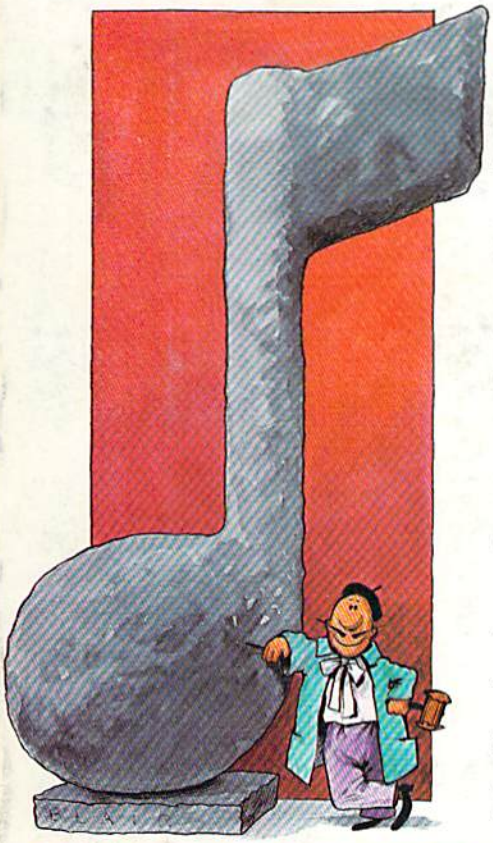
Exploring 64 Sound

COMPUTE!'s GAZETTE

$2.50
May 1984
Issue 11 Vol. 2, No. 5
02220 £1.95 UK $3.25 Canada

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

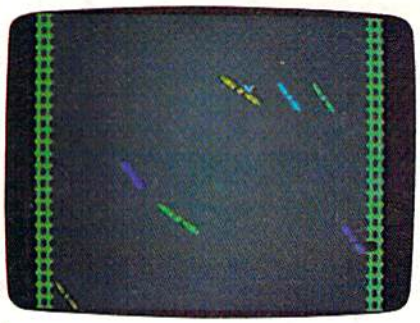


Sound Sculptor

A comprehensive, menu-driven utility that takes all the work out of programming and saving sound on the 64. Simply use the joystick-controlled "mouse" and the function keys to select any sound parameter.

SpeedScript Revisited

Tips on advanced uses of the GAZETTE's favorite word processor.



Sound Story

A unique story presentation which demonstrates the capabilities of sound on the VIC-20.

Also In This Issue

Props

An innovative and nonviolent game for the 64 which uses machine language animation, eight sprites, and all three voices.

0 71486 02220 05

www.commodore.ca

Dear Susan,

I've discovered something very exciting that I want to share with you. I've always thought assembly language was too complicated for me to learn and I've been doing all my programming in Basic, or buying software that doesn't do quite what I want. You know, Basic is just too slow for a lot of tasks, and I can't find ready made software to do those specialized things I want to do.

Well, I just bought Panther's C64 Assembler and I found out that assembly language is easier than I thought, and it's also fun.

The C64 Assembler is very "friendly" and the documentation is clear and well written. One very nice feature of the manual is a section for the neophyte assembly language programmer that really helped me understand how to use the machine.

Now I'll be able to write those programs myself instead of waiting for some software manufacturer to guess what I'm looking for! My programs will do exactly what I want, and I'll have fun writing them.

The dealer even told me that Panther is looking for good programs in assembly language, and they're willing to publish and pay royalties for useful programs which meet their standards.

As you know, I don't have any experience yet, so I can't compare assemblers, but Jim's seen it and he's a professional assembly language programmer. He says it's the easiest-to-use and the fastest assembler he's seen for any microcomputer. In fact, he said he's going to buy a Commodore 64 just so he can use it.

Come on over to my place when you have time and I'll show off the assembler for you, or go to the dealer down the street to see it. The whole Commodore community is excited about the C64 Assembler.

I've got to sign off now. I'm anxious to get back to my assembler and finish the program I'm working on. This is fun!

Let's get together soon.

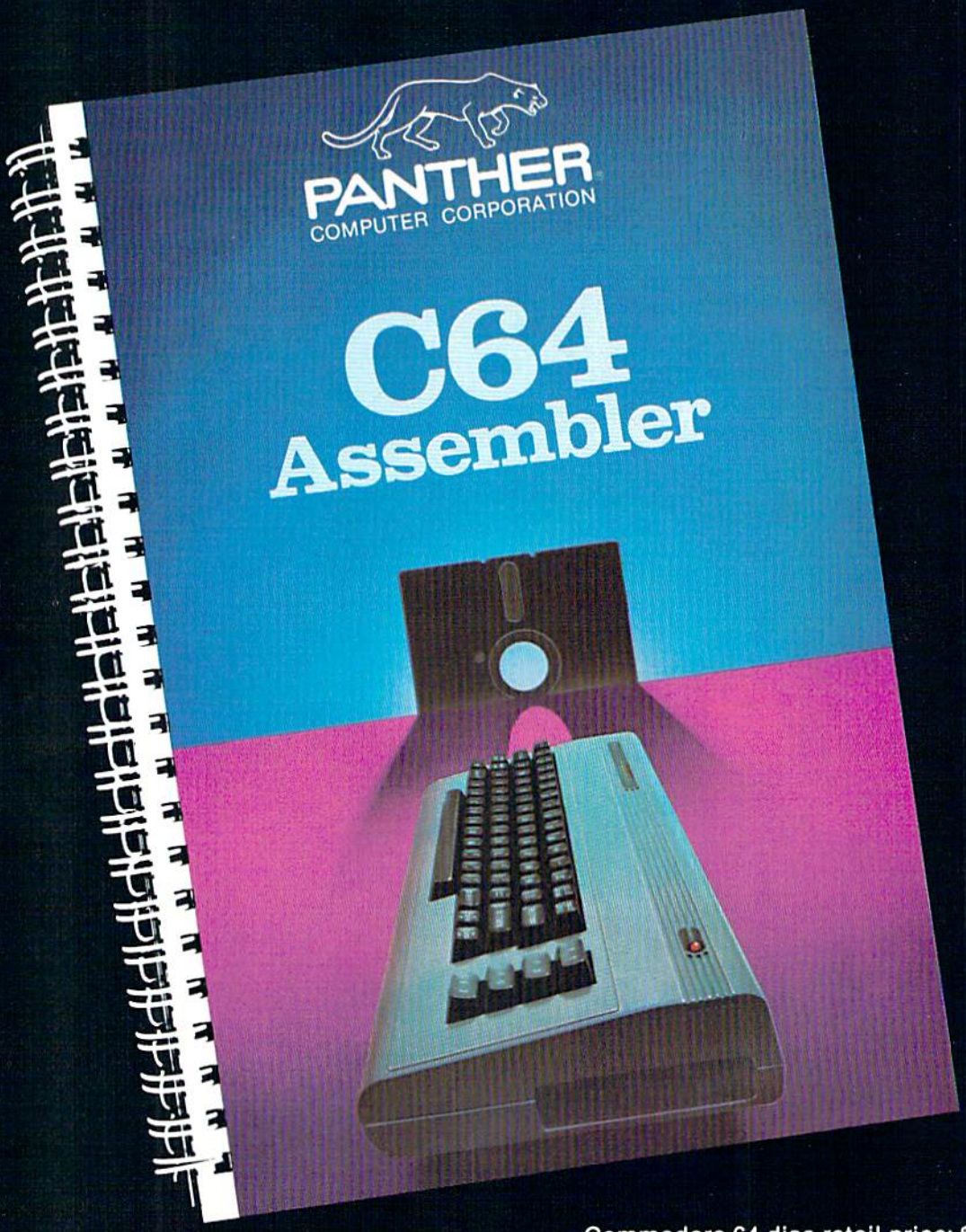
Bob

Commodore is a trademark of
Commodore Electronics, Ltd.

Panther Computer Corporation

www.commodore.ca

The Assembler for the Commodore 64.



Commodore is a trademark of Commodore Electronics, Ltd.

Commodore 64 disc retail price: $59.95

Dealer Inquiries Invited
1-800-222-7105
In CA 1-800-821-7644

Panther Computer Corporation

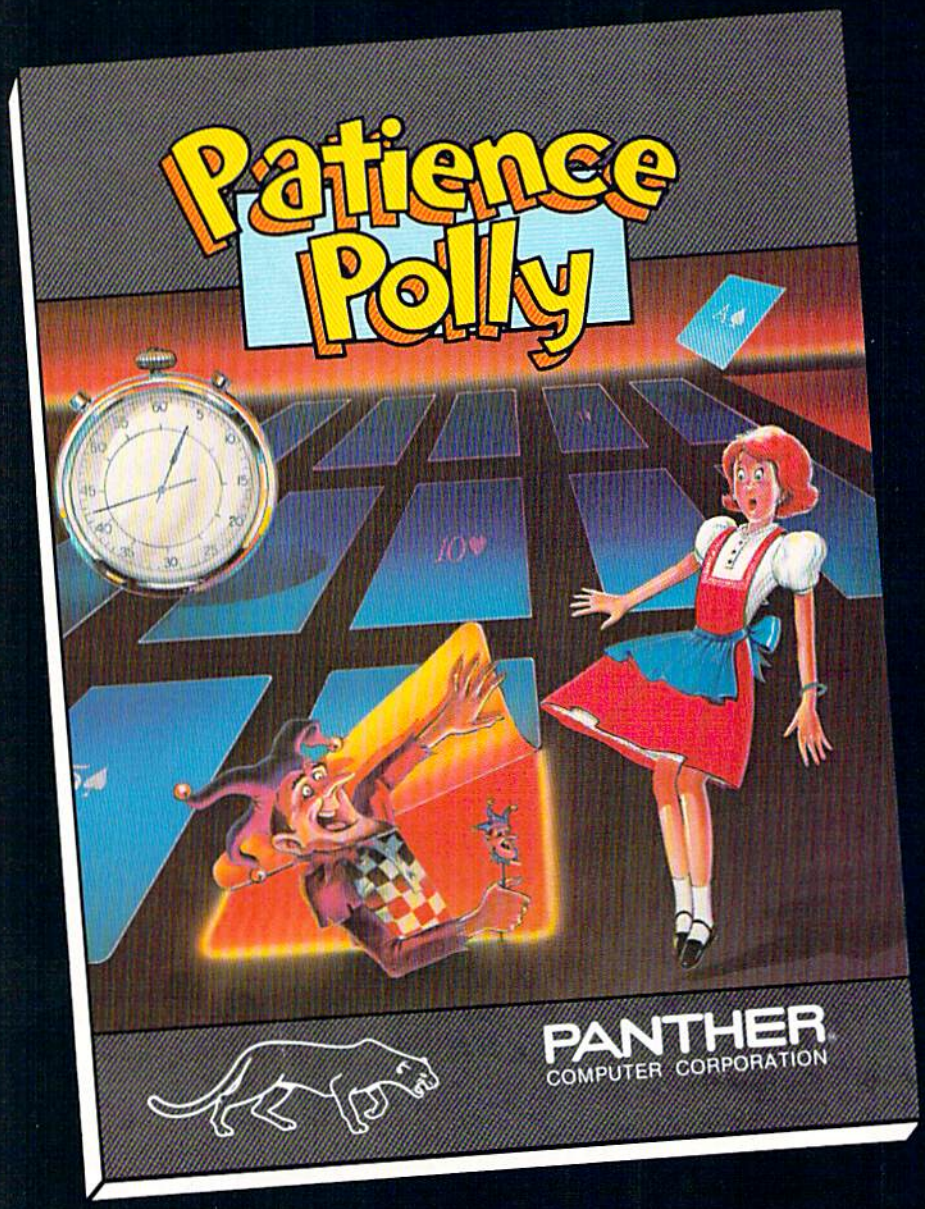
12021 Wilshire Blvd. Los Angeles, CA 90025

www.commodore.ca

WARNING:

Don't Play this Game.

(Habit Forming)



Commodore 64 disc retail price: $29.95
VIC 20 cassette retail price: $15.95

Commodore is a trademark of Commodore Electronics, Ltd.
VIC 20 is a trademark of Commodore Electronics, Ltd.

Dealer Inquiries Invited
1-800-222-7105
In CA 1-800-821-7644

Panther Computer Corporation

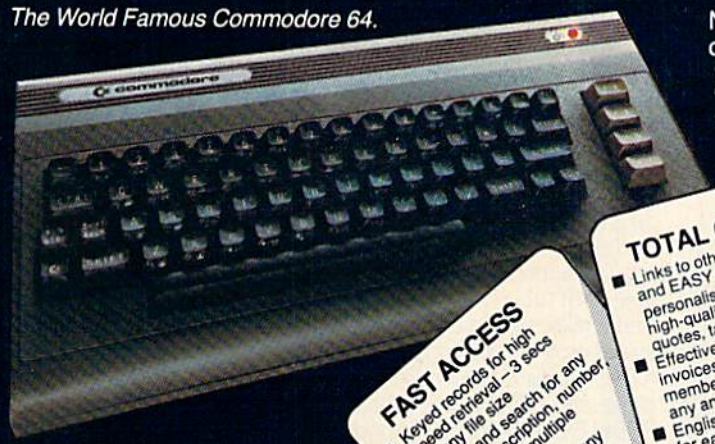
12021 Wilshire Blvd., Los Angeles, California 90025

www.commodore.ca

Strengthen your hand with Superbase 64™

The complete information control system for the Commodore 64

The World Famous Commodore 64.



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

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

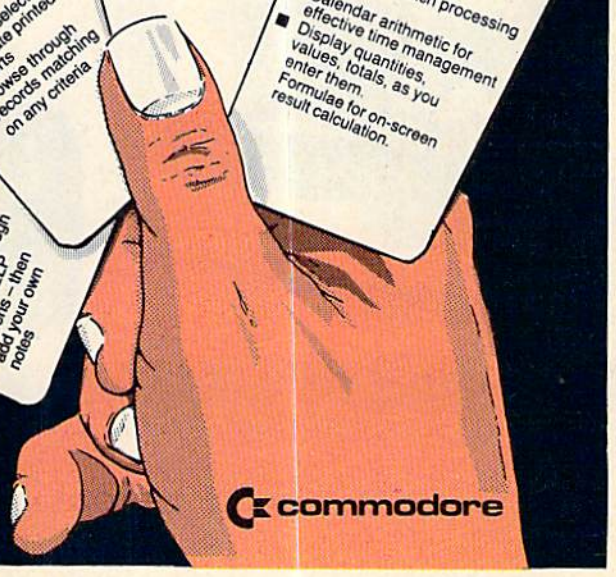
Superbase gives you unrivalled control in home or office, business or professional practice, with a range of features including:

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

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

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

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



Superbase 64™

Precision Software

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

OFFICIALLY APPROVED BY COMMODORE

commodore

www.commodore.ca

IF YOU'RE LIKE MOST
BUY A SINGLE

YOU'LL BUY LOTS OF SPINNAKER GAMES.

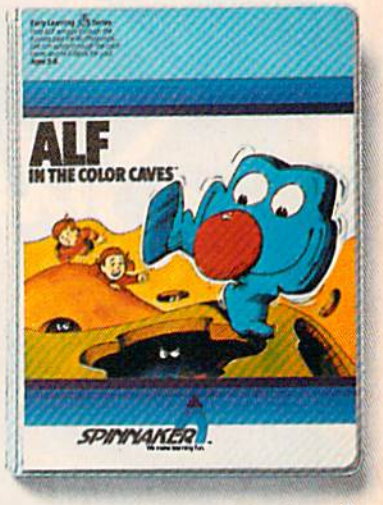
And not just because they're educational, but also because they happen to be a lot of fun to play.

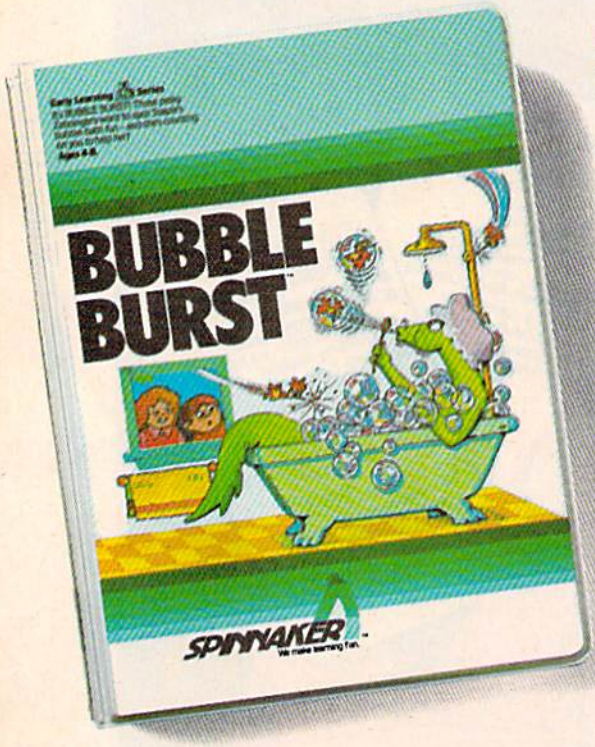
In fact, they're so much fun, parents have been known to sneak in a few hours of play when the kids are asleep.

After all, if your kids are actually enjoying a learning game, there must be something to it. And there is: fun, excitement and real educational value. That's what sets Spinnaker games apart from all the rest. And what brings parents back for more.

We offer a wide range of learning games for a wide range of age groups: 3 to 14. One look at these two pages will show you how we carefully designed our line of learning games to grow right along with your child.

So if you're looking for a line of learning games that are as much fun to play as they are to buy, consider Spinnaker games. They're compatible with **Apple,® Atari,® IBM® PC, PCjr, Commodore 64,™ Coleco Adam™** and parents who don't mind their kids having fun while they learn.





It's new! BUBBLE BURST™ is bursting with fun! Ages 4 to 8.

Soapie the Sea Serpent is counting on your kids to keep the pesky Zeobingers from spoiling her bubble-bath fun.

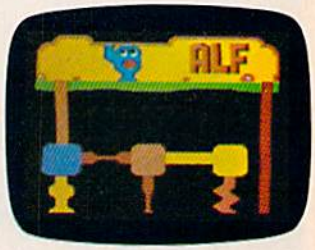
And while children are helping Soapie, they're developing strategy and prediction skills plus an understanding of cause-and-effect relationships.

BUBBLE BURST provides hours of fun—and it comes with a workbook full of challenging projects.

It's new! ALF in the Color Caves™: a colorful adventure! Ages 3 to 6.

This cheerful game lets children guide lovable Alf through the color caves to the color room at the bottom where he dances to his own special music.

As kids maneuver Alf through the maze and past the Wufflegumps, they're improving their routing and prediction skills. And the enclosed activities workbook offers a rainbow of colorful projects!



Apple, IBM PC and PCjr and Atari are registered trademarks of Apple Computer, Inc., International Business Machine Corp. and Atari, Inc. respectively. Commodore 64 and Coleco Adam are trademarks of Commodore Electronics Ltd. and Coleco Industries respectively. © 1984, Spinnaker Software Corp. All rights reserved.

www.commodore.ca

PARENTS, YOU WON'T SPINNAKER GAME.

The story of STORY MACHINE.™ Ages 5 to 9.

STORY MACHINE is like a storybook come to life. Using the keyboard, your children write their own fun little stories. The computer then takes what they've written and animates their story on the screen, complete with full color graphics and sound.

STORY MACHINE helps your children learn to write correctly, become familiar with the keyboard, and lets them have fun exercising their creativity at the same time.

DELTA DRAWING.™ Have fun creating pictures and computer programs. Ages 4 to Adult.

Kids love to draw. And DELTA DRAWING Learning Program lets them enjoy creative drawing and coloring while they learn computer programming concepts.

With DELTA DRAWING, even kids who have never used a computer before can learn to write programs and build an understanding of procedural thinking. It's easy, clear, and lots of fun!

KIDS ON KEYS™ helps kids catch on to letters, numbers—and computers. Ages 3-9.

KIDS ON KEYS offers children three terrific games that teach them the location of the letters and numbers while they have fun with the computer.

The games are fast and fun, with exciting sound effects and colorful graphics. It's a great way for kids to enjoy learning to identify numbers, letters, and words and associating them with images on the screen. And KIDS ON KEYS certainly do have fun!

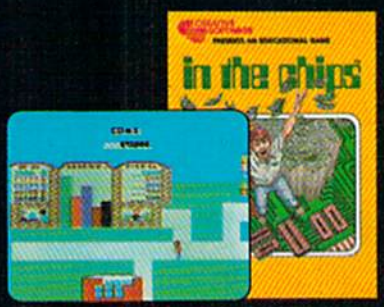
SPINNAKER™
We make learning fun.

Disks for: Apple, Atari, IBM PC and PCjr, Commodore 64.
Cartridges for: Atari, IBM PCjr, Commodore 64, Coleco Adam.

www.commodore.ca

BRUTAL! RUTHLESS! UNPREDICTABLE!

IN THIS GAME, YOU REALLY GET THE BUSINESS.



Okay, boss, now what do we do? Research & Development is working 'round the clock coming up with new products, the warehouse is overflowing, the advertising agency wants more money, your customers are fickle, and the competition just slashed their prices. We're all waiting for your decision.

Put yourself at the helm of this enterprising new software company. Every major decision is in your hands. Use your logic and intuition to spot market trends. Keep a close eye in your balance sheet. Get a grip on your company, a leg up on your competition, and a stranglehold on the market. Do you have what it takes to be King of Silicon Valley? Or will you end up selling apples on skid row?

Intense strategic challenge combined with a real education in the workings of big business make In The Chips one game anyone can profit from.

IN THE CHIPS.™ Concept Education for the VIC-20, Commodore 64, IBM PC and PCjr.

C R E A T I V E S O F T W A R E

"VIC-20" AND "COMMODORE 64" ARE TRADEMARKS OF COMMODORE ELECTRONICS, LTD. "IBM PC" AND "PCjr" ARE TRADEMARKS OF INTERNATIONAL BUSINESS MACHINES, INC. © 1984 CREATIVE SOFTWARE

www.commodore.ca

May 1984 Vol. 2, No. 5

FEATURES

GAMES

REVIEWS

EDUCATION/HOME APPLICATIONS

PROGRAMMING

DEPARTMENTS

PROGRAM LISTINGS

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

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, $20. 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 © 1984 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.

www.commodore.ca

THE EDITOR'S *notes*

First things first... As I write this, the final master copy of the May GAZETTE DISK is going to the duplication service. For a variety of good reasons, we have decided that, initially at least, it will *not* be protected. We made that decision several weeks before a recent flood of letters started coming in as a response to my last editorial. I should say I'm gratified to discover that so many of you *read* the Editor's Notes. The first two letters arrived seven working days ago... the torrent escalates; we're into the hundreds now, and as promised, I'm reading them all, some of them several times.

We're a few issues (and I suspect several thousand letters) away from my sharing much of the substantive content of these letters with you, but I've held up this issue's Notes as long as possible to collect as many letters as I could. There have been numerous arguments, both for and against protection. The most frequent argument against protection is the necessity not only of backup copying but also the desire to have the disk reflect the flexibility and tutorial nature of the magazine. That is also our desire, and probably the foremost reason for our decision to carry through with our original inclinations and goals: no protection.

The other arguments are far more mixed, and in this editorial we'll present some of the various points raised. One frequently recurring point is that users have a right to back up their disks, a point we clearly agree with (as does the 1980 amendment to the Copyright Act). Some readers chided us for raising the notion of protecting our disks while concurrently running ads for programs designed to back up disks. It does get confusing. Software vendors currently have the right to protect programs on disk, and the market in large part helps determine their backup policies. Users, on the other hand, have the right to make backup copies for their own security/use. The catch-22 is that while some users may use such programs to generate "bootleg" copies of programs, far more users use them simply to generate backup copies for their personal use. We therefore do accept and publish what we consider to be legitimate advertising which allows a user to do just that.

So the biggest topic area so far has been the need to make personal backups; the need to be able to group programs onto different disks for various uses; and especially the need to be able to alter, enhance, and generally have a good time "fiddling" with the code.

Also, some people were quite surprised that anyone would copy the disk to share; some felt it's perfectly legitimate among friends; and some strongly argued that they can hand out copies as desired (this last group is a small minority, and contains the bulk of the unsigned letters). At this point, I'm just reporting the contents of the letters rather than responding to the points raised. Part of the deal from this end is that we want to collectively put as much time and energy into developing a perspective on GAZETTE DISK as many of you have put into these letters. We should comment now, however, on one point that a few readers have raised—public domain software.

I don't know why, but some readers assume that if a program appears in a magazine, it becomes "public domain," thereby leaving the realm of copyright law. We hold copyright on almost all of the material we publish; very little of what we publish is placed in public domain. The "publication" of a record over the airways no more places it in the public domain than the publication of a program in the GAZETTE.

All in all, the letters and the thoughtfulness you've shown in responding are impressive (regardless of the positions taken). Another frequent comment is the notion that the price is quite fair, and that service will eventually win out.

Finally, here's a quote from one letter's closing lines. It's indicative of the opening/closing comments of many of you, regardless of your positions on the subject at hand.

"You guys do good work. Keep it up."

Thanks. We intend to.

Editor In Chief

www.commodore.ca

These are the hands of a master typist. (Jonathan Pandolfi, age 7.)

MasterType™—the best-selling program that turns learning into child's play.

Given the choice of learning a skill or playing a game, most kids go for the game.

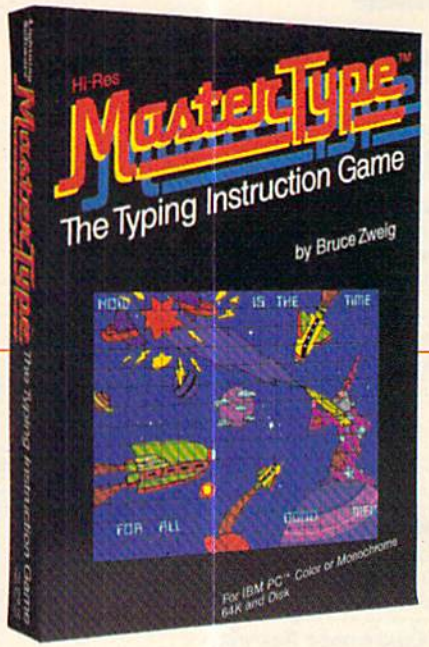
So how has MasterType™ gotten so many young kids to sit still long enough to learn to type?

By being fun. By bringing the fast action of video games to each of MasterType's lesson program segments.

Kids get so caught up in zapping spaceships, they hardly realize they've mastered the keyboard.

Warning: Parents like it, too. And may find themselves unwittingly becoming expert typists before they know it.

Disks: Apple®, Atari®, Commodore 64® $39.95
IBM-PC $49.95
Cartridges: Atari®, Commodore 64® $39.95



Try the other programs in the Scarborough System—Songwriter™, PictureWriter™, Phi Beta Filer™, PatternMaker™ and Run for the Money™. All Scarborough software utilizes your computer's capabilities to the fullest. And perhaps more importantly, all are easy to use.

Apple, IBM and Atari are registered trademarks of Apple Computer, Inc., International Business Machines Corp. and Atari, Inc. respectively. Commodore 64 is a trademark of Commodore Electronics Limited.

The Scarborough System.

You'll grow with us.

© Scarborough Systems, Inc., 25 N. Broadway, Tarrytown, New York 10591

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

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

Editors
Tom R. Halfhill, PC and PCjr Editor; Stephen Levy, Editor, COMPUTE! Books Division; Gail Walker, Production Editor; Ottis R. Cowper, Technical Editor; Charles Brannon, Program Editor

Assistant Editors
Dan Carmichael (Submissions); Gregg Keizer, Steve Hudson (Books); John Krause, George Miller (Technical); Todd Heimarck, Robert Sims (Publications); Selby Bateman (Features), Kathy Yakal, Editorial Assistant (Features), Randall Fosner, Assistant Managing Editor (Books)

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

Technical Assistant
Dale McBane

Programming Assistants
Mark Tuttle, David Florance, Kevin Mykytyn

Copy Editors
Juanita Lewis, Joan Rouleau

Copy Assistants
Linda Shaw, Martha Banks

Proofreaders
Becky Hall, Ethel Silver, Dwight Smith

Administrative Staff
Vicki Jennings, Laura MacFadden, Julia Fleming, Susan Young, Sue Booth

Production
Irma Swain, Production Manager; Janice Fary, Art & Design Director; De Potter, Mechanical Art Supervisor; Terry Cash, Debi Thomas, Typesetting

Artists
Leslie Jessup, Cindy Mitchell (Publications), Debbie Bray (Books); Harry Blair, Illustrator

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

Operations/Customer Service
Patty Jones, Subscriber Services Supervisor; Assistants: Chris Patty, Chris Gordon, Sharon Sebastian, Rosemarie Davis; Fran Lyons, Dealer Sales Supervisor; Assistants: Gail Jones, Sharon Minor, Rhonda Savage

Customer Service Staff
Dorothy Bogan, Supervisor; Judy Taylor, Lisa Flaharty, Anita Roop, Debi Goforth, Jenna Nash; Elizabeth White, Sybil Agee, Mary Sprague; Jim Coward (Warehouse Manager), Larry O'Connor, Dai Rees, Jack McConnell, Eric Staley, Eddie Rice, Sam Parker, David Hensley

Data Processing
Leon Stokes, Manager; Joan Compton, Chris Cain, Assistants

Accounting
Paul J. Megliola, VP, Finance & Planning; R. Steven Vetter, Director, Finance & Planning; James M. Hurst, Controller; Assistants: Linda Miller, Doris Hall, Jill Pope; Staff: Anna Harris, Emilie Covil, Anne Ferguson, Tracey Hutchins

Advertising Sales
Ken Woodard, Director of Advertising Sales; Patti Williams, Production Coordinator; Bonnie Valentino, Accounting Coordinator; Joyce Margo, Production Assistant

Sales Representatives

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

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

Address all advertising materials to:
Patti Williams, COMPUTE!'s GAZETTE,
324 West Wendover Ave., 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	408-354-5553
Northern CA	415-348-8222 or 408-354-5553
Southern CA	619-941-2313 or 213-378-8361
Nevada, Arizona	619-941-2313
New Mexico	213-378-8361
Colorado	303-595-9299

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

Corporate Office:
324 West Wendover Ave., Suite 200, Greensboro, NC 27408

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

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

Chief Executive Officer Robert C. Lock
President Gary R. Ingersoll
Vice President, Finance & Planning Paul J. Megliola
Executive Assistant Debi Nash
Assistant Cassandra Robinson

Subscription Information

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

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

COMPUTE!'s Gazette Subscription Rates

(12 Issue Year): US (one year) $20. Canada, Mexico and Foreign Surface Mail $25. Foreign Air Mail $45.

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

Authors of manuscripts warrant that all materials submitted to COMPUTE!'s GAZETTE are original materials with full ownership rights resident in said authors. By submitting articles to COMPUTE!'s GAZETTE, authors acknowledge that such materials, upon acceptance for publication, become the exclusive property of **COMPUTE!** Publications, Inc. No portion of this magazine may be reproduced in any form without written permission from the publisher. Entire contents copyright © 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.

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.

www.commodore.ca

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

GAZETTE FEEDBACK

EDITORS AND READERS

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

Color Connections On Commodore Monitors

I know that many people have had trouble connecting Commodore's 1701 color monitor to the VIC-20 and the 64. I have read several suggestions on this, but when I recently purchased a 1702 monitor (updated version of the 1701), I found that neither Commodore's instructions nor the past suggestions went far enough.

The 1702 is apparently identical to the 1701 on the outside, and the electrical connections are also identical. A cable was supplied with three phono plugs on the monitor end (white, yellow, and red), and an eight-pin DIN plug on the computer end. Since my year-old 64 has a five-pin DIN plug connection for the monitor, I first purchased a five-pin male DIN plug from Radio Shack (Catalog # 274-003) and consulted the *Commodore 64 User's Guide* for the proper pin connections.

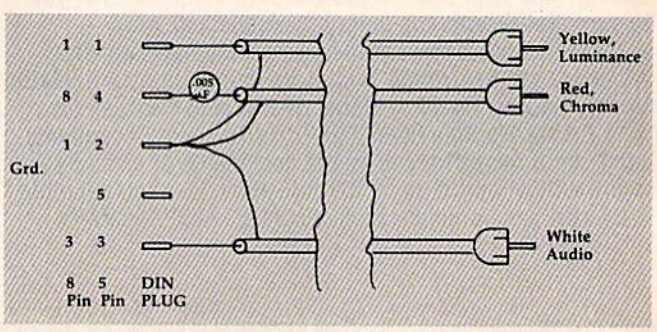
Using this modified cable, I connected to the three phono sockets on the rear of the monitor and tried it out (this is the "best" hookup according to all that I have read). I was disappointed to find out that although it worked well with some colors, other bright colors like yellow caused the monitor to revert to black and white.

Being a TV engineer, I broke out my scope and started to examine the signals. The video signal (pin 4 of the DIN connector) was a combination of about 25 percent luminance and 75 percent chrominance. Since I was feeding this into the chroma input of the monitor, it seems that the luminance component was upsetting the color circuitry. Breaking out my calculator, I found that a 0.005 μF capacitor would pass almost all of the chroma signal, but less than 10 percent of the luminance component.

Again at Radio Shack I discovered a very small 0.005 μF, 50 volt disk capacitor (catalog #272-130). I placed this capacitor in the DIN connector between pin 4 and the wire to the red phono plug. This arrangement gives almost perfect performance and the scope confirms good separation of chroma and luma.

From other letters to the editor that I have read, I suspect that this problem also exists in some VICs and possibly in some of the newer 64s with the eight-pin DIN connectors. A quick test would be to plug the red chroma phono plug into the yellow luma plug input on the back of the monitor. The picture will be very washed-out in appearance and low in contrast, but you should look for horizontal or vertical rolling only. Also, try plugging it into the yellow video input on the front. If a stable picture results with either of these hookups (no horizontal or vertical rolling), your computer has sync and video mixed with the chroma on this output and you should try the 0.005 μF capacitor in series with pin 4 of the five-pin DIN connector or pin 8 of the eight-pin DIN connector.

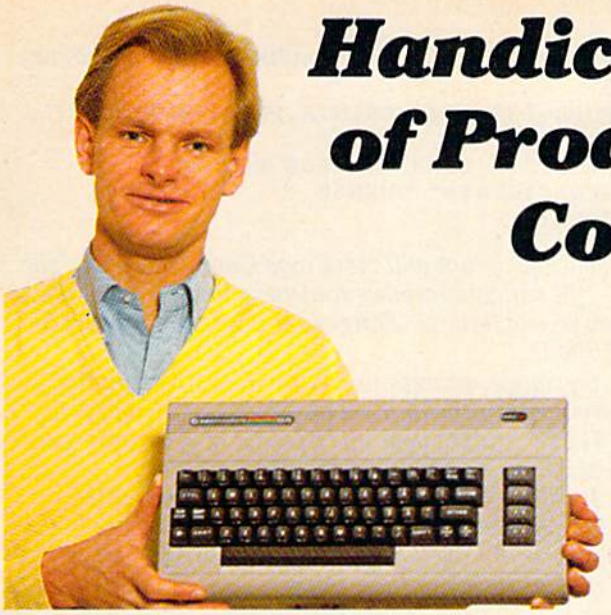
If you are not experienced and equipped for soldering small assemblies like this, I strongly recommend that you have a qualified technician perform these changes.



Edward P. Alciatore III

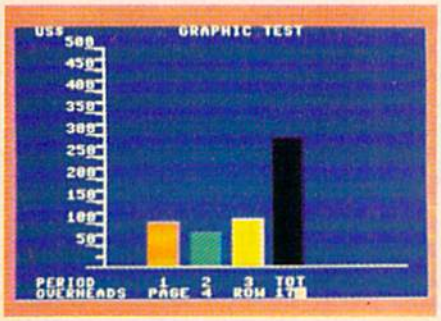
www.commodore.ca

Handic – A Complete Line of Products to Keep Your Commodore 64 Busy – Everyday!



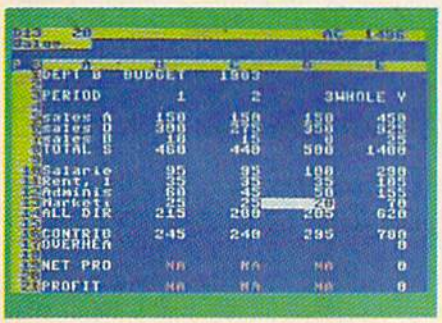
Handle your home budget, stock portfolio, loans and mortgages with Calc Result

Calc Result Easy is a simple-to-use spreadsheet program for the Commodore 64. It includes 254 lines × 64 columns, built-in graphics, and flexible printout formats. Plug-in cartridge... just plug it in and its ready. Perfect for cash flow analysis, personal net worth, IRA analysis, travel expenses, credit card expenditures, gas and electricity bills, etc.



Calc Result Easy $49.95

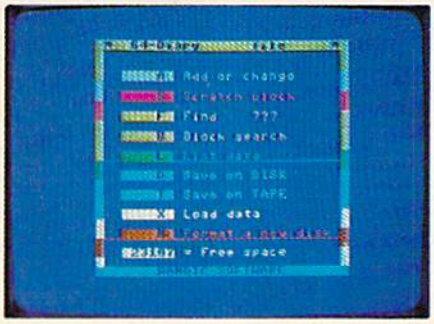
Calc Result Advanced gives you 32 pages of interrelated information. The three-dimensional feature allows you to consolidate calculations in summary format. Calc Result Advanced comes on plug-in cartridge and disk. Disk drive required.



Calc Result Advanced $99.95

A complete database for the home

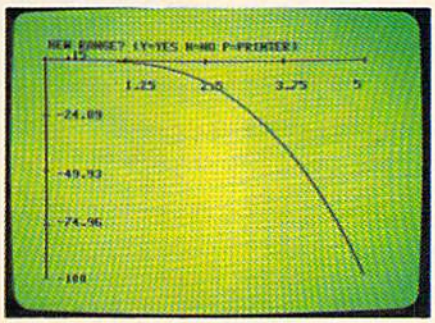
Addresses, telephone numbers, appointments, birthdays, or records–whatever you want to remember–put it on DIARY, an electronic notebook for home use. DIARY comes on a plug-in cartridge. It's easy to use and easy to learn, giving you the flexibility to design a personal calendar or address book.



Diary $29.95

Turn statistical information into graphic format

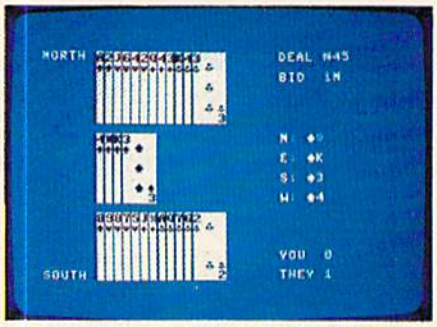
GRAF 64 converts mathematical functions into graphical analysis on the Commodore 64. An ideal program for studying math. Define a function, set the limits of an axis, plot a graph and display the extreme points, intersection values, etc.



Graf 64 $29.95

Develop your bridge skills

Whether you're an experienced bridge player or a beginner, polish your skills or learn the game with BRIDGE 64. Play North-South, then switch to East-West in the same deal, the return to that deal again and test your skill with a different strategy.



Bridge $39.95

Handic–for the broadest range of Commodore products

As the largest independent developer of Commodore software and accessories, Handic's broad range of business, education and recreation products are designed exclusively for the Commodore user who demands quality and reliability.

For more information and a catalogue of our products, see your nearest Commodore dealer, or call us direct.

handic software

Handic Software, Inc.
Fellowship Business Center
520 Fellowship Road, B 206
Mount Laurel, NJ 08054
Phone (609)663-0660

www.commodore.ca

Thank you for the tip, Mr. Alciatore. We'd like to mention that as of this writing, the new Commodore 1703 monitor should be on the market. The above information should also apply to the 1703. For more information, consult your monitor user's manual, or talk to your Commodore dealer.

Testing For Free Memory

I didn't discover this little tidbit, but I thought it useful enough to be passed on to other readers. To find out how much free BASIC programming memory is available, you type PRINT FRE(0) then press RETURN. However, when the amount of unused memory exceeds 32,000 bytes, the number displayed will be negative. This is confusing to many people. An easy way around this quirk is PRINT FRE(0)+2↑16 then press RETURN. This gives you the actual amount of free BASIC memory in a positive number format.

Mark Cowan

Wafer Drive Update

We've received several letters asking about the Exatron stringy floppies (July 1983) and the Unitronics wafer drive module (September 1983). Neither company is currently manufacturing these products. However, Jim Howell (formerly of Exatron) informed us that his company, A & J Microdrive, is introducing an updated stringy floppy with added features. The new product should be available in May and will sell for $99.50. He also noted that blank wafers are available.

For further information, contact:

A & J Microdrive
1050 East Duane Ave.
Suite I
Sunnyvale, CA 94086

Random Numbers And Machine Language

I would like to know how to derive random numbers in machine language on the Commodore 64. I have looked through the *Programmer's Reference Guide* for possibilities, but have found none. I am currently using part of the timer (memory location 162), but I would like to have a truly random number instead of a constantly increasing one for game programming.

Josh Hickman

Generating random numbers within a machine language program can be done a number of different ways. The easiest way is to use the RND function and the random seed.

The RND function can be found in Kernal ROM at $E097 (57495). If, within a machine language routine, you JSR $E097, the five random seed bytes ($8B–$8F, decimal 139–143) will be "seeded" with random numbers as if an RND statement were used within a BASIC program. Enter this short demonstration program to see how it works:

```
10 PRINT"{CLR}BYTE","VALUE{DOWN}":SYS5749
   5
20 FORA=139TO143:PRINTA,PEEK(A):NEXT

25 PRINT"{2 DOWN} (PRESS RETURN)"
30 GETA$:IFA$=""THEN30
40 GOTO10
```

The above program will work on a Commodore 64. The VIC-20's random number routine is located at $E094, so you would have to change line 10 of the program to SYS 57492.

Of course, processing the random numbers that are produced in the random seed bytes each time you JSR $E097 is up to you, and specific to your program or application.

It should be noted that the numbers generated in the random seed bytes are limited in range. Here is a chart that will give the approximate ranges of values that will be seeded in these bytes.

Byte	Low Value	High Value
139	114	128
140	0	127
141	0	255
142	0	255
143	0	255

For more on random numbers, see "Inside Random Numbers" in next month's issue.

Too Many Peripherals For The 64?

I have several questions I hope you can address.

I have a Commodore 64 and a Datassette at present, and plan on adding two disk drives, a printer, a Rabbit cartridge for the Datassette, and a dedicated color monitor in the near future. My question is, is it possible to have all of these peripheral devices connected to the 64 simultaneously?

Second, what purposes do accessory motherboards serve?

Concerning the 1541 disk drives, I read somewhere that Commodore has had mechanical problems with the head staying in alignment, and had temporarily halted shipments of the 1541s until the problem could be cleared up. I've been wanting to buy a disk drive, but I'll wait until I hear the outcome to this problem.

Donald N. Pering DSC

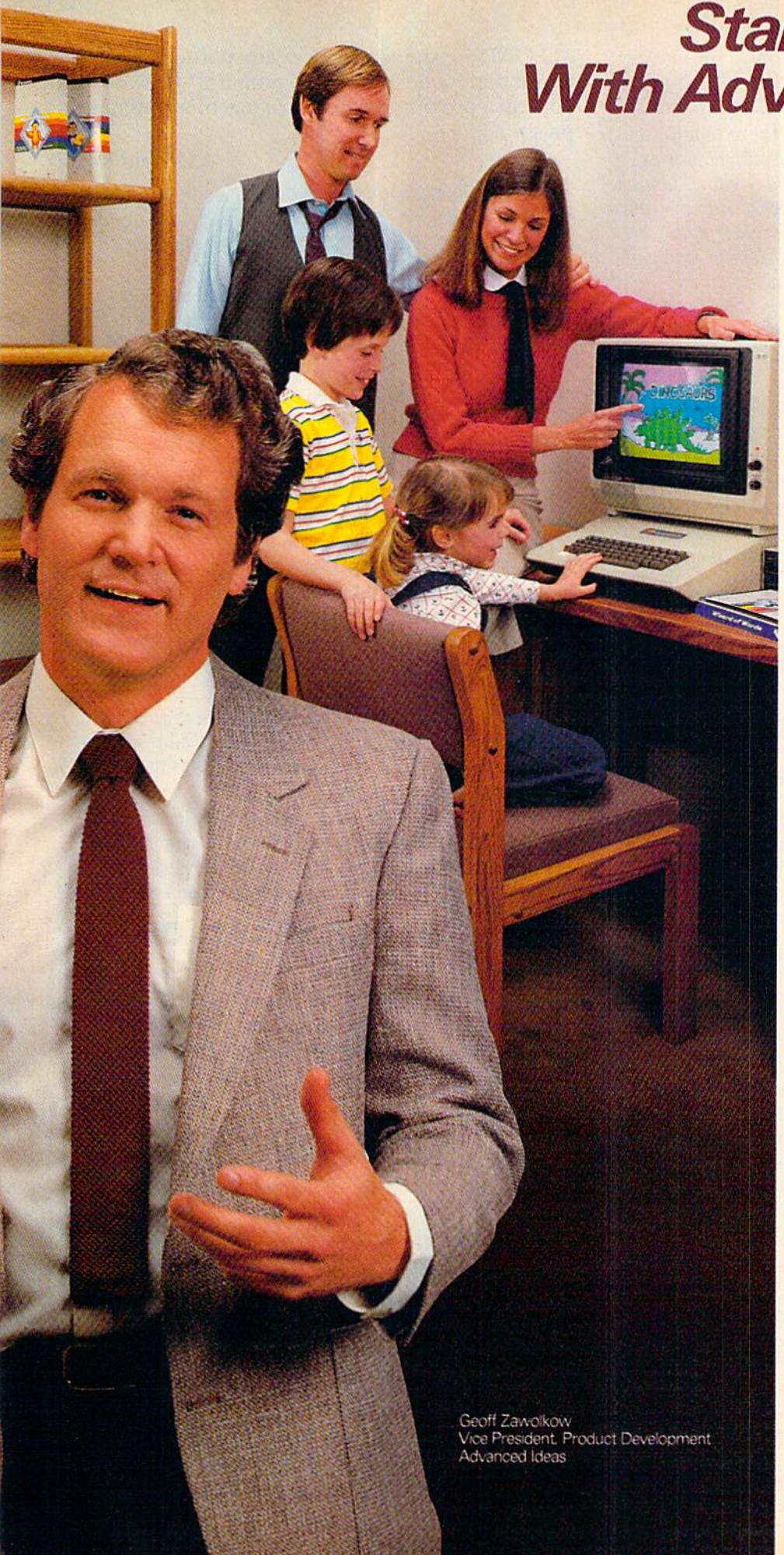
Yes, your 64 can handle all of the peripheral devices you desire, and more. Using one printer, monitor, and the Rabbit cartridge shouldn't create any problems. However, there are limits to the number of disk drives the 64 can support.

If you decide to use several disk drives and change the device numbers via the hardware method (see your 1541 user's manual), you are limited to four (device numbers 8 through 11). If you change the device numbers via software, the 1541 user's manual says the 64 can handle up to five disk drives and one printer.

Accessory motherboards make it possible to plug in

www.commodore.ca

Start A Tradition With Advanced Ideas™



Geoff Zawolkow
Vice President, Product Development
Advanced Ideas

Bring the whole family together with programs that are educational, flexible, extendable and *fun.* As the years go by you'll be glad you did.

Families like yours know programs aren't all the same. And that a computer is only as good as the software that runs on it.

So go ahead. Demand programs flexible enough to fit your children's abilities as they grow. Insist on features that extend subject matter as far as you want to take it. And be unimpresed if the whole thing isn't great fun. Then watch as your family keeps coming back to Advanced Ideas. You'll discover that you've really started something.

How to Choose Software for Your Home

"As an educator with over a decade of experience using computers with children, I've found there are key features in a well-designed learning game. One is *extendability.*

Look for enough variety to hold your child's attention over time. Some games are appealing in the short run, but are quickly mastered. Supplementary materials such as disks of added lessons can continue your child's interest and enjoyment.

The ability to modify a program is another form of extendability. Authoring systems can let you create lessons on your own topic areas for any age level and allow children to create and save original work, giving a sense of completion and pride vital to learning."

Software of Choice

Advanced Ideas (formerly Computer-Advanced Ideas) leads the industry with programs designed for extendability through easy-to-use authoring systems and a unique library of LearningWare™ diskettes. Rich game play and sound educational design have won Advanced Ideas programs the approval of the National Education Association.

Ask to see a demonstration at your local computer store. Then make Advanced Ideas a tradition in your home.

Advanced Ideas™
Bringing Ideas Home

2550 Ninth Street Suite 104 Berkeley, CA 94710
(415) 526-9100

Advanced Ideas programs are compatible with the most popular computers: Apple,® IBM® and Commodore.™

Apple is a registered trademark of Apple Computers, Inc. IBM is a registered trademark of IBM Corp. Commodore is a trade-

www.commodore.ca

more than one ROM cartridge at a time. The motherboards plug into the expansion port and then can accommodate two or more ports to accept cartridges.

The deluxe motherboards offer the option to switch in or out the various expansion port outlets. For example, if you had five favorite cartridge games you like to play, you could plug the motherboard into the computer, and then plug in the five game cartridges (assuming it had at least five slots). You could play game one in expansion slot 1. If you wanted to play game two in the second expansion slot, you would turn off the computer, turn off the switch for slot 1, turn on the slot for expansion port 2, turn on the computer, and game two could be played.

The one big advantage to motherboards is that you don't have to continually plug and unplug cartridges into the computer's expansion port. This might be especially good where young children are playing games on the 64. By being able to switch games on or off on the motherboard, the possibility of the child breaking a cartridge (or the 64) by inserting a cartridge the wrong way would be eliminated.

Concerning your third question, yes, there were apparent mechanical problems with the 1541s. The problem allegedly centered around the step motor—it controls the positioning of the read/write head on the 1541—causing the drive to become misaligned.

However, this problem is now a thing of the past. As a matter of fact, the 1541s we've recently purchased work very smoothly and haven't presented us with any problems. The availability problem of the 1541 disk drives is also a thing of the past, and they, or the new 1542s, should be available at your local Commodore dealer.

Multiple GOTOs?

I have seen a program with the command GOTO 46,52,78 and so on. How can the computer go to all these line numbers at the same time?

Tom Smith

It is not possible to use GOTO with more than one line number. Your computer can execute only one command at a time; when it sees GOTO 500 the program moves to line 500. This is called an unconditional branch.

The program you saw probably used the ON-GOTO command, which is used for conditional branches. For example, you might use this line in a program: ON AZ GOTO 710, 50, 632, 22, 590. The program checks the value of variable AZ. If AZ equals 1, the program moves to line 710. If AZ equals 2, it goes to 50, and so on. Under certain conditions, the program will GOTO one line; under other conditions it will GOTO another. Other conditional commands include ON-GOSUB, IF-GOTO, and IF-THEN. For more details see the user's manual or the Programmer's Reference Guide.

Naming Programs

I understand you need a program name to SAVE or LOAD a program. Is there any particular place to put that name in a BASIC program? How do you get a program name into a machine language program?

Donald Kaja

A program name is optional if you are using a cassette drive. It is, however, a good idea to name your programs, especially if you are SAVEing more than one on each side of the tape.

Disk drive users have no choice; they must name each program they LOAD or SAVE. The name can be up to 16 characters long. If you forget the name of a program, you can look at the disk directory with the command LOAD"$",8 followed by LIST.

Regardless of whether you use tape or disks, the only time you need to give a name to a program is when you LOAD or SAVE (or VERIFY). When a program is SAVEd, the computer automatically saves the name of the program (on a header*) with the program itself.*

You don't have to put the name inside the program. But it is common practice to use REMarks at the beginning of a program to indicate the name of the program, the person who wrote it, and so on. If you enter programs from COMPUTE!'s GAZETTE*, you might also include the title, page number, and issue. For example, you could add this line: 1 REM DYNAMIC SAVE 120 MARCH 1984 GAZETTE. When your computer sees a REMark, it ignores the rest of the line. REMarks take up space in memory, but in most cases a few dozen bytes will not make a difference.*

To put a name in an ML program, you could POKE the ASCII codes into memory, but unless you are familiar with machine language, you might alter part of the program. Simply name the program when you SAVE it.

Where To POKE And SYS On The 64

POKE and SYS seem to be very powerful commands. I am aware that there are 65,535 locations you can POKE and SYS on the 64. Where can I find a list of the important memory areas?

Steve Schmidt

Each byte in memory contains eight bits, each of which can be either on or off. There are 256 different possible patterns; you can POKE numbers from 0 to 255 into the 65,536 locations.

The computer interprets the numbers either as instructions to do something or as data to be used in a program.

The SYS command tells the computer to forget BASIC for a while and execute the machine language (ML) instructions at a certain area of memory. One of the instructions in ML is RTS (ReTurn from Subroutine), which can send the program back to BASIC. SYS is powerful but can easily be used improperly. If you accidentally SYS to a section containing data, your computer may crash, unless you're lucky enough to

www.commodore.ca

Commodore 64™ Owners, Relax...

with Mirage Concepts software

Mirage Concepts has mastered the art of uncomplicating software. Before you buy—we help you determine which Mirage Concepts package will meet your need. No guesswork! With your purchase comes a menu-driven program ranked by independent evaluators nationwide as among the finest available. Relax as you learn how to operate your program with clear, concise tutorials written by professional writers... not programmers. For consultation on your special questions, technical support personnel are standing by on a toll-free basis.

For Brochures, Support and Information, Call...
(800) 641-1441
In California, Call...
(800) 641-1442

DATABASE MANAGER, $89.95
• 100% Machine Language • Free Form Design • Sort On Any Field • Calculated Fields
• Interfaces to W.P. • Record Size = 2,000 Characters

ADVANCED REPORT GENERATOR, $49.95
• Companion to Database • Totals and Subtotals • Field Matching • Expanded Reports
• Sorting (Up & Down) • Calculated Fields

WORD PROCESSOR, Professional Version $89.95
• 80 Col w/o Addt'l Hdwr • 100% Machine Language • Spelling Checker (30,000 Words)
• Over 70 Single Keystroke Commands • Printer Command File • Interfaces to Database

WORD PROCESSOR, Personal Version $39.95
• 100% Machine Language • True Word Wrap • Printed page/line/character counters
• Right Justify, Center • Printer Command File • Interfaces to Database

MIRAGE CONCEPTS, INC.

2519 W. Shaw Ave., #106 • Fresno, CA 93711

TM—Commodore 64 is a Registered Trade Mark of Commodore Electronics, Ltd.

send it to an RTS.

Most ML programs are written using an Assembler, although you can also POKE them into memory directly from BASIC.

If you're programming in BASIC, there aren't a lot of useful SYSes available. It would be possible to LOAD a program by POKEing a few memory locations and then SYSing to the LOAD routine, but it is much easier to simply type LOAD.

POKE can be a useful command, though. POKE XXX, YYY puts the number YYY into memory location XXX. Try changing the screen color by putting different numbers into 53281 (36879 on a VIC).

To understand what happens in each of the various memory locations, you need a memory map. The shorter maps tell you the name of the memory location and a brief description of what it does. More detailed maps contain information on how memory works and the effects of POKEs. You can find memory maps in Commodore's Programmer's Reference Guide *(available for both VIC and 64) and in various COMPUTE! Books, including the recently published* Mapping The VIC *and* Mapping The Commodore 64.

A memory map of the Commodore 64 would show you numerous useful locations to PEEK or POKE. Screen memory (1024–2023) and color memory (55296–56295) control the image on the screen. POKEing to BASIC RAM (2048–40959) can drastically alter the program you have in memory and is not advisable. The stack, found at 256–511, is used by GOSUB-RETURN and FOR-NEXT to remember where to jump. Zero page (0–255) contains many pointers, flags, and vectors.

A More Visible Checksum

Readers using "Automatic Proofreader" might find this discovery useful. My 64 is attached to a TV set that cuts off the top corners of the screen. This is a trivial problem, except when I want to use Automatic Proofreader. POKE 53265,31 lowers the screen enough so the number is visible.

Paul Hollander

Readers who own 64s should note that this POKE also cuts off about half of the bottom line.

Touch Typing Tutor Update

In the January GAZETTE, *we featured programmer Marion Taylor's* Touch Typing Tutor. *Several readers have written asking for further information about this typing tutorial. This can be obtained by writing or calling:*

Taylormade Software
P.O. Box 5574
Lincoln, NE 68505
(402) 488-0196

MasterCard

Commodore® owners:

VISA

"THE FUTURE IS HERE . . ."

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

The CONNECTION™ is truly the ultimate parallel interface for the VIC20™/COMMODORE 64™. This fully intelligent interface plugs into the disk (serial) socket just like the standard printer and you can easily assign it any device number. It will provide virtually TOTAL EMULATION of the Commodore® printer including all standard graphic characters (normal or inverse), column tabbing, dot tabbing, graphic repeat, dot addressable graphics, cursor up/down mode, and more. It responds to all of the standard commands (PRINT #, OPEN, CLOSE, etc.) to insure software designed for the Commodore® printer will operate with the CONNECTION™. Use it in the TOTAL TEXT MODE, or purchase our Universal* CONNECTION that works with virtually EVERY DAISY WHEEL OR MATRIX PRINTER with standard Centronics Parallel configuration. To take full advantage of your printer's special features, please specify the printer type. Available for STAR MICRONICS, BX80, EPSON, OKI, NEC, PROWRITER, BANANA, SEIKOSHA, RITEMAN, GEMINI10X and others. ONLY $119.00 Complete. (Additional ROMs are available if you should ever change printers).

Dealer And Distributor Inquiries Invited

THE CONNECTION PROVIDES:

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

*Note: Only the Universal CONNECTION will not provide 100% Commodore graphics.

ORDER FROM

MICRO WARE D

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

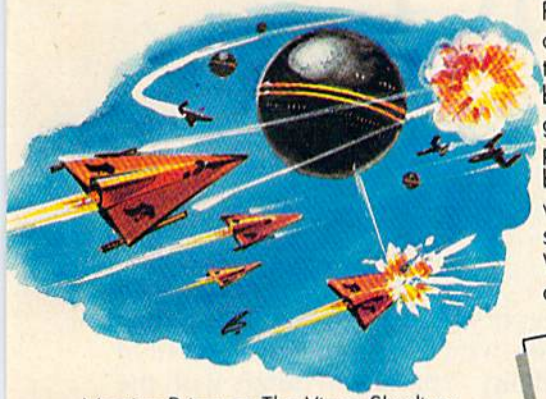
www.commodore.ca

Get more out of your Commodore with

COMPUTE!'s GAZETTE

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.

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!

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 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, 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!

More savings

You can save up to 40% off the newsstand price of *COMPUTE!'s Gazette* by subscribing now. All you do is mail the coupon below or the postpaid card bound into this issue. But don't delay! Subscribe now to start receiving every issue of *COMPUTE!'s Gazette*.

SAVE UP TO 40% ON COMPUTE!'s GAZETTE

Yes! Start my subscription to COMPUTE!'s Gazette at big savings off the newsstand price:

- ☐ 1 year $20—Save $10
- ☐ 2 years $36—Save $24
- ☐ 3 years $54—Save $36

Name _____

Address _____

City _____

State _____ Zip _____

☐ Payment enclosed ☐ Bill me

Charge my

☐ Visa ☐ MasterCard ☐ Am. Ex.

_____ ___/___

Account No. Exp. Date

COMPUTE!'s GAZETTE

CALL TOLL FREE 800-334-0868

P.O. Box 961, Farmingdale, N.Y. 11737

www.commodore.ca

Exploring 64 Sound

Selby Bateman, Assistant Editor, Features

Thanks to a microelectronic marvel called SID (Sound Interface Device), the Commodore 64 has the most advanced music and sound creation system available on any home computer. Packed into one tiny computer chip is nothing less than a sophisticated, programmable, three-voice synthesizer.

Imagine yourself at the keys of a music synthesizer. You deftly finger through a Bach concerto or pound out The Pretenders' latest hit. Meanwhile, your Commodore 64 is channeling the keyboard input into nearby speakers, memorizing the music for later playback and print-out, and offering you sounds that range from the clarity of a harpsichord to the whine of an electric guitar.

Sound far-fetched? The Commodore 64 has what it takes to deliver all of that. And a new breed of music software is emerging to help the 64's remarkable sound system live up to its potential while painlessly educating even the most ignorant would-be musicians.

At the heart of this musical scenario is the versatile SID chip, an electronic synthesizer which hasn't been matched by another home computer since Commodore introduced it on the 64 back in 1982. The power of the SID chip lies not so much in its capabilities, which are outstanding, but in its programmability. You can *do* things with the SID that the sound systems on other microcomputers won't allow.

Simply stated, the SID chip works by combining certain sound *waveforms* to make a variety of other sounds through its three independent voices, or oscillators. SID's waveforms are the *triangle*, *sawtooth*, *pulse* (or *square*), and *noise*. These are the frequency configurations from the computer's output.

Sound itself is little more than a type of kinetic energy produced when, for example, air molecules vibrate in response to the vibrations of some other medium. The Commodore 64's voices produce electrical signals which you shape through programming. The resulting electrical impulses can be sent to an amplifier and then to a speaker system, the vibrating medium which makes the sound waves we hear.

For each voice in the 64, you have a choice of the four waveforms mentioned earlier, plus programmable high-, low-, band-, and notch-pass filters; 16-bit frequency resolution over a nine-octave range; variable resonance; synchronization; ring modulation; and volume control. Another important property of the SID is that you can program the *attack*, *decay*, *sustain*, and *release* for the notes of each voice. *Attack* is the rate at which a

www.commodore.ca

Waveform Corporation's Colortone synthesizer keyboard for the Commodore 64. Scheduled for release by May 1, the keyboard will be priced between $200 and $300.

note reaches its peak. *Decay* is the speed at which a note declines from its peak. *Sustain* is the volume (often thought of as the duration) of the sound after the decay. And *release* is the rate at which a note falls into silence.

Bob Yannes, the designer of the SID chip, says there are a couple of reasons why we haven't seen the SID duplicated or surpassed in other personal computers. "No one has really taken the approach of doing the music synthesizer in a computer the way music synthesizers are really done. Most of the people who work with LSI [Large-Scale Integration of computer circuits] don't have that much experience with synthesizers. They don't know what features are important. They don't know what you do with the things that you put in there."

You don't have to be a professional musician to understand that the SID chip's capabilities offer many opportunities for you to affect the forms of sound coming from the Commodore 64. (See *COMPUTE!'s First Book of Commodore 64 Sound and Graphics* and the soon-to-be-published *COMPUTE!'s Beginner's Guide to Commodore 64 Sound*.) To appreciate fully all of this programmability, it helps to understand that the SID is a giant step in the relatively brief history of sound-producing computers.

The first computer sound effects made use of just about any piece of hardware available, producing some rather strange results. For example, innovative computer users wrote programs to make the keys on printers strike in rhythmic patterns. Others altered the sounds from transistor radios by experimenting with the frequency interference created when programs run at high speed in a computer. Even the cassette port on a computer, which is an audio output, has been used to make limited sounds.

Since the primary purpose for sound in personal computers began with the demand for game sound effects, tone generator chips with simple oscillators have been used extensively. These generators allow you to control the pitch and volume, and often have more than a single voice. But none of them has the programmability of the SID. Even Atari's four-voice sound chip, which represented the state of the art in home computer sound for several years, doesn't have the 64's versatility.

Paul Higginbottom, software development manager at Commodore's Dallas, Texas, offices says the SID chip is still a unique component. "We're probably the leader in terms of the way we've packaged that chip and what we've put into it. It was certainly unusual to put that in a micro."

www.commodore.ca

But what excites Higginbottom now is the availability of a growing number of software packages which use the SID chip effectively. "We've been doing a lot of thinking here about what is *not* out there [in music software]. And we've been having a hard time because we think that most people are slowly covering the areas," he says, laughing. "There's some pretty good software out there. There's no question about that."

That's important. As would-be music programmers soon find out, with the Commodore 64 there are plenty of POKE commands to learn and a considerable number of memory locations involved. The values for each location must be entered as well. All of that adds up to a daunting task for beginners.

Among the newer software products aimed at simplifying your musical efforts is Waveform Corporation's *MusiCalc*, a series of four interrelated disk-based packages. The programs are based on *MusiCalc 1*, which turns the Commodore 64 into a three-voice synthesizer with advanced features like interactive real-time sequencing, slide controls, modulators, and transposers. The program allows users to play along with preset melodies, or create and store their own music for later playback. *MusiCalc 1* has a suggested retail price of $74.95, and forms the basis for several other related products.

The concept behind the series of products, says Waveform President Thomas McCreery, is for "people to have fun first, and then to learn the skills later." The company wanted to market a product that would easily introduce nonmusicians to a broad range of musical applications, while at the same time allowing the experienced musician plenty of options, he adds.

A key to this in the Waveform packages are companion disk templates, each of which contains over a thousand combinations of sounds and melodies, and has preprogrammed musical scores. Selling for $24.95 each, the first template contains African and Latin rhythms while the second template has new wave and rock rhythms. You hear the music by hooking your Commodore 64 to a television, stereo system, or musical instrument amplifier with RCA-plug patch cords. Waveform plans to offer other templates later, depending on the success of the first two.

MusiCalc 2 ScoreWriter shows *MusiCalc 1* users how their compositions and improvisations would look in standard musical notation, complete with bass and treble clefs, staffs, sharps, flats, and incidentals. Priced at $34.95, *MusiCalc 2 ScoreWriter* translates score sequences into notation that appears on the screen in either one, two, or three voices. Connected to a compatible Epson printer with the Graftrax option or to a Commodore VIC-1525 graphics printer, the *ScoreWriter* permits print-outs of musical scores.

MusiCalc 3 Keyboard Maker, at $34.95, turns the 64's keyboard into a synthesizer keyboard. It also provides a set of 72 scales, which you can structure. The effect is to allow you to arrange

www.commodore.ca

LAST NIGHT, COMPUSERVE TURNED THIS COMPUTER INTO A TRAVEL AGENT FOR JENNIE, A STOCK ANALYST FOR RALPH, AND NOW, IT'S SENDING HERBIE TO ANOTHER GALAXY.

NO MATTER WHICH COMPUTER YOU OWN, WE'LL HELP YOU GET THE MOST OUT OF IT.

If you've got places to go, CompuServe can save you time and money getting there. Just access the Official Airline Guide Electronic Edition—for current flight schedules and fares. Make reservations through our on-line travel service. Even charter a yacht through "Worldwide Exchange."

If your money's in the market, CompuServe offers a wealth of prestigious financial data bases. Access Value Line, or Standard and Poor's. Get the latest information on 40,000 stocks, bonds or commodities. Then, consult experts like IDS or Heinold Commodities. All on line with CompuServe.

Or if, like Herbie, intergalactic gamesmanship is your thing, enjoy the best in fantasy, adventure, and space games. Like MegaWars, the ultimate computer conflict.

To get all this and more, you'll need a computer, a modem and CompuServe. CompuServe connects with almost any personal computer, terminal, or communicating word processor. To receive an illustrated guide to CompuServe and learn how you can subscribe, contact or call:

CompuServe

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

800-848-8199

In Ohio call 614-457-0802.

An H&R Block Company

www.commodore.ca

and design musical scales on the Commodore 64's keyboard.

By May 1, Waveform is scheduled to offer an actual synthesizer keyboard for the 64, which will be priced between $200 and $300. It will come with an interface that allows it to work with *MusiCalc 1*, and lets the user play music and automatically record it on disk for later playback or print-out.

All of this represents quite an extensive line of music software and hardware from one company for the Commodore 64. But it's an indication of just how attractive a product the 64 is when it comes to programming sound. We will probably be seeing even more sound and music programs during 1984, and possibly even other keyboards specifically for the 64. Although Commodore itself has actually shown prototypes of a 64 keyboard, it has so far not put one on the market. But, according to one Commodore official, the company is presently in the development stage on a keyboard and eventually plans to make it available. No dates or product specifications have as yet been announced, however.

Without attempting a comprehensive list of every music program available for the Commodore 64, here are a few of the packages aimed at the SID chip.

The Commodore Software division offers a couple of cartridge-based programs, *Music Composer* and *Music Machine* for the 64. No musical ability or computer knowledge is required for *Music Composer*. The computer keys become a piano keyboard, and special "help" guides cover basic editing through advanced techniques. Similarly, *Music Machine* uses the keys as a music keyboard and requires no previous musical knowledge. Melodies and percussion rhythms may be played at the same time since the program has three keyboard sections. Special musical effects like vibrato, glide, and two-voice harmony are among its options. Each program is available for $19.95.

Electronic Arts has produced *Music Construction Set*, available for $40 on disk. (See "Inside View" in this issue.) Using a menu of music and action icons controlled by your joystick, *Music Construction Set* allows you to build your own compositions, and to play with a variety of options, such as sound, speed, and volume. Flexible cut-and-paste editing techniques are included, and your compositions can be printed out as well. The package also features a dozen compositions ranging from baroque music to rock and roll which may be played and altered.

En-Tech Software sells *Studio 64*, a $39.95 disk-based music package which will write the music you play on the screen, and allow block moves, single note editing, and storing and printing of the compositions. The music scrolls across the screen as it plays.

The Alien Group offers the *When I'm 64 Advanced Music Synthesizer System* for the Commodore 64 on disk or cassette for $29.95. This package converts the top two rows of the computer keyboard into a music synthesizer keyboard. It includes advanced features such as vibrato, pulse-width phasing, attack-triggered filter sweep, and a metronome timing track. The SHIFT and CONTROL keys extend the synthesizer's range to seven octaves. There are thirty prerecorded songs included, with menus and written instructions to help you write and save compositions.

This software package also supports The Alien Group's VOICE BOX Singing Speech Synthesizer, which sells for $129. The VOICE BOX plugs into the user port of the computer and translates text into speech. Used with the *When I'm 64* software, the music may be used with a vocal part, including harmony, if you wish.

Jim Mason, manager of customer relations for the Alien Group, points out that the SID chip is a big advantage for programmers. "It gave us the opportunity to get better sounds from the computer other than whatever kind of generators the Atari and the Apple used. So, the music system that's available for the Commodore 64 is superior. Again, specifically because we're able to utilize the SID system," he says.

Electronic Lab Industries has three sound and music programs for the 64. *Note Pro II*, for $46.95 on tape or $49.95 on disk, lets you control the pitch of all three voices. In addition, it offers high-speed play (up to 450 notes per second), eight-measure treble clef display, eight-octave range, ADSR control, and arrangement capabilities. *Note Pro I* is a less powerful program, giving you control of a four-octave range, and is available for $24.95 on tape and $27.95 on disk. Finally, *Note Pro Bridge*, for $24.95 on tape and $27.95 on disk, is a machine language subroutine which allows you to play *Note Pro* music from within programs.

Quicksilva Ltd. has released *ULTISYNTH 64*, a sound and music package on disk for $39.95 and on tape for $34.95. The program incorporates many of the features found on other packages, including controls for filters, envelope, keyboard, pulse parameters, modulation, synchronization, and other options. As with all music programs for the Commodore 64, *ULTISYNTH 64* encourages you to experiment.

Given the great versatility and programmability of the SID chip, what's the next step? How can it be improved?

www.commodore.ca

If you're having a hard time getting organized, here's some good news.

The Home Cataloger.™

With The Home Cataloger, you can set up a complete home inventory system to cross-file your wine, book and record collections. Or even keep your favorite recipes.

Remember birthdays, anniversaries and your Christmas card list effortlessly. You won't even have to try to recall who sent you a Christmas card last year—The Home Cataloger will tell you.

And since it's such a flexible and easy to use program, you'll be able to put it to work almost immediately. Even if you're new to computers.

To help you out, The Home Cataloger comes with 10 ready-to-use cataloging formats for some of the most common uses: telephone list, inventory, travel plans, restaurants, insurance policies, coins, growth (height and weight), running, studies, and book list. All you have to do is plug in your own information.

If you want additional categories, just add them on—simple as that.

Your imagination is the only limit to ways you can use The Home Cataloger.

Stop by your nearest dealer and check out The Home Cataloger. You'll be amazed at all the different ways The Home Cataloger will work for you. You'll also be amazed at the low price.

If fact, you'll probably wonder what you ever did without it.

More ways to use The Home Cataloger:

Organize your stamp collection according to country, commemoratives, people, places, mint, cancelled, or first day categories.

Catalog your coin collection using categories such as date, mint, country, type of coin, or condition.

And, find things easily:

Organized your wine collection by vintner, year, classification, district, grape, color, purchase price, or current value.

Videotapes can be filed in a number of ways: comedy, drama, mystery, adventure, documentary, stars, director, or year made.

Available for: Apple II/IIe, Commodore 64, IBM PC/XT and PCjr.

Price: from $49.95.

For your free 64 page booklet, "Tips for Buying Software," and complete product catalog, please write **Continental Software, Dept. GAZ, 11223 S. Hindry Avenue, Los Angeles, CA 90045, 213/410-3977.**

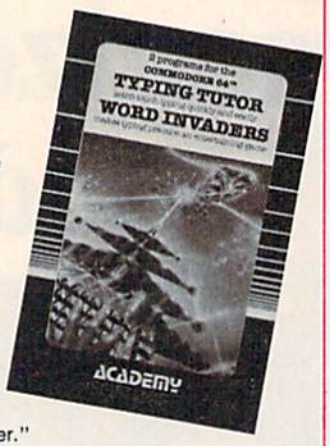
The Home Cataloger is a registered trademark of Continental Software. Apple II/IIe, Commodore 64, IBM PC/XT and PCjr are registered trademarks, respectively, of Apple Computer, Inc., Commodore Business Machines, Inc. and IBM Corp.

Continental Software

www.commodore.ca

VIC 20™ COMMODORE 64™

Still the Best!



Rated **THE BEST** educational program for the VIC 20™ by ***Creative Computing*** magazine.

Commodore 64 version: "This is the best typing tutor we have seen yet; it can get your children touch typing in short order and bring an old hand up to speed. Includes excellent training modules and an arcade type mode to liven things up and put some pressure on; ★★★★+" **INFO-64**

Our customers continue to tell us of their success. . . .

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

(58 year old man writes) . . . "great, excellent. To me a source of great learning . . . I just can't express how much I have enjoyed it!"

In daily use by schools across the USA.

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

TYPING TUTOR + WORD INVADERS

The proven way to learn touch typing.

COMMODORE 64 Tape $21.95
COMMODORE 64 Disk $24.95
VIC 20 (unexpanded) Tape $21.95

NEW!

IFR
(FLIGHT SIMULATOR)

DISK OR TAPE FOR THE COMMODORE 64 $29.95

CARTRIDGE FOR THE VIC 20 $39.95
JOYSTICK REQUIRED

Put yourself in the pilot's seat! A very challenging realistic simulation of instrument flying in a light plane. Take off, navigate over difficult terrain, and land at one of the 4 airports. Artificial horizon, ILS, and other working instruments on screen. Full aircraft features. Realistic aircraft performance—stalls/spins, etc. Transport yourself to a real-time adventure in the sky. Flight tested by professional pilots and judged "terrific"! Rated "Excellent" by Midnite Software Gazette.

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

ACADEMY SOFTWARE

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

Programmers: Write to our New Program Manager concerning any exceptional VIC 20™ or Commodore 64™ game or other program you have developed.

SID designer Yannes, who has worked with synthesizers for years and now runs his own electronic design company, Peripheral Visions, Inc., says that to improve on SID, manufacturers will have to make a quantum leap to a far more complex and expensive type of chip.

"It's hard to justify doing a fantastic sound synthesizer built into any particular personal computer now because to make that quantum leap is going to cost a lot of money," he says. "Just to do a custom LSI chip in general is going to cost a lot of money. Commodore was obviously able to handle that since they have their own design center and processing."

And that may be the answer. As the cost of making computer chips continues to fall, Commodore itself—with its own chip design center—may be the most likely candidate to come up with a new, improved SID.

In fact, Commodore is rumored to be developing just such a new, more efficient synthesizer chip—a super SID. But don't expect to see it this year. According to one industry source, the improved SID will be for a new generation of Commodore computers, not for the 64 or the already announced 264 series (which does not have the SID chip). No matter what happens in the future, however, for now your Commodore 64 continues to be a music-making personal computer second to none.

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

Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171

En-Tech Software
P.O. Box 881
Sun Valley, CA 91353
(213) 768-6646

Commodore Business Machines
1200 Wilson Dr.
West Chester, PA 19380
(215) 431-9100

The Alien Group
27 W. 23rd St.
New York, NY 10010
(212) 741-1770

Electronic Lab Industries
100 W. 22nd St.
P.O. Box 7167
Baltimore, MD 21218
(301) 366-8138

Quicksilva, Inc.
426 West Nakoma
San Antonio, TX 78216
(512) 340-3684

www.commodore.ca

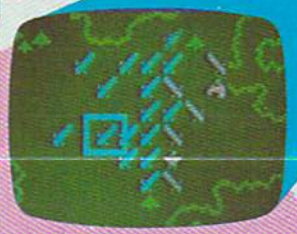
London Blitz

The streets of London are threatened with deadly V-1 rockets. You, as a member of Her Majesty's Royal Bomb Squad, must disarm each one before its timed fuse detonates. A variety of bombs with infinite defusing combinations make for endless nail-biting excitement.

A combination of logic, skill and a little luck is required in this highly-acclaimed computer masterpiece.

Cassette for Commodore 64®, $20
Disk for Commodore 64®, $25
Playing time: 20 minutes to 3 hours;
Intermediate complexity level

Legionnaire



The beat of barbarian war drums echoes through the valleys of Gaul; the crack legions of Imperial Rome are on the move. Outnumbered two-to-one by multitudes of heathen infantry and cavalry, you, as Caesar, must select your terrain and tactics carefully or face annihilation. Beautifully detailed scrolling map lets you examine the entire battlefield in this realtime game of ancient warfare.

Cassette for Atari® (16K) and Commodore 64®, $35
48K Disk for Apple® II, II + & IIe, $40
32K Disk for Atari® Home Computers, $40
64K Disk for Commodore 64®, $40
Playing time: 20 to 45 minutes; Intermediate complexity level

A World of Games

AH QUALITY

microcomputer games®

A Division of The AVALON HILL Game Company
4517 Harford Road • Baltimore, Maryland 21214

These and many other fine Avalon Hill Microcomputer Games are available at leading computer game stores everywhere . . . or call Toll-free: **1 (800) 638-9292** for the name of a store near you. Ask for Operator **W1.**

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

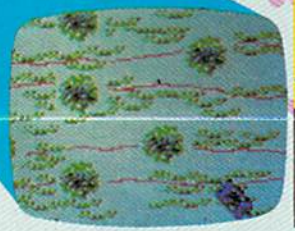
Panzer-Jagd

The endless Russian steppe trembles again with the rumble of invading panzers, and this time you are in command! Your units include platoons of Panthers and PzKw III's with infantry support, all maneuvering over an ever-changing battlefield map. Off-map artillery support is also available to help you combat the hordes of Russian units.

Not just an arcade shoot'em up, **Panzer-Jagd** requires careful tactical planning and, above all, a determination to win. Hi-res graphics and sound effects.

Cassette for Atari® (32K) and Commodore 64®, $25
48K Disk for Atari® Home Computers, $30
64K Disk for Commodore 64®, $30
Playing time: 1-4 hours; Intermediate complexity level

T.A.C.



The wooded plains of Germany are furrowed once again by the steel monsters, the armored fighting machines of WWII. In this realistic tactical wargame, you choose your force from a variety of WWII era armor and infantry. Design your own scenario or select one of those provided and pit your German, British, American or Russian forces against that of a friend or play solitaire vs. your computer.

48K Apple® or Atari® Disk for $40
64K IBM-PC® or Commodore 64® Disk for $40
Playing time: 20 minutes to 1 hour; Advanced complexity level

www.commodore.ca

New Standards For Home Learning

Part 1

Fred D'Ignazio

Recently I read an article by a leading educator in which he called for standards for educational software for the home. "Who must design these standards?" he asked rhetorically. "*We* must design the standards," he answered emphatically, "because *we* are the experts."

But this is not necessarily true. Expertise in using computers in the schools may not carry over into the home.

Why? First, learning at home is not the same thing as learning at school.

Second, we are a long way from realizing the potential of learning using a computer. I have a strong conviction that there are whole realms of computer learning that we have yet to explore. If we were to establish a single set of standards right now, we would stifle software companies' ability to lead us into these new realms.

The Wild, Wild West

Computer learning, especially in an unstructured environment like the home, is a vast, unexplored terrain. It would be foolish to try to define and map this terrain even before we have explored it. We would end up roping off a small part of the territory to confine ourselves in. The rest of the territory, beautiful and vast, would remain beyond our reach and the reach of our children.

The present stage in home computer learning is like the days of the Wild West. We have all sorts of people in the home-learning software industry, including cutthroats, gunslingers, and the like. But we also have pioneers, scouts, traders, settlers, and explorers. And we have gypsylike Indians roaming freely through the whole terrain.

We certainly need some sheriffs and marshals in all this hooting rowdiness, in these gun duels and disorder. But we do not need an outside expert or government official to impose mock order by garrisoning us off and forcing us onto tiny reservations. We still have too much exploring to do.

Structured Vs. Unstructured Learning

According to one expert, over 10,000 companies have already created over 40,000 software packages, any of which, potentially, could be used for learning. And, within another year, this number will double!

Much of the software is excellent. But there is also a lot of junk out there. And there is no way for the average consumer, a parent or a teacher, to separate the junk from programs that will help them or their children—especially since most software can't be previewed before taking it home.

People are concerned. It is natural for them to turn to government policy makers and educational experts for some help and respite. And when the policy makers and experts get involved, it will be natural for them to create a model for home learning based on learning at school.

Unfortunately, this would be a mistake.

Why? First, because learning takes place in school primarily in a structured environment, while learning at home is largely unstructured.

Second, learning at school takes place under the pressure and prod of a teacher's leadership, the school's disciplinary and academic atmosphere, and the competition, opinions, and watchful eyes of one's peers.

In comparison, learning at home is normally done in a psychological vacuum. Parents cannot hope to duplicate the school environment. Most parents do not have the time to play the roles, night after night, of cheerleader, coach, taskmaster, teacher, and friend that a learner, especially a young learner, often finds vital.

Learning at school is curriculum-based, cumulative, and progressive. It follows a well-

www.commodore.ca

AT LAST! EDUCATION PROGRAMS YOUR KIDS CAN'T OUTGROW.

At Timeworks, we know that kids' minds and curiosity never stop growing. So we create educational software for kids of all ages. Little kids. Big kids. Even teenagers, too.

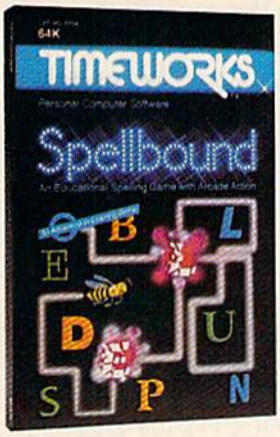
Our educational programs for your Commodore 64* go far beyond the kind of software others offer. Our programs are adventures in learning, with real arcade action. They're totally entertaining, involving, challenging, and enlightening.

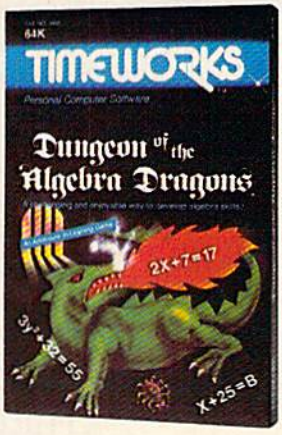
Timeworks **Dungeon of the Algebra Dragons** for instance. A challenging and enjoyable way to develop algebra skills, with 3-D graphics, 5 skill levels, for ages 14 and up. You have been locked in the infamous Dungeon of the Algebra Dragons. To make your way to freedom, you must search through the Dungeon for the two Magic Keys...But beware of the Algebra Dragons. If they find you, you must use your Algebra skills to outwit them or your escape may be foiled.

Timeworks **Spellbound** is an educational spelling game with arcade action and ten skill levels for ages 6 to 18. Spellbound is a captivating combination of Education and Strategy, to keep your child Spellbound while learning basic spelling skills.

Timeworks learning systems are super easy to understand and play. Because helping kids learn is something Timeworks is deeply committed to doing. We believe the substance of success is thinking and learning. So we create educational software with substance—for everyone.

Now at your favorite dealer. Or contact Timeworks, Inc.: P.O. Box 321, Deerfield, IL 60015. 312-291-9200. And be sure to ask about our **Exclusive Cassette-to-Disk Conversion Privilege.**





TIMEWORKS

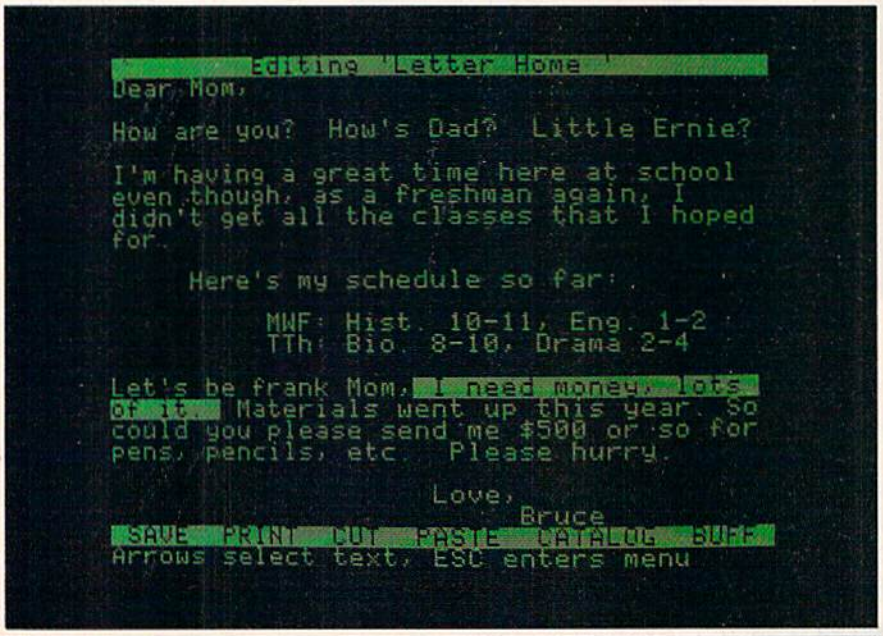
Software With Substance —For Everyone.

*Registered Trademark of Commodore Computer Systems. ©1983 Timeworks, Inc. All rights reserved.

www.commodore.ca

HOME MANAGEMENT SOFTWARE FROM ELECTRONIC ARTS

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



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

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

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

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

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

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

You now know how to use Cut & Paste.

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

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

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

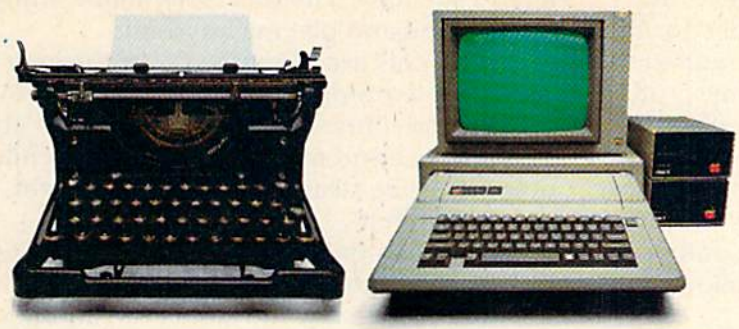
If you think about a word processor in terms of what it replaces (typewriters, pens and paper, files), Cut & Paste begins to look very good indeed.

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

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

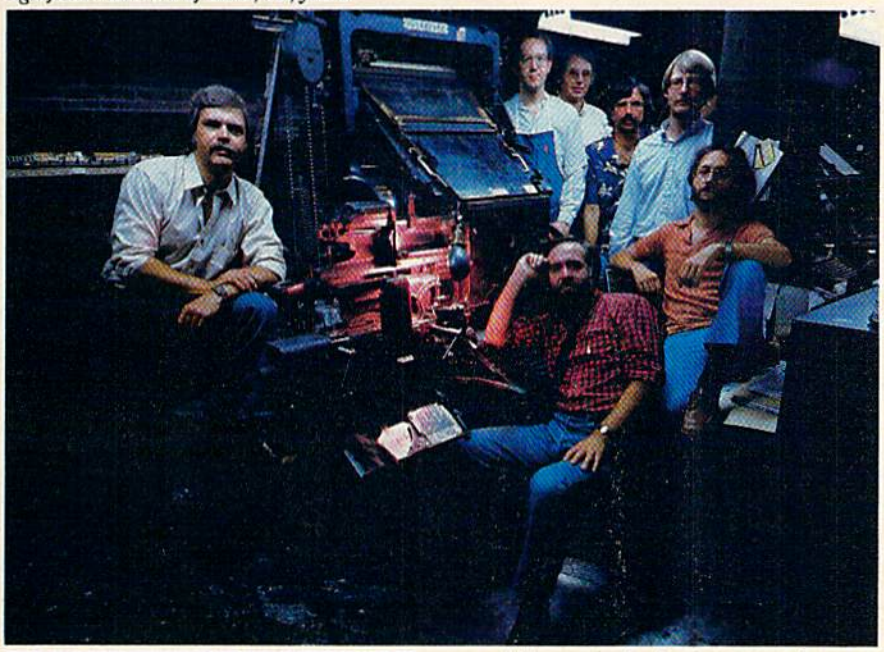
They are people who worked on the internationally-famous user interface designs that led to the Xerox Star® and Apple's Lisa.® They are also

www.commodore.ca



NOW AVAILABLE FOR THE COMMODORE-64

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



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

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

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

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

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

Cut & Paste feels good.

ELECTRONIC ARTS™

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

OUR COMMITMENT TO HOME MANAGEMENT.

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

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

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

Apple and Lisa are registered trademarks of Apple Computer, Inc. Star is a registered trademark of the Xerox Corporation. Commodore 64 is a registered trademark of Commodore Business Machines, Inc. PC is a registered trademark of International Business Machines, Inc. Atari is a registered trademark of Atari, Inc., a Warner Communications company

For a free Electronic Arts catalog, send a stamped, self-addressed #10 envelope.

www.commodore.ca

marked path laid out by the teacher's learning plan, by the school board, the boards of education and testing, and the committees of accreditation.

On the other hand, learning at home is ad hoc and sporadic; it happens in bursts. There is no curriculum or lesson plan to follow. There are no formal standards to meet, to fail, or to surpass. Learning at home is usually marked by the joy, the pain, or the insight of the moment, rather than the result of a coordinated plan followed over days, months, and years.

A Sense Of What Is Right

At school, a teacher can be a leader because he or she has some sense of what is right. This sense comes from training, years of experience, fellow teachers and colleagues, from the insights gleaned from professional books and magazines, and from attendance at conferences and meetings.

In contrast, at home a parent, as teacher, flies by the seat of the pants. Parents have to trust their gut feelings and their dim memories of being students themselves. Parents can certainly nag and demand that their children sit down and do their work, but they can't get them to learn—unless they can somehow lead them into learning. But how can a parent be a leader unless he or she knows where or how to lead?

A New Curriculum For Home Learning

Parents need guidelines for a home-learning curriculum. But it must be something totally new, unlike any curriculum found in school. And parents need help in making decisions as to which home-learning software they should purchase, and how to derive the greatest benefit from that software for their children.

They can't follow the school model. The school "carrots and sticks" will probably not work at home. Children who learn at home, over the long term, will need more incentive than their mom or dad threatening and nagging them, day after day, week after week. Children who learn at home will need software that inspires them, challenges them, and gives them free rein to learn independently and at their own pace.

Above all else, learning software for the home must be *entertaining*. The incentive for learning must come from learning itself. It cannot be imposed from outside. Otherwise, the long-term effect on the child is likely to be more negative than positive. Children will come to resent enforced learning on the computer just as much as I resented being "strapped into" the piano seat for a half-hour of practice every day when I was growing up. After eight years of this kind of "education" I came to hate the piano. Today, many years later, I still have a mental block about sitting down at the piano and playing anything.

If parents are to succeed over the long run, computer learning at home must be fun, even joyful. And it must be meaningful to the child. The purpose and meaning of what the child is doing must be clear, not just to the parent, but also to the child.

Equally important, the child must have control over the direction and extent of his or her learning. Otherwise the child is an automaton or puppet, and will derive very little satisfaction, pleasure, or real learning from all those accumulated hours in front of the computer.

Opportunities For Home Learning

If school models for education are artificially grafted onto the home, computer learning could become very dreary indeed!

Yet something must be done.

Home learning using computers may soon be the complement to and the extension of learning in the school. Preschool children will learn at home on computers. School-age children will do their homework on computers and get remedial instruction. Handicapped children and those with learning disabilities will get valuable learning assistance from the computer to help them keep up with or even move ahead of their classmates. Talented and gifted children will be able to use the computer as a "Space Shuttle" of learning. They will be able to blast off into new areas, on their own, areas that challenge and stretch them to the utmost. They will be able to free themselves from the fetters and the crippling fear of failure they may feel in front of parents, teachers, and peers.

Computer learning at home will also be valuable as an "eleventh period." Children will be able to learn subjects and skills not offered by their school.

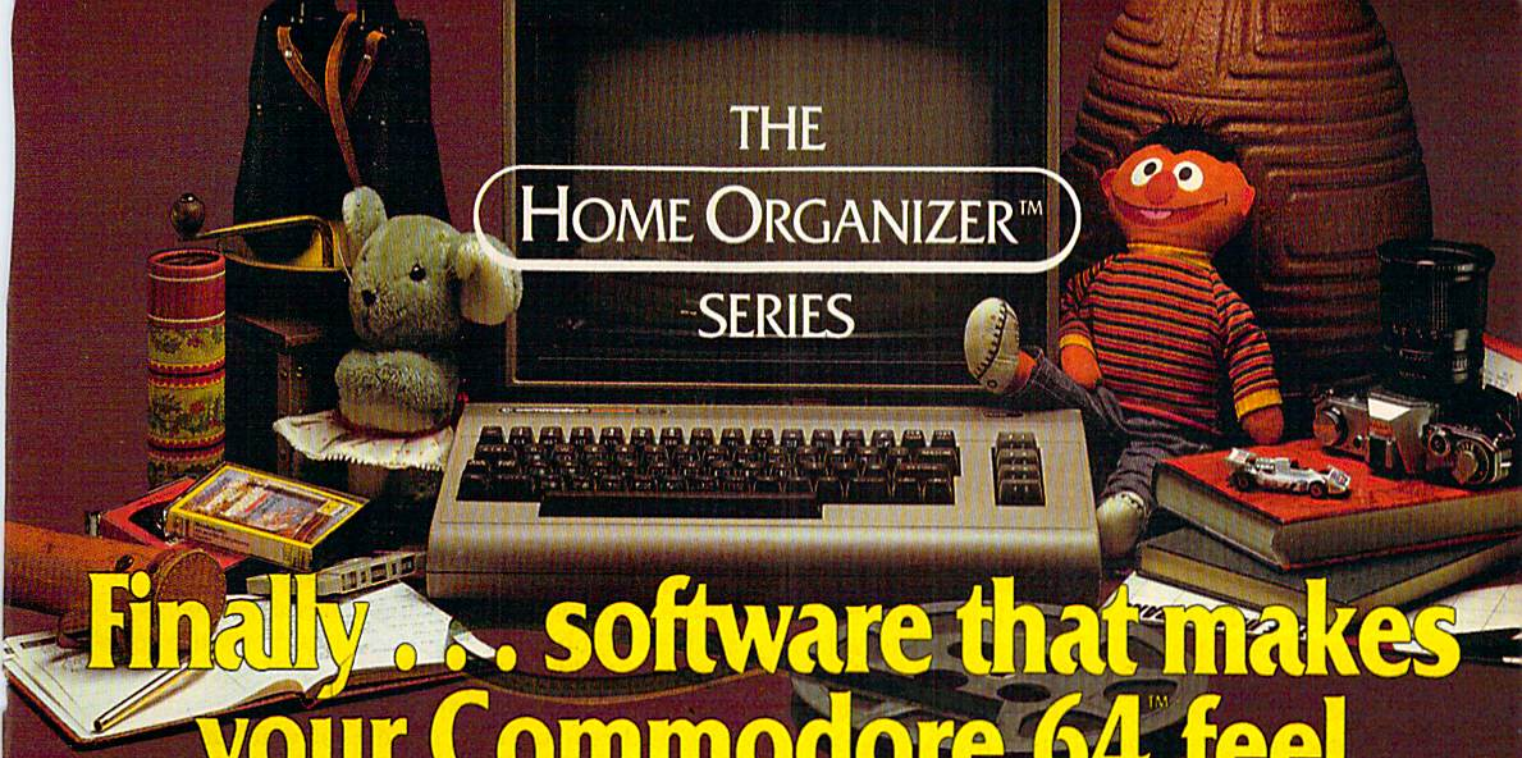
Adult computer learning, too, will be important. Schools will be able to provide "continuing education" courses for adults at home, using computers. Adults will be able to acquire valuable job skills and gain academic degrees by using computers to learn at home.

The Free Enterprise Model

Learning at home shouldn't be constricted by a school-like institutional curriculum or standards. Instead, new kinds of curricula and standards should be created, based on realistic conditions that exist in the average home.

Learning at home on a computer should be as diverse as possible to reflect different families' and individuals' interests, personalities, goals,

www.commodore.ca



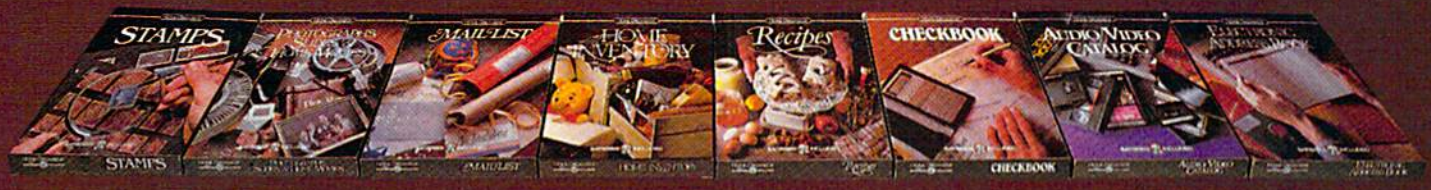
Finally . . . software that makes your Commodore 64™ feel comfortable at home

Now your home computer can help you cook, keep your accounts, find an address or keep track of your record and book libraries—with first-class software specially tailored for the home environment.

The Home Organizer™ series includes a wide range of separate and individual programs for different activities like stamp collecting, personal banking, or home photo and movie collections. Each one is pre-programmed with a "page" format planned out by experts to make it easy for you to store and retrieve the information you'll want for your special activity. You don't have to program anything yourself. Just load the disk and start feeding in your data.

If you're used to run-of-the-mill home computer software, the speed and simplicity of the Home Organizer™ series will surprise you. Each program is written entirely in "machine language", the most basic computer code. So they search, sort and analyze your data with amazing speed.

The Home Organizer™ is fast enough to sort through your household belongings in seconds, yet so simple the children can use it to look up a phone number. Choose any or all program modules that fit your needs. They make ideal gifts, too!



BATTERIES INCLUDED

"Excellence in Software"

For a full color brochure write to:
Batteries Included, 186 Queen Street West, Toronto, Canada M5V 1Z1 (416) 596-1405 / 3303 Harbor Blvd., Costa Mesa, CA. 92626 (714) 979-0920

www.commodore.ca
COMMODORE 64 IS A REGISTERED TRADE MARK OF COMMODORE BUSINESS MACHINES

and abilities. Diversity in computer learning should reflect (and *enhance*) the diversity in people.

Educators need to work along with educational policy makers, parents, children, and computer users to come up with a diversity of new standards, materials, and curricula for home learning.

The best model for home learning might be a *free enterprise model*. Major government bodies, computer users groups, educators, private companies, and consumer groups should each come up with their own packages. There might, for example, be a McGraw-Hill Comprehensive Package of Computer Home Learning Materials, and other packages from Scott Foresman, Addison-Wesley, D.C. Heath, etc. There might also be packages from MECC (the Minnesota Educational Computing Consortium), the Apple Computer Company, IBM, Atari, Tandy, and, of course, Commodore. Consumers Union might have its own package. Children's Television Workshop, CBS Software, Scholastic, Reader's Digest, Sunburst Software, and HesWare might have their own packages.

Each of these packages would compete for the biggest share of computer users. Parents could read evaluations and descriptions of the packages, talk to dealers, and preview the software before choosing the package that was right for them and their family.

Extra-curricular Learning

Not all home learning should be curriculum-based. Not even if we redefine "curriculum" to be something appropriate for homes and families.

Many kinds of software companies should continue producing what they do best—one-shot, maverick programs that are unlike anything anyone has ever seen. These are works of art that delight, charm, entertain, and educate, all at the same time. They might not fit easily into a package or a curriculum, but they deserve to be seen and experienced by every family.

Also, there should be lots of room for content-free, "learning how to learn" software. I would welcome lots of new programs that don't teach us when the Pilgrims landed on Plymouth rock, or how to conjugate a verb in Spanish, or how to solve an algebra problem. Instead they would teach us to be better learners. These programs would help us in all our learning, at home and at school.

Furthermore, learning at home and at school are not always different. I think that many of the unstructured learning exercises targeted at the home could be used in special, unstructured learning times at school. And many types of courseware aimed primarily for the school could be used, with proper materials and parental guidance, in the home. Above all, there should not be a wall separating learning at home from learning at school. Instead, it should be a broad, circular continuum that melts together and meets at either end.

Horse Breeders, Plumbers, And Brain Surgeons

Completely new modes of learning may be discovered yet.

A home-learning curriculum might be devised based entirely on real-world career domains. For example, all computer-based home-learning courses shouldn't just be on *knowledge domains*, such as Algebra I or language arts. Software companies should also offer children full-scale courses on how to be a space shuttle pilot, how to manage a nuclear reactor, how to be a software designer, a fashion photographer, a horse breeder, an archaeologist, a diplomat stationed in Latin America, an executive in a multinational corporation, a plumber, brain surgeon, or a police detective.

In these courses, knowledge domains would be subsidiary to *career domains*. Kids would pick up the physics, math, language arts, and social studies they needed to get their credentials in the various fields. The youngest kids would naturally become junior horse breeders and archaeologists. The models that they would have to master would be simpler, yet for them, no less exciting and challenging.

Older kids would have to work with more complex, lifelike models of the real world and of the careers they were studying. They would work for milestones like Apprentice and Assistant on the way to achieving mastery of the career.

Perhaps work-study internships could even be set up to coincide with advanced home-study programs for teenagers and young adults. Companies and government agencies could open their doors to student interns who had mastered their "career courses." In this way, young people could complement their home learning with on-the-job training and real-world experiences. Employers would benefit by getting to see a crop of enthusiastic, well-trained young people.

The programs of study should be diverse, entertaining, and short enough to encourage children to try as many careers as possible. The programs should be rewarding, playful, and encourage social and emotional skills as well as intellectual skills.

My thanks to the many industry watchers who, through discussions during the recent Consumer Electronics Show, helped contribute to the ideas in this article.

www.commodore.ca

COMPUTE!'s GAZETTE DISK

COMPUTE!'s GAZETTE DISK will premier with the May 1984 issue of COMPUTE!'s GAZETTE. When you subscribe to COMPUTE!'s GAZETTE DISK, each month you will receive a fully tested 5¼-inch floppy disk which will run on either your Commodore VIC-20 or 64 personal computer. Each issue of COMPUTE!'s GAZETTE DISK will contain all of the programs which appear in the corresponding issue of COMPUTE!'s GAZETTE. You'll save hours of typing time and be able to enjoy all of the high quality software found each month in COMPUTE!'s GAZETTE.

Here are just a few of the quality programs which will appear in the May 1984 issue:

- *Props* — a fast-paced, nonviolent game for the Commodore 64. Animated with machine language, the game puts you in control of a pigeon lost in a dangerous sky filled with whirling propellers. Your goal is to make it across the sky to find your skittish mate, who moves unpredictably from coop to coop.
- *SuperSprite* — an unsteady flyer depends on you to guide him down through a series of unfriendly kryptonite barriers. For the Commodore 64, SuperSprite makes effective use of sprite animation and sound.
- *PRINT Sound* — a utility for the VIC-20 which translates letters into musical notes. All you supply is a simple PRINT statement.
- *Sound Story* — an exciting demonstration program that illustrates the sound capabilities of the VIC-20. A story with screen text comes to life with the sound of crickets, lightning and thunder, a UFO in flight, and Morse code.

and many more!

Ordering Information

To Order:
To reserve YOUR copy of the premier issue of the GAZETTE DISK and enter your subscription, return the attached postpaid card or call COMPUTE!'s GAZETTE TOLL FREE 800-334-0868 (in North Carolina 919-275-9809). All orders must be prepaid—send check or money order or charge to VISA, MasterCard, or American Express.

Subscription Rates:
Six month subscription $39.95
(add $18 shipping and handling outside the US and Canada)
One year (12 mo.) subscription $69.95
(add $36 shipping and handling outside the US and Canada)

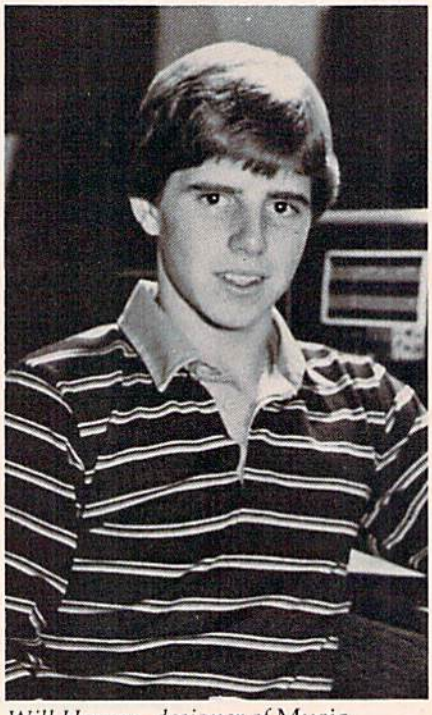
Individual Issues:
Individual issues of the GAZETTE DISK can be ordered for $7.95 (in the US and Canada add $1 per issue for shipping and handling. Outside the US and Canada add $3 per issue). Individual issues can be ordered by calling TOLL FREE 800-334-0868 (in North Carolina call 919-275-9809), or by sending your prepaid order to: GAZETTE DISK, P.O. Box 5406, Greensboro, NC 27403.

www.commodore.ca

Will Harvey
The Programmer Behind *Music Construction Set*

Kathy Yakal, Editorial Assistant

Some professional programmers draw a blank when you ask what they do in their spare time. "There isn't any," they say. Not so with the subject of this month's "Inside View," Will Harvey, the programmer behind *Music Construction Set*.



Will Harvey, designer of Music Construction Set.

"Programmer" doesn't mean what it used to.

The next generation of program designers will need more than just expertise in BASIC and machine language. As programming itself becomes less complicated, and hardware capabilities allow better graphics, sound, and depth of play, the intricacies of the programs themselves will become more important. The successful designer will be the one who can develop glorious ideas, the "guy with the vision," according to many of today's programmers.

Will Harvey, the designer/programmer of Electronic Arts' *Music Construction Set* has a good chance of being one of those people, considering his early success—and his confidence, technical ability, and emphasis on ideas.

But Will Harvey may decide that he has other plans for the future. "Computers are just another hobby for me," he says. "I wouldn't consider it a profession, or anything that takes precedence over any of my other activities."

Those other activities are many and varied. Seventeen-year-old Harvey is president of the student body at Uplands Senior High School near his home in Foster City, California. A straight-A student, he plays football and basketball, sings in the school chorus, and is an Eagle Scout.

School celebrity? Not really. "People at school know I'm interested in computers. They know I've been in some big magazines," he says. "But that's not a big thing."

Music Construction Set evolved in a rather roundabout way. Harvey bought a Commodore PET about five years ago. "It was the only one I could afford," he says. "It was the kind of thing where you save up money from a paper route, and your parents go half and half with you.

www.commodore.ca

When it comes to superior performance, we study our lines very carefully.

Superior printer performance is not a fluke. It evolves from analyzing printed line after printed line. Taking the time to test and retest. After 30 years of manufacturing precision parts, we know that there are no shortcuts.

And so we took the Gemini-10X and methodically put it through its 120 cps pace. We achieved a print head life of over 100 million characters with an extremely precise dot alignment creating each crisp character.

So far so good.

Next, sophisticated performance demanded versatility. A wide choice of character sets, a buffer expandable to 8K, and the ability to interface with all popular personal computers. We added macro instruction, giving Gemini-10X the capability to perform up to 16 operations with one command. We included as standard a paper feed system that has a friction and fully adjustable tractor feed. Then we even built in the dexterity to print graphics and text on the same line.

Done.

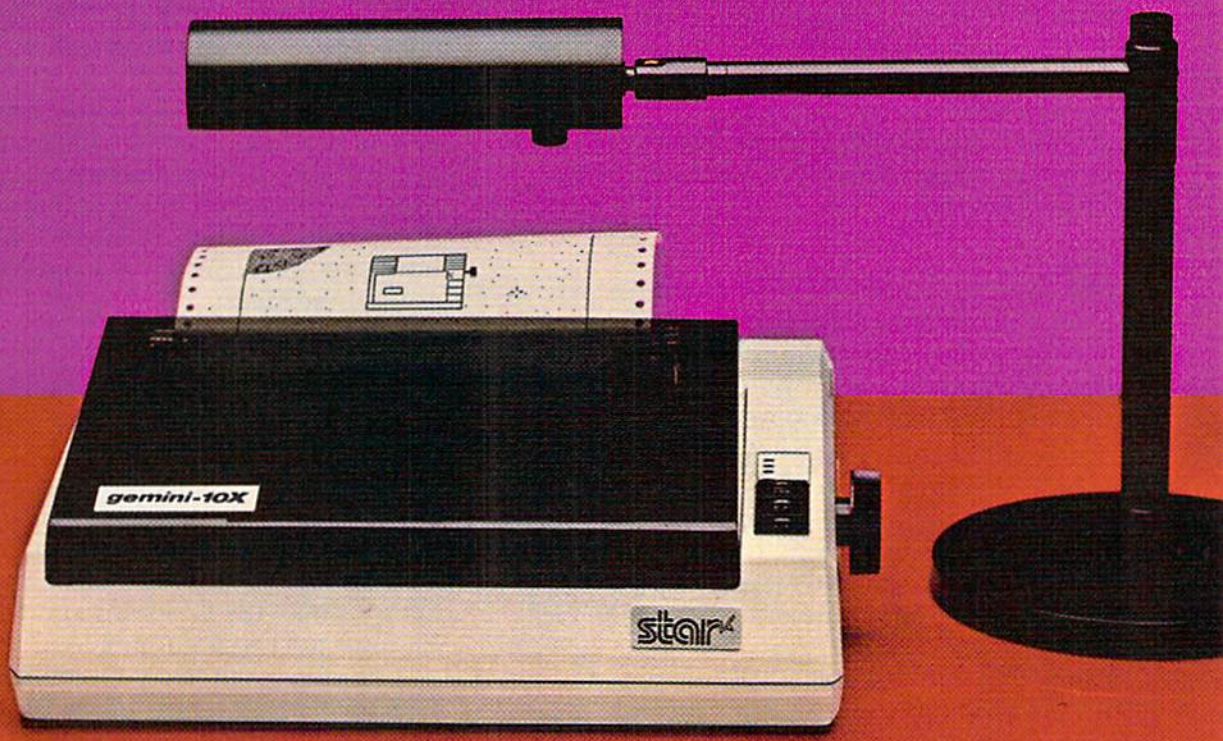
And, of course, staying the best means constant reviewing and fine-tuning. Keeping the Gemini easy to find, easy to afford and so reliable it can be warranted for up to twice as long as its major competitors.

Only the most careful engineering has built the new hard-working Gemini-10X. You'll applaud its performance.

star™
micronics·inc

THE POWER BEHIND THE PRINTED WORD.

Computer Peripherals Division
2803 N.W. 12th Street, Dallas/Ft. Worth Airport, TX 75261



www.commodore.ca

"I just played around with it as if it were a toy at first. I had no serious interest until about two years ago, when I started using it as a tool to program on."

Harvey traded his PET for an Apple at about that time. He was working on a game called *Lancaster*, which was to contain some music. To incorporate music into the program, he created a mini-music construction set. "I had to convert sheet music into numbers the computer could understand," he says. "Originally, it was a tool for me, an interface between me and the computer."

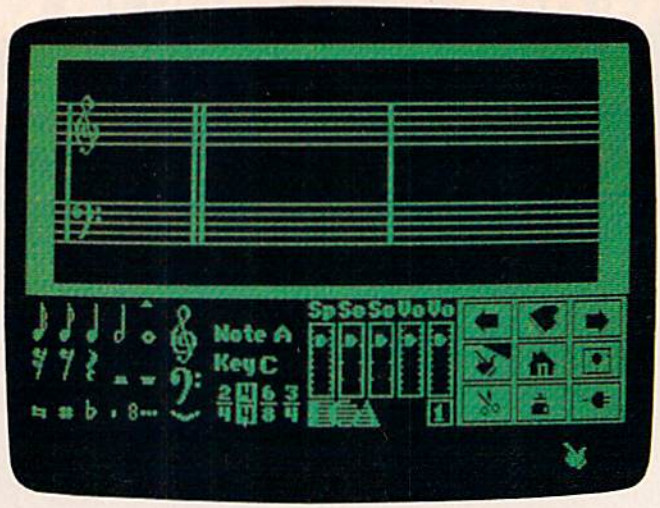
In the process, Harvey found out that creating music on the computer was fun. Having completed *Lancaster*, which was published by Silicon Valley Systems, he set to work on a program that would allow people to learn about and have fun with music.

"I didn't know much about music beforehand," he says. "I went up to people in the school chorus and asked them questions.

"The more I learned and put into the program, the more I realized that this was a fun thing to do. What the program could do for people was to provide an environment where they could learn about composing and playing music without having to learn an instrument."

Another aspect of the program that Harvey discovered later was its use as a tool. "It's very much like a word processor for music," he says. "It lets you move around notes and transpose music, just like you would move around text when you're writing something."

Electronic Arts discovered Harvey through one of its programmers, and published *Music Construction Set*.



By moving the hand (bottom right of the screen) with a joystick, you can easily create and edit your own music.

M*usic Construction Set* lets you do just what the name says. It allows you to compose three-part melodies, listen to them, and print them out. It's easy to use, and uses the graphics and sound capabilities of the Commodore 64 quite well.

You might imagine that its programmer was a technically-oriented tyke who grew up taking apart the toaster and television and anything else he could get his hands on.

That kind of image is inaccurate among today's young programmers. "I'm not an electronics whiz," says Harvey. "I'm not even a computer whiz. I'm just able to take an idea and put it in a fantastic form.

"There's a difference between a computer whiz and a computer artist. A computer whiz is someone who's a very good programmer. A computer artist is someone who designs and fully makes a game. A programmer is just someone who programs it.

"You have to have some technical background, but that's not really what makes a good program."

So what does it take? "I have sufficient background in electronics and computer programming to do it," says Harvey. "But that's not really what makes a good programmer. It's like having writing skills. That doesn't mean you're going to write a good book.

"What you need is lots of imagination and confidence in yourself. I think the biggest thing is enough confidence in yourself so you can take an idea and develop it.

"Once you've got the perfect idea, only then do you say, 'How am I going to do this?' That, in my opinion, is the perfect approach to writing a program. The ideal program doesn't have anything to do with how difficult it is to program, or how impossible. You have to develop the idea around the ideal."

Next fall will probably find Will Harvey attending classes at nearby Stanford University. Studying computer science? "No. I'll probably study the pure sciences, or maybe history. I know as much about computers as I want to know," he says. "Not to say that I know everything, or even a whole lot about computers. I know enough to keep doing what I'm doing right now. I'm sure I'll continue programming."

Harvey is currently finishing up an Atari version of *Music Construction Set*. Beyond that, he's planning two different types of games, one fast-action and one fantasy. He's also working on some programming utilities. "There's still a very wide gap between the way people think and the way computers work," he says. "Resolving that problem will be the ultimate breakthrough. I'm endeavoring to close that gap."

www.commodore.ca

SEE THE LIGHT!

Quality Software that Outshines the Rest

Programs for the Commodore 64

dMOS™

Database Management Operating System

The BEST data base management tool for the collection, arrangement and display of alphanumeric data.

A unique pattern matching and searching capabilities make dMOS™ the easiest DB system available on the market.

Features:

- Map search technique to achieve a "logical AND", while searching between fields.
- Display records found, or NOT found by a search.
- Rearrange fields.
- Suppress fields and field titles.
- Insert short (10 character) text.
- Selectively print records.

$39.95

SoftLoc™

The Program Security System

Set up program security in minutes.

Lock up your personal, financial or business records.

3 types of protection:

- Re-encodes program.
- Modifies diskette directory.
- Selectable and reassignable 7 digit access code.

$29.95

and announcing. . .

Missing Key™

A reset System
Restores your BASIC Program.

After programming for hours you press RUN for a final check of your work — the computer locks up. You press RUN, STOP. . . nothing — you press RESTORE. . . nothing — you look for the missing key but it isn't there. You have to turn off your computer and lose hours of work!!

Now Add the Missing Key™:

- Press the "Missing Key™" and the computer resets itself from any lockup, and your BASIC program is restored.
- Load and run the program included.
- Takes nothing away from your computer, neither memory nor a plug-in port.
- Attaches to your C64 keyboard or any other convenient location.
- Will not void your CBM warranty.

$29.95

Phone Boss™

Personal Phone Directory Program

Designed to store and organize your personal phone listings.

The user has complete control of 15 category titles and entries.

$29.95

Software by SoftPeople ■ Programs for the Commodore 64 ■ Connecting People with Great Ideas.

SoftPeople Inc.

2042 Marshall Ave. St. Paul, MN 55104 **(612) 644-1551**

by Softpeople, Inc.

MasterCard VISA

Dealer Inquiries Invited
1-800-447-3273
Special P.O.P Packages & Prices Available

www.commodore.ca

SpeedScript Revisited

Charles Brannon, Program Editor

Got a question about "SpeedScript"? Find an answer here, along with some tips on advanced uses for this popular word processor.

The letters keep pouring in: The response to "SpeedScript" (COMPUTE!'s GAZETTE, January 1984) is overwhelming. Our readers are well pleased with the speed, power, and low cost of this powerful word processor.

To help answer the deluge of questions brought up by our readers, we'll cover them here in this article.

The Good, Bad, And The Ugly

SpeedScript was extensively tested before we released it. That's good. However, a few changes were made after this testing to improve efficiency. That's also good. But after this change, one command was not adjusted. That's bad. The [n] command, for next page, does its job too well. It feeds on to the next page, and the page after that, the page after that, endlessly. And that's ugly. There's no simple fix for this command; you cannot insert changes in machine language like you can in BASIC. It would require you to retype the entire program. And that would be uglier still.

Fortunately, this command has been fixed on the version of SpeedScript available on the GAZETTE DISK. Those who order the first issue of the GAZETTE DISK, either through subscription or single-copy, will receive as a bonus a revised, updated version of SpeedScript. If you were unable to obtain a copy of the January GAZETTE, which quickly sold out, you can still obtain SpeedScript without even having to type it in. I'd call that quite a deal.

A Hidden Command?

Many readers "discovered" a new command in SpeedScript that sets the line spacing. The [s] command was not mentioned in the article, although there is a cryptic reference to it. There are no hidden commands in SpeedScript, just poorly documented ones! It's just as well that [n] was left off the quick-reference card, but [s] works just fine. First type CTRL-£ (or CTRL-3), then enter [s] and follow it with the number you want for line spacing: 1, 2, or 3. You can use any number, really, if you want something like four or five spaces between lines.

The Deadly Linefeed

SpeedScript will double-space by default, though you can change it with the [s] command. Some people found they were getting triple-spacing, though. Worse still, this threw off paging, so headers and footers would be in the middle of the page. The problem is caused by the *deadly linefeed*.

A carriage return should return the print position to the left, then down a line, simulating carriage return on a typewriter. Two operations are involved, though. Carriage return just returns the carriage (printhead) to the start of the same line. The platen or tractor feed then scrolls the paper up a line. This is called a *linefeed*. The combination is a CRLF, Carriage Return/Linefeed.

The code for carriage return is 13, and on

www.commodore.ca

Flight Simulator II

For the Commodore 64™

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

See your dealer . . .

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

Order Line: 800/637-4983

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

www.commodore.ca

most computer screens acts as a CRLF. Many printers are set up like this, too. But some programmers realized that if you could separate carriage return from linefeed, you could overstrike a line. If you returned the carriage without linefeeding, you could underline a whole line by just printing a bunch of underlines after you did a carriage return. You would then send a linefeed by itself (CHR$(10)) to advance the page for the next line.

But if you are not trying to do this little trick, you get a 50-page document all on one line. For SpeedScript, you need the printer to go up a line at each carriage return.

Since printer manufacturers want their printers to be flexible, they allow either option: CHR$(13) performs a carriage return or a linefeed. Since SpeedScript does not send linefeeds (to make life easier), your printer should be set up to make automatic linefeeds. The Commodore printers will always perform a CRLF (although you can send CHR$(141) to return without a linefeed). You can usually open up your printer (or reach through a slot in the back, or under the paper cover) and slide tiny little DIP (Dual In-line Packages) switches to change the way carriage returns work. Get out your manual and a magnifying glass.

Paper Alignment

Other readers find it hard to print a document of several pages. The first page looks okay, but the subsequent pages are off by one line, with the footer appearing not on the bottom of one page, but at the top of the next. This is not a problem with SpeedScript, but with paper alignment. You must have the printhead set so it would print its first line *exactly* at the top of the page. SpeedScript will skip a bit past this, but it is important for the sake of paging, especially if you use headers and footers. Trial and error will teach you where to position the paper.

Gemini printer owners sometimes find that paging is very inaccurate. Their problem is that some Gemini printers (and Epson printers with Graftrax Plus or better) will automatically skip over the paper perforation. The printer may do this while SpeedScript is trying to skip lines to get to the next page.

The trick is to disable the automatic skip-over-perf mode. The code for this on Gemini printers is 56. To send this code, OPEN 4,4:PRINT#4, CHR$(56):CLOSE 4 before you load and run SpeedScript. You can also initialize other printer features this way before you run SpeedScript, but be sure not to turn off your printer, or this will reset all the default modes. Consult your manual for a list of codes you use to change modes on your printer.

You can also change this mode from within SpeedScript. On a separate line enter:

```
[9]=56←
```

Remember that commands, represented here in brackets ([ ]), are obtained by typing CTRL and the English pound symbol (£), followed by the desired letter or number. Commands appear on the screen in inverse video. Now you can embed the [9] by itself on another line, or at the start of a line by itself. Here are three ways:

```
[9]=56←
[9]←
The quick brown fox...←

[9]=56←
[9]The quick brown fox...←
[9]=56[9]The quick brown fox...←
```

I gave all these examples to help those of you who are confused about how to use the programmable numbers. Some of them are predefined, as in [1]=27. If you want to go into emphasized mode on the Epson printer, you would send in BASIC: PRINT#1,CHR$(27);CHR$(69).

Since CHR$(69) is the code for E, you could also use PRINT#1,CHR$(27);"E". In SpeedScript, you would embed [1]E. The [1] will send out CHR$(27), and the E right after it would then be sent. By the way, be sure you use a capital E, since a lowercase E would be sent as a CHR$(101).

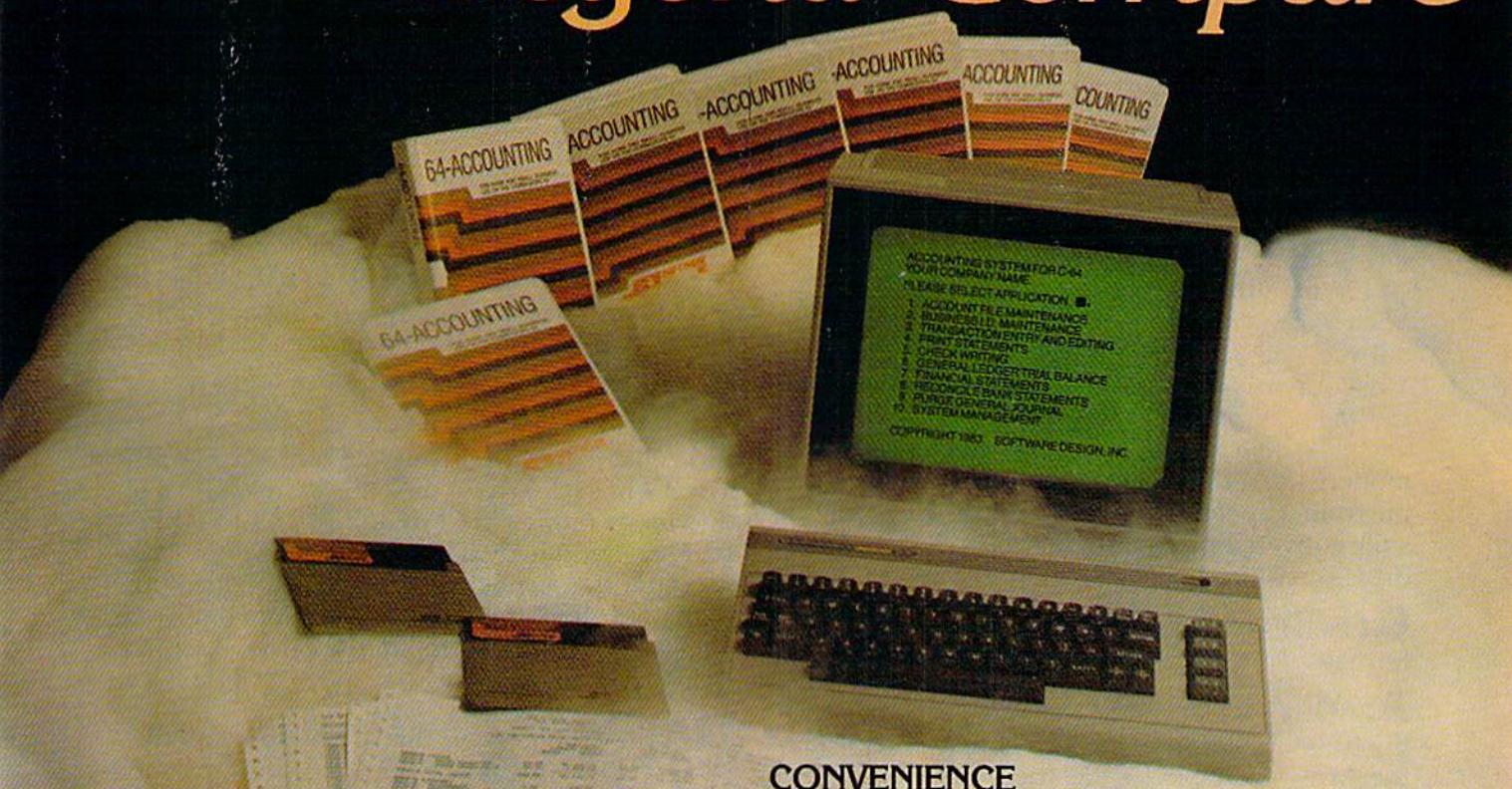
Some interfaces have their own escape commands, so CHR$(27); "E" would either perform an interface command, or it would be ignored. In either case, you wouldn't get Enhanced mode. You may be able to get past the interface by sending ESCape twice: [1][1]E. Otherwise, you may be able to turn off your interfaces's emulation mode and operate SpeedScript in the true ASCII mode by placing an [a] at the top of your document.

On some printers you'll get better performance by adding 128 to the mode code: [1]=155 instead of [1]=27.

Remember that SpeedScript doesn't understand the intent of the programmable numbers. It just sends the codes out. If you sent out a CHR$(12) as a formfeed, the printer would indeed skip to the next page, but SpeedScript thinks it is still on the same page, and will probably try to skip over the perforation in the middle of a page. Double-wide characters are also treated as single-width by SpeedScript. If you center a double-width phrase, SpeedScript will skip to the center position as if the phrase were single-width, then print the double-wide characters off-center. Again, only the printer knows to print double-wide characters. One way to get around it is to pad out the line you want to center with an equal number of spaces. The centering will be based on twice as many characters, but the extra spaces will not be visible. @

www.commodore.ca

64 Software Beyond Compare



Introducing The New 64-ACCOUNTING SYSTEM.

If you can't put your finger on your total financial picture, we've got the answer. Software Design, Inc. has a personal software accounting package designed for your Commodore 64®.

Even if you're all thumbs, we offer a support line and an easy-to-follow manual written in plain English. Created for home and small business demands, the 64-ACCOUNTING SYSTEM puts financial management at your fingertips.

FLEXIBILITY

Design your own financial statement with no rigid account number system, and with flexible subtotal possibilities. Take the guesswork out of checkbook balancing. Distribute checks and receipts to 20 separate accounts. Establish monthly, quarterly, or yearly accounting periods. 64-ACCOUNTING expands with your financial management needs.

CONVENIENCE

Organizing your tax return has never been easier. 64-ACCOUNTING offers up to 10 checking ledgers for those special home and business accounts. Teams with your printer to write checks, print statements, profit and loss and trial balance sheets. Even offers mini accounts receivable and accounts payable ledgers.

PRACTICAL BUDGETING

Control your expenses with the 64-ACCOUNTING SYSTEM'S budgeting ledgers. Monitor your past expenses against projected costs. It's so versatile you can select year-to-date totals or any span of months for comparison budgeting.

Plan your financial future around the 64-ACCOUNTING SYSTEM. There may never be a better time than now. **$69.95. To order call 1-800-553-0002. In Iowa call 1-800-772-5771.**

Dealer and distributor inquiries welcome

SOFTWARE DESIGN, INC.

P.O. Box 570, Waterloo, Iowa 50704

For use with Commodore 64® and disk drive.

Copyright 1983 — Software Design, Inc.

Commodore 64 is a registered trademark of Commodore Business Machines, Inc.

www.commodore.ca

Speaking of centering, SpeedScript will always center in the middle of a 8½-inch wide piece of paper. If you had a 40-column printer and changed the left and right margins, centering would not conform to the new page width. SpeedScript thinks the page is 80 columns wide no matter what the left and right margins are. SpeedScript also assumes the page length is always 66, for 11-inch paper. If you have a 40-column printer or 10-inch paper, you have my sympathy. Next time I'll get it right.

Questions And Answers

Many people had the same questions, so I can sum up a good many answers to letters right now:

Q: Is SpeedScript compatible with *EasyScript 64?*

A: No. SpeedScript and *EasyScript* store text within memory and on disk in different ways. You can load an *EasyScript* file into SpeedScript, but you will have to do a lot of work to get it right. Most other word processing files cannot be seen by SpeedScript, either. Many people would also like to be able to send SpeedScript files over a modem in ASCII, or create an ASCII sequential file from a SpeedScript program file. Program 1 is a file conversion program for SpeedScript. A disk drive is required.

Q: Can I save SpeedScript files in "rabbitized" format?

A: Many VIC-20 and 64 owners with tape use the ROM Rabbit from Eastern House Software, or the Arrow from Skyles Electric Works. These programs in ROM add commands to BASIC that permit you to load and save tape programs at a substantially accelerated rate. But these products are not hardware peripherals, and there is no way to treat them as such. In any case, SpeedScript doesn't like ROM cartridges, since they reside within SpeedScript's usable text area.

Q: I am a Francophone, and would like to be able to print letters of the alphabet with accent marks. How do I modify SpeedScript to do this?

A: You don't have to. If you don't need to see them on the screen, you can have them on paper. Just overstrike the letter with an accent mark. Define a programmable number, and use it to print the letter e, the code for backspace (CHR$(8)), then an accent mark, like this:

```
[5]=8[RETURN]
Je suis enchante[5]' de faire votre
connaissance.[RETURN]
```

If you can't do it with overstriking, you may be able to define a character on your printer (see the example in the SpeedScript article).

Q: When I print out something with SpeedScript, it will always skip to the next page after it finishes.

A: Sorry. There's a tradeoff involved: Some people want to go ahead and remove the document from the printer right after they print it, so it's nice that SpeedScript ejects the last page. But the real reason is that SpeedScript must go to the bottom of the last page in order to print the footer, if any.

Q: For several reasons, I want to be able to print out in all uppercase. I could type it all in lowercase, then use CTRL-A to reverse it all, but this seems like a lot of trouble.

A: You don't have to use CTRL-A. Just type it all in lowercase. If you have a Commodore printer or an interface that emulates one, put an [a] at the very top of your file. This will have the effect of reversing upper- and lowercase. If you usually use [a] to get upper- and lowercase, just omit it.

Q: How do you insert a line in the middle of text?

A: A blank line is represented by a carriage return symbol (a back-arrow) on a line by itself. Just go into insert mode (CTRL-I) and press RETURN wherever you want a line break to appear. The text after the carriage return will be pushed down to the next line. If you want to insert a line of text, just put the cursor on top of the carriage return, then type it in.

Q: Can you get more than 80 columns on the printer? I'm using my printer's proportional mode, which can take 100 characters to fill up a line.

A: Just increase the right margin, as in [r]100.

Q: How do you abort a printout?

A: Hold down the RUN/STOP key while the printer is printing. This key is checked for only while text is being printed, not form feeds. You need to hold it down until it "catches." When you let go, you'll be back in SpeedScript. SpeedScript waits for you to let go of the key to prevent you from accidentally inserting spaces into your text.

Q: How can I get SpeedScript to work with an 80-column board?

A: You would need to be a machine language programmer and have a copy of the source listing of SpeedScript. You would also have to have documentation on how the 80-column board interfaces with your machine. SpeedScript updates directly on the screen. It does not go through PRINT, which is all most 80-column boards trap.

www.commodore.ca

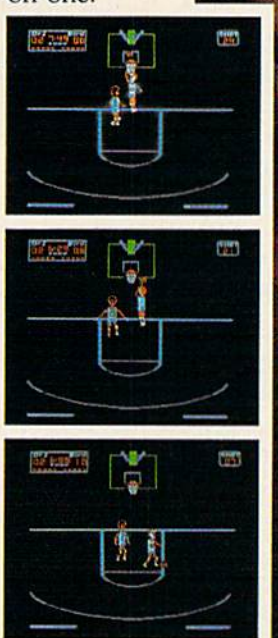
SOFTWARE ARTISTS?

How we got this year's hottest sports game out of two rather inexperienced designers.

TO MAKE THE FIRST BASKETBALL PROGRAM that feels like the real thing, it helps to start with two guys who know what the real thing feels like.

Enter Larry Bird and Julius Erving. Bird – the hustler, the strong man, deadly from outside. Erving – The Doctor, maybe the most explosive player in the history of the game.

We talked to them, photographed them in action, studied their moves and their stats and their styles. Then we set out to create on computer disc an event which may never happen in real life. We put the two of them together on a dream court of light, for an electronic afternoon of one-on-one.

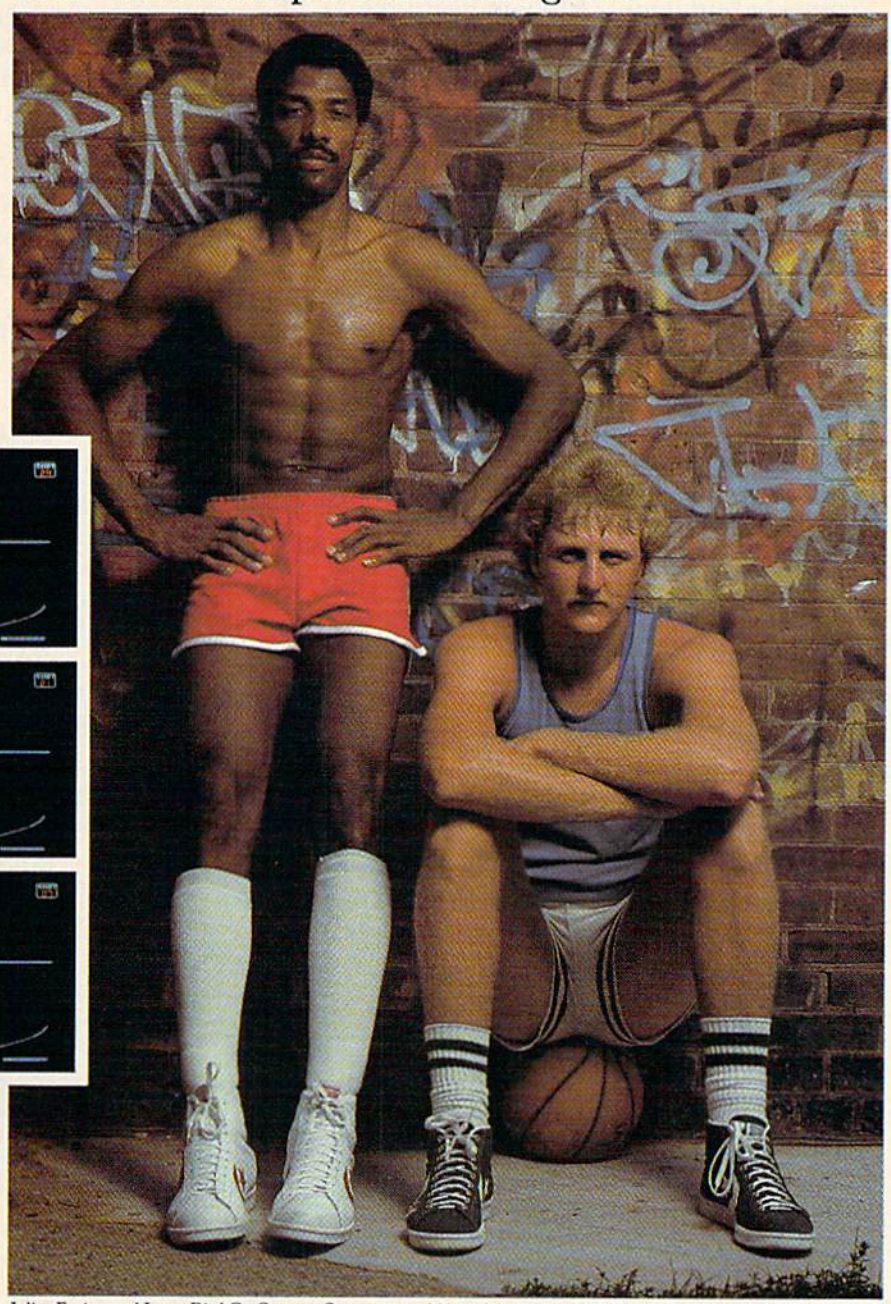


It wasn't easy. When they talked, we listened. When they criticized, we made big changes. When they gave suggestions, we took them.

And it shows. This thing is absolutely uncanny. You actually take on all the skills and characteristics of Bird or The Doctor – their own particular moves, shooting abilities, even strength and speed.

You'll meet with fatigue factors, hot and cold streaks, turnaround jump shots, and 360-degree slam dunks. But there's some whimsy in here, too – a funny referee, a shattering backboard, even instant replay.

It's called *Julius Erving and Larry Bird Go One-on-One.*™ You're Bird. Or you're The Doctor. And that's the last decision you'll have plenty of time to make.



Julius Erving and Larry Bird Go One-on-One is now available on diskette for Apple II, II+, and IIe computers. Apple is a registered trademark of Apple Computer. To find out more about Electronic Arts and its products, write us at 2755 Campus Drive, San Mateo, CA 94403 or call (415) 571-7171. For a free catalog, send a stamped, self addressed #10 envelope.

NOW AVAILABLE FOR THE COMMODORE-64

ELECTRONIC ARTS™

www.commodore.ca

Hints And Tips

Many people have written in with new ways of using SpeedScript. Also, the more you work with a word processor, the more tricks you learn. Here are some suggestions to make the most of SpeedScript.

If you have a special format line that you always use, save it to disk. You can then call it up every time you start to write. You can also create fill-in-the-blank form letters. If you use some strange character for the blank, you can use Hunt to quickly find it and, while in insert mode, fill in the information. You could have forms for articles, personal letters, business letters, etc. The point is to save repetition.

Although SpeedScript doesn't have search and replace, you can use the cut and paste feature of the text buffer to memorize the string you want to replace with. Use Hunt to find each occurrence, then CTRL-R in insert mode to substitute. You can then use the DELete key to remove the original phrase. (Don't use CTRL-back arrow, since it chains to the buffer.) Sounds a bit klutzy, but after practice you can be quite proficient.

Don't forget that you can use SHIFT-CTRL-P. This will ask you for the device number and secondary address of the printer. Answer with a device number of 3 and a secondary address of 0, and SpeedScript will print to the screen. You can see where line and page breaks occur, as well as how many pages your document runs (if you have a header or footer with [#] embedded).

This may seem trivial, but if you copy SpeedScript as the first file on each document disk you use, it will make life easier. You don't have to remember which disk has SpeedScript on it. Just insert your document disk, LOAD "*",8 and you're in business.

Watch out for repeating keys. SpeedScript is so fast you could insert a paragraph with CTRL-R two or three times before you realize what's happened.

Modifying SpeedScript

We've received more than a few letters asking for an assembly source listing of SpeedScript. We don't have the manpower (or personpower) to mail listings to individuals, not to mention the postage it would take to mail 100 pages of source code. It goes without saying that we can't publish it in the magazine for space reasons. Besides, the source code isn't even commented.

Without the source code, it's very difficult to add anything to SpeedScript, or make significant changes, since it is machine language, but you can overwrite parts of the code. Following the disassembled listing of a mass of raw numbers without labels or remarks is like reading a book upside down.

The following memory locations contain the default settings for several of the printer commands. This was discovered by Ken McEnany for the 64:

Location	Hex	Value	Item
5200	1450	05	left margin
5201	1451	75	right margin
5202	1452	66	page length
5203	1453	05	top margin
5204	1454	58	bottom margin
5205	1455	02	line spacing

A treat, indeed! If you have nonstandard paper, or prefer single-spacing, you can load SpeedScript, use POKE to change a default (such as page length), then save the new SpeedScript back to disk. For example, POKE 5205,1 would be used for single-spacing.

Jeffrey C. Edman owns a Brother CE50 typewriter and an RS-232 interface. Unfortunately, SpeedScript doesn't work with the RS-232 port—or does it? Mr. Edman pored over a disassembly of SpeedScript, and found that his setup would work with the following POKEs:

POKE 659,6 (sets the RS-232 control register)
POKE 660,0 (sets the RS-232 command register)
POKE 7812,2 (changes SpeedScript)

Mr. Edman continues:

"Using a device #2 and a secondary address #2 (in response to the prompt after a CTRL-SHIFT-P) plus true ASCII format (using [a]) will result in an excellent print-out.

"With these changes the output to the printer does not print out approximately the last 120 characters of the text. I get around this by adding greater than 120 spaces to the end of the text."

I hope owners of RS-232 printers can apply these suggestions to get SpeedScript to work with their printer.

This isn't the last time we'll look at SpeedScript. Keep sending in your suggestions. When the time is right for SpeedScript Deluxe, it will owe a debt to the readers of COMPUTE!'s GAZETTE for their many good ideas and constructive criticism.

See program listing on page 141.

C-64 SOFTWARE AT LOW PRICES

POWER PLUS

A utility program that adds over 40 commands to your C-64. Doesn't use any BASIC memory. 100% machine language.

FEATURES:
- Un-new—get back BASIC programs after reset
- Screen Dump—to printer
- Easy, abbreviated Disk Commands
- Machine Language Monitor with
  - Assembler/Disassembler
  - Transfer, Fill, Hunt, etc.
- Adds BASIC commands
  - Find
  - Change
  - Renumber
  - Delete
  - Auto line numbers
- Excellent manual

$19.99

QUICKWRITER II

A full-featured word processor at a fraction of the cost. More powerful than all w/p under $50.00. Has features even $100.00 w/p don't have.

FEATURES
- 100% machine code, the fastest w/p we've seen
- Works with all printers/interfaces
- Semi-automatic hyphenation
- Justification
- Form letters automatically
- Block Transfer, Delete, Insert, Append,
- Auto page numbers, headers and footers
- Send disk commands
- PRE-VIEW—see left or right side of page before printing
- Full-screen editing with rapid scroll
- Easily send special printer commands
- Excellent manual

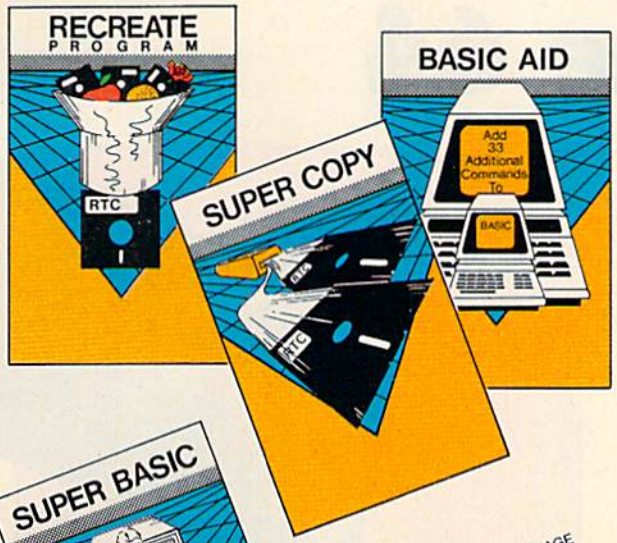
$29.99

Indicate tape or disk. Send check or m.o. (include $2.00 p/h) to: **Educomp**
2139 Newcastle Ave. • Cardiff, CA 92007
(619) 942-3838
SATISFACTION GUARANTEED

www.commodore.ca

Developing a mind for the Future.

RTC



SUPER BASIC $39.95 U.S.

- Gives you 3 different versions of Commodore Basic Programing Language Version 4 PLUS!
  A Built in Machine Language Monitor!
- Disk & File Maintenance Commands
  Data Handling Commands
  Graphics Plus Basic
  Compatible with Commmodore's "B" Series &
  Much Much More!

RECREATE PROGRAM $39.95 U.S.

RTC's Answers to Program Recreation
Converts Printer's File to SCRIPT 64's Files

SUPER COPY $29.95 U.S.

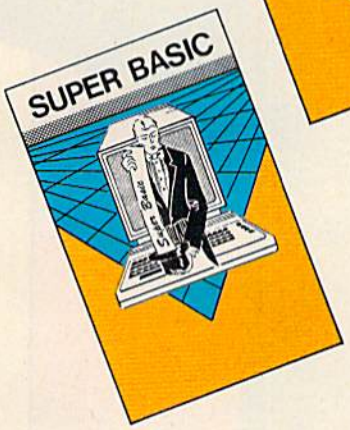
Super Fast Disk Copies on a 1541
Copy Entire Disk in 7 Minutes or Less
Copy Selected Files
Complete Pattern Matching
Full Prompts

BASIC AID $39.95 U.S.

Your Aid to Writing Programs
Allows Scrolling Through Programs
Adds 33 more Commands to the Basic Language
Has Find, Change, Merge, Move Commands
Convert Hex, Binary and Decimal Numbers and More!

Color 80 $49.95 U.S.

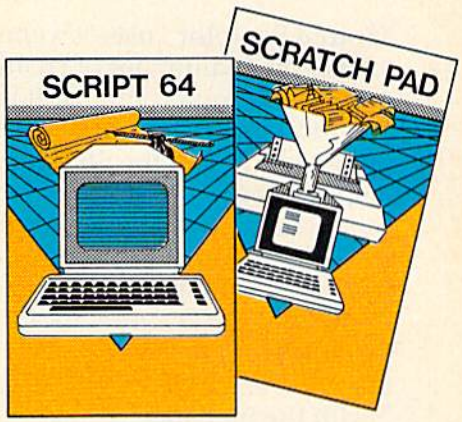
Produces 80 Columns With Color!
Needs No Extra Hardware
Use With Terminal Programs
Uses No Basic Memory in the 64
Develop Your Own Programs



NEW Combined PACKAGE

SCRIPT 64 & SCRATCH PAD 64 $105.00 U.S.

Script 64:
Word Processor in French and English
80 Columns
Global Search and Replace
User Created Dictionary
Spelling Check
Scratch Pad 64:
The Database/Mail List in One!
Merges with Script 64 Word Processor
Print out Labels, Envelopes, Mail List & More!
Suitable with both Single and Dual Disk Drives
Fully C64 Link Compatible



*SUGGESTED RETAIL PRICE F.O.B. in U.S. FUNDS, Toronto, CANADA

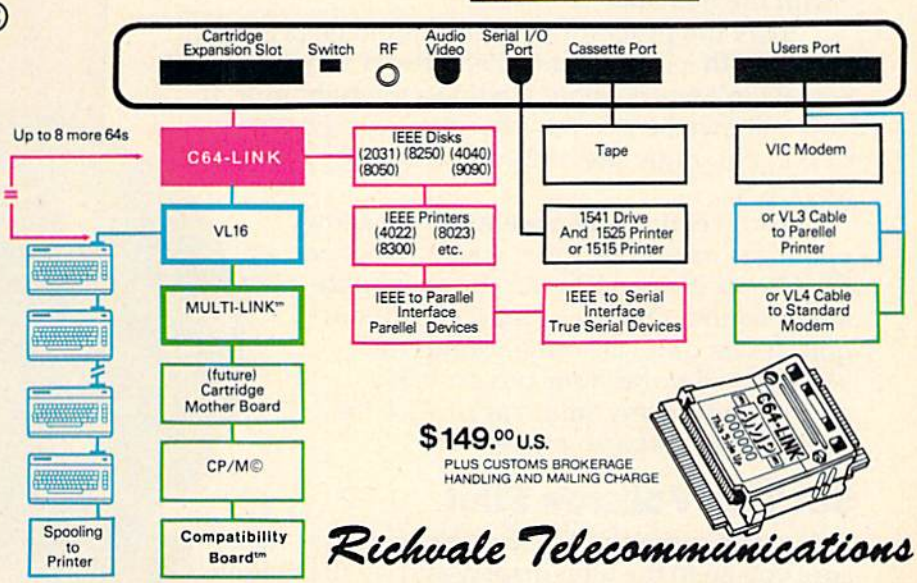
C64 LINK©

The Smart 64

Give These Expanded Capabilities to Your 64 and VIC 20

- The ability to transfer data from any type of device to another (IEEE, Serial, Parallel)
- BASIC 4.0 which allows you to run more PET BASIC programs and gives you extended disk and I/O commands.
- The ability to have several 64s on line together - sharing common IEEE devices such as disks or printers with Spooling Capability.
- Built-in machine language monitor.
- A built-in terminal or modem program which allows the system to communicate through a modem to many bulletin board systems and other computer mainframes.
- Compatability with CP/M.

Contact your local Commodore dealer or RTC.
Payments by VISA, MASTERCARD or BANK TRANSFER.
Mail orders also by certified cheque, etc.



$149.00 U.S.
PLUS CUSTOMS BROKERAGE HANDLING AND MAILING CHARGE

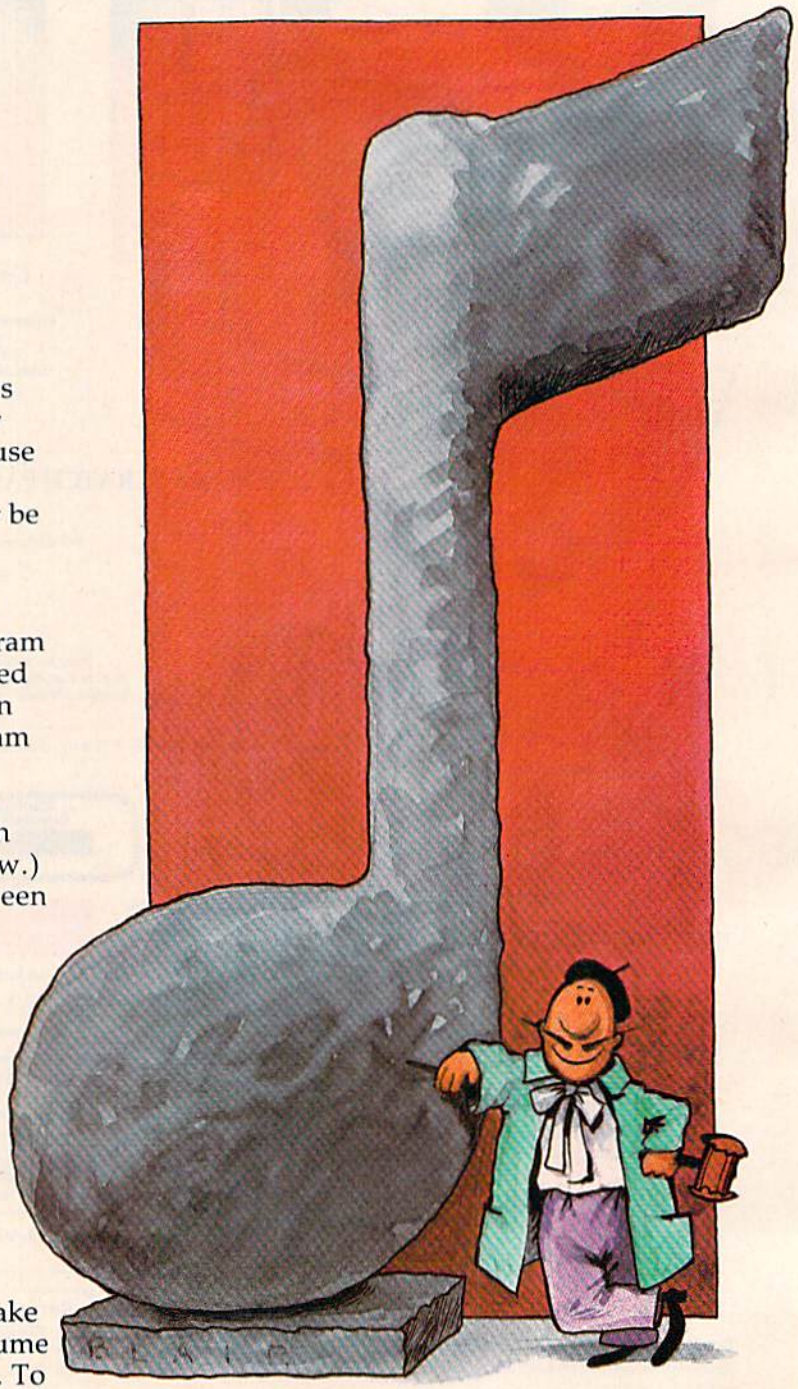
Richvale Telecommunications

10610 Bayview Avenue (Bayview Plaza) Richmond Hill, Ontario, Canada L4C 3N8 (416) 884-4165

www.commodore.ca

Sound Sculptor For The 64

Todd Touris



With formatted screens and a joystick-controlled pointer, "Sound Sculptor" gives you the ability to quickly and easily create your own music and save your creation.

"Sound Sculptor" uses several graphics screens to take the tedium out of creating data for your music or sound programs. It is not difficult to use and therefore needs little explanation; a basic understanding of the SID chip would probably be helpful, however. The *Programmer's Reference Guide* is a good source of information.

After you have loaded and run the DATA program (Program 1), the main program (Program 2) should LOAD automatically if you have saved Program 2 immediately following Program 1 on the same tape. Disk users should SAVE Program 2 with the filename "2".

RUN the program and you should be presented with a main menu. Press the f1 function key. (Don't worry about loading a file right now.) You will then be asked to choose a sound between 0 and 1250. Enter the one you want and press RETURN.

You will then get a menu which allows you to set one of the three voices, work on the filter settings, clear the sound, choose a new sound, change joystick speed, or quit. If you don't clear the sound, the settings will be random and probably won't produce any sound at all. Use the keyboard to make your selection.

Set The Volume First

Before you jump right to the voice settings, make sure you go to the filter display and set the volume control, or you won't be able to hear anything. To

www.commodore.ca

change the various settings, you simply move the sprite arrow over the appropriate display and press the fire button. When a word or character is in reverse display, it means that the particular setting is on or, if the display is a scale (+ signs), it shows what value that setting contains.

To trigger the voices, you must use the function keys (f1 for voice one, f3 for voice two, f5 for voice three, and f7 for all voices). If the voice is off, it should go through attack and decay and then remain at the sustain level; when the key is pressed again, the sound should be released and fall to zero volume. When pressing the function keys or switching a setting, you must be careful. The program is very fast and the keys are very responsive and sometimes the voice or setting can be triggered twice, so hit the keys quickly.

When you are finished experimenting with the various settings, press the space bar to return to the selection menu. You can continue working on more sounds, or you can press f8 to quit. When you quit, you will get another menu with three options.

Saving Sounds

The first option is to save a series of sounds on tape or disk as a file (depending on your earlier selection). You can load these sounds back for later use by pressing f3 at the beginning of the program instead of going right to the design/review routine. This feature allows you to build a library of various sounds.

Your second choice is to create DATA statements of your sound or sounds. With the program below, you can use these DATA statements to incorporate complex and fast sound effects into your BASIC programs.

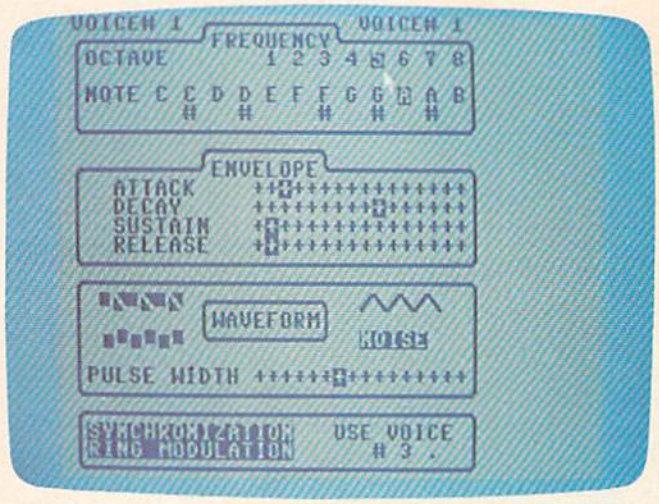
```
1000 FORL=0 TO 42:READDA:POKE828+L,DA:NEX
     TL
1010 DATA 166,2,165,251,133,253,165,252,1
     33,254,224,0,240,16,169,25,24,101

1020 DATA 253,133,253,169,0,101,254,133,2
     54,202,208,240,160,0,177,253
1030 DATA 153,0,212,200,192,26,208,246,96
```

This is a machine language routine that is POKEd into the cassette buffer (starting at 828), but it is relocatable and can be put anywhere in free memory. To use it, you must POKE the values from the DATA statements created by Sound Sculptor into any free memory. For example, you could put the sound data into the block of free memory beginning at 49152 with:

```
10 FORL=0 TO 24:READSND:POKE49152+L,SND:N
   EXTL
```

If you have more sounds, POKE the DATA into memory immediately following the first. Next, POKE the starting address of the sounds into locations 251 and 252. For the example above, this would be accomplished by:

```
20 POKE252,49152/256:POKE251,49152-256*PE
   EK(252)
```



Moving the sprite arrow with a joystick affords easy selection for all sound parameters.

A Fast Sound Switch

This process only has to be done once. Whenever you wish to call upon a certain sound, just POKE the sound number into location 2. For example, POKE 2,1, selects the first sound in memory. Follow this with a SYS 828 (or to whatever memory location you have relocated the routine) and you now have your sound in the SID chip. With this routine you can switch various sounds in and out of the SID at lightning speed. For example, to turn on voice one, use this line in your program: S1 = 54276: POKE S1, PEEK(S1) OR 1. To turn it off, POKE S1, PEEK(S1) AND 254. The same logic would apply to voices two and three, except you would use S2 = 54283 and S3 = 54290.

If you don't want to type in this program yourself, I will make a copy of the program and include the much faster loading ML program. Just send a blank tape, $3, and a self-addressed, stamped envelope to:

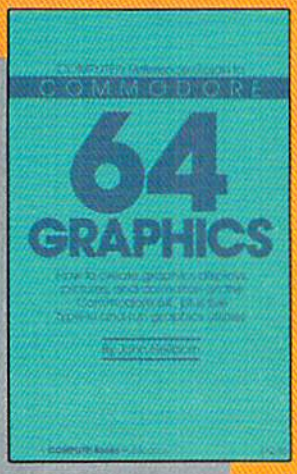
Todd Touris
32 Sherburn Drive
Hamburg, NY 14075

See program listing on page 161.

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

www.commodore.ca

COMPUTE! Books

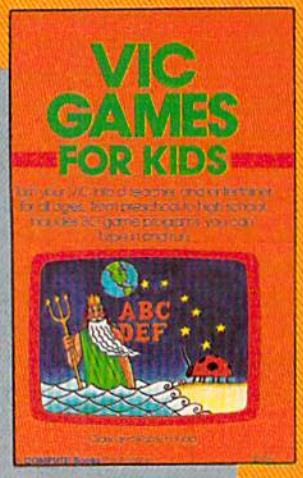


COMPUTE!'s Reference Guide To Commodore 64 Graphics

A complete tutorial on Commodore 64 graphics. Noted Commodore author John Heilborn explains how to program sprites, multicolored screens, animation, custom characters, and more. Beginners will like the step-by-step instructions and clear example programs. Advanced programmers can build up their tool kit with the character editors, sprite editors, screen design program, and other useful utilities.

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

$12.95
ISBN 0-942386-29-9

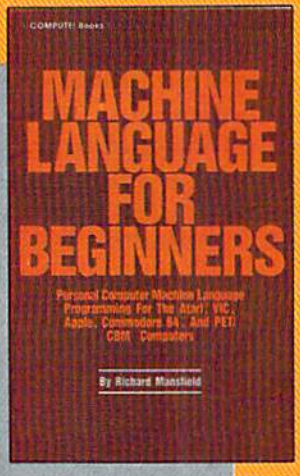


VIC Games For Kids

Contains 30 games written just for kids (although adults will enjoy them too). This book is an inexpensive source of educational software for children. The games are designed to teach math, geography, history, and other topics. Children learn while they're having fun. They will return to these games again and again.

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

$12.95
ISBN 0-942386-35-3



Machine Language For Beginners

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

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

$14.95
ISBN 0-942386-11-6

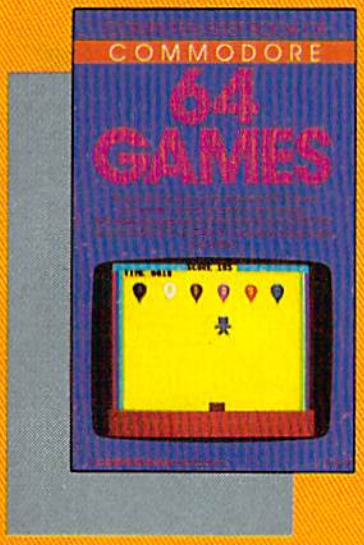
COMPUTE!'s First Book Of Commodore 64

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

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

$12.95
ISBN 0-942386-20-5

www.commodore.ca

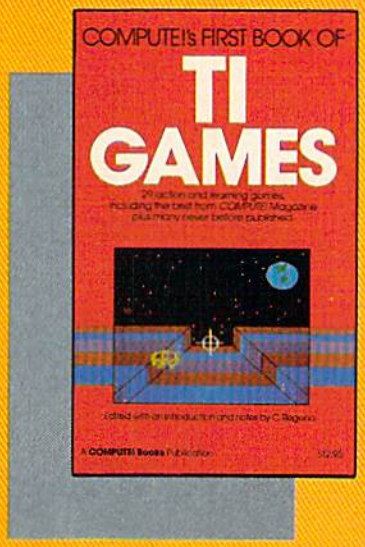


COMPUTE!'s First Book Of Commodore 64 Games

Packed full of games: "Snake Escape," "Oil Tycoon," "Laser Gunner," "Zuider Zee," and many more. Machine language games requiring fast hands and a good eye, as well as strategy games which will exercise your mind. Introductory chapters and annotated listings provide ideas and techniques for writing games. An excellent introduction for 64 owners who want to begin writing games.

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

$12.95
ISBN 0-942386-34-5

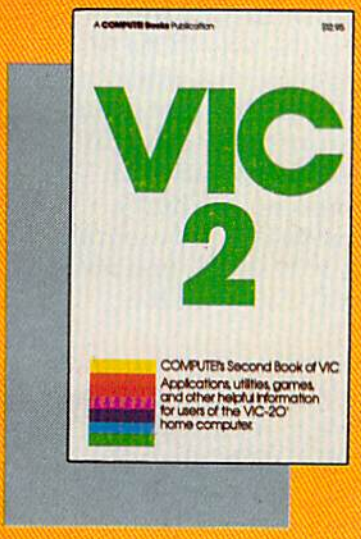


COMPUTE!'s First Book Of TI Games

Although this book is packed with ready-to-type-in games (29 in all), it is more than just a book of games. It is designed to teach game programming techniques. Introductory chapters explain the special features of the TI-99/4 and 99/4A, giving advice on coding techniques. Most games include an explanation of how the program works. Contains mazes, chase games, old favorites, thinking games, creative challenges, and more.

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

$12.95
ISBN 0-942386-17-5

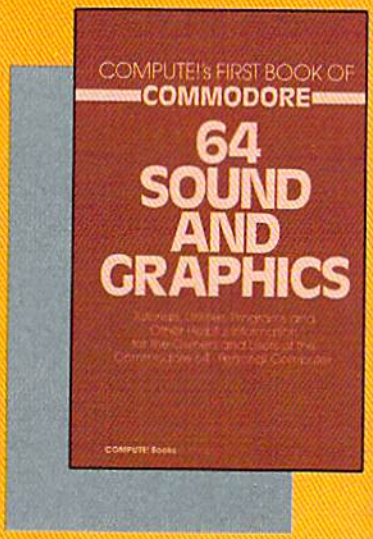


COMPUTE!'s Second Book Of VIC

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

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

$12.95
ISBN 0-942386-16-7



COMPUTE!'s First Book Of 64 Sound And Graphics

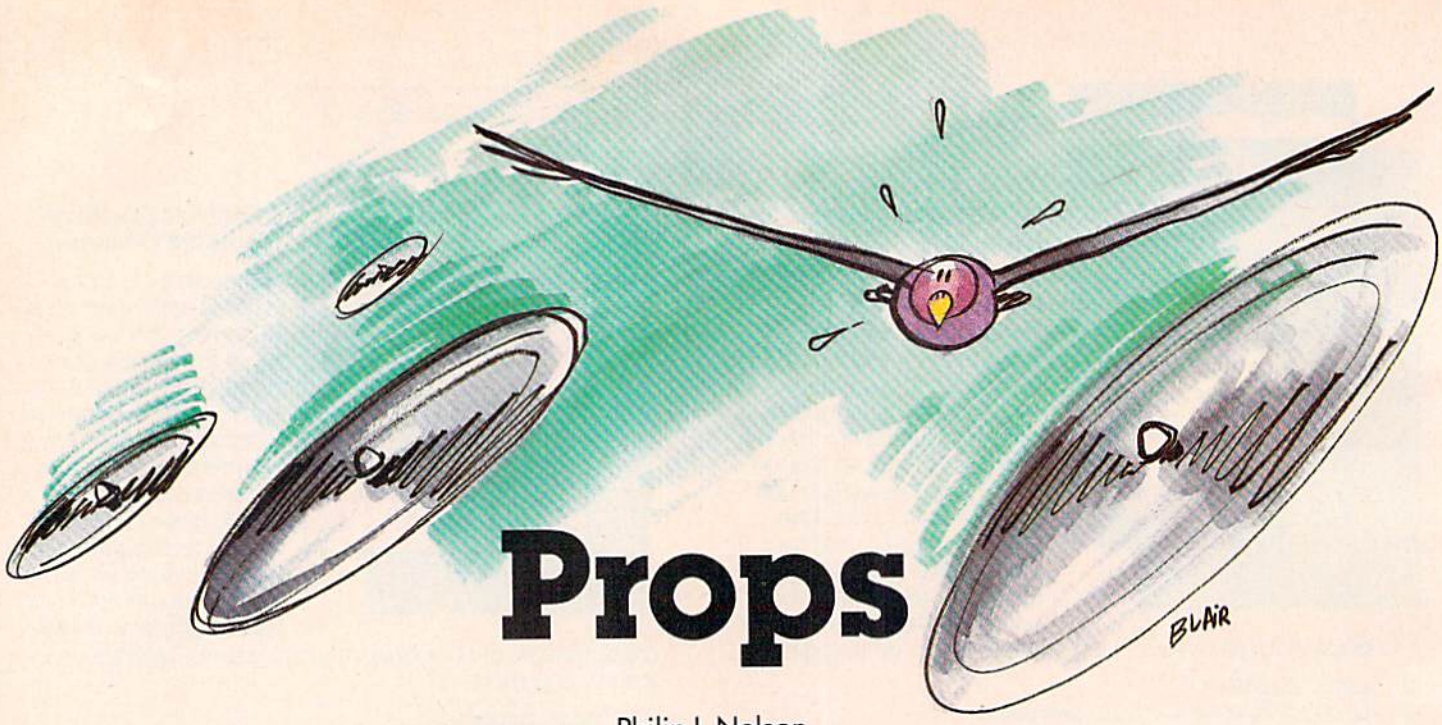
Clear explanations of the 64's sound and graphics capabilities. Includes many tutorials and example programs: "MusicMaster," a complete music synthesizer; "High-Resolution Sketchpad," an all-machine-language program for making computer art; and "Ultrafont Character Editor," one of the best character editors available. The appendices feature useful reference charts and conversion tables.

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

$12.95
ISBN 0-942386-21-3

COMPUTE!™ Publications, Inc. abc
One of the ABC Publishing Companies
Post Office Box 5406, Greensboro, North Carolina 27403

www.commodore.ca



Props

Philip I. Nelson

"Props" is a fast-paced, nonviolent game for the 64 with six levels. Animated in machine language, it uses all eight sprites, programmed characters, and all three SID voices for sound effects.

Included in the article is a detailed program discussion which offers a variety of excellent programming tips and techniques.

You are a lonely pigeon, lost in a dangerous sky filled with whirling propellers. Your mission is to return to your coop and your mate, for a brief rest before flying away again. To make matters worse, every time you leave, and at other uncertain intervals, your mate moves to a new coop.

While in flight, you must avoid getting pulled into the propellers. If that happens, you lose points. Unless you escape quickly, the props may pull you back again and again. The props start in orderly formation, but every collision will bump one out of line; so the worse you play, the more confusing things get.

To play, plug your joystick into port 2. The six skill levels range from leisurely to manic. Whenever you reach home, your score is displayed briefly. If you press the fire button during the score display, the game pauses to let you catch your breath. During the pause, you can change to a different skill level by pressing number keys 1 through 6. To quit, just pause and press the 0 key. If you score well at any given level, the game pauses by itself and lets you pick a new skill level.

The Animation Subroutines

Two main machine language (ML) routines are responsible for virtually all the animation. The first one reads the joystick, moves your bird shape accordingly, and flaps the wings of both birds. The second rotates the eight propeller sprites and moves them up or down. Two additional small routines help program a new character set and fill color memory with white values for the new-ROM 64s.

Let's look first at the bird-moving routine (Birdmove), which you could adapt for just about any graphics game. Birdmove animates our bird-shaped character. The routine keeps track of a variable, BIRDLOC, that represents the bird's current screen location. To move the bird around in screen memory (locations 1024–2023), first we put a blank space into BIRDLOC to erase the character.

Next we check to see whether any movement has been requested through the joystick. If so, we change the BIRDLOC variable to represent the new screen location. If not, BIRDLOC stays the same. In either case, we then plant a new bird shape in the updated BIRDLOC screen location.

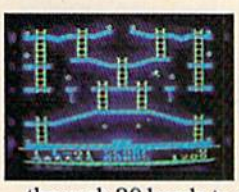
Setting The Bird's Boundaries

To move the bird left or right, Birdmove will subtract or add 1 to BIRDLOC. To move the bird up or down on the 40-column screen, we subtract or add 40 to BIRDLOC. Before moving our pigeon around in memory, we need safeguards to prevent the bird figure from flying above screen memory into the BASIC program space, or below it into the sensitive zero page of memory, either of which could crash the computer.

Birdmove uses two techniques to confine the bird. The first compares BIRDLOC to absolute

www.commodore.ca

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



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

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

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

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

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

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

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

EPYX COMPUTER SOFTWARE

STRATEGY GAMES FOR THE ACTION-GAME PLAYER.

*1983 C.E.S. award winner.

www.commodore.ca

upper and lower limits. If you try to move lower (<1024) or higher (>2023) than the bounds of screen memory, Birdmove will terminate without changing BIRDLOC.

Collision Detection

The second safeguard is a collision-checker for sideways movement. When you move left, for example, Birdmove holds the updated BIRDLOC position in temporary storage. Before it moves a bird figure into the new location, the routine checks that spot to see which of the three possible characters is there.

If the desired spot contains a space, your bird can move left. If the new spot holds the coop character, the old BIRDLOC is restored and you exit Birdmove without changing position. If neither character is found, then the spot must contain the mate character, so the routine sets a flag to show that the bird has reached home, and ends with the wing-flapping display.

To modify Birdmove for your own games, just add more comparisons to check for as many possibilities as you need. For example, your game might check the desired location and then branch to appropriate routines to score if you've hit a treasure, faint if you've hit a troll, rejoice if you've bumped into a friend, and so on.

The Joystick Flags

The joystick reader at the front of Birdmove is from the *Commodore 64 Programmer's Reference Guide*. It will store flag values in a memory location which you can then PEEK to determine movement. In "Props," the joystick flag values are in the cassette buffer, but you could put them in any safe memory spot. The right/left flag is stored in location 832, and the up/down flag in 833. The value in 832 will be 255 for left, 1 for right, and 0 for no movement. The value in 833 will be 255 for up, 1 for down, and 0 for no movement. Note that leftover flag values will remain in the computer's X and Y registers, though, so if your ML program goes from this routine to one that uses indirect addressing, you should clear the X and Y registers to 0 to keep things straight.

Programmed characters are used to make the birds' wings flap. In lines 62000–63000 of Props, we first copy the character set from the ROM chip into RAM memory beginning at location 14336. Then we create new shapes for characters 90–96 by POKEing new values into the right places in our RAM character set. Character 90 is programmed to serve as our coop character, and the other six are a series of bird shapes.

Each time we call the Birdmove routine, we also flip to the next character in this wing-flapping series to create the illusion of movement. To see all the programmed characters, first RUN the program and then press the STOP key while the instructions are displayed. Hold down the SHIFT key and press CLR/HOME to blank the screen. Now type in this line. You'll have to use abbreviations to fit it all on two lines.

```
PRINT"{CLR}"TAB(255): K=0:FORJ=1024TO1
276STEP42:POKE54272+J,1:POKEJ,K:K=K+1:N
EXTJ
```

Press RETURN and you'll see the coop character and six bird shapes in the upper left of the screen.

Flapping From BASIC

Now let's make our bird flap its wings from BASIC in immediate mode. Type this line and then press RETURN:

```
FORK=1TO100000:FORJ=91TO96:POKE1024,J:F
ORL=1TO30:NEXTL,J,K
```

The bird should be flapping at top left. Press STOP when you've seen enough. While we're at it, let's do the same job with our ML routine. To set things up, type this line and press RETURN.

```
POKE251,0:POKE252,4:POKE834,91
```

This puts information in memory locations which the ML routine uses to position the bird and start the wing-flapping character series. Now type this line and press RETURN:

```
FORJ=1TO100000:SYS49608:FORK=1TO30:NEXT
K,J
```

Using The Routine's Modules

As before, press STOP when you've seen enough. The entire Birdmove routine starts at location 49408 in memory, with its flap portion toward the end of the routine (49608). At certain points during Props (the reunion or a pause), we want the birds to flap their wings without moving. So we just bypass the movement parts entirely, starting at location 49608. If all we want is to place the mate somewhere, without any moving or flapping, we can jump in even later, at 49615. By structuring our ML program in distinct modules, we're able to get maximum use out of what we've written.

Now let's call the whole Birdmove routine to let our bird fly free. First, type this line and press RETURN.

```
POKE834,91:POKE835,0:POKE836,4:POKE837,
230:POKE838,6:POKE251,255:POKE252,5
```

We just positioned the bird and set limits to keep it on the screen. Now enter this as one line.

```
PRINT"{CLR}":FORJ=1024TO2008STEP41:POKE
J,90:POKEJ+54272,1:NEXT:FORJ=1TO100000:
SYS49408:NEXT
```

You'll see the bird wrap around the side of the screen when its way is clear, but stop when it hits a coop character. The up-and-down movement routine contains no collision-checker, though, so moving in those directions will erase any character you encounter.

www.commodore.ca

COMMODORE 64™

PURPLE TURTLES
Authors: **Mark & Richard Moore**
A fully animated arcade game with Loveable Turtles, Cuddly Graphics and more Cuteness than you'll find in any other Commodore 64 game! A game for the young at heart and people who have tired of alien bashing.

ULTISYNTH
Author: **Nalin Sharma**
Turn your CBM 64 into a sophisticated synthesiser, a piano, violin, organ, guitar or harpsichord. Woodwind, drums or cymbals and play along with your own or any of the preset rhythms.

Also available
Bugaboo • Aquaplane • Ring of Power • Sting • Quintic Warrior

TIMEX/SINCLAIR 2068™

BUGABOO
Author: **Indescomp**
Jump your way out of the caves with Bugaboo the flea but beware of the fearsome Dragon as you jump around the exotic vegetation.

Also available
Xadom • Astro Blaster • Games Designer • 3D Strategy • Ant Attack • The Chess Player • Smugglers Cove • Velnor's Lair • Trader • Traxx • Time Gate

TIMEX/SINCLAIR 1000 & 1500™

3D BLACK STAR
Author: **M. Sudworth**
Explosions mushroom around you and the rear scanner shows following craft, you increase speed and fire at the ducts, dodging from side to side of the narrow corridor.

Also available
Damper & Glooper • Croaka Crawla • Pioneer Trail • Munchees

ATARI 400/800™

ULTI-SKETCH
Author: **M. Walker**
INCREDIBLY VERSATILE CHARACTER GENERATOR
Define characters on 8 × 8 grid. Save to tape. Load from tape. Freely merges character sets into existing programs. Hex & Dec. O/Ps. Character manipulation. Mirror, rotate, invert, left, right, up down, hold, wipe, cancel. Redefine whole character set. Also works in colour mode. Excellent examples supplied.

VIC 20™

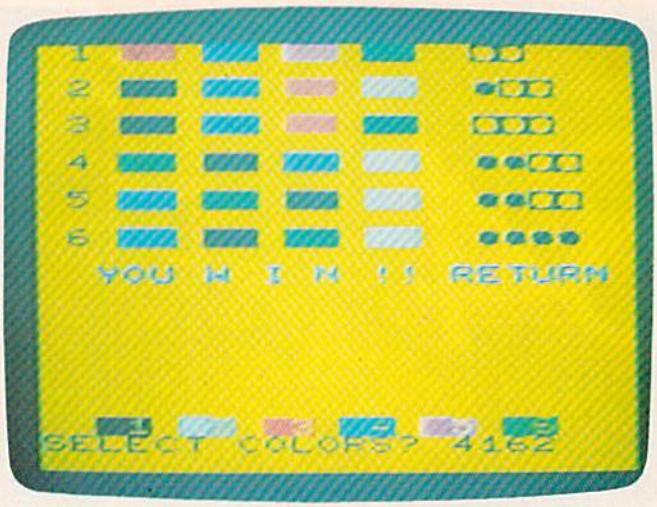
SKYHAWK
Author: **Chartec**
A quiet European village is attacked, pilot the jet fighter Skyhawk against the attackers.

Also available
Tornado • Bugaboo

QS THE GAME LORDS OF BRITAIN

QUICKSILVA INC. 426 West Nakoma San Antonio Texas 78216 (512) 340 3684

www.commodore.ca



It will take some tricky maneuvering to free this bird from the whirling propellers.

Vary The Difficulty With Delay Loops

Running at full ML speed, Birdmove is fun to play with, but too fast to be practical. Props uses a variable delay loop (pegged to skill level) to slow things down to a manageable speed.

Spritemove, the second big ML routine in Props, handles the sprite animation, moving the eight propellers up or down at the correct speed and twirling them in unison.

Look at lines 2–6 of Props and you'll see something odd. The game works by cycling through these lines, calling the Birdmove routine over and over with the statement SYS 49408. But Spritemove is called only once (SYS 49152) in line 1, while we're setting things up. Yet the sprites move continuously as long as we're playing. How can we make Spritemove work all the time without calling it repeatedly? Easy—just let the computer do it along with its other housekeeping.

Harnessing The Hardware Interrupt

In addition to executing your programs, your computer's processor chip has continual housekeeping to do like updating timers and scanning the keyboard. But it can do only one thing at a time. So occasionally the computer stops doing your work and takes time out for its own. You never notice these *interrupts*, because they happen about 60 times every second.

Like Birdmove, the 64's hardware interrupt routine is just another ML program, starting at location 59953 ($EA31) in memory. By changing one pointer (vector), we can have the computer perform our ML routine first, then on to do its housekeeping as usual—60 times a second.

Memory locations 788–789 ($0314–0315) are specially reserved to hold the address where this interrupt routine begins. When you turn on your 64, it automatically sticks the normal (default) address in these locations. The first part of Spritemove just changes this vector to point the computer to the beginning of our ML program.

At the end of our ML routine, we send the computer on to its normal interrupt program at $EA31, rather than returning to the program as we do in a conventional ML subroutine.

Watch It In Isolation

Such an *interrupt-driven* ML routine will seem to run independent of BASIC. To watch Spritemove in isolation, first RUN Props and press the STOP key when the props move. You'll see the blinking cursor and READY signal, which shows the computer has quit executing our BASIC program. We're back in BASIC immediate mode, but Spritemove is still working along with the interrupts, so our graphics and sound keep going.

We can do anything we'd normally do from BASIC, even call other ML subroutines as we did in the examples above, but there's a limit to how far we can take this technique. Grafting a lengthy ML routine onto our interrupts will make those "time-outs" so long that they slow our BASIC operations down to a crawl.

To stop Spritemove, first clear the screen of character graphics by holding down SHIFT and pressing CLR/HOME. Now type SYS49152 and press RETURN. The props and sound should freeze.

To restart the props, move your cursor up to the same line and press RETURN again. The interrupt vector now points to Spritemove again, and we're back in business. Spritemove (as in "Hawkmen") is designed to alternately change and restore the interrupt vector, every time we call the routine, letting us turn it on or off at will.

The Sprites Are Still There

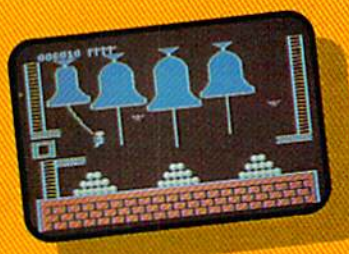
Note that stopping Spritemove doesn't erase the sprites. If we want them to disappear at certain points in Props, we have to disable their display with the statement POKE SP+21, 0. When that's done, the sprites are all still moving in the sense that Spritemove keeps changing their location registers and shape pointers as always. But none of this is visible since we've commanded the computer not to show it on the screen.

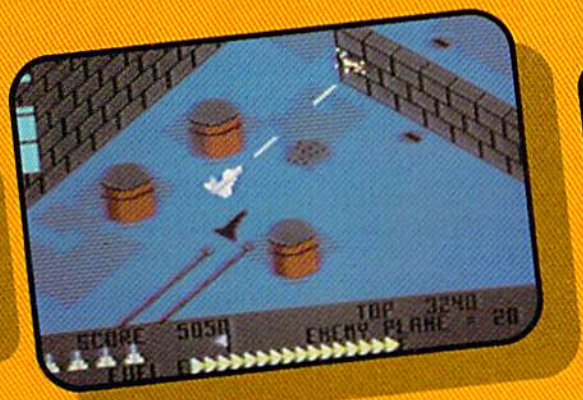
Compared to the interrupt routine, the rest of Spritemove is simple. The BASIC setup portion of Props sets all eight sprites to fixed horizontal locations, giving each a track to run up or down in. Each prop always flies in the same direction—one space up or down on the sprite grid for every execution of Spritemove at skill level 1.

Each sprite has a register (memory location)

www.commodore.ca

ZAXXON FOR THE C-64!





Quasimodo

Quasimodo knows who stole the crown jewels. He even knows where they are, but the soldiers just won't leave him alone! This multi-screen arcade adventure is a great combination of skill and strategy.

Commodore 64 disk & cassette

ZAXXON

At last, your favorite arcade game comes home to the C-64! Amazing 3-D graphics, a diagonally scrolling screen and incredible sound effects guarantee hours of space excitement. And if you practice hard, you might be able to meet the deadly ZAXXON himself.

Commodore 64 disk & cassette

ZAXXON, a trademark of SEGA Enterprises, Inc.

Slamball

Maybe you've played pinball before, but not like this! Up and down scrolling over 4 full screens, plus complete ball control and even a "tilt" feature in the best computer pinball game yet.

Commodore 64 disk & cassette

All Synapse entertainment titles are available at software dealers everywhere, or direct from Synapse for $34.95 ($39.95 for ZAXXON) plus $2 handling. Send check, money order or VISA/MasterCard number.

More C-64 Titles:

Blue Max, Fort Apocalypse, Shamus and Shamus Case II, Necromancer, Pharaoh's Curse, Zeppelin, Drelbs, Sentinel.

Write for a FREE Synapse catalog. Synapse games are also available for the Atari, Apple and IBM computers.

Name_____

Address_____

City_____

State_____ Zip_____

Computer_____ C

synapse

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

All titles are trademarks of Synapse. Commodore 64 is a trademark of Commodore, Inc.
© 1984 Synapse.

www.commodore.ca

containing its vertical location. To move the props, Spritemove increments or decrements every vertical location register one or more times, depending on skill level.

Believe it or not, this is simpler in ML than in BASIC. Let's say sprite 1 starts out at vertical location 100. If we start plopping bigger values into its vertical location register, sprite 1 will move down the screen.

Safe Increments Are Assured

In BASIC we'd have to program in a safeguard to make sure we couldn't POKE a value larger than 255 into the register, since that would abort our program with an ILLEGAL QUANTITY error.

But ML lacks the error-checking mechanics of BASIC, and simply won't let you put a number bigger than 255 into any memory cell. Trying to increment a register from 255 to 256 will just flip its value back to 0. Increment that register again, and it'll contain the value of 1, and so on.

The same thing works in reverse—decrementing a register that contains a 0 value will give us the value of 255. This characteristic of ML, which might seem a limitation, is used to advantage in Spritemove, which just keeps incrementing and decrementing the vertical sprite registers blindly. We know ML won't let us exceed the safe 0–255 range which, conveniently enough, the sprites also use for vertical location.

Animating The Propellers

You define a sprite's shape by pointing it to a block of shape information which you've placed in memory beforehand. To rotate the props, we just flip them through a series of related shapes, much as the birds are made to flap their wings. Spritemove points all eight sprites in unison to successive sets of shape data which was stored when we set up Props. Since props are bilaterally symmetrical, we can save memory space and get the effect of an eight-position rotation by flipping them repeatedly through a series of only four shapes.

Just as the computer looks in a special place to find the address of its interrupt routine, Spritemove checks and changes a special spot for the current shape pointer, location 828 ($033C).

We've used other memory registers in the cassette buffer to store things for our ML routines. Locations 832 and 833 hold values received from the joystick, as we've seen. Location 842 holds the home flag: The Birdmove routine will store a value of 1 here if the bird reaches home; otherwise, the register contains a 0.

Passing ML Values To BASIC

This is an example of how to use variables in machine language, and pass information back and forth from ML to BASIC sections of your program. In BASIC, of course, we'd name a variable something like HOME, and say that HOME=1 when home is reached, making sure that HOME=0 at all other times. But ML doesn't recognize names—just numbers inside memory locations. So, in Spritemove we choose a special memory location (842) to represent the condition of our home flag. Then we store a 1 value into 842 as a signal whenever home is reached.

Line 3 of the BASIC program uses the PEEK function to check that same memory location (HM=842) for a nonzero value, branching to the BASIC "home" subroutine at line 20 if that condition is satisfied. Once we've performed our home routine, we set the flag back to 0 in line 24, so that our bird can get lost again.

Synchronizing Sound And Action

Props also creates its filtered and ring-modulated sound effects by passing values from ML to BASIC. When the bird flies around the screen, a soft musical tone is heard, changing constantly in relation to screen position. We start making this sound in line 2 by POKEing voice 1 on. In line 6 we change the pitch of voice 1 by PEEKing into location 251 which, you'll recall, is used by Birdmove to store our bird's screen location. In this simple way, we can link the bird's sound effect to its graphics action.

Voice 2 is always on during the game, set to the noise waveform to make a swooshing sound. The effect of fading in and out is created, not with the volume control (which affects all three voices equally), but with a filter, which we can set to affect any or all of the voices at a given time. In line 1002 of Props we POKE register 54296 with a value of 47. Besides volume, this register lets you select what *type* of filter you want. So we started with a value of 15 for maximum volume in all voices, then added 32 (15+32=47). This turns on bit 5 of the register to activate the *bandpass* filter, which will cut out all but a narrow band of frequencies in the tone of the filtered voice.

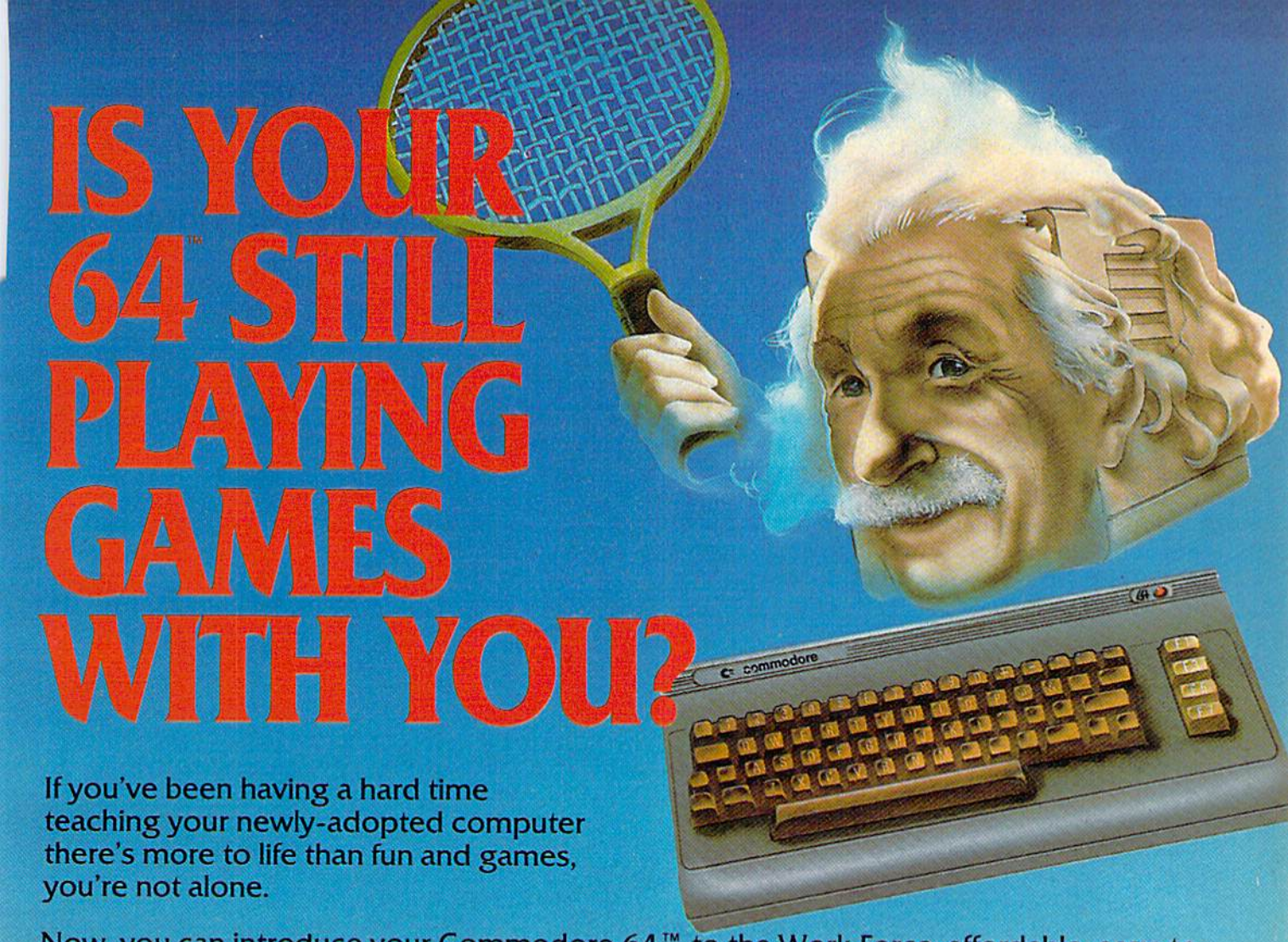
Next we have to tell the computer which of the three voices it should send through the filter. Also in line 1002, we POKE the value of 66 into register 54295, which sends voice 2 through the filter and selects a moderate amount of resonance. (If you've never played with filter resonance, try editing line 1002 to substitute the value of 226 instead of 66, to hear the more pronounced effect of maximum resonance.)

A Swoosh Is Filtered Noise

Now the filter's ready to use. Picking the noise waveform for voice 2 gives us a more or less random mishmash of all audible frequencies to work

www.commodore.ca

IS YOUR 64™ STILL PLAYING GAMES WITH YOU?



If you've been having a hard time teaching your newly-adopted computer there's more to life than fun and games, you're not alone.

Now, you can introduce your Commodore 64™ to the Work Force: affordable, easy-to-use software and hardware that will unleash the power you always expected from your Commodore 64™, but thought you might never see.

PaperClip™

is simply the best word processing program of its kind—loaded with advanced features, yet so easy to use even a novice can get professional results. With **SpellPack**™, it even corrects your spelling! Once you've tried it, you'll never use a typewriter again.

The Consultant™

(formerly Delphi's Oracle)

is like a computerized filing cabinet with a brain. Organize files for recipes, albums, or the membership of your service club. Then search, sort, arrange and analyze your information with speed and flexibility that's simply astounding.

SpellPack™

teaches your 64 to spell. It checks an entire document in 2 to 4 minutes against a dictionary of over 20,000 words. And you can add up to 5,000 of your own specialized terms. Type letter perfect every time!

BusCard II™

is a magic box that lets you transform your humble home computer into a powerful business machine. It gives you the added power of BASIC 4.0, and lets you add IEEE disk drives, hard disk, virtually any parallel printer, and other peripherals without extra interfaces. Completely software invisible.

B.I.-80™ *Column Adaptor*

gives you crystal clear 80 column display. Using the highest quality hardware, we've eliminated the problems of snow, fuzziness and interference. Basic 4.0 commands greatly simplify disk drive access. Switches easily from 40 to 80 column display.

Discover the true power of your Commodore 64™. Ask your dealer about the Commodore 64™ Work Force, from Batteries Included—the company that doesn't leave anything out when it comes to making things simple for you.

BATTERIES INCLUDED

"Excellence in Software"

These products have been developed specifically for Commodore computers by Batteries Included and are totally compatible with each other. For a full color brochure write to:

186 Queen Street West, Toronto, Canada M5V 1Z1 (416) 596-1405 / 3303 Harbor Blvd., Costa Mesa, CA 92626 (714) 979-9930

www.commodore.ca

64 AND COMMODORE 64 ARE REGISTERED TRADE MARKS OF COMMODORE BUSINESS MACHINES

with. Setting the *cutoff* frequency low will *pass through* a narrow band of low frequency tones for a roaring or rumbling sound, and cut off all other tones. A high cutoff value gives us a narrow band of hissing, high-frequency tones. To make a swooshing sound, we just change the cutoff frequency at high speed, from low to high values.

To tie this sound to the graphics action, we let Spritemove change the cutoff frequency at ML speed. At the very end of SPRITEMOVE is a little routine that stores a value into the filter cutoff frequency register. This value is the same one used to control how many spaces the sprites move each 1/60 second. So at higher skill levels we add bigger numbers to the cutoff frequency register, to sweep the filter from low to high more rapidly.

As with sprite positioning, we can increment forever, without fussing over illegal quantity errors. What we get is a repeated low-to-high sweep in the range 0 to 255.

Filtering Voice Three

The echoing synthesizer tones heard while pausing, or when the bird's mate changes coops, are produced by applying similar bandpass filtering to voice 3. The technique is the same—we sweep the filter cutoff frequency upward, over and over. But instead of noise we're using a triangular waveform, ring-modulated by the pitch frequencies of voice 2 (line 51).

The pitch of voice 3 is linked to the bird's screen position by using the value found in location 251. And the pitch frequency of voice 2 is also swept down over and over, in our familiar 255-to-0 range, by the Spritemove routine.

Unlike the noise waveform, which contains tones at almost every audible frequency, the triangular waveform is rich in certain harmonic frequencies and totally lacking in others. So at certain frequencies the bandpass filter cuts out just about everything, causing silence. Adding ring modulation suppresses the fluty tone we'd otherwise get from a triangle wave, and adds new harmonics for an even stranger effect.

A Two-Voice Sound Effect

One final, important difference between this and the swoosh sound is in the ADSR (attack/decay/sustain/release) envelope. For the prop sound, we set voice 2's sustain value to the maximum of 240 (line 1082), and trigger the ADSR envelope only once at the beginning (line 11050).

With maximum sustain, the tone will never fade out naturally—it only seems to reach silence when our filter is set to its lowest cutoff frequencies. For contrast, we trigger the ADSR envelope for voice 3 every time we make the synthesizer sound, causing the slow, ghostly fade-out.

But you do fancy filtering without mastering ML. Take a look at lines 11050–11058, which govern the animation and sound of wings flapping during the instruction display. Here we're controlling the filter frequency from an entirely different source.

A Special Number Generator

Location 54299 (VM+3) is a very special register that can be made to produce four different number sequences which are handy for controlling sound. It can generate a 0-to-255 sweep like we've used up to now. Or it can sweep from 0 up to 255 and back down again. It can generate random numbers, and can also flip back and forth from 0 to 255 at varying rates.

You choose *which* number sequence you want by selecting one of the four waveforms for voice 3. You control the *rate* at which the numbers change within that sequence by setting the frequency of voice 3.

For a convincing wing-flapping sound, we want the filter to sweep up and then back down again. So we select the up-and-down number sequence by setting voice 3 to a value of 16 in line 11050. To time it to the beating of our birds' wings, we just fiddle with various pitch frequency values for voice 3 (H3 and L3) until we get it right. Note that you don't want to *hear* voice 3—you're only using its pitch values to control the output of voice 2. So W3 is POKEd to 16, which selects the triangle waveform without turning on the gate bit which would make the voice audible (that is, by POKEing W3 to 17).

Once you have Props working, you can learn a lot about the 64's SID chip just by changing the values used in this and other sound sections.

If you'd rather not type in this game, I'll send you a copy. Send me a blank tape or disk with a stamped, self-addressed mailer and a check for $3, to:

Philip I. Nelson
3801 Garfield Avenue South
Minneapolis, MN 55409

See program listing on page 141.

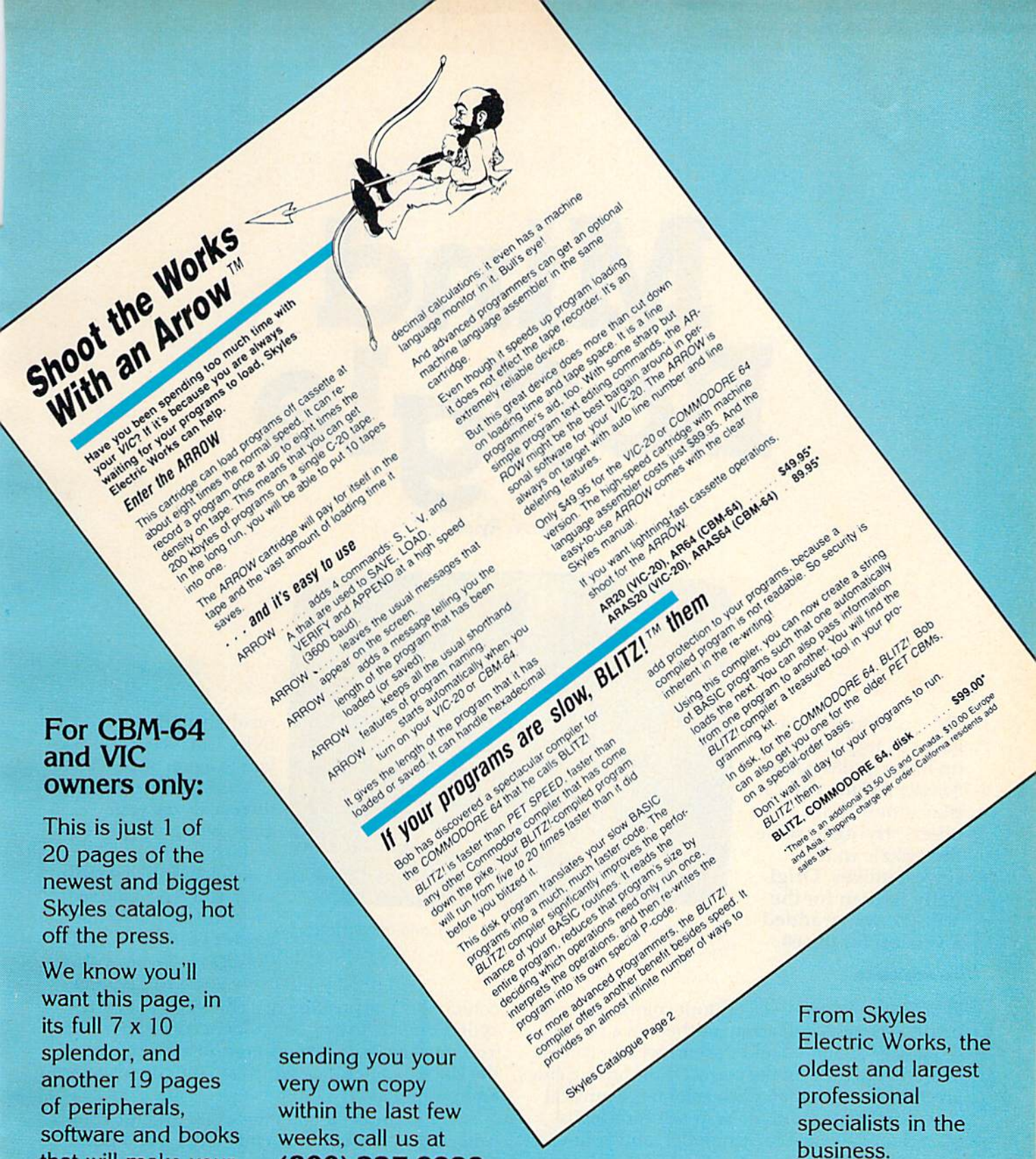
ATTENTION PROGRAMMERS

Our company is small enough that you won't get lost in the shuffle and our distribution is large enough for you to make significant royalties. One of our outside programmers made over $18,000.00 in royalties from our first sale of his program to *one* mass merchandiser! (Our royalties are generous.) His program wasn't quite finished when it was submitted to us, but we could see its possibilities and aided in its completion.

If you have an exceptional original program for the Commodore 64 that would appeal to a wide audience, contact our new program manager.

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

www.commodore.ca



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.**

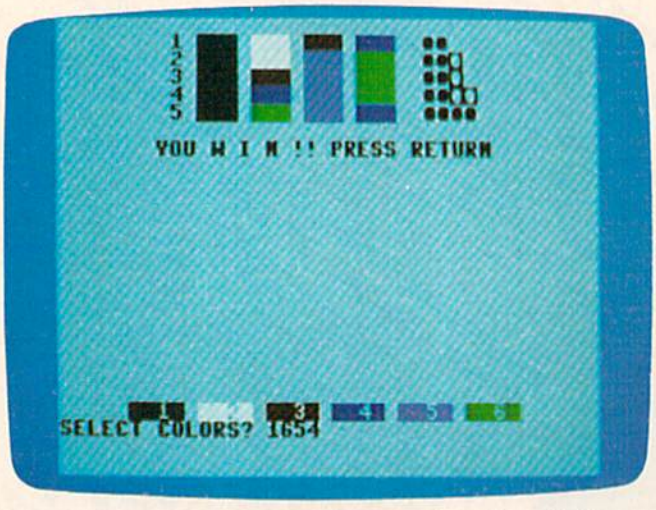
From Skyles Electric Works, the oldest and largest professional specialists in the business.

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

www.commodore.ca

Mind Boggle

James E. Rylee



In the 64 version, the solution has been found in only five tries.

"Mind Boggle" is a game of logic based on the popular game *Master Mind*. You can play alone or against others, trying to solve the puzzle in the fewest moves. Originally written for the VIC-20, we've added a version for the 64.

First "Mind Boggle" selects four colors out of six possible choices and arranges them in a random sequence. You must find the correct four colors and arrange them in the correct order, using clues given by the program. Each color has a musical sound associated with it. Your selection is displayed on the left side by number, and your clues are on the right.

Guess The Colors And Sequence

When the computer asks SELECT COLORS you may enter your guess of four colors by entering the numeric values for the colors indicated and pressing RETURN. Any entry with digits other than 1–6 or more than the four required digits will result in an ILLEGAL INPUT message and ask you to again SELECT COLORS. The computer then analyzes your guess and gives you the results.

A black dot (•) indicates you have guessed the correct color in the correct position. A white dot (▪) indicates you have guessed a correct color only. The position of a clue does not correspond directly to any one color or correct position. You must move the colors around and analyze the clues to determine which are the correct colors and positions.

For example, if you guess 1234 and the computer responds with two white dots, you know two of the numbers are correct, but in the wrong place. If your next guess, 3214, gains two black dots, you can deduce that 3 and 1 were correct and that the hidden code is 3x1x (where x is an unknown number).

The program rates you on your skill or luck. The colors are displayed for you if you do not find them in ten tries. In either case, you can choose to play again. (Answer Y or N.)

www.commodore.ca

The world's fate is in your hands.

Picture yourself as the world's greatest super-agent, Graham Crackers. You must go undercover and sneak into an enormous art museum. Incredibly, it's a front for an international terrorist organization!

Your secret mission is to heist all the artwork in search of a classified microfilm. If you don't carry it off in time, the world is doomed!

Grab the keys to the 90 fiendishly boobytrapped rooms (144 in Apple). Brave the multitude of heart-stopping dangers as you make your tortuous way through the deadly rooms. Test your cunning against overwhelming odds!

Chilling suspense and unknown terrors await you behind every door. You must evade man-eating robots, monstrous stompers, sweeper drones and tons of falling boxes — and make death-defying leaps from moving platforms.

Only your artful handling of this dangerous assignment can save the world from destruction!

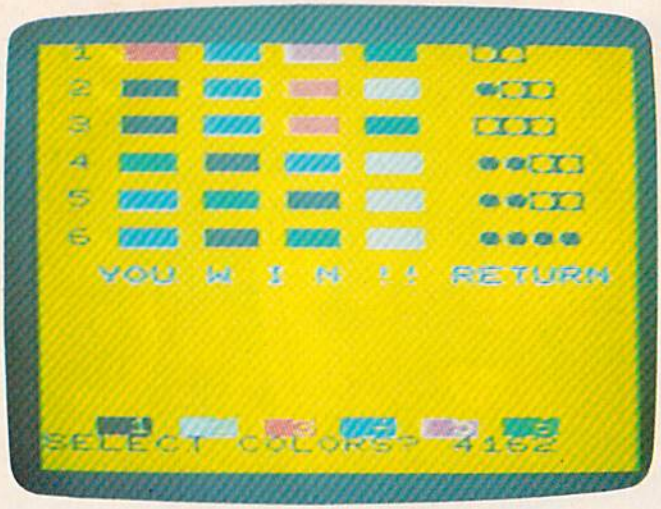
For Apple II & IIe, IBM PC & jr, Atari, Commodore 64, ColecoVision & Adam.

©1984 by MicroLab, Inc. The Heist is a registered trademark of MicroLab, Inc. Apple II & IIe, IBM PC & jr, Atari Commodore 64, ColecoVision & Adam are registered trademarks of Apple Computer, Inc., IBM Corp., Atari, Inc., Commodore Electronics, Ltd. and Coleco Industries, Inc., respectively.

micro fun

THE COMPUTER ENTERTAINMENT DIVISION OF MICROLAB, INC.
2699 Skokie Valley Road, Highland Park, IL 60035 • (312) 4337550

www.commodore.ca



By combining logic and intuition, the player has successfully broken the code (VIC version).

Making It Harder

If Mind Boggle doesn't provide sufficient challenge, a few simple changes will produce a more difficult version. As the game is written, each of the four positions will contain a different one of the six possible colors. If you allow the same color to appear in more than one position, the number of possible sequences soars. Game play remains the same, except that a color may now appear two, three, or even four times.

To accomplish this on the VIC, change these lines in Program 1:

```
1 PRINT"{CLR}{5 RIGHT}{9 DOWN}MIND BOGGLE
  ":CLR                              :rem 178
9 A$="123456":GOSUB13:A1$=R$:A1=VAL(A1$)
10 GOSUB13:A2$=R$:A2=VAL(A2$)
11 GOSUB13:A3$=R$:A3=VAL(A3$)
12 GOSUB13:A4$=R$:A4=VAL(A4$):GOTO16
13 R=INT(RND(1)*6)+1:R$=MID$(A$,R,1):RETU
   RN
```

To accomplish this modification in the 64 version, these lines should be changed in Program 2:

```
300 PRINT"{CLR}{13 DOWN}{13 RIGHT}{BLK}MI
    ND BOGGLE{5 DOWN}":FORT=1TO1000:NEXT
                                   :rem 202
400 A$="123456":GOSUB450:A1$=R$:A1=VAL(A1
    $)
401 GOSUB450:A2$=R$:A2=VAL(A2$)
402 GOSUB450:A3$=R$:A3=VAL(A3$)
403 GOSUB450:A4$=R$:A4=VAL(A4$):GOTO500
450 R=INT(RND(1)*6)+1:R$=MID(A$,R,1):RETU
    RN
```

If you're having trouble telling the colors apart (perhaps you're using a black and white TV set), the following changes to Program 1 will cause the numeric value for the color to be displayed:

```
51 PRINT"{BLK}{RVS}{2 SPACES}1{OFF} ";:PO
   KES2,135:GOTO57
52 PRINT"{WHT}{RVS}{2 SPACES}2{OFF} ";:PO
   KES2,159:GOTO57
53 PRINT"{RED}{RVS}{2 SPACES}3{OFF} ";:PO
   KES2,175:GOTO57
54 PRINT"{BLU}{RVS}{2 SPACES}4{OFF} ";:PO
   KES2,191:GOTO57
55 PRINT"{PUR}{RVS}{2 SPACES}5{OFF} ";:PO
   KES2,201:GOTO57
56 PRINT"{GRN}{RVS}{2 SPACES}6{OFF} ";:PO
   KES2,209:GOTO57
```

For the 64 version (Program 2), change these lines:

```
1700 PRINT"{BLK}{RVS}{2 SPACES}1{OFF} ";:
     POKESO+1,100:GOTO1750
1701 PRINT"{WHT}{RVS}{2 SPACES}2{OFF} ";:
     POKESO+1,124:GOTO1750
1702 PRINT"{RED}{RVS}{2 SPACES}3{OFF} ";:
     POKESO+1,140:GOTO1750
1703 PRINT"{BLU}{RVS}{2 SPACES}4{OFF} ";:
     POKESO+1,166:GOTO1750
1704 PRINT"{PUR}{RVS}{2 SPACES}5{OFF} ";:
     POKESO+1,150:GOTO1750
1705 PRINT"{GRN}{RVS}{2 SPACES}6{OFF} ";:
     POKESO+1,185:GOTO1750
```

A potential flaw in the game will occur if you use any of the cursor keys or cause the screen to scroll: The playing screen could be changed. The game will continue but you won't be able to see the entries which have scrolled off the screen.

See program listings on page 165.

DEALER INQUIRIES INVITED

COMPUTER KEYBOARD PROTECTION

Introducing **K-COVER** an anti-static, unbreakable, Commodore keyboard protector made of a durable smoked grey plastic with mar-resistant rubber feet.

K-COVER protects your keyboard from dust, dirt, and wandering fingers.

K-COVER also doubles as an angled riser for computer or monitor and comes with a lifetime guarantee against breakage.

K-COVER in now available with easy-tilt hinges that install in seconds and require no tools, so your **K-COVER** flips out of the way while computer is in use.

To order send $9.95 for hinged model FP884H or $7.95 without hinges, model FP883 plus $1.00 shipping/handling to:

Penguin Products
P.O. Box 7008
Roseville, MI 48305-7008

CHECK, MONEYORDER.
VISA AND MASTERCARD ACCEPTED
or call toll-free 1-800-732-0614

www.commodore.ca

Look at these Features

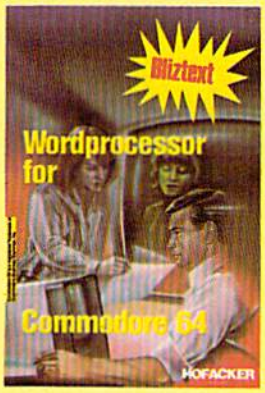
- Fully screen-oriented
- Horizontal and vertical scrolling
- Terminal mode — never seen before on a wordprocessor
- Supports Commodore disk and cassette handling
- Imbedded commands

Bliztext

BLIZTEXT is a trademark of ELCOMP PUBLISHING, INC.

BLIZTEXT WORDPROCESSOR FOR THE COMMODORE 64

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



NEW NEW NEW NEW NEW NEW NEW NEW NEW NEW

BLIZTEXT — SUPER WORDPROCESSOR for the Commodore-64

— ON SALE NOW! —

- Fully screen-oriented, up/down, left and right scrolling — Upper and lower case
- More than 70 commands
- Full I/O compatibility with Commodore peripherals Upper and lower case
- Works with practically every printer on the market, user definable printer control commands
- INCLUDE command allows handling large files on up to 4 diskettes or on cassette.
- Build in terminal software for electronic mail and networking. Telecommunications mode, upload and download, save on disk or cassette.
- Dynamic formatting, Imbedded commands
- Single keystroke for disk directory and error channel
- Program comes on disk or cassette
- Double line spacing, left and right margin justification, centering, page numbering, and practically everything one expects from a good wordprocessor.

AVAILABLE NOW!

Order # 4965 $89.00
Manual only (62 pages) $29.95

MACROFIRE
Editor/Assembler for the Commodore-64

ON SALE NOW
AVAILABLE IMMEDIATELY

One outstanding tool, consisting of 3 powerful elements combined into one efficient program!

1.) Fully screen-oriented Editor (more than 70 commands)
2.) Very fast assembler with macro capability
3.) Machine Language Monitor

Assembly can be started from the editor. Translates in 3 passes. More than 1,000 lables, screen oriented/no line numbers, scrolling, includes disk files.
Practically everything the serious machine language programmer needs everyday!

Manual only $19.95
Order # 4963 $89.00

THE GREAT BOOK OF GAMES, VOL.I,
by Franz Ende
46 programs for the Commodore 64
Introduction to graphics and sound. How to program your own games. Walking pictures, animation, high resolution graphics, programming tips and tricks, hints and useful subroutines for the beginner and advanced programmer. This book is a MUST for every C-64 owner.
Come and get it — It's yours for only $ 9.95
Order # 182 128 pages $9.95
Programs from the book on disk.
Order # 4988 $19.95

MORE ON THE SIXTYFOUR, by H.-C. Wagner
How to get the most out of your powerful Commodore 64. Very important subroutines, tricks and hints in machine language for your C-64. How to modify DOS. How to connect a parallel and serial printer. How to design your own terminal program for communication and networking. Dig into I/O for cassette and disk.
Order # 183 $9.95
Programs from the book on disk
Order # 4989 $19.95

NEW PRODUCTS

Watch out for our new books, software and add-ons to come soon. ON SALE NOW! — ORDER TODAY!

How to program in 6502 Machine Language on your C-64 , by S. Roberts (Introduction)
Order-# 184 $12.95

Commodore-64 Tune-up, Vol. I, by S. Roberts
How to expand and customize your C-64.
Order # 185 $12.95

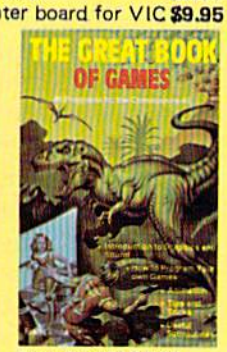
Small Business Programs for the Commodore-64
by S. Roberts
How to make money using your C-64. Mailing list, invoice writing, inventory, simple wordprocessing and much more.
Order # 186 $12.95

Dealer and Distributor inquiries are invited.

Hardware Add-Ons:

Parallel printer interface KIT Order # 4990 $ 19.95
Universal Experimenter Board Order # 4970 $ 9.95
Expansion Board, space for four experimenter boards (board only) Order # 4992 $ 29.95
Tricks for VICs, No. 176 $9.95
Universal Experimenter board for VIC $9.95

Book No. 184 $12.95



Book No.182 $9.95

Book No.183 $9.95

NEW Products for the C-64
SUPERMAILING (D)
Order No. 4962 $49,-
Superinventory (D)
Order-No. 4961 $ 49,-
BUSIPACK 1 (D)
Order-No. 4963 $99,-
SixtyFORTH (D)
FigFORTH for C-64
Order-No. 4960 $39,—

For your VIC-20
Tricks for VICs
Order-No. 176 $9.95
Universal Experimenter board
Order-No. 4844 $9.95

HOFACKER

PAYMENT: check, money order, VISA, MASTER CARD, Eurocheck, ACCESS, Interbank
Prepaid orders add $3.50 for shipping (USA)
$5.00 handling for C.O.D.
All orders outside USA: add 15 % shipping, California residents add 6.5 % sales tax.

ELCOMP PUBLISHING, INC
53 Redrock Lane
Pomona, CA 91766
Phone: (714) 623 8314

www.commodore.ca

SuperSprite

Nick Sullivan

Guide "SuperSprite" through the kryptonite barriers using the function keys as cursor controls. For the Commodore 64.

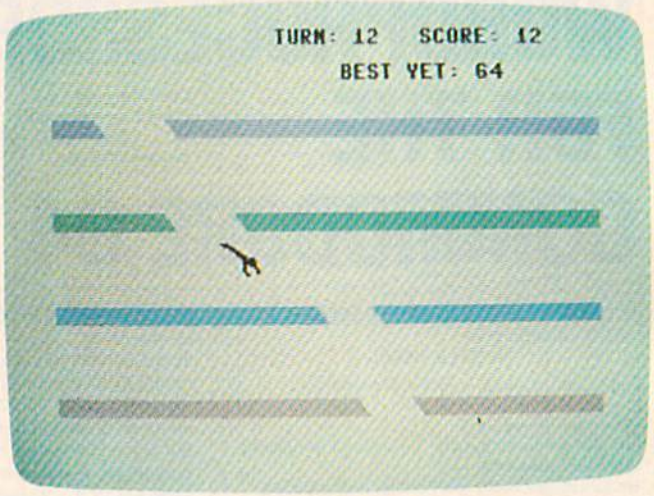
The game "SuperSprite" makes use of two fascinating aspects of Commodore 64 sprite graphics. First, the size of a sprite is doubled at the flip of a bit in either or both of its two dimensions. Second is the ability to detect, by PEEKing a single register, collisions between sprites and other graphic data.

The SuperSprite character resembles a superpowered being with arms outstretched in flight. SuperSprite is not a steady flyer. This is unfortunate, as his flight path is blocked by barriers of kryptonite, impassable except for narrow gaps. The gaps are movable—luckily, for SuperSprite does not wear a helmet—but moving them requires a deft hand at the controls. And that's where you come in.

You are the keeper of the Spritely Gates, and you get 20 turns to manipulate the barriers on the screen so that SuperSprite can make his way to the bottom. If you make it, you increase your score and begin a new turn at the top of the screen.

You will need the four function keys, each of which controls a gap in one of the four barriers. These keys work as cursors to move the gaps into SuperSprite's path so he can fly through. If SuperSprite hits a barrier you lose a turn, and SuperSprite starts over at the top of the screen. Unshifted, a function key will cause its gap to move to the right; a SHIFTed function key moves the gap to the left. Holding the keys down causes them to repeat.

The soothing SuperSprite soundtrack is created by feeding a slightly altered version of SuperSprite's y-position data to the frequency registers of the sound chip. The swooshing sound gets deeper as SuperSprite flies down the screen.



SuperSprite has made it through the first two barriers, but the third will be more difficult.

Special Scoring Technique

Scoring is based on several factors linked through the expressions on lines 210, 590, and 600. The program displays and saves the best score yet achieved by players of SuperSprite on your computer. The record is stored in a location whose contents are displayed in line 10 between the REM keyword and the colon. When you type in the program, the character in this position is the letter A. After you have finished entering the program, but before you save, you should type:

```
POKE PEEK(44)*256+PEEK(43)+5,1
```

This will properly initialize the high-score record for you.

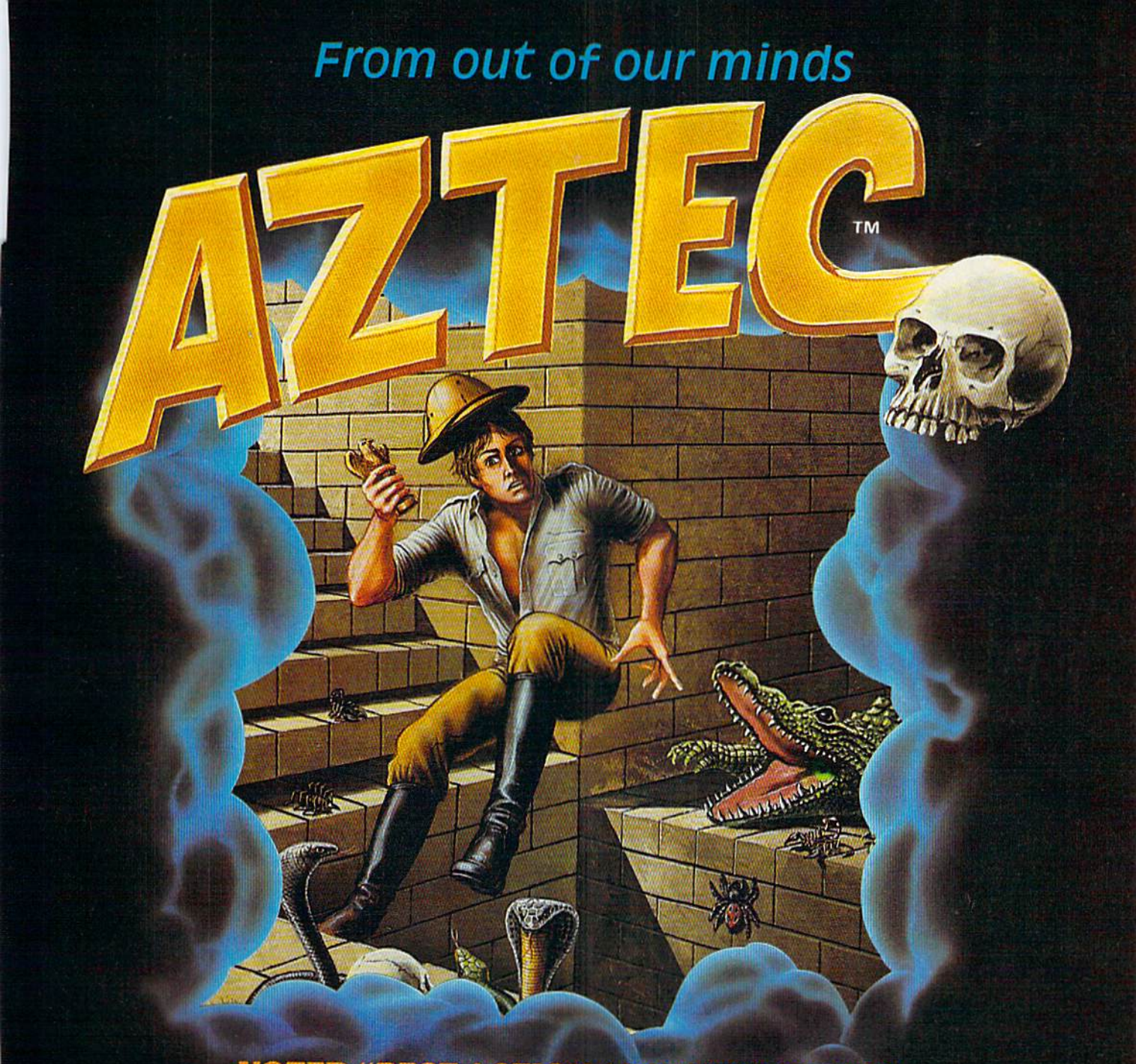
If you break the record, a special message will remind you at the end of the session to SAVE the program so you can preserve your high score. It is good practice to perform a VERIFY to make sure that the SAVE was successful.

See program listing on page 145.

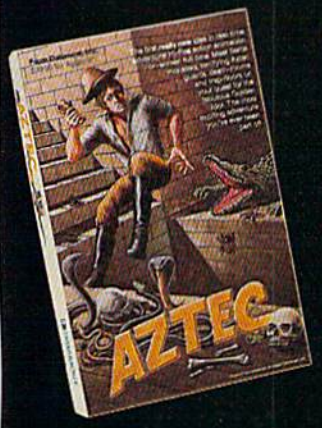
www.commodore.ca

From out of our minds

AZTEC™



VOTED "BEST ACTION ADVENTURE" 1983
ELECTRONIC FUN WITH COMPUTERS & GAMES



Imagine. You're deep within an ancient Aztec pyramid. You're searching for the Golden Idol — running, jumping, crawling, fighting cobras, scorpians, giant lizards and Aztecs with a wide assortment of weapons, falling through trapdoors and blowing up walls. ALL IN REAL TIME ACTION ANIMATION! AZTEC — the adventure of your life. Only $39.95.

ACTUAL GAME SCREEN

NOW FOR THE COMMODORE 64 AND ATARI 48K!
Also available for the Apple II+ & //e.*

DATAMOST INC.
The most out of our minds.
8943 Fullbright Avenue, Chatsworth, CA 91311-2750
(818) 709-1202

Visa/Mastercard accepted.
$2.00 shipping/handling
(California residents add 6½% sales tax).

Copyright © 1984 DATAMOST, Inc.
All Rights Reserved

*Commodore 64 is a trademark of Commodore Business Machines, Inc. Apple II+ & //e are trademarks of Apple Computers Inc.

REVIEWS

Knights Of The Desert For The Commodore 64

Arthur B. Hunkins

Knights Of The Desert, by Strategic Simulations, is a war-game simulation of the North African Campaign of 1941–43. It pits the Axis (Germany and Italy, led by Rommel) against the Allies (mostly British). It is most definitely a real thinker's game.

The entire scenario is well researched and documented (as is usual with Strategic's games). Situations, events, and odds are all based on historical fact. The accompanying booklet is well produced and includes a densely packed, 11-page article detailing every aspect of the two-year campaign.

A Multitude Of Options

Knights Of The Desert is a challenging and instructive game, one with involved strategy and an enormous complex of interacting variables. It has tremendous depth and staying power; once the battle's on, it is even exciting (in a strategic sort of way).

You can play against another person or the computer (the computer is always the Allies); you can select one of six scenarios (from a one-turn battle to the entire campaign); and each player chooses one of ten difficulty levels on each of three different scales. Furthermore, there are three different degrees of winning or losing—marginal, tactical, or strategic.

As even further evidence of the game's sophistication, each "turn" consists of seven different phases per player, along with "limited reaction" options from the opponent during these segments. The seven phases are Operational, Resupply, Depot Movement, Enemy Reaction, Operations, Second Resupply, and Second Depot Movement.

The supply phases are handled in terms of individual units (up to 28 units per player, in different categories—depot, infantry, mobile infantry, armor). Cycling through all of them takes some time. During the Operations phase, the attacking player may choose which units to commit to battle, the battle intensity level, level of risk, and number of air points. The defender specifies level of risk and air points. Additional factors can affect the outcome: morale, defender odds, terrain effects, and a unit cadre factor (which allows some defeated units with good supply lines and high morale to return later

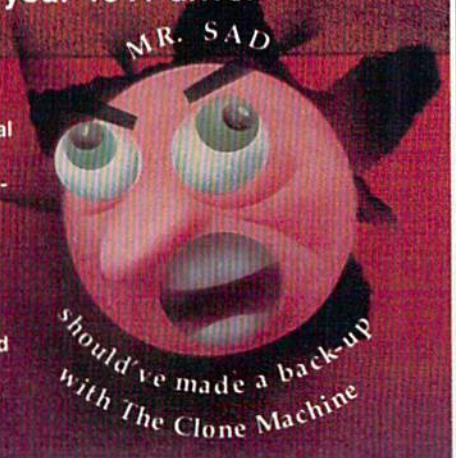
ATTENTION COMMODORE 64 OWNERS

WE'LL BACK YOU UP!

If you own a disk drive then you'll need "The Clone Machine." Take control of your 1541 drive.

NEW IMPROVED WITH UNGUARD*

Package includes
1) Complete and thorough users manual
2) Copy with one or two drives
3) Investigate and back-up many "PROTECTED" disks
4) Copy all file types including relative types
5) Edit and view track/block in Hex or ASCII
6) Display full contents of directory and print
7) Change program names, add, delete files with simple keystrokes
8) Easy disk initialization
9) Supports up to four drives



*UNGUARD Now allows you to read, write and verify bad sectors and errors on your disk making it easy to back-up most protected software.

$49.95

CALL (201) 838-9027

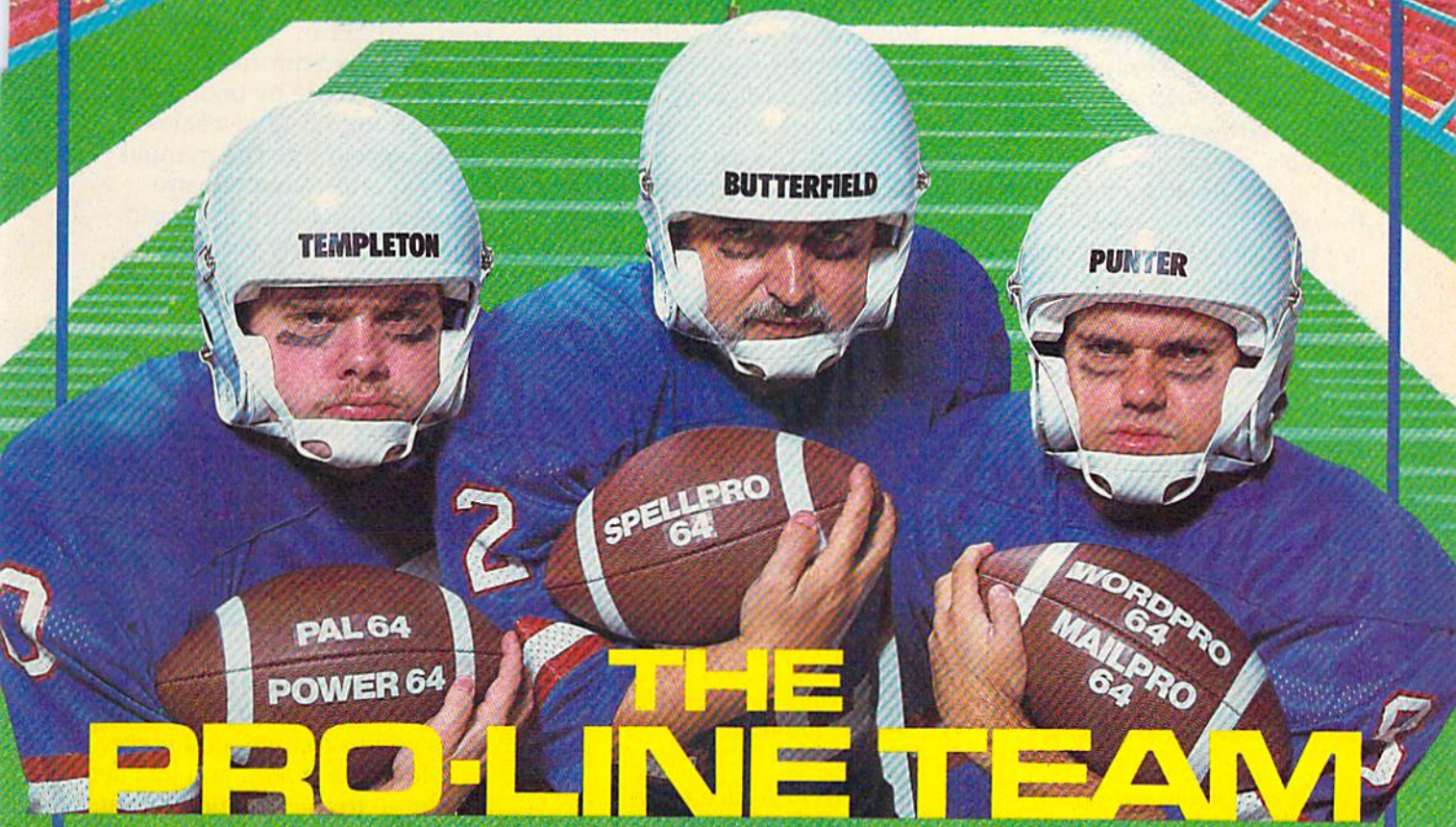
Dealers & Distributors Inquiries Invited

MICRO WARE D.T.

1342 B Rt. 23
Butler, N.J. 07405

www.commodore.ca

INTRODUCING



THE PRO-LINE TEAM

PAL 64
The fastest and easiest to use assembler for the Commodore 64.+ Pal 64 enables the user to perform assembly language programming using the standard MOS mnemonics. **$49.95***

POWER 64
Is an absolutely indispensible aid to the programmer using Commodore 64 BASIC. Power 64 turbo-charges resident BASIC with dozens of new super useful commands like MERGE, UNDO, TEST and DISK as well as all the old standbys such as RENUM and SEARCH & REPLACE. Includes MorePower 64. **$49.95***

TOOL BOX 64
Is the ultimate programmer's utility package. Includes Pal 64 assembler and Power 64 BASIC soup-up kit all together in one fully integrated and economical package. **$89.95***

SPELLPRO 64
Is an easy to use spelling checker with a standard dictionary expandable to 80,000 words. SpellPro 64 quickly adapts itself to your personal vocabulary and business jargon allowing you to add and delete words to/from the dictionary, edit documents to correct unrecognized words and output lists of unrecognized words to printer or screen. SpellPro 64 was designed to work with the WordPro Series and other wordprocessing programs using the WordPro file format. **$49.95***

MAILPRO, SPELLPRO and PAL are available for Commodore 8032 computers equipped with either Commodore 4040 or 8050 Disk Drives. Further information on request.

Distributed in Canada by:
PACO ELECTRONICS LTD.
20 Steelcase Rd., West, Unit 10
Markham, Ont., L3R 1B2
416-475-0740 Telex 06-966655
U.S. Dealer, Distributor inquiries invited.

*Prices shown are in U.S. Dollars, slightly higher in Canada

+Commodore 64 and Commodore are trademarks of Commodore Business Machines Inc.

WORDPRO 64
This brand new offering from the originators of the WordPro Series brings professional wordprocessing to the Commodore 64 for the first time. Two years under development, WordPro 64 features 100% proportional printing capability as well as 40/80 column display, automatic word wrap, columnization, alternate paging for headers & footers, four way scrolling, extra text area and a brand new 'OOPS' buffer that magically brings back text deleted in error. All you ever dreamed of in a wordprocessor program, WordPro 64 sets a new high standard for the software industry to meet. **$49.95***

MAILPRO 64
A new generation of data organizer and list manager, MailPro 64 is the easiest of all to learn and use. Handles up to 2,000 records on one disk, prints multiple labels across, does minor text editing ie: setting up invoices. Best of all, MailPro 64 resides entirely within memory so you don't have to constantly juggle disks like you must with other data base managers for the Commodore 64. **$49.95***

PRO·LINE SOFTWARE

(416) 273-6350
755 THE QUEENSWAY EAST, UNIT 8,
MISSISSAUGA, ONTARIO L4Y 4C5

www.commodore.ca

as fighting units).

Turns begin only after a mobilization segment that includes reinforcement, supply, logistics, and initiative phases. At the end of each player's turn the game may be saved to disk or tape, and continued either then or later.

Few Drawbacks

The graphics are reasonably good, documentation is excellent, but sound effects are nonexistent. The only audio is soft blips when it's time for the player to act, or when an inappropriate key has been pressed.

I encountered a small difficulty in using the program. The documentation is written for the Apple, Atari, and TRS-80. The 64 version adds only a single loose sheet, which I didn't spot until well into my work.

Strategic Simulations has produced more than 20 wargame simulations, the majority of them modeled on historical events. Like *Knights Of The Desert*, each of their games teaches strategy, often within a real-world, educational, and historical context, and teaches it interestingly and well.

Knights Of The Desert
Strategic Simulations, Inc.
883 Stierlin Road, Building A-200
Mountain View, CA 94043
$39.95 (tape or disk)

CodeWriter

Richard E. DeVore

CodeWriter, from Dynatech Microsoftware, Inc., is a program generator that helps you write your own BASIC programs.

You don't need to know how to program to use this product. You simply input your program using normal English, and *CodeWriter* converts it into a BASIC program.

Operation Clearly Explained

The 60-page manual (with an index) illustrates program design, with screen examples every step of the way. The explanations are clearly written and easy to understand. Although *CodeWriter* can be used to create many types of programs, it seems best suited for an application such as a mailing list, data base, accounts receivable, and payroll.

To use *CodeWriter* you need a Commodore 64 and a disk drive. The disk drive may be an upgraded 1540, a 1541, or a 4040 dual drive. A nice extra to have is a printer. The program works with the Commodore 1525 and other printers.

Menus are used extensively: The manual is almost unnecessary. Start by loading Disk 1, the Data Entry System. The first screen to appear is the Main Menu. It allows you to set up the display colors of your television or monitor. It also lets you format a disk to use with the program if you need to do so before loading the program. At this point, you can go back to BASIC, but if you want to put *CodeWriter* to work, select Create a Data Entry System.

Begin With The Screen

Program design starts with your screen layout. From the next menu you can choose to edit or create a screen. After reading the instructions and pressing RETURN, you are ready to design a program.

There is a tutorial that serves as good practice by taking you through the setup of a sales/invoice program. The manual fully explains what you are accomplishing with the input and tells you why you make each entry. The methods of establishing alphanumeric, numeric, money, and date fields are well explained.

Setting Up Fields

Having designed the screen layout, you then determine if input will be from the keyboard or if the program will calculate the figures. This includes totals which the program will handle for you.

Next, you return to the screen format menu, which allows you to change, edit, save, or reload the screen you just set up, or go to the Creation menu. To see how this menu works, you are led through the change and edit options. Then the screen is saved to your formatted disk.

After you have established the screen format and data fields, the Creation menu is accessed. This sets up calculations for the fields. The program asks about each field in turn. It is here that the power of your program is determined. The manual explains how and why the calculations are entered and what each accomplishes in the program.

Having completed this, you are asked for the number of records that will be needed for this program. *CodeWriter* tells you the maximum number of records which can be stored on the disk. Space for them is then set aside on the disk, along with the program title that you select. At this time you choose the field key or fields that the program will use to sort your records.

www.commodore.ca

Error Trapping

You have now reached the error-trapping aspect of program design where many programmers have difficulty. The manual really shines in its explanations of what you should consider and why. A four-page appendix devoted to this subject takes you step by step through the process.

After the error-trapping routine is set up, *CodeWriter* will convert your design into a BASIC program. The process takes from 30 minutes to more than an hour, depending on the size of the application. The final version will run by itself. You don't need to load *CodeWriter* or any other program into memory first.

After conversion, you are prompted to place your formatted disk in the drive and press RETURN. Your program will be saved to disk.

Generating Reports

The ability to create programs is only part of *CodeWriter*'s power. The second part, Disk 2, is the Report Creation System.

Report Creation lets you access the information from your *CodeWriter* programs and print it to the screen or on paper.

The manual shows how to set up a report and how to use fields in the program to extract specific information. Report Creation allows the fields to be manipulated mathematically in the same manner as when you designed the program.

In designing your report, you may use a 40-column or 80-column format. Paging from left to right on the screen, you can design in 80 columns and see the results on the screen as they would appear on paper.

As in the Data Entry System, the computer converts your report design into a BASIC program which is saved on disk.

Comm-File™

You deserve it . . . so does your Commodore 64!*

COMM-FILE is a powerful database program that eliminates multiple data files and turns them into one organized and concise information management system. Offering extreme ease of use and tremendous versatility, COMM-FILE can maintain reports, records, form letters, invoices, listings, mailing addresses and any other information vital to your business' proficient operation.

COMM-FILE combines Extensive Data Capacity . . . Flexible User-Designed Files and Fields . . . Complete Mathematical Calculation Abilities . . . Powerful Search and Sort Control . . . File Merge Capability . . . Advance Text Editing Features . . . and Custom-Designed Printer Formats . . . all to bring maximum efficiency and effectiveness to any business!

*Commodore is a registered trademark of commodore Business Machines.

ORBYTE™ SOFTWARE

P.O. Box 948, Waterbury, CT 06720
203-621-9361

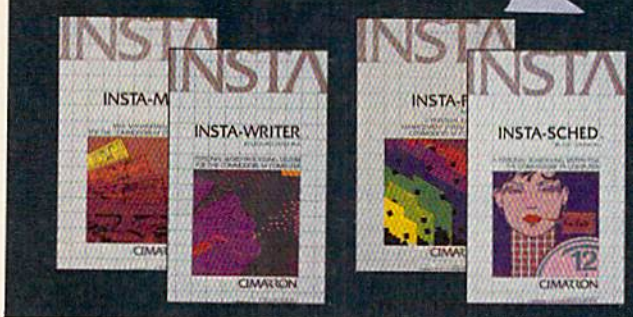
No Foolin' Around

The Commodore 64 is your first "real" computer. So, it stands to reason that the software you use be real too. And, *useful.*

The INSTA series productivity software is just that — real and useful.

With our tutorial manuals and HELP SCREENS we actually *teach* you what word processing, spreadsheets and graphs are all about.

Games are fun....for foolin' around. INSTA is for real.



INSTA™

By Cimarron a division of MICRO SCI CORP.
2158 Hathaway Street
Santa Ana, CA. 92705
(714) 241-5600

μ-SCI MICROSCI

Commodore 64 is a trademark of Commodore

www.commodore.ca

The program generation does not take as long, usually finishing within 30 minutes.

Although using *CodeWriter* proficiently requires a bit of work and time, the effort is quickly paid back when your custom programs start clearing up the problems you bought your computer to solve.

CodeWriter comes on a double-sided disk, with the Data Entry System on one side and the Report Creation System on the other. Backup disks are available at a low cost after you register the warranty. Dynatech offers a one-year, free replacement warranty and a toll-free hotline to provide help when needed. Upgrades are free to registered owners in exchange for their original disk.

CodeWriter
Dynatech Microsoftware, Inc.
7847 N. Caldwell Ave.
Niles, IL 60648
$99.95

The Commodore Automodem

Robert Sims, Assistant Editor

The Commodore 1650 Automodem is designed specifically for the VIC-20 and Commodore 64. It plugs directly into the user port, with no need for the special cables and RS-232 interfaces required by most non-Commodore modems.

Like all modems, the Automodem translates your computer's digital signals into sounds which can be transmitted over telephone lines, and translates incoming sounds into the signals your computer recognizes.

But unlike other modems in its price range, it has the ability to automatically dial or answer the phone, for faster and easier telecommunications linkups.

The Function Switches

The Automodem's functions are changed with three switches, which set the modem to originate or answer calls (O/A), to operate in half or full duplex (H/F), and to switch the phone line connection back and forth between the modem and a telephone (D/T).

The modem also has two modular telephone plugs, one for the cord that connects it to the telephone wall plug, and one for a cord from the modem to any modular telephone. This arrangement allows you to connect the modem to the phone line without disconnecting the telephone. To switch from data mode to voice transmission while on-line, pick up the phone handset and move the switch on the modem to the T position. This is useful when you are swapping files with a friend and want to talk between data transfers.

Commodore has included everything you need for basic telecommunications. Besides the 300-baud Automodem, you get a modular cord which connects your phone to the modem, and a cassette tape containing two simple terminal programs (one for the VIC and one for the 64). This software gives you the capability to access bulletin boards and information utilities such as the CompuServe Information Service, but it does not include routines for downloading (receiving) or uploading (sending) files.

VICmodem Software Works, Too

If you already have VICmodem terminal software with these capabilities, it will also work with the Automodem. However, to use the automatic dialing and answering features, you will need software which includes these routines.

The Automodem manual explains clearly how to hook up the modem and put it into operation. It explains how to use the software, and includes a BASIC program you can use to add auto-dial and auto-answer capabilities to your own software.

One of the few errors in the manual occurs in this BASIC program listing on page 22. Lines 310–350 contain a routine to check for a ring signal and to send the signal that puts the modem on-line (the electronic equivalent to picking up the receiver). As written, the routine detects the ring, but never actually answers the phone. A Commodore representative assured me that if you insert this line:

```
335 IF X=0 THEN POKE B1,32
```

the program will answer the phone properly.

A Duplex Glitch

Another minor error of c nission involves the duplex settings. With the Automodem, you have two ways of choosing the setting: The H/F switch on the modem can be set to half or full duplex, and your terminal software will also have a duplex setting.

Whether you choose half or full duplex will depend on how you are using the modem. To access CompuServe, you set the modem switch and your software to full duplex. But for most bulletin boards, and to communicate with a friend's com-

www.commodore.ca

puter, you use half duplex. It's in half duplex that the problem occurs.

When operating in half duplex, the Automodem sends all data to your screen as it transmits it, and your software does the same. If you set both to half duplex, you will get double letters on your screen, lliikkee tthhiiss. This problem is not mentioned in the manual, but the solution is simple. When you want half duplex, set the modem switch to half and set the software to full duplex (or vice versa). The half-duplex setting is dominant, so you will eliminate the double letters but will still be transmitting in half duplex.

Pulse Dialing

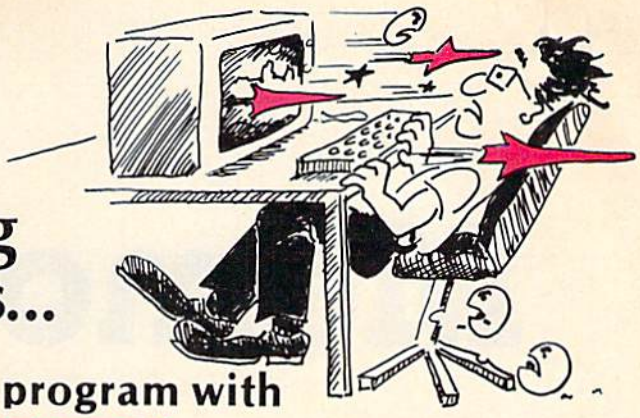
Finally, you should be aware that the Automodem's automatic dialing feature uses pulses only. The modem will work for ordinary dialing on residential Touch-Tone lines, because tone line equipment also recognizes pulses. But pulse dialing is not compatible with some special phone company services. For example, in order to use a telephone calling card without operator assistance, you must be able to generate the tones, using either a Touch-Tone phone or your modem.

Such sophisticated uses require special software and programmable firmware in the modem, at prices double the cost of the Automodem and more.

For most home telecomputing needs, however, the Automodem is more than adequate, and you won't find a better buy in this price range.

The 1650 Automodem
Commodore Business Machines, Inc.
1200 Wilson Drive
West Chester, PA 19380
$149.95

Tired of just playing games...



Learn to program with

BASIC
A TUTORIAL

BASIC, A TUTORIAL introduces you to the essential elements of programming your Commodore 64 in the BASIC language. Everything from keywords and statements to data handling and printing . . . and so much more!

BASIC, A TUTORIAL makes learning fun for even the youngest computer "whiz" through imaginative graphics and hands-on programming experience. Each BASIC lesson is presented on the monitor screen and in the manual for self-paced learning both at and away from the computer.

BASIC, A TUTORIAL helps you truly understand and use your computer to its fullest. Isn't that more challenging than 'just playing games'!

*Commodore is a registered trademark of Commodore Business Machines.

ORBYTE™ SOFTWARE
Box 948, Waterbury CT 06720 203-621-9361

No Lookin' Around

We know. You've been looking everywhere for 64 software, INSTA's *interactive* line of software is just a phone call away.

Imagine, specially designed software that "talks" to one another. Your home budget created with CALC instantly becomes a GRAPH. And your club membership list with addresses and monthly dues quickly becomes a form letter, printed over and over again, automatically, for each member.

So, no more lookin' around. INSTA is here now!

INSTA™
By Cimarron a division of MICRO SCI CORP.
2158 Hathaway Street
Santa Ana, CA. 92705
(714) 241-5600
μ-SCI MICROSCI
Commodore 64 is a trademark of Commodore

www.commodore.ca

Memo Writer

Mark R. Brown

Here's a mini word processor that's handy for memos, notes, or lists. Written for the 64, we've added a version for the unexpanded VIC.

With "Memo Writer" you can fill the screen with text and then edit it using all of the editing keys you are already familiar with: cursor controls, insert and delete, and home and clear screen.

Since you are limited to one screen of text, the program prevents you from doing anything which would cause you to scroll off the bottom of the screen, thus losing the text at the top. Well, almost anything. If you use the INST key to insert characters on the bottom line, the screen will scroll, so avoid this if possible.

The function keys are used for tabs and selecting print options. You can choose single- or double-spacing and expanded or normal print sizes. There are no set margins, but the tabs can be used to move the left margin.

Two Typing Modes

You can type in either capitals or lowercase letters. The print subroutine PEEKs to see which shift mode you're in and sends the proper control characters to the printer.

The 64 program structure can be divided into five parts:

1. Lines 9–60 handle the input and sort out the control keys from the text input.
2. Lines 100–220 perform the control key functions.
3. Lines 500–780 print the instructions.
4. Lines 800–820 format the screen.
5. Lines 60000–60140 dump the screen contents to the printer. This is a modified version of the screen dump program contained in the VIC printer manual.

You can save about half the work of typing if you leave out line 9 and lines 500–780 and just refer to the program listing for instructions. Line 500 sets the background and border colors; these can be set to your preference.

A Caret Prompt

The caret marks at the left side of the screen help keep track of where you are on the 80-column line. Don't forget to erase them before you print or they'll appear in your printed output. You can eliminate or modify them in line 800.

A side effect of having repeating keys is a possible inconsistency when selecting (toggling) between uppercase and lowercase. This may or may not be an aggravation. To turn off this function, delete POKE 650,128 in line 10.

A Blinking Cursor

There are a couple of tricks in the input routine. POKE 204,0 in line 10 turns the cursor on. Normally you wouldn't have one during a GET and PRINT sequence. POKE 205,3 in line 40 sets the cursor blink countdown timer to a short count, to even out the timing jerks caused by the GET loop in line 20. Without this, typing is not smooth at all. WAIT 207,1 in line 40 waits for the cursor to blink off before printing. This keeps the PRINT statement from leaving reverse characters behind during the cursor blink phase.

The PEEKs in lines 35 and 50 check to see if you are on the last screen line, and keep you from doing anything which would cause the screen to scroll. It should be fairly easy to add any special features you want. This program supports the full graphics character set, but of course it will only print properly on a Commodore-compatible printer. Those with other printers may need to make some changes in the control codes in order to make Memo Writer compatible.

See program listings on page 148.

www.commodore.ca

Food for Thought.

Real computing at appetizing prices.

Inventory 64.™ An easy-to-use menu-driven program that lets you track complete and complex inventories. Pinpoint locations, vendors, units of measure. Update prices, reorders, sales, entire stocks. A powerful tool for your home computer at only $29.95*, on disk.

64 PAK.™ A self-teaching sampler package of 10 menu-driven programs. Ideal as an introduction to computing. Or compute your life expectancy, your mortgage payments, even learn the language of the deaf, plus a lot more. Only $19.95*, on tape; $24.95*, on disk.

PractiFile.™ A fully professional file manager for your Commodore. PractiFile can handle mailing list entries by the thousands. You can change records, numbers, methods of filing, and a great deal more. Plus, it's easy to use. Only $54.95*, on disk.

PractiCalc™ 64. The most powerful spreadsheet available for a home computer—at the least cost. Track investments, inventories, expenses. Project profits. Make charts. Keep mailing lists. Sort alphabetically or numerically, instantly. An incredible value at $49.95*, tape; $54.95*, disk.

Total Health.™ The fun way to keep fit. Stay on top of your daily intake and outgo of calories. Balance your daily diet and graph your progress—all tailor-made to your body, past, present, and future. It's like having a health spa in your home for only $24.95*, on tape; $29.95*on disk.

Now you can do real, honest-to-goodness computing at computer-game prices. Computer Software Associates brings you hard-working software that makes your work easy. (While it's easy on your budget.) All programs are easy to work with right on the screen, from self-teaching instant software that tracks your vital statistics to potent programs to track inventories and profits.

Of course, if it's games you want, we've got them too. But if you're looking for home computer power with real brainpower, look no more. Now you can play for keeps.

COMPUTER SOFTWARE ASSOCIATES, INC.

Exclusively distributed by Micro Software International, Inc. • The Silk Mill, 44 Oak St., Newton Upper Falls, MA 02164 • (617) 527-7510

*Prices are suggested retail; actual retail prices may vary. © 1984 Computer Software Associates, Inc. Commodore 64™, trademark of Commodore Electronics Limited

www.commodore.ca

C. REGENA

Teaching Music With Computers

One difference between microcomputers like the VIC-20 and Commodore 64 and "big" computers (minis and mainframes) is that micros can play music and create sounds. They can play a variety of tones and three voices at once. They also have a noise generator and can combine music with noise for a variety of sounds—arcade-game noises to three-part classical music.

To program music, you need to keep your manuals handy. In Commodore BASIC there are no PLAY or SOUND commands. Instead there are POKE statements, where different numbers represent the voices and tones. In my column in the August 1983 issue you'll find some programming tips for creating music on the VIC. Programming music on the 64 is more complex—mainly because more options are available. You can control the waveform, attack-decay, and sustain-release. Using different combinations, you can make your Commodore 64 sound like an oboe or a trumpet, a piano or a drum. Gregg Peele, our musician-programmer, has written several GAZETTE articles in past issues to help readers understand the complexities of the 64's music.

Sound And Music In Educational Programs

This month we'll look at the use of music in educational programs. Early programs for computers were mostly "computing"—manipulating numbers for calculations in formulas or business programs. Soon programmers discovered that self-paced instruction and drill work were ideal applications for these machines. Eventually educators worked with programmers or wrote their own programs so that computerized instruction also contained good educational concepts. Color and music were then added to enhance educational programs.

How is sound used in programs? One technique is to use an audio prompt when the user is expected to respond. I usually use an "uh-oh" sound to indicate an incorrect or unacceptable response. You could also use a noise instead of tones. Naturally, a correct response needs a positive reinforcement, like an arpeggio or a happy tune. Adding sound to an educational game will make the game more arcadelike and help to keep the student's interest.

To play music on the VIC and 64, you must first turn on the volume. You can choose a level from 0 to 15, where 15 is the loudest. If I use music in a program and won't be changing the volume, I like to set the volume at the beginning of the program (before any sounds are used):

```
VIC: 110 POKE 36878,15
64:  110 POKE 54296,15
```

For each voice or sound channel there is a different location to POKE the tones. Each tone has a number. You'll find a chart in your user's manual that converts the letter names of the musical notes to numbers for the POKE statements. Variables may be used for the numbers in the POKE statements. The 64 has two values for each note, a high-frequency value and a low-frequency value for each tone. To play the tone, find the numbers needed from the Table of Musical Notes. In one channel, the statements to play a high A are:

```
VIC: 130 S=36876:POKE S,237
64:  130 HF=54273:LF=54272:POKE HF,112:POKE
       LF ,199
```

For the 64 you'll need to choose some of the options also.

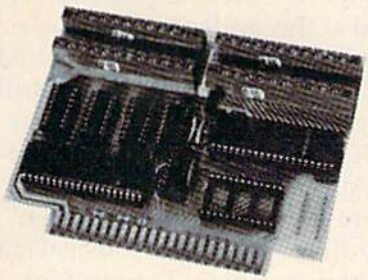
```
120 POKE 54277,64:POKE 54278,128:W=54276
140 POKE W,17
```

Timing Methods

The tone will play until you POKE numbers for different tones, turn off the volume, or POKE 0 for the tones (or on the 64 POKE a different number for the waveform). The most common way to play a note for a certain length of time is to

www.commodore.ca

NEW!
Universal Input/Output Board for VIC-20/64



- 16 channel 8-bit A/D converter with 100 microsecond sampling time.
- 1 D/A output.
- 16 high voltage/high current discrete outputs.
- 1 EROM socket.
- Use multiple boards for additional channels up to 6 boards.

VIC-20 uses MW-311V $205.00
CBM-64 uses MW-311C $225.00

MW-302: VIC-20/64 Parallel Printer Interface.

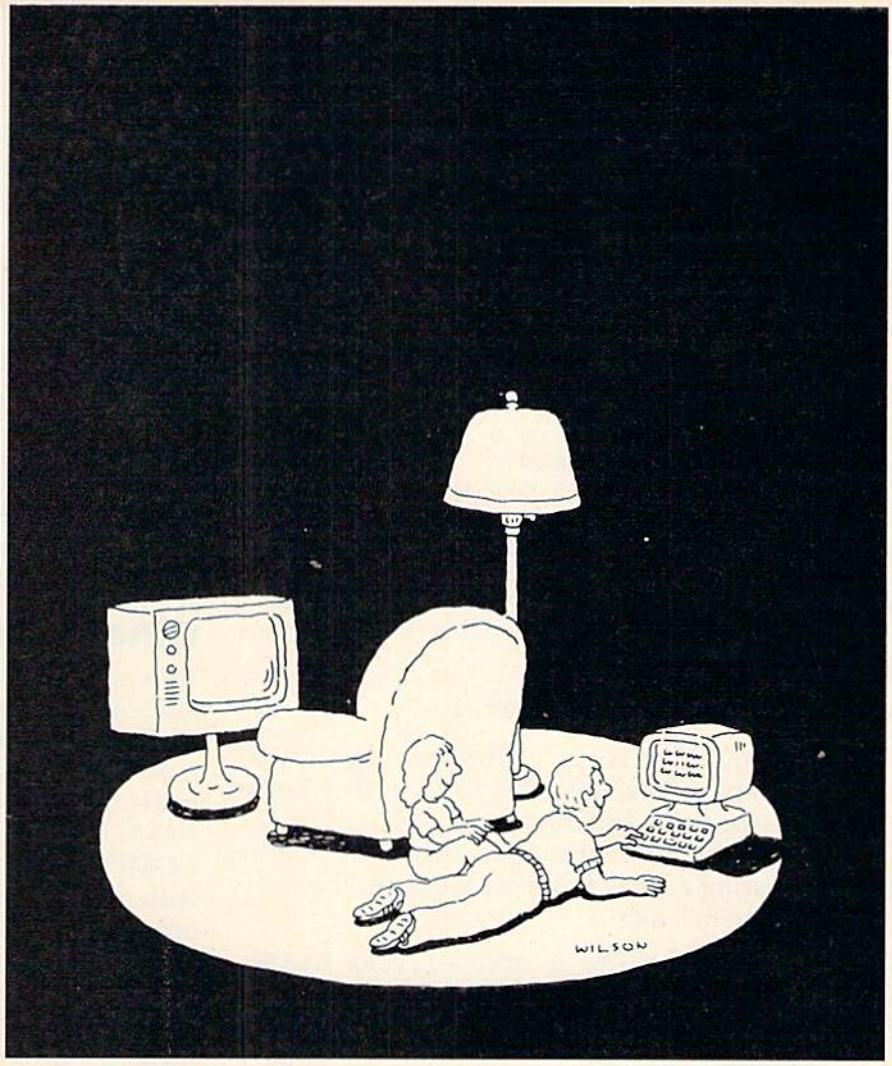
Works with all centronics type parallel matrix & letter printers and plotters—Epson, C.Itoh, Okidata, Nec, Gemini 10, TP-I Smith Corona, and most others. Hardware driven; works off the serial port. Quality construction: Steel DIN connectors & shielded cables. Has these switch selectable options: Device 4, 5, 6 or 7; ASCII or PET ASCII; 7-bit or 8-bit output; upper & lower case or upper only. Recommended by PROFESSIONAL SOFTWARE for WordPro 3 Plus for the 64, and by City Software for PaperClip.

MW-302 ..... $119.95

Dealer inquiries invited.

VISA MasterCard

Micro World Electronix, Inc.
3333 S. Wadsworth Blvd. #C105,
Lakewood, CO 80227
(303) 987-9532 or 987-2671



Complacency or curiosity?

Move your children away from the passive nature of TV viewing and turn them on to the excitement and fun of interactive learning with Dow Jones News/Retrieval®

With our 20-volume, 30,000 article encyclopedia, Dow Jones News/Retrieval will pique your children's curiosity about the world around them and help them develop new skills. The information they need for school is easy to access, always up-to-date, always ready. And kids love to use it!

Mom and Dad will like Dow Jones News/Retrieval, too! The whole family will enjoy the unique shop-at-home service, movie reviews, sports and weather. Plus, Dow Jones Current and Historical quotes—continuously monitored for accuracy by our staff—and exclusive electronic access to instant business and financial news from *The Wall Street Journal, Barron's,* and the Dow Jones News Service.

Overall, you'll find a wide variety of high quality data bases that are easily and quickly accessible with most personal computers.

To get your children involved, excited and turned on to the fun of learning, turn them on to Dow Jones News/Retrieval.

DOW JONES NEWS/RETRIEVAL®

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

FOR FULL DETAILS, CALL 800-345-8500, EXT. 5

Alaska, Hawaii and foreign, call 1-215-789-7008, Ext. 5

www.commodore.ca

use a delay loop, then turn off the tone:

```
VIC: 150 FOR DELAY=1 TO 100:NEXT DELAY:POK
     E S,0
64:  150 FOR DELAY=1 TO 100:NEXT DELAY:POK
     E W,0
```

Instead of the delay loop you could draw pictures or do calculations.

It is helpful to put different valued delay loops in subroutines. Then, to play a note of a certain duration, just go to the corresponding subroutine. For example,

```
300 FOR D=1 TO 100:NEXT D
310 FOR D=1 TO 100:NEXT D
320 FOR D=1 TO 100:NEXT D
330 FOR D=1 TO 100:NEXT D:POKE S,0:RETURN
```

For an eighth note, after the tone is chosen GOSUB 330. For a quarter note, GOSUB 320. For a half note, GOSUB 300.

Another method for the delay is to use a variable counter limit:

```
200 FOR D=1 TO L*100:NEXT D
```

where L could be 1 for an eighth note, 2 for a quarter note, and 4 for a half note. You specify L before going to the delay statement.

To create different sounds, instead of holding a tone during a delay loop, set the tone, then vary the volume in a loop.

```
VIC: 400 FOR V=15 TO 0 STEP -1:POKE 36878,
     V:NEXT V
64:  400 FOR V=15 TO 0 STEP -1:POKE 54296,
     V:NEXT V
```

Try this technique with the noise channel to create fun sounds for your games. Of course, with the 64 you need to spend some time experimenting with the various waveforms and the rates of attack-decay and sustain-release.

Practical Applications

There are many practical applications of computer music, especially in education. Since a computer can play an exact tone, you can tune an instrument to your computer. My daughter uses the computer to tune her clarinet. If you play a solo instrument, get the computer to play the accompaniment. Convert the accompaniment music to POKE statements then play or sing along with the computer.

The computer can also help you learn music. By setting a variable duration at the beginning of a song, you can play the song at a slower than normal tempo. The durations of the notes are in proportion, and you can practice the music at a slower rate until you learn the notes. Gradually increase the tempo by changing that one variable in the program, and play along with the computer until you're up to standard tempo. Of course, you can increase the tempo to hear how it would sound, too—have you ever heard "The Entertainer" at triple speed?

I used to teach piano and used the computer for much of the drill work—the computer never lost patience or yelled at the students. The students could work on a program as long as they wished until a concept was learned. One of the first drill programs for my beginning piano students was to learn the names of the notes on the keyboard (VIC version in the August 1983 Gazette).

I use the program "Stepping Up Or Down" to start a student reading music. The musical staff is shown with two random notes. The student needs to determine if the second note is higher, lower, or the same as the first note. The same graphics idea from this program can be applied to a program that teaches intervals. We'll go into more detail on Stepping Up Or Down later.

Other Piano Drills

Two more music programs teach the treble clef notes and the bass clef notes. First, the letter names of the notes on the staff are shown, then a drill of random notes is presented and the student must name the note. These programs are in the book, *BASIC Programs For Small Computers*, published by COMPUTE! Books. The nice thing about computers with music capabilities is that, as the drills appear on screen, the actual notes can be played so the student hears the tones. You can probably think of many game ideas for learning note names.

Some ideas for other programs are teaching the differences between half steps and whole steps on the keyboard or on a staff. This leads into teaching intervals and then chords. A program could be written to teach the names of chords in which the computer could also play the chords. Programs can teach chord inversions, and the computer can either play the chords a note at a time or together. Teaching differences between types of chords—major, minor, augmented, and diminished, for example—could be another program.

Another possible drill program could ask for the key signature given a certain number of sharps or flats. Draw a staff, then use the # sign for sharps and a custom character for flats. Randomly choose a number of sharps or flats, then let the computer POKE that many sharps or flats onto the screen. The computer could get the student's answer, then play a scale in that key.

Time signatures and rhythms could be incorporated into drill programs. Perhaps a measure with a given time signature could be shown, and the student would need to fill in a missing note to make the meter correct.

Music composition can also be enjoyable on the computer. I have seen several music programs for nonprogrammers in which you design a line by choosing different kinds of notes and rests and

www.commodore.ca

PC GALLERY

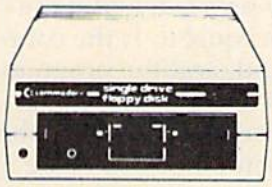
P.O. Box 3354 Cherry Hill, N.J. 08034

Toll FREE (800) 992-3300

For Information Call (609) 596-1234

Call us for reliable service, experience and affordable prices!

CMD Computer $CALL



1541 Disk Drive $Call

1520 Color Plotter	$165
MPS 801 Printer	$235
1526 Printer	$319
1530 Datasette	$64
1650 Auto Modem	$87
1110 8K Memory Exp	$40
1111 16K Memory Exp	$65
1011 RS 232 Terminal Interface	$42
1211 Super Expander	$53
1212 Prog. Aid Cartridge	$39
1213 Mach. Lang. Monitor	$39
1312 Paddles	$11.95
1311 Joystick	$4.95

Color Monitor 1702

14" screen, outstanding resolution, special Commodore computer circuit.

Lowest Price **$CALL**

PRINTERS

EPSON

RX-80, RX-80 FT.	$ CALL
FX-80, FX-100	$ CALL

OKIDATA

92	$CALL

STAR

Gemini 10X	$299
Gemini 15X	$449

SMITH CORONA

TP-2	$468

CARDCO

Cardco G+ Printer Interface	$89
Cardco Printer Interface B+	$49
Tymac the Connection	$99
6 Slot Expander Interface	$72
3 Slot Expander Interface	$31
Code Writer	$74

FLOPPY DISK

Elephant SS/DD (10)	$24
Elephant SS/SD (10)	$17.50
Verbatim SS/DD (10)	$Call

WORD PROCESSING

Quick Brown Fox	$42
Easy Script	$34
Word Pro 64	$64
EZ Spell	$17

PROGRAMMING SERIES

Assembler 64	$15
Logo	$38
Pilot	$38
Simon Basic	$19
Screen Editor	$19
CPM 2.2	$56

EDUCATION

English I-VII	$9
Math I-VIII	$9
Computer Science	$9
Science I-IV	$9
Technology	$9
History	$9
Business	$9
Geography	$9

GAMES

Avenger	$15
Wizard Wor	$19
Jupiter Lander	$14
Pinball Spect	$16
Lemans	$14
Radar Rat Race	$14
Clowns	$19
Gorf	$19
Omega Race	$19
Sea Wolf	$19

INFOCOM

Zork I, II, III	$25 ea.
Suspended	$25
Starcross	$25
Deadline	$25

COMPUTER COVERS

Features heavy duty canvas with vinyl interior waterproof

Reg. $15.95 **$6.99**

CMD 64	$6.99
VIC 20	$6.99
Disk Drive	$6.99
Espon MX 80	$7.99
Espon MX 80 FT	$7.99
Okidata 92	$7.99

ATARISOFT

Centipede	$35
Defender	$35
Dig Dug	$35
Donkey Kong	$35
Pac Man	$35
Robotron	$35

Special of the Month

DELPHI ORACLE $89

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.

Catalog

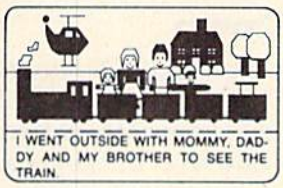
We sell a large selection of hardware and software. Send $1 for catalog, refundable with order.

THOUGHTFUL EDUCATIONAL PROGRAMS

BECi

C-64 VIC 20 ATARI

CREATIVITY SERIES



MY BOOK Ages: 4 and up

Your child makes his or her own book!

Using only a joystick, your youngster picks objects from the library (princesses, pirates, houses, vehicles, people, etc.), colors them and arranges them in the picture!

Older youngsters can then type in a story-line or caption, and the page is saved to disk.

Page after page can be saved. But the fun isn't over yet! Your child can PRINT the book on almost any printer capable of producing Commodore graphics!

The first program in BECi's new Creativity Series. Available soon for the Atari.

C-64 DISK: $34.95

CHILD DEVELOPMENT SERIES

"The goal of Boston Educational Computing is to provide owners of the most elementary computer systems with educational software that can be used easily by those with little knowledge of computing.

"In its Child Development Series, BECi (pronounced Becky) meets this goal."*

*Computes!'s Gazette, January 84

ALPHA-BECi Ages: 2 and up

An alphabet program with 26 screens, each featuring a capital and small letter and an object.

"For a child, watching the colorful objects appear on screen is like opening a present."*

(VIC-20 only).

NUMER-BECi Ages: 2 and up

Number identification and color and shape grouping. Five levels and adjustable timing.

ADD/SUB Ages: 5 and up

Addition and subtraction. Up to four digits. Optional objects, carries and borrows, decimal points and hints. Answers entered from right to left, one digit at a time.

MULT-BECi Ages: 7 and up

Multiplication. Up to four digits in multiplier and multiplicand. Answers entered from right to left, one digit at a time.

TAPE: $19.95 **DISK:** $24.95

If ordering directly from BECi, add 5% (or $2.00 minimum) for shipping.

BOSTON EDUCATIONAL COMPUTING, INC.

Dept. G
78 Dartmouth Street
Boston, MA 02116
(617) 536-5116

Dealer Inquiries Invited

MasterCard VISA

Charge cards and phone orders accepted.

www.commodore.ca

placing them on the staff, then hear the computer play what you have composed. You don't need to be a musician to enjoy composition—just try things to hear how they sound.

These are just a few ideas of how you can use the music capabilities of computers. I'm sure you have other ideas ready to try.

Stepping Up Or Down

This month's program, Stepping Up Or Down, is designed for students who are just beginning to read music. Students need to associate written music with moving up or down on the keyboard.

This program shows two notes. To get from the first note to the second, do you step up, step down, or stay the same? Press f1 for up, f3 for same, or f5 for down. Ten problems are presented in the program.

The line numbers for both the VIC and 64 versions are related for this program explanation. Line 10 branches past subroutines. Line 10 in the 64 version also POKEs 53281,1 to change to a white screen.

Lines 20–40 contain subroutines. Lines 20–26 print the message to PRESS RETURN, then wait for the student to respond before continuing the program.

Line 30 is a short delay for playing tones for the audible prompt and the "uh-oh" sound for an incorrect response. Line 40 is a delay used in playing the notes shown after the student has pressed the correct answer. The notes are played so the student can hear as well as see the interval.

Lines 100–130 print the title and instruction screen. Line 140 defines L$ for use in printing the musical staff. To type this line, use SHIFT and * to get a horizontal line. For the VIC use 22 lines, and for the 64 use 40 lines.

Lines 150–160 define the tone numbers for playing the notes. The numbers are read in as an array. Two numbers are necessary for each tone in the 64 version. Line 170 defines the B array. The three numbers are the ASCII codes for the keys f1, f3, and f5. Line 175 POKEs values necessary to play music. Line 180 calls the subroutine to wait for the student.

Lines 190–380 present the quiz of ten problems. SC is the score. Line 200 prints the musical staff. Note that after L$ a blank line is printed because L$ ends in the last column. You should see five horizontal lines with blank lines between them if you have typed L$ correctly.

Line 210 chooses a random number for the first note. There are nine possible positions, so INT(9*RND(0)) chooses a number from 0 to 8. P1 is the screen memory location calculated, so line 220 can POKE a red circle representing the note in the chosen position. Lines 230–240 similarly choose the second note.

Line 250 calculates the answer. The SGN function returns a value of +1, 0, or –1 depending on whether the number is positive, zero, or negative. By subtracting N2 from N1 we can determine whether the second note is up, same, or down from the first. I added 2 to the SGN to get an answer (A). B(A) will be the ASCII code of the correct function key pressed. Line 250 also sets a flag FL to zero.

Line 260 plays the audible prompt, a short, high-pitched tone. Lines 270–290 then receive the student's answer, accepting only the f1, f3, and f5 keys.

Line 300 checks the key pressed, and if the answer is incorrect, FL is set equal to 1, the computer plays an "uh-oh" sound, and the program branches back to line 280 for another answer. If the answer is correct, then lines 350–360 play the notes shown and line 370 increments the score if this is the first response.

After ten problems, line 390 prints the score. Although a student must get the correct answer for the program to continue, the score represents answers correct on the first try.

Lines 400–420 present the option to try the drill again, and the program branches appropriately. Line 430 clears the screen and ends the program.

See program listings on page 150.

Which Software Is Worth The Money?

Find out in:

The SOFTWARE BUYER'S REPORT T.M.

The newsletter that gives you the real story behind the software hype.

- No advertising means honest, unbiased evaluations
- Topnotch reviewers offer opinions you can trust
- Get in-depth reviews of software for:

Games and Entertainment • Graphics and Music • Home Applications • Education • Business • Programming Aids • Telecommunications • And more!

NEW!! COMMODORE 64/VIC 20 EDITION

Published ten times a year. Subscription rate $35.00 a year U.S. (Canadian and Overseas Additional)

Special charter rate for Commodore subscribers $29.95

Start Getting The Most Out Of Your Software Dollar!

To Order Or Get More Information Call Us At 800-336-3535 (In Penna. 215-691-1912) Or Write To Us At The Software Buyer's Report-RA 824 Eighth Ave., Bethlehem, PA 18018

www.commodore.ca

If you want to stay ahead of the personal computing revolution ...

...welcome to *COMPUTE!'s PC & PCjr!*

This exciting new magazine from *COMPUTE!* takes you inside the PC and the incredible new PCjr to bring you inside information you'll find nowhere else.

You'll discover how to get the most computer power for your money. At home. At school. At work. With easy-to-run programs. Challenging projects for advanced users. Brand new sound and graphics applications. Plus some of the most exciting computer functions outside of the top-secret research labs!

We'll help you decide what to buy. With independent evaluations of hardware, software and peripherals. Comprehensive reviews of new products as they're introduced. Hard-nosed evaluations of each machine's strengths and weaknesses.

COMPUTE!'s PC & PCjr will keep you on the leading edge of personal computing like no other publication can. Here are some of the features you can look forward to:

Welcome to the PCjr! A complete introduction to IBM's newest personal computer, and a fascinating peek at the 8088 microprocessor – the tiny-but-talented brain of the PCjr.

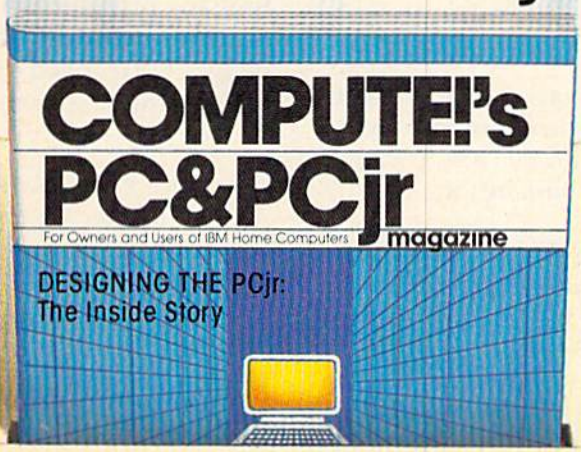
Designing PCjr — The Inside Story. PCjr's creators tell how they designed the new computer – from original planning to trade-offs to ultimate success.

Telecomputing with Your IBM. How to link up with distant computers over ordinary phone lines, access information services, even do office work at home with your own machine!

Music and Graphics. How to play songs and create sound effects with your PC or PCjr. Programs to generate impressive hi-res graphics and computer animation.

From the publishers of COMPUTE!

Announcing the magazine that takes you inside the IBM PC and the PCjr.



Your First Hour with an IBM. How to avoid those opening night jitters and get your computer up and running fast!

Financial Analysis. Ready-to-run programs to help you make intelligent investments.

PC vs. PCjr. Which one is right for you? *COMPUTE!'s PC & PCjr* helps you decide!

PLUS: Programming the function keys to suit *you*. Speeding up BASIC without resorting to machine language. Tape, disk, or hard disk? Buyer's guides. How to take advantage of free public-domain software. Computing activities for the whole family. Reviews. Games. Educational programs for children. And much, much more!

Subscribe right now and you can enjoy special Charter Subscriber Savings on *COMPUTE!'s PC & PCjr* – just $24 for the first 12 big issues. That's 33% off the cover price!

To start receiving *COMPUTE!'s PC & PCjr*, just mail the postpaid card in this issue or the coupon below today.

CHARTER SAVINGS OFFER

OR CALL TOLL FREE
1-800-334-0868

[ ] ENTER my Charter Subscription to *COMPUTE!'s PC & PCjr*. I pay just $24 for the first 12 issues—a 33% saving off the cover price. What's more, I reserve the right to cancel at any time for a full pro-rata refund.

MAIL TO:
COMPUTE!'s PC&PCjr
P.O. Box 974, Farmingdale, NY 11737

[ ] Payment enclosed
[ ] Bill me
Charge
[ ] VISA [ ] MasterCard
[ ] American Express

Acct. No.

Exp. Date

www.commodore.ca

Speeding Up BASIC

Robert Friesen and Ramunas Motekaitis

If you've discovered a clever timesaving technique, or brief but effective programming shortcut, send it to "Hints & Tips," c/o COMPUTE!'s GAZETTE *for Commodore. If we use it, we'll pay you $35.*

This month, we've combined programming tips from readers Robert Friesen and Ramunas Motekaitis, who have each discovered techniques to make BASIC programs run faster.

Benchmarks are a common way to compare computers: You type a standard program into each computer you want to test and use a stopwatch to determine how quickly each finishes the job. It's a race between computers.

The same technique can be used to test variations of a BASIC routine. And if you own a Commodore, you don't need the stopwatch. You can use the built-in clock. First set it to midnight with TI$="000000" and run the routine. When the computer finishes, you can read the clock by printing the variable TI$ (which gives you hours, minutes, and seconds) or TI (which measures sixtieths of a second).

By testing different ways of doing the same thing, you can discover which is the fastest.

Faster FOR-NEXT Loops

Enter the program below and RUN it.

```
7 TI$="000000"
8 FORZ=1TO10000
9 NEXTZ
10 PRINT TI/60;"SECONDS"
```

This program does nothing—it simply loops 10,000 times—but gives us a standard time (or benchmark) for FOR-NEXT loops. On a 64, the time should be 13 to 14 seconds. An unexpanded VIC is approximately 10 percent faster; the same test takes 12 to 13 seconds.

Now add this line:

```
3 A=1:B=2:C=3:D=4:E=5:F=6:G=7:H=8:I=9:J=1
  0:K=11:L=12:M=13:N=14:O=15:P=16
```

When you RUN the program, you'll find that adding just 16 variables slows it considerably. A 64 uses 19 seconds, a VIC 17 seconds. Variables are stored in the order they are assigned, so every time the program encounters NEXTZ in line 9, it has to search through the 16 variables that come before Z. To speed up the loop, use this line to make Z the first variable in the program:

```
2 Z=0
```

Since Z is now first in memory, the time needed to execute the loop decreases. We're back where we started.

But that's not the best way to make a faster FOR-NEXT loop.

NEXT Without A Variable

You may already know that NEXT will work with or without the variable name. Try the following change:

```
9 NEXT
```

Omitting the Z saves you one byte of memory, and it shaves two seconds off the execution time. Now, if you delete line 2, you might expect the old search-through-sixteen-variables problem to appear. But it doesn't. When you ignore the variable after NEXT, the computer seems to do the same. It sees NEXT without a variable and looks for a FOR. It doesn't need to check variable memory for the value of Z. Using NEXT by itself can save a lot of time, especially in a long program containing lots of variables.

The lesson is clear: Use NEXT alone whenever possible. And if certain variables are used frequently in a program, their values should be defined early.

www.commodore.ca

Faster Multiplication

If you have tried the programs above, type NEW. Then type this short program:

```
7 TI$="000000"
8 FORZ=1TO1000
9 C=3*123.4567
10 NEXT
11 PRINTTI/60;"SECONDS"
```

The program (which loops 1000 times and multiplies two numbers) gives us an idea of how much time it takes a computer to multiply. A 64 takes about 25 seconds to complete the program. A VIC uses 23 seconds. Again, the VIC is faster.

Now replace line 9:

```
9 C=123.4567*3
```

It seems to be almost exactly the same program. Everyone knows that A*B is the same as B*A, right? But when you RUN the program, you will find that it runs one or two seconds faster.

The number 123.4567 contains seven significant digits; the number 3 has just one. If you try different values in line 9, you will discover that if the number with more digits is first, the multiplication is faster.

There is another technique to speed up multiplication. Make the following changes to the program:

```
2 A=3:B=123.4567
9 C=A*B
```

You've cut execution time to just six seconds, saving almost 20 seconds by assigning values to variables before multiplying. When you multiplied with regular numbers (C=3*123.4567) they were stored as ASCII characters. The computer had to translate from ASCII to floating-point before it could do any math—a time-consuming chore. But when you assign the values to variables, it has to translate the ASCII only once.

Change the program once more:

```
2 A=123.4567:B=3
```

Again we find that putting the longer number first speeds up multiplication. The execution time drops from six seconds to less than five. This rule of thumb can be useful when you write a program using the RND (RaNDom) function or pi, both of which are long numbers. And, whenever possible, predefine the variables before you multiply.

You may want to set up other benchmark tests to discover other methods of speeding up BASIC programs. For example, try A∧2 against A*A (multiplying is faster than squaring a number). Or test A%*B% against A*B (integers are slower than floating-point numbers).

A Star is Born.

TelStar 64™
by Eastern House

A Communications Cartridge for the Commodore 64.

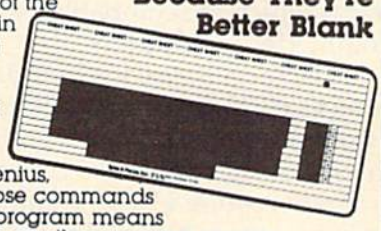
Upload/Download, Status Line, etc. Works with your Commodore 1600 or 1650 Modem. Auto-dialing, etc. when used with the new CBM 1650 Modem.

Cartridge and Manual – $49.95

Eastern House
3239 Linda Dr.
Winston-Salem, N.C. 27106
(919) 924-2889 (919) 748-8446

Why Blank "Cheat" Sheets?

Because They're Better Blank



O.K. So now you've got the best Commodore 64 in the world, and lots of complex software to run on it. One problem. Unless you work with some of these programs everyday or are a computer genius, who can keep all those commands straight? "F5" in one program means one thing, and "F5" in another program means something else. A few companies do offer a solution...a die cut "cheat" sheet that attaches to your keyboard with all the commands of one program printed on it. Great idea, unless you need them for 10 or 20 programs. You could purchase another disk drive for the same investment. Our solution? Simple. A pack of 12 lined cards, die cut to fit your keyboard and just waiting to be filled with those problem commands **you** forget most often. Simple? Yes, but effective. Now you can have **all** your program commands right at your finger tips on YOUR VERY OWN, custom designed "cheat" sheets. Order a couple packs today!

Please send me the following:

Qty.	Item	Price
___	Sets of 12 C-64 Keyboard Cheat Sheets @ $15.95	$ ___
___	2 Packs (24 Sheets) for $24.95	$ ___
	Total for Merchandise Shipping and Handling	$ 2.00
	5% State Tax (WI Residents only)	$ ___
	TOTAL ENCLOSED	$ ___

☐ Please Charge to: ☐ MasterCard ☐ VISA

Number _____ Expires _____

SHIP TO: Name _____

Address _____

City _____

State/Zip _____

Dealer Inquiries Invited

Bytes & Pieces, Inc.

550 N. 68th Street
Wauwatosa, WI 53213
414/257-3562

www.commodore.ca

SIMPLE ANSWERS TO COMMON QUESTIONS

TOM R. HALFHILL
FEATURES EDITOR

Q A

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

Q. ***I've seen references in articles, books, and Commodore manuals to something called the* Kernal. *It has something to do with programming. Exactly what is the Kernal?***

A. It's not surprising that you've run across this term because it's referred to quite frequently—yet your question is deceptively simple. To understand the Kernal, you must first learn a little about machine language and computer operating systems.

You're right that the Kernal has something to do with programming. It's a tool used mainly by machine language programmers, but rarely (if ever) by BASIC programmers. The Kernal makes it possible to write shorter machine language programs which are compatible with many different Commodore computers.

The term *Kernal* itself means slightly different things to different people. Some use it to describe a Commodore computer's entire *operating system.* An operating system is a complex housekeeping program required by all computers. It performs various routine but vital tasks necessary to the computer's operation. The computer would be helpless without it. The operating system is permanently stored in the computer's ROM (Read Only Memory) chips.

Other people think of the Kernal not as the entire operating system, but as a collection of useful routines (subprograms) within it. Machine language programmers often use these routines to avoid writing similar routines themselves, and to help make their programs work on more than one model Commodore computer.

Let's say someone is writing a machine language program and wants to display a simple message on the screen, such as "Press any key to continue." In BASIC this would be a simple one-line instruction:

```
10 PRINT "PRESS ANY KEY TO CONTINUE."
```

But machine language has no such command as PRINT. Machine language is the lowest-level language—not really a language at all in the same sense as BASIC, but rather the set of very elementary instructions recognized by the computer's main microprocessor chip. BASIC and all other languages are actually large machine language programs themselves, and the PRINT command is made up of many machine language commands.

That's where the Kernal comes in handy. Why go to a lot of programming trouble if there's already a routine built into the computer which does the same thing? The routine is part of the Kernal. The Kernal is full of routines, and one of them prints characters on the screen.

To use this built-in routine, you could execute the machine-language equivalent of a GOTO or GOSUB in BASIC, jumping directly to the routine's starting memory address (analogous to a line number in BASIC). However, this address could vary on different Commodore computers, so the program still might work on only one model.

The solution is the Kernal *jump table.* This is simply a table of memory addresses which *point* to other addresses. You jump to the table address for the print-character routine, and the table passes you along to the routine itself. The jump table is the same for *all Commodore computers,* even though the addresses for the routines themselves might be different.

Think of the Kernal jump table as a series of post office boxes. Someone who moves around a lot within the same city could avoid mail problems by using a post office box as his mailing address. No matter where he moved, his mail would always reach him through the same post office box. Similarly, by maintaining a jump table of common addresses in all its computers, Commodore is free to change the addresses of the operating system routines from model to model. Yet machine language programmers can always be sure their programs will find the routines by using the jump table addresses, which stay the same.

The results are machine language programs which are easier to write, consume less memory, and are transportable among different models.

Kernal routines are almost never used by BASIC programmers because they are more difficult to access from BASIC, and also because BASIC already contains one-word commands which do the same things anyway—commands such as PRINT, GET, PUT, etc.

www.commodore.ca

how to really get in touch with your computer.

The Edumate™ Light Pen puts you closer in touch with your computer than ever before. Paint a masterpiece, or play an interactive game simply by moving the pen across the screen. Compared to other graphic peripherals, the Edumate stands alone. Drawing is now easy. Because it's natural. Just connect the Edumate and touch the screen. It's as simple as that. No awkward touchpad surface. No unnatural joystick controls. And look what else is at hand. You can choose from a complete line of educational and entertainment software. Our Playground Software™ series brings the magic of the Edumate together with the amazing computer voice of S.A.M.,™ the Software Automatic Mouth, so children can interact directly with our teaching programs. Our new advanced graphics program, Peripheral Vision™, allows you to draw or fill in 16 different colors, a variety of sizes and textures, and zoom in for greater detail. You can save your picture to disk, print a copy for your friends, and more. What could be more natural than picking up an Edumate and letting your imagination run free!

See the Edumate™ Light Pen at your local computer store or call direct 1-800-334-SOFT. Available for Commodore 64™ & Atari® computers. Please specify computer, memory, and disk/cassette when ordering.

drawn with Edumate™ Light Pen

futurehouse™

P.O. Box 3470 Department C.
Chapel Hill, North Carolina 27514

Edumate Light Pen, Playground Software, Computer Crayons, Alphabet Construction Set are trademarks of Futurehouse, Inc.
S.A.M. is a trademark of Don't Ask Software.
Commodore 64 and Atari are registered trademarks of Commodore Electronics, Ltd. and Atari, Inc., respectively.

www.commodore.ca

Fast Add

J. C. Bye

The author, a parent of young children, wrote this effective math drill program which is very easy to use. For the VIC and 64.

When parents buy a computer, one of the first types of programs they usually attempt to write is a mathematical drill for their children. After acquiring a VIC-20, my first major programming effort was this same project. The result is "Fast Add," a math drill program which provides practice on either one-, two-, or three-digit addition problems. This selection is handled on the initial screen.

The numbers are large and easy to read. When a problem is presented, squares are displayed so a child can see how many digits must be entered for the correct answer. Answers are entered right to left just as though the problem was being worked with pencil and paper.

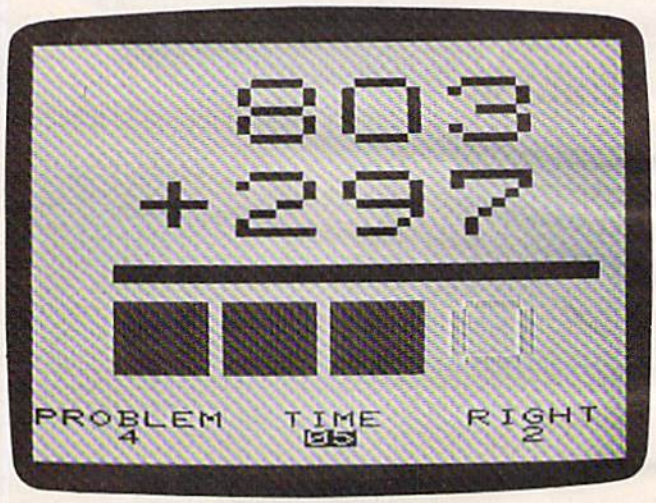
A correct answer is rewarded with a short fanfare prior to proceeding to the next problem. An incorrect answer is signified by a contrasting screen, and the entire problem is rewritten. The correct answer is then given, right to left, so that it is easy to see where the error occurred.

Adding Incentive

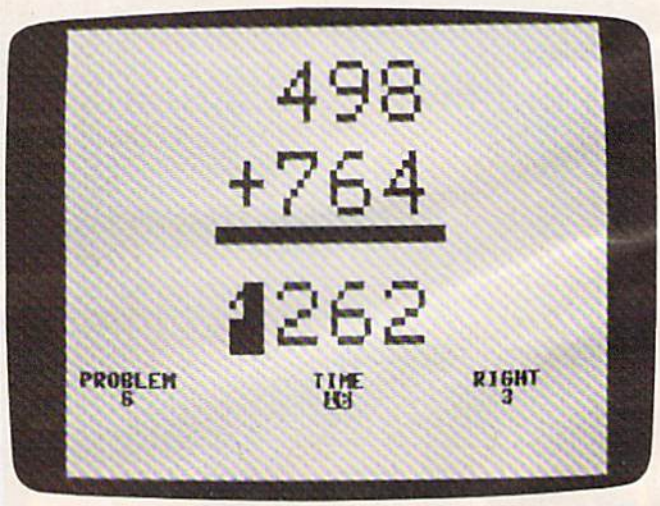
Each time the program is run, ten randomly generated problems are presented and thirty seconds are allowed for entry of each answer. A timer at the bottom of the screen counts from 0 to 30 seconds so a child can work in a time frame. Upon completion of the ten problems, a final screen display shows the percentage correct and a timed score provides added incentive to work faster.

The timed score is the total time remaining on all problems multiplied by the number of digits in the problems. That is, the maximum score for one-digit problems is 300, for two-digit problems is 600, and for three-digit problems is 900. A missed problem is counted as no score.

Program 1 will run on a VIC with any memory configuration; Program 2 is the 64 version. Com-



Answers are entered right to left in "Fast Add" (VIC version).



A "1" is about to be entered for a correct answer in the 64 version of "Fast Add."

www.commodore.ca

LEARN
MACHINE LANGUAGE
Have Complete Control Over Your Commodore 64

- Write Fast-action Arcade-style graphics
- Fully use the Music synthesizer
- Completely understand the Computer
- Develop your skills inventory

Learn with the Tutorial that comes complete with a Full set of professional quality development tools.

DEVELOP-64 4.0
IS NOW
FAST!!!

Assembles 2000 lines of code in under 15 seconds!

Many new expanded features including direct program file output to disk or tape, directory display and disk wedge commands, full-screen editing, copy/move/search/replace commands breakpoints, trace, walk, go, full-screen memory display and modify. Program included to convert Commodore assembly files.

PLUS **the Machine Language Programmer's Bible:**

"Inside The Commodore 64"

$69.95

Plus $3.00 postage and handling. (Minn residents add 6%)

DEVELOP-64

Call Toll-Free 1-800-328-0145
or in Minnesota call: (612) 871-4505

French Silk

VISA MasterCard

P.O. Box 7426 Minneapolis, MN 55407

Computer Tutor™

VIDEO INSTRUCTION TAPES!
STEP BY STEP INSTRUCTIONS

PICTURES ARE WORTH THOUSANDS OF WORDS AND SAVE HOURS OF FRUSTRATION

USE YOUR VCR SIDE BY SIDE WITH YOUR COMPUTER TO LEARN HOW TO PROGRAM, AND HOW TO USE PROGRAMS. YOUR VCR ALONG WITH YOUR COMPUTER SERVE AS YOUR PERSONAL TUTOR. PAUSE YOUR VCR TO REVIEW AND LEARN AT YOUR OWN PACE.

TAPES NOW AVAILABLE

CAT#	TOPIC	APPROX RUN TIME	
BP-3	LEARNING C-64 BASIC	2 HR	$49.95
BP-4	LEARNING VIC-20 BASIC	2 HR	$49.95
DIO-1	COMMODORE 64 DISK I/O	1 HR 45 MIN	$49.95
DIO-2	VIC 20 DISK I/O	1 HR 45 MIN	$49.95
EW-9	MULTIPLAN C-64	1 HR 50 MIN	$39.95
EW-3	CALC-RESULT ADVANCED	1 HR 30 MIN	$39.95
EW-4	CALC RESULT EAZY	1 HR 15 MIN	$29.95
EW-5	PRACTICALC C-64	1 HR 15 MIN	$29.95
EW-6	PRACTICALC VIC-20	1 HR 15 MIN	$29.95
WP-5	SCRIPT-64	1 HR 30 MIN	$39.95
UT-2	THE LAST ONE	1 HR 30 MIN	$39.95

Electronic worksheets: EW-3-6. Detailed step by step insturction in the use of electronic spread/sheet software. Work along and set up a complete example worksheet.

Basic programming: BP-3 & 4. Teaches BASIC Language commands and programming techniques. Builds your knowledge from beginning in advanced levels.

Data File Programming: DIO-1 & 2 teaches BASIC Language data file programming using random, sequential, and relative access data files.

VHS or BETA FORMAT

Add $3.00 per order for shipping and handling.
Add $3.00 for C.O.D.

To Order Phone or Write

VISA master charge

LYNN COMPUTER SERVICE

6831 West 157th Street Tinley Park, Illinois 60477

(312) 429-1915

CALC-RESULT IS A TRADEMARK OF HANDIC SOFTWARE PRACTICALIS A TRADEMARK OF COMPUTER SOFTWARE ASSOCIATES. MULTIPLAN IS A TRADEMARK OF MICROSOFT.

www.commodore.ca

VIC Program Structure

Lines	
1–5	initialization
10	initial screen
15–25	setup for each execution
30–35	main routine
40–50	routine for wrong answer
55–65	fanfare for correct answer
70–96	final screen
100–140	generate a new problem
200–240	draw the current problem to the screen
300–370	get the answer and write it to the screen
400–410	read the DATA statements into the arrays
500–510	routine to draw one large character to the screen
1100–1112	DATA statements for large characters
1113	DATA statement for fanfare

plex mathematical calculations have been avoided so that the program can be easily understood and modified. You may wish, for example, to create subtraction and multiplication versions.

If you would rather not type in the program (VIC version *only*), send a blank cassette tape, an SASE, and $3 to:

J. C. Bye
21411 Park Royale Dr.
Katy, TX 77450

See program listings on page 151.

BASIC BYTE JUST MADE MANAGING YOUR STOCK PORTFOLIO EASIER

Introducing PORTFOLIO MANAGER by Basic Byte, a high-quality, easy-to-use software program for use on your Commodore 64 or VIC 20 (16K RAM) personal computer.

It's designed to eliminate hours of time consuming paperwork. And make it easy for you to handle your investments.

PORTFOLIO MANAGER lets you instantly update your stock's current value. Calculate gains and losses. Record dividends. Print reports. Even determine the price per share after your broker's commission. All you have to do is follow the easy, step-by-step instructions.

The price? Only $39.95. And that makes PORTFOLIO MANAGER a great investment by itself.

You'll find PORTFOLIO MANAGER on tape or disk drive at your local dealer. Or call direct (313) 540-0655 or write P.O. Box 924, Southfield, MI 48037 and order yours today.

BASIC BYTE, INC.

TOTL SOFTWARE ROLLS OUT ANOTHER WINNER!

DataBase Management for the Commodore 64™
TOTL.INFOMASTER 3.6—only $50 on disk

Money-Saving Bonus Paks of 64 Software

(BP-1)—(disk)
totl.text/ totl.speller/totl.label
reg. price $103 NOW **$79**

(BP-2)—(disk)
totl.business/ totl time manager/ totl.infomaster/totl.text
reg. price $228 NOW **$159**

(BP-3)—(disk)
totl.infomaster/ totl.text/totl.speller
reg. price $129 NOW **$99**

(BP-4)—(disk)
totl.text/ totl.speller/ research assistant
reg. price $118 NOW **$89**

(BP-5)—(tape)
totl.text/totl.label
reg. price $60 NOW **$49**

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

INFORMATION AND ORDER COUPON

	TAPE	DISK
TOTL.TEXT 2.0 (VIC + 8K)	☐ 24.95	☐ 28.95
TOTL.TEXT 2.5 (VIC + 16K)	☐ 34.95	☐ 38.95
TOTL.LABEL 2.1 (VIC + 16K)	☐ 19.95	☐ 23.95
TOTL TIME MGR. 2.1 (VIC + 8K)	☐ 29.95	☐ 33.95
RESEARCH ASST. 2.0 (VIC + 8K)	☐ 29.95	☐ 33.95
TOTL.BUSINESS 3.0 (VIC + 24K)		☐ 84.95
TOTL.TEXT 2.6 (C-64)	☐ 39.95	☐ 43.95
TOTL.SPELLER 3.6 (-C64)		☐ 34.95
TOTL.LABEL 2.6 (C-64)	☐ 19.95	☐ 23.95
TOTL TIME MGR. 2.6 (C-64)	☐ 34.95	☐ 38.95
RESEARCH ASST. 2.0 (C-64)	☐ 34.95	☐ 38.95
TOTL.INFOMASTER 3.6 (C-64)		☐ 49.95
TOTL.BUSINESS 3.6 (C-64)		☐ 94.95
BONUS PAK #_____		_____

Total _____
C.O.D. Charges/Sales Tax _____
Shipping & Handling $3.00
Amount Enclosed _____

Check, Money Order or C.O.D.* also accepted. *C.O.D. orders $2.00 additional (CA residents add 6½% sales tax)

FOR ORDERING ONLY—CALL OUR TOLL FREE NUMBERS
Continental U.S. 1-800-351-1555, California 1-800-351-1551
Hawaii and Alaska 415-943-7877

☐ SEND MORE INFORMATION (no charge for catalog)

Name _____
Street _____
City _____ State _____ Zip _____
Phone ( ) _____ ☐ MC ☐ VISA
Card # _____ Exp. Date _____

TOTL SOFTWARE, INC.
quality you can afford
1555 Third Avenue
Walnut Creek, CA 94596
415/943-7877

Other VIC 20™ and Commodore 64™ software available from your dealer or directly from TOTL Software:
Word Processing (totl.text)
Spelling Checker (totl.speller)
Mailing List & Label (totl.label)
Business Accounting (totl.business)
Time Management (totl time manager)
Keyword Cross Reference (research assistant)

TOTL Offers You...
low prices and high quality • 30 day money-back guarantee on direct purchases • an interactive family of software • product registration • customer support • free informative newsletter • regular upgrades at reduced cost • availability in many stores • 800 numbers for ordering convenience • prompt shipment of direct orders • savings coupons with each order • money-saving bonus paks • two years and 45,000 products strong

www.commodore.ca

User Group Update

Kathy Yakal, Editorial Assistant

Beginning this month, the GAZETTE will publish a regular update on Commodore user groups. They are listed alphabetically by state. The list is growing so rapidly that it's difficult to run it in its entirety, but we'll try to do so a couple of times a year. If you have already sent us information about your group, please let us know if there are any changes; otherwise, we'll continue to publish it. If you have a new group you want listed, or need to update our information, please write to:

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

Changes

The *New London Area Commodore Users* has a new name and phone number. Robert Kind, contact person for the *New London County Commodore 64 User Group*, can be reached at (203)446-8491, or by writing P.O. Box 1608, Groton, CT 06340.

Inquiries regarding the *Long Island VIC Society* (L.I.V.I.C.S.) should be forwarded to Lawrence Stefani, 20 Spyglass Lane, East Setauket, NY 11733. (516)751-7844.

The *Metro Knoxville 64 User Club* of Knoxville, Tennessee, now supports all Commodore computers. Its new name is the *Metro Knoxville Commodore User Club*.

The new president and address for the *Triad C-64 Users Group* is George Shelhorse, P.O. Box 10833, Greensboro, NC 27404.

The new address for the *National Science Clubs of America/Commodore User Division* is P.O. Box 10621, Merrillville, IN 46411. Please send an SASE to this new address for information.

All inquiries about *MASSPET* should go to Harry Flaxman, P.O. Box 283, Taunton, MA 02780.

New Listings

Commodore Club of Mobile
Tom Wyatt
3868-H Rue Maison
Mobile, AL 36608
(205) 343-1178

64/20 Club
Mike Rogalski
1408-A S. Alamitas St.
Monrovia, CA 91016

South Bay Commodore User Group
(suburban Los Angeles)
Lloyd Lehrer
401 9th St.
Manhattan Beach, CA 90266

SixtyFourum
John Damiano
P.O. Box 16098
Fresno, CA 93755

F.T.D. Commodore Club
(Field Training Detachment Instructors only)
Larry Prince
Castle AFB, CA 95342

PUG of the Silicon Valley
Marvin Vander Kooi
22355 Rancho Ventura St.
Cupertino, CA 95014

PET Educators' Group
Palmer Johnson
P.O. Box 454 Station A
Windsor, Ontario,
Canada N9A 6L7

Brockville User Group (BUG)
Bill Maxwell
72 Murray St.
Brockville, Ontario,
Canada K6V 2X1

Budget Wise Computer User Group
Dennis J. Lachance
17 Chaplin Ave.
St. Catherines, Ontario,
Canada L2R 2E4

Quinte Commodore User Group
Wayne Wickson
P. O. Box 477
Belleville, Ontario,
Canada K8N 5B2
(613) 966-7535

Commodore 64 User Group
Walter Scholz
568 Mornington St.
Stratford, Ontario,
Canada N5A 5G9
(519) 271-5704

Fairfield County Commodore User Group
Linda Retter
P.O. Box 212
Danbury, CT 06810

Commodore Computer User Group
Ernest M. Julian
165B S. Bigelow Rd.
Hampton, CT 06247
(203) 455-0108

Tri-State User Group
Russell Prince
2312 Carpenter Rd.
Wilmington, DE 19810
(302) 475-1351

SUNCOAST 64's
c/o Little Professor Books
Curtis J. Miller
2395 U.S. 19 N.
Palm Harbor, FL 33563
(813) 785-1036

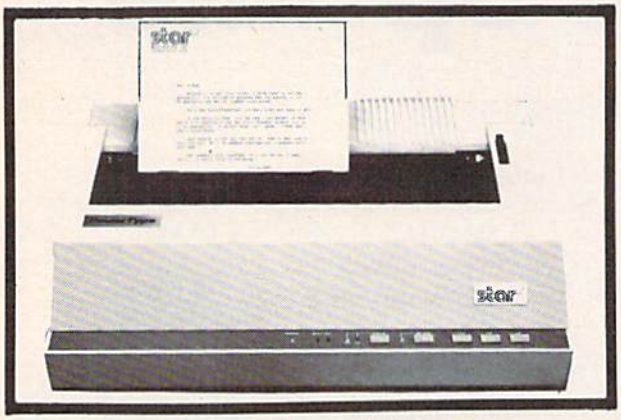
Golden Isles Commodore Users
Richard L. Young
135 Sherwood Forest Circle
Brunswick, GA 31520
(912) 267-2683

www.commodore.ca

EXECUTIVE LETTER QUALITY

DAISY WHEEL PRINTER SALE $379.00

COMSTAR 13"



computer printer

COMSTAR 13" "DAISY WHEEL" POWER TYPE PRINTER is typewriter friendly. It uses a simple drop in cassette ribbon. Just turn on the COMSTAR 13" for Crip executive quality correspondence at 18 CPS with a daisy wheel that prints 96 power type flawless characters, bi-directional. Designed for personal and business applications. COMSTAR 13" carriage accepts paper from letter to legal size, continuous computer paper or single sheets, you can set right and left margins, vertical and horizontal tabs. (Serial and parallel interface). LIST PRICE $599.00 **SALE PRICE $379.00**

OLYMPIA "DAISY WHEEL" COMBINATION

PRINTER/TYPEWRITER SALE $489.00

Olympia (WORLD'S FINEST)

THE **Olympia** COMPUTER PRINTER ELECTRONIC TYPEWRITER is the ultimate for Home, Office, and Word Processing. You get **the best Electronic Typewriter made** and used by the world's largest corporations (better than IBM Selectric) plus a **Superb Executive Correspondence Computer Printer!!** (Two machines in one!) Just flick the switch for the option you want to use. The extra large carriage allows 14⅛" printer paper width. It has cassette ribbon lift off correction. Baud rates, Jumper selectable 75 through 19,200 (parallel interface)
LIST $799.00 **SALE $489.00**

- **15 DAY FREE TRIAL — 90 DAY FREE REPLACEMENT GUARANTEE**

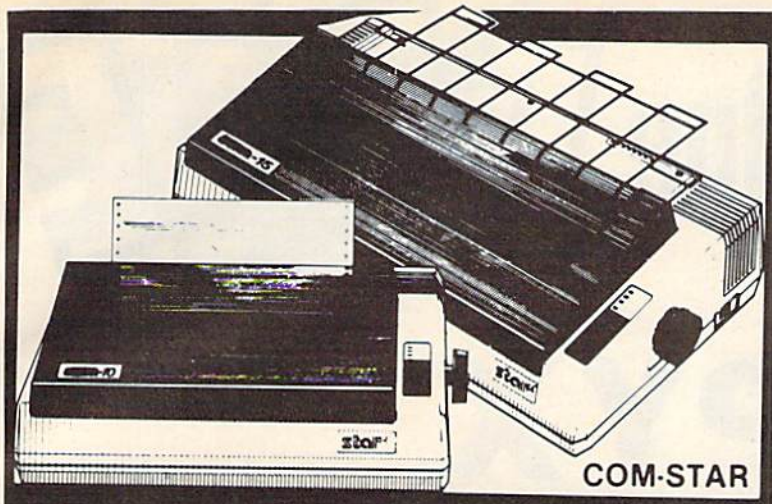
Add $17.50 for shipping and handling!!

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

80 COLUMN PRINTER SALE—$149.00*



COM-STAR T/F

Tractor
Friction
Printer

only $199**

*15 Day Free Trial -180 Day Immediate Replacement Warranty

- 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"

*STX-80 COLUMN PRINTER—$149.00

Prints full 80 columns. Super silent operation, 60 CPS, prints Hi-resolution graphics and block graphics, expanded character set, exceptionally clear characters, fantastic print quality, uses inexpensive thermal paper! Best thermal printer in the U.S.A.! (Centronics Parallel Interface).

**DELUXE COMSTAR T/F 80 CPS PRINTER—$199.00

The COMSTAR T/F (Tractor Friction) PRINTER is exceptionally versatile. It prints 8½" 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 CPS COMSTAR T/F SUPER-10X PRINTER—$289.00

COMSTAR T/F (Tractor Friction) SUPER-10X PRINTER gives you all the features of the COMSTAR T/F PRINTER plus a 10" carriage, 120 CPS, 9 x 9 dot matrix with double strike capability for 18 x 18 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, plus 2K of user definable characters! The COMSTAR T/F SUPER-10X PRINTER was Rated No. 1 by "Popular Science Magazine." It gives you print quality and features found on printers costing twice as much!! (Centronics Parallel Interface) (Better than Epson FX 80).

Premium Quality—120 CPS COMSTAR T/F SUPER-15½" PRINTER—$379.00

COMSTAR T/F SUPER 15½" PRINTER has all the features of the COMSTAR T/F SUPER-10X PRINTER plus a 15½" carriage and more powerful electronics components to handle large ledger business forms! (Better than Epson FX 100).

Superior Quality SUPER HIGH SPEED—160 CPS COMSTAR T/F 10" PRINTER—$489.00

SUPER HIGH SPEED COMSTAR T/F (Tractor Friction) PRINTER has all the features of the COMSTAR SUPER-10X PRINTER plus SUPER HIGH SPEED PRINTING—160 CPS, 100% duty cycle, 8K buffer, diverse character fonts, special symbols and true decenders, vertical and horizontal tabs. RED HOT BUSINESS PRINTER at an unbelievable low price!! (Serial or Centronics Parallel Interface)

Superior Quality SUPER HIGH SPEED—160 CPS COMSTAR T/F 15½" PRINTER—$579.00

SUPER HIGH SPEED COMSTAR T/F 15½" PRINTER has all the features of the SUPER HIGH SPEED COMSTAR T/F 10" PRINTER plus a 15½" carriage and more powerful electronics to handle larger ledger business forms! Exclusive bottom paper feed!!

PARALLEL INTERFACES

For VIC-20 and COM-64—$49.00
For All Apple Computers—$79.00

NOTE: Other printer interfaces are available at computer stores!

Double Immediate Replacement Warranty

We have doubled the normal 90 day warranty to 180 days. Therefore if your printer fails within "180 days" from the date of purchase you simply send your printer to us via United Parcel Service, prepaid. We will IMMEDIATELY send you a replacement printer at no charge, prepaid. This warranty, once again, proves that WE LOVE OUR CUSTOMERS!

Add $17.50 for shipping, handling and insurance. WE DO NOT EXPORT TO OTHER COUNTRIES EXCEPT CANADA.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. 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

SUPER-10" ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

www.commodore.ca

*Buy 1 (at Sale Price!) Get One FREE

Commodore 64

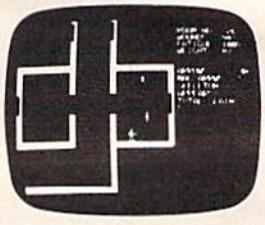
EPYX

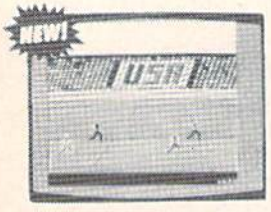
Award Winning Games

Jumpman — If you like Donkey Kong, you'll love Jumpman. Over 30 different screens with 8 speeds and 5 skill levels make this the fastest action game in the country. You must leap girders, climb ropes, and scale ladders to reach and diffuse bombs while avoiding robots, birds, bullets, explosives, crumbling walls, vanishing escape routes, and many other obstacles. (Truly a fantastic game!) List $39.95. **Sale $24.95** (Disk only).

Temple of Apshai — ***(computer game of the year)***. This is the standard by which other adventure games are judged. Full color graphics portray the temple and all its contents — magic, monsters, doomed cities and damsels in distress. Do battle in real time with over 20 monsters, expansion modules will keep your adventure alive in the future. List $39.95. **Sale $24.95**. (tape/disk).

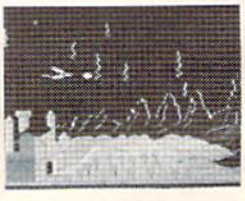
(Also Available For VIC-20)





Summer Games — Now you can compete in the Olympics right along with the real competitors. Compete in track, swimming, diving, cycling, archery, weight lifting, rowing and more. This Olympic game is so realistic it even includes a beautiful opening ceremony and an awards presentation after each event. (Highly recommended, by far the best Olympics game we've seen). List $39.95. **Sale $28.00**. (disk only).

Dragon Riders of Pern — Based on the best selling book series by Anne McCaffey (over 10 million sold). This program forces you to make an alliance with the Lord holders, then mount your dragon (stunning graphics) and battle the dreaded thread. (Super fast action with a great theme). List $39.95. **Sale $24.00**. (tape/disk).



Fax — Stop wasting quarters! Now you can play Exidy's Fax at home. Play against the computer or an opponent to get the answer first, over 3,700 questions dealing with sports, television, movies, histories, and many more subjects will keep you playing for hours (a must for trivia buffs). List $34.95. **Sale $24.95**. (disk only).

* Buy Any Epyx Game From Protecto And Send The Proof Of Purchase Seals To Epyx And Epyx Will Send You A Free Game.

Add $3.00 for postage. Add $6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D.

PROTECTO

ENTERPRIZES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010

Phone 312/382-5244 to order

www.commodore.ca

Factory Clearance

VIC-20 Cartridge Games

CREATIVE SOFTWARE

No. 1 Seller In U.S.A.

Sale

First Come Basis

Astroblitz — (Like Defender.) Voted No. 1 computer game overall by Creative Computing! Fantastic copy of an arcade classic. Destroy alien saucers and gun towers while avoiding enemy objects that float by. List $34.95. **Sale $7.95.**

Your Choice

$7.95

Was $34.95

Serpentine — Awarding winning game. Avoid hostile red snakes and lay your young while getting food to keep you alive. Fantastic strategy game that has become a classic. List $34.95. **Sale $9.95.**

Priced Below Cost

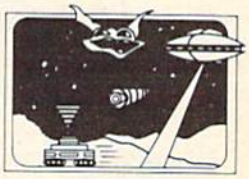
Apple Panic — The fast action computer game hit now comes to the VIC-20. You must dig traps in the brick floor and wait for the wandering apples to fall in.

Then simply beat them on the head to push it through and destroy the apple. Otherwise the apple's will roll right over you and kill you. (Fast action.) List $34.95. **Sale $7.95.**

While They Last

Rat Hotel — Here you get to play the rat. Running and jumping from floor to floor in Hotel Paridisimo you must eat whatever you find but Waldo the maintenance man has set many traps for you that you must avoid. Plus Waldo has an atomic elevator that let's him jump several floors at once. See if you can get to the bottom before Waldo does you in. Fantastic graphics and sound. List $34.95. **Sale $9.95.**

Terraguard — Your mission is to destroy the aliens before their ship has a chance to land. Move your base along the ground and shoot up at them. List $34.95. **Sale $9.95.**



Video Mania — You're in an open field and strange alien creatures are roaming all over. If you stand still too long, they'll collide with you, causing instant annihilation. Your only defense is to destroy them by throwing your electronic, football-shaped alien zapper at them. **Sale $9.95.**

Spills & Fills — How much is too much? How much isn't enough? With this original concept educational game designed for grade schoolers through high school students, you can develop ratio and perspective skills. With three exciting and challenging skill levels, this program presents new and ever-changing challenges for the inquisitive mind. **Sale $9.95.**

Household Finances — This 4 part program will take care of all your family's finances. Record, change and delete expense and income items from 16 categories, monthly and yearly totals are easily graphed and even a budgeting program to help you clamp down on excessive spending. List $34.95. **Sale $9.95.**

Nationally Advertised

PROTECTO

ENTERPRIZES (WE LOVE OUR CUSTOMERS)

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

Add $3.00 for postage. Add $6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D.

www.commodore.ca

Commodore 64
No. 1
Educational Software
At Its Best

SPINNAKER™
We make learning fun.

Sale!!
(Your Choice — Disk or Cartridge)

Kids on Keys — Letters, numbers, and pictures rain down the screen. It's up to you to find the matching keys or type in the correct word before the images disappear. Helps familiarize the children with the computer keyboard as well as identifying numbers, letters, and words. List $34.95. **Sale $22.00.**

Fraction Fever — This fast paced arcade graphic program helps you develop: better understanding of what a fraction is, of relationships between different fractions, and numerical and visual representation of fractions. To succeed you must match the right fractions, zap the wrong ones, look out for holes in the floor, and watch the clock. (Fast paced, highly recommended!!). List $34.95. **Sale $22.00.**

In Search of the Most Amazing Thing — You have been given a quest to find the most amazing thing. You must negotiate with the aliens as well as use your problem solving skills to overcome obstacles along the way. Fantastic for learning step by step thinking to overcome problems. Highly recommended!! List $39.95. **Sale $28.00.**

Up For Grabs — If you like Scrabble you'll love this one. You have to grab letters off a rotating cube before anyone else and then use the letters to make words in a hurry. Fantastic for spelling and vocabulary skills. List $39.95. **Sale $28.00.**

Trains — Enter the world of Big Business. Keep the railroad going and growing. Teaches fundamentals of financial management (and planning). This is a must for any youngster and most adults. Very highly recommended. List $39.95. **Sale $28.00.**

Aerobics — Follow the instructions on the screen to fun and fitness. Including warm ups, aerobics, stretches, and cool-downs. Fantastic graphics let you follow the characters exactly. Tailors your exercise program to your needs. Best fitness program we've seen. List $44.95. **Sale $36.00.**

Add $3.00 for postage. Add $6.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! Canada orders must be in U.S. dollars. We accept Visa and MasterCard. We ship C.O.D.

PROTECTO
ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

www.commodore.ca

SANYO MONITOR SALE!!

9" Data Monitor

- 80 Columns × 24 lines
- Green text display
- Easy to read - no eye strain
- Up front brightness control
- High resolution graphics
- Quick start - no preheating
- Regulated power supply
- Attractive metal cabinet
- UL and FCC approved

- ***15 Day Free Trial - 90 Day Immediate Replacement Warranty***

9" Screen - Green Text Display	*$ 69.00
12" Screen - Green Text Display (anti-reflective screen)	*$ 99.00
12" Screen - Amber Text Display (anti-reflective screen)	*$ 99.00
14" Screen - Color Monitor (national brand)	*$239.00

*PLUS $9.95 for Connecting Cable.

Display Monitors From Sanyo

With the need for computing power growing every day, Sanyo has stepped in to meet the demand with a whole new line of low cost, high quality data monitors. Designed for commercial and personal computer use. All models come with an array of features, including up-front brightness and contrast controls. The capacity 5 × 7 dot characters as the input is 24 lines of characters with up to 80 characters per line.

Equally important, all are built with Sanyo's commitment to technological excellence. In the world of Audio/Video, Sanyo is synonymous with reliability and performance. And Sanyo quality is reflected in our reputation. Unlike some suppliers, Sanyo designs, manufactures and tests virtually all the parts that go into our products, from cameras to stereos. That's an assurance not everybody can give you!

• 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

www.commodore.ca

Treasure Valley Commodore 64 User Group
P.O. Box 45477
Boise, ID 83711

Champaign-Urbana Commodore User Group (CUCUG)
Jeff Stevenson
2006 Crescent Dr.
Champaign, IL 61821
(217) 398-1616

Logansport Commodore Club
Mark Bender
1020 Michigan Ave.
Logansport, IN 46947
(219) 722-5205

Capitol Complex C64 Computer Club
Doren Hulet
Grimes Bldg. 3rd Fl.
Des Moines, IA 50319
(515) 281-3550

Commodore User Group of Central Kentucky
Robert Dickow
2095 Rambler Rd.
Lexington, KY 40503
(606) 277-6981

Commodore 64 User Group
Richard L. Hood
P.O. Box 1422
Baton Rouge, LA 70821

Computer User Society of Penobscot
c/o Art Pete
101 Crosby Hall
University of Maine at Orono
Orono, ME 04469
(207) 581-2140

Maine Commodore 64 User Group
Billiam Brazer
P.O. Box 542
Ogunquit, ME 03907
(207) 646-2097

Commodore/VIC User Group (COM-VICS)
Paul Lodge
RFD #1 Box 2086
Hebron, ME 04238
(207) 966-3641

Montgomery County Commodore Computer Society
Meryle B. Pounds
P.O. Box 6444
Silver Spring, MD 20906
(301) 946-1564

Pioneer Valley VIC Club
Marvin Yale
34 Bates St.
Westfield, MA 01085
(413) 562-1027

EM 20/64 User Group
John Chaplain
36 Buckman St.
Woburn, MA 01801

Commodore User Group
Robert Olari
c/o Comm*Data Systems
244 Summit St.
Milford, MI 48042
(313) 684-6767

Computer Operators
M. Gauthier
St. Clair Community College
Port Huron, MI 48060
(313) 364-6804

Michigan C-64 User Group
P.O. Box 539
East Detroit, MI 48021

Brainerd Area Commodore User Group
Norm Saavedra
1219 S.E. 11th St.
Brainerd, MN 56401
(218) 829-0805

Commodore Biloxi User Group (ComBUG)
c/o Universal Computer Services
3002 Hwy. 90 E.
Ocean Springs, MS 39564
(601) 875-1173
John Lassen

MOARK Commodore User Group
Marshall B. Turner
P.O. Box 504
Golden, MO 65658
(417) 271-3293

Commodore Computer Club
Dave Westphalen
308 Palisade Ave.
Union City, NJ 07087

Commodore Buffalo User Group (COMBUG)
David A. Newton
199 Dale Dr.
Tonowanda, NY 14150
(716) 631-3932

Commodore User Group of Greater New York
Elmo Christian/James Wattson
P.O. Box 812
Adelphi Station,
Brooklyn, NY 11233
(212) 776-0808 or 693-6118

Mohawk Valley Commodore User Group
William A. Nowak
P.O. Box 343
Tribes Hill, NY 12177
(518) 829-7576

Down East Commodore User Group
Bruce E. Theden
302 Belltown Rd.
Havelock, NC 28532
(919) 447-4536

Galion Commodore User Group
Philip C. Seitz
361 S. Market
Galion, OH 44833

Greater Oklahoma Commodore Club
Randy Hill
1401 N. Rockwell
Oklahoma City, OK 73127
(405) 789-3229

University VIC-Commmodore User Support System (UV-CUSS)
Dean G. Thomas
RD 1 Box 210A
Edinburg, PA 16116
(412) 652-3352

Eight Squared
J. A. Skelton
P.O. Box 76
Mt. Holly Springs, PA 17065
(717) 776-3469

A-K 64 User Group
Alton E. Glubish
1762 Fairmont St.
New Kensington, PA 15068
(412) 335-9070

Commodore User Group
Alan B. Karpe
c/o Lincoln Technical Institute
5151 Tilghman St.
Allentown, PA
(215) 770-1032

dBus
Mario Franco Arroyo
14-D LaSalle St.
Cubao,
Quezon City, Philippines

Commodore Club of Pawleys
Meg Shinall
P.O. Box 825
Pawleys Island, SC 29585

Spartanburg Commodore User Group (SPARCUG)
James B. Paslay
803 Lucerne Dr.
Spartanburg, SC 29302
(803) 582-5897

Tri-State Commodore User Group (TRICUG)
Chuck Carroll
5122 Matador
Amarillo, TX 79109
(806) 355-4170

Commodore User Group of Austin
P.O. Box 49138
Austin, TX 78765

Irving Commodore User Group
Robert Hayes
3237 Northgate #1289
Irving, TX 75062
(214) 252-7017

Heart Of Texas Commodore User Group (HOT CHUG)
Lt. Mike Stuff
2100 N. New Rd.
Waco, TX 76710
U.S. Naval Reserve
Training Center

Central Vermont Commodore 64 User Group
Al Piecush
R.R.1, Trow Hill,
Barre, VT 05641

Commodore Personal Users Trading Expertise & Resources
c/o Honeywell Inc.
5303 Shilshole Ave. NW
Seattle, WA 98107
(206) 789-2000 ext. 1402
Art Witbeck

Commodore 64 User Group
Jerry and Linda Hughes
3311 Sutherland Dr.
Gillette, WY 82716
(307) 686-0635

www.commodore.ca

Step Lister

E. A. Cottrell

"Step Lister" lets you look at your BASIC program lines without repeatedly typing LIST. This is a machine language routine, but it requires no special knowledge to use it. For VIC and 64.

"Step Lister" is a machine language *wedge* (explained below) which allows you to step through a BASIC listing one line at a time.

To see the first line of your program, just type:

```
@0
```

(Entering any other number after the @ will start the listing at that line. There should be no spaces between the @ and the line number, and the @ must be on the left margin.)

Then, press any key, and the next line will be displayed. Press the SPACE bar and hold it down, and the listing will continue scrolling until the space bar is released.

If you wish to stop Step Lister, press RUN/STOP.

Be sure to SAVE the program before you RUN it because the VIC version is self-erasing, and if there are any undetected errors, the computer may crash.

What Is A Wedge?

To understand a wedge, you must first have some knowledge of how BASIC works. When you press RETURN, one of two things happens. If the entered line has a number as the first character, the computer assumes that a BASIC line is being entered. This line is then converted to BASIC *tokens* and put in its proper place in memory. (Tokens are single-byte symbols which represent BASIC commands. To save space and time, the computer stores PRINT, for example, as 153.)

No interpretation of the characters following the line number is made until the program is RUN. If the first character is not numeric, the line is tokenized and placed in the BASIC input buffer at locations 512–600 ($0200–$0258). The interpreter then calls the CHRGET subroutine to get the characters from the buffer and return them for interpretation.

To implement a wedge, the CHRGET subroutine located at 115–138 ($73–$8A) must be altered to go to your machine language program before returning to the interpreter. At the entry point of the wedge, a check is made to see if the special character (in this case, @) has been entered. If it has, the special routine is executed. Otherwise, the character is sent to the interpreter for normal BASIC interpretation and execution.

Using ROM Routines

Step Lister uses many of the subroutines which are part of the BASIC ROM in the VIC and 64. Analyzing some of the subroutines already in the machine can prove useful.

Although the BASIC ROMs in the VIC and 64 are located at different addresses, they are very similar. If you find a subroutine in the VIC, you'll have little trouble finding it in the 64. For example, the subroutine to return to BASIC with READY is at $C474 in the VIC. In the 64 it's located at $A474.

The wedge can be a powerful tool. If you decide to write a wedge program of your own, heed one word of caution: Do not try to alter the CHRGET subroutine with BASIC. You will be changing the way BASIC gets its instructions in the middle of a BASIC program, and this will crash your computer.

See program listings on page 153.

www.commodore.ca

HOME TELECOMMUNICATIONS

ROBERT SIMS, ASSISTANT EDITOR

We are pleased to welcome Robert Sims and his new column, "Home Telecommunications," to COMPUTE!'s GAZETTE.

Robert has a thorough background with the VIC and 64, and has been involved in telecommunications for several years.

Home telecomputing is in a state of rampant growth. There are thousands of new users every month. Understandably, such growth has given rise to a number of myths. Some of the most common mixtures of fact and fiction are:

- Telecommunications is just a vast playground for business executives and professional programmers.
- It's very expensive.
- The information networks want commercial customers; they don't like to bother with beginners on a budget.
- You have to know all about things like ASCII, A and B protocols, and file translation.

Finding What You Need

The purpose of this monthly column is to help dispel these myths, and others, and to help you become an accomplished telecommunicator.

The emphasis here is on communication, on obtaining information for your own use, or to share with others. Although we will examine some technical aspects of the subject in passing, the main idea is to help you find what you need, rather than to talk about how the computers do their job.

Home telecomputing is barely out of the experimental stage, and there is already more information available in more data bases than you can access in a lifetime. In addition, you can choose from a long list of modems and software, each with different features. Your range of choices is limited only by how much time and money you decide to spend.

How Will You Use It?

Users who rush into telecommunications unprepared can find the process frustrating, time-consuming, and prohibitively expensive. So before you commit yourself to a telecomputing system, you should ask the same question you asked before you bought a computer: What will I use it for?

Your investment in hardware and software, the amount of money you must spend on connect charges, and what you ultimately get out of it, can all depend on this question.

The simplest, and least expensive, service available to you is one-to-one communication. You call a friend, hook the computers to the phone line, and swap data and programs or type messages to each other using your keyboards.

The next level of service is the bulletin board system (BBS). It's the electronic equivalent of those notice boards found in laundromats, libraries, and other public places. A BBS is usually run by a computer user or by a user group. You can dial the BBS phone number, hook up your modem, and read the messages left by other users or leave messages of your own.

Some boards have a *chat* feature which allows you to "talk" with the sysop (system operator) via your keyboard.

You can access these two levels with an inexpensive *modem* and a *dumb terminal* program. Copies of such programs are in the *public domain*, and are often available from user groups. (Some manufacturers, like Commodore, provide programs with their modems.)

Transferring Files

So far, all you're basically doing is dialing a phone and typing on the keyboard. Anything you send to anybody else must be entered manually.

You will probably also want to send long messages or programs which you have already typed into your computer or saved on disk or cassette. To send it (or receive it) all at once without

www.commodore.ca

80 Column Smart Terminal
For Your C64 Without Any Hardware Change!

VIP Terminal ready 11:15:46
Dear Pepper,

You're right. This VIP Terminal is the only terminal for the C 64 worth owning. That freebie software that came with my modem just didn't work, especially with my new smartmodem. The 80 column display alone was well worth the $49.95 - much less the 40, 64 and 106 character displays - and it doesn't need any hardware changes. Imagine 106 characters on 25 lines. Heck, there's more text on my screen than on my uncle's Apple or my dad's I B M - P C!

I put auto-dial to work right away. I auto-dialed Compuserve, but couldn't get through, so I had VIP Terminal redial 'til it got through - it dialed five minutes straight! Then I auto-logged on with one of my 20 programmed keys, and downloaded some graphics screens, and stock quotes for dad. I printed it and saved it to disk as it came on the screen. Wow! And now I can send you my programs automatically. I got yours and they worked right off.

Those icons, - you know, like the Apple Lisa - are a lot of fun. I also like the menus, function keys, highlights, help tables - great for a newcomer like me. And with the many options there isn't a computer I can't talk to.

What's really neat is that Softlaw has a whole VIP Library of interactive programs, including a word processor, spreadsheet and database, which will be out soon. Sis promised me the whole set for my birthday.

I see by the built-in "old clock" on the screen that long-distance rates are down. Got to call that L.A. B B S. Yep, there goes the alarm. Later.

- Lone

VIP TERMINAL™

They're right! To start with the best you've got to have the **VIP Terminal!**

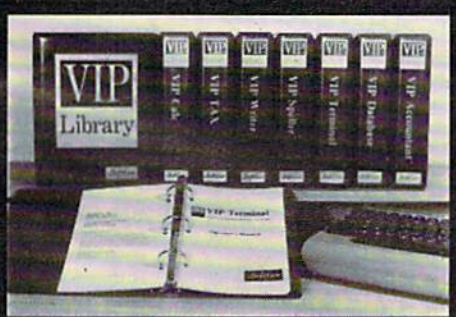
- **Built-in 40, 64, 80 and 106 columns**
- **Word wrap for a formatted display**
- **Talk to any computer**
- **Use any modem and printer**
- **Written in fast machine code**
- **15 entry phone directory**
- **20 programmable keys**
- **Automatically dial, redial, upload, download and log-on**
- **Professional 96 character ASCII display**
- **128 character ASCII keyboard**
- **Simultaneous on line printing and saving of files to tape and disk**
- **Use and save files as big as your disk!**
- **E Mail & E-COM Compatible**

Get yours NOW! **$49.95**

Introducing The VIP Library

The Library Concept

The **VIP Terminal** is only the first in a whole series of elegant software for your Commodore 64 called the **VIP Library.** This complete collection of easy-to-use, serious, high quality, totally interactive productivity software includes **VIP Writer, VIP Speller, VIP Calc, VIP Database, VIP Disk-ZAP, VIP Accountant and VIP Tax.** All are equal in quality to much more expensive software for the IBM PC, and all are very affordable!



Virtual Memory

VIP Library programs are not limited by the size of your computer's memory. All programs use virtual memory techniques to allow creation and use of files larger than your computer's available work area. You're only limited by the space on your disk!

©1983 by Softlaw Corporation

Icons Make Learning Easy

Hi-res technology and sprites allow **VIP Library** programs to bring you task Icons, made famous by the Apple Lisa™ and the Xerox Star™. With these advanced sprite representations of the task options open to the user, even the total novice can, at a glance, perform every task with ease. Just look at the icon and press a key! No programs are easier or more fun to learn and use!

Total Compatibility

All **VIP Library** programs are compatible with each other and other computers for easy file transfer. Each uses ASCII, the universal language of computer communications so that files can be sent to and received from other computers without modification! The Library also gives you the benefit of a consistent icon and command structure. Once you have learned one program, the others will come easily.

Professional Displays

The 40-characters-per-line display of the Commodore 64 is inadequate for serious computing. An 80-column display is the industry standard. **VIP Library** programs bring this standard to your Commodore 64 with state-of-the-art graphics, without need for costly hardware modifications. With **VIP Library** programs you can freely choose from four displays: the standard 40 column display, plus a 64, 80 and even a 106 column by 25 line display. With these programs you can have more text on your screen than on an IBM PC or an Apple IIe with an 80-column board! Welcome to the professional world!

Who Is Softlaw?

Softlaw Corporation has years of software experience in micros. We currently offer the full-line **VIP Library** for other micros in the U.S. and in Europe. Now we are bringing this experience to the Commodore 64 so you get ultra-high quality software at very affordable prices.

VISA **For Orders ONLY — Call Toll Free —** MasterCard

1-800-328-2737

Order Status and Software Support call (612) 881-2777

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

MAIL ORDERS: $3.00 U.S. Shipping ($5.00 CANADA; $10.00 OVERSEAS. Personal checks allow 3 weeks.

Softlaw

9072 Lyndale Ave. So., Mpls., MN 55420

AUTHOR'S SUBMISSIONS ARE ENCOURAGED.

retyping it, you will need software which has upload (send) and download (receive) capabilities.

Most dumb terminal software does not have these capabilities, so if you want to upload and download, you'll have to purchase a commercial package, or write the routines yourself. There are terminal software packages available for under $40 which allow you to upload and download. These packages usually offer additional features such as a screen dump to your printer, and include programs to translate your files into the proper formats for uploading, and translate downloaded files to fit your computer's formats.

A Wider Choice

The next level up is the information utility (also called a network). Utilities offer a collection of different, often unrelated, services which are accessible through a single phone number. The CompuServe Information Service, The Source, Dow Jones News/Information Retrieval Service, and Delphi are some examples.

On the utility you will find hundreds of data bases and service companies, providing bulletin boards aimed at different computer brands, conference lines on which you can talk to other users or manufacturer spokespersons, data bases full of public domain programs which you can download, shop-at-home and bank-at-home services, and many others.

Again, you can access this level of service with the least expensive modem and any terminal software (to upload or download, of course, your software must have the capability).

Getting Special Service

Some network services require special software. For example, CompuServe offers *Vidtex*, a terminal software package designed to access special features such as color graphics and screen formatting, in addition to regular services. You can access regular CompuServe services without *Vidtex*, but you won't get the full use of the network. Next month we'll look at this package in more detail.

The next level of service you might want to consider is the *dedicated data base*. If you are a farmer, there are data bases of agricultural information. If you are a doctor, a free-lance writer, a stockbroker, or an environmental activist, there is a data base dedicated to your field. In fact, whatever your profession or interest, you will probably find a data base designed for your use.

Some dedicated data bases are operated by individual companies, for their customers. Some large banks now have phone numbers available which allow customers to hook up their modem-equipped computers. This allows the user to pay bills and transfer money between accounts from home.

The Fees Are Higher

Most dedicated data bases, however, are not inexpensive. Whereas the most popular utilities charge $5 to $8 per hour for connect time in the evening, the usage fees for dedicated data bases are generally much higher. Also, some data bases transmit data at faster speeds than most low-cost modems can accept.

Before you purchase your modem and software, you should decide at what level you will be looking for information. If you buy a simple modem and inexpensive software and then decide to access a dedicated data base, you may find that your system is incompatible because of the wrong transmission rate or special characters missing from the software.

Remote Access

If you want to call (or let others call) your computer from another location to upload data or download from your own files, you will need a modem that automatically answers the phone, and software that allows the remote user to download data from the unattended computer. For this kind of advanced telecommunications, you may want to have a modem with programmable features and special software, so you can use private control codes to lock out uninvited callers.

You may want to use a computer and modem away from home and charge the call to your home phone, using a calling card number to save operator-assistance charges. In that case, you must either dial the call yourself (on a Touch-Tone phone) or have a modem that automatically dials the phone using tones. Some auto-dial/auto-answer modems send tones and some send pulses; some allow you to choose which to send.

If you travel a lot and take your computer with you, you should consider buying a modem which will dial on both pulse and tone phone lines.

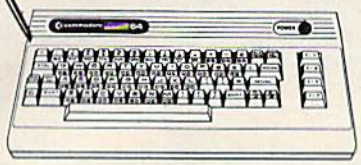
Price And Compatibility

Generally, the more sophisticated your needs, the more expensive it will be to meet those needs. It is not necessary to become a telecommunications expert to make a decision about what to buy, but it is necessary to do some homework in order to know if a product or service meets your needs at a price you can afford.

Once you've decided which services, modem, and software you want, ask the service firms if your modem and software are compatible with their access requirements. And while you're at it, you could order their user manuals. They are usually inexpensive and up-to-date, and are your best resources for finding the best route through the many menus you will encounter on the utilities.

www.commodore.ca

COMPUTER MAIL ORDER



commodore

SX-64 PORTABLE

COMMODORE 64.

$199

$839

VIC 20.....CALL
M-801 Dot Matrix/Parallel...$219.00
MCS 801 Color Printer $499.00
1520 Color Printer/Plotter ...$129.00
1530 Datasette.....$69.00
1541 Disk Drive.....$249.00
1600 VIC Modem $59.00
1610 VIC Term 40.....$59.00
1650 AD/AA Modem $89.00

1702 Color Monitor.....$249.00
DPS Daisywheel Printer $459.00
Magic Voice Speech Module...$54.00
Desk Organizer Lock.....$49.00
1311 Joystick...each.....$4.99
1312 Paddles.....$11.99
1110 VIC 8K.....$42.00
1111 VIC 16K $69.00
1011 RS-232 Interface.....$42.00
1211 Super Expander.....$53.00

MSD
SD 1 Disk Drive $349.00
SD 2 Disk Drive $599.00

CARDCO.
Light Pen $32.00
3 Slot VIC Expansion Int. $32.00
6 Slot Expansion Int. $79.00
Cassette Interface $29.00
Parallel Printer Interface.....$49.00
Parallel Interface w/Graphics..$69.00

PRINTERS
Epson.....CALL
Okidata .....CALL
Star Gemini k10X.....$299.00
Star Gemini Delta 10 .....$559.00
Smith Corona TP-2 .....$399.00
C.Itoh Prowriter 8510P.....$379.00
C.Itoh Gorilla $209.00
BMC BX 80.....$269.00

SOFTWARE

commodore
CBM 64 Reference Guide ...$18.00
C-64 DISKS
EasyCalc.....$65.00
EasyFinance I, II, III, IV.....$19.00
EasyMail.....$19.00
EasyScript.....$39.00
Word/Name Machine $19.00
EasySpell.....$19.00
Accounts Receivable $39.00
Accounts Payable $39.00
General Ledger.....$39.00
Assembler $19.00
Logo $39.00
Pilot.....$39.00
Pet Emulator $19.00
Screen Editor $19.00
Music Machine.....$15.00
Music Composer.....$15.00
VIC 20 CARTRIDGES & DISKS
Gortek & the Micro Chips(C)...$19.00
Super Slot (R) $14.00
Super Alien (R) $14.00
Jupiter Lander (R).....$14.00
Radar Rat Race (R) $14.00
Count Adventure (R) $21.00
Pinball Spectacular (R) $19.00
VIC Reference Guide $15.00

ARTWORX
C-64/VIC 20 CASSETTES
Bridge 3.0.....$15.00
Teacher's Pet.....$12.00

BRODERBUND
VIC 20 CASSETTES
Martian Raid.....$16.00
Shark Trap.....$16.00
Multisound Synthesizer.....$16.00

COMMERCIAL DATA
VIC 20 CASSETTES
Motor Mouse $23.00
Centipod.....$23.00
Frogee $23.00
C-64 CASSETTES
Road Toad.....$24.00

CREATIVE SOFTWARE
C-64 CASSETTES
Home Inventory $11.00
Household Finance.....$23.00
C-64 CARTRIDGES
Trashman.....$29.00
C-64 DISKS
Home Inventory $11.00
Household Finance.....$29.00
VIC 20 CASSETTES
Home Inventory $12.00
Household Finance.....$14.00
VIC 20 CARTRIDGES
Astro Blitz $21.00
Black Hole.....$32.00
Trashman.....$21.00
Choplifter.....$21.00

DYNATECH
C-64 DISK
Codewriter.....$75.00

EPYX
VIC 20 CASSETTES
Ricochet.....$32.00
Sword of Fargoal.....$24.00
Rescue at Rigel $24.00

QUICK BROWN FOX
C-64/VIC 20 CARTRIDGE
Word Processor..... $49.00

UMI
VIC 20 CARTRIDGES
Amok $30.00
Meteor Run $40.00
Alien Blitz $30.00
VIC 20 CASSETTES
Cloud Burst.....$15.00
Video Verman $19.00

DUST COVERS
C-64/VIC 20 Cover.....$9.99

ATARISOFT
C-64/VIC 20 Cartridges
Centipede $37.99
PacMan.....$37.99
Donkey Kong $37.99
Dig Dug.....$37.99
Defender $37.99
Robotron $37.99
Stargate $37.99

HES
VIC 20 CARTRIDGES
VIC Forth $32.00
HES Mon $29.00
HES Writer.....$29.00
Aggressor $29.00
Synthesound $21.00
Shamus.....$29.00
Protector $29.00
Turtle Graphics.....$29.00
C-64 CARTRIDGES
HES Mon $29.00
HES Writer.....$35.00

NUFEKOP
VIC 20 CASSETTES
Alien Panic $10.00
Race Fun-Drag Race $16.00
The Catup $10.00
Exterminator $19.00
C-64 CASSETTE
3-D Man.....$16.00

ROMOX
Typo (20/64).....$29.00

RAINBOW
C-64 DISKS
Personal Finance $48.00
Writers Assistant $95.00
Spreadsheet Assistant $95.00

QUANTUM
40/80 Column Video Board...$95.00
40/80 Col. Video Board (16K)...$179.00

SIRIUS
VIC 20 CARTRIDGES
Deadly Duck.....$21.00
Spider City.....$29.00

MICROSPEC
VIC 20 CASSETTES
Spelling Bee
Grades 2, 3, 4, 5, or 6.....$8.00
Math Drill $8.00
Portfolio Manager.....$16.00
Data Manager $16.00
VIC 20 DISKS
General Ledger.....$69.00
Mailing List Manager $35.00
Inventory Package $69.00
Payroll $69.00
Data Base.....$49.00
C-64 CASSETTES
Black Box.....$12.00
Color Sketch $20.00
Match Maker $16.00
C-64 DISKS
Mailing List Manager $45.00
Inventory Package $79.00
General Ledger.....$79.00
Payroll $79.00
Data Base.....$69.00
CalcResult $139.00
Black Box.....$16.00
Color Sketch $22.00
Match Maker $20.00

TRONIX
VIC 20 CASSETTES
Galactic Blitz $19.95
Swarm $22.95
Sidewinder $22.95

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

PROFESSIONAL SOFTWARE
Word Pro 64 plus spell.....$65.00

We carry a selection from the above manufacturers plus...
Synapse, Thorn, InfoCom, Onslow, Practicalc, Spinnaker & Timeworks.

=WEST=
1-800-648-3311
in NV call (702)588-5654, Dept. 0513
P.O. Box 6689, Stateline, NV 89449
Order Status #: 588-5654

=CANADA=
1-800-268-4559
In Toronto call (416)828-0866, Dept. 0513
2505 Dunwin Ct.,Unit 1B,
Mississauga, Ontario, Canada LSLIT1
Order Status #: 828-0866

=EAST=
1-800-233-8950
In PA call (717)327-9575, Dept. 0513
477 E. Third St. Williamsport, PA 17701
Order Status #: 327-9576
Customer Service Number: 327-1450

MasterCard VISA

No risk, no deposit on C.O.D. orders. Pre-paid orders receive free shipping within the UPS Continental United States with no waiting period for certified checks or money orders. Add 3% (minimum $5.00) shipping and handling on all C.O.D. and credit card orders. Larger shipments may require additional charges. NV and PA residents add sales tax. All items subject to availability and price change. We stock manufacturer's and third party software for most all computers on the market. Call today for our new catalog.
CANADIAN ORDERS: All prices are subject to shipping, tax and currency exchange fluctuations. Call for exact pricing in Canada.

www.commodore.ca

Home Telecommunications Glossary

A And B Protocols: Two sets of telecommunications guidelines used by the CompuServe Information Service. Protocols include information on how information is to be stored and transmitted, and which special characters are used to control the information exchange.

ASCII (American National Standard Code for Information Interchange): Data is transferred over phone lines as ASCII codes. Several variations exist (including Commodore ASCII) in which nonstandard codes are used. In order for a VIC-20 or Commodore 64 to communicate with a non-Commodore computer, Commodore ASCII must be translated to standard ASCII. This is one of the functions which your terminal program performs automatically.

Data Base: Also called a data bank, it's an organized mass of information.

Dumb Terminal: Software which causes your computer to act as a terminal for a remote computer. A dumb terminal is used as a keyboard only; all processing is done by the host computer.

File Translation: Different services organize files using their own formats. Before you can use them, downloaded files must be translated into a format compatible with your computer and software. Since most telecommunications software makes some provision for file translation, the only thing you need to know is what kind of file it is and which translation program to use.

Modem: Modulator/demodulator. An interface which translates a computer's digital signals into sounds which can be transmitted over telephone lines, and translates incoming sounds into the signals which your computer recognizes.

Public Domain: If an article or program is in the public domain, anyone may use it for any purpose. Copyrighted material (such as the articles and programs in COMPUTE!'s GAZETTE) is not in the public domain. Distributing copyrighted material, or using it in your own software which you distribute, is against the law.

Pulse Dialing: When you dial a number on a regular dial phone, you send a set of clicks, or pulses, over the line. A Touch-Tone phone sends tones of different frequencies which represent the numbers 0–9 and some special characters. Pulse dialing will work on a Touch-Tone line, but Touch-Tone dialing will not work on a pulse line.

Screen Dump: Copy the contents of screen memory to the printer.

Other Resources

If your telecomputing needs require you to access dedicated data bases and bulletin boards in some special field of interest, you may want to add some directories to your computer library. They contain categorized listings and descriptions of hundreds of data bases.

Two recently published directories are the *Omni Online Database Directory* and *The Computer Phone Book*.

The Omni directory contains information on more than 1000 commercial and governmental data bases in 50 categories. The *Computer Phone Book* is oriented more toward the home computerist; it lists more than 400 national networks and local bulletin boards. This book also contains information for the beginner on how telecommunications works, and in the case of the national networks, provides tips on how to log on, with facsimiles of the menus you will encounter. Both books include information on connect charges, on-line services, and addresses where you can write for more information.

After 6000 Years

It's easy to be overwhelmed by the massive amount of information available. After facing the complicated choices between modems, software, and services, the temptation might be to restrict your use to brief forays into local bulletin boards and familiar services on the networks.

If you are daunted by that mountain of data, keep in mind that it took 6000 years, more or less, to put it together. Don't expect to have access to the accumulated written knowledge of the human race after spending only a few dollars and a couple of hours at a keyboard.

If you have questions or ideas about subjects you'd like to see covered in this column, write to: Home Telecommunications, COMPUTE!'s GAZETTE, *P.O. Box 5406, Greensboro, NC 27403. Or send EMAIL. My CompuServe ID is 75005,1553. My Delphi ID is BOZART.*

Omni Online Database Directory
edited by Mike Edelhart and Owen Davies
Macmillan Publishing Company
866 Third Ave.
New York, NY 10022
ISBN: 0-02-079910-1 $10.95

The Computer Phone Book
by Mike Cane
New American Library, Inc.
1633 Broadway
New York, NY 10019
ISBN: 0-452-25446-9 $9.95

www.commodore.ca

VIC-20/C-64

MODEM

MFJ-1237

$39.95

Tiny 2¾x2¾x1 in.

300 baud Direct Connect Originate/Answer • Full Duplex • Carrier detect LED

World's lowest cost modem. High performance Texas Instrument single chip modem design.

Works for both VIC-20 and Commodore 64. Plugs into user's port. Use with single or multi-line phones. Plugs into telephone base.

300 baud. Direct connect. Originate/answer. Full duplex. Carrier detect LED. Crystal controlled.

Powered by computer. Aluminum enclosure.

Includes Basic listing of Terminal Program. Terminal Program available on tape, $4.95 and cartridge, $19.95. Specify VIC-20 or C-64.

Save VIC-20 Cartridge Programs on tape

MFJ-1256

$39.95

Adapter board lets you save VIC-20 cartridge programs on cassette tape and run them using 8K RAM board. Provides cartridge backup, eliminates plugging and unplugging cartridges and turning VIC-20 on and off.

Includes adapter board that plugs into expansion port and software to save and run cartridge programs on cassette tape. Requires 8K RAM board (not included).

RS-232 Interface for VIC-20/C-64

MFJ-1238

$39.95

Provides RS-232 voltage conversion for VIC-20/C-64 serial port. Use RS-232 printers, modems, speech synthesizers and other RS-232 peripherals. Switch reverses transmit/receive lines for DTE or DCE operation. Use as null modem. Standard 25 pin RS-232 connector. Plugs into user's port. Powered by computer. 2¼x2¼ inches.

VIC-20 Capacitance Meter

Measure 100 pf to 100 Mfd. Includes calibration capacitor, software on tape and hardware interface.

MFJ-1258

$29.95

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. Add $4.00 each for shipping and handling.

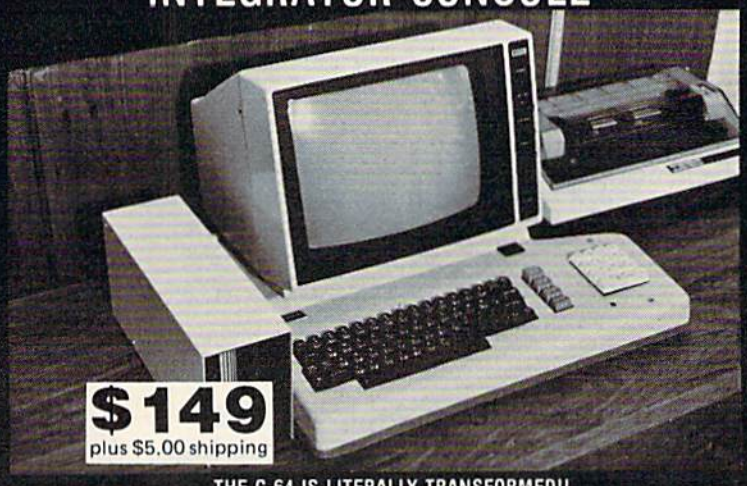
CALL TOLL FREE . . . 800-647-1800

Call 601-323-5869 in MS, outside continental USA.

MFJ ENTERPRISES INCORPORATED

921 Louisville Road, Starkville, MS 39759

NOTHING CAN UPGRADE THE KEYBOARD OF YOUR C-64 LIKE THE MAGNACOMP-64 INTEGRATOR CONSOLE



$149
plus $5.00 shipping

THE C-64 IS LITERALLY TRANSFORMED!!

- YOU INSERT THE ENTIRE KEYBOARD INTO THE LARGER, MORE SUBSTANTIAL HOUSING.
- NUMERIC DATA-PAD IS BUILT IN (HARD WIRED, NO SOFTWARE REQUIRED.)
- A FULLY ENCLOSED COMPARTMENT HIDES WIRES, ROOM IS PROVIDED FOR 80 COLUMN CARDS, EXPANSION, ETC.
- SIX SURGE/SPIKE PROTECTED AND GROUNDED RECEPTACLES ARE INTERNALLY PROVIDED, WITH A HEAVY-DUTY CORD.
- UNIT IS COLOR-MATCHED TO THE NEW **MSD** HIGH SPEED DISK DRIVE, TO PROVIDE A HANDSOME COMBO.

SEND FOR FREE 6-PAGE CATALOG • C.O.D. or prepaid, only. • California residents add 6.5% sales tax.
Please allow 3-5 week for delivery • 10-day money back guarantee.

AVAILABLE FROM: **OAKWOOD COMPUTER PRODUCTS**
3421 Burbank Blvd., Burbank, CA 91505 • (213) 841-0964

HUNDREDS OF PROGRAMS AVAILABLE COMMODORE 64

Commodore 64

All Prices up to 40% OFF RETAIL

D=Disk
Cass=Tape
CT=Cartridge

HOME/BUSINESS	
Practicalc (D)	41.50
Totl Business Mgr.	71.25
Multiplan (D)	72.95
Bank St. Writer (D)	49.95
Smart 64 Terminal	31.95
Quick Brown Fox (CT)	**29.95**
Paper Clip (D)	**66.50**
Word Pro/SpellRight (D)	72.95
CalcResult Advanced (D)	**109.95**
Data Manager (D/CASS)	18.75
Home Acct (Continental) (D)	49.95
Delphi's Oracle (D)	**89.95**
CompuServe Start-up Kit	**29.95**

GAMES	
Choplifter (CT)	27.95
Lode Runner (D)	25.95
Enchanter (D)	37.00
Jumpman (D/CASS)	27.95
Beach Head (D/CASS)	26.95
Neutral Zone (D/CASS)	26.95
Planetfall (D)	37.00
Star Trek (CT)	29.00
Odesta Chess 7.0 (D)	47.50
Uston's Prof. Blackjack	47.50

EDUCATIONAL	
Facemaker (D/CT)	22.95
Kindercomp (D/CT)	19.95
Delta Drawing (CT)	26.95
Type Attack (D)	28.95
Early Games (D/CASS)	22.50
Barron's SAT (D)	59.00
Snooper Troops #1 (D)	26.95
Alphabet Zoo (CT)	22.95
Koala Touch Tablet	72.95
Mastertype (D/CT)	28.95
Hey Diddle Diddle (D)	19.95
Story Machine (CT)	26.95
Kids on Keys (CT)	24.95
Designware Spellicopter	28.95
Designware SpellaKazam	28.95

HARDWARE AND ACCESSORIES	
Cardprint G	71.95
The Connection Parallel Int.	89.95
Cardco 5 Slot Exp. (C-64)	55.95
Data 20 Video Pak 80 (C-64)	139.00
Zenith 12" Green Monitor	102.00
Zenith 12" Amber Monitor	125.00
Brother/Dynax DX-15 (Letter Quality)	485.00
C Itoh Prowriter 8510AP	Call
Gemini 10X	Call

TO ORDER: CALL 1-714-643-1056
8:00 A.M.-6:00 P.M. PST Mon.-Sat. or send check or credit card number, signature and expiration date. Please include phone number.

CENTURY MICRO PRODUCTS
P.O. Box 2520, Mission Viejo, CA 92690
Visa/Mastercard add 3%. Personal checks allow 2 weeks to clear. CA residents add sales tax.
Shipping & Handling: UPS - $3.00; APO, FPO, Canada, US Mail - $4.00 (hardware extra) Prices subject to change.

www.commodore.ca

Cassette Beeper

Don Brady

Watching and waiting for programs to load and save is often tedious and time-consuming. This program will signal you when your VIC or 64 is ready for more work.

If you use a Datassette with your VIC-20 or Commodore 64, you know how long it can take to load or save programs on tape. "Cassette Beeper" will change the LOAD and SAVE operations to signal you with a beep when the LOAD or SAVE is completed. You can go on to other work until the beep sounds, instead of just staring at the screen.

Program 1 (the VIC version) locates itself at the top of memory and will remain there until the computer is turned off, or the top of memory pointers (locations 55 and 56) are changed. If the RUN/STOP and RESTORE keys are used, a SYS to the start of the program is needed to reset the LOAD/SAVE vectors. Since the address of the top of memory will vary depending on the amount of expansion RAM installed on the VIC, the program will print the appropriate SYS location. Remember this value in case you need it later to restart the beeper.

Using The Stack

If you have an unexpanded VIC, or are loading or saving a program that uses all available memory, you may want to delete lines 20 and 25 and change the following lines:

```
10 EM=267
15 PT=EM
```

These changes cause the machine language to be located in the operating system's stack so that no BASIC memory is used.

The stack is used for temporary storage by machine language programs, and by the computer's operating system. These changes locate the beeper routine deep enough in the stack to remain untouched by most programs. The program is still there even after other programs have been executed. Even a SYS 64802, which resets the computer, does not affect the program in the stack. After a reset or a RUN/STOP–RESTORE, you'll need to SYS 267 on the VIC to reset the LOAD and SAVE pointers.

The 64 version of Cassette Beeper (Program 2) resides at $C000 (49152) and works just like the VIC version. To start the 64 version, you must RUN Program 2 and then enter SYS 49152. You'll also need this SYS to restart the beeper after a reset or RUN/STOP–RESTORE.

See program listings on page 153.

Young People

COMPUTE!'s GAZETTE wants to know what today's young people are doing with computers. We want our readers to know, too. If you've written an interesting program for the VIC-20 or Commodore 64, share it with us. See the Author Guide elsewhere in this issue, and tell us your age when you submit an article.

www.commodore.ca

64 SOFTWARE CONNECTION
SJB DISTRIBUTORS
(800) 527-4893 or
(800) 442-1048 In Texas

WORDPROCESSING	
WordPro 3†/Spellnght	$79.00
Spellnght	$39.00
Mirage Concepts (80 col)	$85.00
SPREADSHEETS	
Calc Result (adv)	$95.00
Multiplan 64	$60.00
Calc Result (EZ)	$45.00
DATABASE	
ENTECH's Data Base 64	$30.00
Mirage Concepts	$85.00
M'File	$60.00
Codewriter	$60.00
PERSONAL FINANCE	
ENTECH	
Finance Calc 64	$25.00
Management Systems 64	$35.00
CONTINENTAL	
Home Accountant	$60.00
Tax Advantage	$40.00
ACCOUNTING	
INFO DESIGNS	
G/L, A/P, A/R, INV, P/R	ea.
Cardco Numeric Keypad	$35.00
Computer Place Keypad	$65.00
TELECOMPUTING	
VIC 1650 (Auto Ans/Dial) Modem	$95.00
VIC 1600 Modem	$59.00
Super Term (Download/80-128 Form)	$95.00
LANGUAGES	
Instaspeed Basic Compiler	$99.00
Nevada Cobol	$55.00
LOGO	$45.00
MISCELLANEOUS	
ENTECH	
Studio 64	$35.00
Game Designer 64	$35.00
Family Pak	$55.00
HANDIC	
64 Relay	$35.00
64 Tool	$35.00
64 Diary	$25.00
64 Stat	$25.00
64 Graph	$25.00
64 Bridge	$35.00
RECREATION	
ODESTA	
How About A Nice Game of Chess	$37.00
Chess	$50.00
Checkers	$37.00
HANDIC	
64 Space Action	$20.00
PRINTERS - DOT MATRIX	
EPSON- All FX & FX100	Call
OKIDATA- 82A, 92P	Call
STAR MICRONICS- Gemini 10X, 15X, Delta 10	Call
Micro Edge Printer Paper (9 1/2 x 11)	$10.00
PRINTERS - LETTER QUALITY	
Transtar 120	$499.00
CardPrinter (C64 Intfc included)	$499.00
Transtar 130	$755.00
ACCESSORIES	
INTERPOD (IEEE, RS232C, Serial)	$149.00
VIC switch (8 C64's or VICS to one drive or printer)	$145.00
3 Meter Cable	$12.00
6 Meter Cable	$14.00
12 Meter Cable	$18.00
CARDO	
Graphics Parallel Intfc	$85.00
TYMAC Connection Parallel Intfc (PET graphics & 2K buffer)	$95.00

TERMS: VISA/MC, Prices reflect 3% cash discount, Prompt UPS service, All software sales final

SJB DISTRIBUTORS INC.
3524 Dividend Drive
Garland, Texas 75042

How to make your computer look as smart as it is.

Store it in a beautiful piece of furniture specifically designed for the proper operation and storage of your home computer equipment.

- Upper unit shelf adjusts to most computers.
- Keyboard shelf at correct typing height with plenty of work surface.
- Monitor placement at proper height and viewing distance eliminates fatigue.
- Lower unit shelves for storage.

- Desk shelf swings up to close off unit when not in use.
- Compact design: 34"w x 36"h x 24"d.
- Indestructible natural oak or walnut woodgrain finish.
- Ready to assemble with only a screwdriver.

ONLY $149.00

To order call toll free
1-800-426-5301
In Washington call
(206) 423-7277
VISA & MasterCard accepted.

THE FURNITURE BYTE
P.O. Box 1757 9 Judith Place Longview, WA 98632

MAKES YOUR PERSONAL COMPUTER EVEN MORE USEFUL AND VERSATILE!

Eliminates the Need for Expensive Computer Checks...

CHF™

MODEL S-100 COMPUTER CHECK CARRIER™

- Allows quick computer processing of conventional checks.
- Heavy vinyl - 8" wide.
- Holds eight personal-size checks.
- For adjustable, tractor-type printers, friction-type printers or regular typewriters.
- Comes with BASIC program to format checks. Can be used as a sub-routine in your present program.
- Ideal for small to medium-size businesses, too! (Model-200 holds six commercial-size checks)

ONLY $11.95 INCLUDES POSTAGE AND HANDLING

Send check or money order. Ohio residents add 5½% sales tax. Allow two weeks for delivery. Be certain to specify model. Visa and MasterCard accepted.

THE CHF COMPANY
P.O. BOX 185 • OBERLIN, OH. 44074
216/775-7338

www.commodore.ca

MACHINE LANGUAGE FOR BEGINNERS

RICHARD MANSFIELD, SENIOR EDITOR

Mods And Bombs

Our all machine language game is nearly finished. Everything we've done so far—the frame, the enemies, the paddle, and this month's addition, the bombs—is contained in Programs 2 and 3. These are BASIC loader programs, so you can type them in and RUN them without knowing anything about machine language (ML). But our goal is to become familiar with ML, so let's look at Program 1, the routine which fires bombs.

This is a disassembly (a LISTing) of the 64 version, but the VIC version is essentially identical. Lines 49370–49376 take the paddle position address and put it into a new pointer, the bomb position address. When first fired, a bomb will come out of the paddle and, thus, share the paddle's address. Then line 49378 sends us to a subroutine (lines 49423–49436) which subtracts 40 from the bomb position. (This is the only difference between the 64 and VIC versions: The VIC version subtracts 22 since VIC lines are 22 characters long.)

This subtraction has the effect of moving the bomb up one screen line. If we do this repeatedly, in a loop, the bomb appears to leave the paddle and travel up towards the enemies.

The Bomb Image

After RTS (ReTurn from Subroutine), we land up at line 49381 where the Y register is loaded with zero and the A register is loaded with the bomb character, 193. Then STA (253) Y prints a bomb on screen at the correct bomb address. Now we've got to slow things down a bit. Without a delay loop, you'd never see the bombs at all. Line 49387 puts the amount of delay into the X register and Jumps to a SubRoutine. This subroutine (see below) counts down X (and also Y) and serves only to take up some time.

The next job is similar to printing the bomb except that this time (lines 49392–4) we're printing a blank character, the space, number 32. Without this, we'd have a trail of bombs running up the screen. Then, once again we JSR down to the subtract 40 from bomb address routine.

After returning this time, the bomb address pointer (253) is pointing to the next position up screen from the previous bomb print. We cannot just put a new bomb image there without first checking to see if we're up at the top border or have encountered an enemy character. Line 49401 CoMPares this new position against a blank. LDA has put whatever is in this position into the A register for the comparison. In other words, if the character is *not* a blank (32), then we have hit something. BNE (Branch Not Equal) sends us down to 49412 for further comparisons: Is it a border? (224), an enemy? (90). In either case, we go back to the main loop (at 49260). Later we'll add some scoring and visual effects to show that we've hit an enemy character.

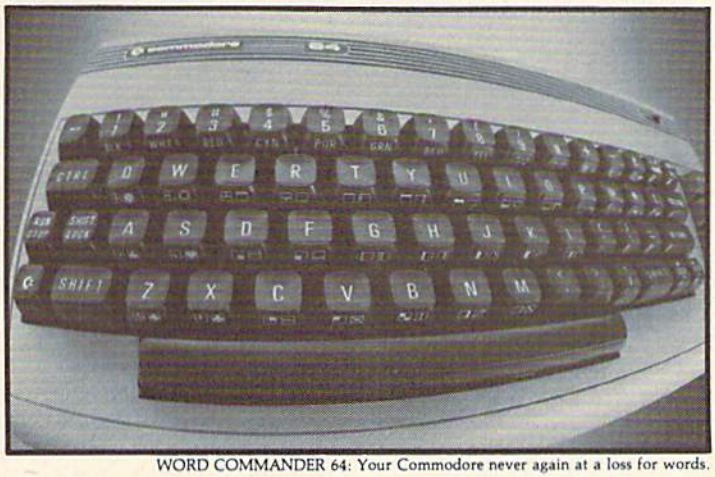
If we've not hit anything, however, the BNE at 49403 doesn't send us anywhere. We slide through it to 49405, load in a bomb character, store it at the new bomb position, and JuMP back up to repeat the blank-checkit-printbomb loop. This loop will continue until that BNE forces an exit because we've encountered a border or an enemy. That's it for this month's new routine. However, the game is beginning to take shape and to draw us towards its final form. Sometimes the game itself, not the programmer, dictates required modifications and reveals improvements.

Shrinking The Paddle, Improving The Timer

In the March issue, we drew a paddle that was five characters wide. This would be fine for a game which bounced a ball around the screen and used the paddle to smack it as in Ping-Pong. But we're firing bombs. With such a fat paddle, we can't get near enough to the sides to send bombs at enemies located close to the right or left border. What to do? It's simple; we'll just draw a paddle that's only one character wide. There are four places where the size of the paddle is controlled by the number placed into the Y register (49300, 49313, 49333, and 49351). Those numbers have been reduced this month to shrink the paddle size. You can disassemble the program after running the BASIC loader to see this modification.

www.commodore.ca

"Introducing the Word Processor with Less."



WORD COMMANDER 64: Your Commodore never again at a loss for words.

You have to look very closely to find what we left out of our new word processor. But once you try the WORD COMMANDER 64 you'll discover what's missing. We've taken the *process* out of word processing and put it where it belongs—in our software. With the WORD COMMANDER 64 there's less for you to do and more that it does. And that makes *you* look good.

Only Two Hands.

The WORD COMMANDER 64 is a complete word processor. We've included every function you'll need and some comforts you'll enjoy. And we didn't hide them in complicated codes or commands that require three hands. Everything about the WORD COMMANDER 64 makes plain sense.

Less Hassle.

When you write you probably change your mind a lot. Now changing your text is almost as easy as changing your mind. Like when you want to underline a word or group of words all you do is press "COMMODORE-U" —regardless of the printer control code your printer uses.
Simple.

Less is More.

While simple to use, you won't find the WORD COMMANDER 64 lacking in power or sophistication. We've integrated all of the best features into the WORD COMMANDER 64:

- extremely user friendly
- menu driven
- full word wrap
- block text right
- center text
- right justify text
- delete a block of text
- insert a block of text
- move a block of text
- copy a block of text
- three different fonts supported
- print in bold type
- print in elongated type
- allows sending of any control codes to your printer
- select any background color of your preference
- select any character color as well
- select cursor color
- set top, right, bottom and left margin
- set line spacing
- print headers and footers on every page
- automatically number pages
- print subscripts and superscripts
- underline text
- search for specific text
- search and replace
- change margins, font, or justification from within your document
- full 80 column view of the page before printing
- use MMG's MAIL LIST for mail merge capability

Follow Your Ideas.

The words you need to write represent your ideas; and they flow—one after another. So we designed the WORD COMMANDER 64 to work along with your thought processes. And not slow you down. We did that by making it less complicated and easier to use. So easy you probably already know how to use it.

Oh, there's one more thing missing from the WORD COMMANDER 64, the high price: Only $49.95

Includes full manual and tutorial.

How to Get Yours.

Available at your local dealer or direct from **MMG Micro Software**. Just send check or money order to:

P.O. Box 131 Marlboro, NJ 07746

Or for MasterCard, Visa, and C.O.D. deliveries call: **(201) 431-3472**

Please add $3.00 for postage and handling for all direct orders. New Jersey residents add 6% sales tax.

MMG micro software

©ZADCO 1984

COMMODORE is a registered trademark of COMMODORE Business Machines Ltd.

www.commodore.ca

We've also improved the delay timer. In March, this subroutine just LoaDed Y with zero and counted down until Y reached zero again. This month, we've added an outer loop involving X. Not only will this cause much longer delays, but it's also more flexible. Before we JSR to the delay subroutine, we first load X with a number representing the amount of delay we want. See line 49387. This lets us fine-tune the game so that it's challenging yet fair and also gives us greater control over the animation effects.

```
49361   LDY    # 0
49363   DEY
49364   BNE           49363
49366   DEX
49367   BNE           49361
49369   RTS
```

One last modification. In March, the main loop checked for only three keypresses: 1 for left paddle movement, 3 for right, and 0 for exit. This month we've added @ to fire a bomb. Next month we'll take care of one final oddity about the behavior of the paddle (can you spot it?) and add the final animated objects—descending spikes.

Program 1: Fire Bomb

```
49370   LDA    251
49372   STA    253
49374   LDA    252
49376   STA    254
49378   JSR    49423
49381   LDY    # 0
49383   LDA    193
49385   STA  ( 253 )Y
49387   LDX    # 10
49389   JSR    49361
49392   LDA    # 32
49394   STA  ( 253 )Y
49396   JSR    49423
49399   LDA  ( 253 )Y
49401   CMP    # 32
49403   BNE           49412
49405   LDA    # 193
49407   STA  ( 253 )Y
49409   JMP     --->    49387
49412   CMP    # 224
49414   BEQ           49420
49416   CMP    # 90
49418   BEQ           49387
49420   JMP     --->    49260
49423   SEC
49424   LDA    253
49426   SBC    # 40
49428   STA    253
49430   LDA    254
49432   SBC    # 0
49434   STA    254
49436   RTS
```

See program listings on page 154.

VIC - 20 / COM - 64
HOME / BUSINESS

	VIC	64
PRACTICALC PLUS (16K)(T)	43.95	
PRACTICALC 64 (T)		43.95
(disk version)		46.95
TOTL TEXT 2.5 (T)	26.95	29.95
(disk version)		32.50
CARDCO 3 SLOT EXPANSION BOARD	28.95	

16K MEMORY EXPANSION
ONLY $49.95

★ 14 Day Money Back Guarantee
★ Boosts VIC to 21K RAM
★ Top Quality, Fully Tested
★ 90 Day Warranty

for IMMEDIATE SHIPMENT on Credit Card Orders

Call: (303) 245-9012
9 AM - 9 PM MST Every Day
ASSEMBLY TECHNOLOGY
2692 Hwy 50 Suite 210
Grand Junction, CO 81503

Personal checks allow 3 weeks
Shipping & handling $2.50
Colorado Residents add Sales Tax
COD add $2.00

BIG BYTES

Order Line: 1-800-638-2617
Information, Order Inquiry and In Ohio 1-216-758-0009

1541 Disk Drive	$219	1702	Color Monitor	$226	
1530 Datasette	$ 59	1600 Modem	$ 59	MPS801 Printer	$208
1526 Printer 100 cps	$289	1520 Printer/Plotter	$159	1650 Auto Modem	$ 89

COMMODORE 64 $219

Assembler/Monitor	$ 15	Easy Script	$ 35	HOME FINANCES	
Super Expander	$ 15	Easy Spell	$ 17	Home Accountant	$ 49
LOGO	$ 39	SPREADSHEETS		FCM	$ 39
PILOT	$ 39	Calc Result	$ 99	Tax Advantage	$ 45
CP/M 2.2	$ 59	Calc Result Easy	$ 65	MONITORS	
Intro to BASIC	$ 17	Multiplan	$ 75	BMC green screen	$ 79
Visible Solar System	$ 16	Omni Calc	$ 39	BMC amber screen	$ 89
Lazarian	$ 18	WORD PROCESSING		BMC composite color	$219
Pinball Spectacular	$ 16	Word Pro 3+ with speller	$ 69	PRINTERS	
ZORK I,II,III	$ 25	Paper Clip	$ 69	Gemini 10X with Cardco interface	$319
Suspended	$ 25	DATA BASE MANAGERS		Gemini 15X	$389
Easy Calc	$ 55	Delphi's Oracle	$ 89	Riteman	$299
Easy Finance I,II,III,IV,V	$ 17	Super Base 64	$ 79	Okidata	CALL
The Manager	$ 35	PROGRAM GENERATORS		SPECIALS	
General Ledger	$ 35	The Last One	$ 72	Compuserve Starter Kit	$ 27
Accounts Receivable	$ 35	Codewriter	$ 65	Smart 64 Terminal	$ 30
Accounts Payable	$ 35			Micro Pak Paper	$ 9
Payroll	$ 35				
Inventory	$ 35				

We carry a complete line of Quality Commodore related products including those by: Timeworks, Spinnaker, Epyx, Sierra, HES and Cardco. Even if not listed, we probably have it, at the lowest price possible. SEND FOR OUR CATALOG! MOST ORDERS SHIPPED WITHIN 48 HOURS! All prices include cash discount. VISA/MC orders accepted - add 3.5%. NO C.O.D. ORDERS! For quickest delivery send bank check or money order. Personal or Company checks delay order 21 days. All sales are final - defective merchandise exchanged for same product only. Shipping add 3% ($2.50 minimum). Call for shipping on monitors. Ohio customers add 5.5% sales tax. Prices & availability subject to change.

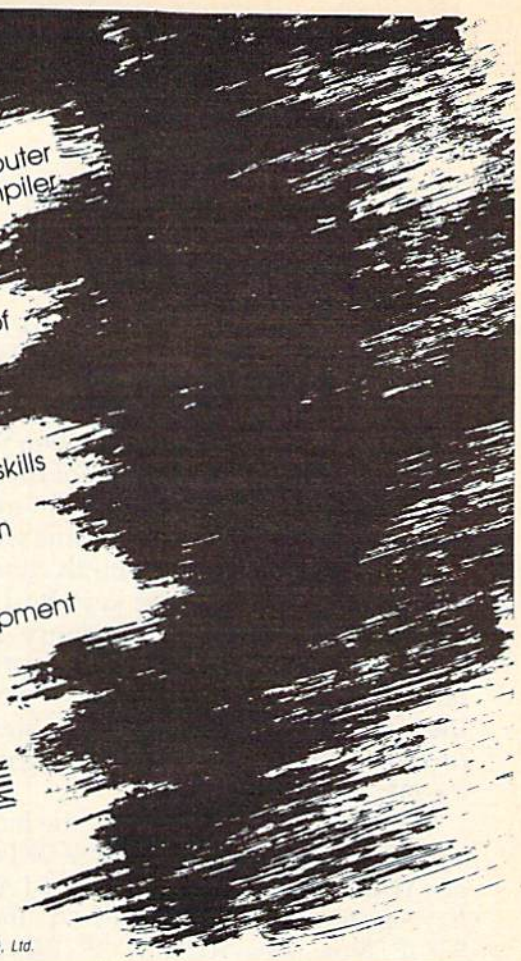
HOURS:
Mon.-Fri.
10 a.m. - 10 p.m.
Saturday
10 a.m. - 5 p.m.

1301 Boardman-Poland Road, Poland, Ohio 44514

www.commodore.ca

COMMODORE 64 GETS AWAY FROM BASICs
with

THE *Pascal Compiler* FOR THE COMMODORE 64™



Limbic Systems, Inc. introduces the PASCAL COMPILER from Oxford Computer Systems (Software), Ltd., developers of *PETSPEED -- the BASIC compiler recommended by Commodore.

THE PASCAL COMPILER OFFERS --

- **EASE OF OPERATION**
  Pascal, a programming language, simplifies development of software for customized applications
- **POWER**
  to write programs efficiently and effectively
- **TEACHING TOOL**
  Pascal is the preferred language to teach programming skills
- **EFFICIENCY**
  debugging time is minimized -- the major task in program development
- **FLEXIBILITY**
  utilities are provided as an aid in programming development

CAPABILITY ECONOMICALLY
THE PASCAL COMPILER PRICED UNDER $50

Limbic Systems Inc.

560 San Antonio Road, Suite 202 Palo Alto, CA 94306
(415) 424-0168

Commodore 64 is a trademark of Commodore Electronics, Inc.
**PETSPEED is a trademark of Oxford Computer Systems (Software), Ltd.*

TELSTAR 64

Sophisticated Terminal Communications Cartridge for the 64.

PFO 10D 00D CP D1 D2 BELL 12:30:00 10:14:36
(TELSTAR's Status Line)

Don't settle for less than the best!

- Upload/Download to/from disk or tape.
- Automatic File Translation.
- Communicates in Industry Standard ASCII.
- Real-Time Clock plus Alarm Clock.
- Line editing capability allows correcting and resending long command lines.
- 9 Quick Read functions.
- Menu-driven.
- Similar to our famous STCP Terminal package.
- Works with Commodore Modems and supports auto-dialing.

The best feature is the price — **only $49.95** (Cartridge and Manual)

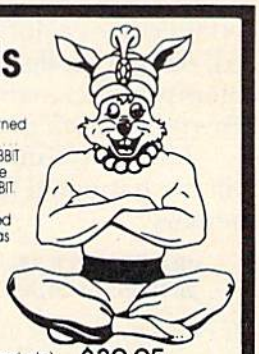
Machine Language Monitor Cartridge
for the CBM 64

More than 20 commands allow you to access the CBM 64's Microprocessors Registers and Memory Contents. Commands include assemble, disassemble, registers, memory, transfer, compare, plus many more.

Someday every CBM 64 owner will need a monitor such as this.

Cartridge and Manual — **$24.95**

8K in 30 Seconds
for your VIC 20 or CBM 64



If you own a VIC 20 or a CBM 64 and have been concerned about the high cost of a disk to store your programs on ... worry yourself no longer. Now there's the RABBIT. The RABBIT comes in a cartridge, and at a much, much lower price than the average disk. And speed ... this is one fast RABBIT. With the RABBIT you can load and store on your CBM datasette an 8K program in almost 30 seconds, compared to the current 3 minutes of a VIC 20 or CBM 64, almost as fast as the 1541 disk drive.

The RABBIT is easy to install, allows one to Append Basic Programs, works with or without Expansion Memory, and provides two data file modes. The RABBIT is not only fast but reliable.

(The Rabbit for the VIC 20 contains an expansion connector so you can simultaneously use your memory board, etc.)

$39.95

MAE NOW THE BEST FOR LESS!

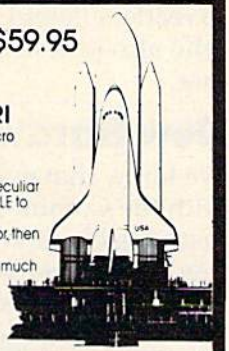
$59.95

For CBM 64, PET, APPLE, and ATARI

Now, you can have the same professionally designed Macro Assembler/Editor as used on Space Shuttle projects.

- Designed to improve Programmer Productivity.
- Similar syntax and commands – No need to relearn peculiar syntaxes and commands when you go from PET to APPLE to ATARI.
- Coresident Assembler/Editor – No need to load the Editor, then the Assembler, then the Editor, etc.
- Also includes Word Processor, Relocating Loader, and much more.
- Powerful Editor, Macros, Conditional and Interactive Assembly, and Auto – zero page addressing.

Still not convinced; send for our free spec sheet!



Eastern House

3239 Linda Dr.
Winston-Salem, N.C. 27106
(919) 924-2889 (919) 748-8446
Send for free catalog!

VISA* MasterCard

www.commodore.ca

HORIZONS: 64

CHARLES BRANNON
PROGRAM EDITOR

Mysterious Lockup Revisited

In the January GAZETTE, I documented a strange lockup. The lockup happens when you type two full screen lines at the bottom of the screen (until the cursor wraps around the right margin twice), then try to back up to the long line with INST/DEL. As it DELetes the seventy-ninth character, LOAD, then RUN are fed into the keyboard buffer. If you have a BASIC program in memory, it will be run. Otherwise, READY will appear, with the cursor, but no typing will be accepted. In January, I said there is no way to correct the problem short of turning off the computer (or using the Emergency Reset).

Actually, you can escape the lockup without such drastic measures. Press SHIFT-3, then let go. You'll see "PRESS PLAY ON TAPE." If you have a cassette unit, press PLAY, then RUN/STOP. Now press RUN/STOP–RESTORE. You're saved! The lockup only seems to happen with certain cursor colors: red, cyan, blue, yellow, light red, dark gray, light blue, and light gray. The safe colors are black, white, purple, green, orange, brown, medium gray, and light green.

Tae Kyun Kim also noticed that the lockup will not happen if the following program is in memory.

```
10 OPEN 15,8,15
20 INPUT#15,A$
```

Of course, unless you always type this in, the chances are slim that it will be there. Special thanks to readers Peter Ulrich and Graydon W. Harman who also sent in solutions to the strange lockup bug.

New Hardware

We know that everyone is completely satisfied with the Commodore 1541 disk drive. It's quiet, fast, reliable, and inexpensive. What's that? A few dissenters? Well, if you don't agree, there are some alternatives to the 1541 drive.

There are a few manufacturers that sell disk drives for the Commodore 64, and we can expect more third-party drives in the future. When shopping for a drive, you need to look for several things: compatibility, price, compatibility, reliability, compatibility, speed, compatibility, features, and compatibility. I suppose the point's well-made, but the number one priority *is* compatibility. What good is a $100 warp-speed drive with printer port and five-year warranty if you can't read and write to and from standard Commodore disks? Without compatibility, how can you trade programs with your friends, or load commercial software from the drive?

There are several levels of compatibility. First, you should be able to format, read, and write to your own disks. That's taken for granted. You should also be able to load almost any Commodore disk. I say almost because not even 1541s can always read each other's disks. A third level of compatibility is that you should be able to write without harm to any Commodore disk. Again, some flaky 1541s can read but not write to a disk they haven't formatted.

More subtly, the disk should be as much like the 1541 internally as possible. The hardware doesn't have to be the same, but the DOS inside the disk drive should support every tricky 1541 technique, from relative files to Block-Allocate. There's just one complication. If a company used the same DOS as the 1541, there would be a potential copyright violation. Apple and Franklin (who makes an Apple-compatible computer) are still slugging it out in court over the question of ROM copyrights. If it's better to be safe than sorry, the manufacturer will have to rewrite the DOS.

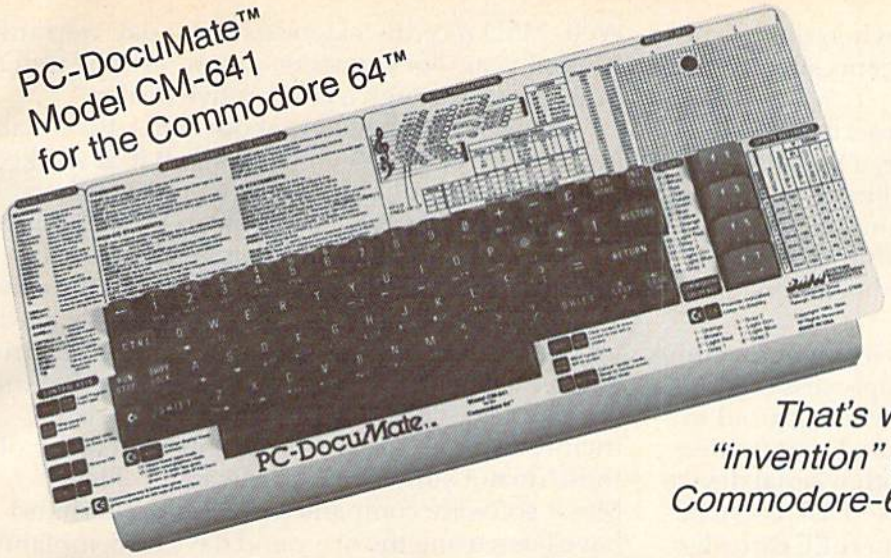
In any rewrite, you leave the security of a debugged, tested DOS. You try to copy all the features and functions of the 1541 DOS, but DOS is not a trivial program. One little error, and you have to face hordes of angry owners with trashed disks.

Considering the difficulty, Micro Systems Development's (MSD) Super Disk Drive is remarkably compatible. We received a unit for review, so I thought I'd give you an early look.

The MSD unit comes in a metal case and is slightly smaller than the 1541. The disk slot is vertical instead of horizontal, and there is a more reliable drive clamp, which centers and grabs onto the inner hub of the diskette. There are two LEDs: power on (green) and drive busy (red). The power on light also flashes between red and green when you get an error. The 1541 also has two LEDs: a green one for power, and a red one that flashes when you get an error, stays steady when

www.commodore.ca

PC-DocuMate™
Model CM-641
for the Commodore 64™



EUREKA!

That's what we said when our new "invention" solved all our VIC-20™ and Commodore-64™ programming problems

We had a problem. So we invented PC-DocuMate™ to solve it. The problem was how to quickly master the VIC-20 and CBM-64 keyboards and easily start programming in BASIC on our new personal computers. First we went through the manuals.

INCONVENIENT MANUALS

The user's guide was a nuisance and the programmer's reference manual was just plain inconvenient to use. We found the control key combinations confusing and the introduction to BASIC to be too "basic" for our needs. We needed a simple solution to our documentation problems.

So we decided to surround the keyboard of each PC with the information we wanted. We decided to print whatever we needed on sturdy **plastic templates** which would fit the keyboard of either the VIC-20 or Commodore 64.

SIMPLE SOLUTION

This was the simple solution to our problem. Now we could have the essential information right at our fingertips.

On the left side and top of the templates we put **BASIC** functions, commands, and statements. On the lower left we used **key symbols** to remind us of how to use SHIFT, RUN/STOP, CTRL and the "Commodore" key. Over on the bottom right side we put some additional keys to help remember about CLR/HOME and RESTORE. But we were still a little confused.

STILL CONFUSED

We found we were confused about music programming, color graphics, and sprites. On both the VIC-20 and the CBM-64 templates we carefully organized and summarized the essential reference data for **music** programming and put it across the top—showing notes and the scale. All those values you must POKE and where to POKE them are listed.

Then to clarify **color graphics** we laid out screen memory maps showing character and color addresses in a screen matrix. (We got this idea from the manuals.)

For the VIC-20 we added a complete memory address map for documenting where everything is in an expanded or unexpanded VIC.

For the Commodore 64 we came up with a really clever summary table for showing almost everything you ever need to know for **sprite** graphics.

GETTING EASIER

Now we had organized the most essential information for our VIC and 64 in the most logical way. BASIC, music, color graphics, and sprites all seemed a lot easier. Our initial problem was solved by PC-DocuMate™.

But we have a confession to make.

WE CHEATED

We had solved this kind of problem before. In fact, many times before. You see, we at SMA developed the original PC-DocuMate for the IBM PC. We've made templates for IBM BASIC and DOS, for WORDSTAR™, VISICALC™ and other best-selling software packages for the IBM PC.

So we knew we could invent another PC-DocuMate™ to solve our problems with the VIC-20 and Commodore 64. Now our solution can be yours and you can join the thousands of satisfied users of our template products.

Take advantage of our experience and success with PC-DocuMate templates. Get one for your personal computer.

SOME SPECIFICS

Our templates for the VIC and 64 are made from the same high quality **non-glare** plastic as the more expensive IBM PC versions.

The templates are an attractive **gray** color and are imprinted with a special black ink which bonds permanently to the plastic. They are precision **die-cut** to fit your keyboard.

Unlike some other products we've seen in this category, PC-DocuMate templates are professionally and expertly designed. And they are fully guaranteed.

OUR GUARANTEE

We guarantee your satisfaction. **You must be satisfied** with your PC-DocuMate for your VIC-20 or CBM-64. Try it for 10 days and if for any reason you are not satisfied return it to us (undamaged) for a full refund. **No risk.**

SOLVE YOUR PROGRAMMING PROBLEMS WITH PC-DocuMate™

Order your PC-DocuMate today (by phone or mail) and solve your VIC-20 or CBM-64 programming problems. Send only **$12.95** and specify which computer you have. We pay for shipping and handling. Use the coupon below or call **919-787-7703** for faster service.

YES! Please RUSH me _____ VIC-20 templates and/or _____ CBM-64 templates at $12.95 each. I have enclosed $_____ by:

Check ___ Money order ___ MC/VISA ___

Name _____

Address _____

City _____ State _____ Zip _____

Card # _____ Exp. _____

Signature _____

Foreign orders (except Canada) add $5.00 US

Mail to: **Systems Management Associates**
3700 Computer Drive, Dept. J-1
P.O. Box 20025
Raleigh, North Carolina 27619

VISA MasterCard

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

Ad no. 731 Copyright 1983, SMA.

Dealer inquiries invited.

www.commodore.ca

the drive is busy, and turns off when there is no access. The MSD LED scheme seems slightly more logical.

Included with the drive is a serial cable to attach the drive to the computer, a detachable power plug, and a 45-page "preliminary" manual. No sample disk was included, such as the 1541 test/demo disk which comes with the 1541. The MSD manual is a little better for beginners than Commodore's.

Like the 1541, the MSD has its own operating system, driven by a 6511Q microprocessor (similar to the 6502). It has 4K of RAM, which is used to buffer data. In addition to the serial port (with a second port to let you chain another serial device, such as a printer), the MSD Super Disk Drive has an IEEE-488 parallel bus. With an IEEE cartridge, such as the CIE or VIE sold by MSD, you can significantly speed up disk access to the speed of a Commodore 4040 (dual-drive unit used with the PET/CBM). Unfortunately, this interface was not included in the review package, so we cannot vouch for the speed with a VIC or 64. We did attach the MSD drive to a Commodore 8032 instead of a 4040. The data transfer was fully up to the speed of a 4040, about twice as fast as the 1541.

Compatibility

From all appearances, the MSD drive is completely compatible with existing 1541 disks. I read and wrote to the same disk with both the MSD and a 1541 over a period of about a week. I never got a bad sector, nor a program that wouldn't load.

But when you get to the tricky details, the MSD is not a 1541. Its DOS is a software product, and is constantly being "perfected." When we were using it to make a backup copy of a disk, it would not accept the command to change its device number from 8 to 9, even though this command is mentioned in the manual. This is because we were using a drive which underwent a revision in the DOS. Present drives have had this problem fixed.

MSD says they will offer a practically free upgrade to the DOS whenever a new version is available. You buy a new EPROM chip, and send in your old one for credit. Alternately, you could go through your dealer, who would make the exchange and work with MSD.

Reliability And Speed

The metal case and more positive head-centering lead you to believe that the MSD drive is a heavy-duty piece of equipment. The MSD drive is a little louder during disk access, making metallic clicks and whines instead of the softer plastic-on-plastic sounds of the 1541. This also gives you a feeling of solid, metal construction.

How reliable does MSD think the drive is? Well, MSD recently extended its 90-day warranty to a full year. For servicing, you return the unit to MSD, or go through a cooperative dealer.

It just so happened that our MSD drive malfunctioned on us. When we first got it, it worked perfectly. Later on, though, it would refuse to read any disks after it had been on for an hour or so. Something in the drive was getting very hot. Turning it off and letting it cool restored the drive. The metal case may be a plus, but it makes it harder for heat to escape. It wouldn't hurt the MSD drive to have a small built-in fan. We can't say that this is a problem with all MSD drives. MSD claims their return rate is about 1 percent, and many of these do not suffer from hardware problems. Major software companies such as Brøderbund have been using the drive and have no complaints. If you've used an MSD drive, write us and tell us how it's worked for you.

As mentioned, with an IEEE interface, you can substantially speed things up; but without it, I could hardly detect any difference in speed between a 1541 and the MSD drive. The MSD may be slightly faster, but not appreciably.

The MSD drive we used was a single drive unit. It offers only an IEEE port over the 1541. Otherwise, there are no added features or enhancements. However, MSD also manufactures a dual-drive model.

Why Buy MSD?

Given that the MSD costs more than a 1541, why would you buy it? First, it is less expensive than a 2031 or 4040 if you want to use the IEEE cartridge. Second, the metal case (which blocks moderate magnetism and RF interference) may extend the life of the read/write head. Third, you might want to own a dual-drive model (two drives in one case), not available from Commodore. Fourth, you may not be able to find any 1541s in stock (or one that works). But otherwise, it's up to you.

Micro Systems Development
10031 Monroe Drive
Dallas, TX 75229
$399 (single disk drive)
$695 (dual drive unit)

Although we haven't seen one yet, Concorde Peripheral Systems has its own 1541-compatible disk drive. The Concorde C-321-P comes with a parallel interface to speed up disk access "over 100 percent." Promotional literature does not indicate whether the interface is an IEEE-488.

Reliability is said to be enhanced by the use of "full ball bearing mountings, with no pulleys or belts, helping to minimize spindle run-out and to provide a 10,000-hour mean time between failure rate." Whew! Concorde alludes to a major cause of 1541 failure: spindle run-out. The 10,000 MTBF rate should give you plenty of time to use

www.commodore.ca

GOSUB®

How to do your own maintenance, troubleshooting, schematics, theroy of operation, cleaning hints, conversion from one power source to another and calibration. These topics and many more will make this manual a valued addition to your reference shelf. Whether you are an amateur electronics technician or a seasoned professional, you will be able to realize the full potential of your VIC-1541 by using this manual. Step-by-step instructions will lead you through the proper methods to get your VIC-1541 up and going in a hurry. The manual is 170 pages long, has two foldouts and over 100 illustrations, including:

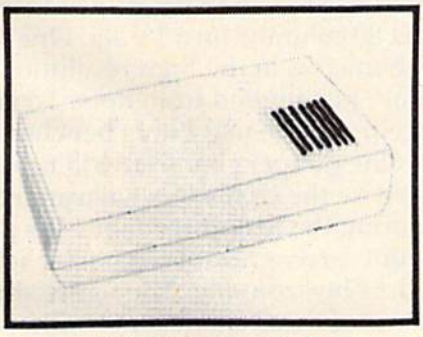
Block Diagrams
Schematics
Waveforms
Isometric (Pictoral) views
Test point locators

With all these illustrations and the detailed theory for each circut involved, along with step-by-step procedures to follow, the manual is a great time and money saver.

CONTENTS OF MANUAL

Front Matter
Section 1 Introduction
Section 2 Theory of Operation
Section 3 Initial Configuration
Section 4 Performance Test
Section 5 Calibration
Section 6 Disassembly/Reassembly
Section 7 Preventive Maintenance
Section 8 Troubleshooting
Section 9 Schematics and Parts Layout
Appendices

Suggested list price: $39.95



HEAT DISSIPATING KIT
For VIC-1541 and 1541 Disk Drives

FEATURES:
Reduces internal tempratures to safe operating levels.
Does not promote dust migration.
No added noise.
Easy to install.
Increases life expectancy and realiability of disk drive.
Increases operating time of disk drive.
Installs on both VIC-1541 and 1541 Disk Drives.

The heat Dissipating kit cools the internal components of the Disk Drive by transferring internal heat to an external heat sink, where the heat is then dissipateded into the surrounding air. The kit will lower operating tempratures of the IC's by as much as 20 degrees C (36 degrees F), and thus allow all the IC's to operate within their absolute maximum temprature ratings.

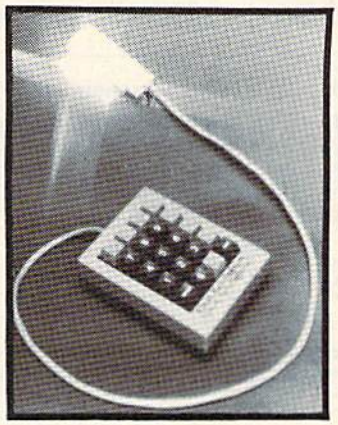
Suggested list price: $24.95

GRIDIRON STRATEGY '64

AND YOU THOUGHT FOOTBALL SEASON WAS OVER GRIDIRON STRATEGY '64 and the Commodore 64 now give you a year-round seat on the 50-yard line. GRIDIRON STRATEGY '64 is a highly realistic simulation of football instincts NOT "Joystick Reflexes". Most football games let you control a few players an a scrolling field. NOT GRIDIRON. In GRIDIRON, you coach the entire team and the colorful field and the stadium styled scoreboard are completely visiable at all times. Also, with the use of TEAM DATA DISK '84, the teams you control are the actual pro teams, based on their performances in the '84-'85 season. These disk can be updated every year, so you can constantly keep up with the rise and fall of each team. Finally, compare these features with any other football game on the market, for any other computer:
Real time game and 30-second play clocks?
Colorful Graphics, and Sprite animation?
Realistic sounds of a packed stadium?
Optional print out copy of plays and statistics?
Individuaoized teams, based on actual performances?
96 possible play combinations, infinate results?
Does not require and charts or dice for results?
In-depth playbook and strategy sections?
GRIDIRON STRATEGY '64 offers all of these qualities.

ORDER NOW!!!

Suggested retail price:
GRIDIRON STRATEGY '64 - $27.95
TEAM DATA DISK '84 - $14.95



THE FLEXI-KEY SYSTEM

20 keys, 19 of which may have 3 seperate definitions! Complete documentation! Works on the VIC-20 (Expanded) and C-64 Computers! Compatible with most existing software! Great for use with business programs and electronic spread sheets! Works with COMPUTES MLX program as an aid to machine language programmers!

Suggested list price: $69.95

ORDER FROM:
GOSUB of Slidell, Inc.
P. O. Box 1781
Slidell, LA 70459
(504) 641-8307
MasterCard and VISA
Shipping & Handling $2.00
C. O. D. add $2.00

Dealer and Distributor inquires welcome

www.commodore.ca

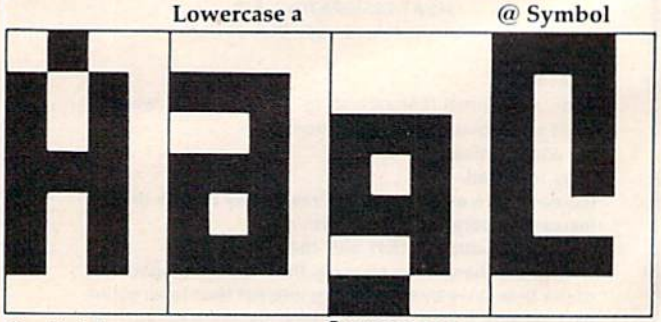
the drive before it and your computer become obsolete. Concorde also says that programs load in one-fifth the time of the Commodore drive.

The Concorde drive attaches to the game port (expansion port for those of you who scorn games), and does not use any of the 64's memory. An extension of the port allows you to plug other cartridges into the interface. You can also attach up to three "slave" drives, which depend on the intelligence of the master drive, so they will presumably be cheaper. The price of the master drive is $356, making it competitive with the 1541 (if the extra speed is worth $100 to you). A half-height, double-sided unit with 384K of storage is also available for $446. We should be receiving a test unit in a few weeks, and I'll give you a full report, including details on compatibility.

Why 40 Columns?

A television can display no more than a certain number of dots on a single line. A dot is formed by a change in the signal going into the TV, and that change can't happen faster than the TV can keep up with it. Either you'll get a picture out of sync, with tearing and rolling, or the TV will just ignore the extra signal changes. This is partly due to electronics that prevent bleedover between adjacent channels.

With 8 dots per character horizontally, 40 columns require 320 dots per line. This is just about the limit of a TV. Eighty columns requires 640 dots per line, and this is too much for a TV (or a color monitor, which has the same limitations). So unless you use less than 8 dots per character, you can't get 80 columns on a TV set. One solution is to draw characters in the high resolution mode. Characters are just plotted from dots. To get 80 columns, we'll need to use 4 dots per character (4 x 80 = 320). One dot per character will need to be blank, otherwise the characters will run into each other, rendering the text unreadable. It's pretty tricky to define a recognizable character set with only three dots horizontally. The figure shows you how some of these characters would look.



There are several word processing and terminal programs which use this technique for 80 col-

Here comes the new generation of SM's
GOLDEN TOOL
program series for the 64.
ONLY $75
SM TEXT64
The professional wordprocessor with more than 80 functions like multi-color selection, up to 120 columns/line without additional hardware, find & replace, enhanced blockhandling, direct-access to SM-ADREVA-files, and all the other usual features.
PLACE YOUR CHECK OR MONEY ORDER NOW!

SM SOFTWARE INC. 252 Bethlehem Pike Colmar. PA 18915

Here comes the new generation of SM's
GOLDEN TOOL
program series for the 64.
ONLY $60
SM ISM64
This index-sequential file manager gives you a new dimension on direct access files. Up to 40 keys, various length for each record and up to 10 files can be handled at the same time by this sophisticated module. How could your programs survive without SM-ISM?
PLACE YOUR CHECK OR MONEY ORDER NOW!

SM SOFTWARE INC. 252 Bethlehem Pike Colmar. PA 18915

www.commodore.ca

umns. Since it is done in software, though, it is in danger of being wiped out or interfered with by other programs you run with it. Many programs do not PRINT to the screen, either. A number representing a character is just POKEd into the character memory, and the video chip is responsible for displaying the character. If software is responsible for displaying the character, it would have to update the screen 60 times a second, reading an area of memory to see what's been changed. Impossible. You just can't update 8,000 bytes 60 times a second. Furthermore, if the software was written for 40 columns, you can't change the screen width and hope the software is smart enough to figure it out.

Why 80 Columns?

Even hardware 80 column cards have this problem—what do you do with it? You can write your own programs to use 80 columns, even edit your programs with it. But don't expect to plug in the card and have your word processor or spreadsheet adapt to the new screen width. Very little commercial software is written for 80 columns, and to be honest, if it wasn't designed for 80 columns, it won't adapt. BASIC programs that use PRINT to display to the screen will still work, but since they're based on a 40-column width, tables and other screen formatting will be skewed all over. It would be like running a 22-column VIC program on your 40-column 64.

This may change in the future, as more companies support the Data 20 Video Pak 80. This cartridge offers generation of 80 columns in hardware. This is true 80 columns, so it won't work with a TV. A monochrome (green screen) monitor, though, does have the necessary bandwidth to resolve 80 columns. Operation of the Video Pak is fairly simple: just plug it into the cartridge port (however, there's no extension to let you chain other cartridges into the Video Pak), then attach a supplied cable from the computer's audio/video port into the cartridge. Turn on the power, and you've got—40 columns.

To get into 80-column mode, you have to SYS 36867. The screen clears, and with easy to read characters, you're in 80-column mode. It's surprising how well the normal Commodore editor is supported. You can cursor around, insert and delete, and change lines by pressing RETURN. Scrolling is a little slower, and there is some snow (similar to sparkle) during the scroll.

The function keys are also "live." The f1 key will shift into lowercase mode; f2 will switch back. f3 will erase to end of line; f4 erases to the end of the screen. If you have an RS-232 port already open, you can press f6 to dump the screen to an RS-232 printer. I would have preferred that the

Here comes the new generation of SM's

GOLDEN TOOL

program series for the 64.

ONLY $60

SM KIT64

The famous programming tool with powerful basic extentions like merge, find, renumber, dump, trace, enhanced floppy-monitor (disc-doctor) and high efficient machine-language-monitor with built-in assembler, diassembler, trace and lots of more helpful features-really a golden tool!

PLACE YOUR CHECK OR MONEY ORDER NOW!

SM SOFTWARE INC. 252 Bethlehem Pike Colmar. PA 18915

Here comes the new generation of SM's

GOLDEN TOOL

program series for the 64.

SM ADREVA 64

Your personal professional address-file-system. Up to 620 addresses per disc in direct access. Including 5 extra lines for individual text/record. Totally menue-driven. Powerful editing and back-up facilities. Several hardcopy features.

ONLY $60

PLACE YOUR CHECK OR MONEY ORDER NOW!

SM SOFTWARE INC. 252 Bethlehem Pike Colmar. PA 18915

www.commodore.ca

dump work with a printer attached through the serial port. A handy bonus is terminal mode in 80 columns. It's a dumb terminal; it simply lets you communicate with a modem plugged into the user port, with no frills like upload/download.

You can also get an improved 40-column display with SYS 36864. It should be noted that you can switch modes with software. This lets the computer control the cartridge, instead of your having to manually flip switches. An audio connector on the cartridge lets you easily attach your computer to an amplifier or stereo system. There is documentation on accessing the Video Pak from machine language.

One complication with many cartridges is that they have to reside somewhere in the computer's address space—they take up memory. Video Pak 80 resides at $9000–$9FFF, right at the top of user RAM, leaving you 4K less for BASIC programming. You may not mind losing that RAM, given 80 columns, but certain machine language programs may not be so sanguine. They'll try to use the RAM at $9000, and find that it's ROM, crashing both the Video Pak and the machine language program.

If nothing else, you can use Wordmaster 20 from Data 20, included with the Video Pak. It's a functional 80-column word processor, with many commands. It formats on the screen, so you can see how the output will look, but you have to put up with a few inconveniences to get this. A mailing list program is also included, and you can merge data created by the mailing list program with a document on the word processor.

Data 20
23011 Moulton Parkway
Suite B10
Laguna Hills, CA 92653
$179.95 (Video Pak 80)

FREE CATALOG!

Send for your *FREE COPY* of

'64 SHOPPER

Your complete source for C-64 and Vic software!
You've never seen anything like it!!
USE READER'S SERVICE CARD, OR WRITE DIRECTLY TO:

'64 SHOPPER
BOX 187, FRASER, MI. 48026

COMPUTE!'s GAZETTE
TOLL FREE
Subscription Order Line
800-334-0868
In NC
919-275-9809

Advertise your program or product for the VIC-20 or 64 here and reach hundreds of thousands of readers.

Reduction of an actual sign

The Banner Machine™
For the **Commodore 64** (3 extra fonts available). For the **VIC-20** with 24K memory (2 extra fonts available). • Use on any Gemini or Epson MX with Graftrax or the FX and RX printers. Also Commodore 1525E and Banana with the C-64. • Menu-driven program operates like a word processor. • Makes signs up to 13" tall by any length. • Makes borders of widths up to ¾". • 8 sizes of letters from ¾" to 8" high. • Proportional spacing; Automatic centering; Right and left justifying. • $49.95 Tape or Disk (Specify computer equipment)

For the Commodore 64:
Space Raider An amazing arcade simulation. Your mission is to destroy the enemy ships. $19.95
CTRL-64 Permits listing of C-64 programs on non-Commodore printers. Lists control symbols in readable form. Tape or disk $24.95
Microbroker Exciting, realistic and educational stock market simulation. $34.95 Tape or Disk
Preschool Educational Programs ABC Fun and 123 Fun have bright color and action. **Each** $14.95
Formulator A scientific calculator for repetitive arithmetic computations. Save formulas. Ideal for chemistry, physics, or engineering students. $39.95
MUPOS Create a file of up to 9 basic programs from keyboard/tape/disk and run each program selectively. Combine programs. Renumber BASIC lines. Note pad, and more. Tape or disk $29.95
Grade Organizer Teachers—store grades for 6 classes, up to 40 students each, 680 grades per student. Print interim and final reports, class rosters, and more! Disk $39.95

Cardinal Software™
Virginia Micro Systems, 13646 Jeff Davis Hwy., Woodbridge, VA 22191
Phone (703) 491-6502
Ask for our free catalog
Commodore 64 and VIC-20 are registered trademarks of Commodore Electronics Ltd.

COMMODORE 64
Finally, Excellent Software At An Affordable Price!
Compare: • MENU DRIVE • USER LOVABLE • ADVANCED FEATURES

DATA BASE/MAIL LIST
Fast random access to any record. Search on any field. Machine Language sorts. Prints mailing labels. Large records. Eight fields.

LOAN ANALYSIS SYSTEM
Calculate a loan's term, interest rate, principal or monthly payment. Display an amortization schedule on screen or printer. Yearend totals for payment to interest and payment to principal. Printer version also gives principal and interest paid to date for the life of the loan.

HOME INVENTORY
Record all your valuables. Print inventory lists on screen or printer. Record 700 items per disk. Search items by Category, Manufacturer or Item Description. Indispensable in case of theft or fire.

ALL THREE PROGRAMS FOR
$26.95 SORRY, DISK ONLY
SEND CHECK OR MONEY ORDER TO:
MULTI-PAC SOFTWARE
BOX 7342
TULSA, OK 74170
WE PAY TAX AND POSTAGE!

www.commodore.ca

Write For FREE Catalog

Call your order in and get a FREE program

NEW

Call your order in and get a FREE program

Write For FREE Catalog

VISA

(602) 855-3357

CBM 64 SOFTWARE CBM 64

MasterCard

(602) 855-3357

5 Great Adventures For Your CBM 64 ....

$29.95

Add $1.00 Shipping

SAMURAI PAK

ON CASSETTE OR DISK

SHOGUN

FULL ACTION GRAPHICS.

YOU WILL NEVER TIRE OF THE HIRES ACTIONS!

NEVER THE SAME GAME TWICE!

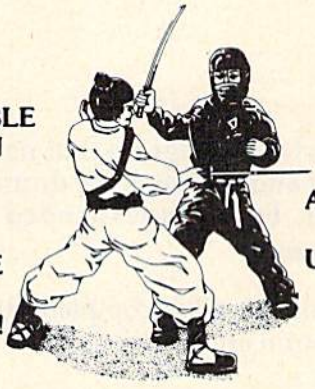
NINJA

Every Game Is Different!

HI-RES ACTION GRAPHICS

UNPREDICTABLE AND HIDDEN DANGERS

YOU WILL NEVER HAVE TO WAIT FOR ACTION!



ONE OF THE MOST EXCITING ADVENTURES YOU WILL UNDERTAKE.

ALSO INCLUDES TEXT PROGRAMS

ADVENTURE - SHUTTLE VOYAGE CAVES OF SILVER

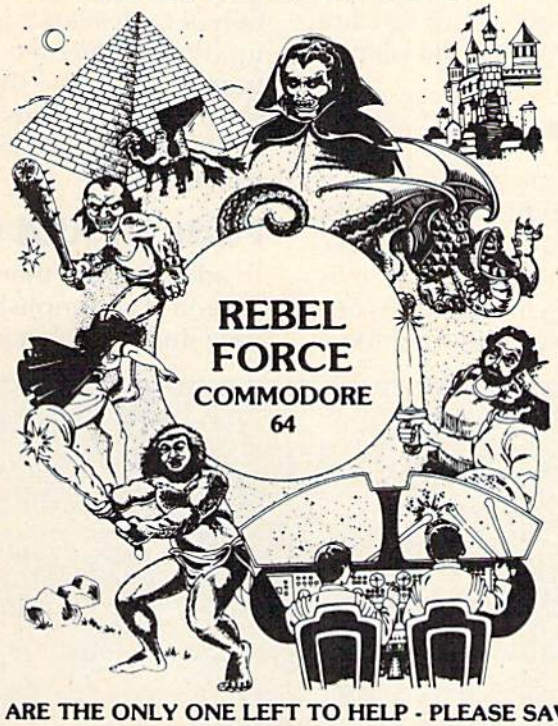
REBEL FORCE *by Tom Falk*

$29.95

Add $1.00 Shipping

DISK VERSION ONLY — CBM 64

A HI-RES GRAPHIC ADVENTURE



Here is the most extensive hi-res adventure game ever developed and created for the Commodore 64. It encompasses both sides of the disk and includes full color hi-res pictures. The story begins in the Kingdom of Acritym.

For numerous years the Kingdom of Acritym has been ruled by Lord Cybal. A rebel group has formed in an attempt to overthrow his majesty's Acritym's government. The rebellion has left the majority of Acritym's people exhausted, famished and defenseless. Despite the small size of the group, they have a major advantage. They are very well organized. Because of this they have developed a sturdy network of guerrilla tactics that have diminished the Kings army. If the rebellion and the organization can be thwarted the rebel force will be eliminated. His Majesty is presently in hiding. YOUR MISSION - You have been hired as a mercenary of your land. You must locate the rebel meeting place. The journey will long and hard. Others before you have fought valiantly, as you shall, only to meet their death inside the walls of Acritym.

Its all part of the most complex intricate and huge adventure ever created for the Commodore 64. GOOD LUCK! Keyboard Control.

YOU ARE THE ONLY ONE LEFT TO HELP - PLEASE SAVE US

COMPUTERMAT • Box 1664G • Lake Havasu City, Arizona 86403

www.commodore.ca

Sound Story

Bruce Bartlett

Here's a clever program that narrates a story on screen and enlivens the drama with a variety of sounds. For the unexpanded VIC-20.

"Sound Story" tells a complete story in a succession of sound effects, much like an old radio drama.

It was created by listening to natural sounds, analyzing them in terms of pitch, noise, durations, and repetitions, then converting these parameters to program statements.

For best visual effect, be sure that the background on your TV or monitor is black. That is, turn down the brightness control just to the point where the screen background is fully black.

The effects in Sound Story are produced using nested FOR-NEXT loops to control both the duration of repetitive sound patterns and the silences between patterns.

From Crickets To UFOs

The crickets sound is an example. Consider the sound pattern of a cricket chirping (see the figure). It consists of a series of tone bursts and silences. Each tone burst and each silence requires a FOR-NEXT loop for duration. Each chirp consists of five tone bursts and five silences—another loop. The chirps repeat continuously with another loop. Finally, the chirps gradually fade out or decrease in volume as the story ends. That's one more loop.

The dropping ping-pong ball is a series of very short tones and silences. The silences gradually become shorter as the ball loses height with each bounce.

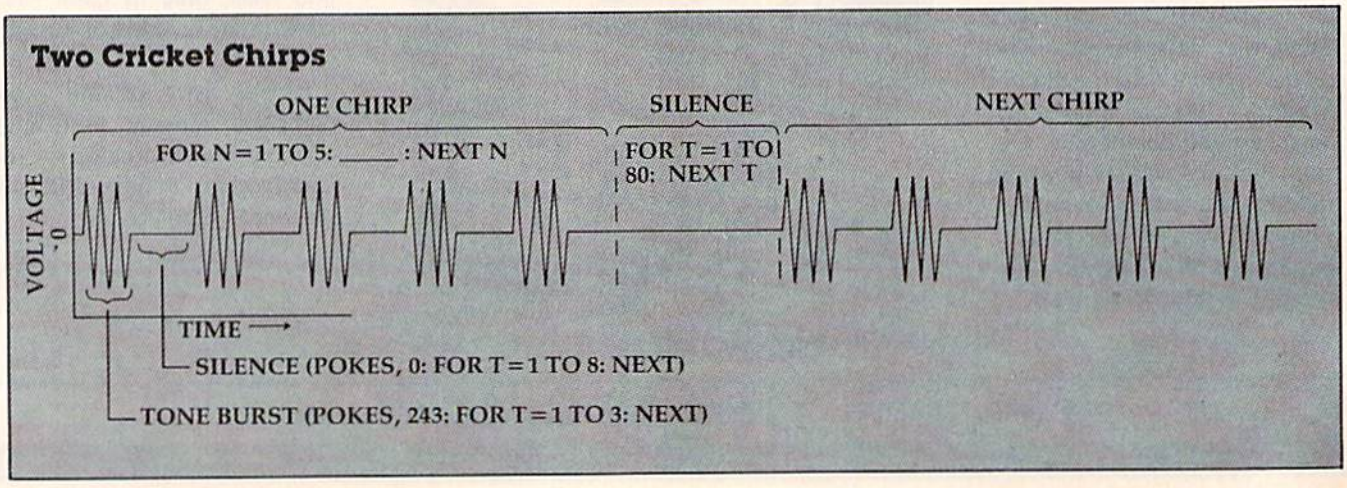
The warble tone in the musical introduction is done by alternating rapidly between two pitches.

Lightning and thunder are simulated by a rapid downward sweep of the noise generator (a thunder crack) followed by low-pitched noise which gradually decreases in volume (thunder rumbling).

The train sound is a series of accelerating puffs or noise bursts. Each puff and silence requires a FOR-NEXT loop for duration. The duration of each silence is long when the train starts up (that is, the train puffs slowly). Gradually the train accelerates—the silences between puffs get shorter, so the puffs speed up. Finally, the train attains top speed, so the puffs repeat rapidly at a constant rate.

Fade In And Out

In addition, the train sound fades in and out. The fade-in is accomplished by incrementing the volume during each noise burst. Another FOR-NEXT



www.commodore.ca