"{8 SPACES}"; :rem 118
:rem 43  1250 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}
890 GOTO930 :rem 118  {RVS} {OFF}{2 SPACES}{RVS} {OFF}
910 PRINT"{3 DOWN}{BLK}YOU LOSE" :rem 94  {3 SPACES}{RVS} {OFF} {RVS} {OFF}
930 PRINT"{2 DOWN} {RVS}PRESS{2 DOWN} :rem 142
{4 LEFT}ANY{2 DOWN}{3 LEFT}KEY" :rem 142
:rem 142  1310 FORD=1TO2000:NEXTD :rem 128
940 GETC$:IFC$=""THEN940 :rem 97  1320 RETURN :rem 166
960 PRINT"{CLR}{2 DOWN}{BLK}WOULD YOU LIK :rem 98
E TO TRY AGAIN ?{2 SPACES}{RVS}Y/N :rem 98
{OFF}" :rem 29  1330 IFZ%(I)=0THENHI=130:LO=130:GOTO1520
980 GETA$:IFA$=""THEN980 :rem 101      :rem 78
990 IFA$="Y"THENRUN130 :rem 40  1340 IFZ%(I)=1THENHI=175:LO=175:GOTO1520
1000 IFA$<>"N"THEN980 :rem 145      :rem 98
1010 PRINT"{CLR}":END :rem 55  1350 IFZ%(I)=2THENHI=183:LO=183:GOTO1520
1020 FORDE=IT01STEP-1:POKECGLOC-DE,12:GOS :rem 98
UB1510:NEXTDE :rem 192  1360 IFZ%(I)=3THENHI=191:LO=191:GOTO1520
1030 FORRE=0TO8:GC%(RE)=0:NEXTRE :rem 216      :rem 98
1040 CGLOC=CGLOC-(I*1) :rem 244  1370 IFZ%(I)=4THENHI=195:LO=195:GOTO1520
1050 GOTO330 :rem 149      :rem 108
1060 PRINT"{CLR}THIS IS A CODE BREAK- :rem 86
ING :rem 86  1380 IFZ%(I)=5THENHI=201:LO=201:GOTO1520
GAME. SIX OF EIGHTRANDOM COLORS WIL :rem 100
L BE" :rem 95  1390 IFZ%(I)=6THENHI=207:LO=207:GOTO1520
1070 PRINT"CHOSEN. A COLOR MAY BECHOSEN M :rem 97
ORE THAN ONCE.AFTER THE SIX DIAMONDS :rem 97
"; :rem 166  1400 IFZ%(I)=7THENHI=209:LO=209:GOTO1520
1080 PRINT"COVERING THE CODE{5 SPACES}APP :rem 166
EAR, ENTER YOUR{4 SPACES}GUESS WITH :rem 166
{SPACE}THE COLOR{2 SPACES}KEYS." :rem 64
:rem 50  1410 RETURN :rem 166
1090 PRINT"AFTER YOUR SIX COLORS ARE ENTE :rem 84
RED YOUR SCOREWILL APPEAR." :rem 84  1420 IFA%(T)=0THENHI=130:LO=130:GOTO1520
1092 PRINT"{5 SPACES}{DOWN}{RVS}PRESS ANY :rem 84
KEY" :rem 84  1430 IFA%(T)=1THENHI=175:LO=175:GOTO1520
1095 GETA$:IFA$=""THEN1095 :rem 193      :rem 84
1100 PRINT"{CLR}{DOWN}SCORING IS:" :rem 94  1440 IFA%(T)=2THENHI=183:LO=183:GOTO1520
1110 PRINT"+=CORRECT COLOR{9 SPACES}CORRE :rem 72
CT LOCATION" :rem 248  1450 IFA%(T)=3THENHI=191:LO=191:GOTO1520
1120 PRINT"0=CORRECT COLOR WRONG :rem 86
{3 SPACES}LOCATION" :rem 121  1460 IFA%(T)=4THENHI=195:LO=195:GOTO1520
1130 PRINT"@=WRONG COLOR" :rem 92  1470 IFA%(T)=5THENHI=201:LO=201:GOTO1520
1140 PRINT"{DOWN}THE SCORING MARKER :rem 72
{4 SPACES}LOCATIONS DON'T RELATETO T :rem 72
HE GUESS LOCATIONS" :rem 220  1480 IFA%(T)=6THENHI=207:LO=207:GOTO1520
1500 RETURN :rem 86
1510 HI=45:LO=198 :rem 92
1520 POKEHF,HI:POKELF,LO :rem 166
:rem 178 :rem 178
:rem 4 :rem 4

```





```

490 SYS7168:P1=PEEK(820):C1=P1:P1=DR(P1)
      :rem 70
500 IFPEEK(P+P1+P1)=93THENRETURN :rem 250
510 T=MQ:GOSUB280:TP=PEEK(P+P1+P1):IFMQ=T
      THEN540 :rem 18
520 IFRM(RM)=0THENRM(RM)=1:SC=SC-300:TC=T
      C-1 :rem 180
530 RETURN :rem 120
540 IF(TP<=45)AND(TP>=40)THENP1=0:C1=0
      :rem 222
550 IFPEEK(824)THENGOSUB610:GOTO490
      :rem 147
560 IF(P+P1)<>TLAND(P+P1+P1)<>TLTHEN570
      :rem 66
561 RM(RM)=0:TC=TC+1:SC=SC+300:GOSUB760:P
      OKETL+C,0:POKETL,32:TL=0:GOTO490
      :rem 21
570 G=PEEK(P+P1):H=PEEK(P+P1+P1):IF(G<>MT
      )AND(G<>MB)AND(H<>MT)AND(H<>MB)THEN58
      0 :rem 39
575 MQ=MQ+1:IFRM(RM)=0THENRM(RM)=1:TC=TC-
      1:SC=SC-300 :rem 205
576 RETURN :rem 130
580 IFC1=0THEN490 :rem 217
590 POKEP+P2,32:POKEP,32:P=P+P1:POKEP+C,2
      :POKEP+P1+C,3 :rem 31
600 POKEP,0:POKEP+P1,63+C1:P2=P1:C2=C1:GC
      TO490 :rem 244
610 AL=P+P2:S=0:IFC2=0THENP2=22:C2=1:POKE
      36876,200 :rem 167
620 S=S+1:POKEAL+((S-1)*P2),32:POKE36876,
      200-S*5:BL=PEEK(AL+(S*P2)) :rem 31
630 IF(BL=MT)OR(BL=MB)THENS=SC+10:GOSUB7
      60:POKE36876,0:GOTO660 :rem 142
640 IFPEEK(AL+(S*P2))<>32THENPOKEP+P2,63+
      C2:POKE36876,0:RETURN :rem 3
650 POKEAL+(S*P2),63+C2:POKEAL+(S*P2)+C,C
      L+1:GOTO620 :rem 8
660 AC=AL+(S*P2):FORA=0TO3:POKE36877,200
      :rem 64
670 IFAC=M(A)ORAC=M(A)+MPTHENPOKEM(A),32:
      POKEM(A)+MP,32:M(A)=0:POKE36877,0:RET
      URN :rem 184
680 NEXTA:POKE36877,0:RETURN :rem 12
690 PRINT"{CLR}";:PRINTTP$;:FORI=1TO17:PR
      INTSI$;:NEXT:PRINTBT$; :rem 226
700 RETURN :rem 119
710 PRINT"{HOME}{3 DOWN}";:FORB=1TO2:PRIN
      T"{2 RIGHT}({,,,,,){2 SPACES}({,,,,,
      ){2 RIGHT}"; :rem 252
720 PRINT"{2 RIGHT}-{6 SPACES}-{2 SPACES}
      -{6 SPACES}-{2 RIGHT}";:PRINT"
      {2 RIGHT}'{6 SPACES}'{2 SPACES}'
      {6 SPACES}'{2 RIGHT}"; :rem 35
730 PRINT"{2 RIGHT}-{6 SPACES}-{2 SPACES}
      -{6 SPACES}-{2 RIGHT}";:PRINT"
      {2 RIGHT}+,,,,,*{2 SPACES}+,,,,,*
      {2 DOWN}{2 RIGHT}";:NEXTB:RETURN
      :rem 57
740 PRINT"{HOME}{8 DOWN}"; :rem 66
750 FORI=1TO3:PRINT"_{20 RIGHT}_";:NEXT:R
      ETURN :rem 231
760 PRINT"{HOME}{19 DOWN}"; :rem 255
770 PRINTLEFT$(ML$,11-MQ)CHR$(13);:PRINT"
      {RVS}{YEL}{4 RIGHT}SCORE";SC;"{LEFT}
      {SPACE}LEVEL"LV"{OFF}"; :rem 149
780 PRINT"{HOME}";:PRINT"{BLU}";:RETURN
      :rem 61
790 FORI=1TO4:RM(I)=1:NEXT:LV=LV+1
      :rem 134

```

```

800 PRINT"{CLR}{7 DOWN}{7 RIGHT}{RVS}YOU
      {SPACE}HAVE":PRINT"{3 RIGHT}{RVS}ACHI
      EVED LEVEL"LV"{OFF}" :rem 14
810 FORI=1TO2000:NEXT:RETURN :rem 47

```

## Program 4: The Forbidden Crypt—64 Version

```

100 PRINT"{CLR}{12 DOWN}{12 RIGHT}PLEASE
      {SPACE}WAIT" :rem 12
101 SN=54272:FORI=SN+24:POKEI,0:NEXT:
      AD=54277:SR=AD+1:LF=SN:LH=SN+1
      :rem 204
102 CR=SN+4:VL=54296 :rem 136
103 POKEAD,16:POKESR,240 :rem 171
104 POKEVL,15 :rem 248
110 GOSUB820:GOSUB1810 :rem 48
115 T$="{RVS}{40 SPACES}{OFF}":P=5:SC=0:L
      V=1 :rem 183
116 FORI=1TO4:RM(I)=0:NEXT :rem 102
120 S$="{RVS}{2 SPACES}{OFF}{36 SPACES}
      {RVS}{2 SPACES}{OFF}" :rem 211
125 POKE49194,7 :rem 53
130 DEFFNRX(X)=INT(RND(1)*87)+X:DEFFNRY(Y
      )=INT(RND(1)*57)+Y:POKE53280,0
      :rem 247
140 POKE53281,0:PL=1524:PX=20:PY=12:OPL=1
      524:POKEPL,81:POKEPL+54272,4:EN=53269
      :rem 117
150 POKEEN,255:POKE49192,0:LV=1:SC=0:CS=5
      3278:CD=53279:GOSUB330:GOTO115
      :rem 237
160 PRINT"{CLR}";:PRINT:PRINTT$;S$;S$;:GO
      SUB180:PRINTS$;S$;:GOSUB180:PRINTS$;S
      $;T$ :rem 79
170 PRINT"{HOME}":RETURN :rem 150
180 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}
      {A}*****{S}{2 SPACES}{A}*****
      *****{S}{2 SPACES}{RVS}{2 SPACES}
      {OFF}"; :rem 41
190 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}-
      {13 SPACES}-{2 SPACES}-{13 SPACES}-
      {2 SPACES}{RVS}{2 SPACES}{OFF}";
      :rem 98
200 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}-
      {13 SPACES}-{2 SPACES}-{13 SPACES}-
      {2 SPACES}{RVS}{2 SPACES}{OFF}";
      :rem 90
210 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}I
      {13 SPACES}I{2 SPACES}I{13 SPACES}I
      {2 SPACES}{RVS}{2 SPACES}{OFF}";
      :rem 11
220 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}-
      {13 SPACES}-{2 SPACES}-{13 SPACES}-
      {2 SPACES}{RVS}{2 SPACES}{OFF}";
      :rem 92
230 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}-
      {13 SPACES}-{2 SPACES}-{13 SPACES}-
      {2 SPACES}{RVS}{2 SPACES}{OFF}";
      :rem 93
240 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}
      {Z}*****{X}{2 SPACES}{Z}*****
      *****{X}{2 SPACES}{RVS}{2 SPACES}
      {OFF}"; :rem 62
250 RETURN :rem 119
260 PRINT"{CLR}";:PRINT:PRINTT$;:rem 120
270 FORI=1TO20:PRINTS$;:NEXT:PRINTT$:PRIN
      T"{HOME}":PRINT"{9 DOWN}"; :rem 106
280 D$="{L}]{J}{36 SPACES}{L}]{J}":PRINTD$;
      D$;D$;D$:RETURN :rem 139

```

```

290 PRINT"{HOME}{23 DOWN}{YEL}{2 SPACES}S
CORE"SC"{3 SPACES}LEVEL"LV"{3 SPACES}
LIVES"P"[7]": :rem 67
291 PRINT"{HOME}":RETURN :rem 154
330 IFTC<>4THEN340 :rem 48
335 TC=0:FORI=1TO4:RM(I)=0:NEXT:LV=LV+1:G
OSUB880 :rem 24
336 IFLV/4=INT(LV/4)THENP=P+1:V=7-INT(LV/
4):IFV>=0THENPOKE49194,V :rem 61
340 POKE49192,0:POKE53269,0:GOSUB160:GOSU
B290:IFP=0THEN610 :rem 235
341 IFRM(1)=1THENPOKE1315,160 :rem 161
342 IFRM(2)=1THENPOKE1332,160 :rem 162
343 IFRM(3)=1THENPOKE1675,160 :rem 174
344 IFRM(4)=1THENPOKE1692,160 :rem 175
350 POKEPL,81:POKEPL+54272,4 :rem 140
360 M=PEEK(56320):M=(MAND15) :rem 52
370 IFM=15 THEN 360 :rem 225
380 DX=((M>8)AND(M<12))-(M<8) :rem 40
390 DY=((M=6)OR(M=10)OR(M=14))-((M=5)OR(M
=9)OR(M=13)) :rem 185
400 PX=PX+DX:PY=PY+DY :rem 121
410 PL=(PY*40)+1024+PX:IFPEEK(PL)<>32THEN
430 :rem 59
420 POKEOPL,32:POKEOPL+54272,0:POKEPL,81:
POKEPL+54272,4:OPL=PL:GOTO360 :rem 88
430 IFPEEK(PL)<>9THENGOTO590 :rem 241
440 IFPY=7THENRM=1 :rem 128
450 IFPY=16THENRM=3 :rem 179
460 IFPX>19THENRM=RM+1 :rem 127
470 IFRM=1THENCL=6 :rem 104
480 IFRM=2THENCL=7 :rem 107
490 IFRM=3THENCL=5 :rem 107
500 IFRM=4THENCL=2 :rem 97
510 POKE53292,CL :rem 133
520 IFRM(RM)=1THENPX=PX-DX:PY=PY-DY:PL=(P
Y*40)+1024+PX:OPL=PL:GOTO420 :rem 162
530 FORI=1TO4:POKE2040+I,230+RM:POKE53287
+I,CL+1:NEXT:POKE2045,235+RM:GOSUB650
:rem 202
540 X=PEEK(53248):Y=PEEK(53249) :rem 247
550 IFX<=46THENPX=-3*((RM=1)OR(RM=3))-20*
((RM=2)OR(RM=4)) :rem 29
560 IFX>46THENPX=-19*((RM=1)OR(RM=3))-36*
((RM=2)OR(RM=4)) :rem 33
570 PY=-7*((RM=1)OR(RM=2))-16*((RM=3)OR(R
M=4)):PL=(PY*40)+1024+PX:OPL=PL
:rem 142
580 GOTO330 :rem 108
590 PX=PX-DX:PY=PY-DY :rem 135
600 GOTO360 :rem 104
610 PRINT"{HOME}{7 DOWN}{16 RIGHT}{RVS}
{YEL}GAME OVER{OFF}" :rem 90
611 PRINT"{DOWN}{7 RIGHT}{RVS}PRESS ANY K
EY TO PLAY AGAIN[7]{OFF}":POKE198,0
:rem 129
612 WAIT198,1 :rem 205
613 PRINT"{CLR}":RETURN :rem 24
650 POKEOPL,32:POKEOPL+54272,0:POKEPL,81:
POKEPL+54272,4:GOSUB260:GOSUB290
:rem 250
660 IFPX=18ORPX=35THEN680 :rem 52
670 X=45:Y=145:POKE53264,PEEK(53264)AND25
4:POKE49189,0:GOTO690 :rem 108
680 X=45:Y=145:POKE53264,PEEK(53264)OR1:P
OKE49189,1 :rem 192
690 POKE53248,X:POKE53249,Y:POKE53264,PEE
K(53264)AND1:POKE53269,0 :rem 50
700 PL=53250:POKEPL,FNRX(58):POKEPL+1,FNR
Y(67):POKEPL+2,FNRX(169) :rem 227
710 POKEPL+3,FNRY(67):POKEPL+4,FNRX(58):P
OKEPL+5,FNRY(146) :rem 50
720 POKEPL+6,FNRX(167):POKEPL+7,FNRY(146)
:rem 220
730 POKEPL+8,INT(RND(1)*222)+33:POKEPL+9,
INT(RND(1)*139)+66:POKEEN,255 :rem 64
740 GOSUB900:POKE49178,0 :rem 134
750 SYS49152:A=PEEK(49178) :rem 219
760 IFA=1THENPOKE49178,0:POKE49190,0:RETU
RN :rem 136
770 IFA<>2THEN800 :rem 225
780 POKE49178,0:POKE49190,0:P=P-1:IFRM(RM
)=1THENRM(RM)=0:SC=SC-300:TC=TC-1
:rem 207
785 FORI=20TO0STEP-1:POKELH,I:POKECR,17:F
ORW=1TO20:NEXT:POKECR,16:NEXT :rem 82
790 POKECR,0:POKE53261,0:RETURN :rem 160
800 IFA<>3THEN810 :rem 221
801 SC=SC+300:GOSUB290:TC=TC+1:POKE49178,
0:RM(RM)=1:POKE53261,0 :rem 229
802 FORI=0TO100STEP10:POKELH,I:POKECR,17:
FORW=1TO20:NEXT:POKECR,16:NEXT
:rem 122
803 POKECR,0:GOTO750 :rem 202
810 POKE49178,0:POKE49190,0:SC=SC+10:GOSU
B290:GOTO750 :rem 144
820 POKE2040,230:POKE2041,231:POKE2042,23
2:POKE2043,233:POKE2044,234 :rem 36
830 POKE2045,236:POKE2046,235 :rem 87
840 CH=0:FORI=14720TO15359:READA:POKEI,A:
CH=CH+A:NEXT :rem 11
845 IFCH<>45651THENPRINT"BAD DATA IN SPRI
TE DEFINITIONS":END :rem 214
850 RETURN :rem 125
880 POKEEN,0:PRINT"{CLR}{5 RIGHT}{5 DOWN}
YOU HAVE ACHIEVED LEVEL ";LV"!"
:rem 86
890 FORW=1TO1000:NEXT:RETURN :rem 68
900 A=PEEK(49189):ONA+1GOTO910,920
:rem 170
910 A=1424:GOTO930 :rem 242
920 A=1462 :rem 230
930 FORI=ATO+120STEP40:POKEI,160:POKEI+1
,160:NEXTI:RETURN :rem 174
960 DATA0,60,0,0,126,0,0,219 :rem 120
970 DATA0,0,255,0,0,255,0,0 :rem 70
980 DATA126,0,0,60,0,1,255,128 :rem 230
990 DATA3,255,192,3,126,192,3,126:rem 143
1000 DATA192,3,126,192,3,126,192,3
:rem 174
1010 DATA126,192,0,102,0,0,102,0 :rem 43
1020 DATA0,102,0,0,102,0,0,102 :rem 186
1030 DATA0,0,102,0,0,231,0,0 :rem 91
1050 DATA0,0,0,0,0,0,0,0 :rem 148
1060 DATA12,0,0,216,0,1,240,0 :rem 201
1070 DATA1,192,0,1,192,0,0,224 :rem 216
1080 DATA0,0,56,0,0,28,0,0 :rem 12
1090 DATA14,0,240,14,131,252,14,199
:rem 222
1100 DATA255,14,207,15,158,254,7,252
:rem 25
1110 DATA124,3,248,56,0,224,0,0 :rem 12
1120 DATA0,0,0,0,0,0,0,0 :rem 146
1140 DATA0,0,0,12,0,48,30,0 :rem 54
1150 DATA120,18,24,72,51,60,204,97
:rem 178
1160 DATA60,134,13,153,176,30,255,120
:rem 65
1170 DATA51,127,204,45,255,180,110,255
:rem 121
1180 DATA118,219,255,219,53,255,172,110
:rem 182
1190 DATA255,118,219,255,219,48,60,12
:rem 88

```

```

1200 DATA32,24,4,96,0,6,64,0      :rem 127
1210 DATA2,64,0,2,0,0,0,0        :rem 208
1230 DATA0,24,0,0,60,0,0,126     :rem 105
1240 DATA0,0,195,0,0,195,0,0     :rem 115
1250 DATA102,0,0,60,0,0,255,0    :rem 155
1260 DATA1,255,128,3,189,192,3,189 :rem 197
1270 DATA192,7,126,224,7,126,224,9 :rem 189
1280 DATA126,144,16,255,8,9,126,144 :rem 241
1290 DATA6,255,96,0,255,0,1,255  :rem 36
1300 DATA128,3,255,192,0,0,0,0    :rem 216
1320 DATA2,0,64,14,66,112,63,90   :rem 23
1330 DATA252,127,255,254,255,129,255,255 :rem 239
1340 DATA165,255,221,129,187,136,195,17 :rem 192
1350 DATA0,195,0,0,102,0,0,126    :rem 210
1360 DATA0,0,60,0,0,60,0,0       :rem 4
1370 DATA60,0,0,60,0,16,56,0     :rem 119
1380 DATA48,248,0,255,224,0,127,128 :rem 237
1390 DATA0,48,0,0,16,0,0,16      :rem 69
1410 DATA0,0,0,0,0,0,0,0        :rem 148
1420 DATA0,0,0,0,0,0,0,0        :rem 149
1430 DATA0,0,0,126,0,1,153,128   :rem 212
1440 DATA2,60,64,6,255,96,6,255  :rem 44
1450 DATA96,2,60,64,1,153,128,0  :rem 30
1460 DATA126,0,0,0,0,0,0,0       :rem 2
1470 DATA0,0,0,0,0,0,0,0        :rem 154
1480 DATA0,0,0,0,0,0,0,255      :rem 7
1490 DATA0,0,0,0,0,0,0,0        :rem 156
1500 DATA0,0,0,0,0,0,0,0        :rem 148
1510 DATA0,0,0,0,0,0,0,0        :rem 149
1520 DATA0,0,0,63,255,252,96,0   :rem 227
1530 DATA6,192,0,3,255,255,255,192 :rem 188
1540 DATA20,3,192,28,3,192,0,3   :rem 229
1550 DATA192,0,3,255,255,255,0,0  :rem 76
1560 DATA0,0,0,0,0,0,0,255      :rem 6
1570 DATA0,0,0,0,0,0,0,0        :rem 155
1580 DATA0,0,0,0,0,0,0,0        :rem 156
1590 DATA0,0,0,0,0,97,255,134    :rem 177
1600 DATA146,0,73,147,129,201,137,255 :rem 76
1610 DATA145,135,255,225,128,255,1,65 :rem 81
1620 DATA255,130,34,126,68,28,60,56 :rem 240
1630 DATA0,255,0,3,255,192,31,255 :rem 127
1640 DATA248,0,0,0,0,0,0,255     :rem 115
1650 DATA1,255,128,3,255,192,7,129 :rem 192
1660 DATA224,12,195,48,24,102,24,56 :rem 235
1670 DATA60,28,60,126,60,54,195,108 :rem 242
1680 DATA51,153,204,49,189,140,49,189 :rem 101
1690 DATA140,51,153,204,54,195,108,60 :rem 79
1700 DATA126,60,56,60,28,24,102,24 :rem 175
1710 DATA12,195,48,7,129,224,3,255 :rem 191
1720 DATA192,1,255,128,0,0,0,0    :rem 220
1730 DATA0,0,0,0,0,0,0,0        :rem 153
1740 DATA0,0,0,0,0,126,0,0       :rem 3
1750 DATA195,0,0,195,0,0,126,0   :rem 226
1760 DATA0,60,0,0,60,0,0,60     :rem 62
1770 DATA0,0,126,0,0,255,0,0     :rem 114
1780 DATA255,0,1,255,128,1,255,128 :rem 186
1790 DATA3,255,192,3,255,192,3,255 :rem 196
1800 DATA192,1,255,128,0,255,0,0 :rem 71
1810 CH=0:I=49152:IFPEEK(I)=76THENRETURN :rem 200
1820 READ A:CH=CH+A:IFA=256THEN1840:rem 1
1830 POKEI,A:I=I+1:GOTO1820       :rem 84
1840 IFCH<>"141279"THENPRINT"BAD DATA ERROR :rem 141
      IN ML DATA.":END
1850 RETURN                       :rem 174
1860 DATA 76,24,194,1,2,4        :rem 205
1870 DATA 8,16,32,64,128,254     :rem 106
1880 DATA 253,251,247,239,223,191 :rem 102
1890 DATA 127,0,0,0,0,0,0        :rem 82
1900 DATA 0,0,0,0,0,0,0          :rem 224
1910 DATA 0,0,0,0,0,0,0          :rem 225
1920 DATA 0,0,0,0,0,0,0          :rem 226
1930 DATA 0,0,173,20,192,10     :rem 29
1940 DATA 168,141,19,192,185,0   :rem 205
1950 DATA 208,141,21,192,172,20  :rem 240
1960 DATA 192,185,3,192,45,16    :rem 159
1970 DATA 208,141,22,192,172,19  :rem 251
1980 DATA 192,185,1,208,141,23   :rem 200
1990 DATA 192,173,21,192,24,109  :rem 255
2000 DATA 24,192,141,21,192,201  :rem 226
2010 DATA 255,240,19,201,0,240   :rem 174
2020 DATA 3,76,129,192,172,20    :rem 142
2030 DATA 192,185,3,192,141,22   :rem 190
2040 DATA 192,76,129,192,173,24  :rem 254
2050 DATA 192,16,12,173,21,192   :rem 189
2060 DATA 201,255,208,5,169,0    :rem 140
2070 DATA 141,22,192,173,23,192  :rem 241
2080 DATA 24,109,25,192,141,23   :rem 190
2090 DATA 192,172,20,192,173,22  :rem 244
2100 DATA 192,240,12,185,3,192   :rem 187
2110 DATA 13,16,208,141,16,208   :rem 182
2120 DATA 76,168,192,185,11,192  :rem 255
2130 DATA 45,16,208,141,16,208   :rem 189
2140 DATA 172,19,192,173,21,192  :rem 247
2150 DATA 153,0,208,173,23,192   :rem 189
2160 DATA 201,66,144,9,201,205   :rem 186
2170 DATA 240,2,176,3,153,1      :rem 35
2180 DATA 208,169,0,141,24,192   :rem 195
2190 DATA 141,25,192,96,173,0    :rem 149
2200 DATA 220,41,15,201,15,208   :rem 172
2210 DATA 3,76,111,193,32,207    :rem 137
2220 DATA 193,32,44,192,173,1    :rem 142
2230 DATA 208,201,66,208,9,24    :rem 143
2240 DATA 105,1,141,1,208,76     :rem 83
2250 DATA 246,192,201,205,208,6  :rem 241
2260 DATA 56,233,1,141,1,208     :rem 85
2270 DATA 173,16,208,41,1,208   :rem 141
2280 DATA 42,173,0,208,201,39   :rem 140
2290 DATA 208,74,173,1,208,201  :rem 193
2300 DATA 130,144,22,201,161,176 :rem 21
2310 DATA 18,173,16,208,41,1    :rem 87
2320 DATA 205,37,192,240,8,169   :rem 200
2330 DATA 1,141,26,192,76,111   :rem 137
2340 DATA 193,238,0,208,76,78   :rem 159
2350 DATA 193,173,0,208,201,49   :rem 194
2360 DATA 208,32,173,1,208,201  :rem 185
2370 DATA 130,144,22,201,161,176 :rem 28
2380 DATA 18,173,16,208,41,1    :rem 94
2390 DATA 205,37,192,240,8,169   :rem 207
2400 DATA 1,141,26,192,76,111   :rem 135
2410 DATA 193,206,0,208,162,5    :rem 138
2420 DATA 32,54,195,173,32,192  :rem 199
2430 DATA 240,23,169,3,141,26   :rem 139
2440 DATA 192,160,5,185,11,192   :rem 196

```

2450	DATA	45,21,208,141,21,208	:rem 186	3160	DATA	105,1,141,35,192,32	:rem 134
2460	DATA	160,10,169,0,153,0	:rem 83	3170	DATA	44,192,32,33,195,173	:rem 202
2470	DATA	208,173,38,192,208,90	:rem 2	3180	DATA	32,192,208,1,96,32	:rem 98
2480	DATA	173,43,192,208,85,173	:rem 4	3190	DATA	229,195,96,162,0,236	:rem 210
2490	DATA	0,220,41,16,208,78	:rem 94	3200	DATA	20,192,240,8,32,54	:rem 85
2500	DATA	173,40,192,201,3,176	:rem 188	3210	DATA	195,173,32,192,208,5	:rem 198
2510	DATA	71,169,50,141,43,192	:rem 196	3220	DATA	232,224,6,208,238,96	:rem 200
2520	DATA	169,1,141,38,192,238	:rem 202	3230	DATA	173,20,192,10,168,185	:rem 245
2530	DATA	40,192,169,10,141,1	:rem 136	3240	DATA	0,208,141,28,192,185	:rem 195
2540	DATA	212,169,17,141,4,212	:rem 189	3250	DATA	1,208,141,29,192,138	:rem 196
2550	DATA	162,2,32,15,194,169	:rem 150	3260	DATA	10,168,185,0,208,141	:rem 191
2560	DATA	16,141,4,212,160,12	:rem 131	3270	DATA	30,192,185,1,208,141	:rem 192
2570	DATA	173,0,208,153,0,208	:rem 140	3280	DATA	31,192,173,29,192,56	:rem 208
2580	DATA	173,1,208,153,1,208	:rem 143	3290	DATA	233,19,205,31,192,176	:rem 251
2590	DATA	173,16,208,41,1,240	:rem 142	3300	DATA	11,173,29,192,24,105	:rem 188
2600	DATA	9,173,16,208,9,64	:rem 54	3310	DATA	19,205,31,192,176,6	:rem 146
2610	DATA	141,16,208,96,173,16	:rem 199	3320	DATA	169,0,141,32,192,96	:rem 148
2620	DATA	208,41,191,141,16,208	:rem 241	3330	DATA	172,20,192,185,3,192	:rem 196
2630	DATA	96,168,41,1,208,8	:rem 55	3340	DATA	45,16,208,240,2,169	:rem 146
2640	DATA	169,255,141,25,192,76	:rem 4	3350	DATA	1,141,33,192,138,168	:rem 197
2650	DATA	230,193,152,41,2,208	:rem 190	3360	DATA	185,3,192,45,16,208	:rem 153
2660	DATA	5,169,1,141,25,192	:rem 99	3370	DATA	240,2,169,1,205,33	:rem 89
2670	DATA	152,41,4,208,8,169	:rem 104	3380	DATA	192,240,46,176,25,173	:rem 0
2680	DATA	255,141,24,192,76,253	:rem 1	3390	DATA	28,192,56,233,15,176	:rem 210
2690	DATA	193,152,41,8,208,5	:rem 104	3400	DATA	11,205,30,192,176,6	:rem 137
2700	DATA	169,1,141,24,192,173	:rem 195	3410	DATA	169,1,141,32,192,96	:rem 149
2710	DATA	38,192,208,12,173,24	:rem 197	3420	DATA	169,0,141,32,192,96	:rem 149
2720	DATA	192,141,39,192,173,25	:rem 253	3430	DATA	173,28,192,24,105,15	:rem 195
2730	DATA	192,141,41,192,96,160	:rem 251	3440	DATA	144,242,205,30,192,144	:rem 33
2740	DATA	255,136,208,253,202,208	:rem 91	3450	DATA	237,169,1,141,32,192	:rem 198
2750	DATA	248,96,169,0,141,20	:rem 153	3460	DATA	96,173,28,192,56,233	:rem 214
2760	DATA	192,32,202,192,44,43	:rem 197	3470	DATA	15,176,2,169,0,205	:rem 97
2770	DATA	192,240,3,206,43,192	:rem 198	3480	DATA	30,192,176,216,173,28	:rem 0
2780	DATA	173,26,192,208,88,173	:rem 11	3490	DATA	192,24,105,15,144,2	:rem 143
2790	DATA	38,192,240,21,32,13	:rem 145	3500	DATA	169,255,205,30,192,144	:rem 41
2800	DATA	196,173,38,192,240,13	:rem 252	3510	DATA	201,169,1,141,32,192	:rem 186
2810	DATA	173,26,192,208,70,32	:rem 198	3520	DATA	96,138,240,31,173,34	:rem 199
2820	DATA	13,196,173,26,192,208	:rem 255	3530	DATA	192,141,24,192,173,35	:rem 248
2830	DATA	62,174,42,192,32,15	:rem 148	3540	DATA	192,141,25,192,32,44	:rem 196
2840	DATA	194,162,0,173,27,192	:rem 203	3550	DATA	192,173,34,192,141,24	:rem 249
2850	DATA	24,105,1,201,5,208	:rem 84	3560	DATA	192,173,35,192,141,25	:rem 252
2860	DATA	2,169,1,141,27,192	:rem 100	3570	DATA	192,32,44,192,96,169	:rem 217
2870	DATA	141,20,192,168,185,3	:rem 203	3580	DATA	2,141,26,192,96,160	:rem 152
2880	DATA	192,45,16,208,208,16	:rem 207	3590	DATA	12,185,1,208,201,66	:rem 146
2890	DATA	152,10,168,185,0,208	:rem 201	3600	DATA	240,106,201,205,240,102	:rem 63
2900	DATA	208,8,232,224,4,240	:rem 140	3610	DATA	173,16,208,41,1,208	:rem 140
2910	DATA	161,76,79,194,32,139	:rem 215	3620	DATA	7,185,0,208,201,39	:rem 95
2920	DATA	194,173,26,192,208,3	:rem 205	3630	DATA	240,88,185,0,208,201	:rem 195
2930	DATA	76,24,194,169,0,141	:rem 155	3640	DATA	49,240,81,173,39,192	:rem 210
2940	DATA	38,192,96,173,27,192	:rem 219	3650	DATA	141,24,192,173,41,192	:rem 248
2950	DATA	10,168,185,0,208,141	:rem 196	3660	DATA	141,25,192,169,6,141	:rem 202
2960	DATA	21,192,185,1,208,141	:rem 197	3670	DATA	20,192,32,44,192,160	:rem 196
2970	DATA	23,192,173,23,192,205	:rem 252	3680	DATA	12,185,1,208,201,66	:rem 146
2980	DATA	1,208,208,8,169,0	:rem 54	3690	DATA	240,52,201,205,240,48	:rem 241
2990	DATA	141,23,192,76,187,194	:rem 12	3700	DATA	173,16,208,41,64,208	:rem 197
3000	DATA	144,8,169,255,141,25	:rem 195	3710	DATA	10,185,0,208,201,39	:rem 137
3010	DATA	192,76,187,194,169,1	:rem 210	3720	DATA	240,34,76,104,196,185	:rem 255
3020	DATA	141,25,192,172,27,192	:rem 243	3730	DATA	0,208,201,49,240,24	:rem 137
3030	DATA	185,3,192,45,16,208	:rem 147	3740	DATA	162,1,32,54,195,173	:rem 150
3040	DATA	208,8,169,0,141,22	:rem 89	3750	DATA	32,192,208,22,232,224	:rem 243
3050	DATA	192,76,211,194,169,1	:rem 202	3760	DATA	5,208,243,76,122,196	:rem 208
3060	DATA	141,22,192,173,16,208	:rem 241	3770	DATA	169,0,141,26,192,96	:rem 160
3070	DATA	41,1,205,22,192,240	:rem 131	3780	DATA	169,0,141,26,192,76	:rem 159
3080	DATA	5,176,18,76,236,194	:rem 163	3790	DATA	171,196,138,24,105,3	:rem 205
3090	DATA	173,21,192,205,0,208	:rem 189	3800	DATA	141,26,192,138,168,185	:rem 52
3100	DATA	240,12,144,5,169,255	:rem 189	3810	DATA	11,192,45,21,208,141	:rem 188
3110	DATA	76,248,194,169,1,76	:rem 162	3820	DATA	21,208,185,11,192,45	:rem 197
3120	DATA	248,194,169,0,141,24	:rem 196	3830	DATA	16,208,141,16,208,152	:rem 244
3130	DATA	192,173,24,192,73,255	:rem 252	3840	DATA	10,168,169,0,153,0	:rem 94
3140	DATA	24,105,1,141,34,192	:rem 132	3850	DATA	208,169,0,141,38,192	:rem 205
3150	DATA	173,25,192,73,255,24	:rem 201	3860	DATA	160,12,153,1,208,96,256	:rem 93

## Program 5: The Forbidden Crypt— Plus/4 And 16 Version

```

20 POKE55,0:POKE56,60:CLR:COLOR 0,1,0:COL
  OR4,1,0:COLOR1,7,4
30 DIMN(4,6),DR(8),RM(4)
40 FORI=1TO4:FORJ=1TO6:READMN(I,J):NEXTJ:
  NEXTI:FORI=1TO8:READDR(I):NEXT
50 FORI=1TO4:RM(I)=1:NEXT
60 DATA0,77,78,40,79,72,0,82,83,1,84,69,0
  ,85,86,1,87,34,0,88,89,40,90,52
70 DATA-40,-39,1,41,40,39,-1,-41
80 DEFFNY(X)=INT(X/40):DEFFNX(X)=X-(FNY(X)
  )*40
90 PR=30
100 GOSUB1280:GOSUB1380
110 VOL 5
120 T$="{RVS}{40 SPACES}{OFF}"
130 S$="{RVS}{2 SPACES}{OFF}{36 SPACES}
  {RVS}{2 SPACES}{OFF}":P=5
140 DEFFNA(X)=INT(RND(1)*X)+1
150 DEFFNRX(X)=INT(RND(1)*100)+X:DEFFNRY(
  Y)=INT(RND(1)*58)+Y
160 PL=3572:PX=20:PY=12:OPL=PL
170 LV=1:SC=0:GOSUB330:END
180 PRINT"{CLR}":PRINT:PRINTT$:S$:S$:GO
  SUB200:PRINTS$:S$:S$:GOSUB200:PRINTS$:S
  $:T$
190 PRINT"{HOME}":RETURN
200 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}
  [A]*****[S]{2 SPACES}[A]*****
  *****[S]{2 SPACES}{RVS}{2 SPACES}
  [OFF]";
210 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}-
  {13 SPACES}-{2 SPACES}-{13 SPACES}-
  {2 SPACES}{RVS}{2 SPACES}{OFF}";
220 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}-
  {13 SPACES}-{2 SPACES}-{13 SPACES}-
  {2 SPACES}{RVS}{2 SPACES}{OFF}";
230 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}I
  {13 SPACES}I{2 SPACES}I{13 SPACES}I
  {2 SPACES}{RVS}{2 SPACES}{OFF}";
240 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}-
  {13 SPACES}-{2 SPACES}-{13 SPACES}-
  {2 SPACES}{RVS}{2 SPACES}{OFF}";
250 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}-
  {13 SPACES}-{2 SPACES}-{13 SPACES}-
  {2 SPACES}{RVS}{2 SPACES}{OFF}";
260 PRINT"{RVS}{2 SPACES}{OFF}{2 SPACES}
  [Z]*****[X]{2 SPACES}[Z]*****
  *****[X]{2 SPACES}{RVS}{2 SPACES}
  [OFF]";
270 RETURN
280 PRINT"{CLR}":PRINT:PRINTT$:
290 FORI=1TO20:PRINTS$:NEXT:PRINTT$:PRIN
  T"{HOME}":PRINT"{9 DOWN}";
300 D$="[L][J]{36 SPACES}[L][J]":PRINTD$:
  D$:D$:D$:RETURN
310 PRINT"{HOME}{23 DOWN}{YEL}{2 SPACES}S
  CORE"SC"{3 SPACES}LEVEL"LV"{3 SPACES}
  LIVES"P"{7}"
320 PRINT"{HOME}":RETURN
330 REM OUTSIDE ROOM
340 IF TC<>4 THEN 360
350 TC=0:FORI=1TO4:RM(I)=1:NEXT:LV=LV+1:G
  OSUB1030:IF LV/4=INT(LV/4) THEN P=P+1
360 GOSUB180:GOSUB310:IF P=0 THEN 600
370 IFRM(1)=0 THEN POKE3363,160
380 IFRM(2)=0 THEN POKE3380,160
390 IFRM(3)=0 THEN POKE3723,160
400 IFRM(4)=0 THEN POKE3740,160
410 POKEPL,81:POKEPL-1024,4
420 D=DR(JOY(1)AND15)
430 IFD=0 THEN 420
440 PL=PL+D:IF PEEK(PL)<>32 THEN 470
450 SOUND1,200,1
460 POKEOPL-1024,0:POKEOPL,32:POKEPL-1024
  ,4:POKEPL,81:OPL=PL:GOTO420
470 IF PEEK(PL)<>9 THEN P=OPL:GOTO420
480 PY=FNY(PL-3072):PX=FNX(PL-3072)
490 IF PY=7 THEN RM=1
500 IF PY=16 THEN RM=3
510 IF PX>19 THEN RM=RM+1
520 IFRM=1 THEN CL=6
530 IFRM=2 THEN CL=7
540 IFRM=3 THEN CL=5
550 IFRM=4 THEN CL=2
560 IFRM(RM)=0 THEN P=PL-D:GOTO460
570 PX=FNX(PL-3072):PY=FNY(PL-3072):GOSUB
  640
580 REM
590 GOTO340
600 PRINT"{HOME}{7 DOWN}{16 RIGHT}{RVS}
  {YEL}GAME OVER{OFF}"
610 PRINT"{DOWN}{7 RIGHT}{RVS}PRESS ANY K
  EY TO PLAY AGAIN[7]{OFF}":POKE239,0
620 WAIT239,1
630 PRINT"{CLR}":RUN
640 GOSUB280:GOSUB310:IF PX=21 OR PX=4 THEN PX
  =2:PY=11:GOTO660
650 PX=37:PY=11
660 GOSUB1050
670 PL=PX+3072+(PY*40):POKEPL,0:POKEPL-10
  24,2:OPL=PL
680 MT=MN(RM,2):MB=MN(RM,3):MP=MN(RM,4):M
  D=MN(RM,5):MC=MN(RM,6)
690 FORI=0TO3:X=FNA(35)+2:Y=FNA(18)+2:Z=3
  072+X+(Y*40):POKEZ+MP,MB:POKEZ,MT
700 POKEZ-1024,MC:POKEZ+MP-1024,MC:M(I)=Z
  :NEXTI
710 X=FNA(18)+1:Y=FNA(12)+1:Z=3072+X+(40*
  Y):IF PEEK(Z)<>32 THEN 710
720 TR=2+MT:TL=Z:POKETL,TR
730 FL=0:DOWHILE FL=0
740 D=DR(JOY(1)AND15):A=PEEK(PL+D)
750 IFD<>0 THEN MD=D
760 IF JOY(1)AND128 THEN GOSUB1130
770 IFA=32 THEN 810
780 IF(A=0)OR(A=160) THEN 830
790 IFA=TR THEN SC=SC+300:RM(RM)=0:TC=TC+1:
  GOSUB310:GOSUB1270:GOTO810
800 FL=1:GOTO840
810 PL=PL+D:POKEOPL-1024,0:POKEOPL,32:POK
  EPL-1024,2:POKEPL,0:OPL=PL
820 SOUND1,100,1
830 TQ=MQ:GOSUB910:IFTQ<>MQ THEN FL=1:A=0:F
  ORI=200TO0STEP-5:SOUND1,I,2:NEXT
840 LOOP
850 IFA>100 THEN 870
860 P=P-1:IFRM(RM)=0 THEN RM(RM)=1:SC=SC-30
  0:TC=TC-1
870 PX=FNX(PL-3072):IFRM>2 THEN PY=16:ELSEP
  Y=7
880 IF PX<20 THEN PX=-20*((RM=2)OR(RM=4))-3*
  ((RM=1)OR(RM=3)):GOTO900
890 PX=-19*((RM=1)OR(RM=3))-36*((RM=2)OR(
  RM=4))
900 PL=3072+PX+(PY*40):OPL=PL:RETURN
910 FORI=1TO4:MM=MM+1:IFMM=4 THEN MM=0
920 IFM(MM)<>0 THEN I=6
930 NEXT I
940 IF I=5 THEN RETURN

```

```

950 V1=PL-3072:Y1=FNY(V1):X1=FNX(V1):V=M(
MM)-3072
960 Y=FNY(V):X=FNX(V):M=40*(Y>Y1)-40*(Y<Y
1):M=M-1*(X<X1)+1*(X>X1):TM=M(MM)+M
970 Q=PEEK(TM):R=PEEK(TM+MP):IFQ=0ORQ=C1O
RR=C1THENMQ=MQ+1:RETURN
980 IF(M<>MP)AND(M<>-MP)THEN990
981 IFM=MPTHENIF(R<>0)AND(R<>32)THENRETUR
N
982 IFM=-MPTHENIF(Q<>0)AND(Q<>32)THENRETU
RN
983 GOTO1000
990 IF(Q<>32)OR(R<>32)THENRETURN
1000 POKEM(MM),32:POKEM(MM)+MP,32:POKETM-
1024,MC:POKETM+MP-1024,MC:POKETM,MT
1010 POKETM+MP,MB:M(MM)=TM
1020 RETURN
1030 PRINT"{CLR}{10 DOWN}{6 RIGHT}YOU HAV
E ACHIEVED LEVEL "LV"1"
1040 FORW=1TO1000:NEXTW:RETURN
1050 IFPX=37THENGOTO1070
1060 A=3472:GOTO1080
1070 A=3510
1080 FORI=ATO+120STEP40:POKEI,160:POKEI+
1,160:NEXTI:RETURN
1090 D=JOY(1)
1100 IFD=0THENRETURN
1110 D=DR(D):RETURN
1120 REM FIRE
1130 MS=PL+DM:OMS=MS:PT=PL
1140 SD=900
1150 B=PEEK(MS)
1160 IF(B=160)OR(B=117)OR(B=118)OR(B=TR)T
HEN1250
1170 PT=PT+1
1180 IFB=MBORB=MTTHEN1210
1190 SD=SD-10:SOUND1,SD,10
1200 POKEOMS-1024,0:POKEMS-1024,27:POKEMS
,PR:POKEOMS,32:OMS=MS:MS=MS+DM:GOTO1
150
1210 SC=SC+10:GOSUB310
1220 FORI=0TO3
1230 IFM(I)=MSORM(I)+MP=MSTHENPOKEM(I),32
:POKEM(I)+MP,32:M(I)=0
1240 NEXT
1250 IFPT<>PLTHENPOKEOMS,32:POKEOMS-1024,
0
1260 RETURN
1270 FORI=100TO1000STEP50:SOUND1,I,2:NEXT
:RETURN
1280 FORI=819TO869:READA:POKEI,A:NEXT
1290 SYS819
1300 POKE65298,PEEK(65298)AND251
1310 POKE65299,(PEEK(65299)AND3)OR(60)
1320 RETURN
1330 DATA169,0,133,55,169,60,133,56,160
1340 DATA0,185,0,208,153,0,60,200,152
1350 DATA208,246,185,0,209,153,0,61,200,1
52,208,246,185,0,210,153,0
1360 DATA62,200,152,208,246,185,0,211,153
,0,63,200,152,208
1370 DATA246,96
1380 FORI=1TO14:READA:FORJ=15360+(A*8)TO1
5360+(A*8)+7:READB:POKEJ,B:NEXT:NEXT
1390 RETURN
1400 DATA0,60,126,219,255,189,195,126,60
1410 DATA77,129,66,36,24,126,153,24,126
1420 DATA78,153,24,126,153,24,126,153,0
1430 DATA82,0,0,0,131,198,108,56,0
1440 DATA83,4,24,24,140,204,108,56,0
1450 DATA85,28,54,98,64,113,63,5,5

```

```

1460 DATA86,0,0,0,16,248,252,80,80
1470 DATA88,24,36,36,24,126,189,189,189
1480 DATA89,189,60,60,126,255,0,0,0
1490 DATA30,0,0,24,60,60,24,0,0
1500 DATA79,0,0,0,126,153,153,129,255
1510 DATA84,192,224,118,60,28,62,38,0
1520 DATA87,126,231,195,153,153,195,231,1
26
1530 DATA90,60,24,24,24,60,126,126,60

```

## Address File

(Article on page 60.)

### BEFORE TYPING ...

Before typing in programs, please refer to "How To Type In COMPUTE's GAZETTE Programs," which appears before the Program Listings.

```

10 L=12:SYS65517:A=PEEK(781):Q$=CHR$(13):
IFA=40THENPOKE53281,15:L=200 :rem 241
20 DIMM$(L,6),N$(6):FORI=1TO6:READN$(I):N
EXT :rem 93
30 DATALAST NAME,FIRST NAME,ADDRESS,CITY/
STATE,ZIP CODE,TELEPHONE :rem 248
40 PRINT"{CLR}{2 DOWN}{3 RIGHT}{RVS}{BLK}
ADDRESS FILE"Q$"{2 DOWN}{RIGHT}1..RETR
IEVE FILE"Q$"{DOWN}{RIGHT}2..ADD/START
FILE" :rem 47
50 PRINT"{DOWN}{RIGHT}3..EDIT FILE"Q$"
{DOWN}{RIGHT}4..DISPLAY FILE"Q$"{DOWN}
{RIGHT}5..SAVE AND END" :rem 55
60 INPUT"{2 DOWN}YOUR CHOICE":B:ONBGOSUB4
50,70,130,240,450:GOTO40 :rem 132
70 N=N+1:PRINT"{CLR}RECORD #"N:FORJ=1TO6:
PRINTQ$"{RIGHT}{RVS}{BLK}";N$(J):"
{OFF}{BLU}":INPUTM$(N,J) :rem 35
80 NEXTJ:PRINT"{DOWN}{RVS}N{OFF}EXT
{RVS}D{OFF}ELETE {RVS}E{OFF}ND"
:rem 194
90 GETA$:IFA$=""OR(A$<>"D"ANDAS<>"N"ANDAS
<>"E")THEN90 :rem 205
100 IFA$="N"THEN70 :rem 234
110 IFA$="E"THEN40 :rem 223
120 N=N-1:GOTO70 :rem 164
130 GOSUB660:FORI=1TON:IFB$=M$(I,1)THEN15
0 :rem 18
140 NEXTI:PRINT"{CLR}{DOWN}"BS"{DOWN}IS N
OT IN FILE.":GOSUB620:GOTO40 :rem 34
150 GOSUB650:PRINT"{DOWN}CHANGE WHAT:":FO
RJ=1TO6:PRINT"{RIGHT}"J"..N$(J):NEXT
:rem 43
160 PRINT"{2 RIGHT}7 ..DELETE ENTRY{DOWN}
":INPUT"YOUR CHOICE":J:IFJ<1ORJ>7THEN
160 :rem 190
170 IFJ=7THEN210 :rem 167
180 PRINT"{CLR}{RVS}"M$(I,1)", "M$(I,2)
:rem 80
190 PRINT"{DOWN}{RVS}{BLK}OLD "N$(J)" IS
{BLU}":PRINTM$(I,J)Q$Q$"{RVS}{BLK}COR
RECTED "N$(J)" IS{BLU}" :rem 200
200 INPUTM$(I,J):GOSUB620:GOTO220:rem 252
210 FORA=ITON-1:FORJ=1TO6:M$(A,J)=M$(A+1,
J):NEXTJ,A:N=N-1 :rem 168
220 PRINT"{CLR}{DOWN}{RIGHT}DO YOU WISH T
O:"Q$"{DOWN}{RIGHT}1..CONTINUE EDITIN
G"Q$"{DOWN}{RIGHT}2..RETURN TO MENU
{2 DOWN}" :rem 250

```

# Power BASIC: Color Swap

(Article on page 108.)

## BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE's GAZETTE Programs," which appears before the Program Listings.

## Program 1: Color Swap—64 Version

```
230 INPUT "{RIGHT}YOUR CHOICE";B:ONBGOTO13
    0,40:GOTO230 :rem 123
240 PRINT "{CLR}{BLK}{DOWN}WHICH DO YOU WA
    NT"Q$"{DOWN}{RIGHT}1..ALPHABETICAL"Q$
    "{DOWN}{RIGHT}2..INDIVIDUAL" :rem 4
250 PRINT "{DOWN}{RIGHT}3..MENU{2 DOWN}":I
    NPUT"YOUR CHOICE";B:ONBGOTO260,410,40
    :GOTO250 :rem 70
260 G=N:IFN=0THENPRINT "{DOWN}NO RECORDS I
    N FILE. ":FORI=1TO2000:NEXT:GOTO40
    :rem 32
270 G=INT(G/2) :rem 1
280 IFG=0THEN380 :rem 167
290 FORA=1TON-G :rem 150
300 IFM$(A,1)<=M$(A+G,1)THEN350 :rem 148
310 R$=M$(A,1):S$=M$(A,2):T$=M$(A,3):U$=M
    $(A,4):V$=M$(A,5):W$=M$(A,6) :rem 70
320 FORJ=1TO6:M$(A,J)=M$(A+G,J):NEXT
    :rem 97
330 M$(A+G,1)=R$:M$(A+G,2)=S$:M$(A+G,3)=T
    $:M$(A+G,4)=U$:M$(A+G,5)=V$ :rem 43
340 M$(A+G,6)=W$:E=A :rem 35
350 NEXTA :rem 24
360 IFE=0THEN270 :rem 162
370 E=0:GOTO280 :rem 89
380 PRINT "{CLR}":L=0:FORI=1TON:L=L+1:PRIN
    TM$(I,1)", "M$(I,2):IFL<>10THEN400
    :rem 225
390 L=0:GOSUB620:PRINT "{CLR}" :rem 69
400 NEXTI:GOSUB620:GOTO240 :rem 119
410 GOSUB660:FORI=1TON:IFB$=M$(I,1)THEN44
    0 :rem 21
420 NEXTI :rem 30
430 PRINT "{CLR}{2 DOWN}";B$:PRINT "{DOWN}I
    S NOT IN FILE":GOSUB620:GOTO240
    :rem 121
440 GOSUB650:GOSUB620:GOTO240 :rem 14
450 PRINT "{CLR}DISK OR CASSETTE (D/C)"
    :rem 44
460 GETES$:IF(E$<>"D"ANDE$<>"C")ORE$=""THE
    N460 :rem 249
470 IFE$="D"THENF$="@0:ADDRESSES":F=1:GOT
    O490 :rem 184
480 F$="ADDRESSES":F=0:G$="" :rem 56
490 IFB=5THEN540 :rem 168
500 IFF=1THENG$=",S,R" :rem 240
510 OPEN1,1+7*F,8*F,F$+G$:GOSUB580
    :rem 127
520 INPUT#1,N:FORI=1TON:FORJ=1TO6:rem 112
530 INPUT#1,M$(I,J):NEXT:NEXT:GOSUB580:CL
    OSE1:GOSUB580:GOTO40 :rem 129
540 IFF=1THENG$=",S,W" :rem 249
550 OPEN1,1+7*F,1+7*F,F$+G$:GOSUB580
    :rem 222
560 PRINT#1,N:FORI=1TON:FORJ=1TO6:rem 113
570 PRINT#1,M$(I,J):NEXT:NEXT:GOSUB580:CL
    OSE1:GOSUB580:END :rem 188
580 IFF=0THENRETURN :rem 238
590 IFO=0THENOPEN15,8,15:O=1 :rem 157
600 INPUT#15,A,B$,C,D:IFATHENPRINTA,B$,C,
    D:STOP :rem 133
610 RETURN :rem 119
620 PRINT "{2 DOWN}{RVS}{BLK}ANY KEY TO CO
    NT" :rem 252
630 GETA$:IFA$=""THEN630 :rem 85
640 RETURN :rem 122
650 PRINT "{CLR}{DOWN}"M$(I,1)", "M$(I,2)Q
    $M$(I,3)Q$M$(I,4)" "M$(I,5)Q$M$(I,6):
    RETURN :rem 188
660 PRINT "{CLR}{DOWN}{3 RIGHT}WHAT NAME D
    O YOU"Q$"{3 RIGHT}WANT (LAST NAME)?:
    INPUT "{2 DOWN}";B$:RETURN :rem 103
```

```
10 REM *COLOR-SWAP 64*{3 SPACES}N IS ML C
    ODE, A IS ADDRESS, AND I DOES THE COUN
    TING. :rem 128
20 N=74:FORA=685TO690STEP5:FORI=0TO3:POKE
    A+I,N:NEXTI:POKEA+I,96:N=N-64:NEXTA
    :rem 113
30 CK=0:FORI=0TO9:X=PEEK(685+I):CK=CK+X:N
    EXT :rem 252
40 REM CK IS CHECKSUM AND X ONE OF ITS CO
    MONENTS. :rem 139
50 IFCK<>528THENPRINT "{CLR} {DOWN}CHECK L
    INE 20 FOR ERRORS.":END :rem 42
100 CK=0:FORA=702TO750:READN:POKEA,N:CK=C
    K+N:NEXTA :rem 145
110 IFCK<>5158THENPRINT "{CLR} {DOWN}CHECK
    LINES 702-750 FOR ERRORS.":END
    :rem 222
120 RA=49152:RA$=STR$(RA):L=LEN(RA$):RA$=
    RIGHT$(RA$,L-1):REM RA IS RELOC. ADR.
    :rem 228
130 CK=0:FORA=RATORA+392:READN:POKEA,N:CK
    =CK+N:NEXTA :rem 78
140 IFCK<>46713THENPRINT "{CLR} {DOWN}CHEC
    K LINES 49152-49542 FOR ERRORS.":END
    :rem 235
150 PRINT "{CLR} {DOWN}NOW POKE700,OC:POKE
    701,NC:SYS"RA$" TO{3 SPACES}SWAP COLO
    RS" :rem 37
160 PRINT:PRINT "{2 SPACES}WHERE OC IS THE
    COLOR CODE FOR THE OLD COLOR,"
    :rem 165
170 PRINT "{2 SPACES}AND NC IS THE CODE FO
    R THE NEW COLOR.":END :rem 213
702 DATA 216,173,188,2,41,15 :rem 97
708 DATA 141,188,2,173,189,2 :rem 109
714 DATA 41,15,141,189,2,169 :rem 103
720 DATA 0,141,172,2,141,171 :rem 80
726 DATA 2,141,169,2,141,170 :rem 93
732 DATA 2,96,173,33,208,41 :rem 51
738 DATA 15,205,188,2,208,6 :rem 56
744 DATA 173,189,2,141,33,208 :rem 154
750 DATA 96 :rem 37
49152 DATA 32,190,2,173,134,2 :rem 145
49158 DATA 41,15,205,188,2,208 :rem 208
49164 DATA 9,173,189,2,141,134 :rem 212
49170 DATA 2,32,190,2,173,32 :rem 94
49176 DATA 208,41,15,205,188,2 :rem 208
49182 DATA 208,9,173,189,2,141 :rem 214
49188 DATA 32,208,32,190,2,32 :rem 153
49194 DATA 222,2,32,190,2,173 :rem 149
49200 DATA 37,208,41,15,205,188 :rem 252
49206 DATA 2,208,6,173,189,2 :rem 108
49212 DATA 141,37,208,173,38,208 :rem 50
49218 DATA 41,15,205,188,2,208 :rem 205
```

```

49224 DATA 6,173,189,2,141,38 :rem 161
49230 DATA 208,160,0,185,39,208 :rem 253
49236 DATA 41,15,205,188,2,208 :rem 205
49242 DATA 6,173,189,2,153,39 :rem 165
49248 DATA 208,200,192,8,208,235 :rem 53
49254 DATA 32,190,2,173,17,208 :rem 204
49260 DATA 41,64,240,22,32,222 :rem 191
49266 DATA 2,173,36,208,41,15 :rem 156
49272 DATA 205,188,2,208,6,173 :rem 211
49278 DATA 189,2,141,36,208,24 :rem 215
49284 DATA 144,7,173,22,208,41 :rem 207
49290 DATA 16,240,37,169,255,141 :rem 55
49296 DATA 170,2,173,34,208,41 :rem 207
49302 DATA 15,205,188,2,208,6 :rem 152
49308 DATA 173,189,2,141,34,208 :rem 4
49314 DATA 173,35,208,41,15,205 :rem 250
49320 DATA 188,2,208,6,173,189 :rem 216
49326 DATA 2,141,35,208,173,17 :rem 203
49332 DATA 208,41,32,208,5,169 :rem 206
49338 DATA 255,141,169,2,173,0 :rem 208
49344 DATA 221,41,3,201,3,208 :rem 139
49350 DATA 4,162,0,134,254,201 :rem 190
49356 DATA 2,208,4,162,64,134 :rem 156
49362 DATA 254,201,1,208,4,162 :rem 196
49368 DATA 128,134,254,201,0,208 :rem 47
49374 DATA 4,162,192,134,254,173 :rem 56
49380 DATA 24,208,41,240,32,173 :rem 249
49386 DATA 2,32,180,2,101,254 :rem 147
49392 DATA 133,254,169,0,133,253 :rem 52
49398 DATA 169,0,133,251,169,216 :rem 63
49404 DATA 133,252,162,0,142,167 :rem 41
49410 DATA 2,162,0,142,168,2 :rem 91
49416 DATA 162,234,142,183,2,160 :rem 44
49422 DATA 0,177,251,41,15,205 :rem 196
49428 DATA 188,2,208,5,173,189 :rem 224
49434 DATA 2,145,251,173,169,2 :rem 207
49440 DATA 201,255,208,2,240,55 :rem 246
49446 DATA 177,253,41,15,141,171 :rem 52
49452 DATA 2,205,188,2,208,6 :rem 106
49458 DATA 173,189,2,141,171,2 :rem 212
49464 DATA 177,253,41,240,141,172 :rem 101
49470 DATA 2,32,173,2,205,188 :rem 154
49476 DATA 2,208,13,173,189,2 :rem 163
49482 DATA 32,178,2,24,109,171 :rem 209
49488 DATA 2,24,144,7,173,172 :rem 164
49494 DATA 2,24,109,171,2,145 :rem 155
49500 DATA 253,200,204,168,2,240 :rem 33
49506 DATA 2,208,170,174,183,2 :rem 204
49512 DATA 224,96,208,1,96,238 :rem 217
49518 DATA 167,2,230,252,230,254 :rem 47
49524 DATA 162,3,236,167,2,240 :rem 203
49530 DATA 2,208,144,162,232,142 :rem 39
49536 DATA 168,2,162,96,142,183 :rem 13
49542 DATA 2,208,132 :rem 220
70 REM *COLOR-SWAP VIC-20*{2 SPACES}N IS
{SPACE}ML CODE, A IS ADDRESS, AND I DO
ES THE COUNTING. :rem 141
80 N=74:FORA=680TO685STEP5:FORI=0TO3:POKE
A+I,N:NEXTI:POKEA+I,96:N=N-64:NEXTA
:rem 118
90 CK=0:FORI=0TO9:X=PEEK(680+I):CK=CK+X:N
EXT :rem 253
100 REM CK IS CHECKSUM AND X ONE OF ITS C
OMPONENTS. :rem 184
110 IFCK<>528THENPRINT"{CLR}{2 SPACES}
{DOWN}CHECK LINE 80 FOR{6 SPACES}ERRO
RS.":END :rem 93
120 RA=RA:RA$=STR$(RA):L=LEN(RA$):RA$=RIG
HT$(RA$,L-1):REM RA IS RELOCATABLE AD
R. :rem 237
130 CK=0:FORA=RATORA+182:READN:POKEA,N:CK
=CK+N:NEXTA :rem 75
140 IFCK<>19910THENPRINT"{CLR} {DOWN}CHEC
K LINES 828-1008":PRINT" FOR ERRORS."
:END :rem 83
150 PRINT"{CLR} {DOWN}NOW-":PRINT:PRINT"P
OKE 700,OC:POKE701,NC":PRINT"SYS"RA$:
PRINT:PRINT :rem 143
160 PRINT"{3 SPACES}WHERE OC IS OLD
{5 SPACES}COLOR CODE,":PRINT"
{3 SPACES}AND NC IS THE NEW{3 SPACES}
COLOR." :rem 57
170 END :rem 111
828 DATA 173, 134, 2, 41, 15, 205 :rem 95
834 DATA 188, 2, 208, 6, 173, 189:rem 117
840 DATA 2, 141, 134, 2, 173, 14 :rem 36
846 DATA 144, 41, 15, 141, 19, 3 :rem 47
852 DATA 173, 14, 144, 32, 168, 2:rem 100
858 DATA 205, 188, 2, 208, 12, 173
:rem 157
864 DATA 189, 2, 32, 173, 2, 109 :rem 56
870 DATA 19, 3, 141, 14, 144, 173 :rem 97
876 DATA 15, 144, 41, 240, 141, 16
:rem 146
882 DATA 3, 32, 168, 2, 141, 17 :rem 255
888 DATA 3, 205, 188, 2, 208, 12 :rem 56
894 DATA 173, 189, 2, 141, 17, 3 :rem 59
900 DATA 32, 173, 2, 141, 16, 3 :rem 241
906 DATA 173, 15, 144, 41, 8, 141 :rem 98
912 DATA 19, 3, 173, 15, 144, 41 :rem 46
918 DATA 7, 141, 18, 3, 205, 188 :rem 57
924 DATA 2, 208, 6, 173, 189, 2 :rem 6
930 DATA 141, 18, 3, 13, 19, 3 :rem 197
936 DATA 13, 16, 3, 141, 15, 144 :rem 43
942 DATA 169, 0, 168, 170, 133, 251
:rem 203
948 DATA 173, 2, 144, 41, 128, 208
:rem 155
954 DATA 6, 169, 148, 133, 252, 208
:rem 213
960 DATA 4, 169, 150, 133, 252, 177
:rem 206
966 DATA 251, 41, 15, 205, 188, 2:rem 104
972 DATA 208, 5, 173, 189, 2, 145:rem 112
978 DATA 251, 200, 208, 239, 230, 252
:rem 46
984 DATA 232, 224, 1, 208, 232, 177
:rem 203
990 DATA 251, 41, 15, 205, 188, 2:rem 101
996 DATA 208, 5, 173, 189, 2, 145:rem 118
1002 DATA 251, 200, 192, 251, 240, 2
:rem 223
1008 DATA 208, 235, 96 :rem 222

```

## Program 2: Color Swap—VIC Version

```

10 HT=PEEK(644):LT=PEEK(643):PRINT"{CLR}I
F YOU ARE A CASSETTE USER, PRESS {RVS}
C{OFF}." :rem 36
20 MT=HT*256+LT:MT=MT-183:HT=INT(MT/256):
LT=MT-HT*256:PRINT"{DOWN}OTHERWISE, PR
ESS {RVS}D{OFF}." :rem 153
30 GETR$ :rem 185
40 IFR$="D"THENRA=828:GOTO80 :rem 170
50 IFR$="C"THENPOKE55,LT:POKE56,HT:CLR:RA
=PEEK(56)*256+PEEK(55):GOTO80 :rem 17
60 GOTO30 :rem 2
966 DATA 251, 41, 15, 205, 188, 2:rem 104
972 DATA 208, 5, 173, 189, 2, 145:rem 112
978 DATA 251, 200, 208, 239, 230, 252
:rem 46
984 DATA 232, 224, 1, 208, 232, 177
:rem 203
990 DATA 251, 41, 15, 205, 188, 2:rem 101
996 DATA 208, 5, 173, 189, 2, 145:rem 118
1002 DATA 251, 200, 192, 251, 240, 2
:rem 223
1008 DATA 208, 235, 96 :rem 222

```

## Program 3: VIC Inverter

```
10 REM *VIC INVERTER* CK IS CHECKSUM, A I
   S ADDRESS, AND N IS ML CODE.      :rem 65
20 RA=743:RA$=STR$(RA):L=LEN(RA$):RA$=RIG
   HT$(RA$,L-1):REM RA IS RELOCATABLE ADD
   RESS.                               :rem 246
30 CK=0:FORA=RATORA+24:READN:POKEA+I,N:CK
   =CK+N:NEXTA                          :rem 89
40 IFCK<>2391THENPRINT"{CLR}{DOWN}"SPC(3)
   "CHECK YOUR DATA"SPC(9)"STATEMENTS.":E
   ND                                    :rem 222
50 PRINT"{CLR}{DOWN}NOW SYS"RA$" TO TURN
   ":PRINT:PRINT" INVERSE ON AND OFF.":EN
   D                                     :rem 44
743 DATA 173, 15, 144, 41, 8, 240 :rem 97
749 DATA 9, 173, 15, 144, 41, 247 :rem 111
755 DATA 141, 15, 144, 96, 173, 15
   :rem 156
761 DATA 144, 9, 8, 141, 15, 144 :rem 51
767 DATA 96 :rem 45
```

## Name That Note

(Article on page 62.)

### BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

## Program 1: Name That Note—VIC Version

```
0 PRINT"{CLR}";CHR$(142):POKE36879,59
   :rem 204
1 PRINT"{HOME}{3 DOWN}{RIGHT}{BLK}CCCCCCCC
   CCCCCCCCCCCCCC{2 RIGHT}CCCNAME THAT NOTE
   CCC{2 RIGHT}CCCCCCCCCCCCCCCCCCCC"
   :rem 251
2 PRINT"{RIGHT}CCCCCCCCCCCCCCCCCCCC
   {2 RIGHT}CCCCCCCCCCCCCCCCCCCC{RIGHT}
   {2 DOWN}{4 RIGHT}A MUSIC TUTOR :rem 195
3 PRINT"{6 DOWN}{4 RIGHT}INSTRUCTIONS?
   {13 RIGHT}Y=YES":C$=CHR$(13) :rem 102
4 GETI$:IFI$=""THEN4 :rem 155
5 IFI$<>"Y"THENGOTO14 :rem 21
6 PRINT"{CLR}";CHR$(14)"{4 RIGHT}{BLK}NAM
   E THAT NOTE{4 SPACES}{3 RIGHT}[16 T]"
   {5 RIGHT}INSTRUCTIONS" :rem 153
7 PRINT"{RVS}1{OFF} LEARN THE POSITION",
   {2 RIGHT}OF THE NOTES IN THE",
   {2 RIGHT}STAVES." :rem 244
8 PRINT"{RVS}2{OFF} LEARN THE CLEF SIGN",
   "{2 RIGHT}{PITCH RANGE}OF THE",
   {2 RIGHT}STAVES(TREBLE CLEF" :rem 83
9 PRINT"{2 RIGHT}OR G-CLEF.BASS CLEF",
   {2 RIGHT}OR F-CLEF)", "{RVS}3{OFF} START
   THE EXERCISE", "{2 RIGHT}BY CHOOSING";
   :rem 205
10 PRINT" A PITCH"C$"{2 RIGHT}RANGE."C$"
   {RVS}4{OFF} PROMPTLY RECOGNIZE",
   {2 RIGHT}THE NOTE DISPLAYED" :rem 251
11 PRINT"{2 RIGHT}IN THE STAFF-PRESS"C$"
   {2 RIGHT}THE CORRESPONDING", "{2 RIGHT}
   KEY.": :rem 178
```

```
12 PRINT"THE QUICKER THE {2 RIGHT}BETTER.
   "C$"{RVS} PRESS A KEY TO GO ON {OFF}
   {CYN}" :rem 51
13 GETP$:IFP$=""THEN13 :rem 9
14 POKE1,17:POKE2,18:GOTO810 :rem 149
18 POKE36879,109:PRINTCHR$(147):PRINT"
   {WHT}{10 DOWN}{5 RIGHT}PLEASE WAIT
   {BLU}" :rem 125
19 POKE36869,255:POKE56,28:CLR:FORI=7168T
   O7679:POKEI,PEEK(I+25600):NEXT :rem 49
20 FORI=0TO7:POKE7168+I,PEEK(33464+I):NEX
   T:FORI=0TO7:READX:POKE7384+I,X:NEXT
   :rem 46
50 DATA0,0,0,0,0,60,66,66,66,66,60,0,0,0,
   0,255,0,60,66,66,66,66,60,255 :rem 131
51 DATA60,126,227,193,129,129,129,255,129
   ,131,135,142,156,184,240,255,224,192
   :rem 19
52 DATA128,128,128,128,128,255,128,240,24
   8,140,134,131,129,255,129,129,129,130,
   132,136 :rem 201
53 DATA144,255,128,128,128,128,128,128,0,
   0,0,0,32,112,112,97,62,128,128,64,32
   ,16,8,4 :rem 166
54 DATA255,96,195,135,136,136,132,128,255
   ,1,7,12,24,48,96,96,255 :rem 158
55 DATA0,0,0,24,24,0,0,255,240,56,12,6,3,
   131,195,255,195,131,3,3 :rem 87
56 DATA3,3,3,255,3,3,6,12,24,48,96,255,33
   ,30,0,0,0,0,0,255,1,2,4,8,8,5,2,255,3,
   1,0,0,0 :rem 105
58 DATA0,0,255 :rem 219
60 FORI=0TO7:READX:POKE7392+I,X:POKE7400+
   I,PEEK(33568+I):NEXT :rem 1
75 FORI=7408TO7423:READX:POKEI,X:NEXT:FOR
   I=7432TO7551:READX:POKEI,X:NEXT
   :rem 197
80 FORI=7632TO7639:READX:POKEI,X:NEXT
   :rem 128
81 POKE1,81:POKE2,84:GOTO810 :rem 157
84 POKE36879,24:POKE36869,255 :rem 127
90 DATA158,161,173,181,189,192,200,206,20
   8,214,218,222,224,227,230,231,234,236
   :rem 54
100 PRINTCHR$(147):FORI=7724TO7724+109:PO
   KEI,29:NEXT :rem 133
101 FORI=7878TO7878+109:POKEI,29:NEXT
   :rem 229
102 POKE7726,31:POKE7748,33:POKE7770,34:P
   OKE7792,35:POKE7814,36:POKE7836,37
   :rem 77
103 POKE7835,38:POKE7813,39:POKE7791,40:P
   OKE7769,41:POKE7902,42 :rem 122
105 POKE7924,42:POKE7901,43:POKE7923,44:P
   OKE7945,45:POKE7966,46:POKE7900,47
   :rem 78
110 PRINT"{HOME}{21 DOWN}{GRN}&{PUR}&
   {BLK}&{BLU}&{BLK}NAME THAT NOTE{BLK}&
   {PUR}&{GRN}&{CYN}&{BLK}{HOME}":rem 24
120 PRINT"{16 DOWN}{3 RIGHT}{BLK}ENTER CL
   EF SIGN":PRINT"{3 RIGHT}T=TREBLE B=BA
   SS":GOSUB500 :rem 204
200 R=0:DIMP(18):DIMN(18):FORI=0TO18STEP2
   :P(I)=7685+R:R=R+22:NEXT :rem 183
202 DIMN1(20):V=36878:S2=36875:FORN=0TO3
   STEP-1:READN1(N):NEXTN :rem 63
203 N(0)=68:FORH=1TO18:N(H)=(N(H-1)-1)+(7
   *-(N(H-1)=65)):NEXT :rem 5
```

```

205 PRINT"{3 UP}":FORE=0TO40:PRINTCHR$(32
);:NEXT:PRINT"{HOME}{22 SPACES}"
:rem 69
206 GOSUB400:C=5:SC=0:Q=L*22:FORI=38400TO
38839:POKEI,0:NEXT
:rem 89
208 FORI=0TO15STEP5
:rem 177
210 J=INT(RND(X)*13)+3:J1=J:E=29:E1=30:E2
=27:E3=28
:rem 50
212 PRINT"{HOME}{5 RIGHT}{BLK}SCORE{BLK}"
SC
:rem 60
225 IFJ1=INT(J1/2)*2THENPOKEP(J1)+I+Q,E1:
GOTO232
:rem 106
230 POKEP(J1-1)+I+Q,E2:POKEP(J1+1)+I+Q,E3
:POKEP(J1-1)-1+I+Q,E:POKEP(J1-1)+1+I+
Q,E
:rem 136
232 IFEL=29ORE1=32THEN260
:rem 196
235 T=TI
:rem 200
240 GETN$:IFN$=""THENIFTI-T<600THEN240
:rem 23
241 IFN$=""THEN250
:rem 223
242 IFASC(N$)<65THENN$=""GOTO250:rem 148
243 POKE8059+I,ASC(N$)-64:IFASC(N$)=N(J1+
Z)THEN300
:rem 112
250 FORT=0TO500:NEXTT:IFJ1=3THENE=32:E1=3
2:E2=32:E3=29
:rem 13
252 IFJ1=13THENE1=32:E2=29:E3=32
:rem 56
253 IFJ1=14ORJ1=15THENE=32:E1=32:E2=32:E3
=32
:rem 20
254 IFJ1>3ANDJ1<13THENE1=29:E2=29:E3=29
:rem 4
256 POKE8059+I,32:POKE38779+I,0:GOTO225
:rem 254
260 NEXTI
:rem 32
270 C=C-1:IFC>0THEN208
:rem 253
272 IFSC>SITHENSI=SC
:rem 56
275 PRINT"{HOME}{BLK}SCORE{BLK}"SC"{LEFT}
{3 SPACES}HI{BLK}"SI
:rem 82
285 PRINT"{HOME}{17 DOWN}{RIGHT}AGAIN?T=T
REBLE B=BASS":GOSUB500:GOTO205
:rem 176
300 POKE38779+I,0:SC=SC+(600-(TI-T))
:rem 245
310 IFJ1>2ANDJ1<16THENPOKEV,15:POKES2+X,N
1(J1+X1):FORS=0TO150:NEXTS:POKES2+X,0
:POKEV,0
:rem 175
320 GOTO250
:rem 101
400 POKEV,15:F=15:G=8:K=-1:GOSUB430
:rem 53
410 F=8:G=15:K=1:GOSUB430
:rem 184
420 POKES2+X,0:RETURN
:rem 67
430 FORP=FTOGSTEPK:POKES2+X,N1(P):FORI=0T
O200:NEXTI:POKES2+X,0:FORS=1TO20:NEXT
S:NEXTP
:rem 150
440 RETURN
:rem 120
500 GETA$:IFA$=""THEN500
:rem 77
510 IFA$="T"THENL=0:Z=0:X=1:X1=0:RETURN
:rem 146
520 IFA$="B"THENL=7:Z=-2:X=0:X1=5:RETURN
:rem 187
530 PRINTCHR$(147):END
:rem 36
810 RE=830:DE=DE+1:POKE0,DE:PRINTDE
:rem 139
820 PRINT"GO"RE:FORBK=631TO634:POKEBK,145
:NEXT:POKE635,13:POKE636,13:POKE198,6
:END
:rem 191
830 PRINTCHR$(147):DE=PEEK(0):DR=PEEK(1):
IFDE<DRTHEN810
:rem 92
840 RE=PEEK(2):GOTO820
:rem 37

```

## Program 2: Name That Note—64 Version

```

100 DIM LOW%(25),HI%(25)
:rem 212
110 PRINT"{BLK}{CLR}{13 DOWN}{12 RIGHT}JU
ST A SECOND..."
:rem 140
120 POKE53281,12:POKE53280,12
:rem 78
130 REM INITIALIZE ROUTINE
:rem 217
140 NOS$="EFGABCDEFABCDEFABCDEFABCDEF"
:rem 126
150 FOR T=1 TO 25:READ LOW%(T):NEXT:FOR
[SPACE]T=1TO25:READ HI%(T):NEXT
:rem 235
160 FOR T=0 TO 63:READD:POKE704+T,D:NEXT:
POKE2040,11
:rem 14
170 FOR T=832TO1020:READD:POKET,D:NEXT:P
OKE2041,13:POKE2042,14
:rem 213
180 POKE2043,15
:rem 35
190 V=53248:POKEV+21,0
:rem 220
200 POKEV,255:POKEV+16,0:POKEV+39,0:POKE5
3280,12:POKE53281,12
:rem 51
210 POKEV+2,90:POKEV+3,84:POKEV+4,88:POKE
V+5,126:POKEV+23,14:POKEV+29,14
:rem 35
220 POKEV+6,90:POKEV+7,163:POKEV+40,0:POK
EV+41,0:POKEV+42,0
:rem 247
230 S=54272:FOR T=S TO S+24:POKET,0:NEXT
:rem 71
240 POKES+24,13:POKES+5,17:POKES+6,243
:rem 203
250 PRINT"{CLR}{10 DOWN}{13 RIGHT}NAME TH
AT NOTE":FORT=6TO 20:POKES,LOW%(T)
:rem 55
260 POKES+1,HI%(T):POKES+4,17:FOR T1=1TO
150:NEXT:POKES+4,16
:rem 32
270 FOR T2=1TO40:NEXT:NEXT
:rem 109
280 CH$=""PRINT"{2 DOWN}{4 RIGHT}DO YOU
[SPACE]WANT [RVS]T[OFF]REBLE, [RVS]B
[OFF]ASS OR [RVS]A[OFF]LL":INPUT "
[4 RIGHT]":CH$
:rem 26
290 IF CH$<>"B"ANDCH$<>"T"AND CH$<>"A"THE
N PRINT"{5 UP}":GOTO280
:rem 208
300 LW=-((CH$="B"ORCH$="A")-(CH$="T"))*13
:rem 5
310 TP=-((CH$="B")*13-(CH$="T"ORCH$="A"))*2
5
:rem 152
320 POKE646,6:PRINT"{CLR}{6 DOWN}"
:rem 202
330 LIS$="*****"
:rem 110
340 PRINT"{DOWN}"
:rem 121
350 FOR T=1 TO 5:PRINTSPC(3)LIS$:NEXT
:rem 124
360 PRINT"{HOME}COUNTER{7 RIGHT}SCORE
{7 RIGHT}MISSES"
:rem 131
370 FOR TR=1 TO 20
:rem 154
380 NN=INT(RND(0)*(TP-LW)+LW):IFNN=NO THE
N 380
:rem 219
390 POKES,LOW%(NN):POKES+1,HI%(NN):rem 53
400 IF NN=1ORNN=25ORNN=13THEN POKE 752,12
7:POKE754,240:GOTO420
:rem 130
410 POKE752,1:POKE754,0
:rem 36
420 POKE V+1,(194-4*NN)+8*(NN>13):POKEV+2
1,15
:rem 180
430 TS=10
:rem 220
440 FOR T=0TO 500:NEXT:TS=TS-1:PRINT"
{HOME}{9 RIGHT}":TS:GET G$
:rem 158
450 IF G$<>" "THENPOKE1934,(ASC(G$)-64)AND
255
:rem 150

```

```

460 IF(G$<>"AND G$<>MID$(NO$,NN,1))ORTS=
    0THENWR=WR+1:POKE198,0 :rem 198
470 PRINT"{HOME}{33 RIGHT}";WR :rem 32
480 IFG$<>MID$(NO$,NN,1)ANDTS<>0THEN440
    :rem 48
485 IF TS<>0THENPOKES+4,17:FORT=1TO300:NE
    XT:POKES+4,16 :rem 101
490 SC=SC+TS:PRINT"{HOME}{20 RIGHT}";SC;
    :rem 70
500 FOR T= 0 TO 1500:NEXT :rem 31
510 NO=NN:NEXT :rem 133
520 POKEV+21,0:PRINT"{CLR}{11 RIGHT}
    {7 DOWN}YOUR SCORE WAS";SC :rem 225
530 PRINT"{3 DOWN}{9 RIGHT}AND YOU MISSED
    ";WR;"TIME(S)" :rem 108
540 PRINT"{3 DOWN}{6 RIGHT}WOULD YOU LIKE
    TO PLAY AGAIN?" :rem 112
550 GET A$:IF A$=""THEN550 :rem 87
560 IF A$<>"Y"ANDA$<>"N"THEN550 :rem 179
570 IF A$="Y"THEN RUN :rem 142
580 REM DATA NOTES (LOW BYTES) :rem 238
590 DATA 71,152,71,12,233,97,104,143,48,1
    43,24,210 :rem 153
600 DATA 195,209,31,96,30,49,165,135,162,
    62,193,60,99 :rem 72
610 REM DATA NOTES (HIGH BYTES) :rem 22
620 DATA 5,5,6,7,7,8,9,10,11,12,14,15
    :rem 6
630 DATA 16,18,21,22,25,28,31,33,37,42,44
    ,50,56 :rem 253
640 REM DATA FOR SPRITE :rem 86
650 DATA000,002,000,000,003,000,000,002
    :rem 112
660 DATA128,000,002,064,000,002,032,000
    :rem 136
670 DATA002,032,000,002,032,000,002,064
    :rem 133
680 DATA000,002,000,000,002,000,000,002
    :rem 114
690 DATA000,000,002,000,000,002,000,000
    :rem 113
700 DATA122,000,000,254,000,001,254,000
    :rem 129
710 DATA001,254,000,001,254,000,000,252
    :rem 135
720 DATA000,000,120,000,000,000,000,000
    :rem 106
730 DATA0,224,0,0,208,0,0,216,0,0,204,0,0
    :rem 213
740 DATA206,0,0,199,0,0,199,0,0,199,0,0,2
    06,0 :rem 186
750 DATA0,204,0,0,216,0,0,240,0,0,224,0,1
    :rem 212
760 DATA192,0,3,192,0,6,192,0,12,192,0,24
    ,192 :rem 197
770 DATA0,48,192,0,96,192,0,224,192,0,255
    :rem 19
780 DATA48,111,128,97,248,192,195,96,96,1
    98,96,48,195,104,48,193 :rem 200
790 DATA232,48,96,248,96 :rem 233
800 DATA112,96,224,56,96,192,28,99,192,7
    :rem 254
810 DATA111,0,1,248,0,0,96,0,0,0,0,0,0,0
    ,0,0 :rem 180
820 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
    :rem 72
830 DATA 0,248,0,3,6,0,6,3,128,6,0,198,3,
    192 :rem 99
840 DATA 198,3,192,192,0,0,198,0,1,134,0,
    1 :rem 3

```

```

850 DATA128,0,3,0,0,3,0,0,6,0,0,12,0,0
    :rem 61
860 DATA24,0,0,112,0,1,192,0,3,0,0,0,0,0
    ,0,0,0 :rem 178
870 DATA0,0,0,0,0,0 :rem 181

```

### Program 3: Name That Note—Plus/4 And 16 Version

```

10 FORI=1TO210:READA:X=X+A:NEXT:IFX<>2886
    0THENPRINT"ERROR IN DATA STATEMENTS.":
    STOP
20 POKE56,60:POKE55,0:CLR:VOL 8
30 FORI=819TO848:READA:POKEI,A:NEXT
40 DATA160,0,185,0,208,153,0,60,185,0,209
    ,153,0,61
50 DATA185,0,210,153,0,62,185,0,211,153,0
    ,63,136,208,229,96
60 PRINT"{CLR}"CHR$(142):COLOR0,4,1:COLOR
    4,4:F$="CCCCCCCCCCCCCCCCCCCCCCCCCCCC
    CCCCCCCC"
70 C$=CHR$(13):PRINT"{HOME}{4 DOWN}{WHT}"
    F$"CCCCCCCCCCCCCCCCNAME THAT NOTECCCC
    CCCCCC"FFF$
80 PRINT"{3 DOWN}"TAB(13)"A MUSIC TUTOR"
90 PRINT"{9 DOWN}"TAB(13)"INSTRUCTIONS?"C
    $TAB(16)"{RVS}Y{OFF}ES/{RVS}N{OFF}O"
100 GETKEYI$:IFI$<>"Y"THEN200
110 PRINT"{CLR}{DOWN}"CHR$(14)TAB(13)"NAM
    E THAT NOTE"C$TAB(12)"{16 T}"
120 PRINTTAB(14)"{DOWN}INSTRUCTIONS"
130 PRINT"{DOWN}{RVS}1{OFF} LEARN THE POS
    ITION OF THE NOTES IN THE":PRINT"
    {2 RIGHT}STAVES."
140 PRINT"{DOWN}{RVS}2{OFF} LEARN THE CLE
    F SIGN (PITCH RANGE) OF"C$"{2 RIGHT}T
    HE STAVES (TREBLE CLEF";
150 PRINT" OR G-CLEF."C$"{2 RIGHT}BASS CL
    EF OR F-CLEF)."
160 PRINT"{DOWN}{RVS}3{OFF} START THE EXE
    RCISE BY CHOOSING A PITCH{2 RIGHT}RAN
    GE."
170 PRINT"{DOWN}{RVS}4{OFF} PROMPTLY RECO
    GNIZE THE NOTE DISPLAYED"
180 PRINT"{2 RIGHT}IN THE STAFF -
    {SHIFT-SPACE}PRESS THE CORRESPONDING"
    ;:PRINT"{2 RIGHT}KEY.";
190 PRINT"{RIGHT}THE QUICKER, THE BETTER.
    "C$TAB(9)"{3 DOWN}{RVS} PRESS A KEY T
    O GO ON {OFF}{CYN}":GETKEYP$
200 COLOR0,7:COLOR4,7:PRINTCHR$(147):PRIN
    T"{BLU}{10 DOWN}"TAB(14)"PLEASE WAIT
    {BLK}":SYS819
210 FORI=0TO7:POKE15360+I,PEEK(16056+I):N
    EXT:FORI=0TO7:READX:POKE15576+I,X:NEX
    T
220 DATA0,0,0,0,0,60,66,66,66,66,60,0,0,0
    ,0,255,0,60,66,66,66,66,60,255
230 DATA60,126,227,193,129,129,129,255,12
    9,131,135,142,156,184,240,255,224,192
240 DATA128,128,128,128,128,255,128,240,2
    48,140,134,131,129,255,129,129,129,13
    0,132,136
250 DATA144,255,128,128,128,128,128,128,0
    ,0,0,0,32,112,112,97,62,128,128,64,
    32,16,8,4
260 DATA255,96,195,135,136,136,132,128,25
    5,1,7,12,24,48,96,96,255
270 DATA0,0,0,24,24,0,0,255,240,56,12,6,3
    ,131,195,255,195,131,3,3

```

```

280 DATA3,3,3,255,3,3,6,12,24,48,96,255,3
3,30,0,0,0,0,0,255,1,2,4,8,8,5,2,255,
3,1,0,0,0
290 DATA0,0,255
300 FORI=0TO7:READX:POKE15584+I,X:POKE155
92+I,PEEK(16160+I):NEXT
310 FORI=15600TO15615:READX:POKEI,X:NEXT:
FORI=15624TO15743:READX:POKEI,X:NEXT
320 FORI=15824TO15831:READX:POKEI,X:NEXT
330 COLOR0,2:COLOR4,5:POKE65298,PEEK(6529
8)AND251
340 POKE65299,PEEK(65299)AND30R60
350 DATA7,118,169,262,345,383,453,516,571
,596,643
360 DATA685,704,739,770,798,810,834,854,8
64,881,897
370 PRINTCHR$(147):FORI=3152TO3351:POKEI,
29:NEXT
380 FORI=3432TO3631:POKEI,29:NEXT
390 POKE3155,31:POKE3195,33:POKE3235,34:P
OKE3275,35:POKE3315,36:POKE3355,37
400 POKE3354,38:POKE3314,39:POKE3274,40:P
OKE3234,41:POKE3475,42
410 POKE3515,42:POKE3474,43:POKE3514,44:P
OKE3554,45:POKE3593,46:POKE3473,47
420 PRINT"{HOME}{22 DOWN}{GRN}"TAB(9)"&
{PUR}&{BLK}&{BLU}&{BLK}NAME THAT NOTE
{BLK}&{PUR}&{GRN}&{CYN}&{HOME}"
430 PRINT"{16 DOWN}"TAB(12)"{BLK}ENTER CL
EF SIGN{DOWN}"
440 PRINTTAB(12)"{RVS}T{OFF}=TREBLE {RVS}
B{OFF}=BASS":GOSUB770
450 R=0:DIMP(18):DIMN(18):FORI=0TO18STEP2
:P(I)=3079+R:R=R+40:NEXT
460 DIMN1(24):FORN=24TO3STEP-1:READN1(N):
NEXTN
470 N(0)=68:FORH=1TO18:N(H)=(N(H-1)-1)+(7
*-(N(H-1)=65)):NEXT
480 FORI=3761TO3782:POKEI,32:POKEI+80,32:
NEXT
490 GOSUB740:C=5:SC=0:Q=L*40:FORI=2048TO2
846:POKEI,0:NEXT
500 FORI=0TO30STEP10
510 J=INT(RND(X)*13)+3:IFJ=OJOR(L=7ANDJ>1
2)THEN510
520 OJ=J:J1=J:E=29:E1=30:E2=27:E3=28:PRIN
T"{HOME}"TAB(5)"{RVS}{RED}SCORE{OFF}
{BLK}"SC
530 PRINT"{HOME}"TAB(26)"{RVS}{PUR}COUNT
E{OFF}{BLK}"9:IFJ1=INT(J1/2)*2THENPOK
EP(J1)+I+Q,E1:GOTO550
540 POKEP(J1-1)+I+Q,E2:POKEP(J1+1)+I+Q,E3
:POKEP(J1-1)-1+I+Q,E:POKEP(J1-1)+1+I+
Q,E
550 IFE1=29ORE1=32THEN660
560 TI$="000000":POKE239,0
570 GETN$:IFN$=""THEN T=TI:IFT<600THENPRIN
T"{HOME}"TAB(33)9-INT(T/60):GOTO570
580 IFN$=""THEN610
590 IFASC(N$)<65THENN$="" :GOTO610
600 POKE3759+I,ASC(N$)-64:IFASC(N$)=N(J1+
Z)THEN710
610 FORT=0TO500:NEXTT:IFJ1=3THENE=32:E1=3
2:E2=32:E3=29
620 IFJ1=13THENE1=32:E2=29:E3=32
630 IFJ1=14ORJ1=15THENE=32:E1=32:E2=32:E3
=32
640 IFJ1>3ANDJ1<13THENE1=29:E2=29:E3=29
650 POKE3759+I,32:GOTO530
660 NEXTI

```

```

670 C=C-1:IFC>0THEN500
680 IFSC>SITHENSI=SC
690 PRINT"{HOME}"TAB(5)"{RVS}{RED}SCORE
{OFF}{BLK}"SC:PRINTTAB(16)"{RVS}{7}HI
GH{OFF}{BLK}"SI
700 PRINT"{HOME}{19 DOWN}"TAB(9)"AGAIN?
{RVS}T{OFF}=TREBLE {RVS}B{OFF}=BASS":
GOSUB770:GOTO480
710 POKE2737+I,0:SC=SC+(600-T)
720 IFJ1>2ANDJ1<16THENSOUND1,N1(J1+X1+L),
25
730 GOTO610
740 F=15+L:G=8+L:K=-1:GOSUB760
750 F=8+L:G=15+L:K=1:GOSUB760:RETURN
760 FORP=FTOGSTEPK:SOUND1,N1(P),20:NEXTP:
RETURN
770 POKE239,0:GETKEYA$:IFA$="T"THENL=0:Z=
0:X1=0:GOSUB800:RETURN
780 IFA$="B"THENL=7:Z=-2:X1=5:GOSUB800:RE
TURN
790 POKE65298,196:POKE65299,208:PRINTCHR$
(147):END
800 FORI=3072TO3151:POKEI,32:NEXT:RETURN

```

## VIC Quiz Generator

(Article on page 66.)

### BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

```

100 POKE36879,110 :rem 143
110 READA$:IFA$<>"999"THENN=N+1:GOTO110
:rem 19
120 RESTORE:DIMQ$(N),C(N) :rem 237
130 X=RND(0):V=36878:S2=36875 :rem 116
140 S$="{WHT}WHO WROTE " :rem 17
150 PRINT"{CLR}{8 DOWN}{RVS}{RIGHT}{PUR}
{20 SPACES}" :rem 77
160 PRINT"{RIGHT}{RVS}{YEL} VIC QUIZ GENE
RATOR " :rem 7
170 PRINT"{RVS}{RIGHT}{PUR}{20 SPACES}"
:rem 52
180 GOSUB510 :rem 175
190 FORI=1TON:READQ$(I):NEXT :rem 7
200 T=0:FORI=1TON:C(I)=2:NEXT :rem 27
210 PRINT"{CLR}{WHT}{9 DOWN}SHUFFLE QUEST
IONS ({RVS}Y{OFF}/{RVS}N{OFF})?"
:rem 27
220 GETA$:ON-(A$="")GOTO220:IFA$="N"THEN2
50 :rem 164
230 FORJ=1TON:T$=Q$(J):RN=INT(RND(1)*N)+1
:Q$(J)=Q$(RN):Q$(RN)=T$:NEXT:REMSHUFF
LE :rem 151
240 REM SPLIT QUESTION/ANSWER :rem 125
250 FORJ=1TON:IFC(J)=0ORC(J)=1THEN400
:rem 235
260 QZ$="":AN$="":FL=0:FORK=1TOLEN(Q$(J))
:M$=MID$(Q$(J),K,1) :rem 103
270 ON-(M$="#")GOTO310 :rem 150
280 IFM$="*"THENFL=1:GOTO310 :rem 123
290 IFFL=0THENQZ$=QZ$+M$ :rem 207
300 IFFL=1THENAN$=AN$+M$ :rem 144
310 NEXTK :rem 30

```

```

320 REM ASK QUESTION & GET ANSWER:rem 166
330 PRINT"{CLR}{4 DOWN}"+S$:PRINT{RVS}"Q
Z$"{OFF}"+"?":INPUTRS$ :rem 227
340 IFRS$=AN$THEN370 :rem 168
350 PRINT"{3 DOWN}{BLK}SORRY...YOU'RE WRO
NG.":GOSUB530 :rem 29
360 PRINT"{2 DOWN}{YEL}THE ANSWER IS":PR
INT{RVS}"AN$"{OFF}"+".":GOTO390
:rem 3
370 GOSUB520:PRINT"{3 DOWN}{RVS}{YEL}GREA
T...THAT'S RIGHT!" :rem 230
380 C(J)=1 :rem 231
390 GOSUB510 :rem 178
400 NEXTJ :rem 29
410 WA=0:FORI=1TON:IFC(I)=-1THENC(I)=0
:rem 29
420 IFC(I)=2THENWA=1:C(I)=-1 :rem 88
430 NEXTI :rem 31
440 IFWA=1THEN250 :rem 243
450 REM SCORE QUIZ & RESET SEQ :rem 212
460 FORI=1TON:T=T+C(I):NEXT:SC=INT(T/N*10
0+.5) :rem 44
470 PRINT{CLR}{2 DOWN}{WHT}YOUR SCORE IS
:"SC"% :rem 198
480 PRINT{DOWN}WANT TO TRY AGAIN (Y/N)?"
:rem 32
490 GETA$:ON-(A$="")GOTO490:IFA$="N"THENE
ND :rem 246
500 GOTO200 :rem 96
510 FORI=1TO2000:NEXT:RETURN :rem 44
520 POKEV,10:FORI=110TO241:POKES2,I:NEXT:
POKEV,0:RETURN:REM CORRECT :rem 93
530 POKEV,10:POKES2,135:FORI=1TO300:NEXT:
POKEV,0:RETURN:REM INCORRECT :rem 224
1000 DATA #MOBY DICK*HERMAN MELVILLE
:rem 143
1010 DATA #RED BADGE OF COURAGE*STEPHEN C
RANE :rem 114
1020 DATA #THE SCARLET LETTER*NATHANIEL H
AWTHORNE :rem 45
1030 DATA #THE GREAT GATSBY*F. SCOTT FITZ
GERALD :rem 54
1040 DATA #TOM SAWYER*MARK TWAIN :rem 165
1050 DATA #FOR WHOM THE BELL TOLLS*ERNEST
HEMINGWAY :rem 87
1060 DATA 999 :rem 140
190 READA:N=N+1 :rem 102
200 IFN<=20THENC=CT+A:GOTO230 :rem 88
205 PRINT".": :rem 209
210 IFCT<>ATHENGOTO320 :rem 113
220 CT=0:N=0:GOTO190 :rem 154
230 IF(A<=255)AND(A>=0)THENGOTO270
:rem 220
240 IFA<0THEN260 :rem 153
250 A=HM-OF(A-300):L=FNL(A):A=FNH(A):POKE
I-2,L:GOTO270 :rem 174
260 A=HM+A:POKEI,FNL(A):I=I+1:A=FNH(A)
:rem 242
270 POKEI,A :rem 126
280 NEXTI :rem 34
290 P=HM-113:S=P+3:PRINT{CLR}{2 DOWN}TYP
E SYS "P" TO":PRINT"LIST TO PRINTER."
:rem 107
300 PRINT{DOWN}TYPE SYS "S" TO":PRINT"LI
ST TO SCREEN." :rem 200
310 END :rem 107
320 PRINT"DATA ERROR IN"(I-HM)+462+340
:rem 134
330 END :rem 109
340 DATA 462,431,407,387 :rem 166
350 DATA 13,76,73,78,69,32,78,85,77,66
:rem 114
360 DATA 69,82,13,67,82,79,83,83,32,82,13
19 :rem 98
370 DATA 69,70,69,82,69,78,67,69,58,13
:rem 122
380 DATA 0,13,32,32,76,73,78,69,32,32,108
1 :rem 20
390 DATA 82,69,70,69,82,69,78,67,69,68
:rem 131
400 DATA 32,65,84,13,0,13,76,73,83,84,124
6 :rem 21
410 DATA 73,78,71,32,67,79,77,80,76,69
:rem 112
420 DATA 84,69,46,13,0,13,32,32,32,105
5 :rem 4
430 DATA 32,32,32,32,0,32,231,255,169,0
:rem 104
440 DATA 32,189,255,169,4,162,4,160,7,32,
1829 :rem 181
450 DATA 186,255,32,192,255,162,4,32,201,
255 :rem 120
460 DATA 96,169,32,32,210,255,192,40,176,
44,2820 :rem 70
470 DATA 192,39,208,4,224,16,176,36,32,21
0 :rem 21
480 DATA 255,192,4,176,29,192,3,208,4,224
,2424 :rem 228
490 DATA 232,176,21,32,210,255,192,0,208,
14 :rem 58
500 DATA 224,100,176,10,32,210,255,224,10
,176,2757 :rem 143
510 DATA 3,32,210,255,152,32,205,221,96,1
69 :rem 59
520 DATA 0,133,9,169,10,133,42,165,122,16
6,2324 :rem 0
530 DATA 123,133,2,134,3,165,43,166,44,13
3 :rem 7
540 DATA 40,134,41,133,122,134,123,160,0,
177,2010 :rem 79
550 DATA 40,208,14,200,177,40,208,9,165,2
:rem 217
560 DATA 166,3,133,122,134,123,96,32,115,
0,1987 :rem 11
570 DATA 32,115,0,133,57,32,115,0,133,58
:rem 161

```

## Line Number Cross Reference

(Article on page 118.)

### Program 1: Line Number Cross Reference—VIC Version

```

100 PRINT "{CLR}{3 DOWN}{2 SPACES}XREF UT
ILITY" :rem 145
105 PRINT{DOWN}LOADING"; :rem 177
110 DEFFNL(X)=X-(INT(X/256)*256) :rem 36
120 DEFFNH(X)=INT(X/256) :rem 132
130 DIMOF(4) :rem 136
140 FORI=1TO4:READOF(I):NEXTI :rem 81
150 HM=PEEK(55)+256*PEEK(56) :rem 27
160 HB=FNH(HM):LB=FNL(HM):POKE55,LB:POKE5
6,HB :rem 2
170 N=0:CT=0 :rem 145
180 FORI=HM-462TOHM-1 :rem 250

```

```

580 DATA 32,115,0,201,0,240,4,201,143,208      {SPACE}TO THE":PRINT"SCREEN.":rem 112
    ,1819                                         :rem 192 210 END :rem 106
590 DATA 11,160,1,177,40,170,136,177,40,5     220 DATA 13,76,73,78,69,32,78,85,77,66
    6                                             :rem 17 :rem 110
600 DATA 176,193,201,137,240,8,201,141,24    230 DATA 69,82,32,67,82,79,83,83,32,82,13
    0,4,2509                                     :rem 98 38 :rem 96
610 DATA 201,167,208,222,32,115,0,32,243,    240 DATA 69,70,69,82,69,78,67,69,58,13
    220                                           :rem 92 :rem 118
620 DATA 32,155,220,165,101,197,59,208,60    250 DATA 0,13,32,32,76,73,78,69,32,32,108
    ,165,2802                                     :rem 163 1 :rem 16
630 DATA 100,197,60,208,54,36,9,48,28,169    260 DATA 32,32,82,69,70,69,82,69,78,67
    :rem 242 :rem 108
640 DATA 128,133,9,169,13,32,210,255,166,    270 DATA 69,68,32,65,84,13,0,13,76,73,114
    59,2083                                       :rem 71 3 :rem 28
650 DATA 164,60,32,-351,169,32,32,210,255    280 DATA 83,84,73,78,71,32,67,79,77,80
    ,32                                           :rem 107 :rem 112
660 DATA 210,255,169,11,133,42,198,42,208    290 DATA 76,69,84,69,46,13,0,13,32,32,115
    ,11,1914                                       :rem 111 8 :rem 31
670 DATA 169,75,160,304,32,30,203,169,10,    300 DATA 32,32,32,32,32,32,0,32,231,255
    133                                           :rem 114 :rem 94
680 DATA 42,166,57,164,58,32,-351,32,121,    310 DATA 169,0,32,189,255,169,4,162,4,160
    0,1606                                         :rem 8 1,1854 :rem 227
690 DATA 201,44,208,143,56,176,171,32,-37    320 DATA 7,32,186,255,32,192,255,162,4,32
    7,169                                           :rem 231 :rem 225
700 DATA 147,32,210,255,24,162,5,160,1,32    330 DATA 201,255,96,169,32,32,210,255,192
    ,1851                                           :rem 201 ,40,2639 :rem 115
710 DATA 240,255,169,0,160,301,32,30,203,    340 DATA 176,44,192,39,208,4,224,16,176,3
    162                                           :rem 97 6 :rem 31
720 DATA 20,169,61,32,210,255,202,208,250    350 DATA 32,210,255,192,4,176,29,192,3,20
    ,24,2983                                       :rem 105 8,2416 :rem 13
730 DATA 162,8,160,1,32,240,255,169,31,16    360 DATA 4,224,232,176,21,32,210,255,192,
    0                                               :rem 11 0 :rem 3
740 DATA 302,32,30,203,169,17,32,210,255,    370 DATA 208,14,224,100,176,10,32,210,255
    165,2633                                       :rem 101 ,224,2799 :rem 154
750 DATA 43,166,44,133,38,134,39,160,0,17    380 DATA 10,176,3,32,210,255,152,32,205,1
    7                                               :rem 26 89 :rem 61
760 DATA 38,208,5,200,177,38,240,30,160,2    390 DATA 96,169,0,133,9,169,10,133,42,165
    ,2032                                           :rem 206 ,2190 :rem 227
770 DATA 177,38,133,59,200,177,38,133,60,    400 DATA 122,166,123,133,2,134,3,165,43,1
    32                                               :rem 81 66 :rem 54
780 DATA -293,160,0,177,38,72,200,177,38,    410 DATA 44,133,40,134,41,133,122,134,123
    133,1749                                       :rem 126 ,160,2121 :rem 126
790 DATA 39,104,133,38,56,176,215,169,55,    420 DATA 0,177,40,208,14,200,177,40,208,9
    160                                           :rem 139 :rem 214
800 DATA 303,32,30,203,32,204,255,96,2250    430 DATA 165,2,166,3,133,122,134,123,96,1
    :rem 212 60,2177 :rem 56

```

## Program 2: Line Number Cross Reference—64 Version

```

90 PRINT"{CLR}{3 DOWN}{5 RIGHT}LINE CROSS
    REFERENCE UTILITY" :rem 6
95 PRINT"{2 DOWN}{10 SPACES}LOADING";
    :rem 154
100 CT=0 :rem 149
110 FORI=1TO476 :rem 116
120 READA :rem 240
130 CT=CT+A :rem 107
140 IFINT(I/20)<>(I/20)THEN180 :rem 167
150 READQ:PRINT". "; :rem 119
160 IFQ=CTTHENCT=0:GOTO180 :rem 138
170 PRINT"ERROR IN DATA - LINES"200+I"TO"
    210+I:CT=0:GOTO210 :rem 132
180 POKE49151+I,A :rem 173
190 NEXT :rem 217
200 READQ:IFQ<>CTTHEN170 :rem 241
205 PRINT"{CLR}{3 DOWN}TYPE 'SYS 49515' T
    O LIST TO THE":PRINT"PRINTER."
    :rem 133
206 PRINT"{DOWN}TYPE 'SYS 49518' TO LIST

```

```

210 END :rem 106
220 DATA 13,76,73,78,69,32,78,85,77,66
    :rem 110
230 DATA 69,82,32,67,82,79,83,83,32,82,13
    38 :rem 96
240 DATA 69,70,69,82,69,78,67,69,58,13
    :rem 118
250 DATA 0,13,32,32,76,73,78,69,32,32,108
    1 :rem 16
260 DATA 32,32,82,69,70,69,82,69,78,67
    :rem 108
270 DATA 69,68,32,65,84,13,0,13,76,73,114
    3 :rem 28
280 DATA 83,84,73,78,71,32,67,79,77,80
    :rem 112
290 DATA 76,69,84,69,46,13,0,13,32,32,115
    8 :rem 31
300 DATA 32,32,32,32,32,32,0,32,231,255
    :rem 94
310 DATA 169,0,32,189,255,169,4,162,4,160
    ,1854 :rem 227
320 DATA 7,32,186,255,32,192,255,162,4,32
    :rem 225
330 DATA 201,255,96,169,32,32,210,255,192
    ,40,2639 :rem 115
340 DATA 176,44,192,39,208,4,224,16,176,3
    6 :rem 31
350 DATA 32,210,255,192,4,176,29,192,3,20
    8,2416 :rem 13
360 DATA 4,224,232,176,21,32,210,255,192,
    0 :rem 3
370 DATA 208,14,224,100,176,10,32,210,255
    ,224,2799 :rem 154
380 DATA 10,176,3,32,210,255,152,32,205,1
    89 :rem 61
390 DATA 96,169,0,133,9,169,10,133,42,165
    ,2190 :rem 227
400 DATA 122,166,123,133,2,134,3,165,43,1
    66 :rem 54
410 DATA 44,133,40,134,41,133,122,134,123
    ,160,2121 :rem 126
420 DATA 0,177,40,208,14,200,177,40,208,9
    :rem 214
430 DATA 165,2,166,3,133,122,134,123,96,1
    60,2177 :rem 56
440 DATA 2,177,40,133,57,200,177,40,133,5
    8 :rem 15
450 DATA 166,41,165,40,24,105,3,144,1,232
    ,1938 :rem 210
460 DATA 133,122,134,123,32,115,0,201,0,2
    40 :rem 31
470 DATA 4,201,143,208,11,160,1,177,40,17
    0,2215 :rem 245
480 DATA 136,177,40,76,191,192,201,137,24
    0,8 :rem 127
490 DATA 201,141,240,4,201,167,208,222,32
    ,115,2929 :rem 149
500 DATA 0,32,243,188,32,155,188,165,101,
    197 :rem 122
510 DATA 59,208,60,165,100,197,60,208,54,
    36,2448 :rem 72
520 DATA 9,48,28,169,128,133,9,169,13,32
    :rem 192
530 DATA 210,255,166,59,164,60,32,113,192
    ,169,2158 :rem 171
540 DATA 32,32,210,255,32,210,255,169,11,
    133 :rem 101
550 DATA 42,198,42,208,11,169,77,160,192,
    32,2470 :rem 73

```

```

560 DATA 30,171,169,10,133,42,166,57,164,
      58 :rem 76
570 DATA 32,113,192,32,121,0,201,44,208,1
      43,2086 :rem 42
580 DATA 76,22,193,32,87,192,169,147,32,2
      10 :rem 85
590 DATA 255,24,162,5,160,1,32,240,255,16
      9,2463 :rem 14
600 DATA 0,160,192,32,30,171,162,28,169,6
      1 :rem 10
610 DATA 32,210,255,202,208,250,24,162,7,
      160,2515 :rem 92
620 DATA 1,32,240,255,169,31,160,192,32,3
      0 :rem 5
630 DATA 171,169,17,32,210,255,165,43,166
      ,44,2414 :rem 115
640 DATA 133,38,134,39,160,0,177,38,208,5
      :rem 230
650 DATA 200,177,38,240,30,160,2,177,38,1
      33,2127 :rem 56
660 DATA 59,200,177,38,133,60,32,171,192,
      160 :rem 122
670 DATA 0,177,38,72,200,177,38,133,39,10
      4,2200 :rem 10
680 DATA 133,38,76,168,193,169,57,160,192
      ,32 :rem 147
690 DATA 30,171,32,204,255,96,2006
      :rem 139
40 IFK>1983THEN100 :rem 17
50 IF(K-1063)/40-INT((K-1063)/40)=0THEN30
      0 :rem 216
60 POKECC,64:NEXT :rem 42
100 FORX=1TOQ:POKEK,B:POKEK+C,U:POKEAA,H(
      2):POKEBB,L(2):POKECC,65:K=K-39
      :rem 237
110 IFK<1064THEN30 :rem 5
120 IF(K-1063)/40-INT((K-1063)/40)=0THEN2
      00 :rem 5
130 POKECC,64:NEXT :rem 88
200 FORX=1TOR:POKEK,B:POKEK+C,V:POKEAA,H(
      3):POKEBB,L(3):POKECC,65:K=K-41
      :rem 235
210 IFK<1064THEN300 :rem 54
220 IF(K-1024)/40-INT((K-1024)/40)=0THEN1
      00 :rem 255
230 POKECC,64:NEXT :rem 89
300 FORX=1TOS:POKEK,B:POKEK+C,W:POKEAA,H(
      4):POKEBB,L(4):POKECC,65:K=K+39
      :rem 245
310 IF(K-1024)/40-INT((K-1024)/40)=0THEN3
      0 :rem 209
320 IFK>1983THEN200 :rem 67
330 POKECC,64:NEXT :rem 90
340 GOTO21 :rem 51

```

## Program 2: Bleep

```

10 PRINTCHR$(147)CHR$(5):POKE53280,0:POKE
      53281,0 :rem 242
20 FORX=1TO9:PRINT:NEXT:PRINTTAB(12)"TURN
      UP VOLUME." :rem 181
30 PRINT:PRINTTAB(9)"HIT ANY KEY TO BEGIN
      ." :rem 72
35 PRINT:PRINTTAB(9)"HIT RUN/STOP TO STOP
      ." :rem 199
40 GETA$:IFA$=""THEN40 :rem 235
50 PRINTCHR$(147) :rem 224
60 FORR=54272TO54295:POKER,0:NEXT :rem 28
70 POKE54296,15:FORT=1TO500:NEXT :rem 198
80 POKE54277,4:POKE54275,8 :rem 212
90 X=1524:J=54273:K=54272:L=54276:C=54272
      :rem 223
100 CH=INT(17*RND(1))+1 :rem 233
110 ONCHGOTO111,112,113,114,115,116,117,1
      18,119,120,121,122,123,124,125,126,12
      7 :rem 182
111 CH=81:GOTO200 :rem 201
112 CH=86:GOTO200 :rem 207
113 CH=91:GOTO200 :rem 204
114 CH=92:GOTO200 :rem 206
115 CH=102:GOTO200 :rem 247
116 CH=108:GOTO200 :rem 254
117 CH=123:GOTO200 :rem 252
118 CH=127:GOTO200 :rem 1
119 CH=160:GOTO200 :rem 255
120 CH=171:GOTO200 :rem 249
121 CH=204:GOTO200 :rem 247
122 CH=205:GOTO200 :rem 249
123 CH=209:GOTO200 :rem 254
124 CH=214:GOTO200 :rem 251
125 CH=233:GOTO200 :rem 253
126 CH=236:GOTO200 :rem 1
127 CH=238:GOTO200 :rem 4
200 LO=INT(255*RND(1))+1:HI=INT(255*RND(1
      ))+1 :rem 250
210 CO=INT(15*RND(1))+0 :rem 239
220 Y=INT(4*RND(1))+1 :rem 134
230 ONYGOTO231,232,233,234 :rem 166

```

# Baker's Dozen, Part 2

(Article on page 120.)

### BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

## Program 1: Music Patterns

```

1 FORZ=54272TO54295:POKEZ,0:NEXT:POKE5429
      6,15:POKE54277,4:AA=54272:BB=54273
      :rem 203
10 PRINTCHR$(147)CHR$(5):POKE53280,0:POKE
      53281,0:POKE54275,8:CC=54276 :rem 203
15 FORZ=1TO10:PRINT:NEXT:PRINTTAB(9)"PLEA
      SE TURN UP VOLUME.":PRINT :rem 58
17 PRINTTAB(9)"PRESS RUN/STOP TO STOP."
      :rem 168
18 FORT=1TO2000:NEXT:PRINTCHR$(147)
      :rem 165
20 K=INT(1000*RND(1))+1024:B=160:C=54272
      :rem 119
21 P=INT(11*RND(1))+1:H(1)=INT(150*RND(1)
      )+1:L(1)=INT(150*RND(1))+1 :rem 124
22 Q=INT(11*RND(1))+1:H(2)=INT(150*RND(1)
      )+1:L(2)=INT(150*RND(1))+1 :rem 128
23 R=INT(11*RND(1))+1:H(3)=INT(150*RND(1)
      )+1:L(3)=INT(150*RND(1))+1 :rem 132
24 S=INT(11*RND(1))+1:H(4)=INT(150*RND(1)
      )+1:L(4)=INT(150*RND(1))+1 :rem 136
25 T=INT(14*RND(1))+2 :rem 134
26 U=INT(14*RND(1))+2 :rem 136
27 V=INT(14*RND(1))+2 :rem 138
28 W=INT(14*RND(1))+2 :rem 140
30 FORX=1TOP:POKEK,B:POKEK+C,T:POKEAA,H(1
      ):POKEBB,L(1):POKECC,65:K=K+41:rem 178

```

```

231 X=X+1:GOTO300 :rem 229 :rem 135
232 X=X-1:GOTO300 :rem 232 110 GETA$:IFA$=""THEN110 :rem 71
233 X=X+40:GOTO300 :rem 26 120 POKE54276,33:REM TURNS NOTE ON
234 X=X-40:GOTO300 :rem 29 :rem 233
300 IFX<1064THENFORT=] TO1000:NEXT:GOTO360 :rem 66 130 FORT=255TO1STEP-10:POKE54294,T:NEXT:F
:rem 79 140 REM TRY ALSO 1 TO 255 STEP 5 :rem 136
310 IFX>1983THENFORT=1TO1000:NEXT:GOTO360 :rem 79 150 GOTO90 :rem 56
320 POKEJ,HI:POKEK,LO :rem 70 160 DATA5,185,5,103,4,208,4,73,3,210,3,15
330 POKEK,CH:POKEX+C,CO :rem 193 5,3,54,2,220,-1,-1 :rem 87
340 POKEJ,65:FORT=1TO10:NEXT:POKEJ,64 :rem 84
:rem 99
350 GOTO200 :rem 99
360 PRINTCHR$(147):X=1524:GOTO100:rem 179

```

### Program 3: Chimes

```

10 PRINTCHR$(147)CHR$(5):POKE53280,0:POKE
53281,0 :rem 242
20 PRINT:PRINT"HIT SPACE BAR TO HEAR ANOT
HER CHIME." :rem 136
30 PRINT:PRINT"HIT ANY KEY TO END.":FORT=
1TO1500:NEXT :rem 30
40 S=54272:REM START OF SOUND CHIP :rem 230
50 FORL=0TO24:POKES+L,0:NEXT:REM CLEAR
{2 SPACES}SOUND CHIP :rem 72
60 POKE54296,15:FORT=1TO500:NEXT:
{3 SPACES}REM FULL VOLUME + TIME DELAY :rem 183
70 PRINTCHR$(147):A=INT(255*RND(1))+1:
{2 SPACES}REM GENERATES RANDOM FREQ FO
R VOICE 1 :rem 151
80 POKE54273,A:N=N+1:PRINT:PRINT"VO
ICE ONE FREQUENCY=";A :rem 212
90 POKE54277,09:POKE54278,00:REM ADSR :rem 125
100 B=INT(255*RND(1))+1:REM GENERATES
{3 SPACES}RANDOM FREQUENCY FOR VOICE
{SPACE}3 :rem 147
110 POKE54287,B:PRINT:PRINT"VOICE TWO FRE
QUENCY =";B :rem 231
120 FORN=1TO50:POKE54276,21:REM 21=17+4,
{SPACE}TURN ON TRI WAVE + RING MOD, N
O. HITS :rem 97
130 FORT=1TO300:NEXT:POKE54276,20:REM
{4 SPACES}TIME BETWEEN CHIMES:rem 251
140 GETA$:IFA$=""THENNEXT :rem 247
150 IFA$=" "THEN70 :rem 161

```

### Program 4: Tuba

```

10 POKE53280,0:POKE53281,0:PRINTCHR$(147)
CHR$(5):POKE650,128 :rem 189
20 S=54272 :rem 246
30 FORL=0TO24:POKES+L,0:NEXT :rem 20
40 POKE54277,108:POKE54278,96:REM ADSR :rem 183
50 POKE54295,1:REM RESONANT FILTER:rem 72
60 POKE54296,31:REM HIGH-PASS IS 79,
{5 SPACES}BANDPASS IS 45, LOW-PASS IS
{SPACE}31 :rem 220
70 FORT=1TO9:PRINT:NEXT:PRINTTAB(12)"TURN
UP VOLUME. :rem 148
75 PRINT:PRINTTAB(6):INPUT"HOW FAST (0=FA
ST 500=SLOW)";D :rem 202
80 PRINT:PRINTTAB(7)"HOLD ANY KEY TO HEAR
TUBA." :rem 116
90 READX,Y:IFX=-1THENEND :rem 36
100 POKE54273,X:POKE54272,Y:REM FREQ

```

### Program 5: Good Vibes

```

10 POKE53280,0:POKE53281,0:PRINTCHR$(147)
CHR$(5) :rem 242
20 FORZ=54272TO54295:POKEZ,0:NEXT:REM CLE
AR SOUND CHIP :rem 90
30 POKE54296,15:POKE54277,12:POKE54278,25
2:POKE54275,8:REM VOL, ADSR, HI PULSE :rem 230
35 PRINTCHR$(147):PRINT:PRINT"PLEASE TURN
UP VOLUME ON TV OR MONITOR. :rem 81
36 FORT=1TO2000:NEXT :rem 240
40 PRINTCHR$(147):PRINT:PRINT:PRINT"VOICE
1, 2, 3, 4 OR 5? :rem 47
50 GETA$:IFA$<>"1"THENIFA$<>"2"THENIFA$<>
"3"THENIFA$<>"4"THENIFA$<>"5"THEN50 :rem 173
60 IFA$="1"THENM=17:V=1 :rem 43
70 IFA$="2"THENM=33:V=2 :rem 44
80 IFA$="3"THENM=65:V=3 :rem 52
90 IFA$="4"THENM=129:V=4 :rem 104
100 IFA$="5"THENM=21:V=5 :rem 89
110 POKE54276,M:REM WAVEFORM :rem 199
120 PRINTCHR$(147) :rem 14
130 C=INT(50*RND(1))+1:D=INT(150*RND(1))+
1:E=INT(100*RND(1))+1 :rem 143
140 PRINT:PRINT"VOICE = ";V :rem 113
150 PRINT:PRINT:PRINT"HIT SPACE BAR TO PL
AY A RANDOM VIBE{5 SPACES}OVER AND OV
ER." :rem 149
160 PRINT:PRINT"REPEAT IF DESIRED." :rem 173
170 PRINT:PRINT"HIT ANY KEY TO HEAR SAME
{SPACE}SOUND ONCE AND LIST ITS VALUES
" :rem 122
180 PRINT:PRINT"HOLD ANY KEY DOWN TO CYCL
E THROUGH{6 SPACES}RANDOM SOUNDS." :rem 96
190 PRINT:PRINT"HIT 'V' TO CHANGE VOICES.
" :rem 251
200 IFPEEK(203)=64THENPOKE54273,0:POKE542
72,0:GOTO200 :rem 96
210 IFPEEK(203)=60THEN280 :rem 153
220 IFPEEK(203)=31THEN40 :rem 98
230 FORA=CTODSTEPE:POKE54273,A:NEXTA:FORB
=CTODSTEPE:POKE54272,B:NEXTB :rem 27
240 FORA=DTOCSTEP-E:POKE54273,A:NEXTA:FOR
B=DTOCSTEP-E:POKE54272,B:NEXTB :rem 118
250 PRINT:PRINT"LO FREQ=";C", HI FREQ=";D
", STEP=";E:POKE54273,0:POKE54272,0 :rem 154
260 IFPEEK(203)=64THEN260 :rem 160
270 GOTO120 :rem 101
280 FORA=CTODSTEPE:POKE54273,A:NEXTA:FORB
=CTODSTEPE:POKE54272,B:NEXTB :rem 32
290 FORA=DTOCSTEP-E:POKE54273,A:NEXTA:FOR
B=DTOCSTEP-E:POKE54272,B:NEXTB:GOTO20
0 :rem 128

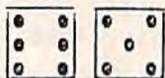
```

# PRODUCT MART

Pass Don't Pass Odds Come Bets

## "CRAPSMAN"

A  
n  
y



O  
d  
d  
s

C  
r  
a  
p  
s

## "CASINO CRAPS TUTOR" \*FOR THE C64\*

Regulation Bets and Payoffs  
For Up to 4 Players  
Color Graphics and Sound  
Playing and Tutor Modes  
Instruction Book Included  
Learn and Test Betting Systems

D  
o  
n'  
t

A  
n  
y



EMCEE SOFT CORP.  
P.O. BOX 402124  
MIAMI BEACH, FL 33140



S  
o  
l  
e  
v  
e  
n

\$29.95 + \$2 Postage  
Check or Money Order  
Specify DISK or CASSETTE  
(For educational purposes only)

C  
o  
m  
e  
F  
i  
e  
i  
d

Horn Bets Hardways Bets Place Bets

# wabash®

When it comes to  
Flexible Disks, nobody  
does it better than  
Wabash.

MasterCard, Visa Accepted.  
Call Free: (800) 235-4137



**PACIFIC EXCHANGES**  
100 Foothill Blvd.  
San Luis Obispo, CA  
93401 (In Cal. call  
(805) 543-1037)

## TEN - FORTY

### R. DILLON SOFTWARE

Not to be confused with other programs. TEN-FORTY is a complete easy to use tax program with over 12 features including:

- On screen facsimiles of forms and schedules
- Scrolling using function keys
- Built-in tax tables... does what if calculations
- Entire return is refigured for each change
- Prints reports
- Annual update available
- Schedules A, B, C, D, E, G, W, Plus...

Let your Commodore 64™ do your tax return and others for cash!!

\$35 postpaid check or money order

**R. DILLON SOFTWARE**  
BOX 262, SIDMAN, PA 15955  
(814) 487-4091

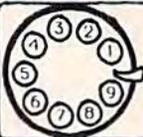
PA residents add 6% sales tax

## C-64

NOW AVAILABLE FOR  
THE FIRST TIME!!!!  
**A BULLETIN BOARD**  
THAT IS AFFORDABLE FOR  
THE HOBBIEIST, THE CLUB  
OR THE SMALL BUSINESS  
FOR UNDER \$20.00!!!!

A FULL FEATURE BBS  
DOWNLOAD FEATURES  
PASSWORD FEATURES  
SYSOP CHAT MODES  
E-MAIL SECTION  
MANY OTHER FEATURES  
ALL THIS FOR ONLY

**\$19.95**



**COMPUTER ENTERPRISES**  
P.O. BOX 3001  
FAIRFIELD, CA  
94533  
CHECK OR  
MONEY ORDER

**NEW!** **RELIEVE**  
**20-50% OF THE**

HEAT IN YOUR 1541 DISK DRIVE

INTRODUCING  
"EASY/COOL"



INSTALLED  
in 10  
Min.

enclose check for \$4.95 (postage included) / **ALMATT**  
7 GLENWOOD RD  
PLAINVIEW  
NEW YORK 11803

## Maxell Floppy Disks

The Mini-Disks  
with maximum quality.



Dealer inquiries invited. C.O.D.'s accepted.  
Call FREE (800) 235-4137.



**PACIFIC EXCHANGES**  
100 Foothill Blvd., San Luis  
San Luis Obispo, CA 93401.  
In Cal. call (800) 592-5935 or  
(805) 543-1037.

## COMMODORE -USER WRITTEN SOFTWARE-

Supporting all COMMODORE computers  
Written by users, for users  
★ GAMES ★ UTILITIES ★ EDUCATIONAL ★  
**VIC 20™**

Vic 20 collections #1 thru 12  
50+ programs per collection-Tape/Disk \$10.00 each

### COMMODORE 64™

64 collections #1 thru 12  
25+ programs per collection-Tape/Disk \$10.00 each

### PET®/CBM® Software Available

Other products available are

### P.D.L PROGRAM MANUAL - \$10.00

Each Vic 20 and Commodore 64 program will have instructions operation, use, commands and other information to make using it as easy as possible.

### DINSET™: Reset Switch

### SERIAL CABLES

### LOC-LITE™ Operation Status Indicator

Prices include U.S. shipping and handling only.

CHECK MONEY ORDERS, VISA and MASTERCARD

accepted. NO C.O.D.'s

Write For A Free Flyer Or Send 60¢ In Coin Or Stamps

For A Complete Catalog.

### "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

NEW! From FANTASY SOFTWARE

## Lost Planet

If you are tired  
of poorly written,

illogical adventure games,

LOST PLANET is a sure-fire cure!

This full length adventure hurls you into a startling world full of surprises at every turn. You will encounter the strange Cliffs of Jade, The Mighty Overlord Mordrake, the beguiling Weeping Brook, the awesome Iron Guard, the horrifying slave camps of Krell, the mystical Chamber of Truth and dozens of other wonderous sights along your journey.

Fantasy Adventures are bursting with color, sound and action and are designed to be totally logical, with no random deaths or endless mazes. This is adventuring the way it should be, with stories that will stretch your imagination to the limits! Written in machine language for fast response. Send check or money order for \$19.95 to:

**FANTASY SOFTWARE**  
360 W. Pleasantview Ave Hackensack NJ 07601

COMMODORE 64 TAPE AND DISK

NJ residents add 6% tax. Overseas add \$3.00

For C.O.D. add \$2.00 (Prompt Delivery)

# ALL THE BEST PRICES

## Commodore

M-801 Dot Matrix Parallel.....	\$219.00
MCS 801 Color Printer.....	\$499.00
1520 Color Printer/Plotter.....	\$129.00
1530 Databette.....	\$59.99
1541 Disk Drive.....	\$249.00
1600 Vlc Modem.....	\$59.99
1610 Vlc Term 40.....	\$59.99
1680 Auto Modem.....	\$89.99
1702 Color Monitor.....	\$249.00
DPS Daisywheel Printer.....	\$459.00
Desk Organizer Lock.....	\$49.99
1311 Joystick...each.....	\$5.99
1312 Paddles.....	\$11.99
1110 VIC 8K.....	\$42.99
1111 VIC 16K.....	\$69.99
1214 Super Expander.....	\$55.99

## Call for CBM 4 Plus



### PRINTERS

#### AXIOM

GP-100 Parallel.....	\$189.00
GP-550 Dual Mode.....	\$289.00

#### COMREX

ComWriter II Letter Quality.....	\$449.00
----------------------------------	----------

#### EPSON

RX-80, RX-Soft, RX-100, FX-80, FX-100 CALL	
--	--

#### JUKI

6100.....	\$449.00
-----------	----------

#### MANNESMAN TALLY

160L.....	\$589.00
180L.....	\$749.00
Spirit 80.....	\$289.00

#### NEC

8027 Dot Matrix.....	\$349.00
----------------------	----------

#### OKIDATA

82, 83, 84, 92, 2350, 2410.....	CALL
---------------------------------	------

#### OLYMPIA

Compact 2.....	\$479.00
Compact RO.....	\$509.00
Needlepoint Dot Matrix.....	\$329.00

#### SMITH CORONA

TP-1000.....	\$449.00
--------------	----------

#### SILVER REED

400 Letter Quality.....	\$279.00
500 Letter Quality.....	\$349.00
550 Letter Quality.....	\$459.00
770 Letter Quality.....	\$799.00

#### TOSHIBA

1340.....	\$799.00
1351.....	\$1389.00

### SOFTWARE

#### DESIGNWARE (64)

File.....	\$59.99	Crypto Club.....	\$29.99
Report.....	\$59.99	Trap-a-Zoid.....	\$29.99

#### PRECISION SOFTWARE

Superbase 64.....	\$59.99
-------------------	---------

#### BATTERIES INCLUDED

Paperclip w/Spell Pack.....	\$84.99
The Consultant DBMS.....	\$69.99

#### COMMODORE (64)

C-64 Reference Guide.....	\$18.99
EasyCalc.....	\$59.99
Easy Finance I, II, III, IV.....	\$10.99
Easy Mail.....	\$19.99

#### CBS (64)

Addition & Subtraction.....	\$16.99
Linear Equation.....	\$16.99
Multiplication & Division.....	\$16.99
Quadratic Equations.....	\$16.99

#### CONTINENTAL SOFTWARE (64)

The Home Accountant.....	\$49.99
--------------------------	---------

#### ELECTRONIC ARTS (64)

Pinball Construction.....	\$29.99
Cut & Paste.....	\$39.99
Hard Hat Mack.....	\$75.99

#### HES (64)

Games '84.....	\$19.99
Type 'N' Writer.....	\$19.99
Graphics.....	\$19.99
Cell Defense.....	\$19.99
Hor Writer 84.....	\$23.99

#### DISKETTES

#### MAXELL

5 1/4 MD-1.....	\$19.99
-----------------	---------

#### DENNISON

5 1/4 Elephant SS/SD EM-1.....	\$15.99
--------------------------------	---------

**SX-64 Portable.....\$749.00**  
**Commodore 64.....\$199**  
**CBM 4 Plus.....CALL**

### MONITORS

#### AMDEK

300 Green.....	\$129.00
300 Amber.....	\$149.00
New Color 300.....	\$269.00

#### BMC

1201 (12" Green).....	\$88.99
9191 Plus Color.....	\$249.00

#### NAP

12" Amber.....	\$95.99
----------------	---------

#### NEC

JB 1201 Green.....	\$139.99
JB 1205 Amber.....	\$149.99
JB 1215 Color.....	\$239.00

#### SAKATA

50-100 Color.....	\$289.00
50-1000 Green.....	\$129.00
50-1000 Amber.....	\$139.00

#### TAXAN

100 12" Green.....	\$125.00
105 12" Amber.....	\$119.00
210 Color.....	\$249.00

#### ZENITH

ZVM123 Amber.....	\$89.99
ZVM123 Green.....	\$84.99

# COMPUTER MAIL ORDER

west

canada

east



800-648-3311



Ontario/Quebec 800-268-3974  
Other Provinces 800-268-4559



800-233-8950



In NV call (702)588-5654

In Toronto call (416) 828-0866

In PA call (717)327-9575

Order Status Number: 588-5654

Telax: 06-218960

Order Status Number: 327-9576

PO Box 6689, Dept. 115

2505 Dunwin Drive, Unit 3E, Dept. 115

Customer Service Number: 327-1480

Statenline, NV 89448

Mississauga, Ontario, Canada L6L1T1

477 E. 3rd St., Dept. 115, Williamsport, PA 17701

No risk, no deposit on C.O.D. orders and no waiting period for certified checks or money orders. Add 3% (minimum \$5) shipping and handling on all orders. Larger shipments may require additional charges. NV and PA residents add sales tax. All items subject to availability.

www.commodore.ca

# AA COMPUTER EXCHANGE

"SOUTH'S LARGEST COMMODORE 64 DEALER"  
OVER 2000 ITEMS IN STOCK

COMPLETE REPAIR SERVICE FOR  
COMMODORE 64 AND C-64 PERIPHERALS

ORDER LINE: 1-800-447-0088  
INQUIRIES & FL: 904-388-0018

REQUEST OUR FULL CATALOG TODAY  
HERE ARE A FEW OF OUR MAIL ORDER PRICES

HARDWARE & ACC.	\$	PRACTICORP	\$
Plus4	299	64-Doctor	20
C-64 Computer	199	Practicalic 64	37
1541 Disk Drive	239	Practifile	37
1702 Color Monitor	239	PS: Spreadsheet	54
MSP Dual Drive	551	Wordpro 3+ w/Speller	54
HES Modem I	49		
Total Comm. Auto Modem	75	MIRAGE CONCEPTS	
Westridge Auto Modem	76	Data Base Manager	61
C-64 Power Supply	29	W/P Prof. Version	61
RS-232 Interface	30	W/P Pers. Version	28
Par. Printer Intfoc	30		
		SIGHT N' SOUND	
ACCESS SOFTWARE		Keyboard	34
Beach Head	24	Synthesizer	34
Raid Over Moscow	24	Processor	24
Master Composer	28	Rhythm Rocker	27
		Music Video (Thriller)	17
COMPUSERVE		On Stage	17
Starter Kit (5 hr)	23	Tune Trivia	24
Executive Kit (2 hr)	52		
Vidtex	28	SKYLES ELECTRIC	
		"1541 Flash" Disk Drive	69
KOALA		Speed-Up Kit	
Koala Pad	58		
Spider Eater	18	SUBLOGIC	
Programmers Tool Kit	24	Flight Simulator II	37
PRECISION SOFTWARE		MISC.	
Superbase	60	Doodle	29
		Inkwell's Flexidraw	129
BATTERIES INC.		Smart 64 Term	29
Paper Clip w/Spellpack	82	Teistar 64 Term (Cart)	34
The Consultant	68	Auto-Boot (Cart)	15
Home Organizer Ser. (ea)	20	Super Clone	39

2726 PARK ST., JACKSONVILLE, FL 32205

Orders with cashiers check, money order and VISA/MC shipped promptly • For personal/company checks allow 3 weeks for clearance • No CODs • For VISA/MC add 3% • Shipping charges extra, \$3.00 minimum • Prices may differ in AA stores • Florida residents add 5% tax • Prices subject to change without notice.

## WE WON'T PAY YOUR TAXES!

But **TAX MASTER** will help you compute them more QUICKLY and EASILY.

Be the Master of your Income Taxes with **TAX MASTER**

now available for your 1984 Federal Income Taxes for the Commodore 64 with single, twin, or dual disk drive and optional printer.

Features of **TAX MASTER**:

- **GUIDES** you in the **PROPER ORDER** through forms 1040, 4562 & Sched. A, B, C, D, E, and F.
- **PERFORMS ALL** arithmetic, **CORRECTLY!** You enter only the original data.
- **EASY CHANGE** of any entry, with instant **RECALCULATION** of the entire form.
- **TRANSFERS** numbers between forms.
- **CALCULATES** your taxes and **REFUND.** (Tax tables are included!)
- **SAVES** all your data to disk for future changes, re-use, or reference.
- **PRINTS** the data from each form.
- **MULTIPLE SCHEDULES** (for more than one business, farm, etc.) are supported.
- Data from **MANY DIFFERENT TAX RETURNS** may be stored on the same disk.

**TAX MASTER . . . . (DISK ONLY) . . . . ONLY \$24.00**

If you don't need all the schedules, get

**TAX MASTER JR**

- For VIC-20 with 24K expansion or Commodore 64, disk or tape.
- Form 1040, Schedules A and B.
- Disk or tape data storage & retrieval.

**TAX MASTER JR . . . . . ONLY \$19.00**  
SPECIFY DISK OR TAPE

INCLUDED WITH EACH PROGRAM:

- **COMPLETE INSTRUCTION MANUAL.**
- **DISCOUNT COUPON TOWARD THE PURCHASE OF NEXT YEAR'S UPDATED PROGRAMS**

Cost of these programs is **TAX DEDUCTIBLE.**

Add \$2.00 per order shipping & handling  
Maryland residents add 5% sales tax

Send check or money order to:

**MASTER SOFTWARE**

6 Hillery Court

Randallstown, MD 21133

General Overall Design™

-Presents-

GRAX™

## GRaphics eXtensions for C-64 BASIC V2

Draws Points and Lines

Draws & Fills Boxes & Circles

Plots in all Modes: Text, Bit Mapped Regular & Multi-Color

Supports Definable Character Sets

Includes Character Editor and

Two Sample Character Sets

Allows Easy Sprite Manipulation

Uses a Minimum of User Memory

Easy Access to Three Voice Sound

Includes a DGS Wedge + Much More

**No Copy Protection**

Multi-User & Commercial Licensing

Agreements Available

Disk \$14.29

Indiana Residents add 5% sales tax

All others add 5% S&H

(Comes to \$15 for everyone)

Send Check or Money Order to

General Overall Design™

P.O. Box 2039

West Lafayette IN 47906



HAVE YOU BEEN DRIVEN CRAZY  
TRYING TO BACKUP YOUR EXPENSIVE  
SOFTWARE? NOW YOU CAN RELAX!

**DITODISK-64™**

NEW

**VIC & 64**

DITODISK 64 is a utility program that has been tested and found to be capable of copying most protected disks produced by the major software houses. A notable attribute of this copy program is its lack of a large manual. There are no menus and no disk analysis routines. The screen prompts will be all that you'll need to get you through 99+% of your copying.

BE A COPY C A D (CASSETTE AIDED DUPLICATOR) NOW YOU CAN MAKE BACKUP COPIES OF ALL THE COSTLY, NON-SAVEABLE CASSETTE PROGRAMS YOU BOUGHT.

OUR BACKUP V1.0 UTILITY PROGRAM WILL LET YOU MAKE DUPLICATES THAT RUN.

BACKUP V1.0 WILL WORK WITH A STANDARD 5K UNEXPANDED VIC. MEMORY EXPANSION IS REQUIRED TO COPY PROGRAMS LONGER THAN 3K BYTES.

TAPE

**\$24.95**

ORDERING  
INFORMATION

ADD \$2.00 PER ORDER  
FOR SHIPPING.  
WE ACCEPT VISA, MASTERCARD,  
CHECKS, M.O.  
C.O.D. ADD \$3.00 EXTRA.

California Residents, Add 6%

Sales Tax to Orders

DISK ONLY  
**\$34.95**

THE BEST  
YOU CAN BUY

Dealers inquiries invited!!!



6201 C Greenback Lane

**SOFTWARE PLUS**

(916) 726-8793



Citrus Heights, CA 95610

# FAST DELIVERY

Call Us For  
Fast Service, Experience  
and Affordable Prices

## Software

**HOLIDAY SPECIAL**



**SUBLOGIC Flight Simulator**  
\$34.95

**MICROPROSE Solo Flight**  
\$24.95

**F-15 EAGLE**  
\$29.95

**INFOCOM**

Zork I, II, III, ea	'25
Suspended	'25
Starcross	'25
Deadline	'25
Sea Stalker	'25

**WORD PROCESSING**

*Special of the Month*

**PAPERCLIP with SPELLER \$69**

Easy Script	'45
Word Pro 64 & Speller	'58
EZ Spell	'17

**PROGRAMMING SERIES**

Assembler 64	'36
Logo	'52

**Simon Basic \$29**

Screen Editor	'19
Nevada Fortran	'39
Nevada Cobol	'39

**ACCOUNTING**

Home Accountant	'45
Tax Advantage	'45
General Ledger	'35
A/R, A/P, Payroll	'35
The Manager	'35

**DATA BASES**

Code Writer	'64
Mirage Database Mgr	'79
Super Base 64	'67

*Special of the Month*

**The Consultant**  
\$65.00

**SPREAD SHEET**

Multiplan	'63
Practicalc	'38

## Hardware



**1541 \$Call**

*Special of the Month*

**MSD DISK DRIVE**

SD1 Disk Drive \$335  
SD2 Disk Drive \$495

*Introductory Offer*

**INDUS GT DISK DRIVE \$CALLS**

**ELEPHANT DISK**

SS/SD \$15.50 SS/DD \$16.50

Verbatim, Datalife ..... \$19.95  
Maxell SS/DD ..... \$19.95  
Westridge 64 Modem .. \$77

*HOLIDAY SPECIAL*

**1650 AUTO MODEM \$87**

1520 Color Plotter	'109
MPS 801 Printer	'205
1530 Datasette	'64
1526 Printer	'265
Magic Voice Speech	'49.95
1011 RS 232 Interface	'49

**1702 Monitor \$CALL**

**ZENITH MONITORS**

122 Amber	'84
123 Green	'84

**COMPUTER COVERS**

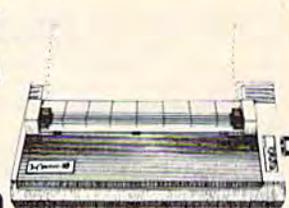
Features heavy duty canvas with vinyl interior waterproof

Reg. \$15<sup>95</sup> **\$6.99**

CMD 64	\$6.99
VIC 20	\$6.99
Disk Drive	\$6.99
Epson MX 80	\$7.99
Epson MX 80 FT	\$7.99
Okidata 92	\$7.99

## Printers

**GEMINI 10X**  
**\$239**



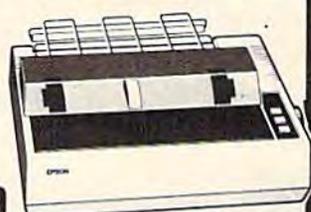
15X ..... \$349

Number one selling dot matrix printer, Gemini 10X, prints 120 cps bi-directionally, with logic-seeking printerhead control. There's both friction and tractor paper feed. Prints high resolution graphics.

**POWERTYPE... \$325.00**

**RADIX 10..... \$499.00**    **DELTA 10 ..... \$359.00**  
**RADIX 15..... \$555.00**    **DELTA 15 ..... \$495.00**

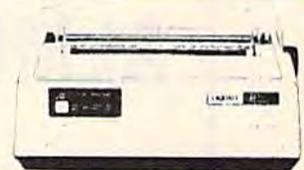
**EPSON RX80**  
**\$239**



**RX 80 FT..... \$279**

The most compatible dot matrix printer, prints 100 cps, bi-directionally. Call for RX-100, FX-80 and FX-100 prices.

**OKIDATA 92**  
**\$374**



The most advanced dot matrix printer, prints 100cps, bi-directionally. Correspondence quality at 40 cps.

**OKIDATA 93 .... \$599.00**    **OKIDATA 84 .... \$699.00**

**PRINTER INTERFACES**

Micrografix MW350	'69
Tymac Connection	'79
Cardco + G Interface	'66
Cardco B Interface	'39
Grappler CD	'102

**SURGE PROTECTORS**

1 Outlet	'14
4 Outlet	'38
6 Outlet	'69
6 Outlet & Noise Filter	'88



### Ordering & Payment Policy

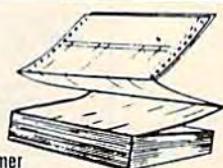
Prices reflect a cash discount. For C.O.D., Visa, and MasterCard add 3% Immediate delivery with certified check or wired funds. N.J. resident add 6%. Prices subject to change.

### Shipping

For shipping and handling add 3%. (\$3 minimum)  
Larger shipments require additional charge.

### Special Offer With Printer Purchase!

**STARTER PAK**  
For Gemini or Okidata  
300 Sheets & Ribbon **\$9.95**



FOR EPSON..... \$10.95    Limit One Per Customer

FOR INFORMATION CALL (609) 596-1944

**ORDER TOLL FREE (800) 992-3300**



P.O. Box 3354  
Cherry Hill, N.J. 08034

## COMPUTER ROAD ATLAS

TAKE TRIPS WITH COMPUTER LISTINGS SHOWING THE BEST ROUTE



Enter the departing city and the destination city. **ROADSEARCH** computes and prints the shortest route.

**ROADSEARCH** contains 406 cities/road junctions and 70,000 road miles. **ROADSEARCH-PLUS** (extra cost) also contains a **ROADMAP DEVELOPMENT SYSTEM** which lets you customize your roadmap with up to 50 towns/road junctions anywhere in North America.

**EASY TO USE.** Back-up copies allowed. Specify Commodore-64/disk or Apple II. **15 DAY MONEY-BACK GUARANTEE.**

**ROADSEARCH-PLUS** is \$74.95 and **ROADSEARCH** is only \$34.95. MD residents add 5% state tax. Ask your dealer or:

MAIL COUPON OR CALL TODAY

**Columbia Software** (301) 997-3100  
Box 2235E, Columbia, MD 21045

Please send me:

( ) **ROADSEARCH-PLUS** for \$74.95 for ( ) Apple II/IIe/IIc  
( ) **ROADSEARCH** for \$34.95 ( ) C-64 disk

Add \$1.50 shipping. If I am not satisfied, I may return it for a full refund.

( ) check ( ) Master Charge ( ) VISA

Card Number \_\_\_\_\_ Expiration Date \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

**ORDERS: 1-800-835-2246, EXT. 172**

## NEW! Universal Parallel Graphics Interface



- Built-in self-test with status report
- Optional RAM printer buffer
- Provides virtually total emulation of Commodore printers for compatibility with popular software
- ASCII conversion, total test, Emulate & transparent mode
- Fully intelligent interface that plugs into standard Commodore printer socket
- Exclusive graphic key-match function
- Switch selectable Commodore graphics mode for Epson, StarMicro, C.Itoh, Prowriter, Okidata, Seikosha, Banana, BMC, Panasonic, Mannesman Talley & others.

Micrografix MW-350 ..... \$129.00  
MW-302C Printer Interface also available at \$79.95



Dealer  
inquiries invited.

**Micro World Electronix, Inc.**  
3333 S. Wadsworth Blvd., # C105,  
Lakewood, CO 80227  
(303) 987-9532 or 987-2671

SATISFACTION GUARANTEED  
OR MONEY BACK

## 1984 TAX RETURN HELPER

Fast and easy  
income tax preparation.

- Form 1040 and Schedules A,B,C, D,E,G,SE,W and Form 2441
- Plus TAX DBASE - a data base program for tax related records that can be directly used in any of the forms (disk only)
- Enter and modify data on a screen copy of the form.
- Works like a spreadsheet - all the lines affected by a change are instantly updated.
- Automatic tax computation.
- Forms can be printed or saved.
- Price is tax deductible.  
Tape \$23 Disk \$33 (+ \$1.50 S&H). Specify C64 or VIC 20 (16K RAM).
- Previous users discount \$11 (disk), \$7 (tape).



**KSOFT CO.**  
845 WELLNER RD.  
NAPERVILLE, IL 60540  
(312) 961-1250



Dealer inquiries welcome

# ALMOST-FREE-SOFTWARE

## FOR VIC 20 AND COMMODORE 64

10 SELECTIONS FOR \$25 FOR THE VIC-20. ALL SELECTIONS RUN ON AN UNEXPANDED VIC-20 AND ARE SUPPLIED ON CASSETTE TAPE OR DISK.

PAK I	PAK II	PAK III	PAK IV	PAK V	CHECK YOUR SELECTION		
Tiny Kong	UFO Attack	Checkers	Budget	Speed Read	VIC 20	Disk	Cassette
Race	Robot Chase	Mastermind	Checkbook	Algebra	Pak I Games	<input type="checkbox"/> \$25.00	<input type="checkbox"/> \$25.00
Depth Charge	Firing Tank	Othello	Inventory	Math Drill	Pak II Games	<input type="checkbox"/> \$25.00	<input type="checkbox"/> \$25.00
Star Chase	Money Manager	Letter Squares	Car Cost	Long Division	Pak III Combination	<input type="checkbox"/> \$25.00	<input type="checkbox"/> \$25.00
Deflection	Ping Pong	Mini Golf	Mailist	Typing Drill	Pak IV Math Pak	<input type="checkbox"/> \$25.00	<input type="checkbox"/> \$25.00
Forest Driver	Pinball	Artillery	Mortgage Calc	Chemistry	Pak V Edu Pak	<input type="checkbox"/> \$25.00	<input type="checkbox"/> \$25.00
Arrow	Dam Buster	Blackjack	Date Book	Metric Drill	Individual Selection:		
Snake	Crazy Balloon	Dragon Maze	Recipe Filer	Capitals	1		\$9.95
Freighter	Moon Lander	Deadly Maze	Price List	Presidents	2		\$9.95
Star Wars	Invaders	Chuck A Luck	Monthly Report	Cash Register	3		\$9.95

INDIVIDUAL SELECTIONS ARE \$9.95

10 SELECTIONS FOR \$25 FOR THE COMMODORE 64. ALL SELECTIONS RUN ON THE COMMODORE 64 AND ARE SUPPLIED ON CASSETTE OR DISK.

PAK I	PAK II	PAK III	PAK IV	PAK V	PAK VI	CHECK YOUR SELECTION		
Backgammon	Alo	Monopoly	Decimals	Vectors	Grammar	Commodore	Disk	Cassette
Monopoly	Blackjack	Magic Piano	Percent	Planes	Antonyms	Pak I Games	<input type="checkbox"/> \$25.00	<input type="checkbox"/> \$25.00
Hangman	Concentration	Boyrhythm	Division	Lines	Definition	Pak II Games	<input type="checkbox"/> \$25.00	<input type="checkbox"/> \$25.00
U Boat	Quick Reaction	Time Card	Arithmetic	Conics	Speed Read	Pak III Combination	<input type="checkbox"/> \$25.00	<input type="checkbox"/> \$25.00
Murder Mansion	Let's	Titrate	Dart	Linear Systems	Q's and Z's	Pak IV Math Pak	<input type="checkbox"/> \$25.00	<input type="checkbox"/> \$25.00
Yahzee	Labyrinth	Murder Mansion	Fractions	Matrix Solution	Spelling	Pak V Math Pak	<input type="checkbox"/> \$25.00	<input type="checkbox"/> \$25.00
Master Mind	Frog	Microtyping	Powers	Triangle Solving	Mad Lib	Pak VI Combination	<input type="checkbox"/> \$25.00	<input type="checkbox"/> \$25.00
Draw Poker	Word Chess	Hawai	Integers	General Anova	Microtyping	Individual Selection:		
Sheet	Checkers	Ferry	Hex Demo	Heat Solver	Word Ladder	1		\$9.95
Limerock	Artillery	Date Book	Small Math	Root Finder	Computer Poetry	2		\$9.95
						3		\$9.95

INDIVIDUAL SELECTIONS ARE \$9.95

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
 Master Card# \_\_\_\_\_ Exp. Date \_\_\_\_\_  
 Visa # \_\_\_\_\_ Exp. Date \_\_\_\_\_  
 Check or Money Order Enclosed  
Signature \_\_\_\_\_

Send Check or Money Order, VISA and MasterCard Accepted

Mail Check or Money Order to:

**Almost-Free-Software**  
78 Main St.  
Littleton, N.H. 03561  
Or Call: (603) 444-2668 Days 9AM-5PM  
MONEY BACK GUARANTEE

FOR COMMODORE 64™

## TRACKMIMIC™

- Disk Back-up System for all disks including latest protection schemes.
- Used in conjunction with Diskmimic 5+™.
- Unique "Comparatrak" Method insures accurate reproduction.
- Fully Automatic Back-up.
- No Formatting necessary (formats as it writes the copy).
- Installs in 1541 drives.

Software & Hardware Included

**Only \$89.95**

## DISKMIMIC 5+™

- Copy Disks Automatically
- Backs up virtually all existing disks for Commodore 64™ including Copy Protected Versions. ALL AUTOMATICALLY.
- Supports 1541™ Drives.
- Don't be without back-up!
- Formats disk in less than 20 seconds.

Now 3 Times as Fast!  
BACKS UP ENTIRE COPY  
PROTECTED DISKS IN LESS  
THAN 8 MINUTES!!

**ONLY \$49.95**

A.I.D. CORP.

4020 HEMPSTEAD TURNPIKE  
BETHPAGE, NEW YORK 11714  
(516) 731-7100

Diskmimic 5+™ is a trademark of A.I.D. Corporation  
Commodore 64™ & 1541™ is a trademark of  
Commodore Electronics Ltd.

Shipping & Handling — \$1.50 each



# Software Shack

commodore

### GAMES

F-15 Strike Eag.	\$25.57	Summer Games (D)	\$27.57	Grst Baseball (D)	\$25.57
BreakDance (D)	\$25.57	Monster Trivia (D)	\$17.57	Trivia Fever (D)	\$28.57
Imp. Mission (D)	\$25.57	Pitstop II. (R)	\$27.57	Questron (D)	\$27.57
Hes Games (D)	\$27.57	Bungeling Bay (D)	\$22.57	Castle Dr. Creep (D)	\$22.57
Archon (D)	\$31.57	Music Const. (D)	\$31.57	M.U.L.E. (D)	\$31.57
One on One (D)	\$29.57	DeBug (D)	\$26.57	ARCHON II (D)	\$31.57
Hot Wheels (D)	\$27.57	Pittfall II (D)	\$24.57	Zeppelin (D-T)	\$24.57
Zaxxon (D-T)	\$28.57	Space Shuttle (D)	\$24.57	Millionaire (D)	\$28.57
Flight Sim. II (D)	\$38.57	Solo Flight (D)	\$27.57	Wizard (D)	\$29.57
Lode Runner (R)	\$26.57	Op. Whirlwind (D)	\$28.57	Spy vs Spy (D)	\$23.57
Boulder Dash (D)	\$27.57	Flip Flop (D)	\$17.57	Rails West (D)	\$28.57
Suspect (D)	\$30.57	Witness (D)	\$27.57	Seastalker (D)	\$27.57
Beachhead (D-T)	\$24.57	Raid on Moscow (D)	\$24.57	Miner 2049r (R)	\$26.57
Congo Bongo (D)	\$32.57	Tapper (D)	\$32.57	Spy Hunter (D)	\$32.57
Cstl Wolfstn (D)	\$24.57	Beyond Wolfstn (D)	\$24.57	Carrier Force (D)	\$45.57
Pro Tour Golf (D)	\$26.57	Ringside Seat (D)	\$26.57	Tigers in Snow (D)	\$26.57
Spelunker (D)	\$25.57	Ultima III (D)	\$39.57	MusiCalc 1 (D)	\$36.57
Stealth (D)	\$18.57	Pro Blackjack (D)	\$48.57	Dallas Quest (D)	\$23.57

### BUSINESS

Superbase 64 (D)	\$68.57	Practicalc (D)	\$38.57	MultiPlan (D)	\$68.57
Practifile (D)	\$38.57	Cut & Paste WP (D)	\$36.57	Fleet Sys. 2 (D)	\$68.57
C.P.A. (D)	\$57.57	WriteNow WP (R)	\$36.57	PaperClip WP (D)	\$66.57
Net Worth (D)	\$49.57	Financial CkBk (D)	\$38.57	FileWriter (D)	\$37.57
Micro Cookbk (D)	\$23.57	Super Text (D)	\$62.57	Homeword (D)	\$58.57

### EDUCATIONAL

Step by Step (D)	\$48.57	C-64 Tutor (D-T)	\$22.57	Rocky's Boots (D)	\$38.57
Wiztype (D)	\$25.57	Mastertype (D)	\$27.57	Chatterbee (D)	\$28.57
Word Wizard (D)	\$25.57	Jggl's Rainbow (D)	\$22.57	Moptown Hotel (D)	\$22.57
Evelyn Wood (D)	\$52.57	Anim. Station (D)	\$62.57	The Ranch (R)	\$24.57
TechSketch LP (D)	\$38.57	Total Health (D)	\$21.57	Doodle (D)	\$27.57

If it's for the C-64 we have it!!

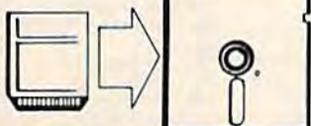
If you don't see what you want—Call and ask for it! You Will Be Glad You Did!!!

## SOFTWARE SHACK

449 EAST 146th STREET  
CLEVELAND, OHIO 44110

216/953-9141

SHIPPING AND TERMS: Add \$3.00 per order. No COD. Cash, certified check or money order (personal checks allow 3 wks. to clear). Ohio residents add 5.5% sales tax. Visa or MasterCard phone orders only.



# CBUS™

THE CARTRIDGE BACKUP SYSTEM  
FOR THE COMMODORE 64.

**CBUS I** lets you copy any cartridge to disk. Many cartridge images can be run from disk (software listings provided) with no changes. Some cartridge images may require modifications.

**CBUS II** will run ANY cartridge image without modification. **CBUS II** is a true cartridge emulator and will run cartridges with even the heaviest of copy-protection.

CBUS I \$34.95      CBUS I deluxe\* \$49.95  
CBUS II \$84.95      CBUS II deluxe\* \$99.95

\*Deluxe systems include diskette with all necessary programs)

CBUS combo \$119.95

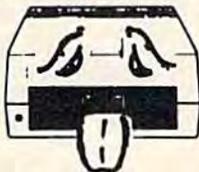
(includes CBUS I, CBUS II and diskette)

Add \$3.00 for shipping and handling. MC, Visa, check accepted.

R.J. Brachman Associates, Inc.  
P.O. Box 1077, Havertown, PA 19083  
ORDERS ONLY — (215) 622-0706  
TECH INFO — (215) 622-5495

Commodore 64 is a registered trademark of Commodore Electronics, Ltd.

## HAVE YOU GOT THE 1541 BLUES?



WE'VE GOT THE  
PERMANENT FIX!!

Send us your sick 1541 and a check for \$89.95 plus 5.00 shipping and we'll not only align your drive, we'll fix it so it will STAY THAT WAY.

We guarantee it for 6 months.

We also service the complete  
COMMODORE COMPUTER LINE  
with a 48-hour turn-around time.

C-64	50.00
1541	65.00
1702	85.00
DATASETTE	35.00
1525	50.00
1526	75.00
MPS801	50.00

CALL FOR REPAIR PRICES ON ALL  
OTHER COMMODORE EQUIPMENT

We also repair OKIDATA PRINTERS  
and TELEVIDEO COMPUTERS

Please send \$5.00 for S/H  
Our BBS No. is 919-765-3892

TRIAD COMPUTERS  
3068 Trenwest Dr.  
Winston-Salem, NC 27103 (919)765-0433

300 "N" AVE.  
P.O. BOX 454  
PLANO, TEXAS 75074

COMPARE  
OUR LOW PRICES  
ON POPULAR COMPUTER  
ACCESSORIES, MONITORS  
AND PERIPHERALS by **MTR**

8401 UHF/VHF TV MONITOR TUNER	\$85.85
EV-2114 COMPOSITE COLOR MONITOR	
Green Screen Switchable. 6 Front	
Controls. 13" Diag. picture	\$229.95
EV-1251C 11" 80 Col. Composite Green	
or Amber. Swivel included	\$134.95
SWIVEL BASES FOR MONITORS. Tilt, Turn &	
Lock. Standard	\$19.95, Large
	\$25.95
DATA CASSETTE for C-64 and VIC-20.	
Ready to connect	\$39.95
CABLES - 6' PRINTER/DRIVE for	
Commodore. 6 pin DIN each end.	\$9.95
3' UNIVERSAL MONITOR CABLE. 5 pin	
DIN to 4 RCA plugs & adapter	\$7.95
DUST COVERS. Brown vinyl with cloth backing	
For Commodore Computers	\$3.95
For Commodore Disk Drives	\$3.95

\$2.00 BRINGS YOU OUR FULLY ILLUSTRATED BROCHURE BY FIRST CLASS MAIL, WITH \$2.00 REFUND CERTIFICATE—GOOD ON ANY ORDER. SEND TODAY!

Prices do not include shipping, handling or insurance. Ask for complete copy of order terms.

**E MART, INC.** Dept. "G", P.O. Box 454  
Plano, Texas 75074

ORDER TOLL FREE 1-800-631-1112

IN TEXAS CALL 214-423-4199



### BETTER KEYBOARD UTILITY.

A simply elegant solution—blank "Cheat Sheets" give you the keyboard commands you need, instantly, for any program.

You've got the best personal computer in the world and lots of software to run on it. But unless you work with each of these programs every day, how do you keep the commands straight? "F5" in one program means something else in another. Our solution? Simple. A pack of 12 cards die cut to fit your keyboard. Ready for YOU TO FILL IN. Have all of your program commands right where you want them... on your keyboard. Order a couple of packs today.



**\$12.95** set of 12 custom die cut sheets **\$19.95** set of 24 custom die cut sheets

### BETTER DUST PROTECTION

**FOR VIC & COMMODORE**  
Choose an attractive static-free cover for your keyboard, monitor or complete system.

Don't confuse these attractive covers with cheap static-filled clear plastic covers. These deluxe covers are custom-fitted to each element of your Commodore, and are sewn, not glued. The interior of the upper portion of the covers is made of leather-like material lined with a special soft fabric liner to prevent scratching. Soft camel color fits beautifully in any office or home. Available: computer cover (\$9.95), monitor cover (\$12.95), 1541 disk drive cover (\$6.95), dataset cover (\$7.95). Printer covers (specify type) \$12.95.



**\$7.95 to \$12.95**

### We Can Solve All Your Commodore Color Problems

Unique Problem Solvers for Older Commodores (with 5 Pin Monitor Din Plug).

**The Interference Stopper.** A new kit that installs in minutes with two simple solder connections. Best results when combined with items below. Absolutely stops 90% of the RF interference.

**\$15.95**

**The Color Sharpener.** Use if your "old 64" is hooked up to a TV. Just plug into the monitor plug, and the color and contrast immediately improve. Dramatically crisp letters. Great graphics.

**\$18.95**

**The NEW Color Sharpener CABLE.** Use if your "old 64" is hooked up to a monitor. A new 2 prong cable, with a Color Sharpener built in for your monitor.

**\$24.95**

**The Monitor "Improver."** If you have a Commodore 1701 monitor, this cable (3 prong) gives you a picture you won't believe. Better than the cable Commodore built. (Also hooks your "old 64" to the 1702.)

**\$24.95**

### RESET SWITCHES

2 Versions for Every Need

At last, the "needed" switch for Vic-20 and Commodore. Commodore left out a reset switch. Our switches will return control to you every time.

**Version 1—Install It Yourself.** Requires two simple solder connections, and drill a small hole. Works great. Saves money.

A steal at **\$9.95**

**Version 2—Use in any Commodore Application.** A special buffered flow-thru version, that plugs in, gives a "Y" connection that provides your computer with another serial port and a reset switch. The ultimate in versatility, convenience and simple installation. No soldering.

Introductory priced at **\$19.95**

### Is Your Commodore Disk Drive Hot and Bothered?

Most of them are, you know. They suffer from read and write problems frequently. We've been told that most of these problems occur because the drive has overheated. Throwing the head out of alignment.

Our inexpensive muffin fan sits on top of the disk drive and blows cooling air through it.

We went one step further. We built a surge protector into a second fan model.

**\$79.95** Fan with Surge protector **\$54.95** Muffin fan

### Order Today!

Please send me the following:

(Please describe fully. Send U.S. funds only.)

Your satisfaction guaranteed or your purchase price refunded.

Qty.	Item	Price
_____	_____	\$ _____
_____	_____	\$ _____
_____	_____	\$ _____

Total for Merchandise \$ \_\_\_\_\_  
Shipping and Handling (foreign orders add \$5.00) \$ **2.00**

5% State Tax (WI Residents only) \$ \_\_\_\_\_  
**TOTAL ENCLOSED** \$ \_\_\_\_\_

Please charge to  MasterCard  VISA  
Number \_\_\_\_\_  
Expires \_\_\_\_\_

SHIP TO:  
Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State/Zip \_\_\_\_\_

Mailed by **Bykes & Pieces, Inc.** 550 N. 68th St.  
Wauwatosa, WI 53223 / (414) 257-1234

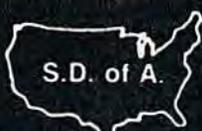


# Software Discounters of America

For Orders Only 1-800-225-SOFT\*

Inquiries and PA 412-361-5291

- Free shipping on orders over \$100 in continental USA
- No surcharge for VISA/MASTERCARD



Open Saturday

### Commodore 64 Software

ACCESS	Get Rich Series	Call	Death Caribbean (D)	\$23	Knights in Desert (D)	\$25
Beach Head (T or D)	Home Accountant (D)	\$47	Dino Eggs (D)	\$23	Pro Tour Golf (D)	\$25
Beach Head II	Call		Heist (D)	\$21	Questron (D)	\$25
Raid Over Moscow (T or D)	\$25		Bruce Lee (T/D)	\$23	RDF 1985 (D)	\$25
Scrolls of Abaddon (D)	\$23		Conan the Barbarian (T or D)	\$25	Rails West (D)	\$25
ACTIVISION	Dallas Quest (D)	\$23	F-15 Strike Eagle (T or D)	\$23	Ringside Seat (D)	\$25
Decathlon (D)	\$25		Hellcat Ace (T or D)	\$19	<b>SUBLOGIC</b>	
Designers Pencil (D)	\$25		Nato Commander (T or D)	\$23	Flight Simulator II (D)	\$35
Ghostbusters (D)	\$25		Checker (D)	\$47	Night Mission Pinball (D)	\$21
Pitfall II (D)	\$25		Mancopter (T or D)	\$19	<b>SYNAPSE</b>	
Space Shuttle (D)	\$25		Mr. Do (T or D)	\$25	Blue Max (T or D)	\$21
Zenji (D)	\$25		Pac Man (T/D)	\$19	Encounter (T or D)	\$17
<b>ARTWORX</b>			Pole Position (T/D)	\$19	Necromancer (T or D)	\$21
Bridge 4.0 (T or D)	\$16		Poonyan (T/D)	\$19	Pharaoh Curse (T or D)	\$21
Ghost Chasers (D)	\$16		<b>EPPYX</b>		Sentinel (T or D)	\$21
Strip Poker (D)	\$21		Dragonriders Pern (T or D)	\$25	Slamball (T or D)	\$21
Female Data Disk	\$18		Fast Load (R)	\$25	Zaxxon (T or D)	\$25
Male Data Disk	\$18		Gateway Apsal (R)	\$25	<b>TIMWORKS</b>	
<b>BATTERIES INCLUDED</b>			Impossible Mission (D)	\$23	Acct Payable (D)	\$39
Audio/Video			Jumpman (T or D)	\$25	Acct Receivable (D)	\$39
Catalog (D)	\$21		Monty's Scrabble (D)	\$25	Cave Word Wizard (D)	\$23
Buscard II	\$135		Pitstop II (D)	\$25	Data Manager (T or D)	\$17
Checkbook (D)	\$21		Robots of Dawn (D)	\$25	Data Manager 2 (D)	\$33
80 Column Card	\$115		Summer Games (D)	\$25	Evelyn Wood Reader (D)	\$47
Elect. Address Book (D)	\$21		Temple Apsal (T or D)	\$25	Reeder Ledger (D)	\$39
Home Inventory (D)	\$21		World's Greatest Baseball (D)	\$23	Inventory Mgr. (D)	\$39
Home Pak (D)	\$33		<b>FIRST STAR</b>		Money Mgr. (T or D)	\$17
Mail List (D)	\$21		Astro Chase (D)	\$17	Programming Kit 1, 2 or 3 (T or D)	\$17
Paperclip (D)	\$59		Bristles (T or D)	\$13	Sales Analysis (D)	\$39
Paperclip w/ Spellpak (D)	\$79		Flip Flop (T or D)	\$13	Word Writer (D)	\$33
Photos/Slides (D)	\$21		Spy vs. Spy (T or D)	\$19	<b>TRILLIUM</b>	
Recipes (D)	\$21		<b>FISHER PRICE</b>		Amazon (D)	\$23
Spellpak (D)	\$33		Alpha Build (R)	\$19	Dragonworld (D)	\$23
Stamps (D)	\$21		Hop Along Counting (R)	\$19	Fahrenheit 451 (D)	\$23
The Consultant (D)	\$67		Number Tumbler (R)	\$19	Rendezvous w/ Rama (D)	\$23
*bonus w/ purchase of three B.I. titles			Sea Speller (R)	\$19	Shadowkeep (D)	\$23
<b>BOOKS</b>			<b>FUTUREHOUSE</b>		<b>TRONIX</b>	
Book of Adv. Games	\$16		CPA (D)	\$47	Chatterbee (D)	\$25
64 Color Graphics	\$12		Light Pen (D)	\$19	Pokersam (D)	\$19
Shortcut Through Adventureland II (Infocom)	\$9		Light Pen w/Peripheral Vision (D)	\$39	S.A.M. (D)	\$39
<b>BRODERBUND</b>			<b>HBJ</b>		<b>WAVEFORM</b>	
Bank St. Writer (D)	\$33		Computer SAT (D)	\$59	Musical 1 (D)	\$35
Castles Dr. Creep (D)	\$21		HES		Musical 2 or 3 (D)	\$23
Championship Loderunner (D)	\$23		Hes Games 84 (D)	\$23	Colortone Keyboard	\$59
Karateka (D)	\$21		Hes Modem I	\$44	<b>WINDHAM CLASSICS</b>	
Mask of Sun (D)	\$25		Hes Mon 64 (R)	\$25	Below the Root (D)	\$19
Music Shop (D)	\$33		Millionaire (D)	\$25	Gulliver's Travels (D)	\$19
Operation Whirlwind (D)	\$25		Multiplan (D)	\$59	Swiss Family Robinson (D)	\$19
Print Shop (D)	\$29		<b>INFOCOM</b>		Wizard of Oz (D)	\$19
Raid on Bungeling Bay (D)	\$21		Cutthroats (D)	\$23	<b>ACCESSORIES</b>	
Serpent's Star (D)	\$25		Enchanter (D)	\$23	BASF, SS, DD	\$15 Bx
Spelunker (D)	\$21		Hitchhiker's Guide to the Galaxy (D)	\$23	BASF, DS, DD	\$19 Bx
Stealth (D)	\$21		Infidel (D)	\$23	Cardco Printer Int.	Call
Whistler's Brother (D)	\$19		Planetfall (D)	\$23	CompuServe Starter Kit (5 hrs)	\$25
<b>CBS</b>			Seastalker (D)	\$23	CompuServe Vidtex	\$25
Adventure Master (D)	\$29		Sorcerer (D)	\$26	Disk Case (holds 50)	\$12
Astro Grover (R)	\$25		Starcross (D)	\$29	Disk Case (holds 100)	\$19
Big Bird Funhouse (R)	\$25		Suspended (D)	\$29	Disk Drive Cleaner	\$9
Dinosaur Dig (D)	\$33		<b>KOALA</b>		Indus GT Disk Drive	Call
Ernie's Magic Shapes (R)	\$19		Touch Tablet w/Painter (D)	\$65	Modem Special	Call
Letter Go Round (R)	\$25		Touch Tablet w/Painter (R)	\$75	Panasonic KXP 1090	Call
Math Series	Call		Field of Fire (D)	\$25	Sakata 13" Color Monitor	\$229
Mastering SAT (D)	\$99		50 Mission Crush (D)	\$25	Super Sketch Graphics Tablet	\$39
Murder by Dozen (D)	\$23		Fortress (D)	\$23	Wico Boss	\$12
Timebound (D)	\$19		<b>CONTINENTAL</b>		Wico Bat Handle	\$19
FCM (D)	\$33		<b>MICROLAB</b>		Wico Three-Way	\$23
			Boulder Dash (D)	\$21	Wico Trackball	\$29

P.O. BOX 278—DEPT CG—WILDWOOD, PA 15091

\*Ordering and Terms: Orders with cashier check or money order shipped immediately. Personal/company checks, allow 3 weeks clearance. No C.O.D.'s. Shipping: Continental U.S.A.—Orders under \$100 add \$3; free shipping on orders over \$100. PA residents add 6% sales tax. AK, HI, FPO-APO—add \$5 on all orders. International—add 15% or 15% of order whichever is greatest. Defective merchandise will be replaced with same merchandise—NO CREDITS! Return must have authorization number (412) 361-5291. Prices subject to change without notice. Order today, get it tomorrow. Overnight delivery is just \$17.50—software orders only in Continental U.S.A.

# Lycy Computer Marketing & Consultants

"PEOPLE WHO KNOW WHAT THEY WANT AND KNOW HOW TO USE IT RECEIVE THE LOWEST PRICES FROM US"

## MONITORS

### TAXAN

210 Color RGB	\$259 00
100 Green	\$115 00
105 Amber	\$125 00
400 Color RGB	\$295 00
410 Color RGB	\$349 00
420 Color RGB-IBM	\$459 00
121 Green-IBM	\$145 00
122 Amber-IBM	\$149 00

### ZENITH

ZVM122A Amber	\$ 95 00
ZVM123G Green	\$ 85 00
ZVM124 Amber-IBM	\$129 00
ZVM131 Color	\$275 00
ZVM133 RGB	\$389 00
ZVM135 Composite	\$449 00
ZVM136 HI RES Color	\$589 00

### GORILLA

12" Green	\$ 82 00
12" Amber	\$ 89 00

### AMDEK

300 Green	\$139 00
300 Amber	\$149 00
310 Amber-IBM	\$159 00
Color I Plus	\$259 00
Color 4T-IBM	\$589 00

### NEC

JB 1260 Green	\$ 99 00
JB 1201 Green	\$145 00
JB 1205 Amber	\$145 00
JC 1215 Color	\$255 00
JC 1216 RGB	\$399 00
JC 460 Color	\$349 00

### SAKATA

SC-100 Color	\$229 00
STSI Tilt Stand	\$ 35 00
SG 1000 Green	\$ 99 00
SA 1000 Amber	\$109 00

## ★ DISK DRIVES ★

### INDUS

Commodore	CALL	SD1 DRIVE	\$309 00
		SD2 DRIVE	\$499 00

### MSD

## MIGHTY MO MODEMS Westridge

\$79.95

\$79.95



## DISKETTES

### SKC

SKC-SSSD	\$14 75
SKC-SSDD	\$17 75
SKC-DSDD	\$21 75

### ELEPHANT

5 1/4"SSSD	\$15 99
5 1/4"SSDD	\$17 99
5 1/4"DSDD	\$22 99

### MAXELL

5 1/4"MD-1	\$19 95
5 1/4"MD-2	\$24 99

## ★ SAVE ON THESE IN-STOCK PRINTERS

### MANNESMANN TALLY

SPIRIT 80	\$269 00
MTL-160L	\$549 00
MTL-180L	\$749 00

### JUKI

Juki 6100	\$389
Tractor kit	\$119

### Epson

FX80	\$239
RX80FT	\$279
RX100	\$379
FX80	\$389
FX100	\$559
JX80	\$529
LQ1500P includes Kit	\$1089
LQ1500S	\$1149

### Citoh

Prowiter 8510A	\$309
8510BC2	\$429
8510BP1	\$349
8510SP	\$449
8510SR	\$499
8510SCP	\$519
8510SCR	\$569
1550P	\$499
1550BCD	\$589
A10-20P	\$469
F1040PU or RDU	\$899
F1055PU or RDU	\$1199

### PANASONIC

1090	\$229
1091	\$289
1092	\$439
1093	\$CALL

### BLUE CHIPS

M12010	\$279 00
M12010 C-64	\$279 00
D4015	\$1399 00

### OKIDATA

80	\$159
82A	\$299
83A	\$549
84	\$669
92	\$369
93	\$579

### LEGEND

880	\$259 00
1000	\$279 00
1200	\$299 00
1500	CALL
1081	CALL

PRINTER INTERFACING Available



### NEC

NEC 8025	\$699 00
NEC 8027	\$359 00

### STAR MICRONICS

Gemini 10x	\$239
Gemini 15x	\$355
Delta 10	\$339
Delta 15	\$449
Radix 10	\$499
Radix 15	\$589
Powertype	\$319
Sweet p 100	\$CALL
STX 80	\$CALL

## GEMINI 10X

\$239 ★

### CARDCO

LO1	\$449 00
LO3	\$339 00
PRINTER INTERFACE	\$39 75
PRINTER INTERFACE W/ FULL GRAPHICS	\$65 75

### Batteries Included

Paper Clip	\$59.95
Spell Pak	\$34.95
Consultant	\$64.95
Paper Clip with Spell Pak	\$79.95
Home Pak	\$34.95
BUS CARD	\$139.95
80 Column Board	\$139.95

### SYNAPSE-64

Blue Max	\$22 75
Shamus	\$22 75
Shamus II	\$22 75
Zeppelin	\$22 75
Zaxxon	\$22 75

### CONTINENTAL-64

Home Accountant	\$44 75
Tax Advantage	\$35 75
C-64 Users Encyclopedia	\$12 50

### SUB LOGIC-64

Flight Simulator II	\$32 75
Night Mission Pinball	\$22 75

### Timeworks

Inventory	\$32 75
Sales	\$32 75
Accts. Rec	\$32 75
G. Ledger	\$39 75
Data Mgr	\$14 75
Checkbook	\$14 75
Star Battle	\$14 75
Cave of Word	\$18 75

### MICROPROSE-64

Solo Flight	\$22 75
NATO	\$22 75
Spitfire	\$19 95
F-15 Strike	\$22 75
Air Rescue	\$22 75

### CARDCO-64

C/P/G Printer Interface	\$69 75
C/P/B Printer Interface	\$39 75
CK/1 Numeric Keypad	\$34 75
DC/1 Cassette Recorder	\$39 75
CB/5 5-Slot Expansion	\$54 00
CR/1 Light Pen	\$29 75
CE/1 Cassette Interface	\$29 75
C/O2 Write Now	\$34 75
D/O1 Mail List	\$26 75
D/O4 Spell Now	\$26 75

### PERSONAL PERIPHERALS-64

Super Sketch Graphics	\$39 95
Joystick	\$7 75

### INNOVATIVE CONCEPTS

FLIP-N-FILE 10	\$3 75
FLIP-N-FILE 15	\$8 95
FLIP-N-FILE 25	\$18 95
FLIP-N-FILE 50	\$17 75
FLIP-N-FILE (ROM HOLDER)	\$17 75

### BIB

DISK DRIVE CLEANER	\$12 75
COMPUTER CARE KIT	\$19 75

### STRATEGIC SIMULATIONS

Baseball	\$22 75
Germany 1984	\$32 75
50 Missions	\$21 75

# TOLL FREE 1-800-233-8760



TO ORDER



CALL TOLL FREE

800-233-8760

Customer Service 1-717-327-1825 Jersey Shore PA 17740

or send order to

Lycy Computer  
P O Box 5088

### RISK FREE POLICY

In-stock item shipped within 24 hours of order. No deposit on C.O.D. orders. Free shipping on prepaid cash orders within the Continental U.S. PA residents add sales tax. APO, FPO, and International orders add \$5.00 plus 3% for priority mail service. Advertised prices show 4% discount for cash, add 4% for Master Card or Visa. Personal checks require 4 weeks clearance before shipping. All items subject to change without notice.



COMPUTER  
CENTERS  
OF AMERICA

# USER FRIENDLY PRICES! (BELOW WHOLESALE)



commodore  
**VIC 1541  
DISC DRIVE**  
**199<sup>95</sup>**



commodore  
**64**  
**189<sup>95</sup>**  
C-16 & C+4 IN STOCK!

**2 FREE Software Cartridges**  
with Purchase of Commodore 64  
Call for Details until 1/15/85



commodore  
**NEW  
802  
PRINTER**  
**559<sup>95</sup>**



commodore  
**1702  
MONITOR**  
**199<sup>95</sup>**

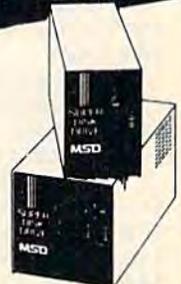


commodore  
**SX64  
PORTABLE**  
**559<sup>95</sup>**

**ALL CARDCO PRODUCTS  
IN STOCK & ON SALE!**

## Diskettes

BASF	13 <sup>95</sup>
Sentinel Color	16 <sup>95</sup>
Scotch	14 <sup>95</sup>
Maxell	14 <sup>95</sup>



**New! MSD  
Super Disc II**  
Now On Sale  
**449<sup>95</sup>**  
Single Drive 249<sup>95</sup>

## Monitors



NEC	199 <sup>95</sup>
Pan 1300 RGB & Comp.	289 <sup>95</sup>
EV 2114 14" Color to Green	189 <sup>95</sup>
Amdek III	124 <sup>95</sup>
BMC Green	69 <sup>95</sup>

## Printers

Okimate	Call
Gemini 10X	239 <sup>95</sup>
Gemini 15X	399 <sup>95</sup>
Silver Reed 400	249 <sup>95</sup>
Silver Reed 500	379 <sup>95</sup>
Silver Reed 550	409 <sup>95</sup>
Brother 15X	379 <sup>95</sup>
Brother 25X	514 <sup>95</sup>
Juki 6100	399 <sup>95</sup>
Panasonic 1090	249 <sup>95</sup>

## Interfaces

Star	Call
Tally	Call
Microworld	99 <sup>95</sup>
Cardco G+	Call

## Modems



Hayes-300	Call
Hayes-1200	Call
Comm 1650	Call
Hes II	Call

## Cassette Recorders



Comm CN-2	59 <sup>95</sup>
Third Party	39 <sup>95</sup>

**TO ORDER: CALL TOLL FREE—WE'RE PROUD OF OUR PRICES—SATISFACTION GUARANTEED**  
**1-800-631-1003**  
IN NEW YORK STATE CALL  
TOLL FREE 1-800-221-2760  
OR 516-249-2120



Computer Centers of America  
31 East Mall  
Plainview NY 11803

**We're Reliable! 18 years of service at these  
locations: Plainview, Syosset, New  
Hyde Park, West Hempstead,  
Huntington, Patchogue**

Check Money Order MC or VISA accepted  
No additional charge for MasterCard and Visa  
Call for shipping and handling information NYS residents add applicable sales tax  
All goods are new and include factory warranty Dealers Welcome!  
Prices and availability are subject to change without notice  
NYS residents must purchase service contracts on hardware in retail outlets.  
Original ad must accompany purchase in retail outlets.  
Prices may vary in retail stores.

### ACCESS

Neutral Zone-D/T	20 95
Spritmaster-D/T	20 95
Beachhead-D/T	20 95
Master Composer-D	23 95

### ACCESSORIES

WICO Joysticks	Call
Flip 'n' File-D	20 95
Flip 'n' File-Cart	20 95
Joyensor	Call
WICO Trakball	37 95
KRAFT Joystick	15 95

### ATARIISOFT

Battlezone-Cart	24 95
Centipede-Cart	24 95
Defender-Cart	24 95
Dig Dug-Cart	24 95

Donkey Kong-Cart	24 95
Galaxian-Cart	24 95
Joust-Cart	24 95
Jungle Hunt-Cart	24 95
Moon Patrol-Cart	24 95
Ms. Pac-Man-Cart	24 95
Pac-Man-Cart	24 95
Pole Position-Cart	24 95
Robotron: 2084-Cart	24 95

### CBS SOFTWARE

Argos Expedition-D	29 95
Charles Goren's Bridge-D	49 95
Coco Notes-D	19 95
Ducks Ahoy-D	23 95
Ernie's Magic Shapes-D	23 95
Mastering the SAT-D	104 95
Movie Musical	
Madness-D	24 95
Murder by the Dozen-D	23 95

Peanut Butter Panic-D	24 95
Sea Horse Hide 'n Seek	24 95
Success Decimals	
(Add/Subt)-D/T	14 95
Success Decimals	
(Mult/Div)-D/T	14 95
Success Fractions	
(Add/Subt)-D/T	14 95
Success Fractions	
(Mult/Div)-D/T	14 95
Timebound-D	24 95
Webster Word Game-D	24 95

### COMMODORE

Program Ref. Guide	19 95
Assembler-D	17 95
Easy Finance I, II, III, IV-D	19 95
Easy Calc-D	64 95
Easy Mail-D	17 95
Easy Script-D	39 95
Easy Spell-D	19 95

Logo-D	49 95
The Manager-D	37 95
General Ledger-D	37 95
Accts. Rec. D	37 95
Accts. Pay. D	37 95
Magic Desk-D	52 95
Zork I, II or III-D	29 95
Suspended-D	29 95
Starcross-D	29 95
Deadline-D	29 95

### HESWARE

Super Zaxxon	22 95
64 Forth-Cart	40 95
6502 Profess Dev Sys-T	19 95
Coco-D/T	26 95
Factory-D	16 95
Finance Manager-D	48 95
Ghost Manor/Spike Pk-D	18 95
Graphics Basic-D	23 95
HES Cat-D	18 95
HES Font-Cart	15 95
HES Games '84-D	23 95
HES Kit-Cart	33 95
HES Mon-Cart	25 95

HES Writer-Cart	29 95
Microsoft Multiplan-D	65 95
Minnesota Fats' Pool-Cart	19 95
Missing Links-D	19 95
Mr. TNT-Cart	19 95
Omnewriter/ Omnispell-D	49 95
Root n' Tootin-Cart	23 95
Synthesound-D	15 95
The Pit-Cart	19 95
Time Money Manager-D	48 95
Turtle Graphics II-Cart	40 95
Turtle Toyland Jr.-D/T	22 95
Type n' Writer-D	19 95
HES Modem I	49 95

### SPINNAKER

Adventure Creator-Cart	21 95
Aerobics-C	25 95
Aegean Voyage-Cart	21 95
All in the Color Caves-C	21 95
Alphabet Zoo-Cart	20 95
Bubble Burst-Cart	21 95
Cosmic Life-Cart	20 95
Delta Drawing-Cart	21 95
Facemaker-Cart	20 95

Fraction Fever-Cart	20 95
Grandma's House-D	20 95
Jukebox-Cart	20 95
Kids on Keys-Cart	20 95
Kidwriter-D	20 95
Kidercamp-Cart	17 95
Ranch-Cart	20 95
Rhymes/Riddles-D	17 95
Search/ Amazing Thing-D	24 95
Snooper #1-D	24 95
Snooper #2-D	24 95
Story Machine-Cart	20 95
Trains-D	24 95
Up For Grabs-Cart	20 95

### TOUCH TABLETS

Koala Touch Tablet-D	44 95
Koala Touch Tablet-Cart	49 95
Muppet Learning Keys	Call

Concorde Third Party Disk  
Drive for Commodore 64  
parallel & serial models  
available

Price reductions may have been made since this ad was placed.  
Call us for our latest price quotes.

# ADVERTISERS INDEX

Reader Service Number/Advertiser	Page	Reader Service Number/Advertiser	Page
<b>102</b> AA Computer Exchange	152	Master Software	152
<b>103</b> Abacus Software	91	<b>141</b> MFJ Enterprises Incorporated	94
<b>104</b> Abacus Software	93	<b>142</b> MicroProse Software	51
<b>105</b> Abacus Software	95	<b>143</b> MicroSci, Inc.	22
<b>106</b> Academy Software	28	Micro-Sys Distributors	68
A.I.D. Corp.	155	<b>144</b> Micro-W Distributing, Inc.	112
Almatt	150	<b>145</b> Micro World Electronix	154
Almost-Free Software	154	<b>146</b> Mimic Systems Inc.	57
Apropos Technology	63	<b>147</b> Mindscape, Inc.	7
<b>107</b> Artificial Intelligence Research Group	124	<b>148</b> Mindscape, Inc.	14,15
<b>108</b> BASIX	73	<b>149</b> NewArts Co.	64
Batteries Included	17	<b>150</b> Omnitronix	124
Batteries Included	43	<b>151</b> Orange Micro Inc.	27
<b>109</b> Big Bytes	121	Owl Software Corp.	86
<b>110</b> Blue Chip Electronics	41	<b>152</b> Pacific Exchanges	150
Brantford Educational Services	158	<b>152</b> Pacific Exchanges	150
<b>111</b> Broderbund Software	1	<b>153</b> Parsec Research	52
<b>112</b> Broderbund Software	2,3	<b>154</b> PC Gallery	153
<b>113</b> Bytes & Pieces, Inc.	156	<b>155</b> PlayNet, Inc.	31
<b>114</b> Cardco, Inc.	IBC	<b>156</b> Practical Programs	115
Cardinal Software	58	<b>157</b> Professional Software, Inc.	13
<b>115</b> Cheatsheet Products	158	Pro-Line Software	89
<b>116</b> Columbia Software	154	<b>158</b> Protecto Enterprizes	102,103
<b>117</b> Columbia Software Club	19	Protecto Enterprizes	104,105
Commodore	BC	Protecto Enterprizes	106,107
<b>118</b> CompuServe	25	<b>159</b> PSI	9
<b>119</b> ComputAbility	111	<b>160</b> Public Domain, Inc.	150
<b>120</b> Computer Centers of America	159	<b>161</b> Quantum Software	128
Computer Enterprizes	150	<b>162</b> Radix Marketing	119
<b>121</b> Computer Mail Order	151	<b>163</b> R. Dillon Software	150
<b>122</b> Computer Profit Systems, Inc.	61	R. J. Brachman Associates, Inc.	155
<b>123</b> Covox Inc.	122	<b>164</b> Sega Enterprises, Inc.	55
<b>124</b> Creative Software	4	<b>165</b> Signal Computer Consultant, Ltd.	64
<b>125</b> Crown Custom Covers	22	<b>166</b> Simon & Schuster	84
<b>126</b> C.S.M. Software	45	<b>167</b> Skyles Electric Works	109
<b>127</b> Custom Programming Group, Inc.	115	Softlaw	59
DJ Software	58	<b>168</b> Software Discounters of America	156
<b>128</b> Dow Jones News/Retrieval	11	<b>169</b> Software Plus	152
<b>129</b> Eastern House	52	<b>170</b> Software Shack	155
Electronic Arts	21	<b>171</b> Solid State Software	128
Electronic Arts	75	<b>172</b> Starpoint Software	42
<b>130</b> E Mart, Inc.	155	<b>173</b> subLOGIC Corporation	23
Emcee Soft Corp.	150	Tailored Solutions	125
Epyx	33	TaxAid Software, Inc.	97
Epyx	35	<b>174</b> Telesys	54
Epyx	37	<b>175</b> Timeworks, Inc.	47
Fantasy Software	150	<b>176</b> Triad Computers	155
<b>131</b> Full Circle Software, Inc.	115	<b>177</b> Tussey Mt. Software	122
<b>132</b> Future Computer Applications	72	Ultrabyte	88
Gamestar, Inc.	29	<b>178</b> USI/CDI, Computer Devices International	77
<b>133</b> General Overall Design	152	Vertical Horizons, Inc.	89
<b>134</b> Genesis Computer Corp.	97	<b>179</b> Votalker	85
<b>135</b> Genie Software	64	West Coast Commodore Association, Inc.	22
<b>136</b> The Gold Disk	79		
<b>137</b> Indus Systems	83		
<b>138</b> Inforunner Corporation	IFC		
Jason-Ranheim	101		
KSOF Co.	154		
<b>139</b> Kyan Software	28		
<b>140</b> Legend Peripheral Products	99		
Lyco Computer Marketing & Consultants	157		

COMPUTE!'s First, Second and Third Book of Commodore 64	69
COMPUTE!'s Gazette Disk Subscription	49
COMPUTE!'s Gazette Subscription	65
COMPUTE!'s Home Computer Wars	80
COMPUTE!'s Programming the VIC	67

# Turn your CRT Monitor into a television set with Cardco's new monitor tuners.

With a flick of the switch you can turn your computer monitor to provide the most vivid television pictures available. Receive a sharper, clearer television picture on your CRT monitor than you ever thought possible. Model MT/1 includes a full wireless remote control sixty-channel cable ready tuner with separate video and audio output. Completely compatible with your composite input computer monitor. For composite color or monochrome.



Also available to turn your CRT monitor into a television set is CARDCO Model MT/2, a full UHF/VHF TV tuner with



separate video and audio output matched to your composite input computer monitor. For composite color or monochrome monitors. Backed by a full 90 day guarantee.

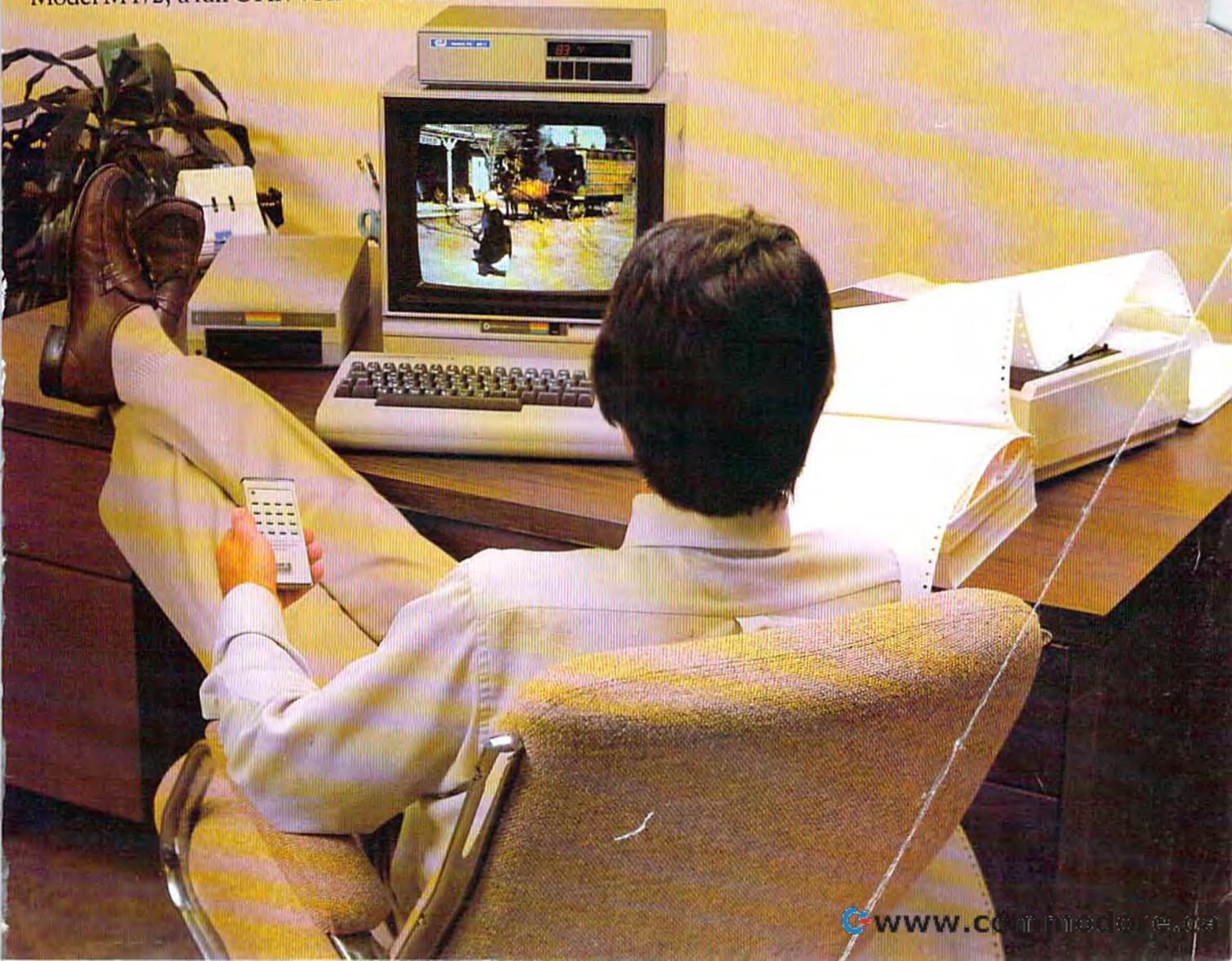
Write for illustrated literature and prices or see CARDCO Computer Accessories and Software wherever computers are sold.



**cardco, inc.**

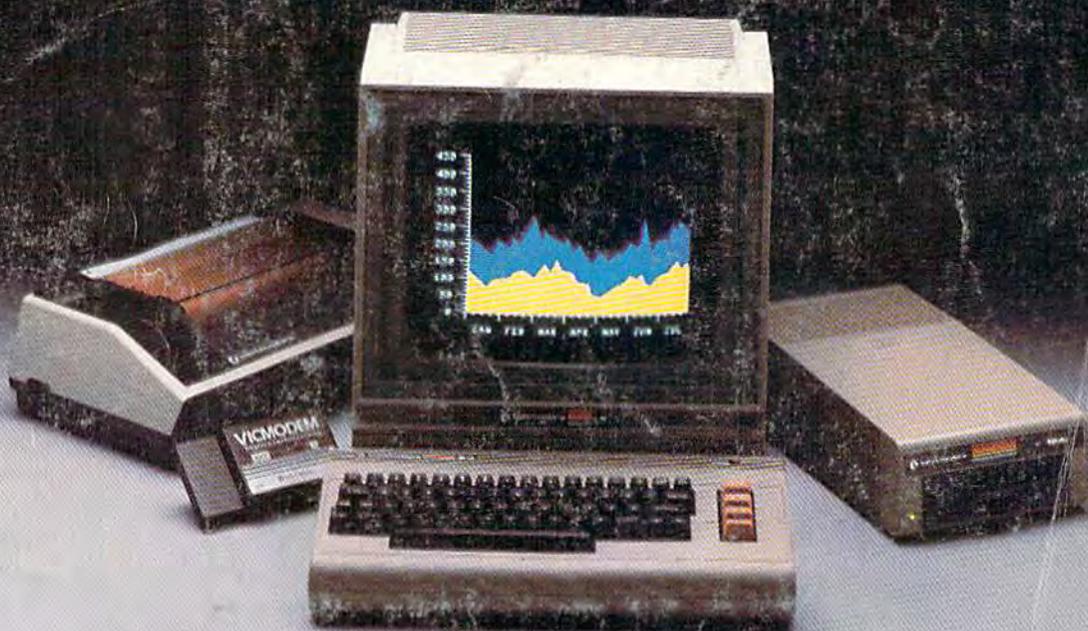
300 S. Topeka Wichita, Kansas 67202  
(316) 267-6525

"The world's largest manufacturer of Commodore accessories."





**IT'S NOT HOW MUCH YOU PAY.**



**IT'S HOW MUCH YOU GET.**

The computer at the top has a 64K memory.

It has the initials I, B, and M. And you pay for those initials—about \$669.

The Commodore 64™ has a 64K memory.

But you don't pay for the initials, you just pay for the computer: \$215. About one third the price of the IBM PCjr.™

The Commodore 64 also has a typewriter-type

keyboard with 66 typewriter-type keys. (Not rubber chicklet keys like the IBM PCjr.)

It has high resolution graphics with 320 x 200 pixel resolution, 16 available colors and eight 3-dimensional sprites.

It has 9-octave high fidelity sound.

The Commodore 64 is capable of running thousands of programs for home and office. And if you add a printer

or color monitor, disk drive and a modem—all together it just about equals the price of the IBM PCjr all alone. With no peripherals.

So you can buy a computer for a lot of money.

Or buy a lot of computer for the money.

**COMMODORE 64** 

IT'S NOT HOW LITTLE IT COSTS,  
IT'S HOW MUCH YOU GET.

 [www.commodore.ca](http://www.commodore.ca)