

COMPUTER'S GAZETTE

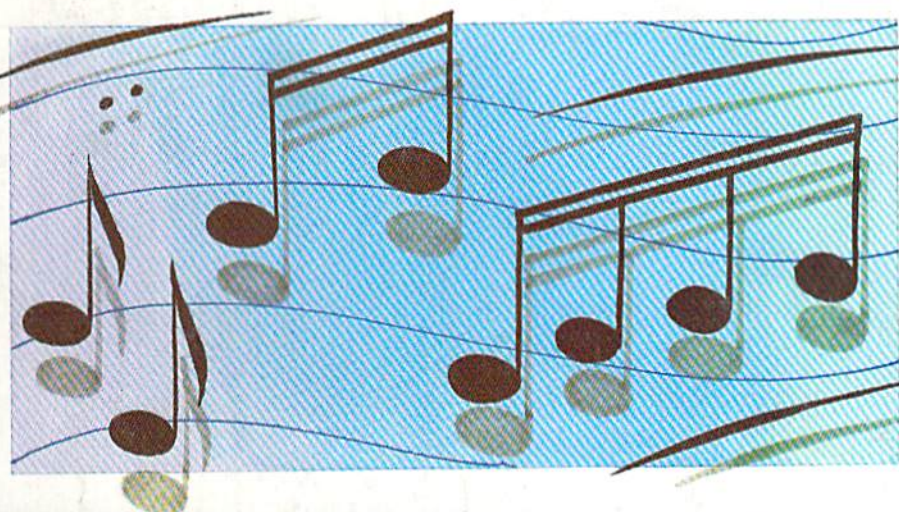
\$2.95
January 1986
Issue 31, Vol. 4, No. 1

02220 \$3.75 Canada

FOR **COMMODORE** PERSONAL COMPUTER USERS

Sprint

Complete Inside: A BASIC compiler that can make your Commodore 64 programs run up to 50 times faster!



Programming Music And Sound On The Commodore 128

With the powerful BASIC commands of the 128, making music is easier than ever.

The Fast Assembler

An efficient machine language assembler for the 64.



Also In This Issue:

Horizons:
Another Look At C

Disk Disassembler

Software Reviews

And More

Power BASIC: Print Maker

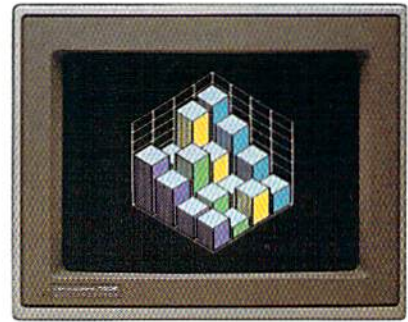
Design your own screen, then this program will convert it to a BASIC subroutine. For the 64, Plus/4, 16, and VIC.



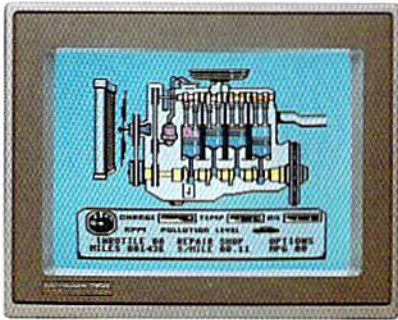
Face-Off

If you like competitive, fast-action games, you'll like this one-on-one hockey simulation for the 64. For one or two players.

All you need to do this



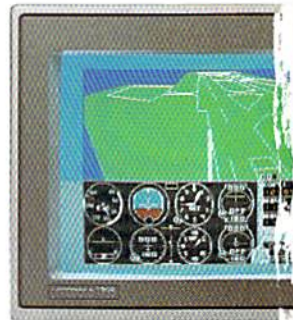
graph a spreadsheet



fix an engine



write a novel



learn to fly



do your banking



study astrology



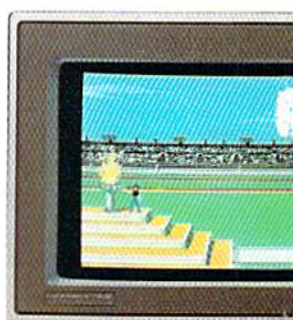
organize a data base



tell a story



forecast sales



win a gold medal



make a birthday card



compose a song



design a dream house



master logic



paint a picture



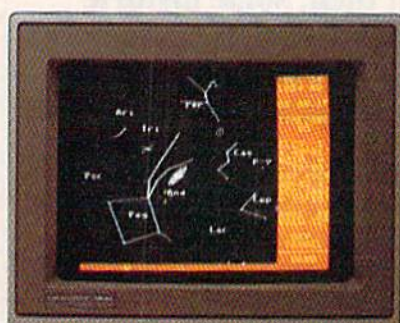
learn to type



dissect a frog



improve your chess



follow the stars




When it comes to personal computers, you want the smartest you can own. At a price that makes sense.

Feature for feature, the new Commodore 128™ system outsmarts its competition. It comes with a powerful 128K memory, expandable to 512K, more than enough to start with and stay with for years. An 80-column display lets you see more of your spreadsheets and word processing. And with its 64, 128 and CP/M® modes you have easy access to thousands of educational, business and home programs now available.

It also has a state-of-the-art keyboard with built-in numeric keypad to execute complex tasks with little effort.

The new Commodore 128. From the company that's sold more personal computers than IBM® or Apple.® Look for it at a store near you. And discover the personal computer that does more for you. At the price you've been waiting for.

COMMODORE 128 PERSONAL COMPUTER
A Higher Intelligence



SOME HISTORIC BREAKTHROUGHS DON'T TAKE AS MUCH EXPLAINING AS COMPU SERVE.

But then, some historic breakthroughs could only take you from the cave to the tar pits and back again.

CompuServe, on the other hand, makes a considerably more civilized contribution to your life.

It turns that marvel of the 20th century, the personal computer, into something useful.

Unlike most personal computer products you read about, CompuServe is an information service. It isn't software. It isn't hardware. And you don't even have to know a thing about programming to use it. You subscribe to CompuServe—and 24 hours a day, 7 days a week, it puts a universe of information, entertainment and communications right at your fingertips.



A few of the hundreds of things you can do with CompuServe.

COMMUNICATE

EasyPlex™ Electronic Mail lets even beginners compose, edit, send and file messages the first time they get online. It puts friends, relatives and

business associates—anywhere in the country—in constant, convenient touch.

CB Simulator features 72 channels for “talking” with thousands of other enthusiastic subscribers throughout the country and Canada. The chatter is frequently hilarious, the “handles” unforgettable, and the friendships hard and fast.

More than 100 Forums welcome your participation in “discussions” on all sorts of topics. There are Forums for computer owners, gourmet cooks, veterinarians, pilots, golfers, musicians, you name it! Also, Electronic Conferencing lets businesses put heads together without anyone having to leave the shop.

Bulletin Boards let you “post” messages where thousands will see them. You can use our National Bulletin Board or the specialized Bulletin Boards found in just about every Forum.

HAVE FUN

Our full range of games includes “You Gussed It!”, the first online TV-style game show you play for real prizes; and MegaWars III, offering the



ultimate in interactive excitement. And there are board, parlor, sports and educational games to play alone or against other subscribers throughout the country.

Movie Reviews keep that big night at the movies from being a five star mistake.

SHOP

THE ELECTRONIC MALL™ gives you convenient, 24-hour-a-day, 7-day-a-week shopping for name brand goods and services at discount prices from nationally known stores and businesses.

SAVE ON TRIPS



Travelshopper™ lets you scan flight availabilities (on virtually any airline—worldwide), find airfare bargains and order

tickets right on your computer.

Worldwide Exchange sets you up with the perfect yacht, condo, villa, or whatever it takes to make your next vacation a vacation.

A to Z Travel/News Service provides the latest travel news plus complete information on over 20,000 hotels worldwide.

MAKE PHI BETA KAPPA

Grolier's Academic American Encyclopedia's Electronic Edition delivers a complete set of encyclopedias right to your living room just in time for today's homework. It's continuously updated ... and doesn't take an inch of extra shelf space.



The College Board, operated by the College Entrance Examination Board, gives tips on preparing for the SAT, choosing a college and getting financial aid.

KEEP HEALTHY

Healthnet will never replace a real, live doctor—but it is an excellent and readily available source of health and medical information for the public.

Human Sexuality gives the civilization that put a man on the moon an intelligent alternative to the daily "Advice to the Lovelorn" columns. Hundreds turn to it for real answers.

BE INFORMED

All the latest news is at your fingertips. Sources include the AP news wire (covering all 50 states plus



national news), the Washington Post, USA TODAY Update, specialized business and trade publications and more. You can find out instantly what Congress did yesterday; who finally won the game; and what's happening back in Oskaloosa with the touch of a button. And our electronic clipping service lets you tell us what to watch for. We'll electronically find, clip and file news for you... to read whenever you'd like.

INVEST WISELY

Comprehensive investment help just might tell you more about the stock you're looking at than the company's Chairman of the Board knows. (Don't know who he is? Chances are, we can fill you in on that, too.) CompuServe gives you complete statistics on over 10,000 NYSE, AMEX and OTC securities. Historic trading statistics on over 50,000



stocks, bonds, funds, issues and options. Five years of daily commodity quotes. Standard & Poor's. Value Line. And more than a dozen other investment tools.

Site II facilitates business decisions by providing you with demographic and sales potential information by state, county and zip code for the entire country.

National and Canadian business wires provide continuously updated news and press releases on hundreds of companies worldwide.

GET SPECIALIZED INFORMATION

Pilots get personalized flight plans, weather briefings, weather and radar maps, newsletters, etc.

Entrepreneurs use CompuServe too for complete step-by-step guidelines on how to incorporate the IBMs of tomorrow.

Lawyers, doctors, engineers, military veterans and businessmen of all types use similar specialized CompuServe resources pertinent to their unique needs.

And now for the pleasant surprise.

Although CompuServe makes the most of any computer, it's a remarkable value. With CompuServe, you get low start-up costs, low usage charges and local phone-call access in most major metropolitan areas.

Here's exactly how to use CompuServe.

First, relax.

There are no advanced computer skills required.

In fact, if you know how to buy breakfast, you already have the know-how you'll need to access any subject



in our system. That's because it's "menu-driven," so beginners can simply read the menus (lists of options) that appear on their screens and then type in their selections.

Experts can skip the menus and just type in "GO" followed by the abbreviation for whatever topic they're after.

In case you ever get lost or confused, just type in "H" for help, and we'll immediately cut in with instructions that should save the day.

Besides, you can either ask questions online through our Feedback service or phone our Customer Service Department.

How to subscribe.

To access CompuServe, you'll need a CompuServe Subscription Kit, a computer, a modem to connect your computer to your phone, and in some cases, easy-to-use communications software. (Check the information that comes with your modem.)

With your Subscription Kit, you'll receive:

- a \$25 usage credit.
- a complete hardcover Users Guide.
- your own exclusive user ID number and preliminary password.
- a subscription to CompuServe's monthly magazine, *Online Today*.

Call **800-848-8199** (in Ohio, 614-457-0802) to order your Subscription Kit or to receive more information. Or mail this coupon.

Kits are also available in computer stores, electronic equipment outlets and household catalogs. You can also subscribe with materials you'll find packed right in with many computers and modems sold today.



- Please send me additional information.
- Please send me a CompuServe Subscription Kit.
- I am enclosing my check for \$39.95, plus \$2.50 handling. (Add sales tax if delivered in Ohio.)

Please make check payable to CompuServe Information Services, Inc.

- Charge this to my VISA/MasterCard

Expiration Date _____

Signature _____

Name _____

Address _____

City _____

State _____ Zip _____

MAIL TO:

CompuServe®

Customer Service Ordering Dept.
P.O. Box L-477
Columbus, Ohio 43260

PRI-601

An H&R Block Company
EasyPlex and ELECTRONIC MALL are trademarks of CompuServe, Incorporated. Travelshopper is a service mark of TWA.

Jet



A New Dimension in Fun

Easy aircraft control, coupled with unexcelled omnidirectional visual (plus audio) references and ballistic power, provide the speed and aerobatic maneuverability that add up to pure fun. Engage in a wide variety of combat scenarios (land-based F-16 or carrier-based F-18), or fly over detailed United States scenery at Mach 2.



Flight
Simulator
Scenery Disk
Compatible

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

Order Line: (800) 637-4983
(except in Illinois, Alaska, and Hawaii)

GAZETTE

contents

January 1986 Vol. 4, No. 1

features

The Commodore 64's Other Languages Selby Bateman	20	*
A Buyer's Guide to Commodore 64 Languages	28	*
The Natural Approach to Computer Languages Selby Bateman	34	*
Languages of Convenience	40	*

reviews

Soundchaser Keyboard and MacMusic Arthur B. Hunkins	52	
S'More Todd Heimarck	52	
Operation Market Garden and Kampfgruppe Neil Randall	55	
Stunt Flyer David Florance	55	
Fast Tracks George Miller	57	
Keys to Responsible Driving Gregg Keizer	57	
Also Worth Noting	58	

games

Space Arena Bryan Files	48	64†
Face-Off Kevin Mykytyn and Mark Tuttle	50	64

programming

The New MLX Ottis R. Cowper	42	64
BASIC Magic: Using That New Disk Drive You Got for Christmas Michael S. Tomczyk	62	128/64/+4/16/V
Hints & Tips: The Power of SYS	66	64/V
Machine Language for Beginners: Blanketing Memory Richard Mansfield	68	64/V
Sprint: A Compiler for the 64 Robert A. Stoerle	72	64
The Fast Assembler Yves Han	78	64
Programming Music and Sound on the 128 Philip Nelson	88	128
BASIC Backup John R. Hampton	97	64
Power BASIC: The Printmaker Manu Gambhir	104	64/+4/16/V
BASIC Windows Wayne Arnett	106	64/+4/16
REM Highlighter Don A. Ellis	108	128/64/+4/16/V
Disk Disassembler Jeff Babuschak and Richard Rager	110	64
Off-Screen Trace Brent Dubach	115	64

departments

The Editor's Notes Robert C. Lock	6	*
Gazette Feedback Editors and Readers	10	*
User Group Update	70	*
Computing for Families: Smart Power Tools—A Peek Inside the Black Box Fred D'Ignazio	117	*
Simple Answers to Common Questions Tom R. Halfhill	118	*
Horizons: Another Look at C Charles Brannon	119	*
Bug-Swatter: Modifications and Corrections	120	*
News & Products	121	*

program listings

How to Type In COMPUTE!'s Gazette Programs	123	*
The Automatic Proofreader	124	*
Advertisers Index	160	

† All Commodore 64 programs in this issue work on the Commodore 128 in 64 mode.

*=General, V=VIC-20, 64=Commodore 64, +4=Plus/4, 16=Commodore 16, 128=Commodore 128

COMPUTE!'s GAZETTE is published monthly by COMPUTE! Publications, Inc., Post Office Box 5406, Greensboro, NC 27403 USA. Phone: (919) 275-9809. Editorial offices are located at 324 West Wendover Avenue, Greensboro, NC 27408. Domestic Subscriptions: 12 issues, \$24. POSTMASTER: Send address changes to COMPUTE!'s GAZETTE, P.O. Box 10958, Des Moines, IA 50390. Second class application pending at Greensboro, NC 27403 and additional mailing offices. Entire contents copyright ©1985 by COMPUTE! Publications, Inc. All rights reserved. ISSN 0737-3716.

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

editor's notes

This represents the first time in the history of our publications that we're printing the same set of *Editor's Notes* in both COMPUTE! and in COMPUTE!'s GAZETTE. The reason for this change of heart is a rather massive set of announcements—at least massive to me. In the space of two weeks, we've learned that two of our major competitors have chosen to close up shop. *Creative Computing* magazine and *Popular Computing* magazine are both reportedly ceasing publication with their December issues. To understand the significance of news such as this, you have to be aware of a bit of the history and folklore of our industry. COMPUTE! was first published as a fall 1979 quarterly issue. At that time, the largest, most successful publications in the industry were BYTE magazine, *Creative Computing*, *Interface Age*, *Kilobaud Microcomputing*, and *Personal Computing*. *Popular* didn't come along until the fall of 1980. I remember my determination to someday catch up with *Creative Computing* magazine in circulation. But before we could pursue 100,000 or even 50,000, we had to pursue 5,000, and it took many months for us to achieve that goal.

I remember too the twinge of jealousy I felt when McGraw-Hill, then owner of BYTE and publisher of the new *Popular Computing* announced in a flurry all of the many expenditures being made in the launch of their newest magazine. I was even approached about the position of editor-in-chief with a

promise of funds and staffing and the many things not so readily available to us at COMPUTE! without a McGraw-Hill behind us.

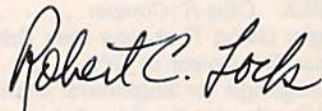
Creative Computing, under David Ahl's leadership, was at one time the premier magazine of consumer computing. Time and changes in the market eventually led to David's decision to sell to Ziff-Davis Publishing. Again, time and changes in the market have led to their apparent decision to close up the magazine.

Popular never seemed to establish its market niche with the clarity once demonstrated by *Creative*. It was always a junior introductory magazine that never seemed to bridge the gap between first time buyer and BYTE, its very successful parent. Perhaps *Popular* is the best example of that portion of our industry that came to rely on a massive influx of new computer buyers for growth. When, seemingly suddenly, our market dropped from 300 percent growth per year to 20 percent, the bottom fell out for many.

I applaud the immeasurable contribution to the personal computing industry made by *Creative Computing* and its founder David Ahl. I regret the demise of *Creative* and the demise of *Popular* as well even though it doesn't represent

the same loss of industry-impacting personality that *Creative* does.

This is a rather significant time, both for my own personal reflection of what we here at COMPUTE!/ABC Publishing have accomplished, and on times past. We will assure you here and now that COMPUTE! Publications is and continues to be quite successful, quite proud of our place in the market, and quite determined to continue to provide you, our readership, with all of the many services that have enabled us to grow and flourish, even during these particularly difficult times for the industry.



Editor-In-Chief/Founder

SYLVIA PORTER'S PERSONAL FINANCIAL PLANNER DOES MORE THAN MANAGE YOUR MONEY IT PLANS YOUR FINANCIAL FUTURE TOO

Sylvia Porter, and the editors of Sylvia Porter's Personal Finance Magazine, now combine with all the computer tools you'll ever need to help manage your money on a day-to-day basis and plan your financial future, too. In Sylvia Porter's style, without complicated financial jargon or "computerese".

Volume 1

Your Personal Financial Planner:

Helps you track your day-to-day financial data, then combines this information with your future financial objectives to produce the most comprehensive and easily-understood financial planning program available.

For Your Day-to-Day Affairs:

- Maintains your electronic checkbook and credit card system.
- Writes your checks and balances your checkbook. (We even built in a calculator and memo pad for you.)
- Prepares and monitors your budget.
- Classifies and tracks your taxable income and expenses.
- Calculates your net worth and generates customized personal financial statements.
- Tracks your financial assets – and your insurance policies.
- Graphically generates supplemental data, such as percentages, ratios and charts.
- You get our Toll-Free Hotline and our Customer Technical Support Team at no charge.
- You get Timeworks' Money Back Guarantee. (Details in each package.)



For Your Financial Future:

- You'll be led step-by-step through a series of questions regarding your life and lifestyle, your financial goals, and your current financial condition. Your answers will enable a computer to determine and print a summary of the amounts you must save each year to meet your financial objectives - in both real and inflated dollars.
- Helps you plan for protection against major medical adversities and other financial setbacks.
- Each program interfaces with others in this series. Your information can be incorporated into letters and reports produced by Timeworks' Word Writer.
- Everything is integrated. You need to enter data only once.

Available for Apple, IBM and Commodore computers.

Moderately Priced - from your favorite Dealer or contact

Timeworks for the Dealer closest to you.

Next in this integrated series:
Your Personal Investment Manager.

Other Timeworks Programs: The Evelyn Wood Dynamic Reader • Word Writer with Spell Checker • Data Manager 2 • SwiftCalc with Sideways • Business Systems • Swiftax • Cave of the Word Wizard • Wall Street



More power for your dollar.

TIMEWORKS, INC., 444 Lake Cook Rd., Deerfield, IL 60015, 312-948-9200

© 1984 Sylvia Porter's Personal Finance Magazine Co. & Timeworks, Inc. All rights reserved.

**From America's #1
Financial Adviser**

Publisher James Casella
Founder/Editor in Chief Robert C. Lock
Director of Administration Alice S. Wolfe
Senior Editor Richard Mansfield
Managing Editor Kathleen Martinek
Editor Lance Elko
Assistant Editor Todd Heimark
Production Director Tony Roberts

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

Assistant Editors
Gregg Keizer (Books); John Krause, George Miller, (Technical); Philip Nelson (COMPUTE! Magazine); Kathy Yakal, Assistant Features Editor; Joan Rouleau, Research/Copy Editor; Ann Davies, Copy Editor; Mark Tuttle, Submissions Reviewer

Editorial Programmers
Patrick Parrish (Supervisor), Tim Victor, Kevin Mykytyn

Programming Assistant
David Florance

Administrative Staff
Executive Assistant, Debi Nash; Julia Fleming, Iris Brooks, Jan Kretlow

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

Artists
Dabney Ketrow (Publications), Debbie Bray (Books); Harry Blair, Illustrator

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

Customer Service
Philippa King, Customer Service Manager; Gail Jones, Dealer Sales Supervisor; Judy Taylor, Customer Service Supervisor; Dealer Sales Staff: Rhonda Savage, Liz Krusenstjerna; Customer Service Staff: Betty Atkins, Gayle Benbow, Mary Hunt, Jenna Nash, Chris Patty
Receptionist, Anita Armfield

Lonnie Arden, Warehouse Manager; Staff: Howard Ayers, David Hensley, Larry O'Connor

Data Processing
Leon Stokes, Manager; Chris Cain, Steve Bowman, Assistants

Accounting
Paul J. Megliola, VP, Finance & Planning; R. Steven Vetter, Director, Finance & Planning; Karen K. Rogalski, Financial Analyst; Staff: Jill Pope

Credit
Staff: Sybil Agee, Pat Fuller, Doris Hall, Linda Miller, Mary Waddell, Jane Wiggs

Promotion
Caroline Dark, Promotion Assistant

Advertising Sales
Ken Woodard, Director of Advertising Sales; Patti Stokes, Production Coordinator; Kathleen Hanlon, Administrative Assistant

Sales Representatives
Jerry Thompson 415-348-8222
Ed Winchell 213-378-8361
Harry Blair 919-275-9809

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

Address all advertising materials to:
Patti Stokes, COMPUTE!'s GAZETTE
324 West Wendover Ave., Suite 200, Greensboro, NC 27408

Sales Offices, Jules E. Thompson, Inc.

New England	617-720-1888
Mid-Atlantic	212-772-0933
Southeast	919-275-9809
Midwest	312-726-6047
Texas	713-731-2605
Pacific Northwest	415-348-8222
Northern CA	415-348-8222
Southern CA	213-378-8361
Arizona	213-378-8361
New Mexico	213-378-8361
Colorado	303-595-9299



COMPUTE! Publications, Inc., publishes
COMPUTE! COMPUTE! Books COMPUTE!'s GAZETTE

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

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

Distribution Center
500-A Radar Road, Greensboro, NC 27419
Telephone: 919-275-9809
Office Hours: 8:30 AM to 4:30 PM Monday-Friday

President Robert G. Burton
Vice President, Finance & Planning Paul J. Megliola

Subscription Orders

COMPUTE!'s GAZETTE
P.O. Box 10958, Des Moines, IA 50950

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

COMPUTE!'s GAZETTE
Subscription Rates

(12 Issue Year): US (one year) \$24. Canada, Mexico and Foreign Surface Mail \$30. Foreign Air Mail \$65.

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 10958, Des Moines, IA 50950. 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 © 1985, COMPUTE! Publications, Inc. Rights to programs developed and submitted by authors are explained in our author contract. Unsolicited materials not accepted for publication will be returned if author provides a self-addressed, stamped envelope. Where programs are included in an article submission, a tape or disk must accompany the submission. Printed listings are optional, but helpful. Articles should be furnished as typed copy (upper and lowercase, please) with double spacing. Each article page should bear the title of the article, date, and name of the author. COMPUTE! Publications, Inc., assumes no liability for errors in articles or advertisements. Opinions expressed by authors are not necessarily those of COMPUTE! Publications, Inc. COMPUTE! Publications assumes no responsibility for damages, delays, or failure of shipment in connection with authors' offer to make tape or disk copies of programs published herein.

PET, CBM, VIC-20, Commodore 64, Plus/4, 16, and 128 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.

HOW TO GET OVER \$2000 WORTH OF NEW CAPABILITIES FOR YOUR COMMODORE 64™



FOR \$599*

The Spartan™ is the Apple™ II+ emulator for your Commodore 64™ that will open up a whole new world of hardware and software for you! Imagine adding these features to your Commodore 64™ for the Spartan™ price of \$599: Apple™ II+ hardware and software capabilities 64K RAM expansion four software selectable Commodore 64™ cartridge slots non-dedicated 8-bit parallel port standard audio cassette deck capabilities for your C-64™.

The suggested retail value of comparable products offering only these capabilities is over \$2200.00* — but the Spartan™ gives you much, much more! By building on your investment in your Commodore 64™ — an excellent introductory computer — you create a whole new system with both C-64™ and Apple™ II+ capabilities. There is a whole other world out there! The huge selection of Apple™ II+ hardware and software is now yours to explore! Call toll free for the Spartan™ dealer nearest you.



MIMIC

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

TO ORDER CALL:
1-800-MODULAR
(663-8527)

*All prices quoted are in U.S. funds, freight and taxes not included. Value of components equivalent to the Spartan™ system are quoted from Apple™ II+ CPU and Apple™ II+ single disk drive 1983 list prices, and from current suggested list prices and component specifications of other peripheral manufacturers. Commodore 64™ and Commodore logo are trademarks of Commodore Electronics Ltd. and/or Commodore Business Machines, Inc. Apple™ II+ is a trademark of Apple Computer Inc. Spartan™ is a trademark of Mimic Systems Inc. and has no association with Commodore Electronics or Apple Computer Inc. The Spartan™ is manufactured by Mimic Systems Inc. under license granted by ATG Electronics Inc. of Victoria, B.C. Canada.

Do you have a question or a problem? Have you discovered something that could help other Commodore 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. We regret that due to the volume of mail received, we cannot respond individually to programming questions.

Changing Grays

On my black and white television, my VIC displays black characters on a white screen, while the 64 shows white characters on a black screen. If I buy a 64, is there a way to change the screen to black characters on a white background?

A. R. Brink

On a color TV or monitor, you would see that the VIC's screen is white with blue characters and the 64 is blue with light blue characters. Your black-and-white television displays these colors as white, black, or shades of gray in between. A single POKE to 53281 will change the 64's screen to one of the 16 colors (numbered 0-15) available. For example, POKE 53281,1 changes the background to white. To change the character color, hold down either CTRL or the Commodore key and press one of the keys numbered 1-8. Another way to do the same thing is to POKE 646 with a number from 0-15.

Characters on the VIC screen can have any of the eight CTRL colors, black through yellow, but not the other eight.

Finding Public Domain Programs

Our user group would like to trade information and noncopyrighted programs with anyone who is interested. Can you give us some suggestions on starting a library of public domain programs?

Randolph Scott Zimmer

When a software author puts a program in the public domain, it means people can make copies for themselves or others. User groups often collect public domain programs and offer them at no charge to their members.

First, find a volunteer to be the club librarian. The best place to start in setting up a program library is with your group members. You may find quite a few who have written programs they're willing to share. Or you could sponsor a contest and award prizes to the best programs. Some members may have downloaded programs from a bulletin board system (BBS) or other online information services. You could also correspond with other user groups that have already built up libraries to see how they went about it, or offer to trade public domain disks and newsletter subscriptions with them. Some user groups put their newsletters in the public domain; you can reprint articles from these publications in your own newsletter.

Commodore's national user group coordinator, Pete Baczor, may be able to give you some guidance. He may be reached c/o Commodore Business Machines, 1200 Wilson Dr., West Chester, PA 19380.

The Toronto PET User Group (TPUG), probably the largest Commodore user group in the world, offers associate memberships, which allow groups to order inexpensive public domain software from its huge library. Annual dues for an associate membership are \$25. Write to TPUG, Inc. Membership Information, 101 Duncan Mill Rd., Suite G7, Don Mills, Ontario, Canada M3B 1Z3.

Program distribution among members can be handled in several different ways, depending on the size of the group. If your group is large enough to support its own BBS, members can call in and download programs, as well as upload programs that they wish to contribute. This will require some extra maintenance time for the system operator (sysop). Many groups ask members to bring blank formatted disks to meetings and have a copying session before or after the main meeting. Or the group could supply its own disks and prepare them before each scheduled meeting. Orders could be taken at each meeting for the next month's disks.

128 Compatibility Questions

I have some questions about the 128 and the 1571 disk drive. Will I be able to use single-sided disks with the new drive? Can I use my 1541 as a second drive without hardware or software changes? Does the 1571 work with a

64? I have heard that Commodore had some problems with the early 64s and 1541s and later upgraded them; should I wait until the bugs are worked out before buying a 128 or 1571?

Jeff Knott

You can use single-sided disks, disks containing 64 programs for example, with the 1571. Also, nearly all commercial software for the 64 works fine with the 1571. So far, we have found only one disk that does not load on the 1571 (it does load into 64 mode with a 1541). The problem seems to be the copy-protection method, and the software publisher is working on a new version that will load correctly.

You can use a 1541 and a 1571 at the same time, but they can't both be device number eight. There are two switches on the back of the 1571 that control the device number, and it's quite easily done. And the 1571 does work with a 64, but it won't be able to work at the faster speeds.

We haven't heard of any bugs or mechanical problems with the 1571. There is talk of a planned minor ROM revision for the 128, though. On the first versions, when the CAPS LOCK key is down, the letter Q displays an unshifted Q rather than the ball character (SHIFT-Q). Also, LOCATE and some other graphics commands work with +x and +y, but not -x and -y in the "relative to the pixel cursor" option. Neither of these is a serious problem.

Disk Storage

Is it OK to store disks in the box they came in or should they be kept apart? Does a disk containing programs emit any magnetic field that could affect other disks nearby?

R. Gumula

You shouldn't have any problems storing disks together in one box. There's no chance that a disk will scramble data on a neighboring disk.

Fading Away

On a game I am creating, I have an engine sound that is constant; it has to play all of the time. I tried it on the 64 and the sound gradually goes away. On my VIC, I could turn on a sound and it would play through the whole game.

Justin Luton

A new set of crayons for children of the computer age.

ColorMe nurtures creativity with child's play.

A child's imagination needs little more than tools and encouragement to flourish. That's why Mindscape created ColorMe: The Computer Coloring Kit.

Every child can shine with ColorMe. Kids from the age of four and up can compose pictures without previous artistic or computer

paste options using predrawn pictures.

ColorMe gives every artist room to grow.

With ColorMe, kids can draw, color, and print their own creations. Text can be integrated to create original stories. The room for creativity is limitless.

ColorMe Picture Disks make this

predrawn and ready to "cut and paste" for added color, excitement and fun.

You can even take the ColorMe Supply Box with adhesive-backed paper for stickers, colored papers, buttons, cards, envelopes, and a binder for original coloring books.



experience. The program disk can be used alone or with one or more optional picture disks for hours of freehand drawing and thousands of cut and

coloring kit extra special. Choose from Rainbow Brite™, Shirt Tales™, Hugga Bunch™, and TINK! TONK!™. These popular characters are

your software dealer for a demonstration. Then take home the fun.

ColorMe is available on: Apple® and Commodore®

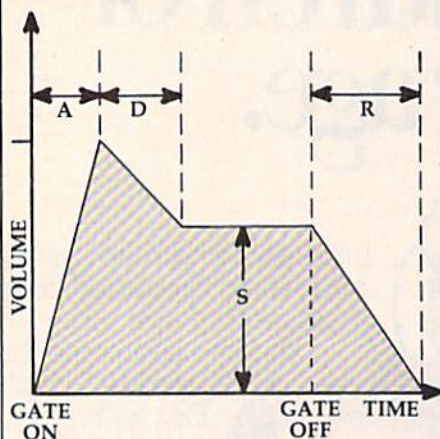
Mindscape
Software that challenges the mind.



Mindscape, Inc. 3444 Dundee Road, Northbrook, Illinois 60062
1-800-221-9884. (In Illinois 1-800-942-7315)

Copyright © 1985, Mindscape, Inc. All Rights Reserved. Apple and Commodore are registered trademarks of Apple Computer Inc. and Commodore Business Machines. Rainbow Brite, Shirt Tales and Hugga Bunch are trademarks of Hallmark Cards Inc. TINK! TONK! is a trademark of TINK TONK, INC. Mindscape is a trademark of Mindscape, Inc.

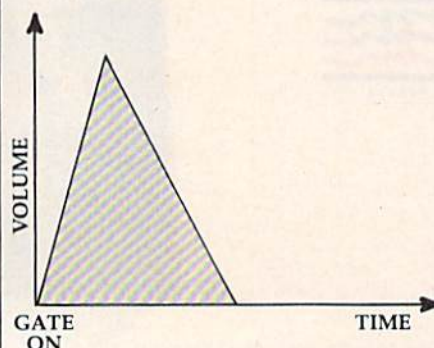
Sound on the Commodore 64 is made up of four parts: attack, decay, sustain, and release (the "ADSR envelope"). The gate bit of a voice controls when the sound is turned on and off. It helps to visualize the ADSR envelope:



When the gate is turned on, the attack begins—the sound gets louder. It increases in volume gradually or suddenly, depending on the number you POKEd into the attack/decay register. The larger the attack number, the longer it takes to reach the peak. The peak volume is the loudest the sound will be during the cycle; it's determined by the number you POKEd into the volume register. Next, the decay begins and the sound gets softer. The length of the decay varies according to the number in that register.

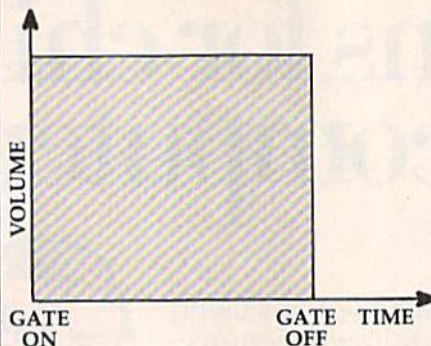
Here's where some people might get confused. Attack, decay, and release are all time periods—how long it takes to complete one phase of the ADSR envelope. Sustain is not a time, it's a volume level, a fraction of the peak volume. The sound you create will continue at the sustain level until you turn the gate bit off. Then the release phase begins and the note gradually (or suddenly) fades.

The key to solving your problem is the sustain value. An envelope with an attack five, decay five, and sustain zero looks like the figure below. The sound peaks and then goes away. A zero sustain means the note will level off at volume zero (no sound).



But if you set sustain at 15 (the maximum) and put zeros in attack, decay, and release, the envelope will act like the tone generator on the VIC. The attack and de-

cay end immediately, and sustain starts at 100 percent of the volume you selected. When the gate is turned off, the release period is zero and the note stops.



Listen To Disk Loads

For anyone interested in hearing "Turbo-Disk" (July) in action, all you have to do is POKe 54296,15 and turn up the volume. Each beep represents a disk block being loaded, although they go by too fast to be counted. There's a slight pause each time the read/write head moves to the next track and then the beeping resumes. You can also listen to a standard load (without TurboDisk), which is much slower.

Eric Fern

You've discovered something called crosstalk. It's similar to talking on the telephone and hearing snatches of another conversation. As you noted later in the letter, shielding the sound chip would prevent it from picking up signals from disk loads.

Playing Tag

I've been trying to make one character home in on another character on my VIC-20. I think it's called artificial intelligence. Could you explain how it works and maybe include a program?

Mike Baluch

Making one character chase another doesn't require anything as complex as artificial intelligence. It can be done with fairly simple math.

The screen of your VIC has 22 columns and 23 rows. The position of a character can be described by which column and row it occupies—the "x" and "y" coordinates. The top left corner is (0,0) and the bottom right is (21,22). (The same principle applies to 40 and 80 column screens of other Commodore computers.)

The hunter and prey characters each have their own x and y positions, which you would store in a variable. If you subtract the hunter's x-coordinate from the prey's, you'll get a number that tells you how the hunter should move. Say the prey is in column eight and the hunter is in column 15. Subtract to get a result of minus

seven. In general, any negative number means the hunter should move left (subtract one column) and a positive number means to move right (add one to the column). The same logic determines whether the hunter should move up or down.

The BASIC program below for the VIC and 64 uses the Kernal plot routine at location 65520 (on all Commodore computers) to place two shapes, an asterisk and a ball, on the screen. To use this routine, POKe 782 with the horizontal position and 781 with the vertical position; then SYS 65520.

On the Plus/4 and 16, eliminate the POKes in lines 200-210 and change the first SYS to SYS 65520,0,Y,X and the second to SYS 65520,0,B,A. On the 128, make the same changes and add BANK15 at the beginning of 200.

You move your character with the cursor keys. The ball follows closely behind and catches you if you stop. The SGN function in line 180 converts negative numbers to -1, positive numbers to +1, and leaves zero alone. This number is added to the hunter's current position to make it move up or down, left or right.

```

100 X1=10:Y1=10:A1=20:B1=10
110 PRINT "[CLR]"
120 A$=" ":B$=" ":X=OX:Y=OY:A=
    OA:B=OB:GOSUB200
130 A$="*":B$="Q":X=X1:Y=Y1:A=
    A1:B=B1:GOSUB200:OX=X1:OY=
    Y1:OA=A1:OB=B1
140 GETK$:IFK$=" [UP]" THENY1=Y1
    -1
150 IFK$=" [DOWN]" THENY1=Y1+1
160 IFK$=" [RIGHT]" THENX1=X1+1
170 IFK$=" [LEFT]" THENX1=X1-1
180 T=(T=0):IF(THEN A1=A1+SGN(X
    1-A1):B1=B1+SGN(Y1-B1)
190 FORA=1TO50:NEXT:GOTO120
200 POKe782,X:POKE781,Y:SYS655
    20:PRINTA$;
210 POKe782,A:POKE781,B:SYS655
    20:PRINTB$;:RETURN
  
```

New 128 Error Messages

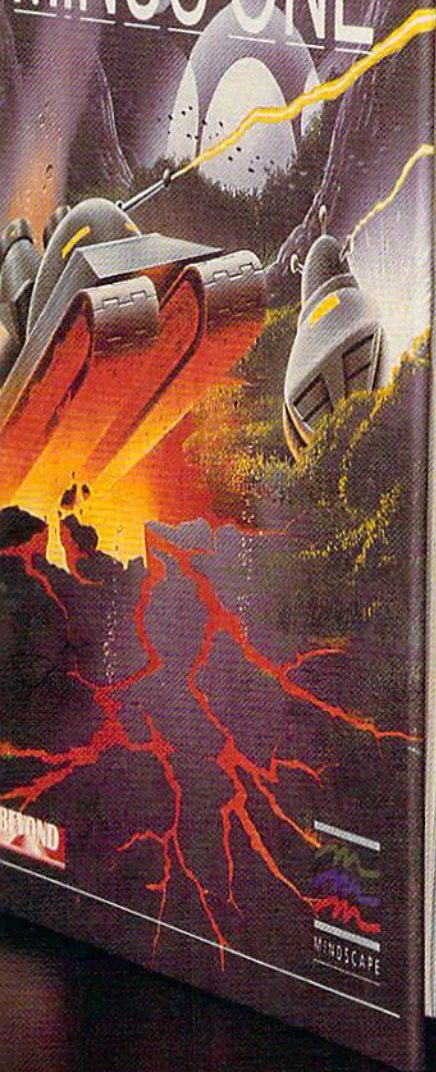
I just bought a Commodore 128 and have a question. If I try to draw a circle without the hi-res screen on, I get a NO GRAPHICS AREA error. I've seen Commodore 64 programs that draw a hi-res scene and then switch it on after it has been drawn. I am writing a game and want to display the instructions while the hi-res screen is being drawn, then enable the hi-res screen. Is this possible?

Phil Gaylord

You can draw on a hidden hi-res screen on the 128, Plus/4, and 16 if you establish a graphics area first. To do that, put the GRAPHIC command somewhere near the beginning of your program. The two statements GRAPHIC 1: GRAPHIC 0 are what you need. You might also want to clear the hi-res screen either with a SCNCLR or by adding a ,1 (GRAPHIC 1,1). The GRAPHIC 1 statement turns on

Stop the terrorist plot to trigger a massive earthquake in this undersea graphic adventure

QUAKE MINUS ONE



BEYOND



Command the super heroes in this graphic adventure

SHADOWFIRE



BEYOND



Defeat the evil Doomdark in this medieval graphic adventure

The LORDS OF MIDNIGHT



BEYOND



Shake, battle & role.

Warm up your Commodore* and get ready for full-screen graphic action.

Save the industrial world from going off the deep end of the Richter scale in *Quake Minus One*. Stop the terrorists from triggering a massive earthquake and toppling civilization.

In *Shadowfire*, Ambassador Kryxix has been kidnapped. You have but 100 real-time minutes to assemble a strike force of specialists and elite fighters to rescue him and then destroy the evil Zoff and his starship.

Embark on a quest to defeat Doomdark

in *The Lords of Midnight*. Choose your role. Capture the source of Doomdark's power or conquer his forces in battle. Over 32,000 different panoramas ensure a challenge.

Visit your software dealer. Ask to see the new Beyond Line from Mindscape. And discover graphics, adventure, excitement, and fun that's beyond belief.



Mindscape 
Software that challenges the mind.

Mindscape, Inc. 3444 Dundee Road, Northbrook, Illinois 60062 1-800-221-9884. (In Illinois 1-800-942-7315)

© 1985 Mindscape, Inc. All rights reserved. © 1985 Beyond. Licensed in conjunction with International Computer Group. Commodore is a trademark of Commodore Business Machines. Mindscape is a trademark of Mindscape, Inc.

the hi-res screen and sets up the graphics area. And GRAPHIC 0 sets the screen back to text. To turn the screen back on, add another GRAPHIC 1 later in the program.

One thing GRAPHIC does is carve out a protected area of memory for the hi-res screen. Try this simple experiment: Turn on your 128 and enter **PRINT FRE(0), FRE(1)** to see how much memory you have in banks zero and one. Now type **GRAPHIC 1: GRAPHIC 0** and then **PRINT FRE(0), FRE(1)** again. You should see that bank zero, where programs are stored, has 9K less memory than before. The hi-res screen needs 8K for the bitmap and 1K for color memory.

BASIC programs are normally stored at (hexadecimal) address \$1C00. Setting up a graphics area moves the beginning of BASIC up to \$4000, leaving room for the hi-res screen at \$2000-3FFF and color memory at \$1C00-1FFF.

Can You Strum A 64?

Is it possible to make the 64 sound like a guitar playing a chord? How can I duplicate an open D or open C chord?

Jeremy Baer

The 64's SID chip is capable of playing three voices simultaneously. You can't precisely duplicate the notes of the open guitar chords you mentioned because an open D requires four strings (notes) and an open C five. And even though the SID chip is capable of myriad sounds, it cannot truly simulate an acoustic string instrument like a guitar. Acoustic string instruments have a unique sound quality created by resonance (a sustaining or re-echoing quality caused by sound bouncing within the wooden body of a guitar, for example) and overtones (harmonic sound frequencies higher than the original frequency).

You can play three-note chords with the SID. A D chord contains a D, F#, and A, and a C chord contains a C, E, and G. You could program each voice to play one of these notes. And you can roughly simulate a strumming sound by very slightly staggering the time intervals between each of the notes played. Here's a short program that plays two chords (to select a chord, delete the REM C MAJOR or REM D MAJOR from one of the DATA statements). We've tried to get as close to an acoustic guitar sound as we could.

```
10 S=54272:FOR X=STOS+24:POKEX
,0:NEXT:IFPL=1THENFL=0:END
20 POKES+24,44:POKES+22,96:POK
ES+21,0:POKES+23,7:POKES+5,
0:POKES+6,247
30 POKES+12,0:POKES+13,247:POK
ES+19,0:POKES+20,247:POKES+
4,16
40 POKES+11,16:POKES+18,16:R=5
4266:FORX=1TO3:R=R+7:READHF
,LF:POKER,HF
50 POKER-1,LF:POKER+3,17:FORD=
```

```
1TO150:NEXT:NEXT:FORX=12TO2
STEP-1
60 POKES+24,X+32:FORD=1TO100:N
EXT:NEXT:POKES+24,33:FORY=1
TO20:NEXT
70 POKES+24,32:FL=1:GOTO10
100 REM C MAJOR DATA 16,195,25
,30,42,62
110 REM D MAJOR DATA 18,209,28
,49,47,107
```

Get Rid Of READY

I recently purchased an SG-10 printer with a G-Wiz interface. It works great, but I wonder if you can tell me how I can get rid of that "READY." that always appears when it's through printing.

Luis A. Mata

The commands for listing a program to the printer are **OPEN 4,4: CMD 4: LIST**. If you prefer upper/lowercase listings, change the first statement to **OPEN 4,4,7**. Either way, when it's finished, enter **PRINT#4: CLOSE 4**.

The reason the READY prompt appears is fairly simple. OPEN paves the way for communications to the printer. Usually LIST or PRINT sends characters to the screen, but CMD reroutes all output to the previously opened channel to the printer. When you list a program to the screen, the READY prompt always follows the listing (BASIC treats READY as an error message that means there have been no errors). So when CMD diverts the listing to the printer, it also diverts the prompt.

Don't blame the printer or the interface, blame BASIC. The solution is to alter the way BASIC works. The following program—for the 64 only—changes the error vector so it won't print READY (error messages are disabled as well). After loading and running this program, enter SYS 828 to turn off the prompt and SYS 828 to turn it back on again.

```
10 FORA=828TO853:READB:POKEA,B
:NEXT:PRINT"{CLR}SYS 828 TO
TOGGLE"
20 DATA 162,131,160,164,173,85
,3,73,1,141,85,3,208,4,162,
139,160,227,142,0
30 DATA 3,140,1,3,96,0
```

Translating Other Dialects Of BASIC

In many books about printers I've seen the term LPRINT. What does this mean and how can I use it in my programs?

Scott Petoff

Some versions of BASIC include the usual PRINT statement for displaying text on the screen as well as a separate LPRINT statement for sending text to a printer. Printers are sometimes called "line printers," hence the origin of the term LPRINT.

There's no single command like LPRINT in Commodore BASICs, though, so you can't use it in your own programs.

To send a line to a printer, you must first open a channel to the printer and then PRINT# the line to it:

```
10 OPEN 1,4,7
20 PRINT"THIS LINE GOES TO THE
SCREEN"
30 PRINT#1,"BUT THIS ONE ENDS UP
AT THE PRINTER"
40 PRINT#1:CLOSE 1
```

The three numbers after OPEN are the logical file number, the device number, and the secondary address. The logical file number can be any integer up to 127 and is used after the PRINT# statement to identify which peripheral should receive the information. Commodore printers are usually device number four, and the secondary address of seven means the characters will be printed in upper- and lowercase rather than uppercase and graphics. To print graphics characters, change the secondary address from seven to zero, or just leave it off (OPEN 1,4).

PRINT# can send data to tape or disk files, modems, or printers, making it more versatile than LPRINT, which is limited to printers.

Hidden Commands

I purchased a Commodore 128 a couple of weeks ago and was quite anxious to run some programs on it, so I picked your program "Litter Patrol." I received a SYNTAX ERROR in line 510 because I began the line without spaces, like this: **IFHTANDC=215**. Is the 128 more sensitive to spacing?

Kenneth H. Smith

Your 128 isn't more sensitive; that line would cause trouble on a VIC, 64, Plus/4, or 16. The problem is that you've accidentally placed a hidden command in the line. TAN is a BASIC function that figures out the tangent of an angle. The computer interprets HT ANDC correctly, but sees HTANDC as containing the keyword TAN. This type of problem is often difficult to detect because the line looks correct.

BASIC programs are stored in memory in tokenized form. Each keyword (PRINT, POKE, etc.) is turned into a one or two byte token before it's put into memory. Tokenizing has two advantages. First, a great deal of memory is saved—instead of five bytes for the five letters P-R-I-N-T, only one is needed. Second, when a program is executing, it's much faster for the BASIC interpreter to find one or two byte tokens than it is to find whole keywords.

As soon as you press the RETURN key, the line is tokenized. All keywords are changed to their corresponding tokens and any non keyword data is stored as ASCII text.

Since TAN comes before AND in that line from "Litter Patrol," it is tokenized first. The solution is to break up the line with a space between the T and A.

Here are a couple more examples of

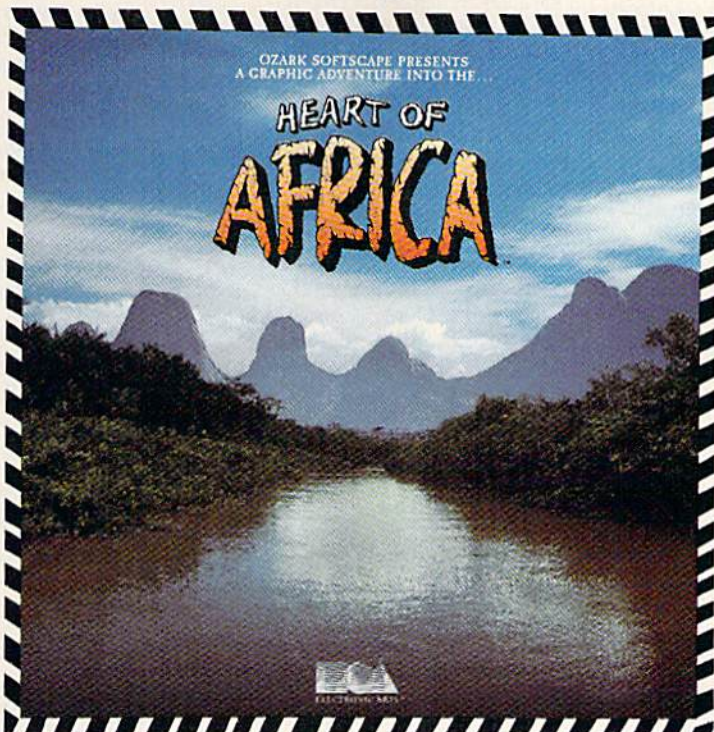
(Hi. I'm from Baltimore. Where's the pharaoh?)

A sequel to the
Award-Winning
Seven Cities
of Gold.

Africa, 1890

Up that river lies
the African
Adventure of your
imagination.

The mysterious Dark
Continent. Where the
mighty Kilimanjaro
towers over the Source
of the Nile. Where the
Congo snakes through
steaming jungles and the
scorching Sahara sun
bleaches men's bones.
Africa. Where legends
of secret treasure drive
men mad with desire.
And where an adventurer
can still find glory and
gold...or a lonely death
far from home.



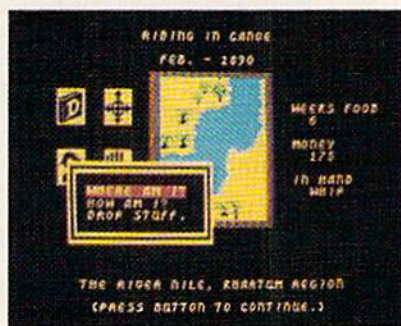
You have inherited
a madman's diary
... and his dream to
find the tomb of
an ancient pharaoh.

Ancient songs still sung
by tribal historians contain
clues to the hidden tomb
of a fabulously wealthy
pharaoh. The madman's
last feverish words drive
you onward: "I now know
it does exist. I am so
close, but so near death.
If you hear no more from
me, then warn those that
follow: this is not a journey
for the weak of spirit
or dull of mind. Come
prepared."—H. Primm,
May 21, 1889



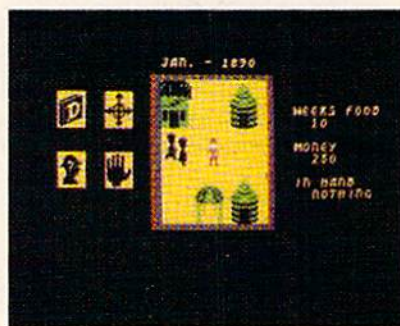
A Living Map of Africa

11 million square miles stuffed into your computer. Navigate 17 rivers. Hack through jungle and swamp. Sail to ten cities. Learn the ways of 22 tribes. Explore savannah, deserts and mountains. It's all geographically accurate.



Follow Your Dreams

Set your course and go for it. The computer automatically maps your progress and keeps your journal. If you get lost, it can tell you "The River Nile." What it won't say is "about to get sucked over the Kabelega Falls."



Decipher Native Clues

Local myths will help, if you can get the natives to talk. Enter their huts. Learn their customs. Pass out some bribes. The chief might tell you, "Look where the sun rises over the Childless Waters." Now try to figure it out.



ELECTRONIC ARTS™

Specifications: Available now for Commodore 64 & 128. Infinitely playable because the computer hides the tomb and treasure in new places each time you start. **How to order:** Visit your retailer or call 800-227-6703 for direct VISA or MasterCard orders (in CA call 800-632-7979). The direct price is \$32.95. To buy by mail, send check or money order to Electronic Arts, P.O. Box 306, Half Moon Bay, CA 94019. Add \$4 for shipping and handling. Allow 3-4 weeks for delivery. All E.A. products purchased direct have a 14-day "satisfaction or your money back" guarantee. For a complete catalog, send 50¢ and a self-addressed envelope to Electronic Arts, 2755 Campus Dr., San Mateo CA 94403.

embedded keywords: **HEADER**"DISK 1", **IF1** contains **IF**, which confuses **BASIC**, and **B=TOR127** contains **TO** (as in **FOR J=1 TO 5**).

Emulating BSAVE

How do you save a section of memory to disk as a program file?

Steve Lefcort

Saving a section of memory can be useful for many things. Text screens, hi-res screens, sprite data, machine language, and character sets can all be saved to disk or tape and later loaded by another program.

Many computers have a command to save a section of memory (the Commodore 128 uses the command **BSAVE**). The 64 does not have such a command in **BASIC**. But you can use the following short **ML** program which emulates **BSAVE**:

```
10 FORA=705TO761:READB:POKEA,B
   :C=C+B:NEXT:IFC<>7580THEN
   PRINT"DATA ERROR"
20 DATA 32,253,174,32,158,173,
   32,130,183,166
30 DATA 34,164,35,32,189,255,3
   2,155,183,169
40 DATA 2,168,32,186,255,32,24
   1,2,165,20
50 DATA 133,251,165,21,133,252
   ,32,241,2,166
60 DATA 20,164,21,169,251,76,2
   16,255,32,253
70 DATA 174,32,158,173,76,247,
   183
```

To save a section of memory type:

```
SYS 705,"filename",device number,start
address,end address + 1
```

For example, the text screen could be saved to disk with **SYS 705,"SCREEN",8,1024,2025**. This saves screen memory only; you'd have to handle color memory separately. The screen could then be loaded from a program with the following lines:

```
10 IF A=1 THEN 30
20 A=1:LOAD "SCREEN",8,1
30 REM REST OF PROGRAM
```

Pushing And POKing

How do you put a character in the very bottom right corner of the screen?

Ryan Wilhm

Whenever something is printed on the screen, the cursor moves to the next position on the screen. So when the cursor is at the last column on the bottom line, printing makes the screen scroll up to make room for more characters. Most of the time this is an advantage, but when you want to create a title screen with a border, this feature can be very annoying.

There are a couple of ways to solve the problem and put a character in the corner. Probably the easiest way is to **POKE** this location with the character you want. Look at the screen and color maps in

one of the appendices of the book that came with your computer. On the 64 and 128 (40-column mode), you would **POKE 2024,1** to put the letter **A** in the corner. Note that you must use screen codes (also listed in an appendix) and not **ASCII** codes when **POKEing** to the screen.

Another way to put a letter on the screen at that location is by inserting a character. Whenever a character is inserted, the characters to the right are pushed to the right. The general idea is to print the corner character at the second to the last position, cursor left, and then push it into the corner with the shifted **INST/DEL** key. This program illustrates this method.

```
10 PRINT "{CLR}";:FORA=1TO24:FOR
   RB=1TO40:PRINT"*";:NEXT:N
   EXT
20 FORA=1TO39:PRINT"*";:NEXT:P
   RINT"{LEFT}{INST}*";
30 GOTO 30
```

On the 128, Plus/4, and 16, it's possible to turn off screen scrolling altogether. In direct mode, press the **ESCAPE** key and then **"M"** to turn scrolling off, and **ESCAPE L** to turn it back on. **ESCAPE** has the **ASCII** code 27, so within a program you would **PRINT CHR\$(27);"M"** to turn off scrolling. One more way to do it is **POKE 248,255** (**POKE 2025,255** on the Plus/4 and 16). To enable scrolling **POKE 248,0** (**POKE 2025,0** on the Plus/4 and 16).

128 Calculator Mode

I have a numeric keypad that plugs into my 64. I use it to enter programs with a lot of **DATA** statements by programming one key (the period) to type **DATA** and redefining the plus key as a comma. But the program that does this on the 64 will not work on my new 128. Any suggestions?

Donnie D. Shanholtz

You could load the program into the 128 and disassemble it with the built-in monitor, but it might take a long time to rewrite it. Here's a better suggestion:

The 128 already has a built in numeric keypad and the function keys directly above it are redefinable. To make it easier to type in **DATA** statements, define one function key to print a comma and one for the word **DATA** with **KEY 1,""** and **KEY 3,"DATA"**. The same idea can turn your 128 into a calculator. Define one key as **PRINT**, and define two others as ***** and **/** (for multiplying and dividing).

Sound Effects For PRINT

A while back, you had a program that slows down printing, like the Apple's **SPEED** command. You suggested that readers who know machine language could add a clicking sound, to make it

sound like a typewriter. Well, I don't know machine language. Would you please write it for me?

Masoud Keshmiri

The following program adds both clicking and speed control to anything that's **PRINTed** on the 64. It's a short machine language program that goes into the cassette buffer. After typing **RUN**, you can control the speed at which characters are printed by **POKEing** location 2. The higher the number, the slower the printing. For the fastest printing, **POKE 2,1**. For extremely slow printing, **POKE 2,255**. To make it sound even more like a typewriter, have your own program change printing speeds now and then, maybe every word or two.

```
10 FORA=828TO898:READB:POKEA,B
   :NEXT:SYS828:POKE2,40:LIST
20 DATA 120,169,93,141,38,3,16
   9,3,141,39
30 DATA 3,169,0,160,23,153,0,2
   12,136,16
40 DATA 250,169,15,141,24,212,
   169,1,141,5
50 DATA 212,88,96,72,138,72,15
   2,72,166,2
60 DATA 160,0,136,208,253,202,
   208,250,169,10
70 DATA 141,1,212,169,32,141,4
   .212,169,33,141
   TA 4,212,104,168,104,170,
   34,76,202,241
```

Scratching The Unscratchable

How do I delete a disk file that I've named **"**"** by mistake? If I follow the normal procedure, the entire disk will be scratched. It cannot be renamed either.

Moshe Politis

The asterisk is a wildcard, so using **OPEN 15,8,15,"S0:*"** would indeed scratch every file on the disk. (This is one technique for quickly clearing everything from a disk. Another is to reformat the disk without the two-letter ID.)

The way to scratch the asterisk file is to use the other wildcard, the question mark. **OPEN 15,8,15,"S0:?"** will scratch every file with a one-letter name. If you have other one-letter files you wish to keep, rename them with a longer name (two or more characters) before the scratch.

Organizing Files

My reference books don't explain how to use index files with relative files. Could you shed some light on the subject?

George Trout

Relative files are superior to sequential files in some applications because they give you random access to records. To read record 50, for example, you would position the disk pointer and then **GET** or

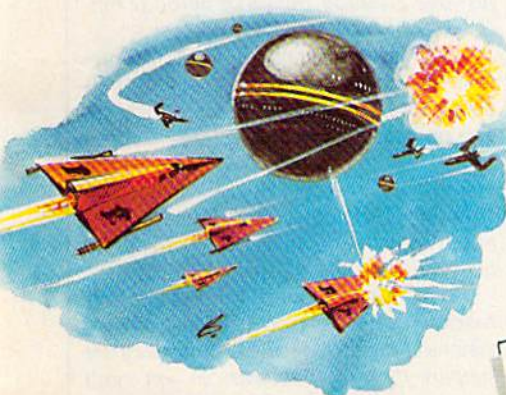
Get more out of your Commodore with

COMPUTE!'s GAZETTETM

CC

FOR COMMODORE PERSONAL COMPUTER USERS

More fun



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.

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.

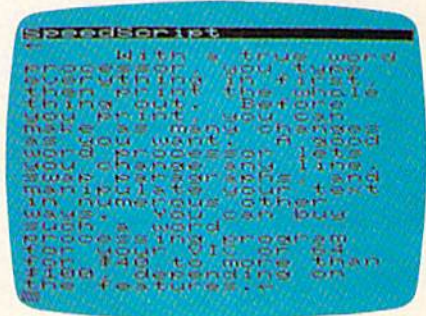
More challenge

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!



More programs

Programs to help you balance your checkbook, store your addresses, keep tax records, manage your personal business. You can create your own programs and games, improve your word processing, spreadsheets, and data base management, load and run faster with 64 Searcher, VIC/64 Program Lifesaver,



Quickfind, Word Hunt, Disk Menu, VIC Timepiece, The Automatic Proofreader and more.



More buying guidance

You'll profit from comprehensive reviews of everything from data-quality cassette tapes to software to graphics plotters and modems. Virtually anything that's compatible with your Commodore is reported on in *COMPUTE!'s Gazette*. With this kind of expert help, every computer purchase you make can be the right one!

Order now

All you do is mail the postpaid card bound into this issue. But don't delay! Subscribe now to start receiving every issue of *COMPUTE!'s Gazette*.

For Faster Service
Call Toll-Free
1-800-346-6767

INPUT the information there. With a sequential file, you'd have to read all of the 49 previous records before reaching the 50th record.

To alphabetize or otherwise sort a relative file, you could read all the records into memory, organize them, and then write them all back to disk in alphabetical order. But sorting that way uses up a lot of memory. It also takes a long time to read the entire file and then write it back to disk. An index file is often a faster way to handle sorting.

As a simple illustration, imagine that you've put four customer records into a relative file:

1. Smith, shirt, \$10
2. Jones, shirt, \$12
3. Farley, shoelaces, \$5
4. Olson, belt, \$20

Each record contains three fields: name, item purchased, and price paid. To create an alphabetical list of customer names, you would initially read all the names into a string array and create a numeric array of pointers to the string array:

	Before Sort	After Sort
A(1)	1	3
A(2)	2	2
A(3)	3	4
A(4)	4	1

The relative file remains scrambled, with Smith, Jones, Farley, and Olson—in that order. But the array holds the index numbers for the sorted list: 3 (Farley), 2 (Jones), 4 (Olson), and 1 (Smith). The four numbers 3, 2, 4, and 1 would then be written to a sequential file. You could create several index files, one for alphabetizing names, one for the subfile of people who have bought shirts, and so on.

This may seem to be a lot of extra work, but it pays off when you're working with large files. Say you've got a list of 1000 names in a relative file and an index file, with 1000 pointers to the records in the relative file. Now you add a new record (number 1001) to the relative file. To update the index file, read the index numbers into an array and do a binary search.

Find the 500th number on the list—the middle of the alphabetized list. Let's say A(500) is 321 and that record #321 in the relative file is a customer named "Lyons." If the new record is "Stanley" you know that, alphabetically, the new record is in the second half of the list. With one comparison, you've eliminated half the list. It's not necessary to read through the entire list, you just divide the list in half a few times and decide if the name there is too low or too high. (For more on this method, see "Quick Search" in "Hints & Tips," July 1985.)

After about ten comparisons, you might discover that customer 1001 (Stanley) belongs between 731 and 732 on the alphabetical index list. So, you have to

move items 732-1000 up a notch in the array: FOR J=1001 TO 732 STEP -1: A(J)=A(J-1): NEXT. Then A(732)=1001 wraps things up.

PRINT In Machine Language

What's the best way to display a large amount of text, like instructions to a game, in machine language? I would think there would be an easier way than loading a number for each letter and storing it.

David DeHaai

There are several ways to display strings to the screen in a machine language program. As you noted, loading a register with a screen code and storing to screen memory is one, but remember that you have to store to color memory as well. You can also load the accumulator with the ASCII value of a character and JSR \$FFD2 (the Kernal routine for outputting a character). For long strings, you could use a loop like this:

```
C000 LDY #S00
C002 LDA $C400,Y
C005 JSR $FFD2
C008 INY
C009 CMP #S00
C00B BNE $C002
C00D RTS
```

Put the ASCII values of the characters into memory starting at location \$C400 and insert a 0 right after the message. The Y register is both a counter for the loop and an index to the table.

Here's one more ML solution. Frequently when you want to do something that BASIC does very well (like PRINT), it's convenient to use the routine built into BASIC. The STROUT (STRing OUT) routine can be found at these locations:

Commodore 64	\$AB1E	43806
VIC 20	\$CB1E	51998
Plus 4/16	\$9088	37000

Put the text string that you want printed into memory. The string can contain up to 254 characters and must end with a 0. Next, load the accumulator with the low byte of the address of the text string and the Y register with the high byte. Then call the routine with a JSR instruction. This routine can print any of the ASCII characters, including control codes like color changes or cursor controls.

Future Expansion

I've got a question concerning the use of the unimplemented 6502 opcodes in machine language programming. Exactly what do these opcodes do when they are encountered in a program? Does the microprocessor carry out an instruction? I would like to know if anyone has published a list of these opcodes.

Dennis Wilson

The machine language section of the Programmer's Reference Guide calls some operation codes (opcodes) "Future Expansion," which means they're currently undefined, but may be defined sometime in the future. Nevertheless, if you include them in an ML program, the unimplemented opcodes actually work as instructions.

When a chip like the 6502 or 6510 fetches an instruction from a machine language program, it keeps track of where it is with an internal register called the program counter (PC). If the PC points to 49152, the number held in 49152 is fed into the processor as an opcode, an instruction to perform an operation. The eight bits of the number trigger switches inside the chip. Similar instructions have similar binary numbers: STA absolute has the opcode \$8D, while STA absolute indexed by X is \$9D. There's a difference of a single bit. Likewise, STX absolute is \$8E, just one bit away from STA absolute (opcode \$8D).

The unimplemented opcodes, sometimes called quasi-ops, follow similar patterns, based on which bits are on or off. The number \$8F, for example, performs a logical AND of the Accumulator and X register and then stores the result in an absolute (two byte) address. In most cases, quasi-ops make the processor try to do two instructions simultaneously.

The problem with using these opcodes within a program is that newer revisions of the 6502 family of chips may not support these instructions, so you can't depend on them working in future computers. Also, most aren't very useful. It's not likely that someone would need an instruction that ORs the accumulator with the number \$EE, ANDs the result with another number, and transfers the result to the X register.

Quasi-ops are sometimes used by software companies as a means of software protection, since standard disassemblers will not translate these instructions properly. A comprehensive list of the unimplemented opcodes is contained in the appendices of Programming the VIC and Programming the 64 (both available from COMPUTE! Books).

COMPUTE!'s Gazette is looking for utilities, games, applications educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it, on tape or disk to: **Submissions Reviewer, COMPUTE! Publications, P.O. Box 5406, Greensboro, NC 27403.** Please enclose an SASE if you wish to have the materials returned. Articles are reviewed within four weeks of submission.

"... as innovative in form as it is in content. If they're all as good as *Mindwheel*, we have a lot to look forward to."
—GAMES

"Technically and artistically, it represents the 'wave of the present' in interactive fiction."
—QUESTBUSTERS

"... blazes a whole new frontier in computer game design."
—COMPUTER GAMING WORLD

ELECTRONIC NOVELS™

Mindwheel, *Essex* and *Brimstone*. Fascinating stories, compelling characters, intriguing ideas, rich language, a maelstrom of constant change—all the elements of the best Sci-Fi and fantasy. Combined with the interactive possibilities you've always wanted in a great text adventure.

Electronic Novels are written by prize-winning published authors. They're not "computer versions" of existing novels—they're stories conceived especially for this new medium.

In the world of Electronic Novels, you have a lot more to do than "Go south" and "Kill dragon." You'll find that each character has a mind of his own, and nothing stays the same for long because everything happens in real time. So just because that room was empty the last time you entered it, don't expect it to be empty this time. Everything you do—or fail to do—affects everything else that happens. The surprises never end.

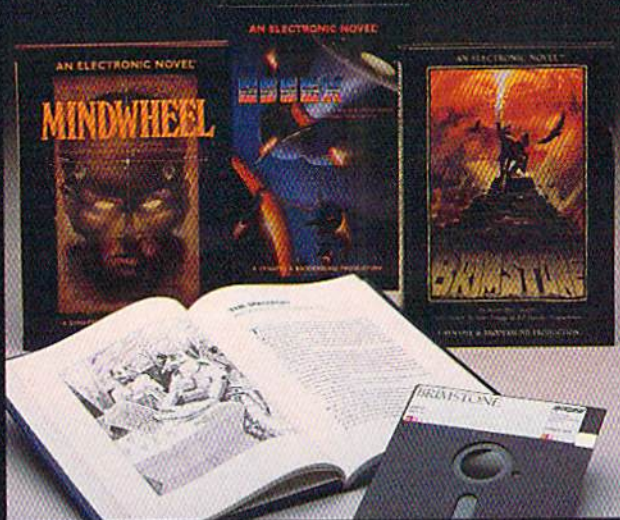
MINDWHEEL
Every mind that has ever been continues to exist for eternity. Somewhere in this web of mental energy is the key to civilization's

survival. You are the adventurer who must travel through four unusually powerful minds in search of the mysterious Wheel of Wisdom.

ESSEX
You're the captain of the Starship *Essex*, on a desperate intergalactic rescue mission. Even before you face the deadly *Hamster People* and the vile *Vollchions*, you've got your own crew to deal with—as unlikely a bunch of misfits as ever sailed the *Sirus* sector.

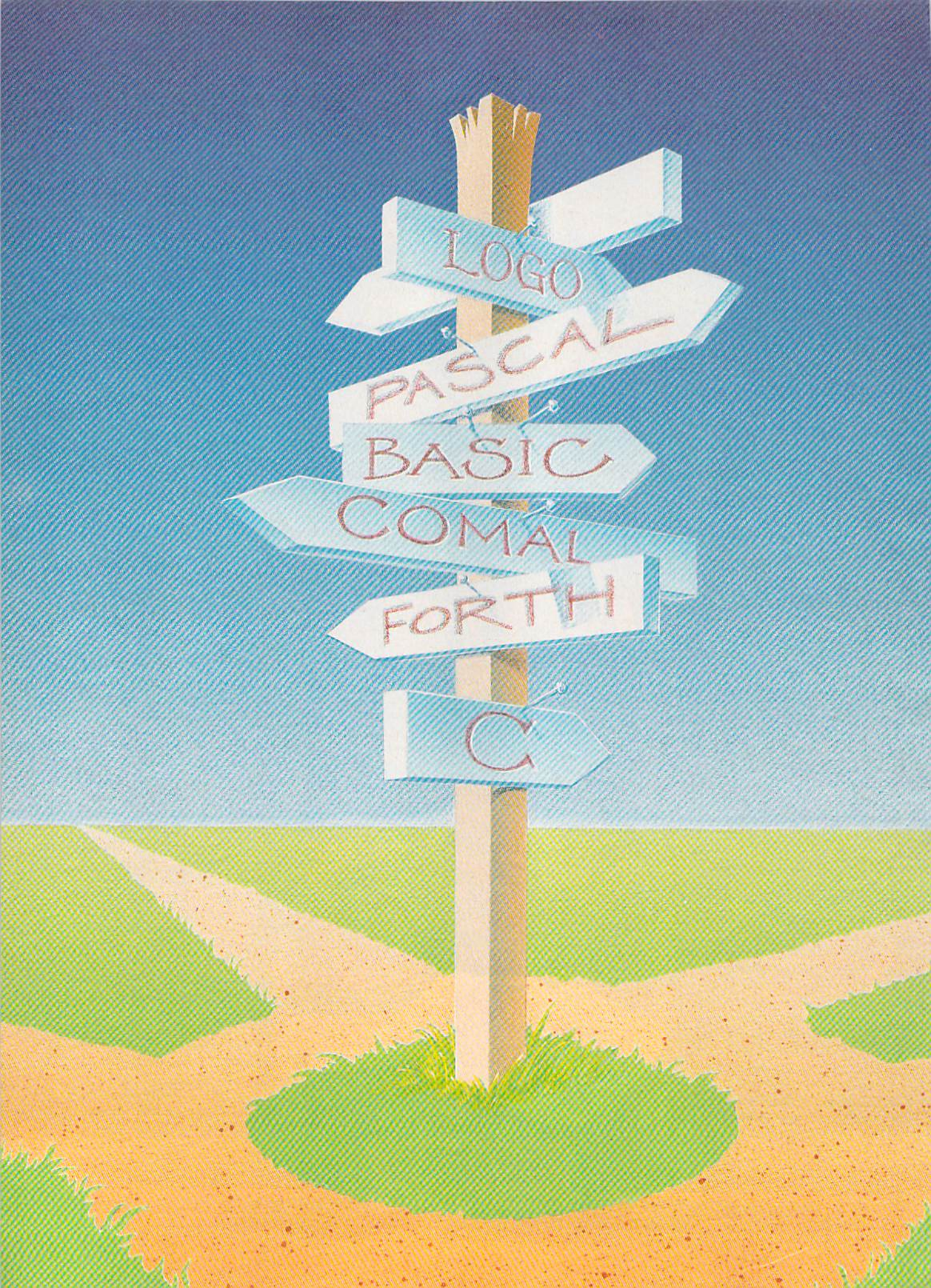
BRIMSTONE
You play the part of Sir Gawain, proud Knight of the Round Table, in a mystical quest for truth, chivalry, and a little peace and quiet. All you've got to contend with is the entire Underworld and every monster, ghost and demon known to medieval sorcery.

BEGIN WITH A BOOK
Set the stage and introduce yourself to the characters with the graphic, hardbound book included with each program. Just when things start getting good, you'll switch to your computer—and now, you're at the center of the action!



Synapse

A BRÖDERBUND SOFTWARE COMPANY



LOGO

PASCAL

BASIC

COMAL

FORTH

C

The Commodore 64's Other Languages

Selby Bateman, Features Editor

One of your first discoveries as a Commodore 64 owner is the presence of a programming language called BASIC built into your computer. Each time you turn on the system, BASIC is ready to go—an easy to use, general-purpose programming language. But BASIC is not the only programming path for your Commodore, and often it's not the most efficient. For a few extra dollars, you'll find plenty of other languages that do a lot of things differently—and often, very well.

What's a sure way to start an argument? Try criticizing a computer programmer's favorite language.

Logo, C, Forth, Pascal, COMAL, PROMAL, and a handful of other programming languages for your Commodore 64 all have their own cheering sections and their critics. Each of these languages represents to one degree or another a step away from the native tongue of your computer—*machine language*, a binary-based language of ones and zeros—and toward a more English-like

New toll free number:
1-800-541-1541



KEYMASTER

The easiest-to-use, most-powerful disk backup program ever written for the 64.

With one 1541 drive:

- **FAST FILE COPIER** — up to 5 times faster!
- **FAST full protected** — disk GCR nibble copier
- **FAST full unprotected** — disk copier
- **KEYMASTER protected** — disk unlocking kit**
- **FAST 10 second disk formatter**

With two 1541 drives (NO disk swapping required during copying):

- **FAST file copier** — up to 6 times faster!
- **FAST full protected** — disk GCR nibble copier
- **FAST full unprotected** — disk copier
- **KEYMASTER** unlocks protected disks by **ELIMINATING** the protection scheme originally written on the disk.
- Once one of **KEYMASTER's KEYS** has unlocked a disk, the program can generally be **FILE COPIED** onto another disk (also making the program compatible with non-1541 drives). If it is not file copyable, it can be fast nibble copied.
- **50 KEYS** for popular programs will be provided on the first **KEYMASTER** disk.
- Frequent updates of 25 to 50 additional **KEYS** will be available (no original disk return required for updates!).

ALL OF THIS AT THE RIGHT PRICE! ONLY —

\$29.95 for **KEYMASTER**

\$10.00 for update disks

KEYMASTER created by Jim Drew.

New toll free number:
1-800-541-1541



MAGNUM LOAD BLOWS THE OTHERS AWAY!

ATTENTION 1541 AND MSD OWNERS!

- **MAGNUM LOAD** will **LOAD** and **VERIFY** programs up to **6 TIMES FASTER** than before. It is a new replacement **KERNAL** (operating system) ROM chip for your Commodore 64 or 128 computer.
- A high speed loader, high-speed verify, disk drive no head-rattle routine (1541 drive) and a **BASIC UNNEW ROUTINE** (MSD drive) have replaced the Datassette tape routines.
- The first program on a disk may be loaded and run by pressing only two keys (SHIFT/RUN).
- Unlike the older, cartridge-style fast loaders, no ports are tied up at the rear of your computer, the screen is not blanked during loading and there is no wear-and-tear on the game port.
- For maximum convenience and performance, **MAGNUM LOAD** is installed **DIRECTLY** in the circuit board. Generally, a socket has already been provided to make the operation easy, but occasionally some soldering may be required.
- Now you can give your 1541 disk drive, 1571 speed!

The chart below compares **ACTUAL MEASURED** loading times

PROGRAM	STAR DOS	REGULAR LOAD	MACH 5	FAST LOAD	MAGNUM LOAD
Pitstop II (EPYX)	?	144 sec	43 sec	41 sec	31 sec
Music Shop (BRODERBUND)	?	105 sec	105 sec*	105 sec*	21 sec
Hitchhiker's Guide to the Galaxy (INFOCOM)	?	70 sec	70 sec*	**	68 sec*
Off-field Football (GAMESTAR)	?	159 sec	66 sec	63 sec	56 sec
EASY FINANCE (COMMODORE)	?	58 sec	13 sec	13 sec	11 sec

* = Will not fast load — defaulted back to regular load.

** = Failed to load at all.

FIVE VERSIONS OF **MAGNUM LOAD** ARE AVAILABLE TO FIT ANY NEED.

VERSION	APPLICATION	PRICE
A	C64 computer and one 1541 drive	\$24.95
B	C64 and one MSD drive (single or dual)	\$24.95
C	C64, one 1541 drive AND one MSD drive (switchable)	\$29.95
D	C128 computer and one 1541 drive***	\$24.95
E	C128 and one MSD drive (single or dual)***	\$24.95

*** = Fully compatible with 128 & CP/M modes. Cartridge versions MUST be UNPLUGGED to access 128 & CP/M modes!

ORDER THE VERSION YOU NEED NOW!

MAGNUM LOAD created by Jim Drew.

C64, C128, 1541, 1571 and Datassette TM Commodore, MSD TM Micro Systems Development, MACH 5 TM ACCESS, FAST LOAD TM EPYX, STAR DOS TM Star Point

NEW
TOLL-FREE PHONE
1-800-541-1541

Shadow is a new and revolutionary way to back up your most protected software. It encompasses all the latest advances in software, as well as a highly sophisticated piece of hardware. This is absolutely the best utility available today. You may not even need updates, but if you do, the Shadow's unique design allows for updates to be available for a nominal fee.

INTRODUCTORY OFFER **\$89.95**

THE
SHADOW
KNOWS

HACKER PACKAGE **\$39.95**

INTRODUCTORY OFFER

Shadow a disk while it loads, then read an exact list of:

- Track, sector, ID, check sum, drive status
- High and low track limits
- Density use on each track
- Half tracks that are used
- Command recorder shows exact commands that were sent to the 1541 while program was loading
- RAM recorder records custom DOS

Shadow-scan any disk, then read exact list of:

- Valid tracks, half tracks, partial tracks and segments
- Sync mark links, header block links, and data block links
- Track to track synchronization

Exclusive snap shot recorder will give you an exact copy of the 1541 RAM and can be viewed, saved or printed. Plus many more features included.

GT PACKAGE **\$39.95**

INTRODUCTORY OFFER

Highly sophisticated and integrated piece of hardware that turns your 1541 into something you've always wanted.

- Track and sector display
- Drive reset switch
- Device number change
- Half track indicator
- Abnormal bit density indicator
- Shadow on-off indicator

The Shadow display will give you an accurate display of precisely what track you are accessing during a normal load even if the program does a read past track 35.



Order by phone 24 hrs./7 days or send cashier's check/money order payable to Megasoftware. Visa, MasterCard include card # and exp. date. Add \$3.50 shipping/handling for continental U.S., \$5.50 for UPS air. CODs add \$7.50, Canada add \$10.00. Other foreign orders add \$15.00 and remit certified U.S. funds only. Distributors invited and supported.

MegaSoft
LTD

P.O. Box 1080 Battle Ground, Washington 98604 1-800-541-1541

language easier for people to use. Look at a few testimonials:

"Logo is the most misunderstood language in the history of programming," says author and teacher David Thornburg. "Logo is based on Lisp, the premiere language of researchers in artificial intelligence, and it has all of the capabilities of that language."

"(The C language)...is transportable, and that's one of the reasons it's so popular. It produces very efficient code. Things that you couldn't do with BASIC, you *can* do with C and not have to resort to machine language," says Arnie Lee, president of Abacus Software, which markets *Super C*, among other languages for the 64.

"(Forth) is a language that's optimized for high performance, for programs that need to be especially quick or small," says Martin Tracy, president of MicroMotion and author of *Mastering Forth*. "It's really a developer's language. The novice can rapidly learn it, but it's not as natural as other languages."

"By using COMAL, you get what BASIC should have had; you get the structures that are very useful, and you get a turtle graphics system that you would have bought Logo for—all in one system," says Len Lindsay, president of the COMAL Users Group USA.

"(PROMAL) is the most powerful and innovative programming language and development system available for the Commodore 64," says John R. Segner, president of SMA, creators of PROMAL.

Can all of these endorsements be correct? Is there a *best* language, or are they all equally good?

The answer to that has to do with two general principles which programmers soon learn: What's considered the best programming language depends on what you're trying to program and your own personal programming style. Some languages are better at producing fast-action arcade-type games with colorful graphics, sprites, and music. Other languages may be more appropriate for educational programs and teaching purposes. Still others may be better equipped to handle payroll systems, inventory programs, and related business software. And some programmers

For every
programming
language, you'll
find supporters
who would never
use anything else.

prefer a very structured programming environment, such as Pascal, while others like the flexibility of a less structured language. Both factors have a great deal to do with the popularity of a programming language.

So there's no single best language; some are just better, or more appropriate, for certain types of programs or programming styles. An important consideration in some cases is the time it takes a program to run versus the time it takes to write the program. Certain *benchmark* tests do show measurable differences among languages, usually based on speed and efficiency of operation. But there's a tradeoff; speeding up a program often means spending more time working on it.

For every programming language, you'll find supporters who would never use anything else. There are even user groups for most of the major languages, some with thousands of members. Most of these languages are called high level (some, like Forth or C, are considered mid-level); that is, they are more removed from machine language, and closer to human languages. Your computer doesn't really understand any of these high-level languages. It must interpret them, changing the symbols into machine code, which it then uses directly.

Machine language is not a programming language in the same sense as BASIC or other languages. While it may seem more difficult to learn than most high-level programming languages, machine language is popular because of its power and speed. Although it may

take you several machine language operations to accomplish what could be done in BASIC or another high-level language with one command, the computer doesn't have to translate the machine code. It acts on it directly.

The great majority of people who learn to program on their own start with BASIC. After all, it's built into your Commodore, making it immediately accessible. BASIC, which stands for Beginner's All-purpose Symbolic Instruction Code, was created at Dartmouth College in the early 1960s for the express purpose of teaching beginners to program. There are many variations of BASIC now, some built into personal computers and others available on cartridge or disk. If you have a Commodore 64, your computer has Commodore BASIC 2.0; the Plus/4 and the 16 have more commands in a BASIC version 3.5; and the 128 has the richest Commodore BASIC, version 7.0. (For a closer look at these BASICs, see "Exploring 128 BASIC" in the November 1985 GAZETTE.)

BASIC 2.0 doesn't contain commands to let you directly control the excellent graphics and sound capabilities of the Commodore 64. To remedy that, there are programs, either cartridge or disk-based, which extend BASIC by adding new commands. *Simons' BASIC* and the *Super Expander 64* are two of the best known of these extensions. *Simons' BASIC* adds 114 commands to assist with high-resolution graphics, sprites, program debugging, and music and sound effects. If that many new commands seems daunting, try the *Super Expander*, which adds 32 new words to BASIC to aid in programming graphics and sound. Also included are ten different instrument sounds, and a sprite editor. One of the newest and most powerful BASIC extensions for your 64 is Cardco's *S'more*, which brings the 64's BASIC almost to the level of the 128's powerful BASIC 7.0. (See the review of *S'more* elsewhere in this issue.)

Despite the great success of BASIC, not all programmers agree that it's the best language to learn first. David Thornburg, a supporter of the Logo language, has found that his computer science students have

EPYX PRESENTS LUCASFILM GAMES™ RESCUE ON FRACTALUS!™



WIN a day at Lucasfilm! Special sweepstakes offer.*

© 1985 LFL



You've joined an elite Rescue Squadron, flying to the hostile planet Fractalus to confront the ruthless enemy Jaggies head on. The mission is a treacherous one for, as everyone

knows, the cyanitric acid atmosphere on Fractalus is fatal and Jaggi saucers are cunning. You're needed to rescue Ethernorps pilots shot down and stranded on that brutal planet, and to help lead our forces to victory . . . for the merciless Jaggi onslaught must be stopped to preserve the future of our galaxy.

Rescue on Fractalus! is a rescue and space action game with realistic 3-D flight simulation. You pilot your Valkyrie Fighter through the canyons and around the mountain peaks of the planet Fractalus to rescue fellow

pilots, do battle with enemy saucers and destroy enemy gun emplacements.

We supply the Long Range Scanner, Dirac Mirror Shield and Anti-Matter Bubble Torpedoes . . . YOU supply the skill and guts! Take the challenge: The perils of Fractalus await you.

C64/128 ATARI APPLE

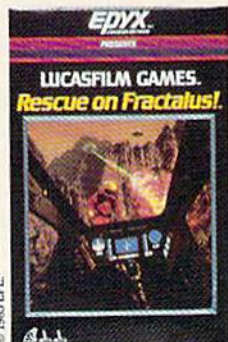
Rescue on Fractalus! ✓ ✓ ✓



EPYX
COMPUTER SOFTWARE

1043 Kiel Ct., Sunnyvale, CA 94089

Strategy Games for the Action-Game Player®



© 1985 LFL

* See specially marked boxes for details. No purchase necessary. Sweepstakes ends Dec. 31, 1985. Official rules available at participating dealers.

an easier time learning other languages if they've never been exposed to BASIC. Len Lindsay, a COMAL language supporter, says that BASIC's weaknesses led to the creation of COMAL. And others complain that BASIC has evolved into an unstructured, inefficient language which teaches poor programming habits. Nevertheless, millions of people have learned how to program in BASIC and enjoy its relative simplicity, ease of use, and general-purpose capabilities.

Whatever your final opinion of BASIC, as a Commodore owner you have several other languages available to you. Each of them has a faithful following, some numbering into the thousands. But, you'll have to purchase whatever new language you try, either on disk or cartridge, and then load it into your computer with each use. Most programmers believe that's a small price to pay, considering the enjoyment of learning a new language and the results of programming.

Logo

Logo has become one of the most popular programming languages in the field of education since its development by a team of computer scientists headed by MIT professor Seymour Papert in the 1960s. Papert and his team wanted to create a language which would be easy enough for children to learn, but would be expandable enough to develop power and depth. A part of the language contains easy to use graphics commands, called turtle graphics (so named because the first use of the language controlled the movements of a small robot that resembled a turtle). However, the full Logo language is based on LISP (for LISP Processing), a very powerful high-level language especially suited for text manipulation and analysis and used in artificial intelligence research.

Although most references to Logo emphasize the language's suitability for teaching children with its turtle graphics, Logo supporters point out that the language is really very powerful. "What happened with Logo was that people said, 'Oh, a language for learning—so Logo's for kids,'" says Thornburg, author of a half-dozen books on Logo. "(Computer dealers) said 'I can go sell that as a kid's language; it's warm and

Despite the great success of BASIC, not all programmers agree that it's the best language to learn first.

fuzzy.' But the fact is that Logo is *not* warm and fuzzy. It has a warm and fuzzy component, but Logo is also a *chainsaw*—you can do some pretty extraordinary things with Logo."

Logo contains a number of commands, called *primitives*, which a programmer uses to create programs. But these primitives can also be combined to create brand new commands, allowing you to extend the language in ways which you can't with a language like BASIC (which offers only defined functions, a limited sort of extensibility). Another aspect of Logo is its modular programming structure, which lets a programmer break down various parts of a program into separate components. This also makes Logo easier for teachers as they try to analyze their students' programs. As a result of this and of Logo's similarity to some advanced languages, some computer science teachers recommend Logo as a first language rather than BASIC.

Commodore Logo is a fairly powerful version of the original Logo, and has commands which let you control the 64's graphics, including its sprites, as well as the SID sound chip and other features. Commodore Logo comes on a pair of disks, one of which contains the language and the other a collection of more than 50 utilities and demonstrations. There is also a 350-page manual.

Logo's widespread use and popularity have encouraged the growth of a variety of user groups

throughout the world. A good source of information on Logo is the National Logo Exchange, P.O. Box 5341, Charlottesville, VA 22905.

Pascal

Another programming language which has had a major impact in schools, especially at the university level, is Pascal. Named for French mathematician Blaise Pascal, the language was created in the 1970s by Niklaus Wirth of Switzerland as a medium for the teaching of structured, organized programming.

It has evolved since then into a general-purpose language that's also used extensively for business and scientific programs. Pascal is taught in hundreds of high schools and universities, and the Scholastic Aptitude Test (SAT) advanced-placement test in computer science is based on Pascal. There are several Pascal software packages available on disk for the Commodore 64.

PILOT

PILOT was developed in 1968 at the University of California at San Francisco Medical Center by John Starkweather to serve as a computer-aided instruction (CAI) tool. PILOT (Programmed Inquiry, Learning, Or Teaching) was planned as a programming system for nonprogrammers—sometimes called an authoring system—for development of teaching resources and testing.

It was to be used by teachers and administrators who were not expected to have programming knowledge. Therefore, the language is simple to use and particularly good for screen displays and for the kinds of True-False branching requirements used in testing. Consequently, it's not meant to be as sophisticated in the areas of computation and file-handling. Commodore markets a version of PILOT for the 64.

Forth

As with Pascal, there are several versions of Forth for the Commodore 64. Developed in the 1960s by Charles Moore, Forth was meant to be a jump ahead of the third-generation computers of the time—a "fourth generation" language. "Fourth" reportedly became "Forth" because Moore's IBM computer would allow a maximum of five characters as identifiers.

22 FAST-PACED, EXCITING EVENTS. GO FOR THE GOLD!



WIN a Tahoe ski week! Special sport and ski-wear offer.*

SUMMER GAMES.®

Want some great play action? This award winning best seller brings you eight great events, including Swimming, Diving, Track, Gymnastics, and more. Compete against world records. Or get together with a group of up to eight for some good competitive *fun*. Realistic, graphics and *action* will challenge you again and again to *go for the gold*.

SUMMER GAMES II.™

You asked us for more great events. Here they are. Rowing, Triple Jump, Javelin, High Jump, Fencing, Cycling, Kayaking, even Equestrian. Like SUMMER GAMES, you get spine tingling *action and challenge* for one to eight players. These aren't just games. They're *the games*. And you're the star.

WINTER GAMES.™

You've got to see the graphics, and *feel* the knot in your stomach as your bobsled careens along the walls of the run

to know why people are wild over WINTER GAMES. Seven events give you a variety of action—from the endurance of the Biathlon to the timing of the Ski Jump, and more.

What are you waiting for?

Play your favorite events over and over. Play all 22. Set up teams. Challenge your friends. These great action-strategy games are sure to be the stars of *your* collection.

At your local Epyx dealer.

	APPLE	MAC	ATARI	C64/128
Summer Games	✓		✓	✓
Summer Games II	✓		✓	✓
Winter Games		✓		✓



EPYX
COMPUTER SOFTWARE

1043 Kiel Ct., Sunnyvale, CA 94089

Strategy Games for the Action-Game Player®



* See specially marked boxes for details. No purchase necessary. Sweepstakes ends Dec. 31, 1985. Official rules available at participating dealers.

A Buyer's Guide To Commodore 64 Languages

Language	Publisher	Price	Comments
<i>Ada Training Course</i>	Abacus Software, P.O. Box 7211, Grand Rapids, MI 49510	\$59.95	Comprehensive subset of Ada language on disk.
<i>BASIC Lightning</i>	Oasis Software, 377 Oyster Point Blvd., Unit 15, San Francisco, CA 94080	\$39.95	BASIC extension and graphics development system on disk.
<i>COMAL 0.14 and COMAL 2.0</i>	COMAL Users Group, USA, Ltd., 6041 Monona Drive, Madison, WI 53716	0.14 Version for \$11; 2.0 for \$89.95	0.14 Version includes demonstrations and interactive tutorial on disk, plus reference book; 2.0 is full COMAL implementation on cartridge.
<i>C Power</i>	Pro-Line Software, Ltd., 755 The Queensway East, Unit 8, Mississauga, Ontario, Canada L4Y 4C5	\$99.95	C compiler; includes book with disk.
<i>C-64 Forth/79</i>	Performance Micro Products, P.O. Box 370, Canton, MA 02120	\$69.95	Follows 1979 Forth standard; on disk.
<i>Enhanced Forth</i>	Accelerated Software, Inc., P.O. Box 129, Station A, Scarborough, Ontario, Canada M1K 5B9	Price not available	Follows FIG-Forth standard; on disk.
<i>Forth-64 Language</i>	Abacus Software, P.O. Box 7211, Grand Rapids, MI 49510	\$39.95	Forth language, follows 1979 Forth standard and parts of 1983 standard.
<i>Kyan Pascal</i>	Kyan Software, Suite 183, 1850 Union Street, San Francisco, CA 94123	\$49.95	Pascal language on disk with tutorial manual.
<i>Logo</i>	Commodore Business Machines, Inc., 1200 Wilson Drive, West Chester, PA 19380	\$73.95	Disk-based Logo.
<i>Master Forth</i>	MicroMotion, 12077 Wilshire Blvd. #506, Los Angeles, CA 90025	\$100	Follows the Forth 1983 standard; includes graphics system.
<i>Nevada COBOL</i>	Commodore, 1200 Wilson Drive, West Chester, PA 19380	\$55.95	For experienced COBOL users; used with Commodore CP/M cartridge.
<i>Nevada Fortran</i>	Commodore, 1200 Wilson Drive, West Chester, PA 19380	\$55.95	For experienced Fortran programmers; used with Commodore CP/M cartridge.
<i>PILOT</i>	Commodore, 1200 Wilson Drive, West Chester, PA 19380	\$55.95	Educational language on disk.
<i>PROMAL</i>	Systems Management Associates, 3700 Computer Drive, P.O. Box 20025, Raleigh, NC 27619.	\$49.95—end-user version; \$99.95—developer's version	On disk.
<i>Simons' BASIC</i>	Commodore, 1200 Wilson Drive, West Chester, PA 19380	\$34.95	BASIC extension on cartridge.
<i>The Sixty Forth</i>	Elcomp Publishing, Inc., 2174 West Foothill Blvd., Unit E, Upland, CA 91786	\$39.95	Forth compiler on disk.
<i>Super C Language Compiler</i>	Abacus Software, P.O. Box 7211, Grand Rapids, MI 49510	\$79.95	C compiler on disk.
<i>Super Expander 64</i>	Commodore, 1200 Wilson Drive, West Chester, PA 19380	\$29.95	BASIC extension on cartridge.
<i>Superforth 64</i>	Parsec Research, Drawer 1766, Fremont, CA 94538	\$59.95	Follows 1979 Forth standard.
<i>Superforth 64 + Artificial Intelligence (AI)</i>	Parsec Research, Drawer 1766, Fremont, CA 94538	\$99	Forth language, plus expert systems development module.
<i>Super Pascal</i>	Abacus Software, P.O. Box 7211, Grand Rapids, MI 49510	\$59.95	Pascal language development system, also includes graphic toolkit and fast DOS.
<i>UltraBASIC-64</i>	Abacus Software, P.O. Box 7211, Grand Rapids, MI 49510	\$42.95 on disk; \$39.95 on cassette tape	BASIC extension on disk or cassette tape.
<i>Video BASIC-64</i>	Abacus Software, P.O. Box 7211, Grand Rapids, MI 49510	\$39.95	BASIC extension adds more than 50 graphic, sound, and utility commands.
<i>White Lightning</i>	Oasis Software, 377 Oyster Point Blvd., Unit 15, San Francisco, CA 94080	\$49.95	Forth language on disk; includes BASIC Lightning.

[This isn't just hype. We really do have the money.]

WANTED:

WORLD'S GREATEST ADVENTURES.

REWARD: \$1000 and FAME. CALL (800) 227-6703.



ACS is your tool kit. More than 7000 parts to build from. Power to spare!



Or make your own parts from scratch. Draw 'em. Give 'em properties. Go for it!



ACS is menu driven. It works with a positive "stick shift" controller. Easy as pie!



Ready-made segments of sci-fi, mystery & dragon-type adventures included. A real bargain!



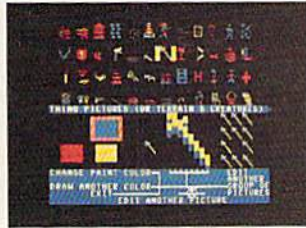
Mountains, oceans, forests & etc. are pre-built. Or make your own landscapes. You're the boss!



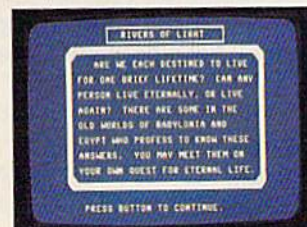
Amazing fact #1: ACS makes adventures (& finishes parts of yours) by itself. This is No Lie!



Music modules & sound effects included. Score your adventures like movies. Be a maestro!



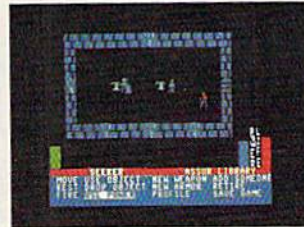
No arms control here! Endless weapons of your design. (Endless armor & cures, fortunately)



Complete, top-notch epic adventure included: *Rivers of Light* by Stuart Smith, author of *Ali Baba!*



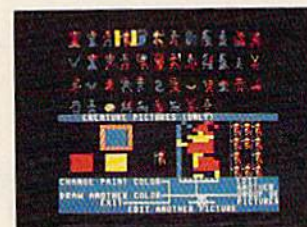
500 obnoxious creatures thrown in! Or make your own. Point 'em at the population! See their priorities!



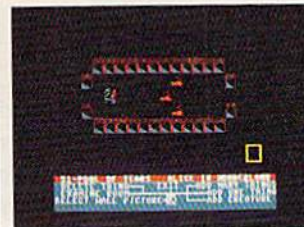
You get magic! 31 variations on 15 Big Spells! You get technology. You get religion. All right!



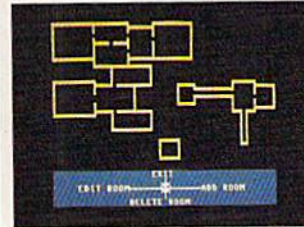
Amazing fact #2: ACS integrates text and graphics. All other products wimp out in this regard.



Characters? How many you want? Make 'em. Break 'em. Cast them into the world without a dime!



7 tutorial mini-adventures included! Generously survivable for those tentative first timers!



Design up to 15 different regions with 16 different rooms in each one. Space out!



When you've made a zippo-zack GREAT ADVENTURE, send it here. You could win 1,000 smackers!

ADVENTURE CONSTRUCTION SET™

from ELECTRONIC ARTS™



HOW TO WIN: Send your adventure entries to Electronic Arts by 12/30/85. 3 winners will be selected by our judges. Their decision: final. Your adventure becomes "public domain" which means you can still get famous even if you don't get rich. **HOW TO ORDER:** Visit your retailer or call 800-227-6703 for direct VISA or MasterCard orders (in CA call 800-632-7979). To buy by mail, send check or money order to Electronic Arts, P.O. Box 306, Half Moon Bay, CA 94019. Add \$3 to cover insured shipping and handling. Indicate desired machine version. Allow 1-4 weeks for delivery. All EA products purchased direct have a 14 day "satisfaction or your money back" guarantee. **PRICE & MACHINE AVAILABILITY:** C-64 \$39.95. To receive our complete product catalog and direct order form, send 50¢ and a self-addressed, stamped envelope to Electronic Arts, Catalogue Offer, 2755 Campus Drive, San Mateo, CA 94403.

Like Logo, Forth is an extensible programming language, but with quite a different approach from most languages. It's considered a mid-level language, somewhere between the high-level languages like BASIC and machine language. Forth, like Logo, is extensible. Words from its command vocabulary can be used to define other words which in turn become part of the vocabulary. You're essentially writing your own computer language based around Forth. Like Pascal, Forth separates programming into structured modules.

First used to control the movements of a large telescope, Forth's development over the years has resulted in several different standards. Each standard represents a different stage of evolution in the continuing growth of Forth.

The popularity of Forth is probably best expressed in FIG, the Forth Interest Group, a California-based non-profit support organization which has a membership of over 5,000 Forth users worldwide. For more information, contact FIG at P.O. Box 8231, San Jose, CA 95155. A FIG hotline is staffed to answer Forth-related questions at (408) 277-0668. And the FIG Tree is an on-line computer database which offers Forth information through your computer at (415) 538-3580. (Once connected by modem, hit the RETURN key twice to start.)

COMAL

When Borge Christensen of Denmark created COMAL (COMmon Algorithmic Language) during the early 1970s, he was seeking to replace BASIC as the major programming language in schools and homes. He reportedly wanted to keep the interactivity of BASIC but add to it the structure of Pascal. The resulting language has continued to gain popularity in both Europe and in the U.S., especially in schools. COMAL is generally regarded as a language easy to learn and use, with a structured form that makes teaching the language less confusing. The editing capabilities are extensive, and programming is modular.

The most popular versions of COMAL are for Commodore computers since the language is particularly suited for the Commodore's features. Two versions are available

for the 64, the earlier COMAL 0.14 on disk and the fully implemented COMAL 2.0 on cartridge, both from the COMAL Users Group USA, Ltd., 6041 Monona Drive, Madison, WI 53716.

C

Created in 1972 by Dennis Ritchie, the C programming language has become very popular, especially within the last few years. Its power and transportability from one computer to another have made it the language of choice for much of the applications programming for Apple's Macintosh, Atari's 520 ST, and Commodore's new Amiga. (See "C: Language of the Future?" in the October issue and "Horizons: Another Look at C," elsewhere in this issue.) But there are also at least a couple of versions available for the Commodore 64 as well. It's popular among software developers for two reasons: C programs usually run faster than programs written in other languages (except machine language), and once a program has been written, it can be translated fairly easily to run on other machines.

PROMAL


PROMAL (PROgrammer's Micro Application Language) is a recent addition to the languages available for the 64. This high-level language is structured in ways similar to C and Pascal, and emphasizes simplicity, power, and speed. Created by Systems Management Associates (SMA), PROMAL is meant to appeal to a wide range of programmers who have at least a working knowledge of BASIC or another high level language. In addition to the "end-user" version of PROMAL, there's a developer's version for those who wish to create professional quality programs and market them.

In addition to the languages already mentioned, there are several other packages for the Commodore 64 which you may wish to investigate. Commodore sells versions of two programming languages used primarily in business and science, *Nevada COBOL* (COMmon Business Oriented Language) and *Nevada FORTRAN* (FORmula TRANslator). COBOL

and FORTRAN were both created in the 1950s, the former to handle business programming tasks and the latter as an aid to scientists and engineers. The Commodore 64 versions are aimed at experienced programmers, and must be used with the CP/M (Control Program for Microcomputers) cartridge. According to Commodore, both the COBOL and FORTRAN disks are compatible with CP/M 3.0, which is built into the 128.

Also for the 64, Abacus Software sells a package called the *Ada Training Course*, an introduction to a programming development system used extensively by the Department of Defense. Although it would be impossible to implement the entire Ada system on a 64, the package is useful for its structured programming techniques and its introduction to Ada and to compilers (utility programs which translate high-level language into machine code).

Although there are literally hundreds of different programming languages and variations of languages, those available for the Commodore 64 will give you an excellent introduction into the major categories of programming languages and development systems beyond BASIC.

For more specific information on languages for your 64, see the accompanying chart, "A Buyer's Guide to Commodore 64 Languages." 

COMPUTE!'s Gazette is looking for utilities, games, applications educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it, on tape or disk to:

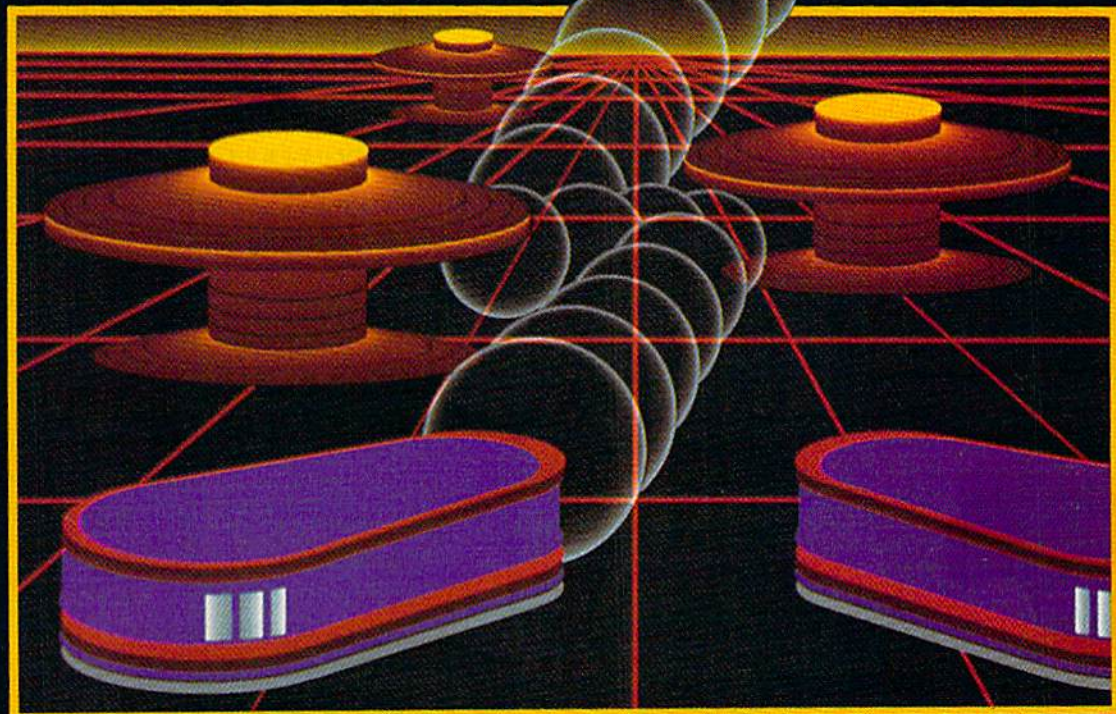
Submissions Reviewer
COMPUTE! Publications
P.O. Box 5406
Greensboro, NC 27403

Please enclose an SASE if you wish to have the materials returned.

Articles are reviewed within four weeks of submission.

TAKE A BREAK!

For
Commodore 64™
Computers



WITH NIGHT MISSION **PINBALL**

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



See your dealer . . .

or write or call for more information.

Order Line: 800 / 637-4983

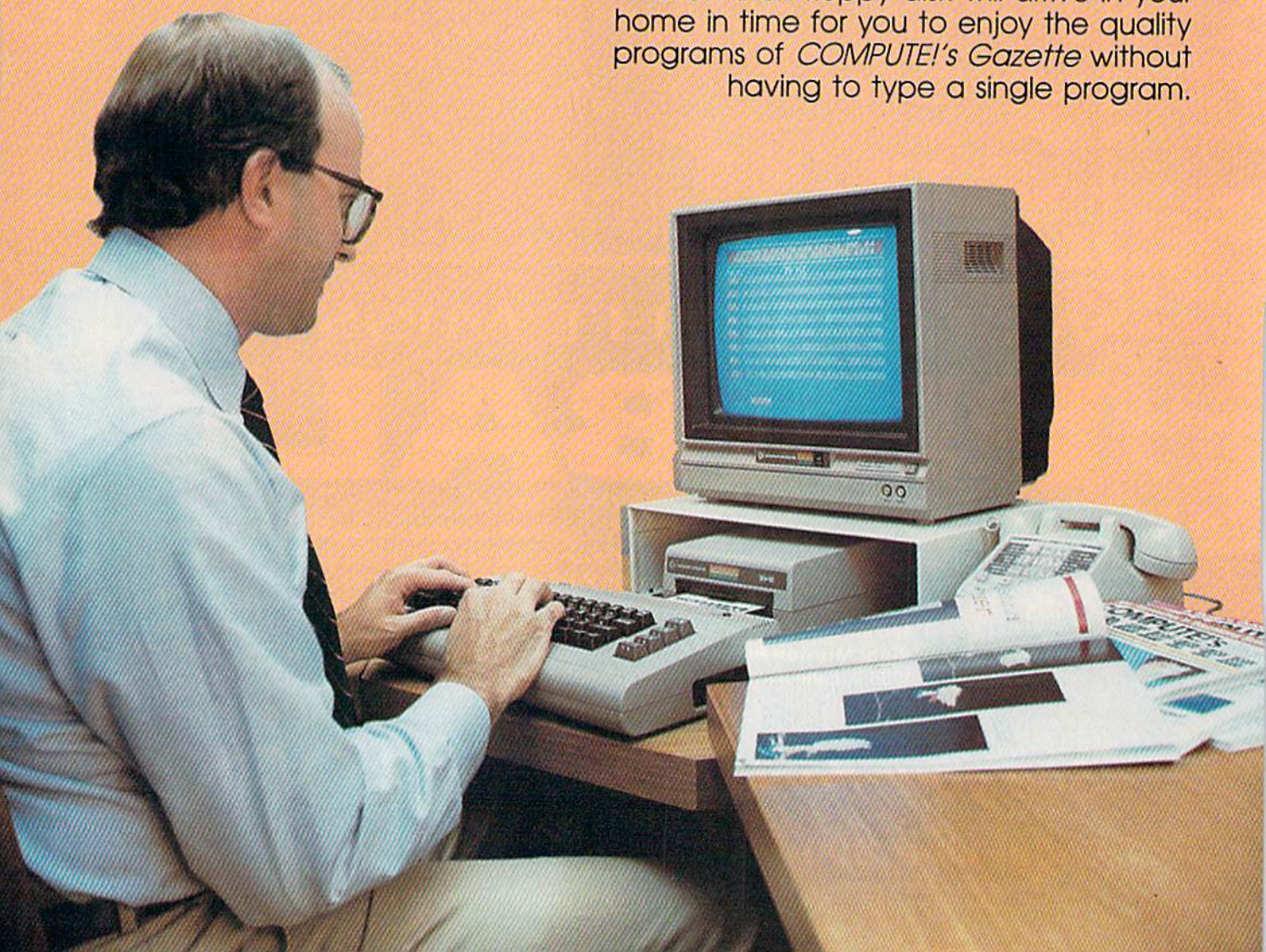
subLOGIC
Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

COMPUTE!'s *Gazette Disk*

Now you can enjoy the exciting programs
from *COMPUTE!'s Gazette* on a
ready-to-run disk

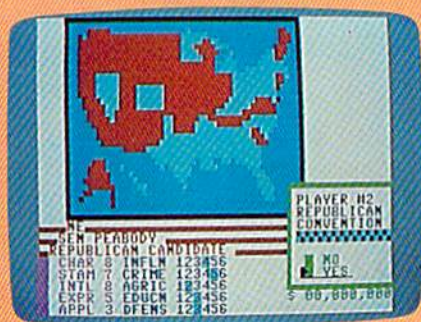
Every month you can receive *COMPUTE!'s Gazette Disk*, which includes the fascinating and challenging programs published in the corresponding issue of *COMPUTE!'s Gazette*, ready to load on your Commodore 64 or VIC-20.

The 5¼-inch floppy disk will arrive in your home in time for you to enjoy the quality programs of *COMPUTE!'s Gazette* without having to type a single program.



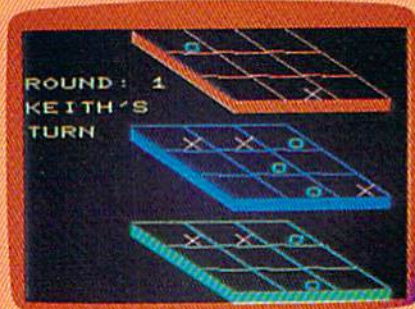
Timesaving

Using *COMPUTE!'s Gazette Disk* saves you time. Instead of spending hours typing in each program from *COMPUTE!'s Gazette*, you can load all the fun and fascinating programs in just a few minutes with the *Disk*. You have more time to enjoy Budgeteer, Mystery at Marple Manor, Vocab Builder, and many other exciting games and applications.



Inexpensive

And *COMPUTE!'s Gazette Disk* is inexpensive, only \$69.95 for a one-year subscription. That means the *Disk* costs you \$5.83 a month, a savings of 55 percent off the single disk price of \$12.95. And what price can you put on the hours of typing time you save?



**COMPUTE!'s
GAZETTE DISK**

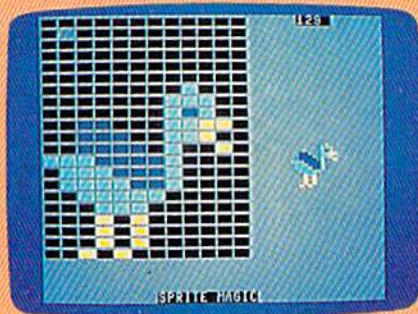


Risk-Free

All *Disks* are fully tested before they're shipped to you. And full documentation for all programs is in the corresponding issue of *COMPUTE!'s Gazette*. But if you should have a problem with a disk, just call toll free 800-346-6767 and a member of our Customer Service Staff will assist you.

Convenient

COMPUTE!'s Gazette Disk gives you access. As soon as you read about a new and challenging program in *COMPUTE!'s Gazette*, you can load the *Disk* and begin using it immediately—the *Disk* is ready when you are.



Enjoy the quality programs from *COMPUTE!'s Gazette* on the convenient, ready-to-use *COMPUTE!'s Gazette Disk*.

To order *COMPUTE!'s Gazette Disk*

Call toll free **1-800-247-5470** (in IA **1-800-532-1272**) or mail your prepaid coupon to *COMPUTE!'s Gazette Disk*, P.O. Box 10960, Des Moines, IA 50340.

Individual Issues of the *Disk* are available for \$12.95 (plus \$2.00 shipping and handling.) Call 1-800-346-6767 (in NY 212-265-8360) to order.

YES! I want to save time and money. Please enter my subscription to *COMPUTE!'s Gazette Disk*.

Save 55% off the single issue price. 1 year subscription, \$69.95

Save even more! 2 year subscription, \$129.95

All *Disk* orders must be prepaid.

Payment enclosed (check or money order)
 Charge MasterCard Visa American Express

Acct. No. _____ Exp. Date _____

Signature _____

Name _____

Address _____


City _____

State _____ Zip _____

(Outside U.S. and Canada, add \$36.00 per year for shipping and handling.)

Please allow 4-6 weeks for delivery.

35AD02



The Natural Approach to Computer Languages

Selby Bateman, Features Editor

How would you like to converse with your computer just as you do with another person? No special programming languages with unfamiliar commands, statements, and symbols—simply conversational English. Researchers in the fields of artificial intelligence, expert systems, and robotics are working toward that goal. They're still a long way from achieving it, but the results so far are changing the way we think about and use computers.

At an automated factory, a plant manager uses ordinary English phrases to type in the day's orders to a roomful of computer-controlled robots. He keys in quotas, suggests adjustments for several specialized robotic arms, and reprograms the work assignments of a group of the machines. The factory's computer system translates the English commands into machine code, asks for clarification on one order, and soon the robots are at work.

At a nearby hospital, a doctor races to diagnose a sick child, using a computer-based expert system. Engaging in a written dialogue with the computer, she types in the symptoms and notes relevant factors in the youngster's medical history. The diagnostic program replies with a battery of related questions and then suggests several diagnoses for the physician to consider.

In a schoolroom across the city, a computer quizzes a student on a history lesson, then answers questions that the student asks. Spotting a weakness in one area of the student's understanding, the computer program suggests several readings to be completed before the next lesson.

In these situations, individuals with no programming background are communicating with computers in ordinary English as they direct actions, solve problems, and search for answers. The examples represent three of the most promising areas of advancement in using ordinary English language to communicate with computers—industrial robotics, expert systems, and interactive databases. Such scenes may well be common within a few years thanks to recent developments in artificial intelligence research and the continuing improvements in computer hardware and software.

While natural language research has gone on for more than 40 years, the subject remains a complex and controversial one. The complexities of human language, including the use of common sense and context to differentiate meaning, continue to elude researchers seeking to codify those rules within a computer system. In fact, there are those who believe that a true natural language for computers will

always stay beyond reach. Others feel that natural languages will one day be the dominant method of computer-human communication.

New menu-driven user interfaces, with easy to understand symbols, or icons, are being implemented extensively to help the average person use computers in applications ranging from 24-hour money machines to information kiosks and library catalog systems. New-generation computers like the Apple Macintosh, the Atari ST, and the Amiga from Commodore feature graphics-based interfaces rather than text-based operating system commands which intimidate many beginners.

But a real natural language must go beyond menus and icons. It should allow interactive conversations between the user and the computer system. And that has proven far more complex than researchers initially thought.

One of the first efforts in natural language research came just after World War II, when computer scientists built machines to translate one language to another. A translation machine looked up each word in a built-in dictionary, found what was supposed to be its foreign language equivalent, and then altered the syntax of the message to correspond to the new language.

But the limitations of such a primitive syntax-based system soon became apparent. For instance, the English-language phrase "The spirit is willing but the flesh is weak," when translated to Russian by one of the early machines, reportedly became "The vodka is strong but the meat is rotten."

Undaunted, a handful of scientists at Stanford, Yale, M.I.T., Cal Tech, and a few other universities developed artificial intelligence research centers to carry their efforts beyond the early attempts. They've continued their work, and their debate, through the years.

Computer pioneer Joseph Weizenbaum developed one of the most publicized natural language simulation programs at M.I.T. in 1966. Called *Eliza*, the program seemed to understand English statements and questions. The soft-

ware was written in an extension of the Fortran programming language, called Slip. Other versions, some watered down from the original, were later written in Lisp and also in BASIC.

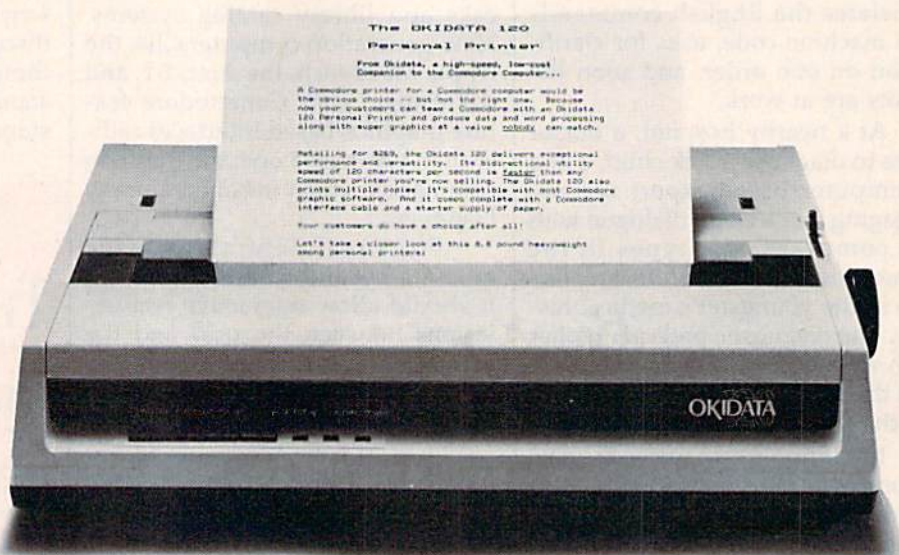
Weizenbaum reportedly centered the original *Eliza* on two components of operation: a parser, which breaks down each sentence to determine word meaning, and a script system, or a list of rules for discussing particular subjects. Although the program didn't understand English, it seemed to understand based on a simple technique

The promise is
that millions of
people may one
day be able to
control computer
environments
through ordinary
language.

of template, or pattern, matching. *Eliza* was only a trick, not an example of a true natural language at work. Weizenbaum never meant to suggest that it was an example of artificial intelligence, and the publicity given to the program at the time surprised him.

Versions of *Eliza* are still available for the Commodore 64. And a new program, *Racter* from Mindscape, Inc., for the IBM PC, Apple II, and Macintosh computers, goes even further along the same lines by generating poems and prose monologues in addition to what seems to be an interactive dialogue with the user.

Left Brain.



Rational. Functional. Precise.
Introducing the OKIDATA 120, the logical printer for your Commodore® computer.

Get results fast. With a utility mode that zips through letters and reports at twice the speed of any Commodore printer.

Switch to the enhanced mode. And print your most important ideas with typewriter clarity. Or illustrate your rationale with the 120's bit image graphics for high resolution charts, graphs and drawings.

Stay on target. With a self-inking "Clean Hands" ribbon cartridge. And Okidata's famous full year warranty on parts, labor and printhead.

The OKIDATA 120. At \$269*, it's the only Commodore-compatible printer that makes sense.

For more information, call 1-800-OKIDATA (in New Jersey 609-235-2600). Mt. Laurel, NJ 08054.

Get the OKIDATA 120
at these fine stores:

Advantage Computer
Accessories (Canada)
Childworld/Children's Palace
Consumers Distributing
David Weis
Electronics Boutique/
Games & Gadgets
Federated
Fred Meyer
Gemco
Lionel/Kiddie City/
Lionel Playworld
Montgomery Ward
(at participating stores)
S. E. Nichols
Service Merchandise
Toys 'R Us

OKIDATA®

an OKI AMERICA company
We put business on paper.

Commodore is a registered trademark of Commodore Business Machines, Inc.
OKIDATA is a registered trademark of Oki America, Inc.
OKIDATA - Marque déposée de Oki America, Inc.
*Manufacturer's suggested retail price.

Right Brain.



OKIMATE 10 — THE PERSONAL COLOR PRINTER

Better than a typewriter: OKIMATE prints 60 characters per second, 240 words per minute—about the same as four fast typists. OKIMATE prints on computer paper (so there is no need to skip between pages) and on single sheets of paper. Since OKIMATE works with word processor programs, changes and corrections can be made on the computer screen instead of on paper. **WIDE PRINT. BOLD PRINT. 100 dpi.**



Effervescent. Colorful. Outrageous.

Meet the OKIMATE 10, the \$208* color printer that takes your Atari® or Commodore® computer over the rainbow!

Dazzle 'em. With brilliant printing in over 36 eye-tickling colors. Reds, greens, golds and blues that breathe life into everything: from charts and graphs to original drawings and overhead transparencies.

And when you're forced to work in black and white, the OKIMATE 10 prints crisp, clean reports and papers—at 240 words per minute. You can even add spice with wide, bold and fine print.

Everything you need for color printing comes with the OKIMATE 10 and its Plug 'n Print package. Including a data cable, Learn to Print and Color Screen Print software diskettes, a color ribbon cartridge, a black ribbon cartridge and paper.

So c'mon, print on the wild side. With the OKIMATE 10 Personal Color Printer from Okidata.

For more information, call 1-800-OKIDATA (in New Jersey 609-235-2600). Mt. Laurel, NJ 08054.

OKIDATA®

an OKI AMERICA company

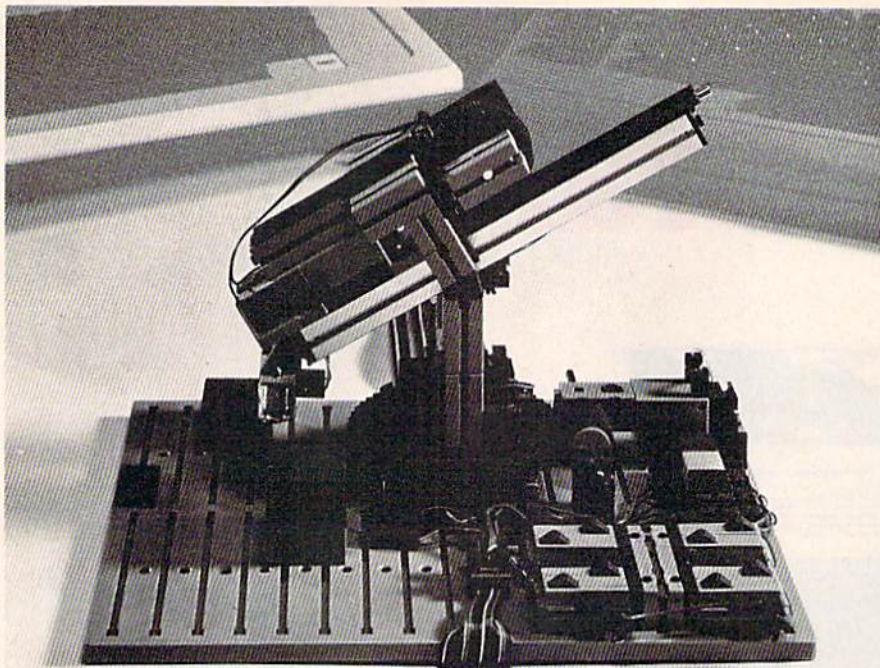
We put business on paper.

*Manufacturer's suggested retail price. Atari is a registered trademark of Atari, Inc. Commodore is a registered trademark of Commodore Business Machines, Inc. OKIDATA is a registered trademark of Oki America, Inc. OKIDATA - Marque depose de Oki America, Inc. OKIMATE and Plug 'n Print are trademarks of Oki America, Inc. To run Plug 'n Print software, the Commodore 64, 128 and PLUS 4 require disk drive. Atari requires disk drive and a 48K memory.

Buy Now!
\$15 Manufacturer's
rebate on OKIMATE 10.

Offer good from October 1, 1985 through January 31, 1986. See the following participating stores for details.

Advantage Computer
Accessories (Canada)
Arthur's Jewelers
Best Catalog Showrooms
Brendle's
Caldor
Childworld/Children's Palace
Consumers Distributing
Crazy Eddie
David Weis
Dolgins Catalog Showrooms
Electronic Boutique/
Games & Gadgets
Ellman's
Evans
Federated
Fred Meyer
Fred P. Gattas
G.C. Murphy/Murphy Mart
G.I. Joe
Great Western
Catalog Showrooms
J. Triesman
Jafco Catalog Showrooms
LaBelles Catalog Showrooms
Lionel/Kiddie City/
Lionel Playworld
McDade
Meijers (Michigan only)
Montgomery Ward
(at participating stores)
Prange
S.E. Nichols
Save-Rite
Sears, Roebuck & Co.
(at participating stores)
Service Merchandise
Stereo Village
Stokes
Toys 'R Us
Videoland
Witmark
Wizards Electronics
Zayre



Using a natural language called PaRCL, Commodore 64 owners program this FischerTechnik robotic computer kit.

Natural language research has evolved along several different lines over the years, moving away from the idea that a natural language can be based primarily on defining words and changing a sentence's syntax. To really work, a natural language must not only be able to handle the words, grammar, and syntax of human language, but also the meaning as it shifts from the context of one application to the context of another. It must also be able to distinguish metaphors, logical connections between statements, the plausibility of statements, and hundreds of other factors. To do all of that, some researchers believe it may require a mammoth knowledge base of the way the world works and thousands of rules. It may also require a computer program which can generate its own rules—learning as it goes along.

Limited though they may be, commercial natural language systems have been on the market since the late 1970s. Their purposes and levels of use vary greatly, however, from robotic controllers to "smart" databases. The promise behind such research is that millions of people who have no desire or aptitude for learning formal computer languages may one day be able to control computer environments through ordinary language.

For example, by the early 1990s, more than 100,000 robots are expected to be used in U.S. factories, according to estimates by the Robot Institute of America, an industry support association. Can some or most of those robotic workers be controlled by people who don't know computer programming?

"That's pretty much the trend coming out of the laboratories presently in robotics applications," says Allen Amaro, chief executive officer of Parsec Research in Fremont, California. "They want the average operators to be able to control the robotics configurations. And in order to do that, you have to have a natural language front end."

Amaro's company has recently been involved in just such a natural language robotics project, one that Commodore 64 (and Apple II and IBM) owners can take part in as well. The FischerTechnik computer robotics kit is a \$199 package of precision electromechanical parts, computer software, and interface which lets you build and program your own robotics experiments.

The robotics laboratory is offered with a new natural language program, called PaRCL (pronounced "parkul"), with which you program your robotic experiments. The system gives nonprogrammers a chance to learn the basics of ro-

botics through hands-on activity. Teachers can use the system to teach everything from simple programming to robotic fundamentals. And engineers will find a variety of sophisticated options which follow in miniature many industrial robotic operations.

"We're presently manufacturing the interface for FischerTechnik of West Germany," says Amaro. "But in addition to that, we've written the software. The original product they're releasing uses BASIC. What we've done is transform the whole system into what is not only a very powerful educational tool, but the language we're using is presently being introduced into the robotics community industrywide."

Based on the programming language Forth, PaRCL uses English words written in a simple syntax. With the 249-piece construction set and the PaRCL language, you build ten different projects and learn to use reversible motors, gears, digital and analog inputs, outputs, position sensors, lamps, and switches. A dual-axis robot arm simulates industrial processes physically and in the operating language.

The robotics kit is being marketed through retail stores in the U.S. by Fischer America, a division of Fischer International, which has extensive experience with industrial robotics. The system is also available directly through Parsec Research (P.O. Box 1766, Fremont, CA 94538).

One of the most practical applications in natural language development is the area of computer databases. Originally found on mainframe systems, newer microcomputer database programs have been developed that let nonprogrammers create the environment they need for virtually any type of database. That is, you type in your query, in English, and the database translates the words into a computer language, gets the answer, and displays it on the screen. If you wish to redefine or restructure the database, the system lets you do that without having to know a computer language.

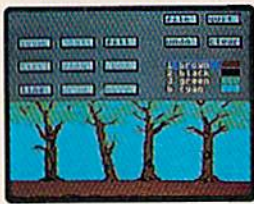
The most powerful natural language systems are still tied to mainframe or supermini computers, especially to those with large database

We Just Made Designing Your Own Computer Game Much Easier.

"And, If Yours Is The Best, We'll Publish It."

—James Levy, Chairman/CEO Activision, Inc.

Here's Your Tool Kit:



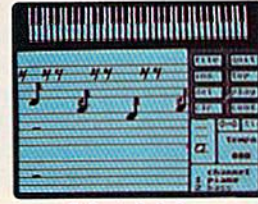
SceneMaker



SpriteMaker



SoundMaker



MusicMaker



The Editor

"(GameMaker is)... designed for everyone who has ever wanted to build his own computer game, but never had the time to learn assembly language."

—Ric Manning/Louisville Times

There's no question! Now is the time to turn that great game idea of yours into a real piece of computer software. With GameMaker, Garry Kitchen brings you the single most powerful computer game design tool ever offered. But he didn't stop with just power. He put all the tools of his trade together and then made them more accessible than ever before for owners of the Commodore 64/128 and the Apple II series computers. GameMaker includes these incredible tools:

SceneMaker. Create the background scenes for your game. Either use scenes that have been pre-programmed or create scenes of your own.

SpriteMaker. Create the characters or objects that move in your game. Use full animation to make them life-like. You can select from many pre-programmed sprites or you can create almost any kind you can imagine.

SoundMaker. Smashing, blasting, singing, whooshing and a whole lot more can be created, or you can select from a variety of commonly-used effects already created for you.

MusicMaker. A little musical introduction for your creation? How about some background music or a grand finale? You can create it all.

The Editor. This is where you bring together all the components you created with SceneMaker, SpriteMaker, SoundMaker, and MusicMaker. All the commands needed to make a game program are listed for you. Just choose the ones you want to use, put them in order, and presto! Your new game is off and running.

The Design Contest.

If you've always thought you had some great ideas for games (and you know you have), there's never been a better time or a better way to get them on a disk. Because you can enter the GameMaker Design Contest, and, if your game is judged to be the best, we'll publish it! And that will make you a published software designer. Has a nice ring to it, doesn't it?

Published... Software... Designer. Design the most exciting and creative computer game you can imagine and send it to us. All the rules and information for this unique contest are in specially-marked GameMaker packages. Gentlemen—and ladies—start your minds.

Garry Kitchen's GameMaker™
The Computer Game Design Kit™



ACTIVISION
HOME COMPUTER SOFTWARE

The Next Generation.

A Language Of Convenience:

Keyboard Macros

As a computer user, you may have seen certain commercial productivity programs available which use templates, or preprogrammed forms. There are form letters for word processors, budget forms for spreadsheets, address file forms for databases, and so on. A growing number of programs offer these preset templates to free you from having to set up your own.

In most cases, templates can be customized even further to suit your personal needs. And many of the commercial templates let you achieve customized forms without having to alter the actual code in which the original template is written. It can be done with a few keystrokes.

Related to customized templates are much more powerful and flexible tools, *macros*, which have gained popularity as many high-end commercial programs become more complex. But the term itself originated in the world of computer programming.

Machine language programmers often use shortcuts called *macroinstructions* (or "macros" for short) to speed up their programming. A macro is a preprogrammed group of assembly language microinstructions. By using macros, a programmer avoids writing and re-writing often-used routines. Simply

plug in the name of the appropriate macro and the assembler automatically inserts the proper code.

A different sort of macro is built into the Commodore 128 and Plus/4. Press the f3 key and the word DIRECTORY appears. A disk directory automatically prints to the screen. You could type DIRECTORY yourself, but why press nine keys (plus RETURN), when a single key does it all? Programmable keys can save a lot of typing time.

This approach is also being used regularly in sophisticated application programs to save repetitive or time-consuming steps. For example, *Lotus 1-2-3*, a popular integrated productivity package for IBM and other MS-DOS computers, offers users the option of setting up keyboard macros. Frequently repeated procedures or commands can be assigned to one or two keystrokes. Thereafter, when that procedure is needed, you have a shortcut to save you time.

The problem for many people in setting up macros on *Lotus 1-2-3* is that the system is not a simple one to get used to. The options are plentiful, and the result is that making macros can become like learning a small programming language. In fact, numerous magazine articles—and even books—have been devoted to explaining the advanced customizing features of *1-2-3*. Other productivity software such as *SuperCalc*, *VisiCalc*, and *dBase II* also have macro capabilities. They're generally easier than *1-2-3*

to use with macros, but not quite as powerful.

With macros, even a nonprogrammer can customize a piece of software in many ways. Let's say that your word processor has a four-step, eight-keystroke command sequence to redefine the margins—top and bottom, left and right. A macro might be programmed to do that for you with one or two keystrokes. If you also want to have the right edge of your text justified, that could be added to the same macro. With the right software, almost any word, phrase, sentence, paragraph, or larger combination of characters can be made into a macro.

Or, suppose you regularly log on to one of the major telecommunications services like CompuServe. Rather than go through the log-on procedures of dialing the number, giving your identification number and then your password, a macro can be made to do all of that with one keystroke.

The popularity of these keyboard enhancers is reflected in the number of stand-alone macro makers now on the market. Products like *SuperKey*, *ProKey*, *SmartKey*, *Keyworks*, and others are in growing demand, especially in the business environment where repetition of procedures is necessarily frequent. The programs are usually loaded into the computer prior to the loading of an application, such as a spreadsheet. They reside in memory behind the application program, providing keyboard shortcuts to just about any function you need.

systems. And these commercial natural language packages still cost thousands of dollars. One example is the Artificial Intelligence Corporation's (Waltham, Mass.) *Intellect* program, which lets you ask questions of a database system in ordinary English, then converts the query into the program's language. Another commercial natural language system is *Themis* from Frey Associates of Amherst, New Hampshire, a program which allows you to add words easily to its base vocabulary in addition to supplying a natural language interface.

Some of the most optimistic expectations for the development

of natural languages come from Japan's Fifth Generation computer project. This massive government-backed effort to move beyond today's so-called fourth-generation computers includes a strong component of natural language research. The goal is to have systems which will contain as many as 20,000 rules and a hundred million data items from which to draw. It's hoped that these computers will be able to make inferences from their knowledge bases, fill in gaps between logical statements, create their own data indexes from external sources, and differentiate among different possible meanings

within the same sentence constructions. But much more work must be done before any of these capabilities are achieved.

Despite the setbacks and slow progress associated with natural language interfaces for computers, hardware and software manufacturers realize the long-range importance of advances in this field. In order to involve the bulk of the population in computing, the machines themselves must become easier to use, less intimidating, and more productive. And one of the most important steps in attracting these people is more plain talk between computers and humans. ☐

THE PERFECT STOCKING STUFFER!

Underware™ makes custom T-Shirts in minutes!

With the Underware Ribbon your printer makes iron-on transfers of any screen image! Just print the image on plain paper using an Underware Ribbon, then iron it on to your own T-Shirt. Each ribbon makes 30-100 permanent and washable transfers.



Adding color is simple & inexpensive

With a set of Underware ColorPens you can add up to seven colors to any transfer made with an Underware Ribbon. Just color the plain paper transfer and iron it onto a T-Shirt.

A complete selection of Underware Products...

The ribbon is available for the NEC 8023, C. Itoh, Image-writer, Okidata, Star Gemini, and Epson dot matrix printers. For other printers — try our new Iron-on Coloring Kit with special carbon transfer paper. Please call for details.

NOW WORKS WITH PRINT SHOP™

- Underware Ribbon \$14.95
- Underware ColorPens (set of 5) \$14.95
- Underware Jumbo ColorPens (set of 7) \$19.95
- Underware Iron-on Coloring Kit \$19.95

UNDERWARE™



Diversions, Inc.
1550 Winding Way, Belmont, CA 94002

415-591-0660



HAVE YOU GOT THE 1541 BLUES?

WE'VE GOT THE PERMANENT FIX!!

Here's what we do . . .

- FIRST, we disassemble your 1541 disk drive.
- SECOND, we re-machine the stepper motor to the shaft.
- THIRD, we adjust the stepper motor and align the heads.
- FOURTH, we upgrade your DOS to the latest version available.

GUARANTEED FOR SIX MONTHS!

AND WE DO IT ALL IN 72 HOURS OR LESS!!

TOTAL COST . . . \$69.95, plus \$7.50 shipping & handling

We also service the entire Commodore Line with a 72 hour turn-around time (subject to parts availability).

C-64	59.00
1541	65.00
1702	85.00
1525/801	59.00
1526/802	75.00
1541 Flash Installed	125.00

(Includes DOS Bridge and Switch for 100% Software compatibility)

Call for Repair Prices on other Commodore Equipment
We also repair Televideo Computers and Okidata Printers

WE DO WARRANTY REPAIRS! — Call for Details
\$7.50 for shipping/\$15.00 for APO/FPO or outside Continental US.
Our BBS No. is 919-765-3892, Temporary Password — TRIAD

TRIAD COMPUTERS

3068 TRENWEST DRIVE, WINSTON-SALEM, NC 27103
919-765-0433

NEW UPDATED VERSION Now Includes 1541 FAST NIBBLER

ANOTHER MASTERPIECE

The Programmer MIKE J. HENRY has done it AGAIN with

FASTHACK'EM

FOR THE COMMODORE 64

DUAL DRIVE MSD

- Automatic back-up of nearly all protected disks in **68 Seconds!**
- Using unique track analysis process, protection schemes are treated as normal data giving you an original back-up.
- Equipped with Special Auto-Back-up.**

SINGLE 1541

- FASTEST single drive back-up ever made, less than **2 Minutes!**
- Backs-up all standard disks in only **3 Passes!**
- Nibbles protected disk in less than **3 Minutes!**

TWO DRIVES 1541

- Automatically backs-up a standard disk in only **35 Seconds!**
- Nibbles protected disk in less than **60 Seconds!**
- Also equipped with Special Auto-Back-up**

Dealer
Inquiries
Welcome!

**SPECIAL

Auto-Back-up After booting up, the computer is no longer necessary, and may be disconnected. The drives automatically detect the disk being inserted and removed. An absolute must for multiple back-ups!!!
All routines are highly reliable and include full verify option.

EASY TO USE
ALL VERSIONS
ON ONE DISK

ONLY \$29.95
ADD \$3.00 SHIPPING

Check, Money Order, VISA, MASTERCARD Accepted
 Add \$3.00 for C.O.D.'s

ALWAYS SAME
DAY SHIPPING

BASEMENT BOYS SOFTWARE

P.O. Box 30901 Portland, OR 97230-0901

(503) 256-5506

The New MLX

Enhanced Machine Language Editor For The Commodore 64

Ottis R. Cowper, Technical Editor

This significantly improved version of COMPUTE!'s GAZETTE "MLX" utility will help you enter machine language program listings without typos. It's more foolproof than the old MLX and is easier to use, too—especially for beginners. The new MLX is required to enter all Commodore 64 and 128 (in 64 mode) machine language programs published in COMPUTE!'s GAZETTE, beginning in this issue.

Since its initial publication in the December 1983 issue of COMPUTE!'s GAZETTE, our "MLX" machine language editor has helped thousands of readers type in dozens of ML programs with a minimum of problems. MLX detects most common typing mistakes as they're made. However, your growing appetite for high-quality programs is leading us to publish longer and longer listings. Lengthy programs demand a more efficient entry system, so this month we're introducing a new MLX with important enhancements:

- A much more compact format. With each line of a new MLX listing, you enter eight bytes of data

with 18 keystrokes, as opposed to only six bytes of data in 21 keystrokes when using the original MLX. This means you can enter machine language programs with 40 percent less typing.

- A more sophisticated checksum scheme. Transposition errors that could slip past the original MLX are caught by this version. Typing mistakes are now virtually impossible.

- A buffer (reserved area of memory) that holds the data you enter instead of direct storage in memory. This means that you'll never again have to worry with those bothersome POKes that were

sometimes necessary to reconfigure memory before using the old MLX.

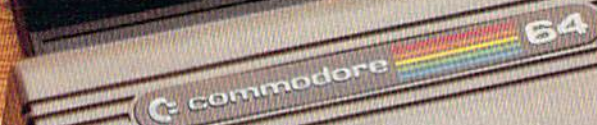
Hexadecimal Checksums

Type in and save a copy of the new MLX. You'll need it for all future machine language programs in COMPUTE!'s GAZETTE, as well as ML programs in our companion magazine, COMPUTE!, and COMPUTE! books.

When you're ready to enter an ML program, load and run the new MLX. It asks you for a starting address and ending address. These addresses appear in the article accompanying the MLX-format program listing you're typing. If you're unfamiliar with machine language, the addresses (and all other values you enter in MLX) may appear strange. Instead of the usual decimal numbers you're accustomed to, these numbers are in *hexadecimal*—a base 16 numbering system commonly used by ML programmers. Hexadecimal—hex for short—includes the numerals 0-9 and the letters A-F. But don't worry—even if you know nothing about ML or hex, you should have no trouble using the new MLX.

Why settle for less when you can have Mo?

Now with free
PLAYNET
software too!



Mitey Mo turns your Commodore 64 into a telecommunications giant. It's the best-performing modem with upload/download.

Mitey Mo is being hailed as "the best price/performance communications package available." Its software has received the endorsement of the U.S. Commodore Users Group, which gives a money-back guarantee to members. It is truly the industry standard, and no wonder. It's the most user-friendly modem you can buy — it will take you online faster and easier than anything else.

Mitey Mo opens up a world of practical and exciting uses for your C-64. It lets you send and receive electronic mail, link up with community bulletin boards, play computer games with people in distant places, tap into library resources, and much more. All at your convenience.

Until Mitey Mo, Commodore's 1650 Automodem was the obvious choice when you went looking for a modem for your computer. Like Mitey Mo, it has "auto answer" — it receives data while unattended. And both modems are "auto dialers" — you dial right on the computer's keyboard. But that's about where the similarity ends.

Mitey Mo can dial up to 9



MODEM FEATURES	MITEY MO	COMMODORE AUTOMODEM
Auto Dial/Answer	YES	YES
Auto Redial	YES	NO
Smart 64 Software	YES	NO
Function Keys		
Programmable	YES	NO
Upload/Download		
Text & X-Modem	YES	NO
VT-52/VT-100 Emulation	YES	NO
Menu Driven	YES	NO
28K Software Buffer	YES	NO
Easy-to-Use Manual	YES	NO
Bell 103 Compatible	YES	YES
Multiple Baud Rates	YES	YES
Cable Included	YES	YES
Single Switch Operation	YES	NO
Warranty	3 years	90 days

Some mighty interesting features — ours and theirs. Yours to decide.

numbers sequentially. But suppose you dial a number and find it's busy. Mitey Mo has "auto redial" — it hangs up and redials immediately until it gets through. With the other modem you have to redial each time — and somebody with auto redialing can slip in ahead of you.

Mitey Mo is menu driven. It lists the things you can do on the screen. Select a number and you're on your way. Since Automodem isn't menu driven, you'll be hunting through the manual a lot.

With Mitey Mo, your computer's function keys are programmable — you can save yourself plenty

of keystrokes. Not so with the other modem. And only Mitey Mo lets you store data to review or print it later.

Mitey Mo has just one switch, the Smart 64 software does the rest. With the other modem you'll have to remember to check three switches, otherwise you may be answering when you mean to be originating.

Mitey Mo is half the size of the other modem. The very latest technology allows miniaturization and increased reliability, as well. Mitey Mo is so reliable, we gave it a full three-year warranty. The other modem gives 90 days, then you're on your own.

Not only will you find Mitey Mo mighty useful, you'll find it mighty reasonably priced. When you buy it, you'll get \$15 of CompuServe access time and 2 hours of PlayNet free, as well. See your dealer or call us directly to order your Mitey Mo.



CDI Computer Devices Int'l
1345-A2 Doolittle Drive
San Leandro, CA 94577
(415) 633-1899

After you enter the starting and ending addresses, MLX offers the option of clearing the workspace. Choose this option if you're starting to enter a new listing. If you're continuing a listing that's partially typed from a previous session, don't choose this option.

It's not necessary to know more about this option to use MLX, but here's an explanation if you're interested: When you first run MLX, the workspace area contains random values. Clearing the workspace fills it with zeros. This makes it easier to find where you left off if you enter the listing in multiple sittings. However, clearing the workspace is useful only before you first begin entering a listing; there's no need to clear it before you reload to continue entering a partially typed listing.

When you save your work with the new MLX, it stores the entire contents of the data buffer. If you clear the workspace before starting, the incomplete portion of the listing is filled with zeros when saved and thus refilled with zeros when reloaded. If you don't clear the workspace when first starting, the incomplete portion of the listing is filled with random data. Whether or not you clear the workspace before you reload, this random data will refill the unfinished part of the listing when you load your previous work. The rule, then, is to use the clear workspace feature before you begin entering data from a listing, and not bother with it afterward.

At this point, MLX presents a menu of commands:

```
Enter data
Display data
Load data
Save file
Quit
```

You no longer have to remember SHIFT command keys as in the original MLX. Instead, just press the letter of a menu option. These commands are available only while the menu is displayed. You can get back to the menu from most options by pressing RETURN with no other input.

Entering A Listing

To begin entering data, press E. You'll be asked for the address at which you wish to begin entering data. (If you pressed E by mistake,

you can return to the command menu by pressing RETURN.) When you begin typing a listing, you should enter the starting address here. If you're typing in a long listing in multiple sittings, you should enter the address where you left off typing at the end of the previous session. In any case, make sure the address you enter corresponds to the address of a line in the MLX listing. Otherwise, you'll be unable to enter the data correctly.

After you enter the address, you'll see that address appear as a prompt with a nonblinking cursor. Now you're ready to enter data.

To help prevent typing mistakes, only a few keys are active while you're entering data, so you may have to unlearn some habits. The new MLX listings consist of nine columns of two-digit numbers—eight bytes of data and a checksum:

```
C000:A9 0C 8D 15 D0 A9 FF 8D 17
C008:3B 63 8D 3C 63 A9 01 8D C6
C010:01 58 A9 00 8D 33 63 20 7D
C018:0B C5 20 C1 CB A9 FF 8D 43
```

You *do not* type spaces between the columns; the new MLX automatically inserts these for you. You *do not* press RETURN after typing the last number in a line; the new MLX automatically enters and checks the line after you type the last digit. The only keys you need for data entry are 0-9 and A-F. Pressing most of the other keys generates a warning buzz.

To correct typing mistakes before finishing a line, use the INST/DEL key to delete the character to the left of the cursor. (The cursor-left key also deletes.) If you mess up a line really badly, press CLR/HOME to start the line over.

The RETURN key is also active, but only before any data is typed on a line. Pressing RETURN at this point returns you to the command menu. After you type a character of data, the new MLX disables RETURN until the cursor returns to the start of a line. Remember, you can press CLR/HOME to quickly get to a line number prompt.

Beep Or Buzz?

After you type the last digit in a line, MLX calculates a checksum of the line number and the first eight columns of data, then compares it

with the value in the ninth column. The formula (found in lines 370-390 of the MLX program) catches almost every conceivable typing error, including the transposition of entire numbers that the original MLX could miss. If the values match, you'll hear a pleasant beep, the data is added to the workspace area, and the prompt for the next line of data appears (unless the line just entered was the last line of the listing—in which case you'll automatically advance to the Save option). But if MLX detects a typing error, you'll hear a low buzz and see an error message. Then MLX re-displays the line for editing.

To edit a line, move the cursor left and right using the normal cursor controls. (The INST/DEL key now works as an alternative cursor-left key.) You cannot move left beyond the first character in the line. If you try to move beyond the rightmost character, you'll reenter the line.

To make corrections in a mistyped line, compare the line on the screen with the one printed in the listing, then move the cursor to the mistake and type the correct key. During editing, RETURN is active; pressing it tells MLX to recheck the line. You can press the CLR/HOME key to clear the entire line if you want to start from scratch, or if you want to get to a line number prompt to use RETURN to get back to the menu.

Other MLX Functions

The Display data option lets you review your work. Unlike the original MLX, the new MLX calculates and displays checksums for each line. Thus, a quick way to check your typing is to compare the reverse video checksums on the screen with the data in the rightmost column of the printed listing. If the values match, you can be confident that the line is entered correctly.

When you select D, you'll be asked for a starting address. (As with the other menu options, pressing RETURN at this point takes you back to the command menu.) When entering an address, make sure it corresponds to the address of a line from the listing. Otherwise, the checksums will be meaningless. You can pause the scrolling display by pressing the space bar. (MLX

THERE'S NO BEATING MASTERTRONIC



An all action large scale arcade adventure in which you'll need every ounce of skill and courage to destroy the forces of evil.

Traverse the Labyrinth, defy fireball breathing dragons and release the city from its curse by reuniting the 5 pieces of the Golden Talisman.



Caught on the surface of a nuclear devastated planet you have seconds to return underground before your radiation shield decays.

In any other car you would stand no chance – in the Last V-8, survival is possible . . . Maybe!

FEATURES

360° smooth scrolling, superb voice synthesis, 3 voice professionally composed theme music, realistic life simulation.

MASTERTRONIC HAVE DONE IT AGAIN!

Bringing you an added dimension for your Commodore 64/128 with these two outstanding programs on Disc. **Hero of the Golden Talisman** and **The Last V8** for the incredible price of only \$9.99 each.



THE MASTERTRONIC PLEDGE

We promise to bring you two outstanding added dimension programs every month.

finishes printing the current line before halting.) To resume scrolling, press the space bar again. The display continues to scroll until the ending address is reached, then the menu reappears. To break out of the display and return to the menu before the ending address is reached, press RETURN.

The Save and Load menu options are straightforward. First, MLX asks for a filename. (Again, pressing RETURN at this prompt without entering anything returns you to the command menu.) Next, MLX asks you to press either T or D for tape or disk. If you notice the disk drive starting and stopping several times during a load or save, don't panic; MLX opens and reads from or writes to the file instead of using the usual LOAD and SAVE commands, so this behavior is normal. Disk users should also note that the drive prefix 0: is automatically added to the filename (line 750), so this should *not* be included when entering the name. (This also precludes the use of @ for Save-with-Replace, so remember to give each version you save a different name.)

Remember that MLX saves the entire workspace area from the starting address to the ending address, so the save or load may take longer than you might expect if you've entered only a small amount of data from a long listing. When saving a partially completed listing, make sure to note the address where you stopped typing so you'll know where to resume entry when you reload.

Error Alert

MLX reports any errors detected during the save or load. Tape users should bear in mind that the Commodore 64 is never able to detect errors when saving to tape. The new MLX also has three special load error messages:

- **INCORRECT STARTING ADDRESS.** This means the file you're trying to load does not have the starting address you specified when you ran MLX. If you feel certain you're trying to load the right file, exit and rerun MLX, being careful to enter the correct starting address.

- **LOAD ENDED AT address.** This means the file you're trying to

load ends before the ending address you specified when you started MLX. If you feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct ending address.

- **TRUNCATED AT ENDING ADDRESS.** This means the file you're trying to load extends beyond the ending address you specified when you started MLX. If you feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct ending address.

The Quit menu option has the obvious effect—it stops MLX and enters BASIC at a READY prompt. Since the RUN/STOP key is disabled, Q lets you exit the program without turning off the computer. (Of course, RUN/STOP-RESTORE also gets you out.) If you choose this option, MLX asks for verification. Press Y to exit to BASIC, or any other key to return to the menu. After quitting, you can type RUN again and reenter MLX without losing your data, as long as you don't use the clear workspace option.

The Finished Product

When you've finished typing all the data for an ML program and saved your work, you're ready to see the results. Unlike the original MLX, this version keeps the data in a temporary holding area rather than in its final resting place in memory, so you must always save the finished program with MLX and then reload it from BASIC with a standard LOAD command.

The instructions for loading the finished product varies from program to program. Some ML programs are designed to be loaded and run like BASIC programs, so all you need to type is LOAD "filename",8 for disk or LOAD "filename" for tape, and then RUN. (Such programs usually have 0801 as their MLX starting address.) Others must be reloaded to specific addresses with a command such as LOAD "filename",8,1 for disk or LOAD "filename",1,1 for tape, then started with a SYS to a particular memory address. (On the Commodore 64, the most common starting address for such programs is 49152, which corresponds to MLX address

C000.) In either case, you should always refer to the article which accompanies the ML listing for information on loading and running the program.

An Ounce Of Prevention

By the time you finish typing in the data for a long ML program, you'll have several hours invested in the project. Don't take chances—use our "Automatic Proofreader" to type the new MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of data. (Incidentally, the new MLX is included on this month's COMPUTE!'s GAZETTE DISK.) Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses, then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to ensure that you can recall your work from disk or tape. Don't let a simple typing error in the new MLX cost you several nights of hard work.

See program listing on page 136. ☐

DR64 SPEECH DIGITAL RECORDER

DR64 FEATURES:

- EXCELLENT SOUND QUALITY! SOUNDS LIKE TAPE!
- FULL SPEECH SYNTHESIZER WITH UNLIMITED VOCABULARY.
- RECORD AND SPEAK IN ANYONE'S VOICE!
- INCLUDES RECORDER/PLAYBACK UNIT, HEADSET MIC AND ALL SOFTWARE ON DISK.
- COMES WITH DEMO PROGRAMS.
- PLUGS INTO USER PORT.
- CAN BE PLAYED BACK WITH (EXCELLENT SOUND) OR WITHOUT (GOOD SOUND) DR64 CONNECTED.
- MAKE (SELL?) YOUR OWN TALKING PROGRAMS!

ALSO AVAILABLE — SP64 SPEECH ON DISK (MADE WITH DR64 UNIT). INCLUDES COMPLETE SPEECH SYNTHESIZER. FOR ONLY \$19.95!

Send \$19.95 for Speech on Disk. Send \$99.00 for DR64 Digital Recorder Unit, or send \$4.00 for Demo Diskette including talking alarm clock, talking games and others. You'll be amazed!

ORDER NOW FROM:
SEYMOR-RADIX

P.O. BOX 166055 IRVING, TX 75016

A Printer For All Reasons

Search For The Best High Quality Graphic Printer

If you have been looking very long, you have probably discovered that there are just too many claims and counter claims in the printer market today. There are printers that have some of the features you want but do not have others. Some features you probably don't care about, others are vitally important to you. We understand. In fact, not long ago, we were in the same position. Deluged by claims and counter claims. Overburdened by rows and rows of specifications, we decided to separate all the facts — prove or disprove all the claims to our own satisfaction. So we bought printers. We bought samples of all the major brands and tested them.

Our Objective Was Simple

We wanted to find that printer which had all the features you could want and yet be sold directly to you at the lowest price. We didn't want a "close-out special" of an obsolete product that some manufacturer was dumping, so we limited our search to only those new printers that had the latest proven technology. We wanted to give our customers the best printer on the market today at a bargain price.

The Results Are In

The search is over. We have reduced the field to a single printer that meets all our goals (and more). The printer is the SP-1000 from Seiko-sha, a division of Seiko (one of the foremost manufacturers in the world). We ran this printer through our battery of tests and it came out shining. This printer *can* do it all. Standard draft printing at a respectable 100 characters per second, and with a very readable 12 (horizontal) by 9 (vertical) character matrix. This is a full bi-directional, logic seeking, true descender printer.

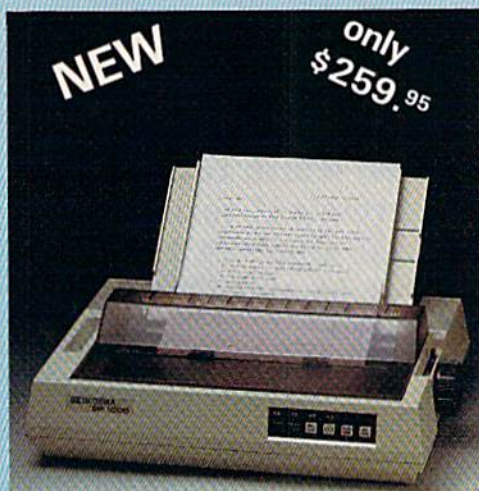
"NLQ" Mode

One of our highest concerns was about print quality and readability. The SP-1000 has a print mode termed Near Letter Quality printing (NLQ mode). This is where the SP-1000 outshines all the competition. Hands down! The character matrix in NLQ mode is a very dense 24 (horizontal) by 18 (vertical). This equates to 41,472 addressable dots per square inch. Now we're talking *quality* printing. It looks like it was done on a typewriter. You can even print graphics using the standard graphics symbols built into your computer. The results are the best we've ever seen. The only other printers currently available having resolution this high go for \$500 and more *without* the interface or cable needed to hook up to your computer.

Features That Won't Quit

With the SP-1000 your computer can now print 40, 48, 68, 80, 96, or 136 characters per line. You can print in ANY of 35 character styles including 13 double width and 3 reversed (white on black) styles. You not only have the standard Pica, Elite, Condensed and Italics, but also true Superscripts and Subscripts. Never again will you have to worry about how to print H₂O or X². This fantastic

machine will do it automatically, through easy commands right from your keyboard. Do you sometimes want to emphasize a word? It's easy, just use **bold** (double strike) or use *italics* to make the words stand out. Or, if you wish to be even more emphatic, underline the words. You can combine many of these modes and styles to make the variation almost endless. Do you want to express something that you can't do with words? Use graphics with your text — even on the same line. You have variable line spacing of 1 line per inch to infinity (no space at all) and 143 other software selectable settings in between. You can control line spacing on a dot-by-dot basis. If you've ever had a letter or other document that was just a few lines too long to fit a page, you can see how handy this feature is. Simply reduce the line spacing slightly and ... VOILA! The letter now fits on one page.



Forms? Yes! Your Letterhead? Of Course!

Do you print forms? No problem. This unit will do them all. Any form up to 10 inches wide. The tractors are adjustable from 4 to 10 inches. Yes, you can also use single sheets. Plain typing paper, your letterhead, short memo forms, labels, anything you choose. Any size to 10" in width. In fact this unit is so advanced, it will load your paper automatically. Multiple copies? Absolutely! Use forms (up to 3 thick). Do you want to use spread sheets with many columns? Of course! Just go to condensed mode printing and print a full 136 columns wide. Forget expensive wide-carriage printers and changing to wide carriage paper. You can now do it all on a standard 8½" wide page, and you can do it quietly. The SP-1000 is rated at only 55 dB. This is quieter than any other impact dot matrix printer that we know of and is quieter than the average office background noise level.

Consistent Print Quality

Most printers have a ribbon cartridge or a single spool ribbon which gives nice dark

printing when new, but quickly starts to fade. To keep the printers output looking consistently dark, the ribbons must be changed quite often. The SP-1000 solves this problem by using a wide (½") ribbon cartridge that will print thousands of pages before needing replacement. (When you finally do wear out your ribbon, replacement cost is only \$11.00. Order #2001.)

The Best Part

When shopping for a printer with this quality and these features, you could expect to pay around \$500 or more. *Not now!* We sell this fantastic printer for **only \$259.95!** You need **absolutely nothing else to start printing — just add paper.**

No Risk Offer

We give you a 2-week satisfaction guarantee. If you are not completely satisfied for any reason we will promptly refund your purchase. A 1-year warranty is included with your printer. The warranty repair policy is to repair or replace and reship to the buyer within 72 hours of receipt.

The Bottom Line

Be sure to specify the order # for the correct version printer designed for your computer.

Commodore C-64 & C-128, Order #2200, cable included

IBM-PC and compatibles, Order #2100, plus 8' cable #1103, \$26.00

Standard Parallel with 36 pin Centronics connector, Order #2400, no cable

We also have interfaces and cables for other computers not listed. Call Customer Service at 805/987-2454 for details.

Shipping and insurance is \$10.00 — UPS within the continental USA. If you are in a hurry, UPS Blue (second day air), APO or FPO is \$22.00. Canada, Alaska, Mexico are \$30.00 (air). Other foreign is \$70.00 (air). California residents add 6% tax. The above are cash prices — VISA and MC add 3% to total. We ship the next business day on money orders, cashiers' checks, and charge cards. A 14-day clearing period is required for checks.

For information call 805/987-2454

TO ORDER CALL TOLL FREE

1-(800) 962-5800 USA (8-6 PST)
1-(800) 962-3800 CALIF.

or send order to:



APROTEK

1071-A Avenida Acaso
Camarillo, CA 93010



Space Arena

Bryan Files



This engaging two-player game, which could have been titled "Indirect Aggression" for its unique design, features superior graphics and playability. For the Commodore 64 and 128 (in 64 mode). Two joysticks are required.

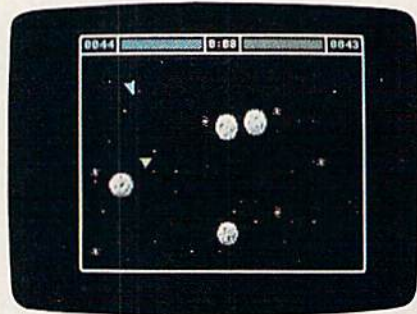
In a distant galaxy, a fierce war between two great empires has reached a stalemate. The cost to both civilizations has been high with no gain to either side. With the assistance of the Timelords, the two sides have agreed to settle the dispute in a controlled environment—a Space Arena.

Enclosed in this arena are four asteroids and a ship representing each side. Both ships are equipped with photon blasters, which have the ability to push objects without damaging them. A ship is destroyed only by a collision with an asteroid. The highest score within a given time determines the victor. One point is given each time a pilot hits the opposing ship with a photon blast. If the enemy's ship is destroyed by running into an asteroid, 20 points are awarded.

In "Space Arena," two people compete with their joystick-controlled ships. The movement is much like the classic arcade game

Asteroids. Rotate the ship by moving the joystick left or right. Push the joystick forward to activate the ship's thrusters, and press the fire button to release a photon blast. Remember that you have no brakes; to slow down, you must turn the ship around and thrust in the direction you're moving. Game options include speed (1-3, where 1 is the slowest and 3 the fastest) and time limit (1-5 minutes).

There are two basic strategies to playing Space Arena. You can try to push your opponent into an asteroid, or push the asteroids into your opponent. The effect of photon blasts on asteroids is much less than on ships because the asteroids are heavier. A single photon blast can send a ship flying across the screen, especially if the ship has to turn around before being able to slow down. On the other hand, if your opponent is faced with several fast moving asteroids, he may crash into one on his own.



The blue spaceship (upper left) has scored a hit, causing the other ship to careen out of control into the path of an asteroid.

Typing It In

Space Arena is written entirely in machine language, so you must use MLX, the machine language entry program that appears regularly in the GAZETTE (a new, time-saving version of MLX appears beginning this month—see "The New MLX" elsewhere in this issue). When you run MLX, answer the initial questions as follows:

Starting Address: C000
Ending Address: CFB7

After entering the program, save a copy on tape or disk. To load the game, type LOAD "filename",8,1 for disk, or LOAD "filename",1,1 for tape, where *filename* is the name you used to save the program. To run it, type SYS49152.

If you'd rather not type in the program, send a blank tape or formatted disk, a self-addressed, stamped return envelope, and \$3 (U.S. funds) for each copy. Outside the U.S., please don't send stamps but include the extra cost of postage. Please indicate that you want a copy of Space Arena. Send it to:

Bryan Files
404 Eastbrook Lane
O'Fallon, MO 63366

See program listing on page 130. ☺

CAN WE TALK?



You Bet We Can!

Announcing The VOICE MESSENGER and EASY SPEECH For The Commodore 64 and 128.

YOU'RE NOT ALONE--ANYMORE! (Or how to program your best friend)

Ever ask yourself why you spend so much time alone. Or, if only someone would talk to me. Thanks to Welwyn/Currah, you won't have to think about those things again with the new, exciting VOICE MESSENGER™ speech synthesizer and accompanying EASY SPEECH™ text-to-speech system.

TALK TO ME

By simply plugging in the VOICE MESSENGER to your Commodore 64™ and 128™ home computer, it can really become your best friend. The VOICE MESSENGER and EASY SPEECH system will say anything you want, letter by letter, in words, sentences, or in conversational or story form.

SOUNDS GOOD

Unlike other types of synthesizers the VOICE MESSENGER and EASY SPEECH system has an allophone speech synthesizer that makes computer speech intelligible with an unlimited vocabulary that will speak to you clearly and understandably. Its text-to-speech converts your typed copy into conversational dialog at the touch of the keyboard.

NOT JUST ALL TALK

Welwyn/Currah along with Rist, Inc. are without a doubt the most innovative developers of computer speech technology. The VOICE MESSENGER and EASY SPEECH system was designed for all possible applications: educational, entertainment, business and home utility. And can immediately be put into use with most dedicated, menu-driven and pre-existing software including: Infocom's™ "Adventure Series", the CBS™ "Success with Math" educational series, and many, many more.

TALK IS CHEAP! (Inexpensive, anyway)

The VOICE MESSENGER and EASY SPEECH system is available at a suggested combination retail price of under \$70.00, or may be purchased separately.

To find out how you can turn your Commodore 64 or 128 computer into your best friend, or to locate a store location nearest you call: (313) 547-8300; or write: Welwyn/Currah, 104 West Fourth Street, Suite 208-9, Royal Oak, Michigan 48067.



Commodore 64 & 128 are trademarks of Commodore, Inc. Infocom is a trademark of Infocom, Inc. Voice Messenger & Easy Speech are trademarks of Welwyn/Currah & Rist, Inc. CBS is a trademark of CBS Software

Welwyn

CURRAH



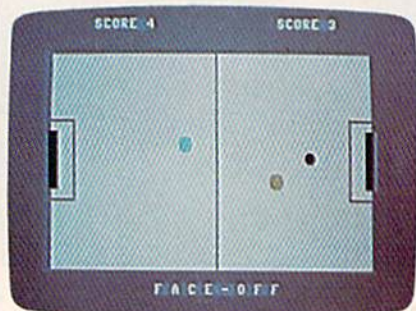
© 1985 Welwyn/Currah. All Rights Reserved.

Face-Off

Kevin Mykytyn and Mark Tuttle

Do you like fast action and competition? Whether you play against a friend or your computer, this colorful simulation of Air Hockey offers both. For the Commodore 64 and 128 (in 64 mode). A joystick is required (two joysticks for two-player game).

If you've played Air Hockey, you already know how to play "Face-Off." Based on ice hockey, Air Hockey pits two players against each other, each trying to shoot a puck into his opponent's goal while



The player on the right has missed blocking the puck, which is headed straight for the goal.

defending his own goal. A center line splits the playfield. Neither player is allowed to cross this line. The object of the game is simple: The first player to score five goals wins.

Typing It In

Face-Off is written in BASIC, although a large portion of the game is in machine language (in the form of DATA statements). Type it in using "The Automatic Proofreader," elsewhere in this issue. After you've finished entering the program, save a copy on tape or disk. To play the game, load it and type RUN. You'll see a message (READING DATA—PLEASE WAIT) and after a brief pause, you'll see a prompt, 1 OR 2 PLAYERS. Press 1 or 2 (it's not necessary to press RE-

TURN). The one-player game pits you against your computer; the two-player game is for two human opponents and requires two joysticks.

Next, you're prompted to select the speed (1-3). Speed 1 is the slowest and 3 is the fastest. (It is suggested that you play your first game at the slowest speed, although speed 2 is probably the one you'll choose after playing a few times.) If you selected a two-player option, the game begins after you've selected a speed. If you chose the one-player option, there's one more prompt to answer: Skill Level (1-9). This determines the intelligence of the computer-controlled player. If you choose 1, the computer plays a pretty easy game. At 9, it's very wily. With a speed of 3 and a skill level of 9, the computer is next to impossible to beat.

When the game begins, you see a red puck, a cyan player on the left, and a yellow player on the right. The cyan player controls the puck to start. Contact with the puck starts the game. (Notice that the puck gradually slows down if it's not hit.) After each goal scored, the player scored against gets control. (You can knock the puck into your own goal, which awards a point to your opponent.) A total of nine pucks are placed per game. If you wish to change the number of pucks, change the value in line 510.


One Player Or Two?

When playing against the computer, plug a joystick into port 1. You control the yellow player, on the right.



You can move anywhere up to the center line. (At slower speeds, one strategy is to play along the center line, like rushing the net in tennis. This keeps the puck in the computer player's territory most of the time if you can react quickly enough.) Current scores for each player are posted at the top of the screen. After nine pucks are used, the game is over. You're then prompted to press the fire button to play again, then to press up on the joystick to change play options or down to play with those of the previous game.

The two-player game has the same rules. The cyan player, on the left, must use a joystick plugged into port 2.

See program listing on page 135. 

2 MILLION AMERICANS ARE ABOUT TO BECOME 'DANGEROUS'

You could be one.

Play **Elite** – it's totally stunning.

Elite is Britain's 1985 Adventure Game of the Year, an interstellar mind-game with incredible 3D Vector-Graphic space flight simulation

Take command of your Cobra MK III combat craft, trade with alien cultures on over 2000 planets in eight galaxies. Pick your destination on the starmap, checking out the computer's 4-way viewscan – and you're ready for your first jump thru hyperspace.

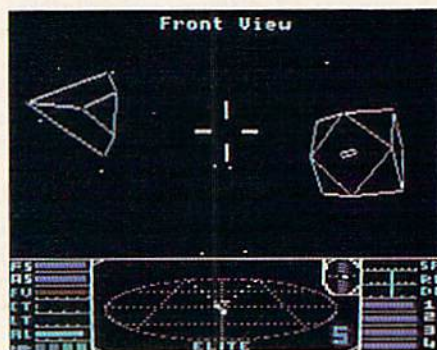
As a rookie you start with 'Harmless' status but with the right stuff and combat skills, you'll win ratings of 'Average' to 'Dangerous' – with your ultimate objective to become one of the **Elite**.

It's big, it's fast and it's here now for the **Commodore 64™** and **128™** complete with Manual, Novel, Control Guide, Ship Identification Chart, Keyboard Overlay and the opportunity as the US competition winner to get flown to London, England to try for the Elite World Championship.

It's so addictive it's been called "the Game of a Lifetime".

Elite.

Be dangerous.



Firebird

P.O. BOX 49, RAMSEY
NEW JERSEY 07446 USA.

FIREBIRD HOTLINE ☎: 201 934 7373

**GOLD
EDITION**

SoundChaser Keyboard And MacMusic

The SoundChaser-64 is a rugged, full-size, four-octave musical keyboard, interfacing with the Commodore 64's cartridge port, and designed for serious applications. Although at \$199 it is not inexpensive, it's one of the *best* Commodore 64 musical keyboards on the market and well worth the price. In addition, the SoundChaser is driven by quality software. (Be advised, however, that the software may not work properly on some of the earliest model 64s.)

The disk accompanying *SoundChaser* includes an instructional program which clearly explains the Monophonic and Polyphonic (three-voice) play modes. (Written documentation is a scant three pages, one of which is installation instructions.) In polyphonic mode, the voices all have the same characteristics (waveform, envelope, etc.); there is a modest selection of variable parameters and five preset instruments. Monophonic mode permits substantial—even total—modification of 13 preset sounds. Unfortunately, there is no way to save new voicings. This is a considerable drawback, particularly given the absence of other software for SoundChaser. I hope that a Load/Save option for voicings will be added in the future.

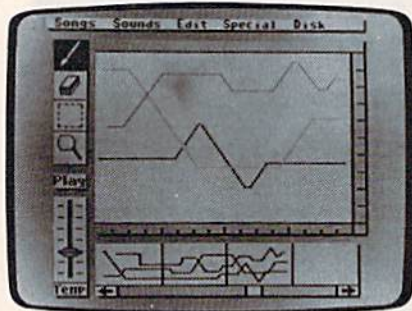
The monophonic voices are a veritable tutorial on how to get expressive sounds from the SID chip. Richness is largely dependent on two-oscillator near-unison detuning, filter and oscillator modulation (LFO and ADSR). Sync and ring modulation are also implemented. Limitations include: the same ADSR for filter and amplitude enveloping, a shallow depth of LFO modulation (three half-steps maximum), and no pulse LFO.

Both monophonic and polyphonic modes offer excellent keyboard response: no delay, and rock-solid decoding. The three voices of polyphonic mode correspond to the two lowest and the highest keys pressed. Overall, SoundChaser software is intuitively accessible, particularly to those with analog synthesizer experience.

The *MacMusic* program will indeed, as its liner states, "make your C-64 into

a musical Macintosh"—complete with joystick instead of mouse. (The 64 keyboard isn't used at all.) Here are icons, pull-down menus, boxes (windows), clicking, and dragging, and "cut/paste/copy/erase/paint/magnify" options inspired by *MacPaint* and *Music Construction Set*.

The well-designed hi-res screen is coupled with an innovative "visual music" notation which combines a vertical musical keyboard graphic (for pitch) with a horizontal beat/time-line. Three color-coded voices are drawn/brushed (edited/erased) within this time/space block—an effective method for those untrained in music theory and traditional notation.



MacMusic

I must confess to some difficulty and frustration in trying to use the joystick as a mouse (a real mouse would be easier). Otherwise, *MacMusic* is simple to learn and operate. The short manual is well-written, clear, and concise.

Ten current pop songs are included, as well as a choice of 13 instruments (bearing little resemblance to their names). While you are offered a menu of ten scales in any key, a major limitation of the current version of *MacMusic* is that you cannot create or modify instruments. (The "canned" instruments are nowhere near the quality of SoundChaser's.) Although the program liner suggests that additional sounds may be loaded (a pull-down menu includes a "Load Sounds" option), *MacMusic* itself does not have this capability. (Perhaps this is a future development to which the liner refers—"MacMusic's

upward compatibility," "continually expanding its features.")

Although early Passport/Hal Leonard literature announced *MacMusic*'s compatibility with the SoundChaser keyboard, *MacMusic* does *not* use SoundChaser. Indeed, *MacMusic* is now described as "the ultimate stand-alone composing program." Unfortunately, joysticks are no substitute for organ keyboardists. The value of both SoundChaser and *MacMusic* would increase if they were made compatible. In particular, the ability to enter musical data through the superb SoundChaser would make the innovative and well-designed *MacMusic* a much more flexible and viable arranging tool.

—Art Hunkins

SoundChaser-64
Passport Designs, Inc.
625 Miramontes St., Suite 103
Half Moon Bay, CA 94019
\$199

MacMusic for Commodore 64
Hal Leonard Publishing Corporation
(with Passport Designs, Inc.—Passport Musicsoftware)
8112 W. Bluemound Rd.
Milwaukee, WI 53213
\$49.95

S'more

The *S'more* cartridge changes a 64 into a new, more powerful computer, one with more memory and a much improved BASIC. Most of the additional commands are the same as, or similar to, the commands found in the 128's BASIC 7.0. You could say that *S'more* transforms a 64 into a mini-128.

When you first turn on a 64 with *S'more* installed, the screen has a cyan border, a white background, and a dark gray cursor, which is much more readable than the 64's default blue on blue. The power-up message announces that you have 61183 bytes free, half again as much as a normal 64. The best part, though, is that there are more than 50 new commands. Plus, you have access to several dozen new variables and arrays for handling the SID chip, the CIA chips, screen and color memory, and other memory addressing tasks.

S'more abounds in programming aids. NUMBER rennumbers a program; DELETE removes a range of lines from a program; FIND shows you where certain variables, numbers, or strings are located; CHANGE performs a search-and-replace; DEC and HEX\$ make translations between decimal and hex easy; and DUMP shows current variable definitions. KEY can program the function keys with commonly used statements. Turn on TRACE mode to follow the execution of a program. If you make a programming error, EL, ER, and ERR\$ tell you the line number with the mistake, the error number, and the error message. TRAP lets you set up error-handling routines within a program and, if you wish, RESUME to a line number after an error has occurred.

Several new and enhanced disk commands have been added. MERGE adds a program on disk (or tape) to the one currently in memory. LOAD and SAVE have been modified to default to disk. You can enter RUN "program name" to load and run a program from disk. RECORD simplifies access to relative files. No longer is it necessary to go through the OPEN 15,8,15 ritual to send disk commands; you just type DISK, followed by the usual command for scratching, initializing, or whatever. When the drive light starts blinking, you can read the error channel with PRINT DSS.

S'more supports DO-LOOPS (including WHILE, UNTIL, and EXIT), which are more flexible than FOR-NEXT loops. And IF-THEN statements can be followed by ELSE. There's PRINT AT, for locating the cursor before printing, and PRINT USING, for formatting output. Keyboard input is improved by new commands like IN-LINE, INFORM, and GETKEY. There are many more commands and features; *S'more* has nearly all of the 128's program control keywords and programmer's utilities (and some very useful ones that aren't available in the 128), but it lacks the new commands for sprites, hi-res graphics, and music.

The cartridge comes with a well-written 129-page manual, which includes an explanation and at least two programming examples for each new command. As a bonus, there's a disk with programs written in *S'more* BASIC for programmers to study and use. The manual notes that the disk should be backed up—it's not copy-protected—or, if you prefer, you can send \$3 to Cardco for a backup. Included is a version of the popular public domain machine language monitor *Micromon*, a mailing list program, and more. There are also several interesting hi-res pictures on the flip side (although you have to remove the *S'more* cartridge to get the program to work).

The Dam Busters.TM The game that'll keep your Aston Martin in the hangar.



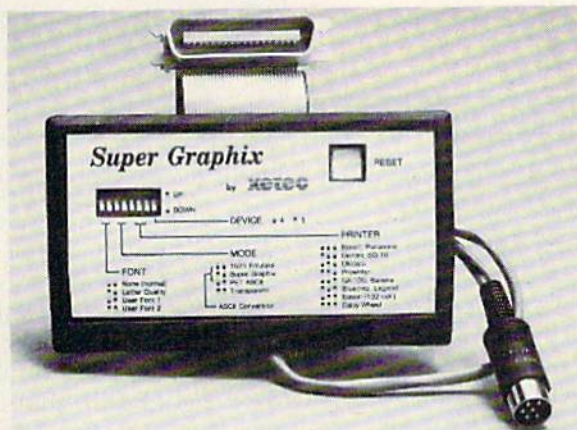
You won't be doing much cruising around in your Aston Martin when you have the game that lets you rely on one of the R.A.F.'s most decisive World War II bombing missions. You must man seven different tactical positions within the bomber. Grasp control of the intricate and complex cockpit or you will perish. Don't kid yourself, this is a very difficult game. To be successful, you'll need the right stuff!

Your mission is to match the legendary raid led by Wing Commander Guy Gibson on May 16th, 1943. Against incredible odds, British Lancaster Bombers from his Squadron 617 successfully breached three dams, flooding the Ruhr Valley and virtually crippling the Nazi war machine.

AccoladeTM

For dealer information contact: Accolade Inc., 20863 Stevens Creek Boulevard, Cupertino, CA 95014, (408) 446-5757. All rights reserved © 1985. Licensed from Sydney Development Corp., Canada © 1984. In Canada exclusively, call Beamscope: 1-800-268-5535.

Super Graphix



You
Asked
For
It . . .
Here
It Is!!!

GRAPHICS and FONTS plus an 8K BUFFER for the ultimate in performance and speed. The XETEC Super Graphix interface for Commodore Computers now offers a new high in technology with these features:

- 8K Buffer Standard
- 10 Printing Modes
- 3 Internal Screen Dumps
- Extensive Command Channel
- Reset Button to Halt Printing from Buffer
- Switch Settings on Label for Quick Reference
- Correspondence Quality Font Built-In
- Capable of Storing 2 Additional Fonts
- Correct Graphics/Text Aspect Ratio for all Major Printers
- 8 Active Switches with Changes Constantly Monitored
- Internal Fonts Support Super-script, Sub-script, Underlining, Bold-face and Choice of 9 Pitches

Suggested list \$99.95 • Includes Lifetime Warranty

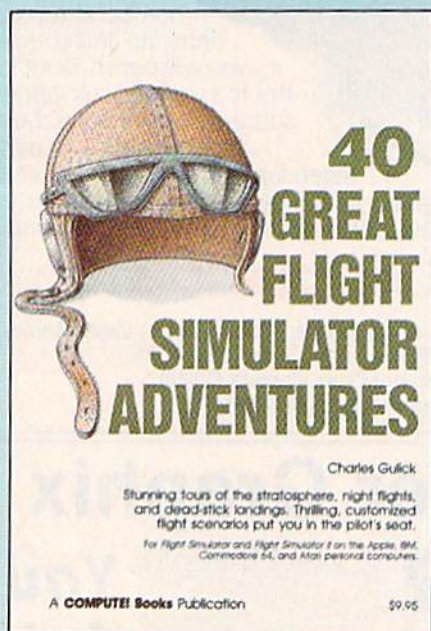
XETEC, Inc. / 3010 Arnold Rd. / Salina, KS 67401 / 913-827-0685

Discover the thrill of flying!



with COMPUTE! Books' **40 Great Flight Simulator Adventures**

- Maneuver around the towers of the World Trade Center.
- Sightsee the Hudson River.
- Practice night flying and aerobatics.



40 Great Flight Simulator Adventures

Charles Gulick

Forty exciting, customized flight simulator scenarios put you in the pilot's seat as you fly over bridges, around skyscrapers, and land at mysterious airports. *Flight Simulator* (IBM PC) and *Flight Simulator II* (Apple II, Commodore 64, Atari) are two of the most popular games/simulations for personal computers. With this book, you can experience flight adventures from the moment you load the program. Parameters set up each flight and a running commentary describes what you'll see (and where to look to see it). Ranging from the simple and straightforward to the advanced and even mystical, these 40 flights will open a new dimension to an already outstanding program. **\$9.95** ISBN 0-87455-022-X

Please send me _____ copies of *40 Great Flight Simulator Adventures* at \$9.95 each.
(ISBN No. 0-87455-022-X)

All orders must be prepaid in U.S. funds.

Subtotal _____

NC residents add 4.5% tax _____

\$2.00 shipping and handling
charge per book. _____

Total amount enclosed _____

To order this exciting adventure guide, mail
the attached coupon with your payment to
COMPUTE! Books, P.O. Box 5038,
F.D.R. Station, New York, NY 10150. Or call
toll free 1-800-346-6767 (in NY 212-265-8360.)

Payment enclosed (check or money order)

Charge Visa MasterCard American Express

Name _____

Address _____

City _____ State _____ Zip _____

Please allow 4-6 weeks for delivery.

7610222

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

COMPUTE! books are available in the U.K., Europe, the Middle East, and Africa from Holt Saunders, Ltd., 1 St. Anne's Road, Eastbourne, East Sussex BN21 3UN, England.

Of the two game-systems, though, *Operation Market Garden* is the more traditional. It uses a hexagon-covered terrain map and battalion-sized units with lots of numbers. It employs a rigid play sequence, where one side moves and fights and then the other side moves and fights. The detailed manual includes maps showing the progress of the historical campaign, and charts demonstrating how the computer calculates combat. The game is superbly done, but it's also completely without surprise.

Operation Market Garden demonstrates SSI's concern for the evolution of proven game systems. There is little

innovation, but there is nothing out of place, either. The game uses well-tested movement, combat, and supply systems to simulate the campaign with respectable accuracy. It forces the player to use both strategic planning and tactical finesse. And it does it all without raising the gamer's ire. A thoroughly solid effort.

Kampfgruppe illustrates SSI's other major concern—the innovative war-game system. The game map is divided into squares, not hexagons. The squares do not appear on the screen, so the map has a more natural appearance, and is easy to read. Units can move in eight directions instead of six. The game in-

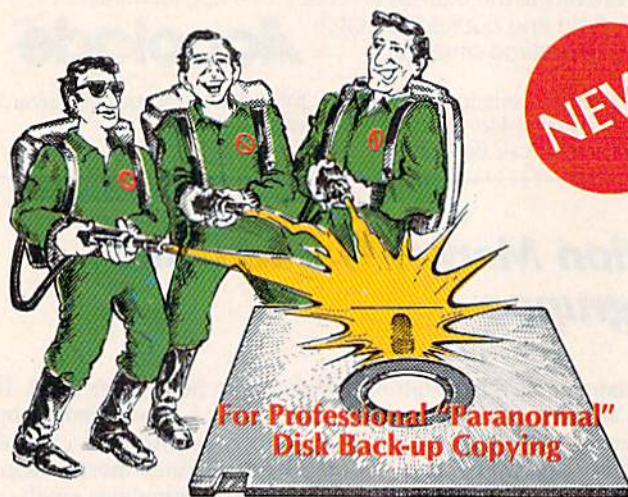
cludes four historical scenarios and an easy-to-use scenario generator. A wide variety of armored, artillery, and infantry weaponry is available to the players. None of these features is innovative in itself, but in the context of a swift-moving system, they are nicely done.

What is new is the way you, the player, control your battle units. Effectively, you order your units to move twice. A unit will follow its first order, then, unless you have changed it, its second order. If you alter the orders, it will obey, but only after a short (but often crucial) delay. The delay system forces you to make a plan and stick to it, or suffer some degree of chaos. Units fire automatically at enemy units; you can control the range at which your units fire, but not the actual target. This procedure is both unusual and realistic.

IF THERE'S SOMETHING STRANGE PREVENTING DISK COPYING

call

DISKBUSTERS™



DISKBUSTIN' IS GONNA MAKE YOU FEEL GOOD! Now you can make back-up copies of your newest software. This is the SUPER-FAST Disk Copier that ZAPS thru copy protection! Average copy time is only 3-4 minutes. Includes unique Power-Pack feature for tough disks. Has copy capability not available until now, and even copies other copiers!! DISKBUSTERS will help you insure the safety of your software investment, and it's both C-64 and C-128 compatible!

WE AIN'T AFRAID OF NO DISKS!!

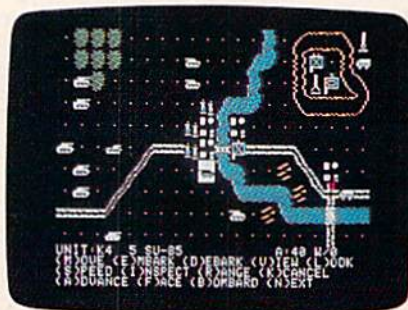
INTRODUCTORY
OFFER
ONLY
\$29.95

To order by phone call
(805) 569-1644
Operator 10

Order by phone, VISA/MASTERCARD/COD or send Check or Money Order and include shipping charges, CA addresses add 6% tax; \$3.50 ship USA addresses; UPS air \$5.50, COD add \$4.00 to continental US only; Canada \$7.50; all other countries \$10.00 and must include U.S. certified money order only.

dob SOFTWARE

Box 31169 • Goleta • CA • 93130



Kampfgruppe

Kampfgruppe allows you to play a very specific leadership role. Rather than command individual units, you can give orders to those units' headquarters. This system both reduces the time-consuming problem of moving each unit and adds a further degree of realism. In effect, you give general rather than specific orders, of the type actually given by higher-level commanders. The game allows you to switch to a unit-by-unit command if you wish, but you will use this option less frequently as you begin to master the game.

Both *Operation Market Garden* and *Kampfgruppe* are encouraging for the company's followers. Thoroughly designed efforts like *Operation Market Garden* are always welcome in the war-game hobby, while new directions like *Kampfgruppe* are necessary if the hobby is to grow. What SSI seems to need now is a computer with greater graphics and computing capabilities. With the new generation of personal computers now appearing, SSI's games should soon offer even better graphics, easier play, and greater realism.

—Neil Randall

Strategic Simulations, Inc.
883 Stierlin Rd., Bldg. A-200
Mountain View, CA 94043
Kampfgruppe (\$59.95)
Operation Market Garden (\$49.95)

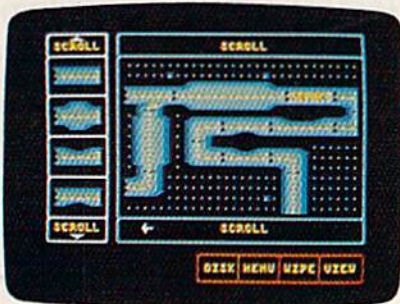
Fast Tracks: The Computer Slot Car Construction Kit

That's Tom Sneva up ahead on the pole. Bobby Rahal is outside on the first row. Rick Mears is inside on the second row, and here I am, starting in fourth, on the outside of the second row. The green flag will be out any second. Rahal is probably going to accelerate hard and try to beat Sneva into the turn. I'll just go with him and try to take the lead coming out of the second turn. There's the flag! Hit it hard now!

You'll probably never be sitting on the starting grid at the Indianapolis 500 with Mears, Sneva, and Rahal, but *Fast Tracks: The Computer Slot Car Construction Kit* will put you on the toughest slot car tracks around against the toughest and smartest drivers you'll ever care to see.

The predesigned tracks are tricky enough. But they can get even trickier as you design your own race course and try to post the fastest time possible. Tight turns, narrow one lane straight-aways, overpasses, and oil slicks make the course extremely demanding. Try to pass at the wrong time, and you'll find yourself being bumped and spinning off the track. Your 64 is not Mr. Nice Guy. Given the chance, it'll push you off the track every time. Don't hesitate to bump back—you can gain two seconds for every car you force off the track.

Fast Tracks includes more than 20 different track sections for designing your own race course. The track sections are easy to position for your own racing layout. Just use your joystick to place the pieces. After completing your track, the computer provides the landscaping and you're ready to race. Build a really tough track, then challenge your friends to beat your time on your track.



The most innovative feature of *Fast Tracks* is an option that allows you to make a disk copy of your track and give it to a friend who can then load it and

Psi 5 Trading Co.™ The game that'll put your BMW into orbit.



It's the 35th Century and you're trying to captain Quasan-3GP Space Freighters on the edge of an eternal galaxy. You don't have time to tool around in your BMW, you're trying to outlast marauding space pirates who seem to be reading your mind.

It's a long shot, but this is your only chance to save the starved-out inhabitants of the Parvin Frontier. You hand-pick your own crew from 30 possible candidates. Some will be human.

Some will not. Make the right choice! Each candidate has his own special skills and personality. If you can't manage them, you won't survive.

Accolade™

For dealer information contact: Accolade Inc., 20863 Stevens Creek Boulevard, Cupertino, CA 95014. (408) 446-5757. All rights reserved © 1985. In Canada exclusively, call Beamscope: 1-800-268-5535.

run it, without having to own a copy of *Fast Tracks*. The program even gives you credit for designing the track. Your friends can experience the challenge of attempting to beat your best time, lacking only the ability to modify or design a track of their own.

An additional disk may be purchased from Activision which includes several other tracks, including a Bobby Rahal signature track. Here's a chance to experience a race against one of the best. Try to beat Rahal's time around

his own track.

Activision has also announced a "Dream Track" contest. Create the most difficult and complex track imaginable, then send it to Activision. The winner, selected by Bobby Rahal, will receive an all-expense paid trip for two to the 1986 Indianapolis 500.

—George Miller

Activision
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
\$29.95

Keys to Responsible Driving

Learning how to drive is a rite of passage in America. Almost every teenager takes some sort of driver's education course in high school. *Keys to Responsible Driving*, a package from CBS software, is an interesting addition to this education.

This isn't a driving simulation—that's left for the open highway. Instead, this self-paced question and answer program presents the general rules of the road, letting you move through each chapter of instruction at your own speed. Defensive driving is stressed

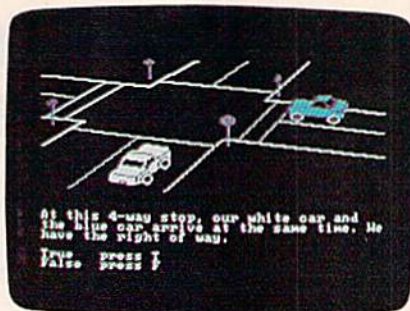
throughout the program, and graphically displayed situations put you in the driver's seat. You react, and your answers, whether right or wrong, are evaluated.

Do you know what the sign for a slow-moving vehicle is? Just how safe or unsafe is mixing alcohol and automobiles? Answers to these questions, and scores of others, are included in this program. Screen after screen shows you the proper way to make a U-turn, or parallel park. What are the steps you need to keep in mind when making a

right turn—or a left turn? *Keys to Responsible Driving* tells you.

A pre-test and post-test show you what you know before you begin, and what you've learned after you're finished. Scores are even kept in a record file which you can access at any time. Separate chapters cover such things as handling and maneuvering a car, road signs, city driving, highway driving, turning and changing lanes, as well as outlining the dangers of driving under the influence of drugs or alcohol.

Two disks and a *Guide to Safe Driv-*



ing booklet are included in this package for the Commodore 64. Reviewed by

such organizations as the National Safety Council, the American Automobile Association, and Allstate Insurance Company, the only thing that *Keys to Responsible Driving* doesn't include is a driver's license.

—Gregg Keizer

CBS Software
One Fawcett Place
Greenwich, CT 06836
\$79.95 (disk)

also worth noting

Cadpak-64 (Enhanced Version)

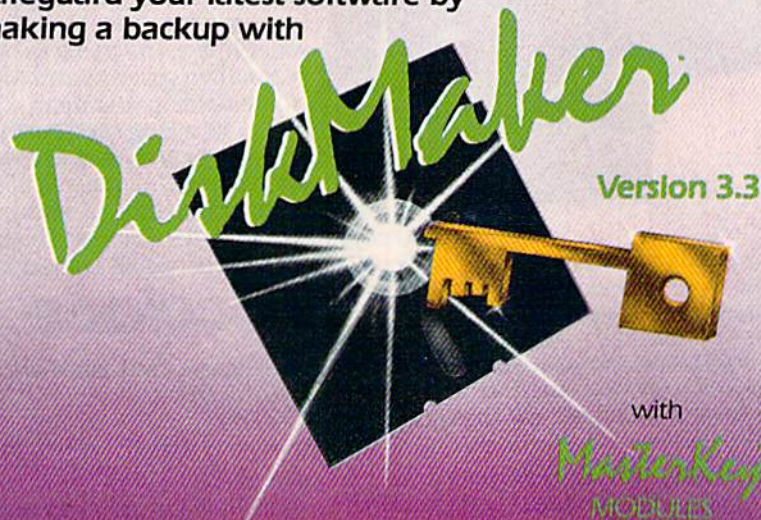
Subtitled a "Computer Aided Design Package with Dimensioning," *Cadpak-64* is a very good program for the creation of high-resolution pictures and graphics designs on the Commodore 64. The package lets you use either a light pen or the keyboard to create the images, and supports numerous dot-matrix printers, both color and black-and-white. A major plus for *Cadpak* is its ability to produce accurately dimensioned output at every stage of the design process. Documentation is very comprehensive, although it can be a bit confusing at times because of the two different input methods covered. That shortcoming is more than compensated for by the excellent tutorials on the disk. *Cadpak* is a typically thorough effort from Abacus, and will be of interest to anyone wishing to create, store, and print hi-res pictures.

Abacus Software
P.O. Box 7211
Grand Rapids, MI 45910
\$39.95

Temple Of Apschai Trilogy

For those as yet unfamiliar with the popular Apschai series of fantasy adventure programs for the Commodore 64, this new release from Epyx should be of great interest. Even those who've played one or more of the three games included in the trilogy may want to invest in this combined package. Epyx has taken *The Temple of Apschai*, *The Upper Reaches of Apschai*, and *The Curse of Ra*—all previously released separately—and placed them on one disk. The colorful graphics have been noticeably improved, the game play is faster, and the accompanying manual is informative and clear. An Apschai Command Card provides a quick reference to all

Safeguard your latest software by making a backup with



THE 3 BEST COPIERS AVAILABLE ALL IN ONE SUPER PACKAGE

No hardware necessary, easy to use, NEW! MasterKey™ system makes Diskmaker virtually 100% effective!

Copies new custom G.C.R. code protection, long data-block logic, no-sync data blocks, NEW wide head protection, and many other specialized protection routines. Copies normal and protected disks. Includes 3 copiers—FAST copier, VARI-SECTOR copier, and AUTO-LOGIC NIBBLER. Actually copies a full disk in only 2 minutes. Inexpensive module releases keep you up-to-date. MODULES available by subscription or individually.

Only **\$49.95**
for copier system

To order CALL **805-687-1541 ext 64**
Technical line 805-682-4000 ext 99

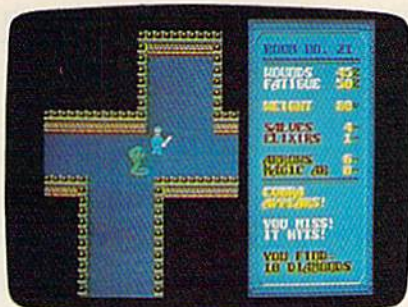
Also available DiskMaker™ ToolKit™, SUPER Disk Utility package. Ask for SPECIAL Combo offer with DiskMaker™.

Order by phone 24 hrs/7 days or send cashiers check/money order Payable to BASIX. Visa, MasterCard & American Express include card # and exp. date. Ca. residents add 6% tax. Allow 2 weeks for clearance of personal and co. checks. Add \$3.50 shipping/handling for continental US, \$5.50 for UPS air. COD's shipped to 48 states only, add \$4.00. AK, HI, APO, FPO add \$7.50. Canada add \$10.00. Other foreign orders add \$15.00 and remit, certified US funds only. No credit card orders from outside North America. Dealers & Distributors invited & supported.

DISKMAKER PAYS FOR ITSELF THE FIRST TIME YOU USE IT

basix

3463 State Street • Suite 1541A • Santa Barbara • CA 93105



the options within the game as well. There are 12 levels, 568 rooms, and 37 different monsters for you to conquer.

Select a character, imbue him or her with varying levels of strength, constitution, dexterity, intelligence, intuition, and ego. Then set forth. If you create an adventurer you particularly like, you can save the character for use in later games. The program will record all of the pertinent information—experience, fatigue, treasure, weapons, and strength—and let you take that character to any of the three games. There is even a provision for you to bring to the Apschai trilogy a character or characters created on other computer game systems. This is a classic series of computer games made even better.

Epyx Computer Software
1043 Kiel Court
Sunnyvale, CA 94089
\$27

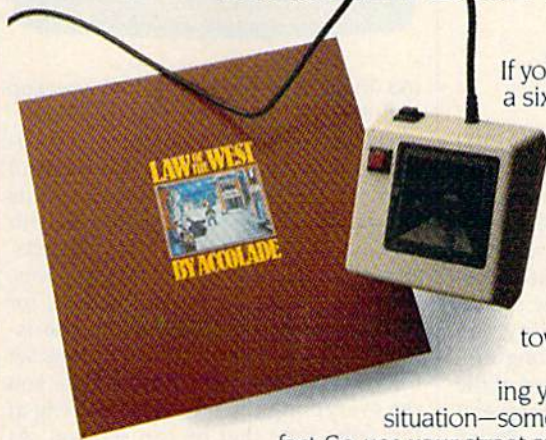
Decision in the Desert

This World War II combat simulation blows the sands of North Africa across your computer's screen as you become a German or British general fighting for your army's survival. Five scenarios cover the first two years of the war in the desert, from O'Conner's raid against the Italians in 1940 to the final assault on the El Alamein position in 1942. You command one army's divisions, regiments, and air squadrons while the computer controls the other.

Sending orders to your units through the keyboard or joystick, you move, attack, and defend on a variety of terrain, from the fortress of Tobruk to the ridges of Alam Halfa. Plunge too far behind enemy lines, and you could get cut off from your supplies, endangering your army and tempting defeat. But take no risks—become a Rommel or Montgomery in name only—and the enemy could pummel you from all sides.

In this strategic-level game, you decide where to attack, and when. Whether to press your Italian infantry forward, even though they've suffered severe casualties, or husband your last reserve of armor for that final counter-attack which could swing the battle. Pe-

Law of the West.TM The game that'll keep your Porsche off Main Street.



If you've ever wanted to strap on a six-shooter, pin a tin star to your chest and match the exploits of Bat Masterson or Wyatt Earp, then Law of the West is your chance. Forget about gunning down Main Street in your Porsche. It's the 1870s and you're the Sheriff of Gold Gulch—as bad a Wild West town as there ever was.

You won't survive by blasting your way out of every sticky situation—some of the gunslingers are just too fast. So, use your street smarts and get to know their "bad guy" personalities. You've also got to keep the locals happy—Rose, the saloon keeper, the doctor, the "kid" and even your own deputy—they're all valuable allies if you want to live to see another high noon.

AccoladeTM

For dealer information contact: Accolade Inc., 20863 Stevens Creek Boulevard, Cupertino, CA 95014, (408) 446-5757. All rights reserved © 1985.
In Canada exclusively, call Beamscope: 1-800-268-5535.

riods of frantic movement and combat are interspersed with relative calm, just like in the real desert war. You can select options within each scenario, set the level of computer competence, even display only those enemy units you've brushed against. *Decision in the Desert* may not put sand in your face, but it's the closest you'll come from this side of the screen.

MicroProse Software
120 Lakefront Dr.
Hunt Valley, MD 21030
\$39.95

Actionauts

Software designer Rob Fulop calls his *Actionauts* a set of computer toys rather than a game. And, as such, the program is an engaging experiment in creativity. You play with a "gravity grid" and a group of programmable screen characters. These figures move around on the grid in any fashion you choose. The program's editor lets you use a joystick or the keyboard to instruct your set of *Actionauts* on what to do. Start with a simple game of tag (the user's manual shows you how) and then move on to more complex constructions.

Actionauts is a special program in



that it's *freeware*—copyrighted software which is intended to be copied by anyone who wants to use it. Fulop's company, Advanced Program Technology (APT), is sending copies of *Actionauts* to user groups across the country. The company requests that those who use the program send in \$3 to become registered users and to get a copy of the manual and a subscription to the "Actioneer" newsletter. If you can't get a copy at your local user group, you can order the entire package from ATP for \$10. But note: Freeware is still copyrighted software, not public domain material.

Fulop, formerly a computer game designer with Atari and Imagic, was responsible for such programs as *Missile*

Command and Demon Attack. He's brought the same talents to *Actionauts*, which is an inventive package at an unbeatable price.

Advanced Program Technology (APT)
467 Hamilton Ave., Suite 1
Palo Alto, CA 94301
Free (through user groups)
\$3 for documentation
\$10 individually through APT

The Original Boston Computer Diet

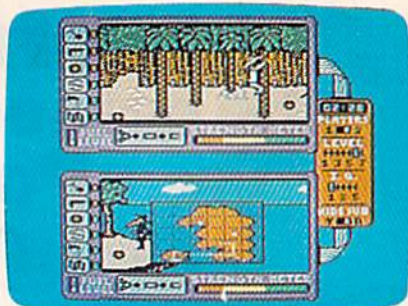
No one ever said dieting is easy. But Scarborough's *Original Boston Computer Diet* for the Commodore 64 can at least make the process easier and more enjoyable. The program will also get you started on a balanced, nutritional approach to weight loss rather than a fad diet that might be unhealthy and could be unproductive in the long run. Developed by Dr. Leighton Read of the Harvard Medical School and several other medical researchers, the *Boston Diet* focuses on meal planning, food reporting, goal setting, and solid nutritional advice. The program counts calories for you, offers feedback on the nutritional balance of your diet, and even has built-in "counselors" who help guide your efforts. The 97-page manual contains short chapters on health, fitness, and proper diet. A separate Food Reporting and Meal Planning Guide shows you how to set up your own schedule.

This is an easy-to-use, flexible, and informative computer diet program. Although only one person can use the package at a time, after you've purchased the program you can buy additional disks for only \$10.

Scarborough Systems, Inc.
25 N. Broadway
Tarrytown, NY 10591
\$49.95 (disk)

Spy Vs Spy II: The Island Caper

Don't expect to master the elements of espionage in one sitting with First Star Software's *Spy vs Spy II: The Island Caper*. The action is fast, the dangers many, and your opponent unscrupulous. *The Island Caper*, for the Commodore 64, uses the same *Simulvision* format—a split-screen feature for two players or one player against the computer—used in the first *Spy vs Spy* game. In this sequel, you and the opposing spy are trapped on a tropical island while searching for the parts to a missile. Find and construct the missile before your opponent, and you can leave the island on a submarine. Wait



too long, and the still-active volcano will end the search for you.

Like its predecessor, *The Island Caper* features excellent color graphics and sound. The treacherous island and its surrounding waters come equipped with quicksand, coconut bombs, swords, sharks, snare traps, and even punji pits. As you search, you set booby traps for your opponent while avoiding the island's natural hazards and the traps set for you. The split screen effect lets you see everything the other spy is doing at the same time that he can see you. At the upper levels of play, there may be more than one island to search. Playing against the computer, you'll have to become very fast and tricky to win. Playing against another person, with simultaneous two-player action, is even more fun.

First Star Software
18 E. 41 St.
New York, NY 10017
\$29.95 (disk)

Star Rank Boxing

This well-designed one- or two-player game for the 64 allows you to create your own boxer, train him, then work your way up through the ranks.



Pre-fight training is important to fine tune your boxer for the upcoming contest. Spend too little time on road work, and you'll find your boxer tiring early in the fight.

With a joystick, you select punches as you fight any of 19 ranked boxers in bouts against the computer, or select a "dream match" against a friend. Excellent animation and graphics, with effec-

tive use of sound make *Star Rank Boxing* an interesting addition to any game collection.

Gamestar, Inc.
1302 State St.
Santa Barbara, CA 93101
\$29.95 (disk)

Halley's Comet

This new package, a series of programs written by Eric Burgess, Fellow of the Royal Astronomical Society, is intended to help amateur astronomers keep track of Halley's comet, especially during its 1986 appearance. It could also be useful for instructors, as it includes a short teacher's guide in addition to the 12-page user's manual.

The on-screen introduction to the programs sums up their features rather nicely:

This program helps you to find and to observe Halley's comet. It shows where the comet can be seen among the stars of the constellations. It tells you what time the comet rises, is highest in the sky, and sets, for any day you choose, anywhere on earth. It plots the sky from any location for any time and date, and shows the comet relative to stars, naked eye planets, sun and moon. It shows earth and comet moving in their orbits, and their positions at any date. It provides physical details of the comet and its historical passages through the inner solar system. The program is optimized for the apparitions of 1759, 1835, 1910, and 1986.

This kind of program is not for everyone. Some of its material is fairly dry, and the time plots could be confusing without interpretation. However, this software does an excellent and accurate job, and uses the 64's features to full advantage.

Science & Technology Software Service
13361 Frati Ln.
Sebastopol, CA 95472
\$49.95

COMPUTE!'s Gazette is looking for utilities, games, applications educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it, on tape or disk to:

Submissions Reviewer
COMPUTE! Publications
P.O. Box 5406
Greensboro, NC 27403

Please enclose an SASE if you wish to have the materials returned.

Articles are reviewed within four weeks of submission.

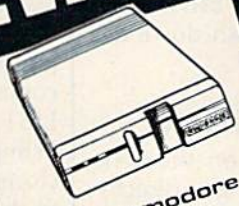


**CALL TOLL FREE
1-800-631-1003**

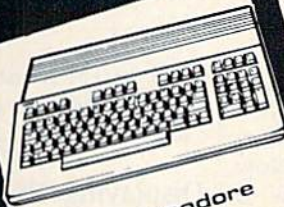
UNBELIEVABLE PRICES! (BELOW WHOLESALE)



commodore
1902 MONITOR
239⁹⁵



commodore
1571
DISC DRIVE
239⁹⁵



commodore
128
\$269



CCA NEVER EXCLUSIVE BEFORE
NEVER AGAIN AT THIS PRICE
Star G10X **149⁹⁵**
Star G15X **249⁹⁵**
Gemini SG10 **209⁹⁵**

commodore
PRODUCTS



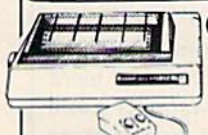
commodore
64 **129⁹⁵**



commodore
1541 DISC DRIVE
159⁹⁵

NEW!

commodore
141M MONITOR **149⁹⁵**

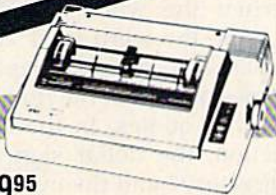


commodore
803 PRINTER
99⁹⁵



WICO JOYSTICKS
The Boss **12⁸⁸**
The Bat **14⁸⁸**
3-Way **19⁸⁸**

PRINTERS



GEMINI SG10 209⁹⁵
Gemini SG10C **234⁹⁵**
With Built-in Commodore Interface
Gemini SG15 **359⁹⁵**
Powertype (Letter Quality) **309⁹⁵**
Gemini SR10/15 **Call for Price**
Gemini SB10 **Call for Price**

EPYX SPECIALS



MICROSOFT MULTIPLAN 39⁹⁵

PROGRAMMER'S BASIC TOOL KIT . 29⁹⁵



YOUR CHOICE 19⁹⁹ EA.

- FASTLOAD
- WINTER GAMES
- HOT WHEELS •BASEBALL
- BARBIE • G.I. JOE
- TEMPLE OF APSHAI TRILOGY
- JET COMBAT SIMULATOR
- SUMMER GAMES I & II

INTERFACES

PPI Buffer •4 Different Type Faces & Reverse Characters •Includes Power Cord, Five Feet of Cable and All Required Connectors **44⁹⁵**
XETEC SUPER 8K BUFFER **69⁹⁵**
XETEC JR. **54⁹⁵**
CARDCO G+ **CALL FOR PRICE**
MICROWORLD **CALL FOR PRICE**

DISKETTES

Memorex **8⁹⁵*** Scotch **11⁹⁵**
BASF **8⁹⁵** Maxell **11⁹⁵**
Nashua **8⁹⁵** *After \$3 Rebate



MONITORS



BMC Color **144⁹⁵**
Sharp Green **64⁹⁵**
Sharp Amber **69⁹⁵**

MODEMS

Mighty Mo **69⁹⁵**
Commodore 1660 **59⁹⁵**
Telesonic **Call for Price**



commodore SOFTWARE

Assembler D	27.95	Easy Spell-D	19.95
Easy Finance I, II, III, IV-D	19.95	Logo-D	49.95
Easy Calc-D	64.95	The Manager-D	37.95
Easy Script-D	39.95	General Ledger	37.95
Accts. Rec-D			37.95

commodore CONT.

ACCESS SOFTWARE

Accts. Pay.-D	37.95	Neutral Zone D-T	20.95
Magic Desk-D	52.95	Spritemaster D-T	20.95
Silent Butler	24.95	Beachhead D-T	20.95
Sky Travel	27.00	Master Composer	23.95

WE'RE PROUD OF OUR PRICES - SATISFACTION GUARANTEED

Check, Money Order, MC or VISA accepted/No additional charge for MasterCard and Visa/Call for shipping and handling information/NYS residents ad applicable sales tax/Prices and availability are subject to change without notice/All factory fresh merchandise with manufacturer's warranty. Dealers Welcome. Call for recent price reductions and new rebate information. Plus shipping and handling. No returns without return authorization number.

IN NEW YORK STATE CALL TOLL FREE

1-800-631-1003 1-800-221-2760 1-800-548-0009

OR 516-349-1020

Or Write: Computer Centers of America, 81 Terminal Drive, Plainview, NY 11803

Michael S. Tomczyk

Congratulations—you just got a new disk drive for Christmas. Now you're trying to figure out how to use it. Don't panic—we're here to help get you started, with a beginner's introduction to disk drive commands for your Commodore 128, 64, Plus/4, 16, and VIC-20.

First, some terminology. Floppy disks are technically floppy *diskettes*, but they're usually called "disks" or "floppies."

You can buy all sorts of programs on disk, the most popular being word processors, spreadsheets, databases, games, and educational programs. If you buy a commercial program in a store or through the mail—such as a word processing program on disk—what you usually get is a disk and a manual or instruction sheet explaining the commands associated with that program.

But disk drives aren't just for commercial programs. You can also save your own programs—ones that you write—on disk, regardless of the "language" they're written in—BASIC, machine language, Logo, and so on. You can also save data files—which are different from program files. An example of one is a text file, a document created with a word processor.

Using A Preprogrammed Disk

First, we'll assume your computer and disk drive are already connected and both turned on, and we'll also assume you're using a single disk drive (as opposed to a dual drive—two drives in one unit).

A disk can be damaged (or the information on it scrambled) if you bend it, overheat it, or touch it with a magnet.) Never leave disks lying around exposed where dust can collect. Disks are relatively fragile and should be handled carefully.

Insert a preprogrammed disk, perhaps the one that came with the

1541 or 1571, into the drive. Turn the locking lever or push-down device to secure it.

Displaying The Directory

Now let's see what's on the disk. All disks contain a listing or directory of the programs or data files on that disk. To call up the directory on your screen, type the following and press RETURN:

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

When the word READY appears, type the word LIST and the directory will appear, displaying the names of each of the files on the disk within quotes. In the loading instruction, the dollar sign stands for "directory" and the number 8 is the disk drive *device number*. Incidentally, if you leave out the number 8, the computer will think you're using a tape recorder instead of a disk drive and will tell you to PRESS PLAY ON TAPE.

Also, if you're using a dual disk drive you can address directories in, say, drive number 1, like this:

```
LOAD"$1",8
```

REM: *If you have a Commodore 128, Plus/4, or 16, you can use a shortcut command to get a directory. Just type DIRECTORY and press RETURN. The 128 also has the CATALOG command, which works exactly like DIRECTORY. An even shorter shortcut is to press the f3 function key, which is preset to print DIRECTORY.*

Printing The Directory

You can print your disk directory on your printer for filing or reference purposes by using the following commands:

```
LOAD"$",8
OPEN 4,4:CMD 4
LIST
PRINT#4:CLOSE 4
```

OPEN 4,4 tells the computer you're going to be working with the printer. CMD 4 directs subsequent commands to the printer, so the LIST command sends the directory listing to the printer. The last line closes the communication channel to the printer.

Loading A Program From Disk

To load the first program on a disk (the one at the top of the directory), type the following and press RETURN:

```
LOAD"***",8 or
DLOAD"***" (Plus/4, 16, and 128 only)
```

The computer will whirl as it searches for the program and loads it. When the word READY appears, the program is loaded.

To start the program, type RUN, press RETURN, and the program begins. RUN works with BASIC programs. To run machine language programs, you usually have to use a different command:

```
LOAD"***",8,1 or
BLOAD"***" (Plus/4, 16, and 128 only)
```

and then type something like SYS 49152 instead of RUN.

REM: *You can use an asterisk (*) to load the first program from any disk. Most major programs like word processors and spreadsheets have only one program on the disk, so using the asterisk gives you a shortcut.*

If there's more than one program on the disk, load the program you want by name, like this:

```
LOAD"program name",8 or
DLOAD"program name" (Plus/4, 16, and 128 only)
```

where *program name* is the name of the file as listed in the directory. When the word READY appears, type RUN and press RETURN.



Sing Along With Your Favorite Christmas Carols

and Party Songs

Here's a great way for you and your family to have fun with your Commodore 64™ or Commodore 128™ this Christmas. Our exciting Christmas Carols disk features 18 of your favorite holiday songs, with professionally-arranged music and entertaining graphics. For sing along fun, the lyrics appear in easy-to-read verse on your TV or monitor. Play just your favorite song or set your computer to play them all.

SONGS INCLUDE:

- Angels We Have Heard on High • Deck the Hall
- O Come All Ye Faithful • Away in a Manger
- The First Noel • God Rest You Merry, Gentlemen
- Hark! The Herald Angels Sing • O Holy Night
- It Came Upon The Midnight Clear • Jingle Bells
- O Little Town of Bethlehem • We Three Kings of Orient Are
- Jolly Old St. Nicholas
- Joy to the World
- O Christmas Tree
- Silent Night
- What Child is This?
- Up on the Housetop



An Actual Screen

For fun on New Year's Eve and throughout the year, order our Party Songs. The disk contains 18 favorites, including Auld Lang Syne, Dixie, For He's a Jolly Good Fellow, Oh! Susanna, Yankee Doodle, and more.

You can trust John Henry Software to bring you quality software at the lowest price. We specialize in prompt delivery and guarantee our product.

Don't wait, call us today! Toll Free Number:

1-800-223-2314

In Ohio call 513-896-7660

\$15⁹⁵
each

Both for only \$28.95

Please send me:

- Christmas Carols disk(s) at \$15.95 each
 Party Songs disk(s) at \$15.95 each
 Christmas Carols and Party Songs at \$28.95

Add \$1.00 for postage and handling. Ohio residents add 6% sales tax. Foreign orders, except Canada and APO, add \$3.00 for Air Mail. Please pay in U.S. funds.

Check or money order enclosed Visa MasterCard

Acct. # _____ Exp. Date _____

Name _____

Address _____

City _____ State _____ Zip _____

Send to John Henry Software, P.O. Box 745, Vandalia, Ohio 45377.



John Henry Software®

QUALITY IS OUR STRENGTH

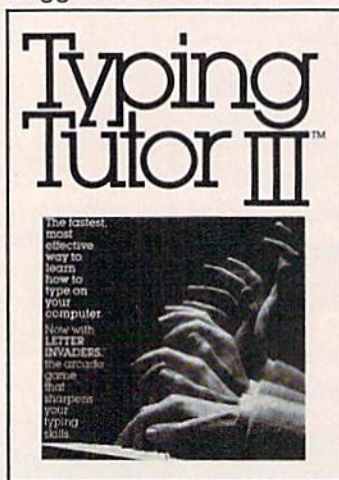
"TYPING TUTOR III is the best typing instruction program for personal computing that I have seen."

Erik Sandberg-Diment
The New York Times 1/8/85

Your computer productivity is directly proportional to your speed at the keyboard. That's why *Typing Tutor III™* with *Letter Invaders™*:

- Automatically adjusts to your abilities and progress;
- Tests words, numbers, and full keyboard, as well as through a standard speed test;
- Features *Letter Invaders*, an arcade-style game that lets you take an entertaining break while sharpening your typing skills at the same time.

For the IBM PC, PC jr, XT, AT, (\$49.95*); Apple II Series (\$49.95*), Macintosh (\$59.95*); and Commodore 64 (\$39.95*) wherever software is sold. (*Suggested Retail)



BY KRIYA SYSTEMS™, INC.
SIMON & SCHUSTER

Typing Tutor III, Letter Invaders, and Kriya Systems, Inc. are trademarks owned by and licensed from Kriya Systems, Inc.

Simon & Schuster
1230 Avenue of the Americas
New York, NY 10020

Using A New Blank Disk

One of the best uses for your disk drive is storing programs that you write. Since the blank disks you buy in a store come *unformatted*, you have to *format* each one before you can put information on it. The reason the disks don't come already formatted is that they can be used by many different disk drives which store information in different patterns on the disk. Formatting a disk means preparing it for use by your particular brand of disk drive. In doing this, you must give the disk a *disk name* and an *identification (ID) number*. Examples of these are: "MAGIC, M2". In this example, "MAGIC" is the disk name and "M2" is the ID. The ID can be any two letters or numbers. (Consult your disk drive manual for more specific information.)

To format a blank disk, insert the disk into the drive and type:

```
OPEN 1,8,15,"N:disk name,id":CLOSE 1  
or  
HEADER "disk name",lid (Plus/4, 16,  
and 128 only)
```

Now your disk is formatted and ready to accept programs or data you want to store on it.

A word of caution: This procedure can also be used to erase and reformat an old disk, but if you do that, *any previous information stored on the old disk will be completely erased and lost*, so be careful not to erase a disk you want to keep. Also, be sure to use a different name and ID for each disk. This way each disk has a unique identity—and will prevent any confusion later.

Saving Your Own Program On Disk

OK, so you've formatted your blank disk and want to save a program or data file on it. With your disk in the drive, type the following program (or any program of your own):

```
10 PRINT "HOW MANY K WILL  
YOUR"  
20 PRINT "DISK HOLD?"  
30 INPUT K  
40 PRINT "YOUR DISK WILL HOLD"  
50 PRINT "APPROXIMATELY"  
K*1024/60/56  
60 PRINT "PAGES OF TEXT."
```

This program calculates approximately how many pages of text can be stored on one disk, assuming each page will contain 60 characters on each line, and 56 lines

of text. One page of 8½ × 11-inch typing paper can hold 60 lines total, but only 56 lines are used because of the top and bottom margins. A disk formatted on the 1541 drive can hold about 165K of information. A disk formatted with the HEADER command on a 1571 drive can hold twice as many kilobytes of memory because the 1571 can use both sides of the disk.

To save this program on a formatted disk, type the following and press RETURN:

```
SAVE"TEXTCALCULATOR",8 or  
DSAVE"TEXTCALCULATOR" (Plus/4,  
16, and 128 only)
```

The program is automatically saved on the disk. To check it, try listing the directory (LOAD"\$",8 and LIST). To retrieve the program in the future, insert the disk in the drive and type: LOAD "TEXTCALCULATOR",8 or DLOAD "TEXTCALCULATOR".


The program is now stored on your disk with the name you gave it between the quotation marks in the SAVE command. You can use any program name you like, as long as it's 16 characters or less. But don't try to give the same name to two different programs on the same disk, the disk drive won't allow it (if you saved two programs under the name SPACEGAME and later tried to load one of them, the disk drive would have no way of knowing which program of that name you wanted to load).

Erasing A Program From A Disk

You can use the S (SCRATCH) command to erase an unwanted program from a disk. For example, to erase the program we just created, type:

```
OPEN 1,8,15,"S:TEXTCALCULATOR"  
:CLOSE 1 or  
SCRATCH"TEXTCALCULATOR"  
(Plus/4, 16, and 128 only)
```

Check the directory to see if it's gone.

This should help get you started with your new drive. Again, your disk drive manual contains a lot of useful information. Once you're used to the techniques we've discussed here, study your disk drive manual. You'll find your drive is the most important device you use with your computer. 

Solutions!



**Paperback
Writer 64**
Word Processor

PW 128/64 Dictionary
also available at \$14.95 (U.S.)



**Paperback
Writer 128**
Word Processor

MAIL ORDERS:

CRYSTAL COMPUTER INC.
In Michigan 1-517-224-7667
Outside Michigan 1-800-245-7316
24 hours a day, 7 days a week.

U.S. DEALER ENQUIRIES:

ALLEGRO TECH
1-800-544-1004
In Massachusetts
1-413-443-9443

MICRO-PACE COMPUTERS INC.
1-800-362-9653
In Illinois
1-217-356-1884

MICRO-SYS DISTRIBUTORS
1-800-527-1738
In Texas
1-214-231-2645

CANADIAN DEALER ENQUIRIES:

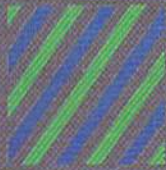
FRANKLIN WINTER
Consulting & Sales
1-416-822-5974



**Paperback
Planner 64**
Spread Sheet



**Paperback
Filer 64**
Database



**Paperback
Filer 128**
Database



**Paperback
Planner 128**
Spread Sheet

Best-selling software for Your Commodore 128 or 64

You want the very best software you can find for your Commodore 128 or 64, right?

You want integrated software — word processing, database and spreadsheet applications — at a sensible price. But, you also want top-of-the-line features. Well, our Paperback 128/64 software goes one better.

With Paperback 128 or 64, you'll find all the features you can imagine... and then some. And Paperback 128/64 is so easy to use, you won't even need the reference guide. On-screen and in memory instructions will have you up and running in less than 30 minutes, even if you've never used a computer before.

The price? It's as low as you'd expect for a line of software called 'Paperback'. Suggested Retail Price for the 64 Software is \$39.95 (U.S.) and \$49.95 (U.S.) for the 128. Any of the 64 products may be upgraded to their 128 version for \$15.00 (U.S.) + \$3.00 shipping and handling. (Available to registered owners from Digital Solutions Inc. only.)

Paperback Writer 128 or 64, Paperback Planner 128 or 64 and Paperback Filer 128 or 64... **Solutions** at sensible prices from Digital Solutions Inc.

International & Distributor enquiries to:

**Serious software
that's simple to use.**

 **Digital
Solutions
Inc.**

P.O. Box 345, Station A
Willowdale, Ontario
Canada M2N 5S9
1-416-221-3225

Paperback Writer 128 and 64 are now available in French.

If you've discovered a clever time-saving technique or a brief but effective programming shortcut, send it to "Hints & Tips," c/o COMPUTE!'s GAZETTE. If we use it, we'll pay you \$35. Due to the volume of items submitted, we regret that we cannot reply individually to submissions.

More Control Over BASIC

David Whittaker

Putting information into DATA statements and then READING through them is one way of handling lists, whether they're numbers to be POKEd into memory or information to be stored in arrays.

The READ-DATA combination is *sequential*, which means the computer starts at the first DATA statement and moves forward, reading each item in sequence. It's like a sequential file on tape or disk—you have to read the individual pieces of data in order. The seventeenth variable written to a file is always the seventeenth when you read the file. A Datassette has a rewind button which allows you to go all the way back to the beginning if you wish to reread the file. The RESTORE command is a similar sort of rewind button for DATA statements. It sets the pointer to DATA statements back to the beginning.

You may encounter situations where you want to start rereading from the middle of DATA statements. The 64 doesn't allow you to RESTORE to a line number (although the Plus/4, 16, and 128 do—you can enter RESTORE 50, for example).

The following short machine language program is the answer. Add it to the beginning of your program and you'll have access to any line of DATA:

```
3 FOR H=685 TO 709:READ A:POKE
  H,A:NEXT
4 DATA 32,158,173,32,247,183,3
```

```
2,19,166,165,95,56
5 DATA 233,1,176,2,198,96,133,
  65,165,96,133,66,96
```

When you want to RESTORE to a specific DATA statement, add SYS(685)xx to the program, where xx is a line number or a numeric expression.

Here's another BASIC improvement. It allows you to GOTO an expression.

```
6 FOR H=710 TO 718:READ A:POKE
  H,A:NEXT
7 DATA 32,158,173,32,247,183,7
  6,163,168
```

Put it at the start of a BASIC program and when you want to send the program to a calculated line number, enter SYS(710)xx, where xx is a numeric expression that returns a valid line number within your program.

VARPTR For VIC And 64

David Pancoast

Some BASICs have a function called VARPTR, which allows you to find the location of a variable in memory. It may not sound like a particularly useful command, but there are some situations in which it's handy.

BASIC itself has to find variables and their addresses, so it's not surprising that there's a built-in ROM routine you can call on. Try running the following program on a 64:

```
10 A=2:VP=0
20 SYS 45195A
30 VP=PEEK(780)+256*PEEK(782):
  PRINT VP
```

VIC owners should substitute SYS 53387A in line 20. To find the location in memory of a variable, put the variable name directly after the SYS. After the SYS, locations 780 and 782 hold the low and high bytes of the variable's address.

In this example, we're finding the location of the numeric variable A. If you're trying to pinpoint an ar-


ray variable, be sure to predefine all nonarray variables (like VP) before you SYS to the VARPTR routine. Defining brand new simple (non-array) variables moves all array variables up a few bytes in memory.

You can see a variable's name in the two bytes before the pointer (VP-2). If the example above returned a value of 2111 for the variable A, you could enter PRINT PEEK(2111-2) to find a value of 65 (the letter A is CHR\$(65)). POKE a 66 there and the variable A would disappear from the program, replaced by the new variable B.

All simple variables use two bytes for the variable name and five for the definition. Integer variables take up two of five bytes, string variables fill three of five (length plus a pointer to where the string is actually located), and numeric variables use all five bytes (in floating point format).

How does knowing the address of a variable help you with programming? First, it's very helpful when you're passing information to machine language (ML) programs. If you know where a variable resides, you can POKE the information into memory, telling your ML routine where the value of that variable can be found.

And if you're investigating floating point operations, finding a variable allows you to test different numbers—try adding one to the value in the first byte of the variable pointer with POKE VP, PEEK(VP)+1 just to see what happens to the value of the variable.

Advanced BASIC programmers might want to devise a fast sorting routine that swaps pointers rather than switching values (to avoid the delays caused by dynamic strings and garbage collection). Just remember that new variables push array variables up in memory, so you'd need to declare all variables before starting the sort. 

SATISFACTION GUARANTEED OR MONEY BACK

1985 TAX RETURN HELPER

Fast and easy income tax preparation

- This is the 5th annual edition - thousands of repeat customers
- Includes Form 1040, Schedules A, B, C, D, E, G, SE, W, Forms 2106, 2441 and 4562
- Enter and modify data on a screen copy of the form.
- Works like a spreadsheet - all the lines affected by a change are instantly updated.
- Automatic tax computation.
- Data can be saved on disk and updated.
- Also included:

TAX DBASE

A data base program to create and maintain files of tax related items (medical, car expenses, etc.) that can be used directly by the tax programs.

- Can be used all year round. Also good for many other accounting jobs (checkbook balancing, etc.)

Price is tax deductible. C64 disk: \$33 (+ \$1.50 S&H)

PROFESSIONAL VERSION - also prints data on IRS forms: \$45 (+ \$1.50 S&H)

Previous customers prices: \$22 and \$30 for pro-version (+ \$1.50 S&H)

KSOFT CO.

845 WELLNER RD.
NAPERVILLE, IL 60540
(312) 961-1250



Dealer inquiries welcome.



Play the new family trivia game set to music!

Remember all the great songs from movies and television when you were growing up? Now your Commodore 64 or 128 is challenging you to name them.

Tunes 'n Trivia, the new game from Sound Software, plays all the old favorites and even some new ones.

Once you or your teammates recognize a melody, you'll still have to deal with the trivia. Miss the easy questions and lose points. Get the tough ones correct and earn a big bonus.

Tunes 'n Trivia even takes an occasional time out for a word from a sponsor. Some of the best ad songs from TV are included for extra points.

Enjoy these special features:

- Up to 4 teams or players.
- Automatic score-keeping.
- No crowding around your computer . . . just one keyboard operator.
- Hundreds of tunes on each disk . . . no repeats.
- Future data disks include Beatlemania; Solid Gold from the 50's and 60's; New Generation hits of the 70's and 80's.

Order Tunes 'n Trivia by phone 24 hours a day. Or send check or money order for \$29.95 plus \$3.00 shipping and handling. Ohio residents add 5.5% sales tax.

MasterCard

Not available in
retail stores.

VISA

SOUND SOFTWARE, LTD.

221 E. Avondale Ave.

Youngstown, OH 44507

1-800-742-6188

Ohio residents only

1-216-742-6188

WCCA PRESENTS

THE COMMODORE SHOW

FEBRUARY 8th & 9th

CATHEDRAL HILL HOTEL

CALL 800-227-4730 for hotel reservations

- 100+ VENDOR BOOTHS & DISPLAYS
- NATIONAL COMMODORE SPEAKERS
- SHOW SPECIALS & DISCOUNTS
- SEE THE LATEST INNOVATIONS IN HARDWARE/ SOFTWARE TECHNOLOGY FOR THE COMMODORE MARKET

The only West Coast exhibition and conference focusing exclusively on the AMIGA, Commodore 128 PC and C-64 marketplace.

REGISTRATION FEES: ONE DAY \$10.00 TWO DAY \$15.00

FOR MORE INFORMATION AND DETAILS CONTACT:

WEST COAST COMMODORE
ASSOCIATION, INC.

P.O. BOX 210638
SAN FRANCISCO, CALIFORNIA 94121
(415)982-1040 BETWEEN 8AM-5PM PST

machine language for beginners

Blanketing Memory

Richard Mansfield
Senior Editor

When you want to fill the screen with a particular color or a special background, or otherwise blanket a section of memory with a particular number, you need to send a large number of contiguous bytes. It's easy to send up to 256 bytes by using a Y offset like this:

```
10 *= 864
20 .S
30 .O
40 SCREEN = $0400
50 LDY #0
60 TYA
70 LOOP STA SCREEN,Y
80 DEY:BNE LOOP
90 RTS
```

Line 10 sets the start address to 864. After you assemble it, you can test this little routine by typing SYS 864. Line 20 causes the assembler to print the results on screen and line 30 POKes the program into memory. (These are conventions used by the LADS assembler from my *Second Book of Machine Language*. Other assemblers will differ.)

Line 40 defines the address of the screen on the 64. Line 50, the start of the program proper, puts a zero into the Y register, and line 60 transfers the zero to the Accumulator so we can print the @ symbol—which has a code value of 0—on the screen. Then in line 70 we start a loop which puts the zero into the SCREEN address plus whatever number is in the Y register. This addressing mode is signified by NAME,Y and is very useful for this kind of repetitive task.

Since we set Y to zero in line 50, the first time through the loop we will store a @ character into address \$0400 (SCREEN + Y), but we then DEY which makes Y become 255. It's important to realize that the Y and X registers and the Accumulator (like any other single byte) can only count up to 255. If you LDY #255:INY you will cause Y to

go up past 255, which resets it to zero. Likewise, if Y holds a zero and you DEY, it then holds 255. The next DEY will make it 254 and so on down.

Since we're filling the first 256 bytes of the screen with @, it doesn't matter whether we start with byte 0 and INY upwards or fill downwards from 255 to 0 using DEY. In our example, we're going down until DEY causes Y to once again hold a zero which will drop us through the BNE in line 80 and we RTS (ReTurn) from this Subroutine.

To fill the entire screen, however, we need more than a single STA SCREEN,Y:

```
10 *= 864
20 .S
30 .O
40 SCREEN = $0400
50 LDY #0
60 TYA
70 LOOP STA SCREEN,Y
80 STA SCREEN+256,Y
90 STA SCREEN+512,Y
100 STA SCREEN+768,Y
110 DEY:BNE LOOP
120 RTS
```

This is essentially identical to the first program, but we've added some additional target zones in lines 80, 90, and 100. Since line 70 will fill the screen from bytes zero to 255, we can fill the second block using SCREEN+256 and the third block with SCREEN+512. You can continue adding 256-byte chunks to SCREEN to fill as large an area as you wish. However, for really big jobs, there's an easier way:

```
10 *= 864
20 .S
30 .O
40 SCREEN = $0400
60 LDA #<SCREEN:STA LOOP+1:LDA
#>SCREEN:STA LOOP+2
70 LDY #0
80 TYA
90 LOOP STA $FFFF,Y
100 DEY
110 BNE LOOP
120 INC LOOP+2
130 LDX LOOP+2
140 CPX #508
```

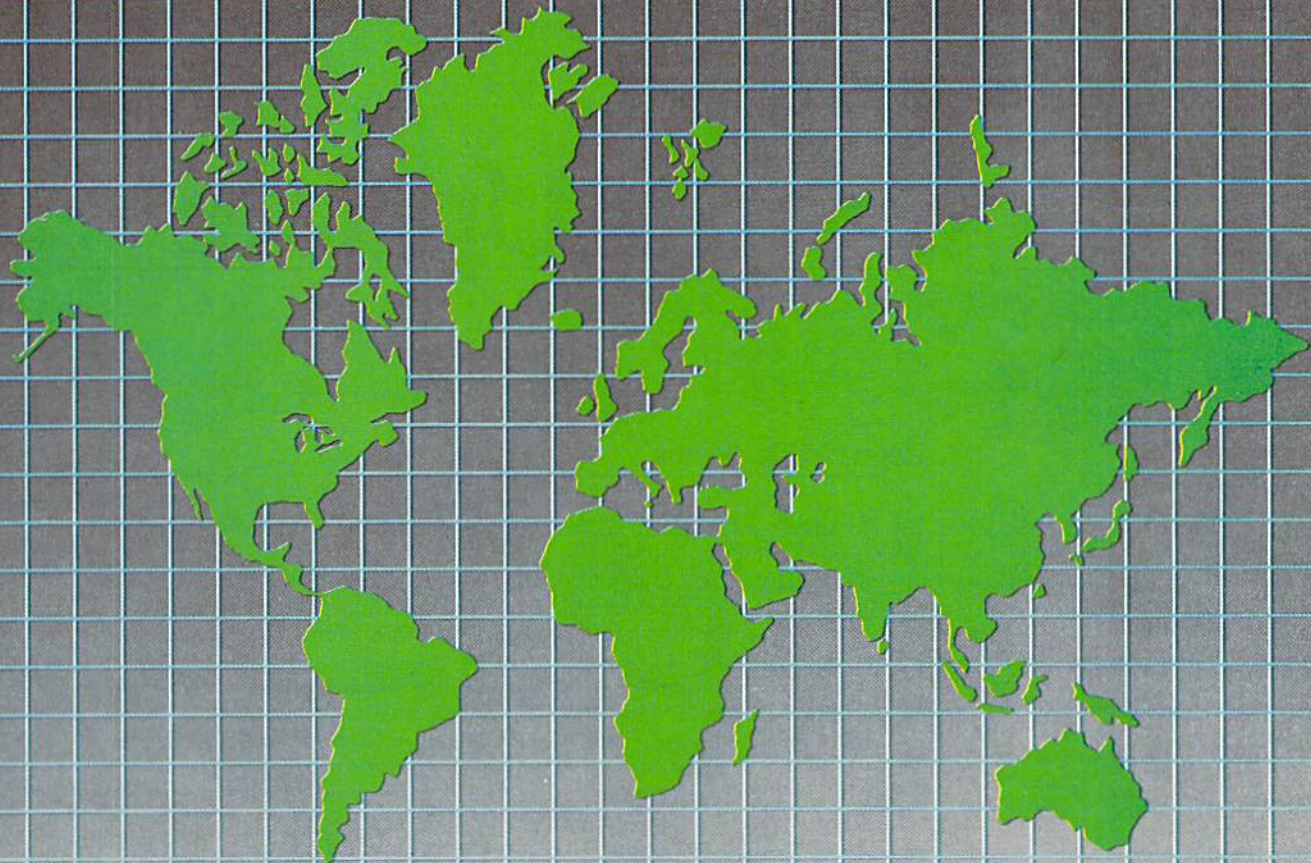
```
150 BCC LOOP
160 RTS
```

In this case, we're going to adjust the target address in line 90 on the fly. In line 60 we stuff the starting address of the screen into the FFFF's on line 90 (notice that the STA \$FFFF,Y never really happens, because the FF's are just temporary place holders until the screen address can be stored there). We set this up by loading the Accumulator with the low byte (using the #< command) of SCREEN and storing it into the low byte of the target value, then putting the high byte of SCREEN into the high byte on line 90. Don't worry about how this is done. If you need to set up such a pointer, just define the target (line 40) and initialize the pointer as we do in line 60, storing the low-byte directly before the high-byte.

The loop between lines 90-110 sends our @ character to the address that has been stuffed into the 0000 we originally typed, plus the value of Y. So, as we did in the first two programs, we can fill a 256-byte chunk of the screen at a time by counting down the Y register with DEY. The only difference this time is that we're not sending bytes to SCREEN, we're sending to a replaced set of FF's in line 90. The advantage of this is that we can easily adjust this address to make it point to the next higher 256-byte chunk simply by raising the high byte (the two F's on the left in FFFF). The high byte of a pointer address represents multiples of 256; the low byte represents single bytes. This is similar to ordinary decimal numbers like 12. If you raise the "high digit," you get 22, then 32, then 42, etc. If you raise the "low digit," you get 13,14,15...etc.

So, in line 120 we INC the high byte. In the instruction STA \$FFFF,Y the STA instruction takes up one byte (that would be the address of LOOP). The low byte is FF

SCENERY DISKS *for* FLIGHT SIMULATOR II



SubLOGIC Scenery Disks expand the potential flying environment of Flight Simulator II and Microsoft Flight Simulator.

Twelve separate Scenery Disks cover the entire continental United States. Each disk covers a geographical region of the country, and includes the major airports, radio-nav aids, cities, highways, rivers, and lakes located in that region. Enough detail is available on each disk for either visual or instrument cross-country navigation.

A STAR Scenery Disk (available 4th quarter 1985) covers a smaller area with a relatively dense amount of scenery. STAR Scenery Disks are primarily intended for visual flight sight-seeing. They include buildings and landmarks, as well as detailed renditions of all major airports in the area.

Individual Scenery Disk price: \$19.95

Western U.S. (Disks 1-6): \$99.95

- Coming Soon -

Eastern U.S. (Disks 7-12): \$99.95

See Your Dealer . . .

or write or call for more information. For direct orders please specify which disk or disk-set you want. Enclose the correct amount plus \$2.00 for shipping (\$6.00 for the six-disk set) and specify UPS or first class mail delivery. Visa, MasterCard, American Express, and Diners Club cards accepted.

Commodore 64 is a trademark of Commodore Electronics Ltd.
IBM is a registered trademark of International Business Machines Corp.

For the Commodore 64™ and IBM PC®



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

Order Line: (800) 637-4983
(except in Illinois, Alaska, and Hawaii)

and the high byte is the second FF, located at LOOP+2. (Addresses are stored backwards from the way we would read them. Thus, 04 00 that we read becomes 00 04 when stored in the computer.)

We then need to see if we're finished, if we've filled everything

we wanted to fill. We load the X register (which is otherwise not being used in this routine) with the high byte of the pointer and then compare it to 8. Take a look at line 40. You can see that we started out with a high byte of 04 and a low byte of 00. So, if we want to fill four

256-byte chunks, we look at the pointer to see if the high byte has been INCed up to 8. BCC means branch-if-less-than, so until the high byte reaches 8, we'll branch back to LOOP and continue filling.



User Group Update

User Group Notes

When writing to a user group for information, please remember to enclose a stamped, self-addressed envelope.

Send typed additions, corrections, and deletions for this list to:

COMPUTE! Publications
P.O. Box 5406
Greensboro, NC 27403
Attn: Commodore User Groups

The Commodore Computer Club of Pine Bluff has a new address: P.O. Box 1083, Pine Bluff, AR 71603.

The Atlanta C-64 User's Group is now the Commodore User's Group of Atlanta (CUGA), Donald Schwab, 633 Clairmont Circle, Decatur, GA 30033.

The address for the Gold City User Group has been changed: P.O. Box 257, Ft. Knox, KY 40121.

The Alliance Commodore Computer Club also has a new address: c/o Eugene Hansen, 726 W. 16th St., Alliance, NE 69301.

Another new address is for the Commodore Users Group of Massena (COMA): c/o Star Tech Systems, 69 Main St., Massena, NY 13662.

The Chillicothe Commodore Users Group can now be reached c/o Robert May, 213 Terrace Dr., Chillicothe, OH 45601.

The new address for the VIC-UPS Computer User Group is: P.O. Box 178, Nedlands, W. A. 6009, Australia.

A new users group is forming in Zurich, Switzerland. For more information, write: P.O. Box 130, CH-8062, Zurich, Switzerland.

New Listings

ALABAMA

Crimson Tide Users Group (CTUG), Clark White, 3722 37th St. E., Tuscaloosa, AL 35405

ARKANSAS

River City Commodore Club, P.O. Box 4298, N. Little Rock, AR 72116

CONNECTICUT

Bristol Commodore Users Group (BCUG), Scott Coons, 38 Mine Rd., Burlington, CT 06013

FLORIDA

Mana Sota Commodore Users Group (MSCUG), 916 E. 35th Ave., Bradenton, FL 33508

ILLINOIS

Knox Commodore Club, 675 Arnold St., Galesburg, IL

Knights of the Round Table, Charles Renaud, 1724 Pierce Ave., Rockford, IL 61103

IOWA

Product Engineering Center Commodore Users Group (PECCUG), c/o Al Sorensen, 333 Joy Dr., Waterloo, IA 50701

NEW JERSEY

Southern Ocean County's User Group (SOCUG), Frank Aiello, Jr., 54 Shining Way, Toms River, NJ 08753

Commodore Link Users Group, Dave Westphalen, 308 Palisade Ave., Union City, NJ 07087

NEW MEXICO

Commodore Users Group of Roswell (CUGOR), George Barry, 304 E. Country Club Rd., Roswell, NM 88201

NEW YORK

Chenango County Commodore Helpers & Users Group (CC-CHUG), P.O. Box 487, Norwich, NY 13815

NORTH CAROLINA

Carolina Amiga Club, P.O. Box 40114, Raleigh, NC 27629

OHIO

Commodore Club of Central Ohio (CCCO), 4368 Valley Quail N., Columbus, OH 43081

South Toledo Commodore Computer Club, P.O. Box 6086, Toledo, OH 43614

C-128 Users Group, 416 Shields Rd., Youngstown, OH 44512

PENNSYLVANIA

SUB-64 User's Group, Will Hines, P.O. Box 54208, Philadelphia, PA 19105

Greater Pittsburgh Commodore User Group (GPCUG), 1560 Orchard View Dr., Pittsburgh, PA 15220

RHODE ISLAND

Commodore Connection, P.O. Box 929, Woonsocket, RI 02895-0929

OUTSIDE THE U.S.

ARGENTINA

Club USR[64] Cordoba, Calle Montevideo 281, Piso 5, Dpto "D", 5000-Cordoba, Republica Argentina

CANADA

Central Alberta Commodore 64 User Group (CACUG), Dale Butterworth, Box 304, Forestburg, Alberta TOB INO

MEXICO

Club Commodore del Sureste, P.O. Box 1272-A, Alberto Marin Hdez., Merida, Yucatan, Mexico



Number one arcade hits for your computer.



KUNG-FU MASTER™

You are the KUNG FU MASTER. Battle the evil forces through the five dangerous floors in the wizard's castle to rescue the captive fair maiden.

KARATE CHAMP™

Put on your black belt and challenge your friends or the computer through nine picturesque settings in this leading Martial Arts Game to become the KARATE CHAMP.

Both available on diskette for the Commodore 64™ and the 48K Apple II® Series. Look for them at your local computer/software or game store today!

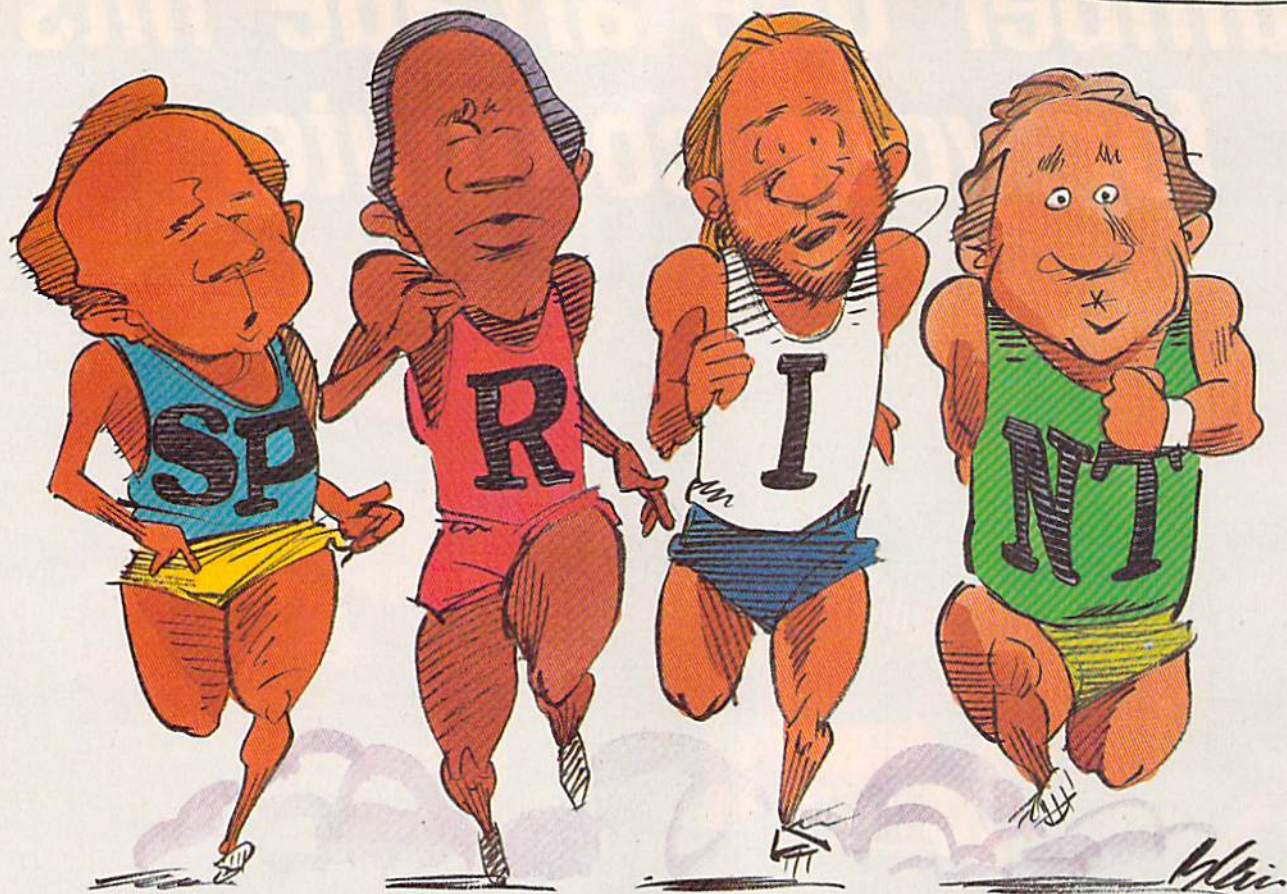
Data East, a leading manufacturer of video arcade games for over ten years, including hits such as Burger Time™, and Commando™.

Commodore 64 and Apple II are trademarks of Commodore Electronics, LTD and Apple Computer, Inc. respectively.

* These trademarks are owned by Data East USA, Inc.
** © Item Corp. manufactured under license by Data East USA, Inc.



470 Needles Drive
San Jose, CA 95112
(408) 286-7074



A Compiler For The 64

Robert A. Stoerle

Here's a BASIC compiler that can make your programs execute up to 50 times faster! Written in machine language, and extremely easy to use, "Sprint" supports most Commodore BASIC commands, statements, and functions. For the Commodore 64 and 128 (in 64 mode). A disk drive is required.

What's the chief complaint when it comes to Commodore BASIC? Speed, or more precisely, the lack of it. Yet the language itself is not what earns BASIC its reputation as painstakingly slow; it's the way that it's implemented. BASIC is *interpreted*. Most faster languages are *compiled*.

Whether a program in a high-level programming language is interpreted or compiled, each statement has to be translated into the machine language of the computer. With an interpreter, this has to be done every time the statement

is executed. This slows down execution speed considerably. However, a compiler translates the entire program once—before execution. So, when you run the program, it executes much faster than a comparable interpreted program.

"Sprint" is a BASIC compiler that supports a subset of BASIC statements available on the 64. It supports most of the Commodore statements, including LET, FOR, NEXT, IF, POKE, PRINT, READ, DATA, and INPUT. It supports integer numbers (but no fractions), numeric and string variables, and

one-dimensional numeric arrays. Sprint also supports a wide range of functions, including LEFT\$, RIGHT\$, MID\$, PEEK, STR\$, and VAL.

Typing In The Program

Sprint is written entirely in machine language and must be typed using the new version of MLX (elsewhere in this issue).

After loading MLX, run it. When prompted for the starting and ending addresses, enter these values:

Starting Address: 8000
Ending Address: 9737

Since Sprint is a very large program (almost 6K of pure machine language), you may want to type it in more than one sitting. Be sure to follow the instructions in the MLX article to save your work between sittings, and always load up your previous work before typing further.

Once the program has been typed in and saved, it can be loaded by the following statement.

```
LOAD"SPRINT",8,1
```

To run it, type:
SYS 32768

Using Sprint

The first step, of course, is to write the BASIC program you wish to compile. You can do this with the normal BASIC built into your 64. If you wish, you can test the program on the interpreter first by running it. This will not always work, as Sprint has a slightly different syntax for certain keywords.

When you're ready to compile the program, save it on disk (Sprint compiles a program from disk, not from memory). Load Sprint and type SYS 32768. You'll be prompted for the filename of your BASIC program. When you enter it, Sprint will proceed to compile your program. As the program is compiled, each line will be listed to the screen, followed by any error messages for the line. Note that you can stop the compiler simply by pressing the STOP key. If the compilation finishes with no errors, you can simply type RUN to execute the compiled program. However, if there are errors, you'll have to load the original BASIC program (the source program) and make the necessary changes.

Sprint compiles programs starting at the beginning and continuing straight to the end; it does not follow GOTOs or GOSUBs, or evaluate IF/THEN statements. Because of this, you can't have conditional DIMs (IF...THEN DIM...) or conditional FORs. Sprint is a two-pass compiler—it scans the program twice. Once a program has been compiled, there's no need for the compiler to be in memory in order to run the program; Sprint programs are self-sufficient.

After the source program is compiled, the object program (the resulting code) will reside in memory as if it were an ordinary BASIC program. You can run and save it, but if you type LIST, you'll see:

```
10 SYS 2061
```

This is another advantage of using a compiler—people can't easily LIST or modify your program. Editing can only be done on the source program.

Constants, Variables, And Expressions

Sprint works much the same as regular Commodore BASIC. However, there are some differences you

should keep in mind when you're writing a program.

Constants are data values used in BASIC programs, such as -1, 4353, and "HELLO". Sprint supports two types of constants: integer and string. Integer numbers are limited to -32768 to 32767. However, numbers greater than that are allowed in POKE, PEEK, and SYS statements. String constants are characters enclosed in quotes. The closing quote may be omitted if it's at the end of a line.

Sprint supports both numeric and string variables. Variable names may be of any length, but must not contain any *reserved words* (words that are significant to the compiler, such as POKE and THEN). Only the first 15 characters are looked at, however. Integer variables may be terminated by a percent sign (%) if desired, but all regular numeric variables are assumed to be integers anyway, since there are no floating point numbers. String variable names must be terminated with a dollar sign (\$).

Strings are limited to ten characters, unless specified otherwise. If you want to include more characters, DIMension the string, as if it were an array, to the maximum number of characters it will hold. The maximum number of characters allowed in a string is 253.

In addition to integer variables, Sprint supports one-dimensional integer arrays. Subscripts may range from 0 to 126. Arrays that are not DIMensioned are assumed to consist of 11 elements, numbered 0-10. The format for assigning, reading, and dimensioning integer arrays is identical to that for interpreted BASIC, except that the subscript of a variable may not be another subscripted variable or an expression. It must be an integer constant or integer variable.

Numeric expressions in Sprint may contain integer constants, variables, arrays, functions, and operators. The operators supported by Sprint are +, -, *, /, as well as the logical operators AND and OR, and the relational operators =, <, etc. *Parentheses are not permitted.* Unlike interpreted BASIC, expressions are evaluated strictly left to right; there is no operator precedence. To get around this, you must break up the expression into several

smaller expressions, and then put the results of these back together. For example, this expression:

```
SUM = A + X*Y + B + I*J
```

becomes the following.

```
Q1 = X*Y:Q2 = I*J:SUM = A+Q1+B+Q2
```

Strings can be compared using the relational operators as in regular BASIC. They can also be *concatenated* (one string appended to the other) using the plus sign. Note that the result of a string expression must not be longer than the number of characters allocated for the string.

When an expression is assigned to a variable, the LET may be omitted.

Sprint Keywords

ABS	INPUT	RESTORE
AND	LEFTS	RETURN
ASC	LEN	RIGHTS
CHR\$	LET	READ
DATA	MID\$	RND
DIM	NEXT	SGN
END	OR	SPC
FOR/TO/STEP	PEEK	STR\$
GET	POKE	SYS
GOSUB	POS	TAB
GOTO	PRINT	VAL
IF...THEN...	REM	

Statements

A complete list of the keywords available in Sprint appears in the "Sprint Keywords" table. Most keywords function the same as in regular BASIC, except for the following:

- **DATA.** The DATA statement has one small idiosyncrasy: Items that include spaces must be enclosed in quotes, or the item will be READ as if it doesn't contain a space (YOU ARE becomes YOUARE.)

- **DIM.** The DIM statement can only be used to declare one-dimensional numeric arrays. Multi-dimensional arrays are not permitted, nor are string arrays. A string is dimensioned to the maximum number of characters it will hold, like an array of numbers representing each character of the string. Only integer constants are allowed between the parentheses of variables in a DIM statement.

- **FOR.** This statement functions the same as in Commodore BASIC, but its syntax is somewhat more particular. The TO value, and

Lyc0 Computer Marketing & Consultants

DISKETTES

DENNISON
ELEPHANT 5 1/4" SSSD...11.99
ELEPHANT 5 1/4" SSDD...12.99
ELEPHANT 5 1/4" DSDD...14.99
PREMIUM 5 1/4" SSDD...13.99
PREMIUM 5 1/4" DSDD...15.99

SUNKYONG
SKC 5 1/4" SSDD...11.99
SKC 5 1/4" DSDD...13.99

MAXELL
5 1/4" MD1...13.99
5 1/4" MD2...19.99

VERBATIM
5 1/4" SSDD...13.99
5 1/4" DSDD...19.99

BONUS
5 1/4" SSDD...9.99
5 1/4" DSDD...12.99

NO LABEL DISKETTES

NL 5 1/4" SSDD...10.99 (Box 10)
NL 5 1/4" DSDD...15.99 (Box 10)
*Free Diskette Writer Pen!
*Free Storage Case!

PRINTING PAPER

3000 SHEETS
FANFOLD...\$42.75

1000 SHEETS
FANFOLD...\$19.75

1000 SHEET LETTER...\$21.95

200 SHEETS LETTER...\$8.99

150 RAG STATIONARY...\$10.99

MAILING LABELS (1 in.)...\$9.95

COMMODORE SOFTWARE COMMODORE

C-128 NEW...CALL
1571 Drive...CALL
1572 Drive...CALL
1902 Monitor...CALL
1670 Modem...CALL
C-64 Computer...CALL
1541 Drive...189
MPS801 Printer...LOW
1702 Monitor...199
Simon's Basic...24.75
Assembler 64...34.75
Super Expander...22.75
Logo 64...49.75
Pilot 64...38.75
Easy Calc...34.75
Easy Script...38.75

CARDCO

Digitizer Camera...189.95
32K Printer Buffer...59.95
Numeric Keypad...34.95
CB/5 5-slot Board(64)...54.00
CB/2 2-slot Board(64)...25.00
S'More Basic Rom...49.95
Write Now-64...35.00
Mail Now-64...29.00
Spell Now-64...29.00
File Now-64...29.00
Paint Now-64...29.00
Calc Now-64...29.00
Tax Survival...29.00
Super Printer Utility...27.95
Write Now-Vic-20...29.95

SPINNAKER (C-64ROM)

Cosmic Life ROM...19.75
Jukebox...19.75
Alphabet Zoo...17.75
All in Color Waves...19.75
Up for Grabs...19.75
Delta Drawing...19.75
Kids on Keys...16.75
Kindercomp...14.75
Facemaker...17.75
Fraction Fever...17.75

MICROPROSE (C-64)

Kennedy Approach...21.75
Crusade in Europe...24.75
Decision in Desert...24.75
Solo Flight...20.75
Nato Commander...20.75
Spitfire Ace...18.75
F-15 Strike Eagle...20.75
Hellcat Ace...18.75

BATTERIES INCLUDED

Paper Clip...59.95
Spell Pak...34.95
Consultant...59.95
Paper Clip...75.95
w/Spell Pak...34.95
Home Pak...34.95
Bus Card...129.95
80 Column Board...109.95

EASTERN HOUSE

Rabbit C-64...19.95
Rabbit VIC-20...19.95
MAE C-64...27.95
Telstar 64...19.95
M.L. Monitor 64...18.95

CONTINENTAL

(C-64)
Home Accountant...44.75
1984 Tax Advantage...35.75
1985 C-64 Book of Software...16.95

SSI (C-64)

Colonial Conquest...24.75
Wings of War...24.75
Computer Ambush...34.75
Field of Fire...24.75
Fighter Command...36.75
Kampfgruppe...36.75
Mech Brigade...36.75
Market Garden...29.75
Six Gun Shootout...24.75
Computer Baseball...24.75
Computer Quarterback...24.75
Imperium Galactum...24.75
Phantasie...24.75
Cartels & Cutthroats...24.75
50 Mission Crush...24.75
Questron...24.75

SUB LOGIC (C-64)

Flight Simulator II...32.75
Night Mission Pinball...20.75

PERSONAL PERIPHERALS

Super Sketch 64...32.75
Printer Utility...18.75

WICO Joysticks

15-9714 Bat Handle...16.75
50-2030 Boss...11.99
50-2002 Super 3-Way...19.99

QR & D

Copy Q...27.95
GPC Printer Interface...65.00

SCARBOROUGH (C-64)

Build A Book...24.75
Improved Mastertype...23.75
NET WORTH...48.75
Mastertype Filer...22.75
Boston 64 Diet...27.75

EPYX

(C-64)
Fast Load...26.75
Breakdance...23.75
Greatest Baseball...24.75
Summer Games...26.75

KOALA

(C-64)
Koala Pad...59.95

BRODERBUND

The Print Shop...28.75
Graphics Library...18.75
Graphics Library II...19.95
Graphics Library III...19.75
Karateka...19.75
Castles Dr. Creep...19.75
Bank St. Writer...32.75
Loderunner...20.75
Mask of the Sun...24.75
Spelunker...19.75
Serpent's Star...24.75
Whistler's Brother...18.75
Raid Bungleing Bay...18.75

PRECISION SOFTWARE

Superbase 64...52.75

TRONIX

S.A.M. - Atari...38.50
S.A.M. - C-64...38.50

WICO Joysticks

15-9714 Bat Handle...16.75
50-2030 Boss...11.99
50-2002 Super 3-Way...19.99

INNOVATIVE CONCEPTS

Flip-n-File 10...3.50
Flip-n-File 15...8.25
Flip-n-File 25 Lock...17.95
Flip-n-File 50...17.25
Flip-n-File 50 Lock...22.95
Flip-n-File Rom...17.25

LOWEST PRICES

Buy Lyc0 and Enjoy:

- *THE LOWEST PRICES!!!
- *TOLL FREE ORDER LINE!
- *FREE Shipping on Prepaid Cash Orders in U.S.
- *All Merchandise Factory Fresh!
- *24 Hours Shipping on in stock product!
- *Access to our Multi-Million \$ Inventory!
- *No Deposit on UPS COD Orders!
- *Orders Outside PA SAVE State Sales Tax!
- *Full Manufacturer's Warranty Apply!
- *Air Freight Service Available!
- *Full Accessory Line in Stock!
- *Purchase Orders Accepted from Educational Institutions!
- *We Check for Stolen Credit Cards!
- *You'll Love Our Courteous Sales Staff!
- *We Ship to Our Servicemen Overseas!

FINEST QUALITY

"WE MAKE
YOUR COMPUTER FUN TO USE!"

AMERICA'S MAIL ORDER HEADQUARTERS
LYCO COMPUTER
WORLD'S LEADER IN SALES & SERVICE

TO ORDER
CALL TOLL FREE
800-233-8760
In PA 1 717-327-1824
Lyc0 Computer
P.O. Box 5088
Jersey Shore, PA 17740

Lyc0 Computer Marketing & Consultants



SAVE ON THESE IN STOCK PRINTERS



AXIOM SEIKOSHA	
GP550AT (Atari)	222
GP550CD (C-64)	222
GP700AT (Atari)	439
GP700AP (Apple)	439
ELITE5CD (C-64)	229

CARDCO	
32K BUFFER (C-64)	59
CORONA	
LP300 Laser Printer	2686
200361 Toner Cartridge	89

CITIZEN	
MSP-10	269
MSP-15	358
MSP-20	337
MSP-25	495
Sheetldr (10/20)	189
Sheetldr (15/25)	199

JUKI	
Juki 6100	347
RS232 Serial Board	55
6100 Tractor	119
6100 Sheet Feeder	209
Juki 6300	757

PANASONIC	
1091	233
3131 (NEW)	259
1092	373
1093	426
3151 Letter	426
4K Buffer	65

C. ITOH	
1550 P	437
1550 BP	437
1550 EP	437
1550 BCD	469
F10-40	859
F10-55	1039
7500 AP	204
7500 AR	244
8510 SP+	CALL

EPSON	
FX85 (New)	333
LX80	212
FX185 (New)	464
LX90 (New)	226
SQ2000 (New)	1555
JX80	467
HomeWriter 10	193
CR-20-Atari	153
CR-220-C-64	153
DX-10 (New)	207
DX-20 (New)	297
HS-80 (New)	288
LQ1500P	975
LQ1500S	1039
RX-100	356
FX-100+	CALL

OKIDATA	
Okimate 10	179
Okimate 20	CALL
182	214
192	348
193	563
92P	349
93P	565
84P	645
92 Imagewriter	349

LEGEND	
880	188
1080	222
1380	262
1385	296
DIGITAL DEVICES	
16K BUFFER	75
32K BUFFER	89
64K BUFFER	125

SILVER REED	
EXP400	249
EXP500	295
EXP550	399
EXP770	749
STAR MICRONICS	
SG-10	208
SG-15	373
SD-10	336
SD-15	442
SR-10	483
SR-15	583
SB 10	595
Power Type	303
SG-10 C-64 (NEW)	CALL

TOSHIBA	
P1340	557
P351	1286

BROTHER	
HR-15XLP	359
HR-15XL S	359
HR-35P	839
HR-35S	839
2024L-P	949
M1009-P	189

DIABLO	
D25	549
630 API	1599
630 ECS	1759
D 80 1F	2395
P 32 CQ1	699
P 38	1749
C 150	999
DX-35 (NEW)	CALL
AP-80	CALL

MONITORS

TAXAN	
115 12" Green Composite	CALL
116 12" Amber Composite	CALL
121 12" Green TTL	135
122 12" Amber TTL	145
220 14" Color Composite	259
410 12" RGB Hi Res IBM	329
420 12" RGB Super Hi IBM	409
440 12" RGB Ultra Hi Res	555
Tilt Stand	35
ZENITH	
ZVM 122A Amber	75
ZVM 123G Green	75
ZVM 124 Amber IBM	129
ZVM 131 Color	275
ZVM 133 RGB	389
ZVM 135 Composite	449
ZVM 136 Hi Res Color	589
ZVM 1220	95
ZVM 1230	95
ZVM 1240	149

PANASONIC	
DT13000 13" RGB/Composite	247
DTM140 14" RGB/Composite	329
DTM103 10" RGB Hi Res	395
DT5101 10" Composite	175
DT1000G 10" RGB	166
TX12H3P 12" Color	419
TR120M1PA 12" Green	109
TR120MBA 12" Amber	109
TR122MSP 12" Green IBM	148
TR122MYP 12" Amber IBM	148
SAKATA	
SG 1000 12" Green	99
SA 1000 12" Amber	109
SG 1500 12" Green TTL	119
SA 1500 12" Amber TTL	129
SC 100 13" Color Comp	209
SC 200 13" RGB	389
1500 G	CALL
1500 A	CALL
STS1 Tilt Stand	29

TEKNIKA	
MJ-10 Composite	179
MJ-22 RGB	255
AMDEK	
300 Green	118
300 Amber	128
310 Amber IBM	155
Color 300 Audio	234
Color 500 Composite	369
Color 600	397
Color 700	495
Color 710	569

NEC	
JB-1260 Green	95
JB-1201 Green	135
JC 1215 Color	235
JC 1216 RGB	375
JC 1460 Color	265
JB 1205 Amber	139
PRINCETON GRAPHICS	
MAX-12 Amber	185
HX-12 RGB	465
SR-12 RGB	595

INTERFACING

DIGITAL DEVICES	
U-Print C (C-64)	49
ORANGE MICRO	
Grappier CD (C-64)	79

QRD	
GPC (C-64)	59
CARDCO	
G-Wiz (C-64)	54
C7 + G (C-64)	45
C7PS (C-64)	49
C7B (C-64)	39
TYMAC	
Connection (C-64)	55

MODEMS

HAYES	
Smartmodem 300	133
Smartmodem 1200	377
Smartmodem 1200B	347
Smartmodem 2400	598
Micromodem IIE	135
Westridge (C-64)	59
Mitey Mo Modem	69
Compuserve	19.85

NOVATION	
IBM-300/1200 MS-DOS ext	319
IBM-300/1200 CPM-86 ext	319
IBM 300/1200/2400 ext	529
IBM 300/1200/2400 MS-DOS	579
IBM MS-DOS int	325
IBM CPM-86 int	325
Macromodem 300/1200	315
Macromodem 300/1200/2400	585
Apple Cat II	219
TELE LEARNING	
Total Telecommunications (C-64)	29.95
AP-250 (300 Baud Apple)	69.95
IB-250 (300 Baud IBM)	69.95
ANCHOR	
Volksmodem	55
Volksmodem 12	186
Mark 12	229

DRIVES

COMTEL	
Enhancer 2000 (c-64)	179
INDUS	
GT ATARI	215
GT COMMODORE	235
MSD	
SD1 Drive (C-64)	229
SD2 Drive (C-64)	469

BUY LYCO AND ENJOY

- * THE LOWEST PRICES
- * Free shipping on prepaid cash orders in U.S.
- * All Merchandise Factory Fresh
- * Access to our Multi-Million \$ Inventory
- * Orders outside PA save state sales tax
- * Full Manufacturer's Warranty apply!
- * Purchase Orders Accepted from educational institutions!
- * We check for stolen credit cards!
- * TOLL FREE ORDER LINE
- * 24 hrs. shipping on in-stock product
- * No deposit on UPS C.O.D. orders
- * Air freight service available
- * Full accessory line in stock
- * We ship to our servicemen overseas!

TOLL FREE 1-800-233-8760



TO ORDER



CALL TOLL FREE

800-233-8760

Customer Service 1-717-327-1825 Jersey Shore PA 17740

or send order to
Lyc0 Computer
P O Box 5088

RISK FREE POLICY

In-stock items shipped within 24 hours of order. No deposit on C.O.D. orders. Free shipping on prepaid cash orders within the continental U.S. Volume discounts available. PA residents add sales tax. APO, FPO and international orders add \$5.00 plus 3% for priority mail service. Advertised prices show 4% discount for cash, add 4% for MasterCard or Visa. Personal checks require 4 weeks' clearance before shipping. Ask about UPS Blue and Red label shipping. All merchandise carried under manufacturer's warranty. Free catalog with order. All items subject to change without notice.

the STEP value, if specified, must be either integer constants or integer variables. Expressions are not allowed. Also, every FOR statement must have one, and only one, matching NEXT statement.

• GET. In Sprint, the GET statement can be followed only by a string variable. This shouldn't be a problem, as numeric GETs are prone to errors because of non-numeric keystrokes, and the VAL function can be used to change the string to a number.

• IF. This statement functions a bit abnormally when AND or OR is used. Because expressions are evaluated without operator precedence, the following statement will not work:

```
IF A=B AND C=D THEN...
```

It would be evaluated as if it were
IF (A=B AND C) = D THEN...

To get around this, you can use the following modification.

```
X = A=B:Y = C=D:IF X AND Y  
THEN...
```

The result of the comparison A=B, which is -1 for true or zero for false, is assigned to variable X. The result of C=D is assigned to Y. Now X and Y can be substituted for

those comparisons in the IF statement.

• INPUT. Each INPUT statement can assign input to just one variable. In addition, all characters, except leading and trailing spaces, typed on the screen, are assigned to the variable. This includes commas, colons, and quotes.

Functions

Sprint supports most Commodore functions that do not require floating point numbers. The arguments of functions must be constants or variables, not expressions. Also, note that functions may not be nested. For example, ABS(RND(0)) is illegal. The following functions work differently in Sprint than in regular BASIC:

• RND. The RND function always returns a number ranging from -32768 to 32767, no matter what its argument is. To scale the number down to size, you can divide, using the equation.

```
Z=32767/upper range:N=RND(0) AND  
32767/Z
```

The AND is necessary to insure that no negative numbers result. Sprint gets its random numbers from voice 3 of the SID chip.

• MID\$. This string function has two forms in Commodore BASIC: MID\$(v\$,x) and MID\$(v\$,x,y). Only the latter form is supported by Sprint.

• ASC. In Commodore BASIC, using this function on a null ("") string results in an error. This does not occur in Sprint. Instead, a value of zero is returned.

Error Messages

Sprint has many error messages which make it easier to debug programs. However, only certain types of errors can be flagged during compilation. Sprint catches errors such as data type mismatches, NEXT without FOR, and so on. Errors such as overflowing numbers and running out of DATA items cannot be flagged during compilation because they occur during execution of the actual compiled program. In these cases it will be harder, but not impossible, to debug programs.

Sometimes, an error earlier in the program leads to another error later on. For example, if there is an error in a FOR statement, the compiler will act as if that FOR does not exist. Because of this, the corresponding NEXT statement will cause a NEXT WITHOUT FOR error message. You'll have to use your judgment to weed out these extraneous messages. Note that you should never attempt to execute a program with even a single error in it.

See the Sprint Error Messages table for more details.

How Fast Is Sprint?

I ran several test programs through the compiler to determine the speed of Sprint. Results varied according to the type of program. The compiled test programs ran 15 to 50 times faster than Commodore BASIC. A program to sort 100 numbers took over two minutes in Commodore BASIC, but the same program compiled by Sprint executed in only five seconds!

For demonstration purposes, I've included a sample program. Type in Program 2, "64 Doodler Demo," and run it, noting the speed with which it executes. Now, save, compile, and run it again. Notice the difference?

See program listings on page 127. ☐

Sprint Error Messages

BAD FILE—Sprint only reads program files. This error results if the filename of a sequential file is entered. This error may also happen if program line has more than 80 characters or a read error occurs.

DISK ERROR—The disk error channel is checked prior to each pass. If there is an error, it is displayed and compilation is aborted.

DEVICE NOT PRESENT—The disk drive is not connected to the serial bus, or it is not turned on.

NOT SUPPORTED—A statement that is legal in Commodore BASIC but illegal in Sprint was used.

ILLEGAL FUNCTION USE—A function was used where a statement should have been used.

ILLEGAL STATEMENT USE—A statement was used where a function should have been used.

NON-EXISTING LINE—A

GOTO or GOSUB attempts to branch to a program line that does not exist.

SYNTAX—A misspelled keyword, extra parenthesis, and so on.

TOO MANY FORS—It is unlikely that you'll ever encounter this error, as up to 19 FOR/NEXT loops can be nested.

NEXT WITHOUT FOR—A NEXT statement attempts to end a loop which does not have a corresponding FOR statement.

TYPE MISMATCH—Numeric data was used where string data was expected, or vice versa.

COMPILATION ABORTED—Either the STOP key was pressed or an irrecoverable error has occurred (file not found, and so on).

MISSING COMMA

MISSING PARENTHESIS

MISSING SEMICOLON

MISSING EQUAL SIGN

BEACH-HEAD II

FEATURES
"VOICE
SIMULATION"
AND TRUE
"HEAD TO HEAD"
TWO PLAYER
ACTION

By Roger and
Bruce Carver

The war time drama of the award winning game Beach-Head continues with Beach-Head II, "The Dictator Strikes Back."

Beach-Head II pits allied forces against the cruel dictator, who escaped the destruction of the fortress and fled into the tropical forest with portions of his army and prisoners captured during the land battle. The player must locate and penetrate the heavily armed sanctuary, capture the dictator, and free the prisoners.



THE DICTATOR STRIKES BACK

\$39.95

AVAILABLE ON DISK FOR COMMODORE 64/128, APPLE II+ /E/C, ATARI 48K

TRY THESE OTHER FINE ACCESS PRODUCTS

MACH5™

NEW

CARTRIDGE FAST LOADER

- Load programs up to 500% faster.
- Full help menu at the touch of a key.
- Eliminate 1541 disk drive rattle.
- Print screen (screen dump to printer).
- Restore basic program (old).
- List disk directory without erasing program in memory.
- Pause or exit from directory listing.
- Execute short hand load commands from directory.
- Auto run any basic program.
- Open and close printer channels with a single key.
- Disable and re-enable features without turning off computer.
- Compatible with all popular printers.
- Send dos command (@).
- Load virtually 95% of all software, even copy protected games.
- Completely transparent.
- Does not disturb ram.

\$34.95

Compatible with your Commodore 64/128 and 1541, Indus GT, Enhancer 2000 or Tech 16.

BEACH-HEAD™

"The graphics are remarkable—it's almost like watching a John Wayne Movie."

—Computer Games



\$34.95

Commodore 64/128, Atari 48K

RAID OVER MOSCOW™

"Raid Over Moscow is action gaming at its finest—realistic graphics, superb sound effects and highly challenging tests of skill."

—Home Computing & Video News



\$39.95

Commodore 64/128

ACCESS
Software Incorporated

VISIT YOUR FAVORITE RETAILER...

For mail orders, enclose check or money order, plus \$2.00 shipping and handling, and specify machine version desired. Order by phone on Visa, MasterCard or C.O.D. by calling 801/298-9077.

ACCESS SOFTWARE, INC. 2561 So. 1560 W. Woods Cross, UT 84087

The Fast Assembler

Yves Han

Here's a truly amazing machine language assembler for the 64 and 128 (in 64 mode). "Fast Assembler" supports multiple statement lines, labels, and macro-like "include" files. It can assemble to memory or to disk. Written very compactly, it occupies only about 2600 bytes, leaving the rest of memory for your source code. It also adds to the BASIC editor several new features useful to both BASIC and machine language programmers.

Symbolic label-based assemblers are the most convenient way to write machine language (ML) programs. The instructions are entered as *source code* and later assembled into object code (the actual ML program—the numbers in memory). And rather than using memory locations, you can name routines with meaningful labels. It's as if you could enter GOSUB JOYSTICK in BASIC.

Saving Memory By Using The BASIC Editor

You write your ML programs for "The Fast Assembler" (FA) with the 64's BASIC editor. You save to tape or disk as you would a BASIC program, and listing it to a printer is exactly the same as listing BASIC.

The FA is an extension of the BASIC interpreter especially designed for writing programs in machine language. Writing it as a BASIC extension kept the program short (under 2600 bytes) because many subroutines of the BASIC interpreter could be used. Some modifications have been made to BASIC to make writing programs easier. To do this, the BASIC ROM had to

be copied to its matching RAM.

Even if you don't write programs in machine language, you can still use the assembler because of the new features added to BASIC and the extra BASIC commands. The assembler will execute a BASIC program just like normal BASIC would.

Typing Instructions

You'll need a copy of "The New MLX" program (appearing this month for the first time) to type in Fast Assembler. First type in MLX and save a copy or two. When you run it, answer the prompts as follows:

Starting Address: 0801
Ending Address: 1220

After entering the FA, save it on tape or disk. To start up FA, first load it as if it were a BASIC program (don't use a secondary address of 1, just type LOAD "filename",8 for disk or LOAD "filename" for tape). Then type RUN. The enabling SYS is built into the first line of the program. The screen will clear, and a message will appear at the top of the screen, indicating FA has been enabled. You

can now start programming—in BASIC or machine language.

BASIC Modifications And Enhancements

The following changes have been made to the BASIC interpreter:

- **Structured listings.** Spaces between the line number and the first character on the line are not deleted. This makes it possible to indent lines and make listings easier to read.

- **List pause.** You can freeze a listing by holding down the SHIFT key or pressing SHIFT-LOCK. Listing can be continued by releasing the SHIFT key.

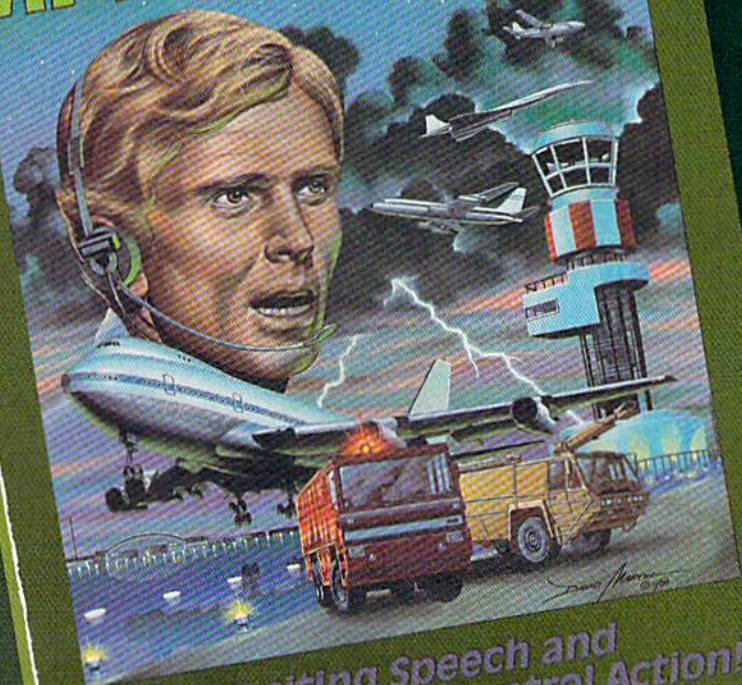
- **ASCII translations and hexadecimal/binary numbers.** In arithmetic expressions, you can use hexadecimal and binary numbers. Hexadecimal numbers should be preceded by "\$" and binary numbers by "%". You can also use a character preceded by a single quote ('A is the same as ASC("A")). You can also use this to find the value of a BASIC token. For example, PRINT 'END will print the value 128, which is the BASIC code for END. If you put a space between the quote and the character, the ASCII value of the space will be taken instead of the character.

- **Variable and function names.** The rules for variable and function names have been changed a little bit. Instead of the first two, the first eight characters are recognized. FA recognizes NUMBER1 and NUMBER2 as separate variables, while ordinary BASIC would consider them the same variable

NEW
simulation with **SPEECH!**

MICRO PROSE
SIMULATION • SOFTWARE

"KENNEDY APPROACH..."



Exciting speech and
Graphic Air Traffic Control Action!!

ARE YOU READY?

EXPERIENCE THE
THRILLS AND
EDGE-OF-THE-SEAT
EXCITEMENT AS
YOU DIRECT THE
FRANTIC ACTION
IN THE SKIES
AROUND OUR
NATION'S
BUSIEST
AIRPORTS.

LOOK AT THESE GREAT REVIEWS:

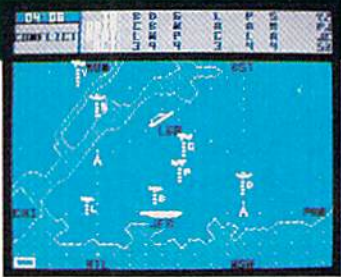
"Superb! Try to remember **this is only a game**. Once again, MicroProse has really fulfilled its slogan "The action is simulated, the excitement is real!" **RUN** — Garold Stone

"Kennedy Approach is a simulation par excellence. What it all adds up to is engrossing, intense and frenetic fun." **Power Play** — Jack Kammer

"...fast thinking is more important than fast reflexes. This one will drive you crazy." **Boys' Life** — Scott Stucky

"This edge of the seat, nerve-racking air-traffic controller simulation is one of the most intense games I've ever played. One of the year's best!" **Family Computing** — Jamie Delson

"Kennedy Approach is an addictive gem. A fantastic speech synthesis system makes this simulation all too real!" **Creative Computing** — Russ Lockwood



Commodore 64 Screen Picture

Voice Communications coming in from all directions!! 20 Aircraft in the pattern, and now you have an EMERGENCY!! As "Kennedy Approach", YOU are in charge!! It's your job to get all these aircraft and passengers on the ground or on the way safely!! You'll really be glad when this shift is over!!

"Kennedy Approach" is the first "Speaking Simulation" that allows you not only to control the exciting action in the skies around some of our busiest airports but also to hear and communicate with the simulation aircraft using computer generated speech. Fast action, great aircraft control simulation, and outstanding graphics and sound make "Kennedy Approach" a must addition to your simulation software library!! **SEE YOUR LOCAL RETAILER** for "Kennedy Approach". Available for Commodore-64 and Atari computers for suggested retail of only \$34.95. For more information on all MicroProse products call or write.

MICRO PROSE

SIMULATION • SOFTWARE

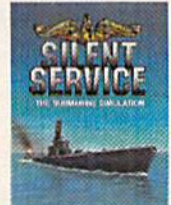
120 Lakefront Drive Hunt Valley, MD 21030 (301) 667-1151

COMMODORE 64 and ATARI are registered trademarks of Commodore Business Machines, Inc. and Atari Inc., respectively. Software Speech by Electronic Speech Systems of Berkeley, Ca.

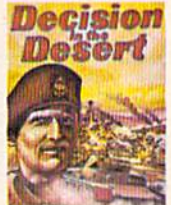
EXPERIENCE THE REALITY OF THESE OTHER GREAT SIMULATIONS FROM MICROPROSE



Challenging and Exciting Air Combat from the Modern Electronic Cockpit!



Exciting World War II Submarine Action in the Pacific!



You are in command — North Africa 1940-1942

MAGNUM LOAD

Programed by Jim Drew

MAGNUM LOAD is a new replacement KERNAL (operating system) ROM chip for your Commodore 65 or 128 computer that will load and verify programs up to 6 times faster than before. The tape routines have been removed from the old chip and in their place have been put a high-speed loader, high-speed verify, and disk driver no-head-rattle routine. Unlike the older cartridge fast loaders, no ports are tied up at the rear of the computer, the screen is not blanked during loading and there is no wear-and-tear on the expansion port. For maximum convenience and performance, the chip is installed directly in the circuit board. Generally a socket has already been provided to make the operation easy, but occasionally some soldering may be required. Now you can give your 1541 disk drive "1571 speed."

Rather than give you more exaggerated claims about how many times faster our ROM chip is compared to the slower cartridge versions, a comparison chart is supplied listing MEASURED loading times.

Program	Star-Dos	Reg. Load	Mach 5	Fast Load	MAGNUM LOAD
Pitstop II	?	144 sec.	43 sec.	41 sec.	31 sec.
Music Shop	?	105 sec.	105 sec.	105*	21 sec.
Hitchhiker's Guide to the Galaxy	?	70 sec.	70 sec.	N.G.**	68 sec.
On-Field Football	?	149 sec.	66 sec.	63 sec.	56 sec.
EASY FINANCE I	?	58 sec.	13 sec.	13 sec.	11 sec.

\$24⁹⁵

\$39⁹⁵

For 1541 or MSD Version

for Combo Version

*Will not fast load - defaulted back to regular load

**Failed to load at all

D-CODER

- Translates any machine language program into easy-to-read English descriptions with complete explanations of each command.
- Makes complete notations of all important memory locations accessed by the program (SID, VIC, MOS, KERNAL, etc.)
- Gives you three ways of accessing programs:
 1. Will read and list programs from DISK
 2. Will read and list programs from MEMORY
 3. Direct user input (from magazines, etc.)
- Can be used to locate and examine any machine language program's protection routines!
- Can be used to easily break apart machine language programs for study and examination!
- Printer option for complete hard copy listings!

You no longer need to be an EGGHEAD to read Machine Language.

\$19⁹⁵

N-CODER

THE PERFECT COMPANION PROGRAM TO D-CODER!

Allows you to easily make changes in machine language programs... right on the disk!

- Rewrite ability allows code to be altered and then rewritten directly to the disk!
- Features sector-by-sector scrolling assembly language display of machine language programs!
- Notation of ASCII text equivalents for easy spotting of embedded text strings!
- Handy reference display of all assembly language commands and their ML numerical equivalents!
- Byte splitter for easy splitting of decimal addresses into low byte-high byte format!

\$19⁹⁵

Top Secret Stuff I and Top Secret Stuff II

Programed by Jim Drew

Are both collections of 20 programs per diskette (that works out to about \$1.00 per program!) that help you explore and enhance your Commodore 64 and/or 128 and 1541 disk drive. Now you can unlock many secrets formerly known only to top machine language programmers by using these sophisticated "tools." If you have ever been curious about the inner workings of your computer system, now is your chance to dig in and find answers with the help of these programs. These collections of programs have gotten rave reviews from actual users, and we are sure that you, too, will be pleased.

The programs include on each diskette are listed below

TOP SECRET STUFF I

The Dock (view/repair disk contents)
 Sync Checker (diskette)
 Imbedded Track Number Creator
 Disk Manipulation System
 3 Minute Copy (backup program)
 Diskette Matcher (compare sectors)
 Unscratch A File (recover file)
 View BAM (block allocation map)
 1541 Read/Write Test
 1/2 Track Reader
 Header Reader (display disk header)
 Sync Maker
 Device Number Change (disk drive)
 Electronic Arts Backup
 Drive Mon (disk drive m/f1 monitor)
 Diskette File Log (start-end address)
 Write-Protect Sensor Test
 Repair A Track (recover data)
 Fast Format (10 seconds)
 1/2 Track Formatter

TOP SECRET STUFF II

RAM Test (test Computer RAM)
 Copy \$A000-\$FFFF (under ROMS)
 Display G.C.R. (All sector data)
 Un-Write Protect (diskette)
 Unnew Program
 Wedge - \$8000
 Smooth Scroll (messages up screen)
 Koala Dump (koala pad screen dump)
 Disk Manipulation System
 Disk Eraser (20 second clean wipe)
 Split Screen (TWO screen colors)
 Disk Protection System (stops copies)
 Write Protect (diskette)
 Boot Maker (autoboot BASIC programs)
 Wedge - \$C000
 Diskmatcher II (high speed version)
 No Drive Rattle (on reading errors)
 3 Times Disk Drive Head Speed
 Monitor Test (check video monitor)

\$19⁹⁵

\$19⁹⁵

SOFTWARE PROTECTION HANDBOOK Third Edition! Now Available!

If you're tired of being harassed by protected software and too many copy programs, then this is the book for you! This 224 page manual covers the gamut from legalities to protection methods to step-by-step back up procedures. Now you can learn both how to protect and unprotect software! The techniques covered include copying cartridges to tape or disk, tape protection, and disk protection. Disk protection covers error numbers 20, 21, 22, 23, 27 and 29 plus single track formatting, header modification, header swapping, half track reading and writing, reading and modified bit densities, formatting illegal track/sectors, sync writing and more! The Third edition explains, tells how to detect and how to write them with included software.

C-64 Book Only **\$19⁹⁵** US

Book & Disk of all Programs **\$29⁹⁶** US
 This manual does not condone piracy *Shipping \$2.00

'TRACK TRAP' The 1541 Disk Expander! • Supplement to the Software Protection Handbook •

The most unusual and innovative protection analysis tool for the Commodore yet! — **Not For Beginners** — This system expands your 1541 drive giving capability otherwise only possible for professional disk duplication equipment. Now you can create or analyze exotic forms of disk protection. 'D.O.S. Kings Take Note!' — Entire tracks of data can be read and written without regard to 'standard' sync and format. You are not longer limited to sector by sector searches. Whole track readouts reveal hidden data even when all or most of the sectors have been erased. Uncovers and writes data under errors, pulse coded sync or data, hidden data and access codes, multiple track densities and more! This supplemental manual covers the complete implementation of the track trap system including necessary software and hardware documentation.

Track Trap disk expanded manual **\$9⁹⁵** US

WAR GAMES AUTODIALER



1. **Auto Dial** will automatically dial a set of numbers you choose
2. **Review Numbers** will review numbers that were answered by a computer
3. **Save Numbers** will save numbers where a computer answered.
4. **Hardcopy of Numbers** will print out list of numbers where a computer answered
5. **LOAD Numbers** will load in numbers to continue where it left off
6. **Continue** will pick up dialing where it was interrupted.

\$29⁹⁵

BBS

- 300/1200 Band
- Remote access for sysop
- 2 levels of security for up and down load
- 7 rooms (read and write) with 4 security levels
- Secret highest level
- Open chalk board
- Auto message cycling
- Printer option

Plus the only BBS with all three (3) protocols X modem, new printer and midwest term, so anyone can up/down load.

Don't be fooled by cheap imitations. This is the most comprehensive system available anywhere. Now at a new low price.

\$39⁹⁵

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. Canada orders must be in U.S. Dollars. VISA — MASTER CARD — C.O.D.



Programs for C-64 \$2.00 S & H on all orders
 Software Submissions Invited

MegaSoft Limited

P.O. Box 1080, Battle Ground, Washington 98604
 Phone 800-541-1541 • BBS 687-5205 After Hours Computer to Computer (BBS)

(NU). Variables may contain but not be equal to BASIC/assembler commands or mnemonics: LAND is a legitimate variable name, even though it contains the keyword AND. But variable labels starting with TI or ST (reserved keywords) are not automatically set to zero the first time you use them. An exception to the eight character names is that only the first two characters of array variables are significant.

• **Keywords.** Because variable and function names may contain keywords, FA has to be able to decide whether a keyword is a keyword or part of a variable or function name. So the assembler recognizes a keyword if it's followed by a space or nonalphabetic character. For example, in PRINT "OK" the keyword PRINT will be recognized as a PRINT command, but in A\$="OK":PRINTA\$, the keyword PRINT is recognized as part of the variable name PRINTA\$. You would have to insert a space (PRINT A\$) if you wanted to print the variable A\$.

• **REM and DATA.** Capital letters in REM and DATA lines are listed as capital letters and not as tokenized BASIC keywords. For example, 10 rem AB lists as it is entered and not as 10 rem atnpeek as normal BASIC would do.

New BASIC Commands

AUTO step value

This command turns automatic line numbering on and defines the step value between the line numbers. To enter AUTO mode, type AUTO followed by the step value and press RETURN. Then enter a line with a line number. The next line number prints automatically. To leave auto mode, move the cursor to an empty line and press RETURN. To turn automatic line numbering off altogether, enter AUTO only.

You can also use this command to delete part of a program. Turn automatic line numbering on with a step value of one. Type the number of the first line you want to delete and press RETURN. Keep pressing RETURN until you've reached the end of the section you want to delete. Instead of pressing RETURN again and again, you can enter POKE 650,128 and hold RETURN down until you've reached the last line to be erased.

OLD

If you accidentally type NEW, you can restore your program with this command. It can also be used if you've installed a reset button. If you've assembled a program and are testing it, sometimes your computer locks up. Use the reset button and then enter SYS 4408 to restart the assembler and type OLD to restore the source program. If your program has not destroyed the assembler or the source program, everything will be there.

Semicolon (;)

This has the same function as the REM statement. It need not be separated with a colon from the preceding command. For example:

```
10 X=0:REM SET X TO ZERO
```

is the same as

```
10 X=0;SET X TO ZERO
```

The semicolon in the commands PRINT and INPUT is not treated as a REM statement but as a separator.

Using Labels As Variables And Addresses

Label names follow the same rules as variable names. They can be used in arithmetic expressions like normal variables. You can define a label in two ways:

You can place the label name just before the command to which you want to refer. If more commands are on the same line, you must separate the label from the commands with a colon.

Or you can label the current program counter: LABEL-NAME=*. The asterisk (*) is a special variable which gives the value of the program counter. The counter is the address where the next instruction or datum will be placed. You can only read the variable *. You cannot assign a value to it with the statement *=expr.

Here's an example of using labels to mark routines in a program (don't type this in, it's only a fragment of a program):

```
50 JSR DISPLAY1; JUMP TO LABELED
   SUBROUTINE (LINE 90)
60 LDA $FF: BNE SKIPIT ; CONDI-
   TIONAL BRANCH AHEAD TO
   SKIPIT
70 TYA
80 SKIPIT: LDX #4: STA $8000,X: RTS;
   TARGET OF BRANCH IN 60
90 DISPLAY1=* ; THIS LABELS THE
   CURRENT PROGRAM COUNTER
```

100 ;

```
110 LDA #65: JSR $FFD2: RTS
```

Remember that in the lines above, the semicolon marks the beginning of a comment which, like a REM, is ignored by FA. The technique in line 90 is valuable if you think you may be adding some code at the beginning of the routine. As listed, the subroutine called DISPLAY1 starts with LDA #65, but later you could go in and add some lines between 90 and 110.

Three Passes To Assemble

Three passes are required to assemble source code (what you write) into object code (an executable ML program that the computer can follow). But FA doesn't do it by itself. You have to insert a loop that repeats three times with BASIC commands:

```
10 FOR PASS=1 TO 3
```

```
    . (Insert source code)
```

```
90 NEXT PASS:END
```

If you use an invalid addressing mode such as LSR (expr), you'll see ILLEGAL ADDRESSING MODE ERROR. Mnemonics can only be used in program mode—that is, in a program you execute with RUN. If you enter a mnemonic in direct mode, you'll see ILLEGAL DIRECT ERROR.

Also note that for Immediate Addressing, the argument can be an actual number or an arithmetic expression with a value in the range 0-255. Or you can substitute a string expression, in which case the assembler takes the ASCII value of the first character as the argument. If the string length is zero, the argument becomes zero.

Assembler Commands

Assembler commands which write data to the output device can only be used in program mode, otherwise you'll get ILLEGAL DIRECT ERROR. All assembler commands must be included in every pass.

ORG address,mode,device,name

This command must be used at the start of each pass. It does several things. First, it sets the origin (ORG), the memory address for the beginning of the ML program. It assigns an initial value to the program counter. It also sets the assembler mode, which should be zero on the

ENHANCER 2000



Commodore® Compatible Floppy Disk Drive

One Year Warranty With Second Year Extended Warranty Available

“Where Speed and Quality Meet”

• SUPER HIGH SPEED • SLIM LINE CONSTRUCTION (LOW PROFILE)
FULLY COMMODORE COMPATIBLE • DIRECT DRIVE (DC) MOTOR •
AVG. MTBF RATE OF 10,000 HOURS • VENTED CASE • SOLID STATE
POWER SUPPLY • DUAL SERIAL PORT (CHAINING OPTION) • 5¼”
INDUSTRY STANDARD FORMAT

Manufactured Exclusively BY CHINON INDUSTRIES of Japan For “THE COMTEL GROUP”

Foreign And Domestic
Inquiries Welcome

1651 East Edinger Suite 209 Santa Ana, CA 92705
Commodore® is a Registered Trademark of Commodore Bus. Machines.

Telephone: (714) 953-6165
Telex: 503727

first two passes and one on the third and last. ORG also sets the output device and filename (if necessary).

Not all arguments are necessary. Also permitted are:

ORG
ORG address
ORG address,mode

Default values for the arguments are:

address = 49152 (= \$C000)
mode = 0
device = 0 and no name

If you use a mnemonic or assembler command before you've used the command ORG, you'll see UNDEF'D LOCATION COUNTER ERROR.

The address assigns a value to the program counter. Usually, you use more than one pass to assemble the source program. Only during the last pass should the object code be written to memory or to the output device. Mode tells the assembler when the last pass is reached. Zero means it's not the last pass, so no object code should be produced, and there's no range checking for arguments and no checking for too large branches.

On the final pass, you should set the mode to one, which signals the last pass, when object code is written to the output device.

Finally, you set the device number of the output device and a string expression which contains the filename if the object code is not written to memory. Zero means the output device is memory. Be careful not to write to memory locations where the assembler is placed (\$0801-\$121B) or where the BASIC interpreter is placed (\$A000-\$BFFF).

A device number in the range 8-11 means the output device is a disk drive. If mode is equal to one, the assembler will open a PRG file with the name specified in the argument name. The logical file number will be eight.

BYTE *expression,expression,...*

This command writes numbers or characters to memory or the selected output device. It can have one or more arithmetic or string expressions separated by commas. Arithmetic expressions must give a positive value less than 256. The value will be placed in one byte. Each character of a string expres-

sion will be placed in one byte.

WORD *expression,expression,...*

This has the same function as BYTE except that values of arithmetic expressions must be positive and less than 65536. The value will be placed in two bytes in low/high format.

INCLUDE *name,device*

This command assembles a file from disk and inserts the resulting object code into memory or the output device. The file must be a normal PRG file and may not contain BASIC commands which cause a branch to another line or stop the program. Also not permitted are the BASIC commands DEF, RETURN, CLR, NEW, and the assembler commands SEND and INCLUDE.

The file is opened with a logical file number of nine. The file is closed when the end of the file is reached. The name is the filename you're including, and the device number can be 8-11 (use 8 if you have a single drive). If you have only one disk drive and you assemble to disk, the file(s) for the command INCLUDE must be on the same disk to which you assemble.

All variables and labels are *global*, which means you can pass parameters to INCLUDE files so they can work like macro-instructions. Let's say you're writing a program that needs to access several different disk files, and there are several points in the program that use the Kernal routines SETLFS, SETNAM, and OPEN. You could write the source code that performs these Kernal calls and save it to disk under the program name "OPEN" to be used later. Then, in the main program, use INCLUDE "OPEN",8. When the source code is compiled, the series of commands from the OPEN file are automatically inserted in the proper place in the object code.

SEND *stringexpr*

The command SEND may be used only if the object program is written to disk. It's used to link object code to a BASIC program. *Stringexpr* must contain a BASIC line with line number. If you forget the line number, you'll get MISSING LINE NUMBER ERROR. If you want to send more than one line, you must use SEND for each line, and you have to send the lines in the right

order. You must send the lines before the actual object code is written to disk. The address in the ORG command must be the start of BASIC RAM (2049).

UNSEND

If you load a program which consists of both BASIC and ML, the interpreter has to know where the BASIC part ends. UNSEND places a mark which the computer recognizes as the end of the BASIC part.

Example Programs

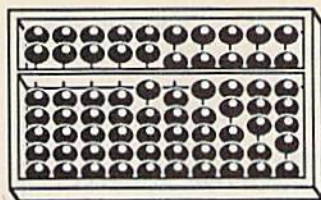
```
100 FOR PASS=1 TO 3:PRINT "PAS
S"PASS,
110 ORG $C000
120 IF PASS=3 THEN ORG $C000,1
130 START: LDX #0
140 LOOP: LDA TEXT,X:PRINT TEX
T,
150 BEQ EXIT
160 JSR $FFD2
170 INX
180 BNE LOOP
190 EXIT: RTS
200 PRINT *
210 TEXT: BYTE "EXAMPLE 1",0
220 NEXT PASS:END
```

Lines 110 and 120 show how to use the command ORG. In every pass, line 110 sets mode 0. But in pass three, line 120 sets mode 1. The object code will start at 49152 (hexadecimal \$C000). Line 200 prints the current value of the location counter (*).

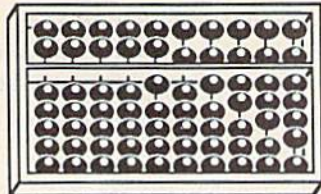
You can assemble the program with the command RUN. The program will give the following output:

PASS 1	0	49165
PASS 2	49165	49166
PASS 3	49166	49166

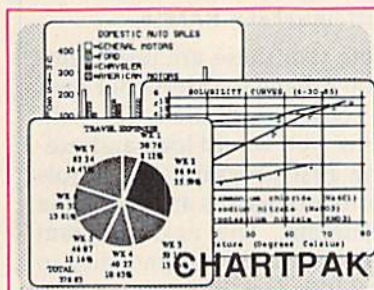
The first column is the pass number. The second column is the value of the label TEXT in the instruction LDA TEXT,X in line 140. The third column is the value the label should have when the source code is assembled. You can see that only in pass three are these values equal to each other. This is because the assembler defaults to zero-page addressing. In pass one, TEXT has a value less than 256 so zero-page addressing is assumed. This means a two-byte instruction instead of three. The value assigned to TEXT will be too low, as you can see in pass one. In pass two, this value, which is too low, will be used in assembling line 140. The assembler decides not to use zero-page addressing, so TEXT is assigned the



NEW



'128 SOFTWARE



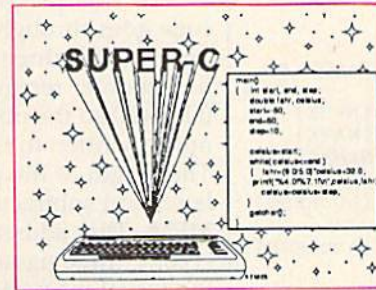
CHARTPAK
Make professional quality pie, bar and line charts, and graphics from your data. Includes statistical functions. 3x the resolution of '64 version. 500+ data points Outputs to most printers. \$39.95



SUPER Pascal
Complete J&W development system. With enhanced editor, compiler, built-in assembler, tool-kit, graphics, 220 page handbook, and plenty more. \$59.95



BASIC 128 Compiler
Versatile compiler instantly turns BASIC into lightning fast 6510 machine code and/or compact speedcode. Variable passing overlays, integer arithmetic, and more. \$59.95



SUPER C
Complete K&R compiler and development system. Editor, compiler, linker, I/O library and extensive 200 page handbook. Creates fast 6510 machine code. \$79.95

...AND OUR OTHER FANTASTIC 64 SOFTWARE

Technical Analysis System

A sophisticated charting and technical analysis system for serious investors. By charting and analyzing the past history of a stock, TAS can help pinpoint trends and patterns and predict a stock's future. TAS lets you enter trading data from the keyboard or directly from online financial services. \$59.95

Cadpak

A deluxe graphics design and drawing package. Use with or without a lightpen to create highly detailed designs with dimensioning, scaling, text, rotation, object libraries, hardcopy and much more. \$39.95

Xper

Capture your information on XPER's *knowledge base* and let this first expert system for Commodore computers help you make important decisions. Large capacity. Complete with full editing and reporting. \$59.95

PowerPlan

One of the most powerful spreadsheets for your Commodore computer. It includes menu or keyword selections, online help screens, field protection, windowing, trig functions and more. PowerGraph is also included to create integrated graphs and charts for you spreadsheet data. \$39.95

Personal Portfolio Manager

Complete portfolio management system for the individual or professional investor. Allows investors to easily manage their portfolios, obtain up-to-the-minute quotes, news, and perform selected analysis. \$39.95

Versions of the above are also available:

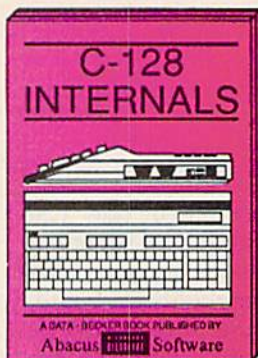
Super C 64	\$79.95
Super Pascal 64	\$59.95
BASIC 64	\$39.95
Chartpak 64	\$39.95

Abacus Software

P.O. Box 7211 Grand Rapids, MI 49510 Telex 709-10 Phone 616/241-5510
Call now for the name of your nearest dealer. To order by credit card, MC, AMEX or VISA, call 616/241-5510. Other software and books are available - Call and ask for your free catalog. Add \$4.00 for shipping per order. Foreign orders add \$12.00 per item. Dealer inquiries welcome - 1200+ dealers nationwide.

HOT OFF THE PRESS

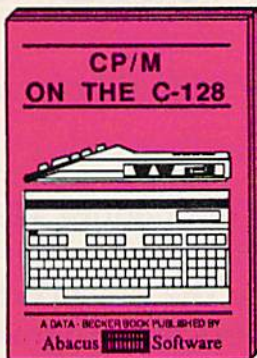
NEW INFORMATION FOR YOUR C-128



A detailed guide presenting the 128's operating system, explanations of graphics chips, a concise description of the MMU, well documented ROM listings, more. \$19.95



Computer Aided Design on your C-128 or 64. Design a CAD system using programs provided. Create 3D objects. With 128-Hardcopy and 128-Merge program listings. \$19.95



An essential guide to using CP/M on your 128, simple explanations of operating system and its memory usage, CP/M utility programs, submit files, and other subjects. \$19.95

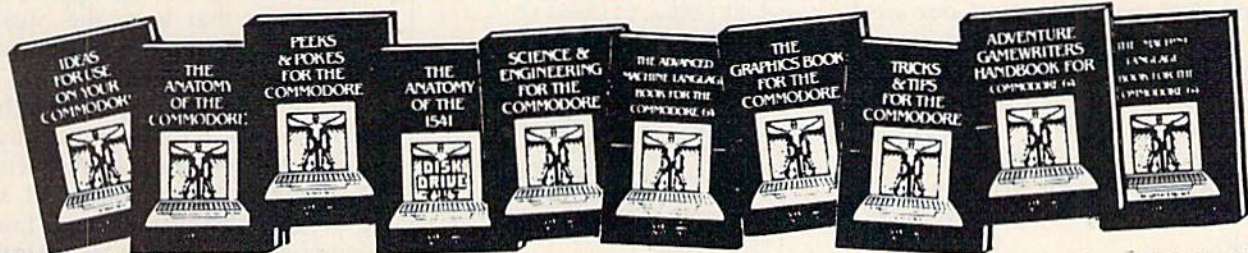


A guide for novice and advanced users. Sequential and relative files, direct access commands, directory usage, important DOS routines, commented DOS listings. \$19.95



This book is chock full of information which no '128 user should be without. It covers memory usage, hires graphics in 80 columns, windowing, memory locations. \$19.95

...AND TRUSTED INFORMATION ON THE 64!



ANATOMY OF C-64 Insider's guide to the '64 internals. Graphics, sound, I/O, kernel, memory maps, more. Complete commented ROM listings. 300pp \$19.95

ANATOMY OF 1541 DRIVE Best handbook on floppy explains all. Many examples and utilities. Fully commented 1541 ROM listings. 320pp \$19.95

MACHINE LANGUAGE C-64 Learn 6510 code write fast programs. Many samples and listings for complete assembler, monitor, & simulator. 200pp \$14.95

GRAPHICS BOOK C-64 - best reference covers basic and advanced graphics. Sprites, animation, Hires, Multicolor, lightpen, 3D-graphics, IRQ, CAD, projections, curves, more. 350pp \$19.95

TRICKS & TIPS FOR C-64 Collection of easy-to-use techniques: advanced graphics, improved data input, enhanced BASIC, CP/M, more. 275pp \$19.95

1541 REPAIR & MAINTENANCE Handbook describes the disk drive hardware. Includes schematics and techniques to keep 1541 running. 200pp \$19.95

ADVANCED MACHINE LANGUAGE Not covered elsewhere: - video controller, interrupts, timers, clocks, I/O, real time, extended BASIC, more. 210pp \$14.95

PRINTER BOOK C-64/VIC-20 Understand Commodore, Epson-compatible printers and 1520 plotter. Packed: utilities; graphics dump; 3D-plot; commented MPS801 ROM listings, more. 330pp \$19.95

SCIENCE/ENGINEERING ON C-64 In depth intro to computers in science. Topics: chemistry, physics, biology, astronomy, electronics, others. 350pp \$19.95

CASSETTE BOOK C-64/VIC-20 Comprehensive guide; many sample programs. High speed operating system fast file loading and saving. 225pp \$14.95

IDEAS FOR USE ON C-64 Themes: auto expenses, calculator, recipe file, stock lists, diet planner, window advertising, others. Includes listings. 200pp \$12.95

COMPILER BOOK C-64/C-128 All you need to know about compilers: how they work; designing and writing your own; generating machine code. With working example compiler. 300pp \$19.95

Adventure Gamewriters Handbook Step-by-step guide to designing and writing your own adventure games. With automated adventure game generator. 200pp \$14.95

PEEK & POKES FOR THE C-64 Includes in-depth explanations of PEEK, POKE, USR, and other BASIC commands. Learn the "inside" tricks to get the most out of your '64. 200pp \$14.95

Optional Diskettes for books For your convenience, the programs contained in each of our books are available on diskette to save you time entering them from your keyboard. Specify name of book when ordering. \$14.95 each

Call now for the name of your nearest dealer. To order by credit card call 616/241-5510. Other software and books are available - ask for free catalog. Add \$4.00 for shipping per order. Foreign orders add \$8.00 per book. Dealer inquires welcome - 1200+ dealers nationwide.

Abacus Software

P.O. Box 7211 Grand Rapids, MI 49510 - Telex 709-101 - Phone 616/241-5510

Programming Music and Sound On The 128

Philip Nelson, Assistant Editor

Anxious to unleash your new Commodore 128's sound and music capabilities? Here are some practical examples of how to use the powerful new BASIC 7.0 commands in working programs.

One of the Commodore 128's most welcome features is its ability to make music and sound effects with simple BASIC commands. Gone are the days when it took hours of programming and multiple POKEs to create sound on a Commodore computer. Since your *128 System Guide* explains the basics of each command, we'll look at some programs that actually put them to work.

Musical Keyboard

The first program, "Musical Keyboard," is lots of fun to use and also demonstrates how arrays can simplify your programs. It defines four rows of keys on the 128's keyboard as musical keys, giving you two separate one-octave keyboards. By pressing keys 0-9 on the numeric keypad, you can switch to any of the 128's ten predefined instrument voices.

```
10 GOSUB 60
20 GETKEY A$:X=PEEK(212)
30 IF T$(X)<>" THEN PLAY T$(X)
   ):PRINT "{HOME}"SPC(7)"TUNE
   : "MID$(T$(X),2)
```

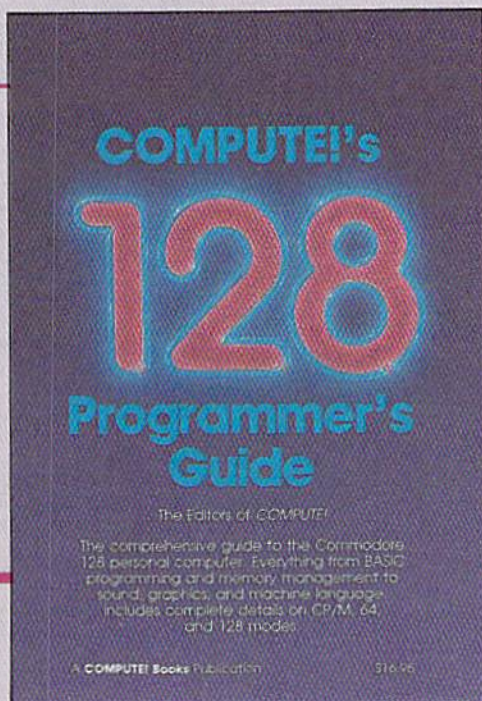
```
40 IF P$(X)<>" THEN PLAY P$(X)
   ):PRINT "{HOME}"P$(X)
   {2 SPACES}"
50 GOTO 20
60 DIM P$(256),T$(256):FOR J=1
   TO 3:SOUND J,0,0:NEXT
70 PLAY "U15 X0 T7 S":TEMPO 15
80 READ K,P$:P$(K)=P$:IF P$<>"
   DONE" THEN 80
90 READ K,P$:T$(K)="T"+P$:IF P
   $<>"DONE" THEN 90
100 PRINT CHR$(147)SPC(10)"
   [RVS]{2 DOWN}MUSICAL KEYBO
   ARD[OFF]":PRINT SPC(12)"4
   [SPACE]5 6 7 8 9"
110 PRINT SPC(11)"E R T Y U I
   [SPACE]O":PRINT SPC(12)"D
   [SPACE]F G H J K"
120 PRINT SPC(11)"X C V B N M
   [SPACE],":PRINT "{HOME}"SP
   C(7)"TUNE:"MID$(T$(70),2):
   RETURN
130 DATA 23,03C,18,03#C,20,03D
   ,21,03#D
140 DATA 31,03E,26,03F,28,03#F
   ,29,03G
150 DATA 39,03#G,34,03A,36,03#
   A,37,03B
160 DATA 47,04C,14,04C,11,04#C
   ,17,04D
170 DATA 16,04#D,22,04E,19,04F
   ,25,04#F
180 DATA 24,04G,30,04#G,27,04A
   ,33,04#A
190 DATA 32,04B,38,05C,256,DON
   E
200 DATA 81,0,71,1,68,2,79,3,6
   9,4,66,5
210 DATA 77,6,70,7,65,8,78,9,2
   56,DONE
```

Think for a moment how you would structure a musical keyboard program like this. It requires that you read the computer's keyboard, detect the pressing of certain keys, and translate those keypresses into musical notes. One way to do this would be with a long series of individual IF tests (IF A\$="X" THEN PLAY "O3C" and so on). But that would be slow and inefficient. This program takes a different approach, using arrays that store the music data and simplify the keyboard-scanning process as well.

Take a look at lines 60-90, the setup portion. Both of the arrays (P\$ and T\$) are dimensioned with 256 elements, enough to hold all the possible keyscan values. Line 80 stores a PLAY string (O3C, O3#C, etc.) in each element of the P\$ array that corresponds to the keyscan value (23, 18, etc.) of a key that we'll use to make music. Line 90 creates a similar array for selecting different instruments with the numeric keypad keys. (Actually, these two arrays could be combined into one, but we want to display the instrument data separately.)

After the setup portion is complete, the program loops continuously through lines 20-50. The statement X=PEEK(212) returns the value of the last key pressed. (Location 212 performs the same function as location 197 on the 64 and VIC-20. The statement FOR J=1 TO 1E9:PRINT PEEK(212):NEXT

COMPUTE!'s PROGRAMMER'S GUIDES



Everything you need for successful, entertaining, and challenging programming on your Amiga, Atari ST, or Commodore 128 computer.

Each book is carefully written in COMPUTE!'s lively, understandable style to help even beginning programmers learn the ins and outs of their personal computers.

COMPUTE!'s 128 Programmer's Guide

ISBN 0-87455-031-9

Edited 300 pages

Written and compiled by the most technically proficient authors in consumer computing today, the technical staff of COMPUTE! Publications, this guide to the powerful Commodore 128 computer contains a wealth of information for every programmer. Explore both BASICs, 2.0 and 7.0, through countless hands-on examples and sample programs. Learn how to create dazzling graphics and sophisticated sounds in both BASIC and machine language. See how to program peripherals, such as disk drives, printers, modems, and mice. Enter the world of CP/M, just one of the three modes of the 128.

There are even chapters on machine language programming and the computer's method of managing memory. As with all COMPUTE! books, *COMPUTE!'s 128 Programmer's Guide* includes numerous appendices covering everything from error messages to memory maps. This book is a must for every 128 owner.

\$16.95

Look for these new books at a bookstore or a computer store near you. Or order directly from COMPUTE! Books. Call toll-free 1-800-346-6767. In NY call 212-265-8360.

COMPUTE!'s Atari ST Programmer's Guide

0-87455-023-8

Edited

Complete and comprehensive, yet easy to understand, *COMPUTE!'s Atari ST Programmer's Guide* is a must for any Atari ST owner. The technical staff of COMPUTE! Publications has put together a reference guide to programming that takes the reader through every aspect of this newest Atari personal computer. Logo and BASIC, the two programming languages now available for the machine, are explored in detail. From programming concepts to writing programs, the scores of ready-to-type-in examples show just what can be done, and how to do it. Also advanced features of this new-generation computer, such as GEM and TOS, the ST's user interface and operating system, are illustrated. Valuable appendices provide information programmers need, including the 68000 opcodes and a list of ST resources.

\$16.95

COMPUTE!'s Amiga Programmer's Guide

0-87455-028-9

Edited

Covering AmigaDOS, BASIC, Intuition, and the other important programming tools which accompany the new Amiga, *COMPUTE!'s Amiga Programmer's Guide* is a clear and thorough guide to the inner workings of this fascinating, new-generation computer. The great speed of its 68000 microprocessor, coupled with the versatility of the Amiga-specific graphics and sound chips, makes the Amiga one of the most powerful computers available today. Written by the technical staff of COMPUTE! Publications, the most technically knowledgeable authors in computing today, this book is your key to accessing the Amiga's speed and power.

\$16.95 (March Release)

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

COMPUTE! books are available in the U.K., Europe, the Middle East, and Africa from Holt Saunders, Ltd., 1 St. Anne's Road, Eastbourne, East Sussex BN21 3UN, England.

lets you see the keyscan value of any key.) Lines 30-40 use the keyscan value as an index into the T\$ and P\$ arrays. The IF statements in these lines will be true only for those array elements in which we placed data: Every other element in the arrays is empty, containing nothing but a null string (""). Note that the arrays make it possible to use a short, efficient working loop that doesn't slow the program as a multitude of IF statements would.

Since this program uses PLAY to make the actual notes, you may wonder why there's a SOUND command in line 60. The statement FOR J=1 TO 3:SOUND J,0,0:NEXT immediately silences all SOUNDS that may be in effect from a previous program (or your own experiments). When you're setting up a sound program, it's prudent to reset sound and music parameters to a known state to avoid unwanted residual effects. If you fail to take this precaution, previous sound commands (FILTER, etc.) may prevent your sounds from working properly. Of course, pressing RUN/STOP-RESTORE resets most sound parameters, but that's not a very elegant solution. Thus, line 70 ensures that various TEMPO and PLAY parameters are set as needed in this program (filter off, maximum volume, etc.).

Although PLAY can generate as many as three notes at once, the 128's BASIC can only read one key at a time. So this keyboard is necessarily monophonic. Machine language routines are necessary to create a polyphonic (chord-playing) keyboard.

128 Soundmaker

"Soundmaker" is the shortest of the example programs, but it creates the most complex effects, using all three of the 128's voices simultaneously. Type in Soundmaker and save it to disk or tape (pay close attention to the punctuation in line 60). When you run the program, it spends a few seconds in preparation, then invites you to press any key.

```
10 GOSUB 70
20 GETKEY AS:V=V+1:IF V=4 THEN
  V=1:PRINT
30 W=INT(RND(1)*4):DI=INT(RND(
  1)*3):FRQ=K(T(ASC(AS)))
40 MI=INT(FRQ/(8*(V*W+1))):S=I
```

```
NT((FRQ-MI)/((INT(RND(1)*10
)+1)*(MI/100)))
50 SOUND V,0,0:SOUND V,FRQ,100
  ,DI,MI,S,W
60 PRINT "SOUND"V"{LEFT},"FRQ"
  {LEFT},"100"{LEFT},"DI"
  {LEFT},"MI"{LEFT},"S"{LEFT}
  ,"W"{LEFT},"":GOTO 20
70 FOR J=1 TO 3:SOUND J,0,0:NE
  XT:VOL 15:DIM K(256),T(256)
  :FOR J=1 TO 255:T(J)=J
80 K(J)=J*150:NEXT:POKE 2594,1
  28:PRINT CHR$(147)SPC(10)"
  {DOWN}[RVS]128 SOUNDMAKER
  {OFF}"
90 PRINT SPC(10)"PRESS ANY KEY
  ":PRINT:RETURN
```

Whenever you press a key, the 128 executes a new SOUND command and displays it on the screen for reference. As you'll soon discover, SOUND can create a dazzling variety of effects. All three voices are used, in 1-2-3 order, so if you keep pressing keys, you'll hear as many as three different sounds at once. The duration of each sound is limited to 100. If you want to hear individual sounds, wait until the current sound is done before pressing a key.

Note the difference in the way that SOUND and PLAY handle volume. SOUND does not produce any sounds at all unless you have previously set the volume to some non-zero value with VOL (line 70). PLAY, on the other hand, sets volume for itself with the U symbol, and pays no attention to VOL commands.

The frequency of each sound is determined by the ASCII value of the key you press. Keys with high values (like Z, ASCII 90) create higher pitched sounds than those with lower values (like the space bar, ASCII 32). Pressing SHIFT pitches the entire keyboard higher. The waveform and sweep direction for each sound are selected at random, while the minimum frequency and step value are held within reasonable ranges.

Song Player

This program demonstrates a simple way to encode and play music on the 128. "Song Player" lets you enter PLAY strings under program control, adding them to the program as DATA statements with the dynamic keyboard method. After entering your music, you can replay it at any time or resave it along with the program. Pay special attention to the punctuation in lines 60 and

190, which cause the program to modify itself.

```
10 J=1000
20 CH$="0123456789#$%&*.XVOTUWHQ
  ISRMABCDEFG":PLAY"X0 U15 O4
  T7 I"
30 PRINT"{CLR}[2 RIGHT][RVS]12
  8 SONG MAKER":PRINT"
  {2 DOWN}[2 RIGHT][RVS]E
  {OFF}NTER[2 SPACES][RVS]P
  {OFF}LAY[2 SPACES][RVS]Q
  {OFF}UIT"
40 GETKEY AS:IF AS<>"E"ANDA$<>
  "P"ANDA$<>"Q" THEN 40
50 IF AS="E" THEN 120
60 IF AS="Q" THEN PRINT"{CLR}1
  0 J="J:POKE 208,2:POKE 842,
  19:POKE 843,13:END
70 REM---SONG PLAYING ROUTINE
80 RESTORE:PRINT "[DOWN]PLAYIN
  G SONG. PRESS ANY KEY TO QU
  IT."
90 GET AS:READ PS:IF AS="ANDP
  $<>"FINI" THEN PRINT PS:PLA
  Y PS:GOTO90
100 PRINT "[DOWN]END OF SONG.
  {SPACE}PRESS ANY KEY.":GET
  KEY AS:GOTO 20
110 REM---MUSIC ENTRY ROUTINE
120 POKE 208,0:PRINT "[CLR]ENT
  ER MUSIC DATA (29-CHARACTE
  R MAXIMUM)"
130 PRINT "TYPE 'MENU' TO EXIT
  "
140 PS="":INPUT "{8 SPACES}":P
  $:IF PS="MENU" OR PS="" TH
  EN 20
150 X=0:FOR M=1 TO LEN(PS):FOR
  K=1 TO LEN(CH$)
160 IFMID$(PS,M,1)=MID$(CH$,K,
  1)THENX=X+1
170 NEXT K,M:IF X<LEN(PS) THEN
  PRINT"ILLEGAL MUSIC DATA"
  :PRINT PS:GOTO 130
180 PRINT "[CLR]":J:"DATA ":PS
  :PRINT "J="J+1":GOTO 120"
190 POKE 208,4:POKE 842,19:POK
  E 843,13:POKE 844,13:END
999 REM---MUSIC DATA STARTS HE
  RE
63999 DATA FINI
```

The music entry routine permits you to enter as many as 29 PLAY symbols at one time (blank spaces are acceptable, although PLAY ignores them). Consult the 128 System Guide for an explanation of the various PLAY symbols. Before adding the PLAY string as a DATA statement, the program checks every character in the string to make sure it is legal. If you enter a character that the PLAY command does not understand (Z, for instance), the program signals an error and lets you try again. Note that while the program can tell whether a character is a legal PLAY symbol, it does not check for correct PLAY syntax: You are still responsible for arranging the symbols in meaningful order. For example, the string "XU\$#" contains legal PLAY



ORDERS ONLY...CALL TOLL FREE
1-800-468-9044
 INFORMATION & PA ORDERS 814-234-2236
 EXTENDED HOLIDAY HOURS: NOV 24-DEC 25: 9-10 M-F, 10-6 S-SUN
 REGULAR HOURS: 9-8 Mon-Fri, 10-5 SAT EAST COAST TIME

HOLIDAY SPECIALS



NEW PRODUCTS! NEW LOWER PRICES! MANY PACKAGE DEALS!

FAST DEPENDABLE SERVICE — Your order on in stock items is shipped UPS ground the next business day. UPS 2nd day and next day air available.

"If we don't have the lowest price — give us a chance to beat it."



**NOW IN STOCK
 CALL FOR LATEST
 PRICES!**

COMMODORE 128

1571, 1572 disk drives, 1902 monitor, 1670 modem, & Software for the C128

**PACKAGE DEALS AVAILABLE
 ON C128 AND DISK DRIVES CALL FOR DETAILS**

CLOSEOUT PRICES ON C64, 1541, and 1702 PACKAGES
 MPS-801 PRINTER \$106.95

COMMODORE 128 SOFTWARE

WORDPRO 128...SCALL	JANE.....\$32.95
WordWriter 128.....\$44.95	Perfect Calc.....\$42.95
Consultant.....\$49.95	Perfect Writer...SCALL
Paperclip.....\$47.95	Perfect Filer...SCALL
Swift Calc.....SCALL	Vizastar 128...SCALL

DATA 20 XL-80

The XL-80 is an 80 column board that plugs into the back of your C-64. Its output is a crisp 80 columns (monochrome monitor reg.) snow free. Also included are an 80 column word processor, spreadsheet, and mailing list program, all at one incredible price.

\$79.99



**RGBi/Composite Monitors
 Alternatives to the 1902**

Technica MJ-22.....	\$269.00
Panasonic 1300.....	SCALL
RGBi Cable.....	\$19.95
Composite Video Cable..	\$6.95

Print Shop

Broderbund Print Shop...	\$25.95
Graphics Library I or II...	\$16.95
120 sheet color paper refill	
1/2 red, 1/2 blue, 1/2 gold	\$8.95

SG-10.....	SCALL
SG-10C.....	\$229
Commodore ready	
SG-15.....	\$364
SD-10.....	\$323
SD-15.....	\$449
POWERTYPE..	\$299
18cps daisywheel	
SR-10,	
SR-15.....	SCALL



PRINTER PACKAGE MANIA!

all packages work with C64 or C128

Star SG-10 & XETEC SUPERGRAPHIX ..\$274.95

SG-10 & Xetec Supergraphix jr.....	\$254.95
SG-10 & Cardco G-Wiz.....	\$264.96
SG-10 & MW-350.....	\$275.95
SG-15 & Xetec Supergraphix.....	\$419.95
SG-15 & Cardco G-Wiz.....	\$412.95
SD-10 & Xetec Supergraphix.....	\$384.95

PANASONIC

1091 & Xetec Supergraphix.....	\$289.95
1091 & Cardco G-Wiz.....	\$285.95
LX-80 & Xetec Supergraphix.....	\$274.95
LX-80 & Cardco G-Wiz.....	\$269.95
FX-85 & Xetec Supergraphix.....	\$387.95
FX-185 & Xetec Supergraphix.....	\$529.95

PRO-LINE SOFTWARE

GT 4, fast load/fast save/disk basic cartridge for C-64...\$29.95

C POWER	
C COMPILER.....	\$69.99
CADPIC.....	\$36.95
CASHBOX.....	\$36.95
Wordpro 64.....	\$36.95
Spellpro 64.....	\$32.95
Mailpro 64.....	\$24.95
Profile 64.....	\$36.95
PAL 64.....	\$32.95
POWER 64.....	\$32.95
TOOLBOX 64.....	\$69.95

MODEMS — MODEMS — MODEMS

TOTAL TELEMODEM ... \$29.95

MASTER MODEM ... \$39.95

includes Compuserve, Dow Jones time

1660.....	\$49.95
WESTRIDGE AUTO.....	\$59.95
MITEY MO.....	\$59.95
MPP 1064.....	\$64.95
VIP TERMINAL.....	\$29.95
VIDTEX TERMINAL.....	\$23.95
COMPUSERVE STARTER KIT.....	\$19.95



LEGEND PRINTERS

This printer may offer the best price performance ratio in the business at 100cps with tractor and quality.

808.....	\$159
880.....	SCALL

LX-80.....\$214.95

LX-80 tractorfeed.....\$34.95

Homewriter 10.....\$246.95

includes Commodore or Atari interface

FX-85.....\$316.95

FX-185...\$444.00

Xetec inc.

SUPER GRAPHIX printer interface w/BK buffer, and down loadable character fonts. Simply the best interface made... **\$ lowest price**

SUPERGRAPHIX jr printer interface...\$46.95
FONT MASTER.. \$24.95

MIRAGE CONCEPTS

Database Manager with Report Generator.....	\$36.99
Prof. Wordprocessor.....	\$36.99
Database Manager, Prof. WP Package.....	\$67.95

- ★ All items new and factory sealed
- ★ Buy with confidence, we honor manufacturer's warranty
- ★ Qualified corporate and educational purchase orders accepted
- ★ We accept VISA, MasterCard, COD, Mail Orders.

KENSINGTON STAND.....\$19.95

w/any printer...\$14.95



MONITOR MADNESS

SAKATA SC100	
13" COLOR.....	\$149.00
Zenith 12" Amber.....	\$77.95
Zenith 12" Green.....	\$77.95
NEC 12" Green.....	\$69.95
Cable for monitors...\$	6.95

HUSH 80 CD ...\$74.95

Commodore ready thermal printer



LETTER QUALITY PRINTERS

when near letter quality isn't good enough

Riteman LQ.....	\$239
Epson DX-10.....	\$209
Epson DX-20.....	\$309
Star Powertype.....	\$299

PANASONIC

1091 ..\$229.00

1092.....\$349.00

1093.....SCALL

PRINTER INTERFACES

Cardco ?/G.....	\$47.95
Cardco G Wiz.....	SCALL
Tymac	
Connection.....	\$67.95
MW-350.....	SCALL
MW-350 buffer.....	\$20.00
Grapler CD.....	\$87.95

DISKOUNT DISKS!!

Bonus Disks (10)	
SS dd.....	\$9.95 dd dd...\$12.95
Maxell (10)	
ss dd.....	\$13.95 dd dd...SCALL
Centech colored disks (10)	
ss dd.....	\$9.45 dd dd...\$11.95
other brands available.....	CALL

To order by mail: Send money order, certified check, personal check. Allow 2 weeks for personal check to clear.

Shipping: \$2.50 for software and accessories; \$10.00 for printers and color monitors; \$8.00 for disk drives and other monitors/

Add \$3.00 per box shipped COD. Call for other shipping charges. Additional shipping required on APO, FPO, AK, HI, and foreign orders.

Terms: ALL PRICES REFLECT CASH DISCOUNT, ADD 3%

FOR MASTERCARD OR VISA. Manufacturer's warranty honored with copy of our invoice. ALL SALES ARE FINAL. Defective items replaced or repaired at our discretion. Pennsylvania residents add 6% sales tax. Prices and terms subject to change without notice.

TUSSEY COMPUTER PRODUCTS

P.O. BOX 1006
 STATE COLLEGE, PA 16804


characters but causes an error when you try to PLAY it. If the PLAY string is accepted, the screen flashes briefly as the program adds the string as a DATA line, then the entry prompt reappears. You can return to the main screen by entering MENU or typing RETURN without entering any characters.

Music data is added beginning with line 1000. Successive DATA lines are entered as 1001, 1002, and so on up through 63998. Do not delete or renumber line 63999; it contains a string that marks the end of the music data. When you exit the program by pressing Q, it automatically modifies line 10 to let you re-save the program complete with the new data. The next time you load and run the program, all the data will be there. Since this program modifies itself as it runs, don't renumber it or alter any lines unless you understand exactly how the dynamic keyboard processing works.

As short as they are, these program examples demonstrate a number of handy sound and music techniques. It's often preferable to use variables rather than literal values in sound commands. SOUND VOC, FRQ, DUR is just as valid as SOUND 1, 11000, 100—and considerably easier to understand. And replacing literals with variables lets you change the sound dynamically, just by redefining the variable. Since the computer can often look up a variable faster than it can interpret a literal, variables can also speed up a program somewhat.

PLAY accepts variables, too, so PLAY A\$ and PLAY A\$(23) work just as well as PLAY "C D E F". You may also concatenate PLAY strings and use other string operations such as MID\$, LEFT\$ and so on:

```
10 PLAY "X0U15S":P$="CDEFGAB"
20 FOR J=ASC("1") TO ASC("6"):
   FOR K=1 TO 7
30 PLAY "O"+CHR$(J)+MID$(P$,K,
   1)
40 NEXT: NEXT
```

PLAY accepts nearly any string construction that PRINT can handle. However, you may not separate PLAY strings with a comma or semicolon. One final reason to put strings into variables is that it simplifies debugging. If you're not sure what a PLAY statement is doing, simply PRINT the string on the screen to see what it contains. 

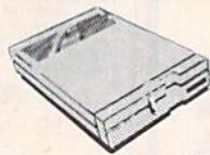
COMMODORE 128



PERSONAL
COMPUTER

CALL FOR LATEST
SUPER SPECIAL PRICE

COMMODORE C1571 DISK DRIVE

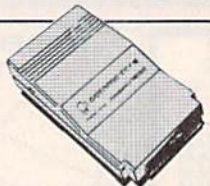
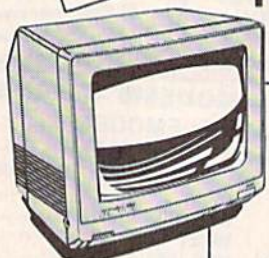


CALL FOR LATEST
SUPER SPECIAL PRICE

**THESE ITEMS ARE
NOW IN STOCK!!!
AT COMPUTABILITY**

FREE \$25.00 BUY BOTH THE C-128 & C1571 DISK DRIVE
AND RECEIVE A SOFTWARE
GIFT CERTIFICATE

1902 MONITOR ONLY \$289



1670 MODEM ONLY \$169



1350 MOUSE ONLY \$42.95

EST. 1982

ComputAbility™

P.O. BOX 17882
MILWAUKEE, WI 53217

ORDER LINES OPEN
MON - FRI 11 A.M. - 7 P.M. CST
SAT 12 P.M. - 5 P.M. CST

TO ORDER CALL TOLL FREE

800-558-0003

FOR TECHNICAL INFORMATION,
ORDER INQUIRIES, OR FOR WIS. ORDERS

414-351-2007

ORDERING INFORMATION FOR FAST DELIVERY SEND CASHIER'S CHECK MONEY ORDER OR DIRECT BANK TRANSFER. PERSONAL AND COMPANY CHECKS ALLOW 14 BUSINESS DAYS TO CLEAR. CHARGES FOR C.O.D. ARE \$3.00. IN CONTINENTAL U.S.A. INCLUDE 4% SHIPPING ON ALL ORDERS. MINIMUM \$4.00. MASTER CARD & VISA ORDERS PLEASE INCLUDE CARD #, EXPIRATION DATE, AND SIGNATURE. WI RESIDENTS PLEASE ADD 5% SALES TAX. HI., AK, FPO, APO, PUERTO RICO AND CANADIAN ORDERS PLEASE ADD MINIMUM 5% SHIPPING AND HANDLING. MINIMUM \$5.00. ALL OTHER FOREIGN ORDERS PLEASE ADD MINIMUM 15% SHIPPING. MINIMUM \$10.00. ALL GOODS ARE NEW AND INCLUDE FACTORY WARRANTY. DUE TO OUR LOW PRICES ALL SALES ARE FINAL. ALL DEFECTIVE RETURNS MUST HAVE A RETURN AUTHORIZATION NUMBER. PLEASE CALL 414-351-2007 TO OBTAIN AN RA# OR YOUR RETURN WILL NOT BE ACCEPTED FOR REPLACEMENT OR REPAIR. PRICES AND AVAILABILITY SUBJECT TO CHANGE WITHOUT NOTICE.

NOTE ON ALL ORDERS OUTSIDE CONTINENTAL U.S.A. WE SHIP ALL ORDERS FIRST CLASS INSURED U.S. MAIL. IF SHIPPING CHARGES EXCEED THE MINIMUM AMOUNT YOU WILL BE CHARGED THE ADDITIONAL AMOUNT TO GET YOUR PACKAGE TO YOU QUICKLY AND SAFELY.



NO SURCHARGE ON CREDIT CARDS

SUPER PRINTER PACKAGES

FOR C-64

SG 10 & G-Wiz	279
Panasonic 1091 & G-Wiz	308
Panasonic 1090 & G-Wiz	261
Legend 1080 & G-Wiz	282

Super Printer packages have no extra charges added when shipped in Continental USA.

MODEMS

Westridge AA/AD	49.95
Total Tele Modem	49.95
Mighty Mo	69.95
1660 Modem	49.95

PRINTERS

Legend 1080	229	Legend 808	179
Citoh 7500AP	219	Panasonic 1090	199
Epson	Call	Panasonic 1091	245
Juki 5510	389	Powertype	309
Toshiba 1340	559		

Buy the Print Shop for 27.95 with the purchase of any printer.

PRINTER BUFFERS

Microfazer Call

U-Print-16K
Printer Buffer... 79

U-Print-32K
Printer Buffer... 89

U-Print-64K
Printer Buffer... 99

Samsung Monitor Special

12 Inch Amber	79.95
12 Inch Green	79.95
14 Inch Color (.63 DOT)	159
14 Inch Color (.52 DOT)	179
Monitor Shipping	\$10.00



SG-10	215	SD-15	449
SG-15	369	SR-10	Call
SD-10	339	SR-15	Call

INDUS GT

For C-64 Call

PRINTER INTERFACES

Data Share	49.95
Cardco G+	44.95
G-Wiz	54.95

C O M M O D O R E 6 4 S O F T W A R E

ACCESS

Beachhead-D	21.95
Beachhead II-D	24.95
Raid Over Moscow-D	24.95
Mach V-Cart	21.95

BATTERIES INCLUDED

Cal-Kit-D	34.95
Consultant-D	41.95
Home Pak-D	34.95
Paper Clip/Spellpak	54.95
Home Org. Series-D	16.95

BRODERBUND

Bank Street Writer-D	34.95
Dr. Creep-D	20.95
Bungling Bay-D	20.95
Spelunker-D	20.95
Music Shop-D	29.95
Print Shop-D	29.95
Karateka-D	20.95
Champ Loderunner-D	23.95
Prt. Shop Graphics-D	19.95
Print Shop Refill	16.95
Prt. Shop Graph. II-D	19.95

CBS SOFTWARE

Call for items and prices.

COMMODORE

Call for items and prices.

EPYX

Fast Load-Cart	24.95
Rescue on Fractalus-D	24.95
World's Greatest Football-D	24.95
The Eidolon-D	24.95
Winter Games	24.95
Summer Games II-D	24.95
Koronis Rift-D	24.95
Ballblazer-D	24.95

FIRST STAR

Call for items and prices.

INSTA (CIMMARON)

Insta-Calc Graph	
Combo-D	24.95
Insta-Ledger-D	39.95
Insta-Speed-D	39.95
Insta-Writer-D	14.95
Management Combo-D	39.95

INFOCOM

Deadline-D	29.95
Enchanter-D	24.95
Infidel-D	29.95
Planetfall-D	24.95
Sorcerer-D	29.95
Starcross-D	29.95
Suspended-D	29.95
Witness-D	29.95
Sea Stalker-D	24.95
Zork I, II or III-D	27.95
Wisbringer-D	29.95
Spellbreaker-D	29.95

MICROPROSE

Silent Service-D	23.95
Gunship-D	23.95
Accrojet-D	23.95
F-15 Strike Eagle-D	23.95
Decision in Eagle-D	27.95
Kennedy Approach-D	23.95
Crusade in Europe-D	27.95

MINDSCAPE

Color Me-D	20.95
Crossword Magic-D	34.95
Bank Street Storybook-D	27.95
Keyboard Cade-D	27.95
Perfect Score-D	49.95
Halley Project-D	27.95
Bank Street Music-D	27.95

MISCELLANEOUS

Reach For The Stars-D	29.95
Carriers At War-D	34.95

AMIGA COMPUTER

SOFTWARE AND HARDWARE

Call for prices and availability

BROWN BAG SOFTWARE

Integrated Word Processor & Database

- display 80 columns w/o additional hardware
- menu driven • prints letters & reports
- free database templates included • free telephone support to registered owners

ONLY 34.95



Gamemaker	24.95
Decathlon	18.95
Alcazar	18.95
Computer Fireworks	21.95
Countdown to Shutdown	18.95
Ghostbusters	21.95

*** SUPER SPECIAL PRICES EFFECTIVE NOW THRU JANUARY 31, 1985**

MISC. (cont.)

Castle Wolfenstein-D	20.95
Superbase 64-D	47.95
Strip Poker-D	23.95
Slap Shot Hockey-D	14.95
Mastertype-D	27.95
Beyond Wolfenstein-D	23.95
S.A.M.-D	41.95
Alien Voice Box	99.95
Sargon III-D	34.95
Ultima IV-D	41.95
Typing Tutor III-D	34.95
Koalaprinter-D	19.95
Ultima II-D	37.95
Relax-D	79.95
Microleague Baseball-D	29.95
Stunt Flyer-D	27.95
Expedition Amazon-D	23.95
Xyphus-D	27.95
Transylvania-D	23.95
Bounty Bob-Cart	29.95
Fleet System II-D	44.95
Newsroom-D	34.95
Paper Airplane Kit-D	23.95
Chem Lab	27.95
Print Shop Graphics III-D	19.95
Superbowl Sunday-D	24.95
Vip Terminal-D	29.95
Compuserve Starter Kit	21.95

C-128 COMPUTER

1571 DISK DRIVE

1670 MODEM

1902 RGBI MONITOR

Call for latest prices and availability

COMMODORE 128 SOFTWARE

Consultant	52.95	Wordwriter+Spell	49.95
Paper Clip	59.95	Data Manager II/	49.95
Swiftcalc		Fleet System II/	44.95
w/Sideways/	49.95		

MISC. (cont.)

Karate Champ-D	25.95
Essex-D	27.95
Kung Fu/Exploding Fist-D	20.95
Kung Fu Master-D	25.95
9 Princes of Amber-D	22.95
Spy vs. Spy Vol. II-D	23.95
Maxi Golf-D	24.95
Internat'l Hockey-D	19.95
The Fourth Protocol-D	23.95
Blazing Paddles-D	24.95
Mirage Word-D	34.95
Mirage Database	34.95
Welcome Aboard-D	19.95
Super Huey-D	14.95
Spell It-D	34.95
Math Blaster-D	34.95
Word Attack-D	34.95
Odesta Chess-D	49.95

ELECTRONIC ARTS

Archon-D	19.95
Archon II-D	24.95
Mule-D	19.95
Realm Impossibility-D	19.95
Murder Zinderneuf-D	19.95
Music Construction-D	19.95
Pinball Construction-D	19.95
Skyfox-D	24.95
One on One-D	24.95
Seven Cities of Gold-D	24.95
Mail Order Monsters-D	24.95
Racing Destruction-D	24.95
Adventure Construction-D	29.95
Financial Cookbook-D	29.95

SSI

50 Mission Crush-D	24.95
Battle/Normandy-D/T	24.95
Combat Leader-D	24.95
Computer Baseball-D	24.95
Cosmic Balance-D	24.95
Germany 1985-D	37.95
Professional Golf-D	24.95
Ringside Seat-D	24.95
Broadsides-D	24.95
Questrom-D	24.95
Computer Quarterback-D	24.95
Field of Fire-D	24.95
Carrier Force-D	37.95
Breakthrough/Ardenes-D	37.95
Computer Ambush-D	37.95
Kampfgruppe-D	37.95
Oper. Market Garden-D	32.95
Gemstone Warrior-D	21.95
Imperium Galacticum-D	24.95
Phantasia-D	24.95
Battalion Commander-D	24.95
Fighter Command-D	37.95
Norway 1985-D	21.95
Wings of War-D	24.95
Mesh Brigade-D	37.95

MISCELLANEOUS

Ultima III-D	37.95
Flight Simulator II-D	34.95
Ghostbusters-D	24.95
Batter-Up-D	29.95
Amer. Cross Country Race-D	20.95
SynCalc-D	34.95
Loderunner's Resc.-D	20.95
Mindwheel-D	27.95
Voice Messenger-D	44.95
Main Event Boxing-D	20.95
Crimson Crown-D	23.95
The Works-D	34.95
Perry Mason-D	22.95
Sherlock Holmes-D	23.95
Frank & Ernest ADV-D	23.95
Kobayashi Alternative-D	27.95
Hacker-D	20.95
Brimstone-D	27.95
Fast Tracks-D	23.95
Keys to Typing-D	19.95
The Hobbit-D	23.95
Cave of Time-D	23.95
Escape-D	23.95
Golden Oldies-D	19.95
Europe Ablaze-D	33.95
Trio-D	49.95
Animation Station-D	49.95



P.O. Box 17882, Milwaukee, WI 53217
ORDER LINES OPEN
Mon-Fri 11 a.m. - 7 p.m. CST • Sat. 12 p.m. - 5 p.m. CST

To Order Call Toll Free
800-558-0003

For Technical Info, Order Inquiries, or for Wisc. Orders

414-351-2007

ORDERING INFORMATION: Please specify system. For fast delivery send cashier's check or money order. Personal and company checks allow 14 business days to clear. School P.O.'s welcome. **C.O.D. charges are \$3.00.** In Continental U.S.A. include \$3.00 for software orders, 4% shipping for hardware, minimum \$4.00. Master Card and Visa orders please include card #, expiration date and signature. Wisconsin residents please include 5% sales tax. HI, AK, FPO, APO, Puerto Rico and Canadian orders, please add 5% shipping, minimum \$5.00. All other foreign orders add 15% shipping, minimum \$10.00. All orders shipped outside the Continental U.S.A. are shipped first class insured U.S. mail. If foreign shipping charges exceed the minimum amount, you will be charged the additional amount to get your package to you quickly and safely. All goods are new and include factory warranty. Due to our low prices all sales are final. All defective returns must have a return authorization number. Please call (414) 351-2007 to obtain an R.A.# or your return will not be accepted. Prices and availability subject to change without notice.



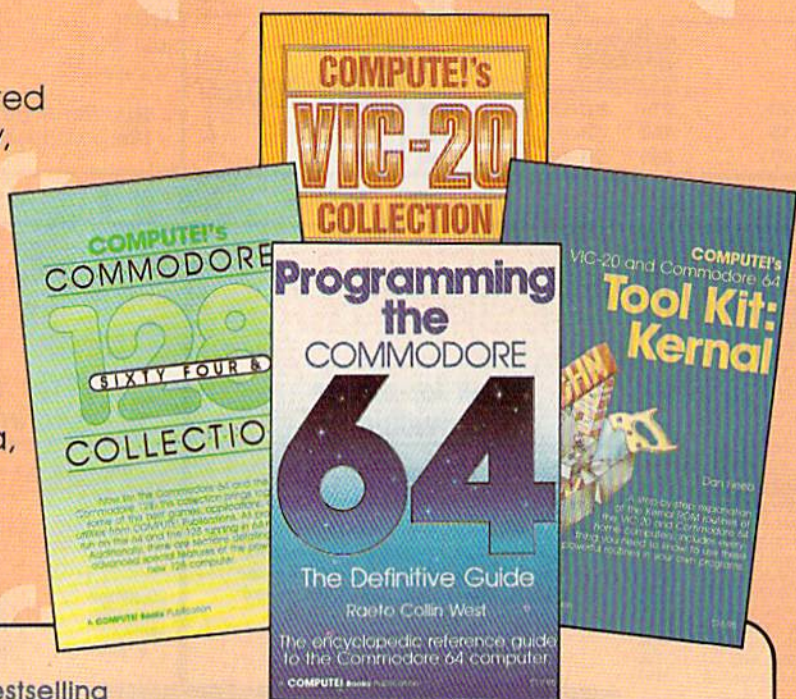
No surcharge for MasterCard or Visa



D-Disk T-Cassette
Cart-Cartridge

COMPUTE! Books Supports Commodore Computer Users

COMPUTE Books is dedicated to bringing you top-quality, reliable, and understandable tutorials, applications, games, reviews, product information, and programming aids. Whether you have a Commodore 64, 128, VIC-20, or a new 128 or Amiga, COMPUTE! has the books you need to get the most from your computer.



Look over this collection of bestselling computer titles and choose the ones you want for your favorite Commodore computer. To order any of these outstanding Commodore titles, call toll-free 1-800-346-6767 (in NY 212-265-8360).

COMPUTE!'s Personal Accounting Manager for the Commodore 64 and 128

Roland A. Frechette

A complete small-business/home accounting system with 13 support routines, from income and expenses to property and investments.

\$12.95 ISBN 0-87455-014-9

The Amiga: Your First Computer

Dan McNeill

Everything a beginner needs to know to get started quickly with the Amiga, including setting up the system, selecting software, and learning about the hardware.

\$16.95 ISBN 0-87455-025-4

COMPUTE!'s VIC-20 Collection

Edited

More than 70 never-before-published articles, games, utilities, applications, and tutorials for the Commodore VIC-20.

338 pages

\$12.95 ISBN 0-87455-007-6

COMPUTE!'s VIC-20 and Commodore 64 Tool Kit: Kernal

Dan Heeb

The invaluable reference guide to the Kernal routines on the Commodore 64 and VIC-20 for beginning to advanced programmers.

429 pages

\$16.95 ISBN 0-942386-33-7

Programming the Commodore 64: The Definitive Guide

Raeto Collin West

An encyclopedic, thorough reference guide which covers the Commodore 64 in its entirety.

609 pages

\$24.95 ISBN 0-942386-50-7

COMPUTE!'s Commodore 64/128 Collection

Edited

Some of the best games, applications, and utilities from COMPUTE! Publications for the Commodore 64 and 128 in 64 mode, plus special sections detailing the advanced features of the 128. A disk is also available which includes programs in the book.

285 pages

\$12.95 ISBN 0-942386-97-3

COMPUTE! Publications, Inc. 

One of the ABC Publishing Companies
324 W. Wendover Avenue, Suite 200, Greensboro, NC 27408, 919-275-9809
Publishers of COMPUTE!, COMPUTE!'s Gazette, COMPUTE!'s Gazette Disk, COMPUTE! Books, and COMPUTE!'s Apple Applications

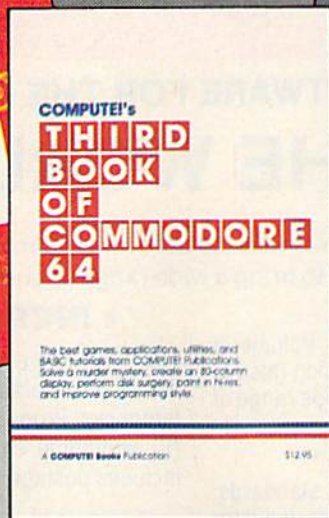
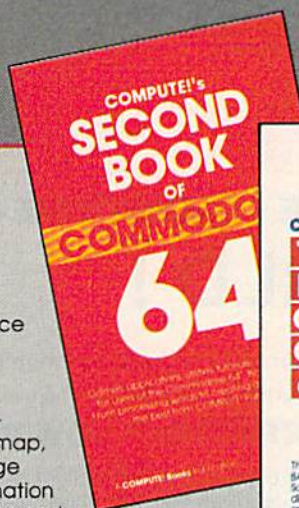
COMPUTE! books are available in the U.K., Europe, the Middle East, and Africa from Holt Saunders, Ltd., 1 St. Anne's Road, Eastbourne, East Sussex BN21 3UN, England.

A **SPECIAL OFFER** from **COMPUTE! Books**

for Owners and Users of Commodore Computers

Buy any two of these books and receive a **15% Discount**. You pay \$22.00 and save \$3.90!
Buy all three books and get a **25% Discount**. You pay only \$29.00, a savings of \$9.85!

An excellent resource for users of the 64, with something for everyone: BASIC programming techniques, a memory map, a machine language monitor, and information about writing games and using peripherals. This 264-page spiral-bound book includes many ready-to-type-in programs and games. **\$12.95**



Continues in the tradition of the *First Book of Commodore 64* in presenting some of the best programs and articles from COMPUTE! Publications, many revised or never before published. There's something for almost any Commodore 64 user in this 289-page book: arcade and text adventure games in

BASIC and machine language, a commercial software-quality word processor, a program which adds 41 new commands to BASIC, an electronic spreadsheet, tutorials about programming sound and graphics, and utilities for saving, copying, and retrieving files. **\$12.95**

A collection of outstanding games, applications, tutorials, and utilities from the most recent issues of *COMPUTE!* magazine and *COMPUTE!'s Gazette*, including several programs never before published. Commodore 64 users of all ages and experience will find this book informative, entertaining, and educational. Create an 80-column display, play educational and arcade-quality games, compose music, move sprites easily and quickly, and see how to program more efficiently and effectively. **\$12.95**

Buy Now—This Offer Expires February 10, 1986

Yes! I want to save money while I enjoy COMPUTE! Books.
_____ COMPUTE!'s First Book of Commodore 64, \$12.95
_____ COMPUTE!'s Second Book of Commodore 64, \$12.95
_____ COMPUTE!'s Third Book of Commodore 64, \$12.95

All Orders Must Be Prepaid

Payment Enclosed (check or money order)
 Charge MasterCard Visa American Express

Acct. No. _____ Exp. Date _____

Name _____

Address _____

City _____

State _____ Zip _____

To Order Call Toll Free **1-800-346-6767**
(in NY call **212-265-8360**)

or mail this coupon with your payment to:
COMPUTE! Books, P.O. Box 5038
F.D.R. Station, New York, NY 10150

Please send me:

1 Book for \$12.95
 2 Books for \$22.00
 3 Books for \$29.00

NC residents add 4.5% sales tax _____

Add \$2.00 per book for shipping _____

Total Paid \$ _____

Please allow 4-6 weeks for delivery.

7611142

COMMODORE 64 PROGRAMS . . .

\$3 EACH !!

WHY PAY MORE FOR QUALITY PROGRAMS?

WE ARE THE LOWEST COST ORGANIZATION

SPECIALIZING IN SOFTWARE FOR THE COMMODORE 64 . . .

IN THE WORLD !

The Commodore Software Association is a world-wide software organization specializing in the distribution of owner/user written software. Our purpose is to bring a wide range of quality software at the lowest possible cost.

How can you sell programs for only \$3 each?

The name of the game in cutting costs is volume. Volume of membership (in the tens of thousands) and purchasing (also in the thousands). We also lower our costs with the wide range of programs we offer.

\$3 programs? Are they really quality programs?

Any program submitted to us has to meet our high standards. We reject any program that does not meet high industry standards of quality and sophistication.

How many programs are available?

We currently have more than 1000 programs in our Commodore 64 software library. Most are in our up-to-date Commodore 64 catalog. The list grows daily as submissions pour in from around the world. Members will receive regular catalog expansions.

Programs are categorized as follows:

GAMES, MUSIC, EDUCATIONAL,
BUSINESS/FINANCIAL, HOME/PERSONAL, TECHNICAL.

How do I get a list of programs?

Membership entitles you to our extensive software catalog with listings categorized by type of program.

What else does membership provide?

Membership entitles you to our newsletter REMarks. It contains hints, program reviews, problem solvers and tips that make using your Commodore 64 easier and simpler, and expand its capability.

Do I have to be a programmer to benefit?

Not at all. However, if you do program and want to submit a program to our software library, we have a generous software submission system.

What does it cost to join?

Only a low membership fee of \$15 per year. That entitles you to our newsletter, plus all the benefits mentioned above, and quality programs for only \$3 each. What's more, we'll mail out membership materials the very same day that we receive your membership fee!

★ INCREDIBLY LOW PRICES ★

Members may purchase ANY PROGRAM from our Commodore 64 software catalog for ONLY \$3.⁰⁰ per program—no tricks, no gimmicks. Programs available on cassette or disk. There are NO additional charges, the price of \$3.⁰⁰ per program also includes postage, handling and all applicable taxes.

★ DIVERSITY ★

Here are just A FEW sample titles to wet your appetite: Motocross, Meteor, Star Flight, Space Patrol, Eliza, Exterminator, Boxing, Battleground, Checker, Backgammon, Poker, Space Patrol, Alien Ambush, Rear Assault, Vicous Vircle, Freeway Fox, Shark Hunt, Moon Base, Mystery, Battleground, Blackjack, Keno, Kizmet, Metrics, Math Tutor, Chemistry, Physics, Spanish, Plant Facts, Super Fly, Fireball, Preschool Learning Aids, European Geography, Credit Card Management, Recipe File, Auto Expenses, Garden Help, Weather Forecaster, Football Rating, Autocpyher, Basketball Statistician, Home Inventory, Loan Amortization, Phone/Address List, Financial Math, Depreciation Schedule, Stock Trends, Handicapper, Personal Banker, Mortgage Spreadsheet, Letter Writer, Budget Management, W-2 Form, 1040 Form, Annuities, Paycheck, Regression, Bowling Records, Sectional Properties, Equations, Chi-Square, Digital Logic Simulator, Factorial, Flow Chart, Bisection, Simpson Integration, Polyhedra Coordinates, Statistical Analysis etc., etc., etc. -
A very small list when compared to our catalog!

MEMBERSHIP . . \$15.00

I'm interested in programs for only \$3 each. Here's my membership fee of only \$15.00. This entitles me to your newsletter, your extensive software catalog, and programs for only \$3 each.

CHECK OR MONEY ORDER

Name: _____

Address: _____

City _____

State _____ Zip _____



COMMODORE SOFTWARE ASSOCIATION
P.O. Box 83655, LOS ANGELES, CA 90083

BASIC Backup

John R. Hampton

Regularly saving your BASIC programs is always a good idea, but how many times have you lost a program by forgetting? This utility serves as a nifty reminder. You choose how often you'll save—anywhere from one minute to over four hours (255 minutes). For the 64 and 128 (in 64 mode) with disk or tape drive.

When you're writing a new program or making changes to an old one, it's important to remember that all your typing is stored in random-access memory (RAM), and a simple thing like a power failure could instantly erase it all. Therefore, it's a good idea to periodically save your work.

If you're like me—and a lot of other programmers—time becomes unimportant when you're lost in the depths of creation, and it's easy to let hours slip by without realizing it. What's needed is a small reminder. That's what "BASIC Backup" provides.

Saving Programs Or Cooking Eggs

BASIC Backup runs in the background, not interfering with the program you're working on. It gives you a programmable timer and an easy way to save programs. You can set it for any time from 1–255 minutes, and then go on programming without thinking about BASIC Backup. For example, if you set it for 15 minute intervals, it waits 15 minutes and then starts flashing the border colors. A blinking border is hard to ignore, in fact it can be very annoying. To stop it, you can reset the timer and contin-

ue programming or you can press a few keys to save the program in memory. The timer is there to remind you to make another backup but can be used to time almost anything. I've even used it while cooking hard-boiled eggs.

BASIC Backup is a machine language wedge that's POKed into memory by BASIC. After you've typed in the program and saved it, type RUN. When it's finished, the READY message will return. You should then type NEW to reset pointers. Now BASIC Backup is ready to use.

This utility can be used whenever a program is not running by holding down the CTRL key and pressing f1. This pauses the timer and displays current values for several parameters:

FILENAME: the name of the program most recently saved
DISK/TAPE: press D or T
VERIFY: an option to have the save verified; press Y or N
INTERVAL: the number of minutes between saves; enter 1–255
REMAINING: the number of minutes left before Backup gives notice (no input)
OVERDUE: the number of minutes beyond the assigned Backup notice (no input)

You can enter new values for the first four of these, or just press RETURN over the values currently displayed.

After entering new values—or keeping the current ones—you're given a chance to do a backup. Press C to continue, to start saving the program. On disk saves, BASIC Backup looks at the filename you entered and attempts to scratch a program by that name before starting the save. Scratching before saving is preferable to the sometimes unreliable Save-with-Replace option.

By pressing RUN/STOP at the prompt, or when entering any parameter, you can return to BASIC immediately. This way you can enter the utility simply to view the time remaining, or to change one of the parameters.

When you exit the utility and return to BASIC, the timer will continue from where it left off if you didn't enter an interval. Otherwise, it will be restarted using the new interval, or stopped if you entered OFF. You can then resume your programming, or CONTINUE the program that was running.

When the timer finishes counting down, it will signal you by flashing the screen's border colors twice every second. The flashing will continue even if a BASIC program is running, and will not stop until you reenter the utility to reset or stop the timer by pressing CTRL-f1. If you don't define a new interval for the timer, the flashing will continue when you return to BASIC.

If you should have to reset your BASIC program by pressing RUN/STOP-RESTORE, you'll disable Backup. It can be restarted by typing in and running this short BASIC program (you may want to add these lines to the program in memory):

```
10 POKE 56334, PEEK(56334) AND 254
20 POKE 788, 167:POKE 789, 2
30 POKE 56334, PEEK(56334) OR 1
```

Backup uses memory from addresses 679 to 767 for its interrupt routine, so your BASIC program cannot use these 89 bytes. The main portion of the utility resides underneath BASIC ROM, and should not interfere with your programs.

See program listing on page 139. ☐

COMMODORE 64 COMPUTER

(Order Now)

\$ 139⁹⁵

- C128 Disks 79¢ ea.*
- Commodore Graphics Printer \$99.95
- 13" Zenith Color Monitor \$149.95

CALL BEFORE YOU ORDER

COMMODORE 64 COMPUTER \$139.95

You pay only \$139.95 when you order the powerful 84K COMMODORE 64 COMPUTER! LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your computer that allows you to SAVE OVER \$250 off software sale prices!! With only \$100 of savings applied, your net computer cost is \$39.95!!

* C128 DOUBLE SIDED DISKS 79¢ EA.

Get these 5 1/4" Double Sided Floppy Disks specially designed for the Commodore 128 Computer (1571 Disk Drive). 100% Certified. **Lifetime Warranty.** Automatic Lint Cleaning Liner included. 1 Box of 10 - \$9.90 (99¢ ea.), 5 Boxes of 10 - \$44.50 (89¢ ea.), 10 Boxes of 10 - \$79.00 (79¢ ea.).

13" ZENITH COLOR MONITOR \$149.95

You pay only \$149.95 when you order this 13" ZENITH COLOR MONITOR. LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your monitor that allows you to save over \$250 off software sale prices!! With only \$100 of savings applied, your net color monitor cost is only \$49.95. (16 Colors).

80 COLUMN

COMMODORE GRAPHICS PRINTER \$99.95

You pay only \$99.95 when you order the 803 Commodore Graphics Printer. 60 CPS, Dot Matrix, Bi-Directional. Prints 8 1/2" full size paper. Plug in direct interface included! LESS the value of the SPECIAL SOFTWARE DISCOUNT COUPON we pack with your printer that allows you to SAVE OVER \$250 off software sale prices!! With only \$100 of savings applied your net printer cost is ZERO!

4 SLOT EXPANDER & 80 COLUMN BOARD \$59.95

Now you program 80 COLUMNS on the screen at one time! Converts your Commodore 64 to 80 COLUMNS when you plug in the 80 COLUMN EXPANSION BOARD!! PLUS 4 slot expander!

80 COLUMNS IN COLOR

PAPERBACK WRITER 64 WORD PROCESSOR \$39.95

This PAPERBACK WRITER 64 WORD PROCESSOR is the finest available for the COMMODORE 64 computer! The ULTIMATE FOR PROFESSIONAL Word Processing. DISPLAYS 40 or 80 COLUMNS IN COLOR or black and white! Simple to operate, powerful text editing, complete cursor and insert/delete key controls line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers! List \$99.00. **SALE \$39.95.** Coupon \$29.95.

COMMODORE 64 SYSTEM SALE

Deal 1	Deal 2
Commodore 64	Commodore 64
Com. 1541 Disk Drive	Com. 1541 Disk Drive
Com. 803 Printer	13" Zenith Color Monitor
\$407	\$457

PLUS FREE \$49.95 Oil Barons Adventure Program

SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE DISCOUNT COUPON with every COMMODORE 64 COMPUTER, DISK DRIVE, PRINTER, or MONITOR we sell! This coupon allows you to SAVE OVER \$250 OFF SALE PRICES!!

(Examples)

PROFESSIONAL SOFTWARE COMMODORE 64

Name	List	Sale	Coupon
Paperback Writer 64	\$99.00	\$39.95	\$29.95
Paperback Database 64	\$69.00	\$34.95	\$24.95
Paperback Dictionary	\$24.95	\$14.95	\$10.00
The Print Shop	\$44.95	\$27.95	\$26.95
Halley's Project	\$39.95	\$25.95	\$24.95
Practical (spread sheet)	\$59.95	\$19.95	\$14.95
Programmers Reference Guide	\$24.95	\$16.95	\$12.50
Nine Princes in Amber	\$32.95	\$24.95	\$21.95
Super Bowl Sunday	\$30.00	\$19.95	\$17.95
Flip & File Disk Filter	\$24.95	\$14.95	\$12.95
Deluxe Tape Cassette (plus FREE game!)	\$89.00	\$44.95	\$34.95
Pro Joystick	\$19.95	\$12.95	\$10.00
Computer Care Kit	\$44.95	\$29.95	\$24.95
Dust Cover	\$ 8.95	\$ 6.95	\$ 4.60
Injured Engine	\$39.95	\$27.95	\$24.95
Pitstop II (Epyx)	\$39.95	\$22.95	\$19.95
Music Calc	\$59.95	\$14.95	\$12.95
File Writer (by Codewriter)	\$39.95	\$29.95	\$24.95

(See over 100 coupon items in our catalog)

**Write or call for
Sample SPECIAL SOFTWARE COUPON!**

ATTENTION Computer Clubs We Offer Big Volume Discounts CALL TODAY!

PROTECTO WARRANTY

All Protecto's products carry a minimum 90 day warranty. If anything fails within 90 days from the date of purchase, simply send your product to us via United Parcel Service prepaid. We will IMMEDIATELY send you a replacement at no charge via United Parcel Service prepaid. This warranty proves once again that **We Love Our Customers.**

C128 COMMODORE COMPUTER

(Order Now)

\$ 289⁹⁵

Less \$30 FREE Software, your choice from our catalog (See Catalog Page 13)

- 340K 1571 Disk Drive \$259.00
- Voice Synthesizer \$39.95
- 12" Amber Monitor \$59.95

PRICES MAY BE LOWER

C128 COMMODORE COMPUTER \$289.95

We expect a limited supply for Christmas. We will ship on a first order basis. This all-new revolutionary 128K computer uses all Commodore 64 software and accessories plus all CPM programs formatted for the disk drive. **Less \$30 FREE Software, your choice from our catalog (See Catalog Page 13)** List \$349.00. **SALE \$289.95.**

340K 1571 COMMODORE DISK DRIVE \$259.00

Double Sided. Single Disk Drive for C-128 allows you to use C-128 mode plus CPM mode. 17 times faster than 1541, plus runs all 1541 formats. List \$349.00. **Sale \$259.00.**

SUPER AUTO DIAL MODEM \$37.95

Easy to use. Just plug into your Commodore 64 computer and you're ready to transmit and receive messages. Easier to use than dialing your telephone. Just push one key on your computer! Includes exclusive easy to use program for up and down loading to printer and disk drives. **Best in U.S.A.** List \$129.00. **SALE \$37.95.**

VOICE SYNTHESIZER \$39.95

For Commodore-64 computers. Just plug it in and you can program words and sentences, adjust volume and pitch, make talking adventure games, sound action games and customized talkies!! **FOR ONLY \$19.95 you can add TEXT TO SPEECH,** just type a word and hear your computer talk — **ADD SOUND TO "ZORK", SCOTT ADAMS AND OTHER ADVENTURE GAMES!!** (Disk or tape.) List \$89.00. **SALE \$39.95**

12" AMBER MONITOR \$59.95

Your choice of green or amber screen monitor, top quality. 80 columns x 24 lines, easy to read, anti-glare! **PLUS \$9.95 for connecting cable.** Com-64 or VIC-20. List \$159.00. **SALE \$59.95.**

PRINTER/TYPewriter COMBINATION \$249.95

"JUKI" Superb letter quality, daisy wheel printer/typewriter combination. Two machines in one — just a flick of the switch. 12" extra large carriage, typewriter keyboard, automatic margin control and relocate key, drop in cassette ribbon! (90 day warranty) centronics parallel or RS232 serial port built in (Specify). List \$349.00. **SALE \$249.95.** (Ltd. Qty.)

13" RGB & COMPOSITE COLOR MONITOR \$259.95

Must be used to get 80 columns in color with 80 column computers (C128 - IBM - Apple). (Add \$14.50 shipping) List \$399.00. **SALE \$259.95.**

- LOWEST PRICES • 15 DAY FREE TRIAL
- BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL

PHONE ORDERS
8 a.m. - 8 p.m. Weekdays
9 a.m. - 12 noon Saturdays

- 90 DAY FREE REPLACEMENT WARRANTY
- OVER 500 PROGRAMS • FREE CATALOGS

Add \$10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$20.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES 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! VISA — MASTER CARD — C.O.D. No C.O.D. to Canada, APO-FPO

PROTECTO

We Love Our Customers
Box 550, Barrington, Illinois 60010
312/382-5244 to order

GIANT PRINTER SALE!!

List \$399.00

10" Printer

1 Year Warranty

120-140 CPS

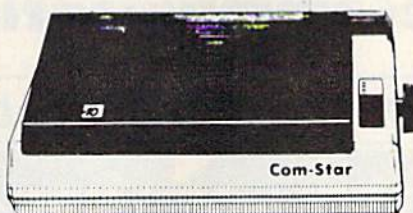
Premium Quality

List \$599.00

15½" Printer

\$179⁰⁰

15½" Comstar 15X — Has all the features of the 10" Comstar 10X plus a wider 15½" carriage and more powerful electronics to handle large ledger business forms! (Better than FX-100). The 15½" Comstar 15X also prints on standard size paper and continuous forms and labels. Fantastic value. (Centronics parallel interface.)
List \$599.00. Sale \$239.00.



10" Comstar 10X — This Bi-directional Tractor/Friction Printer prints standard sheet 8½"x11" paper and continuous forms or labels. High resolution bit image graphics, underlining, horizontal tab setting, true lower descenders, with super scripts and subscripts, prints standard pica, compressed, expanded, block graphics, etc. Fantastic value. (Centronics parallel interface.)
List \$399.00. Sale \$179.00.

List \$499.00

10" Printer

1 Year Warranty

150-170 CPS

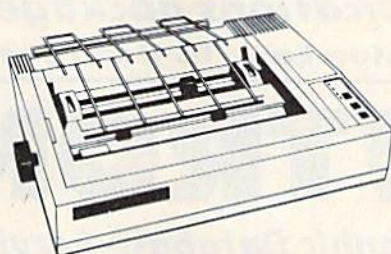
High Speed

List \$699.00

15½" Printer

\$229⁰⁰

15½" Comstar 160+ High Speed — This Bi-directional Tractor/Friction Printer has all the features of the 10" Comstar 160+ High Speed plus a wider 15½" carriage and the heavy duty electronics required for today's business loads. You can use large ledger business forms as well as standard sheets and continuous forms and labels. This is the best wide carriage printer in the U.S.A. (Centronics parallel interface.)
List \$699.00. Sale \$289.00.



10" Comstar 160+ High Speed — This Bi-directional Tractor/Friction Printer combines the above features of the 10" Comstar 10X with speed (150-170 cps) and durability. Plus you get a 2K buffer, 96 user definable characters, super density bit image graphics, and square print pins for clearer, more legible print (near letter quality). This is the best value for a rugged dependable printer. (Centronics parallel interface.)
List \$499.00. Sale \$229.00.

List \$599.00

10" Printer

*Lifetime warranty**

165-185 CPS

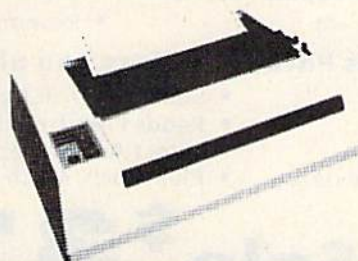
High Speed & Letter Quality

List \$599.00

10" Printer

\$259⁰⁰

With the flip of a switch you can go into the letter quality mode which makes all your printing look like it came off a typewriter. Turn in term papers, do articles or just print programs. Have the best of letter quality and speed in one package. Fantastic printer (Centronics parallel interface.)
List \$599.00. Sale \$259.00.



10" Comstar 2000 — The ultimate printer has arrived! This Bi-directional Tractor/Friction Printer gives you all the features of the Comstar 160 plus higher speed (165-185 cps), 256 downloadable characters, proportional setting, external dark printing mode and a *lifetime printhead warranty. PLUS ...

• 15 Day Free Trial — 1 Year Immediate Replacement Warranty
Parallel Interfaces

Commodore-64, VIC 20 — \$39.00

Atari — \$59.00

Apple II, II+, IIe — \$59.00

Add \$10.00 (\$14.50 for 15½" Printers) for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$20.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, 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!

VISA — MASTER CARD — C.O.D. No C.O.D. to Canada, APO-FPO.

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

Commodore 64

MODEM

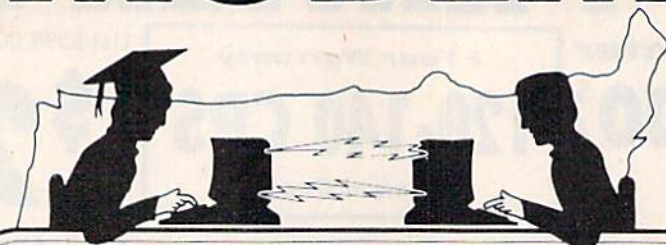
Commodore 64



List \$99.00

Sale
\$37⁹⁵

Coupon \$32.95



Telecommunications



List \$99.00

Sale
\$37⁹⁵

Coupon \$32.95

Lowest Price In the U.S.A.

FOR CHILDREN · ADULTS · BUSINESS

Complete Auto Dial Telecommunications Package

"The only telecommunications package you will ever need."

(Exclusive Easy To Use Features)

FREE VIEWTRON DATABASE MEMBERSHIP

• Only Good Color Graphic Database Service in the U.S.A. (C-64)

Viewtron Software Plus First Hour FREE (See the Protecto Software Catalog On-Line) \$9.95 value

• 300 Baud Modem • Auto Dial • Auto Answer • Upload & Download
Reach Out and Access Someone

- Educational courses
- Financial Information
- Banking at Home
- News Updates and Information
- Popular Games
- Electronic Shopping
- Research and Reference Materials

The Complete Telecommunications Package offers you all this plus ...

- Auto Log-on
- Dialing from Keyboard
- On-line Clock
- Capture and Display High Resolution Characters
- Download Text, Program or Data Files
- Stores on Disk Downloaded Files
- Reads Files from Disk and Uploads Text or Program Files
- Select Any Protocol (access almost any computer or modem)
- Plus Much, Much More

List \$99.00

Sale \$37⁹⁵ Coupon \$32.95

We are so sure this is the only telecommunications package you will need we will give you 15 days Free Trial.
Viewtron Membership sold separately — \$9.95.

Add \$3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, 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!

VISA MASTER CARD — C.O.D.

No C.O.D. to Canada, APO FPO.

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

COLOR MONITOR

Sale

SALE!!!

16
COLORS

(Premium Quality)

- Built in Speaker and Audio
- Front Panel Controls
- For Video Recorders
- For Small Business Computers
- Apple - Commodore - Atari - Franklin - etc.



(Premium Quality)

- Beautiful Color Contrast
- High Resolution
- Separated Video
- Sharp Clear Text
- Anti-Glare Screen
- 40 Columns x 24 Lines
- Supports 80 Columns
Requires special \$19.95 C-128 cable.

List \$329⁰⁰

RGB

13" Color Computer Monitor

IBM, C-128,
Apple, Atari ST

*C64/C128 connecting cable \$9.95

Sale \$159.95*
Add \$14.50 Shipping

13" RGB & COMPOSITE COLOR MONITOR

Allows use of C-128 and C64 mode - composite and 80 column RGB mode. Must be used to get 80 columns in color with 80 column computers (IBM, C-128, Apple & Atari ST). (add \$14.50 shipping)

List \$399.00

Sale \$259.95*

* C128 RGB cable \$19.95

13" ZENITH COLOR MONITOR

(add \$14.50 shipping)

List \$299.00

Sale \$149.95*

15 Day Free Trial - 90 Day Immediate Replacement Warranty

12" XTRON SUPER HI-RESOLUTION MONITOR

80 Columns x 24 Lines, Super Hi-Resolution 800 lines Green or Amber Super-Clear "Easy to Read" text with special anti-glare screen! (Ltd. Qty.) List \$249.00

Sale \$109.95*

12" ZENITH HI-RESOLUTION GREEN OR AMBER TEXT DISPLAY MONITOR

80 Columns x 24 Lines, Hi-Resolution, crisp clear easy to read text with anti-glare screen! A MUST for word processing. (Ltd. Qty.) List \$199.00

Sale \$89.95*

12" AMBER MONITOR

80 Columns x 24 Lines, easy to read up front controls (Ltd. Qty.)

List \$159.00

Sale \$59.95*

* C64/C128 connecting cable \$9.95

• **LOWEST PRICES** • **BEST SERVICE IN U.S.A.** • **ONE DAY EXPRESS MAIL** • **OVER 500 PROGRAMS** • **FREE CATALOGS**

Add \$10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$20.00 for CANADA, PUERTO RICO, HAWAII, ALASKA. APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, 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!

VISA MASTER CARD C.O.D.

No C.O.D. to Canada, APO-FPO

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

FLOPPY DISKS SALE *59¢ ea.

Economy Model or C-128 Cadillac Quality

We have the lowest prices!

*ECONOMY DISKS

For use with Commodore 64, Atari, Apple.

Good quality 5¼" single sided double density with hub rings.

Bulk Pac	100 Qty.	59¢ ea.	Total Price	\$59.00
Box w/ sleeves	10 Qty.	79¢ ea.	Total Price	7.90

★ C-128 Computer Disks ★

CADILLAC QUALITY (Double Sided, Double Density)

Specifically designed for use with C-128

• Each disk certified • Free replacement lifetime warranty • Automatic dust remover • Works with IBM PC

For those who want cadillac quality we have the C-128 Floppy Disk. Used by professionals because they can rely on C-128 Disks to store important data and programs without fear of loss! Each C-128 disk is 100% certified (an exclusive process) plus each disk carries an exclusive FREE REPLACEMENT LIFETIME WARRANTY. With C-128 disks you can have the peace of mind without the frustration of program loss after hours spent in program development.

100% CERTIFICATION TEST

Some floppy disk manufactures only sample test on a batch basis the disks they sell, and then claim they are certified. Each C-128 disk is individually checked so you will never experience data or program loss during your lifetime!

FREE REPLACEMENT LIFETIME WARRANTY

We are so sure of C-128 Disks that we give you a free replacement warranty against failure to perform due to faulty materials or workmanship for as long as you own your C-128 disk.

AUTOMATIC DUST REMOVER

Just like a record needle, disk drive heads must travel hundreds of miles over disk surfaces. Unlike other floppy disks the C-128 smooth surface finish saves disk drive head wear during the life of the disk. (A rough surface will grind your disk drive head like sandpaper). The lint free automatic CLEANING LINER makes sure the disk-killers (dust & dirt) are being constantly cleaned while the disk is being operated.

C-128 Disks are definitely the Cadillac disk in the world

Just to prove it even further, we are offering these super LOW INTRODUCTORY PRICES

1 Box of 10 — \$9.90 (99¢ ea.) 5 Boxes of 10 — \$44.50 (89¢ ea.) 10 Boxes of 10 — \$79.00 (79¢ ea.)

All disks come with hub rings and sleeves in an attractive package.

DISK DRIVE CLEANER \$19.95

Everyone Needs A Disk Drive Doctor

FACTS

- 60% of all drive downtime is directly related to poorly maintained drives.
- Drives should be cleaned each week regardless of use.
- Drives are sensitive to smoke, dust & all micro particles.
- Systematic operator performed maintenance is the best way of ensuring error free use of your computer system.

NEW RSI-SMARTCARE HEAD CLEANING KIT WITH FREE LIBRARY CASE!

Improper maintenance can cause costly read/write errors on your disk drive. Regular cleaning of heads is essential for maintaining high quality operation and eliminating expensive downtime and repairs. The RSI-Smartcare Dry Process Head Cleaning Kit provides proper maintenance without the mess. Simply insert the cleaning disk into the drive and activate for 30 seconds. This kit contains 1-open ended disk jacket and 2 cleaning pads, good for a total of 30 cleanings. Applicable for both single and double-sided drives.

List \$29.95. **Sale \$19.95.** Coupon \$12.95.



RSI-COMplete PERSONAL COMPUTER CARE KIT!

The RSI Complete Personal Computer Care Kit contains everything you need to properly maintain your computer system. This easy to use kit makes necessary computer care quick and inexpensive. In one convenient package you will get all the necessary products: 5¼" Dry Process Head Cleaning Disk (Good for 15 thorough cleanings); Anti-Static Spray (Eliminates static build-up. For use on carpets, clothes, paper, glass, hard surfaces, and other material); Screen-Terminal Cleaner (Removes smoke, dust, and other contaminants on computer screens and keyboards); Lint-Free Cloths (Non-scratch, non-abrasive, used for cleaning and applying sprays to computers); Foam-Covered Swabs (use to clean those hard to reach places such as keyboards, etc.). GREAT VALUE FOR THE MONEY!! List \$44.95. **Sale \$29.95.** Coupon \$24.95.

Add \$3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, 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!
VISA — MASTER CARD — C.O.D.
No C.O.D. to Canada, APO-FPO.

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

Commodore 64 COMPUTER

\$139⁹⁵*



COMMODORE 64 SYSTEM SALE

LIMITED QUANTITIES

Deal 1

Commodore 64
Com. 1541 Disk Drive
Com. 803 Printer

\$407

PLUS FREE \$49.95 Oil
Barrons Adventure

SAVE

Deal 2

Commodore 64
1541 Disk Drive
13" Zenith Color Monitor

\$457

PLUS FREE \$49.95 Oil
Barrons Adventure

Commodore
C128 Computer
\$289.00 *

C128 1571
Disk Drive
\$259.00 *

\$30

\$30

FREE SOFTWARE COUPON CM45

SUPER OFFER

(Expires 1-1-86)

SUPER OFFER

To introduce you to the C128 computer, we are offering you **YOUR FIRST \$30 OF SOFTWARE** from our 64 page catalog **FREE** when you buy a C128 Computer from Protecto. Just send this coupon along with your order. Choose software worth \$30 or more at sale prices from our 64 page catalog and subtract \$30 from the total.

\$30

(1 Coupon per family)

Software From Protecto's 64 Page Catalog Only **\$30**

* **Commodore C128 Computer \$289.00.** This all-new revolutionary 128K computer uses Commodore 64 computer software, CPM Software, plus new advanced C-128 software. You pay only \$289 for the C128 computer! **Less** the value of the **Special Software Discount Coupon** (see page 14 of our 64 page catalog) we pack with your computer that allows you to **Save Over \$250** off software sale prices!! With only \$100 of savings applied your net computer cost is \$189.00. **PLUS \$30.00 Your Choice FREE Software.****

* **340K 1571 Commodore Disk Drive \$259.00.** Double Sided, Single Disk Drive for C-128 allows you to use C-128 mode plus CPM mode. 17 times faster than the 1541, plus runs Commodore 64 software. You pay only \$259.00 for the 340K 1571 Commodore Disk Drive. **Less** the value of the **Special Software Discount Coupon** (see page 14 of our 64 page catalog) we pack with your Disk Drive that allows you to **Save Over \$250** off software sale prices! With only \$100 of savings applied your net Disk Drive cost is only \$159.00.

Add \$10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$20.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES, 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!

VISA — MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

PROTECTO

We Love Our Customers

22292 N. Pepper Rd., Barrington, Illinois 60010

312/382-5244 to order

Manu Gambhir

This clever program converts a screen you design with keyboard graphics into a BASIC routine—and appends it to your program. For the 64, Plus/4, 16, VIC-20, and 128 (in 64 mode).

Wouldn't it be nice if you could spend your time designing a screen and not have to worry about writing the program to produce it? "Printmaker" lets you do just that. It automatically creates code in the form of PRINT statements from whatever is on the screen and appends these lines to the program in memory. The PRINT statements include color control codes and REVERSE ON/OFF codes to reproduce the screen exactly as it was created.

Printmaker is very easy to use. It's written in machine language, but as a BASIC loader. There is only one rule to follow: The top line of the screen may not be used.

Designing A Screen

Type in the appropriate version of Printmaker for your computer, and be sure to save a copy before running it the first time because the BASIC loader erases itself from memory. To use it, just load and run. The program is POKEd into a safe location (49152 on the 64, 15872 on the Plus/4 and 16, and 7168 on the unexpanded VIC), out of the way of BASIC. Now you can begin writing your BASIC program, or you can load a BASIC program to which you wish to append your screen.

At this point, you're ready to create your design on the screen using keyboard characters. All characters—numbers, letters, graphics—are legal. Colors are available, too. (Plus/4 users should note that only the 16 primary colors will work with Printmaker. Luminance levels will not be translated

to PRINT statements.) To move about the screen, use the cursor keys. (If you mistakenly hit the RETURN key, the computer will attempt to enter the current line as a BASIC statement.)

The entire screen (apart from the first line) will be encoded in PRINT statements. Since the last character position on the screen, the bottom right location, is included, the screen (and your display) will scroll up one line when you run the BASIC program. If you wish to avoid this effect, delete the last character (even if it's a space) in the final PRINT statement created by Printmaker. If your screen design calls for a character in this position, it can be POKEd there in the BASIC program following the final PRINT statement.

When you've completed your design, press the HOME key to get the cursor in the upper left corner of the screen. Then type:

SYS 49152,I (for the 64 and 128 in 64 mode)

SYS 7168,I (for the VIC)

SYS 15872,I (for the Plus/4 and 16)

COMPUTE!'s Gazette is looking for utilities, games, applications educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it, on tape or disk to:

**Submissions Reviewer
COMPUTE! Publications
P.O. Box 5406
Greensboro, NC 27403**

Please enclose an SASE if you wish to have the materials returned.

Articles are reviewed within four weeks of submission.

where I is the increment by which you want the lines numbered. Any number from 1-255 is allowed. Printmaker will append the new lines automatically to your program. For example, if your BASIC program ends with line 850 and you design a screen with Printmaker and SYS with an increment of 10, the appended code will begin with line 860 and proceed with 870, 880, and so on.

After typing the SYS, the cursor reappears and the screen (minus the top line) is appended to your program in the form of PRINT statements. Type LIST to see the results.

See program listings on page 133. ☺

SOCCER REAL FOOTBALL

3 UNIQUE INTERNATIONAL SOCCER SIMULATIONS

- 1) European Club Game
- 2) European Cup
- 3) World Cup

EACH ON TWO JAM PACKED DISKS AND COMPREHENSIVE MANUAL

- Real Club in 31 National Leagues
- Real Player Selection
- Real Stadiums/Team Colors

PLUS

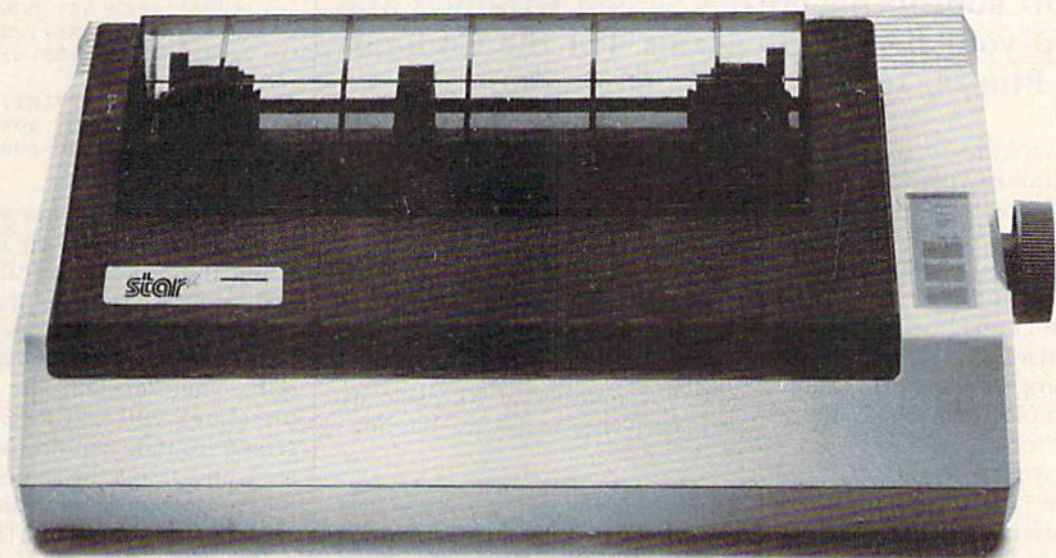
Finance / Transfer Markets / Schedule Relegations / Promotion / Graphics Sound

Its fun, informative, compelling, frustrating, challenging
IT'S REAL!

To order, remit \$34.95 (check or money order) and specify version.

B & G ASSOCIATES
P.O. Box 2571 • Liberty Park Station
Spokane, Washington 99202

A BRIGHT NEW STAR FOR A COMMODORE TO PRINT BY



Now you can own a sophisticated, affordable printer that's made just for your C-64.[™]

Here's a dual-mode Star printer that delivers 120 cps draft and 30 cps *near-letter-quality*. With outstanding graphics ability. Interface cable. And friction and tractor feed. All standard.

And it's the best-selling printer for the best-selling home computer!

Star's made-for-Commodore[®] printer needs no add-ons. Just plug it into your computer and go to work. It's made at a price that can't be beat.

You've got the computer. Now get everything out of it. Get the Star that's labelled "C." There's no better mate made for a Commodore.

star[®]
MICRONICS

BASIC Windows

Wayne Arnett

This short subroutine creates screen windows and livens up your BASIC programs. For the Commodore 64, Plus/4, 16, and 128 (in 64 mode).

Programs written in BASIC are sometimes dull and predictable, but they don't have to be. You don't need high-speed graphics and polyphonic sound in, say, a recipe filer, but you shouldn't fall asleep using the program either. Including a few surprises in your programs can go a long way toward making even the simplest ones more entertaining and fun to use.

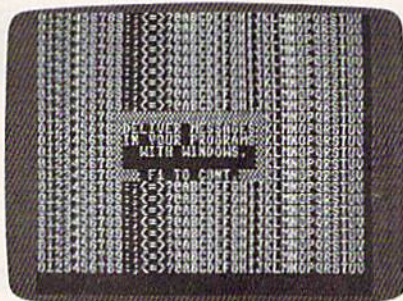
Screen windowing is a trick you should have in your programming repertoire, and it's easy to include in most programs. Windows are message boxes superimposed on a small area of the screen. But they don't disturb the contents of the rest of the screen.

Windows can present mini-menus to guide a user through a program without switching back and forth between full-screen displays. You can use them to flash scores, time elapsed, or a funny comment to keep the kids interested in that math program they've been yawning over. Any brief message your program delivers to the screen can be presented in a window. When it's no longer needed, it can just disappear, leaving the original text in its place.

Superimposing a bright window border and contrasting colors onto the screen has far more visual impact that squeezing a few words into whatever display space is available. And it's much less disruptive to your program than clearing the screen, printing a message, and then reprinting the original display.

The Universal Window

"BASIC Windows" is a short program which can be included as a subroutine in most BASIC programs. There are three main modules, and each can be tailored to your specific needs. The program is only 26 lines long, and it contains a generous number of REMs to explain each section. BASIC Windows



Screen windows can enhance your program presentation.

puts a 5-line by 18-character window in the center of the screen. If you want your window to be a different size, or you want to place it elsewhere on the screen, you'll need to make some adjustments to the program. The height and width of the window can be changed by setting variables H and W in line 100 to the number of rows and columns, respectively. The position of the window is specified in the next line. Set variable R to the row number (1-25) and variable C to the column number (1-40). The B\$ array defined in lines 140-190 contains the message in the window. Each

element of the array (starting with element 0) contains one row of the message. Substitute your own message, making sure that the number of characters in each row equals the width specified in line 100. Lines 200-210 fill the screen with characters for testing purposes; be sure to delete these lines before transferring the subroutine to another program.

The program runs as listed on the Commodore 64. Plus/4 and 16 owners should substitute these lines:

```
90 KEY 1,CHR$(133):COLOR 0,5,4
230 M=3031+40*R+C:REM UPPER LEFT CORNER OF WINDOW
250 POKE205,R-1:PRINT:PRINT"
{UP}";:REM SET ROW NUMBER
270 S(I,J)=PEEK(M+J):NEXT:POKE
202,C-1:PRINTB$(I):M=M+40:
NEXT
350 POKE205,R-1:PRINT:PRINT"
{UP}";:REM SET ROW NUMBER
360 FORI=0TOH-1:POKE202,C-1:PR
INTC$(I):NEXT
```

Most of the time you don't know what will be on the screen when the window is called; since you want to retrieve the original display after the window is erased, the area that's to be overwritten has to be "memorized." The first module (lines 230-270) PEEKs each screen location within the window area, and stores the screen codes in the S array (defined in line 120).

As each horizontal line is scanned and stored, one line of the window is printed in its place. For a variety of messages, you can design the window in several different versions, and call whichever one you need (scorebox, reminder, etc.). Try different colors, or let your program choose them randomly. You can even use one color for the border and another for the message by including color changes within the PRINT statement.

As soon as all five lines of the window are printed, part two of the subroutine (starting at line 290) begins converting the stored screen codes into printable strings (the C\$ array).

The third module waits until the f1 key is pressed. Then it reprints the characters that were covered by the window to their original place on the screen. The original text color is also restored in line 340. At this point, there's no evidence that a window ever appeared on your screen.

See program listing on page 140. ☐

SPECIAL OFFER
\$7.00
(NORMALLY \$19.95)

Seeing Is Believing

"I don't have enough time or space to list all the good points!" -- *Noland Brown, MIDNITE SOFTWARE GAZETTE*

"This disk is fantastic!" -- *Tom Lynch, THE USERS PORT*

"Why all the enthusiasm? Because **COMAL** is a composite of the best features of the most popular programming languages... the familiarity of BASIC commands with the structural programming environment of Pascal and the turtle graphics of Logo." -- *Mark Brown, INFO 64*

"**COMAL** was just what I was looking for." -- *Colin Thompson, RUN*

Seeing *is* Believing. Take a look at what **COMAL** has to offer: the complete **COMAL 0.14 System** for Commodore 64™ includes the **Tutorial Disk*** (*teaches you the fundamentals of COMAL*), plus the **Auto-Run DEMO Disk*** (*demonstrates 26 COMAL programs including games, graphics, sprites and sounds*), all for just **\$7.00!**

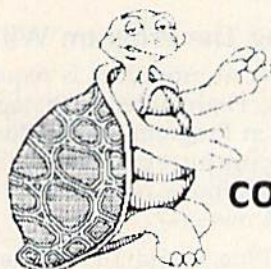
You can add the reference book, *COMAL from A to Z*, for just **\$4.00 more.**

\$7 or \$11 -- either way you're a winner!

"Everybody who gets it, likes it! (I'll guarantee it.)" -- *Len Lindsay, President, COMAL Users Group*

For more information or to place an order call (608) 222-4432. Visa or Master Card accepted; checks or money orders must be in U.S. dollars.

All orders pre-paid only - no C.O.D.



Send check or money order in US Dollars to:

COMAL USERS GROUP, U.S.A., LIMITED

6041 Monona Drive, #104, Madison, WI 53716
phone: (608) 222-4432

*Programs will come on 2 disks or 1 double sided disk -- each disk includes COMAL.
Commodore 64 is a trademark of Commodore Electronics

REM Highlighter

Don A. Ellis

If you headline routines in your programs with REMs, here's a short and clever utility that helps you find important sections of code more quickly. It highlights REMs on your screen and your printer. For the 64, 128 (64 or 128 mode), Plus/4, 16, and VIC.

Trying to find the REMark statements in a crowded program listing as it scrolls by is difficult, particularly after a few late-night hours in front of the screen. Like many other programmers, I use asterisks (***) but that's only marginally effective. Blank REM lines inserted to set off the comments and identify program routines work better, but use up both screen space and memory.

A Better Solution

"REM Highlighter" automatically tweaks another program, at no cost to memory, so that REM statements on separate lines will be displayed in reverse, standing out sharply. The adjusted program may be saved normally, and this version will retain its reversed comments when reloaded.

There are three disk versions of REM Highlighter: Program 1 for the 64 and 128 (in 64 mode), Program 2 for the 128 (128 mode), and Program 3, the VIC version. Plus/4 and 16 users should type in Program 1 but make this substitution (because the keyboard buffer is in a different location):

```
6 N=239:P=1319:COLOR0,7,4
and change the values of variables
```



REM Highlighter is handy for handling routines in your programs. It works on your screen and your printer.

N and P in line 28. Change N from 198 to 239 and P from 631 to 1319.

This utility is very easy to use. Load and run Highlighter and enter the name of the program you wish to tweak. If you're using disk, that's all there is to it. If you're using tape, the process is a little less automatic, but still simple (see below for details).

Be sure to enter the program exactly as in the listing; it depends on precise screen layout to function, so the spacing is tight. Common keyword abbreviations must be used; when you see an underlined character, it means to enter it with the SHIFT key held down. Save a copy before using the program because the program in mem-

ory destroys itself when it's done its work.

The disk version uses the dynamic keyboard technique. It POKes keystrokes into the keyboard buffer, so that when the program ends, the computer is fooled into thinking that certain keys have been pressed. REM Highlighter first loads the program to be modified, so REM Highlighter itself is overwritten (and lost). But several lines of BASIC (63994-63999) have been left on the screen. The 13s in the keyboard buffer are carriage returns, so the computer prints RETURN over lines, adding them to the program just loaded. The final line tells the program to GOTO 63995, and the program obliges by jumping to the highlighter routine. When it's finished, blank lines numbered 63994-63999 are printed on the screen. The dynamic keyboard is again used to press RETURN over the lines, erasing them from memory. You're left with the program with reversed REMs. You can now save back to disk.

Using The Program With Tape

A special procedure is required for using Highlighter with tape. First type in Program 4 and adjust it for the computer you're using (no modifications are necessary for VIC or 64 owners):

Plus/4 and 16: In line 63993, change the value of N to 239 and change P to 1319.

128 (128 mode): In line 63993,

change N to 208, change P to 842, and change the PEEKs into 43 and 44 to PEEK(45) and PEEK(46). Also, add the BANK0 command to the beginning of 63993.

It's necessary to append Highlighter to the program you wish to tweak. To accomplish this:

1. Load the program you wish to be highlighted.
2. Clear the screen; in direct mode, enter the following line exactly (use abbreviations, no spaces):

```
743:pE(43),44;pE(44):a=pE(45)+pE(46)*
256-2:c=int(a/256):b=a-c*256:pO43,
b:pO44,c
```

For the 128, use this line:


```
print45;peek(45),46;peek(46):a=peek(4624)
+peek(4625)*256-2:c=int(a/256):
b=a-c*256:poke45,b:poke46,c
```

3. Load REM Highlighter.
4. Using the values displayed (by step 2), POKE 43 and 44 with their original values again. On the 128, POKE 45 and 46 instead.
5. Type RUN 63993.

How It Works

The routine in lines 63994-63998 works its way through your program in memory, examining each line to see if it starts with REM; if it does, and if the line has comments on it as well, the last space before the comments is POKEd with 18 (the code for reverse printing). Since only one byte is examined in each non-REM line, and only a few in others, the process is very fast for BASIC; most programs will take less time than they take to load. When the end of your program is reached, line 63999 erases all the new lines, and you're left with your original program—except now you can see the highlighted REMs.

The affected lines save properly as we've noted, and signal the printer as well as the screen; so you can also print copies with reversed comments. You'll also notice that any affected line appears one space shorter since the 18 is a signal only and takes up no display space. But they will not withstand other attention: If you change a line with a REM, or even press RETURN over one of them, the BASIC interpreter will not see the POKEd 18 and the reversed display will not reappear.

See program listings on page 138. 



Who needs this?

When you can solve disk drive alignment problems in 60 minutes with the CSM program.

**Disk drive alignment problems?
Drive out of alignment again?
Tired of waiting two weeks or
more to get your drive fixed??**

WE HAVE THE ANSWER !!

With the 1541 DISK DRIVE ALIGNMENT PROGRAM you can align the drive yourself in an hour or so. Not only that, you can do it at home AND no special equipment is required. Anyone with average mechanical skills can do it!!

**Read What Compute!'s Gazette
had to say. (Oct., 1984)**

"... with 1541 Disk Drive Alignment from CSM Software, you can fix it [the disk drive] yourself in an hour or so and the program will pay for itself the first time you use it...No technical expertise is required to accomplish the alignment procedures, and the manual accompanying the program thoroughly describes the procedures."

1541 DISK DRIVE ALIGNMENT PROGRAM - VERSION 2.0 - \$44.95 plus shipping

NUMERIC KEYPAD

FOR VIC and C-64

NO SOFTWARE
REQUIRED

**100% COMPATIBLE
WITH ALL SOFTWARE**

MORE FUNCTIONS THAN
KEYPADS COSTING \$79.95

\$64.95 plus shipping


7	8	9	*
4	5	6	/ --
1	2	3	+ ↑
0	.	-	DEL
ENTER		SH	↓

PROGRAM PROTECTION MANUAL FOR THE C-64 VOLUME II

Not just a third edition — a new and up-to-date manual covering the latest advances in program protection. Over 275 pages of valuable information. Topics include:

- ENCRYPTION AND DECRYPTION
- UNDOCUMENTED OPCODES
- GCR RECORDING
- CUSTOM DOS ROUTINES
- CARTRIDGES AND EPROMS
- PROTECTING YOUR OWN SOFTWARE
- TIPS FROM EXPERTS ON PROTECTION, BACKUP & MORE
- DISK INCLUDED

\$34.95 plus shipping

 is a registered trademark of Commodore Business Machines, Inc.

NEW PRODUCT

★ **SNAPSHOT 64™** ★

SNAPSHOT 64 is a new utility backup program that literally takes a 'SNAPSHOT' of your computer's memory. This snapshot is then saved to disk with an autoboot so that it may be easily loaded back in. It does all this automatically and easily.

- EASY TO USE. TAKES ONLY 3-5 MINUTES
- BACKS UP MANY MORE PROGRAMS THAN SIMILAR UTILITIES
- SOLD FOR ARCHIVAL PURPOSES ONLY
- EXCLUSIVE FEATURE - ALLOWS YOU TO STOP MOST PROGRAMS AT ANY POINT, EXAMINE THE COMPUTER'S MEMORY, AND THEN RESTART THE PROGRAM. THIS IS A VERY VALUABLE FEATURE FOR THE HACKER!!

\$49.95 plus shipping

PROGRAM PROTECTION MANUAL FOR THE C-64 VOLUME I

- A MUST FOR BEGINNERS
- THE PERFECT INTRODUCTION TO PROGRAM PROTECTION
- DISK INCLUDED

\$29.95 plus shipping

VISA AND MASTERCARD ACCEPTED

Shipping \$3.50 per item in U.S.; foreign orders extra



Available through your local software dealer or call:

CSM SOFTWARE, INC.

POST OFFICE BOX 563, CROWN POINT IN. 46307, PHONE (219) 663-4335

Disk Disassembler

Jeff Babuschak and Richard Rager

This useful utility disassembles machine language programs from memory or disk. The disassembly can be routed to the screen, to a printer, or to a disk file. For the 64 and 128 (in 64 mode).

In BASIC, when you enter something like `20 PRINT "HELLO"`, the computer transforms the English-like commands which people can understand into numbers it will use later when the program is run. `PRINT`, for example, is not stored in memory as five letters, but as the single number 153 (the *token* for `PRINT`). When you type `LIST`, the numbers are converted back into letters that spell out the command.

Machine language (ML) programs are similar: The numbers in memory are *operation codes*—opcodes for short—and each opcode has a corresponding *mnemonic*—an abbreviation that's easier to remember than the number. For example, the opcode 169 followed by a 5 is equivalent to the instruction `LDA #5` (written as a mnemonic).

To create a machine language program, you need an assembler. It converts the mnemonics into the opcodes—the runnable ML pro-

gram. (See "Fast Assembler" elsewhere in this issue.)

A disassembler is just the opposite: It's a program that allows you to list ML programs. It translates the numbers in memory or on disk into readable abbreviations for ML commands.

Follow The Menu

Apart from a short ML routine `POKE`d into the cassette buffer, "Disk Disassembler" is written entirely in BASIC. There are no special instructions for typing it in or running it. After saving a copy to disk, just type `RUN`.

You can disassemble a program from memory or from disk. You can also create a source file for making your own modifications to a program. The resulting program (PRG) file is compatible with the "Fast Assembler," *PAL*, *LADS* (from *The Second Book of Machine Lan-*

guage, published by COMPUTE! Books), and other assemblers that use source files in program format. You'll have to make a few changes before assembling, like adding a line that gives the origin (the `ORG` command in Fast Assembler, or the `*=` command in LADS), for example.

In some cases, disassembling from disk has a slight advantage over disassembling in memory since "auto boot" programs take control of the computer by tampering with memory pointers.

Once you run the program, you'll be asked what kind of disassembly you want, from RAM or from disk. If you choose RAM, you enter a starting and ending address. For disk disassembly, you must name the ML file to be disassembled. Next, you answer the following questions:

1. List Hold—prints enough to fill the screen and then pauses the listing and offers an escape.
2. Screen—sends disassembly to screen.
3. Save to Disk—sends disassembly to disk to create a source file.
4. Print—sends disassembly to printer (check to see that your printer is turned on).
5. Hexadecimal—prints numbers in hexadecimal. If your answer is no, the numbers will appear in decimal.

When answering these questions, you are not limited to one device. You can have all the devices working at the same time, with one exception. When using the List Hold command, you *cannot* send the disassembly to disk at the same time because the saving process would be slowed down entirely too much. (The program will refuse to allow both List Hold and Save To Disk options.)

The Problem Of Messages

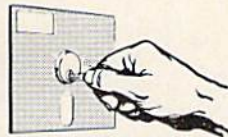
Disk Disassembler attempts to disassemble every single byte in the ML program, which sometimes leads to some strange results. Let's say a file contains a simple message like " HI", a space and the letters H and I. This message would be stored in memory as the ASCII numbers 32, 72, 73 (hexadecimal \$20, \$48, \$49).

STOP SOFTWARE PIRACY

Using Safeguard 64 Disks

- Renders Bit and Nibbler Copiers Ineffective
- Software is Encrypted and Protected on Each Disk
- For Commodore 64

Why should your valuable data or useful software program become available in the Public Domain?



Call or write for more information.

GLENCO ENGINEERING INC.
3920 Ridge / Arlington Hts., IL 60004
(312) 392-2492

Release the hidden musical talent in your COMMODORE 64 or 128 with **MUSIC MAGIC™**

Teach your computer to play your favorite songs and/or compose your own music



- HI RES screen display of music as it plays
 - PRINTS music on many popular printers
 - SAVE/LOAD/APPEND songs to/from disk drive
 - TRANPOSE songs to any key
 - SELECT TRADITIONAL INSTRUMENT SOUNDS or create your own sounds with on-screen displays of synthesizer controls
 - Music notation educationally correct
 - Great companion for music lessons
 - ON-SCREEN COMMANDS for beginners of any age
 - VERSATILITY for experienced musicians
 - USER MANUAL with MUSIC TUTORIAL
 - Capacity for more than 2000 notes per voice
 - Keyboard control
 - Optional joystick or KoalaPad™ control
 - 100% machine language
- List price \$30
Introductory offer \$25
Iowa residents add 4% sales tax
Send check or money order to:



Dayline Software
Dept. C
P.O. Box 305
Ames, IA 50010

DEALER INQUIRIES WELCOME

GUARANTEED SOFTWARE



VIZASTAR for the C128

Vizastar, the integrated spreadsheet, database and graphics program that has the Commodore 64 world raving, is now available for the C128. It boasts 80 columns, and has over 40K of free memory in the spreadsheet. Those who already own Vizastar 64 will be pleased to know that your existing files can be read by Vizastar 128. Also, you can upgrade to the 128 version. Call us for details and pricing.

"The only other comparable product would be Lotus 1-2-3 for the IBM PC; nothing in the C64 world comes even close to the features of Vizastar."

AHOY July 85

"I found Vizastar would do anything Lotus 1-2-3 could, and then some. It's my Commodore choice to become the standard against which the others will be judged."

INFO 64 Magazine, Issue #7

"Vizastar is an exceptional package that rivals the features of programs such as Lotus 1-2-3 and offers C64 owners the kind of integrated software previously only available for higher-priced systems."

RUN Magazine, June 1985

"I scrutinized, tested and experimented with Vizastar extensively, but could find no weaknesses whatsoever. It is the most comprehensive, most flexible, most powerful and easiest to use integrated software package I've worked with."

Commodore Microcomputer, Sept/Oct 1985

"I use an IBM PC at work with Lotus 123. I feel Vizastar is just as good and in some ways better than 1-2-3."

Steven Roberson, NC. End User

"I have used Multiplan and Superbase; both are good pieces of software, but are inadequate when compared to Vizastar."

Jim Mathews, WA. End User

"So good, I bought a second C64 and Vizastar for my office. A wild bargain! You've saved me from having to buy IBM and Lotus."

Philip Ressler, MA. End User

VIZAWRITE CLASSIC for C128

This is the new word processor from Vizastar's author, Kelvin Lacy and is the successor to Omniwriter, which he also wrote. All the features of Omniwriter are there, plus many significant enhancements, like auto pagination, on-line help, pull-down menus, full-function calculator and more. Up to 8 'newspaper-style' variable-width columns can help with newsletters.

Three different proportionally-spaced "near letter quality" fonts are also built-in for use with Commodore or Epson compatible printers. You can merge almost any other word processor file directly into Vizawrite, including Paper Clip and Omniwriter. Naturally, it is also compatible with Vizastar. At all times, what you see on the screen is exactly the way it will be printed out. Vizawrite can do mail-merges and has an integrated 30,000 word spelling checker that you can expand yourself.

PROGRAM SPECIFICATIONS

Both Vizawrite and Vizastar are written in 100% machine language and run in the 128's FAST mode, making it lightning fast. They require a C128 with 80 column color or monochrome monitor. Both come with a cartridge, a diskette, a backup, and a reference manual. Vizastar also includes a 50 page tutorial book. Both work with 1541 or 1571 disk drives.

RISK-FREE OFFER

Vizastar 128 is priced at **\$119.97**. Vizawrite's price is **\$79.97**. Vizastar 64 XL8 is now available for **\$119.97**. We are so positive you will be satisfied with our programs that we offer a 15-day money-back guarantee. Try it Risk-Free. Call us today or send a check or money order. VISA/MC accepted.

Calif. residents add 6.5% Sales Tax.
Add P&H: UPS-\$4; COD/Canada-\$7.

SOLID STATE SOFTWARE

1125 E. Hillsdale Blvd., Suite 104
Foster City, CA 94404-1609
(415) 341-5606

• Dealer Inquiries Welcome •

Trademarks: Lotus 1-2-3/Lotus Development
Commodore 64/Commodore Electronics Ltd. Multiplan/Microsoft



**Now you can take
a giant leap forward
in on-line services.**

Free offer for Co

**Free limited-time offer
when you subscribe
to Viewtron.**

**The easier-to-use service
that turns your computer
into a powerful servant.**

Viewtron was created by one of America's leading communications companies. It is the newest, most advanced generation of on-line services. And it's less expensive to buy, less expensive to use. We'll send you a Viewtron Starter Kit, which includes one FREE hour of use. Use your free hour to leap into our huge database of information, shopping, home banking, messaging, air fares, schedules, electronic auctions where prices constantly drop, and much more.

Viewtron is so much easier to use than other services because its sophisticated navigational structure uses everyday English keywords

rather than arbitrary meaningless codes. Our system makes it faster getting around. So it saves you time. *And that saves you money.*

For instance, just type "stocks," "encyclopedia," or "news" when you want the latest stock market data, educational material, or up-to-the-minute news. You can even create your own keywords.

Special services exclusively for Commodore owners.

Viewtron lets you "Ask the Experts" for answers to Commodore questions. Or order bargains on hot-selling Commodore software and hardware. Plus, you get other services like Commodore software reviews, SIGs, and the latest computer news. With Viewtron, you can also download free, tested software.

What's more, Viewtron is the only complete on-line service that runs in color on Commodore machines.

A single button can get you what you need.

With the touch of one button, you access a keyword file that lets you quickly review information which is particularly important to you. Like the current price of your securities, or your favorite team's stats and scores, or news in your career field.

Pay only for what you use.

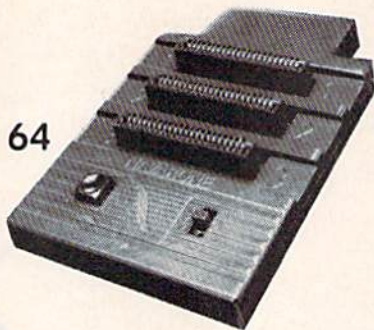
Viewtron is the least expensive on-line service you can use. Viewtron charges no subscription fee and no monthly minimum. You pay only for what you use. Just 9 cents a minute weekday nights (after 6 p.m.) and weekends; 22 cents a minute weekdays.* And unlike other services, we don't charge extra if you use a 1200-baud modem.

You can access Viewtron on any of the three major communications networks at no extra charge. (A local call for most people.)

**SUGGESTED
RETAIL PRICE**
\$29.95
(includes shipping)

**EXPAND
YOUR
COMMODORE 64**

**WITH A
3-SLOT CARTRIDGE
EXPANDER**



- Eliminates wear on connectors
- Saves time when changing cartridges
- Built in Reset button
- Holds up to 3 cartridges
- Convenient access to cartridges


Are you tired of turning your Commodore 64 computer upside down just to insert or change a cartridge? Then you need the new Cartridge Expander from Navarone. We have been making these units for the TI-99/4A home computer for over three years, and now have the same high quality product available for your Commodore 64.



TO ORDER: Send Cashier's Check or M.O. or personal check (allow 10 days to clear), to Navarone Industries, Inc., 11836 Judd Court, 304B Dallas TX 75243 or call 214-437-1118. For MASTER/VISA CARDS and C.O.D.'s add 3%. CA Residents please add 6.5% Sales tax. Outside US add \$2.00 for Shipping.

When Disk Disassembler reaches those three numbers, it wouldn't know that they're really part of a message, so it would disassemble them and print JSR 18760 (in hex, JSR \$4948), because the number 32 is not only the ASCII value for a space character, it's also the opcode associated with the mnemonic JSR. If a section of the program starts to look funny, or contains a lot of BYTE statements, you're probably looking at some sort of data table (ASCII or otherwise). It would take a much more sophisticated program to figure out which parts of an ML program are the program and which parts are data.

There's one more thing to watch out for: When you create a source file, JMPs, JSRs, and branches are followed by target addresses. If you make any changes to the source code, all addresses could turn out to be wrong. To modify a disassembled program, you'll have to go through and replace any addresses with labels and then place the labels at the appropriate line.

See program listing on page 125. 



**BACKUP
PROTECTED SOFTWARE
FAST
with COPY II 64/128™**

From the team who brought you COPY II PLUS (Apple), COPY II PC (IBM) and COPY II MAC (Macintosh) comes a revolutionary new copy program for the Commodore 64 and 128 computers.

- Copies most* protected software — *automatically*.
- Copies even protected disks in just 2 minutes (single drive).
- Copies even protected disks in just 1 minute (dual drive).
- Maximum of four disk swaps on a single drive.
- Includes fast loader, 12 second format.

Requires a Commodore 64 or 128 computer with one or two 1541 or 1571 drives.

**CENTRAL POINT
Software, Inc.**
9700 SW Capitol Hwy., #100
Portland, OR 97219

503/244-5782
M-F, 8-5:30, W. Coast Time
  CHECK, COD WELCOME
(Prepayment Required)

\$39.95
plus \$3 s/h (\$8 overseas)

*We update Copy II 64 regularly to handle new protections; you as a registered owner may update at any time at a reduced price.

This product is provided for the purpose of enabling you to make archival copies only.

**Cartridge
back-ups
made easy!**

- Makes working copies of all C64 program or game cartridges — fully automatic operation — no confusing DIP switches or LED's — no programming knowledge required.
- Copies onto disc or cassette — either will hold several cartridges for convenient storage and access — select and run cartridges from convenient menu (disc only).
- Comes complete with 16 K RAM — includes hardware logic for true cartridge emulation — even supports memory banking.



**Smart
Cart**

Only
\$79.95

plus \$3 handling and shipping
(Texas residents add 5% sales tax)

**Satisfaction unconditionally
guaranteed or your money refunded.**

Send check or money order to:

Merritt Micro Systems
P.O. Box 832505
Richardson, TX 75083

• Delivery from stock.

• Specify Smart Cart operating program on disc or cassette
(procedures included with cassette to upgrade to disc).

Additional information or COD orders (214) 231-1140

Off-Screen Trace

Brent Dubach

BASIC programmers will appreciate this testing and debugging utility. It traces program execution line by line and displays the trace on an alternate screen so there's no interference with your program display. It also allows you to control the speed of the execution. For the Commodore 64 and 128 (in 64 mode).

Tracing the path of program execution is helpful when you're debugging a program. Most TRACE commands in BASIC languages print executing line numbers on the same screen as the program being traced. While acceptable for some programs, in others this approach so disrupts formatted text output that it loses much of its debugging value. For example, in programs that use a high-resolution graphics screen, tracing execution becomes awkward since the normal text screen cannot be seen so long as the program has the machine in the hi-res graphics mode.

Here's a trace utility for the Commodore 64 that avoids these problems by setting up its own display screen. Your own program output is not disturbed, and the trace information can be seen at the touch of a key. And the line displayed is the line *after* the line which has just been executed.

How To Use The Trace

Since "Off-Screen Trace" is written entirely in machine language (ML), you'll need to use MLX to type it in (see "The New MLX," elsewhere in

this issue). When prompted for the starting and ending addresses, respond with the following:

Starting address: 8800
Ending address: 8AFF

Be sure to save a copy before running the program.

Although Off-Screen Trace is written in ML, you don't need to know anything about ML in order to use it. Once in memory, the trace program is activated by a **SYS 34816** command and deactivated by **SYS 34970**. These commands should be issued only in direct mode and not from within a program. If you want to trace only a part of the program, you may use **RUN** or **GOTO** followed by the line number at which you want to begin and then either a **STOP** command or the **STOP** key to halt execution. Tracing may be turned off at any time after it has been switched on. *Be sure, however, that you do not follow a **SYS 34816** with another **SYS 34816** without deactivating tracing in between.* If you do this, you'll need to turn the machine off and back on and start all over.

Once Off-Screen Trace is activated, pressing **CTRL-O** (for Other

screen) will allow you to see a separate trace display that shows the line numbers in which statements are being executed. Pressing **CTRL-O** again returns you to whatever output screen your program is using. This keypress is not "debounced" by the program and therefore has a very light touch. Use a quick, crisp keypress to toggle between the two displays.

Controlling Execution Speed

Because of the overhead involved in tracing execution, programs always run more slowly while being traced. This utility allows you to control the speed of execution with the space bar. It allows statements to be executed only when it sees that the space bar is held down. By holding it down, you can keep the program executing at maximum speed, and you can also step through statements one at a time with a quick single press of the space bar. Regardless of which screen is in view at the time you press the space bar, your own program screen will be reinstated before the next statement in the BASIC program is executed. Another **CTRL-O** will retrieve the updated trace display.

Instead of an unstructured sequence of line numbers, the trace display shows executing line numbers in an outline format that reflects the organization of your program. Each time a **GOSUB** is encountered, the trace display is indented two spaces. With each **RETURN** it is moved two spaces to

the left of the left margin. Thus, you can easily tell by monitoring the line number display whether your program is entering and exiting subroutines as you intended.

Memory Considerations

The program uses memory at the top of the range normally available for BASIC program text and variables. In addition to memory for machine language itself, memory is needed for the separate display screen and for saving certain important information when toggling between displays. When activated with SYS 34816, the trace program protects itself and its display screen from incursions by BASIC by setting 33792 as the top of memory available to BASIC. This still allows BASIC programs that need almost 32K of memory and leaves all the typically used sprite and machine-language areas available. You should note that some of this range of memory is the same as that used by "MetaBASIC," so you should disable "MetaBASIC" before loading and using this trace facility.

See program listing on page 138. @

SUPERCAT



- ☆ Runs on Commodore C-64 or C-128 with 1 1541 Drive / 2 1541 Drives / Dual Drives
- ☆ Printer not required
- ☆ Search Function defaults to the Screen
- ☆ Automatic Entry from Disk Directory with Manual Selection, Edit and Cross Reference
- ☆ Unique Disk ID'S not necessary
- ☆ Catalogs up to 640 Disk Directories
- ☆ Indexes and Alphabetizes over 5000 Titles
- ☆ Sorts 1000 Titles in 8 seconds
- ☆ Search — find any Title in 10 seconds
- ☆ Print — Alphabetized Index of all Titles, Directories by disk, Disk Labels and more

Have you ever "lost" a program — it's on one of your disks, but which one? Despair no more! **SUPERCAT**. THE Disk Catalog System, has arrived!

\$29.95 (U.S.) Includes shipping within USA
Includes backup copy of program disk
Add \$4 for COD Orders — \$6 for Shipping Outside of USA



Order your copy today!
(503) 293-3437

Cornucopia Software

P.O. BOX 2638, Portland, OR 97208 -2638

☆ Lines open 24 hours a day. Please allow 4 to 6 weeks for delivery. Dealer inquiries invited.



ULTRABYTE DISK NIBBLER VERSION 2.0

TOP - RATED COPIER DRAMATICALLY IMPROVED

INFO - 64 Magazine, June 1985, compared Commodore 64 copy programs and awarded the Nibbler its highest rating. Now the Nibbler has been improved to copy dozens of the latest programs that previously could not be copied, all in less than three minutes.

FOR SINGLE 1541 & DUAL MSD DRIVE

- Simple. Even a beginner makes perfect copies
- Fast. Copies protected disks in three minutes
- Sophisticated. Senses the disk being copied and automatically adjusts for dozens of protection schemes. Copies 99+ % of software
- Modular design to allow easy updates
- Even copies itself. For this reason, no refunds will be given

\$ 39.95 plus \$4.00 shipping & handling.

Mastercard, Visa, Check or M.O., Calif. add 6.5% (\$2.60) sales tax.
Foreign orders or COD add \$2.00. Payment must be in U.S. funds.
Previous customers may order V 2.0 for \$20.00 plus \$4.00 shipping

NIBBLER V 2.0 EVEN COPIES ITSELF

To order, write or call 24 hr. order line
For information, write. Phone for orders only

ULTRABYTE (818) 796 - 0576

P.O. Box 789 La Canada, CA 91011 USA

DEALERS & DISTRIBUTORS WANTED

kyan

PASCAL

For the Commodore 64

kyan pascal is the most complete package available for learning and using the Pascal language.

kyan pascal is easy to use, lightning fast, and loaded with features. It's a full Pascal implementation. It compiles and runs many times faster than other Pascal compilers.

kyan pascal features:

- Optimized Machine Code Compiler;
- Built-In Full Screen Text Editor;
- String-Handling, Chaining, Include File, and Other Powerful Extensions;
- Random Access Files and Full Graphics Support;
- Built-In Assembler (Allows Full Hardware Control);
- 13-Digit Arithmetic Precision; and,
- Tutorial Manual with Sample Programs.

kyan pascal requires 64K of memory and a single disk drive. No additional hardware is necessary. And, it comes with kyan's **MONEY BACK GUARANTEE**... If not completely satisfied, return it within 15 days for a full refund.

kyan pascal for the C64 **\$69.95**
(Add \$4.50/copy for handling; \$12.00 outside North America; California residents add \$4.55/copy for sales tax)

Send Check/Money Order to: **kyan software, Dept. X**
Call: **(415) 775-2923** 1850 Union St., Ste. 183
MC/Visa Accepted San Francisco, CA 94123

computing for families

Smart Power Tools: A Peek Inside The Black Box

Fred D'Ignazio, Associate Editor

The microcomputer industry has an inferiority complex. And no wonder. Since microcomputers were introduced a decade ago, they have evolved at an amazing pace. Yet this pace has not been enough to silence the host of critics—consumers, educators, and the media—who demand that the computer be *powerful* yet also *easy to use*.

This is not a simple task! The industry has tried to respond to these criticisms by manufacturing "powerful" computers that are also "user friendly."

One legitimate way to measure the power of the computer is to measure the power of its software. You can do this by adding up the number of useful commands, options, and functions of the software. For example, the giant super power-tool program *Symphony* from Lotus contains hundreds of functions and commands. But is *Symphony* easy to use? Not according to many disgruntled consumers, educators, and reporters.

As a result, *Symphony* is a dinosaur. It will soon be extinct, along with its whole generation of super-power tools.

When the microcomputer industry produced *Symphony*, it erred on the side of power while neglecting ease of use. Now the industry is headed in the other direction. For the short term, the industry has backed away from producing any more "super power tools" like *Symphony* and is splitting up the power tools into smaller, more manageable, and easier to use, programs. And there's lots of excitement about mini-power tools—little "pop-up" programs—that a user can call on, even in the middle of another program.

But this strategy cannot last. It sacrifices power for ease of use, so it's only a temporary solution. The

critics don't just want ease of use, or just power. They want both—at the same time.

Is This Possible?

It is, with software now on the drawing boards: programs known as *smart power tools*. These will be so user-friendly and intelligent that a child can operate them. In less than five years, computer tools' power, complexity, and richness will be completely masked from the user. The tools will edit our prose, reshape our ideas, organize our information, and manipulate our numbers, all with almost no supervision by us. Microcomputer companies will have satisfied their critics at last.

But we will have sacrificed something even greater—*control*. To be so easy to use, smart power tools will have to take control over the problems we want solved. The human's job will be reduced to pushing buttons. We will respond to the computer's questions and feed the computer the information it needs. Then the smart computer tool will do all the rest.

In my opinion, this loss of control is unacceptable. The sacrifice is too great. And I, for one, don't want to make it.

I'm worried about the *automation of human thinking* that such power tools will represent. If people are accustomed to having computer programs do their thinking for them, they'll lose the habit of thinking for themselves. This has at least two harmful effects. First, if people don't carefully scrutinize the computer's *black box thinking*, who's to say that the answers it gives are correct? Second, people will be sacrificing their own standards of thinking for the computer's standard. In many cases, this may lead to an improvement. But over time it will lead people to become *numb* to what is good thinking and what is

bad. We could end up like the piano player in *Catcher in the Rye*, who was so accustomed to people applauding his virtuosity for so long that he grew deaf to his own playing, which became mechanical and mediocre.

As Easy To Use As A TV

I'm even more worried about children in school. Courses on word processors, databases, and spreadsheets will soon replace courses in programming, computer literacy, and computer fundamentals, in most schools. Like the rest of us, the children are being told that computers should be more powerful yet "as easy to use as a TV." As future consumers and office workers, they're not supposed to settle for anything less. And they won't have to. They're a primary market for the new smart power tools.

But what happens to the children's thinking skills when the tools don't just do arithmetic or word processing, but also organize thoughts, correct spelling, solve word problems, and group facts, figures, and ideas?

I may sound like an alarmist, but I think that for our own sake—to preserve our thinking skills and to stay in control of our computers—we *must continue to program computers*.

I don't mean programming in BASIC or Logo. I mean programming in the larger sense of the word: thinking through a problem, task, or process, step by step, precisely and in considerable detail, until we thoroughly understand what is going on and have made sure that it goes on correctly.

At this level, programming isn't just an obsolete computer skill. It's the same as thinking. And thinking is a human skill, one that we must continue to cultivate, even in a world full of smart power tools. @

simple answers to common questions

Tom R. Halfhill, Staff Editor

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

Q. I've noticed that some commercial software disks do not have the little notch on their edges, yet they contain a program on the disk. How do the software companies write to a "write-protected" disk?

A. As you know, the lack of a write-enable notch (or its equivalent, a notch covered with tape) prevents a disk drive from writing to a disk. But most software publishers these days don't duplicate their disks one by one with a disk drive. It would take far too much time, and they'd have to pay someone to sit at a computer all day shoving disks in and out. Instead, they use bulk copiers, or subcontract the job to a duplication company that uses bulk copiers. These copiers resemble office photocopy machines. Basically, you just insert a master disk into one slot, stick a blank disk into another slot, and press a button. In seconds, the machine copies the master disk onto the blank disk.

Of course, there's a little more involved to it in practice. Bulk copiers are designed to duplicate many different kinds of disks—Commodore, Apple, Atari, IBM, or whatever—so they have to be adjusted for the proper format. High-volume copiers usually have automatic feeders that handle whole stacks of blank disks at a time, collators to sort the finished copies, and devices which slap on the paper labels. But essentially, bulk copiers do for floppy

disks what photocopy machines do for sheets of paper. They aren't foiled by the lack of write-enable notches on the blank disks, and they even apply copy-protection schemes as they copy.

If all this makes it sound like a bulk copier would be a handy machine to have around, keep in mind that they cost several thousand dollars—without frills.

Q. What advantage is there to daisy-chaining two disk drives together?

A. Two-drive computer systems are generally more convenient to use than one-drive systems. For example, if you often find yourself making backup copies of entire disks—or copies of numerous files on disks—there are two-drive copy programs that speed up the process considerably. You can insert the source disk in one drive, the target disk in the second drive, and then run the copy program. By copying from drive to drive, it duplicates the entire disk or the files you specify without the frequent disk-swapping required on a single-drive system.

Two-drive systems also make it easier to maintain backups as you're working. With a disk inserted in each drive, you can periodically save copies of important data files, documents, or programs by alternating from drive to drive.

Or suppose you're a programmer who likes to keep a disk of utilities handy as you work. With a two-drive system, one drive can hold the disk with your assembler, compiler, renumbering utility, etc., while the other drive contains your work disk. Then you don't have to swap disks whenever you need to load a certain utility or save the current copy of your program.

You can do practically anything with a one-drive system that you can with a two-drive system, so

it's mainly a question of convenience. The benefits must be weighed against the cost.

Q. I currently own a Commodore 64 with a Datassette. I've been thinking about purchasing a disk drive. Recently I saw a TV show about laser discs. Laser discs are supposed to be faster than floppy disks and able to hold much more data, plus they are said to be almost indestructible. The people on the show said the laser discs would be on the market soon. Do you think I should go ahead and buy a floppy disk drive, or wait for the laser discs?

A. The laser discs you're referring to are probably CD-ROMs, which stands for *Compact Disc-Read Only Memories*. CD-ROMs are based on audio compact disc technology and have recently been adapted for personal computers. They are indeed much faster than floppy disks and hold immense amounts of data.

At this point, however, CD-ROMs are not a replacement for a floppy disk drive. As their name implies, CD-ROMs are *read-only*—the computer can read data from the disc, but can't save new data or erase the disc. Like phonograph records, CD-ROMs are manufactured with their information permanently pressed into the surface. They're intended for such applications as storing databases and programs which don't require frequent updating. For instance, one of the first CD-ROMs to be announced is Grolier Inc.'s *Academic American Encyclopedia*. Engineers are working on read/write laser discs, but it will be a couple of years before they become available at consumer prices.

For more information see "CD-ROMs: The Ultimate Database" in the November 1985 issue of COMPUTE!'s GAZETTE. ☐

Charles Brannon
Program Editor

I've been learning the C programming language for a few months now. Not only is the study of the language fun in itself, it's also valuable for applications programming on new computers like the Atari 520ST and Commodore's Amiga. Each of these computers supports C as a primary applications language, a niche filled by BASIC and machine language on other machines. It will still be worthwhile to use machine language, but C is a good blend of readability, portability, efficiency, and raw speed (see "C: Language of the Future?" in the October 1985 GAZETTE).

I've recently been impressed with the Pro-Line C Power compiler. Even on a computer like the 64, with somewhat limited resources ("only" 64K, an 8-bit 1Mhz 6502, the slow 1541 disk drive, and no "true" operating system), C can perform exceptionally well.

C Power is a complete programming system. It supplants the operating system with a Unix-like shell that lets you execute commands and programs from a command line, and can pass command arguments to your program. A full-screen, 240-column (horizontal scrolling) text editor makes entering C programs easy and convenient. A version of the standard editor includes a simple C syntax checker. This lets you weed out some of your errors before you go through the elaborate process of compiling and linking.

Using C Power can be a bit tricky. The primary documentation is the 536-page "C Primer Plus," a worthwhile introduction to C written by the Waite Group (published by Howard Sams). The only documentation specific to C Power is 48 photocopied pages stapled together, printed on both sides by a letter-

quality printer. Although the documentation is adequate to get you started, and does include a full description of all the C library functions, it seems a little sparse for a product as complex as a language compiler.

Compiling a C program is fairly easy, though tedious. You start with side one of the C Power disk, and LOAD "SHELL",8 to RUN the command-line shell. Next you load the C editor by typing ED or CED. You type in or edit your C program with the editor, then save it to your work disk. You might first use the CCheck command from the C editor to save you some grief if your program contains any obvious errors. You then exit to the shell, reinsert the compiler disk, then enter "cc program name." The compiler starts (after a lengthy pause while it loads from disk) and prompts you to insert the source disk. You insert your work disk, press RETURN, and the compiler reads your file. You then reinsert the compiler disk, wait some more, then reinsert your work disk so that the compiler can write the completed object file to disk. But you can't run the program yet—you have to link it.

Reinserting the compiler disk, you type LINK from the shell. If you want to prepare a program that can be run independent of the shell, you type LINK -S. You can also have the linker create your program at a specific address. After the linker loads, you enter the name of your object file, and insert your work disk. After your object file is read into memory, you insert side two of the compiler disk and press up-arrow and RETURN. This links in any other library modules used by your program. Finally you reinsert your work disk, and press RETURN to write the finished, executable program to the disk. Be sure to append the .SH suffix if you want your program to run under the

shell. If you LINK -S, you can exit to BASIC and LOAD "program",8 and run it.

As you can see, running a C program involves more than just typing RUN. BASIC is a much easier programming environment to learn and use, but it is slower and less easily extensible than C. The difficulty of compiling and linking pays off with blinding execution speed. Also, linking lets you write large programs in small modules. Each module can be compiled, tested and debugged, then left alone. You don't have to recompile an entire program, just the module you're working on. You can then link all the modules (which is faster than compiling) whenever you want to test the entire program.

C Power is fast. The C benchmark used in "C: Language of the Future?" was a simple bubble sort demo. The bubble sort is not the best kind of sort to use, but it involves a variety of logical and arithmetic functions. The BASIC equivalent (timing the sort only) took two minutes to sort a list of 100 integers. The same program, compiled via C Power, sorted 100 integers in just over four seconds.

C Power
Pro-Line Software, Ltd.
755 The Queensway East, Unit 8
Mississauga, Ontario
Canada L4Y 4C5
\$99.95



We appreciate receiving both corrections and suggested modifications from readers. Address them to:

Bug-Swatter
c/o COMPUTE!'s GAZETTE
P.O. Box 5406
Greensboro, NC 27403

• "64 Disk Boot" from "Hints & Tips" (November 1985) does not work correctly. The line with the POKEs to 770 and 771 should be line 0 and not line 1.

• Some readers with black-and-white televisions or monochrome monitors have suggested that the screen and character colors of "Preview 80" (November 1985) are not ideal. Preview 80 displays blue characters on a black background. To change the character colors, POKE a color code (0-15) into 52500 before you SYS 52000. To change the characters to yellow, for example, POKE 52500,7. For white, POKE 52500,1.

• There are no corrections for "Maze-Mania" (September 1985). If the maze has the wrong shape or is missing some portals, check the spacing in line 170 and the PRINT statements in lines 210-300, especially where there's a {RVS} or {OFF} followed by a space.

• "Turbo-Disk" (July 1985) works on North American 64s, but several readers from Europe and Australia have reported problems with the program. Graeme McKenzie from Darwin, Australia, has apparently found a fix. (Not having access to an Australian 64, nor the 50 Hz electrical current, we can't test this correction). Change these two lines:

49554 DATA 221,162,4,202,208,253
49560 DATA 234,162,4,173,0,221

Also, the checksum in line 160 should be changed from 55976 to 55977. The reason for the incom-

patibility is very technical; it concerns the speed of the internal (1 MHz) clock and the number of clock cycles used by each machine language instruction.

Note that this modification does not apply to North American 64s.

• The printer used for making program listings put a superfluous question mark into line 560 of the Plus/4 version of "Kaleidoscope"

(October 1985). The last number should be 61, not 621.

• "X BASIC" (October 1985) works as listed. Readers who received an OUT OF MEMORY error after loading the program should type NEW before typing SYS 49152. In general, after an absolute load (LOAD "diskprogram",8,1 or LOAD "tape-program",1,1), it's necessary to type NEW to reset some memory pointers.

VOTALKER C-64

FREE
GAME OFFER

New From Votrax

- Easy to Use — Plug In and Speak
- Clear, Unlimited Speech
- Screen Echo Speaks Words and Symbols
- Character Mode Spells Each Word
- Rate, Pitch and Volume Controls
- Completely ROM Based, No Software to Load
- Self-Contained Speaker



The ultimate speech synthesizer for the Commodore 64.

Also Introducing Trivia Talker II*

- Votalker C-64 Version of Votrax's Popular Talking Trivia Game
- Five Game Categories for Up to Four Players
- Create Your Own Questions and Answers
- Multiple Choice Questions With Timed Responses
- Questions and Answers Displayed and Announced

Special Offer

- Buy Votalker C-64 for **\$99.95**
- Get Trivia Talker II ~~\$39.95~~
FREE

Other Votrax Products:

- PSS, T-N-T, Stand-Alone Devices
- IBM, Apple II Plug In Board Synthesizers
- Votrax Speech Chips



VOTRAX, INC.
1394 Rankin, Troy, Michigan 48063-4074
(313) 588-2050 TWX-8102324140 Votrax-TRM

Call Votrax at (800) 521-1350

*Trivia Talker I operates only through the Commodore 64 on board SID chip. Price: \$39.95

news & products

Votalker C-64

A new speech synthesizer from Votrax can speak text as it's entered into the computer and spell words upon command. Three types of text vocalization are offered: Conversation mode, which reads text as its spoken; verbatim mode, which reads text and pronounces symbols; and character mode, which spells each word and pronounces numbers and symbols.

The 4 x 5 inch unit plugs into the Commodore 64 expansion port and contains its own amplifier, speaker, and external speaker jack. Suggested retail price, \$99.95.

Votrax, Inc., 1394 Rank, Troy, MI 48083-4074

Circle Reader Service Number 220.

New Mindscape Adventures

In *Quake Minus One*, one of three new adventures from Mindscape, the "Robot Liberation Front" has sabotaged an undersea power station in the middle of the Atlantic Ocean. It's up to the player to capture the renegade robots and prevent an earthquake. Field-of-view perspective and advanced animation are featured.

Shadowfire is a space adventure in which six super-hero characters must

beam aboard an alien spacecraft, locate and rescue a kidnapped ambassador, and destroy the alien craft. Also available is a *Shadowfire Game Changer* disk that enables players to create entirely new *Shadowfire* scenarios.

The medieval era is the setting for *Lords of Midnight*, an illustrated text adventure. Characters must be moved by day across the forbidden Land of Midnight in search of Doomark the Witchking. By night, the computer responds to the player's actions. More than 32,000 different landscapes can be displayed.

Each game lists for \$29.95 and can be played on the Commodore 64 or 128. The *Shadowfire Game Changer* disk is priced at \$9.95.

Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062

Circle Reader Service Number 221.

Six-Part Harmony

Three more voices can now be added to the Commodore 64 and 128's three standard voices with the VT-6 cartridge from V-Tech. The cartridge is sold with the *Visible Music Monitor* software, which supports both sound chips and enables music creation, editing, and playing, as well as disk or tape storage and retrieval.

Editing features allow control over the sequence in which music segments are played or repeated, and a playlist can be specified to play a group of songs automatically.

The system (*Visible Music Monitor* and VT-6 cartridge) runs on a Commodore 64 or 128 with either disk or tape and either color or monochrome monitor. Suggested retail price, \$89.

V-Tech, Inc., 2223 Rebecca, Hatfield, PA 19440

Circle Reader Service Number 222.

More From Bank Street

Brøderbund has released three new Bank Street programs for the Commodore 64. *Bank Street Speller*, a proof-reader and spelling checker for the popular *Bank Street Writer* word processor, highlights misspelled words with the use of its 30,000 word dictionary. *Bank Street Filer*, Brøderbund's new database management program, prints out customized reports. A mailing list and letter-writing program, *Bank Street Mailer*, includes a mailing list manager. Each program comes with a backup disk and lists for \$49.95.

Brøderbund Software, 17 Paul Dr., San Rafael, CA 94903-2101

Circle Reader Service Number 223.

NOW!

DECISION ANALYSIS

for the

Commodore 64

- Menu Driven
- Documents and Structures the Decision Process
- Allows Over 30 Decision Criteria
- Up to 150 Alternatives
- Save and Reload Decision Data
- **Make Decisions On:**

Which House to Buy
Which Applicant to Hire
Where to Locate a Branch
Which Computer to buy or any
Decision with multiple alternatives

\$24.95 - 1541 Disk
CA Residents add \$1.50 sales tax

R. Lewter & Associates
5104 Linda Lou Drive
Carmichael, California 95608

Commodore 64 is a Registered Trademark of Commodore, Inc.

RPM

REPLACEMENT POWER SUPPLY

for Commodore C64 and VIC-20's

SPECIAL FEATURES

- Serviceable -- not disposable!
- Surge Protected!
- Spike Protected!
- TWO fused circuits (computer and accessory)
- Power Indicator Light
- 4 extra 110-120 volt outlets for peripherals
- 2 year warranty
- Master ON-OFF Switch
- Long Cords

Retails at \$69.95

AVAILABLE TO DISTRIBUTORS ONLY THROUGH:

R.P.M. Concepts, Ltd.

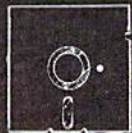
60 E. Main St., Alliance, Ohio 44601

Call 800-821-1297 IN OHIO 800-821-8555

VISA - MASTERCARD - C.O.D.

RPM

DISKS 69c



Foolish to pay more.

Dangerous to pay less.

- QUALITY MEDIA
- LIFETIME REPLACEMENT GUARANTEE
- HUB RINGS
- TYVEC EPS.
- WRITE PROTECTS

	1-100	101+
5.25" SSDD	.79	.69
5.25" DSDD	.89	.79
PC FORMATTED	1.09	.99
AT 1.2MB/3.5 1D (Mac)	1.99	CALL



BLACKSHIP
COMPUTER SUPPLY

P.O. Box 883362
San Francisco, CA 94188
In California 415-550-0512
USA orders 800-431-6249
In Canada 403-428-6229

Add \$3.00 shipping and handling per 100 Diskettes.
COD add \$1.95 (CA residents add 6.5% sales tax)
VISA MC COD

FREE? DISKETTES

SAVE MONEY! C64 and VIC 20 users can use the diskette flip side, if another 'write enable' notch is correctly made.

TOP NOTCH™ by QUORUM quickly solves that problem. It's like FREE DISKETTES!

- Stainless Steel Guide
- Easy Leverage Handle
- Clippings Catcher
- Square Notch Cut

Lifetime Warranty

TOP NOTCH™ Just \$14.95

Add \$2.00 s/h • CA Res. add 97¢ tax

It's the
Top-Notch
Notcher!

CALL TOLL FREE
1-800-222-2824
In CA: 1-800-222-2812

8-5pm PST

Visa/MC

QUORUM INTERNATIONAL, Unltd.
INDUSTRIAL STATION P.O. BOX 2134-GZ
OAKLAND, CA 94614

Sesame Street Software

Three new Sesame Street titles for ages four to six have been released from CBS Software. In *Ernie's Big Splash*, children help Ernie find his Rubber Duckie by building a pathway in Ernie's bathtub. Fire hydrants, a water slide, and a friendly alligator are among the available building pieces.

Grover's Animal Adventures is an animal classification activity with colorful graphics and music. The program presents four different animal environments: the African grasslands, the Atlantic Ocean, a North American forest, and a barnyard. Children select from an array of animated animals and objects and place them on land, water or in the sky.

Big Bird, Bert, Ernie, and other Sesame Street characters explore the city in *Sesame Street Pals Around Town*. Children can create their own scenes and stories with music and animated objects.

Each program is on disk and lists for \$14.95.

CBS Software, One Fawcett Place,
Greenwich, CT 06836

Circle Reader Service Number 224.

Gardening Guide

A comprehensive gardening and landscaping guide has been created for the Commodore 64 by Ortho Books. Called *Ortho's Computerized Gardening*, the program provides gardening information for specific areas according to zip code.

With the program, users can create plant lists according to flower color, growing conditions, watering requirements, growth habits, and desired use.

Also included is a plant encyclopedia, with information about hundreds of plants; a planning calendar and diary; and a calculator for determining landscape dimensions or planning a budget.

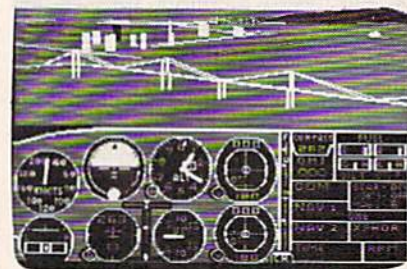
Ortho's Computerized Gardening comes with a 192-page gardening techniques book, and a bonus Garden Planning Kit. Suggested retail price is \$49.95.

Ortho Information Services, Chevron Chemical Co., 575 Market St., San Francisco, CA 94105

Circle Reader Service Number 225.

A Change Of Scenery

SubLogic has released six new scenery disks for the Commodore 64 versions of *Flight Simulator II* and *Jet*. The disks cover the Western half of the continental United States. Each disk includes major airports, cities, highways, rivers, lakes, and radio-nav aids.



Scenery disks are now available for SubLogic's *Flight Simulator II* and *Jet*.

The entire six-disk set can be purchased for \$99.95; individual scenery disk packages sell for \$19.95 each.

SubLogic Corp., 713 Edgebrook Dr.,
Champaign, IL 61820

Circle Reader Service Number 226.

STATE-OF-THE-ART MAGNETIC MEDIA

5 1/4" DISKETTES

- With Hub Rings
- With Write Protect Tabs
- With Static-Free, Dust-Free Envelopes
- With User ID Labels
- In Factory Sealed Poly Packs

69¢

Single Side
Double Density

79¢

Double Side
Double Density

100% ERROR FREE - LIFETIME WARRANTY
MEET OR EXCEED APPLICABLE ANSI, ECMA, ISO STANDARDS

Minimum quantity: 50 diskettes. Discount for 300 or more diskettes. Shipping and Handling: \$4.00 per 100 diskettes. Reduced shipping charge for larger quantities. C.O.D. add \$4.00. Cash or certified check. MI residents add 4% sales tax. Prices subject to change without notice.

COD

Precision Data Products

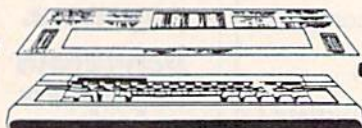
P.O. Box 8367, Grand Rapids, MI 49508
(616) 452-3457 • Michigan 1-800-632-2468
Outside Michigan 1-800-258-0028

Having Trouble Remembering All The Commands For Your Programs??

YOU NEED

LEROY'S CHEATSHEET®

KEYBOARD
OVERLAYS



FOR
COMMODORE
64™

LEROY'S CHEATSHEETS® are plastic laminated keyboard overlays designed for use with popular software, hardware, and languages for Commodore 64 computers.

These cut-out-yourself help sheets fit over the keyboard, putting hard to remember program commands right at your fingertips. The actual keystrokes are in bold type and any variables are shown in italics. Now you can use your software faster, more easily, and more effectively. With LEROY'S CHEATSHEETS® you'll never have to hunt for a program command again.

ONLY
\$3.95
EACH

- ✓ FITS OVER KEYBOARD
- ✓ PUTS PROGRAM COMMANDS RIGHT AT YOUR FINGERTIPS
- ✓ SAVES TIME — ENDS FRUSTRATION
- ✓ GET TO KNOW YOUR SOFTWARE BETTER
- ✓ LEARN NEW SOFTWARE FASTER, EASIER
- ✓ STURDY PLASTIC LAMINATE
- ✓ UNBEATABLE PRICE!!

CIRCLE YOUR CHOICES

- | | | |
|---------------------|---------------|------------------------|
| Basic | Multiplan | VIP Terminal |
| Blanks (set of 3) | OmniWriter | Vizastar |
| Consultant | Paper Clip | WordPro 3+ |
| Disk 1541 | PractiCalc 64 | WordPro 64 |
| Doodle | PractiCalc II | Write Now! 64 |
| Easy Script | Simons' Basic | Epson FX & RX Printers |
| Flight Simulator II | Sky Travel | Gemini 10, 15x |
| Fleet System 2 | Speedsript | 1525, MPS 801, 803 |
| For the Beginner | Superbase | 1526, MPS 802 |
| Manager | Vidtext | Okidata 92, 93 |

DOZENS MORE AVAILABLE

QUANTITY _____ X \$3.95 = \$ _____

SHIPPING \$ 1.00*

6% TAX \$ _____
(Pa only)

TOTAL \$ _____

* U.S. & CANADA \$1.00
FOREIGN ORDERS \$3.00
CHECK, M.O., MC/VISA
U.S. FUNDS NO C.O.D.

MC/VISA # _____

EXPIRATION DATE _____

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____



CHEATSHEET PRODUCTS INC
P.O. Box 111368 Pgh., Pa. 15238
(412) 781-1551



GAZ
1

How To Type In COMPUTE!'s GAZETTE Programs

Each month, COMPUTE!'s GAZETTE publishes programs for the Commodore 128, 64, Plus/4, 16, and VIC-20. Each program is clearly marked by title and version. Be sure to type in the correct version for your machine. All 64 programs run on the 128 in 64 mode. Be sure to read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

We frequently publish two programs designed to make typing easier: The Automatic Proofreader, and MLX, designed for entering machine language programs.

When entering a BASIC program, be especially careful with DATA statements as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the computer). If this happens, the only recourse is to turn your computer off then back on, erasing whatever was in memory. So be sure to *save a copy of your program before you run it*. If your computer crashes, you can always reload the program and look for the error.

Special Characters

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from the GAZETTE, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor down key; {5 SPACES} means to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing another key), the character is underlined. For example, A means hold down the SHIFT key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example, enter eight SHIFTed A's).

If a key is enclosed in special brackets, [] hold down the Commodore key (at the lower left corner of the keyboard) and press the indicated character.

Rarely, you'll see a single letter of the alphabet enclosed in braces.

This can be entered on the Commodore 64 by pressing the CTRL key while typing the letter in braces. For example, {A} means to press CTRL-A.

The Quote Mode

Although you can move the cursor around the screen with the CRSR keys, often a programmer will want to move the cursor under program control. This is seen in examples such as {LEFT} and {HOME} in the program listings. The only way the computer can tell the difference between direct and programmed cursor control is *the quote mode*.

Once you press the quote key, you're in quote mode. This mode can be confusing if you mistype a character and cursor left to change it. You'll see a reverse video character (a graphics symbol for cursor left). In this case, you can use the DELETE key to back up and edit the line. Type another quote and you're out of quote mode. If things really get confusing, you can exit quote mode simply by pressing RETURN. Then just cursor up to the mistyped line and fix it.

When You Read:	Press:	See:
{CLR}	SHIFT CLR/HOME	
{HOME}	CLR/HOME	
{UP}	SHIFT ↑ CRSR ↓	
{DOWN}	↑ CRSR ↓	
{LEFT}	SHIFT ← CRSR →	
{RIGHT}	← CRSR →	
{RVS}	CTRL 9	
{OFF}	CTRL 0	
{BLK}	CTRL 1	
{WHT}	CTRL 2	
{RED}	CTRL 3	
{CYN}	CTRL 4	

When You Read:	Press:	See:
{PUR}	CTRL 5	
{GRN}	CTRL 6	
{BLU}	CTRL 7	
{YEL}	CTRL 8	
{ F1 }	f1	
{ F2 }	SHIFT f1	
{ F3 }	f3	
{ F4 }	SHIFT f3	
{ F5 }	f5	
{ F6 }	SHIFT f5	
{ F7 }	f7	
{ F8 }	SHIFT f7	

When You Read:	Press:	See:
←	←	
↑	SHIFT ↑	

For Commodore 64 Only

[1]	COMMODORE	1	
[2]	COMMODORE	2	
[3]	COMMODORE	3	
[4]	COMMODORE	4	
[5]	COMMODORE	5	
[6]	COMMODORE	6	
[7]	COMMODORE	7	
[8]	COMMODORE	8	

The Automatic Proofreader

Charles Brannon, Program Editor

"The Automatic Proofreader" will help you type in program listings from COMPUTE!'s GAZETTE without typing mistakes. It is a short error-checking program that hides itself in memory. When activated, it lets you know immediately after typing a line from a program listing if you have made a mistake. Please read these instructions carefully before typing any programs in COMPUTE!'s GAZETTE.

Preparing The Proofreader

1. Using the listing below, type in the Proofreader. The same program works on both the VIC-20 and Commodore 64. Be very careful when entering the DATA statements—don't type an 1 instead of a 1, an O instead of a 0, extra commas, etc.

2. Save the Proofreader on tape or disk at least twice *before running it for the first time*. This is very important because the Proofreader erases this part of itself when you first type RUN.

3. After the Proofreader is saved, type RUN. It will check itself for typing errors in the DATA statements and warn you if there's a mistake. Correct any errors and save the corrected version. Keep a copy in a safe place—you'll need it again and again, every time you enter a program from COMPUTE!'s GAZETTE.

4. When a correct version of the Proofreader is run, it activates itself. You are now ready to enter a program listing. If you press RUN/STOP—RESTORE, the Proofreader is disabled. To reactivate it, just type the command SYS 886 and press RETURN.

Using The Proofreader

All VIC and 64 listings in COMPUTE!'s GAZETTE now have a *checksum number* appended to the end of each line, for example "rem 123". Don't enter this statement when typing in a program. It is just for your information. The rem makes the number harmless if someone does type it in. It will, however, use up memory if you enter it, and it will confuse the Proofreader, even if you entered the rest of the line correctly.

When you type in a line from a program listing and press RETURN, the Proofreader displays a number at the top of your screen. This checksum number must match the checksum number in the printed listing. If it doesn't, it means you typed the line differently than the

way it is listed. Immediately recheck your typing. Remember, don't type the rem statement with the checksum number; it is published only so you can check it against the number which appears on your screen.

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

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

Special Tape SAVE Instructions

When you're done typing a listing, you must disable the Proofreader before saving the program on tape. Disable the Proofreader by pressing RUN/STOP—RESTORE (hold down the RUN/STOP key and sharply hit the RESTORE key). This procedure is not necessary for disk SAVES, but you must disable the Proofreader this way before a tape SAVE.

SAVE to tape erases the Proofreader from memory, so you'll have to load and run it again if you want to type another listing. SAVE to disk does not erase the Proofreader.

Since the Proofreader is a machine language program stored in the cassette buffer, it will be erased during a tape SAVE or LOAD. If you intend to type in a program in more than one sitting or wish to make a safety SAVE, follow this procedure:

1. Load and run the Proofreader.
2. Disable it by pressing RUN/STOP—RESTORE.
3. Type the following two lines in direct mode (without line numbers):

```
AS="PROOFREADER.T":FORX=1TO40:AS=AS+" ":NEXT
```

```
FORX=886TO1018:AS=AS+CHR$(PEEK(X)):NEXT:OPEN1,1,1,AS:CLOSE1
```

After you type the last line, you will be asked to press RECORD and PLAY. We recommend you start at the beginning of a new tape.

You now have a new version of the Proofreader (PROOFREADER.T, as renamed in the above code). Turn your computer off and on, then load the program you were working on. Put the cassette containing PROOFREADER.T into the tape unit and type:

```
OPEN1:CLOSE1
```

You can now get into the Proofreader by typing SYS 886. To test this, PRINT PEEK (886) should return the number 173. If it does not, repeat the steps above, making sure that AS (PROOFREADER.T) contains 13 characters.

The new version of Automatic Proofreader will load itself into the cassette buffer whenever you type OPEN1:CLOSE1 and PROOFREADER.T is the next program on your tape. It will not disturb the contents of BASIC memory.

The above code converts the machine language program into characters that are concatenated into a string. When you open a tape file, using the string as the name of the file, the tape header contains the machine language program (disguised as part of the filename). Opening and closing the tape file loads the header into the cassette buffer, but does not disturb BASIC programs already in memory.

Automatic Proofreader For VIC And 64

```
10 PRINT"[CLR]PLEASE WAIT...":FOR I=886TO1018:READA:CK=CK+A:POKE I,A:NEXT
20 IF CK<>17539 THEN PRINT"[DOWN] YOU MADE AN ERROR":PRINT"IN DATA STATEMENTS.":END
30 SYS886:PRINT"[CLR]{2 DOWN}PROOFREADER ACTIVATED.":NEW
40 DATA 173,036,003,201,150,208
50 DATA 001,096,141,151,003,173
60 DATA 037,003,141,152,003,169
70 DATA 150,141,036,003,169,003
80 DATA 141,037,003,169,000,133
90 DATA 254,096,032,087,241,133
100 DATA 251,134,252,132,253,008
110 DATA 201,013,240,017,201,032
120 DATA 240,005,024,101,254,133
130 DATA 254,165,251,166,252,164
140 DATA 253,040,096,169,013,032
150 DATA 210,255,165,214,141,251
160 DATA 003,206,251,003,169,000
170 DATA 133,216,169,019,032,210
180 DATA 255,169,018,032,210,255
190 DATA 169,058,032,210,255,166
200 DATA 254,169,000,133,254,172
210 DATA 151,003,192,087,208,006
220 DATA 032,205,189,076,235,003
230 DATA 032,205,221,169,032,032
240 DATA 210,255,032,210,255,173
250 DATA 251,003,133,214,076,173
260 DATA 003
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Disk Disassembler

Article on page 110.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

```

100 BA=53280:PR=65490:CO=646:A
C=780:PRINT"CLR":POKEBA,
0:POKEBA+1,0 :rem 65
110 FORA=828TO985:READB:POKEA,
B:NEXT :rem 11
120 DATA 32,253,174,32,158,173
,32,130,183,168,169,0,145,
34,162,0,181,0,157 :rem 51
130 DATA 0,160,202,208,248,165
,34,133,122,165,35,133,123
,32,172,3,169,1,133:rem 83
140 DATA 129,208,7,32,121,0,20
1,0,240,43,32,115,0,176,32
,32,172,3,169 :rem 30
150 DATA 36,32,210,255,32,131,
174,32,155,188,165,100,240
,3,32,181,3,165,101:rem 82
160 DATA 32,181,3,32,172,3,76,
101,3,32,210,255,76,101,3,
120,162,0,169 :rem 33
170 DATA 54,133,1,189,0,160,14
9,0,202,208,248,169,55,133
,1,88,96,166,122 :rem 225
180 DATA 208,2,198,123,198,122
,96,72,74,74,74,32,195,
3,104,41,15,76 :rem 142
190 DATA 195,3,170,189,202,3,7
6,210,255,48,49,50,51,52,5
3,54,55,56,57 :rem 88
200 DATA 65,66,67,68,69,70
:rem 16
210 OPEN15,8,15:PRINT"15,"M-W"
;CHR$(106)CHR$(0)CHR$(1)CH
R$(133):CLOSE15 :rem 218
220 OPEN1,0 :rem 83
230 POKEAC,147:SYSPR:DIM C$(25
5),C(255) :rem 175
240 POKECO,1:PRINT"HOME"
{10 SPACES}DISK DISASSEMBL
ER" :rem 123
250 READA$,B,C:IFA$="END"THEN2
90 :rem 69
260 C$(B)=A$:C(B)=C :rem 196
270 GOTO250 :rem 105
280 POKE152,0:OPEN1,0:PRINT"
{CLR}"TAB(4)"{6 SPACES}DIS
K DISASSEMBLER":Q$="":NU$=
"" :rem 79
290 PRINT:PRINT:PRINT"ENTER DI
SASSEMBLY: {RVS}R{OFF}AM O
R {RVS}D{OFF}ISK" :rem 230
300 GETMD$:IFMD$="D"ORMD$="R"
HEN320 :rem 88
310 GOTO300 :rem 96
320 IFMD$="R"THEN340 :rem 114
330 GOTO390 :rem 107
340 PRINT:PRINT"ENTER STARTING
ADDRESS: "; :rem 148
350 INPUT#1,SA :rem 60
360 PRINT:PRINT"{DOWN}ENTER EN
DING ADDRESS" :rem 123

```

```

370 PRINT"(IF NOT KNOWN PUT 0)
: "; :rem 103
380 INPUT#1,ED:PRINT:GOTO420
:rem 4
390 PRINT:PRINT"ENTER ML FILE
{SPACE}NAME: "; :rem 1
400 INPUT#1,F$:OPEN2,8,2,"0:"+
F$:CLOSE2:OPEN15,8,15:INPU
T#15,A$,B$,C$,D$ :rem 36
410 IFVAL(A$)>0THEN860:rem 248
420 PRINT:PRINT"{2 DOWN}DO YOU
WANT LIST HOLD [Y/N]: ";
:rem 128
430 GETSP$:IFSP$="Y"ORSP$="N"
HEN450 :rem 167
440 GOTO430 :rem 104
450 PRINTSP$:IFSP$="Y"THENLH=1
:rem 136
460 IFSP$="N"THENLH=0 :rem 239
470 CLOSE15:POKE198,0 :rem 222
480 PRINT"{DOWN}SEND TO SCREEN
[Y/N]: "; :rem 14
490 GETSP$:IFSP$="Y"ORSP$="N"
HEN510 :rem 170
500 GOTO490 :rem 107
510 POKE198,0 :rem 195
520 PRINTSP$:IFSP$="Y"THENSC=1
:rem 136
530 IFSP$="N"THENSC=0 :rem 239
540 PRINT"{DOWN}SEND TO PRINTE
R [Y/N]: "; :rem 111
550 GETSP$:IFSP$="Y"ORSP$="N"
HEN570 :rem 173
560 GOTO550 :rem 110
570 POKE198,0 :rem 201
580 PRINTSP$:IFSP$="Y"THENPR=1
:rem 154
590 IFSP$="N"THENPR=0 :rem 1
600 PRINT"{DOWN}SEND TO DISK [
Y/N]: "; :rem 115
610 POKE198,0 :rem 196
620 GETSP$:IFSP$="Y"ORSP$="N"
HEN640 :rem 169
630 GOTO620 :rem 106
640 PRINTSP$:IFSP$="Y"THENDI=1
:rem 130
650 IFDI=1ANDLH=1THENPRINT"
{RVS}{DOWN}LIST HOLD DISAC
TIVATED{OFF}":LH=0:ER=1:GO
SUB860 :rem 89
660 IFSP$="N"THENDI=0 :rem 234
670 IFDI=0THEN700 :rem 236
680 PRINT"ENTER DESTINATION'S
{SPACE}FILE NAME: "; :rem 95
690 INPUT#1,D$:PRINT:POKE198,0
:rem 69
700 HF=0:PRINT"DOWN}HEXADECIM
AL OUTPUT [Y/N]: ";:POKE19
8,0 :rem 30
710 GETSP$:IFSP$<>"Y"ANDSP$<>"
N"THEN710 :rem 83
720 PRINTSP$:IFSP$="Y"THENHF=1
:rem 130
730 PRINT"{DOWN}INFORMATION CO
RRECT [Y/N]: "; :rem 215
740 GETYN$:IFYN$="Y"ORYN$="N"
HEN760 :rem 187
750 GOTO740 :rem 112
760 PRINTYN$:IFYN$="N"THEN280
:rem 33
770 PRINT"CLR}ADDR.{2 SPACES}
COMMAND{7 SPACES}OP CODE "
:CLOSE1 :rem 229
780 PRINT"5 T}{2 SPACES}{7 T}
{7 SPACES}{7 T} " :rem 137
790 IFMD$="D"THENOPEN15,8,15:P
RINT#15,"I0" :rem 159
800 IFMD$="D"THENOPEN2,8,0,F$:
CLOSE1 :rem 107
810 IFST<>0THEN860 :rem 70
820 IFDI=1THENGOSUB1770:REM GO
TO INIT FILE :rem 77

```

```

830 IFPR=1THENOPEN4,4 :rem 47
840 IFST<>0THEN860 :rem 73
850 GOTO990 :rem 120
860 REM CHECK FOR ERROR:rem 81
870 CC=0:IFVAL(A$)>0THENER=0
:rem 149
880 IFER<>1THENPRINT"HOME"
{7 DOWN}{RVS}IO/ERROR:
{OFF} ";A$;";";B$;";";C$;";
";D$ :rem 177
890 IFER<>1THENCLOSE1:CLOSE2:C
LOSE3:CLOSE15 :rem 35
900 POKE54276,0:S=54272:V=S+24
:POKEV,4 :rem 202
910 POKES+5,0*16+0:POKES+6,15*
16+0:POKES+4,33 :rem 12
920 POKES,4:POKES+1,48:FORA=0
T0350:NEXT:POKES,2:POKES+1,
24:FORA=0T0350:NEXT
:rem 247
930 CC=CC+1:IFCC<>3THEN920
:rem 7
940 POKEV,0:IFER=1THENRETURN
:rem 91
950 PRINT:PRINT"PRESS {RVS}ANY
KEY{OFF} TO RESTART"
:rem 0
960 IFPEEK(197)<>64THEN280
:rem 242
970 GOTO960 :rem 120
980 REM START DISASSEMBLER
:rem 145
990 IFMD$="D"THENGET#2,LO$:REM
GET STARTING ADDRESS
:rem 106
1000 IFMD$="D"THENGET#2,HI$:LO
=ASC(LO$+CHR$(0)):HI=ASC(
HI$+CHR$(0)) :rem 71
1010 IFMD$="D"THENSA=HI*256+LO
:REM STARTING ADDRESS
:rem 121
1020 IFDI=1ANDQQ=0THENGOSUB177
0 :rem 173
1030 IFPEEK(653)THEN1030
:rem 90
1040 SX=SX+1:IFSX=19ANDLH=1THE
NGOSUB2040 :rem 25
1050 IFHFANDSCANDQ$<>"THENSYS
828,Q$:PRINTTAB(20);:SYS8
28,NU$:PRINT:GOTO1070
:rem 31
1060 IFSC=1THENPRINTQ$,NU$
:rem 126
1070 IFPR=1THENPRINT#4,Q$+CHR$(
16)+"20"+NU$ :rem 194
1080 IFDI=1THENGOSUB1840
:rem 207
1090 Q$="":NU$="" :rem 66
1100 GOSUB2000:REM GET THE COM
MAND :rem 226
1110 NU$=NU$+STR$(CD) :rem 174
1120 IFST<>0ANDDI=1THENGOSUB19
70:CLOSE1:CLOSE2:CLOSE4:C
LOSE15:END :rem 192
1130 IFST<>0THENCLOSE1:CLOSE2:
CLOSE4:CLOSE15:END
:rem 104
1140 IFSA=ED+1ANDED<>0THENAA=1
:rem 49
1150 IFAA=1ANDDI=0THENCLOSE4:E
ND :rem 253
1160 IFDI=1ANDAA=1THENGOSUB197
0:CLOSE1:CLOSE2:CLOSE4:CL
OSE15:END :rem 99
1170 C$=C$(CD):C=C(CD) :rem 129
1180 Q$=Q$+RIGHT$("0000"+MID$(
STR$(SA-1),2),5)+" "+LEFT
$(C$,3) :rem 172
1190 IFC(CD)=1THENQ$=Q$+"
{3 SPACES}":GOTO1030:REM
{SPACE}1 BYTE :rem 98
1200 IFC(CD)=2THEN1250:REM 2 B
YTE :rem 87

```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

```

1210 IFC(CD)=3THEN1420:REM 3 B
YTE :rem 89
1220 IFC(CD)=4THEN1710:REM CON
DITIONS :rem 240
1230 Q$=Q$+" .BYTE " :rem 190
1240 Q$=Q$+STR$(CD):GOTO1030
:rem 69
1250 REM 2 BYTE COMMAND:rem 17
1260 D$=MID$(C$,4,1):GOSUB2000
:rem 93
1270 NU$=NU$+STR$(CD) :rem 181
1280 S$=STR$(CD):Z$=RIGHT$(S$,
LEN(S$)-1) :rem 4
1290 IFD$="0"THEN1340 :rem 107
1300 IFD$="#"THEN1350 :rem 87
1310 IFD$="I"THEN1360 :rem 127
1320 IFD$="A"THEN1410 :rem 116
1330 GOTO1230:REM BAD COMMAND
:rem 170
1340 Q$=Q$+STR$(CD):GOTO1370
:rem 77
1350 Q$=Q$+" #"+Z$:GOTO1030
:rem 98
1360 Q$=Q$+" (" +Z$+" )":rem 201
1370 D$=MID$(C$,5,1) :rem 228
1380 IFD$="Y"THENQ$=Q$+" ,Y":GO
TO1030 :rem 30
1390 IFD$="X"THENQ$=Q$+" ,X":GO
TO1030 :rem 29
1400 GOTO1030 :rem 194
1410 Q$=Q$+Z$:GOTO1030:rem 205
1420 REM 3 BYTE COMMAND:rem 17
1430 D$=MID$(C$,4,1) :rem 224
1440 GOSUB2000:LO=CD:NU$=NU$+S
TR$(LO) :rem 221
1450 GOSUB2000:HI=CD:NU$=NU$+S
TR$(HI) :rem 202
1460 CD=HI*256+LO :rem 173
1470 CD$=RIGHT$(STR$(CD),LEN(S
TR$(CD))-1) :rem 75
1480 IFD$="0"THEN1540 :rem 110
1490 IFD$="#"THEN1550 :rem 99
1500 IFD$="I"THEN1560 :rem 130
1510 IFD$="A"THEN1630 :rem 121
1520 IFD$="N"THEN1690 :rem 63
1530 GOTO1230:REM BAD COMMAND
:rem 172
1540 Q$=Q$+" "+CD$:GOTO1030
:rem 109
1550 Q$=Q$+" #"+CD$:GOTO1030
:rem 145
1560 Q$=Q$+" (" +CD$+" )"
:rem 248
1570 D$=MID$(C$,5,1) :rem 230
1580 IFD$=""THEN1030 :rem 57
1590 IFD$="Y"THENQ$=Q$+" ,Y":GO
TO1030 :rem 33
1600 IFD$="X"THENQ$=Q$+" ,X":GO
TO1030 :rem 23
1610 IFD$="N"THEN1030 :rem 129
1620 GOTO1230:REM BAD COMMAND
:rem 172
1630 D$=MID$(C$,5,1) :rem 227
1640 IFD$=""THENQ$=Q$+" "+CD$:
GOTO1030 :rem 21
1650 Q$=Q$+" "+CD$ :rem 56
1660 IFD$="X"THENQ$=Q$+" ,X"
:rem 230
1670 IFD$="Y"THENQ$=Q$+" ,Y"
:rem 233
1680 GOTO1030 :rem 204
1690 Q$=Q$+" "+CD$:GOTO1030
:rem 115
1700 GOTO1230:REM BAD COMMAND
:rem 171
1710 REM HANDLE CONDITION COMM
ANDS :rem 82
1720 GOSUB2000 :rem 12
1730 TT=0:NU$=NU$+STR$(CD)
:rem 5
1740 IFCD=>129THENTT=1:CD=CD-1
28 :rem 139
1750 IFTT=1THENQ$=Q$+STR$(SA-(
128-CD)):GOTO1030:rem 249
1760 Q$=Q$+STR$(SA+CD):GOTO103
0 :rem 11
1770 REM INITIALIZE TO DISK FI
LE :rem 147
1780 OPEN1,8,1,"@0:" +D$+" ,P,W"
:rem 15
1790 LI=2049:QQ=1 :rem 188
1800 HI=INT(LI/256):LO=LI-(HI*
256) :rem 177
1810 PRINT#1,CHR$(LO); :rem 255
1820 PRINT#1,CHR$(HI); :rem 246
1830 RETURN :rem 172
1840 REM GOTO DISK :rem 21
1850 IFCD=199THENGOSUB1970:RET
URN :rem 94
1860 IFVAL(Q$)=0THENRETURN
:rem 131
1870 HI=INT(LI/256):LO=LI-(HI*
256) :rem 184
1880 PRINT#1,CHR$(LO); :rem 6
1890 PRINT#1,CHR$(HI); :rem 253
1900 SS=VAL(Q$) :rem 86
1910 HI=INT(SS/256):LO=SS-(HI*
256) :rem 213
1920 PRINT#1,CHR$(LO); :rem 1
1930 PRINT#1,CHR$(HI); :rem 248
1940 DD$=MID$(Q$,7,20):rem 108
1950 PRINT#1,DD$:CHR$(0);
:rem 128
1960 RETURN :rem 176
1970 REM CLOSE DISK :rem 86
1980 PRINT#1,CHR$(0);CHR$(0);C
HR$(0);CHR$(0) :rem 152
1990 CLOSE1:RETURN :rem 148
2000 REM*GET*BYTE*OFF*OF*DISK*
OR*RAM :rem 252
2010 IFMD$="D"THENGET#2,CD$:CD
=ASC(CD$+CHR$(0)):SA=SA+1
:rem 128
2020 IFMD$="R"THENC=PEEK(SA):
SA=SA+1 :rem 211
2030 RETURN :rem 165
2040 SX=0:PRINT:PRINT"PRESS
{RVS}ANY KEY{OFF} TO CONT
INUE,{RVS}F1{OFF} TO ABOR
T." :rem 74
2050 GETA$:IFA$=""THEN2050
:rem 177
2060 IFA$<>"{F1}"THEN2080
:rem 248
2070 CLOSE2:GOTO280 :rem 126
2080 PRINT"{CLR}ADDR.
{2 SPACES}COMMAND
{7 SPACES}OP CODE":rem 48
2090 PRINT"{5 T}{2 SPACES}
{7 T}{7 SPACES}{7 T}":PRI
NT:RETURN :rem 150
2100 DATAADC#,105,2,ADC00,101,
2,ADC0X,117,2,ADCAB,109,3
,ADCAX,128,3,ADCA,121,3
:rem 243
2110 DATAADCIX,97,2,ADCIY,113,
2 :rem 246
2120 DATAAND#,41,2,AND00,37,2,
AND0X,53,2,ANDAB,45,3,AND
AX,61,3,ANDAY,57,3:rem 32
2130 DATAANDIX,33,2,ANDIY,49,2
:rem 220
2140 DATAASLAC,10,1,ASL00,6,2,
ASL0X,22,2,ASLAB,14,3,ASL
AX,30,3 :rem 239
2150 DATABCC,144,4,BCS,176,4,B
EQ,240,4,BIT00,36,2,BITAB
,44,3,BMI,48,4,BNE,208,4
:rem 37
2160 DATABPL,16,4,BRK,0,1,BVC,
80,4,BVS,112,4,CLC,24,1,C
LD,216,1,CLL,88,1:rem 181
2170 DATACLV,184,1,CMP#,201,2,
CMP00,197,2,CMP0X,213,2,C
MPAB,205,3,CMPAX,221,3
:rem 252
2180 DATACMPAY,217,3,CMPIY,193
,2,CMPIY,209,2 :rem 43
2190 DATACPX#,224,2,CPX00,228,
2,CPXAB,236,3,CPY#,192,2,
CPY00,196,2,CPYAB,204,3
:rem 50
2200 DATADEC00,198,2,DEC0X,214
,2,DECAB,206,3,DECAX,222,
3,DEX,202,1,DEY,136,1
:rem 130
2210 DATAEOR#,73,2,EOR00,69,2,
EOR0X,85,2,EORAB,77,3,EOR
AB,93,3,EORAX,93,3
:rem 148
2220 DATAEORAY,89,3,EORIX,65,2
,EORIY,81,2,INC00,230,2,I
NC0X,246,2,INCAB,238,3
:rem 149
2230 DATAINCAX,254,3,INX,232,1
,INY,200,1,JMPAB,76,3,JMP
IN,108,3,JSR,32,3 :rem 83
2240 DATALDA#,169,2,LDA00,165,
2,LDA0X,181,2,LDAAB,173,3
,LDAAX,189,3,LDAAY,185,3
:rem 85
2250 DATALDAIX,161,2,LDAIY,177
,2,LDX#,162,2,LDX00,166,2,
LDX0Y,182,2,LDXAB,174,3
:rem 180
2260 DATALDXAY,190,3,LDY#,160,
2,LDY00,164,2,LDY0X,180,2
,LDYAB,172,3,LDYAX,188,3
:rem 213
2270 DATALSRAC,74,1,LSR00,70,2
,LSR0X,86,2,LSRAB,78,3,LS
RAX,94,3,NOP,234,1
:rem 220
2280 DATAORA#,9,2,ORA00,5,2,OR
A0X,21,2,ORAAB,13,3,ORAA
X,29,3,ORAA,25,3 :rem 21
2290 DATAORAIX,1,2,ORAIX,17,2,
PHA,72,1,PHP,8,1,PLA,104,
1,PLP,40,1,ROLAC,42,1
:rem 75
2300 DATAROL00,38,2,ROL0X,54,2
,ROLAB,46,3,ROLAX,62,3,RO
RAC,106,1,ROR00,102,2
:rem 74
2310 DATAROR0X,118,2,RORAB,110
,3,RORAX,126,3,RTI,64,1,R
TS,96,1,SBC#,233,2
:rem 142
2320 DATASBC00,229,2,SBC0X,245
,2,SBCAB,237,3,SBCAX,253,
3,SBCAY,249,3 :rem 41
2330 SBCIX,225,2 :rem 100
2340 DATASBCIY,241,2,SEC,56,1,
SED,248,1,SEI,120,1,STA00
,133,2,STA0X,149,2:rem 42
2350 DATASTAB,141,3,STAAX,157
,3,STAA,153,3,STAI,129,
2,STAIY,145,2 :rem 204

```



```

2360 STX00,134,2      :rem 76
2370 DATASTX0Y,150,2,STXAB,142
,3,STY00,132,2,STY0X,148,
2,STYAB,140,3      :rem 180
2380 DATATAB,170,1,TAY,168,1,T
SX,186,1,TXA,138,1,TXS,15
4,1,TYA,152,1      :rem 81
2390 DATA"END",0,0 :rem 187

```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Sprint

See instructions in article on page 72 before typing in.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Program 1: Sprint

```

8000:A2 7F B5 00 9D 00 7F CA 9F
8008:10 F8 A9 40 85 12 A9 00 50
8010:85 27 A9 10 85 31 A9 FE 17
8018:85 42 A9 FF 85 43 A9 00 2E
8020:85 44 20 8C 88 20 CF FF 26
8028:C9 0D F0 06 9D 81 97 E8 DA
8030:D0 F3 E0 00 D0 01 60 86 84
8038:0A A9 D0 20 D2 FF A9 00 36
8040:20 BD FF A9 0F A2 08 A0 0F
8048:0F 20 BA FF 20 C0 FF A9 DD
8050:00 85 3A A9 01 85 F7 A9 4C
8058:08 85 F8 A9 EE 85 2A A9 04
8060:92 85 2B A0 00 B1 2A 20 B6
8068:E3 8B E6 2A D0 02 E6 2B 45
8070:A5 2B C9 97 D0 04 A5 2A CD
8078:C9 31 90 E9 A9 FF 85 F9 AD
8080:85 06 A9 7D 85 FA 85 07 FC
8088:A9 00 85 2E 8D FF 7D 85 DE
8090:17 85 18 85 1F A9 00 85 FE
8098:38 A9 C0 85 39 A9 02 20 25
80A0:8C 88 20 15 88 20 D0 8C CA
80A8:E0 00 D0 03 4C 30 82 A5 32
80B0:17 18 69 04 85 17 90 02 5C
80B8:E6 18 A0 00 A5 10 91 38 10
80C0:C8 A5 11 91 38 A5 38 18 AB
80C8:69 02 85 38 90 02 E6 39 C6
80D0:20 4D 8C A5 33 C9 3A F0 47
80D8:04 C9 80 90 04 A2 00 86 98
80E0:1F C9 86 D0 02 E6 1F C9 75
80E8:83 D0 5C 20 4D 8C A5 44 99
80F0:D0 0C E6 44 A5 F7 8D E3 8A
80F8:0B A5 F8 8D E7 0B A0 00 8D
8100:A5 F7 91 42 C8 A5 F8 91 8A
8108:42 A5 33 C9 22 A0 06 20 19
8110:4D 8C 4C 09 81 A5 34 D0 D2
8118:12 A5 33 C9 2C D0 08 A9 EE
8120:00 20 E3 8B 4C 0F 81 C9 CB
8128:3A F0 04 A5 33 D0 F2 A9 CB
8130:00 20 E3 8B A9 00 20 E3 E1
8138:8B A5 F7 85 42 A5 F8 85 E1
8140:43 20 03 8C 4C D3 80 C9 92
8148:22 D0 06 20 CE 81 4C D3 3C
8150:80 C9 8F D0 03 4C A5 80 1A
8158:20 C3 80 90 4D 20 47 8D FD
8160:A5 1F D0 02 B0 47 20 F4 10
8168:81 A5 1D 18 69 04 85 0F 30
8170:A5 06 38 E5 0F 85 06 B0 78
8178:02 C6 07 A0 00 A5 1D 05 EE
8180:1E 91 06 C8 A5 0C 91 06 CA
8188:C8 A5 F9 38 E5 0C 85 F9 80

```

```

8190:91 06 C8 A5 FA E9 00 85 56
8198:FA 91 06 A2 00 C8 BD D1 D8
81A0:97 91 06 E8 E4 1D 90 F5 D5
81A8:B0 03 20 4D 8C A5 33 F0 EF
81B0:03 4C D3 80 4C A5 80 A5 6A
81B8:06 38 E9 04 85 06 B0 02 F1
81C0:C6 07 A0 02 A5 F7 91 06 53
81C8:C8 A5 F8 91 06 60 20 B7 7B
81D0:81 A2 00 20 4D 8C F0 0A C7
81D8:C9 22 F0 06 20 E3 8B E8 58
81E0:D0 F1 84 0F A0 00 A9 30 D2
81E8:91 06 C8 8A 91 06 A4 0F F4
81F0:20 4D 8C 60 A5 1E D0 05 3B
81F8:A9 02 85 0C 60 A9 0A 85 06
8200:0C A5 1F F0 1D 20 74 91 4B
8208:20 D0 8C B0 05 A9 07 4C 17
8210:70 8A 20 DD 8C A5 33 C9 FC
8218:2C F0 F2 20 77 91 A5 13 30
8220:85 0C E6 0C A5 1E C9 20 E1
8228:F0 03 06 0C 60 E6 0C 60 FE
8230:E6 3A 20 CC FF A9 01 20 D0
8238:C3 FF A5 06 38 E5 17 85 41
8240:17 85 2C 85 19 A5 07 E5 63
8248:18 85 18 85 2D 85 1A A5 6F
8250:F7 8D 3D 08 A5 F8 8D 3E 47
8258:08 A9 04 20 8C 88 20 15 2A
8260:88 20 4D 8C E0 00 D0 03 C7
8268:4C 00 83 20 AC 8A A0 00 D6
8270:A5 10 91 2C C8 A5 11 91 D1
8278:2C C8 A5 F7 91 2C C8 A5 6E
8280:F8 91 2C A5 2C 18 69 04 DE
8288:85 2C 90 02 E6 2D 20 7C 36
8290:83 20 4D 8C A5 33 C9 3A 99
8298:F0 15 C9 80 90 3A A2 00 4F
82A0:DD 54 8B F0 13 E8 E0 1F 47
82A8:90 F6 A9 07 4C 7E 8A 20 B2
82B0:4D 8C A5 33 D0 DE F0 A9 F4
82B8:E0 12 90 05 A9 09 4C 70 8F
82C0:8A 20 4D 8C 8A AA A9 01
82C8:82 48 A9 B1 48 BD DD 82 E8
82D0:48 BD DC 82 48 A5 33 60 CC
82D8:A2 07 D2 E8 49 85 7E 86 7D
82E0:F9 86 C0 83 5E 85 C2 83 27
82E8:AE 85 CF 83 CD 84 8F 84 FC
82F0:07 88 D0 84 49 85 C9 83 75
82F8:C2 87 E0 85 F7 87 4E 85 B5
8300:20 7C 83 A9 60 20 E3 8B 18
8308:A5 F8 48 A5 F7 48 A5 1A C9
8310:C5 18 D0 06 A5 19 C5 17 AE
8318:B0 33 A0 00 B1 19 85 F7 4D
8320:C8 B1 19 85 F8 C8 B1 19 DA
8328:85 13 C8 B1 19 85 14 20 12
8330:93 83 A0 02 B1 2A 20 E3 70
8338:8B C8 B1 2A 20 E3 8B A5 5D
8340:19 18 69 04 85 19 90 02 FA
8348:E6 1A 4C 0E 83 A9 05 20 A0
8350:8C 88 20 CC FF A9 01 20 59
8358:C3 FF A9 0F 20 C3 FF A2 1A
8360:7F BD 00 7F 95 00 CA 10 E0
8368:F8 68 85 2D 68 85 2E A5 E4
8370:F9 8D 1B 08 A5 FA 8D 1F 0F
8378:08 6C 02 A0 A5 2E F0 12 C2
8380:20 CD 8B A0 00 A5 F7 91 9E
8388:13 C8 A5 F8 91 13 C6 2E 24
8390:D0 EA 60 A5 17 85 2A A5 E9
8398:18 85 2B A0 00 B1 2A C5 5D
83A0:13 D0 07 C8 B1 2A C5 14 A8
83A8:F0 18 A5 2A 18 69 04 85 79
83B0:2A 90 02 E6 2B A5 2B C5 AB
83B8:2D D0 04 A5 2A C5 2C 90 B6
83C0:DA 18 60 A9 3A 20 4A 8C 0A
83C8:B0 05 68 68 4C 61 82 60 4A
83D0:20 80 8C 20 C3 8C B0 05 52
83D8:A9 0B 4C 70 8A A9 00 85 88
83E0:FD A9 B2 20 A4 8C B0 05 67
83E8:A9 18 4C 70 8A 20 4D 8C 57
83F0:20 F1 8D A5 33 48 A5 32 C8
83F8:85 41 20 8F 8C 20 47 8D 11
8400:A5 1E D0 04 A9 8D D0 0F F1
8408:C9 10 D0 48 20 89 8B 20 B7
8410:5B 8F 20 CD 8B A9 9D 85 4F
8418:40 A5 3F F0 05 A9 10 4C DC
8420:70 8A 20 60 91 A9 02 20 65
8428:E3 8B A5 40 20 E3 8B 20 86
8430:03 8C 20 60 91 A9 03 20 41

```

```

8438:E3 8B E6 13 D0 02 E6 14 94
8440:A5 40 20 E3 8B 20 03 8C DD
8448:A5 FD D0 07 A5 41 85 32 9D
8450:68 85 33 60 A5 3F F0 C5 2D
8458:A9 A2 20 E3 8B E6 13 D0 10
8460:02 E6 14 A5 13 20 E3 8B 6D
8468:A9 A0 20 E3 8B A5 14 20 EB
8470:E3 8B 20 5A 91 A9 D8 20 FC
8478:E3 8B A9 08 20 E3 8B 20 D3
8480:63 91 A5 13 D0 02 C6 14 B5
8488:C6 13 20 03 8C 4C 48 84 98
8490:E6 2E 20 F1 8D A2 00 BD 70
8498:41 85 20 E3 8B E8 E0 09 B0
84A0:D0 F5 A5 F8 20 73 8B A5 5F
84A8:F7 20 73 8B 20 03 8C A9 AC
84B0:A7 20 A4 8C B0 0C A9 89 85
84B8:20 A4 8C B0 0E A9 0B 4C 11
84C0:70 8A 20 4D 8C 20 D0 8C 90
84C8:B0 04 60 20 4D 8C A9 4C 75
84D0:2C A9 20 20 E3 8B 20 CC BA
84D8:85 20 DD 8C 20 93 83 B0 38
84E0:53 A9 00 85 2A A9 C0 85 55
84E8:2B A0 00 B1 2A C5 13 D0 2A
84F0:07 C8 B1 2A C5 14 F0 1C 05
84F8:A5 2A 18 69 02 85 2A 90 04
8500:02 E6 2B A5 2B C5 39 D0 39
8508:04 A5 2A C5 38 90 DA A9 83
8510:0A 4C 70 8A A0 00 A5 19 53
8518:38 E9 04 85 19 B0 02 C6 E8
8520:1A A5 F7 91 19 C8 A5 F8 E9
8528:91 19 C8 A5 13 91 19 C8 8F
8530:A5 14 91 19 C8 B1 2A 20 58
8538:E3 8B C8 B1 2A 20 E3 8B 71
8540:60 A5 03 D0 07 A5 02 D0 F5
8548:03 4C A9 60 4C E3 8B 20 4C
8550:5A 91 A9 85 20 E3 8B A9 CB
8558:0B 20 E3 8B 4C 82 85 C9 67
8560:22 D0 12 20 6F 86 A9 3B 19
8568:20 A4 8C B0 05 A9 14 4C 8C
8570:70 8A 20 4D 8C 20 5A 91 5A
8578:A9 94 20 E3 8B A9 0B 20 F8
8580:E3 8B 20 C3 8C B0 05 A9 7B
8588:0B 4C 70 8A 20 47 8D A9 C5
8590:01 85 3F A5 1E C9 20 F0 09
8598:0F C6 3F 20 5A 91 A9 69 9C
85A0:20 E3 8B A9 0A 20 E3 8B E4
85A8:A9 01 85 FD 4C 00 84 20 E4
85B0:5A 91 A9 BB 20 E3 8B A9 8F
85B8:0B 20 E3 8B 20 82 85 A5 42
85C0:33 C9 2C D0 06 20 4D 8C 42
85C8:4C AF 85 60 20 9B 8E B0 D9
85D0:0F 20 C3 8C B0 05 A9 8B A4
85D8:4C 70 8A A9 07 4C 70 8A E6
85E0:60 A5 33 F0 2E C9 3B F0 FA
85E8:37 C9 3A F0 26 C9 A3 F0 E8
85F0:39 C9 A6 F0 45 C9 2C F0 89
85F8:51 20 F1 8D A5 3F D0 0D A4
8600:20 5A 91 A9 D9 20 E3 8B 23
8608:A9 0A 20 E3 8B 20 72 86 F6
8610:4C E1 85 20 5A 91 A9 B3 8E
8618:20 E3 8B A9 0B 4C E3 8B 17
8620:20 4D 8C F0 04 C9 3A D0 BD
8628:B8 60 20 63 86 A9 6D 20 B9
8630:E3 8B A9 0B 20 E3 8B 4C EB
8638:E1 85 20 63 86 A9 80 20 CD
8640:E3 8B A9 0B 20 E3 8B 4C FB
8648:E1 85 20 5A 91 A9 59 20 57
8650:E3 8B A9 0B 20 E3 8B 20 DF
8658:4D 8C F0 CD C9 3A F0 C9 0D
8660:4C E1 85 20 4D 8C 20 F1 8D
8668:8D 20 77 91 4C 5A 91 20 5B
8670:F1 8D 20 5A 91 A9 ED 20 B2
8678:E3 8B A9 0B 4C E3 8B 20 69
8680:80 8C 20 D0 83 20 8F 8C 4A
8688:20 47 8D 20 B9 8B A9 4A 1F
8690:20 A4 8C B0 05 A9 0B 4C A4
8698:70 8A 20 4D 8C 20 CD 86 60
86A0:A5 33 C9 A9 D0 16 20 4D 8D
86A8:8C 20 CD 86 A5 F8 20 80 F7
86B0:8B A5 F7 20 80 8B 20 CD 2E
86B8:8B 4C C3 8B A9 0B 20 80 DD
86C0:8B A9 01 20 80 8B A9 00 A5
86C8:20 80 8B D0 DF 20 9B 8E C9
86D0:90 0B 20 DD 8C 20 C3 8B C2
86D8:A9 00 4C 80 8B 20 C3 8C 3D

```

86E0:B0	05	A9	0B	4C	70	8A	20	C6	8988:49	4F	4E	20	55	53	45	00	62	8C30:F0	0A	9D	00	02	E8	E0	50	BD
86E8:47	8D	20	C3	8B	A9	01	D0	13	8990:4E	4F	4E	2D	45	58	49	53	AC	8C38:B0	0B	90	EF	86	0E	A9	00	3D
86F0:E9	A2	08	20	A3	8B	CA	D0	50	8998:54	49	4E	47	20	4C	49	4E	79	8C40:85	32	85	34	80	A9	01	20	68
86F8:FA	60	20	C3	8C	90	1C	20	DA	89A0:45	00	53	59	4E	54	41	58	F4	8C48:8C	88	4C	84	88	84	26	20	5E
8700:47	8D	20	A3	8B	85	2A	AA	C5	89A8:00	54	4F	20	4D	41	4E	B6	8C50:E1	FF	D0	03	4C	84	88	A4	CE	
8708:20	A3	8B	85	2B	C5	14	D0	43	89B0:59	20	46	4F	52	53	00	49	5F	8C58:32	C4	0E	B0	1D	B9	00	02	5A
8710:04	E4	13	F0	10	20	F1	86	37	89B8:4C	4C	45	47	41	4C	20	53	F0	8C60:85	33	C8	C9	22	D0	04	45	60
8718:4C	02	47	20	A3	8B	85	2A	41	89C0:54	41	54	45	4D	45	4E	54	9D	8C68:34	85	34	C9	20	D0	04	A5	12
8720:20	A3	8B	85	2B	20	D8	8B	09	89C8:20	55	53	45	00	4E	45	58	1C	8C70:34	F0	E6	84	32	A4	26	A5	1B
8728:20	B9	8B	A9	02	85	28	85	BD	89D0:54	20	57	49	54	48	4F	55	4D	8C78:33	60	A9	00	85	33	F0	F3	47
8730:3D	20	A6	87	20	FF	8E	20	71	89D8:54	20	46	4F	52	00	54	59	70	8C80:84	26	A4	31	88	A5	32	99	E5
8738:AF	87	20	5A	91	A9	58	20	AE	89E0:50	45	20	4D	49	53	4D	41	B9	8C88:00	7E	84	31	A4	26	60	84	E7
8740:E3	8B	A9	0A	20	E3	8B	20	C1	89E8:54	43	48	00	0D	43	4F	4D	61	8C90:26	A4	31	B9	00	7E	85	32	DE
8748:A6	87	20	60	91	A9	02	20	ED	89F0:50	49	4C	41	54	49	4F	4E	D0	8C98:C8	84	31	8B	B9	FF	01	85	3D
8750:E3	8B	20	63	91	20	03	8C	0E	89F8:20	41	42	4F	52	54	45	44	5C	8CA0:33	A4	26	60	85	35	20	80	09
8758:20	60	91	A9	03	20	E3	8B	48	8A00:0D	00	4D	49	53	53	49	4E	A2	8CA8:8C	A5	33	F0	09	C5	35	F0	A1
8760:E6	13	D0	02	E6	14	20	63	0D	8A08:47	20	43	4F	4D	4D	41	00	48	8CB0:0A	20	4D	8C	D0	F7	20	8F	7F
8768:91	20	03	8C	20	AF	87	20	60	8A10:4D	49	53	53	49	4E	47	20	EF	8CB8:8C	18	60	A5	34	D0	F2	E6	36
8770:5A	91	A9	5F	20	E3	8B	A9	8D	8A18:50	41	52	45	4E	54	48	45	DD	8CC0:31	38	60	A5	33	C9	5B	B0	0F
8778:0A	20	E3	8B	20	60	91	A9	19	8A20:53	49	53	00	4D	49	53	53	25	8CC8:05	C9	41	90	01	60	18	60	22
8780:02	20	E3	8B	A9	F0	20	E3	03	8A28:49	4E	47	20	53	45	4D	49	F3	8CD0:A5	33	C9	3A	B0	05	C9	30	C3
8788:8B	A9	03	20	E3	8B	A9	4C	17	8A30:43	4F	4C	4F	4E	00	2A	2A	2A	8CD8:90	01	60	18	60	A9	00	85	37
8790:20	E3	8B	20	CD	8B	20	03	FB	8A38:2A	20	49	2F	4F	20	45	52	5E	8CE0:36	85	13	85	14	85	15	A5	B7
8798:8C	A5	33	C9	2C	D0	06	20	2B	8A40:52	4F	52	20	2A	2A	2A	0D	F9	8CE8:33	C9	AB	D0	05	E6	36	20	E0
87A0:4D	8C	4C	FA	86	60	A5	2A	DD	8A48:00	44	45	56	49	43	45	20	7E	8CF0:4D	BC	A5	32	85	37	20	D0	C5
87A8:85	13	A5	2B	85	14	60	A9	8D	8A50:4E	4F	54	20	50	52	45	53	96	8CF8:8C	90	2F	29	CF	85	16	A5	5B
87B0:04	85	28	20	A3	8B	48	20	26	8A58:45	4E	54	0D	00	4D	49	53	1A	8D00:14	85	15	A5	13	0A	26	15	A5
87B8:D8	8B	68	D0	03	4C	B7	8E	78	8A60:53	49	4E	47	20	45	51	55	BD	8D08:0A	26	15	65	13	85	13	A5	25
87C0:4C	FF	8E	20	F1	8D	20	5A	2A	8A68:41	4C	20	53	49	47	4E	00	6E	8D10:15	65	14	85	14	06	13	26	EE
87C8:91	A9	FD	20	E3	8B	A9	08	78	8A70:A2	FA	9A	48	A9	40	85	12	D8	8D18:14	A5	13	65	16	85	13	90	DC
87D0:20	E3	8B	A5	33	C9	2C	F0	BE	8A78:A9	10	85	31	A5	3A	D0	03	E4	8D20:02	E6	14	20	4D	8C	D0	CE	87
87D8:05	A9	12	4C	70	8A	20	4D	17	8A80:20	AC	8A	A9	06	20	8C	88	0F	8D28:F0	0B	A5	32	C5	37	D0	05	08
87E0:8C	20	F1	8D	A2	00	BD	F2	D8	8A88:68	20	8C	88	A9	02	D0	D2	88	8D30:A9	07	4C	70	8A	A5	36	F0	8A
87E8:87	20	E3	8B	E8	E0	06	90	60	8A90:FF	A9	3A	20	A4	8C	B0	0A	1C	8D38:0D	A9	00	38	E5	13	85	13	61
87F0:F5	60	A0	00	A5	02	91	14	93	8A98:A5	3A	D0	03	4C	A5	80	4C	9F	8D40:A9	00	E5	14	85	14	60	A2	0E
87F8:20	F1	8D	20	5A	91	A9	B8	6D	8AA0:61	82	A5	3A	D0	03	4C	D3	5E	8D48:00	86	1E	20	C3	8C	B0	05	81
8800:20	E3	8B	A9	0B	4C	E3	8B	03	8AA8:80	4C	94	82	A0	00	84	20	F9	8D50:20	D0	8C	90	09	9D	D1	97	44
8808:20	5A	91	A9	E2	20	E3	8B	77	8AB0:A5	10	85	2A	A5	11	85	2B	97	8D58:E8	20	4D	8C	D0	ED	C9	25	59
8810:A9	0B	4C	E3	8B	A5	0A	A2	2A	8AB8:A2	08	A0	00	A5	2B	DD	24	EE	8D60:D0	05	20	4D	8C	F0	2A	C9	44
8818:81	A0	97	20	BD	FF	A9	01	49	8AC0:8B	D0	05	A5	2A	DD	23	8B	65	8D68:24	D0	09	A9	20	85	1E	20	F8
8820:A2	08	A0	08	20	BA	FF	20	25	8AD0:85	2A	A5	2B	FD	24	8B	85	B7	8D70:4D	8C	F0	1B	C9	28	D0	19	EE
8828:C0	FF	90	15	C9	00	F0	54	81	8AD8:2B	C8	D0	E0	E0	00	F0	08	CE	8D78:A5	1F	D0	0B	A9	20	C5	1E	70
8830:C9	05	D0	0D	A9	15	20	8C	C0	8AE0:C0	00	D0	04	A5	20	F0	08	48	8D80:D0	0B	A9	07	4C	70	8A	A9	4F
8838:88	A9	16	20	8C	88	4C	84	60	8AE8:98	09	30	20	D2	FF	E6	20	19	8D88:20	C5	1E	F0	04	A9	10	85	64
8840:88	20	4F	88	A2	01	20	C6	30	8AF0:CA	CA	10	C6	A9	20	20	D2	6D	8D90:1E	E0	10	90	02	A2	F0	86	3D
8848:FF	20	CF	FF	4C	CF	FF	A2	9F	8AF8:FF	A0	00	84	34	B9	00	02	09	8D98:1D	A5	06	85	22	A5	07	85	FF
8850:0F	20	CF	FF	A2	00	CF	EE		8B00:10	0A	A6	34	D0	06	20	2D	C5	8DA0:23	20	E1	FF	D0	03	4C	84	41
8858:FF	C9	0D	F0	06	9D	00	02	35	8B08:8B	4C	19	8B	C9	22	D0	06	52	8DA8:88	A0	00	B1	22	F0	40	29	C9
8860:E8	D0	F3	86	0E	AD	00	02	2A	8B10:45	34	85	34	A9	22	D0	D2	B3	8DB0:0F	85	20	C5	1D	D0	28	B1	43
8868:C9	32	F0	01	60	A9	08	20	EA	8B18:FF	C8	4C	0E	90	DF	A9	0D	3F	8DB8:22	29	F0	C5	1E	D0	20	C8	E6
8870:8C	88	A2	00	BD	00	02	20	50	8B20:4C	D2	FF	01	00	0A	00	64	AE	8DC0:B1	22	85	0C	B1	22	85	85	B5
8878:D2	FF	E8	E4	0E	F0	F5	A9	A6	8B28:00	E8	03	10	27	38	E9	7F	48	8DC8:13	C8	B1	22	85	14	A2	00	89
8880:0D	20	D2	0F	A9	11	20	8C	D8	8B30:AA	84	0F	A0	FF	CA	F0	08	BE	8DD0:C8	B1	22	DD	D1	97	D0	07	74
8888:88	4C	52	83	0A	AA	BD	A5	8F	8B38:C8	B9	9E	A0	10	FA	30	F5	C2	8DD8:E8	E4	1D	90	F3	B0	11	A5	78
8890:88	85	08	BD	A6	88	85	09	8F	8B40:C8	B9	9E	A0	30	06	20	D2	B4	8DE0:20	18	69	04	65	22	85	22	60
8898:A0	00	B1	08	F0	06	20	D2	63	8B48:FF	4C	40	8B	29	7F	20	D2	8D	8DE8:90	02	E6	23	4C	A1	8D	18	F7
88A0:FF	C8	D0	F6	60	D7	88	06	E6	8B50:FF	A4	0F	60	80	81	82	83	0B	8DF0:60	20	80	8C	A9	00	85	3F	B4
88A8:89	19	89	25	89	25	89	31	6D	8B58:85	86	87	88	89	8B	8C	8D	6E	8DF8:20	9B	8E	B0	25	C9	22	F0	6D
88B0:89	49	89	59	89	67	89	7B	18	8B60:8E	8F	97	99	9E	A1	B4	B6	CA	8E00:19	C9	C4	F0	15	C9	C7	90	B3
88B8:89	90	89	A2	89	A9	89	AB	BD	8B68:B9	BB	C2	C3	C4	C5	C6	C7	72	8E08:04	C9	CB	90	0D	C9	80	B0	5D
88C0:89	B7	89	CD	89	DE	89	EC	5A	8B70:C8	C9	CA	84	0F	A4	12	88	B7	8E10:11	20	47	8D	A5	1E	C9	20	D8
88C8:89	02	8A	10	8A	24	8A	36	A1	8B78:99	00	7E	84	12	A4	0F	60	16	8								

8ED8:E3	8B	A5	28	18	69	01	A6	11	9180:4C	70	8A	4C	4D	BC	A9	00	EB	9428:02	60	A5	04	18	65	02	85	3F
8EE0:3E	4C	E3	8B	C9	80	90	06	DC	9188:85	FC	85	29	20	FF	91	A5	BA	9430:02	A5	05	65	03	85	03	60	4F
8EE8:20	A7	8F	4C	77	91	20	C3	BC	9190:33	F0	5D	C9	AC	90	09	C9	55	9438:A5	02	38	E5	04	85	02	A5	F9
8EF0:8C	B0	05	A9	0B	4C	70	8A	B0	9198:1B	F0	05	A9	07	4C	70	8A	D0	9440:03	E5	05	85	03	60	A9	00	4A
8EF8:20	47	8D	A5	1E	D0	27	A9	30	91A0:C9	AA	90	4C	C9	B4	B0	48	F4	9448:85	0A	85	0B	A2	0F	06	0A	7F
8F00:AD	20	E3	8B	20	03	8C	A9	03	91A8:E9	A9	F0	07	A2	00	86	3F	1B	9450:26	0B	06	02	26	03	90	0D	9B
8F08:85	20	E3	8B	A5	28	20	E3	19	91B0:38	E9	06	85	FE	A4	32	B9	2C	9458:A5	0A	18	65	04	85	0A	A5	20
8F10:8B	A5	3D	F0	B6	A9	AD	20	EC	91B8:00	02	C9	B1	90	0E	C9	B4	B5	9460:0B	65	05	85	0B	CA	10	E6	EB
8F18:E3	8B	E6	13	D0	02	E6	14	8A	91C0:B0	0A	38	E9	B0	65	FE	85	03	9468:A5	0A	85	02	A5	0B	85	03	1F
8F20:20	03	8C	4D	C5	8E	C9	20	03	91C8:FE	0A	4D	8C	A9	01	85	29	6B	9470:60	A2	00	86	0A	86	0B	A0	FB
8F28:D0	05	A9	10	4C	70	8A	20	80	91D0:AE	00	85	FC	20	4D	8C	20	B8	9478:00	A5	03	10	04	C8	20	3F	2F
8F30:B9	8B	20	5B	8F	20	CD	8B	EC	91D8:FF	91	A5	FE	0A	AA	20	5A	9A	9480:08	A2	02	A5	05	10	04	88	E9
8F38:A9	BD	20	E3	8B	20	03	8C	4D	91E0:F1	BD	F1	91	20	E3	8B	BD	F8	9488:20	3F	08	A2	0F	06	02	26	77
8F40:A9	85	20	E3	8B	A5	28	20	3B	91E8:F2	91	20	E3	8B	4C	8F	91	6A	9490:03	26	0A	26	0B	A5	0B	C5	33
8F48:E3	8B	A9	BD	20	E3	8B	E6	DB	91F0:60	EC	08	22	0A	18	0A	2E	95	9498:05	D0	04	A5	0A	C5	04	90	53
8F50:13	D0	02	E6	14	20	03	8C	8F	91F8:0A	42	0A	38	0A	4C	0A	A5	B1	94A0:12	A5	0A	E5	04	85	0A	A5	CB
8F58:4C	D5	8E	20	74	91	20	9B	AC	9200:33	C9	22	D0	22	20	59	92	59	94A8:0B	E5	05	85	0B	E6	02	D0	92
8F60:8E	90	18	20	DD	8C	20	5D	AE	9208:20	5D	91	A5	1D	20	E3	8B	DD	94B0:02	E6	03	CA	10	7D	C0	00	03
8F68:91	A5	13	20	E3	8B	A9	0A	C8	9210:A9	A2	20	E3	8B	A5	13	20	2E	94B8:F0	05	A2	00	20	3F	08	60	5E
8F70:20	E3	8B	20	77	91	A9	AA	0C	9218:E3	8B	A9	A0	20	E3	8B	A5	9E	94C0:A5	02	25	04	85	02	A5	03	A4
8F78:4C	E3	8B	20	C3	8C	B0	05	E0	9220:14	20	E3	8B	4C	BD	92	C9	D4	94C8:25	05	85	03	60	A5	02	05	49
8F80:A9	0B	4C	70	8A	20	47	8D	B8	9228:80	90	06	20	A7	8F	4C	77	FF	94D0:04	85	02	A5	03	05	05	85	B3
8F88:A5	1E	C9	00	F0	0E	C9	10	9E	9230:91	20	C3	8C	B0	07	85	A9	0B	94D8:03	60	A5	03	30	11	A5	05	96
8F90:D0	05	A9	07	4C	70	8A	A9	E1	9238:4C	70	8A	20	47	8D	A5	1E	CC	94E0:30	0B	A5	03	C5	05	D0	04	B1
8F98:10	4C	70	8A	A9	AD	20	E3	B1	9240:C9	20	F0	05	A9	10	4C	70	57	94E8:A5	02	C5	04	60	38	60	A5	A8
8FA0:8B	20	03	8C	4C	6E	8F	A2	94	9248:8A	A9	AD	20	E3	8B	20	03	65	94F0:05	30	EF	A9	01	18	60	A9	14
8FAB:00	DD	54	8B	F0	0A	EA	E8	E0	9250:8C	E6	13	D0	02	E6	14	D0	89	94FB:FF	85	02	85	03	60	A9	00	09
8FB0:1F	90	F6	A9	07	4C	70	8A	D1	9258:B7	20	4D	8C	C9	22	F0	04	90	9500:85	02	85	03	60	20	01	09	DD
8FB8:E0	12	B0	05	A9	0E	4C	70	C1	9260:A9	22	85	34	A2	F0	05	A5	33	9508:20	ED	09	F0	EA	D0	EF	20	89
8FC0:8A	8A	E9	12	0A	AA	BD	D2	6F	9268:F0	0D	C9	22	F0	09	9D	D1	5D	9510:01	09	20	ED	09	F0	E7	90	4D
8FC8:8F	48	BD	D1	8F	48	4C	74	41	9270:97	20	4D	8C	E8	D0	EF	86	CC	9518:E5	B0	DC	20	01	09	20	ED	5A
8FD0:91	EA	8F	EA	8F	ED	8F	ED	55	9278:1D	20	4D	8C	A5	06	85	22	19	9520:09	B0	DB	90	D2	20	01	09	A2
8FD8:8F	EA	8F	1B	90	B7	90	3B	DD	9280:A5	07	85	23	A0	00	B1	22	A7	9528:20	ED	09	F0	D1	D0	C8	20	92
8FE0:90	59	90	7F	90	D9	90	FA	B0	9288:C9	30	D0	21	C8	B1	22	C5	E1	9530:01	09	20	ED	09	90	C7	B0	CB
8FE8:90	20	91	20	A6	8E	20	5A	96	9290:1D	D0	18	C8	B1	22	85	13	3C	9538:BE	20	01	09	20	ED	09	F0	37
8FF0:91	A5	28	C9	02	0E	0C	BD	0D	9298:C8	B1	22	85	14	A0	FF	C8	17	9540:B6	90	B4	B0	B9	A5	05	85	80
8FF8:12	90	20	E3	8B	BD	13	90	91	92A0:C4	1D	F0	18	B1	13	D9	D1	6E	9548:17	4C	3D	09	A5	17	30	03	37
9000:4C	E3	8B	BD	12	90	18	69	F9	92A8:97	F0	F4	A9	30	29	9F	18	6B	9550:4C	4F	0A	4C	45	0A	A2	00	13
9008:03	20	E3	8B	BD	13	90	4C	8F	92B0:69	04	65	22	85	22	90	CC	FC	9558:2C	A2	02	A5	08	85	0F	E0	32
9010:E3	8B	86	08	4D	08	68	08	BA	92B8:E6	23	D0	C8	60	20	5A	91	8A	9560:02	D0	04	A5	09	85	0F	A0	B8
9018:76	08	5A	08	20	47	8D	A9	25	92C0:A6	FC	A5	29	D0	0C	BD	DE	D0	9568:00	98	95	02	95	03	85	0C	5C
9020:AD	20	E3	8B	20	03	8C	A9	25	92C8:92	20	E3	8B	BD	DF	92	4C	53	9570:85	0E	C4	0F	E0	3E	B9	00	5F
9028:85	20	E3	8B	A5	28	20	E3	3B	92D0:E3	8B	BD	E0	92	20	E3	8B	F8	9578:7E	C9	2D	00	04	E6	0E	D0	B0
9030:8B	20	5D	91	A9	00	20	E3	55	92D8:BD	E1	92	4C	E3	8B	A8	08	13	9580:30	C9	30	90	2F	C9	3A	B0	0B
9038:8B	4C	D5	8E	A9	00	85	29	57	92E0:C0	08	06	0C	0B	0C	10	0C	9E	9588:2B	E9	2F	85	0D	B5	03	85	CC
9040:85	FC	20	FF	91	20	5A	91	BA	92E8:16	0C	2B	0C	31	0C	0B	08	1A	9590:0C	B5	02	0A	26	0C	0A	26	AB
9048:A6	28	BD	54	90	20	E3	8B	1C	92F0:0A	00	9E	32	30	36	31	00	CE	9598:0C	75	02	95	02	A5	0C	75	F4
9050:BD	55	90	4C	E3	8B	69	0A	A6	92F8:00	00	A9	FF	8D	0E	D4	8D	2F	95A0:03	95	03	16	02	36	03	B5	19
9058:6C	0A	A9	00	85	29	85	FC	40	9300:0F	D4	A9	80	8D	12	D4	A9	29	95A8:02	65	0D	95	02	90	02	F6	76
9060:20	FF	91	20	5A	91	A5	28	52	9308:00	85	02	A9	00	85	03	A0	28	95B0:03	C8	D0	BE	A5	0E	F0	03	DF
9068:C9	02	D0	0A	A9	2A	20	E3	C3	9310:00	98	91	02	E6	02	D0	02	92	95B8:20	3F	08	60	01	00	0A	00	E6
9070:8B	A9	09	4C	E3	8B	A9	2D	75	9318:E6	03	A5	03	C9	7E	D0	04	46	95C0:64	00	E8	03	10	27	20	E6	AF
9078:20	E3	8B	A9	09	4C	E3	8B	7B	9320:A5	02	C9	00	90	E9	20	E2	23	95C8:0A	A6	08	A9	20	9D	00	7E	34
9080:A9	02	85	28	20	A9	8E	A9	98	9328:0B	4C	FF	FF	A9	00	38	F5	9B	95D0:E6	08	60	A9	7E	2C	A9	7F	8F
9088:A5	20	E3	8B	A5	28	20	E3	AB	9330:02	95	02	A9	00	F5	03	95	0C	95D8:8D	47	0B	38	E9	76	8D	50	16
9090:8B	A9	8D	20	E3	8B	A9	00	36	9338:03	60	A2	00	2C	A2	02	B5	F2	95E0:0B	A0	00	84	0C	A9	20	8D	D6
9098:20	E3	8B	A9	7E	18	65	29	17	9340:03	10	03	20	3F	08	60	A2	CC	95E8:00	7E	A5	03	10	0A	A9	2D	C1
90A0:20	E3	8B	20	5D	91	A9	01	C3	9348:00	2C	A2	02	A1	02	95	02	31	95F0:8D	00	7E	A2	00	20	3F	08	E3
90A8:20	E3	8B	A9	85	20	E3	8B	DE	9350:A9	00	95	03	60	A2	02	C2	E8	95FB:C8	A2	08	A9	00	85	0D	A5	A2
90B0:A9	08	18	65	29	4C	E3	8B	CF	9358:A2	02	A9	00	95	03	A5	D3	5E	9600:03	DD	D0	0A	D0	05	A5	02	C8
90B8:A9	02	85	28	20	A6	8E	20	3B	9360:95	02	60	A2	00	2C	A2	02	01	9608:DD	CF	0A	90	13	A5	02	38	CD
90C0:5A	91	A5	29	D0	0A	A9	E6	A3	9368:AD	1B	D4	95	02	AD	1B	D4	F2	9610:FD	CF	0A	85	02				

```

96D0:00 85 10 A9 00 85 11 4C 80
96D8:DD 0B A2 00 E4 08 F0 09 3E
96E0:BD 00 7E 20 D2 FF E8 D0 F7
96E8:F3 60 A5 02 85 14 A5 03 C7
96F0:85 15 60 A5 02 4C A8 08 27
96F8:A5 02 4C C0 08 20 1C 0C 14
9700:4C A8 08 20 1C 0C 4C C0 EC
9708:08 86 14 38 E5 02 18 65 AF
9710:14 AA 90 01 C8 A5 02 60 57
9718:20 37 0C 4C A8 08 20 37 48
9720:0C 4C C0 08 C6 14 8A 18 B4
9728:65 14 AA 90 01 C8 A5 02 E5
9730:60 00 00 00 00 00 00 8F

```

Program 2: 64 Doodler Demo

```

100 POKE53280,0:POKE53281,2:PR
INT "{CLR}{3 DOWN}{WHT}"TAB
(15)"64 DOODLER" :rem 3
110 PRINT "{2 DOWN}[BLK]"TAB(8)
"PLUG JOYSTICK INTO PORT 2
" :rem 18
120 PRINT "{DOWN}"TAB(9)"USE IT
TO DRAW PICTURES":rem 228
130 PRINT "{DOWN}"TAB(10)"TRIGG
ER CLEARS SCREEN":PRINT"
{4 DOWN}{WHT}"TAB(14)"PRES
S ANY KEY" :rem 84
140 GETA$:IFA$=""THEN140
:rem 77
150 PRINT "{CLR}":FORI=0TO7:REA
DP(I):NEXT:DATA1,2,4,8,16,
32,64,128 :rem 140
160 FORI=0TO10:READDX(I),DY(I)
:NEXT :rem 160
170 DATA0,0,0,-1,0,1,0,0,-1,0,
-1,-1,-1,1,0,0,1,0,1,-1,1,
1 :rem 136
180 POKE53272,PEEK(53272)OR8:P
OKE53265,PEEK(53265)OR32
:rem 100
190 GOSUB300:FORI=1024TO2023:P
OKEI,2:NEXT :rem 14
200 X=160:Y=100 :rem 31
210 GOSUB280:J=PEEK(56320):K=J
AND16:IFK=0THENGOSUB300
:rem 237
220 J=JAND15:J=15-J:X=X+DX(J):
Y=Y+DY(J) :rem 81
230 IFX>319THENX=0 :rem 75
240 IFX<0THENX=319 :rem 74
250 IFY>199THENY=0 :rem 85
260 IFY<0THENY=199 :rem 84
270 GOTO210 :rem 101
280 RO%=Y/8:CH%=X/8:LI=YAND7:B
I=XAND7:BI=7-BI:B1=RO%*320
:B2=CH%*8 :rem 115
290 BY=8192+B1+B2+LI:POKEBY,PE
EK(BY)ORP(BI):RETURN
:rem 108
300 FORI=8192TO16383:POKEI,0:N
EXT:RETURN :rem 29

```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Space Arena

See instructions in article on page 48 before typing in.

```

C000:A9 37 85 FC A9 D7 85 FE 5B
C008:A0 00 84 FB 84 FD 78 A5 DC
C010:01 29 FB 85 01 B1 FD 91 90
C018:FB 88 D0 F9 C6 FE C6 FC 30
C020:A5 FC C9 2F D0 EF A0 2F 96
C028:B9 59 CF 99 00 34 88 10 62
C030:F7 A5 01 09 04 85 01 58 58
C038:A9 1C 8D 18 D0 A0 00 84 56

```

```

C040:FB 84 FD A9 20 85 FC A9 F5
C048:CC 85 FE B1 FD F0 1D 91 0C
C050:FB E6 FB D0 02 E6 FC E6 A2
C058:FD D0 02 E6 FE A5 FE C9 12
C060:CF D0 E8 A5 FD C9 59 D0 10
C068:E2 4C 8A C0 E6 FD D0 02 9E
C070:E6 FE B1 FD A8 A9 00 88 AF
C078:91 FB D0 FB B1 FD 18 65 B6
C080:FB 85 FB 90 02 E6 FC 4C DB
C088:57 C0 A0 18 A9 00 99 00 FB
C090:D4 88 10 FA A0 18 B9 36 5F
C098:C7 99 00 D4 88 10 F7 A0 C6
C0A0:00 B9 00 C8 99 00 04 B9 AB
C0A8:00 C9 99 00 05 B9 00 CA A9
C0B0:99 00 06 B9 00 CB 99 00 BD
C0B8:07 A9 0F 99 00 D8 99 00 3A
C0C0:D9 99 00 DA 99 00 DB 88 50
C0C8:D0 D7 20 FD C6 A0 26 B9 4B
C0D0:89 CF 99 28 D8 88 D0 F7 43
C0D8:A9 00 8D 20 D0 8D 21 D0 B2
C0E0:AD 34 C7 09 30 8D 5E 07 4B
C0E8:AD 35 C7 09 30 8D 0E 07 F2
C0F0:20 E4 FF C9 85 F0 36 C9 7E
C0F8:86 F0 1B C9 87 D0 F1 EE 4C
C100:34 C7 AD 34 C7 C9 06 D0 CA
C108:05 A9 01 8D 34 C7 09 30 74
C110:8D 5E 07 4C F0 C0 EE 35 35
C118:C7 AD 35 C7 C9 04 D0 05 13
C120:A9 01 8D 35 C7 09 30 8D 0E
C128:0E 07 4C F0 C0 A0 03 A9 45
C130:00 99 30 C7 88 10 FA 20 37
C138:FD C6 A9 00 8D 08 DC 8D 75
C140:09 DC 8D 0A DC A9 A0 85 26
C148:FD A9 04 85 FE A2 13 A0 57
C150:26 B1 FD 30 04 A9 20 91 AE
C158:FD 88 D0 F5 A5 FD 18 69 35
C160:28 85 FD 90 02 E6 FE CA 96
C168:D0 E5 A0 02 B9 00 09 99 69
C170:00 08 C8 D0 F7 A9 00 8D 10
C178:0E DC A2 04 BD A6 C7 95 40
C180:10 CA 10 F8 A9 84 8D FE C3
C188:07 A9 8C 8D F9 07 A9 00 A3
C190:85 47 85 4E A0 18 88 99 4E
C198:00 D4 D0 FA A9 0F 8D 18 D7
C1A0:D4 A9 80 8D 14 D4 A9 81 AA
C1A8:8D 12 D4 A0 07 A9 0C 99 AC
C1B0:27 D0 88 10 FA A9 0E 8D 36
C1B8:27 D0 8D 2D D0 A9 05 8D 4D
C1C0:28 D0 8D 2E D0 A9 3C 8D 54
C1C8:1C D0 A9 0B 8D 25 D0 A9 C0
C1D0:0F 8D 26 D0 AD 35 C7 0A EC
C1D8:0A 0A 85 02 A9 60 38 2D
C1E0:E5 02 8D 07 DC 8D 06 DC FF
C1E8:A9 09 8D 0F DC A9 3F 8D BF
C1F0:15 D0 A9 01 2C 0F DC D0 A0
C1F8:FB A9 09 8D 0F DC AD 1E 44
C200:D0 85 02 29 C3 D0 03 4C D5
C208:DA C2 10 51 A5 02 29 01 4B
C210:F0 35 A2 00 A0 0E 20 58 85
C218:C4 D0 2C A9 01 20 EC C6 7D
C220:A2 01 B5 3E 30 04 4A 4C 44
C228:2C C2 38 6A 18 75 30 10 29
C230:08 C9 C0 00 0A A9 C0 D0 98
C238:06 C9 41 90 02 A9 05 95 31
C240:30 CA F0 DE 4C 4E C2 A2 60
C248:0E 20 D5 C4 D0 0F AD 15 17
C250:D0 29 7F 8D 15 D0 A0 00 7E
C258:84 1F 20 26 05 A5 02 29 40
C260:40 F0 53 A5 02 29 02 F0 B0
C268:35 A2 02 A0 0C 20 58 C4 D1
C270:D0 2C A9 01 20 EC C6 A2 93
C278:01 B5 3C 30 04 4A 4C 83 DB
C280:C2 38 6A 18 75 32 10 08 E0
C288:C9 C0 B0 A9 C0 D0 06 D1
C290:C9 41 90 02 A9 40 95 32 29
C298:CA F0 DE 4C A5 C2 A2 0C E9
C2A0:20 D5 C4 D0 11 AD 15 D0 8B
C2A8:29 BF 8D 15 D0 A9 00 85 68
C2B0:1D A0 07 20 26 C5 A5 02 65
C2B8:29 02 F0 0C A2 02 2D 65 65
C2C0:C4 D0 05 A0 01 4C 5C 35 3F
C2C8:A5 02 29 01 F0 0C A2 00 D3
C2D0:20 D5 C4 D0 05 A0 00 4C 78
C2D8:5C C5 C0 09 C6 C6 40 D0 35
C2E0:7A A9 07 85 40 A2 01 BD 93

```

```

C2E8:00 DC 29 04 D0 05 D6 41 94
C2F0:4C FC C2 BD 00 DC 29 08 DD
C2F8:D0 0D F6 41 B5 41 29 0F 31
C300:95 41 09 80 9D F8 07 BD 68
C308:00 DC 29 01 D0 28 B4 41 CD
C310:8A 0A AA B5 00 18 79 73 58
C318:C7 C9 A1 90 04 C9 C0 90 80
C320:02 95 30 B5 31 18 79 6F BB
C328:C7 C9 41 90 04 C9 C0 90 90
C330:02 95 31 8A 4A AA CA F0 7A
C338:AE AD 00 DC 29 01 85 02 AA
C340:AD 01 DC 29 01 F0 04 A4 85
C348:02 D0 B8 18 69 10 E5 02 41
C350:8D 0F D4 4C 5B C3 A9 00 FE
C358:8D 0F D4 A5 43 D0 4E AD 07
C360:15 D0 29 BF 8D 15 D0 AD D7
C368:00 DC 29 10 D0 41 A0 00 1A
C370:20 41 C5 A9 80 85 43 A5 F1
C378:10 18 69 20 85 1C A5 11 36
C380:69 01 85 1D A5 20 18 69 C6
C388:40 85 2C A5 21 69 01 85 A7
C390:2D A4 41 B9 73 C7 0A 0A 74
C398:0A 0A 85 3C B9 6F C7 0A 41
C3A0:0A 0A 85 3D AD 15 D0 E4
C3A8:09 40 8D 15 D0 C6 43 A5 95
C3B0:44 D0 4E AD 15 D0 29 7F F0
C3B8:8D 15 D0 AD 01 DC 29 10 1F
C3C0:D0 41 A0 07 20 41 C5 A9 C0
C3C8:80 85 44 A5 12 18 69 50 E8
C3D0:85 1E A5 13 69 01 85 1F 02
C3D8:A5 22 18 69 40 85 2E A5 6F
C3E0:23 69 01 85 2F A4 42 B9 17
C3E8:73 C7 0A 0A 0A 0A 85 3E BF
C3F0:B9 6F C7 0A 0A 0A 85 DC
C3F8:3F AD 15 D0 09 80 8D 15 B5
C400:D0 C6 44 AE 0A DC AD 09 3F
C408:DC F0 09 EC A9 60 F8 38 E4
C410:ED 09 DC D8 85 02 4A 0A 0F
C418:4A 4A 09 30 8D 3C 04 A5 88
C420:02 29 0F 09 30 8D 3C 04 9D
C428:06 02 AD 04 C7 38 E5 02 5B
C430:09 30 8D 3A 04 AD 0A DC 67
C438:CD 34 C7 0F 03 4C F2 C1 AE
C440:A9 00 8D 15 D0 A0 02 B9 68
C448:00 08 99 00 00 C8 D0 F7 C3
C450:A9 01 8D 0E DC 4C 8A C0 6F
C458:B5 10 38 F9 10 00 85 FD F0
C460:B5 11 F9 11 00 85 FE 90 FD
C468:0F A5 FD F9 4F C7 A5 FE 26
C470:F9 50 C7 B0 5D 4C 93 C4 17
C478:B9 10 00 38 F5 10 85 FD 5F
C480:B9 11 00 F5 11 85 FE A5 CC
C488:FD FD 4F C7 A5 FE FD 50 6C
C490:C7 B0 3F B5 20 38 F9 20 63
C498:00 85 FD B5 21 38 F9 21 9D
C4A0:00 85 FE 90 0F A5 FD F9 79
C4A8:5F C7 A5 FE F9 60 C7 B0 0A
C4B0:21 4C CF C4 B9 20 00 38 AA
C4B8:F5 20 85 FD B9 21 00 F5 1E
C4C0:21 85 FE A5 FD FD 5F C7 E4
C4C8:A5 FE FD 60 C7 B0 03 A9 5B
C4D0:00 60 A9 01 60 A5 02 0A 5F
C4D8:0A 85 45 A0 0A 06 45 90 FE
C4E0:05 20 58 C4 F0 09 88 88 91
C4E8:C0 02 D0 F1 A9 01 60 A9 48
C4F0:01 85 45 C8 E8 B5 30 30 40
C4F8:07 4A 4A 4A 4A 4C 06 C5 DB
C500:4A 4A 4A 4A 09 F0 18 79 E6
C508:30 00 10 08 C9 C0 B0 0A EA
C510:A9 C0 D0 06 C9 41 90 02 91
C518:A9 40 99 00 00 CA 88 C6 C1
C520:45 F0 D2 A9 00 60 A9 00 54
C528:99 06 D4 99 47 00 99 04 A7
C530:D4 A9 0A 99 01 D4 A9 35 4F
C538:99 05 D4 A9 21 99 04 D4 53
C540:60 A9 00 99 06 D4 99 04 BA
C548:D4 A9 28 99 07 00 99 01 B5
C550:D4 A9 09 99 05 D4 A9 11 4B
C558:99 04 D4 C0 A9 90 99 F8 0E
C560:07 B9 83 C7 8D 03 C6 E8 B9
C568:A9 01 85 48 A9 20 20 EC 39
C570:C6 A0 07 A9 00 88 99 0E 66
C578:D4 D0 FA A9 0A 8D 13 D4 1E
C580:A9 08 8D 0F D4 A9 81 8D 63
C588:12 D4 A9 1E 85 46 20 09 F7

```

C590:C6	A9 01 2C 0F DC D0 FB 56	C838:84	5D 30 3A 30 30 5D 84 8E	CAE0:20	20 20 20 20 81 20 20 FB
C598:A9	09 8D 0F DC C6 46 D0 3D	C840:84	84 84 84 84 84 84 84 D1	CAE8:20	20 20 82 20 20 20 20 A4
C5A0:ED	A9 80 8D 12 D4 A9 8C 3A	C848:84	84 5D 30 30 30 5D EB	CAF0:20	20 20 20 20 80 5D 84
C5A8:8D	13 D4 A9 11 8D 0F D4 A6	C850:6B	40 40 40 40 71 40 40 3C	CAF8:5D	20 20 20 20 20 20 20 2D
C5B0:A9	A0 8D 16 D4 A9 84 8D 30	C858:40	40 40 40 40 40 40 40 E9	CB00:20	20 20 20 20 20 13 10 6D
C5B8:17	D4 A9 1F 8D 18 D4 A9 4C	C860:40	71 40 40 40 40 71 40 A0	CB08:05	05 04 20 3D 20 35 20 DA
C5C0:81	8D 12 D4 A9 3C 8D 15 6E	C868:40	40 40 40 40 40 40 40 F9	CB10:81	20 20 20 20 80 20 20 D9
C5C8:D0	A9 46 85 46 20 09 C6 D3	C870:40	40 71 40 40 40 40 73 5B	CB18:81	20 20 20 20 20 20 5D 9D
C5D0:20	F0 C5 A9 01 2C 0F DC AF	C878:5D	20 20 20 20 20 20 20 A8	CB20:5D	20 20 20 20 20 20 20 56
C5D8:D0	FB A9 09 8D 0F DC C6 BA	C880:20	20 20 80 20 20 20 20 18	CB28:20	20 20 20 20 20 20 20 BF
C5E0:46	D0 EA A9 00 8D 17 D4 F4	C888:20	20 20 20 20 20 20 20 1A	CB30:20	20 20 20 20 20 20 20 C7
C5E8:A9	0F 8D 18 D4 4C 7A C1 CE	C890:20	20 20 20 20 20 20 20 22	CB38:20	20 20 20 20 20 20 20 CF
C5F0:C6	48 D0 14 A9 08 85 48 0E	C898:20	20 20 20 20 20 20 5D 67	CB40:20	20 20 20 20 20 20 5D 15
C5F8:A0	0A AD 85 C7 49 01 8D 58	C8A0:5D	20 20 20 20 20 20 20 D0	CB48:5D	20 20 20 20 20 20 20 7E
C600:85	C7 99 2E 04 88 10 FA B5	C8A8:20	20 20 20 20 20 20 20 3A	CB50:20	20 80 20 20 20 20 14 E7
C608:60	A2 0E B5 30 10 1D C9 51	C8B0:20	20 20 20 20 20 20 20 42	CB58:09	0D 05 20 3D 20 32 3A 63
C610:FE	B0 3E 75 10 95 10 B5 15	C8B8:20	20 20 20 20 20 20 20 4A	CB50:30	30 20 20 80 20 20 20 07
C618:11	E9 00 95 11 C9 05 90 4C	C8C0:20	20 20 20 20 20 20 5D 8F	CB68:20	20 20 20 20 20 20 5D 3D
C620:28	D0 2E B5 10 C9 40 B0 EF	C8C8:5D	20 20 20 80 20 20 20 FB	CB70:5D	20 83 20 20 20 20 20 13
C628:28	4C 49 C6 C9 03 90 21 0F	C8D0:20	13 20 10 20 01 20 03 84	CB78:20	20 20 20 20 20 20 81 71
C630:18	75 10 95 10 B5 11 69 65	C8D8:20	05 20 20 20 01 20 12 19	CB80:20	20 20 80 20 20 20 20 1E
C638:00	95 11 DD 87 C7 90 11 B8	C8E0:20	05 20 0E 20 01 20 20 0E	CB88:20	20 20 20 20 20 20 20 20
C640:D0	07 B5 10 DD 86 C7 90 08	C8E8:20	20 20 20 20 20 20 5D B7	CB90:20	20 20 20 20 20 20 5D 65
C648:08	B5 30 49 FF A8 C8 94 AA	C8F0:5D	20 20 20 20 20 20 20 21	CB98:5D	20 20 20 20 20 20 20 CE
C650:30	B5 10 85 02 A0 08 B5 16	C8F8:80	63 63 63 63 63 63 63 19	CBA0:20	20 20 20 20 20 20 20 38
C658:11	C9 30 90 02 E9 30 26 2E	C900:63	63 63 63 63 63 63 63 93	CBA8:20	20 20 20 20 20 20 20 40
C660:FD	06 02 2A C9 30 90 04 85	C908:63	63 63 63 63 63 20 20 D1	CBB0:20	20 20 20 20 20 80 20 09
C668:E9	30 E6 02 88 D0 F2 A5 07	C910:20	20 20 81 20 20 20 5D F6	CBB8:20	20 20 20 20 20 20 5D 8D
C670:02	9D 00 D0 B5 31 10 1D 23	C918:5D	20 20 20 20 20 20 20 4A	CBC0:4A	40 40 40 40 40 40 40 5D
C678:C9	FE B0 3E 75 20 95 20 1C	C920:20	20 20 20 20 20 20 20 B3	CBC8:40	40 40 40 40 40 40 40 60
C680:B5	21 E9 00 95 21 C9 11 44	C928:20	20 20 20 20 20 20 20 BB	CBD0:40	40 40 40 40 40 40 40 68
C688:90	28 D0 2E B5 20 C9 80 A7	C930:20	20 20 20 20 20 20 20 C3	CBD8:40	40 40 40 40 40 40 40 70
C690:B0	28 4C B2 C6 C9 03 90 29	C938:20	20 20 20 20 20 20 5D 09	CBE0:40	40 40 40 40 40 40 4B 83
C698:21	18 75 20 95 20 B5 21 27	C940:5D	20 20 20 20 20 81 20 35	CBE8:00	00 00 00 00 00 00 00 80
C6A0:69	00 95 21 DD 97 C7 90 15	C948:20	20 20 20 20 20 20 20 DB	CBF0:00	00 00 00 00 00 00 00 88
C6A8:11	D0 07 B5 20 DD 96 C7 9C	C950:20	20 20 20 20 20 20 20 E3	CBF8:80	80 92 93 94 95 91 91 2C
C6B0:90	08 B5 31 49 FF A8 C8 B6	C958:20	20 20 83 20 20 20 20 22	CC00:01	80 00 01 03 C0 00 01 66
C6B8:94	31 B5 21 85 02 B5 20 65	C960:20	20 20 20 20 20 20 5D 31	CC08:03	C0 00 01 07 E0 00 01 20
C6C0:A0	06 46 02 6A 88 D0 FA 1B	C968:5D	20 20 20 20 20 20 20 9A	CC10:07	E0 00 01 0F F0 00 01 B2
C6C8:9D	01 D0 CA 3A 80 03 4C 95	C970:20	20 20 20 20 20 20 20 04	CC18:0F	F0 00 01 1F F8 00 01 63
C6D0:0B	C6 A5 FD 8D 10 D0 A4 1D	C978:20	82 20 20 20 20 20 20 A4	CC20:1F	F8 00 01 30 0C 00 24 6D
C6D8:47	F0 06 88 84 47 8C 01 EA	C980:20	20 20 20 20 20 80 20 D4	CC28:30	00 02 70 00 02 F0 00 0B
C6E0:D4	A4 4E F0 06 88 84 4E 8A	C988:80	20 60 20 20 20 20 5D 91	CC30:01	01 F0 00 01 03 F0 00 9E
C6E8:8C	08 D4 60 F8 18 7D 30 B2	C990:5D	20 20 20 20 20 20 20 C2	CC38:01	07 F0 00 01 0F F0 00 58
C6F0:C7	9D 30 C7 BD 31 C7 69 F7	C998:20	20 20 20 20 20 20 20 2C	CC40:01	1F F0 00 01 37 F0 00 07
C6F8:00	9D 31 C7 DB A0 01 AD 89	C9A0:20	20 20 20 20 20 20 20 34	CC48:02	B0 00 02 30 00 24 0C 05
C700:32	C7 85 FD AD 33 C7 85 7A	C9A8:20	20 20 80 20 20 20 20 42	CC50:00	02 3C 00 02 FC 00 01 F6
C708:FE	A2 04 A9 00 06 FD 26 15	C9B0:20	20 20 20 20 20 20 5D 81	CC58:03	F8 00 01 0F F8 00 01 1F
C710:FE	2A CA D0 F8 09 30 99 F5	C9B8:5D	20 20 20 80 20 20 20 ED	CC60:3F	F8 00 01 07 F0 00 01 E4
C718:28	04 C8 C0 05 D0 0C A0 06	C9C0:20	06 31 20 2D 20 13 14 32	CC68:01	F0 00 02 F0 00 02 60 CA
C720:23	AD 30 C7 85 FD AD 31 DF	C9C8:01	12 14 20 07 01 0D 05 41	CC70:00	02 60 00 29 7F FE 00 DB
C728:C7	85 FE C0 27 D0 DA 60 7B	C9D0:20	20 20 20 20 20 20 20 64	CC78:01	1F FC 00 01 0F F8 00 30
C730:00	00 00 00 01 01 00 06 D1	C9D8:20	20 20 20 20 20 20 5D A9	CC80:01	0F F0 00 01 07 E0 00 62
C738:00	00 11 0F 00 04 03 00 F0	C9E0:5D	20 20 20 20 20 20 20 13	CC88:01	03 C0 00 01 01 80 00 88
C740:00	15 0F 00 04 0C 00 00 47	C9E8:20	20 81 20 20 20 20 20 A8	CC90:01	03 00 24 38 00 02 1E 91
C748:15	0F 00 00 00 00 0F 30 74	C9F0:20	20 20 20 20 20 20 20 84	CC98:00	02 1F C0 00 01 1F F0 D5
C750:03	30 03 80 04 80 04 80 80	C9F8:20	20 20 20 20 20 20 20 8C	CCA0:00	01 1F FE 00 01 1F F0 81
C758:04	80 04 F0 00 F0 00 00 5D	CA00:20	20 20 20 20 20 20 5D D2	CCA8:00	01 1F C0 00 01 1E 00 B2
C760:03	00 03 C0 04 C0 04 C0 C9	CA08:5D	20 20 20 20 20 20 20 3C	CCB0:02	38 00 24 03 00 02 01 B8
C768:04	C0 04 00 01 00 01 FA AF	CA10:20	06 33 20 2D 20 03 08 97	CCB8:80	00 01 03 C0 00 01 07 F1
C770:FB	FC FE 00 02 04 05 06 4D	CA18:01	0E 07 05 20 13 10 05 55	CCC0:E0	00 01 0F F0 00 01 0F 74
C778:05	04 02 00 FE FC FB FA AA	CA20:05	04 20 20 20 20 20 20 21	CCC8:F8	00 01 1F FC 00 01 7F 5A
C780:FB	FC FE 3F 2E 85 F0 3C C6	CA28:80	83 20 20 20 20 20 5D 04	CCD0:FE	00 27 C0 00 02 C0 00 64
C788:F0	3C 70 3B 70 3B 70 3B ED	CA30:5D	20 83 20 20 20 20 20 D0	CCD8:01	01 E0 00 01 03 E0 00 25
C790:70	3B 30 3F 30 3F 00 3B DA	CA38:20	20 80 20 20 81 20 20 5F	CCE0:01	0F E0 00 01 7F F0 00 C2
C798:00	3B 00 39 00 39 00 39 A8	CA40:20	20 20 20 20 20 20 20 D5	CCE8:01	1F F0 00 01 07 F0 00 EE
C7A0:00	39 00 3D 00 3D 90 06 6E	CA48:20	20 20 20 20 80 20 20 5F	CCF0:01	01 F8 00 02 78 00 02 5E
C7A8:D0	3B 00 21 00 21 00 21 27	CA50:20	20 20 20 20 20 20 5D 23	CCF8:18	00 24 30 00 02 B0 00 8F
C7B0:00	21 00 00 00 00 C0 25 2F	CA58:5D	20 81 20 20 20 20 20 B8	CD00:01	37 F0 00 01 1F F0 00 6E
C7B8:C0	25 40 16 00 20 C0 29 86	CA60:20	06 35 20 2D 20 03 08 28	CD08:01	0F F0 00 01 07 F0 00 0C
C7C0:80	33 00 00 00 00 00 00 5D	CA68:01	0E 07 05 20 14 09 0D A3	CD10:01	F3 F0 00 01 01 F0 00 F8
C7C8:00	00 00 00 00 00 00 00 58	CA70:05	20 0C 09 0D 09 14 20 77	CD18:02	F0 00 02 70 00 02 30 C8
C7D0:00	00 00 00 00 00 01 04 66	CA78:20	20 20 20 20 20 20 5D 4B	CD20:00	23 30 0C 00 01 1F F8 86
C7D8:0C	00 00 FF 00 DE 00 FF E9	CA80:5D	20 20 20 20 20 20 20 B4	CD28:00	01 1F F8 00 01 0F F0 8A
C7E0:00	FF 00 FF 00 FF 00 FF 70	CA88:20	20 20 20 80 20 20 20 9F	CD30:00	01 0F F0 00 01 07 E0 EF
C7E8:09	FF 00 4D 50 BB 4A FF D7	CA90:20	20 20 20 20 20 20 20 26	CD38:00	01 07 E0 00 01 03 C0 CD
C7F0:00	FF 00 FF 00 FF 00 FF 80	CA98:20	20 20 20 20 20 20 20 2E	CD40:00	01 03 C0 00 01 01 80 0F
C7F8:00	FB 08 DF 08 DF 00 DB 22	CAA0:20	20 20 20 20 20 20 5D 73	CD48:00	20 0C 00 02 00 00 02 B3
C800:55	40 40 40 40 40 40 40 E4	CAA8:5D	20 20 20 20 20 20 20 DC	CD50:0F	EC 00 01 0F F8 00 01 1C
C808:40	40 40 40 40 40 40 40 99	CAB0:20	20 20 20 20 20 20 20 46	CD58:0F	F0 00 01 0F E0 00 01 C4
C810:40	72 40 40 40 40 40 72 40 92	CAB8:20	20 20 20 20 20 80 20 0F	CD60:0F	C0 00 01 0F 80 00 01 3F
C818:40	40 40 40 40 40 40 40 A9	CAC0:20	20 20 20 20 20 20 20 56	CD68:0F	00 02 0E 00 02 0C 00 CC
C820:40	40 72 40 40 40 40 49 01	CAC8:20	20 20 20 80 20 20 5D 11	CD70:1E	03 00 02 03 00 02 07 1F
C828:5D	30 30 30 30 5D 84 84 02	CAD0:5D	20 20 81 20 20 20 20 1E	CD78:80	00 01 07 C0 00 01 07 F3
C830:84	84 84 84 84 84 84 84 C1	CAD8:20	20 20 20 20 20 20 20 6F	CD80:F0	00 01 0F FE 00 01 0F AE

```

CD88:F8 00 01 0F E0 00 01 1F D9
CD90:80 00 01 1E 00 02 18 00 A6
CD98:25 C0 00 01 01 80 00 01 12
CDA0:03 C0 00 01 07 E0 00 01 BA
CDA8:0F F0 00 01 1F F0 00 01 D5
CDB0:3F F8 00 01 7F FE 00 2D 5F
CDB8:1C 00 02 78 00 01 03 F8 2D
CDC0:00 01 0F F8 00 01 7F F8 0A
CDC8:00 01 0F F8 00 01 03 F8 19
CDD0:00 02 78 00 02 1C 00 2C A8
CDD8:7F FE 00 01 3F F8 00 01 E2
CDE0:1F F0 00 01 0F F0 00 01 95
CDE8:07 E0 00 01 03 C0 00 01 6C
CDF0:01 80 00 02 C0 00 20 30 C3
CDF8:00 02 3C 00 02 3F 00 02 AB
CE00:1F C0 00 01 1F F0 00 01 2B
CE08:1F FC 00 01 0F E0 00 01 81
CE10:0F 80 00 01 0F 00 02 06 E7
CE18:00 02 06 00 1E 0C 00 02 1A
CE20:0E 00 02 0F 00 02 0F 80 9C
CE28:00 01 0F C0 00 01 0F E0 F6
CE30:00 01 0F F0 00 01 0F F8 1A
CE38:00 01 0F EC 00 01 0D 00 E4
CE40:02 0C 00 21 08 10 00 01 75
CE48:04 32 00 01 06 14 00 01 06
CE50:14 A4 00 01 18 CC 00 01 26
CE58:03 00 02 6D 1C 00 01 08 79
CE60:4A 00 02 C0 00 01 09 30 B5
CE68:00 01 01 00 03 80 00 1D 9D
CE70:60 00 02 F0 00 02 60 00 56
CE78:3A FF 00 01 0F BE F0 0E A6
CE80:FF F0 3F 9F 7C 3F F9 BC 73
CE88:3D 6A B8 F5 7B DA B5 BA 43
CE90:6A F5 B6 A6 F6 B6 A6 FB FD
CE98:DA 56 FA 6A 5A 3A AA 58 A8
CEA0:3A A5 A8 16 96 58 0B 56 BD
CEA8:60 0B 59 A0 00 01 AA 00 C7
CEB0:0C FF 00 01 0F EF B0 0B 09
CEB8:FF B0 3D 7F FC 3D B5 AC 17
CEC0:2F E5 B8 FF A6 FA FF AB 53
CEC8:DA E5 AA 69 F6 EA AA FA EC
CED0:EF 96 FB 75 96 3A B5 98 84
CED8:3A 65 98 25 9A 58 09 55 EF
CEE0:60 0A 55 A0 00 01 AA 00 3F
CEE8:0C FF 00 01 03 FF F0 0E A4
CEF0:D7 F0 0E DB FC 3B FF AC B7
CEF8:3B EA 68 EF AE BA EF B5 F0
CF00:AA FE D5 A6 FE D5 E6 F5 EC
CF08:96 D6 F6 EB E6 3B EF 58 A2
CF10:3A AA 58 2A 99 98 09 99 FF
CF18:60 0A 55 A0 00 01 AA 00 78
CF20:0C FF 00 01 0F FB F0 0E 2E
CF28:FF F0 3B FF FC 3B 5A AC A1
CF30:3F 6E 98 6F 6D AE BF B6 71
CF38:AA FE 6A 6E F6 BA B6 DB 8C
CF40:AE 96 FE B5 56 3A B5 98 B7
CF48:39 A5 98 2A E5 98 09 5A A1
CF50:60 0A 55 A0 00 01 AA 00 B0
CF58:0B 00 00 00 10 00 00 00 FD
CF60:00 00 00 00 18 00 00 00 C0
CF68:00 20 04 00 3A 5C 00 20 F3
CF70:04 00 10 49 18 18 92 08 F6
CF78:00 33 CC 33 CC 33 CC 33 B1
CF80:CC 66 99 66 99 66 99 66 B9
CF88:99 0F 0E 0E 0E 0E 0F 0E 30
CF90:0E 0E 0E 0E 0E 0E 0E 30
CF98:0E 0E 0F 04 04 04 0F 2C
CFA0:05 05 05 05 05 05 05 40
CFA8:05 05 05 0F 05 05 05 E8
CFB0:0F 42 46 00 00 00 00 31

```

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

The Fast Assembler

See instructions in article on page 78 before typing in.

```

0801:0C 08 0A 00 9E 20 34 34 6C
0809:30 38 00 00 00 A9 36 85 D7
0811:01 A6 7A CA 30 0F BD 00 80
0819:02 C9 20 F0 F6 E8 BD 00 86
0821:02 C9 20 D0 01 E8 A0 04 A6
0829:84 0F BD 00 02 10 0A C9 25
0831:FF F0 06 E9 9F D0 16 A9 F2
0839:20 C9 20 F0 FC 05 08 C9 2F
0841:22 F0 4A C9 3F D0 4F A9 0A
0849:99 C8 99 FB 01 E8 D0 DA 73
0851:A4 71 24 B0 10 06 C8 A9 19
0859:90 99 FB 01 A5 0B 09 90 93
0861:C8 99 FB 01 24 0B 30 C2 3C
0869:C9 83 F0 05 49 8F D0 BA 92
0871:2C A9 3A 85 08 BD 00 02 DA
0879:F0 1A 24 0F 70 04 C5 08 25
0881:F0 C7 C9 22 D0 07 0A 45 53
0889:0F 85 0F A9 22 C8 99 FB 62
0891:01 E8 D0 E1 F0 5E 84 71 10
0899:86 7A A0 9E 84 22 A0 A0 18
08A1:84 23 A0 00 84 0B 51 22 E5
08A9:D0 07 E8 C8 BD 00 02 D0 50
08B1:F5 C9 80 D0 26 E8 BD 00 9C
08B9:02 20 1D 09 80 92 A5 0B 2D
08C1:30 19 84 08 A0 0B D9 2E 54
08C9:09 F0 F1 88 10 F8 A4 08 17
08D1:C9 34 90 07 BD 00 02 C9 12
08D9:28 F0 E1 88 C8 B1 22 10 60
08E1:FB E6 0B A6 7A C8 B1 22 F1
08E9:F0 C2 C8 F0 0A A4 71 BD BE
08F1:00 02 D0 11 4C C9 A5 A9 2C
08F9:3A 85 22 A9 09 85 23 A9 B5
0901:80 85 0B D0 A7 E8 C8 99 2F
0909:FB 01 20 1D 09 B0 0A BD 0C
0911:00 02 F0 E0 20 1D 09 90 E7
0919:EC 4C 2B 08 C9 30 90 0B D5
0921:C9 3A 90 08 C9 41 90 03 B0
0929:C9 5B 24 38 60 04 18 23 65
0931:26 31 32 33 2E 2D 2C 2B C5
0939:2A 42 59 54 C5 57 4F 52 DD
0941:C4 4F 52 C7 41 55 54 CF 28
0949:4F 4C C4 49 4E 43 4C 55 B0
0951:44 C5 53 45 4E C4 55 4E 34
0959:53 45 4E C4 42 43 C3 42 65
0961:43 D3 42 45 D1 42 4D C9 A2
0969:42 4E C5 42 50 CC 42 56 9D
0971:C3 42 56 D3 41 44 C3 41 E1
0979:4E C4 43 4D D0 45 4F D2 2E
0981:4C 44 C1 4F 52 C1 53 42 7A
0989:C3 53 54 C1 41 53 CC 44 2E
0991:45 C3 49 4E C3 4C 53 D2 0E
0999:52 4F CC 52 4F D2 53 54 28
09A1:D8 43 50 D8 43 50 D9 4C E3
09A9:44 D8 4C 44 D9 53 54 D9 80
09B1:4A 53 D2 4A 4D D0 42 49 38
09B9:D4 42 52 CB 43 4C C3 43 E3
09C1:4C C4 43 4C C9 43 4C D6 23
09C9:44 45 D8 44 45 D9 49 4E 21
09D1:D8 49 4E D9 4E 4F D0 50 AB
09D9:48 C1 50 48 D0 50 4C C1 31
09E1:50 4C D0 52 54 C9 52 54 31
09E9:D3 53 45 C3 53 45 C4 53 2C
09F1:45 C9 54 41 D8 54 41 D9 2C
09F9:54 53 D8 54 58 C1 54 58 36
0A01:D3 54 59 C1 00 48 AD 8D 65
0A09:02 C9 01 F0 F9 68 10 16 67
0A11:C9 FF F0 12 24 0F 30 0E 15
0A19:50 0F C5 08 D0 08 48 A5 2F
0A21:0F 49 40 85 0F 68 4C F3 16
0A29:A6 C9 90 F0 18 48 C9 83 1D
0A31:F0 05 49 8F D0 0B 2C A9 D5
0A39:3A 85 08 A5 0F 49 40 85 CA
0A41:0F 68 4C 24 A7 C8 B1 5F E5
0A49:30 05 88 A9 90 D0 F3 84 96
0A51:49 AA A0 FF CA 10 08 C8 38
0A59:B9 3A 09 10 FA 30 F5 C8 48
0A61:B9 3A 09 10 F3 4C EF A6 D2
0A69:20 47 AB D0 F2 20 73 00 E0
0A71:A2 00 86 D0 C9 AC F0 16 71

```

```

0A79:86 62 86 63 C9 24 F0 3F 70
0A81:C9 25 F0 28 C9 27 F0 17 48
0A89:20 79 00 4C 8D AE 20 73 AB
0A91:00 A5 FB A4 FC 84 62 85 1D
0A99:63 A2 90 38 4C 49 BC 20 BE
0AA1:AC 0B 48 20 73 00 68 D0 17
0AA9:EE 4C 08 AF 20 73 00 B0 C3
0AB1:E8 C9 32 B0 E4 4A 26 63 FD
0AB9:26 62 90 F0 4C 48 B2 20 A3
0AC1:73 00 90 0A C9 47 B0 D1 E0
0AC9:C9 41 90 CD E9 07 29 0F CE
0AD1:A2 04 06 63 26 62 B0 E4 30
0AD9:CA D0 F7 05 63 85 63 90 5F
0AE1:DE 8D A8 02 85 45 20 B2 32
0AE9:0B 20 13 B1 B0 03 4C 08 3B
0AF1:AF A2 00 86 D0 86 0E 20 AD
0AF9:AC B0 90 05 20 13 B1 90 CA
0B01:0A E0 07 B0 F2 E8 9D A8 5F
0B09:A2 D0 EC E8 E0 08 B0 04 0D
0B11:A0 00 F0 F2 AD A9 02 85 E6
0B19:46 20 B2 0B C9 24 D0 06 E7
0B21:A9 FF 85 0D D0 13 C9 25 19
0B29:D0 1B A5 10 D0 C0 A9 80 81
0B31:85 0E 05 45 85 45 8D A8 87
0B39:A2 A5 46 09 80 85 46 8D 47
0B41:A9 02 20 AC 0B 05 10 49 51
0B49:28 D0 03 4C D1 B1 84 10 3B
0B51:A5 2D A6 2E 86 60 85 5F 5D
0B59:E4 30 90 04 C5 2F B0 1A A6
0B61:A0 00 B9 A8 02 51 5F D0 6E
0B69:08 C8 C0 08 90 F4 4C 85 C4
0B71:B1 A5 5F 69 D0 90 DF E8 9F
0B79:D0 DA 68 48 C9 2A D0 03 DB
0B81:4C 23 B1 AD AA 02 D0 03 99
0B89:4C 28 B1 A5 2F A4 30 20 EC
0B91:47 B1 A0 07 B9 A8 02 91 42
0B99:5F 88 10 F8 A0 07 4C 74 41
0BA1:B1 10 05 A0 08 4C C7 B5 F5
0BA9:4C F6 B5 E6 7A D0 02 E6 CA
0BB1:7B A0 00 B1 7A C9 3A B0 E8
0BB9:03 4C 84 00 60 A6 9D 30 FD
0BC1:29 E0 21 F0 0B E0 20 F0 E4
0BC9:1A A9 0E A0 0E 4C 27 11 24
0BD1:A6 FD F0 0D A2 08 20 18 37
0BD9:E1 20 0C E1 20 CC FF F0 AD
0BE1:02 81 FB E6 FB D0 02 E6 55
0BE9:FC 60 4C AB B3 A5 66 30 0C
0BF1:12 A5 61 C9 91 B0 0C 20 CA
0BF9:9B BC A4 64 A5 65 85 14 C9
0C01:84 15 60 A5 9D 4A 90 03 41
0C09:4C 48 B2 A9 00 A8 F0 EE BD
0C11:20 73 00 F0 04 C9 3B D0 B3
0C19:07 A9 00 85 15 85 FE 60 94
0C21:C9 23 D0 04 A2 01 D0 08 04
0C29:A2 00 C9 28 D0 05 A2 80 AE
0C31:20 73 00 86 FE 20 9E AD 02
0C39:24 0D 30 0A 20 EE 0B A5 C5
0C41:FE 30 1C F0 51 60 A5 FE CD
0C49:C9 01 F0 03 4C 08 AF 20 D6
0C51:A6 B6 A0 00 84 15 C9 00 8A
0C59:F0 02 B1 22 85 14 60 A2 A2
0C61:00 86 0B A0 00 BD 9F 0C C8
0C69:51 7A D0 04 EB C8 D0 F5 25
0C71:0A D0 0D A6 0B BD AC 0C 83
0C79:85 FE 20 FB A8 4C 73 00 35
0C81:E8 BD 9E 0C 10 FA E6 0B 57
0C89:BD 9F 0C D0 D6 A5 FE 30 72
0C91:BB A9 02 85 FE 60 A9 03 5A
0C99:85 0B A2 08 D0 C5 2 58 5A
0CA1:A9 29 2C D9 A9 00 2C D8 7A
0CA9:2C D9 00 05 06 0F 03 04 15
0CB1:20 73 00 20 4C 0C 20 79 C8
0CB9:00 C9 3B D0 03 20 3B A9 71
0CC1:4C AE A7 F0 05 C9 3B D0 46
0CC9:05 60 38 4C ED A7 C9 AF 99
0CD1:D0 F8 A2 09 8A D0 72 D0 C2
0CD9:03 4C 2F A8 E9 80 B0 03 AC
0CE1:4C 08 AF C9 40 80 F9 C9 37
0CE9:08 B0 0D 0A A8 B9 C7 0D 3D
0CF1:48 B9 C6 0D 48 4C 73 00 A0
0CF9:E9 08 AA C9 08 B0 39 BD 2E
0D01:D6 D0 20 BE 0B 20 73 00 79
0D09:AD D6 C9 3B F0 D2 20 8A DB
0D11:AD A5 9D 4A 90 18 20 F7 E0
0D19:B7 18 A5 14 E5 FB AA 08 87

```

```

0D21:A5 15 E5 FC 28 10 02 49 AE
0D29:FF C9 00 D0 04 8A 4C BE 64
0D31:0B A9 26 A0 0E 4C 27 11 0B
0D39:C9 1F 90 0D C9 38 B0 A0 14
0D41:BD D6 0D 20 BE 0B 4C 73 C1
0D49:00 48 BD D6 0D 85 02 20 3D
0D51:11 0C A5 15 20 9D 0D F0 7F
0D59:0C 20 9D 0D F0 07 A9 46 43
0D61:A0 0E 4C 27 11 A5 02 29 97
0D69:0F A8 B9 39 0E 10 06 A5 62
0D71:FE 09 10 85 FE 68 38 E9 9B
0D79:08 A6 FE A8 18 B9 5D 0E 1C
0D81:7D 74 0E 20 BE 0B A5 FE A7
0D89:29 0F F0 38 29 08 08 A5 BC
0D91:14 20 BE 0B 28 F0 2D A5 4B
0D99:15 4C BE 0B F0 06 A5 FE C3
0DA1:09 08 85 FE A5 FE 4A 4A EA
0DA9:4A 4A A5 02 B0 04 29 0F 47
0DB1:90 04 4A 4A 4A 4A A5 75
0DB9:FE 29 07 AA B9 39 0E 49 41
0DC1:FF 3D 94 0E 60 D4 0F D1 E4
0DC9:0F A7 0E 42 0F 11 10 2A 42
0DD1:10 B8 10 B0 10 90 B0 F0 44
0DD9:30 D0 10 50 70 05 05 05 ED
0DEL:05 05 05 05 06 17 11 11 70
0DE9:17 17 17 23 28 28 39 1A D8
0DF1:2B 2C 4C 24 00 18 D8 58 E2
0DF9:B8 CA 88 EB C8 EA 48 08 4D
0E01:68 28 40 60 38 F8 7A AA AA
0E09:A8 BA 8A 9A 98 55 4E 44 1E
0E11:45 46 27 44 20 4C 4F 43 9E
0E19:41 54 49 4F 4E 20 43 4F D1
0E21:55 4E 54 45 D2 42 52 41 DF
0E29:4E 43 48 20 4F 55 54 20 E0
0E31:4F 46 20 52 41 4E 47 C5 47
0E39:1C 0C 04 14 84 6E 6C 0D EB
0E41:86 96 8E 8C 80 49 4C 4C EE
0E49:45 47 41 4C 20 41 44 44 99
0E51:52 45 53 53 49 4E 47 20 B9
0E59:4D 4F 44 C5 60 20 C0 40 1A
0E61:A0 00 E0 80 01 C1 E1 41 06
0E69:21 61 81 E0 C0 A2 A0 80 FE
0E71:14 40 20 09 09 05 15 15 D7
0E79:01 11 80 09 80 0D 1D 19 86
0E81:80 80 80 80 04 14 14 62
0E89:80 80 80 80 0C 1C 1C A6
0E91:80 80 2C 01 02 04 08 10 E3
0E99:20 40 80 20 79 00 F0 04 99
0EA1:C9 3B D0 02 68 68 60 A9 FA
0EA9:00 85 FB 85 FD 85 B7 A9 1E
0EB1:C0 85 FC A5 9D 09 20 85 60
0EB9:9D 20 9C 0E 20 8A AD 20 C7
0ECL:F7 B7 84 FB 85 FC 20 9C 15
0EC9:0E 20 00 E2 E0 02 90 03 56
0ED1:4C 48 B2 8A 05 9D 85 9D 6C
0ED9:20 9C 0E 20 00 E2 86 FD 87
0EE1:20 0E E2 20 9E AD 20 A3 7F
0EE9:B6 20 BD FF A6 FD F0 B6 E6
0EF1:A9 08 A0 01 20 BA FF A5 9A
0EF9:9D 4A 90 AA A5 B7 D0 06 E7
0F01:A5 FD C9 08 B0 15 20 C1 07
0F09:E1 A2 08 20 18 E1 A5 FB 53
0F11:20 0C E1 A5 FC 20 0C E1 3B
0F19:4C CC FF 20 10 F7 4C 3B C6
0F21:A4 20 8B B0 85 49 84 4A BA
0F29:20 79 00 F0 07 C9 3B F0 8B
0F31:03 4C AC A9 A6 3A E8 D0 D4
0F39:03 4C 08 AF 20 92 0A 4C 9D
0F41:D0 BB F0 10 20 6B A9 A5 73
0F49:14 8D B1 02 A5 15 8D B2 7A
0F51:02 A9 80 2C A9 00 8D B0 C6
0F59:02 60 AD B0 02 29 BF 2C B1
0F61:A9 00 8D B0 02 A6 14 8E 72
0F69:FE 01 A6 15 8E FF 01 2C 10
0F71:B0 02 70 24 20 60 A5 86 0D
0F79:7A 84 7B 20 73 00 AA F0 49
0F81:D9 A2 FF 86 3A 90 03 4C 0F
0F89:96 A4 AD B0 02 09 40 8D 1F
0F91:B0 02 20 79 00 4C 9C A4 33
0F99:10 C6 18 AD FE 01 6D B1 D7
0FA1:02 85 63 AD FF 01 6D B2 FA
0FA9:02 85 62 B0 B3 A2 90 38 03
0FB1:20 49 BC 20 DF BD 78 A2 55
0FB9:00 BD 00 01 C9 30 90 06 8D
0FC1:9D 77 02 E8 D0 F3 A9 20 25

```

```

0FC9:9D 77 02 E8 86 C6 58 D0 34
0FD1:A3 A9 08 2C A9 00 85 02 4A
0FD9:20 9E AD 24 0D 30 1F 20 2F
0FE1:EE 0B A5 02 D0 0D A6 15 2C
0FE9:F0 09 A6 9D E0 20 F0 03 DD
0FF1:4C 48 B2 20 8D 0D 20 9C 1E
0FF9:0E 20 0E E2 D0 DA 20 A6 EF
1001:B6 85 64 A0 00 C4 64 F0 41
1009:ED B1 22 20 BE 0B C8 D0 57
1011:FA A0 01 A9 08 91 2B 20 8B
1019:33 A5 A5 22 A4 23 65 2D BC
1021:85 2D 90 01 C8 84 2E 4C 72
1029:5C A6 20 9E AD 20 A3 B6 FA
1031:20 BF DF 20 00 E2 A9 09 BA
1039:A0 00 20 BA FF 20 C1 E1 3F
1041:A2 09 20 1E E1 20 12 E1 70
1049:A5 90 29 02 F0 05 A9 04 98
1051:4C 3B A4 20 12 E1 20 CC 22
1059:FF A5 7A 48 A5 7B 48 A2 05
1061:09 20 1E E1 20 12 E1 20 1D
1069:12 E1 AA F0 34 20 12 E1 97
1071:20 12 E1 A2 FF E8 20 12 82
1079:E1 9D 00 02 AB D0 F6 20 A8
1081:CC FF A9 FF 85 7A A9 01 A7
1089:85 7B 20 73 00 20 C4 0C 9C
1091:20 79 00 AA F0 C9 C9 3A 47
1099:F0 F0 C9 3B F0 C1 4C 08 8A
10A1:AF 20 CC FF A9 09 20 C3 B0
10A9:FF 68 85 7B 68 85 7A 60 FA
10B1:20 B0 10 A9 00 4C BE 0B 65
10B9:20 9E AD 20 A3 B6 A8 A9 3C
10C1:00 C0 58 90 03 4C 71 A5 F7
10C9:99 00 02 88 30 04 B1 22 96
10D1:90 F6 A5 7A 48 A5 7B 48 6C
10D9:A9 FF 85 7A A9 01 85 7B FE
10E1:20 73 00 90 07 A9 14 A0 9F
10E9:11 4C 27 11 20 6B A9 20 BD
10F1:7C A5 A5 14 8D FE 01 A5 BF
10F9:15 8D FF 01 8C FC 01 8C FE
1101:FD 01 84 0B A0 00 B9 FC 19
1109:01 20 BE 0B C8 C4 0B 90 3C
1111:F5 B0 96 4D 49 53 53 49 89
1119:4E 47 20 4C 49 4E 45 20 2B
1121:4E 55 4D 42 45 D2 85 22 30
1129:84 23 4C 47 A4 66 0F 0E 3F
1131:08 06 0A B1 0C 6E 0A A9 0D
1139:37 85 01 A9 00 85 58 85 5F
1141:5A 85 5F A9 C0 85 59 85 CC
1149:5B A9 A0 85 20 00 BB A3 8E
1151:A2 09 BD 2E 11 9D 02 03 A7
1159:CA 10 F7 A9 4C 8D C4 B5 56
1161:8D 92 B0 8D 43 B1 8D A5 7F
1169:A9 A9 0D 8D 4E B5 8D 55 FE
1171:B1 A9 08 8D 0F B6 8D 89 A8
1179:B1 A9 EA 8D 10 B6 A9 60 24
1181:8D 69 B1 A9 8C A0 0B 8D 20
1189:44 B1 8C 45 B1 A9 E2 A0 BA
1191:0A 8D 93 B0 8C 94 B0 A9 5B
1199:A2 A0 0B 8D C5 B5 8C C6 54
11A1:B5 A9 D7 A0 0C 8D 2C A0 9D
11A9:8C 2D A0 A9 22 A0 0F 8D 4B
11B1:A6 A9 8C A7 A9 A9 C4 A0 BB
11B9:0C 8D 49 A9 8C 4A A9 A9 93
11C1:FB A0 F0 8D 20 D0 8C 21 7F
11C9:D0 A9 1B A0 12 8D 81 02 F7
11D1:8C 82 02 20 BF E3 A9 E4 E2
11D9:A0 11 20 1E AB 20 30 E4 99
11E1:4C 9D E3 93 08 0E 9B 11 08
11E9:20 20 2A 20 C1 D3 D3 C5 36
11F1:CD C2 CC C5 D2 20 56 33 98
11F9:20 2A 20 20 20 42 59 20 99
1201:D9 56 45 53 20 C8 41 4E 7A
1209:20 20 31 39 38 35 0D 0D BC
1211:20 20 20 20 20 20 20 35
1219:20 00 00 00 00 00 00 4D

```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Power BASIC: Printmaker

Article on page 104.

BEFORE TYPING . . .
Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Program 1: Printmaker—64 Version

```

100 FORI=49152TO49649:READA:X=
X+A:POKEI,A:NEXT :rem 120
110 IFX<>55761 THENPRINT"ERROR
[SPACE]IN DATA STATEMENTS.
":STOP :rem 236
120 NEW :rem 125
130 DATA 32,155,183,142,85,2,3
2,228,193,32 :rem 15
140 DATA 228,193,32,228,193,32
,140,193,160,193 :rem 221
150 DATA 169,109,32,30,171,169
,0,141,84,2 :rem 219
160 DATA 169,40,133,253,169,21
6,133,254,169,255 :rem 25
170 DATA 141,88,2,169,40,133,2
51,169,4,133 :rem 20
180 DATA 252,32,0,193,160,0,16
9,1,145,45 :rem 165
190 DATA 32,0,193,145,45,32,0,
193,165,20 :rem 165
200 DATA 145,45,32,0,193,165,2
1,145,45,24 :rem 213
210 DATA 165,20,109,85,2,133,2
0,144,2,230 :rem 201
220 DATA 21,32,0,193,160,0,140
,86,2,169 :rem 107
230 DATA 153,145,45,32,0,193,1
69,34,145,45 :rem 19
240 DATA 160,0,177,251,201,32,
240,25,201,96 :rem 49
250 DATA 240,21,177,253,41,15,
205,88,2,240 :rem 9
260 DATA 12,141,88,2,170,189,9
3,193,32,0 :rem 177
270 DATA 193,145,45,177,251,32
,7,193,32,0 :rem 228
280 DATA 193,145,45,230,251,20
8,2,230,252,230 :rem 156
290 DATA 253,208,2,230,254,165
,252,201,7,208 :rem 112
300 DATA 6,165,251,201,232,240
,37,238,86,2 :rem 10
310 DATA 173,86,2,201,25,208,1
79,32,0,193 :rem 220
320 DATA 169,34,160,0,145,45,3
2,0,193,169 :rem 222
330 DATA 59,145,45,32,0,193,16
9,0,168,145 :rem 232
340 DATA 45,76,51,192,160,0,32
,0,193,169 :rem 174
350 DATA 34,145,45,32,0,193,16
9,59,145,45 :rem 235
360 DATA 32,0,193,169,0,145,45
,32,0,193 :rem 118
370 DATA 145,45,32,0,193,145,4
5,32,0,193 :rem 170
380 DATA 32,51,165,108,2,3,230
,45,208,2 :rem 112
390 DATA 230,46,96,72,16,22,17
3,84,2,208 :rem 183
400 DATA 36,169,1,141,84,2,32,
0,193,169 :rem 122

```

```

410 DATA 18,160,0,145,45,76,51
    ,193,173,84 :rem 229
420 DATA 2,240,14,169,0,141,84
    ,2,32,0 :rem 2
430 DATA 193,169,146,160,0,145
    ,45,104,41,127 :rem 115
440 DATA 201,34,208,3,169,39,9
    ,6,201,32,176 :rem 22
450 DATA 4,24,105,64,96,201,64
    ,176,1,96 :rem 131
460 DATA 201,96,176,4,24,105,3
    ,2,96,201,128 :rem 18
470 DATA 176,4,24,105,64,96,16
    ,9,63,96,144 :rem 249
480 DATA 5,28,159,156,30,31,15
    ,8,129,149,150 :rem 81
490 DATA 151,152,153,154,155,1
    ,9,18,80,82,73 :rem 79
500 DATA 78,84,77,65,75,69,82,
    ,146,32,32 :rem 153
510 DATA 32,32,32,13,0,234,234
    ,234,234,234 :rem 252
520 DATA 234,234,234,234,234,2
    ,34,160,0,177,43 :rem 160
530 DATA 208,15,200,177,43,208
    ,10,173,85,2 :rem 11
540 DATA 133,20,169,0,133,21,9
    ,6,165,43,133 :rem 11
550 DATA 251,165,44,133,252,16
    ,0,0,177,251,133 :rem 161
560 DATA 253,200,177,251,133,2
    ,54,160,0,177,253 :rem 214
570 DATA 208,31,200,177,253,20
    ,8,26,160,2,177 :rem 117
580 DATA 251,133,20,200,177,25
    ,1,133,21,24,165 :rem 153
590 DATA 20,109,85,2,133,20,16
    ,5,21,105,0 :rem 157
600 DATA 133,21,96,165,253,133
    ,251,165,254,133 :rem 216
610 DATA 252,76,169,193,56,165
    ,45,233,1,133 :rem 80
620 DATA 45,165,46,233,0,133,4
    ,6,96 :rem 141

```

Program 2: Printmaker—VIC Version

```

100 POKE56,28:CLR :rem 220
110 FORI=7168TO7665:READA:X=X+
    A:POKEI,A:NEXT :rem 18
120 IFX<>52211THENPRINT"ERROR
    {SPACE}IN DATA STATEMENTS.
    ":STOP :rem 224
130 NEW :rem 126
140 DATA 32,155,215,142,162,2,
    ,32,228,29,32,228 :rem 206
150 DATA 29,32,228,29,32,140,2
    ,9,160,29,169,109 :rem 224
160 DATA 32,30,203,169,0,141,1
    ,61,2,169,22,133 :rem 145
170 DATA 253,169,150,133,254,1
    ,69,255,141,165,2 :rem 224
180 DATA 169,22,133,251,169,30
    ,133,252,32,0,29 :rem 209
190 DATA 160,0,169,1,145,45,32
    ,0,29,145,45,32,0 :rem 247
200 DATA 29,165,20,145,45,32,0
    ,29,165,21,145,45 :rem 254
210 DATA 24,165,20,109,162,2,1
    ,33,20,144,2,230 :rem 135
220 DATA 21,32,0,29,160,0,140,
    ,163,2,169 :rem 101
230 DATA 153,145,45,32,0,29,16
    ,9,34,145,45 :rem 225
240 DATA 160,0,177,251,201,32,
    ,240,25,201,96 :rem 49
250 DATA 240,21,177,253,41,15,
    ,205,165,2,240 :rem 53
260 DATA 12,141,165,2,170,189,
    ,93,29,32,0 :rem 171
270 DATA 29,145,45,177,251,32,
    ,7,29,32,0 :rem 128

```

```

280 DATA 29,145,45,230,251,208
    ,2,230,252,230 :rem 106
290 DATA 253,208,2,230,254,165
    ,252,201,31,208 :rem 157
300 DATA 6,165,251,201,250,240
    ,37,238,163,2 :rem 54
310 DATA 173,163,2,201,14,208,
    ,179,32,0,29 :rem 212
320 DATA 169,34,160,0,145,45,3
    ,2,0,29,169 :rem 172
330 DATA 59,145,45,32,0,29,169
    ,0,168,145 :rem 182
340 DATA 45,76,51,28,160,0,32,
    ,0,29,169 :rem 74
350 DATA 34,145,45,32,0,29,169
    ,59,145,45 :rem 185
360 DATA 32,0,29,169,0,145,45,
    ,32,0,29 :rem 18
370 DATA 145,45,32,0,29,145,45
    ,32,0,29 :rem 70
380 DATA 32,51,197,108,2,3,230
    ,45,208,2 :rem 117
390 DATA 230,46,96,72,16,22,17
    ,3,161,2,208 :rem 227
400 DATA 36,169,1,141,161,2,32
    ,0,29,169 :rem 116
410 DATA 18,160,0,145,45,76,51
    ,29,173,161 :rem 223
420 DATA 2,240,14,169,0,141,16
    ,1,2,32,0 :rem 46
430 DATA 29,169,146,160,0,145,
    ,45,104,41,127 :rem 65
440 DATA 201,34,208,3,169,39,9
    ,6,201,32,176 :rem 22
450 DATA 4,24,105,64,96,201,64
    ,176,1,96 :rem 131
460 DATA 201,96,176,4,24,105,3
    ,2,96,201,128 :rem 18
470 DATA 176,4,24,105,64,96,16
    ,9,63,96,144 :rem 249
480 DATA 5,28,159,156,30,31,15
    ,8,129,149,150 :rem 81
490 DATA 151,152,153,154,155,1
    ,9,18,80,82,73 :rem 79
500 DATA 78,84,77,65,75,69,82,
    ,146,32,32 :rem 153
510 DATA 32,32,32,13,0,234,234
    ,234,234,234 :rem 252
520 DATA 234,234,234,234,234,2
    ,34,160,0,177,43 :rem 160
530 DATA 208,15,200,177,43,208
    ,10,173,162,2 :rem 55
540 DATA 133,20,169,0,133,21,9
    ,6,165,43,133 :rem 11
550 DATA 251,165,44,133,252,16
    ,0,0,177,251,133 :rem 161
560 DATA 253,200,177,251,133,2
    ,54,160,0,177,253 :rem 214
570 DATA 208,31,200,177,253,20
    ,8,26,160,2,177 :rem 117
580 DATA 251,133,20,200,177,25
    ,1,133,21,24,165 :rem 153
590 DATA 20,109,162,2,133,20,1
    ,65,21,105,0 :rem 201
600 DATA 133,21,96,165,253,133
    ,251,165,254,133 :rem 216
610 DATA 252,76,169,29,56,165,
    ,45,233,1,133 :rem 30
620 DATA 45,165,46,233,0,133,4
    ,6,96 :rem 141

```

Program 3: Plus/4 and 16 Version

```

100 POKE56,62:CLR:FORI=15872TO
    16369:READA:POKEI,A:X=X+A:
    NEXT
110 IFX<>46904THENPRINT"ERROR
    {SPACE}IN DATA STATEMENTS.
    ":STOP
120 NEW
130 DATA 32,129,157,142,209,0,

```

```

    32,228,63,32
140 DATA 228,63,32,228,63,32,1
    ,40,63,160,63
150 DATA 169,109,32,136,144,16
    ,9,0,141,208,0
160 DATA 169,40,133,5,169,8,13
    ,3,6,169,255
170 DATA 141,212,0,169,40,133,
    ,3,169,12,133
180 DATA 4,32,0,63,160,0,169,1
    ,145,45
190 DATA 32,0,63,145,45,32,0,6
    ,3,165,20
200 DATA 145,45,32,0,63,165,21
    ,145,45,24
210 DATA 165,20,109,209,0,133,
    ,20,144,2,230
220 DATA 21,32,0,63,160,0,140,
    ,210,0,169
230 DATA 153,145,45,32,0,63,16
    ,9,34,145,45
240 DATA 160,0,177,3,201,32,24
    ,0,25,201,96
250 DATA 240,21,177,5,41,15,20
    ,5,212,0,240
260 DATA 12,141,212,0,170,189,
    ,93,63,32,0
270 DATA 63,145,45,177,3,32,7,
    ,63,32,0
280 DATA 63,145,45,230,3,208,2
    ,230,4,230
290 DATA 5,208,2,230,6,165,4,2
    ,01,15,208
300 DATA 6,165,3,201,232,240,3
    ,7,238,210,0
310 DATA 173,210,0,201,25,208,
    ,179,32,0,63
320 DATA 169,34,160,0,145,45,3
    ,2,0,63,169
330 DATA 59,145,45,32,0,63,169
    ,0,168,145
340 DATA 45,76,51,62,160,0,32,
    ,0,63,169
350 DATA 34,145,45,32,0,63,169
    ,59,145,45
360 DATA 32,0,63,169,0,145,45,
    ,32,0,63
370 DATA 145,45,32,0,63,145,45
    ,32,0,63
380 DATA 32,24,136,108,2,3,230
    ,45,208,2
390 DATA 230,46,96,72,16,22,17
    ,3,208,0,208
400 DATA 36,169,1,141,208,0,32
    ,0,63,169
410 DATA 18,160,0,145,45,76,51
    ,63,173,208
420 DATA 0,240,14,169,0,141,20
    ,8,0,32,0
430 DATA 63,169,146,160,0,145,
    ,45,104,41,127
440 DATA 201,34,208,3,169,39,9
    ,6,201,32,176
450 DATA 4,24,105,64,96,201,64
    ,176,1,96
460 DATA 201,96,176,4,24,105,3
    ,2,96,201,128
470 DATA 176,4,24,105,64,96,16
    ,9,63,96,144
480 DATA 5,28,159,156,30,31,15
    ,8,129,149,150
490 DATA 151,152,153,154,155,1
    ,9,18,80,82,73
500 DATA 78,84,77,65,75,69,82,
    ,146,32,32
510 DATA 32,32,32,13,0,234,234
    ,234,234,234
520 DATA 234,234,234,234,234,2
    ,34,160,0,177,43
530 DATA 208,15,200,177,43,208
    ,10,173,209,0
540 DATA 133,20,169,0,133,21,9
    ,6,165,43,133

```


All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

```

[RV$][K$][OFF][K$]{2 SPACES}
"; rem 234
710 PRINT"[RV$][K$][OFF][K$]
[RV$][K$][OFF][K$][RV$][K$]
[OFF][K$][D$][F$][RV$][K$]
[OFF][K$][6 SPACES][RV$][K$]
[OFF][K$][RV$][K$][OFF][K$]
[RV$][K$][OFF][K$]{2 SPACES}
[RV$][K$][OFF][K$]"SPC(10)"
[C$][V$]{2 SPACES}"; rem 145
720 PRINT"[C$][V$][C$][V$] [RV$]
[2 I$][OFF] [C$][RV$][2 I$]
[OFF][V$][5 SPACES][RV$]
[2 I$][OFF] [C$][V$]
[2 SPACES][C$][V$]":RETURN
rem 158
730 DATA 32,45,192,32,218,193,
198,251,208,13,165 rem 71
740 DATA 143,133,251,32,197,19
2,32,49,193,32,28 rem 20
750 DATA 192,165,3,240,232,96,
198,144,208,12,169 rem 77
760 DATA 130,133,144,165,143,2
01,45,240,2,230 rem 148
770 DATA 143,96,160,1,169,20,1
53,110,3,153,120,3 rem 42
780 DATA 136,16,245,165,247,20
8,6,173,122,3,141 rem 15
790 DATA 120,3,169,27,141,17,2
08,162,127,142,13 rem 7
800 DATA 220,232,142,15,212,14
2,18,212,160,23 rem 140
810 DATA 169,0,153,0,212,136,1
6,248,169,1,141,5 rem 0
820 DATA 212,169,15,141,24,212
,169,20,141,1,212 rem 246
830 DATA 169,134,141,20,3,169,
192,141,21,3,169 rem 216
840 DATA 129,141,26,208,169,0,
133,3,133,4,133,5 rem 255
850 DATA 96,169,1,141,25,208,1
65,3,208,36,162,4 rem 17
860 DATA 160,2,169,0,133,2,185
,70,3,157,0,208 rem 157
870 DATA 185,100,3,157,1,208,1
85,80,3,74,38,2 rem 168
880 DATA 202,202,136,16,233,16
5,2,141,16,208,169 rem 56
890 DATA 250,141,18,208,173,13
,220,41,1,240,3,76 rem 46
900 DATA 49,234,76,188,254,165
,4,48,25,24,109,60 rem 79
910 DATA 3,141,60,3,173,70,3,1
05,0,141,70,3,173 rem 236
920 DATA 80,3,105,0,141,80,3,1
6,32,73,255,24,105 rem 37
930 DATA 1,133,2,173,60,3,56,2
29,2,141,60,3,173 rem 248
940 DATA 70,3,233,0,141,70,3,1
73,80,3,233,0,141 rem 237
950 DATA 80,3,165,5,48,18,24,1
09,90,3,141,90,3 rem 215
960 DATA 173,100,3,105,0,141,1
00,3,76,48,193,73 rem 252
970 DATA 255,24,105,1,133,2,17
3,90,3,56,229,2 rem 161
980 DATA 141,90,3,173,100,3,23
3,0,141,100,3,96 rem 193
990 DATA 173,100,3,201,71,176,
7,165,5,16,3,32 rem 159
1000 DATA 205,193,201,212,144,
7,165,5,48,3,32 rem 148
1010 DATA 205,193,173,70,3,201
,27,176,15,174,80 rem 1
1020 DATA 3,208,10,165,4,16,6,
32,172,193,32,185 rem 251

```

```

1030 DATA 193,201,65,144,15,17
3,80,3,240,10,165 rem 249
1040 DATA 4,48,6,32,172,193,32
,185,193,160,1,169 rem 61
1050 DATA 2,133,142,173,80,3,2
17,81,3,208,39,173 rem 49
1060 DATA 70,3,56,249,71,3,201
,9,144,4,201,247 rem 205
1070 DATA 144,24,133,6,173,100
,3,56,249,101,3 rem 148
1080 DATA 133,7,201,9,144,4,20
1,247,144,5,132 rem 150
1090 DATA 142,32,200,194,136,1
6,206,96,32,234 rem 162
1100 DATA 194,165,4,73,255,24,
105,1,133,4,96,173 rem 54
1110 DATA 100,3,201,126,144,12
,201,157,176,8,173 rem 34
1120 DATA 80,3,24,105,1,133,3,
96,32,234,194,165 rem 251
1130 DATA 5,73,255,24,105,1,13
3,5,96,162,1,222 rem 198
1140 DATA 110,3,240,3,76,193,1
94,189,120,3,157 rem 211
1150 DATA 110,3,189,71,3,133,1
39,189,81,3,133 rem 164
1160 DATA 140,189,101,3,133,14
1,165,247,208,78 rem 217
1170 DATA 224,0,208,74,173,80,
3,240,3,56,176,9 rem 213
1180 DATA 173,70,3,201,140,176
,59,201,40,8,160 rem 203
1190 DATA 254,173,100,3,201,14
1,176,5,56,233,1 rem 199
1200 DATA 208,5,24,105,2,208,3
,56,233,1,201,74 rem 189
1210 DATA 176,5,40,169,253,208
,28,201,207,144,5 rem 5
1220 DATA 40,169,254,208,19,20
5,101,3,144,2,160 rem 248
1230 DATA 253,152,40,176,8,73,
3,76,78,194,189,0 rem 25
1240 DATA 220,74,168,176,10,18
9,101,3,201,72,240 rem 47
1250 DATA 3,222,101,3,152,74,1
68,176,10,189,101 rem 253
1260 DATA 3,201,209,240,3,254,
101,3,152,74,168 rem 199
1270 DATA 176,25,189,71,3,221,
245,194,240,17,189 rem 76
1280 DATA 71,3,56,233,1,157,71
,3,189,81,3,233,0 rem 2
1290 DATA 157,81,3,152,74,168,
176,25,189,71,3 rem 187
1300 DATA 221,247,194,240,17,1
89,71,3,24,105,1 rem 206
1310 DATA 157,71,3,189,81,3,10
5,0,157,81,3,152 rem 208
1320 DATA 74,176,0,32,115,193,
228,142,208,15,165 rem 57
1330 DATA 139,157,71,3,165,140
,157,81,3,165,141 rem 10
1340 DATA 157,101,3,202,16,1,9
6,76,220,193,32 rem 154
1350 DATA 234,194,138,72,165,6
,24,105,9,170,189 rem 24
1360 DATA 19,195,133,4,165,7,2
4,105,9,170,189,2 rem 16
1370 DATA 195,133,5,166,146,13
4,143,104,170,96 rem 224
1380 DATA 169,128,141,4,212,16
9,129,141,4,212,96 rem 66
1390 DATA 35,184,169,54,55,50,
39,0,0,1,254,255 rem 220
1400 DATA 255,149,149,180,180,
210,210,240,0,0,5 rem 242
1410 DATA 25,45,75,75,106,106,
106,132,138,149 rem 169
1420 DATA 160,171,182,193,204,
204,215,226,237 rem 163
1430 DATA 248,52,67,82,82,97,1
16,120,0,0,0,0,0,0 rem 31
1440 DATA 0,0,0,0,0,0,0,0,0,0,
248,0,1,252,0,3 rem 82
1450 DATA 254,0,3,254,0,3,254,

```

```

0,3,254,0,1,252,0 rem 223
1460 DATA 0,248,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0 rem 159
1470 DATA 0,0,0,0,0,0,0,0,0,25
5,0,0,0,0,0,0,0,0 rem 158
1480 DATA 0,0,0,0,0,254,0,3,25
5,128,3,255,128,7 rem 233
1490 DATA 255,192,7,255,192,7,
255,192,7,255,192 rem 37
1500 DATA 7,255,192,3,255,128,
3,255,128,0,254,0 rem 2
1510 DATA 0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0 rem 45
1520 DATA 165,231,231,231,231,231,
231,231,0,0,0,0 rem 122
1530 DATA 231,231,231,231,231,
231 rem 67

```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

The New MLX

Article on page 42.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

```

100 POKE 56,50:CLR:DIM IN$,I,J
,A,B,AS,BS,A(7),N$ rem 34
110 C4=48:C6=16:C7=7:Z2=2:Z4=2
54:Z5=255:Z6=256:Z7=127
rem 238
120 FA=PEEK(45)+Z6*PEEK(46):BS
=PEEK(55)+Z6*PEEK(56):H$="
0123456789ABCDEF" rem 118
130 R$=CHR$(13):L$="{LEFT}":S$
="":D$=CHR$(20):Z$=CHR$(0
):T$="{13 RIGHT}": rem 173
140 SD=54272:FOR I=SD TO SD+23
:POKE I,0:NEXT:POKE SD+24,
15:POKE 788,52 rem 194
150 PRINT"[CLR]"CHR$(142)CHR$(
8):POKE 53280,15:POKE 5328
1,15 rem 104
160 PRINT T$ "[RED][RV$]
[2 SPACES]{8 @}{2 SPACES}"
SPC(28)"[2 SPACES][OFF]
[BLU] MLX II [RED][RV$]
[2 SPACES]"SPC(28)"
[12 SPACES][BLU]" rem 121
170 PRINT"[3 DOWN][3 SPACES]CO
MPUTE!'S MACHINE LANGUAGE
[SPACE]EDITOR[3 DOWN]"
rem 135
180 PRINT"[BLK]STARTING ADDR$
SE4$":GOSUB300:SA=AD:GOSU
B1040:IF F THEN180 rem 113
190 PRINT"[BLK]{2 SPACES}ENDIN
G ADDR$E4$":GOSUB300:EA
=AD:GOSUB1030:IF F THEN190
rem 173
200 INPUT"[3 DOWN][BLK]CLEAR W
ORKSPACE [Y/N]{4$}":AS:IF L
EFT$(AS,1)<>"Y"THEN220
rem 9
210 PRINT"[2 DOWN][BLU]WORKING
. . .":FORI=BS TO BS+EA-SA+

```

```

7:POKE I,0:NEXT:PRINT"DONE
" :rem 139
220 PRINTTAB(10)"[2 DOWN]{BLK}
{RVS} MLX COMMAND MENU
{DOWN}[43]:PRINT T$"{RVS}E
{OFF}NTER DATA" :rem 62
230 PRINT T$"{RVS}D{OFF}ISPLAY
DATA":PRINT T$"{RVS}L
{OFF}OAD DATA" :rem 19
240 PRINT T$"{RVS}S{OFF}AVE FI
LE":PRINT T$"{RVS}Q{OFF}UI
T{2 DOWN}{BLK}" :rem 238
250 GET A$:IF A$=N$ THEN250
:rem 127
260 A=0:FOR I=1 TO 5:IF A$=MID
$("EDLSQ",I,1)THEN A=I:I=5
:rem 42
270 NEXT:ON A GOTO420,610,690,
700,280:GOSUB1060:GOTO250
:rem 97
280 PRINT"[RVS] QUIT ":INPUT"
{DOWN}[43]ARE YOU SURE [Y/N
]";A$:IF LEFT$(A$,1)<>"Y"TH
HEN220 :rem 189
290 POKE SD+24,0:END :rem 95
300 IN$=N$:AD=0:INPUTIN$:IFLEN
(IN$)<>4THENRETURN :rem 31
310 B$=IN$:GOSUB320:AD=A:B$=MI
D$(IN$,3):GOSUB320:AD=AD*2
56+A:RETURN :rem 225
320 A=0:FOR J=1 TO 2:A$=MID$(B
$,J,1):B=ASC(A$)-C4+(A$*0
")*C7:A=A*C6+B :rem 143
330 IF B<0 OR B>15 THEN AD=0:A
=-1:J=2 :rem 132
340 NEXT:RETURN :rem 240
350 B=INT(A/C6):PRINT MID$(H$,
B+1,1):B=A-B*C6:PRINT MID
$(H$,B+1,1):RETURN:rem 42
360 A=INT(AD/Z6):GOSUB350:A=AD
-A*Z6:GOSUB350:PRINT":":
:rem 32
370 CK=INT(AD/Z6):CK=AD-Z4*CK+
Z5*(CK>Z7):GOTO390:rem 131
380 CK=CK*Z2+Z5*(CK>Z7)+A
:rem 168
390 CK=CK+Z5*(CK>Z5):RETURN
:rem 159
400 PRINT"[DOWN]STARTING AT[43]
":GOSUB300:IF IN$<N$ THE
N GOSUB1030:IF F THEN400
:rem 75
410 RETURN :rem 117
420 PRINT"[RVS] ENTER DATA ":G
OSUB400:IF IN$=N$ THEN220
:rem 85
430 OPEN3,3:PRINT :rem 34
440 POKE198,0:GOSUB360:IF F TH
EN PRINT IN$:PRINT"[UP]
{5 RIGHT}"; :rem 6
450 FOR I=0 TO 24 STEP 3:B$=S$
:FOR J=1 TO 2:IF F THEN B$
=MID$(IN$,I+J,1) :rem 226
460 PRINT"[RVS]"B$LS$;:IF I<24T
HEN PRINT"[OFF]"; :rem 15
470 GET A$:IF A$=N$ THEN470
:rem 135
480 IF(A$>"/"ANDAS<":")OR(A$>
@"ANDAS<"G")THEN540
:rem 100
490 IF A$=R$ AND((I=0)AND(J=1)
OR F)THEN PRINT B$;:J=2:NE
XT:I=24:GOTO550 :rem 46
500 IF A$="{HOME}" THEN PRINT
[SPACE]B$:J=2:NEXT:I=24:NE
XT:F=0:GOTO440 :rem 66
510 IF(A$="{RIGHT}")ANDF THENP
RINT B$LS$;:GOTO540:rem 107
520 IF A$<>L$ AND A$<>D$ OR((I
=0)AND(J=1))THEN GOSUB1060
:GOTO470 :rem 232
530 A$=L$+S$+L$:PRINT B$LS$;:J=

```

```

2-J:IF J THEN PRINT L$;:I=
I-3 :rem 12
540 PRINT A$;:NEXT J:PRINT S$;
:rem 2
550 NEXT I:PRINT:PRINT"[UP]
{5 RIGHT}";:INPUT#3,IN$:IF
IN$=N$ THEN CLOSE3:GOTO22
0 :rem 106
560 FOR I=1 TO 25 STEP3:B$=MID
$(IN$,I):GOSUB320:IF I<25
[SPACE]THEN GOSUB380:A(I/3
)=A :rem 81
570 NEXT:IF A<>CK THEN GOSUB10
60:PRINT"[BLK]{RVS} ERROR:
REENTER LINE [43]":F=1:GOT
0440 :rem 161
580 GOSUB1080:B=BS+AD-SA:FOR I
=0 TO 7:POKE B+I,A(I):NEXT
:rem 245
590 AD=AD+8:IF AD>EA THEN CLOS
E3:PRINT"[DOWN]{BLU}** END
OF ENTRY **{BLK}[2 DOWN]"
:GOTO700 :rem 207
600 F=0:GOTO440 :rem 84
610 PRINT"[CLR]{DOWN}{RVS} DIS
PLAY DATA ":GOSUB400:IF IN
$=N$ THEN220 :rem 146
620 PRINT"[DOWN]{BLU}PRESS:
{RVS}SPACE{OFF} TO PAUSE,
[SPACE]{RVS}RETURN{OFF} TO
BREAK[43]{DOWN}"; :rem 241
630 GOSUB360:B=BS+AD-SA:FORI=B
TO B+7:A=PEEK(I):GOSUB350:
GOSUB380:PRINT S$; :rem 56
640 NEXT:PRINT"[RVS]";:A=CK:GO
SUB350:PRINT :rem 144
650 F=1:AD=AD+8:IF AD>EA THENP
RINT"[DOWN]{BLU}** END OF
[SPACE]DATA **":GOTO220
:rem 170
660 GET A$:IF A$=R$ THEN GOSUB
1080:GOTO220 :rem 65
670 IF A$=S$ THEN F=F+1:GOSUB1
080 :rem 28
680 ONFGOTO630,660,630:rem 224
690 PRINT"[DOWN]{RVS} LOAD DAT
A ":OP=1:GOTO710 :rem 31
700 PRINT"[DOWN]{RVS} SAVE FIL
E ":OP=0 :rem 32
710 IN$=N$:INPUT"[DOWN]FILENAM
E[43]";IN$:IF IN$=N$ THEN22
0 :rem 229
720 F=0:PRINT"[DOWN]{BLK}{RVS}
T{OFF}APE OR {RVS}D{OFF}IS
K: [43]"; :rem 66
730 GET A$:IF A$="T"THEN PRINT
"TDOWN":GOTO880 :rem 90
740 IF A$<>"D"THEN730 :rem 90
750 PRINT"D[DOWN]":OPEN15,8,15
,"I0":B=EA-SA:IN$="0:"+IN
$:IF OP THEN810 :rem 163
760 OPEN 1,8,8,IN$+"P,W":GOSU
B860:IF A THEN220 :rem 66
770 AH=INT(SA/256):AL=SA-(AH*2
56):PRINT#1,CHR$(AL);CHR$(
AH); :rem 221
780 FOR I=0 TO B:PRINT#1,CHR$(
PEEK(BS+I));:IF ST THEN800
:rem 171
790 NEXT:CLOSE1:CLOSE15:GOTO94
0 :rem 230
800 GOSUB1060:PRINT"[DOWN]
{BLK}ERROR DURING SAVE:[43]
":GOSUB860:GOTO220 :rem 61
810 OPEN 1,8,8,IN$+"P,R":GOSU
B860:IF A THEN220 :rem 57
820 GET#1,A$,B$:AD=ASC(A$+Z$)+
256*ASC(B$+Z$):IF AD<>SA T
HEN F=1:GOTO850 :rem 155
830 FOR I=0 TO B:GET#1,A$:POKE
BS+I,ASC(A$+Z$):IF ST AND
(I<>B)THEN F=2:AD=I:I=B
:rem 180

```

```

840 NEXT:IF ST<>64 THEN F=3
:rem 20
850 CLOSE1:CLOSE15:ON ABS(F>0)
+1 GOTO960,970 :rem 12
860 INPUT#15,A,A$:IF A THEN CL
OSE1:CLOSE15:GOSUB1060:PRI
NT"[RVS]ERROR: "A$;:rem 114
870 RETURN :rem 127
880 POKE183,PEEK(FA+2):POKE187
,PEEK(FA+3):POKE188,PEEK(F
A+4):IFOP=0THEN920:rem 178
890 SYS 63466:IF(PEEK(783)AND1
)THEN GOSUB1060:PRINT"
{DOWN}{RVS} FILE NOT FOUND
":GOTO690 :rem 34
900 AD=PEEK(829)+256*PEEK(830)
:IF AD<>SA THEN F=1:GOTO97
0 :rem 201
910 A=PEEK(831)+256*PEEK(832)-
1:F=F-2*(A<EA)-3*(A>EA):AD
=A-AD:GOTO930 :rem 75
920 A=SA:B=EA+1:GOSUB1010:POKE
780,3:SYS 63338 :rem 107
930 A=BS:B=BS+(EA-SA)+1:GOSUB1
010:ON OP GOTO950:SYS 6359
1 :rem 38
940 GOSUB1080:PRINT"[BLU]** SA
VE COMPLETED **":GOTO220
:rem 139
950 POKE147,0:SYS 63562:IF ST<
>64 THEN970 :rem 39
960 GOSUB1080:PRINT"[BLU]** LO
AD COMPLETED **":GOTO220
:rem 126
970 GOSUB1060:PRINT"[BLK]{RVS}
ERROR DURING LOAD:[DOWN]
[43]":ON F GOSUB980,990,100
0:GOTO220 :rem 233
980 PRINT"INCORRECT STARTING A
DDRESS ("":GOSUB360:PRINT"
)":RETURN :rem 145
990 PRINT"LOAD ENDED AT "":AD=
SA+AD:GOSUB360:PRINT D$:RE
TURN :rem 159
1000 PRINT"TRUNCATED AT ENDING
ADDRESS":RETURN :rem 166
1010 AH=INT(A/256):AL=A-(AH*25
6):POKE193,AL:POKE194,AH
:rem 95
1020 AH=INT(B/256):AL=B-(AH*25
6):POKE174,AL:POKE175,AH:
RETURN :rem 122
1030 IF AD<SA OR AD>EA THEN105
0 :rem 135
1040 IF(AD>511 AND AD<40960)OR
(AD>49151 AND AD<53248)TH
EN GOSUB1080:F=0:RETURN
:rem 104
1050 GOSUB1060:PRINT"[RVS] INV
ALID ADDRESS {DOWN}{BLK}"
:F=1:RETURN :rem 224
1060 POKE SD+5,31:POKE SD+6,20
8:POKE SD,240:POKE SD+1,4
:POKE SD+4,33 :rem 19
1070 FOR S=1 TO 100:NEXT:GOTO1
090 :rem 90
1080 POKE SD+5,8:POKE SD+6,240
:POKE SD,0:POKE SD+1,90:P
OKE SD+4,17 :rem 182
1090 FOR S=1 TO 100:NEXT:POKE
[SPACE]SD+4,0:POKE SD,0:P
OKE SD+1,0:RETURN :rem 8

```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

REM Highlighter

Article on page 108.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

Program 1: REM Highlighter—64 Disk Version

```
6 N=198:P=631:POKE53281,6
      :rem 146
10 PRINT"{CLR}"CHR$(14)CHR$(8)
   PRINT"[7]REM {RVS}HIGHLIGH
   TER{DOWN}
      :rem 191
12 INPUT"[2 DOWN]PROGRAM NAME"
   ;N$:IFN$=""THENPRINT"[5 UP]
   ":GOTO12
      :rem 166
14 Q$=CHR$(34):PRINT"{CLR}
   {22 DOWN}LOADING {DOWN}":PR
   INTN$"{HOME}{BLU}LOAD"Q$N$Q
   $",8
      :rem 164
16 PRINT"{4 DOWN}63994S=PE(S)+
   PE(S+1)*256
      :rem 185
18 PRINT"63995IFPE(S+4)=143TH?
   "Q$"{HOME}{CYN}"Q$"PE(S+2)+
   PE(S+3)*256:T=S+4:GOS63997
      :rem 116
20 PRINT"63996ON-(S<>.)G063994
   :?"Q$"{CLR}{BLU}"Q$";:G0639
   99
      :rem 153
22 PRINT"63997T=T+1:IFPE(T)=.T
   HRET
      :rem 219
24 PRINT"63998ON-(PE(T)=32)G06
   3997:POT+(T>S+5),18:RET
      :rem 111
26 PRINT"63999POP,19:FOI=1TO6:
   POP+I,13:763993+I:NE:POP+I,
   154:PON,8
      :rem 242
28 PRINT"?Q$"{6 DOWN}{RVS}
   {CYN}HIGHLIGHTING"Q$":N=198
   :P=631:S=43:G063994:REM 175
30 POKEP,19:FORI=1TO8:POKEP+I,
   13:NEXT:POKEN,9
      :rem 125
```

Program 2: REM Highlighter—128 Disk Version

```
10 N=208:P=842:COLOR0,7:BANK0
12 PRINT"{CLR}"CHR$(14)CHR$(8)
   :PRINT"[7]REM {RVS}HIGHLIGH
   TER{DOWN}
14 INPUT"[2 DOWN]PROGRAM NAME"
   ;N$:IFN$=""THENPRINT"[5 UP]
   ":GOTO14
16 Q$=CHR$(34):PRINT"{CLR}
   {22 DOWN}LOADING {DOWN}":PR
   INTN$"{HOME}{BLU}LOAD"Q$N$Q
   $",8
18 PRINT"{4 DOWN}63994S=PEE(S)
   +PEE(S+1)*256
20 PRINT"63995IFPEE(S+4)=143TH
   ?"Q$"{HOME}{CYN}"Q$"PEE(S+2)
   )+PEE(S+3)*256:T=S+4:GOS639
   97
22 PRINT"63996ON-(S<>.)G063994
   :?"Q$"{CLR}{BLU}"Q$";:G0639
   99
```

```
24 PRINT"63997T=T+1:IFPEE(T)=.
   THRET
26 PRINT"63998ON-(PEE(T)=32)GO
   63997:POKT+(T>S+5),18:RET
28 PRINT"63999POKP,19:FOI=1TO6
   :POKP+I,13:763993+I:NE:POKP
   +I,154:POKN,8
30 PRINT"?Q$"{6 DOWN}{RVS}
   {WHT}HIGHLIGHTING"Q$":N=208
   :P=842:S=45:G063994
32 POKEP,19:FORI=1TO8:POKEP+I,
   13:NEXT:POKEN,9
```

Program 3: REM Highlighter—VIC Disk Version

```
10 PRINT"{CLR}"CHR$(14)CHR$(8)
   :POKE36879,25:PRINT"{BLU}RE
   M {RVS}HIGHLIGHTER
      :rem 64
12 INPUT"[2 DOWN]PROGRAM":N$:I
   FN$=""THENPRINT"[5 UP]":GOT
   O12
      :rem 132
14 Q$=CHR$(34):PRINT"{CLR}
   {22 DOWN}LOAD{4 SPACES}
   {GRN}"N$"{HOME}{WHT}LOAD"Q$
   N$Q$",8
      :rem 242
16 PRINT"{4 DOWN}63994S=PE(S)+
   PE(S+1)*256
      :rem 185
18 PRINT"63995IFPE(S+4)=143THT
   =S+4:GOS63997
      :rem 184
20 PRINT"63996ON-(S<>.)G063994
   :G063999
      :rem 193
22 PRINT"63997T=T+1:IFPE(T)=.T
   HRET
      :rem 219
24 PRINT"63998ON-(PE(T)=32)G06
   3997:POT+1*(T>S+5),18:RET
      :rem 202
26 PRINT"63999?"Q$"{CLR}"Q$";:
   POP,19:FOI=1TO6:POP+I,13:76
   3993+I:NE:POP+I,31:PO198,8
      :rem 201
28 PRINT"?Q$"{RVS}{BLU}HILIGH
   T{HOME}{WHT}"Q$":P=631:S=PE
   (43)+PE(44)*256:G063995
   {HOME}
      :rem 71
30 POKE631,19:FORI=1TO8:POKE63
   1+I,13:NEXT:POKE198,9
      :rem 101
```

Program 4: REM Highlighter—Tape Version

Plus/4, 16, and 128 owners: See modifications in article.

```
63993 PRINT"{CLR}":N=198:P=631
   :S=PEEK(43)+PEEK(44)*256
   :GOTO63995
      :rem 52
63994 S=PEEK(S)+PEEK(S+1)*256
      :rem 127
63995 IFPEEK(S+4)=143THENPRINT
   "{HOME}"PEEK(S+2)+PEEK(S
   +3)*256:T=S+4:GOSUB63997
      :rem 55
63996 ON-(S<>.)GOTO63994:GOTO6
   3999
      :rem 246
63997 T=T+1:IFPEEK(T)=.THENRET
   URN
      :rem 96
63998 ON-(PEEK(T)=32)GOTO63997
   :POKET+1*(T>S+5),18:RETU
   RN
      :rem 109
63999 PRINT"{CLR}":POKEP,19:F
   ORI=1TO8:POKEP+I,13:PRIN
   T63991+I:NEXT:POKEN,9
      :rem 78
```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

Off-Screen Trace

See instructions in article on page 115 before typing in.

```
8800:78 A9 C0 20 6E 89 A9 80 3F
8808:20 6E 89 A9 80 20 96 89 CB
8810:AJ 00 20 50 8A A9 00 8D 03
8318:C0 8B A9 0C 8D EE 8B A9 4B
8820:84 8D EF 8B A9 3F 8D F0 E3
8828:8B A9 95 8D F1 8B A9 14 1A
8830:8D F2 8B A9 01 8D F3 8B 82
8838:A9 1B 8D F4 8B A9 00 8D 76
8840:F5 8B AD 02 03 8D F3 8A C5
8848:AD 03 03 8D F4 8A AD 08 5F
8850:03 8D F5 8A AD 09 03 8D D2
8858:F6 8A AD 14 03 8D F7 8A 47
8860:AD 15 03 8D F8 8A A9 C4 D0
8868:8D 02 03 A9 88 8D 03 03 3F
8870:A9 D3 8D 08 03 A9 88 8D DA
8878:09 03 A9 53 8D 14 03 A9 A5
8880:89 8D 15 03 20 BA 8A A9 37
8888:93 2D D2 FF 20 BA 8A A9 70
8890:84 85 38 58 20 60 A6 4C ED
8898:86 E3 78 20 B1 8A AD F3 FD
88A0:8A 8D 02 03 AD F4 8A 8D AE
88A8:03 03 AD F5 8A 8D 08 03 AE
88B0:AD F6 8A 8D 09 03 AD F7 28
88B8:8A 8D 14 03 AD F8 8A 8D 19
88C0:15 03 58 60 A9 7F 2D F9 CD
88C8:8A 8D F9 8A A9 00 85 6C 89
88D0:6C F3 8A A5 7A 48 A5 7B 7C
88D8:48 C9 03 80 22 20 73 00 64
88E0:C9 9A F0 11 C9 89 F0 0D 10
88E8:C9 8D F0 09 C9 8A D0 0D 18
88F0:A9 00 8D FA 8A A9 80 0D 41
88F8:F9 8A 8D F9 8A D0 4A 20 47
8900:B1 8A 20 1C 8A 20 E1 FF EC
8908:F0 16 A6 C5 E0 26 D0 0A 95
8910:A9 04 2C 8D 02 F0 03 20 51
8918:BA 8A A5 C5 C9 3C D0 E5 03
8920:20 B1 8A 20 73 00 C9 8D BF
8928:D0 09 EE FA 8A EE FA 8A 04
8930:4C 49 89 C9 8E D0 09 CE 22
8938:FA 8A CE FA 8A 4C 49 89 96
8940:C9 8A D0 05 A9 00 8D FA A8
8948:8A 68 85 7B 68 85 7A 6C DD
8950:F5 8A 60 08 78 A9 04 2C 2C
8958:8D 02 F0 0E A5 C5 C9 26 AF
8960:D0 08 2C F9 8A 30 03 2J 3E
8968:BA 8A 28 6C F7 8A 08 78 B9
8970:85 05 A9 8B 85 06 A9 C7 D4
8978:85 03 A9 00 85 04 8D FC 98
8980:8A A9 2E 8D FB 8A 20 76 A2
8988:8A AD 86 02 91 05 C8 AD 1D
8990:88 02 91 05 28 60 08 78 36
8998:85 05 A9 8B 85 06 A0 30 53
89A0:AD 02 DD 91 05 C8 AD 00 86
89A8:DD 91 05 C8 AD 18 D0 91 3D
89B0:05 C8 AD 21 D0 91 05 C8 DF
89B8:AD 11 D0 91 05 C8 AD 15 D5
89C0:D0 91 05 28 60 08 78 85 5D
89C8:03 A9 8B 85 04 A0 30 B1 46
89D0:03 8D 02 DD C8 B1 03 8D 87
89D8:00 DD C8 B1 03 8D 18 D0 E6
89E0:C8 B1 03 8D 21 D0 C8 B1 8D
89E8:03 8D 11 D0 C8 B1 03 8D B0
89F0:15 D0 28 60 08 78 85 03 FD
89F8:A9 8B 85 04 A9 C7 85 05 31
8A00:A9 00 85 06 8D FC 8A A9 1A
8A08:2E 8D FB 8A 20 76 8A B1 61
8A10:03 8D 86 02 C8 B1 03 8D 9B
8A18:88 02 28 60 A9 80 20 6E FA
8A20:89 A0 00 20 50 8A A9 C0 E4
8A28:20 F4 89 A9 20 AC FA 8A 8A
8A30:F0 06 20 D2 FF 88 D0 FA 2F
8A38:20 C9 BD A9 0D 20 D2 FF B0
8A40:A9 C0 20 6E 89 A9 80 20 59
8A48:F4 89 A0 01 20 50 8A 00 16
8A50:A9 D8 A2 8C C0 00 D0 06 3B
8A58:85 04 86 06 F0 04 85 06 0B
8A60:86 04 A9 00 85 03 05 37
8A68:A9 E8 8D FB 8A A9 83 8D 8C
8A70:FC 8A 20 76 8A 60 A0 00 29
```

```

8A78:AE FC 8A F0 0E B1 03 91 53
8A80:05 C8 D0 F9 E6 04 E6 06 1F
8A88:CA D0 F2 AE FB 8A F0 08 74
8A90:B1 03 91 05 C8 CA D0 F8 CD
8A98:60 A9 0C A0 00 99 00 D8 13
8AA0:99 00 D9 99 00 DA C0 E8 2D
8AAB:80 03 99 00 DB 88 D0 ED 9A
8AB0:60 2C F9 8A 50 03 20 BA 72
8ABB:8A 60 2C F9 8A 50 0F A9 AD
8AC0:C0 20 6E 89 A0 01 20 50 3E
8AC8:8A A9 80 4C E2 8A A9 80 77
8AD0:20 96 89 A9 80 20 6E 89 52
8ADB:A0 00 20 50 8A 20 99 8A D9
8AE0:A5 C0 48 20 F4 89 68 20 C4
8AEB:C9 89 A9 40 4D F9 8A 8D 71
8AF0:F9 8A 60 00 00 00 00 B1
8AF8:00 00 00 00 00 00 00 0E

```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

BASIC Backup

Article on page 97.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

```

100 PRINT "{CLR}LOADING... PLEASE
E WAIT.":POKE56334,PEEK(56
334)AND254 :rem 29
110 FORI=679TO767:READA:POKEI,
A:X=X+A:NEXT :rem 174
120 FORI=4096TO41996:READA:PO
KEI,A:X=X+A:NEXT :rem 117
130 IFX<129717THENPRINT"ERROR
IN DATA.":STOP :rem 25
140 POKE788,167:POKE789,2:POKE
56334,PEEK(56334)OR1
:rem 139
150 REM PART 1 DATA :rem 252
160 DATA 173,251,2,240,13,206,
251,2,208,8 :rem 208
170 DATA 169,30,141,251,2,238,
32,208,165,157 :rem 118
180 DATA 13,141,2,201,132,208,
20,165,197,201 :rem 96
190 DATA 4,208,11,165,1,41,254
,133,1,32 :rem 106
200 DATA 0,160,133,1,76,49,234
,173,250,2 :rem 158
210 DATA 240,248,162,2,222,253
,2,208,241,157 :rem 104
220 DATA 253,2,202,208,245,238
,253,2,208,230 :rem 103
230 DATA 173,32,208,141,252,2,
169,1,141,251 :rem 53
240 DATA 2,208,217,0,0,0,0,0
:rem 150
250 REM PART 2 DATA :rem 254
260 DATA 32,231,255,169,49,141
,20,3,169,234 :rem 70
270 DATA 141,21,3,32,31,161,17
3,251,2,240 :rem 199
280 DATA 6,173,252,2,141,32,20
8,32,240,161 :rem 4
290 DATA 32,49,161,8,162,11,16
0,0,24,32 :rem 112
300 DATA 240,255,40,176,10,162

```

```

,150,32,174,162 :rem 151
310 DATA 208,3,32,78,160,120,1
69,167,141,20 :rem 59
320 DATA 3,169,2,141,21,3,162,
4,160,164 :rem 107
330 DATA 32,48,162,165,1,9,1,9
6,173,84 :rem 83
340 DATA 163,201,84,240,39,162
,2,189,251,162 :rem 118
350 DATA 157,51,163,202,16,247
,165,2,160,163 :rem 114
360 DATA 162,51,24,105,3,32,18
9,255,162,8 :rem 225
370 DATA 160,15,152,32,186,255
,32,192,255,169 :rem 178
380 DATA 15,32,195,255,162,1,1
89,254,162,157 :rem 132
390 DATA 52,163,202,16,247,162
,1,173,84,163 :rem 70
400 DATA 201,84,8,240,2,162,8,
160,255,169 :rem 221
410 DATA 1,32,186,255,165,2,16
0,163,162,54 :rem 13
420 DATA 40,240,5,162,52,24,10
5,2,32,189 :rem 160
430 DATA 255,166,45,164,46,169
,43,32,216,255 :rem 133
440 DATA 8,162,2,189,0,163,157
,51,163,202 :rem 222
450 DATA 16,247,40,176,82,173,
98,163,201,78 :rem 87
460 DATA 240,75,162,8,173,84,1
63,201,68,240 :rem 75
470 DATA 9,162,178,32,174,162,
208,59,162,1 :rem 31
480 DATA 160,0,169,1,32,186,25
5,165,2,162 :rem 225
490 DATA 54,160,163,32,189,255
,169,1,166,43 :rem 85
500 DATA 164,44,32,213,255,176
,30,32,183,255 :rem 115
510 DATA 162,3,41,16,240,2,162
,7,160,3 :rem 54
520 DATA 189,233,163,153,253,1
63,202,136,16,246 :rem 15
530 DATA 162,241,160,163,32,48
,162,96,72,169 :rem 129
540 DATA 1,133,205,169,0,240,1
3,72,169,1 :rem 162
550 DATA 72,133,205,88,120,165
,207,208,250,104 :rem 213
560 DATA 133,204,88,104,96,169
,54,133,253,160 :rem 179
570 DATA 12,162,3,169,16,32,66
,162,132,2 :rem 170
580 DATA 176,238,169,84,133,25
3,160,12,162,5 :rem 131
590 DATA 169,1,32,66,162,176,2
23,173,84,163 :rem 85
600 DATA 201,84,240,8,201,68,2
08,230,166,2 :rem 8
610 DATA 240,209,169,98,133,25
3,160,12,162,6 :rem 121
620 DATA 169,1,32,66,162,176,1
93,173,98,163 :rem 90
630 DATA 201,89,240,4,201,78,2
08,230,169,113 :rem 115
640 DATA 133,253,160,12,162,8,
169,3,32,66 :rem 224
650 DATA 162,176,167,132,253,1
60,0,132,254,162 :rem 215
660 DATA 2,189,113,163,221,3,1
63,208,5,202 :rem 10
670 DATA 16,245,48,60,185,113,
163,201,48,144 :rem 124
680 DATA 213,201,58,176,209,56
,233,48,170,165 :rem 182
690 DATA 254,10,176,200,133,25
4,10,176,195,10 :rem 162
700 DATA 176,192,101,254,176,1
88,133,254,138,101 :rem 67
710 DATA 254,176,181,133,254,2

```

```

00,198,253,208,210 :rem 62
720 DATA 141,249,162,73,255,17
0,232,240,165,142 :rem 11
730 DATA 250,162,160,60,140,25
0,2,169,60,141 :rem 103
740 DATA 254,2,141,255,2,173,2
50,162,141,253 :rem 109
750 DATA 2,169,0,141,251,2,162
,2,189,3 :rem 68
760 DATA 163,157,113,163,202,1
6,247,162,2,189 :rem 174
770 DATA 6,163,157,129,163,157
,145,163,202,16 :rem 179
780 DATA 244,173,250,2,240,30,
173,249,162,162 :rem 168
790 DATA 113,32,201,162,173,25
1,2,8,173,253 :rem 62
800 DATA 2,162,145,40,208,7,73
,255,24,105 :rem 218
810 DATA 1,162,129,32,201,162,
162,9,160,163 :rem 57
820 DATA 134,253,132,254,160,0
,177,253,240,6 :rem 111
830 DATA 32,210,255,200,208,24
6,24,96,133,251 :rem 161
840 DATA 24,32,240,255,169,163
,133,254,169,0 :rem 123
850 DATA 133,252,32,22,161,32,
228,255,208,5 :rem 64
860 DATA 32,225,255,208,246,32
,31,161,56,240 :rem 118
870 DATA 74,201,13,240,56,164,
252,201,20,240 :rem 103
880 DATA 21,196,251,240,223,20
1,32,144,219,201 :rem 206
890 DATA 91,176,215,145,253,32
,210,255,230,252 :rem 221
900 DATA 208,206,192,0,240,202
,198,252,32,210 :rem 154
910 DATA 255,196,251,240,9,177
,253,136,145,253 :rem 234
920 DATA 200,200,208,243,136,1
69,32,145,253,208 :rem 5
930 DATA 177,164,251,136,177,2
53,201,32,208,3 :rem 172
940 DATA 136,16,247,200,24,96,
160,163,32,48 :rem 74
950 DATA 162,162,207,160,163,3
2,48,162,32,225 :rem 168
960 DATA 255,240,7,32,228,255,
201,67,208,244 :rem 127
970 DATA 201,67,96,134,253,162
,163,134,254,170 :rem 229
980 DATA 160,2,169,32,145,253,
136,16,251,138 :rem 126
990 DATA 200,162,0,200,56,233,
10,232,176,251 :rem 102
1000 DATA 202,105,58,72,177,25
3,200,145,253,136 :rem 0
1010 DATA 136,16,247,104,200,1
45,253,138,208,227 :rem 50
1020 DATA 96,0,0,83,48,58,48,5
8,32,58 :rem 39
1030 DATA 32,79,70,70,48,32,32
,147,13,32 :rem 168
1040 DATA 18,32,32,40,40,40,32
,66,65,67 :rem 115
1050 DATA 75,85,80,32,32,85,84
,73,76,73 :rem 145
1060 DATA 84,89,32,41,41,41,32
,32,13,13 :rem 112
1070 DATA 32,70,73,76,69,78,65
,77,69,32 :rem 156
1080 DATA 58,32,66,65,67,75,85
,80,32,32 :rem 144
1090 DATA 32,32,32,32,32,32,32
,32,13,13 :rem 96
1100 DATA 32,68,73,83,75,47,84
,65,80,69 :rem 149
1110 DATA 58,32,68,13,32,86,69
,82,73,70 :rem 138
1120 DATA 89,32,32,32,58,32,89

```

```

,13,13,32 :rem 122
1130 DATA 73,78,84,69,82,86,65 :rem 161
,76,32,58 :rem 161
1140 DATA 32,79,70,70,13,32,82 :rem 138
,69,77,65 :rem 138
1150 DATA 73,78,73,78,71,58,32 :rem 136
,32,32,32 :rem 136
1160 DATA 13,32,79,86,69,82,68 :rem 157
,85,69,32 :rem 157
1170 DATA 32,58,32,32,32,32,13 :rem 50
,0,13,32 :rem 50
1180 DATA 18,32,32,32,32,82,69 :rem 144
,65,68,89 :rem 144
1190 DATA 32,70,79,82,32,66,65 :rem 153
,67,75,85 :rem 153
1200 DATA 80,32,32,32,32,0,13, :rem 43
13,32,18 :rem 43
1210 DATA 32,82,69,87,73,78,68 :rem 154
,32,84,65 :rem 154
1220 DATA 80,69,32,70,79,82,32 :rem 148
,86,69,82 :rem 148
1230 DATA 73,70,89,32,0,13,32, :rem 59
32,32,32 :rem 59
1240 DATA 84,89,80,69,32,67,32 :rem 153
,84,79,32 :rem 153
1250 DATA 67,79,78,84,73,78,85 :rem 163
,69,13,13 :rem 163
1260 DATA 0,71,79,79,68,66,65, :rem 100
68,33,13 :rem 100
1270 DATA 13,32,18,32,86,69,82 :rem 144
,73,70,89 :rem 144
1280 DATA 32,32,32,32,32,32,13 :rem 49
,0,13,82 :rem 49
1290 DATA 69,65,68,89,46,13,0 :rem 165

```

All Commodore 64 programs in this issue work with the Commodore 128 in 64 mode.

BASIC Windows

Article on page 106.

BEFORE TYPING . . .

Before typing in programs, please refer to "How To Type In COMPUTE!'s GAZETTE Programs," which appears before the Program Listings.

```

100 H=6:W=18:REM HEIGHT AND WI :rem 26
DTH OF WINDOW :rem 26
110 R=10:C=10:REM ROW AND COLU :rem 201
MN POSITION :rem 201
120 DIM S(H-1,W-1):REM SCREEN :rem 16
{SPACE}CODE ARRAY :rem 16
130 DIM B$(H-1),C$(H-1):rem 85
140 B$(0)=" [18 +]" :rem 169
150 B$(1)=" [ +]DELIVER MESSAGES :rem 174
[ +]" :rem 174
160 B$(2)=" [ +]IN YOUR PROGRAMS :rem 158
[ +]" :rem 158
170 B$(3)=" [ +] {2 SPACES}WITH W :rem 228
INDOWS. [ +]" :rem 228
180 B$(4)=" [ +] {16 SPACES}[ +]" :rem 81
:rem 81
190 B$(5)=" [3 +] F1 TO CONT. :rem 103
[3 +]" :rem 103
200 REM *** DEMONSTRATION - SE :rem 225
T TEXT COLOR & FILL SCREEN :rem 225
WITH CHARACTERS :rem 225
210 PRINT "{CLR}{WHT}";FORI=48 :rem 225
TO86:A$=A$+CHR$(I):NEXT:FO

```

```

RI=1TO24:PRINTA$:NEXT :rem 97
:rem 97
220 REM *** STORE ORIGINAL SCR :rem 62
EEN CONTENTS AND PRINT WIN :rem 62
DOW :rem 62
230 M=983+40*R+C:REM UPPER LEF :rem 71
T CORNER OF WINDOW :rem 71
240 PRINT "{YEL}":REM SET WINDO :rem 162
W COLOR :rem 162
250 POKE214,R-1:PRINT:PRINT " :rem 162
{UP}";:REM SET ROW NUMBER :rem 162
:rem 162
260 FORI=0TOH-1:FORJ=0TOW-1 :rem 174
:rem 174
270 S(I,J)=PEEK(M+J):NEXT:POKE :rem 148
211,C-1:PRINTB$(I):M=M+40: :rem 148
NEXT :rem 148
280 REM *** CONVERT STORED SCR :rem 138
EEN CODES TO PRINTABLE STR :rem 138
INGS :rem 138
290 FORI=0TOH-1:FORJ=0TOW-1:A= :rem 143
S(I,J):IFA<32ORA>95THENA=A :rem 143
+64:GOTO310 :rem 143
300 IFA>65THENIFA<96THENA=A+32 :rem 52
:rem 52
310 C$(I)=C$(I)+CHR$(A):NEXT:N :rem 131
EXT :rem 131
320 REM *** PRESS 'F1' TO REWR :rem 168
ITE ORIGINAL TEXT :rem 168
330 GETR$:IFR$<>CHR$(133)THEN3 :rem 83
30 :rem 83
340 PRINT "{WHT}":REM RESTORE O :rem 200
RIGINAL TEXT COLOR:rem 200
350 POKE214,R-1:PRINT:PRINT " :rem 163
{UP}";:REM SET ROW NUMBER :rem 163
:rem 163
360 FORI=0TOH-1:POKE211,C-1:PR :rem 138
INTC$(I):NEXT :rem 138
370 REM RETURN TO MAIN PROGRAM :rem 62
:rem 62

```

COMPUTE!'s Gazette Subscriber Services

Please help us serve you better. If you need to contact us for any of the reasons listed below, write to us at:

COMPUTE!'s Gazette
P.O. Box 10958
Des Moines, IA 50950

or call the Toll Free number listed below.

Change of Address. Please allow us 6-8 weeks to effect the change; send your current mailing label along with your new address.

Renewal. Should you wish to renew your Gazette subscription before we remind you to, send your current mailing label with payment or charge number or call the Toll Free number listed below.

New Subscription. A one-year (12-month) U.S. subscription to *COMPUTE!'s Gazette* is \$24 (2 years, \$45; 3 years, \$65. For subscription rates outside the U.S., see staff page). Send us your name and address or call the Toll Free number listed below.

Delivery Problems. If you receive duplicate issues of *COMPUTE!'s Gazette*, if you experience late delivery, or if you have problems with your subscription, please call the Toll Free number listed below.

COMPUTE!'s Gazette
800-334-0868
In NC 919-275-9809

All programs listed in this magazine are available on the GAZETTE Disk. See elsewhere in this issue for details.

COMPUTE!'s Gazette is looking for utilities, games, applications educational programs, and tutorial articles. If you've created a program that you think other readers might enjoy or find useful, send it, on tape or disk to:

Submissions Reviewer
COMPUTE! Publications
P.O. Box 5406
Greensboro, NC 27403

Please enclose an SASE if you wish to have the materials returned. Articles are reviewed within four weeks of submission.

THIS MONTH'S SPECIAL!

Star Gemini SG-10C

64 Direct Connect
Dot Matrix Printer

\$229.00

SOFTWARE

ps:

File.....\$49.99

BATTERIES INCLUDED

Paperclip.....\$59.99

Paperclip w/Spell Pack.....\$79.99

SpellPak.....\$39.99

The Consultant.....\$69.99

Buscard II.....\$139.99

B.I. 80 Display.....\$129.00

Commodore

Word & Name Machine.....\$9.99

Pet Emulator.....\$9.99

Easy Finance I, II, III, IV.....\$9.99

Gorf.....\$9.99

Screen Editor.....\$9.99

INFOCOM

Zork I, II, III.....\$27.99

Deadline.....\$29.99

Witness.....\$29.99

ELECTRONIC ARTS*

Music Construction.....\$19.99

Pinball Construction.....\$19.99

7 Cities of Gold.....\$25.99

Archon II.....\$25.99

HESWARE

MultiPlan.....\$69.99

Games' 84.....\$16.99

Type 'N' Writer.....\$14.99

Super Zaxxon.....\$16.99

Cell Defense.....\$14.99

OmniWriter/Spell Check.....\$34.99

Benji Space Rescue.....\$9.99

Professional Software

Trivia Fever.....\$29.99

Fleet System II Word Processor.....\$49.99

SPINNAKER

Snooper Troops 1 or 2.....\$24.99

Juke Box.....\$29.99

Up for Grabs.....\$29.99

Bubble/Burst.....\$29.99

SUB LOGIC

Flight Simulator II.....\$39.99

synapse

Pharon's Curse.....\$16.99

Protector II.....\$16.99

Sentinel.....\$16.99

DISKETTES

maxell

5 1/4" MD-1 SS/DD.....\$14.99

5 1/4" MD-2 DS/DD.....\$19.99

3 1/2" DS/DD (Amiga).....\$54.99

Dennison

5 1/4" Elephant SS/SD EM-1.....\$13.99

FURNITURE

Bush

CT120 Desk/Printer Stand.....\$69.99

CTA122 Hutch for CT120.....\$49.99

CT125 Desk w/Monitor Stand.....\$89.99

CTA126 Hutch for CT125.....\$69.99

*All above items can be shipped UPS.

Canon

A40.....CALL

LBP-8A1 Laser.....CALL

CITIZEN

MSP-10 (80 Col.).....\$279.00

MSP-15 (132 Col.).....\$389.00

MSP-20 (80 Col.).....\$349.00

MSP-25 (132 Col.).....\$509.00

C. ITOH

Prowriter 7500.....\$219.00

Prowriter 1550P.....\$449.00

Prowriter 8510 - NLQ.....\$329.00

Starwriter 1030.....\$459.00

EPSON

RX-100, LX-80, JX80.....CALL

FX-85, FX-185, LQ1500.....CALL

Homewriter 10.....CALL

NEW! LX-90, SQ-2000, DX-10,

DX-20, HS-80.....CALL

JUKI

6000 Letter Quality.....CALL

6100 Letter Quality.....CALL

6200 Letter Quality.....CALL

6300 Letter Quality.....CALL

LEGEND

808 Dot Matrix 100 cps.....\$179.00

1080 Dot Matrix 100 cps.....\$259.00

1380 Dot Matrix 130 cps.....\$289.00

1385 Dot Matrix 165 cps.....\$339.00

NEC

8027 Dot Matrix.....\$299.00

OKIDATA

182, 183, 192, 193.....CALL

Okimate-64.....\$189.00

Panasonic.

Panasonic 1090.....\$199.00

Panasonic 1091.....\$259.00

SILVER-REED

500 Letter Quality.....\$279.00

550 Letter Quality.....\$419.00

770 Letter Quality.....\$759.00

star

SB/SD/SG/SR.....CALL

Powertype Letter Quality.....CALL

SG-10C (C64 Interface).....\$NEW

TOSHIBA

1340 (80 Col.).....\$589.00

P351 (132 Col.).....\$1499.00

INTERFACES

DIGITAL DEVICES

U-Print C.....\$49.99

Orange Mikro

Grappler CD Interface.....\$99.99

TYMAC

C64 Printer Interface.....\$69.99

Koala

C64 Koala Pad ROM.....\$59.99

JOYSTICKS

**CALL FOR COMPLETE
JOYSTICK SELECTION
INCLUDING WIGO AND
SPECTRAVIDEO**

Commodore 128 LCD CALL



AMIGA.....CALL

C128 Computer.....\$299.00

C1571 (Disk Drive for C128).....NEW

C1902 (RGB 13" Monitor for C128).....NEW

C1670 (Modem for C128).....NEW

Commodore 64.....\$139.00

CBM 4 Plus.....\$199.00

M-801 Dot Matrix Parallel.....\$169.00

MCS 803 Dot Matrix.....\$179.00

1520 Color Printer/Plotter.....\$129.00

1530 Datasette.....\$39.99

1541 Disk Drive.....\$199.00

1660 Auto Modem.....\$59.99

1802 Color Monitor.....\$189.00

DPS Daisywheel Printer.....\$339.00

Desk Organizer Lock.....\$49.99

VISA

SD 1 Disk Drive.....\$219.00

SD 2 Disk Drive.....\$469.00

INDUS

GT-C64 Drive.....\$219.00

cardco, Inc.

Par/Ser Interface.....\$65.99

5 Slot Expansion Interface.....\$69.99

Cassette Interface.....\$29.99

Cassette Deck.....\$29.99

G. Wiz.....\$59.99

S' More Basic cart. (ROM).....\$49.99

32K Printer Buffer.....\$65.99

MONITORS

AMDEK

300 Green.....\$129.00

300 Amber.....\$139.00

Color 300 Composite.....\$179.00

NAP

Composite.....CALL

NEC

JB 1260.....\$59.99

JB 1201/1205.....(ea.) \$99.99

TAXAN

100 12" Green.....\$99.99

105 12" Amber.....\$99.99

ZENITH

ZVM 1220 Amber.....\$99.99

ZVM 1230 Green.....\$99.99

ZVM130 Color.....\$269.00

ZVM131 Color.....\$249.00

MODEMS

ANCHOR

Signalman Express.....\$299.00

Lightning 2400 Baud.....\$399.00

Volksmodem.....\$59.99

TELE-LEARNING

C64 300 Baud.....\$39.99

✓ THE BEST PRICES!

✓ Next day shipping on all in stock items.

✓ Free easy access order inquiry.

✓ Orders from outside Pennsylvania save state sales tax.

✓ Free technical support with our factory trained technical staff.

✓ There is no limit and no deposit on C.O.D. orders.

✓ There's no extra charge for using your credit card. Your card is not charged until we ship.

✓ No waiting period for cashiers checks.

✓ We accept purchase orders from qualified corporations. Subject to approval.

✓ Educational discounts available to qualified institutions.

✓ FREE CATALOG MEMBERSHIP.

ORDER LINE

CALL TOLL-FREE
1-800-233-8950
CUSTOMER SERVICE

**AND
TECH SUPPORT
1-717-327-1450**

DEPT. A401

MAILING ADDRESS

Computer Mail Order

DEPT. A401

477 East Third Street
Williamsport, PA 17701

MEMBER DIRECT MARKETING ASSOCIATION
CREDIT CARDS

VISA

MasterCard

AMERICAN EXPRESS

DINERS CLUB

SHIPPING

Add 3%, minimum \$5.00 shipping and handling on all orders. Larger shipments may require additional charges.

All items subject to availability and price change.

Returned shipments may be subject to a restocking fee.

CANADIAN ORDERS

1-800-268-3974
Ontario/Quebec

1-800-268-4559
Other Provinces

1-416-828-0866
In Toronto

TELEX: 06-218960

2505 Dunwin Drive,
Mississauga, Ontario
Canada L5L1T1

All prices shown are for U.S.A. orders.

Call The Canadian Office for Canadian prices.

**C
O
M
P
U
T
E
R

M
A
I
L
O
R
D
E
R**

TOLL-FREE 1-800-233-8950

Sensational Prices!

... On Our Most Popular Items!

from micro^{int}® ...

THE 79¢ DISKETTE

Are you paying too much for diskettes? Try our first quality, prime, 5 1/4" diskettes (no rejects, no seconds) at these fantastic sale prices and save, save, SAVE! Disks are packaged in boxes of 50; each box contains 5 shrink-wrapped 10-packs that include diskettes in sleeves, labels, and write-protect tabs.

Each diskette is certified to be 100% error free and comes with a lifetime warranty (if you have a problem, we'll replace the diskette). All diskettes include hub reinforcement rings and write-protect notch.

All diskettes are double density and work in either single or double density drives.

SS, DD Diskettes, Box of 50
32391 **\$39.50**-79¢ ea.!

DS, DD Diskettes, Box of 50
32403 **\$49.50**-99¢ ea.!

TIED UP BY PRINT TIME?



Imagine printing a lengthy document in seconds instead of minutes... freeing your computer for other tasks! We are thoroughly impressed with the U Buff 64K printer buffer from Digital Devices. Just connect it between your parallel interface and your printer and it's ready for work! Its speed and versatility make it a valuable accessory for anyone with heavy printing needs.

U Buff receives print data at rates up to 4800 cps and then send it to the printer at the printer's own print rate. With 64K of usable RAM, the buffer has enough memory to hold approximately 32 pages of data. Think of the increase in personal productivity—while the printer is still working on one document, the next one can be loaded and edited! Because the U Buff has its own power supply, it will continue to hold data even if the computer or printer is turned off, or is off line. U Buff comes complete with cables, power supply and comprehensive instruction manual. A one year limited warranty and full customer support are also included.



34888 U Buff 64K Printer Buffer

ONLY \$99.95

COMPUTERFACTS™ from SAMS

Technical Service Data for Your Computer and Peripherals

Sams introduces COMPUTERFACTS™ packets of information that reveal the inner workings of major brand micros, monitors, printers and disk drives. Includes schematic wiring diagrams, parts lists, disassembly instructions, troubleshooting techniques, and other repair data.

- | | |
|---------------------------------|------------------------------|
| 33477 Commodore 64 Computer | 33508 Commodore C16 Computer |
| 33513 VIC-20 Computer | 33546 Commodore 1701 Monitor |
| 33551 Commodore Plus/4 Computer | 35950 Gemini 10X Printer |
| 33481 Commodore 1541 Disk Drive | 35964 Gemini 15X Printer |
| 33496 Commodore 1525 Printer | |



All packets \$17.95 each



LOWEST PRICES!



BMC
EPSON

AXIOM
CARDCO

We can offer you some of the lowest prices in the country on the most popular printers, monitors and interfaces. Our normal prices are already low, but to make sure you get the best deal you can, we will also meet most competitive prices in this publication when placed on an equal basis (Remember—we don't charge for use of your credit card, impose excessive shipping fees, or use any other hidden extras to boost the price you pay. Due to the rapid change in prices in the computer industry, we can only meet prices at the time you place your order; we cannot adjust prices on items ordered or shipped on an earlier date.) Another plus for charge card customers—your charge card is billed at time of shipment only for the items shipped—no early billing, no long wait for the merchandise you already paid for.

★ THE BEST PRICES ★ THE BEST SERVICE ★
WHY SHOP ANYWHERE ELSE?

The Ultimate Speech Synthesizer for the C64... ProVoice



from Genesis
The most sophisticated, easy-to-use speech synthesizer built for the C64! The ProVoice allows the computer to speak in conversational, verbatim or character modes. "Screen Echo" lets many BASIC programs talk without any modification. Package includes a special set of translation rules, built-in amplifier and speaker, and a comprehensive user guide. Plugs into expansion port and is ROM based—no software to load!
35842 C64, Cartridge **\$84.95**

Command Your Computer By Voice!



Give your computer voice recognition capability with the VOICE COMMAND MODULE from Eng Manufacturing. The unit plugs into the C-64's RS-232 port via cable (included); a clip-on lapel microphone attaches to the module with a 6' wire. As you speak into the microphone the machine captures a sample of the voice, compares it to a stored pre-recorded sample, and decides if it matches. Stores up to 64 different words for later recall. Package also includes a disk of software programs (includes SOS - Speech Operating System) and a user's manual. Requires disk drive. Compatible with C-128 computer.
34943 **ONLY \$43.95**

CARTRIDGE EXPANDER



Plus \$22.95
FAST LOAD
OFFER!

Stop wearing out your computer and cartridges by endless swapping! The Navarone cartridge expander features 3 cartridge slots. Select any cartridge, or the "off" position if no cartridge is to be used. Reset the computer independently of the power switch. Cartridge slots are vertical for easy access—no blind fumbling behind the computer.

33227 Cartridge Expander **\$22.95**

The cartridge expander is a great companion for the Epyx Fast Load cartridge—you can keep it permanently installed plus have two slots free for other cartridges!

34216 Fast Load Cartridge (Sug. Retail \$34.95) **\$29.95**
Fast Load **ONLY \$22.95**
with purchase of cartridge expander!

DUST COVER and "EVERYTHING BOOK" SPECIAL OFFER

Get to know us by ordering this great dust cover for your VIC-20 or Commodore 64 and our catalog, "The Everything Book for the Commodore C-64 and VIC-20 Home Computers," for \$2.95 (no extra shipping and handling charges). Cover is antistatic, translucent 8 gauge vinyl sewn to our exacting standards with reinforced seams. Discover the savings and easy shipping available from TENEX Computer Express!



\$2.95

31627 Dust Cover and Catalog (G1K)

TOP DECK



Easy to Use
Paper Catcher

If your printer paper gets tangled up with your cables, spreads over your tabletop, or makes you crawl under the table to find it, Top Deck is what you need! Neatly catches and stacks output for virtually every printer with or without a printer stand. Completely adjustable and self-storing. Durable enough for office use, but economical enough for the home.

37369 **\$33.95**

From Your Friends At

TENEX
Computer
Express

We gladly accept
mail orders!
P.O. Box 6578
South Bend, IN 46660

Questions? Call
219/259-7051

Ad
G1K

SHIPPING CHARGES
ORDER AMOUNT CHARGE
less than \$20.00 \$3.75
\$20.00-\$39.99 4.75
\$40.00-\$74.99 5.75
\$75.00-\$149.99 6.75
\$150.00-\$299.99 7.75
\$300 & up 8.75



NO EXTRA FEE FOR CHARGES

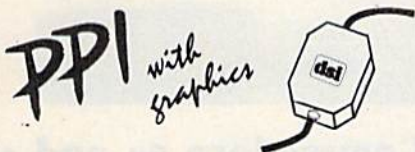
WE VERIFY CHARGE CARD
ADDRESSES.

ORDER TOLL FREE
1-800-348-2778

Sensational Prices!

... On Our Most Popular Items!

The Right Interface For All Your Printing Needs!!



This high-performance graphics parallel printer interface from DSI for C-64 and VIC-20 emulates a Commodore printer. Comes complete with all necessary cables for quick installation and includes easy-to-follow user's manual.

33565 **\$44.95**

Interface Built-in buffer provides super high-speed printing for parallel printers. Dumps high-resolution screens up to 18 times faster. Prints all Commodore characters. All cables and connectors included. From Cardco. Lifetime warranty.

34484 **SCALL**

Ready... Set... PRINT! PRINTER PLUS GRAPHICS INTERFACE ONLY \$189!!

We've combined a famous name printer with an outstanding graphics interface to offer a complete printer package for your C-64 at an unbeatable value! Similar systems can cost \$300 and up... but due to our high volume you pay ONLY \$189!!



You get a standard printing speed of 100 CPS along with Near Letter Quality and compressed print modes available at the flip of a switch. Printing is bi-directional and logic seeking. Both friction and tractor feed are standard—handles original plus two copies.

Other features include graphics printing (compatible with almost all popular graphics software programs), programmable line spacing, and more!

Dimensions: 15.5" W x 11" D x 4" H". Weight: 10.8 lbs.

Here's another plus—the parallel, Centronics compatible printer can be used with any parallel output computer... lets the printer do double duty, or more!

90 days parts and labor warranty with a lifetime warranty on the printhead.

35044 Printer Plus Graphics Interface

\$189.00

Supply is limited — call now!

POWER and PROTECTION FOR YOUR C-64!

POW'R PAK 64



Pow'r Pak is a replacement power supply (1.5 amp) for the Commodore 64... but that's not all! Pow'r Pak also supplies two additional surge protected outlets (120V) for monitor, disk drive, or other peripherals. On/off switch. Fuse protection. Sturdy all-metal casing is ventilated for heat dissipation. Full 1 year warranty.

34910 **\$49.95**



star
MULTIFUNCTION

SG-10

Lowest Price! 33251 **SCALL**

Also: 34446 SG-10C with Built-In Commodore Interface! **SCALL**

NEW

**EPSON LX-90
plus Interface
Plug-in-and-Print!!**



100 CPS dot matrix printer also offers Near Letter Quality printing at 16 CPS. Friction and tractor feed. No other cables or interfaces required!

35011 LX-90 Printer **SCALL**

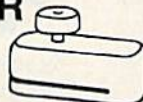
35025 Commodore Interface **\$44.95**

Also: New FX-85 & FX-185! LX-80 **SCALL**

We stock a complete line of Star, Epson, BMC, and Axiom peripherals. Call for best prices!

DISK DOUBLER

Double your storage
by using both sides
of your disks!



The Commodore uses single sided disks. As you may have noticed, however, these disks actually have a magnetic media on both sides. With our Disk Doubler you can punch a new write protect notch on the opposite side of the disk and use the "hidden" second side! The Disk Doubler is easy to use, just slide the disk in, squeeze the button, and a perfectly located notch is punched in the disk jacket. This handy device will pay for itself the first few times you use it.

Sug. retail \$14.95

Only \$9.95

37374

HOME AUTOMATION IS HERE!

X-10 Powerhouse

Now, with your Commodore 64 or 128 computer, you can program lights and appliances to turn on and off, control your thermostat, play your stereo, light up your bedroom, hallway and bathroom, start the coffee, even warm up the curlers... all before you are even out of bed! But it's smart enough not to wake you up on weekends! The user-friendly X-10 POWERHOUSE software lets you first "set up" your house using room diagrams and appliance "icons." Once everything is in place you can program the timing on each item. Once the program is established, you can disconnect the computer—the POWERHOUSE system will control your home independently! It even has a battery backup. Invest in an X-10 POWERHOUSE and enter the age of electronic living.



36493 X-10 POWERHOUSE

\$109.95

36914 Commodore cable and software (required)

\$22.95

From Your Friends At

**TENEX
Computer
Express**

We gladly accept
mail orders!

P.O. Box 6578
South Bend, IN 46660

Questions? Call
219/259-7051

Ad
G1K

SHIPPING CHARGES
ORDER AMOUNT CHARGE

less than \$20.00	\$3.75
\$20.00-\$39.99	4.75
\$40.00-\$74.99	5.75
\$75.00-\$149.99	6.75
\$150.00-\$299.99	7.75
\$300 & up	8.75



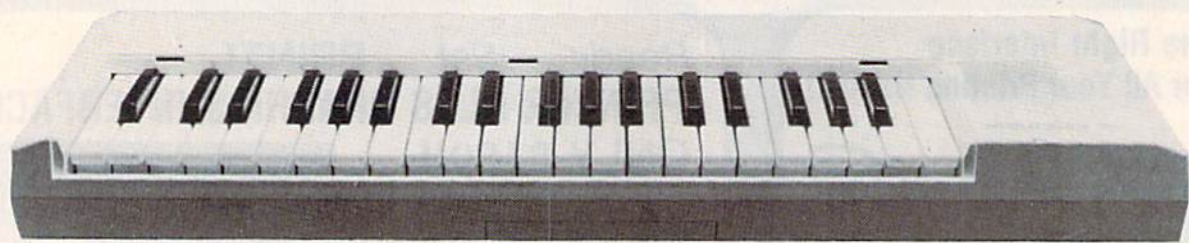
NO EXTRA FEE FOR CHARGES

WE VERIFY CHARGE CARD
ADDRESSES.

ORDER TOLL FREE

1-800-348-2778

Melodian will teach you to play, compose, record and print music in just one evening!!



The Melodian Musical Keyboard for the Commodore 64 and 128.

A True Breakthrough In Music Education

At last, a program that makes it not only easy but fun to learn music. The Melodian keyboard and software were designed by Harry Mendell who designs custom synthesizer electronics and software for professional musicians such as **Stevie Wonder** and Eric Himy, an award winning concert pianist. The Melodian boasts many of the professional features found only on more expensive equipment. These features include multitrack recording, the ability to create custom instrument sounds and most importantly, ease of use.

Start your lesson with **RhythmMaster** Software. With its built-in metronome, RhythmMaster will display the treble and bass musical staves and a picture of a piano keyboard. RhythmMaster will then play a measure of music and you must try to play the same measure back on the Melodian keyboard. You're not familiar with the keyboard or can't read music? No problem. RhythmMaster displays the notes you are to play on the musical staff and on the keyboard pictured on the monitor. If you strike the wrong key the note on the musical staff turns red and shows you which key you played wrong, making it ever so easy to correct what you played.

If you should hold a key too long a turtle runs across the screen. Inversely if you should release a key too quickly a rabbit scurries by. If you don't play it correctly Rhythm-

Master knows it and repeats the measure for you to play.

Sounds easy doesn't it? Now add the fun. You start with six composers (Bach, Handel, Mozart, Beethoven, Schubert and Wagner). The object is to attain the next level of difficulty without losing a composer. You lose a composer each time you accumulate ten mistakes. There are twelve levels of difficulty attainable ranging from tyro to maestro.

ConcertMaster teaches you how to play 35 pre-recorded songs from Bach to Rock. With ConcertMaster you can analyze music note by note, instrument by instrument and learn how a music composition is put together. Then you can compose your own music and record it right onto your floppy disks.

There are nineteen different instrument sounds to choose from in over a seven octave range giving you a wide choice of instruments to suit your musical taste and expression. You can also create your own instrument sounds.

ScoreMaster enables you to print out your music in standard music notation for other musicians to play, or for yourself.

AHOY! Magazine Says . . .

Peggy Herrington of AHOY! said "The system is so easy to use that I didn't need the documentation". "It's fun, challenging, and educational, and for playability and ease of use it is nothing short of spectacular."

New York Times Says . . .

Erik Sandberg-Diment of the New York Times states "really useful and instructive item ... Tanya, our 10 year old beginner quickly caught the spirit of matching the dance of her fingers to the measured metronome." "One piece of educational software that, unlike most of its kinfolk, actually delivers. These software-hardware combinations offer a lot of entertainment to the Commodore owner."

RUN Magazine Says . . .

Tom Benford of RUN notes "Whenever a selection of products of the same genre is available, one among the bunch rises head and shoulders above the rest. Such is the case with Melodian ConcertMaster keyboard and software. The combined features of RhythmMaster and ConcertMaster give you a complete music tutorial."

Satisfaction Guaranteed When You Buy Direct

By selling directly to you, we are able to give you the Melodian Keyboard and Software at far lower prices than ever offered before. You take no risk. **If the Melodian keyboard or any of the programs don't please you, for any reason whatsoever, send it back within 60 days for a full refund!**

CREDIT CARD ORDERS, CALL TOLL-FREE

800-327-4566

IN FLORIDA, **800-351-8777**



**It Talks!
It Recognizes!
It Writes Music!**
and more . . .



THE AMAZING VOICE MASTER®
Speech and Music Processor

Your computer can talk in your own voice. Not a synthesizer but a true digitizer that records your natural voice quality—and in any language or accent. Words and phrases can be expanded without limit from disk.

And it will understand what you say. A real word recognizer for groups of 32 words or phrases with unlimited expansion from disk memory. **Now you can have a two way conversation with your computer!**

Easy for the beginning programmer with new BASIC commands. Machine language programs and memory locations for the more experienced software author.

Exciting Music Bonus lets you hum or whistle to write and perform. Notes literally scroll by **as you hum!** Your composition can be edited, saved, and printed out. You don't have to know one note from another in order to write and compose!

Based upon new technologies invented by COVOX. One low price buys you the **complete system**—even a voice controlled black-jack game! In addition, you will receive a subscription to COVOX NEWS, a periodic newsletter about speech technology, applications, new products, up-dates, and user contributions. **You will never find a better value for your computer.**

ONLY \$89.95 includes all hardware and software.

For telephone demonstration or additional information, call (503) 342-1271. FREE audio demo tape and brochure available.

Available from your dealer or by mail. When ordering by mail add \$4.00 shipping and handling (\$10.00 for foreign, \$6.00 Canada).

The Voice Master is available for the C64, C128, all Apple II's, and Atari 800, 800XL and 130XE. Specify model when ordering.



For Faster Service on Credit Card Orders only:

ORDER TOLL FREE 1-800-523-9230



COVOX INC. (503) 342-1271
675-D Conger Street, Eugene, OR 97402
Telex 706017 (AV ALARM UD)

You Have a Choice.

Numeric Key pads



CP Numeric Keypad, Deluxe Model.

- Top quality, low profile key switches for smooth, reliable data entry.
- Easily connected with computer keyboard.
- No software is required. 100% Compatible with all programs.
- Available for Commodore 64, SX-64*, VIC-20 and Apple IIe Computers.
- One year warranty and available in three models:



Regular
\$49.95



Plus
\$59.95



Deluxe
\$69.95

Power Supply

- Has better features than the original one at \$39.95.
- Is serviceable, NOT disposable.
- Works dependably with one year warranty.
- For Commodore and Atari* Computers.



Computer Place

(213) 325-4754

23914 Crenshaw Blvd. Torrance, CA 90505

* Requires adaptor at additional cost. VISA, MC & AE accepted. No C.O.D. Add \$3.00 shipping. CA residents add 6.5% sales tax. Dealer inquiries welcome. Commodore 64, SX-64 and VIC-20 are trademarks of Commodore Business Machines, Inc. Atari is the trademark of Atari Corp. Apple IIe is the trademark of Apple Computer, Inc.



WIBBOB
WIBBOB
THE

THE
MIRROR

WIBBOB
DISK COPIER

\$24.95

NO FINER OR MORE ADVANCED ARCHIVAL COPIER AVAILABLE AT ANY PRICE.

EASY TO USE. DOES NOT CAUSE DRIVE HEAD TO KNOCK.

COPIES UP TO 41 TRACKS.

PERIODIC UPDATE POLICY.

AUTOMATICALLY MAKES BACK-UP COPIES FROM VIRTUALLY ALL PROTECTED SOFTWARE.

NIBBLES, HALF TRACKS, COPIES EXTRA SECTORS AND EXTRA TRACKS.

REPRODUCES ALL DISK ERRORS AUTOMATICALLY.

FAST. COPIES FULL DISK IN AS LITTLE AS 4-7 MINS. EVEN COPIES ITSELF.

WE COPY MORE!

MASTERCARD, VISA, M.O. OR CHECK OK

+ \$3 SHIPPING & HANDLING

C.O.D. OR FOREIGN ORDERS ADD \$2

CALIF. ORDERS ADD 6% SALES TAX

— WRITE OR CALL —

Compumed



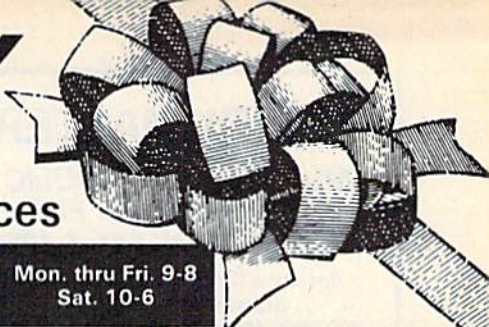
(408) 758-2436
P.O. BOX 6427
SALINAS, CA 93912
FOR COMMODORE 64 AND 1541 DRIVE



FAST DELIVERY

Lowest Holiday Prices

Fast Service Experience, and Affordable Prices



ORDER TOLL FREE (800) 992-3300

Mon. thru Fri. 9-8
Sat. 10-6

commodore

C-128 \$297 Call for Specials

1571 Disk Drive \$259

1902 Monitor \$309

Special Holiday Package
C-128 Computer & 1571 Disk Drive
\$549 GREAT BUY!

FREE Box of Disk with Holiday Package

Holiday Special

Stunt Flyer.....\$21.95
Acro Jet.....\$24.94

SUBLOGIC

Flight Simulator.....\$31.95
Microprose F-15 Eagle...\$21.50
Solo Flight.....\$21.50
Jet Simulator.....\$29
Kennedy Approach....\$21.50

SG-10 \$209

SG-10C.....\$229
SG-15.....\$359
SD-10.....\$322
SD-15.....\$444
SR-10.....\$479
SR-15.....\$579

RX-80.....\$218
Homewriter 10...\$244
NEW LX-80.....\$210
FX-85.....\$329
FX-185.....\$459
DX-10 Daisywheel...\$245

PANASONIC

1091.....\$232
1090.....\$185

FAST LOAD

\$1995

commodore

64

\$139

1530 Datasette.....\$39 1660 Auto Modem.....\$52
1541 Disk Drive...\$174 1802 Color Monitor...\$164

SANTA'S SPECIAL

MPS 801 Printer

\$109 Reg. \$199

WORD PROCESSING

Special of the Month

FLEET SYSTEM 2

Great Buy \$48

Paper Clip.....\$49
Paper Clip/Speller....\$64
Home Pak.....\$33

FREE 4K BUFFER When
You Buy a MW 350 For \$69

While Quantities Last

PRINTER INTERFACES Cardco + G Wiz.....\$54
Datashare PPI.....\$41 MW 302.....\$39
Tymac Connection...\$54 Grappler CD.....\$84

SURGE PROTECTORS

1 Outlet.....\$9
4 Outlet.....\$24
6 Outlet.....\$28

Great Gift

1541 FLASH

\$54.95

CARDCO 5 SLOT EXPANDER

\$49.95

Print Shop

Print Shop.....\$25.95
Graphic Library...\$15.49
Paper Pak.....\$8.45

ALL THREE \$49.95 FOR

COMPUTER COVERS Reg. \$15.95 **\$6.99**

Features heavy duty canvas with vinyl interior waterproof

CMD 64.....\$6.95
VIC 20.....\$6.99
Disk Drive.....\$6.99
Epson MX 80...\$7.99
Epson MX 80 FT \$7.99
Okidata 92.....\$7.99

Call For Price

1902 RGB Monitor

Modem 1670

1200 Baud

\$164

BRODERBUND

Bank Street Writer-D 34.95
Dr. Creep-D 20.95
Bungling Bay-D 20.95
Spelunker-D 20.95
Music Shop-D 29.95

INFOCOM

Deadline-D 29.95
Enchanter-D 24.95
Infidel-D 29.95
Planetfall-D 24.95
Sorcerer-D 29.95
Starcross-D 29.95
Suspended-D 29.95
Witness-D 29.95
Sea Stalker-D 24.95
Zork I, II or III-D 27.95
Wisbringer-D 29.95

DATA BASES

PFS: File.....\$39
Super Base 64.....\$48

Special of the Month

The Consultant

\$39.95

SPREAD SHEET

Multiplan.....\$59
Homepak.....\$34

COMPUSERVE STARTER KIT \$19.95

RIBBONS

Epson MX-80.....\$5
Epson M/Rx-100...\$8
SG 10/15.....\$3
Panasonic.....\$9

PAPER

Mail Labels (1000).....\$8
1000 sheets...\$19.95
2500 sheets...\$34.95

BULK SS/DD DISK

10 50 100 500
96c 92c 89c 85c
Disk Storage Case
10 Disk...\$2.95

PC GALLERY

P.O. Box 3354
Cherry Hill, N.J. 08034

FOR INFORMATION
CALL MON.-FRI. 10-5
(609) 596-1944

S.A. Shipping Charges: All Software & Accessories \$3.00, Printers \$9, Disk Drives \$8, Monitors \$10. Add \$3.00 per box of C.O.D. Ordering and Payment Policy: prices reflect a cash discount. For Visa & MasterCard add 3%. Immediate delivery with certified check or wired funds. N.J. residents add 6% for sales tax. Prices subject to change. Returned Goods Subject to a Restocking Fee.

SYMBOL MASTER™

MULTI-PASS SYMBOLIC DISASSEMBLER FOR COMMODORE 64* & 128*

(Includes C-128 native 8502 mode)
disassembles any
6502/6510/8502 machine code
program into beautiful source

- Learn to program like the experts!
- Adapt existing programs to your needs!
- Automatic LABEL generation.
- Outputs source code files to disk fully compatible with your MAE, PAL, CBM, Develop-64, LADS* or Merlin* assembler, ready for re-assembly and editing!
- Outputs formatted listing to screen and printer.
- Automatically uses NAMES of Kernal jump table routines and all operating system variables.
- Disassembles programs regardless of load address. Easily handles autorun "Boot" programs.
- Generates list of equates for external addresses.
- Generates complete cross-referenced symbol table.
- Recognizes instructions hidden under BIT instructions.
- 100% machine code for speed. Not copy protected.

ORDER NOW! \$49.95 postpaid USA. Disk only.

*MAE is a trademark of Eastern House. PAL is a trademark of Pro-Line. Commodore 64 & 128 are trademarks and CBM is a registered trademark of Commodore. Develop-64 is a trademark of French Silk. LADS is a trademark of Computer Publications. Merlin is a trademark of Roger Wagner Publishing.



UNLEASH THE POWER OF YOUR COMMODORE 64 WITH THE ULTIMATE INTERFACE

- Control and monitor your home — appliances, lights and security system
 - Intelligently control almost any device
 - Connect to Analog-to-Digital Converters
 - Control Robots
 - Perform automated testing
 - Acquire data for laboratory and other instrumentation applications
 - Many other uses
- Don't make the mistake of buying a limited capability interface. Investigate our universally applicable Dual 6522 Versatile Interface Adapter (VIA) Board, which plugs into the expansion connector and provides:
- Four 8-bit fully bidirectional I/O ports and eight handshake lines
 - Four 16 bit timer/counters
 - Full IRQ interrupt capability
 - Four convenient 16-pin DIP socket interface connections
 - Expandability up to four boards & sixteen ports.
- ORDER NOW!** Price \$169, postpaid USA. Extensive documentation included. Each additional board \$149.

COMMODORE 64™ SOURCE CODE!

"What's Really Inside the Commodore 64"

- Most complete available reconstructed assembly language source code for the C-64's Basic and Kernal ROMs, all 16K.
- You will fully understand calls to undocumented ROM routines, and be able to effectively use them in your own programs.
- Uses LABELS. Not a mere one-line disassembly. All branch targets and subroutine entry points are shown.
- TABLES are fully sorted out and derived.
- Completely commented, no gaps whatsoever. You will see and understand the purpose of every routine and every line of code!
- Complete listing of equates to external label references.
- Invaluable fully cross-referenced symbol table. Order C-64 Source. \$29.95 postpaid USA.

PROFESSIONAL UTILITIES:

- We personally use and highly recommend these two:
- PTD6510 Symbolic Debugger for C-64. An extremely powerful tool with capabilities far beyond a machine-language monitor. \$49.95 postpaid USA.
 - MAE64. Fully professional macro editor/assembler. \$39.95 postpaid USA.

All orders shipped from stock within 24 hours via UPS. VISA/MasterCard welcomed.
There will be a delay of 15 working days on orders paid by personal check.

SCHNEDLER SYSTEMS

1501 N. Ivanhoe, Dept. G-1, Arlington, VA 22205. Information/Telephone Orders (703) 237-4796

ROBOTLINK™

Program the Tomy Robots With Your Commodore 64!



TOMY®

VERBOT	\$ 60.00	ROBOT*LINK	\$40.00
OMNIBOT	\$250.00	VERBOT BOWLING ..	\$25.00
OMNIBOT 2000	\$500.00	VERBOT BASKETBALL	\$25.00

Send Check or Money Order to:

Computer Magic Ltd.
18 East Mall
Plainview, NY 11803
NY residents add 8¼% sales tax.

Tomy is a registered trademark of Tomy Corp. Computer Magic is a registered trademark of Computer Magic Ltd.
©1985 Computer Magic Ltd.

SNAPSHOT 64

SNAPSHOT 64 is a unique and exciting utility that virtually takes a picture of your computer's memory. SNAPSHOT 64 then saves that 'snapshot' to disk and automatically creates an auto-boot loader for the program. Once saved to disk the program may be restarted at the exact same point at which it was interrupted!!!

- **MOST EFFECTIVE UTILITY OF ITS KIND - EVEN MORE EFFECTIVE THAN THOSE UTILITIES THAT CLAIM TO "COPY ALL MEMORY-RESIDENT SOFTWARE"**
- **SNAPSHOT FILES RUN BY THEMSELVES — THE BACKUP COPY WILL RUN AS-IS**
- **WORKS MUCH FASTER THAN OTHER SIMILAR UTILITIES**
- **EASY TO USE — EVEN A CHILD CAN DO IT**
- **STORE MANY DIFFERENT SNAPSHOTed FILES ON A SINGLE DISK**
- **FULLY SELF-CONTAINED ON CARTRIDGE — NO DISK TO HASSLE WITH**
- **EXCLUSIVE FEATURE: THE CODE INSPECTOR — ALLOWS MOST PROGRAMS TO BE STOPPED, EXAMINED, MODIFIED AND RESUMED WHILE STILL IN MEMORY!!**
- **NO PARAMETERS NEEDED — AS OFTEN REQUIRED BY OTHER UTILITIES**
- **SOLD FOR ARCHIVAL PURPOSES ONLY**
- **RAVE REVIEWS IN: INFO 64, MIDNIGHT GAZETTE & PROGRAM PROTECTION NEWSLETTER**

SNAPSHOT 64™

ONLY \$49.95 + \$3.50 SHIPPING (U.S. ONLY)

CSM SOFTWARE, INC.

POST OFFICE BOX 563, CROWN POINT IN. 46307, PHONE (219) 663-4335
Visa and Master Cards Accepted Dealer Inquiries Invited
All CSM products are available from your local dealer

Software Discounters of America



For Orders Only—1-800-225-7638
PA Orders—1-800-223-7784
Customer Service 412-361-5291

Open Saturday

- Free shipping on orders over \$100 in continental USA
- No surcharge for VISA/MasterCard
- Your card is not charged until we ship

Christmas Clearance Sale—Our Lowest Prices Ever!!

ACCESS	Castles Dr. Creep (D) \$19	Rescue on Call \$25	Viet Nam Conflict (D) Call	Mickey's Space Adventure (D) \$17	Essex (D) \$25
Beach Head (D) \$21	Karateka (D) \$19	Fractalus (D) \$25	MINDSCAPE	Stunt Flyer (D) \$17	Lode Runner's Rescue (D) \$19
Beach Head 2 (D) \$24	Music Shop (D) \$29	Summer Games 2 (D) \$25	Bank St. Music Writer (D) \$26	Ultima 2 (D) \$37	Mindwheel (D) \$25
Mach 5 (R) \$23	Print Shop (D) \$29	Temple of Apsahai Trilogy (D) \$25	Bank St. Storybook (D) \$26	Winnie the Pooh (D) \$17	Syn-Calc (D) \$33
Raid Over Moscow (D) \$24	P.S. Graphics Library #1 (D) \$16	The Eidolon (D) \$25	Color Me: The Computer Coloring Kit (D) \$19	SIMON & SCHUSTER	TELARIUM
ACTIVISION	P.S. Graphics Library #2 (D) \$16	Winter Games (D) \$25	Color Me Picture Disks: Hugga Bunch \$7	Dell's Xword Puzzles Vol. 1 or 2 (D) \$16	Amazon (D) \$21
Alcazar: The Forgotten Fortress (D) \$19	P.S. Graphics Library #3 (D) \$16	World's Greatest Baseball (D) \$21	Rainbow Brite \$7	Gonzo in Wordwreder (D) \$19	Dragonworld (D) \$21
Alter Ego (D) \$21	Spelunker (D) \$19	World's Greatest Football (D) \$25	Shirt Tales \$7	Kermit's Electronic Storymaker (D) \$19	Fahrenheit 451 (D) \$21
Countdown to Shutdown (D) \$19	Stealth (D) \$19	FIRST STAR	Shirley's \$7	Lovejoy's SAT (D) \$49	Nine Princes in Amber (D) \$21
Decathlon (D) \$19	Whistler's Brother (D) \$19	Spy vs. Spy (D) \$19	Think! Think! \$7	NY Times Crossword Puzzles Vol. 1 or 2 (D) \$16	Perry Mason: Case of the Mandarin Murder (D) \$21
Fast Tracks: Slot Car Const. Kit (D) \$21	CBS	Spy vs. Spy 2 (D) \$19	Crossword Magic (D) Call	1 or 2 (D) \$16	Rendezvous w/Rama (D) \$21
Fireworks Celebration Kit (D) \$23	Astro Grover (D) \$9	Superman (D) \$19	Halley Project (D) \$26	Spy Hunter (R) \$29	TIMEXWORKS
Garry Kitchen's Gamemaker (D) \$21	Big Bird's Funhouse (R) \$9	FISHER PRICE	Indiana Jones (D) \$19	Star Trek: The Kobashi Alternative (D) \$26	Acts. Payable (D) \$39
Ghostbusters (D) \$21	Dinosaur Dig (D) \$25	First Men in the Moon Math (D) Call	Mr. Pixel's Cartoon Kit (D) \$21	Typing Tutor III (D) \$26	Accts. Receivable (D) \$39
Great American Cross-Country Road Race (D) \$19	Dr. Seuss: Fix-Up the Mix-Up Puzzler (D) \$9	Movie Creator (D) Call	Mr. Pixel's Game Maker (D) \$21	SPINNAKER	Data Manager 2 (D) \$33
Hacker (D) \$19	Mastering the SAT (D) \$49	Peter & The Wolf Music (D) Call	Perfect Score SAT (D) \$44	Adventure Creator (R) \$19	Data Manager 128 \$43
Little Computer People (D) \$21	Mr. Rogers: Many Ways to Say I Love You (D) \$16	Peter Rabbit Reading (D) Call	Show Director (D) \$19	Aerobics (D) \$23	Electronic Checkbook (D) \$16
Master of Lamps (D) \$19	Success w/Algebra Call	GAMESTAR	MISC	Alphabet Zoo (R) \$19	Evelyn Wood Dynamic Reader (D) \$33
Mindshadow (D) \$19	Success w/Math Call	On-Court Tennis (D) \$19	Amiga Software Call	Counting Parade (D) \$17	General Ledger (D) \$39
Music Studio (D) \$19	Webster Word Game (D) \$9	On-Field Football (D) \$19	Bounty Bob Strikes Back (D) \$23	Facemaker (R) \$17	Inventory Mgmt (D) \$39
Space Shuttle (D) \$19	CARDCO	On-Track Racing (D) \$17	Buckaroo Banzai (D) \$21	Fraction Fever (R) \$17	Money Manager (D) \$16
AMERICAN EDUCATIONAL	G-wiz Call	Star-League Baseball (D) \$19	CSM 1541 Alignment Kit (D) \$29	Homework Helper-Math Word Problems (D) \$23	Payroll Mgmt (D) \$39
Biology (D) \$16	Write Now (R) \$29	Star Rank Boxing (D) \$19	Central Point-Copy II (D) \$23	Homework Helper-Writing (D) \$23	Sideways (D) \$19
French (D) \$16	CONTINENTAL	HAYDEN	Commodore 64 Software Book (1985) \$14	Kids on Keys (R) \$19	Swiftcalc/Sideways (D) \$33
Grammar (D) \$16	Book of Adv. Games \$14	Sargon III (D) \$33	Diskey (D) \$33	Kindergarten Math Busters (D) \$17	Swiftcalc/Sideways (128) \$43
Science: Grades 3/4/5 (D) \$16	Home Accountant (D) \$44	HBJ	Fantastic Four (D) \$21	Snooper Troops 1 or 2 (D) \$19	Sylvia Porter's Personal Financial Planner (D) \$39
Science: Grades 5/6/7 (D) \$16	DATAMOST	SAT (D) \$47	1541 User's Guide (Book) \$16	Story Machine (R) \$17	Word Writer w/Speller (D) \$33
Science: Grades 7/8/9 (D) \$16	Aztec (D) \$17	HES	Inside Commodore DOS (Book) \$16	Trains (D) \$19	Word Writer w/85000 Word Speller (128) \$43
Spanish (D) \$16	Kwik Calc (D) \$14	Cell Defense (D) \$12	Karate Champ (D) \$26	TRONIX	S.A.M. (D) \$39
U.S. Geography (D) \$16	Kwik-File (D) \$14	Factory (D) \$12	Minor 2049er (R) Cheap	1 free directly from Spinnaker	WEEKLY READER
World Geography (D) \$16	MyChess II (D) \$19	Hes Mon \$21	Multiphan (D) Call	SPRINGBOARD	Stickybear ABC'S (D) \$19
World History (D) \$16	DAVIDSON	Millionaire (D) \$16	Sorcerer of Claymorgue Castle (D) \$21	Early Games (D) \$21	Stickybear Math (D) \$19
ARTWORX	Math Blaster (D) \$33	Omniwriter w/Spell (D) \$33	Sundex CPA (D) \$47	Easy as ABC (D) \$23	Stickybear Numbers (D) \$19
Bridge 4.0 (D) \$16	Speed Reader 2 (D) \$43	Project Space Station (D) \$19	Superbase 64 (D) \$47	Fraction Factory (D) \$19	Stickybear Opposites (D) \$19
Grand Master Chess (D) \$17	Spell It (D) \$33	Super Zaxxon (D) \$12	VIP Terminal XL (D) \$26	Newsroom (D) \$33	Stickybear Reading (D) \$19
International Hockey (D) \$19	Word Attack (D) \$33	Tri-Math (D) \$12	Vizastar 64 XL8 (D) \$89	Stickers (D) \$23	Stickybear Shapes (D) \$19
Sortery (D) \$19	DESIGNWARE	Infidel (D) \$25	Vizawrite 128 (D) Call	ORIGIN	WINDHAM CLASSICS
Strip Poker (D) \$21	Body Transparent (D) \$27	Invisicubes Call	Ultima 3 (D) \$37	Commander (D) \$25	Alice in Wonderland (D) \$17
Data Disk #1 female \$16	Creature Creator (D) \$25	Planetfall (D) \$23	PRACTICORP	Breakthrough in the Ardennes (D) \$37	Treasure Island (D) \$17
Data Disk #2 male \$16	Crypto Cube (D) \$25	Sorcerer (D) \$25	Practical 64 (D) \$17	Broadside (D) \$25	Wizard of Oz (D) \$17
Data Disk #3 female \$16	European Nations & Locations (D) \$27	Spellbreaker (D) \$29	Practifile (D) \$17	Colonial Conquest (D) \$25	ACCESSORIES
ARTWORX PX	Grammar Examiner (D) \$27	Wishbringer (D) \$23	PROFESSIONAL SOFTWARE	Combat Leader (D) \$25	Bonus SS, DD Cheap
Baker St. Detective (D) \$7	Math Maze (D) \$25	Zork 1 (D) \$23	Fleet System 2—W.P. w/70,000 word spell checker 64 or 128 \$47	Computer Ambush (D) \$37	Compuserve Starter Kit (5 hrs) \$19
Cavefighter (D) \$7	Mission Algebra (D) \$27	Zork 2 or 3 (D) \$25	RANDOM HOUSE	Computer QB (D) \$25	Datashare Printer Int. w/Graphics \$39.95
Galaxy (D) \$7	Spellcopier (D) \$25	KOALA	Alpine Encounter (D) \$19	Cosmic Balance (D) \$25	Disk Case (Holds 50) \$9
Hole In One Golf (D) \$7	States & Traits (D) \$27	Keys (D) \$39.95	Charlie Brown's ABC's (D) \$19	Field of Fire (D) \$25	Disk Drive Cleaner \$6
Jumpin' Jimmy (D) \$7	ELECTRONIC ARTS	Touch Tablet w/Painter (D) \$39.95	Charlie Brown's 1.2.3's (D) \$19	Fifty Mission Crush (D) \$25	Dow Jones News Retrieval Kit (5 hrs) \$16
Pro Boxing (D) \$7	Adv. Const. Set (D) \$27	LEARNING COMPANY	Snoopy's Reading Machine (D) \$19	Gemstone Warrior (D) \$23	Kraft Switch Hitter Joystick \$9.95
Starbase Defense (D) \$7	Archon (D) \$23	All Titles Available Call	Typing Is A Ball, Charlie Brown (D) \$19	Imperium Galactum (D) \$25	Sakata 13" Color Composite Monitor for C64 \$159
Zodiac (D) \$7	Archon 2: Adept (D) \$23	MICROLEAGUE	SCARBOROUGH	Kampfgruppe (D) \$37	Total Auto Answer/ Auto Dial Modem w/Software \$29.95
AVALON HILL	Carriers at War (D) \$27	Baseball (D) \$26	Build A Book (D) \$17	Mech Brigade (D) \$37	Wico Bat Handle \$17
Jupiter Mission 1999 (D) \$23	Europe Abriaze (D) \$27	General Manager (D) \$26	Build A Book Refills \$9.95	Norway 1985 (D) \$23	Wico Boss \$12
Maxwell Manor (D) \$19	Heart of Africa (D) \$27	1984 Team Data Disk \$16	Mastertype (D) \$23	Phantasie (D) \$25	
Panzer Jaqd (D) \$21	Mail Order Monsters (D) \$27	MICROPROSE	Net Worth (D) \$44	Pro Tour Golf (D) \$25	
Ripper (D) \$19	Movie Maker (D) \$27	Acro Jet: Advanced Flight Simulator (D) \$23	SUBLOGIC	Questron (D) \$25	
Super Bowl Sunday (D) \$21	Music Const. Set (D) \$27	Crusade in Europe (D) \$25	Flight Simulator II (D) \$32	Ringside Seat (D) \$25	
T.A.C. (D) \$26	One-on-One (D) \$27	Decision in the Desert (D) \$25	Flight Simulator Scenery Disks (D) Call	Wings of War (D) \$25	
Telengard (D) \$19	Pinball Const. Set (D) \$27	F-15 Strike Eagle (D) \$21	Jet (D) \$29		
Tournament Golf (D) \$19	Racing Dest. Set (D) \$27	Kennedy Approach (D) \$21	SYNAPSE		
BATTERIES INCLUDED	Reach for Stars (D) \$27	Mig Alley Ace (D) \$23	Blue Max 2001 (D) \$19		
Cal-Kit (D) \$33	Seven Cities of Gold (D) \$27	Nato Commander (D) \$23	Brimstone (D) \$25		
Consultant (64 or 128) \$39	Skyfox (D) \$27	Silent Service: The Submarine Simulation (D) \$23			
Home Pak (D) \$33	Prices too low to advertise!! Call				
Keys to Typing (D) \$17	EPYX				
Paperclip w/Spell 64 or 128 \$49	Balblazer (D) \$25				
BRODERBUND	Barbie (D) \$19				
Bank St. Filer (D) \$33	Fast Load (R) \$23				
Bank St. Mailer (D) \$33	GI Joe (D) \$19				
Bank St. Writer (D) \$33	Hot Wheels (D) \$19				
Bank St. Speller (D) \$33	Impossible Mission (D) \$21				
	Jet Combat Simulator (D) \$19				
	Koronis Rift (D) \$25				
	Pitstop II (D) \$19				

P.O. BOX 278—DEPT. CG—WILDWOOD, PA 15091

*Ordering and Terms: Orders with cash check or money order shipped immediately. Personal/company checks, allow 3 weeks clearance. No C.O.D.'s. Shipping: Continental U.S.A.—Orders under \$100 add \$3. Free shipping on orders over \$100. PA residents add 6% sales tax. AK, HI, FPO-APO—add \$5 on all orders. Sorry—no International orders. Defective merchandise will be replaced with same merchandise. Other returns subject to a 15% restocking charge—NO CREDITS! Return must have authorization number (412) 361-5291. Prices subject to change without notice.

Extended Holiday Hours
Nov. 11-Dec. 16
M-Th 8:30 AM - 9 PM EST
Fri-Sat
8:30 AM - 6 PM EST
Christmas Order
Deadline—Dec. 17

IS IT POSSIBLE TO MAKE THE BEST ANY BETTER?!



The MW-350 is getting better with age because of these new additions:

- Standard 4K Buffer
- Special Software Modes
- Supports more printers
- Optional Transparent Mode
- External switch selectable Commodore graphics mode for Epson, Star Micronics, C. Itoh Prowriter, Okidata, Seikoshia, Banana, BMC, Panasonic, Mannesman-Talley, Think Jet & others.



And it still has:

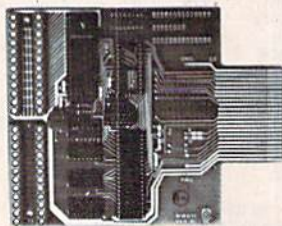
- Built-in Self Test with Status Report
- Microprocessor controlled emulation of Commodore printers for compatibility with popular software

NEW INTRODUCTORY SALE!

PRICE \$89.00
OR \$79.00 with trade in of your old interface

Universal Input/Output Board for C-64 & C-128

- 16 Channel 8-bit A/D converter with 100 microsecond sampling time.
- 1 D/A output
- 16 high voltage/high current discrete output
- 1 EPROM socket
- Use multiple boards for additional channels up to 6 boards



MW-611 \$225.00

Dealer Inquiries invited



Micro World Computers, Inc. (303) 987-9531
3333 W. Wadsworth Blvd. #C105
Lakewood, CO 80227

C64, VIC20 POWER SUPPLY MODEM FOR C64 \$37.95

AUTO DIAL, AUTO ANSWER
300 BAUD UNLOAD & DOWN LOAD



PS01 \$29.95

UL LISTED EXTRA POWER TO TAKE CARE EXTRA LOADS AND HEATING PROBLEMS. BEATS THE CONSUMER

OUTPUT	MAXTRON	COMMODORE
V. S.C.	1.0 A	1.0 A
BY S.C.	1.0 A	1.0 A

Surge Protected & Noise Filtered Power Center. (PO01) \$59.95



TRIZERS OF SURGE & NOISE FROM POWER SOURCE. SIX LIGHTED SWITCHES CONVENIENT CONTROL FIVE OUTLETS. UL LISTED STANDARD CIRCUIT BREAKER & SAFETY COVER. HOPPY COLOR SLIM CASE TO TAKE MAX SPACE UNDER YOUR MONITOR.

Surge Protected Power Outlets (PO02) \$15.95



TAKES CARE SURGE FROM POWER SOURCE. LIGHTS SWITCH CIRCUIT BREAKER. SIX POWER SLOTS. STEEL CASE. HIGH COLOR. ALL IN UL STANDARD.

Dual 5.25" Disk Drive for C64



DD04 \$339.95

TWO SUPER DRIVES IN A COMPACT CASE. FASTER QUETER & MORE READER. THE ORIGINAL. UL LISTED. CONVENIENT FOR MAKING BACK UP.

THE AMAZING KEY FINDER RESPONDS TO YOUR HAND CLAP IN BEEP BEEP SOUND. \$7.95 + 2.00 SAH

NO DAYS WARRANTY FOR MOST ITEMS
MAXTRON 1825A DUFFEE AVE. S. EL MONTE, CA 91733
(818) 350-5707 VISA & MASTERCARD ACCEPTED

SHIPPING & HANDLING \$4.00 EXCEPT LOCAL \$12.00. (PO01) \$5.00. CASH 8% DIS. TAX DEALERS WELCOMED

DATA SETTE FOR C64, C128, VIC20 \$19.95 Special

FUNCTION SAME AS VIC-1510 EXCEPT THE PRICE

C64, C128 CONTROLLED R/C TANK



X' Mas Special \$99.00

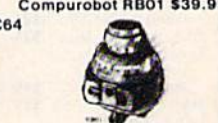
THE U.S. TANK CAR WITH RACE BOX COMES IN THREE PAIRS. ENABLE A RACE OR CONTROL BATTLE OF THREE TANKS. RUN WITH OR WITHOUT CARPET. CARPET IS THE SAME AS THE ORIGINAL. CAR TO MOVE. MOVE & RETURN UP TO HALF AN HOUR. BY MOVEMENT IN FORWARD RIGHT LEFT REVERSE STOP. IMPROVED BY YOUR OWN JUSTICE.

Graphic Mouse (GM01) \$69.95



CREATE BEAUTIFUL GRAPHING WITH THIS USER FRIENDLY PROGRAM. FUNCTIONS INCLUDE: SWITCH LINE POINTS. BOX DRAW. MOVE. SET. ARC. CIRCLE. FILL. SHADE. BACKGROUND. WERSE. CATALOG. SAVE. PICTURE. MOVE. CURSE. LOAD. PICTURE. DRAW. FILLER. EPS. ETC.

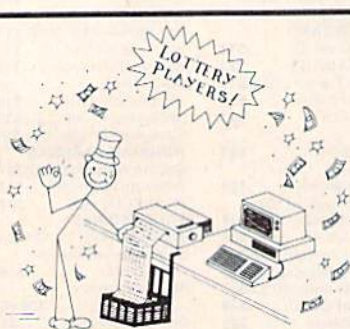
Compuport RB01 \$39.95



NO TALK. NO BEEP. WITH A MICROCOMPUTER PROGRAMMABLE VIA SYMBOLIC KEYBOARD ON TOP. OVER A SERIES OF 48 ACTIONS IN FORWARD. BACKWARD. LEFT. RIGHT. STOP & GOING. WITH BUILT IN INFORMATION PROGRAM. A GREAT EDUCATIONAL. TOOL TO TEACH ABOUT COMPUTER & LOGIC. USE ONE X VOLT & 4K. BATTERIES. NOT INCLUDED.

WINALOTT

TM



Why choose your numbers with cards or numerology when you can get the power of a computer behind your lottery play. They use a computer — You should too, with WINALOTT™

WINALOTT™ alone, may be reason enough to buy a home computer! Of course if you already own one, you're ready to go!

WINALOTT™ Lottery Manager Software Package:

- chooses 3 to 8 groups of numbers
- uses 3 methods of choosing numbers
- works with U.S. and Canadian Lotteries
- checks for winning ticket numbers
- keeps track of winnings
- keeps track of expenses (tax purposes)
- prints out number lists, reports — and more!

Graphics and Music — Written in Assembler — only \$49.95 Commodore™ 64/128 Version - Disk Format NOW available for the TRS-80™ Models I, III, 4 & 4P!

To Order, Send Check or Money Order to:

Computer PALS
125 Larkspur St., Suite 200, San Rafael, CA 94901
(Allow 4 to 6 weeks for delivery)

*Call for FREE Dealer Info Package (415) 453-5551

Soon to Be Available on: Apple II, Atari 400/800, TRS-80 CoCo

PUT YOUR 64 TO WORK!!
START A HOME BUSINESS
PRINT SIGNS TO SELL
WITH

FOR SALE
491-6502

HELP
WANTED

TODAY'S SPECIALS
THINGS \$4.95
WIDGETS \$6.95
DELUXE WIDGETS \$17.50
SOFTWARE \$19.95

YEARBOOK
MEETING
CANCELLED

HOLIDAY
GREETINGS

CUSTOM SIGNS
FOR SALE
CALL YOU!!

THE BANNER MACHINE IS
THE ONLY PROGRAM
THAT PRODUCES
PROFESSIONAL QUALITY
SIGNS!!



1-800
762-5645

Printers: Epson MX (with Graftrax), RX, FX, JX, LQ; Gemini 10 & 15; Commodore MPS 801, 1525E; Banana; Panasonic P1090; Seikoshia GP100A; Riteman II, Plus, 15, Mannesmann Tally, Spirit 80, Okidata 82A, 83A with Okigraph 92A, 93A, Prowriter 8510. C. Itoh 8510.

THE BANNER MACHINE (INCLUDING 5 FONTS) \$49.95
OPTIONAL FONT DISK (INCLUDING 4 FONTS) \$39.95

13646 Jefferson Davis Hwy., Woodbridge
VA 22191. Info. call 703 491-6502
In Canada: ASPIN MICRO
1283 Scarborough Ave.
Ontario M1R 0J1
(416) 443-0843

Cardinal Software

**TOTALLY NEW!
AN IDEA
WHOSE TIME
HAS COME!**



TOMORROW'S TECHNOLOGY IS HERE TODAY.

THE COPY PROGRAM

- WORKS ON 1 OR 2 DRIVES
- EXACT COPIES IN ONLY 21 SECONDS
- SIMPLE-FULL BACK-UP IN A SINGLE KEY STROKE
- RELIABLE—WORKS VIRTUALLY EVERY TIME

\$59.95
HOLIDAY SPECIAL

the 21 Second Back-up

CALL TOLL FREE! 800-468-4689 CALL TOLL FREE!

HOLIDAY SUPER COMMODORE PACKAGE SPECIAL

• **Commodore C-64 COMPUTER WITH 1541 DISK DRIVE ONLY \$289.00**

• **Commodore C-128 COMPUTER WITH 1571 DRIVE ONLY \$519.00**

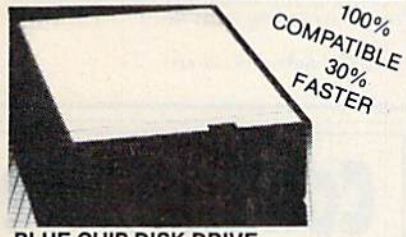
• **Commodore 803 PRINTER ONLY \$109.00**



CALL US FOR SPECIAL HOLIDAY Commodore PRICES

- ALSO AVAILABLE
- 1572 DRIVE MOUSE
 - 1702 MONITOR
 - 1101 D-W PRINTER
 - 1902 RGB MONITOR
 - 1901 MONOCHROME MONITOR
 - MEMORY EXPANSION

BLUE CHIP FOR COMMODORE 64



100% COMPATIBLE
30% FASTER

BLUE CHIP DISK DRIVE FOR COMMODORE C64 \$159.00

CALL FOR ALL SOFTWARE TITLES

FLEET SYSTEM C-128 \$69.95

MEMOREX PAPER 1000 SHEETS \$14.95

ACCESSORIES

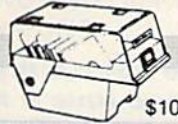
WICO BOSS JOYSTICK CALL



PAPER (1000 COUNT) \$14.95

SURGE STRIP 6 OUTLET EMI-RMI FILTER \$27.95

Inland STORAGE CASE HOLDS 60 \$10.95

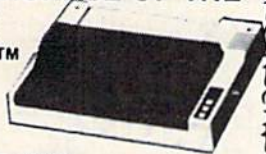


— SUPER PRINTER PACKAGE —

FREE \$100.00 WORTH OF ACCESSORIES

WITH PURCHASE OF THE

Write Hand™



FROM **COPAL**
WRITE HAND 1200L 10" CARRIAGE 120 CPS \$279.00
OR SG-10 PRINTER \$289.00

INCLUDES

- PACKAGE OF PAPER
- EXTRA RIBBON
- PRINTER STAND
- XETEX INTERFACE

BLUE CHIP PRINTERS

120/10 120 CPS, 10" CARRIAGE \$179.00

D 12/10 PRINTER \$219.00

DAISY WHEEL INCLUDES COMMODORE READY/INTERFACE

FREE FLEET WRITER WORD PROCESSOR

Konica®

VHS and Beta Video Cassette **\$5.49**



FISHER VCR MODEL 805

WIRELESS REMOTE 10 FUNCTION CABLE READY / 3 EVENT ONLY \$299.00

DISKS

- NASHUA SS \$24.95
- 3 BOXES OF 10
- NASHUA DS/DD \$14.95
- NASHUA MF-1 3 1/2" \$29.95
- MAXELL SS/DD \$13.95
- MAXELL DS/DD \$21.95
- SENTINEL 10 COLOR W/CASE \$15.95
- SENTINEL 10 COLOR W/CASE DS/DD \$19.95



TRY OUR OWN TOP QUALITY UNIVERSAL DISKETTES ONLY \$14.95 bx

INTERFACES

- XETEC SUPER GRAPHICS \$68.00
- 8K BUFFER, NLQ MODE, 20 FONTS
- XETEC SUPER GRAPHICS JR. \$44.00
- NLQ MODE



UNIVERSAL MKTG. 475 MAIN ST. FARMINGDALE, NY 11735

800-468-4689

LOCAL CALL (516) 753-0110

MASTERCARD, VISA, M.O. OR CHECK
NY ORDERS ADD SALES TAX
NO EXTRA CHARGE FOR VISA OR MASTERCARD

SEND \$5.00 FOR CATALOG & ADDITIONAL SPECIALS
SCHOOL AND DEALERS WELCOME

No returns without authorization number. All products are new merchandise sold with manufacturers warranty. All Prices & Availability subject to change without notice. Prices are mail order only and do not include shipping & handling.

IN CANADA CALL: (514) 445-9663 / CALL FOR OUR OTHER N.Y. LOCATIONS

C-64 & C-128* OWNERS:

Stop playing "Hide-and-Seek" with your Disk software! Let your Commodore 64™ "memory" do all the work for you with **MASTERDISK®**. Easy Manual and Program Menu-Screens make everyone a "pro" in 1 day!

Here's a small "PEEK" at SOME of the FULLY-INTEGRATED POWER of PRODUCTIVITY at your fingertips. . .

- a SORTED Master Catalog of ALL your Disks (even those un-listable "protected" Directories: Names, ID's, File info, etc.)
- Search + List any File/Disk/ID in seconds, automatically, in any of SEVEN WAYS.
- Transfer ML-Programs or Files from Disk to Disk (CATEGORIZE your software)
- Stop disaster before it strikes: change duplicate ID's fast, without total re-copy.
- Restore accidentally-scratched files in a flash, with VERIFICATION that they're OK.
- Works with 1 or 2 Single Disk Drives (1541, MSD, etc.) with or without Printer (Commodore or ASCII).
- Handy-Reference Card for HEX/ASCII/BINARY-TO-DECIMAL VALUE TRANSLATION + FORMULAS, included FREE.
- All this + MUCH MORE, for just \$34.95. (U.S.A.), \$45.95 (Canada)

*MASTERDISK® and MASTERDUAL® are also compatible with the NEW C-128 (in C-64 Mode)!

We ship within 24 hours! Send Money Order or Check to:

INTEGRATED-SOFTWARE SYSTEMS

P.O. Box 1801, Ames, IA 50010
VISA/M.C./C.O.D., Call (515) 233-2992
9 a.m. - 9 p.m. (Central Time) Mon.-Fri.
Add \$3 Shipping/plus \$2 Foreign, C.O.D.
IA Residents add 4% Sales Tax.

IN CANADA: Cricket Distribution Co.,

P.O. Box 953, Cobourg,
Ontario, Canada K9A 4W4
VISA/M.C./C.O.D., Call (416) 372-3692
9 a.m. - 6 p.m. (Eastern Time) Mon.-Fri.
Add \$3 Shipping/plus \$2 C.O.D.
Ontario Residents add 7% Sales Tax

Whether you have tens or hundreds of disks, now YOU can be the MASTER of your TOTAL Software Library!



Now YOU too can get the "Software Edge"!

NEW!! - MASTERDUAL®, "Son of MASTERDISK®" . . . same power, but with Dual Drive Speed!

- Same Catalog Features as MASTERDISK®
- Same Disk repair functions, too
- For all C-64 & C-128* systems with Dual Disk Drives (4040, MSD, etc.)
- Utilizes all Dual Drive functions for maximum speed and ease of use
- FREE Handy Reference Card for HEX/ASCII/Binary to Decimal Translation + Formulas
- Experience FULLY-INTEGRATED POWER for just \$29.95 (U.S.A.), \$39.95 (Canada)

DISCO EXCLUSIVE
EXCLUSIVE DISK
CASSETTES • DISK
BONUS COUPONS • LA
EDUCATIONAL • BUSINESS

UNLIMITED SOFTWARE, INC.
DISK-OF-THE-MONTH CLUB
GUARANTEES
Lowest Prices

Tapes • Cartridges • Disks
NO PURCHASE OBLIGATION

SEND FOR DETAILS

This unique club beats them all

DISK-OF-THE-MONTH CLUB
P.O. BOX 116, FAIR LAWN, N.J. 07410-0116

NAME _____

STREET ADDRESS _____

CITY _____

STATE _____

ZIP _____



R.T.B. SOFTWARE PRESENTS

PRINTER'S DEVIL*

OVER 120 INSIGNIAS,
MONOGRAMS, PICTURES
& OTHER GRAPHICS
(LIST \$24.95) NOW \$18.00
FREE SHIPPING!

EXCLUSIVELY FROM THE
'DISK-OF-THE-MONTH' CLUB

BOX 116, FAIR LAWN, N.J. 07410
Dial: U.S. N.J. RESIDENTS
(800) 345 2582 (201) 794 3220

* FOR "THE PRINT SHOP"
"THE PRINT SHOP" IS A TM OF BRODERBUND SOFTWARE, INC.



Commodore Service

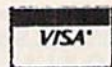
3-5 Day
Turn Around
(subject to parts availability)

C-64 Repair \$55⁰⁰
1541 Alignment . \$35⁰⁰
1541 Repair \$75⁰⁰
Other Computers . . \$CALL

Parts & Return Shipping
Included.
Parts & Power Supplies
Also Available

To save C.O.D. charges —
send Unit & Power Supply
with check or M.O.

Second Source Engineering
9901 Horn Rd., Ste. B
Sacramento, CA 95827
(916) 364-5134





Aquarian Software Introduces . . . Powerful Programs at Affordable Prices

Mike J. Henry's

FAST BOOT!

- Works with Both 1541 and MSD Drives!
- Multiple loading options for increased compatibility.
- Disk-Based & Non-Protected

Only \$14.95

Graphic Screen Exporter 64

- A Universal Graphic Converter
- Converts Anything to Anything — Including:
 - Koala Pad Flexidraw
 - Doodle Print Shop
 - And Many More!

- Complete On-Screen Editor

The Most Versatile Graphics Utility Ever Released for the Commodore 64!

Only \$29.95

I.E.A. Instant Editor Assembler for the Commodore 64

- Written 100% in machine language
- Assembles 17K source code in 5 seconds!
- Co-resident editor assembler monitor
- Compatible with HES MON
- Slow-motion code analyzer
- Technical assistance number

"I would have to recommend the IEA Instant Editor Assembler, the BEST VALUE-FOR-PRICE development package on the market!"

*Jim Gracely,
Technical Editor
Commodore Microcomputer Magazine*

"IEA is a nice, simple assembler, good for beginners at an UNBELIEVABLE PRICE!"

Jim Butterfield

Now Only \$17.95

The Cataloger

The Ultimate Disk Cataloging System for the 64!

Features of The Cataloger V3.5A Include:

- Easy loading of information. Loads directly from the disk itself.
- Ability to change name of entry.
- Ability to change any information instantly — uses relative files exclusively.
- Search, Sort and Print by any of 12 fields.
- Capacity for 1100 different programs (or disks) per data disk.
- FAST — all machine language.
- Menu driven — very easy to use.
- Works with ALL printers.
- Works with one or two drives.
- Allows duplicate ID's.
- Allows selection of items to be entered.

Only \$24.95

Nova Decoder 64

Version 3.0

A 6502/6510 Disassembler
Designed for the Commodore User

A MUST for anyone just learning Machine Language.

A TREAT for those examining the operation of the C-64.

A BLESSING to machine language programmers trying to de-bug their programs.

- Choose Screen or Printer Options
- Addresses Printed in Either Hex or Decimal
- Complete Calculations of Branch Commands
- Brief Explanations of Each Command Encountered
- Generates Tables of Zero Page Addresses Used, Branch Addresses, All Jump Routines, and More . . .

Only \$19.95

Modem Master

The Fastest Commodore
BBS Available!

- Works with 1541 or MSD Dual Drive
- 300/1200 Baud Operation
- New Punter File Transfer Protocol
- Fully Menu Driven
- Over 25 Commands
- Public Message Base
- Private E-Mail Base
- E-Mail Check at Sign-On
- Sub-Directories for File Transfer
- 250 User Capacity
- Accurate Clock/Calendar
- Printer Output
- Information Files
- "Old" E-Mail Deleted After One Week
- User Survey/Poll
- Set Up in Only 10 Minutes!

Only \$29.95

TURBO CALC/64

A Great Beginner's Spreadsheet
At an UNBELIEVABLE Price!!

- 100% Memory Resident
- 100% Machine Code and P-Code
- 100% Menu Driven
- Over 13 K RAM for Data
- Large Matrix, 100 Rows by 26 Columns
- On-Line Help Screens
- On-Screen Menu at All Times
- Full Printer Support
- Built-in Functions (SUM, AVG, MIN, MAX)

At last, a powerful, yet affordable spreadsheet!

ONLY \$17.95

Disk-Lock V2.1

At Last! A professional copy protection system is available to YOU. Now you can protect your programs from most copy programs!

- Disk-Lock is Designed to Prevent Full Disk Copies.
- Stops Over 90% of All Copiers
- Offers Multiple Protection Schemes
- Place Protection on Any Track From 1 to 40!
- Fully Menu Driven

Only \$39.95

The Complete Thriller Collection

All six thrilling adventures now together on one disk! Plus — as a bonus — **Three Hours To Live!** Each is a full-length machine language text adventures that will take you weeks to complete. They feature full-sentence input (not just two words!) with color and sound.

Includes:

- Night of the Walking Dead
- Son of Ali Baba
- Perils of Darkest Africa
- Frankenstein's Legacy
- Revenge of The Moon Goddess
- Shipwrecked!
- Plus Three Hours to Live

Only \$24.95

For All SEVEN!

Canadian Best-Sellers NOW Available in the U.S.

The Gold Disk Series

Quality Software for Your 64 at an Affordable Price!

Only \$14.95 Per Disk*

* Plus Shipping and Handling

Each Disk Contains:

- The Feature Program
- Two High-Quality Games
- A Home Business Program
- Tutorials on Programming
- And MUCH MORE !!

Volume 10 Now Available —

Featuring an Advanced Sound Synthesizer

Volumes 1 through 9 Are Also Available

Dealers Welcome! — Call (503) 654-2641 For Details.

Aquarian Software

P.O. Box 22184
Portland, OR 97222

To Order, Call: (503) 654-2641
VISA and MasterCard Accepted



Dealer Inquiries Welcome!

Add \$3.00 S & H Per Order
Add \$5.00 for COD
Canadian Orders: Add \$10.00 S & H-U.S.
Funds Only, Please.
Allow 4 to 5 weeks for delivery.

UNISOURCE

Your one source for computer hardware, software and peripheral needs since 1981.

What is Unisource? • A leading mail order computer company with a friendly, knowledgeable staff • Accepts VISA & MasterCard at never any additional cost • Provides toll free order lines • Ships in-stock merchandise usually within 48 hours • Discount prices on all products



**Star
SG 10**

\$239.95

(with purchase of TurboPrint Interface right)

This price-leading dot matrix printer has a NLQ mode that really is near letter quality! The new SG 10 from Star Micronics is a speedy 120 cps in draft mode and is almost daisy-wheel quality in LQ mode. This printer has easy access format switches, friction and tractor feed for personalized stationery and fan-fold paper, downloadable characters for great graphics, and ultra high resolution bit image graphics for precision plotting and graphics. Order with the fully compatible printer interface below for even greater savings.

The SG 10 has a suggested retail of \$299.95. Our every-day low Unisource price is \$249.95. But order the printer interface with your SG 10 and receive extra savings on both the printer and the interface! The SG 10 is only \$239.95 when you purchase either of the Turbo Print interfaces. Order part number SG 10.

VOLKS 6470

COMPLETE!
\$154.95
ANC 108C



The VOLKS 6470 from Anchor Automation brings a new standard to the design and performance of 1200/300 bps modems.

The VOLKS 6470 features auto dial/auto answer, Bell 212A compatibility, selectable pulse and tone dialing, a built-in audio monitor speaker, dial tone and busy signal detection, plus an auxiliary telephone jack.

The AutoCom V(tm) software program diskette provides auto answer/auto originate, uploading/downloading, stores phone numbers and has more than 30K bytes of memory available.

The VOLKS 6470 is designed for easy installation and operation. Simply plug it into the user port of your Commodore 64(tm) computer, and connect to your telephone line using the 6 ft. modular telephone cord provided. There is no requirement for external power or for an expensive data interconnect cable.

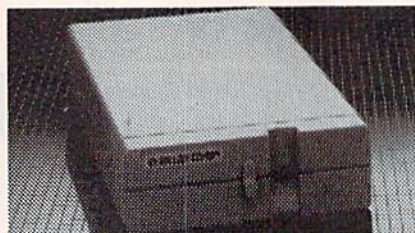
The VOLKS 6470 can link your computer to the exciting world of data communications. This package is complete and ready to run. ANC 108C \$154.95

We'd like to send you a copy of our exciting new catalog covering a full range of Commodore 64 products. It's free just for the asking. Simply fill out this coupon, clip, and send it to the address indicated. We'll put you on our mailing lists and send our complimentary catalog.

Name _____
Mailing Address _____
City, State, Zip _____

"INCREDIBLE!"
**BLUE CHIP
DISK DRIVE**

**ONLY
\$178.95**



State-of-the-art technology enables this Blue Chip BCD/5.25 disk drive to be more compact, require less power and generate less heat than its Commodore counterpart. This disk drive is fully compatible with all Commodore computers, reads and writes much faster than the Commodore disk drive and operates with thousands of Commodore programs.

BCE 100 \$178.95

**TURBOPRINT
INTERFACE**

\$59.95
(with purchase of SG 10 Printer left)

The TurboPrint GC was specifically designed for use with Commodore computers. This performance interface prints enhanced Commodore graphics (on printers like the SG 10 above) and has a special line buffer that doubles text printing speed on printers without on-board memory. External dip switches allow you to select specific printer type and device number. Suggested retail on TurboPrint GC is \$69.95 and is Unisource priced at \$64.95. But with the purchase of the SG 10 printer above, you get the TurboPrint GC for only \$59.95. Order part number TEL 100.

SPECIAL OFFER! Get the TurboPrint GTC with 16K or 32K printer buffer connector for \$69.95 with the purchase of the SG 10 printer. That's a \$79.95 retail value! Call us for pricing on the 16K and 32K buffers for this interface. Order part no. TEL 101.



SUPER STIK

\$9.95



Quality joystick for the budget-minded Commodore user. The Super Stick control cable has built-in isolation electronics for use with the Commodore C64. This will offer the most from software as well as enhance motor skills. No adapter needed. Stick action for maximum enjoyment!
UNI 233S \$9.95

**UNISOURCE
ELECTRONICS, INC.**
7006 UNIVERSITY • P.O. BOX 64240
LUBBOCK, TX 79464

CALL TOLL FREE 1-800-858-4580
IN TEXAS CALL 1-806-745-8834



Beat The Overpriced Software Blues With Home Software Systems

C64 & C128
SOFTWARE COLLECTIONS

Five different Program Disks featuring:

- Menu Driven Autoload Routines
- On-Line Documentation and Help
- 20-30 Programs per Disk
- Professionally Programmed
- Not Copy Protected or Copywrited

Arcade and Card Games. Exciting arcade style action games and card games like Blackjack, Poker, Keno, Spades and more.

Board and Strategy Games. Play Chess, Backgammon, SuperTrek, Monopoly, Adventure & more.

Disk and Utility Programs. Fast copier, disk editor, and manager programs ... a programmers dream. Includes many other programs.

Business Programs. Spreadsheet, stock analysis, word processing, checkbook, annuity and statistical programs.

Print Utility Programs. Print labels, mailing lists, calendars, disk directories and more. For Gemini and Commodore.

Send \$14.95 + 2.00 S & H per disk or \$64.95 + 3.00 S & H for the 5 disk collection to: (MC/VISA accepted. MI Residents add 4%)

Home Software Systems

P.O. Box 85

Sterling Hts., MI 48077



Wicked Wendy's House of Discounts



HARDWARE

List Price WENDY'S Price

MODEMS

MITEY MO 300 baud C-64 automodem incl. free Smart 64 terminal s/ware, \$15 free CompuServe access time, free PlayNET demo software and 2 hr free use \$119 \$57

80 COLUMN CARTRIDGE DATA 20 XL 80 cartridge with free spreadsheet and word-processor s/ware included \$100 \$87

\$\$\$ WICKED WENDY'S WHOPPING HARDWARE SPECIAL \$\$\$
MITEY MO & XL80 card only \$132 Save \$87!

SOFTWARE

VIZASTAR-64 three in one with spreadsheet, data base and graphics \$119 \$85

VIZASTAR-128 NEW! for the C-128 \$119 \$99

SMART 64 +4 terminal software for any modem, allows upload/download, x-modem, VT52/VT100 emulation & more \$40 \$28

6th Sense - the ultimate home modem program. You control its actions even when you're away. It thinks! \$89 \$68

NEW SMART 64 USER'S MANUAL by CDI, makes a sophisticated program easier to use than the original manual \$13 \$8

\$\$\$ WICKED WENDY'S WHOPPING SOFTWARE SPECIAL \$\$\$
MITEY MO & VIZASTAR -64 only \$132 Save \$106!

ALL ITEMS SHIPPED WITHIN 72 HOURS OR WE PAY SHIPPING! CASHIER'S CHECK, MONEY ORDER, VISA OR M.C. ACCEPTED. SHIPPING AND HANDLING EXTRA. ADD 4% FOR VISA OR M.C. CALIF RESIDENTS ADD 6.5% TAX. PRICES SUBJECT TO CHANGE WITHOUT NOTICE. PRODUCT SUBJECT TO AVAILABILITY.

TO ORDER CALL

800-WICKED W

Hours M-F 8:00-5:00 PST

For California residents or customer service call 415-632-1220 or send your order to:

WICKED WENDY'S HOUSE OF DISCOUNTS
24 HAMILTON CT. - PACIFICA, CA 94044

WHITE HOUSE COMPUTER

P.O. Box 4025, Williamsport, PA 17701

"Where Prices Are Born, Not Raised"

TOLL FREE 1-800-351-3442

PA CALL 1-717-322-7700

— PA Residents FREE Shipping —

MON - FRI 9 AM - 6 PM VISA and MC Accepted 4%

POLICY: No deposit on COD orders. Free freight on all prepaid cash orders over \$300 in the continental USA. APO & FPO add \$5.00 per hundred. For priority mail add \$8.00 per hundred. PA residents add 6% sales tax. Defective products must have Prior RA number. Schools net 15.

PRINTERS

EPSON	COMMODORE
RX 80	MPS 801
RX 100	802
JX 80	803
FX 85	DPS 1101
FX 185	
LO 1500 (PAR)	
LQ 1500 (SER)	
LX 80	
Homewriter	
Comrex 220 Atari	
Comrex 220 Comm.	
LX 90	
SQ 2000	
DX 10 Daisywheel	
DX 20 Daisywheel	
HS 80 Letter Jet	
CITIZEN	STAR MICRONICS
MSP 10	SG 10
MSP 15	SG 15
MSP 20	SD 10
MSP 25	SD 15
	SR 10
	SR 15
	Powertype
OKIDATA	LEGEND
Okimate 10	1380
182	1385
84	1080
192	808
193	
	PANASONIC
	1090
	1091
	1092
	1093
	3151

COMPUTERS

C-64	149.95
C-128	275.95

INTERFACES

Cardco G	39.95
G-Wiz	48.95
Grappler CD	89.00
Tymac Connection	58.95

PRINTER PAPER

2500 Shts Lazor	24.95
1000 Shts Lazor	14.95
500 Shts Lazor	9.95

COLOR PAPER

2500 Shts Lazor	42.95
1000 Shts Lazor	23.95
500 Shts Lazor	9.95

DISK DRIVES

Indus GT	198.00
MSD Dual	459.00
Enhancer 2000	189.95
1541	195.00
1571	249.95
1572	375.95

MONITORS

AMDEK	
300 G	119.00
300 A	129.00
Color 300	185.95
Color 500	339.00
Color 600	399.00
Color 700	469.00
Color 710	539.00
310 A	145.00
XTRON	
Comcolor I	189.00
COMMODORE	
1702	189.95
1902	259.95
TEKNIKA	
MJ 10 Comp/	
Sep. Video	175.95
MJ 22 RGB/Comp	
Sep. Video	249.95
ZENITH	
ZVM 122 Amber	82.95
ZVM 123 Green	75.95
ZVM 131	RGB
Color/Green	229.00
ZVM 133 RGB	
Color/Green	389.00
ZVM 130 Color/	
Green	259.00
ZVM 135 RGB	
Color/Green	439.00
NEC	
1260	139.95
1205	95.00
1201	139.95
SAKATA	
SC 100	179.00

MODEMS

C-64 1064	54.95
Tele Learning	39.95
Westridge	59.95
Miley Mo	59.95
Volks 300	59.95
Volks 300/1200	179.95
Hayes 300	149.95
Hayes 1200	385.95
C-1670	185.95
C-1660	54.95
Compuserve	19.85
INNOVATIVE CONCEPTS	
Flip-N-File 10	2.50
Flip-N-File 15	6.50
Flip-N-File 25/Lock	12.50
Flip-N-File 50	12.50
Flip-N-File 50/Lock	16.50

SOFTWARE

Print Shop	28.95
Graphics Library 1	17.50
Graphics Library 2	17.50
Music Shop	34.95
Bank Street Writer	39.95
Syn Calc	32.95
Syn File	32.95
Relax	79.95
Body Sensors	34.95
Paperclip	55.95
Paperclip/Spell	61.95
Homepack	31.95
Consultant	59.95
B.I. 80 Column Card	99.95
Bus Card II	119.95
Fast Load	23.95
WICO	
Bat Handle	17.95
Boss	13.95
3-Way	21.95

SYMPHONIC VHS VCR/REMOTE

- ★ 14 Day/1 Program Timer
- ★ 105 Channel Cable Ready
- ★ 12 Pre-set channels
- ★ Auto Rewind **\$275.00**

C-64™ • VIC™ • SX-64™ • C-128™ • Plus 4™ • C-16™ • B-128™ • PET™ • CBM™ • LCD™

Bought Expensive Software Lately? Brace Yourself.

The Intelligent Software package: an integrated home/business/educational package of **25 programs** on disk or tape at the ridiculous price of **\$29.95** (plus five cents for postage + handling).

The package is not public domain or home-brew software; totaling over 51 pages of source code listings, it is the one product that can take care of all your data processing needs. One customer writes: "... accolades for the authors. This is as slick a deal as I have seen and more than adequate for all except fancy presentations. The best thing is the ease of use ..." The package includes:

Database: A complete multi-keyed fixed-record-length data base manager. Sort or select (using all relational operators: =, >, <, AND, OR, NOT, wild card) on any field, perform computations on numeric fields. Any operation can be performed on all, or only selected records. All fields completely user-definable. Can be used for any number of tasks, including accounting, mailing lists, inventory control, record, tape, or book cataloging, expense account maintenance, or as an electronic rolodex. Even if you use your Commodore for nothing else, this program alone might justify its expense.

Word Processor: A full-featured menu-driven word processor including: very fast file commands, screen editing, text locating and full control over margins, spacing, paging, indentation, and justification. "... well done and highly functional ... Provides an excellent alternative to the high priced word processors ... this is an excellent buy. Highly recommended." —Midnite Software Gazette. "Provides good basic features." —Compute's Gazette.

Copycalc: An electronic spreadsheet. Turns your Commodore into a visible balance sheet; includes screen editor. "Excellent program for budgeting, estimating, or any math-oriented use ... well worth the money. Highly recommended." —Midnite Software Gazette.

Also included: **ReportGen, ReportMerge** (interface W/P with Database to create form letters, statements, invoices, mailing labels, other reports.); **Baseball Statistician** (compiles batting statistics for a baseball league); several W/P utilities, including **Index** (indexes W/P's text files); several Database utilities, including **DBmerge** (facilitates multi-file database applications.), and **DBStat** (analyzes D/B files); a programming utility, **ASCII**, which converts text files (program listings) into program files; also **Checkbook, Inventory, Paper Route, Loan Analysis, Breakeven Analysis, Depreciation, Labeler, File Copier**; more.

Versions of the package are available for every Commodore computer having a minimum of 10k RAM. All programs will support tape, disk, and printer. Price includes documentation and shipping; Calif. residents add 6%. Add \$3 for credit card, COD, B050 disk, or cassette orders (cassette not available for Plus4™ and 16™.) No personal checks from outside USA. This ad is the catalog; a sampling of program output is available for \$2.

Intelligent Software
Quality Software since 1982

Box A Dept. I-6
San Anselmo, CA 94960
(415) 457-6153

IT'S LIKE

FREE DISKETTES



Your 5 1/4" single side disks are usable on the other side. You paid for one side, why not use the other... **IT'S FREE!**

Nibble Notch will **open** your new disk. It's easy... won't harm existing data. Try it!

nibble notch I ONLY **\$14.95***
for Apple, Franklin, Commodore & Atari (w/Atari Drives) square notch. PLUS P&H

ALSO DISK SURGEON

- Software for C-64 & 1541 Drive**
- Read data from, edit & write to disk
 - Analyze disk errors without "hammering"
 - Read data under errors, erase errors
 - Format a single track with any ID
 - File copy to copy portions of a disk
 - Single track copy • 4 minute copy of entire disk, and much more

FREE Nibble Notch
Buy the Disk Surgeon, get Nibble Notch I Free! A \$45 value.
\$29.95* FOR **BOTH!** PLUS P&H

QUALITY DISKETTES low as 99¢

*Add \$2 (\$5 foreign) for postage & handling. FL residents add 5% sales tax.

TOLL FREE 1-800-642-2536

FL (305) 748-3770

or send check or money order to:

nibble notch
computer products

4211 NW 75th Terrace • Dept. 144 • Lauderhill, FL 33319

ELECTRONIC ONE*

Commodore



THE
LOWEST
PRICES
THE
BEST
SERVICE

**ELECTRONIC
ONE** CALL

(614)864-9994

P.O. Box 13428 • Columbus Oh 43213

COMMODORE HARDWARE

C 128	259.99
C64	139.99
1541 DISK DRIVE	169.99
1571 DISK DRIVE	249.99
1702 MONITOR	179.99
1902 MONITOR	249.99

PRINTERS

STAR SG 10	228.00
PANASONIC 1091	228.00
EPSON LX80	228.00
COMMODORE 803	99.99
COMMODORE 802	199.99
CONNECTION INTERFACE	54.99
CARDCO G. WIZ.	44.99

MONITORS

TENIKA MJ22 (RGB)	269.99
TENIKA MJ10	169.99
XTRON 14" COLOR/GREEN	139.99
INDUS GT DISK DRIVE	219.99

SPECIAL
NASHUA DISKS GENERIC
SS D/D **8.88**

SPECIAL
TOTAL TELECOMMUNICATION
MODEM-UPLOAD-DOWNLOAD
AUTO ANS/DIAL
24.77

THE LOWEST PRICES

COMMODORE SOFTWARE

KENNEDY APPROACH	19.99
F 15	21.99
KARATEKA	18.99
PRINT SHOP	24.99
GRAPHIC LIBRARY	14.99
FLIGHT SIMULATOR	32.99
COMPUTER BASEBALL	21.99
FAST LOAD	23.99
MUSIC CONSTRUCTION	18.99
ARCHON II	24.99
GHOSTBUSTERS	19.99
ON FIELD FOOTBALL	19.99
SKY FOX	24.99
ROAD RACE	19.99
HACKER	19.99
WINTER GAMES	24.99
COMPUSERVE STARTER KIT	14.99
MACH 5	21.99

HOW TO ORDER: CASHIER CHECK, MONEY ORDER, MASTERCARD* or VISA* (Add 4% for charge cards) NO PERSONAL CHECKS NO C.O.D.'s SHIPPED U.P.S. PRICES SUBJECT TO CHANGE.
SHIPPING: Prompt one day shipping on in-stock merchandise. Ohio residents add 5.5% sales tax. Add \$3.00 on all orders under \$100.00. Add \$5.00 on all orders over \$100.00.
INTERNATIONAL: Actual freight charge on all orders outside the continental United States including A.P.O.
CALL OR WRITE FOR FREE CATALOG

CALL ELECTRONIC ONE (614) 864-9994

MONITORS DISK DRIVES

NEW UNITS
\$139



FULL
COLOR
COMMODORE CM141

NEW UNITS
\$159



1541
COMMODORE



VIDEO

CABLE??
NO PAY TV?



JERROLD, ZENITH
HAMLIN, OAK, and more

\$198

PORTABLE
VIDEO RECORDER



1-800-328-8322 EXT 581

T & D ELECTRONICS
10517 UPTON CIRCLE
BLOOMINGTON, MN 55431

Statement of Ownership, Management, and Circulation as Required by 39 U.S.C. 3685

- 1A. COMPUTE!'s GAZETTE
- 1B. N/A
2. 9-27-85
3. Monthly
- 3A. Twelve
- 3B. \$24.00
4. 324 West Wendover Ave., Suite 200, Greensboro, NC 27408
5. Same
6. Publisher, James Casella, 825 Seventh Avenue, New York, NY 10019
Editor, Robert C. Lock, 324 W. Wendover Ave., Suite 200, Greensboro, NC 27408
Managing Editor, Kathleen Martinek, 324 W. Wendover Ave., Suite 200, Greensboro, NC 27408
7. American Broadcasting Companies, Inc., 1330 Ave. of the Americas, New York, NY 10019
8. N/A
9. N/A
10. Extent and Nature of Circulation

	Average no. of copies each issue during preceding 12 months	Actual no. copies of single issue published nearest to filing date
A. Total no. Copies (Net Press Run)	403,750	398,168
B. Paid Circulation		
1. Sales through dealers and carriers, street vendors, and counter sales	127,385	115,561
2. Mail subscriptions	168,158	179,579
C. Total Paid Circulation	295,543	295,140
D. Free Distribution by mail, carrier, or other means, samples, complimentary and other free copies	395	811
E. Total Distribution	295,938	295,951
F. Copies not Distributed		
1. Office use, left over, unaccounted for, spoiled after printing	11,315	8,048
2. Returns from news agents	96,497	94,169
G. Total	403,750	398,168

I certify that the statements made by me above are correct and complete, James Casella, Publisher.

FOR THE COMMODORE
C-64 C-128 VIC-20

SERIAL BOX
SERIAL BUFFER
64K PORT

SPECIAL OFFER!
SERIAL BOX
\$149.95
Offer good until January 15, 1986
Plus shipping
Total \$174.95
See store prices for details

MAILS WORTH WRITING

The **SERIAL BOX**
... Lets you compute while your printer prints.

Imagine downloading a bit-mapped screen such as Flexi-draw or Kala-painter in 27 seconds!

You can dump 15 pages of text or a 35-page BASIC listing in 2 1/2 minutes.

Oh yes...

SERIAL BOX
can even skip over perforations.

R.J. Brachman Associates, Inc.
P.O. BOX 1077 • HAVERTOWN, PA 19083
Please add \$3.00 for shipping and handling (USA and Canada), \$4.00 for shipping and handling (USA and Canada), \$5.00 for shipping and handling (USA and Canada), \$6.00 for shipping and handling (USA and Canada).
PLEASE ALLOW 4 TO 6 WEEKS FOR DELIVERY
*Flexi-draw is a registered trademark of Inwell Systems.
Kala Painter is a registered trademark of Kala Technology Corp.

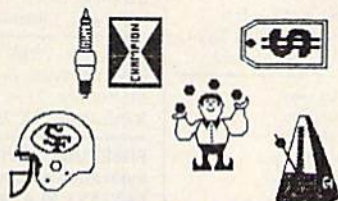
CALL: 1-800-228-7264 FOR ORDERS AND INFORMATION
IN PENNSYLVANIA CALL (215) 822-3495 OR WRITE

NOW YOU CAN Personalize your Graphics Collection with SELECT YOUR OWN

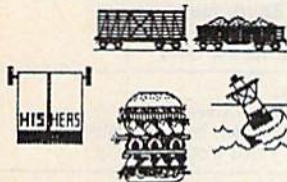
For use with THE PRINT SHOP™

List of SUBJECTS

- AUTOMOTIVE
- CIRCUS
- FOOTBALL - AFC
- FOOTBALL - NFC
- HIS & HERS
- KIDS ONLY



- MUSIC MAKER
- RAILROAD
- SEAWORTHY
- SIGNS
- SPACE
- WESTERN



SUBJECTS contain between 15 and 25 graphics
CHOOSE any 5 SUBJECTS per DISK for **\$19.90**

Include \$2.00 per order for Shipping & Handling

Additional **THEME DISKS** available!

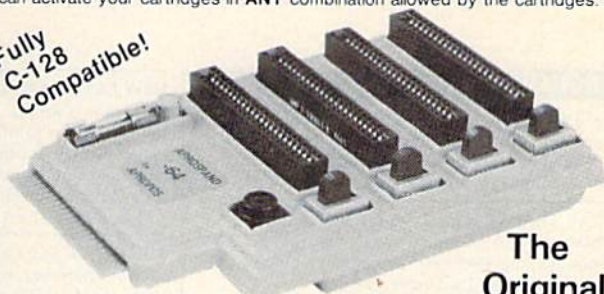
1990 Software
1632 Pleasant Valley Blvd.
Altoona, PA 16602
(814) 942-1990

Available for the
Commodore 64.
Apple II+/IIe/IIc

The Print Shop is a trademark of Broderbund Software

APROSPAND-64™ Gives your Commodore 64 or 128 full expandability! This superbly designed expansion module plugs into the expansion port & gives you 4 switchable (singly or in any combination) expansion connectors - plus fuse protection - plus a reset button! Before you buy an expander, be sure that it has a fuse to protect your computer and that you can activate your cartridges in ANY combination allowed by the cartridges.

Fully
C-128
Compatible!



The
Original
Reduced to **ONLY \$29.95**

Commodore Interfaces and Accessories

- ParallAX-CD Parallel Printer Interface for use with all Commodore incl. SX-64 (except PET).....**\$59.95**
- DSI PPI with Graphics.....**\$44.95**
- Cardprint G-WIZ Printer Interface.....**\$48.95**
- AP-Switch -3P, 3-to-1 Centronics Parallel Peripheral Switch. Switches active pins 1-18 and 31-36. Connects your computer to up to 3 parallel printers or up to 3 computers to one printer.....**\$75.00**

Add Shipping Per Item: \$3.00 Cont. U.S. \$6.00 CAN, Mex, PR, HI, AK, UPS Blue

APROPOS TECHNOLOGY

1071-A Avenida Acaso, Camarillo, CA 93010
CALL OUR TOLL FREE ORDER LINES TODAY:
1-(800) 962-5800 USA or 1-(800) 962-3800 CALIFORNIA
TECHNICAL INFORMATION: 1-(805) 987-2454
All Products have 2 Week Satisfaction or Money Back Guarantee

CA Res. Add 6% Tax
Listed are cash prices
Visa or MC add 3%

PRO-ALIGNMENT II \$39.95

- * ALIGN YOUR OWN COMODORE DISK DRIVE !!!
- * NO ADVANCED SKILLS * FULL VISUAL AND SOUND PROMPTS *
- * C-64 * C-128 * 1541 DRIVE * 1571 DRIVE *

DISCLONE PLUS \$59.95

- COPIES PROTECTED SOFTWARE * DOUBLE SYSTEM * EASIEST SYSTEM *
- 1-CRIPTO-BACK-UP * FULL NIBBLER * 1/2 TRACK * EXTRA TRACKS *
- 2-FLASH COPY * FAST COPY * NEW! WILL BACK-UP 1541 CPM DISKS *

128 MAIL \$69.95

- * PRINT PREVIEW * 80 COLUMNS * TONE PROMPTS *

\$30 OFF & FREE SOFTWARE!!!

- * PURCHASE ANY 2 OF THE ABOVE PROGRAMS AND TAKE \$30.00 OFF !!!
- * ALSO YOU GET YOUR CHOICE OF 1 OF THE PROGRAMS BELOW FREE!!!

SNAP LOAD !!! \$19.95

SPEEDS LOADS 500% * C-64

SOFT 80 \$19.95

- * 80 COLUMNS FOR THE C-64 * ALL BASIC - MOST MACH. LANG. PROG. *

64 MAIL \$29.95

- * MAILBASE * RELATIVE FILES * PRINT PREVIEW *

ORDERS CALL 800-327-8456 Ext. 5

- * FLORIDA AND OUTSIDE USA CALL (305) 949-8440 *
- * VISA - MASTER CARD - AMEX - MO - CHECK
- * OPERATORS STANDING BY FOR IMMEDIATE SHIPPING !!!
- * WE PAY FOR SHIPPING AND HANDLING. *

STATE OF THE ART SOFTWARE

15340 W. DIXIE HWY.
NORTH MIAMI BEACH, FLA. 33162

BETTER KEYBOARD UTILITY.

A simply elegant solution—blank "Cheat Sheets" give you the keyboard commands you need, instantly, for any program.

A pack of 12 cards die cut to fit your keyboard. Ready for YOU TO FILL IN. Have all of your program commands right where you want them... on your keyboard. Order a couple of packs today.

set of 12 custom die cut sheets **\$12.95** set of 24 custom die cut sheets **\$19.95**

BETTER DUST PROTECTION FOR AMIGA, VIC & C-64

Choose an attractive stat-free cover for your keyboard, monitor or complete system.

Deluxe covers are custom-fitted to each element of your Commodore, and are sewn, not glued with a special dust proof tightly woven fabric. Neutral color fits beautifully in any office or home. Available for Amiga: monitor and system unit cover (\$17.95), Amiga monitor only (\$12.95), Amiga system unit only (\$12.95), Available for C-64: computer cover (\$10.95), monitor cover (\$12.95), 1541 disk drive cover (\$9.95), data-set cover (\$7.95). Printer covers (specify type and size) \$14.95.

We Can Solve All Your Commodore Color Problems

Unique Problem Solvers for Older Commodores (with 5 Pin Monitor Din Plug).

The Interference Stopper installs in minutes with two simple solder connections. Absolutely stops 90% of the RF interference. **\$15.95**

The Color Sharpener... Use if your "old 64" is hooked up to a TV. Just plug into the monitor plug, and the color and contrast immediately improve. **\$18.95**

The NEW Color Sharpener CABLE... Use if your "old 64" is hooked up to a monitor. A new 2 prong cable, with a Color Sharpener built in for your monitor. **\$24.95**

The Monitor "Improver"... If you have a Commodore 1701 monitor, this cable (3 prong gives you a picture you won't believe. Better than the cable Commodore built). (Also hooks your "old 64" to the 1702). **\$24.95**

RESET SWITCHES

2 Versions for Every Need

At last, the "needed" switch for Vic-20 and Commodore. Commodore left out a reset switch. Our switches will return control to you every time.

Version 1—Install it Yourself. Requires two simple solder connections, and drill a small hole. Works great. **\$9.95**

Version 2—Use in any Commodore Application. A special buffered flow-thru version, that simply plugs in and provides your computer with a serial port and a reset switch. The ultimate in versatility, convenience and simple installation. No soldering. **\$21.95**

Order Today!

Please send me the following: (Please describe fully. Send U.S. funds only.)

Your satisfaction guaranteed or your purchase price refunded.

Qty.	Item	Price	SHIP TO:
		\$	Name _____
		\$	Address _____
		\$	City _____
		\$	State/Zip _____

Total for Merchandise

Shipping and Handling (foreign orders add \$5.00)

5% State Tax (WI Residents only)

TOTAL ENCLOSED

Please charge to MasterCard VISA

Number _____

Expires _____

Mail to:

Bytes & Pieces, Inc.

550 N. 68th St.
Wauwatosa, WI 53213/(414) 257-1214

Classified

SOFTWARE

Let DISKINDEX sort and print an index to all your disk files. Feed disks into your 1541 drive; DISKINDEX will do the rest. Send \$15 to: RGM, 106 Bienville Dr., Slidell, LA 70458

STAR TRADER a program for 2 to 5 players. Show off your 64 when guests come over. Gomuko compiled basic program 15 by 15 board, unmove, load/save game user changeable logic \$14.95 each. Author's Club Software, 6027 S. High, Suite 410, Oklahoma City, OK 73149

C64/C128 owners manage your US Savings Bonds with our software. Disk & documentation included. Send \$14.95 to: BONDS, P.O. Box 154, Woodbridge, VA 22194

The Checking Account Assistant \$30 to \$40 retail value! Complete prgm available on trial basis. For copy send blank disk + \$3 p/h. SOFTWARE, P.O.B. 491-M, Whitehouse, TX 75791

COMMODORE: TRY BEFORE YOU BUY. Top 25 best-selling games + classics, new releases. Visa, MasterCard. Free brochure. Rent-A-Disk, 908 9th Ave., Huntington, WV 25701 (304) 522-1665

Free Educational Software Catalog

158pp, color pictures, 1000+ programs for Com., Apple, IBM, Atari. Send name & address to: Interstate Software, P.O. Box 8952, Boise, ID 83707, (208) 342-3347

* CASINO 64 *

Hi-res poker and slot machine for C64. Both on one disk \$9.95. Satisfaction or refund. VSB, 4740 Harbinson Ave., La Mesa, CA 92041

THE INVESTMENT MANAGER a program for the 64 guaranteed to out-perform any other method. Comes with two programs to help your investment plan. All three \$19.95 or write for free details to: Author's Club Software, 6027 S. High, Suite 410, Oklahoma City, OK 73149

150 Pictures & Patterns for your C64 Print Shop™. Whole library of useful graphics for school, scouts, business & fun. \$7. B. Lane, Rt. 2, Box 192-C, Waddy, KY 40076-9302

\$49 STATISTICAL SYSTEM FOR C64. Mult. regression, T-test ANOVA, Cross-tabs, menu-driven. (801) 546-0445 NCSS, 865 E. 400 N., Kaysville, UT 84037

Play Pinochle against your C64. Special two-handed version with many features. \$8 disk or tape. John McNamara, 8830 Parson Rd., Erie, PA 16509

Free membership in SW club. Top British C64 progs. Member's discount. Introduct. offer: membership, catalog & reviews (no strings.) Arrow Express, Box 205-G1, Rossland, BC V0G 1Y0

NEW C64 GRAPHICS FOR PRINTSHOP™ USE.

80 unique graphics + 12 hi-res screens for viewing or printing by Screen Magic, or get 4 original pinball games on disk. \$14.95/disk (CA res. + 90¢ tax) + \$2 p.h./order to: On-The-Spot Graphics, Box 4802, Dept. A, Los Angeles, CA 90051. SASE for info only.

MINI-X File System. Create your own file for addresses, recipes, or inv., etc. Sorts, prints, cross or multiple search. For info send SASE. Disk C-64 \$25 pp. CUSTOM DESIGNS, 1336 College Ave., Canon City, CO 81212. CO res. add 3% s.t.

C-64 FILE ENCRYPTOR: Scrambles SEQ, PRG files quickly, easily. Excellent pseudo random method. Dirs, ML/Basic listings, & more: on disk. USA only, \$10. Fran-Tek, 4318 Maybank, Lakewood, CA 90712

TAXPLAN FOR COMMODORE 64 & 128 Form 1040, Schedules A, B, D, W. Requires Multiplan (tm). \$9.95 + \$2.50 p/h. TAXPLAN, P.O. Box 45671, Dallas, TX 75245

Affordable software for your C64/128. For 9.95 + 2 s/h you get one disk full with over 30 programs & instr. Software Shack, Dept. 60, Box 133, Fresno, CA 93707

ENGINEERS, TECHNICIANS, STUDENTS

LINCAD 64 - Analyze and design linear electronic circuits on the Commodore 64. Graphics, optimization, sensitivity, more. For disk and 56 page manual, \$49 plus \$3.50 p/h. Ohio res. add 5.5% tax. Ask about our IBM-PC Version. SOFCAD Electronics, Inc., P.O. Box 21845, Columbus, Ohio 43221

EXCITING NEW CP/M SOFTWARE PRODUCTS for C64 and C128 computers! Write for info. Madd Programmer Software, 831 32nd. Ave., Seattle, WA 98122 (206) 324-6980

Send for your free C64 software catalog and receive CONNECT-4, a great 3-D tic-tac-toe program free as well. PANTHER SOFTWARE, 6608-4 Wisteria, Charlotte, NC 28210

HARDWARE

NEW FOR YOUR 64 - Auto start, auto load & run M/L cart. with: Reset button, unew prg. one button disk commands, much more. Specify screen colors. \$32.95 ch/m.o. to: FINTRONICS, P.O.B. 222, Atascadero, CA 93422

NEW IDEA - COOLS 1541 DISK DRIVE. Easy to make. Costs less than 50¢, installs in 30 seconds. Plans \$3. Computer Dept., Aviation Resource, Box 369, L'caster, NY 14086

C-64: Photo/Therm/Freq Input Module w/.1-25 sec sampling to 300 KHz. Only \$19.42 ppd. USA. M-B guarantee. SASE for info: KALTEK, Box 971-C, Adjuntas, PR 00601

MISCELLANEOUS

AUTHOR'S CLUB - We get you published! Send for free demo-disk. Send \$5.00 shipping and handling to: AUTHOR'S CLUB, 6027 S. High, Suite 410, Oklahoma City, OK 73149

I/O, A/D, WIRE WRAP BDS., and more for the C64. Write or call for catalog. Impact Electronics, 2116 E. Arapaho, Suite 599 Richardson, TX 75081, (214) 480-8070

FREE! USE YOUR MODEM! Call our innovative electronic shopping center, FANTASY PLAZA. VISA and MASTERCARD accepted. 300 BAUD. You've never seen anything like it! Use your Modem NOW! (818) 840-8066

FREE CATALOG

Hardware, Software, Accessories. Competition Computer, 2629 W. National, Milwaukee, WI 53204 (800) 662-9253.

1541 PERMANENT ALIGNMENT \$35
C64 repair \$55, 1541 repair \$85.
DI-TECH, 701 East North Ave., #C
Lompoc, CA 93436 (805) 736-9727

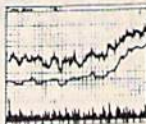


STOCK BROKER.

BEAT THE PANTS OFF MUTUAL FUNDS

BUYING GOOD QUALITY, VOLATILE ISSUES AND USING THE TRADING SYSTEM WILL HAVE YOU FULLY INVESTED AT THE LOWEST PRICES AND CONVERTING TO CASH AS THE STOCK NEARS ITS PEAK.

- BAR GRAPH PRINT-OUTS.
- RECORD UP TO 144 STOCKS ON A DISK.



\$39.95 C-64 DISK

LOTTO CIPHER™

GET THE BEST ODDS ON ANY LOTTERY

SIX NUMBER - PICK FOUR - DAILY GAME

• PRODUCES FOUR COMBINATIONS OF NUMBERS TO CHOOSE FROM

• ANY AMOUNT OF BALLS AND NUMBERS CAN BE PROGRAMMED

• PRINTS OUT PAST LOTTO NUMBERS DRAWN, PAST COMPUTER PICKS, AND NUMBER DRAW FREQUENCY LIST

• COMPLETE NUMBER DATA BASE



\$29.95 C-64 DISK



ABANDON SHIP..

SAILOR JOE HAS VOLUNTEERED TO STAY BEHIND AND KEEP THE SHIP AFLOAT UNTIL HIS CREW MEMBERS ARE RESCUED. CAN HE MAKE IT OR WILL HE HAVE TO ABANDON SHIP? PATCH THE HOLES AND SEAL OFF HOPELESS ROOMS WHILE FIGHTING INVADING SEA CREATURES.

\$21.50 C-64 DISK

ACORN OF INDIANA, INC.

2721 OHIO STREET
MICHIGAN CITY, IN 46360

219-879-2284

SHIPPING AND HANDLING, ADD \$1.50 - C.O.D.'S ACCEPTED
VISA AND MASTERCARD ORDERS ADD 4%
INDIANA RESIDENTS ADD 5% SALES TAX
DEALER INQUIRIES WELCOME

COMPUTE!'s Gazette Classified is a low-cost way to tell over 275,000 microcomputer owners about your product or service.

Rates: \$25 per line, minimum of four lines. Any or all of the first line set in capital letters at no charge. Add \$15 per line for boldface words, or \$50 for the entire ad set in boldface (any number of lines.)

Terms: Prepayment is required. Check, money order, American Express, Visa, or MasterCard is accepted. Make checks payable to COMPUTE! Publications.

Form: Ads are subject to publisher's approval and must be either typed or legibly printed. One line equals 40 letters and spaces between words. Please underline words to be set in boldface.

General information: Advertisers using post office box numbers in their ads must supply permanent address and telephone numbers. Orders will not be acknowledged. Ad will appear in next available issue after receipt.

Closing: 10th of the third month preceding cover date (e.g., June issue closes March 10th). Send order and remittance to: Harry Blair, Classified Manager, COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, NC 27403. To place an ad by phone, call Harry Blair at (919) 275-9809.

Notice: COMPUTE! Publications cannot be responsible for offers or claims of advertisers, but will attempt to screen out misleading or questionable copy.

ANNOUNCING!

PERIPHERALS THAT

Think
FOR THEMSELVES

Now, let your computer spend more time running programs, instead of waiting for printers, drives, modems,

Universal Interface -- Connects your C-64 to our high performance peripherals and lets you use high level commands to talk to them. Includes interface power supply\$49.95

Each of our boards contains its own processor to handle interfacing details. All are designed to get data as quickly as possible, and then free your computer for its next task.

Floppy -- move multiple files or copy entire disks with a single command. Copying and formatting leave computer free for other work. Controls any mixture of 4 single, double, or quad density 5-1/4" drives, or use 8" drives\$124.95

Ramdisk -- transfer files at over 70K bytes/sec. Random access to any record without loss of throughput. A single command can move multiple screen images for animation. Contains 256K of RAM, expandable to 4 megabytes\$179.95 (256K)

Print Spooler -- NEVER wait for your printer again! Quickly moves files to on-board buffer, then frees computer for other tasks. Accepts commands for multiple copies, graphics characters, more. Contains 64K buffer, expandable to 256K. Controls 2 parallel printers\$129.95

RS-232 Controller -- use on-board buffer to download files more quickly. Frees computer from waiting for serial transfers. 64K buffer, expandable to 256K. Controls 2 serial ports. Baud rates to 19,200. +/-12V supplies on-board\$149.95

For orders or information (ask for our free catalog):

WRITE: Research Service Labs CALL: (405)745-9322
P. O. Box 19124 8am-4pm CST
OKC, OK 73144 Monday-Friday

FOR COMMODORE 64

• TRACKMIMIC™ •

— NEW —

Ver. 2.2

Protected Disk Backup System
Installs in 1541 Drive in Minutes
Just Plug It In!!

2 Minutes For Full Disk Backup
New Bit Density Detector
Automatic Operation, Hyperscan
Sector Edit (GCR), Bit Density
Tracks 1-45

• For All New Protection Methods •
89.95

• DISKMIMIC 5+™ •

Our Famous Automatic
Backup System

49.95

DISKAT - Cataloging Program

Reads data directly from Disk,
Holds 8000 Files, Makes Labels,
Recalls 12 Way's, Alphabetizes
Files, Printer/Screen Output.

34.95

A.I.D. CORP.

4020 Hempstead Turnpike • Bethpage, New York 11714

(516) 731-7100

Diskmimic 5+™ is a trademark of A.I.D. Corporation

Commodore 64™ & 1541™ is a trademark of

Commodore Electronics, Ltd.

Shipping & Handling — \$1.50 each

CONVERSE WITH YOUR COMPUTER

AT LAST! A FULL IMPLEMENTATION of the original ELIZA program is now available to run on your Commodore 64!

Created at MIT in 1966, ELIZA has become the world's most celebrated artificial intelligence demonstration program. ELIZA is a non-directive psychotherapist who analyzes each statement as you type it in and then responds with her own comment or question—and her remarks are often amazingly appropriate!

Designed to run on a large mainframe, ELIZA has never before been available to personal computer users except in greatly stripped down versions lacking the sophistication which made the original program so fascinating.

Now, our new Commodore 64 version possessing the FULL power and range of expression of the original is being offered at the introductory price of only \$25. And if you want to find out how she does it (or teach her to do more) we will include the complete SOURCE PROGRAM for only \$20 additional.

Order your copy of ELIZA today and you'll never again wonder how to respond when you hear someone say, "Okay, let's see what this computer of yours can actually do!"

READ WHAT THE EXPERTS SAY ABOUT OUR VERSION OF ELIZA:

"Much more than a mere game... You'll be impressed with ELIZA... A convincing demonstration of Artificial Intelligence."
—PC MAGAZINE

"Delightful entertainment... An ideal medium for showing off your system."
—MICROCOMPUTING MAGAZINE

"ELIZA is an astounding piece of software... A fascinating program to use and study."
—BARON'S MICROCOMPUTER REPORTS

"ELIZA is a great way to introduce your friends to computers... A very funny party game."
—PETER A. MCWILLIAMS

"ELIZA is an exceptional program, one that's fun to use, shows off your machine, and has great historical interest."
—POPULAR COMPUTING MAGAZINE

"This version of ELIZA is the best we have seen. As a party game, it is unmatched."
—HOME APPLICATIONS FOR THE C-64

ELIZA IS AVAILABLE IN THE FOLLOWING FORMATS:

(Please specify Disk or Cassette)

1. Protected Version \$25
(Protected Version can be run but not listed or modified)
2. Un-protected Commodore 64 BASIC Source Version \$45
(Source Version can be listed and modified as well as run)

Both versions include a six page user manual.

Please add \$2.00 shipping and handling to all orders
(California residents please add 6 1/2% sales tax)

ARTIFICIAL INTELLIGENCE RESEARCH GROUP

921 North La Jolla Avenue, Dept. G

Los Angeles, CA 90046

(213) 656-7368 (213) 654-2214

MC, VISA and checks accepted



NOW GET TRUE DESCENDERS FOR 801, 1525, 803, GP-100, HUSH 80 & SIMILAR PRINTERS

From the Descender ROM People



ARTS

SAMPLE
ACTUAL SIZE

FEATURING:

GYPSEY
PAGER
PEOPLE

- True descenders
- A pleasing alternative
- Uniform character formation
- No change in graphic capability
- No change in software compatibility
- No change in printer operation
- North American standard font
- Complete instructions
- Easy installation
- No soldering

\$39.95 Cdn \$29.95 U.S.

Ont. Residents add 7% Prov. Sales Tax
Cheque, Money Order, Visa or MasterCard



WILANTA ARTS

6943 BARRIADALE DR.
MISSISSAUGA ONT.
L5N 2H5

1-416-858-9298

Get a Wilanta Descender ROM Today
and make your old nightmare
Just a font memory of yesterday!

CREATE GRAPHICS! ANIMATION! SOUND! MUSIC!

TECHNIQUE! Easy, direct guide to programming C64 graphics, animation, sound and music. Use Hi-Res and sprites in your programs. Machine language music program. 12 songs and arcade game included on this \$29.95 disk.

BECOME AN EXPERT PROGRAMMER!

BASICALLY SIMPLE. Quick, easy way to master Basic programming. Use all C64 commands and operators. Disk is also handy reference guide. Only \$20.00.

SPECIAL OFFER! Order BASICALLY SIMPLE and TECHNIQUE! together for only \$39.95. Send check or money order to:

Free Spirit
Software, Inc.
5836 So. Mozart
Chicago, Illinois 60629

DUST COVERS! High quality slate gray vinyl dust covers for C64, C128, 1541 and 1571. Only \$6.50 each.

ALL PRICES INCLUDE SHIPPING
AND HANDLING.

Send for free information on other Free Spirit software and accessories.

DUST COVERS

- ★ CUSTOM MADE TO FIT
- ★ Heavy 32-oz. VINYL ANTI-STATIC
- ★ EXTENDS EQUIPMENT LIFE
- ★ Choice of Colors Lt. Tan or Brown

COMPUTERS

C-64; VIC-20; C-16; PLUS 4 7.00
C-128; B-128 13.00
DATASETTE (NEW, C2N) 5.00

DISK DRIVES

C-1541; C-1571 INDUS GT 8.00
MSD S/D; APPLE S/D 8.00
MSD D/D; APPLE D/D UNIT 10.00

PRINTERS

C-1525/MPS801 10.00
C1526/MPS802 13.00
C/MPS 803; C-1520; C-1530 8.00
PANASONIC KX-P1090/91 13.00
EPSON MX/RX/FX 80 13.00
GEMINI 10 & STAR 10's 13.00
GEMINI 15 & STAR 15's 16.00
OKIDATA 91/92 13.00
JUKI 6100 16.00
OKIMATE 10 8.00

MONITORS

C-1702/1703; C-1902 RGBI 16.00
ZENITH ZYM 122/123 16.00
ZENITH ZYM 131/133 23.00
TAXAN RGB 2110 16.00
AMDEK COLOR I 19.00
BMC COLOR 16.00

VIDEO RECORDERS

(Dimensions Required) 13.00

Order by stating NAME and MODEL and COLOR CHOICE TAN or BROWN.

Enclose check or money order plus \$1.50 per item (4.50 max.) shipping and handling California Res. Include 6.5% Sales Tax.

SPECIAL COVERS WILL BE MADE TO YOUR DIMENSIONED SKETCH. SEND YOUR REQUIREMENTS FOR OUR LOW PRICE QUOTES

Crown Custom Covers

9606 SHELLYFIELD ROAD-Dept. A
DOWNEY, CA 90240
(213) 862-8391

advertiser's index

Reader Service Number/Advertiser	Page
102 Abacus Software	85
103 Abacus Software	87
104 Access Software, Inc.	77
105 Accolade Inc.	53
106 Accolade Inc.	55
107 Accolade Inc.	57
108 Accolade Inc.	59
109 Acorn of Indiana, Inc.	158
110 Activision, Inc.	39
111 A.I.D. Corp.	159
112 Aier Products	160
113 Apropos Technology	157
114 Aprotrek	47
115 Aquarian Software	153
116 Artificial Intelligence Research Group	159
117 B & G Associates	104
118 Basement Boys Software	41
119 Basix	56
120 Basix	58
121 Blackship Computer Supply	121
122 Brøderbund Software, Inc.	19
123 Bytes & Pieces, Inc.	157
Cardinal Software	150
124 CDI/Computer Devices International	43
125 Central Point Software, Inc.	114
Cheatsheet Products Inc.	122
Comal Users Group, U.S.A., Limited	107
Commodore	IFC-1
Commodore Software Association	96
126 CompuMed	146
127 CompuServe	2-3
128 ComputAbility	92
129 ComputAbility	93
130 Computer Centers of America	61
131 Computer Magic	148
132 Computer Mail Order	141
133 Computer PALS	150
Computer Place	146
134 The Comtel Group	83
135 Cornucopia Software	116

Reader Service Number/Advertiser	Page
Covox Inc.	146
136 Crown Custom Covers	159
137 CSM Software, Inc.	109
138 CSM Software, Inc.	148
Data East	71
139 Dayline Software	111
140 Digital Solutions Inc.	65
141 Disk-Of-The-Month Club	152
142 Disk-Of-The-Month Club	152
Diversions, Inc.	41
143 Electronic Arts	15
144 Electronic Arts	49
145 Electronic One	156
146 EPYX	25
147 EPYX	27
148 Firebird	51
149 Free Spirit Software, Inc.	159
150 Glenco Engineering Inc.	111
Halix Institute	160
151 Home Software Systems	154
152 Integrated Software Systems	152
Intelligent Software	155
153 John Henry Software	63
Ksoft Co.	67
154 Kyan Software	116
155 Lyco Computer	74-75
156 Mastertronic International Inc.	45
157 Maxtron	150
158 MegaSoft, Ltd.	22-23
159 MegaSoft, Ltd.	80-81
160 Melodian, Inc.	144-145
161 Merritt Micro Systems	114
162 Micro Prose Simulation Software	79
163 Micro Prose Simulation Software	BC
164 Micro World Computers, Inc.	150
165 Mimic Systems	9
166 Mindscape, Inc.	11
167 Mindscape, Inc.	13
168 Navarone Industries, Inc.	114
169 Nibble Notch Computer Products	155

Reader Service Number/Advertiser	Page
170 1990 Software	157
171 Okidata	36-37
PC Gallery	147
172 Precision Data Products	122
173 Protecto	98-103
174 Quorum International, Ltd.	122
Research Service Labs	159
175 R. J. Brachman Associates, Inc.	156
176 R. Lewter & Associates	121
177 R.P.M. Concepts, Ltd.	121
R.T.R. Software	152
Schnedler Systems	148
Second Source Engineering	152
178 Seymour-Radix	46
179 Simon & Schuster	64
180 Software Discounters of America	149
181 Solid State Software	111
182 Sound Software, Ltd.	67
183 Star Micronics	105
184 State of the Art Software	157
185 subLOGIC Corporation	4
186 subLOGIC Corporation	31
187 subLOGIC Corporation	69
188 T & D Electronics	156
Tektonics Plus, Inc.	160
189 Tenex Computer Express	142-143
190 Timeworks, Inc.	7
191 Triad Computers	41
192 Tussey Computer Products	91
193 Ultrabyte	116
194 Uni-Kool	86
195 Unisource Electronics, Inc.	154
196 Universal Mktg.	151
Unlimited Software, Inc.	152
197 Viewtron	112-113
198 Votrax, Inc.	120
199 Welwyn/Currah	61
200 West Coast Commodore Association, Inc.	67
201 White House Computer	155
202 Wickend Wendy's House of Discounts	154
203 Wilanta Arts	159
204 Xetec, Inc.	53
205 X-10 Powerhouse	IBC

Classified Ads	158
COMPUTE!'s Commodore Books Collection	94
COMPUTE!'s Gazette Disk Subscription	32-33
COMPUTE!'s Gazette Subscription	17
COMPUTE!'s Programmer's Guides	89
First, Second & Third Books of Commodore	95
40 Great Flight Simulator Adventures	54

LEARN PROGRAMMING

MASTER COMPUTERS IN YOUR OWN HOME

Now you can write programs and get a computer to do just what you want. Get the most out of any computer, and avoid having to pay the high price of pre-packaged software.

LEARN AT YOUR OWN PACE IN YOUR SPARE TIME

Our independent study program allows you to learn about computers, operations, applications and programming in your spare time, at home. Our instructors provide you with one-on-one counseling.

LEARN EVEN BEFORE YOU DECIDE ON A COMPUTER

Everything is explained in simple language. You will enjoy learning to use a computer—EVEN IF YOU DON'T OWN ONE. Learn to program on any personal computer; IBM, APPLE, COMMODORE, TRS, and more.

BE YOUR OWN COMPUTER EXPERT

Programming is the best way to learn to use computers, and we can show you the best—and most economical—way to learn programming! Send today for your free information package. No obligation. No salesman will call.

halix

CENTER FOR COMPUTER EDUCATION

INSTITUTE 1543 W. Olympic • 226 Los Angeles, CA 90015-3894

HALIX INSTITUTE CENTER FOR COMPUTER EDUCATION DEPT. 62-1
1543 W. OLYMPIC • 226 LOS ANGELES, CA 90015-3894

YES! Send me information on how I can learn about computers and programming at home!

Name _____ Age _____

Address _____

City _____ State/Zip _____

FACTORY AUTHORIZED

COMMODORE REPAIR CENTER

1-800-772-7289

IN ILLINOIS (312) 879-2888

C64 Repair CPU only . 39.95*

1541 Repair 79.95*

1541 Alignment

only 29.95*

Power Supplies . 32.95

C128 & other

products CALL

Commodore Parts . CALL

* Includes parts, labor & UPS shipping both ways. Air Freight add \$10.00.

WARRANTY REPAIRS FREE**

** You pay shipping to us, we pay shipping back.

24-48 HRS TURN AROUND

CALL BEFORE SHIPPING

TEKTONICS PLUS, INC.

150 HOUSTON ST. — STE. 308

BATAVIA, IL 60510



CLIP AND SAVE

NEW!

Take The Heat Off Your 64 Disk Drive!

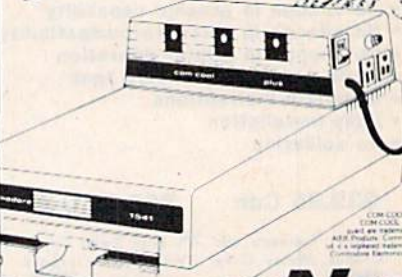
Overheating and line surges are a major cause of frustrating program malfunctions and permanent damage to your Commodore 64 disk drive. Now, for the first time, you can protect your investment with the COM-COOL PLUS* Cooling Fan/Surge Protector.

1. Washable filters remove dust before forcing air through.
2. Quiet fan can cool two stacked disk drives.
3. Foam base holds unit firmly in place.
4. Protected outlets clip spikes at a safe 130V. Replaceable fuse.
5. Pilot lights monitor power, ground and SURGE protection.

Two models for use with Commodore 64 and VIC disk drives

COM-COOL PLUS* \$79.95
Cooling Fan/Surge Protector

COM-COOL* \$54.95
Economical cooling unit (does not include surge suppression and line filter)



NO CHARGE for shipping UPS ground when you call this #.

414-277-9120

AIER PRODUCTS
522 West Bergen
Milwaukee, WI 53217



Distributed exclusively by:

COMPUTER SOFTWARE SERVICE • A CHANGING CONSULTING COMPANY

495-A Bloor Road, Elk Grove Village, IL 60007-2114 • In IL call: 800-331-SOFT

DEALERS ONLY CALL: 1-800-422-4912

THE X-10 POWERHOUSE DOES EVERYTHING BUT PUT OUT THE CAT.



Model CP290



THE X-10 POWERHOUSE INTERFACES WITH YOUR COMMODORE TO CONTROL YOUR HOME...FOR SECURITY, COMFORT AND ENERGY SAVINGS.

This remarkable Interface lets you run your home through your Commodore 64 or 128 and a keyboard or joystick.

When you're away, it makes your home look and sound lived in. When you're home, it can turn off the TV at night and wake you up to stereo and fresh brewed coffee in the morning. It can even turn on your air conditioner and control your heating.

SPECIAL COLOR GRAPHICS MAKE PROGRAMMING A SNAP.

You simply pick a room from the display screen. Use your keyboard or joystick to position graphics of lights or appliances. Then follow on-screen instructions to program any light or appliance to go on or off whenever you choose. You can even control thermostats, light intensity and more.



THE WAY IT WORKS. The X-10 Powerhouse Interface is cable-connected to the Commodore "User" port and plugged into a standard 110V outlet. After it is programmed, the Interface sends digitally encoded signals through your home wiring to special X-10 Modules. To control a lamp or appliance, you simply plug the electrical device into a Module



and then plug the Module into an outlet. The Interface can control up to 256 Modules throughout your home and won't interfere with normal use of lights and appliances.

There are plug-in Appliance Modules, Lamp Modules, Wall Switch Replacement Modules and Special 220V Modules for heavy duty appliances such as water

heaters and room air conditioners. Plus Thermostat Controllers for central heating and air conditioning, Telephone Responders to control your home from any phone, and much more.

IT WON'T TIE UP YOUR COMPUTER. Use your computer only for programming. When you're finished, disconnect the Interface from the "User" or RS-232 port and keep it plugged into any convenient power outlet in your home. It will operate as a stand-alone controller with battery back-up and will run your home automatically.

SURPRISINGLY INEXPENSIVE. A Powerhouse System including the Interface, software and connecting cables costs less than \$150. X-10 Modules are less than \$20 each.

For the Dealer Nearest You Call: **1-800 526-0027**
[in NJ: (201) 784-9700]

or, write to: X-10 (USA)
185A Legrand Avenue
Northvale, NJ 07647

X-10 POWERHOUSE
NUMBER ONE IN HOME CONTROL

Commodore 64 and Commodore 128 are registered trademarks of Commodore Int'l Ltd.



Another Great Simulation from Sid Meier - Author of F-15 Strike Eagle

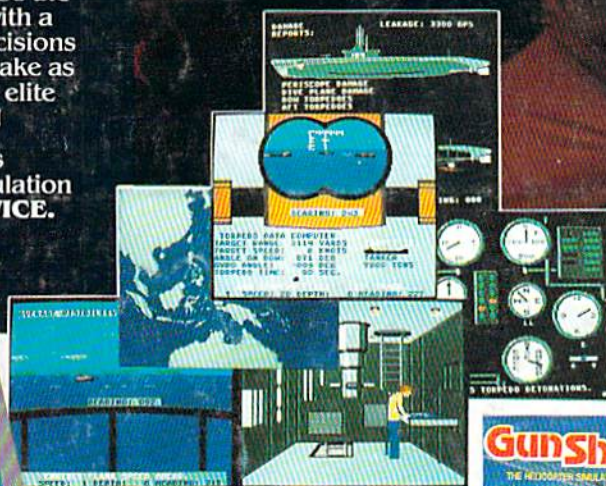
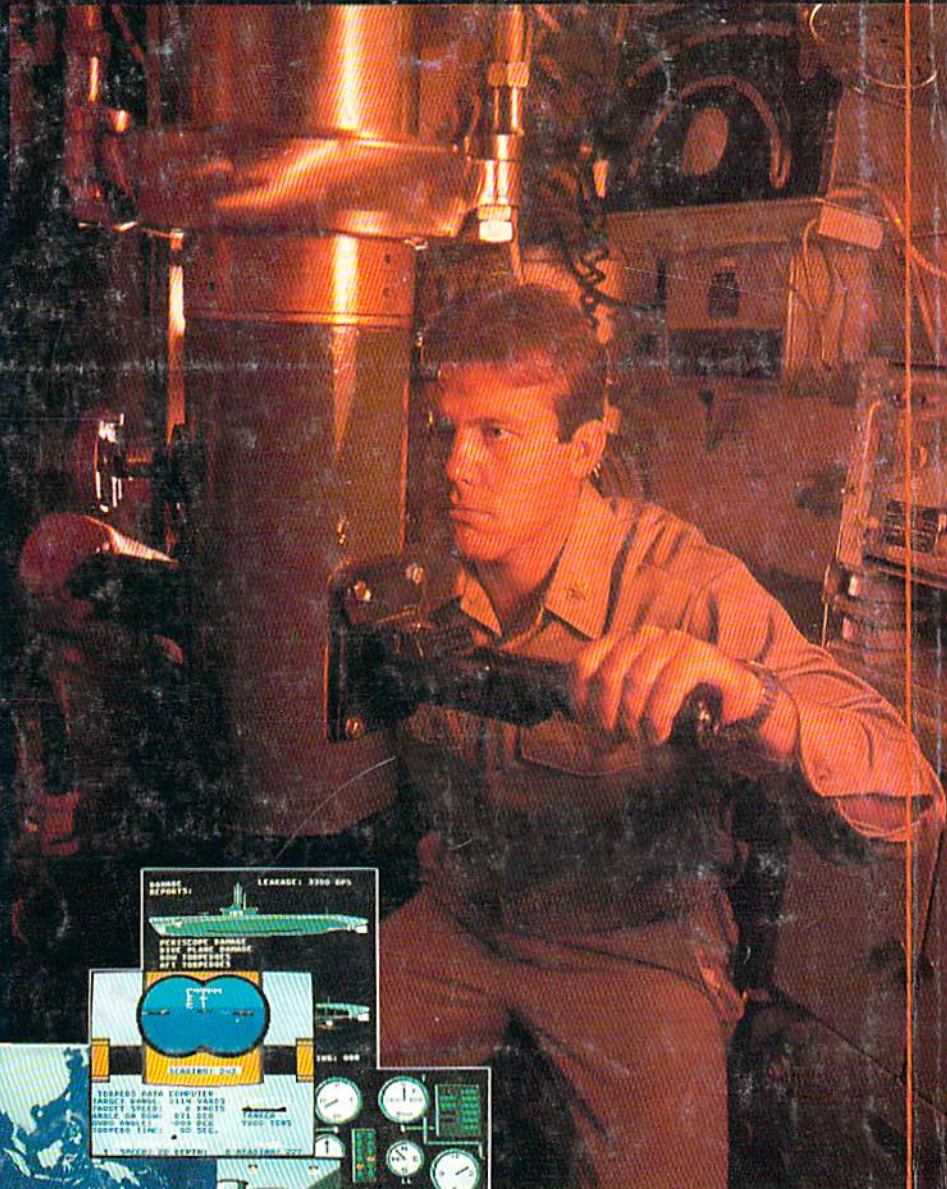
Now he takes you from the cold, thin air and limitless space of F-15 Strike Eagle down into the dark depths of the Pacific Ocean inside an American World War II submarine for a realistic, action-filled simulation —

SILENT SERVICE

Thrill to the initial sighting of the enemy's strike force in your periscope as their ships come into your range. But watch out — the enemy's escorts have just sighted you. You're the **hunter** — but suddenly — you've become the **hunted!**

As Commander, you must sink their ships and keep your submarine from being destroyed — if you can. Will you select a quiet patrol sector in the Marianas Islands or choose the dangerous waters off the coast of Japan? Is a submerged daylight periscope attack best or do you charge in on the surface at night using only radar bearings to guide you? Do you fire a spread of your precious torpedoes or can you close the range and pick off the enemy with a single torpedo shot? These decisions and many more are yours to make as you take your place among the elite ranks of the **SILENT SERVICE!**

It's **exciting** — and it's **fun**. It's another great Micro Prose simulation — and it's called **SILENT SERVICE**. Look for it now on your dealer's shelves.



FIVE AUTHENTIC BATTLE STATION SCREENS

Silent Service is available for Commodore 64/128, Apple II Family, Atari XL/XE, IBM PC/PC Jr. computers for a suggested retail of only \$34.95. Available soon for Macintosh for a suggested retail of only \$39.95. Call or write for more information or MC/VISA orders.

COMMODORE, APPLE, ATARI, IBM, and MACINTOSH are registered trademarks of Commodore Business Inc., Apple Computer Inc., Atari Inc., and International Business Machines Inc., respectively.

Photo courtesy Baltimore Maritime Museum

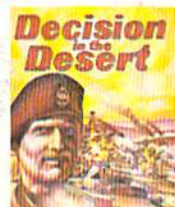
Try These Other Real Life Simulations



Daring Attack Helicopter Action in the AH-64 Apache!



Thrilling Decathlon of aerobatic events in your own personal jet!



You are in command — North Africa 1940-1942

MICRO PROSE

SIMULATION • SOFTWARE

120 LAKEFRONT DRIVE • HUNT VALLEY, MD 21030 • (301) 667-1151

Exciting World War II Submarine Action in the Pacific!!