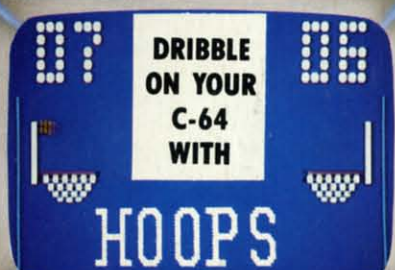


Ahoy!

\$2.95/ CAN. \$3.35 SEPTEMBER 1987

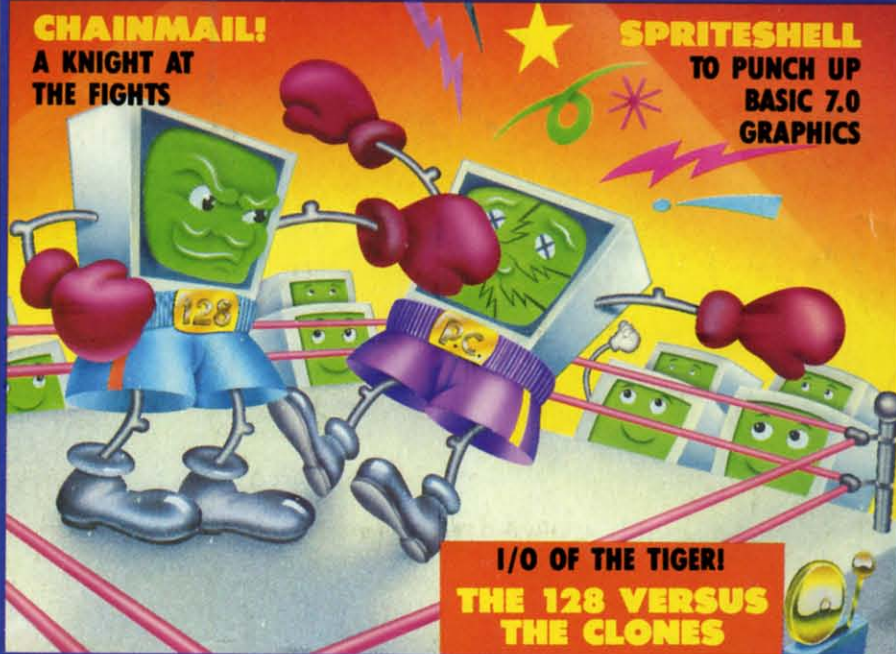
...A FULL CARD OF KNOCKOUT FEATURES!...



DRIBBLE
ON YOUR
C-64
WITH

HOOPS

CENTERFOLD
FOR EYE-POPPING EFFECTS
NO NEWS
AND NO LOST PROGRAMS!
PS TO GEOS
A PRINT SHOP REMODELING



CHAINMAIL!
A KNIGHT AT
THE FIGHTS

SPRITESHELL
TO PUNCH UP
BASIC 7.0
GRAPHICS

I/O OF THE TIGER!
**THE 128 VERSUS
THE CLONES**

CRYSTALLUS
NO GARDEN VARIETY MAZE



RED ALERT
INSTANT URBAN DECAY!
S.O.S.
YOUR MAYDAYS ANSWERED
TIPS AHoy!
AND MORE FOR YOUR COMMODORE

**BUILD AN AMIGA
TRACK
BALL**



**PLUS
AMIGA
REVIEWS**





USE THE BRAINS YOUR COMMODORE WASN'T BORN WITH.

Right at your fingertips in CompuServe's Commodore® Forums.

Our Commodore Forums involve thousands of Commodore users worldwide. These forums show you just how easy it is to get the most from your Commodore computer.

The Commodore Arts and Games Forum is for all Commodore 8-bit computers, concentrating on music, graphics, and games. The Commodore Communications Forum has updates of communications software. The Commodore Programming Forum supports programmers and developers of Commodore 8-bit computers. And the Amiga® Forum serves as the national resource for all business and entertainment applications in the Amiga community.

Easy access to free software, including free uploads.

You can easily download first-rate, non-commercial software and utility programs. Upload your own programs free of connect time charges. And take advantage of CompuServe's inexpensive weeknight and weekend rates, when forums are most active and standard online charges are just 10¢ a minute. You can go online in most areas with a local phone call. Plus, you'll receive a \$25.00 Introductory Usage Credit when you purchase your CompuServe Subscription Kit.

Information you just can't find anywhere else.

Use the Forum Message Board to exchange mail with fellow members. Join ongoing, real-time discussions in a Forum Conference or communicate with industry experts. Scan Forum

Data Libraries for non-commercial software. Enjoy other useful services too, like electronic editions of popular computer magazines.

All you need is your Commodore computer (or almost any other personal computer) and a modem.

To buy your Subscription Kit, see your nearest computer dealer. Suggested retail price is \$39.95. To receive our free brochure, or to order direct, call 800-848-8199 (in Ohio and Canada, call 614-457-0802). If you're already a CompuServe subscriber, type GO CBMNET (Commodore Users Network) at any ! prompt to see what you've been missing.

CompuServe®

Information Services, P.O. Box 20212
5000 Arlington Centre Blvd., Columbus, Ohio 43220

800-848-8199

In Ohio, call 614-457-0802

An H&R Block Company

THE
COMMODORE USERS



clipper

SEPTEMBER 1987

Ahoy! Readers:

Wow! I couldn't wait to write this letter to tell you about all the fantastic offers we have in store for you this issue. This issue the savings really add up. The best without question is S & S' offer to sell any **Timeworks C-128** program for \$34.90. That's a SAVINGS OF 50%! But there's lots more. **The First Annual New York AmiEXPO** will be held October 10-12, 1987 at the Sheraton Centre Hotel. With the coupon on page 3 of this Clipper, you may SAVE \$5 on the cost of attendance. And our friends at **Computer Mart** are offering a whopping 25% SAVINGS on their online help program called **The Live-In Reference Manual**. **Montgomery Grant** is also back with a FREE GAME DISK with any purchase over \$100. And there's even more!

If you took advantage of all of our offers this month, you could SAVE WELL OVER \$50. Your subscription to Ahoy! magazine truly pays for itself!

Be sure to look for us in November, when we'll have more great offers to tempt you.

Admirably yours,

Joe Fergeson
Director
Ahoy! Access Club

50% OFF SOLID WOOD COMPUTER DESK FROM PROTECTO...

Located in the heartland of America, Barrington, Illinois, **Protecto Enterprises** was one of the pioneers in the computer discount mail order business. And the reasons that they continue to do so well are simple. They offer exceptional support and unusual guarantees. Their 15 DAY FREE TRIAL policy on products including software is very impressive.

Protecto knows that once you buy from them, you'll be likely to buy from them again. So they're making a fantastic offer on a valuable computer accessory, a beautiful, Solid Oak Computer Desk. Listing for \$199, this solid wood desk is available to you as a member of the Ahoy! Access Club for only \$99.95. You will need to add \$15 for shipping and handling, and some assembly is required. But with almost 50% SAVINGS, this is surely one of the best offers we've ever featured. Just clip the **Protecto**

coupon on page 3 of this *Clipper*, and send it along with your order. This offer expires October 30, 1987, so don't delay.

PAY FOR FOUR MONTHS, GET A FREE MODEM FROM QUANTUMLINK...

QuantumLink is one of the better subscriber services for features like on-line games, live conferences, software reviews, and user group support. Their advertisement in this month's issue of *Ahoy!* will tell you how you can receive a FREE QUANTUMLINK MEMBER-SHIP KIT when you subscribe to *Ahoy!* (Since you're probably already a subscriber, you may take advantage of this offer by extending your subscription.) For *Ahoy!* Access Club members, **QuantumLink** is making an additional offer: Get FREE **QuantumLink** software, plus a FREE 300-baud, auto-dial modem by paying for four months of **QuantumLink**

Basic Service (\$9.95/month) at \$39.80. You may order by clipping the **QuantumLink** coupon on page 3 of this *Clipper*, or by calling them at 1-800-392-8200, and asking for Department 25. This offer expires October 31, 1987, so mail or phone your order TODAY!

SAVE ALMOST 50% ON THE STAR MICRONICS NP-10 FROM LYCO COMPUTER...

If perchance you're in the market for a printer, read on. This issue **Lycocomputer** is offering one of the best printer values I've ever seen. With a 100 character per second draft mode, the **Star Micronics NP-10** offers speed as well as fine near letter quality output. It offers a choice of friction or tractor feed, and has all the controls on the front panel. With an STD Parallel port, the **Star Micronics NP-10** will require an additional interface. But unlike other printers with built-in interfaces, it is applicable to other equipment should you decide to upgrade. The suggested retail price is \$249, and it's an excellent value at **Lycocomputer's** regular discounted price of \$169. But for a limited time, you may buy this terrific printer from **Lycocomputer** for only \$129.

In each issue of *Ahoy!*, you'll find two pages of great computer offerings from **Lycocomputer**. **Lycocomputer** sells a wide variety of Commodore-compatible hardware and software at good prices. To get more details on shipping and handling for the **Star Micronics NP-10** and applicable interfaces, check out **Lycocomputer's** ad in this month's issue of *Ahoy!* To order your **Star Micronics NP-10** and cable or interface, just clip the **Lycocomputer** coupon on page 3 of this *Clipper*. For more information on printers and interfaces, you may call them at 1-800-233-8760; in Pennsylvania, call 1-717-494-1030. They will accept phone orders on this offer, but you must mention your membership in the Club. This offer expires on October 15, 1987, so hurry and complete the **Lycocomputer** coupon right away.

SUBSTANTIAL SAVINGS ON TIMEWORKS FOR THE 128 FROM S & S...

S & S Wholesalers has very good prices, perhaps the best you'll find anywhere on Commodore and Commodore-compatible hardware and software. Among the brand names of software sold by S & S is **Timeworks**. **Timeworks** has created some really terrific programs, including *Partner*. If you missed our enthusiastic review in the November '86 issue of *Ahoy!*, let me just say we liked it a lot. *Partner* puts some nifty accessories at your fingertips, like a Date Book and Appointment Calendar, Memo Pad, Address Book, Calculator, Envelope Addresser and Label Maker, Auto Dialer (an auto-dial modem is required, of course), and Screen Print. *Partner's* other features include *SwiftLock* and *SwiftLoad*, both very useful. The regular retail price of *Partner* is \$69.95, but that's not what it will cost you....

S & S is anxious for you to consider buying from them when you're in the market for **Timeworks** products or any other programs, so they're making you this exciting offer: When you clip the S & S coupon on page 3 of this *Clipper*, you can purchase any **Timeworks** C-128 program for only \$34.90. That represents OVER 50% SAVINGS on this excellent software! It's S & S's way of motivating you to consider their good prices and excellent service. See their ad in this month's issue of *Ahoy!* You will need to add \$4 for shipping and handling, if your order is under \$100. You may also use your VISA or MasterCard, but you must add 3%. Because of some confusion in the past, they are not accepting phone orders. YOU MUST ENCLOSE THE S & S COUPON TO TAKE ADVANTAGE OF THIS FABULOUS OFFER! This offer expires on October 15, 1987, so mail your order RIGHT AWAY!

FREE GAME DISK WITH PURCHASE FROM MONTGOMERY GRANT...

If you haven't yet checked out the prices from **Montgomery Grant**, you'll surely want to do so. They have a wide variety of Commodore and Commodore-compatible peripherals and their prices are among the lowest in the country. Whether you're looking for a printer, a disk drive, or some other peripherals, **Montgomery Grant** is one of the suppliers you should definitely consider. When you're ready to buy from **Montgomery Grant**, be sure to use their 800 toll-free number, because besides having great prices, with every purchase over \$100, **Montgomery Grant** will add a FREE GAME DISK. Read their ad in this month's issue of *Ahoy!* for details about ordering. They prefer that you place your order by phone. Just call 1-800-345-

7059, or in New York, call 1-212-594-7140. And don't forget to ask for your FREE GAME DISK. If you prefer to place your order through the mail, simply clip the coupon on page 3 of this *Clipper*. This offer expires October 15th, so don't wait. Order TODAY!

25% SAVINGS ON THE LIVE-IN REFERENCE MANUAL FROM COMPUTER MART...

Computer Mart is relatively new to our *Ahoy! Clipper*. They have some excellent programs for sale, including *Kracker Jax*, their powerful parameter copy program. This month **Computer Mart** is featuring \$5 OFF their great on-line help program called *The Live-In Reference Manual*. Regularly selling for \$19.95, *The Live-In Reference Manual* has 17 screens of information, including ASCII characters, POKES, color codes, selected DOS commands, BASIC keywords, abbreviations and token values, sound registers, musical notes in eight octaves, and much more! And even with all this help *The Live-In Reference Manual* uses almost none of the RAM for BASIC programming.

Computer Mart also has some other fine software worth looking at, so be sure to find their ad in this month's issue of *Ahoy!* Because **Computer Mart** wants you to give serious consideration to their *Live-In Reference Manual*, until October 15, 1987, you may take \$5 OFF the cost of this valuable program. Just clip the **Computer Mart** coupon on page 3 of this *Clipper*, and send it with your order. This offer disappears October 15th, so don't wait.

SAVE \$5 ON AmiEXPO...

Many of you have purchased or are considering purchasing Amigas. But even if you haven't thought about it before, you're sure to want to attend **The First Annual New York AmiEXPO**. Scheduled October 10-12, 1987, **The New York AmiEXPO** will be held at the Sheraton Centre Hotel. With 80 exhibitors and over 30 conferences and seminars, 10,000 persons are expected to attend from all over the eastern U.S. There will be keynote sessions by leaders in the field. **The New York AmiEXPO** promises to be the premier Commodore event for the East Coast this year. The regular prices for one, two, or three days of attendance with advance registration are \$10, \$15 and \$20, respectively. At the door, all tickets will cost \$5 more and registration is likely to be very crowded, so when you mail in your advance registration, you'll save time and money. For

more information, call 1-800-32-AMIGA, or in New York State, call 1-212-867-4663. When you call this number, they'll send you registration forms to register in advance. Thanks to the generosity of **AmiEXPO**, you may SAVE an additional \$5, by enclosing the **AmiEXPO** coupon on page 3 of this *Clipper*. You may also use the coupon at the door, but obviously, you'll save \$5 more when you register by mail. Other events are planned for Los Angeles and Chicago, so keep watching your *Clipper* for further developments.

10% OFF WORLD CLASS LEADER BOARD FROM ACCESS SOFTWARE...

Access Software is a leader in the field of pro golf simulators. They built their reputation with *Leader Board*, then *Tournament Disk #1*, and finally *Executive Disk #1*. **Access Software** now presents their latest and greatest pro golf simulator, *World Class Leader Board*. It includes three of the most famous 18-hole golf courses: St. Andrews, Scotland, the most revered course in golf; The Doral Country Club, the Florida Blue Monster; and Cypress Creek, Texas, the largest and finest golf course in the U.S. *World Class Leader Board* features authentic reproductions of these actual courses with trees, traps, ruff, and water hazards. The 4th course included is The Gauntlet Country Club. Only those who have mastered the best courses in the world can expect to come close to par on the Gauntlet.

World Class Leader Board features a scorecard printout, aerial views, a course editor (to arrange the holes in any order you choose), a practice putting green, and a driving range. There are thousands of trees, up to 192 per hole. In addition, the improved graphics and playability increase difficulty and realism.

My whole family had a wonderful time playing *World Class Leader Board*, and so will you. With a suggested retail price of \$39.95, *World Class Leader Board* will challenge you with the same strategy and option decisions you face in a real game. And because the look and feel are so lifelike, it may improve your actual game as well.

Now and for a limited time, you may SAVE 10% on *World Class Leader Board*, when you order it directly from **Access Software**. Use the handy **Access Software** coupon on page 3 of this *Clipper*, or you may call them at 1-801-298-9077 (Please do not use their toll-free number!). Don't forget to mention you saw this offer in the *Ahoy! Clipper*, so that you get your discount. This offer expires on October 15th, 1987, so hurry and place your order RIGHT NOW!

SAVE UP TO 50% ON TIMEWORKS FROM S & S

Mail to: S & S Wholesalers
226 Lincoln Road
Miami Beach, FL 33139

NO PHONE ORDERS, PLEASE!

YES, **S & S**, I want to purchase **Timeworks** programs for the C-128 at \$34.90 each. I understand this represents an OVER 50% SAVINGS from the regular retail price of some programs. If my order is under \$100, I'm adding \$4 for shipping and handling. Thanks! FOR VISA OR MASTERCARD PURCHASE, ADD 3%.

Name on Credit Card _____

Credit Card # _____ Exp. Date _____

Signature _____

SAVE \$5 ON AmiEXPO

FOR REGISTRATION FORMS, FIRST CALL 1-800-32-AMIGA, OR IN NEW YORK STATE CALL 1-212-867-4663, THEN SEND THIS COUPON WITH THAT FORM.

Mail to: The First Annual New York AmiEXPO
211 East 43rd Street, Suite 301
New York, NY 10017

YES, **AmiEXPO**, I want to SAVE \$5 on attendance to your First Annual New York AmiEXPO to be held October 10-12, 1987 at the Sheraton Centre in New York City. I understand that only with this coupon may I SAVE \$5. If my payment is not enclosed, I may still SAVE \$5 at the door, but the cost is also \$5 more.

Days Advance Registration	At the Door
1 \$5 (with coupon)	\$10 (with coupon)
2 \$10 (with coupon)	\$15 (with coupon)
3 \$15 (with coupon)	\$20 (with coupon)

SAVE ALMOST 50% ON THE STAR MICRONICS NP-10 PRINTER FROM LYCO COMPUTER

Mail to: Lyco Computer
P.O. Box 5088
Jersey Shore, PA 17740
For faster service, call 1-800-233-8760.
In PA, call 1-717-494-1030.

YES, **Lyco**, I want to buy the Star Micronics NP-10 Printer. My order for the printer (and applicable cable or interface if desired) is enclosed. CREDIT CARD ORDERS: PLEASE ADD 4%.

Name on Credit Card _____

Credit Card # _____ Exp. Date _____

Signature _____

FREE GAME DISK WITH \$100 PURCHASE FROM MONTGOMERY GRANT

Mail to: Montgomery Grant
Penn Station
Main Concourse
New York, NY 10001
For faster service, call 1-800-345-7059.
In NY, call 1-212-594-7140.

YES, **Montgomery Grant**, I want to get my FREE GAME DISK. Enclosed is my order for \$100 or more. I have checked your ad for the details about ordering. Thanks!

Name on Credit Card _____

Credit Card # _____ Exp. Date _____

Signature _____

10% OFF WORLD CLASS LEADER BOARD FROM ACCESS SOFTWARE

Mail to: Access Software
2561 South 1560 West
Woods Cross, UT 84087
For faster service, call 1-801-298-8077.
VISA and MasterCard accepted.

YES, **Access Software**, I want to SAVE 10% on your excellent pro golf simulator, World Class Leader Board. My payment of \$35.95 plus \$1 for shipping and handling is enclosed. Thanks!

SAVE 50% ON SOLID OAK COMPUTER DESK FROM PROTECTO ENTERPRIZES

Mail to: Protecto Enterprizes
22292 Pepper Road
Barrington, IL 60010
For information, call 1-312-382-5244.
NO PHONE ORDERS, PLEASE!

YES, **Protecto**, I want to SAVE almost 50% on your Solid Oak Computer Desk. Enclosed is my payment of \$114.95, representing \$99.95 for the computer desk and \$15 for shipping and handling. Thanks!

FREE MODEM AND SOFTWARE FROM QUANTUMLINK

Mail to: QuantumLink Computer Services
8620 Westwood Center Drive
Vienna, VA 22180
For faster service, call 1-800-392-8200, Dept. 25.
YES, **QuantumLink**, I want to get my FREE MODEM AND SOFTWARE by paying now for four months of **QuantumLink** Basic Service (\$9.95/month). My payment of \$39.80 is enclosed. Thanks!

\$5 OFF THE LIVE-IN REFERENCE MANUAL FROM COMPUTER MART

Mail to: Computer Mart
2700 NE Andresen Road
Vancouver, WA 98661
YES, **Computer Mart**, I want to SAVE \$5 off the regular price of \$19.95 on *The Live-In Reference Manual*. My order is enclosed. Thanks for my 25% SAVINGS!
Name on Credit Card _____
Credit Card # _____ Exp. Date _____
Signature _____

Name_____

Address_____

City/State/Zip_____

Name_____

Address_____

City/State/Zip_____

This offer expires October 15, 1987.

Name_____

Address_____

City/State/Zip_____

This offer expires October 15, 1987.

Name_____

Address_____

City/State/Zip_____

This offer expires October 15, 1987.

Name_____

Address_____

City/State/Zip_____

Please allow 2 to 4 weeks for delivery.
This offer expires October 31, 1987.

Name_____

Address_____

City/State/Zip_____

This offer expires October 15, 1987.

Name_____

Address_____

City/State/Zip_____

This offer expires October 15, 1987.

Name_____

Address_____

City/State/Zip_____

This offer expires October 30, 1987.

Ahoy!

CONTENTS

DEPARTMENTS

A View from the Bridge... <i>of the September issue of Ahoy!</i>	7
Scuttlebutt... <i>product pronouncements from the Summer '87 CES.</i>	8
Art Gallery... <i>the latest digital delineations on the 64 and Amiga.</i>	20
Tips Ahoy! <i>discoveries from across the Commodore nation.</i>	45
S.O.S.... <i>solutions to common hangups concerning Flankspeed.</i>	61
Reviews... <i>the MSD lives, in the form of three new accessories.</i>	63
Flotsam... <i>we get tagged in the Wizard Tag II challenge!</i>	68
Errata... <i>an error of omission in the docs for Univaders (July '87).</i>	68
Commodares... <i>a quartet of quizzes for computer whizzes.</i>	73
Program Listings... <i>or, how to beat the high cost of software.</i>	77

FEATURES

Rupert Report: The 128 versus The Clones <i>by Dale Rupert*</i>	32
Entertainment Software Section <i>(contents on page 41)</i>	41
Amiga Section <i>(contents on page 53)</i>	53

*Includes program: *Benchmarks Galore* (for the C-128)

PROGRAMS

Crystallus <i>for the C-64 by Bob Blackmer</i>	16
Hoops <i>for the C-64 by Tony Brantner</i>	18
Centerfold <i>for the C-64 by Buck Childress</i>	22
No News <i>for the C-64 and C-128 by Buck Childress</i>	30
Spriteshell 128 <i>by Cleveland M. Blakemore</i>	48
PS to GEOS <i>for the C-64 by Shawn K. Smith</i>	51
Red Alert <i>for the C-64 by Tony Brantner</i>	60
Chainmail! <i>for the C-128 by Cleveland M. Blakemore</i>	70
Bug Repellents <i>for the C-64 and C-128 by Buck Childress</i>	78
Flankspeed <i>for the C-64 by Gordon F. Wheat</i>	79

Cover art by James Regan and Tony Mascio; photos by Michael R. Davila and Morton Kevelson

President/Publisher
Michael Schneider

Editor
David Allikas

Art Director
JoAnn Case

Managing Editor
Michael R. Davila

Senior Editors
Tim Little
Tim Moriarty

Production Director
Laura Pallini

Technical Editors
David Barron
Bob Lloret

Consulting Editors
Ben Bova
Morton Kevelson
Dale Rupert

Entertainment Editor
Arnie Katz

Art Production
Christopher Carter
Victoria Green
Stacy Weinberg

Bulletin Board SYSOP
B.W. Behling

Circulation Director
W. Charles Squires

Advertising Director
Lynne Dominick

Director of Promotion
Mark Kammerer

Controller
Dan Tunick

Advertising Representative
JE Publishers' Representative
6855 Santa Monica Blvd., Suite 200
Los Angeles, CA 90038
(213) 467-2266
Boston (617) 437-7628
Dallas (214) 660-2253
New York (212) 724-7767
Chicago (312) 445-2489
Denver (303) 595-4331
San Francisco (415) 864-3252

ISSUE NO. 45

SEPTEMBER 1987

Ahoy! (ISSN #8750-4383) is published monthly by Ion International Inc., 45 W. 34th St., Suite 500, New York, NY, 10001. Subscription rate: 12 issues for \$23.00, 24 issues for \$44.00 (Canada \$30.00 and \$55.00 respectively). Second class postage paid at New York, NY 10001 and additional mailing offices. © 1987 by Ion International Inc. All rights reserved. © under Universal International and Pan American Copyright conventions. Reproduction of editorial or pictorial content in any manner is prohibited. No responsibility can be accepted for unsolicited material. Postmaster, send address changes to *Ahoy!*, 45 W. 34th Street, Suite 500, New York, NY 10001. Direct all address changes or matters concerning your subscription to *Ahoy!*, P.O. Box #341, Mt. Morris, IL 61054 (phone: 815-734-4151). All editorial inquiries and materials for review should be sent to *Ahoy!*, 45 W. 34th St., Suite 500, New York, NY 10001.



Since 1981

Lyco Computer Marketing & Consultants

TO ORDER
CALL TOLL FREE
1-800-233-8760

in PA
(717) 494-1030
or send to
Lyco Computer
P.O. Box 5088
Jersey Shore, PA 17740



CUSTOMER SERVICE
(717) 494-1670

Mon. - Fri. 9AM - 5PM

RISK FREE POLICY

In-stock items shipped within 24 hrs. 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. Advertised prices show 4% discount for cash, add 4% for MasterCard and VISA. Personal checks require 4 weeks clearance before shipping. We cannot guarantee compatibility. We only ship factory fresh merchandise. Ask about UPS Blue and red label shipping. All merchandise carried under manufacturer's warranty. Return restriction applicable. Return authorization required. All items subject to change without notice.

COMMODORE & AMIGA SOFTWARE

Broderbund:

Bank St. Writer 128K ..	\$32.95
Carmen San Diego	\$22.95
Champ. Lode Runner ..	\$24.95
Graphic Lib. I, II, III ..	\$15.95
Karateka	\$18.95
Print Shop	\$25.95
Print Shop Compan.	\$22.95
Print Shop Paper	\$12.95
Science Kit	\$35.95
Lode Runner	\$24.95
Bank St. Filer	\$32.95
Bank St. Mailer	\$32.95

Access:

Leader Board	\$24.95
Mach 5	\$23.95
Mach - 128	\$29.95
10th Frame	\$24.95
Exec. Tournament	\$13.95
Tournament #1	\$13.95
Triple Pack	\$14.95
Wid. Cl. Leader Brd.	\$24.95

Microleague:

Microleag. Baseball	\$24.95
General Manager	\$19.95
Stat Disk	\$17.95
'86 Team Disk	\$14.95
Microleag. Wrestling	\$New

Microprose:

F-15 Strike Eagle	\$22.95
Gunship	\$24.95
Kennedy Approach	\$18.95
Silent Service	\$22.95
Solo Flight	\$18.95
Top Gunner	\$18.95

Activision:

Aliens	\$22.95
Champion. Basketball ..	\$22.95
Hacker	\$12.95
Hacker 2	\$22.95
Labyrinth	\$19.95
Music Studio	\$22.95
Tass Times	\$19.95
Titanic	\$14.95

Firebird:

Colossus IV	\$21.95
Elite	\$19.95
Frankie Goes to Italy ...	\$19.95
Golden Path	\$24.95
Guild of Thieves	\$24.95
Pawn	\$24.95
Talking Teacher	\$24.95
Tracker	\$24.95
Starglider	\$24.95
Sentry	\$24.95

Strategic Simulations:

Gemstone Healer	\$18.95
Gettysburg	\$35.95
Kampfgruppe	\$35.95
Phantasie II	\$24.95
Phantasie III	\$29.95
Ring of Zelfin	\$24.95
Road War 2000	\$24.95
Shard of Spring	\$24.95
Wizards Crown	\$24.95
War in the S. Pacific ...	\$35.95
Wargame Constr.	\$21.95
Battlecruiser	\$35.95
Gemstone Warrior	\$14.95

Baltic 1985	\$24.95
Field of Fire	\$27.95
Battalion Commander ..	\$27.95
Battle for Normandy	\$27.95
Battle of Antietam	\$34.95
Colonial Conquest	\$27.95
Computer Ambush	\$39.95
Pro Golf Tour	\$27.95

Sublogic:

Baseball Stadium	\$15.95
Flight Simulator II	\$31.95
Jet Simulator	\$31.95
Night Mission Pinball ...	\$21.95
Scenery Disk	\$15.95

Sublogic Baseball	\$31.95
Sublogic Football	\$26.95

Epyx:

Create A Calendar	\$17.95
Destroyer	\$24.95
Fastload	\$24.95
Football	\$14.95
Karate Champ	\$19.95
Movie Monster	\$14.95
Multiplan	\$24.95
Sub Battle	\$24.95
Winter Games	\$24.95
Super Cycle	\$14.95
Graphics Scrapbook	\$14.95
Str. Sports Basketball ..	\$24.95
Wid.'s Great Baseball ..	\$14.95
Summer Games II	\$24.95
Vorpel Utility Kit	\$15.95
World Games	\$24.95

Unison World:

Art Gallery 1 or 2	\$15.95
Print Master	\$22.95

Action Soft:

Up Periscope	\$19.95
--------------------	---------

Hi Tech Expressions:

Heart Ware	\$6.95
Holiday Paper	\$8.95

WE STOCK OVER 5000 SOFTWARE TITLES!

Commodore prices shown, other systems similar. Call for availability.

LYCO'S COMPUTER SPECIALS!

C= 64C COMPLETE PACKAGE



- Commodore 64 C Computer
- Commodore 1541 C Drive
- **star** NP 10 Printer

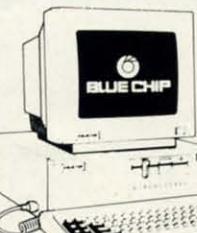
\$475

BLUE CHIP

- 100% IBM PC XT compatible!
- (Green, amber & color monitors available)

PERSONAL COMPUTER

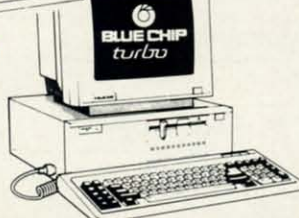
\$499



Blue Chip Turbo

- dual-speed processor, 4.77 and 8.00 MHz
- 640K internal RAM
- color display adapter
- Call for details!

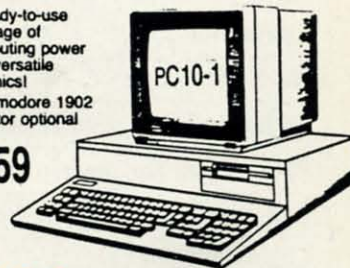
\$749



IBM COMPATIBLE commodore PERSONAL COMPUTERS

- A ready-to-use package of computing power and versatile graphics!
- Commodore 1902 monitor optional

\$559



**PC 10-2
\$619**

- Flexible "open architecture" design for easy installation of variety of options
- 640 K RAM and two 5 1/4" drives
- Limited offer

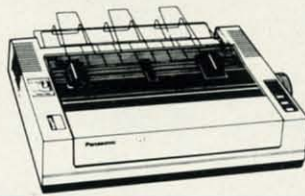
1-800-233-8760

Panasonic

\$159.95

1080i

- 120 cps Draft Mode
- 24 cps NLQ
- 1-year Warranty



Lycu Computer is one of the oldest and most established computer suppliers in America. Because we are dedicated to satisfying every customer, we have earned our reputation as the best in the business. And, our six years of experience in computer marketing is your assurance of knowledgeable service and quality merchandise.

SAVE ON THESE PRINTERS!

INTERFACING CARDCO

Cardco G	\$32.95
Cardco GWIZ	\$35.95
Cardco Super G	\$45.95

XETEC

XETEC Jr	\$38.95
XETEC Super Graphics	\$58.95

DSI

PPI	\$45.95
-----------	---------



NP 10

\$129.95

(Limited Quantity)

- 100 cps draft
- 25 NLQ
- EZ Front Panel Selection
- Auto Single Sheet Feed
- Adjustable Tractor Feed

STAR MICRONICS

NX-10	\$169
NP-10	\$SPECIAL!
NL-10	\$195
NX-15	\$295
NB-15	\$769
SD-10	\$229
ND-10	\$319
ND-15	\$399
SR-10	\$389
NR-15	\$459
SD-15	\$359
SR-15	\$449
NB24-10	\$399
NB24-15	\$599
NX-10C	\$199

BROTHER

HR 10	\$195
HR 20	\$339
M 1109	\$195
M 1409	\$329
M 1509	\$365
M 1709	\$475
Twinwriter Dot & Daisy	\$849
2024 letter quality	\$665

DIABLO

D25	\$499
635	\$779
D-80 IF	\$1299

SEIKOSHA

SP 180 Ai	\$145
SP 1000 i	\$165
SP 1200 Ai	\$195
SP 1200 As RS232	\$195
SL 80 Ai	\$375
MP 1300 Ai	\$359
MP 5300 Ai	\$469
SP 180 VC	\$145
SP 1000 VC	\$149
SP 1200 VC	\$NEW

PANASONIC

1080 i	\$159
1091 i	\$179
1092 i	\$319
1592	\$389
1595	\$449
3131	\$259
3151	\$399
1080 AP1c	\$239

CITIZEN

120D	\$165
Premiere 35	\$469
MSP-10	\$259
MSP-15	\$329
MSP-20	\$299
MSP-25	\$399
Tribute 224	\$629

SILVER REED

EXP 420 P	\$209
EXP 600 P	\$539
EXP 800 P	\$649

OKIDATA

Okimate 20	\$129
Plug n print	\$CALL
120 NLQ	\$205
292 w/interface	\$519
293 w/interface	\$655
182	\$235
192+	\$339
193+	\$519
180	\$CALL

EPSON

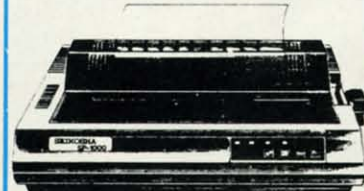
LX-800	\$179
EX-800	\$349
EX-1000	\$469
LQ-800	\$419
LQ-1000	\$589
FX-286e	\$415
FX-86e	\$295
LQ-2500	\$869

Box of 10

MAXELL	5 1/4	3.5
SSDD	\$8.99	\$12.50
DSDD	\$9.99	\$17.99
BONUS		
SSDD	\$6.99	—
DSDD	\$7.50	—
SKC		
SSDD	\$7.99	\$12.99
DSDD	\$9.50	\$16.99
DSHD	\$16.99	—
VERBATIM		
SSDD	\$9.99	\$13.99
DSDD	\$11.99	\$19.99

Call for generic diskette pricing!

SEIKOSHA SP-1000VC



- 100 cps Draft Mode (2-year warranty)
- 20 cps NLQ
- Direct Connect C-64/128

\$149.95

MONITORS

Thompson:	
4120 RGB/COM	\$235
4160/36362	\$279
Teknika:	
MJ-503	\$469
Zanith:	
ZVM 1220	\$89
ZVM 1230	\$89
Panasonic:	
1320	\$369
1361	\$459
NEC:	
Multisync	\$CALL

MODEMS

Avatex:	
1200	\$89
1200	\$99
2400	\$219
Hayes:	
Smartmodem 300	\$125
Smartmodem 1200	\$369
Smartmodem 1200B	\$339
Smartmodem 2400	\$559
Micromodem IIe	\$125
DSI:	
Messenger Modem 300	\$32.95
CompuServe	\$17.95

Avatex 1200hc Modem

with cable purchase

Limited Offer

\$99.95

DRIVES

Indus GT C-64 Drive	\$175.95
Blue Chip 64C Drive	\$CALL
Blue Chip C 128 Drive	\$CALL

COMMODORE

128
System

\$699

(reg. \$1009.85)

- Commodore 1571 Disk Drive
- Commodore 128 Computer
- Thompson 4120 Color Monitor w/Cable



commodore HARDWARE

1802C Monitor	\$189	C128 Computer	\$249
C1700 RAM	\$109	1571 Drive	\$225
C1750 RAM	\$169	1902 Monitor	\$285
C1351 Mouse	\$39	64C Computer	\$175
1670 Modem	\$CALL	1541C Drive	\$185

HOURS

Mon - Thurs 9AM-8PM
Fri 9AM-6PM
Sat 10AM-6PM

Face to Face with Excitement!



F-15E Strike Eagle Fighter



Apache AH-64A Helicopter Gunship



World War Two Fleet Submarine of the Silent Service



There is one sure way to come face to face with the excitement of action: the stunningly realistic combat simulators of MicroProse. Authenticity is the key element that separates mere videogames from today's sophisticated simulations—it's the quality of realistic action that takes you from the world of mere fantasy and into an intriguing realm of spectacular reality. Authenticity is the essence of the MicroProse design approach; excitement is the undeniable result.

F-15 STRIKE EAGLE. The reference standard attack fighter simulation. Totally authentic cockpit flight controls and weapons systems. Missions over Iraq, Egypt, Southeast Asia—even the famous April 1986 Antiterrorist Airstrike against Libya. So realistic Soviet intelligence has reportedly purchased copies for analysis.

GUNSHIP. Helicopter warfare over the high-tech battlefields of tomorrow's headlines, with night vision systems, superb terrain representation for true 'nape of the earth' flying, and the full array of America's most advanced weaponry at your fingertips. Authentic enough to be used in actual helicopter combat environment testing for the United States Army.

Reader Service No. 199

SILENT SERVICE. A tribute to the cunning and courage of America's World War Two submariners. Stunningly accurate recreation of undersea warfare, with accurately reproduced torpedo characteristics, radar and sonar capabilities, and destroyer defensive tactics. So authentic that it charts the entire South Pacific to a resolution of one hundred yards. Recipient of virtually every international award as 'best computer simulation.'

Come face to face with excitement, at your MicroProse dealer.

F-15 Strike Eagle available for Commodore 64/128, Apple IIc/e/+ (64k), Atari XL/XE/520ST, IBM PC/PCjr and compatibles, and Tandy 1000 Series. Gunship available for Commodore 64/128, Apple IIc/e/+ (64k), IBM PC/PCjr and compatibles, and Tandy 1000 Series, coming soon for Atari XL/XE/520ST and Amiga. Silent Service available for Commodore 64/128, Amiga, Apple IIc/e/+ (64k) and Iigs, Atari XL/XE/520ST, IBM PC/PCjr and compatibles, and Tandy 1000 Series. All products have suggested retail prices of either \$34.95 or \$39.95.

Available from your local retailer. If out of stock, contact MicroProse directly for further information on our full range of simulation software, pricing, availability, and to place Mastercard/Visa orders.

Commodore, Amiga, Apple, Atari, IBM, and Tandy are registered trademarks of Commodore Electronics, Ltd., Commodore/Amiga Ltd., Apple Computer Inc., Atari Inc., International Business Machines, Inc., and Tandy Corp., respectively.

MICRO PROSE
SIMULATION • SOFTWARE

100 Lakeside Drive • Hunt Valley, MD 21036 • (301) 771-1851

VIEW FROM THE BRIDGE

We've said it before, but this month it especially bears repeating: *Ahoy!* is not a closed shop. Though this issue features programs from regulars Bob Blackmer, Shawn K. Smith, and two apiece from Cleveland M. Blake-more, Tony Brantner, and Buck Childress, the many other talented individuals who regularly submit work should not consider themselves at a competitive disadvantage. We have no staff programmers—all programs are written freelance, and none of these freelancers has a designated slot to fill each month or any month. The same authors keep appearing because they keep providing the best programs. Equal their work, and you'll have an equal chance. Top it, and we'll be writing about you instead one of these months.

As for this month, *Ahoy!*'s programmers, columnists, and reviewers have turned in a job at least as difficult to surpass as usual:

- The C-128 always seemed like the industry's biggest steal...at least, until Far East ingenuity made it possible to own a generic IBM PC for under \$500. Does the 128 remain the better buy? This month's *Rupert Report* tells you what happened when we put *The 128 versus The Clones*. (Turn to page 32.)

- The 128's built-in sprite editor makes designing the little devils easy...but manipulating them can still be a migraine and a half. So Cleve Blakemore wrote *Spriteshell 128* to endow you with a greater degree of control. (Turn to page 48.)

- With *Spriteshell* in place, maybe you'll be able to create C-128 games as good as Cleve's *Chainmail!* This life and death duel between the Crimson and Green Knights is done to the hilt. (Turn to page 70.)

- After the massive success of *Wizard Tag II*, Bob Blackmer wasted no time designing another challenge for his many fans. On the other hand, after reading some of the smart aleck letters Bob received (see *Flotsam*, page 68), we wonder—did Bob intend to entertain his fans, or lose them in the 36 interconnecting cubicles of *Crystallus*? (Turn to page 16.)

- Are you tired of coming up with new methods of destroying a program in memory? So was Buck Childress. He gives 64 and 128 users protection against some of the most common causes of death in *No News*. (Turn to page 30.)

- We can't promise that Buck's *Centerfold* will make your title screens as appealing as the centerfolds of some other magazines we could name. But it's the best we can do in a family magazine. (Turn to page 22.)

- He's brought auto racing, boxing, bowling, and horse racing to life in these pages...and now Tony Brantner hits from 20 with *Hoops!* (Turn to page 18.)

- Afraid of running out of sports, Tony cribbed from the classics for his second program this month. *Red Alert* involves a *Missile Command*-like defense of a sextet of cities. (Turn to page 60.)

- Barnum and Bailey...Eastman and Kodak...peanut butter and chocolate...when giants in any field merge, the union

seems larger than the sum of its parts. It's happened again with Shawn K. Smith's *PS to GEOS*, permitting commerce between two of the most popular programs in Commodore history. (Turn to page 51.)

- If you own an Amiga but not its attendant rodent, you'll be glad that you never threw away that old C-64 trackball—because Morton Kevelson is going to show you how to turn it into a mouse. And once you're happily *Rolling Your Own*, you can read the reviews also included in this month's *Amiga Section*, on *Space Quest*, *Disk-2-Disk*, and *Butcher*. (Turn to page 53.)

- Now that it's no longer being produced, we tend to forget how good the MSD SD-2 was. But Computer Mart hasn't—they're distributing three new products in support of the landmark dual drive, all of which are covered in this month's *Reviews* section. (Turn to page 63.)

As space on this page runs out, we'll hastily direct you towards *Scuttlebutt*, beginning on the following page and detailing significant software and hardware announcements from this June's Consumer Electronics Show. Richard Herring's *COMAL Column* was cut from this issue for space considerations, but will be present next month—along with a lot more. As winter approaches, we're only going to get bigger and better!

—David Allikas

COMPUTER REPAIR

800-221-7770

AMIGA \$100.00			
	Commodore Disk Drive 1541 2031		Commodore Monitor 1701 1702
	\$60.00		\$75.00
	Commodore SX-64 Portable Computer		PET 64 VIC 20 Computers
	\$99.00		\$45.00
	Commodore Printer MPS 801 MPS 803		Commodore Printer 1526 MPS 802
	\$50.00		\$75.00
	MSD SD1, SD2 CBM 128 CBM 1571		Commodore Computer 8032 8050
	\$85.00		\$85.00

WE BUY ALIVE		commodore SERVICE CENTER PARTS	
64	60.00	901225-01	11.85
1541	75.00	901226-01	11.85
SX64	150.00	901227-03	11.85
MSD	100.00	901229-05	15.85
APPLE 2E	450.00	7701/8701	9.85
1526/802	45.00	8721	16.85
MPS801	35.00	8502	9.85
SFD 1001	85.00	82S100	13.85
DEAD		24.95	6502
64	40.00	15.95	6532
1541	60.00	18.95	6520
MSD	75.00	11.95	6522
SX64	100.00	7.25	6526
		48.95	6567
		8.95	6581
		295.00	6510
		4164	99
		74LS629	4.95
		15.00 APO AND BUSINESS EQUIPMENT	

MUST BE COMPLETE
TC ELECTRONICS
HWY 36 PO 1129
HARTSELLE, AL. 35640

800-221-7770

Reader Service No. 207

AHOY! 7

**ONLINE CASINO GAMES • RECIPE DATABASE • 64 REPLACEMENT CASE •
DESKTOP PUBLISHING • 64 & AMIGA NETWORKING • LIGHT PENS • GRAPHICS
EXCHANGE • PRINTERS • GAMES FROM MICROPROSE, EA, ACTIVISION,
FIREBIRD • TYPING TUTORS • CALENDAR MAKER • COMPUTER LEARNING MONTH**

NEWS FROM CES

As usual, June's Summer 1987 Consumer Electronics Show has yielded a huge amount of prerelease information on Commodore-compatible products, most of which we're passing along to you in this edition of *Scuttlebutt*. Only two generalizations could be made: compared to recent shows, this one was light on hardware and heavy on game software; and the Amiga has clearly continued to gain software support. Unless specified otherwise, the products listed below are scheduled to be in computer stores by the time these words reach you, or shortly thereafter.

DESKTOP PUBLISHING

The newest addition to the home computing lexicon: WYSIWYG. An acronym for "what you see is what you get," the term refers to the style of word processing required for desktop publishing, where you lay out your newsletter or document page onscreen. WYSIWYG with these three new entries, two for the 64 and one for the Amiga:

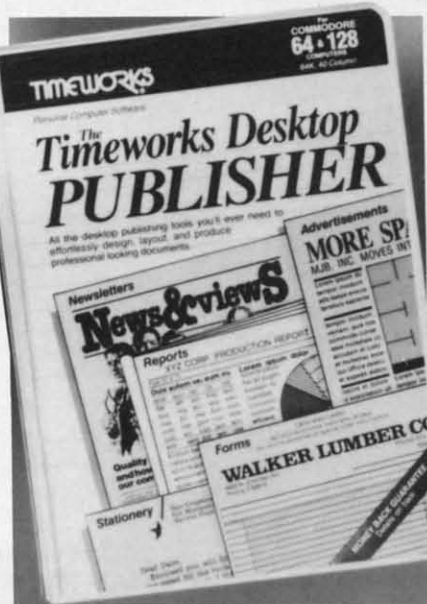
The *Timeworks Desktop Publisher* for the 64 offers typesetting features like kerning, italicizing, and underlining, page design capabilities like definition of margins and column width, drawing tools that utilize built-in patterns or your own, and the ability to import illustrations from leading graphics packages. Price to be announced.

Timeworks, 312-948-9200 (see address list, page 12).

geoPublish (\$59.00) provides *GEOS* users with multicolumn formats, multiple fonts, styles, and point sizes, integrated graphics that can be cropped, centered, or scaled to fit, and full page and "zoom" previews.

Berkeley Softworks, 415-644-0883 (see address list, page 12).

Vizawrite (\$149.95) lets Amiga own-



*Build a newspaper or magazine empire.
READER SERVICE NO. 214*

ers transport images from most "Paint" programs into documents, then move and resize them via the mouse. Text is automatically set into pages, and documents retain information like author, creation date, and alteration count when saved. A glossary feature permits the insertion of frequently used phrases with one keystroke. Also included is a mailmerge facility.

Progressive Peripherals & Software, 303-825-4144 (see address list, page 12).

ALONE FOR THE FIRST TIME

Two light pens from Inkwell Systems: the new model 184-C (\$59.95) featuring a lightweight tri-lobular body and two touch-sensitive switches, and the industrial quality 170-C (\$99.95), an upgraded version of the model that until now was available exclusively with the *Flexidraw* graphics program. Improvements to the latter include nose-tip actuated switch, enhanced circuitry, new case design, and a two-year

warranty.

Both pens are plug compatible with the Commodore 64 and the Amiga, are designed for single pixel resolution on monochrome or color CRT's, and can be used with a variety of software programs including *Flexidraw*, *Flexifont*, *Graphics Integrator 2*, *CADPAK 64* and *I28*, *GEOS*, and *T.H.I.S.* Included with each is a technical manual and a C-64 demo program.

Additionally, *Flexidraw* has been made available for the first time without its light pen. 5.5, the latest version, includes data entry device support for the Koala Pad and the Commodore mouse and joysticks. Price is \$34.95.

Inkwell Systems, 619-268-8792 (see address list, page 12).

FOR GHOST WRITING?

The *Spirit-Writer* word processor (\$29.95) includes a 30,000 word spell checker (expandable to 40,000 words). Onscreen editing, justification, page numbering, variable fonts, line spacing, and other functions are supported. A single file can be up to 450 lines long. Shipping is free.

Free Spirit Software, Inc., 312-352-7323 (see address list, page 12).

TYPING PROGRAMS

Four new typing programs for the 64 and/or Amiga:

Typing Tutor IV (\$39.95) offers such enhancements over version III as a goals questionnaire that allows the program to tailor lessons and tests to your level, an instructor mode for classroom or corporate training, a Natural Language Generator that constructs words and phrases out of letters being learned, multiple standard speed tests, and a Letter Invaders game with improved graphic and sound.

Simon and Schuster, 212-373-8882 (see address list, page 12).

Type! (\$39.95) offers practice with real words and sentences, rather than random-letter drills. The program's diagnostics will display graphics and printouts of performance, and recommend exercises to improve speed and accuracy. Also included is *Type!-Athlon*, an arcade-style game.

Broderbund Software, Inc., 415-479-1700 (see address list, page 12).

Not one but two typing programs from EA:

Mavis Beacon Teaches Typing draws its lessons from a database of over 1000 passages from history's greatest writings (for youngsters, it's jokes, riddles, rhymes, and listings from *The Guinness Book of World Records*). Mavis "speaks" to her students in complete sentences as she analyzes typing errors and progress. Animated hands type in real time along with the student on a detailed onscreen keyboard. \$39.95 for the 64, \$44.95 for the Amiga.

Designed for adults, *IntelliType* (\$49.95) for the Amiga uses artificial intelligence and an adventure story to teach typing in 30 days. Each lesson offers the conclusion to the previous episode's cliffhanger ending. Students can learn to touch type or improve their current skills with thirty lessons.

Electronic Arts, 415-571-7171 (see address list, page 12).

TV DINNERS

The Great Chefs features the entire collection of recipes from the "Great Tastes of the Southwest" TV series that began airing on PBS in June 1987, plus recipes from previous aired segments. Each of the three volumes contains about 100 recipes, cooking tips and biographical information from the chefs, and menu planning and printer driving software. Volumes 1, 2, and 3 are \$24.95 each, or \$65.00 for the set.

Concept Development Associates, Inc., 904-825-0220 (see address list, page 12).

C-64 & AMIGA NETWORKING

geoNET will allow C-64 and 128 computers to be networked with an IBM PC, with the latter serving as a file and print server and each workstation consisting of a C-64, a monitor, and the *geoNET* interface card which contains a 512K RAM disk, the network I/Q hardware, and firmware to allow booting of the network. Each of the workstations can be monitored from the PC, and files easily transferred to and from the PC's hard disk.

No price had been set at press time.

Berkeley Softworks, 415-644-0883 (see address list, page 12).

C Ltd has placed in the public domain a preliminary version of its SCSI-based Local Area Network, which makes it possible to connect several Amigas to a single mass storage device (hard drive, CD ROM, etc.). The complete system now being developed will connect Amigas to laser printers, WORM systems, and more. But the file server is available now on CompuServe in the Amiga Forum area (data library #DL-11 Search: "Multi-user").

C Ltd (see address list, page 12).

CompuServe, 614-457-8600 (see address list, page 12).

TOY SHOP REDUCED

Broderbund has lowered the price of the C-64 version of *The Toy Shop* from \$59.95 to \$39.95, and that of the refill kit from \$24.95 to \$19.95.

Broderbund Software, Inc., 415-479-1700 (see address list, page 12).

COMPUTER LEARNING MONTH

October 1987 has been designated Computer Learning Month by a coalition of leaders in the computer and education fields, among them Apple and



RACE ANALYSIS SYSTEMS III

30 DAY MONEY BACK GUARANTEE

Introducing Race Analysis Systems III. As in all three included (Harness, Thoro, Greyhound), for one low price.

But don't let the low price fool you. Systems III utilizes a state-of-the-art Database Management System that is capable of storing the past performance lines of more than 2000 race entrants on a single 5 1/4" floppy disk. With an average record retrieval time of only four seconds, fast, accurate handicapping is virtually guaranteed.

There is more. Systems III performs a Complete Wager Analysis™ on every race. Checking the viability of eleven different wager types. Pin-pointing the most efficient way to wager on a given race.

Other features include full support of the C-128's numeric key-pad; screen dumps to printer; betting tips; Quickcapper™ mode; built in fast-loader, and much, much more.

C-64/128 Disk ONLY \$49.95

Race Analysis Systems III is part of The Alsoft Team of exceptional handicapping software. To Order: Ask your local retailer or call (412) 233-4659 for MasterCard & Visa orders. To order by mail send check or money order to ALSOFT, 305 Large Avenue, Clairton, PA 15025. Price includes shipping. All Orders are shipped within 24 hours of receipt.

IBM. The national nonprofit campaign will target the nation's schools, encouraging students, educators, parents, and community leaders to explore the potential of computers as learning tools. Planned activities include national student and teacher contests in computer-generated and computer-themed art, essays, and open-ended creative projects. Teachers may submit innovative lesson plans that use the computer to enhance learning. Prizes include Apple workstations and packages donated by software publishers. Deadline for entry is October 22.

Computer Learning Month, 202-223-4338 (see address list, page 12).

SLIMLINE 64

GEOS software notwithstanding, a 64C is practically worth the extra cost for the cosmetic improvement alone. Of course, love is blind, and many owners of standard 64s adore the computer's looks. But for the rest of us 64 owners who would almost prefer to type with the dust cover still on, a face-lift is now available. Previously offered in Europe, the Slim Line 64 Replacement Case (\$34.95) offers the overall appearance of a 64C, including the lower profile and key height. The transformation requires 10 minutes and a Philips screwdriver.

Grapevine Data Products, 902-892-6372 (see address list, page 12).

NEW PRINTERS

The Commodore-compatible Okidata 180 printer (\$329) sports a push-button panel on the front that provides access to the most frequently used commands, including selection of pitch and print mode (NLQ, utility, or high speed modes, printing at 30, 120, and 180 characters per second respectively). A 2K buffer is standard.

Okidata, 609-235-2600 (see address list, page 12).

Featuring simple operation tailored to the computer novice, Seikosha's SP-180VC printer (\$249) outputs at 100 characters per second in draft mode and 20 in NLQ. Included are 129 characters and 68 graphic elements.

Seikosha America Inc., 201-529-4655 (see address list, page 12).

GRAPHICS INTERCHANGE

CompuServe's new Graphics Inter-



The Seikosha SP-180VC is designed specifically for the computer novice, with simple operation and streamlined design. **READER SERVICE NO. 216**

change Format will permit Amiga users to exchange high-resolution graphic images with Macintosh, Atari ST, and IBM PC owners. Typical uses will be the transfer of technical design diagrams, business charts and graphs, medical illustrations, computer art, and digitized photographs. Besides solving hardware incompatibility problems, GIF will compress images to reduce the file size needed by $\frac{1}{2}$ to $\frac{1}{8}$, thus reducing transmission costs. Images can contain up to 256 simultaneous colors. The GIF program and sample files are available through the Amiga hardware forum on CompuServe.

CompuServe, 614-457-8600 (see address list, page 12).

SUPER GRAPHIX GOLD

Super Graphix Gold (\$119.95) outperforms Xetec's pre-Gold interface with a 32K buffer, 8 switch-selectable operating modes, 32 printer choices, 16 active DIP switches, RESET and CLEAR buttons, LEDs to indicate activity and errors, direct-from-disk downloads and dumps, 21 secondary addresses, 12 printing channels, command channel with over 35 commands, banner channel, 4 new channels for downloading and printing fonts, pictures, and directories, and 2 built-in screen dumps with 16 sizes and 4 shades. There are 4 built-in and 4 downloadable fonts, all supporting underlining, italicizing, boldfacing, super/



The Okidata 180 offers pushbutton control of line/form feeds, print mode and pitch selection, etc. on its front panel. **READER SERVICE NO. 217**

subscribing and 9 pitches.

Xetec, Inc., 913-827-0685 (see address list, page 12).

Q-LINK CASINO GAMES

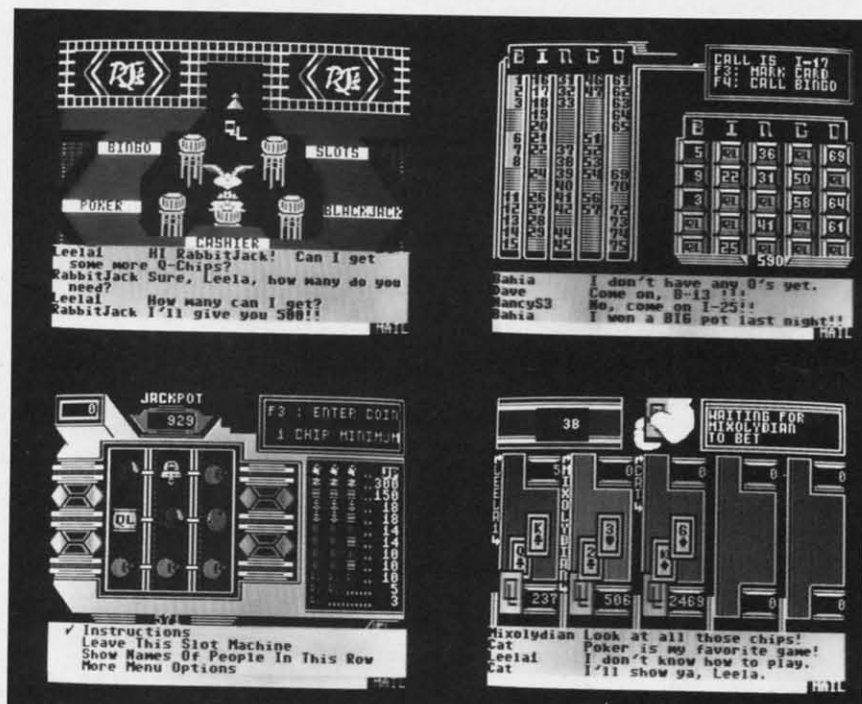
Rabbit Jack's Casino Games will allow QuantumLink subscribers to compete against one another in an online casino in Bingo, Blackjack, Poker, and Slot Machines. Players can raise their opponents in Poker, double down in Blackjack, play full-card Bingo, and bet on three lines in Slot Machines while chatting with their opponents. All four games are packaged on a disk that costs \$14.95; the usual service fee of 6¢ per minute is charged to players.

Quantum Computer Services, 703-448-8700 (see address list, page 12).

ging by changing weather conditions and the unique properties of the barques, loops, frigates, and galleons of the era.

Project: Stealth Fighter (\$39.95) features an advanced cockpit with two multipurpose display screens, radar scope, and 3-D out-the-window viewing with a superimposed "heads-up" display. The pilot must maintain a low electromagnetic profile and use the latest in armament and reconnaissance technology while manipulating more than 30 separate controls.

Uncharacteristically for a MicroProse game, *Airborne Ranger* (\$34.95) involves neither a plane, helicopter, or submarine. Instead it parachutes the player into enemy territory where he



QuantumLink subscribers will be awarded chips for playing Rabbit Jack's Casino Games whenever they sign on.

READER SERVICE NO. 218

GAMES

For the C-64 from MicroProse:

Billed as the first adventure/simulation, *Pirates!* (\$39.95) takes place in the taverns of exotic ports, in the mansions of governors, and on the open seas of the Spanish Main. The game engages players in simulated sword fights, ship to ship duels, and land battles in their roles as English, French, Dutch, or Spanish buccaneers trying to seize fortune and build their reputations. Sailing is made more challen-

must outmaneuver and outperform hostile troops on patrol or hidden in bunkers, machine gun nests, and armored cars. The joystick-controlled soldier evades the enemy across a 3-D terrain, crawling or running through ditches and ravines, armed with a sub-machine gun and grenades.

MicroProse Simulation Software, 301-771-1151 (see address list, page 12).

The C-64 adaptation of *Blue Powder Grey Smoke* (\$49.95) attempts to combine elements of an action simulation with the depth of a wargame. A

CLOSEOUT OF LUCASFILM GAMES™ BY EPYX®



4 COMPUTER GAMES

Take advantage of this closeout from Epyx® on 4 Computer Games! Set yields adventure, strategy, fantasy, and action. Each game has realistic 3-dimensional graphics. Plus, all four are compatible with Commodore® 64, 128 and Atari®. Get in on the fun, order this factory new set NOW!

- **The Eidolon™:** Control the amazing 19th century machine.
- **Koronis Rift™:** Take part in a daring raid to claim exotic ancient technologies.
- **Rescue on Fractalus™:** Enter a hostile planet to rescue stranded pilots.
- **Balblazer™:** Play a fast 31st century sport. For two players.

90-Day Limited Factory Warranty.

List: \$159.80
Liquidation Price
For Four **\$29**
Item H-2615-7166-499 S/H: \$5.00/set

Credit card customers can order by phone, 24 hours a day, 7 days a week.

Toll-Free: 1-800-328-0609

Sales outside the 48 contiguous states are subject to special conditions. Please call or write to inquire.

SEND TO: Item H-2615
C.O.M.B. Direct Marketing Corp.
1405 Xenium Lane N/Minneapolis, MN 55441-4494
Send _____ Computer Software Game Set(s) Item H-2615-7166-499 at \$29 per set, plus \$5 per set for ship, handling. (Minnesota residents add 6% sales tax. Sorry, no C.O.D. orders.)

☐ My check or money order is enclosed. (No delays in processing orders paid by check.)

PLEASE CHECK: ☐ VISA ☐ M/C ☐ DISC ☐ AMEX

Acct. No. _____ Exp. _____
PLEASE PRINT CLEARLY

Name _____

Address _____

City _____

State _____ ZIP _____

Phone () _____

Sign Here _____

COMB

Direct Marketing Corp.

AHOY! 11

zoom-in feature permits closeup combat display.

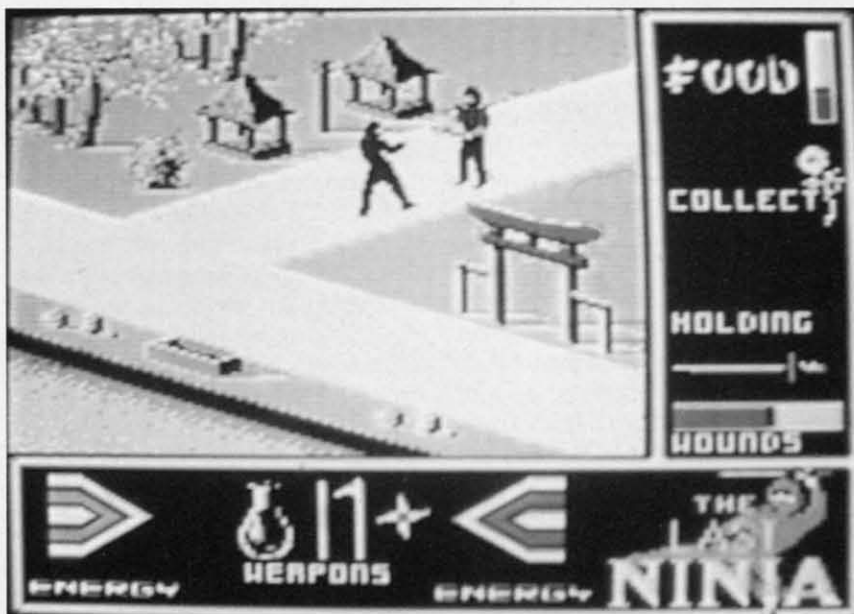
Garde Games of Distinction, 203-245-9089 (see address list, below).

The *NBA* (\$39.95) statistical basketball game lets C-64 coaches combine players of the past and present as they select lineups, make substitutions, and call plays. 20 teams are included, ranging from the '59-'60 Celtics to the four top teams of the '85-'86 season. An animation feature allows plays to be re-enacted by all 10 players, and a stat-keeper program updates players' performances throughout the game. A selection of accessory disks will be made available.

The Avalon Hill Game Company, 301-254-9200 (see address list, below).

New from Activision:

The comedy-adventure *Maniac Mansion* (\$34.95) contains 55 3-D rooms and areas full of mental challenges. More than 450 objects can be manipulated by the player to solve mysteries. At least five successful endings are possible.



No soreheads we—here's Activision's *The Last Ninja* in extra large size, even though we were first with the title. **READER SERVICE NO. 219**

As *The Last Ninja* (\$34.95), you shogun has stolen and brought to his must retrieve the sacred scrolls of the island stronghold. You'll advance White Ninja which a power-hungry through six levels of difficulty across

\$ WIN \$ THE LOTTO With Your Computer!

Forget random numbers. This program for home computers does an actual analysis of the past winning numbers. This amazing program will quickly provide you with all the data you need to predict which numbers will likely come up in subsequent drawings. All consistent lottery winners use some kind of system based on the past winners. Using the real power of your computer gives you a definite edge. It's menu driven and all you do is add the latest winners each week and the program does the rest in seconds. On screen or printer it shows hot and cold numbers, frequency, groups, sums-of-digits, odd/even, wheels numbers and more. No thick manual to read. It even has a built-in tutorial.

Ask your software dealer or call or write:



SOFT-BYTE
P.O. Box 556 F. Park
Dayton, Ohio 45405
(513) 233-2200

THE LOTTO PROGRAM is designed for all 6 & 7 draw lotto games (up to 49 numbers)!

DON'T PLAY LOTTO WITHOUT IT!

APPLE & M/S DOS IBM 24.95
COMMODORE & ATARI 21.95
TRS-80 & MOD III, IV 21.95
MACINTOSH (super version) 29.95

Please add \$2.00 shipping/handling. Fast service on charge cards.



Reader Service No. 212

Activision, Inc.
2350 Bayshore Parkway
Mountain View, CA 94043
Phone: 415-960-0410

Berkeley Softworks
2150 Shattuck Avenue
Berkeley, CA 94704
Phone: 415-644-0883

Broderbund Software, Inc.
17 Paul Drive
San Rafael, CA 94903-2101
Phone: 415-479-1170

C Ltd
723 East Skinner
Wichita, KS 67211
Phone: 316-267-6321

CompuServe
5000 Arlington Centre Blvd.
Columbus, OH 43220
Phone: 614-457-8600

Computer Learning Month
P.O. Box 19763
Washington, D.C. 20036-0763
Phone: 202-223-4338

Concept Development Assoc.
45 Cordova Street
St. Augustine, FL 32084
Phone: 904-825-0220

Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
Phone: 415-571-7171

Epyx, Inc.
600 Galveston Drive
Redwood City, CA 94063
Phone: 415-366-0606

Companies Mentioned in Scuttlebutt

Eurosoft International
114 East Avenue
Norwalk, CT 06851
Phone: 203-838-9890

Firebird
P.O. Box 49
Ramsey, NJ 07446

Free Spirit Software, Inc.
538 S. Edgewood
LaGrange, IL 60525
Phone: 312-352-7323

Garde Games of Distinction
8 Bishop Lane
Madison, CT 06443
Phone: 203-245-9089

Grapevine Data Products
P.O. Box 1886
Charlottetown, P.E.I.
Canada C1A 7N5
Phone: 902-892-6372

Inkwell Systems
P.O. Box 85152 MB290
5710 Ruffin Road
San Diego, CA 92138
Phone: 619-268-8792

MicroProse Software
120 Lakefront Drive
Hunt Valley, MD 21030
Phone: 301-771-1151

Okidata
532 Fellowship Road
Mt. Laurel, NJ 08054
Phone: 609-235-2600

Progressive Peripherals
464 Kalamath Street
Denver, CO 80204
Phone: 303-825-4144

QuantumLink
8620 Westwood Center Drive
Vienna, VA 22180
Phone: 800-392-8200

Seikosha America Inc.
1111 Macarthur Blvd.
Mahwah, NJ 07430
Phone: 201-529-4655

ShareData
7400 W. Detroit Street
Chandler, AZ 85226
Phone: 602-961-7519

Simon & Schuster
One Gulf+Western Plaza
New York, NY 10023
Phone: 212-333-3397

The Avalon Hill Game Co.
4517 Harford Road
Baltimore, MD 21214
Phone: 301-254-9200

Timeworks
444 Lake Cook Road
Deerfield, IL 60015
Phone: 312-948-9200

Xetec, Inc.
2804 Arnold Road
Salina, KS 67401
Phone: 913-827-0685

Basic 12
Basic 64
Cadpak 1
Cadpak 6
Chartpak
Chartpak
Cobol 64
Cobol 12
Speed Ter
Super C
Super Pas

Where in
is Carm
P/S Libra
Print Shop
Print Shop
Toy Shop
P/S Holdi

Box Score
General M
Micro Lea
Team Dis

Axiom Ell
Brother 1
Commode
Commode
Epson 18
Epson 85
Epson mx
Epson mx
Gorilla Ba
Juki 600
Juki 610
Legend 8
MPS 801
MPS 803
OKI 182
OKI 82, 9
SG 10-15
Panasonic

Enchanter
Hitchhike
Hollywood
Invisicue
Leather G
of Phob
Spellbrea
Trinity 1
Zork 1-2
Sorcerer

Command
Karate Cl
Kung Fu
Tag Team

Baseball
Basketba
Football

Custi
718
10A

"SOMETHING TO BYTE INTO"

ABACUS

Basic 128	\$38.95
Basic 64	25.75
Cadpak 128	38.95
Cadpak 64	25.95
Chartpak 128	25.95
Chartpak 64	25.95
Cobol 64	25.95
Cobol 128	37.95
Speed Term	25.95
Super C Compiler 64/128	38.95
Super Pascal	48.95

BRODERBUND

Where in the World is Carmen Sandiego	\$21.95
P/S Library 1-2-3 ea	15.95
Print Shop	26.95
Print Shop Companion	21.95
Toy Shop	39.95
P/S Holiday Library	15.95

MICROLEAGUE

Box Score/Stat Compiler	\$16.95
General Manager Disk	24.95
Micro League Baseball	24.95
Team Disks	16.95

RIBBON

(Min. 6 per order)

Axiom Elite 5 LCD	\$ 5.95
Brother 15, 25, 35	5.95
Commodore 1525	6.95
Commodore 1526	6.95
Epson 185	6.95
Epson 85	4.95
Epson mx, fx, rx 100	6.95
Epson mx, fx, rx 80	4.95
Gorilla Banana	6.95
Juki 6000	4.95
Juki 6100	3.95
Legend 880, 1080, 808	6.95
MPS 801	6.95
MPS 803	6.95
OKI 182, 192	7.95
OKI 82, 92, 83, 93	2.25
SG 10-15	2.25
Panasonic 1081, 1091	8.95

INFOCOM

Enchanter	21.95
Hitchhiker's Guide	21.95
Hollywood Hijinx	21.95
Invisiclues ea	6.00
Leather Goddesses of Phobos	21.95
Spellbreaker	26.95
Trinity 128	24.95
Zork 1-2-3 ea	25.95
Sorcerer	24.95

DATAEAST

Commando	\$21.95
Karate Champ	21.95
Kung Fu Master	21.95
Tag Team Wrestling	21.95

GAMESTAR

Baseball	\$21.95
Basketball 2 on 2	21.95
Football	21.95

PRECISION

Superbase 128	\$56.95
Superbase 64	46.95
Superscript 128	47.95
Superscript 64	46.95

TIMEWORKS

Data Manager 128	\$42.95
Data Manager II	29.95
Partner 128	42.95
Swift Calc 128 w/Sideways	42.95
Swift Calc 64 w/Sideways	29.95
Word Writer 128 w/Speller	42.95
Word Writer 3 w/Speller	29.95
Partner 641	38.95

DIGITAL SOLUTIONS

Pocket Writer II	41.95
Super Pak 64	34.95
Super Pak 128	44.95

MICROPROSE

Conflict in Vietnam	24.95
Crusade in Europe	24.95
F-15 Strike Eagle	21.95
Gunship	21.95
Silent Service	21.95
Top Gunner	18.95

SPRINGBOARD

Certificate Maker	\$29.95
Clip Art I	20.95
Clip Art II	24.95
Clip Art III	24.95
Newsroom	29.95
Graphic Expander	21.95
Certificate Maker #1	21.95

ACCESS

Leader Board	\$24.95
L.B. Tournament Disk	14.95
Mach 128	30.95
Mach 5	21.95
10th Frame	24.95
Triple Pack	14.95
World Class Leader Board	25.95

HOT SELLERS

Commando	\$21.95
Fist II	19.95
Gato	19.95
Ghosts-n-Goblins	19.95
Kung Fu II	19.95
Parallax	19.95
Power	12.95
Rush-n-Attack & Yie Ar Kung Fu	19.95
Star Fleet I	29.95
Strike Force Cobra	13.95
Tag Team Wrestling	21.95
Uchi Mata	19.95
Uridium	19.95
X-15 Alpha Mission	19.95

AVALON HILL

Superbowl Sunday	\$19.95
S.B. Sunday Stat Compiler	16.95
Team Disk	12.95

DATASOFT

Alternate Reality	\$24.95
Black Magic	16.95
Crosscheck	19.95
Goonies	18.95
Mercenary	18.95
Mind Pursuit	18.95
Never Ending Story	18.95
Gunslinger	19.95
221B Baker St	19.95
Theatre Europe	21.95

ACCESSORIES

AICP Disks (12)	\$ 7.95
Commodore 1351 mouse	45.95
Commodore 1670 modem	135.95
Disk Notcher	5.95
Disk Storage Case (70)	8.95
Drive Cleaner	7.95
Flexidraw Light Pen	74.95
Messenger Modem	35.95
WICO Boss Joystick	11.50
WICO Bat Handle Joystick	15.50
WICO Three Way Joystick	18.95
Xetek Graphic Interface	54.95
Xetek Graphic Jr	34.95

ELA

America's Cup	\$22.95
Artic Fox	22.95
Auto Duel	34.95
Bard's Tale	24.95
Bard's Tale II	27.95
Chessmaster 2000	26.95
Lords of Conquest	24.95
Marble Madness	21.95
Mind Mirror	21.95
Moebius	26.95
Movie Maker	24.95
Murder Party	29.95
Orge	26.95
Quizam	21.95
Scrabble	22.95
Ultima I	28.95
Ultima IV	39.95
Ultimate Wizard	22.95

MINDSCAPE

Bop and Wrestle	\$18.95
Fairlight	18.95
High Roller	18.95
Indoor Sports	18.95
Infiltrator	18.95
Lords of Midnight	17.95

BERKELEY SOFTWARE

GEOS	\$36.95
GEOS Fontpak 1	18.95
GEOS Desk Pack	22.95
Geodex	24.95
Writer Work Shop	31.95

SOLID STATE SOFTWARE

VizaStar 128	\$69.95
VizaWrite 128	59.95

ACCOLADE

Dambusters	\$18.95
Fight Night	18.95
Hard Ball	18.95
Law of the West	18.95
PSI 5 Trading Comp	18.95
Kill Until Dead	18.95
Ace of Aces	18.95
Deceptor	12.95
Comics	18.95

ACTIVISION

Aliens	\$21.95
Alter Ego	29.95
Cross Country Road Race	19.95
Gamemaker	24.95
Gamemaker Sci/Fiction	14.95
Gamemaker Sports	14.95
Hacker II	21.95
Labyrinth	21.95
Mindshadow	19.95
Murder on the Mississippi	21.95
Music Studio	21.95
Rocky Horror Show	18.95
Shanghai	21.95
Tass Times in Tonetown	21.95
Titanic	15.95
Transformers	21.95

EPYX

Fast Load	\$23.95
Multipan 64/128	29.95
Programmers Toll Kit	27.95
Vorpal	21.95
World Karate Championship	18.95
World's Greatest Baseball	23.95
Super Cycle	24.95
World Games	24.95
World's Greatest Football	24.95
Movie Monster	24.95
Championship Wrestling	24.95
Destroyer	24.95
Winter Games	23.95

FIREBIRD

Elite	\$19.95
Colossus Chess-IV	21.95
Music Systems	24.95
Advance Music Systems	49.95
The Pawn	28.95
StarGlider	24.95
Tracker	24.95

SSI

Battle of Antietam	\$29.95
Carrier Force	36.95
Phantasia II	24.95
Rings of Zepher	24.95
Wizard's Crown	24.95
Roadwar 2000	24.95

SUBLOGIC

Flight Sim II	\$34.95
Football	27.95
Jet	27.95
Pure Stat Baseball	34.95
Scenery Disk 1-6 ea	14.95
Scenery Disk # 7	14.95
Stadium Disk (baseball)	14.95
Up Periscope	18.95

CALL US

TOLL FREE

Orders

1-800-634-AICP

Only

Customer Service
718-351-1864
10AM to 6PM
E.S.T.



AMERICAN INTERNATIONAL
COMPUTER PRODUCTS

P.O. Box 1758
Staten Island, N.Y. 10314

Reader Service No. 179

ORDER
INFO

In stock items shipped within 24 hours for prepaid orders (cert. check, visa, mc) C.O.D. Orders accepted, please add \$4.00, must be cash or cert. check ONLY. NYS residents add 8 1/2% sales tax. Advertised prices reflect a 4% discount for cash, credit card add 4%. All orders add \$3.50 shipping and handling within the Continental U.S. Personal checks allow 2 wk. for clearance. Availability and pricing subject to change without notice. Free shipping in Continental U.S. on software orders over \$150.00. DEFECTIVE EXCHANGE ONLY FOR SAME PRODUCT. Restocking fee on unopened no-defective items returned. Returns accepted within 15 days of shipping date only. All returns require Return Authorization number. www.commodore.com

130 screens of 3-D graphics, searching for clues and food and solving problems. And, of course, use throwing stars, swords, nunchkus, staffs, spears, Ninja magic, and your karate skills to overcome armed guards, wild animals, and deadly traps.

From Activision's Gamestar subsidiary, *Top Fuel Eliminator* (\$29.95) simulates an entire season of drag racing. Players must fine tune their cars in the pit area, gun their engines properly to get off to a fast start, and shift gears in sync with their tachometers' RPMs to achieve maximum speed. Factors like engine failure, faulty traction, and improper shifting can affect the outcome of a race.

Four more additions to Activision's line of Solid Gold Software (that's Marketingese for "programs no longer moving at list price"): *Hacker*, *Ghostbusters*, *Little Computer People*, and *The Great American Cross-Country Road Race*. Each is \$14.95 for the 64; Amiga versions of *Hacker* and *Little Computer People* are \$24.95.

Finally, Activision will distribute a C-64 version of *Book One: Secret of the Inner Sanctum*, first in New World Computing's *Might and Magic* fantasy role playing series.

Activision, 415-960-0410 (see address list, page 12).

Firebird has adapted *Starglider* to Amiga format. The game requires you, as the driver of an airborne ground attack vehicle, to battle an almost invincible starship. Included are a flight training manual, full color poster, key-guide, and a 64-page novella. Price is \$44.95.

Firebird (see address list, page 12).

From Electronic Arts:

Legacy of the Ancients (\$29.95) transports C-64 fantasy adventure fans to the world of Tarmalon, where they attempt to retrieve a leather scroll with evil powers. The search winds through 12 towns, forests, castles, and dungeons filled with dangerous creatures.

EOS: Earth Orbit Stations (\$34.95), a C-64 strategic simulation based on NASA's space development plans for

the next 50 years, puts players in charge of building and managing space stations among the planets and moons of the solar system, ultimately leading to the search for alien life. Up to 39 different modules such as shuttleports, space telescopes, and chemical labs can be used to construct an infinite variety of stations. There are seven different replayable game scenarios which can last from 2 to 40 hours.

The *Ferrari Formula One* driving simulation (\$49.95) lets Amiga owners race a Ferrari F1/86 around 16 international race courses such as Monaco, Detroit, Monza, and Brands Hatch. The 16 tracks are authentic down to scenery and weather conditions, and the seven other racers are modeled after top contenders in the 1986 Formula One circuit.

The latest in EA's Amazing Software line for the 64: *Sanxion* (20 levels of 3-D landscapes and multiple waves of attackers), *Delta Patrol* (200 alien attack waves in over 50 environments), and on a single disk, *Dragon's Lair I and II*.

Amnesia, an interactive novel for the 64 by science fiction author Thomas Disch, puts the player in Manhattan without his memory but with a strange man who wants to kill him, a strange woman who wants to marry him, and a lot of other problems.

Age of Adventure (\$14.95) consists of two C-64 games: *Return of Heracles* (perform Herc's 12 labors while rescuing Helen of Troy) and *Ali Baba and the Forty Thieves* (battle over 100 different creatures en route to rescuing a beautiful princess).

On EA's drawing board is a Commodore adaptation of *Chuck Yeager's Advanced Flight Simulator*, just released in IBM format.

Electronic Arts, 415-571-7171 (see address list, page 12).

Yak's Progress (\$19.95) comprises eight C-64 games by British programmer Jeff Minter, including *Revenge of the Mutant Camels*. Most of the games revolve around the attempted domination of earth by the forces of Zzyax and Irata.

Eurosoft International, 203-838-9890 (see address list, page 12).

ShareData has released the first official versions of TV's three top game shows: *Family Feud*, *Wheel of Fortune*,

SAVE

WITH THE
Ahoy!

DISK MAGAZINE

The money-saving subscription rates for *Ahoy!* magazine and the *Ahoy!* program disk are now even lower!

If you subscribe to the *Ahoy! Disk Magazine*—magazine and disk packaged together—you'll receive the two at substantial savings over the individual subscription prices!

YEARLY SINGLE ISSUE PRICE (12 ISSUES)	SEPARATE SUBSCRIPTION PRICE (12 ISSUES)
Magazine: \$ 35.40	Magazine: \$ 23.00
Disk: \$107.40	Disk: \$ 79.95
TOTAL: \$142.80	TOTAL: \$102.95

**AHOY! DISK
MAGAZINE
12 ISSUES
\$97**

Use the postpaid card bound between pages 66 and 67 of this magazine to subscribe. (Canadian and foreign prices are higher.)

The *Ahoy! Disk Magazine* is also available at Waldenbooks and B. Dalton's bookstores, as well as other fine software outlets.



LADDERS TO LEARNING

For use on your Commodore 64 or Commodore 128 computer

Three years of development and field testing by education experts have resulted in a series of software programs that are rich in educational content appropriate for both home and school use.

Selected titles from LADDERS TO LEARNING Series (over 50 titles in all) for beginning your home/school software collection:

- **MOVING PICTURES** (3-13 years)
Create and animate a story using fabulous graphics (requires joystick).
- **MEMORY TRAINER** (8-10 years)
Improve recall of numbers, words, lists, and shapes.
- **WORD POWER** (8-10 years)
Learn what a noun is, what it does, how to identify it and match correct meanings.
- **COUNTING** (3-6 years)
A delightful introduction to counting and numbers using animation, superb graphics and captivating sound.
- **ADD/SUBTRACT I & II** (6-9 years)
Henry Hilo makes an interesting game out of presenting, reviewing, and testing basic addition and subtraction principles.

- **SPATIAL RELATIONS** (3-8 years)
Master concepts of perspective, distance, and size in this highly interactive program.
- **FLYING INSTRUCTOR** (10-15 years)
Earn your Flight Certificate by mastering flight principles and experiencing "hands-on" airplane control.
- **BONES AND JOINTS** (10-15 years)
Learn what bones are made of, their function, and about the joints which connect them.
- **SORTING** (6-8 years)
Play the Great Sorting Game as a building block for math and logic skills.
- **MECHANICAL ENERGY** (10-15 years)
Learn the basic facts about kinetic and potential energy and conduct experiments in a laboratory simulation.

ALL PROGRAMS FEATURE:
*Graphics
*Interaction
*Animation
*Sound & Color



Combase, Inc.
333 Sibley Street
Suite 890
St. Paul, MN 55101
(612) 221-0214



* Published by McGraw-Hill Book Company Australia Pty Limited
Available from: **COMBASE, INC.**, Suite 890, 333 Sibley Street, St. Paul, MN 55101
To order, send check or money order. Cost includes shipping and handling.

SCHOOL & GOVERNMENT PURCHASE ORDERS ACCEPTED.
30-DAY RETURN GUARANTEE SUBJECT TO MERCHANDISE RETURNED IN SALEABLE CONDITION AND 10% RESTOCK FEE.

TOTAL DISKS ORDERED _____ AT \$19.95/DISK

AMOUNT ENCLOSED: _____

Name _____
Address _____
City/State/Zip _____
Telephone () _____



- MOVING PICTURES
- MEMORY TRAINER
- WORD POWER
- COUNTING
- ADD/SUBTRACT I&II (Specify #)
- PLEASE SEND COMPLETE CATALOG
- SPATIAL RELATIONS
- FLYING INSTRUCTOR
- BONES AND JOINTS
- SORTING
- MECHANICAL ENERGY

Reader Service No. 209

and *Jeopardy*. Each is for the C-64, and priced at \$9.99.

ShareData, 602-961-7519 (see address list, page 12).

From Broderbund:

Previously a hit in the UK, *Cauldron* (\$29.95) contains two complete quest games. In the first you take the part of a Witch Queen whose golden broom has been stolen by the Pumpking; in the second you're a loyal Pumpking warrior out to destroy the Witch Queen. The only way to win either contest is to collect ingredients to brew a magic spell in the cauldron.

Broderbund Software, 415-479-1700 (see address list, page 12).

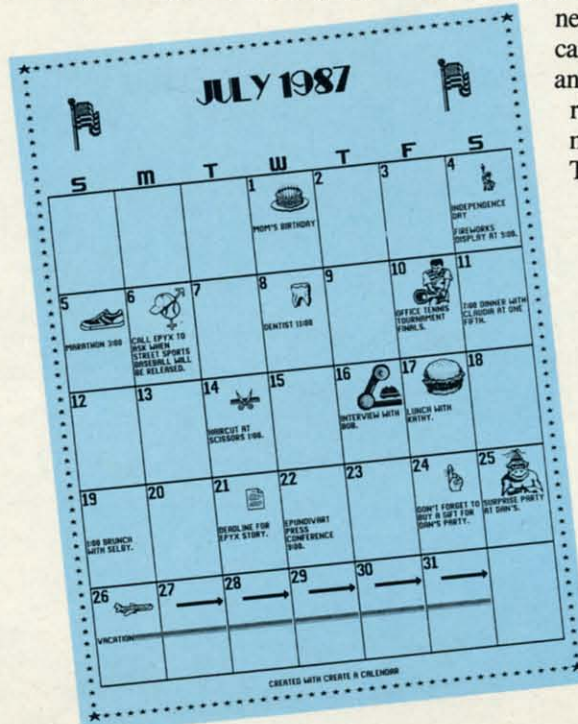
GET ORGANIZED

Create a Calendar lets C-64 users make custom calendars with a variety of text, graphics, and borders. Graphics are included for birthdays, dental appointments, haircuts, and the like; graphics from Epyx's *Scrapbook Collection* and other *Print Shop*-compati-

ble graphic disks can also be incorporated. Daily, weekly, and monthly cal-

endars can be produced in sizes from 8½ x 11" to a six-page horizontal banner. Multiple lines of text can be placed on any day, and events that occur at regular intervals, like a meeting on the second Tuesday of every month, can be repeated automatically.

Epyx, Inc., 415-366-0606 (see address list, page 12).



You can Create a Calendar one day at a time or automatically with the Master Calendar option which contains special events.

READER SERVICE NO. 220

CRYSTALLUS

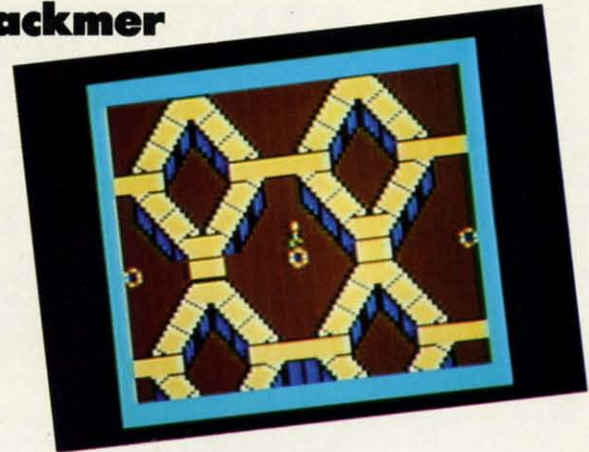
For the C-64
By Bob Blackmer

You are trapped in a huge complex maze made up of 36 interconnecting cubicles. Each cubicle in the maze contains shimmering crystals that emit audible tones when gathered.

These tones are then absorbed into the walls of the structure. When all the tones have sounded, the structure will echo the melody of tones, causing a secret passage to open. The passage will be visible in an outer wall at the top or bottom of the maze. As you leave the maze, you will enter the courtyard which is surrounded by a brick wall. Somewhere in this wall will be an opening, your final hurdle to escape from *Crystallus*.

This game is different from most in that there is no scoring involved. You merely must finish your task to escape from the maze that bars your freedom.

This program is a good example of how to achieve a three dimensional look to a game. The custom character graphics create a maze that shows the walls and tops of walls in contrasting colors and drawn at the proper angles. The sprite priority register is set to display behind the screen data.



This gives the effect of depth as the sprite moves through the cubicles in the maze.

You will need a joystick in Port 2 to play the game. The music used in this program may be familiar to some readers: it's taken from "Opus 6 No. 1" by Fernando Sor.

Crystallus is written in machine language and must be entered using *Flankspeed* (see page 79). After entering and saving *Crystallus*, reset the computer and LOAD "CRYSTALLUS".8.1. Then SYS 49152 to start. □

SEE PROGRAM LISTING ON PAGE 85

PHOTO: MICHAEL R. DAVILA

PIK'EM 87



A Complete Pro Football
Prediction Program For The
1987 NFL SEASON

61% + Accurate vs 'Line' in 1986

More In
'87 To

BEAT THE SPREAD

★ ★ FEATURES ★ ★

- Predicted Scores Each Week
- Season Schedule By Week
- Season Schedule By Team
- Scores By Week
- Scores By Team
- Win Loss Record Home/Away
- Division Standings
- Stats — Accumulated & Average
- Line By Week
- Line By Team
- Record vs Line
- Record vs Common Opponents
- Individual Team Match-Ups
- Printed Copy All Screens
- 1983-1986 Data Base (Includes All of the Above)
- Easy Updates Playoffs/1988
- Not Copy Protected
- Dealer Inquiries Invited

74⁹⁵

INCLUDES DISK AND
DOCUMENTATION
SPECIFY 5¼ OR 3½ DISK

- IBM, Tandy & Compatibles
- Commodore 64 — 128
- Apple II+ — IIc — IIe — IIGs
- TRS 80 MIII / IV

Stats Needed To Run Program Available In
Local Newspapers Or We Will Furnish All Stats
By 1st Class Mail. Season Price 40⁰⁰.

Our Bulletin Board Will Furnish All Stats, Lines,
Predictions and Trends Updated Daily. Season
Price 55⁰⁰. Program Comes Updated Thru Current
Week of Season . . . No Extra Charge.

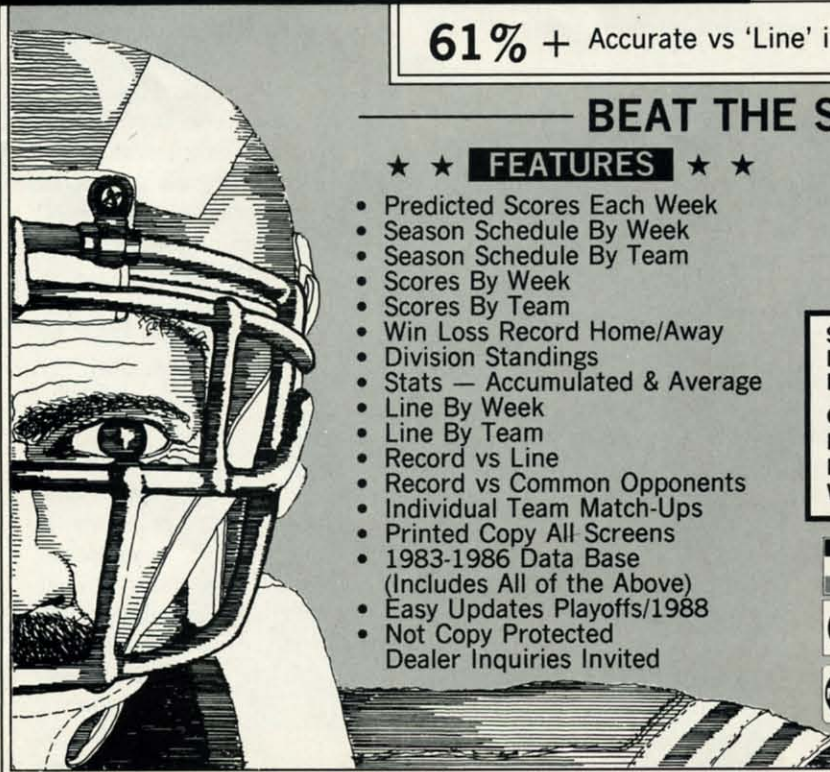


ORDERS SHIPPED IN 2 DAYS
PHONE LINES OPEN 24 HRS.
ADD 3⁰⁰ SHIPPING & HANDLING

TOLL FREE — 800-722-2277
TEXAS COLL. — 214-586-8212

MARATHON SOFTWARE DEPT. A
P. O. BOX 1349 — 641 FORT WORTH ST.
JACKSONVILLE, TEXAS 75766

TOLL FREE & COLLECT FOR ORDERS ONLY





S & S Wholesalers, Inc.
226 Lincoln Road
Miami Beach, Florida 33139

S & S Wholesalers Sizzling Summer Sale

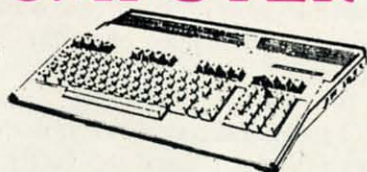
TO ORDER CALL TOLL FREE

(800) 233-6345

These are Special Prices for AHOY Readers Only.
Please Specify When Calling.

C128 COMPUTER

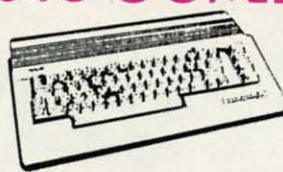
189⁰⁰*



*With Purchase of 1571 Disk Drive
Freight Additional

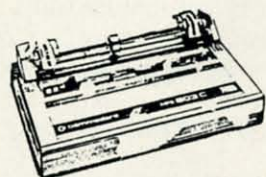
64C COMPUTER

129⁹⁰*



*With Purchase of Specially Priced Software Package
Freight Additional

COMMODORE MP5803



109⁹⁰*

Freight Additional

12" Color Monitor



149⁹⁰*

*Freight Additional

MASTERTRONIC

Software Bonanza

BMX RACER
GOLDEN TALISMAN
5 A SIDE SOCCER
SLUGGER (BASEBALL)
SPEED KING
VIDEO POKER
ELEKTRAGLIDE
MASTER OF MAGIC
CHILLER
HOLY GRAIL

SKYJET
KICKSTART
BLACK CRYSTAL
ACTION BIKER
LAST V8
SPACE HUNTER
BROADSTREET
FINDERS KEEPERS
NINJA
INSTANT RECALL

4⁹⁹*

SPECIAL 20 TITLES FOR 79⁹⁰

ZORK II ZORK III

6⁷⁷*

ZAXXON 6⁷⁷*

POPEYE 6⁷⁷*

FLIGHT SIMULATOR II

By SubLogic

29⁹⁰*

SCENERY DISKS AVAILABLE

WICO JOYSTICKS

BLACK MAX	8 ⁹⁰
BOSS	11 ⁷⁷
BAT HANDLE	14 ⁷⁷
3 WAY	19 ⁷⁷

SUPER SPECIAL KRAFT ACE JOYSTICK

4⁹⁰*

GEOS 29⁹⁰*

*With the Purchase of
any other Berkley Program

TIMEWORKS

PARTNER 128	34 ⁹⁰
SWIFTCALC 128	34 ⁹⁰
DATA MANAGER 128	34 ⁹⁰
WORD WRITER 128	34 ⁹⁰

NEWSROOM 29⁹⁰

COMMODORE PC-10

529⁰⁰*

FREIGHT ADDITIONAL

OKIDATA COLOR PRINTER

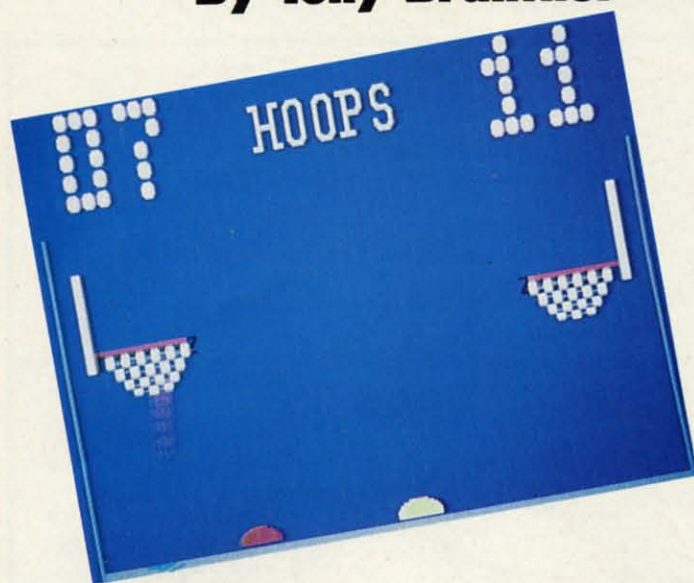
99⁹⁰*

*With Purchase of Plug-N-Print

HOOPS

For the C-64

By Tony Brantner



Hoops combines the games of basketball and computer pong into a fast action contest for one or two players.

Use *Flankspeed* (page 79) to type in and save a copy of *Hoops*. To run the program, type SYS 49152 and press RETURN to start.

When asked for the number of players, enter one or two from the keyboard. If you choose the one player game, you are also asked to select one of the six skill levels (warning: Level six is relentless!).

There are two paddles at the bottom of the screen. A joystick plugged into Port 2 controls the left paddle, while either a joystick plugged into Port 1, or the computer, controls the right paddle. Each paddle can be moved horizontally, but neither can cross the center of the screen.

The game begins with the ball being thrown into the air at center court. Use your paddle to hit the ball into the basket on your opponent's side. If you're not careful, you can knock the ball into your own basket, awarding a point to your opponent. One point is scored each time the ball drops through the basket. Scores are shown at the top of the screen on the giant scoreboard. The first player to reach 21 points wins. You can then press either fire button to play a new game. ☐ **SEE PROGRAM LISTING ON PAGE 82**

PHOTO: MICHAEL R. DAVILA

THE GREAT CONNECTION

300/1200 BAUD HAYES® COMPATIBLE MODEM

Get Connected with the NEW TCM-1200H 300/1200 baud Hayes® compatible modem for the Commodore® C-64 and C-128 computers.

Using the same technology and state-of-the-art circuitry that is used in our IBM® PC Half Card modem, the TCM-1200H was designed from the ground up to work with and enhance the C-64 and C-128 computers.

Compatibility - that describes the TCM-1200H. Just plug the connecting cable into the user port and you're all set. No RS-232 interface and no power supplies to plug in. The TCM-1200H derives its power from the computer.

- Compatibility with terminal software. Most of the popular terminal software already have provisions for Hayes type modems, just change the modem type to Hayes and you're ready.
- Compatibility with the popular Hayes "AT" commands. Unlike other so called Hayes compatible modems, the TCM-1200H is fully Hayes compatible.
- Compatibility with the FCC. The TCM-1200H is fully registered and type accepted with parts 68 and 15.



In addition to being a very compatible modem, the TCM-1200H also offers tone or pulse dialing, speaker with volume control, 8 front panel LED's, two phone jacks, TWO YEAR warranty, a free Quantum-Link starter kit and terminal software with Punter and Xmodem file transfer.

Feature for feature and dollar for dollar, the TCM-1200H is truly the best modem choice for your Commodore C-64 or C-128 computer.

For more information or to order the TCM-1200H, write or call:
Trans Com, Inc. 703-13 Annoreno Dr., Addison, IL 60101

Phone (312) 543-9055

BBS (312) 543-0180

Reader Service No. 184

MONTGOMERY GRANT

115 Nassau St. Between Beekman & Ann Sts. N.Y., N.Y. 10038 (212) 732-4500

open Mon-Fri 8:30am - 6:30pm Sat 9:30am - 6pm Sun 9:30am - 5:30pm

Penn Station/Amta Lvl. Level Beneath Madison Sq. Garden, N.Y., N.Y. 10001

(212) 594-7140 open Mon-Fri 8:30am - 8pm Sat & Sun 9:30am - 7pm

PHONE AND MAIL ORDERS **1(800)345-7059** IN NEW YORK STATE CALL (212) 594-7140

ALL COMPUTERS & PERIPHERALS COME COMPLETE WITH AC ADAPTOR, OWNER'S MANUAL AND ALL CONNECTING CABLES.

OPEN 7 DAYS A WEEK For ORDERS

ALL MERCHANDISE IS BRAND NEW AND FACTORY FRESH, COMPLETE WITH MFR. U.S.A. WARRANTY.

commodore

C-128



128 K RAM
Powered
Personal
Computer

\$235

commodore

C-64C



64 K RAM With Geos Program!
Powered
Home Computer

\$149⁹⁵

commodore

PC10-1

IBM, PC/XT
Compatible
512K Ram Expandable to 640K
MS-DOS 3.2
Parallel and Serial Ports
Full 1 Year
Warranty

\$579⁹⁵

PC10-2 640K Computer
w/2 360K Drives..... **\$699**

AMIGA

AMIGA 512K
COMPUTER
SYSTEM

Complete with
1080 Monitor

\$999⁹⁵



commodore COMPUTER PACKAGES

Get it all together & save!

C-64C COLOR PACKAGE



- Commodore 64C Computer
- Commodore 1541c Disk Drive
- Commodore Color Printer
- Color Monitor

With Geos Program!

\$529⁹⁵

C-64 COMPLETE PACKAGE



- Commodore 64 Computer
- Commodore 1541 Disk Drive
- Commodore Color Printer
- 12" Monitor

\$369⁹⁵

Same pkg. w/C-64C \$399.95

Color
Monitor
ADD \$130

C-128 COMPLETE PACKAGE



- Commodore 128 Computer
- Commodore 1541 Disk Drive
- 12" Monitor
- Commodore Color Printer

\$499⁹⁵

To substitute 1571 for 1541
add **\$65.00**

C-128 DELUXE PACKAGE



- Commodore 128 Computer
- Commodore 1571 Disk Drive
- Commodore 1902 Color Monitor
- Commodore 80 Column Printer

\$759⁹⁵

WE CARRY A FULL LINE OF SOFTWARE FOR COMMODORE COMPUTERS AT DISCOUNT PRICES! Call Toll Free to Order

COMPUTER PRINTERS

commodore MPS-803C PRINTER



\$129⁹⁵

MPS-1000 PRINTER

\$199⁹⁵



MPS-1200 PRINTER

\$229⁹⁵

OKIDATA



OKIDATA 120

PRINTER

\$199⁹⁵



OKIMATE 20 with

Plug 'n' Print

\$189⁹⁵

star POWER TYPE

Daisy Wheel
Letter Quality



\$169⁹⁵

NB24-10.....	\$469.95	SD-15.....	\$399.95
NB24-15.....	\$669.95	ND-15.....	\$419.95
SG-10C.....	\$179.95	SR-10.....	\$429.95
NX-10.....	\$189.95	SR-15.....	\$469.95
NX-10C.....	\$199.95	NR-15.....	\$499.95
NX-15.....	\$309.95	NB-15.....	\$869.95
SD-10.....	\$249.95		
NL-10 w/Commodore Cart.....	\$249.95		



EPSON HOME-WRITER 10

with Interface

\$189⁹⁵

LX-86 Printer.....	\$219.95
FX-86 Printer.....	\$349.95
FX-286E Printer.....	\$469.95
LQ-800 Printer.....	\$469.95
PANASONIC 10811.....	\$169.95

PERIPHERALS

C-1541C NEW Disk Drive

\$159⁹⁵

C-1571 Disk Drive

\$214⁹⁵

C-1902 RGB Color Monitor

\$249⁹⁵

C-1802 Color monitor

\$189⁹⁵

C-"Magic Voice" Module

\$49⁹⁵

C-1351 Mouse for any Commodore Computer

\$39⁹⁵

C-1700 128K Expansion Module

99⁹⁵

C-1750 512K Expansion Module

\$169⁹⁵

GEOS Software.....

\$34.95

TU-803.....

\$34.95

XETEC Jr. Interface.....

\$39.95

XETEC Sr. Interface.....

\$59.95

EPSON EQUITY I PACKAGE

IBM PC/XT COMPATIBLE

- Equity I Computer
- 256K RAM Power • Dual 360K Disk Drives • 12" High Resolution Monitor • Serial and Parallel Ports

\$599⁹⁵

BLUE CHIP IBM PC/XT COMPATIBLE PKG.



- Blue Chip Keyboard • 512K Expandable to 640K • 6 Expansion Slots • Optional 20MB Hard Drive • All Hook-up Cables • Adaptors • Package of 10 Diskettes • 12" Monitor

\$529⁹⁵

C128 Power Supply..... **\$39.95**

C64, C64-C Power Supply... **\$29.95**



WE INVITE CORPORATE & EDUCATIONAL CUSTOMERS

Credit card, Bank check, Mastercard, Visa, Am-Ex, Diner's Club, Carte-Blanche, Discover Card and C.O.D.'s accepted. No additional surcharge for credit card orders. Non-certified checks must wait 4-6 weeks clearance. Money orders are non-certified checks. N.Y. residents add applicable sales tax. Prices and availability subject to change without notice—so call before placing your order. Not responsible for typographic errors. Return of defective merchandise must have prior return authorization number, or returns will not be accepted. IBM PC/XT are registered trademarks of International Business Machine Corp. All orders can be shipped Air Express—call for details.



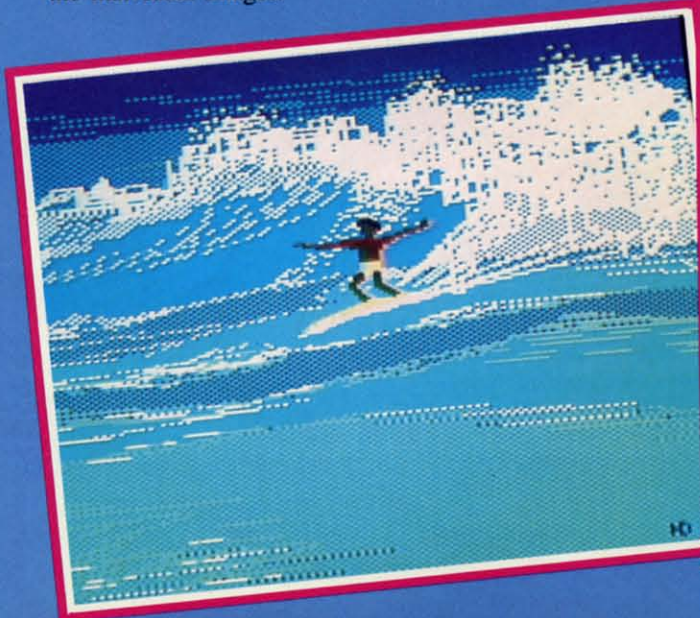
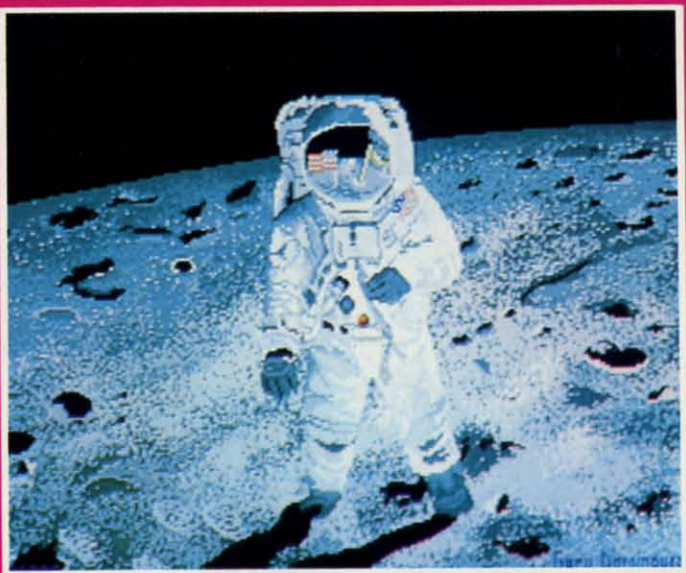
Art Gallery Disk Sale

The images on these pages are now available on a monthly disk. Multicolor images are supplied in *Koala* format, while high-resolution images are in *DOODLE!* format. Included are a slide show for easy viewing, along with a bit map dump for your 1525 printer or properly interfaced equivalent. A sample *Art Gallery* disk with slide show and printer dumps is \$10; or send a stamped and self-addressed envelope (business size) for a listing of available *Art Gallery* collection disks. Prices shown are for US and Canada. All others add \$3 per disk. New York State residents please add appropriate sales taxes. Disks may be ordered from Morton Kevelson, P.O. Box 260, Homecrest Station, Brooklyn, NY 11229.

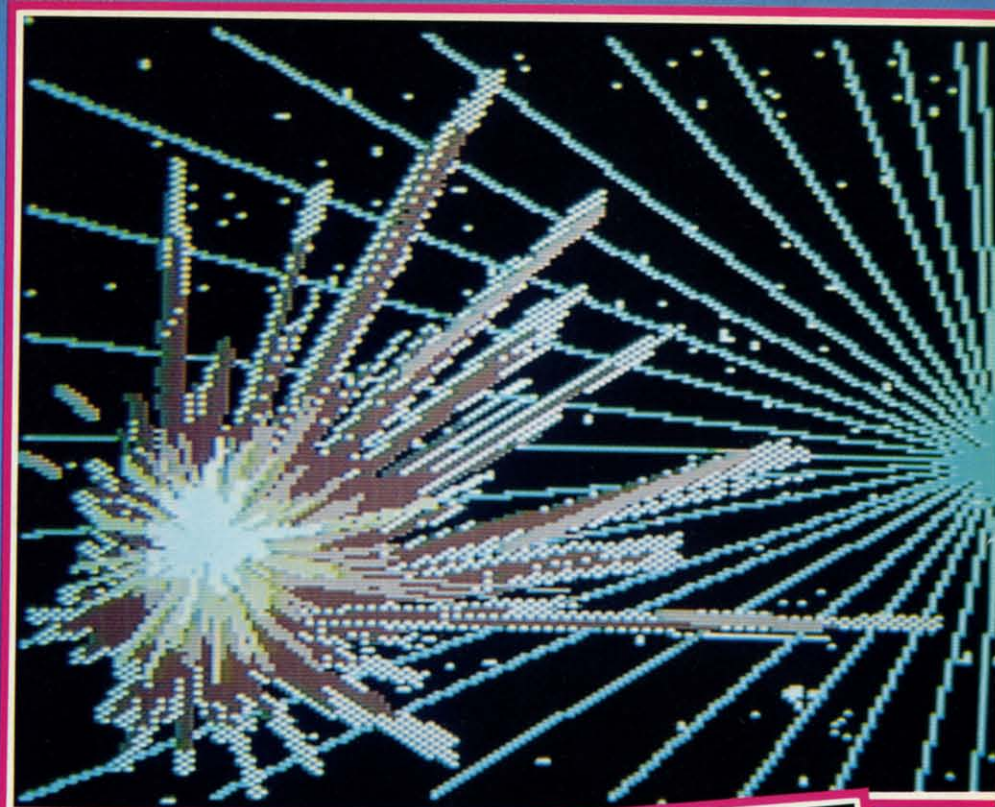
Contribute to Ahoy!'s Art Gallery

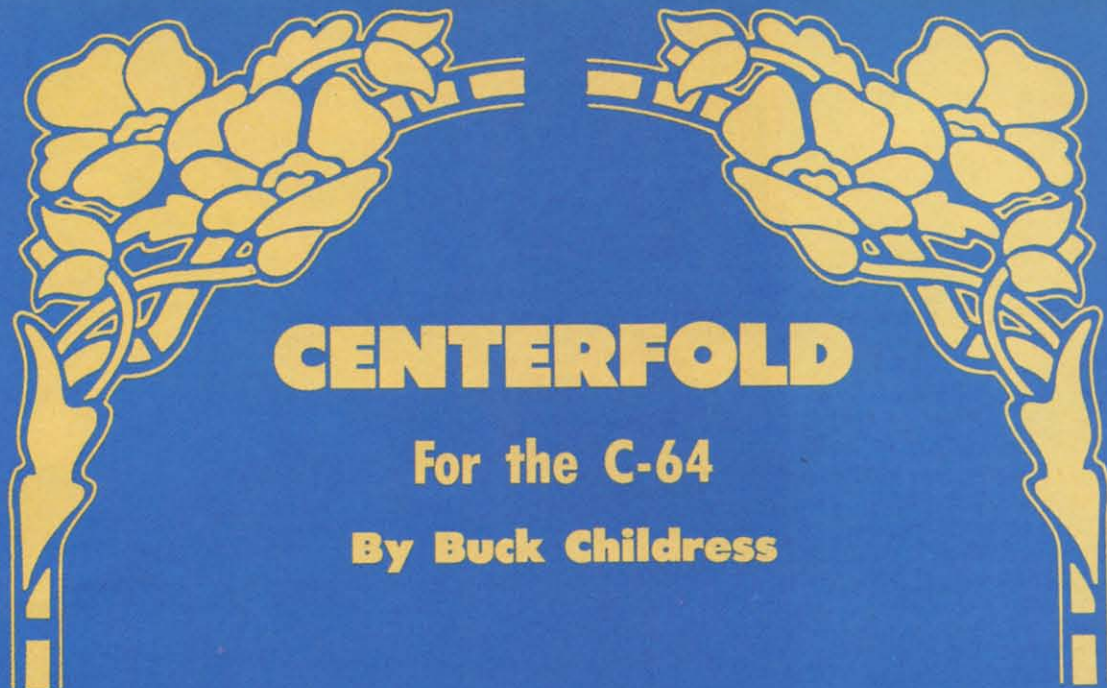
The *Ahoy! Art Gallery* offers the opportunity for fame and fortune to any and all aspiring Commodore artists. Simply send Morton (see address above) your work on disk indicating the drawing package or file format of the images. Inclusion of a self-addressed post card will guarantee an immediate response. All graphics produced on the C-64/ C-128, Plus/4, and Amiga computers are eligible. In exchange your work will receive the opportunity for display in these pages. All published works will receive royalties based on the monthly *Art Gallery* disk sales. Also, both published and unpublished images may be included on *Art Gallery* collection disks.

Note that the *Art Gallery* is not a contest. Published pictures are selected in an arbitrary and capricious fashion by the *Ahoy!* Art Director based solely on the artistic merit of the individual images.



If contributors to *Ahoy!*'s Art Gallery were polled on their favorite graphics format, *Koala* would win paws down! All of this month's masterpieces were generated on *Koala*, with the exception of two Amiga images — can you spot them? Answer appears below. At lower left, catch the wave with *Surf* by Heinz Diekert (Vernon, BC). The column of three to the left includes, top to bottom, *Moonwalker* by Gary Dominguez (Oklahoma City, OK); *Sail* by the ever-popular Alberto Valsecchi (Milano, Italy), and *San Francisco*, also a la Dominguez. To the right is the shooting star of our show, *Nova X* by Tom Kane (Buffalo, NY), and below it, *Cafe* by A. Black (Santa Rosa, CA). The Amiga images were the two by Gary Dominguez.





Are your title screens leaving you a bit on the flat side? Or maybe you'd like to put a little more zip in your menus. Pretty colors and interesting graphics can help to pump them up, but sometimes even that's not quite enough. Without careful planning, title and help screens are about as exciting as a mud fence. However, there is an easy way to give a professional touch to your displays. If you've been looking for a way to add some pizzazz to the ol' mud fence, *Centerfold* is for you.

Centerfold gives the illusion of unfolding your screen from the inside out. Characters seem to spring forth from the center of the screen and race away from one another. It's as if the monitor's midsection were erupting with graphics, all charging toward the outer edges. Yet, when the unfold is complete, your original display is there intact, with each character retaining its own color. *Centerfold* works with all keyboard graphics, including custom characters. Here's how to use it.

After you save a copy of *Centerfold*, run it. The loader POKes the machine language data into memory and checks for errors. Once the data is loaded, you're ready to go.

Centerfold can be operated automatically or manually. Automatic operation is handy when you're creating a screen display. Type SYS 49152 and press RETURN to activate it. Let's say you have a nifty little display on your monitor. All you have to do is take a "picture" of it. Just press the CONTROL and SHIFT keys at the same time. The screen border will flash when the picture has been taken. All the characters and their respective colors are now captured. Now press the CONTROL and COMMODORE keys together. You'll see your display unfold from the inside out. For a better illustration, clear the screen, then press the CONTROL and COMMODORE keys. Don't accidentally press the SHIFT key at this time or you'll capture a blank screen.

You can see a quick demonstration of *Centerfold* in action by listing it or whatever program is in memory. Now

take a picture. Next clear the screen, then do an unfold.

While in the automatic mode, *Centerfold* waits until the cursor is between flashes before taking a picture or unfolding the screen. This avoids having an unwanted footprint left by the cursor. So if nothing happens the instant you press the keys, it will very shortly.

To deactivate the automatic feature, press the RUN STOP/RESTORE combination.

You can access the picture taking and unfolding routines by SYSing directly to them. Since a direct access will most likely be performed from within your programs, the cursor check and flash are bypassed. SYS 49394 takes the pictures and SYS 49246 folds the screen. For example, a line such as

```
100 SYS 49246
```

could unfold a title screen you had previously prepared. A line like

```
200 SYS 49394
```

would take a picture of the current screen display. Later your program could unfold it. You can create a lot of interesting visuals this way.

Whenever a picture is taken, the information is stored in memory from 49664 (\$C200 hex) to 51712 (\$CA00 hex). You can save different screens to disk or tape and recall them later for use in various situations and programs. *Data Express* (July '87 *Ahoy!*) will make the binary saves for you. Or you can use a machine language monitor. Use the above locations as the starting and ending addresses.

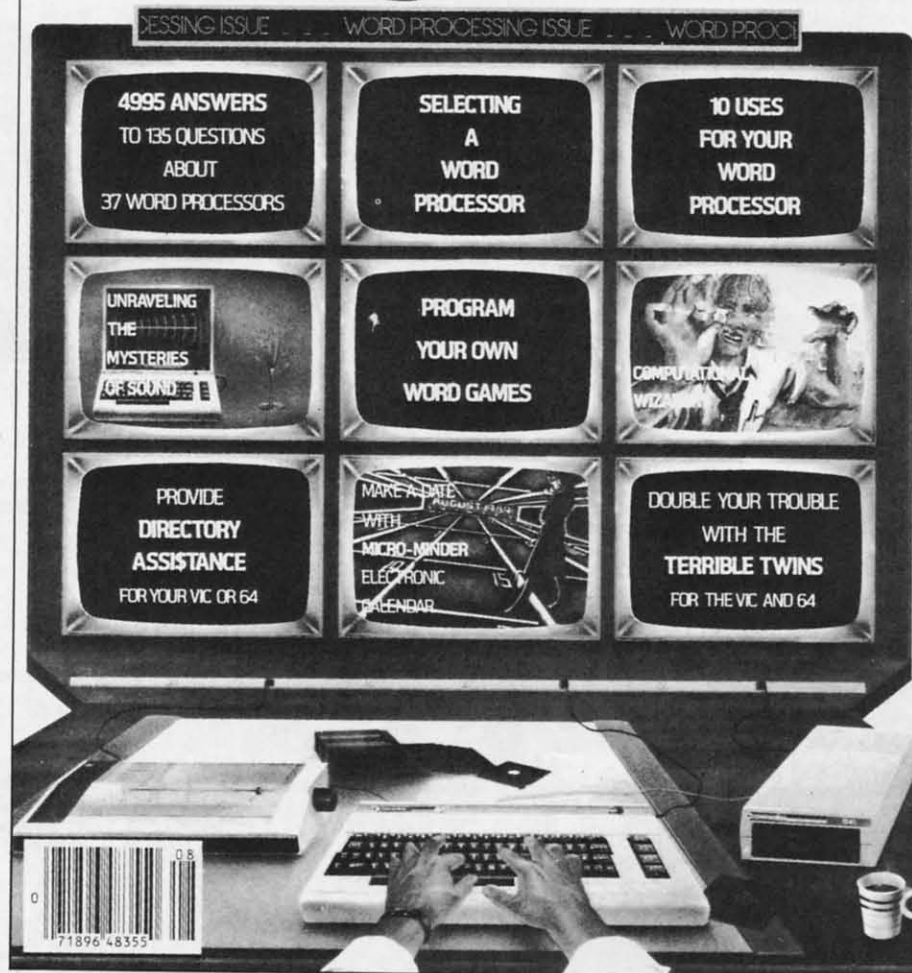
Experiment with *Centerfold*. It really is an exciting effect that will add a new dimension to your programs. With a little practice, you'll discover a whole new realm of possibilities with your screen displays. □

SEE PROGRAM LISTING ON PAGE 84

Ahoy!

\$2.50/CAN \$2.75 AUGUST 1984

MESSING ISSUE . . . WORD PROCESSING ISSUE . . . WORD PROC



HAS EVERYTHING!

SUBSCRIBE TO AHOY!

☐ Twelve Issues for \$23.00 (\$30.00 Canada and Elsewhere)

☐ Twenty-four Issues for \$44.00 (\$55.00 Canada and Elsewhere)

Name _____

Address _____

City _____ State _____ Zip _____

Send coupon or facsimile to:

ION INTERNATIONAL INC.

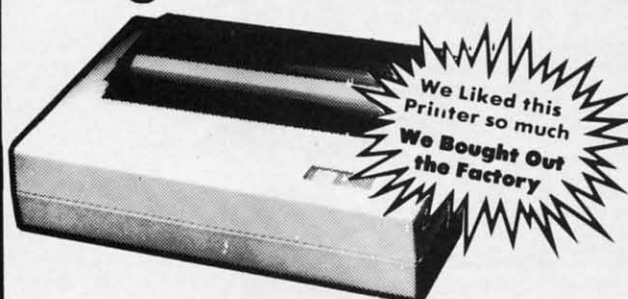
45 West 34th Street, Room 500, New York, NY 10001

We Won't Be **UNDERSOLD** 1st In Price, 1st In Support, 1st In Warranty

15 Day Free Trial • 90 Day Immediate Replacement Policy • Free Catalogs
Call before you order, our prices may be lower • All sale prices expire 9-30-87

80 Column Printer • 8½" Letter Size

Big Blue Printer



- Dot Matrix
- Heat Transfer
- Upper Case
- Lower Case
- Underline
- Enlarged
- Graphics
- Plus Much More

*No One Sells This
Printer For Less!*

Sale \$29⁹⁵

List \$199

(Add \$7.50 Shipping*)

This printer was made by Canon® for the IBM PC and PCjr. The Big Blue printer comes ready to hook up to the serial port of the IBM® PC jr. Plus with low cost adapter cables you can connect the Big Blue printer to the Apple® II, IIe, IIc, Apple Compatibles, Atari®, Commodore® 64, 128, SX-64, Vic 20, Plus 4, IBM® PC, IBM® XT, IBM® AT, IBM Compatibles, TI-99, Tandy 1000, plus many more.

Intelligent Commodore® Interface	List \$49.95 Sale \$19.95	RS-232 Adapter (specify male or female)	List \$19.95 Sale \$ 9.95
Intelligent Atari® Interface	List \$49.95 Sale \$19.95	Paper (2 Rolls)	List \$19.95 Sale \$ 5.95
Laser128, Apple® IIc Interface	List \$24.95 Sale \$12.95	Single Sheet Paper (Qty. 500)	List \$29.95 Sale \$12.95

IBM, Apple, Canon, Commodore, Atari & Laser are registered trademarks of International Business Machines, Apple Computer, Canon Inc, Commodore Business Machines, Atari Inc. & Video Technologies Respectively.

5¼" Floppy Disk Sale

Double-Sided • Double-Density • 100% Certified

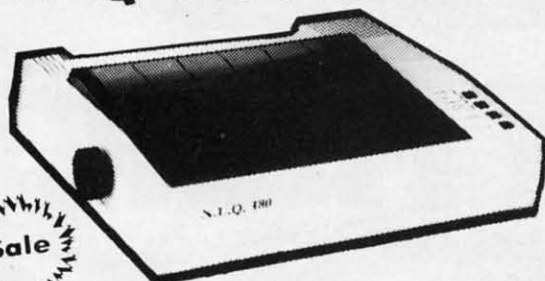
24¢ each *

*1 Box of 100 — \$24.00 (24¢ each)

Paper Economy Sleeves (100) — \$5.00

Hi-Speed (160-180 CPS) Printer

NLQ-180 Printer



Near
Letter
Quality

*No One Sells This
Printer For Less!*

Sale \$199

List \$499

(Add \$10.00 Shipping*)

**Lifetime
Warranty ***

- Near Letter Quality Selectable From Front Panel Controls • High Speed Dot Matrix
- Letter Quality Modes • 8K Buffer frees up computer 4-times faster • Super Graphics
- Pica, Elite, Italics, Condensed • Business or Personal • Tractor/Friction • 15 Day Free Trial
- Lifetime Warranty on Print Head* • 6 Month Immediate Replacement Policy •

INTERFACES

IBM \$24.95 Apple II \$44.95 Laser 128 \$19.95 Commodore \$29.95 Atari \$39.95 Macintosh \$49.95

COMPUTER DIRECT (A Division of PROTECTO)

22292 N. Pepper Rd., Barrington, IL. 60010

312/382-5244 or 312/382-5050

We Love Our Customers

* Illinois residents add 6½% sales tax. All orders must be in U.S. Dollars. We ship to all points in the U.S., CANADA, PUERTO RICO & APO-FPO. Please call for charges outside continental U.S. or C.O.D. MAIL ORDERS enclose cashier check, money order or personal check. Allow 14 days delivery, 2 to 7 for phone orders and 1 day express mail. Prices and availability subject to change without notice. (Monitors only shipped in continental U.S.)

VISA — MASTERCARD — C.O.D.

Reader Service No. 193

We Won't Be UNDERSOLD

15 Day Free Trial • 90 Day Immediate Replacement Policy • Free Catalogs

Call before you order, our prices may be lower • Sale prices expire 9-30-87

Complete C-64 System

Computer, Drive, Monitor & Printer

Sale
\$399



List \$1045

All this for \$399

List

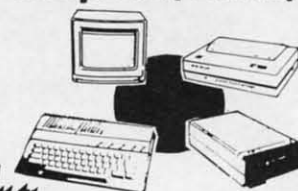
- Commodore 64 Computer \$299⁰⁰
- Commodore 1541c Disk Drive \$229⁰⁰
- Hi-Res 12" Monochrome Monitor \$249⁰⁰
- Monitor Cable \$19⁹⁵
- Big Blue 8 1/2" Printer with Interface and 2 rolls of paper \$199⁰⁰
- \$49⁹⁵

Total Prices

\$1045⁹⁰

Complete Atari System

Computer, Drive, Monitor & Printer



Sale
\$399

List \$1124

All this for \$399

List

- Atari 130XE Computer \$249⁰⁰
- Atari 1050 Disk Drive \$299⁰⁰
- Hi-Res 12" Monochrome Monitor \$249⁰⁰
- Monitor Cable \$19⁹⁵
- Big Blue 8 1/2" Printer with Interface and 2 rolls of paper \$199⁰⁰
- Premium Word Processor \$49⁹⁵
- \$59⁹⁵

Total Prices

\$1124⁸⁵

No One Sells These Systems For Less!

160-180 CPS
Hi-Speed Printer Option
With NLQ

Add \$35.00 shipping per each system ordered.*

Complete Apple® Compatible System

Computer, Drive, Monitor, Printer & Software

Sale
\$499



All this for only \$499:

List \$1228

- Laser 128K Computer
- Video, parallel & serial ports included
- Runs virtually all Apple II/Ic/Ile software
- Hi Res 12" Monochrome Monitor
- Big Blue 8 1/2" Printer with interface and paper
- Software Package: word processor, spreadsheet & data entry

Apple® is the registered trademark of Apple Computers Inc.

Complete IBM® XT Compatible System

Computer, Drive, Monitor, Printer & Software

Sale
\$599



All this for only \$599:

List \$2495

- 10 MHz / 512K Super Turbo XT Computer
- Video, parallel & serial cards included
- 3.2 MS DOS & G.W. Basic included
- Hi-Res 12" Monochrome Monitor
- Big Blue 8 1/2" Printer with interface and paper
- Software Package: word processor, spreadsheet & data base

IBM® is the registered trademark of International Business Machines, Inc.



Call

(312) 382-5244

For Atari & Commodore

(312) 382-5050

For IBM & Apple

Reader Service No. 193



Mail

COMPUTER DIRECT

22292 N. Pepper Road
Barrington, IL. 60010

We Love Our Customers

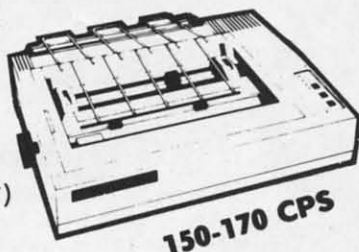
We Won't Be **UNDERSOLD** 1st In Price, 1st In Support, 1st In Warranty

15 Day Free Trial • 90 Day Immediate Replacement Policy • Free Catalogs

Call before you order, our prices may be lower • All sale prices expire 9-30-87

Comstar Aero Printer

Sale
\$149



List \$349

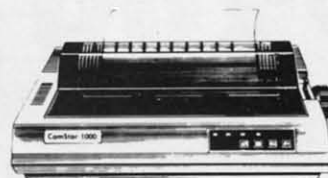
(Add \$10.00 shipping.)*

150-170 CPS

- 150 -170 CPS • Impact Dot Matrix
- 10" Carriage • Underlining • Super & Subscript
- Elite, Condensed, Emphasized, and Enlarged
- Centronics Parallel Port and Much More

Comstar 1000 Printer

Sale
\$149



List \$499

(Add \$10.00 shipping.)*

**Superb
Near Letter
Quality**

- 100 CPS Impact Dot Matrix • Underline
- Double Strike • Superb Near Letter Quality
- Pica, Elite, Condensed, Italics • Super/Subscript
- 10" Carriage • Plus Much More

Daisy Wheel Printer/Typewriter

Sale
\$159

Easy
to Use



List \$299

(Add \$12.00 shipping.)*

- Drop-in Cassette Ribbon • Key in Buffer
- Automatic Centering • 12" Large Carriage
- Superb Letter Quality Correspondence
- Centronics Parallel Port • Plus Much More

Electronic Compact Printer/Typewriter

Sale
\$249

With
Spell
Checker!



List \$399

(Add \$12.00 shipping.)*

- 90,000 Word Dictionary • Centronics Parallel Port
- LED Readout Flags Mistakes Before They Reach Print
- 1 Line/ 240 Character Automatic Correction
- Free 4K Memory Card Stores 4,000 Characters

COMPUTER DIRECT (A Division of PROTECTO)

22292 N. Pepper Rd., Barrington, IL. 60010

312/382-5050 or 312/382-5244

We Love Our Customers

Reader Service No. 193

* Illinois residents add 6 1/2 % sales tax. All orders must be in U.S. Dollars. We ship to all points in the U.S., CANADA, PUERTO RICO & APO-FPO. Please call for charges outside continental U.S. or C.O.D. MAIL ORDERS enclose cashier check, money order or personal check. Allow 14 days delivery, 2 to 7 for phone orders and 1 day express mail. Prices and availability subject to change without notice. (Monitors only shipped in continental U.S.)

VISA — MASTERCARD — C.O.D.

We Won't Be **UNDERSOLD**

15 Day Free Trial • 90 Day Immediate Replacement Policy • Free Catalogs

Call before you order, our prices may be lower • Sale prices expire 9-30-87

13" Color Monitor

Removable Anti-Glare Screen

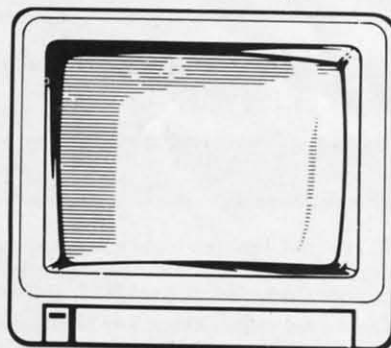


Sale
\$159

Add \$14.50 shipping and handling.* List \$329

14" RGB & Composite Color Monitor

Plus Green Screen Option Switch.

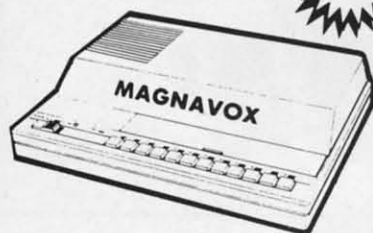


Sale
\$237

Add \$14.50 shipping and handling.* List \$399

Magnavox TV Tuner

• UHF/VHF • Front Panel Programmable Selection Buttons • Rabbit Ear Antenna • Fine Tuning And More



Sale
\$59

Add \$3.00 shipping and handling.* List \$130

Remote Control TV Tuner

• Works with Monitor/TV • Sleep Timer • Access to 139 VHF/UHF/Cable Channels • Signal Booster • Quartz Frequency Synthesized Tuner And More



Sale
\$99

Add \$3.00 shipping and handling.* List \$180



Call

(312) 382-5244

For Atari & Commodore

(312) 382-5050

For IBM & Apple



Mail

Reader Service No. 193

COMPUTER DIRECT

22292 N. Pepper Road
Barrington, IL. 60010

We Love Our Customers

We Won't Be **UNDERSOLD** 1st In Price, 1st In Support, 1st In Warranty

15 Day Free Trial • 90 Day Immediate Replacement Policy • Free Catalogs

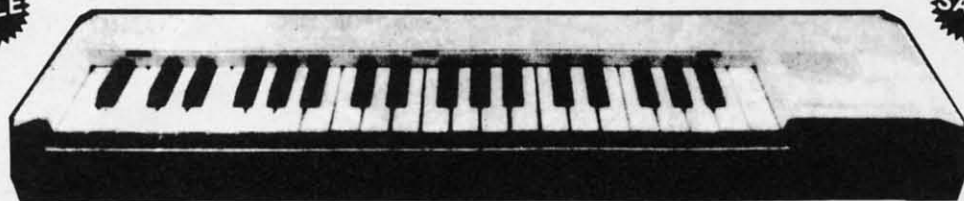
Call before you order, our prices may be lower • All sale prices expire 9-30-87

Full Size Piano/Organ Keyboard

Now With Conductor Software **FREE!**

Sale
\$69

List \$159



With this 40 key (A-C) professional gauge spring loaded keyboard, and the **FREE** Conductor Software included, you can play, record, compose and accomplish just about any musical feat from Bach to Rock. The built-in interface plugs right in to the joystick port of your Commodore 64/128. Just load the **FREE** Conductor Software (A \$19.95 Value) and your on your way!

- Adjust the keyboard to just about any instrument or sound you want • Teaches you how to play: from scales to any of the 35 pre-recorded songs • Record and play back tracks untill your composition is complete • Plus much More

The Music Teacher

This Program teaches a beginner how to read music and play it correctly in rhythm on the keyboard. Features trumpet, organ, violin, synthesizer instrument sounds, built-in metronome, pause-play control and set-up menu for customizing the music teacher. (Disk) List \$39.95 Sale \$24.95

The Printed Song

With this program you can print out, in music notation, your composition for others to read or play. Requires The Conductor Program and printer compatible with the Commodore graphics mode such most dot matrix printers with a Commodore graphics interface. (Disk) List \$29.95 Sale \$19.95



5 1/4" Floppy Disk Sale

Double Sided / Double Density



100% CERTIFICATION TEST

Each 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 these 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 disks.

AUTOMATIC DUST REMOVER

The 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 dust & dirt are being constantly removed during disk operation.



Sale * 24¢ each

1 Box of 10 — \$3.90 (39¢ ea.) 1 Box of 50 — \$14.50 (29¢ ea.) * 1 Box of 100 — \$24.00 (24¢ ea.)

0029 Paper Economy Sleeves (10) 50¢

0030 Paper Economy Sleeves (100) \$5.00

COMPUTER DIRECT (A Division of PROTECTO)

22292 N. Pepper Rd., Barrington, IL. 60010

312/382-5244 or 312/382-5050

We Love Our Customers

Reader Service No. 193

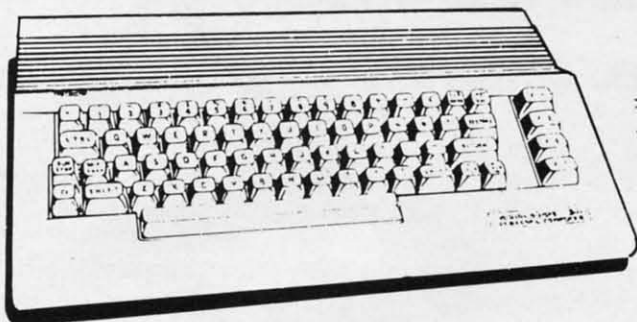
* Illinois residents add 6 1/2% sales tax. All orders must be in U.S. Dollars. We ship to all points in the U.S., CANADA, PUERTO RICO & APO-FPO. Please call for charges outside continental U.S. or C.O.D. **MAIL ORDERS** enclose cashier check, money order or personal check. Allow 14 days delivery. 2 to 7 for phone orders and 1 day express mail. Prices and availability subject to change without notice. (Monitors only shipped in continental U.S.)

VISA — MASTERCARD — C.O.D.

We Won't Be UNDERSOLD

15 Day Free Trial • 90 Day Immediate Replacement Policy • Free Catalogs
Call before you order, our prices may be lower • Sale prices expire 9-30-87

C64c Computer



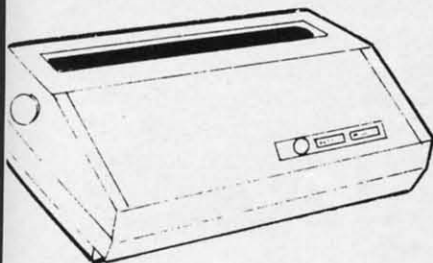
Sale
\$149

List \$249

Included with each computer is the GEOS Program:
word processor and a versatile drawing program.

(Add \$10.00 shipping. *)

Pro 20 Letter Quality Daisy Wheel Printer



Sale
\$99

(Add \$10.00 shipping. *)

List \$499

1541c Disk Drive

* With purchase of the game *Trivia Fever*,
computerized trivia, at our sale price of \$29.95

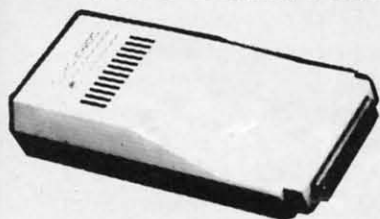


Sale
\$139*

(Add \$10.00 shipping. *)

List \$249

Modem Package 1200/300 Baud Auto Dial/Answer



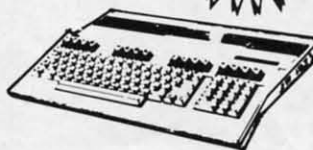
Sale
\$74

• AutoCom Software Included • File
Transfer • Tone/Pulse/Keyboard Dialing
• Download Text/Data Files • Plus More

(Add \$3.00 shipping. *)

List \$329

C128 Computer



Sale
\$239

(Add \$10.00 shipping. *)

List \$329



Call

(312) 382-5244

For Atari & Commodore

(312) 382-5050

For IBM & Apple

Reader Service No. 193



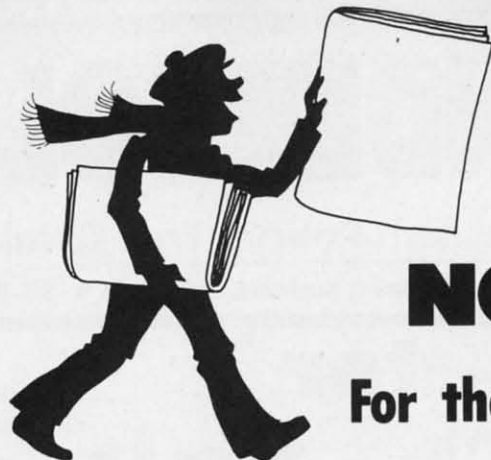
Mail

COMPUTER DIRECT

22292 N. Pepper Road
Barrington, IL. 60010

We Love Our Customers

www.commodore.com



NO NEWS

For the C-64 and C-128

By Buck Childress



All the king's horses and all the king's men can't put my program together again. That little ditty kept echoing through my head as I lay in bed the other night. Earlier I had inadvertently dispatched a program to that Great Microchip in the Sky. It wasn't a large program, but it did have the answer to a problem that had been plaguing me for days. I wanted to compare my latest findings to the contents of another file I had saved previously. Without thinking, I loaded up the other file. By the time I realized what I'd done, it was too late. My program, along with its precious

answer, had entered the Twilight Zone. For some strange reason I just kept hearing "All the king's horses and all the king's men...."

After losing the better part of a night's sleep, I decided it was about time to protect myself from me. Out of the bad news came *No News*. *No News* prevents programs from accidentally being transported to the Great Beyond. There are versions for both the C-64 and C-128.

After you've saved a copy of *No News*, run it. The loader POKes the machine language data into memory and checks for errors. When the data is through loading, you can activate it. For the 128 type SYS 3072 and press RETURN. For the 64 type SYS 53000 and press RETURN. You deactivate it the same way.

There are a lot of ways to snuff out a program without switching off your computer or having it lock up. You can easily squash one with an errant load. If you're loading into an area of RAM that is currently in use, such as BASIC, the program being loaded will wipe out the one in memory. Kiss it goodbye. There's no way to get it back. If this happens, your only recourse may be two aspirins and bedrest. Of course you know about NEWing a program. If you don't panic, a rescue can sometimes be performed—if you know how. Running a program can be disastrous if it executes a NEW or LOAD command while in operation. And there's always the possibility of the computer locking up.

Naturally the best way to prevent these disasters is with safety saves. But, alas, you and I are only human. Sometimes our cranial microchips take a vacation and allow the Masters of Disaster to creep in. The only way to protect ourselves at such times is with a program that compensates for our temporary jellylike state.

No News monitors your commands, even when your brain is sleeping. Whenever you enter an immediate mode command (no line number), *No News* checks to see if you've entered NEW, RUN, or LOAD. If you're using a 128 in 128 mode, it also checks for BLOAD, DLOAD, and BOOT. If any of these commands are encountered, *No News* gives you a chance to recant before the questionable deed is done.

Just think, no more anxiety attacks because you've launched hours of work into oblivion. No more Russian Roulette with all six chambers full. You've got it made.

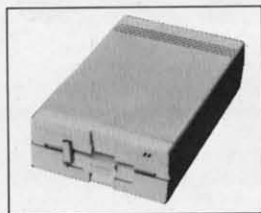
Don't suffer the bad news of a lost program. *No News* is good news! ☐ SEE PROGRAM LISTING ON PAGE 88

NEW!

COMMODORE COMPATIBLE!

EXCEL-71

Disk Drive



Completely compatible with the C128. AND compatible with the 1571! Yet smaller and more reliable.

List Price: \$349

NOW ONLY \$209!

FULL ONE-YEAR WARRANTY
SATISFACTION GUARANTEED
FAST DELIVERY!

ALL Major Credit
Cards Accepted

**6 am to 6 pm
6 days a week**

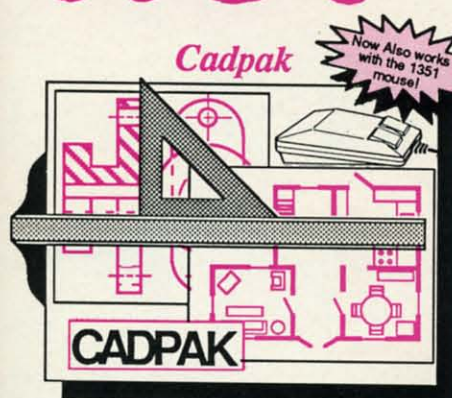
ORDER NOW TOLL-FREE
1-800-356-5178

ECI

Emerald Components International
Dept. A, P.O. Box 1441, Eugene, OR 97440
In Oregon, for orders and
customer service: 503/683-1154

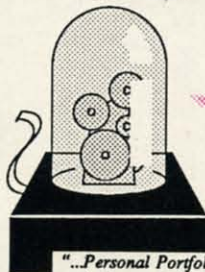
Reader Service No. 183

HOT SELLERS



Cadpak
Design pictures and graphics quickly and precisely. Unlike other drawing programs, you can produce exact scaled output on your printer. Design in the units of your drawing problem (feet, miles, meters, etc.) and send hardcopy to most printers. Uses either the keyboard, lightpen or 1351 mouse. Two separate work screens—transfer artwork from one screen to the other. Place text in four sizes anywhere in the picture—three extra fonts included: Old English, 3-D and Tech. "Try Again" allows you to undo mistakes. Draw solid or dashed lines, circles, ellipses at any angle, rays and boxes. Design fill patterns, fonts and objects. **Cadpak** is the full-featured design and graphics package for your computer. for C-64 \$39.95 for C-128 \$59.95

PPM
Personal Portfolio Manager is the most comprehensive stock market portfolio management system available for the 64 or 128—For investors who need to manage stock portfolios, obtain up-to-the-minute quotes and news, and perform selected analysis. Allows multiple portfolios for special



Personal Portfolio Manager

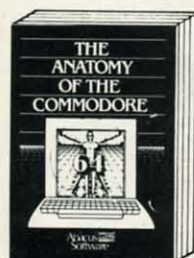
"...Personal Portfolio Manager will help you make the most of your money."
Jim Grubbs, RUN Magazine
"...a customized data base with advanced telecommunication features...sophisticated report generator...hard to beat..."
Ted Salamone, Commodore Magazine

interests (high tech, low risk, income, etc.) and monitored individually. And the versatile report generator lets you produce any kind of report to analyze a portfolio or stock. You can even update your portfolio automatically using Dow Jones or Warner Computer Systems and your modem. for C-64 \$39.95 for C-128 \$59.95

Super Pascal
Your complete system for developing applications in Pascal. A complete implementation of standard Pascal (Jensen and Wirth). C-64 version has a high-speed DOS (3X) for quick and efficient use. The extensive editor (source included) contains added features: append, search and replace. Includes assembler for any of your machine code requirements. Used in hundreds of schools to teach programming and also used for serious development projects. But it can be used for more than just learning Pascal, use it for serious programming. With complete graphic library (source included) in machine language for super-fast execution. Want to learn Pascal or develop software using the best tool? **Super Pascal** is your first choice. for C-64 \$59.95 for C-128 \$59.95



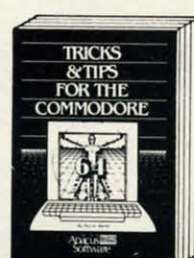
... and SUPER BOOKS!



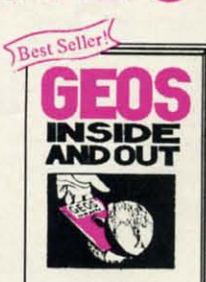
Anatomy of the C-64
Insider's guide to '64 internals. Graphics, sound, I/O, kernel, memory maps, and much more. Complete commented ROM listings. 300pp \$19.95



Anatomy of the 1541 Drive
Best handbook on this drive, explains all. Filled with many examples programs, utilities. Fully commented 1541 ROM listings. 500pp \$19.95



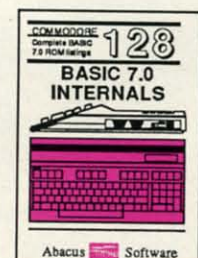
Tricks & Tips for the C-64
Collection of easy-to-use techniques: advanced graphics, improved data input, CP/M, enhanced BASIC, data handling and more. 275pp \$19.95



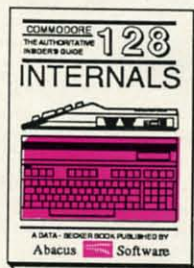
GEOS Inside and Out
Detailed info on GEOS. Add your own applications to GEOS. Edit icons. Constant display clock. Single-step through memory. \$19.95



GEOS Tricks and Tips
Collection of helpful techniques for all GEOS users. Includes font editor, machine language monitor, quick backup, more. \$19.95



C-128 BASIC 7.0 Internals
Get all the inside info on BASIC 7.0. This exhaustive handbook is complete with fully commented BASIC 7.0 ROM listings. \$24.95



C-128 INTERNALS
Important C-128 information. Covers graphic chips, MMU, I/O, 80 column graphics and fully commented ROM listings, more. 500pp \$19.95



1571 INTERNALS
Essential reference. Internal drive functions. Explains various disk and file formats. Fully-commented ROM listings. 450pp \$19.95



C-128 TRICKS & TIPS
Fascinating and practical info on the C-128. 80-col hires graphics, bank switching. 300 pages of useful information for everyone. \$19.95



C-128 PEEKS & POKES
Dozens of programming quick-hitters, techniques on the operating system, stacks, zero page, pointers, and BASIC. 240pp \$16.95

Call now for the name of your nearest dealer. Or order direct with your credit card by calling 616/241-5510. Add \$4.00 per order for S&H. Foreign add \$12.00 per item.

Abacus

P.O. Box 7219
Dept. H9
Grand Rapids, MI 49510
Telex 709-101 • Fax 616/241-5021
Phone 616/241-5510

Other books and software also available. Call or write for your free catalog. Dealers inquiries welcome—2000 nationwide.

The 128

How Does the Commodore 128 Stand Up Against the PC Compatibles?

Commodore has recently introduced its own versions of IBM PC-compatible computers, which it is billing as "the Clone Killers." This is a good time to compare Commodore's more-familiar computers, the C-64 and the C-128, with this other breed of computers, the PCs and PC-compatibles.

There is a conglomeration of computers from numerous manufacturers whose main intent is to duplicate the functions of the IBM PC and to run all the software written for it. They sell at prices lower than the IBM version. These machines typically offer no innovations or enhancements over the original machine, and they are generally referred to as "clones."

Before the new line of IBM computers, the Personal System 2, was introduced in April, there were many rumors that IBM was out to "do in" the clone manufacturers. It was thought IBM would provide a computer with such sophisticated features and a low enough price that clone manufacturers could not compete.

It turned out that the bottom of the line of new IBM computers, the Model 30, is priced above the typical clones. It has some advanced features and it surpasses the original PC in many respects, but it is not the "below \$1000, must-have computer" which some prognosticators foresaw (or hoped for).

Hence the Commodore PC10 is out to take on the task of "clone killer." With its \$999 price tag and a nice combination of features, it may be competitive in the clone wars. Price is the main consideration among clone buyers, although reliability, product support, and brand name are also important to various degrees. How the PC10 will fare remains to be seen.

In the meantime, if you are wondering whether it is worthwhile to move onward from your C-64 or C-128, keep reading. We will compare functions, features, operating environment, and performance of the C-128 with the basic IBM Personal Computer, better known as the IBM PC. In the end, you may realize that your Commodore was, and still is, the best machine for your needs and budget. On the other

versus

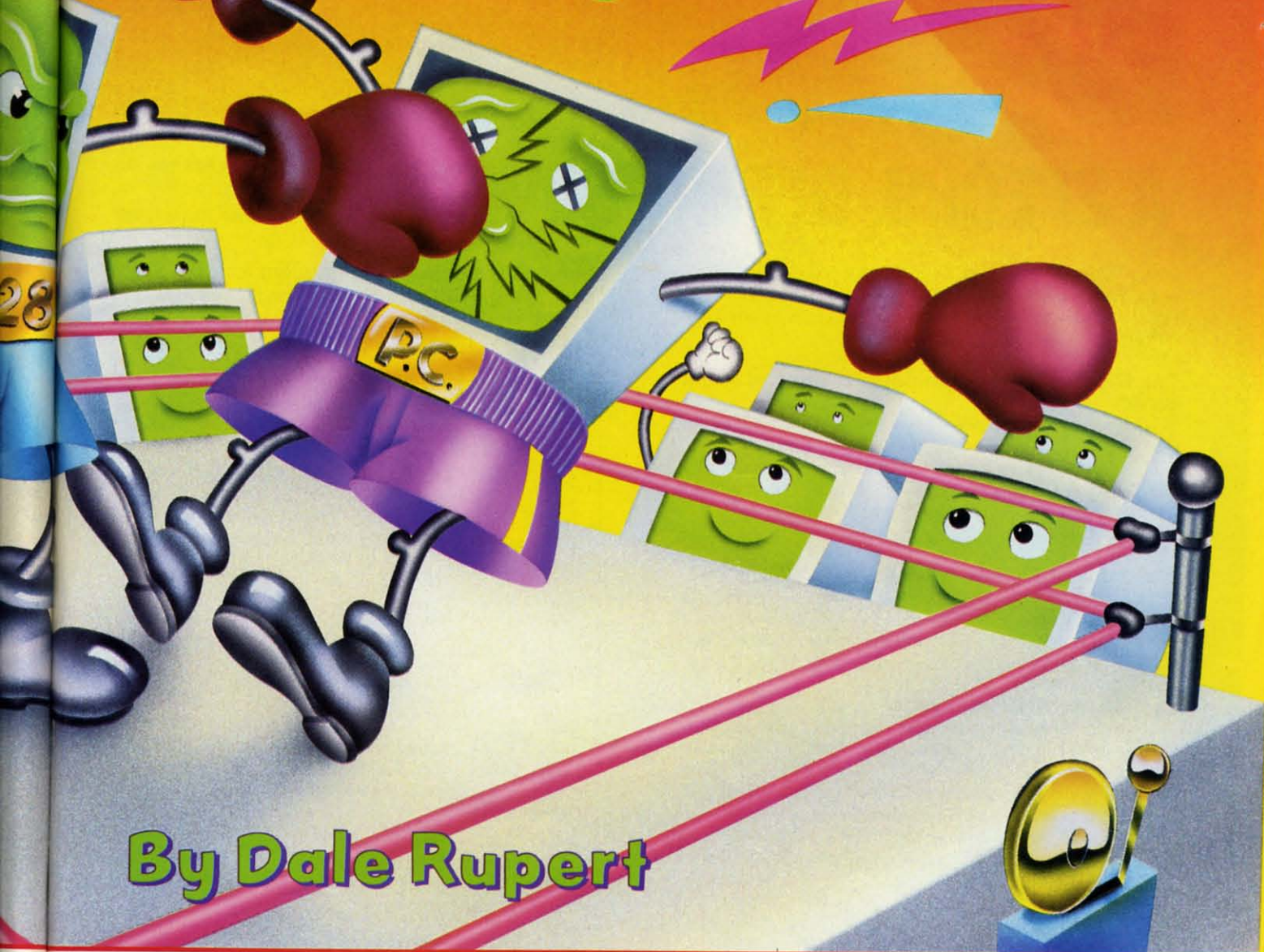


hand, you may conclude that a PC-compatible clone is definitely your next machine.

PHYSICALLY SPEAKING

Physically the C-128 and the PC are quite different. (Discussions mentioning "PC" pertain to the IBM PC, the IBM XT, and PC-compatibles such as the Commodore PC10-1

s The Clones



By Dale Rupert

and PC10-2, unless otherwise noted.) I will assume you are familiar with the basic components of the C-128 (or the C-64). The PC has a keyboard attached to the system unit by a coiled cord. The system unit is a box which contains the circuitry, the power supply, disk drives, and optional expansion boards. A video monitor and a printer complete the basic system.

The expansion boards provide functions not built into the motherboard. Depending upon the model of PC, these may include serial and parallel ports for printers, modems, and mice, as well as video display circuits, disk drive controllers, battery operated clock/calendars, and memory expansion. The add-on boards stand vertically within the system unit, mounted into connectors on the motherboard, with

ILLUSTRATION: TONY MASCIO

AHOY! 33

Get a FREE **QUANTUMLINK™** Starter Kit When You Subscribe to AHOY!



A SPECIAL OFFER TO AHOY! READERS

With your FREE QuantumLink Starter Kit you can connect to a useful and fun online network at a very affordable price. QuantumLink will help you get the most out of your Commodore 64® or 128™. Here's how.

The ONLY official Commodore supported online service.

You'll have access to Commodore services including a hotline for getting fast answers to your questions from experts, online information, user group support, and "live" conferences and forums with Commodore engineers and experts. Because QuantumLink is specially designed for Commodore users, all the services are carefully selected to be of interest to you.

Hundreds of exciting services.

Get over 4,000 Commodore software programs. Play games with people from all over the country, including soon-to-be-released Lucasfilm's Habitat™. Preview "hit" software before you buy it. Book travel reservations, and much, much more!

Easy to use AND affordable.

With QuantumLink, you don't have to memorize any complicated commands. Colorful menus and help screens make it very easy to connect to and use QuantumLink. And QuantumLink is the lowest priced full-service network. For only \$9.95 a month you can access a wide range of services including up-to-the-minute news, the Grolier's Academic American Encyclopedia™, entertainment news and features as often as you like

— for no extra charge! Special "Plus" services cost only 6 cents per minute. But your first hour of "Plus" time every month is FREE. No surcharges for communications or 1200 baud access either!



Habitat: ™ and © 1986 Lucasfilm Ltd. All Rights Reserved. Used Under Authorization.

Get a 300 baud auto-dial modem for only \$24.95!

To use QuantumLink you'll need a modem. You can now get a 300 baud auto-dial modem from QuantumLink at a special low price of \$24.95! Just use the order form below.

Order your AHOY! subscription today and get your FREE QuantumLink Starter Kit!

☐ **YES!** Sign me up for a subscription to AHOY! Plus send me my FREE QuantumLink Starter Kit.

Choose one:

- ☐ 12 issues of AHOY! for \$23.00 (\$30.00 in Canada)
- ☐ 24 issues of AHOY! for \$44.00 (\$55.00 in Canada)

☐ **YES!** I also need a modem. Send me a 300 baud auto-dial modem for \$24.95. (Please allow 4-6 weeks for delivery.)

Name _____
Address _____
City, State, Zip _____
Phone _____

☐ Check or money order enclosed for \$ _____
(Make payable to Ion International Inc.)

Mail this coupon to:

AHOY!/Q-Link Subscription Offer
c/o Ion International Inc.
45 W. 34th St.—Suite 500
New York, NY 10001



QUANTUMLINK™

This offer is valid through 12/31/87.

Reader Service No. 180

other jacks and connectors coming out the back of the system unit. The system unit case must be opened for access to the motherboard and for changing the expansion boards.

COMPARING BRAINS

The PC uses a "16-bit" microprocessor, the 8088, running at 4.77 Megahertz (MHz). Let's compare the 8088 with the 8502 in the C-128. The 8502 (and its nearly identical twin 6510 in the C-64) are "8-bit" microprocessors running at 1 MHz. In C-128 FAST mode, the 8502 runs at 2 MHz.

The "8-bit" versus "16-bit" terminology can be clarified. This refers to the width (in binary bits) of the internal circuitry in each processor. Within 8-bit and 16-bit processors, data is transported among registers and processed within the "arithmetic logic unit" in 8 and 16 bit wide chunks, respectively.

The 8088 is an unusual 16-bit processor since it has an external data bus which is only 8 bits wide. This means that it usually fetches at least two 8-bit bytes from ROM for each instruction. A "true" 16-bit processor fetches 16 bits at a time on a 16 bit wide data bus. The external 8 bit data bus of the 8088 saves money and allows a more compact design at the expense of processing speed.

The 4.77 MHz and 2.0 MHz operational speeds also need explanation. Operations within a microprocessor are synchronized with an external system clock. The speed of operation depends not only on the clock speed but also on the number of clock cycles needed per instruction. In general, the PC is not 2.385 times as fast as the C-128, as the basic clock speeds might imply ($4.77/2 = 2.385$).

For example, the NOP (no operation) instruction on the PC requires 3 clock cycles, whereas the NOP on the C-128 takes only 2 clock cycles. One clock cycle on the PC is $1/4.77E6$ seconds or 210 nanoseconds (ns). One clock cycle on the C-128 is $1/2.0E6$ seconds or 500 ns. Therefore 3 cycles at 4.77 MHz is roughly 630 ns, and 2 cycles at 2.0 MHz is 1000 ns, so the PC is only about 1.6 times as fast at doing nothing as the C-128 is.

Consider one other assembly language instruction, "load accumulator from memory." On the PC this instruction takes a minimum of 10 clock cycles (2100 ns), whereas it takes as few as 2 clock cycles on the C-128 (1000 ns). Based on these numbers, the C-128 will be over twice as fast as the PC for some operations. We'll run some benchmarks later.

On the PC, the disk drives are accessed over a special parallel bus by means of a disk controller. As announced, the Commodore PC10-1 has one $5\frac{1}{4}$ " floppy disk drive, and the PC10-2 has two. The controller circuitry is on the motherboard. The IBM PC requires a separate expansion board for the controller.

The standard floppy disk for the PC is double-sided, double-density, and it stores a nominal 360K bytes. The format of the PC disks is quite different from the C-128 disks. Double-sided diskettes on the 1571 store a nominal 339K bytes.

Actually the format of data on PC disks depends upon the version of the Disk Operating System (DOS, rhymes with "floss"). Unlike DOS in ROMs of the C-128's disk drives, DOS used on the PC is software based. The PC10 comes packaged with version 3.2 of MS-DOS. MS-DOS

stands for Microsoft DOS. DOS sold by IBM is called PC-DOS, but it is essentially the same software. We will say more about the operating systems later.

The 8088 family in the PC includes a numeric co-processor called the 8087. This is an optional chip which provides significant speed improvement in mathematical processing for certain software. There is an empty socket on the PC motherboard for this chip. Numeric processing on the C-128 must be performed in software and is much slower.

Random Access Memory (RAM) on the C-128 is expandable up to 640K bytes, although only 64K is accessible at one time. This is because of the 8502's 16-bit address bus

Table 1
Benchmark Times (in seconds)

Test #	Description	PC	C-128 FAST	C-128 SLOW
1	FOR/NEXT	13.0	11.5	24.3
1a	(optimized)	4.9	7.9	16.9
2	Math Op's.	7.8	10.9	23.1
3	String Op's.	7.2	8.3	17.5
4	Disk Write	16.9	31.1*	42.6*
5	Disk Read	10.1	16.9*	23.1*
6	Vert. Print	49.7	50.7	86.4
7	Horiz. Print	18.7	9.6	19.0
8	Random Numbers	6.6	9.0	18.9
9	Random Points	7.7	8.9	18.7
10	Random Lines	3.7	4.2	8.6
11	Random Circles	4.3	26.5	56.2

*used manual stopwatch for these times

(2 ↑ 16 = 64K). The Memory Management Unit in the C-128 can shuffle 64K chunks of memory so that some software can use the full complement of memory.

The 8088 processor on the PC has a 20-bit address bus. This provides an address space of 1 Megabyte, of which a maximum of 640K bytes in standard configurations is RAM. There are various software controlled bank-switching techniques to allow more than 640K of RAM. Some expansion boards allow 2 Megabytes or more of RAM to be used on a PC.

The significantly larger address space as well as the 16-bit data bus give the PC the power to handle much larger and more complicated software than the C-128 can.

Another important distinction between the two classes of computers is that the PC uses RAM with parity checking. Each byte of RAM on the PC requires nine bits, eight data bits and one parity bit. The parity bit is an error checking mechanism. It is set to zero or one so that the sum of all nine bits in the byte is odd (for odd parity).

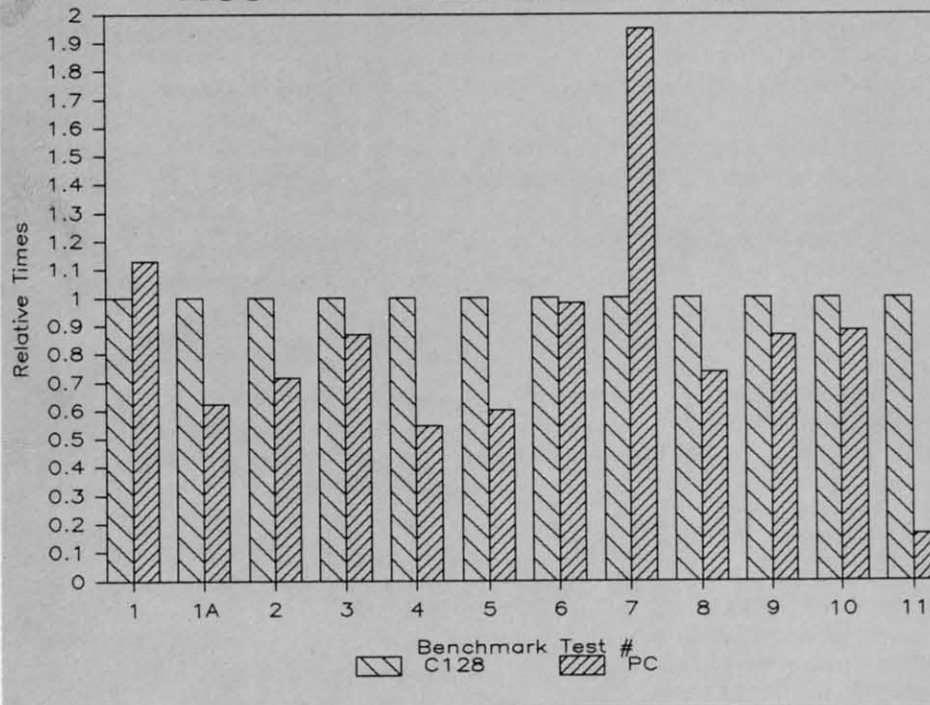
Circuitry checks the parity of each data byte read. If the sum of the nine bits is even, hardware flags the error and software identifies the problem. This guarantees that bits of data cannot be changed by gamma rays or faulty circuitry, for example, and go undetected.

In a game of *Asteroids*, an improperly written or read data byte is usually inconsequential. On the other hand, when the computer is calculating your company's payroll,

it is probably not worth the gamble that there are no gamma rays heading your direction. Parity checking is reason enough to use a PC in business environments.

"320 by 200 with 16 colors" on the C-128 is misleading since there are not 16 independent colors for any two adjacent pixels. There are no such restrictions on the PC.

FIGURE 1 — BENCHMARK TESTS



GRAPHICS GALORE

Among the most confusing aspects of the PCs is their wealth of video standards. The video driver circuitry is provided on an add-on board for the IBM PC and for the PC10. The video adapter board in the PC10 is very versatile, enabling that machine to run essentially any software on any video monitor.

The video adapter in the PC10 duplicates the functions and modes of the IBM Monochrome Display Adapter, the IBM Color/Graphics Adapter (CGA), the Hercules Graphics Adapter, and the Plantronics Color Board. CGA is the most common color/graphics standard, providing 320 by 200 resolution with four colors or 640 by 200 resolution in monochrome. The Hercules and Plantronics standards are supported by some software packages. The Hercules standard provides higher resolution graphics on the IBM Monochrome Display, and the Plantronics standard gives higher resolution and more colors on a color display.

Two newer graphics modes using the Enhanced Graphics Adapter (EGA) and Video Graphics Array (VGA) could be added to the PC10 by replacing its video board with either an EGA or VGA board. These two modes provide even higher resolution and many more colors, but they each require different video monitors as well. As an example, EGA provides up to 640 by 350 pixels with 16 out of 64 colors. VGA goes on up to 640 by 480 pixels with 16 colors or 320 by 200 with 256 colors out of a total of 262,144 colors.

Unlike the C-128 where all pixels within an 8 by 8 block must be one of two colors (foreground or background), the color of each pixel on the PC is individually definable. The

OPERATING ENVIRONMENTS

The operating environment of the PC is quite different from that of the C-128. When you boot up the C-128, you are usually in BASIC. Disk and file commands are all given from BASIC. But a normal boot-up on the PC puts you into the Disk Operating System (DOS) environment.

From DOS on the PC, you may format disks, copy files and disks, display directories, and perform other disk-related activities. You may also execute machine language programs such as spreadsheets, word processors, games, utilities, or programming languages by entering the name of the program. You do not do any normal programming in

DOS. You generally go from DOS into an editor or into a programming language to write programs. MS-DOS on the PC is very similar to the CP/M environment on the Commodore 128.

To program in BASIC, you execute the command BASICA (or GWBASIC) from DOS. This command loads and runs a machine language program named BASICA.COM (or GWBASIC.COM). Now you are in a BASIC environment comparable to BASIC 7.0 on the C-128.

On the C-128, BASIC is entirely in ROM. You don't load it from a disk. (Other languages such as COMAL and Pascal need to be read from a disk or a ROM cartridge.) On the IBM PC, the core of BASIC (called Cassette BASIC) is in ROM, and only the advanced features of disk BASIC (called BASICA) are loaded from disk.

The PC clones generally do not contain any BASIC in ROM. Therefore the entire BASIC language must be loaded into RAM from disk. GWBASIC is a full-featured BASIC compatible with IBM BASICA which is included with the PC10. GWBASIC is sometimes called "Gee Whiz BASIC" because it provides more "bells and whistles" than older versions of BASIC did. GWBASIC is a version of Microsoft BASIC just as BASICA, BASIC 2.0, and BASIC 7.0 are.

BASIC COMPETITION

As C-128 owners know, BASIC 7.0 is a very powerful programming language. It provides functions specifically for the C-128 such as sprite graphics and SID sound generation which are not available with PC BASIC. The PC has very elementary sound capabilities, and it does not pro-

Ahoy! DISK

Why type in the listings in this month's Ahoy! when we've done it for you? All the programs in this issue are available on the current Ahoy! Disk for \$8.95. Isn't your time worth more than that?

Use the coupon at the bottom of this page to order disks for individual months, a disk subscription, or the special anthology disks described below.

(You can also subscribe to the Ahoy! Disk Magazine—disk and magazine packaged together at a special reduced rate. See the card bound between pages 66 and 67.)

BEST OF '84

Address Book (3/84)
Air Assault (5/84)
Alpiner (6/84)
Checklist (7/84)
Construction Co. (12/84)
DOS (9/84)
Emerald Elephant (10/84)
I Got Biorhythm (5/84)
Lawn Job (10/84)
Lunar Lander (4/84)
Math Master (5/84)
Micro Minder (8/84)
Multi Draw 64 (1/84)
Name That Star (4/84)
Post Time (6/84)
Salvage Diver (9/84)
Space Lanes (VIC) (3/84)
Space Lanes (64) (3/84)
Space Patrol (12/84)
VIC 40 (10/84)

BEST OF '85

Ahoy! Dock (9/85)
Auto Line Numbers (3/85)
Directory Manipulator (12/85)
File Lock (9/85)
Fontasia (2/85)
Futurewar! (2/85)
Gameloader (12/85)
Home Budget (3/85)
Jewel Quest (12/85)
Lightning Loader (11/85)
Midprint (1/85)
Music Tutor (1/85)
Salmon Run (3/85)
Screen Dump (8/85)
Telelink (2/85)
Tile Time (5/85)

BEST OF '86

Disk Cataloger (8/86)
Dogcatcher (9/86)
Fidgits' Music School (7/86)
Flapl (8/86)
Guardian (11/86)
Head to Head (2/86)
Highlight (8/86)
JCALC (4/86)
Meteor Run (8/86)
Mine Canyon (9/86)
Mountaineer Mack (10/86)
Star Strike (6/86)
Step On It (8/86)
Syntax Patrol (9/86)
Teleporter (11/86)
Tenpins (11/86)
1541 Alignment Check (2/86)

BEST UTILITIES

Auto Append (7/85)
BASIC Trace (4/85)
Base Conversions (9/84)
Booter (4/85)
Commodore Font Editor (5/85)
DOS (9/84)
Fastnew (9/85)
Formatter (8/85)
Lucky Lottery (7/85)
Maestro (10/85)
Micro Minder (8/84)
Printal (7/85)
Screen Bit Dump (6/85)
Screen Magic (6/85)
Start & End File Address (9/85)
Two Column Directory (5/85)
Windows (8/85)
1541 Cleaning Utility (10/85)

BEST UTILITIES II

Alarm Clock (1/86)
BASIC Relocator (1/86)
Bigprint (5/86)
Chrono-Wedge (4/86)
Disk Checkup (10/86)
Fallsafe (5/86)
Long Lines (11/86)
Programmer's Aid (3/86)
Quick Change (10/86)
Reversed Remarks (7/86)
Screen Sleuth (7/86)
Screen Window (4/86)
Speech64 (9/86)
The Editor (12/86)
Trackdown (6/86)
Very-Able (3/86)
128 to 64 Autoboot (10/86)

BEST GAMES

Alpiner (6/84)
Construction Co. (12/84)
Disintegrator (8/85)
Dragon Type (9/85)
Duck Shoot (6/85)
Emerald Elephant (10/84)
Gators N Snakes (8/85)
Gravinauts (10/85)
Lawn Job (10/84)
Mystery at Mycroft Mews (10/85)
Name That Star (4/84)
Post Time (6/84)
Salvage Diver (9/84)
Script Analysis (7/85)
Space Patrol (12/84)
Tile Time (5/85)
Wizard of Im (7/85)

BEST GAMES II

Actionaids (4/86)
Air Rescue (4/86)
Brickbusters (3/86)
Crabflight (2/86)
English Darts (5/86)
Got a Match? (6/86)
Haunted Castle (1/86)
Head On (7/86)
Knockout (1/86)
Micro City (12/86)
Minotaur Maze (12/86)
Penguins (10/86)
Ski Folly (5/86)
Star Search (5/86)
Swoop (4/86)
The Last Ninja (9/86)

BEST C-128

Ahoy!Term (3/86)
Dark Fortress (1/87)
Dual Dump (9/86)
Extended Background Mode (4/87)
Infloflow (4/87)
List Formatter (4/87)
More BASIC 128 (2/87)
Neborgall Run (7/86)
Planet Duel (4/87)
Queen's and Bishop's Tours (6/86)
Rescue 128 (3/87)
The Artist (12/86)
Variable Manager (9/86)
Wordcount (7/86)
128 to 64 Autoboot (10/86)

We've collected Ahoy! 's best programs onto the Anthology Disks described here.

Please note that many of these programs will be unusable without the documentation printed in the issues of Ahoy! listed in parentheses.

SINGLE ISSUE AND SUBSCRIPTION PRICES

(Postage and Handling Included)

	U.S.A.	CANADA	ELSEWHERE
<input type="checkbox"/> September '87 Ahoy! Disk	\$ 8.95	\$ 12.95	\$ 13.95
<input type="checkbox"/> 12-Month Disk Subscription	\$ 79.95	\$ 99.95	\$124.95
<input type="checkbox"/> 24-Month Disk Subscription	\$149.95	\$179.95	—

ANTHOLOGY DISKS \$10.95 EACH

- ☐ Best of '84 ☐ Best Utilities
☐ Best of '85 ☐ Best Utilities II
☐ Best of '86 ☐ Best Games
☐ Best of C-128 ☐ Best Games II

Send coupon or facsimile to:

Ahoy! Program Disk
Ion International Inc.
45 West 34th Street, Suite 500
New York, NY 10001

BACK ISSUES \$8.95

In Canada add \$2.00 per issue; outside US and Canada add \$4.00 per issue.

<input type="checkbox"/>	\$8.95	<input type="checkbox"/>	\$8.95
<input type="checkbox"/>	\$8.95	<input type="checkbox"/>	\$8.95
<input type="checkbox"/>	\$8.95	<input type="checkbox"/>	\$8.95
<input type="checkbox"/>	\$8.95	<input type="checkbox"/>	\$8.95



NAME _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

Make check or money order payable to Double L Software. N.Y. State Residents must add 8 1/4 % sales tax.

#2—FEB. '84 Illustrated tour of the 1541! Artificial intelligence! Synapse's Ihor Wolosenko interviewed! String functions! And ready to enter: Music Maker Part III! Screen Manipulation! Night Attack! Relative Files!	#3—MAR. '84 Anatomy of the 64! Printer interfacing for VIC & 64! Educational software series begins! VIC game buyer's guide! And ready to enter: Address Book! Space Lanes! Random Files on the 64! Dynamic Power!	#5—MAY '84 Future of Commodore! Inside BASIC storage! Memory management on the VIC & 64! Guide to spreadsheets! Hurray for arrays! And ready to enter: Math Master! Air Assault! Biorhythms! VIC Calculator!	#6—JUNE '84 Game programming column begins! Code generating programs! Rupert on inputting! Memory management continues! And ready to enter: Post Time for the 64 & VIC! Alpinet! Sound Concept!
#7—JULY '84 MSD dual disk drive! Database buyer's guide! Training your cursor! Screen displays! File Sleuth! Users Groups! And ready to enter: Renumbering! Checklist! Math Defender! Brisk! What's My Job?	#8—AUG. '84 Choosing a word processor! Computational wizardry! Creating your own word games! Sound on the 64! And ready to enter: Micro-Minder! Directory Assistance! The Terrible Twins! Words Worth!	#9—SEPT. '84 Program your own text adventure! Build a C-64 cassette interface! Video RAM! Word processors, part III! And ready to enter: Salvage Diver! DOS! Sound Explorer! The Castle of Darkness! Base Conversions!	#10—OCT. '84 C-64 graphics programs! Bit-mapped graphics! Joystick programming! Graphics processing! And ready to enter: VIC 40 Column Operating System! BAM Read & Print! Emerald Elephant! Lawn Job!
#11—NOV. '84 Music programs & keyboards for the 64! Graphics feature continues! 2-D arrays! And ready to enter: PTE word processor! Block Editor! Alternate Character Set for the 64! Tunnel of Tomachon!	#12—DEC. '84 Buyer's guide to printers! 1525 printer tutorial! Fast graphics with custom characters! User Guide to KMMM Pascal! Diving into BASIC! And ready to enter: Construction Co.! Space Patrol! Cross Ref!	#13—JAN. '85 VIC and 64 OS exposed! Sprites! Insert a 1541 device # disconnect switch! Ghostbusters! And ready to enter: Ultra Mail! Music Tutor! Alice in Adventureland! Midprint! To the Top! Tape/Disk Transfer!	#14—FEB. '85 Printer interfacing! Multi-color sprites! Modems! Bulletin Boards! Theory of game design! Buying a modem! And ready to enter: Futurewar! Fontasia! VIC Eraser! Insurance Agent! Flankspeed! Telelink 64!
#15—MAR. '85 Creating multiscreen gameboards! Inside the Plus/4! Commodore DOS! And ready to enter: Old Routine! Programmable Functions! Automatic Line Nos.! Home Budget! Salmon Run! Numerology!	#16—APR. '85 Assembly language column begins! Programming the joystick! 1541 disk drive alternatives! The Kernell! And ready to enter: Hop Around! Faster 64! Booter! Echeck! BASIC Trace! Space Hunt!	#17—MAY '85 Disk drive enhancements! Install a reset switch! Assembler escapades! And ready to enter: Super Duper! Two-Column Directory! DSKDUI! DOS Plus! Font Editor! Tile Time! Interrupt Wedge!	#18—JUNE '85 Music & graphics entry system! How modems work! Inside the 6510! And ready to enter: Quad-Print! Mapping 4.4! Towers of Hanoi! Speedy! Duck Shoot! Bit Dumping! Screen Magic! 6510 Simulator!
#19—JULY '85 PROM Programming! 3-part harmonies on VIC/64! Speeding pixels! And ready to enter: Auto-Append! Script Analysis! Wizard of Im! Lucky Lottery! Brainframe! Etch! Printat! Autos: Leasing v. Buying!	#20—AUG. '85 Inside the 128! Real-world simulations! Sound effects! Modems! And ready to enter: Windows! Formater! Sound-a-Rama! Screen Dump! Selectachrome! Disintegrator! Fidojits! Gators N Snakes!	#21—SEP. '85 Inside the 1571 drive and 128 keyboard! Sprite programming! And ready to enter: Fastnew! Go-lister! File Lock! Dragon Type! Superhero! Auto-Gen! Moxey's Porch! Fish Math! Ahoy! Dock! Invetive!	#22—OCT. '85 Create cartoon characters! Infinitesimal intrigue! Secrets of copy protection! And ready to enter: Shotgun! Maestro! Solitaire! Mystery at Mycroft Mews! Gravi-nauts! 1541 Cleaning Utility! Shadey Dump!
#23—NOV. '85 Guide to adventure gaming! ML sprite manipulation! BASIC for beginners! And ready to enter: Lightning Loader! Knight's Tour! Chopper Flight! Rhythmic Bits! Instant Bug Repellent! File Scout! Slither!	#24—DEC. '85 Speech synthesizer! The IBM Connection! The year's 25 best entertainments! And ready to enter: Gypsy Starship! Directory Manipulator! Cloak! Gameloder! Jewel Quest! Lineout! Santa's Busy Day!	#25—JAN. '86 Build a speech synthesizer! Survey of sports games! And ready to enter: Martian Monsters! Streamer Font! Microsim! Haunted Castle! Knockout! Infraraid! Alarm Clock! Memory Check! Scratch Pad!	#26—FEB. '86 Windows! Build an auto-exec cartridge! Align your 1541! Survey of flight simulators! Structured programming! And ready to enter: Arena! Head to Head! Crabfight! Treasure Wheel! Character Dump!
#27—MAR. '86 Programming educational games! Memory dumpers! Choosing a copy program! Custom characters! And ready to enter: Ahoy! Term 128! Trivia Game Maker! Brickbusters! Easy Lister! Programmer's Aid!	#28—APR. '86 Comet catching! Survey of action and strategy games! Screen dumping! And ready to enter: Chrono-Wedge! Mr. Mysto! Air Rescue! Notemaker! Screen Window! JCALC! Hidden Cavern! Swoop!	#29—MAY '86 128 graphic bit map! Epyx strategy guide! 128 commands! ML music programming! And ready to enter: Bigprint! Star Search! Failsafe! English Darts! Ski Folly! Free RAM Check! Alchemist's Apprentice!	#30—JUNE '86 Debugging dilemmas! Public domain software! Winning at Ultima! Computer Aided Design! And ready to enter: LazyBASIC! Got A Match? Star Strike! Queen's and Bishop's Tours! Shaker! Trackdown!
#31—JULY '86 Inside the Amiga! Conditional branching! Chess programs! 128 and 64 DOS! And ready to enter: Screen Sleuth! Skull Castle! Head-on! Nebergall Run! Word-count! Crazy Joe! Fidojits! Music School!	#32—AUG. '86 Inside the Amiga, part III! Approaching infinity! C-64 war simulations! Pascal for beginners! ML graphics! And ready to enter: Revers! Highlight! Disk Cataloger! Meteor Run! Trim! Step On It! Flap!	#33—SEPT. '86 Windows and viewports! Sound & music on the 64! COMAL! And ready to enter: The Last Ninja! Speech64! Multi RAM! Dogcatcher! Trapped! Matchblocks! Variable Manager! Dual Dump! Mine Canyon!	#34—OCT. '86 Build a digital oscilloscope! ML speed techniques! And ready to enter: Vault of Terror! Quick Change! Penguins! Attack Force! Disk Checkup! Dvorak Keyboard! Mountaineer Mack! 128 to 64 Autoboot!
#35—NOV. '86 C-128 shadow registers! Data file handling! PROMAL! Habitat! And ready to enter: Teleporter! 128 RAM Check! Discs of Daedalus! Guardian! Tenpins! Syntax Patrol! Deluxe List! Long Lines! Detonation!	#36—DEC. '86 File manipulation! C-128 shadow registers! Football games! And ready to enter: The Artist! Minotaur Maze! Mouse in the House! Lazy Source Code! Rebels and Lords! Speedway! The Editor! Micro City!	#37—JAN. '87 Pointers and the monitor! Best games of '86! DOS for beginners! And ready to enter: Vortex! Hanger 14! BASIC Ahoy! Catacombs! Lixter! Dark Fortress! PermaLine! Starfighter! Bugout! Screens!	#38—FEB '87 Hacking into machine language utilities! Amiga RAM expanders! And ready to enter: Window Magic! Crunchman! User Conventions! The Adventurer! More BASIC 128! Jailbreak! Turtle Rescue! 640!
#39—MAR. '87 Basic esthetics! Survey of video digitizers! Multiplayer games! And ready to enter: C-64 Compressor! Wizard Tag! Turbopoke! Rescue 128! Lights Out! Pinball Arcade! Stow Away! Caverns of Geehonk!	#40—APR. '87 Inside the Amiga 2000! Fractals! Baseball games! COMAL, turtle graphics, and Logo! And ready to enter: Info-flow! Laps! Plemat! List Formatter! Scrambler! Extended Background Mode! Planet Duell!	#41—MAY '87 Kernal power! 64 and Amiga graphics! Microworlds in COMAL! Brain games! Dark Fortress master maps! And ready to enter: Moondog! Startup! Illusion Master! Wall Crawler! Scavenger Hunt!	#42—JUNE '87 Megaflops and microseconds! Sci-fi braingames! C-64 to Amiga file transfer! And ready to enter: D-Snap! Wraiths! Galactic Cab Co.! Cave of the Ice Ape! ALT-Key 128! Power Squares! 128 Multi RAM!
#43—JULY '87 Real world interfacing! Bit map graphics tutorial! C-64 graphic conversion! Martial arts software! And ready to enter: Wizard Tag III! Data Creator! Plink & Plonk! Univaders! Data Express! 128 Scroller!	<div> <h2>BACK ISSUES OF Ahoy!</h2> </div>		
#44—AUG. '87 Electronic screen swapping on the C-128! Science fiction action games! The death of GOTO! Amiga reviews! And ready to enter: Archer! Banner Print! Route 64! Steeplechase! Batter Up! Scanner!			

Why settle for reading Ahoy! only once a month? Order the back issues listed above and fill up those boring in-between weeks with all the programs, articles, and reviews you've missed! Use the coupon below to order your issues while limited supplies last.

Use coupon of facsimile. If ordering more than four issues, list choices on a separate sheet.

If you have a modem and want more complete information on any of the back issues listed, call Ahoy's Bulletin Board Service at 718-383-8909.

Please send me
 _____ copies of issue # _____
 _____ copies of issue # _____

**ALL ISSUES \$4.00
 EXCEPT #2, #3, & #21 (\$10.00)**

Enclosed please find my check or money order for \$ _____ (outside the USA add \$1.00 per copy)

NAME _____

ADDRESS _____

CITY _____

STATE _____

ZIP _____

Send to: Ahoy! Back Issues, Ion International Inc., 45 West 34th Street—Suite 500, New York, NY 10001

vide hardware supported graphics objects such as sprites.

PC BASIC does include two fairly sophisticated "sub-languages," one for sound and another for graphics. The PLAY command is similar to PLAY in BASIC 7.0. Strings of characters may be combined to produce musical output. The DRAW command in PC BASIC is more powerful than DRAW in BASIC 7.0, which is primarily a line drawing command.

DRAW in PC BASIC uses strings to define sequences of cursor movements and graphics commands. This gives capabilities comparable to "turtle graphics" in LOGO and other languages.

It is interesting that some commands with identical names behave identically in the two breeds of BASIC while others are quite different. Be careful if you are translating between PC BASIC and C-128 BASIC. For example, LOCATE, GET, PUT, SWAP, WIDTH, and WINDOW are used in both languages but for very different purposes. Other similarly named commands may be subtly different. And sometimes, completely different names, such as CLS and SCNCLE or VARPTR and POINTER, are used for identical purposes. Let's hear it for standardization!

PC BASIC requires that spaces or separators be used between keywords and variables. An advantage of this is that variable names may contain keywords. In PC BASIC for example, GOAL, FONT, and VALUE are valid variable names. Use those in your C-128 programs and you will end up with syntax errors. Another advantage of spaces is that programs written for the PC are inherently more readable. On the C-128,

```
FORN=QTOM:J=TAN(N):PRINTJ:NEXTN
```

is confusing but allowed. It must be written with at least this many spaces on the PC:

```
FOR N=Q TO M:J=TAN(N):PRINT J:NEXT N
```

PC BASIC allows variable names of any length. Also, PC BASIC allows groups of variable names to be of a specific type, such as integer, single precision, string, or double precision. DEFINT A-J defines all variables beginning with letters from A through J to be integers.

PC BASIC allows programs to be merged or chained at run time, and it allows variables to be passed between programs. This is not explicitly supported in BASIC 7.0, but it can be done to a limited extent. PC BASIC also allows programs to be saved in tokenized form or in ASCII (text) form. Either form of the program can be loaded and executed. This process is more cumbersome on the C-128.

The file handling and communications commands are much more complete in PC BASIC than in BASIC 7.0. Also, PC BASIC provides numerous "interrupt-driven" commands for event trapping. In BASIC 7.0, the TRAP command provides run-time error-detection capabilities. Normal operation of the program can be interrupted and rerouted when an error occurs.

PC BASIC allows event trapping for errors as well as for keystroke, joystick and light pen, serial communications, and timer inputs which may be asynchronous to the nor-

mal program flow. A program need not continuously read the keyboard to know when a certain key is pressed, for example. The specified keystroke will make the program stop what it's doing and branch to the interrupt routine.

All in all, PC BASIC (BASICA and GWBASIC) is quite similar to C-128 BASIC (BASIC 7.0). They both allow the programmer to take full advantage of the respective computers without requiring the endless PEEKs, POKEs, and contortions of the less powerful versions of BASIC.

HEAD TO HEAD

How do the C-128 and the PC compare when running identical BASIC programs? That is the idea of benchmark testing. Benchmarks are programs which test various aspects of performance. The choice of definitive benchmark programs can be quite complicated. We don't need much sophistication to get a "ballpark" estimate of relative performance. *Benchmarks Galore* (see page 81) shows the tests run on the C-128.

For a start, Benchmark #1 is this simple FOR-NEXT loop:

```
100 FOR N=1 TO 10000 : NEXT N
```

On the C-128, we use these lines to measure the time in seconds:

```
20 T0 = TI
50 PRINT (TI-T0)/60
```

THE SHOW Commodore

**Saturday & Sunday
October 3 & 4, 1987
10 a.m.-6 p.m.**

THE DISNEYLAND HOTEL ANAHEIM, CALIFORNIA

- EXHIBITS, EVENTS AND DOOR PRIZES
- NATIONALLY KNOWN COMMODORE SPEAKERS
- SHOW SPECIALS AND DISCOUNTS
- SEE THE LATEST INNOVATIONS IN HARDWARE AND SOFTWARE TECHNOLOGY

The Commodore Show is the only West Coast exhibition and conference focusing exclusively on the AMIGA, Commodore 128 and 64, and PC 10 marketplace. Enjoy the Magical Kingdom of Disney along with thousands of Commodore Users.

COMMODORE SHOW
ADMISSION \$10
DISCOUNT ON DISNEYLAND TICKETS AVAILABLE

For More Information or to Reserve Exhibit Space, Contact



RK PRODUCTIONS

P.O. BOX 18906, SAN JOSE, CA 95158
(408) 978-7927 • 800-722-7927 • IN CA 800-252-7927

Reader Service No. 203

AHOY! 39

For the PC, the equivalent timing is performed by these lines:

```
20 T0=TIMER
50 PRINT TIMER-T0
```

There are two versions of Benchmark #1. The first is listed above. The second is optimized as much as possible for each machine. For the C-128, all spaces were removed from line 100 and the NEXT N statement was changed to NEXT. Only the spaces on either side of the colon can be removed for the PC. More significantly, N was specified to be an integer instead of a single precision variable. Line 100 for the PC becomes

```
100 FOR N%=1 TO 10000:NEXT
```

where the percent sign indicates an integer variable, just as it does on the C-128. The C-128 does not allow integers as FOR/NEXT loop variables.

From the time results in Table 1 (page 35), the C-128 in FAST mode is about 10 percent faster than the PC for the unoptimized program, but it is much slower than the PC in the optimized versions.

Figure 1 (page 36) displays the data for the PC and the C-128 in FAST mode from Table 1. The data from the table is first divided by each 128 time, so the 128 values are all normalized to one. A PC value greater than one means the PC is slower than the 128. PC values less than one correspond to tests in which the PC is faster than the 128.

Benchmark #2 performs a mix of single precision (floating point) math operations. The main program line for the two computers is the following:

```
220 K=K+(K-.6)*K/(K+.03)
```



Why dinosaurs never had computers.

Table 1 shows that the PC outperforms the C-128 on this somewhat limited test.

Benchmark #3 combines various string operations. The main statement is in line 320:

```
320 N$=MID$(LEFT$(N$+"AHOY",3),2,1)
```

The results in Table 1 show that the PC has a slight edge with these string manipulations.

The disk access tests used the 1571 drive on the C-128. Benchmark #4 writes 1000 numbers to the sequential file "Test," and benchmark #5 reads those 1000 numbers. The key statements in each test are lines 430 and 530:

```
430 PRINT#1,N
530 INPUT#1,K
```

The PC is nearly twice as fast as the C-128/1571 combination in both of these tests. I used a stopwatch for these tests since disk operations on the C-128 disable the jiffy clock interrupt. The times given by the program are much less than the actual times listed in Table 1.

The IBM PC is notoriously slow in certain types of screen updates. Tests #6 and #7 print 1000 numbers vertically and horizontally on the screen. The C-128 and the PC were both in 80-column mode for these tests. Test #6 is a measure of screen scrolling speed. It simply prints numbers 1 through 1000 vertically with this statement:

```
620 PRINT N
```

Test #7 measures screen writing and scrolling speed. It should be noted that the C-128 and the PC treat this statement in line 720 differently:

```
720 PRINT N;
```

The PC does not print a number at the end of a line if there is not room for the entire number. The C-128, on the other hand, fills all lines completely, breaking a number into two lines if it doesn't fit. The PC gives a better display at the expense of speed. Table 1 shows that the PC is comparable to the C-128 in scrolling speed, but the C-128 is nearly twice as fast at writing horizontally to the screen.

Benchmark #8 compares the speeds with which the two machines calculate random numbers from 0 to 320 and from 0 to 200 with this line:

```
820 R=RND(0)*320 : R=RND(0)*200
```

The PC version omits the "(0)" in both places. This could account for some of the PC's speed advantage over the C-128 in this test.

The last three benchmarks compare graphics display speed. Both computers draw in one color on a 320 by 200 resolution screen in these tests. Benchmark #9 puts points randomly on the screen. (By the way, it also shows how non-random these points really are.) The versions for the C-128 and the PC are as follows:

Continued on page 62

Featured This Month:

Superstar Ice Hockey.....41

Highland Games.....41

President Elect.....42

SUPERSTAR ICE HOCKEY

Mindscape

Commodore 64/128

Disk; \$34.95

The weather outside is still delightfully warm, but here's one game which makes contemplating the oncoming winter a little less painful.

Superstar Ice Hockey is the best action-strategy sports simulation ever published. Period. It provides superb graphics and realistic play, and the opportunity to experience this blindingly fast sport as a general manager, coach, and skater.

Prior to the start of actual play, the computer must make several decisions. The user can select teams with either four or the regulation six players per side and decide whether to direct the squad from the sidelines or personally lace on the skates.

As the coach, the user can juggle lines and select offensive and defensive strategies. The team with the puck can stick to a balanced strategy, set up the center for a shot, or choose an all-out attack. The defender can forecheck, protect the goal, or use a balance attack similar to the offense option.

Every participant must shoulder the responsibilities of the general manager between games. In this role, the user can make trades, recruit (create) players, and send the team to Training Camp during the off-season to sharpen skills. At the end of each four-game season, the program assigns "trading points" to each team based on its performance. The worst team gets 1000, while the Cup winner receives a mere 50. A team expends points when trading, training, and in recruitment.

Thus franchises at the bottom of the league possess the most resources with which to improve for the following season. This diverges from the real-world situation, in which the rich frequently get richer, but it ought to keep one team from dominating play for very long.

Superstar Ice Hockey uses the standard three-quarters perspective, but keeps the boards low so they don't obscure the puck. Players skate, check, stick handle, and shoot with breathtak-

Superstar Ice Hockey uses the standard 3/4 perspective, keeping the boards low so they don't obscure the puck. The animation incorporates many subtle nuances.

READER SERVICE
NUMBER 173

ing realism in response to joystick movements. Goalies drop to their knees, make stick and glove saves, and clear the puck away from the goal crease just like they do in the National Hockey League. The animation incorporates many subtle nuances, such as the way the goalie lifts his shoulder to block shots.

While playing the game as the goaltender offers an interesting change of pace, most users will prefer to skate as the center. The extensive, but straightforward, joystick control system allows the skater to shoot low on the ice, take slapshots, flip wrist shots, pass, check, and even execute fakes.

The simulation of skating is flawless. Players skate in circles to build momentum, but they lose speed due to fatigue as the game progresses.

The game includes offsides calls (the linesmen show no mercy) and penalties. As is all too common in the actual NHL, the refs are completely arbitrary and frequently one-sided. If they whistle a player off the ice once, the odds increase that they will catch him again later for some future infractions. Meanwhile, another skater may gleefully chop and slash without drawing a referee's eye.

The early work of chief engineer Ed Ringler should be well known from his stint with Gamestar. *Superstar Ice Hockey* demonstrates his continued development as a creator of superb action-sports simulations.

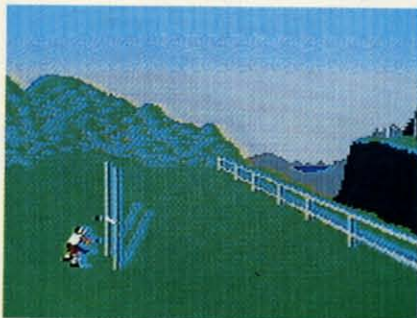
If this program has a drawback, it's that it may be too detailed. It is so realistic that it may intimidate those users



not conversant with the workings of professional ice hockey. True puck partisans, however, will want to canonize Ringler. Bravo!

Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062 (phone: 312-480-7667).

—Bill Kunkel



Highland Games: on a Scotch disk?
READER SERVICE NO. 174

HIGHLAND GAMES

Artworx

Commodore 64/128

Disk; \$14.95

The success of *Summer Games* (Epyx) and its sequels (*Summer Games II*, *Winter Games*, and *World Games*) made sports anthology disks a popular category of computer entertainment. This collection of tartan track and field contests by Supernova is squarely in the tradition of Epyx's series.

Unfortunately, *Highland Games* has little originality in content and some definite flaws in the area of implementation. Set in the Scotch Highlands, this program simulates six events which range from the obligatory Long Jump,

Discus, and Hammer Throw to more exotic contests like the Weight Toss, Caber Toss, and Tug of War.

The Hammer Throw is the anthology's most successful game. Its clever play-mechanic conjures up a genuine feeling of weight and movement. The Long Jump and Discus offer nothing that hasn't been seen many times in similar software packages.

You'd think Caber Toss simulations would be few and far between. Surprisingly, this is the second in recent memory. *World Games* also included an electronic version of that competition. Neither one is likely to start a run on Cabers.

The one in *Highland Games* is a total washout. It combines an uninspiring visual with an awkward joystick-activated control scheme.

In the Weight Toss, a kilted clansman swings a weighted chain back and forth between his legs three times and then throws the thing over a horizontal bar. In a sense, it's like the high jump or pole vault in some other sports

anthologies. The computerist must set the height of the bar and work up to the day's peak toss little by little. This event, too, is sabotaged by its graphics. Clunky linework added to awkward animation provide unintentional humor on those through-the-legs warm-up swings.

The graphics in *Highland Games* fall short of player expectations for such programs. The onscreen athletes are tiny, as though the user were watching the event from a nearby hilltop. This gives the Hammer Throw a nice, open-air feel. In other events, however, the miniscule animations make it difficult for the user to relate to the action occurring onscreen.

The sound track is composed primarily of bagpipe riffs. The well-executed musical phrases introduce the program and play between events.

Putting the Scotsmen through their paces boils down to a lot of joystick jiggling. Other games have employed a similar command control system, and it always guarantees a sore hand by the end of a play-session.

The Tug of War is the most unique event on *Highland Games*, but the lack of a solitaire option cuts into its appeal. Each participant controls the "anchor" of a four-man team and keeps him in synch with his mates as they struggle to drag the opposition across the midway mark. Nothing too complex about this contest, but it offers some fast head-to-head gaming fun.

Highland Games is part of the Art-

worx line of budget-priced software, so it may be unfair to expect it to equal the quality of programs which cost four times as much. On the other hand, a dull game is no bargain. *Highland Games* has at least a spark of interest for computerists who haven't gotten their fill of track and field simulations.

Artworx, 1844 Penfield Rd., Penfield, NY 14526 (phone: 716-385-6120).
—Bill Kunkel

PRESIDENT ELECT: 1988 EDITION Strategic Simulations

Commodore 64/128

Disk; \$24.95

The quadrennial campaign for the Presidency is the biggest high-stakes game in the United States. The winner assumes the most powerful position in the world's mightiest democratic republic, and the loser becomes tour guide on the oblivion express.

Strategic Simulations introduced the original *President Elect* before the 1984 election in which incumbent Ronald Reagan recorded a smashing victory over his rival, Democrat Walter Mondale. Many thought that the simulation of the race for the White House was more exciting than the actual election.

Four years is a long time in the computer software field, and the intervening years have not been totally kind to Nelson G. Hernandez, Sr.'s design. The drab sound and graphics, in particular, are substantially below today's sophisticated audiovisuals in quality.

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
- RANDOM NUMBER GENERATOR INCLUDED.

\$24.95
COMMODORE, COMMODORE AMIGA, AND IBM SYSTEMS

Window Magic

SUPER HI-RESOLUTION DRAWING IN MULTI OR MONO COLOR

- COPY
- FILL
- LINES
- DRAW
- COLOR SQUARES
- TYPES LETTERS AND GRAPHICS
- POLYGON SHAPES-EXPAND, SHRINK AND ROTATE, THEN STAMP ANYWHERE
- ZOOM PLOT-DRAW ON AN EXPANDED WINDOW AND YOUR DRAWING AT THE SAME TIME

- MIRROR, FLIP, AND SCROLLING WINDOWS
- ZOOM-EXPANDS A WINDOW TO DOUBLE SIZE
- SAVE AND LOAD YOUR WINDOWS ON DISK
- PRINTS ON STANDARD DOT MATRIX PRINTER
- CLONE COLOR ATTRIBUTES

\$19.95 C-64/128

STOCK BROKER™

PROFITS GUARANTEED OR
YOUR MONEY BACK

BUYING GOOD QUALITY, VOLATILE ISSUES AND USING THIS TRADING SYSTEM WILL HAVE YOU FULLY INVESTED AT THE LOWEST PRICES AND CONVERTING TO CASH AS THE STOCK NEARS ITS PEAK.

- TECHNICAL TRADING THAT WORKS
- BAR GRAPH PRINT-OUTS
- RECORD UP TO 144 STOCKS ON A DISK

\$29.95
COMMODORE, COMMODORE AMIGA, AND IBM SYSTEMS

ACORN OF INDIANA, INC.

2721 OHIO STREET
MICHIGAN CITY, IN 46360

1754 219-879-2284

SHIPPING AND HANDLING, ADD \$1.50 - C.O.D.'S ACCEPTED
VISA AND MASTER CARD ORDERS ADD 4%
INDIANA RESIDENTS ADD 5% SALES TAX

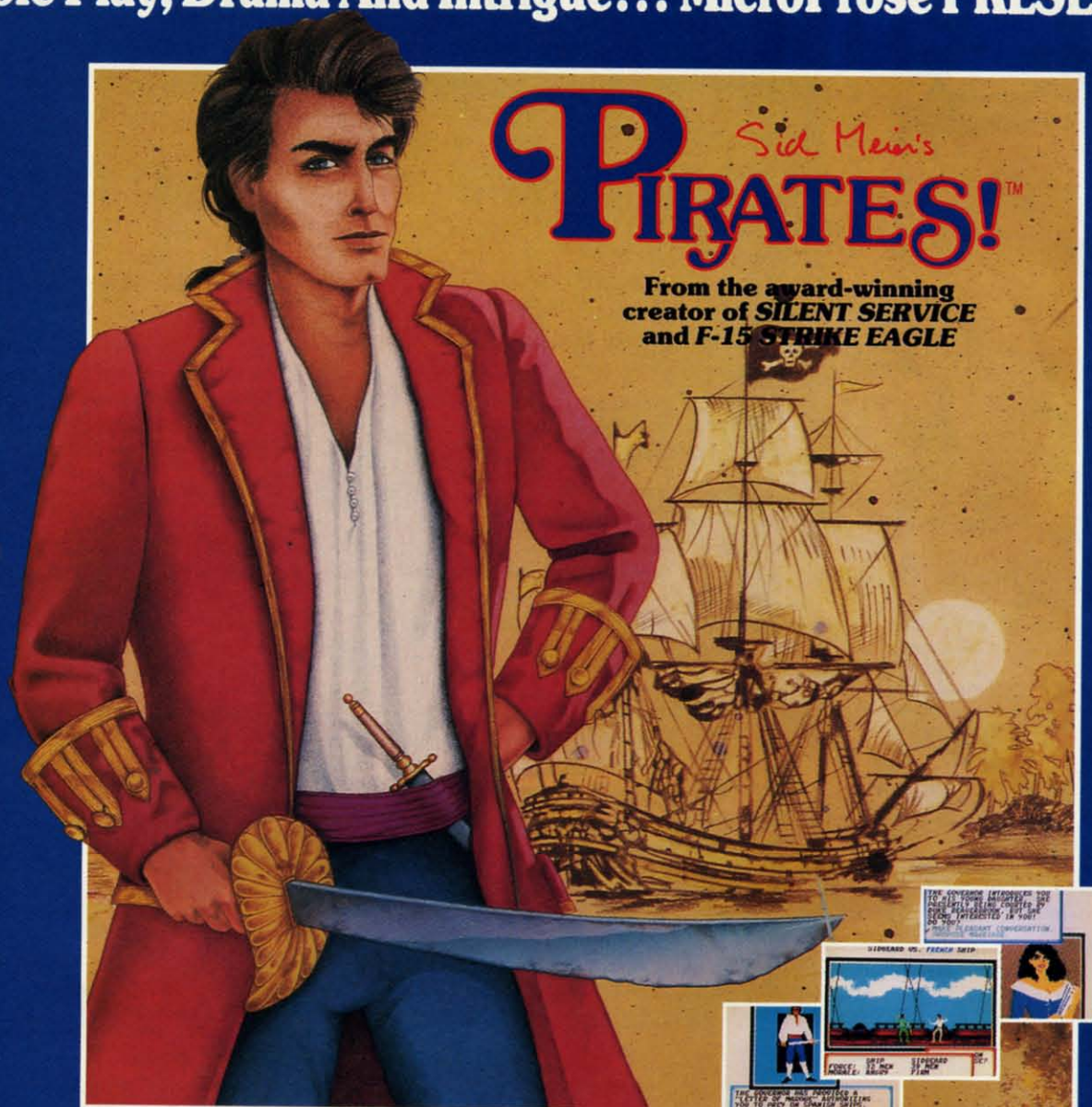
Reader Service No. 211

An electoral map of the US shows which President Elect hopefuls own which states, and which states are on the borderline. Factors like fatigue and overexposure can diminish a candidate's appeal. For a more complete list, see a certain Senator from Colorado.

READER
SERVICE NO. 176



INTRODUCING The Adventure-Simulation... Action, Role Play, Drama And Intrigue... MicroProse PRESENTS



THE ENTIRE ADVENTURE...
...IS NOW AVAILABLE
...ON THE NEW CD-ROM
...INTERESTED IN 1991?



C-64 graphics shown;
Actual screens may vary.

Join us, mate, for an expedition into one of the most fascinating eras of this millennium! **PIRATES!™** is an exciting new adventure-simulation that will challenge your skills while it captures your imagination!

You are cast in the leading role as privateer captain, criss-crossing the Spanish Main, slipping into ports as needs or opportunities require but always relishing your return to the freedom of the open seas!

PIRATES!™ is a unique blend of your favorite software gaming features all in one package. It weaves together the excitement of arcade-style action, the challenge of simulation decisionmaking, and the interactive storyline of a text-adventure. And, in the standard of all MicroProse software, **PIRATES!™** is designed to give you hundreds of hours of stimulating game play!

Pirates!™ features include:

- **ACTION...** ship battles, land conquests, fencing and sailing
- **STRATEGY...** plundering, trading, negotiating and forging alliances
- **GOALS...** treasures, romance, status, power and prestige
- **NEW EXPERIENCES...** explore across a map of the entire Caribbean
- **EXTENSIVE GRAPHICS...** over 70 different scenes and pictures
- **EXCITEMENT...** triumphs and tragedies, victories and defeats

PIRATES!™ is available from your favorite "Valued MicroProse Retailer" (VMR). Call us for the VMR nearest you!

MICRO PROSE

120 Lakefront Drive • Hunt Valley, MD 21030 • (301) 771-1151

Versions planned for Commodore 64/128, IBM PC/PC Jr. and compatibles, Apple II+/c/e, and Atari XL/XE. Call MicroProse for specific machine availability. Suggested retail price only \$39.95. Commodore, IBM, Apple and Atari are registered trademarks of Commodore Electronics Ltd., International Business Machines Inc., Apple Computer Inc. and Atari Inc., respectively.

USED COMPUTERS Buy • Sell • Trade

New and Used
Commodore — IBM — Atari
Hardware, Software, Books
and Accessories

\$\$\$ CASH \$\$\$

We will pay you cash for all
Commodore and compatible
equipment, even if it's damaged!

TRADE-INS

Now, you can trade-in your system
or pieces for new or used products.
Upgrade your system quickly and
hassle free.

PRINTERS • COMPUTERS • MODEMS
DISK DRIVES • MONITORS • SOFTWARE
ACCESSORIES

Try our BBS: (303) 939-8174 (Modem)

CALL NOW!

Computer Repeats, Inc.

2121 4th Street
Boulder, CO 80302

Call: (303) 939-8144 M-F 2-11 pm MT

VISA, MC, CHOICE, C.O.D.

Reader Service No. 190

TRY BEFORE YOU BUY!

Best selling games,
utilities, educational, and
classics, plus new releases!

- 100's of titles
- Low prices
- Same day shipping
- FREE brochure

YES, WE ACCEPT:



RENT-A-DISC

Frederick Building #345
Huntington, WV 25701
(304) 529-3232

Reader Service No. 191

Ken Coates' Commodore 64/128 version of *President Elect: 1988 Edition* won't bowl over anyone with sensational programming innovations, but it overcomes its humdrum presentation with a detailed and flexible simulation of big-time politics.

One to three players can run for the Presidency under the same conditions which candidates faced in any of the elections from 1960 to 1988. Students of history and political prognosticators can even adjust the economic and political factors associated with any campaign to create an unlimited number of exciting "what if?" scenarios. The computer can guide up to three candidates if there aren't enough human participants to fill out the ballot.

Crystal-clear prompts lead computerists through the smooth routine of play as *President Elect* chronicles the race from Labor Day to Election Eve. The candidates must use the nine weekly turns to pile up enough support to carry the Electoral College.

Political action points are the "currency" candidates "spend" during the election. During the tussle for the top spot, candidates expend their PAP on overhead, advertising, campaign stops, and foreign travel.

Since every campaign has continuing expenses, overhead starts at a hefty 500 PAPs for a major party candidate and rises by 100 PAP per week. Weaker organizations cost a little less to maintain, and the overhead for third party nominees varies.

There are three types of campaign advertising. Each has a different purpose. A national effort sways the most voters per PAP, but this broad brush effort is not focused enough to influence particular states. Regional campaigning can inspire a meaningful voting shift, but only in one section of the country. The best way to push a large state with a close race into your column is with state-level ads, but it can be expensive.

Electronic and print advertising bring the candidates to millions of voters, but personal appearances still have the power to affect the outcome. The program assesses costs based on the number of regions and states entered and the number of individual stops.

Fatigue may hamper a candidate who undertakes a particularly strenuous

ENTERTAINMENT SOFTWARE SECTION

whistlestop tour. Also, the law of diminishing returns quickly curbs the effectiveness of personal appearance if a politician schedules too many for the same week. A nice touch is that the effect of personal appearances is cumulative over the course of the race, so that the candidate who ventures among the voters to "press the flesh" on a regular basis gradually develops an advantage over one who lets his or her media image substitute for old-fashioned stump speaking.

Each party decides on foreign travel during the first week of the campaign. All candidates must decide where and when they will take a trip and how long they will stay. A visit to a foreign nation is a gamble that can help or hurt, depending on what happens abroad.

Any time all candidates agree on the format, a debate is held. These direct confrontations, which the program handles abstractly, can conceivably turn the course of a race and allow a dark horse nominee to come from behind.

An electoral map of the United States is the main visual. Each week, it shows the current status of every state. Color coding shows computerists at a glance which states are firmly in one candidate's camp, and which are too close to call. On election night, the map reports the state-by-state vote as it is tabulated.

It's a funny-looking map, though it gets the job done. One which depicts the United States as much less tall and skinny would be a good enhancement for the 1992 edition of *President Elect*.

The documentation is exemplary. The printed booklet carefully explains the overall concept and every major specific rule, and a section in the back contains helpful information about every election since 1980. Ondisk tutorials and demos buttress the printed documentation by providing specific examples of actual play.

The form could have used a little more polishing, but the content of *President Elect* preserves its status as a classic electronic strategy contest. *President Elect* is both absorbing entertainment and highly illuminating about our country's political system.

Strategic Simulations, 1046 Rengstorff Ave., Mountain View, CA 94043 (phone: 415-964-1353). —Arnie Katz

TIPS AH-OY!

Compiled by Michael R. Davila

Contributors to *Tips Ahoy!* will be handsomely compensated immediately upon acceptance. Send your best programming or hardware hints to *Tips Ahoy!*, c/o Ion International Inc., 45 West 34th Street—Suite 500, New York, NY 10001. Include a stamped and self-addressed envelope if you want your submission returned.

SCREEN STUFF

Printing a message onscreen is easy enough, but doing it in an out of the ordinary manner can be one of the most time-consuming tasks in programming. Here is a ready-to-use subroutine that you can put in your programs either unchanged or improved to suit you. The sprinkling of REMs stating the purpose of variables should be helpful in making modifications. The REMs can of course be omitted when typing the subroutine into your own programs.

In the listing, lines numbered below 500 are simply preparatory. The working subroutine begins at Line 500, and expects to find the message text either in string ME\$, or in consecutive elements of string array ME\$ beginning with element number one. Element number zero should not be used.

In *Drop In* each character runs across the screen and drops into its proper place to form the message that is contained in string ME\$.

Try this, or a modification of it, to add a bit of variety to the onscreen messages or menus in your own programs.

—C.C. Stadler
Waynesville, NC

```
100 INPUT"ENTER MESSAGE (40 CHAR. MAX.)"  
;ME$  
110 GOSUB 500  
120 STOP  
130 :  
500 ::REM "DROP IN" DISPLAYS STRING ME$,  
FORTY CHARACTERS MAXIMUM  
510 W1=1:REM CHAR. POS. IN TEXT STRING  
520 PRINT"[DOWN][DOWN]"  
530 FOR N=1 TO W1:CH$=MID$(ME$,W1,1):PRI  
NT"[LEFT] "CH$;:GOSUB570:NEXT  
540 GOSUB570:PRINT "[LEFT] [DOWN][LEFT]"  
;:GOSUB570:PRINT CH$;  
550 IF W1<LEN(ME$)THEN W1=W1+1:PRINT:PRI  
NT"[UP][UP]";:GOTO530  
560 PRINT"[3][DOWN]":RETURN  
570 FOR M=1 TO 5:NEXT:RETURN
```

DISK CHECK

If you have ever run into complications due to a disk error, you'll see the value of this program. I was going to make it read the entire disk, but not that many people want to read an entire disk for errors. So instead I gave you a choice of ways to read errors on a disk. In fact, I crushed the program into only 15 lines to make it easy to type in and useful for everybody. You can elect to:

1. Check Whole Disk (examine the entire disk for errors).
2. Quick Check (check only the first sector of each track).
3. Check 1 Track (examine only the track you specify).
4. Exit/End (quit program and enter regular mode).

If your program is free from errors, you will not see any error messages on the screen. If you're not very sure if the program works or not, simply try it out with a name brand commercial program, especially if the disk rattles during the load. Don't worry if you don't want your drive to rattle during the check; the program has been written to avoid rattles. If you want to use the no rattle routine for other things, just list line 5 and replace the ONAGOSUB7,8,9 with CLOSE15. Then type NEW, go up, delete the line number, and press RETURN. The drive light will appear for a second. Now load your own program. One message of warning: Put a write-protect tab on every disk you want to check. This program has a tendency to make errors of its own. This rarely happens though, so don't worry. —Myong Paek
Portland, OR

```
1 CLR:A=53280:POKEA,,:POKEA+1,,:PRINT"[C  
LEAR][GREEN][DOWN]DISK ERROR CHECKER:"P  
RINT"[DOWN][DOWN][RIGHT]1. CHE";  
2 PRINT"CK WHOLE DISK":PRINT"[DOWN][RIGH  
T]2. QUICK CHECK":PRINT"[DOWN][RIGHT]3.  
CHECK 1 TRACK"  
3 PRINT"[DOWN][RIGHT]4. EXIT/END":INPUT"  
[DOWN][DOWN]YOUR CHOICE";A:IFA<1ORA>4THE  
N1  
4 PRINT"[3][DOWN]"INSERT DISK TO CHECK.  
":WAIT198,1:PRINT"[DOWN][DOWN]CHECKING[3  
"][DOWN]":IFA=4THENEND  
5 OPEN15,8,15:PRINT#15,"M-W";CHR$(106)CH  
R$(0)CHR$(1)CHR$(133):ONAGOSUB7,8,9  
6 CLOSE15:POKE198,0:PRINT"[DOWN]ERROR CH  
ECKING COMPLETE":WAIT198,1:GOTO1  
7 FORT=1TO35:GOSUB11:FORS=0TOLS:GOSUB13:  
NEXT:NEXT:RETURN  
8 FORT=1TO35:S=0:GOSUB13:NEXT:RETURN  
9 POKE198,0:INPUT"WHICH TRACK (1-35)";T:  
IFT<1ORT>35THEN9  
10 GOSUB11:FORS=0TOLS:GOSUB13:NEXT:RETUR  
N  
11 LS=16:IFT<31THENLS=17:IFT<25THENLS=18  
:IFT<18THENLS=20  
12 RETURN  
13 OPEN2,8,2,"#":PRINT#15,"U1,2"0;T,S:IN  
PUT#15,E,E$,T$,S$  
14 IFE<>0THENPRINTE"[LEFT]","E$","T$","S$"  
15 CLOSE2:RETURN
```

BORDERLINE

Do you have programs that wait for a key to be pressed before continuing on their merry way? Some people call

it a refreshing pause. Personally, if nothing is happening on the screen, I call it nap time. If you feel like I do, and want to add some spice to those pauses, try *Borderline*.

Borderline adds a multitude of colorful stripes to your monitor's border. The stripes move continuously downward until the user presses a key. There are versions for the C-64 and the C-128.

Just add *Borderline* to your own programs. Whenever you want the border to begin its colorful scroll, have your program SYS 700 for the C-64 or SYS 3072 for the C-128. For example:

```
100 SYS 700
```

will activate *Borderline* until a key is pressed. For the C-128,

```
100 BANK 15:SYS 3072
```

will do the job. BANK 15 insures proper activation (just in case the bank configuration was previously switched).

On both computers, the value of the keypress is returned in location 251. So, if your program is using *Borderline* in lieu of a GET statement, a line such as

```
110 PRINT PEEK (251)
```

will let your program know what key was pressed.

Borderline can be activated in direct mode also. SYS 700 [RETURN] will activate the C-64 version. BANK 15:SYS 3072 [RETURN] will activate it on the C-128. (Once again, BANK 15 is a precaution.)

Both versions of *Borderline* can be relocated by changing S in line 1. Remember to SYS to the new location if you do change it.

—Buck Childress
Salem, OR

64 VERSION

```
•1 S=700:REM *** CHANGE S TO RELOCATE ***
  C-64 VERSION ***
•2 PRINTCHR$(147):PRINT:FORJ=STOS+20
•3 READA:POKEJ,A:X=X+A:NEXTJ:IFX<>3473THE
  NPRINT"ERROR IN DATA[3"."]":END
•4 PRINT"THE DATA IS LOADED[3"."]":PRINT:
  PRINT"SYS"S"TO ACTIVATE[3"."]":END
•5 DATA32,228,255,240,3,133,251,96,238,32
  ,208,162
•6 DATA90,202,208,253,141,18,208,240,235
```

128 VERSION

```
•1 S=3072:REM *** CHANGE S TO RELOCATE **
  * C-128 VERSION ***
•2 PRINTCHR$(147):PRINT:FORJ=STOS+20
•3 READA:POKEJ,A:X=X+A:NEXTJ:IFX<>3468THE
  NPRINT"ERROR IN DATA[3"."]":END
•4 PRINT"THE DATA IS LOADED[3"."]":PRINT:
  PRINT"SYS"S"TO ACTIVATE[3"."]":END
•5 DATA32,228,255,240,3,133,251,96,238,32
  ,208,162
•6 DATA85,202,208,253,141,18,208,240,235
```

46 AHoy!

THE GREAT ESCAPE

The Commodore 128's BASIC 7.0 is full of features, but the usefulness of some is not apparent. From immediate mode, one can hit the ESCape key and then either a 'W' or 'V'. These two ESCAPE commands control the scrolling capabilities of the screen or window. The 'W' scrolls the screen downward every time the ESCape key and 'W' are entered. The opposite holds true for the 'V' command: the screen scrolls up. These commands do not seem helpful from immediate mode, but from within a program one can accomplish many things.

By entering the program example below, one can see these two commands at work. The program displays the phrase ">>> G A M E O V E R <<<" at the top of the screen. Next the phrase is moved to the bottom, then to the top again. This procedure repeats until the phrase is centered on the screen. To initiate an ESCAPE command from within a program, the "CHR\$(27)" must be used before issuing the command. The ASCII value 27 turns on the ESCAPE mode on the C-128.

```
•1 A$="[3">"] G A M E O V E R [3"<"]"
•2 A$=LEFT$(A$,40)
•3 L=LEN(A$)
•4 TB=INT((40-L)/2)
•5 SCNCLR
•6 CHAR,TB,0,A$
•7 S=24
•8 DO WHILE S>0
•9 FOR I=1 TO 2
•10 FOR J=1 TO S
•11 PRINT CHR$(27);
•12 IF I=1 THEN PRINT "W";: ELSE PRINT "V";
•13 NEXT J
•14 S=S-1
•15 NEXT I
•16 LOOP
•17 END
```

To make the phrase start from the bottom of the screen and move in the opposite direction, change lines 6 and 12 to

```
6 CHAR,TB,24,A$
12 IF I=1 THEN PRINT "V";: ELSE PRINT "W";
```

—Michael Jaecks
Alamogordo, NM

WAIT A MINUTE

For those who write BASIC games which require a joystick—after you have set up the game and want the player to press the joystick button to begin the game, use the following statement:

```
WAIT 56320,16,240
```

This command is better than the common method of using a variable to PEEK the port and the AND operator to mask all but Bit 4. You can change it to WAIT 56321,16,240 and

the computer will wait for the pressing of the fire button of a joystick plugged into Port 1.

—Joshua Guy
Springfield, IL

THE CURTAIN EFFECT

Without a boring explanation, here is a machine language routine that when called from your BASIC program (using SYS LOC) will clear the standard Commodore 64's screen in an exciting new way! It does it in a fashion much like opening a set of curtains. Type it in and see!

—Andrew Vajoczki
Brantford, ONT

```
•100 LOC = 50000:REM - FULLY RELOCATABLE
•125 FORT=0T0103:READA:CH=CH+A:POKELOC+T,
  A:NEXT
•135 IF CH<>15839 THEN PRINT"ERROR IN DAT
  A":STOP
•140 SYS LOC:REM - USE ANYWHERE IN PROG.
•1000 DATA 169,0,72,169,0,133,251
•1001 DATA 169,4,133,252,169,0,133
•1002 DATA 253,169,216,133,254,162,0
•1003 DATA 160,1,177,253,72,177,251
•1004 DATA 136,145,251,104,145,253,200
•1005 DATA 200,192,20,208,239,136,169
•1006 DATA 32,145,251,160,38,177,253
•1007 DATA 72,177,251,200,145,251,104
•1008 DATA 145,253,136,136,192,18,208
•1009 DATA 239,24,165,251,105,40,133
•1010 DATA 251,165,252,105,0,133,252
•1011 DATA 24,165,253,105,40,133,253
•1012 DATA 165,254,105,0,133,254,232
•1013 DATA 224,25,208,182,104,168,200
•1014 DATA 152,192,20,208,155,96
```

INVISIBLE CHARACTERS

I have found that placing a keyboard graphic character immediately after the line number permits indentation of the BASIC line. For example, type in the following line:

```
10[s I][10 " "]REM
```

When you list the program, you will find that the REM has been indented eleven spaces. The SHIFTed character counts as one space, although it is invisible. Any keyboard graphic character obtained from using the SHIFT key or COMMODORE key can be used after the line number. Also, any executable line (such as one that starts with PRINT) can be indented and executed normally.

If you prefer just to have a blank line as a divider in your program, type a graphic character after the line number, then a space, and finally another graphic character. As an example, type in this line:

```
10[c R] [s P]
```

If you list the new line and position the cursor anywhere on that line, you may hit RETURN to delete it. By hitting RETURN on any other line, you will only return it to its

normal unindented state.

If you want structured listings and own a Commodore 128 or C-64, I am sure you will appreciate this technique.

—Michael Jaacks
Alamogordo, NM

DLIST

The program above will allow you to list another program directly to the screen without having to go through the tedious process of saving your current program and then loading the program you wish to view. Just add this routine to whatever program you are currently working on and issue the command RUN 5000. After a brief moment the utility will ask for the name of the program you wish to see. Make sure the program is on the disk that's in the drive.

—Clifford Dedmore Jr.
FPO San Francisco, CA

```
•5000 PRINT"[CLEAR]ONE MOMENT[3"."]":POKE
  49,PEEK(47):POKE50,PEEK(48):DINT$(77):T=
  1:FORK=41118TOK+256
•5010 IFPEEK(K)>127THENA$=A$+CHR$(PEEK(K)
  -128):T$(T)=A$:T=T+1:A$="":GOTO5030
•5020 A$=A$+CHR$(PEEK(K))
•5030 NEXT:O$=CHR$(0)
•5040 CLOSE15:OPEN15,8,15:INPUT"[CLEAR]PR
  OGRAM TO LIST":A$:OPEN2,8,2,""+A$:GOSUB5
  140
```

Continued on page 97



COPIES 99.90% OF PROTECTED SOFTWARE WITH POWER AND PARAMETERS TO SPARE... AND ONE FREE UPDATE

- OVER 40 PARAMETERS built into the Invader Copying Modules are automatically called, when copying certain "Tough to Copy" disks. These are installed on SIDE 1 with all the INVADER V9.5 COPIERS.
- 170 EXTRA PARAMETERS, to copy recent disks that were impossible before are installed on SIDE 2 of the LATEST DISK-INVADER V9.5.
- USE WITH 1 or 2 1541/1571 Drives or compatibles or MSD Dual Drive and COMMODORE 64 and 128 (used in 64 mode).

FAST File Copy Included, with 8 second
NO KNOCK PERFECT FORMATTER.
FAST FULL Disk Copier for two 1541/1571 copies
in under 1 minute.
FAST FULL Disk Copier for one 1541/1571 copies
in under 2 minutes.

**SPECIAL
PRICE**

PRICE P & P INCL. US \$36.50 CDN \$49.50

TO ORDER send check or money order to:
Quebec residents, add 9% sales tax.
All orders shipped within 48 hours.
Telephone: 1-514-621-2085

AVANTGARDE 64
18 Place Charny, Lorraine
Québec J6Z 3X9, Canada

Reader Service No. 195

AHOY! 47

SPRITESHELL 128

By Cleveland M. Blakemore



The C-128 has a really terrific BASIC interpreter: in fact, BASIC 7.0 is almost as advanced as IBM BASICA, or even ABASIC for the Amiga. The C-128 has a number of built-in commands that will produce arcade-quality games in the hands of the right programmers. But the commands have a number of critical drawbacks that limit the user to all but the simplest of games, depriving less advanced 128 owners of some of the game programming fun for which they would otherwise need to learn machine language. While I am a real whiz with assembly language, I do not expect everyone to learn it in order to enjoy the creative pleasure of making games on a computer!

A good example is *Planet Duel*, published in the April 1987 *Ahoy!* The game is really quite good for BASIC, but it suffers from a speed problem—and it would benefit greatly from keeping the sprites on the screen. Because the motion of sprites on the C-128 is interrupt-driven, they have the nasty habit of becoming “rogues” while BASIC processing is occurring during the game. They wander offscreen, collide, or even wrap around the playing area before BASIC can get around to checking their positions.

Obviously, what is needed is some kind of shell, an interrupt-driven program that will monitor the software-driven interrupt like a watchdog keeping the sheep in the pasture, saving the shepherd time he would normally waste doing the job himself!

When I sat down to write a program to cure these problems, I compiled a short list of the major annoyances involved with BASIC 7.0, and designed my machine language program, *Spriteshell 128*, around them:

1. Sprites tend to wander offscreen while a game is in progress.
2. SPRSAV is too slow a command to toggle different shapes for animation. POKE is not much better.
3. Joystick-driven movement for two players is too slow for any games which need the sprites to stay within certain boundaries.
4. Player missiles (laser beam, custard pie, bullet, etc.) need to be turned off when they reach playing area boundaries so that they do not wrap around.

5. The program must be capable of determining which screen is in use, either the graphics area or the text screen.

6. The program must fit unobtrusively into an area which will not interfere with the memory set aside for sprites by the C-128's operating system.

The interrupt-driven program requires a little over 500 bytes and resides at location 4864 in the memory space normally reserved for “function key software,” to quote Jim Butterfield's memory maps. If you BLOAD the object code into memory at the beginning of your program, you will be ready to utilize features like joystick-controlled sprite motion (for one or two players), complete control of sprite positioning to keep selected sprites within borders, interrupt-driven sprite animation at speeds which you can set, and even position checking to turn off certain sprites when they touch the borders you have designated!

The machine language routine has five entry points that should be set up correctly before you start the interrupt, respectively called XB, YB, SPRTG, FLAGS, and CFLAGS. Make sure you always specify *all* parameters when SYSing to these entry points, or the computer may place random values in the neglected locations. Each entry point is described below, along with its parameters.

`XB=HEX$(14D5)/DEC("5333")`

(Used to set the maximum X-coordinate limits on the left and right.)

`FORMAT:SYS XB,XL,XR`

where XL=the left limit X coordinate border that you want the sprites to stop at from coordinates 1 to 255, and XR=the right limit X coordinate border, from 1 to 255. (The program assumes your limit is on the other side of the X-MSB line on the screen. If you want to set the right coordinate limit as close as possible to the X-MSB, then let XR=2.) Possible values such as XL=24, XR=65 will put the limits on the furthestmost visible edges of the screen.

`YB=HEX$(14DC)/DEC("5340")`

(Used to set upper and lower Y-coordinate limits.)

`FORMAT:SYS YB,UL,LL`

where UL=upper limit Y coordinate border (1-255), and LL= lower limit Y coordinate border (1-255). It is wise to make UL less than LL to avoid funny results on the screen. Possible values could be UL=50, LL=229 to place the borders on the furthestmost visible edges of the screen.

`SPRTG=HEX$(14E3)/DEC("5347")`

(Used to set the speed, number of sprites, and sprite blocks

...Announcing

THE COMMODORE USERS

Ahoy Access Club!



**FREE
TO ALL
SUBSCRIBERS**



An incredible offer from the publishers of *Ahoy!*...The **Ahoy! Access Club**. The **Ahoy! Access Club** offers members: discounts, rebates, coupons on products and services for your Commodore, a Commodore calendar of events, and much, much more! Members will also receive "The Clipper," an exclusive bi-monthly news bulletin. But the best thing about the **Ahoy! Access Club** is that it's **FREE!** to all *Ahoy!* subscribers. Subscribe today! and along with your first issue of *Ahoy!* you'll receive your official **Ahoy! Access Club** membership card...your ticket to super savings and bonuses you can only get from *Ahoy!* Don't miss out on this fantastic offer. The **Ahoy! Access Club**...if you own a Commodore — this club is for you!

THE COMMODORE MAGAZINE THAT OFFERS YOU MORE

www.commodore.ca

to be used for interrupt-driven toggling of sprite shapes.)

FORMAT:SYS SPRTG,TS,TN,SB

where TS=speed at which you wish to toggle the sprites between two shapes, and TN=number of sprites to be toggled. Sprites one and two are not toggled so that they may be used either for two players or a player-missile combination. Setting TN to six, the maximum, will toggle sprites three through eight. SB will be the number of the sprite block base of two shapes to be toggled. This number will be the first of two shapes in memory that will be toggled. You have to supply the sprite data at the given memory location, 128 bytes of data that should start at SB*64 in memory. A good location would be 56, the beginning of the C-128's allocated memory for sprites. Setting SB to 56 will toggle the sprite shapes between 56 and 57, the shapes present in SPRITE 1 and SPRITE 2 when in SPRDEF mode.

FLAGS=HEX\$(14F5)/DEC("5365")

(Used to activate joystick movement and sprite toggling, and set the number of players using interrupt-managed joystick movement.)

FORMAT:SYS FLAGS,OF,NT,NP

where OF=a zero or non-zero value. A non-zero value in this location turns on joystick-controlled movement, and a zero value turns it off. This is useful for eliminating movement at certain times during the course of the game—for example, right after the player's spaceship is destroyed. NT is also either a non-zero or zero value to turn sprite toggling on or off respectively. NP is the number of players you want to use interrupt-driven joystick movement, where 0 means you want one player controlling sprite number one with joystick 2, or 1 signifies two players using joystick ports 1 and 2 to control sprites one and two. When you want to turn on joystick movement, sprite toggling and two-player joystick-driven motion, SYS FLAGS,1,1,1.

CFLAGS=HEX\$(14FF)/DEC("5375")

(Used to denote the sprite involved in collision checking, and the number of sprites that are to be kept in the "corral" you set with SB & YB.)

FORMAT:SYS CFLAGS,SC,NS

where SC=the number of the sprite (minus 1) that you wish to turn off whenever it collides with one of the borders set in either XB or YB, and NS=the number of sprites (minus one) that you wish to be involved in border checking. To keep all sprites within borders, set NS=7. Setting NS to zero will only keep sprite one within the designated borders. Normally you would SYS CFLAGS,1,7 if you wanted to have a one player game with sprite one using sprite two as a missile. Whenever sprite two touches one of the borders, it will be turned off. This really comes in handy for *Space Invaders*-type games where your laser fire is continuously moving offscreen and threatening to wrap around. Using this command will turn the missile off whenever it reaches the border you have set with XB or YB. To disable this feature, use any number higher than seven for SC.

When you have entered all these entry points with the appropriate values, SYS SHELL (HEX \$1300/DEC 4864) to start at the interrupt routine. It may sound complicated, but it's really quite simple.

One important point to note about the border checking is that sprites will be kept within the screen limits you have set, but they will not stop moving. If sprite five is moving diagonally and it hits the Y-coordinate border, it will continue creeping along the border in the direction it was headed previously on the X-axis. Thus, screen action won't come to a standstill whenever there's a collision with the border.

The sprites will vibrate when they hit the borders, because the C-128's routine is trying to move them off, while *Sprite-shell* is trying to keep them on. At the higher sprite speeds (12+) set with the MOVSPR command, the vibration will be very rapid.

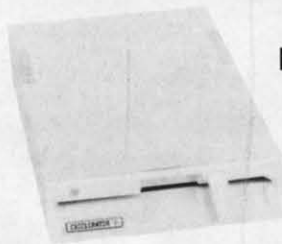
Note that two-player joystick movement is slower than one-player, because the interrupt is servicing each player's port on alternate turns. It should not pose any problem.

The program assumes you are using the GRAPHICS screen if you have any graphic mode enabled other than

Continued on page 72

FSD-2

Commodore Compatible
Disk Drive



Faster, Quieter, More
Compact and More
Reliable Than the
1541 & 1541C!

NOW ONLY **\$159**

Guaranteed 100% Compatibility
It even enhances GEOS!

Full One-Year Warranty

Satisfaction Guaranteed

Fast Delivery

**Advanced Direct
Drive Technology**

Comes Ready to Run and Works
Smoothly with the Commodore
64, 64C, VIC 20, Plus 4, C 128 (in
64 mode) and 16.

CALL NOW TOLL-FREE
1-800-356-5178

ECI

Emerald Components International
Dept. A, P.O. Box 1441, Eugene, OR 97440
Customer Service: 503/683-1154

Reader Service No. 181

PS TO GEOS

For the C-64

By Shawn K. Smith

Print Shop Graphics to GEOS, or PS to GEOS for short, adds another dimension to the world of GEOS. PS to GEOS will allow you to import graphics designed for Broderbund's *Print Shop* into a format that can be used by other GEOS applications, such as *geoWrite* and *geoPaint*. And the graphics can be the ones offered by Broderbund or those offered by third party software houses such as Epyx.

ENTERING THE PROGRAM

PS to GEOS consists of two programs. This division is necessary to make it into a full blown GEOS application with icon. The first listing on page 95, PS TO GEOS.ML, should be entered with *Flankspeed*. Ahoy!'s mistake-free machine language entry program found on page 79. Be sure you understand how to use it before entering PS TO GEOS.ML. After you have typed in the listing, save a copy on your GEOS work disk. The second listing, BINARY TO GEOS, is written entirely in BASIC and should be entered as usual. It is not necessary to save this program on your GEOS work disk, but do save a copy for future use (hint!).

Once you have entered both programs, load BINARY TO GEOS, insert the GEOS work disk with PS TO GEOS.ML in the drive, and run the program. Answer the "ENTER NAME OF BINARY FILE" prompt with the name that you used to save PS TO GEOS.ML. After a short duration, PS to GEOS will be created, replacing the ML file created by *Flankspeed*.

DRIVING THE PROGRAM

PS to GEOS can be loaded by double clicking its icon from the GEOS deskTop. The first dialog box tells you to insert a *Print Shop* graphics disk. The next asks you to enter the name of the graphic you want converted. If you are unsure of the name, press RETURN and the names will be displayed one at a time until you see the one you are looking for. After choosing a name, you are told to place a GEOS work disk into the drive. Then the graphic is converted into GEOS format and saved in a Photo Scrap file. Note: if the disk contains a Photo Scrap file with information you wish to keep, save it in a Photo Album or rename the file before using PS to GEOS.

As with all other GEOS applications, PS to GEOS will reload the deskTop when it's finished.

Give PS to GEOS a drive, and I'm sure you'll agree that it does handle itself well in GEOS' world. □

SEE PROGRAM LISTING ON PAGE 95

RENTING: THE ART OF SPENDING A LITTLE TO SAVE A LOT!

At Wedgwood Rental we have made renting software an art. We have over 500 titles for the C-64, C-128, and Amiga Computers. By spending a little to rent you can use the latest software to find the programs you like. Then purchase only those used programs you know you want at less than retail prices.
CALL TODAY FOR A LIST!

Call toll-free outside Texas: 1-800-433-2938
— Inside Texas call: 817-292-7396



WEDGWOOD RENTAL
5316 Woodway Drive
Fort Worth, Texas 76133



Reader Service No. 197

COMMODORE 128 OWNERS THE REVISED CLONE ENDS THE SOFTWARE BACK-UP BLUES!

The complete update to the 1571 Clone is now being shipped. Our new manual is almost 50 pages long and explains all aspects. We improved the GCR & Nibble copiers and added a MFM Copy (back up IBM disks on Commodore?). The expansion section has over 50 files. Included is a block editor, auto boot maker, single or 2 side copy, copy to alt. sides, track analysis (sync marks, density, block size, GCR data, Hex data), bulk erase, format, copy & combine files, plus more. Over 25 selections from menus. Use with a 1 or 2 1571 drive system.

STILL ONLY \$49.95

BACKS-UP MOST EVERYTHING

WE'LL STILL GIVE YOU \$10 TRADE
FOR YOUR OBSOLETE COPY DISK



Available from
Micro-W.
DISTRIBUTING, INC.
1342B Route 23
Butler, N.J. 07405
CALL: (201) 838-9027

\$10 UPGRADE for all
registered 1571 CLONE
MACHINE Owners
VISA • MASTERCARD
DEALER & DIST INQUIRES

Reader Service No. 198

AHOY! 51

Explore the Potential of Amiga!

AmiExpo

NEW YORK
October 10-12, 1987

LOS ANGELES
January 22-24, 1988

CHICAGO
July 22-24, 1988

Featuring

Keynote Sessions

Jay Miner, the Father of the Amiga™, will open the New York AmiEXPO. *R. J. Mical*, the Designer of Intuition, will provide insights into software development.

Exhibition Hall

A sampling of exhibitors:

Activision, Inc.
Amazing Computing
Amigo Business Computers
ASDG, Inc.
Brown-Wagh Publishing
Byte by Byte
Central Coast Software
Computer Systems Associates
Creative Microsystems, Inc.
Firebird Licensees, Inc.
Lattice, Inc.
Liquid Light, Inc.
Manx Software Systems
Microillusions
NewTek, Inc.
New Horizons Software
PiM Publications, Inc.
Octree Software
Word Perfect Corporation

Amiga™ is a registered trademark of
Commodore-Amiga, Inc.

Development Forums

Intensive working sessions with the leading Amiga developers, such as *NewTek*, detailing specific products.

User Seminars

- The Architect's Amiga
- Art Direction and the Amiga
- The Amiga in Video Production
- Amiga MIDI: Lights, Sound, Action!
- The Ultimate Game Machine, Amiga
- Amiga's Desktop Color Publishing
- "Vax in a Box" - Amiga Engineering

* AND MORE *

For information call 800-32-AMIGA (in New York call 212-867-4663) or complete the form and return it to:

AmiEXPO Headquarters

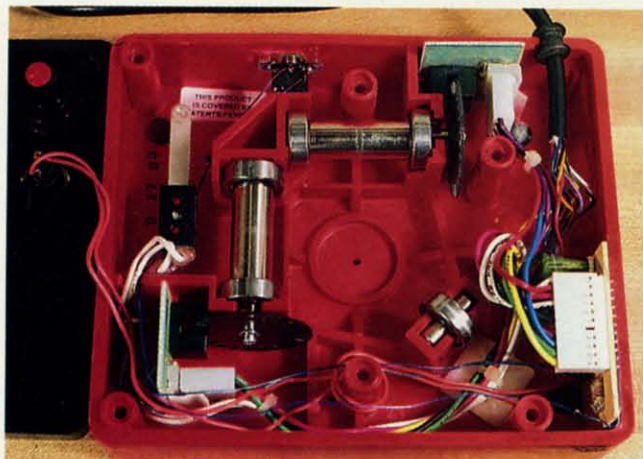
YES! Send me more info on AmiEXPO!	
Name	_____
Company	_____
Address	_____ _____ _____
Telephone	_____

AmiExpo

Return form to:
AmiEXPO Headquarters
211 East 43rd Street, Suite 301
New York, New York 10017

ROLLING YOUR OWN: TURNING YOUR TRACKBALL INTO A MOUSE

By Morton Kvelson



A Zebra-modified WICO trackball. The white connector (lower right) is from the optical encoder boards above and left. The associated circuit board has been replaced. The mouse adaptor jack is at top, left of center.

Last month we reviewed the Amiga-modified trackball from Zebra Systems. In view of Zebra's limited supply, and since many of you may already own a trackball which is only gathering moss, we decided to present the details on doing the conversion yourself. Although the circuit is not complex, you will need some skill in electronic construction. You may also need an ohmmeter, or circuit continuity tester, along with the knowledge of how to use it. The accompanying schematic presents the circuit. If you have no problems following it, go ahead. As always, we make no guarantee as to the outcome of this project. You must assume all the risks of damage to your trackball or your computer.

This circuit should work with any Wico trackball. To our knowledge all the Wico trackballs have the same basic hardware. The various models differ only in their electronics, which gives them their computer-specific characteristics. We will be replacing the electronics with our own. We will also show how a second joystick connector should be installed on the trackball to allow the use of the mouse buttons in parallel with the trackball buttons.

Disassembly

Opening up the trackball is simply a matter of turning it over and remov-

ing the six recessed Phillips head screws. Hold or tape the two halves of the case together so that it does not open while it is upside down. The ball is heavy and probably adverse to impact, and the roller bearings are spring mounted. These parts tend to leap out of the trackball under the influence of gravity. If you open the trackball while it is inverted, you will probably never get to see it in its original state.

Carefully examine the insides of the trackball, taking note of all the components and their locations. Notice that the ball rests on three roller bearings. The single bearing roller in the lower right corner is an idler bearing. Each of the two larger bearings, one at the top and one to the left, have a black slotted wheel attached to the end of the shaft. Observe that each of these wheels passes through a black "U" shaped assembly mounted on a small circuit board. These are the optical sensors which convert the rotational motion of the wheels into a series of electrical pulses. There are actually two optical sensors in each assembly. The mechanical spacing of these sensors generates a series of pulses which may be decoded to yield both the speed and direction of rotation of the trackball.

Each optical assembly is equipped with a four wire connector. If you follow the wires you will see that they ter-

Featured This Month:

Rolling Your Own: Turning Your Trackball into a Mouse	53
Space Quest.....	54
Disk-2-Disk	56
Butcher	57

PARTS LIST

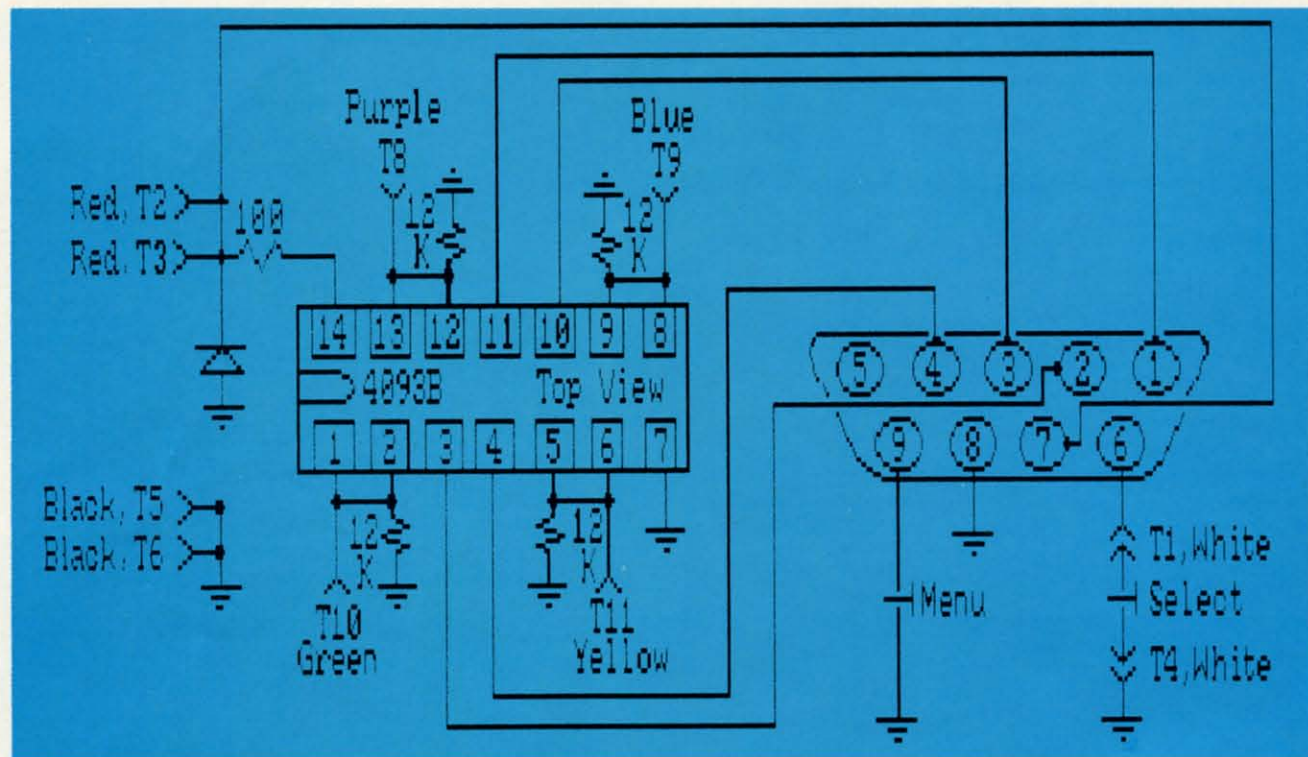
- One 4093B Quad 2-Input NAND Schmitt Trigger (CMOS)
- Four 12000 Ohm resistors
- One 100 Ohm resistor
- One 1N4001 Diode
- One Joystick extension cord (Radio Shack 276-1978)
- Miscellaneous: IC socket, circuit board, push button

minate in an 11 pin connector which also contains the two wires from the trackball's push button. The optical assembly at the top translates vertical rotation of the ball. The sensor to the left translates horizontal rotation.

If your trackball has two push buttons, the wires from the second button will be terminated separately. The cable assembly is terminated on a 1½ by 2" circuit board fitted into a pair of slots at the lower right hand corner. The joystick cable is terminated here as well. This circuit board will be removed and replaced by the circuit on the accompanying schematic.

Assembly Notes

If you are using an Atari style trackball you will have to replace the joystick cable. The Amiga mouse requires eight wires in the joystick cable, one more than in the cable supplied with the Atari version. We suggest using a 10' joystick extension cable for this purpose. Before cutting this cable in two, give some thought to the length of wire you will need for your setup. The female connector will be used for the Amiga's mouse port. The male connec-



Notes:

1. Terminals T1-T11 and the associated wire colors correspond to the wiring of the trackball's internal connector.
2. The joystick pin arrangement is viewed from the end of the cable which is terminated in the female connector.
3. To use the mouse buttons with the trackball, connect pins 6, 8, and 9 of the cable terminated in the male connector to the corresponding pins inside the trackball.

SPACE QUEST

Sierra On-Line

Amiga (512K)

Disk; \$49.95

The introduction of the Amiga and other 68000-based home micros marks the dawn of a golden age of computer adventures. Game formats developed within the limitations of the 6502 machines have provided the foundation for the more complex authoring systems publishers are currently unveiling.

Computer adventures are benefiting greatly from the expanded memory and enhanced audiovisual effects of 16-bit

computers such as the Amiga. Designers who once cut plots to the bone and nervously counted each animation for fear of exhausting memory can now create adventures which rival novels in depth and complexity.

The play-mechanics of *Space Quest* is the latest permutation of the system Sierra introduced in 1984 in Roberta Williams' *King's Quest*. This groundbreaking fantasy epic blended outstanding animated illustration, a fluid joystick control system, and a parser to produce a dynamic, real-time gaming experience.

The Game System

Jeff Stephenson, who programmed this edition of *Space Quest*, was co-designer with Chris Iden of the overall system. It features pop-up text windows, multiple solutions to some of the puzzles, and pseudo-3-D animated graphics. The parser interprets compound sentences, which makes it easier to perform activities such as giving an item to another character. Function keys make it simple to repeat a

command, erase a line, pause the action, save or restore a game-in-progress, or start over from scratch.

A status line at the top of the screen shows the player's current score, the maximum attainable number of points, and whether the suitably stirring music is toggled "on" or "off." Clicking the righthand mouse button activates a menu bar which duplicates the effects of most of the function keys.

The solitary gamer guides *Space Quest's* protagonist with the mouse, a joystick, or the keypad, and enters action commands through the keyboard.



Space Quest: janitor in a conundrum.
READER SERVICE NO. 172



Touches of sarcasm and irony keep the adventure from getting too solemn.

MOUSEPORT

Pin Function

- 1 Vertical
- 2 Horizontal
- 3 Vertical Quadrature
- 4 Horizontal Quadrature
- 5 Mouse Button 2 (not used)
- 6 Mouse Button 1 (left/select)
- 7 +5 Volts
- 8 Ground
- 9 Mouse Button 3 (right/menu)

TRACKBALL CONNECTOR

Wire Color Function

- T1 White Select push button
- T2 Red +5 Volt, vertical
- T3 Red +5 Volt, horizontal
- T4 White Select push button
- T5 Black Ground, horizontal
- T6 Black Ground, vertical
- T7 (No connection)
- T8 Purple Vertical #1
- T9 Blue Vertical #2
- T10 Green Horizontal #1
- T11 Yellow Horizontal #2

tor will be used for the mouse extension to which the Amiga mouse may be reconnected.

If you are installing a second push button, take careful note of the trackball's construction. Although there is plenty of empty space inside the trackball, there are numerous projections from the inside of its case. A possible location for the second button is right beneath the first and above the plastic cable clamp projection inside the case. If you are installing the mouse connector, a good place for the cable hole is directly below the existing cable. You should pass the entire cable through the hole, although only three wires are used for the mouse push buttons.

We will leave the actual layout of the circuit board to your own ingenuity. The schematic and the adjacent tables include the functions of and the wire colors for the trackball's wiring harness. We have also tabulated the functions of the Amiga's mouseport. We suggest you retain the original connector and use an 11 pin header (0.1 inch spacing) with your design. The total cost for parts for this project should be less than \$10.00.

Instead of directly controlling the hero, the mouse, pad, or stick moves a small pointer around the screen. When the user holds down the left button, the figure on the screen moves toward the pointer. Another click causes it to stop in place. This system, though exceptionally straightforward, is not always easy to work. The novice can expect to spend some time running into door jambs, walls, and objects while learning to steer with precision.

The program's text output appears in the center of the screen in pop-up windows, which makes messages much easier to read than in adventures which print them in the same message box which accepts typed input. Hitting RETURN or clicking the appropriate controller button removes the latest block of text.

Illustration is excellent for the most part, but the main character could have more detail and move more naturally. A nagging problem is that there are no printed "room descriptions" as such in *Space Quest*. The computerist can use the parser to "look" at items or "exam-

ine" them and get a well-written explanation. Unfortunately, it isn't always easy to tell what an object is supposed to be or, worse, what the designers have called it. Sessions of "guess the word" disrupt the flow of the plot and may cause some frustration.

The Story

The Star Generator is a super-scientific device which can turn a lifeless planet into a new star. It represents nothing less than salvation to the people of Earnon, whose own sun is slowly dying.

Scientists on the governing planet Xenon, working on the spacelab Arcada, have just perfected the Star Generator. But before they can use it to rescue Earnon, the piratical Sariens strike! These renegades from Earnon swarm over the Arcada, kill everyone they meet, and try to carry the Star Generator to their battle cruiser Deltaur.

And you? Why, you're a janitor on the Arcada. While you slumber in a storage closet, ducking your work as usual, the Sariens launch their attack.

WHAT HAPPENED WHEN YOU WERE BORN

You can find out with the

TIME TRAVELER

computer program from NCI. Tells you Academy Awards, World Series winners, prices, presidents, headlines, annual income, avg. cost of home, calendar, much more. 1900-1986. Sell printout at flea mkt., shows, by mail. Great party gift. Send \$39 for disk, or \$1+SASE for printout. Also includes TRIVIA game. Educational, interesting. For C64 & 128 with any printer. Not copy protected.

FAST 1541. Cartridge makes 1541 load AND save 5x faster. Adds new commands: dload, dsave, scratch, directory, back-up, rename, append, record#, collect. \$25.

NCI **NATIONWIDE
COMPUTER
INDUSTRIES**

205 McCormick Avenue
Hawkinsville, Georgia 31036
Telephone 1-912-783-1158
Visa/MC/Check

Reader Service No. 185

With most of the crew and scientists dead, it's up to you to save the day! To win *Space Quest*, the hero must escape the Arcada with his life, visit the planet Kerona, meet a society of super-intelligent subterraneans, and penetrate the Sariens' battle cruiser.

The attitude of designers Scott Murphy and Mark Crowe toward their subject matter can be guessed from the fact that they call their team "Two Guys from Andromeda." Sarcasm and irony keep *Space Quest* from getting too solemn and inspire the gamer to the kind of freewheeling action which meshes perfectly with the style of the story. The overall mood can be likened to movies such as "Star Wars" and "Raiders of the Lost Ark," with a somewhat greater emphasis on humor.

Space Quest is involving, challenging, and sometimes even laugh-out-loud funny. It's a potent mixture calculated to provide many hours of entertaining adventuring for Amiga owners.

Sierra On-Line, P.O. Box 485, Coarsegold, CA 93615 (phone: 209-683-6858).

—Arnie Katz

AHOY! 55

DISK-2-DISK

Central Coast Software

Amiga with 1020 Disk Drive

Price: \$49.95

In the June 1987 issue we described a method for the bidirectional transfer of files from 1541 format disks to Amiga format disks (*C-64 to Amiga File Transfer*, p. 51) which did not require the use of a telecommunications channel. The procedure required a C-128 computer with a 1571 disk drive, an Amiga with a 1020 disk drive, *DOS-2-DOS* from Central Coast Software, and *Big Blue Reader* from S.O.G.W.A.P. Software. In the same issue we included reviews of both the aforementioned format conversion programs.

At the time we felt we were pretty clever putting together such a diverse collection of hardware and software to solve a common problem. In fact, Commodore also thought the idea was clever, as they intend to distribute copies of the article to all their dealers as an example of the versatility of both computer systems. As a result we were somewhat nonplussed by the arrival of a review copy of *Disk-2-Disk* from Central Coast Software. It seemed as if Central Coast Software had gone ahead and eliminated the need for our carefully choreographed procedure with a single disk. We did breathe a small sigh of relief as we noted that this time the ink had a chance to dry on our report before we had to start again.

In brief, *Disk-2-Disk* eliminates the intermediate step (using the IBM disk format) in our previous article. *Disk-2-Disk* endows an Amiga and a 1020 disk drive with the ability to read and write 1541 format or 1571 format disks.

Unlike *DOS-2-DOS*, which employs a command line user interface, *Disk-2-Disk* has adopted a full-blown Amiga-style, mouse-driven, gadget-laden operating window. Directories from both the source and destination disks are automatically displayed in their respective windows. Files are selected by pointing and clicking. The keyboard is used only for changing file names or entering the wild card characters for batch operations.

Four types of file transfers are provided. One is a direct transfer without any data conversion. The next two involve the translation of PETSCII to

ASCII. The translation may be done from upper/lower case PETSCII or from upper case/graphics PETSCII. The file translation also includes the conversion of all carriage returns (CHR\$(13)) on the 1541 side to linefeeds (CHR\$(10)) on the Amiga side. As a rule the C-64 uses the carriage return as a paragraph marker while the Amiga requires a linefeed. Interestingly enough, this last feature is not mentioned in any of the documentation which accompanied *Disk-2-Disk*.

The fourth type of file transfer is for use on BASIC 2.0 or BASIC 7.0 files which have been saved as sequential text files. This translation does several things. To begin with, spaces are inserted between all BASIC keywords. These spaces are required by AmigaBASIC, but are optional on the C-64 or C-128. Next, all BASIC keywords which are not valid in AmigaBASIC are flagged by preceding them with a REM***. These steps give you a good start towards converting the file to AmigaBASIC. Finally, a BASIC program icon is created for the file.

Disk-2-Disk recognizes all of the 1541 file types. The only limitation is with relative files, where *Disk-2-Disk* ignores the side sector data.

Disk-2-Disk is even able to format 1541 single sided or 1571 double sided disks. However, there are some significant limitations to what can be done with the Amiga 1020 when it comes to formatting and writing to a 1541 format disk. Most other disk formats read and write data from and to the disk at a constant rate. This means that each track will contain the same amount of data even though simple geometry shows that the outer tracks of a disk are physically longer than the inner tracks. Thus for most disk formats the data density on the disk varies with the track with the highest density at the center of the disk.

The 1541/1571 reads and writes data from and to the disk at varying rates, four different rates to be exact. The fastest data rate is associated with the outer tracks (1-17). The slowest data rate is used on the inner tracks (31-35). Intermediate data rates are used for tracks 18-24 and 25-30. As a result the outer tracks of a 1541 disk contain more data than the inner tracks. This is generally

referred to as variable density recording, a term which is somewhat misleading. A better description would be variable rate recording, in fact the data density between the inner and outer tracks, as recorded on a 1541 formatted disk, is actually more uniform than the densities which result from constant data rate recording.

What it all comes down to is that due to hardware limitations of the Amiga 1020 disk drive, *Disk-2-Disk* will only format tracks 18-35/53-70 on a 1541/1571 format disk. When writing to the disk, preference is given to tracks 18-35 with tracks 1-17 being reserved for the last. On the other hand there does not seem to be a similar limitation going in the other direction. *Disk-2-Disk* is perfectly capable of reading any track on a 1541 format disk. This means that the largest files which can be transferred from the Amiga to a 1541 disk which is formatted by *Disk-2-Disk* have to be less than half the capacity of the 1541 disk.

Within the aforementioned limitations, *Disk-2-Disk* provides for substantial control of the file transfer process. Text files may be viewed on the Amiga display. Since the various ASCII-PETSCII translations are in effect while viewing, the results can be used to determine which type of translation to use. On the 1541 side the format check scans a disk for errors. The BAM check verifies that all the files on a disk have been properly allocated in the block availability map.

Our tryout of *Disk-2-Disk* was not without problems. We were never able to get the 1541 format routine to work. Transfers from the Amiga to the 1541 seemed to fail about half the time. On the other hand transfers from the 1541 to the Amiga were done without any difficulty.

We spoke to Richard Chamberlain of Central Coast Software about these problems. He indicated that *Disk-2-Disk* was very sensitive to the disk media when writing or formatting in 1541 mode. Some disk brands would not work at all while other brands worked just fine. The only solution is to experiment until you find a brand that works. The recommended procedure is to preformat the disks on a 1541 or 1571 disk drive. Amiga files should be



The Disk-2-Disk working window. 1541 files are to the left. Size of 1541 files is estimated using 254 bytes per block. **READER SERVICE NO. 192**

transferred only to disks which contain non-critical data or to disks which have been previously backed up.

Mr. Chamberlain also indicated that the next release of *Disk-2-Disk* would contain some additional file conversion options. These would handle the conversion of word processor files which were saved using the C-64 screen codes instead of PETSCII. In particular, support is being provided for *PaperClip*, *Pocket Writer*, and *Speedscript*.

In conclusion, if you already have the setup which we described in *C-64 to Amiga File Transfer*, we see little reason to add *Disk-2-Disk* to your setup. If you do not have a 1571 disk drive or a C-128 computer, then *Disk-2-Disk* is your only option for direct disk transfers at this time. *Disk-2-Disk* will also be of interest to users who have traded in their C-64 for an Amiga. Due to the limitations of the Amiga 1020 disk drive when writing 1541 files, we recommend that *Disk-2-Disk* only be considered if your primary purpose is transferring files to the Amiga.

Central Coast Software offers one more option for users who do not own an Amiga 1020 disk drive. For a service charge of \$15 per order plus \$6.50 per disk they will convert your 1541 format disks to Amiga format disks. These prices include the 3.5" diskettes and return shipping via UPS surface.

This service is intended for users with a limited number of files to transfer, which does not justify the investment in an Amiga 1020 disk drive.

Central Coast Software, 268 Bowie Drive, Los Osos, CA 93402 (phone: 805-528-4906). —Morton Kevelson

BUTCHER Eagle Tree Software Amiga with 512K Price: \$37.00

Butcher may be described as a bit plane cleaver. However, such a description would be inadequate, as *Butcher* does far more than cleave bit planes. *Butcher* is a collection of image processing utilities for graphics saved in the Amiga's IFF format, of which bit plane cleaving is only one function. *Butcher* will work with all of the Amiga's standard graphic formats, ranging from single bit plane (two color), high-resolution/interlaced (640 × 400 pixels) image to six bit plane, hold and modify (4096 color) low-resolution (320 × 400) image. It will automatically adjust the display mode to accommodate the image format to be worked up.

The interface between the user and *Butcher* follows the Amiga's Workbench conventions. Access to all functions is through a collection of drop-down menus. Custom requestors are provided for all functions which require additional user input. Requestors are fitted with an ample supply of button and slider gadgets. Many functions can also be directly accessed by pressing

COPY II[®] 64/128

BACKUP PROTECTED SOFTWARE FAST.

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 64/128 computers.

- Copies many protected programs — automatically. (We update Copy II 64/128 regularly to handle new protections; you as a registered owner may update at any time for \$15 plus \$3 s/h.)
- Copies even protected disks in under 2 minutes (single drive).
- Copies even protected disks in under 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.

Call 503/244-5782, M—F, 8—5 (West Coast time) with your in hand. Or send a check for \$39.95 U.S. plus \$3 s/h, \$8 overseas.

\$39.95

Central Point Software, Inc.
9700 S.W. Capitol Hwy. #100
Portland, OR 97219

*Central Point
Software*
INCORPORATED

Backup utilities also available for the IBM, Apple II, Macintosh and Atari ST.
This product is provided for the purpose of enabling you to make archival copies only.

the Right Amiga key in combination with another key. We have included a table of *Butcher's* menu options as a quick summary of its functions.

can be done with a full-featured program such as *Deluxe Paint*. Of course the Draw function is only meant to be a convenience feature for minor adjust-

setting determines the sensitivity of the edge algorithm. A setting of zero will set an edge whenever a pixel differs from its neighbor. At the maximum setting edges are detected only between pure black and white pixels.

The Edge requestor offers several ways to display the image. The Map selection draws only the edges converting the picture into a line drawing. The map may be drawn in the darkest palette color against a background of the lightest color or in the reverse. Or the map may be drawn in the colors of the edge pixels. The Darkness slider adjusts the intensity of the selected edge colors. Choosing Enhance applies the edges to the picture itself.

Map operations involve a large number of repetitive calculations which require a substantial amount of time. We used a four bit plane, 640 by 400 pixel image to estimate the time required for various operations. A monochrome map required nearly five minutes. A color map took approximately seven minutes.

The Filter function removes isolated pixels or groups of isolated pixels. The size of the group is adjustable. Filtering is done only on the selected color and may be limited to a portion of the image. Filter operations were fairly quick: 10 seconds with our sample.

The Mosaic function converts the picture into blocks of colors. It effectively increases the size of the pixels. The size of the blocking is adjustable. The time for a Mosaic operation varied with the block size. Using a 2 by 2 pixel block required nearly 1½ minutes. A 50 by 50 pixel block size was done in one second.

The Slice Plane option is the bit plane cleaver function we referred to at the start of this review. One or more bit planes may be removed in any combination, and individual bit planes may be examined. Slice plane operations are

BUTCHER'S MENU OPTIONS

Project	Tools	Process	Convert	Slice
Load	Undo	Edge	Histogram	400 to 200
Save	Draw	Filter	Quick Merge	200 to 400
Save As	Reverse	Mosaic	Auto Merge	640 to 320
Print	Flip	Slice Plane	Auto Chop	320 to 640
Print Part	Palette 1	Density Slice	Change Depth	
Ask Mode	Palette 2		Lo-res to HAM	
Title	Palette 3		HAM to Lo-res	
Clear	Make Palette			
Quit				

With a few exceptions the items in the first menu column should be familiar to users of any Amiga paint program. The Print Part function lets you select a portion of the image and dump it to the printer. Choosing the Normal option under the Print Part function will dump the selected part according to the Preferences setting with dimensions as if the entire image were being printed. Choosing the Enlarged option will dump the selected portion so as to fill the dimensions as set in Preferences. The Enlarged option should permit the printing of an image in sections for subsequent pasteup to a larger size. Unfortunately the portion selection process does not include a coordinate display, making precise selection of symmetrical portions difficult.

The Ask Mode options responds with the current display mode and the number of bit planes in the picture. Only standard size bit maps (320 × 200, 320 × 400, 640 × 200, 640 × 400, 320 × 200 HAM) were supported by the version of *Butcher* looked at. Pictures with other dimensions (brushes), Dual Playfield Mode, and Extra Half-Bright Mode cannot be modified by *Butcher*. Hold and Modify mode images may be converted to low resolution images and vice versa. However, most of *Butcher's* functions will not work directly on HAM images.

In the Tools menu the Draw function turns *Butcher* into a rudimentary bit map drawing program. The drawing functions include freehand sketching, lines, filled and unfilled boxes, and area fills. This is a long way from what

ments. *Butcher* is not intended to be used as a drawing package.

Butcher maintains three palettes for the current image. Palettes may be copied from one to another, or they can remain completely independent. The Make Palette function provides for the total control of the image's color content. There are the usual settings for the adjustment of individual colors via red, green, and blue or hue, saturation, and value slider gadgets. The colors may also be sorted in ascending or descending order according to their relative intensity. In *Butcher*, intensity is defined as the sum of the red, green, and blue values.

The Make Palette requestor also contains a set of generalized color controls. These controls affect the red, green, and blue content or the hue, saturation, and value of all the colors in the image. This makes it easy to quickly adjust the overall appearance of an image. The adjustment range of the generalized controls is from -15 to +15.

The process menu encompasses several *Butcher* functions. The Edge function mathematically determines which pixels are part of an edge. A threshold



practically instantaneous.

The Density Slice function treats the palette as a series of intensity levels ranging from black to white. Setting a point on this intensity scale results in a two color image. The set point may be slid up or down the scale. Density Slicing is a nearly instantaneous operation. The Density Slice Function supports two set points. If both are used the image may be divided up into four areas with each area a different color. The pseudocolors used by the Density Slice function are black, red, green, and yellow. Density Slicing may also be done in color. In this case the darker colors are progressively replaced with black as the slicing point is raised.

The Histogram function generates a pixel count for each color in the palette. The results are displayed as a bar graph of the relative totals. The Use button on the Histogram requestor gives an exact pixel count as well as

a percentage of the total. The Histogram offers several options. A Merge operation changes all the pixels of one color into another. A Blend operation is similar to a merge except the resulting colors depend on the relative proportions of the original colors. The entire palette may also be sorted according to the number of pixels in each color. All operations can be performed on a selected portion of the image.

The Auto Merge function automatically merges, blends, and sorts the colors until the selected maximum number of colors has been achieved. The colors which are now devoid of pixels may now be redefined without changing the resulting image.

The Auto Chop function performs an Auto Merge till the number of colors in the palette has been reduced to fit in the specified number of bit planes. The Change Depth function discards bit planes without any regard

for the resulting colors.

The remaining menu items are self-explanatory. Note that for best results the Auto Chop or Auto Merge functions should be used before using a Slice function, which will reduce the number of bit planes.

Butcher is designed to multitask with other Amiga programs, but we did encounter some bugs. An attempt to access Preferences to adjust the printer settings while running *Butcher* brought us a visit from the Guru. *Butcher* is not copy protected and can be easily transferred to other work disks. The program occupies less than 80,000 bytes of disk space. As a rule graphic operations are memory-intensive. Although additional fast RAM is not mandatory, it's recommended for work with high resolution images. *Butcher* maintains several copies of an image to support the various undo options.

Butcher is a useful tool that no Amiga Graphic artist should be without.

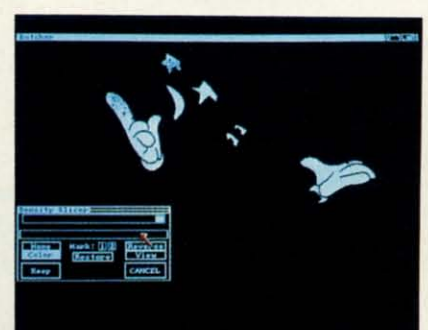
Eagle Tree Software, P.O. Box 164, Hopewell, VA 23860 (phone: 804-452-0623).

—Morton Kevelson



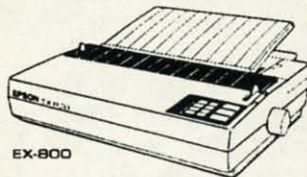
At extreme left is a sample Histogram, followed by a series of four successive steps of a Density Slice operation in color. The large image at left is an Edge/Map operation in color, while directly above is the result of a Mosaic operation.

READER SERVICE NO. 193



Disk Drive Problems?

SAVE Time and \$ with Physical Exam
Test Speed, Alignment and Stop position on your Commodore Disk Drive. Complete illustrated instructions to make necessary adjustments yourself! Specify drive, 1541, 1571, 8050, 8250, 4040, SFD 1001. Physical Exam \$39.95 each + shipping.



Epson Printers

LX-800	\$196
FX-86E	\$335
FX-286	\$489
EX-800	\$438
LQ-800	\$489
GQ-3500	\$1695

Professional Signs created with your C64/128 and printer. Great for school presentations, pointing out locations, advertising events and sales. The Banner Machine with 5 fonts \$49.95.



The Banner Machine: with 5 letter styles in 8 sizes. Format left, center, right, tab and justify. 8 sizes of borders and 15 textured background shades. Banners can be saved on disk. The Banner Machine \$49.95 Additional fonts available.

Cardinal Software
14840 Build America Dr.
Woodbridge, VA 22191
Info: (703) 491-6494
Order Toll Free
800 762-5645

Reader Service No. 202

THE WORLD OF COMMODORE



The 1986 Canadian World Of Commodore show was the largest and best attended show in Commodore International's history. With 350 booths and attendance of over 38,000 users it was larger than any other Commodore show in the World — and this year's show will be even larger.

World of Commodore is designed specifically to appeal to the interests and needs of present and potential Commodore owners — from hardware to software, Business to Personal to Educational.

Exhibitors: Write or phone today to find out how you can take part in the World's largest Commodore Show.

For information contact:
The Hunter Group Inc.
(416) 595-5906

**INTERNATIONAL CENTRE
DECEMBER 3-7 '87
TORONTO
CANADA**

RED ALERT

For the C-64

By Tony Brantner



Red Alert takes its cue from the arcade classic *Missile Command*. The object of the game is to defend six cities and your missile base from the enemy missiles falling from the sky.

Use *Flankspeed* (page 79) to type in and save a copy of *Red Alert*. After loading the program, type SYS 49152 and press RETURN to start. At the lower center of the screen is your missile base. There are three cities on each side of the base which you have to defend. The score, current wave number, and high score are shown at the bottom of the screen.

Using a joystick plugged into Port 2, press the fire button to erase the flashing title and begin play. Above the missile base is a cursor. Use the joystick to move the cursor around the screen, and press the fire button to launch a missile from the base. The missile locks onto the coordinates of the cursor, and explodes when it reaches its destination. Any enemy missiles that are within range are destroyed. Once a missile is launched, you can move the cursor and get ready to fire another once the first is detonated. You earn 10 points multiplied by the current wave for each enemy missile destroyed.

Each wave consists of a random number of missiles being dropped. While it's important to protect the cities, protecting your missile base is essential. If the base is wiped out, you are helpless until the wave ends. At the end of the wave, you are awarded an additional 100 points for every city left standing. For every 10,000 points, a short tune plays, and you receive a bonus city. If all six cities are still standing, the bonus city is saved until you need it. There are a maximum of 20 waves, and you can toggle the SHIFT-LOCK key to freeze the game. □

SEE PROGRAM LISTING ON PAGE 89

By Tim Little

Send your questions about any aspect of Commodore computing to S.O.S., c/o Ahoy! Magazine, Ion International Inc., 45 West 34th Street—Suite 500, New York, NY 10001.

I have noticed that most of your *Flankspeed* listings chop off the end of the line, and won't enter correctly because of that. Also, why don't your ending addresses always correspond to the last line of your *Flankspeed* listings?

—Frank Dobson
Lubbock, TX

Flankspeed is just a data entry program. You tell it where in memory to store a program, and then you enter all the data. The program actually stores the data and uses a rudimentary checksum formula to prevent most typing mistakes.

Let us take this line as an example:

C000: A9 08 20 D2 FF 20 D5 C4 5F

The C000 is the hexadecimal address of the first byte of that row of numbers. The address of the second byte, 08, will thus be C001, the third byte, 20, will be stored at C002, and so on. The last byte on that line that will be stored is C4, which is byte C007. This leaves 5F, the last number on the line, unaccounted for. This number is the checksum. It allows *Flankspeed* to make sure that what you just typed is correct.

Thus, when you see an ending address at the start of the program listing, it refers to the address of where the last byte will be stored, which may or may not be the same as the number that is printed at the start of the last line. In fact, the only way you would have a full final line would be if the ending address were to end with either a '7' or an 'F'.

I have bought a few of the *Ahoy!* diskettes, and I have also entered a few programs from your magazine by hand. But when I try to LOAD any ML programs and RUN them, all I get is a syntax error in some line I didn't enter, or just the READY prompt.

When I try listing the program, all I get is garbage on the screen, or just the READY again. What am I doing wrong?

—Lynn Kidder
Albany, NY

All ML (machine language) programs must be loaded into the computer by typing

LOAD "filename",8,1 (disk)

or

LOAD "filename",1,1 (tape)

Notice the '1' on the end; that is not optional with machine language programs. If you omit the '1' and you try to execute the program or try just to list it, very strange

things happen. The worst that could happen is that your computer will lock up, and you will have to reset it.

The correct way to execute these programs is to enter the proper SYS command after you have loaded them. The correct SYS number is printed in the magazine with the program, or in the article.

After having typed several issues' worth of programs into the computer, and having saved all of them onto my cassette drive, I find that I want to transfer them to my disk drive.

I have no problems transferring my BASIC *Ahoy!* programs, but how can I transfer my ML programs to disk from tape, or from one disk to another? —Wally Levy
Tacoma, WA

To transfer from tape to disk, just LOAD and RUN *Flankspeed*. Then enter the starting and ending addresses as printed with the program you wish to transfer. Then hit F3 to load the program. When done, just hit F1 to save it, and when prompted for [D]isk or [T]ape, enter D for disk.

To transfer ML programs between disks, LOAD and RUN *Flankspeed*, enter the starting and ending addresses and hit F3 to load the program, insert the disk with the program on it, and answer the prompts. Then when the program is finished loading, hit F1 to save it, insert the disk that you want to copy the program onto, and answer the prompts.



Real Computer Bugs

Continued from page 40

C-128 version:

```
930 DRAW,RND(0)*320,RND(0)*200
```

PC version:

```
930 PSET(RND*320,RND*200)
```

Benchmark #10 draws 100 random lines. The two versions are listed with the C-128 version first:

```
1030 DRAW,RND(0)*320,RND(0)*200 TO RND(0)*320,RND(0)*200
1030 LINE(RND*320,RND*200)-(RND*320,RND*200)
```

Finally, Benchmark #11 draws 50 circles with random centers and random radii less than 50 units. The two versions are as follows with the C-128 version first:

```
1130 CIRCLE,RND(0)*320,RND(0)*200,RND(0)*50
1130 CIRCLE (RND*320,RND*200),RND*50
```

If you are using the 40-column screen on the C-128, you should remove the GRAPHIC 5 statements from lines 950, 1050, and 1150.

1541/1571 Drive Alignment

1541/1571 Drive Alignment reports the alignment condition of the disk drive as you perform adjustments. On screen help is available while the program is running. Includes features for speed adjustment and stop adjustment. Complete instruction manual on aligning both 1541 and 1571 drives. Even includes instructions on how to load alignment program when nothing else will load! Works on the C64, SX64, C128 in 64 or 128 mode, 1541, 1571 in either 1541 or 1571 mode! Autoboots to all modes. Second disk drive fully supported. Program disk, calibration disk and instruction manual only \$34.95!

Super Disk Utilities

Super Disk Utilities is the ultimate utilities disk for the 1571 disk drive and C128 computer. An 80 column monitor is required. SDU will copy whole disks (with 1 or 2 drives), perform many CP/M and MS-DOS utility functions, edit any track or sector, trace files, copy files, rename a disk, rename a file, change disk format (without affecting data), scratch or unscratch files, lock or unlock files, erase a track or a whole disk, create auto-boot, assemble/disassemble drive RAM or ROM, analyze disk format, format in MFM, CPM+, 1541, or 1571 format, reads CPM+ directories, contains a 1571 drive monitor, fully supports a second 1571 drive, performs direct DOS commands and much, much more! Options window displays all choices available at any given time. Many utilities also work on the 1541 drive. No need for numerous utility disks! SDU does it all! Only \$39.95!

Free shipping & handling! No surcharge for credit card orders! Immediate shipping! Illinois residents add 8% sales tax. Order from:

Free Spirit Software, Inc.
538 S. Edgewood
La Grange, IL 60525
(312) 352-7323



The C-128 is slightly slower than the PC in plotting points and drawing lines, but it is much slower in drawing circles. Plotting points on a circle is a computation-intensive task. The six to one ratio in times could be because of different algorithms in the two machines. More likely it is because the 8088 processor in the PC has built-in multiply and divide operations which speed up the heavy calculations.

CONCLUSIONS

The conclusions are up to you. The C-128 has sound and sprite graphics features which the standard PC cannot touch, although the PC allows expansion boards to provide almost any capability imaginable. The C-128 in FAST mode runs BASIC programs at roughly the same speeds as the PC. Disk access on the IBM PC is much faster than on the C-128. Disk access speed of the PC10 may be slower than the IBM PC the tests were run on. For standard programming, the two classes of machines are quite comparable.

It should be noted that there is a new breed of interactive BASIC compiler available for the PC (Microsoft *QuickBasic* and Borland *Turbo BASIC*) which gives the PC a significant speed and debugging advantage over every BASIC interpreter on any machine. If you are a serious BASIC programmer, one of these compilers could be reason enough to buy a PC.

The biggest advantages of the C-128 over the PC are basic price, sound, and graphics. The PC's biggest advantages are its expandability, 640K of RAM, and the wealth of technical, high-quality software and hardware available. The PC can readily handle data and software many times larger than the C-128 can. Some programs on the PC come with help files larger than 200K bytes, for example. It should be noted that software for the PC is generally more expensive than C-128 software, since much of the PC software is geared for business use.

For the PC, programs listed at \$99 are considered low-priced. The best-selling word processors for the PC list for \$400 to \$500, although they can be bought via mail order for roughly \$200. Spreadsheet programs that cost \$200 to \$300 mail order are commonplace for the PC, although there are some that are closer to \$100.

Hardware for the PC in some cases is less expensive than C-128 hardware. Double-sided floppy disk drives are typically about \$100 for the PC. (Have you ever seen a 1571 for that price?) Hard disks storing 10 megabytes can be bought for under \$300 for the PC. Memory expansion boards providing 256K bytes or more cost less than \$150.

The PC10-2 lists for \$1199 with 640K of RAM and two floppy disk drives. It can be found for under \$900 from some stores. The C-128 and two 1571 disk drives still sells for over \$700 from most sources. Obviously you can get in on the ground floor of computing less expensively with the C-128 (or the C-64), but if you plan to expand much above the basic system, the initial differences in price may not be so significant.

You get a lot of computer for the money with the C-128. From this article, hopefully you have a better understanding of the PC class of computers. The Commodore PC10 "clone killers" also provide a lot of computer for the money. □

SEE PROGRAM LISTING ON PAGE 81

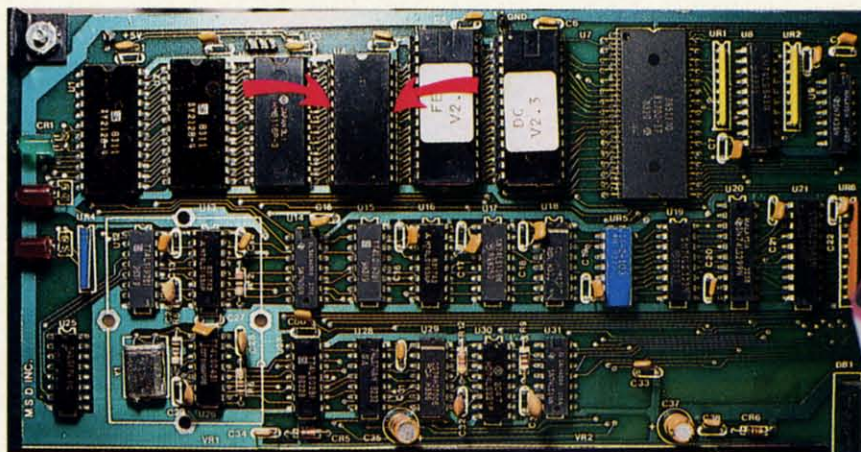
MASS DUPLICATOR Chip Level Designs C-64 with MSD SD-2 Price: \$25.95

It has been over three years since we reported on the MSD SD-2 dual disk drive for the C-64. Since that time MSD has dropped out of the Commodore market entirely. During its brief distribution a fair number of SD-2s were sold. Most of them ended up in the hands of small developers, user groups and individuals with a need for duplicating large quantities, of 1541 format disks. A modest investment in MSD-2 disk drives gives you the ability to go into the business of mass producing C-64 software.

Interestingly enough, the MSD SD-2 has always received some measure of support from the Commodore community. In particular, *Fasthackem* from Basement Boys Software has always included the SD-2 on its main menu. The reason for this support has recently come to our attention. All those thousands of copies of *Fasthackem* sold by the Basement Boys were created on their own SD-2 disk drives.

Although Basement Boys Software seems to have closed up shop, their influence lingers on. The *Mass Duplicator* from Chip Level Designs has been brought to market by Lawrence Hiler, an ex-Basement Boy. It is actually based on a design used by the Basement Boys for their own work.

The *Mass Duplicator* consists of two parts, a 24 pin mystery chip and a software driver on disk. The chip is a mystery due to the fact that its identifying markings have been removed. We quickly ascertained that it was simply two kilobytes of static RAM. The chip is readily installed in an empty spot on the SD-2's main circuit board. The SD-2 was originally designed for 6K of RAM but was ultimately manufactured with only 4K. The circuit board was never changed from the original design and carries all the traces for the additional RAM. This additional 2K of RAM allows the SD-2 to copy an entire track in a single pass.



Mystery chip for the Mass Duplicator installed in the SD-2, between the drive's ROM and RAM chips.
READER SERVICE NO. 175

The *Mass Duplicator's* manual suggests that the chip may be easily installed by simply inserting the provided socket and bending its leads into contact with the circuit board. This is apparently an attempt to avoid the need for soldering skills. We feel that this approach is just asking for trouble. The socket should be soldered to the main circuit board to obtain reliable operation. The circuit board is readily ac-

ing to Lawrence Hiler, the high speed boot routine could only be achieved with a custom disk format. This sounds like a peculiar comment coming from an ex-Basement Boy. It seems to us that for an extra five seconds or so it should have been possible to make a disk which could be backed up.

The *Mass Duplicator* does all that it claims to do. All operations are selected from two full-screen menus.



All operations are chosen from Mass Duplicator's main (left) and nibbler menus.

cessible once the SD-2's cover is removed. The installation should take no more than five minutes.

The extra RAM opens up the possibility for very high speed operation with the proper software, which is provided on the accompanying disk. The driving program boots in less than ten seconds. The last three seconds consists of a screen shimmer which is sure to shake you up the first time you see it. Interestingly enough, the driving software can not be copied. Accord-

There are no fewer than four high speed copiers. The basic copier will duplicate a disk in 15 seconds without verify and in 22 seconds with destination disk verify. This copier will also handle some disk errors, but it will grind to a halt on errors 20, 21, and 22. The quick nibbler will handle most other disks in just 18 seconds.

A second menu screen customizes the nibbler on a track by track basis. This lets you select density (0-3) and number of synchronizing marks (1-99),

and toggles the short sync mode. You are on your own when it comes to determining just what settings will be required for a given task. Other than a table of normal values, no other data is provided on how to implement these options.

The main menu also provides an auto copier and an auto nibbler. This lets the SD-2 duplicate disks without the use of the computer. All the operator has to do is swap disks when the job is done. The version of the *Mass Duplicator* we looked at required that both the source and destination disks be swapped to trigger the auto copiers. Mr. Hiler has indicated that this will be changed so that only the destination disk has to be swapped. This would make much more sense for generating multiple copies of a single disk.

Mass Duplicator also takes the wait out of disk formatting, as two disks with unique names and IDs may be simultaneously formatted in just nine seconds.

Chip Level Designs is now shipping a replacement ROM for the MSD SD-2. This adds fast copy (15 seconds) and fast copy with verify (22 seconds) commands to the drive's repertoire. As of this writing we are still waiting for our copy of this chip.

The *Mass Duplicator* is an effective low cost utility for the SD-2 disk drive. Our sample has already received considerable use since its arrival a short while ago. If you currently have regular use for the MSD SD-2, the *Mass Duplicator* should be considered.

Chip Level Designs, P.O. Box 603, Astoria, OR 97104-0603 (phone: 503-861-1622). —Morton Kevelson

THE MSD DUAL DRIVE CANNON Computer Mart C-64 and the MSD SD-2 Price: \$34.95

When it rains it pours. More than three years since the introduction of the MSD SD-2 and after MSD has stopped producing it, we suddenly find several sources of third party support for the SD-2. The *MSD Dual Drive Cannon* is being produced and distributed by the same people who brought us the *Kracker Jax Protection Busters*, a series of disks full of parameters for copying protected software. The *Kracker Jax* disks presently consist of five volumes and are still going strong.

Although the *MSD Dual Drive Cannon* carries on Computer Mart's penchant for explosive titles, it falls into the category of a bona fide disk utility. This is in spite of the inclusion of 32 deprotection parameters on the distribution disk. Although the MSD SD-2 suffers from compatibility problems with protected software, it can be an excellent tool for duplicating many protection schemes. The irony of it all is that although the copied disks will run off a 1541 disk drive, they still cannot be loaded from the SD-2. The application of deprotection parameters will sometimes generate a copy which is usable on the SD-2. However, software whose very operation depends on the 1541 DOS routines will still not run.

The *MSD Dual Drive Cannon* makes a good companion utility for the *Mass Duplicator* (see above). Although it does duplicate some of the *Mass Duplicator's* functions, such as a whole

disk copier, the *Cannon* includes many additional functions such as an easy to use file copy utility and a full featured track and sector editor.

The file copy utility is based on the SD-2's built-in DOS copy command. Unlike the DOS copy command, you do not have to supply the source file names. The *Cannon* reads the disk directory into memory and allows you to choose any number of files to be copied from an onscreen listing. The most significant limitation to this approach is the inability to automatically rename the destination files as part of the copy process.

There are a total of three types of whole disk copiers in both manual single shot and automatic versions. The latter are triggered by the swapping of the destination disk and will run without the benefit of the computer. The nibble copiers will attempt to reproduce all data including non-standard formats and errors. This will reproduce many early forms of copy protection. The standard copier does not reproduce disk errors. The resulting copy is error free. This may result in the loss of some data; however, the intent is to patch up the resulting copy using an additional utility such as the *Kracker Jax* parameters. There is also a copier which will stop when it encounters a disk error. This feature can be used to verify that your source data disks have not been corrupted. An alternate approach could have been to copy the entire disk while reporting all errors. All the whole disk copiers require about one minute to copy an entire disk.

The *Cannon* includes a full-featured track and sector editor. The screen display of this utility bears a strong resemblance to the public domain sector editor known as *Disk Doctor*. That is, all 256 bytes of a disk sector are displayed as a single block, using the PETSCII character set, on the top half of the screen. We still prefer the open arrangement of four byte groups used by the original *Clone Machine*. The lower half of the screen displays the character under the cursor in both hexadecimal and decimal. The data may be edited by entering either text, decimal, or hexadecimal characters.

The lower half of the screen also contains a menu of the available commands. This part of the screen may be

COMMODORE AUTHORIZED SERVICE

POWER SUPPLY (C-64)	\$29.95
C-64 REPAIR	44.95
1541/1571 ALIGNMENT	35.00
1541 REPAIR & ALIGNMENT	75.00
C-128 REPAIR	95.00
1571 REPAIR	95.00
POWER SUPPLY (C-128)	84.95
NOISE/SURGE PROTECTOR	17.95
EXTENDED WARRANTY	CALL

Free Return Freight - Continental US
Add \$10 for APO, FPO, AIR
Save COD charge - send Check or
Money Order. (Purchase Order Accepted)

Second Source Engineering

2664 Mercantile Drive
Rancho Cordova, CA 95670
(916) 635-3725

Reader Service No. 204

switched to a 10-line disassembly of the sector data, starting with the byte under the cursor. The disassembly is continuously updated as the cursor is scrolled through the data. All unrecognized values are displayed as the so-called unimplemented 6502 opcodes whenever possible. The continuous updating of the disassembly in this fashion makes it difficult to follow a line of code, as the results are dependent on the cursor position.

Overall the *MSD Dual Drive Cannon* provides an easy user interface for all disk maintenance on the MSD SD-2. The program appears to be written in Blitz-I-compiled BASIC with some machine language modules. As a result, some operations are not as quick as they could be. The main menu also includes direct access to the disk drive's scratch, rename, and format commands. All of these require manual entry of the appropriate data.

Computer Mart, 2700 NE Andersen Road, Vancouver, WA 98661 (phone: 206-695-1393). **Morton Kevelson**

THE MSD DOS REFERENCE GUIDE

Computer Mart
Price: \$29.95

Last but not least we have a detailed dissertation on the workings of the MSD DOS. The major part (140 pages) of this 200 page book consists of a fully annotated disassembly of the 16 kilobytes of code in the MSD ROMs. This detailed listing is accompanied by a ten page ROM map of all the major DOS routines and a seven page listing of the MSD's 4 kilobytes of RAM. The remaining chapters include information on the 6511Q microprocessor, some details on the operation of the MSD DOS, a description of the hardware, and some sources of additional information on or related to the workings of the MSD disk drives.

The final chapter is a listing of various demonstration programs and utilities which incorporate direct calls to the DOS. These include the mandatory programs for creating the various DOS errors used by early forms of Commodore disk copy protection. Each program is listed in BASIC with machine language routines in DATA statements and a disassembly of the corresponding code.

The book includes a double sided disk with both sides chock full of additional data as well as the programs in the book. We also found a collection of MSD utilities, a 6511Q disassembler, program compatibility listings, MSD parts lists, and MSD user lists among other interesting items.

The *MSD DOS Reference Guide* is a valuable collection of data on the MSD disk drives which will be of interest to advanced users of the drive. The information was obviously compiled at the expense of considerable time and effort by an individual (David W. Martin) with a deep interest in the subject matter. This book is a must have for anyone interested in delving into the intricacies of the MSD disk drives.

Computer Mart, 2700 NE Andersen Road, Vancouver, WA 98661 (phone: 206-695-1393). **-Morton Kevelson**

(Note: The *Mass Duplicator*, the *MSD Dual Drive Cannon* and *The MSD DOS Reference Guide* are available as a package from Computer Mart for \$79.95.)

THE BOSS

SoftTools

Commodore 64

Disk; \$35.00

This program is almost a dream come true for all the modem fanatics in our reading audience. You finally have an alternative to writing machine language subroutines to perform each useful input/output operation using the RS-232 modem port on your C-64.

Before *The Boss* was written, BASIC programmers were forced to write very cumbersome code, consisting primarily of POKE and PEEK statements which made little sense even to the programmer when looked at months later.

With this program any experienced BASIC programmer can take advantage of an expanded BASIC language, which now includes commands to facilitate sending data, receiving data, detecting phone ringing and carriers, as well as many other vital features.

If you really want to write any type of program that uses the modem, and if you must write it in BASIC, then you

A Powerful Wordprocessor for the Commodore 128®



Selected
for the 1987
CES Software
Showcase
Award.

From the author of **Fontmaster II** comes **Fontmaster 128**, an enhanced version for the Commodore 128. This powerful word processor with its many different print styles (fonts), turns your dot matrix printer into a more effectual tool. Term papers, newsletters, and foreign languages are just a few of its many applications.

- * Program disk with no protection - uses hardware key
- * Supplement disk includes foreign language fonts
- * 56 Fonts ready to use
- * Font editor/creator included
- * On screen Font preview
- * 80 column only
- * Supports more than 110 printers

Commodore 128 is a registered trademark of Commodore Business Machines, Inc.



Inc. 2804 Arnold Rd. Salina, Ks. 67401 (913) 827-0685

Reader Service No. 205

AHOY! 65

should consider this package. You no longer have to worry if your new machine language routine is written correctly, or if it is reliable enough to use in your BBS program.

The package does have a few shortcomings, but as you will see, they are not of any serious consequence to those individuals who should be most interested in buying this program. The most annoying fact is that the program will not work with the C-1670 modem (or any 1200 baud modem); but we have been notified that the new version, which should be out by the time you read this, will feature an option for 300 and 1200 baud compatibility as well as upload and download routines.

Although the program does include a DIAL command, it has no option for touch-tone phones, and the slow speed of the pulse dialing is almost unbearable. Since this program will be used mainly by people who want to write BBS programs, which don't need to dial many outside numbers, this is only a minor annoyance.

Keep Your Collection Looking Shipshape with **Ahoy!** Binders

Don't be caught at sea the next time you need valuable programming information from a back issue of *Ahoy!* Our official binders turn a year's worth of *Ahoy!* into a textbook on Commodore computing! These quality-constructed binders use metal rods to hold each magazine individually, allowing easy reference to any issue without removal. Sporting a navy blue casing with a gold *Ahoy!* logo imprinted on the spine, these binders will be the pride of your computer bookshelf.

To order, send \$12.45 (US funds) for each binder desired to:

Ahoy! Binders
45 West 34th Street—Suite 407
New York, NY 10001

(Outside Continental US add \$2.50 per binder. Allow 4 to 6 weeks for delivery.)



The program comes with a spiral-bound, 58-page manual. Although the manual is well-written, and it does explain each command quite clearly, it still has a few mistakes, some of which contradict previous instructions. Just keep that in mind while you are writing code with this program, and be prepared for any problems that this might cause.

Although our version came with a progress report, describing what kind of bugs the manufacturers are aware of and what enhancements they expect to add in the next version, we found that the program sometimes had problems receiving data from the modem. But the included report did warn us about this, so we could take the necessary precautions. It was still an annoying bug, but we were assured that it would be fixed in the next version.

The Boss' command set is divided into five different groups. They are Set-Up, Modem I/O, Disk I/O, Conversion, and Miscellaneous commands.

The Set-Up commands allow you to define which modem you have and what channel you want to assign it to. They also allow you to set the drive and the device number of any drives being used. Setting the time or date can also be done in one command, and the program keeps track of each until you reset or turn off the machine.

The real heart of the program is held in the Modem I/O command set. These commands let you send data and receive data with the modem. You can also, using single commands, hang up or pick up the phone line, and detect the carrier or ringing. It is these commands alone that would justify the cost of the program.

The Disk I/O commands are very useful and, considering that they are not needed for modem programs, really are a bonus. The new commands let you read the directory into a string array, print the directory, and search for a specific name in the directory with the option of using real wildcards. The program also monitors the error channel and stores the status in DS, with the error name in DS\$, similar to the C-128.

Conversion functions should save many programmers a lot of effort. The conversion routines allow data to be converted from ASCII to PETSCII or

vice versa, and they also allow case changes in either direction.

The Miscellaneous commands offer a strange but wide variety of command types. Similar to the Apple command of the same name, the POP command will let the programmer remove the address of the last GOSUB performed (that is very useful when you must use nested GOSUBs). *The Boss* also has a built-in mini-terminal program which can be activated in just one command, even from a BASIC program.

In order to facilitate the construction of a BBS program, *The Boss* also includes a single command that will sort any string array in either ascending or descending order. Of course, no BASIC extension program would be complete without an INSTR function, which locates one string within another and returns the starting location of the target.

Considering the price, versatility, and quality of this program, it is a must-have for anyone who intends to do any serious modem programming. But I suggest that you wait until the aforementioned flaws are corrected before you make the investment.

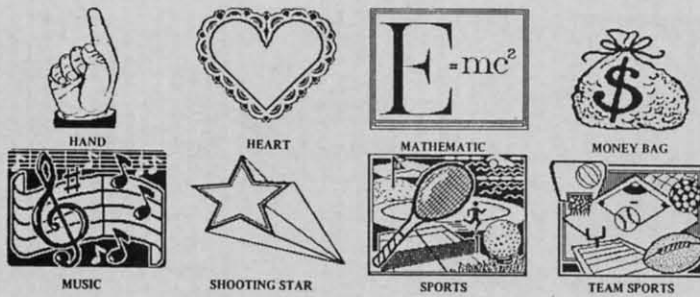
SoftTools, Snowdon P.O. Box 1205, Montreal, PQ H3X3Y3. —*Tim Little*

AWARDWARE **Hi Tech Expressions** **Commodore 64/128** **Disk; \$14.95**

There are few experiences more satisfying to computer owners than making something attractive to show off to their friends. It's especially gratifying when their efforts result in items that are practical as well as pretty.

AwardWare is the latest in the line of creativity programs from Hi Tech Expressions. Like the other products from this Florida company, *AwardWare* provides budget-conscious computerists with an extremely versatile tool for creating personalized printed materials. The computerist can also make an award disk to send to computer-owning friends, who can look at and print the citation even if they don't have a copy of the program itself.

Versatility and ease of use makes *AwardWare* a double value. Along with awards and certificates, templates are provided to create personalized licenses, bank checks, memorandums, tic-



AwardWare offers more than 20 graphics for dressing up certificates, plus assorted borders and type styles.
READER SERVICE NO. 221

kets, coupons, signs, and letterhead stationery. A quartet of special designs create prize ribbons. There are even seals to decorate checks and trophies.

Creating a personalized award is a snap. The manual guides beginners step by step through a sample certificate, but it's such a straightforward process that most people could do it out for themselves just by following the menus.

First the computerist selects the format of the award. There are 60 templates, both horizontal and vertical styles, and a couple of dozen more designs for special uses. After entering the number of the template, a work screen pictures the form. The computerist cursive from one area to another of the template to complete its parts.

There are 20 border designs, plus a special option that lets the creator make up text borders, or even combinations of text and art. There are a few standards for formal awards, but the majority of the borders are pretty, if not downright cute. Hearts, apples, crescent moons, sailboats, even dinosaurs are some of the devices that march obligingly around the frame for trendy awardmakers.

After selecting the border, the computerist chooses a graphic to adorn the creation. There are 20 designs or the award can be left plain. Pictures included are partying animals, apple, bear, book, butterfly, computer, dinosaur, doghouse, dollar, flag, goose, graduation, hand, heart, mathematic, money bag, music, shooting star, sports, and team sports.

Next the computerist chooses the font from five type styles: Block, Ital-

ic, Old English, Roman, and Script. These appear on the awards in small, medium, or large type, depending on the format of the template selected. Some templates have more than one text block; the computerist chooses the type style for each block individually, then writes the citation, verse, or message on the certificate.

After completion of the main body of the award, the computerist chooses the type of signature block. This may be a signature with the date and official title of the signor, signature and date on the left with decorative seal on the right, signature and date on the right with seal on the right, or signature and date centered at the bottom of the page. There are five seals: a bear, a sheep with "ewe's great" logo, a "you're the best" ribbon, a star, and a thumbs up with "terrific job" logo.

There's a lot packed into the *AwardWare* program. It contains a top-quality collection of templates for awards and certificates, and enough of the special designs to give the computerist a lot of ways to use the program. By varying the borders, type styles, and graphics, there is virtually no limit to the number of personalized citations that can be created.

AwardWare belies its budget price with high quality and ease of usability. It's a lot of fun to make up these special awards, for serious or trivial occasions, and it's great to tell a friend how high he ranks in your favor (or how he's bombed out!) with a personalized, low-cost greeting that couldn't be purchased in any store!

Hi Tech Expressions, 1700 NW 65th Avenue, Suite 9, Plantation, FL 33313 (phone; 305-358-5153). —*Joyce Worley*

Page	Company	Svc. No.
31	Abacus Software	178
C-4	Access Software	213
42	Acorn of Indiana, Inc.	211
12	Activision	219
9	Alsoft	208
47	Avantgarde 64	195
43	American Int'l Computer	179
52	AmiEXPO	—
41	Artworx	174
60	Cardinal Software	202
57	Central Coast Software	192
57	Central Point Software	215
63	Chip Level Designs	175
15	Combase, Inc.	209
11	C.O.M.B. Direct Marketing	—
C-2	CompuServe	177
71	Computer Mart	188
72	Computer Mart	187
44	Computer Repeats, Inc.	190
C-3	Data East USA, Inc.	200
30	Emerald Component Int'l	183
50	Emerald Component Int'l	181
15	Epyx, Inc.	220
62	Free Spirit Software, Inc.	206
67	Hi Tech Expressions	221
4,5	Lycos Computer	196
16	Marathon Software	210
6	MicroProse Software	189
43	MicroProse Software	199
51	Micro-W Distributing Inc.	198
41	Mindscape	173
19	Montgomery Grant	186
55	Nationwide Computer Inds.	185
10	Okidata	217
24-29	Protecto Enterprises	193
11	Quantum Computer Services	218
34	Quantum Computer Services	180
69	Recovery!	—
44	Rent-A-Disc	191
39	RK Productions	203
75	Roger Wagner Publishing, Inc.	182
64	Second Source Engineering	204
10	Seikosha America Inc.	216
54	Sierra On-Line	172
12	Soft-Byte	212
42	Strategic Simulations	176
17	S & S Wholesalers	194
7	TC Electronics	207
8	Timeworks	214
18	Trans Com, Inc.	184
51	Wedgwood Rental	197
60	World of Commodore	201
65	Xetec, Inc.	205
14	Ahoy! Disk Magazine	—
23	Ahoy! Subscription	—
34	Ahoy!//QuantumLink Offer	180
37	Ahoy! Disk	—
38	Ahoy! Back Issues	—
49	Ahoy! Access Club	—
66	Ahoy! Binders	—

The publisher cannot assume responsibility for errors in the above listing.

Send letters to *Flotsam*, c/o *Ahoy! Magazine*, Ion International Inc., 45 West 34th Street—Suite 500, New York, NY 10001.

! WE HAVE A WINNER !

That was the winning message of Bob Blackmer's *Wizard Tag II*...and that's what we have this month in the person of Steve Spivey of Inverness, FL. As of this writing more than 25 readers have completed the ninth level of *Wizard Tag II* and written us with the message above to prove it.

We'd originally planned to name as winner the reader who finished with the best time. But because validation of times is not possible we decided that Steve, whose letter bore the earliest postmark, would receive the prize of a year's subscription to the *Ahoy! Disk Magazine* (\$97 value) and the honor of play-testing Bob Blackmer's next programming effort. Sorry to those players who posted better times—but if we did this on the honor system, no one listed here would have won anyway. You wouldn't believe some of the outrageous "time remaining" claims we received (and disqualified). However, each of the runners-up listed will receive a free *Ahoy! Disk*.

Some comments from contestants:

"I find much more pleasure in writing programs than in playing them, but this one was an exception."—Robert Cook

"I can guarantee that my joystick will never be the same! It's a super game. My husband and two kids like it too."—Diane Upton

"I dare you to make a game I can't solve in one or two tries. Your graphics and animation are great, but there's just no challenge! I am looking forward to being challenged;

don't disappoint me."—Wayne Metz

"I found *Wizard Tag II* to be the second best game I've played on a Commodore. *Vortex* from the January '87 *Ahoy!* is the leading Commodore game and *Lode Runner* on the Apple is the best game I've ever played—and the only good reason to own a sorry Apple."—Steve Spivey

"Guess what I did on my 13th birthday with one arm tied behind my back? I beat your game. The next one (had) better be harder if a person just turned 13 can beat it."—Jay Luce

"This game is much better than the first *Wizard Tag*. How about creating *Wizard Tag III* with an ever bigger maze?"—Bryan Kollar

"Should there be a sequel to *Wizard Tag II*, I'll be waiting at the keyboard."—Paul Browning

"If you're planning a sequel to *Wizard Tag II*, a bigger board might be more challenging. The floors with snakes could contain 2 or 3 snakes, and possibly more dangers, like a cat or dog. As for the Wizard, you could have him randomly set anywhere on the board."—Leonel Marchan

We'd be glad to hear from readers who surpass the times posted here—however, no more prizes will be awarded. Not for playing *Wizard Tag II*, that is. But we had so much fun with this contest that we'll be sure to hold another one soon.

ERRATA

UNIVADERS (July '87)

The documentation for *Univaders* omitted the instructions for actually starting the game. Once you have entered and run the program, you should have a new file on the disk called UNIVADERS. Turn off or reset your machine and type

LOAD "UNIVADERS",8,1 [RETURN]

After the READY prompt appears on the screen, type SYS 49152 [RETURN] and the game will start.

PLINK & PLONK (July '87)

A few readers were confused by the extra spaces that appeared in the middle of lines 4000 and 4010 of *Plink & Plonk*. As the majority of you guessed, they don't belong there. Simply move the last segment of each line up and continue typing.

ZING! Review (July '87)

No author was listed for the review of *Zing!* in July's *Amiga Section*. It was Morton Kevelson.

Player	Date of Postmark	Time Remaining
Steve Spivey (Inverness, FL)	5/28	1:47
Victor Lams (Ann Arbor, MI)	5/29	0:45
Wayne Metz (Kansas City, MO)	5/30	1:49
Cindy Kamora (Lake Ariel, PA)	5/30	0:45
Rajesh Michael (Bedford, TX)	6/1	7:23
Craig Russell (Beaumont, TX)	6/2	1:49
Roger West (Houston, TX)	6/3	1:59
Michael Goodrich (Houston, TX)	6/3	0:31
C.J. Jones (Yulee, FL)	6/4	1:16
Richard Temps (San Diego, CA)	6/6	1:17
Eric L. Stout (Topeka, IL)	6/7	2:53
Bryan Kollar (Nanticoke, PA)	6/8	2:06
Gary L. Grable (Mason, MI)	6/8	0:58
Diane L. Upton (No. Adams, MA)	6/8	0:41
Paul Browning (Clarksville, TN)	6/9	0:53
Leonel Marchan (Waukesha, WI)	6/10	0:44
Douglas Blodgett (Portland, ME)	6/11	2:31
Mark Finn (Eureka, MO)	6/11	2:06
Beth Ann Jones (Milton, VA)	6/11	0:39
J. Sergio (Bristol, CT)	6/14	0:37
Chris Burrus (Lexington, KY)	6/15	?
John Puffpaff (Jacksonville, NC)	6/16	1:02
Jay Luce (Marble Falls, TX)	6/16	0:43
David Ray (Wesson, MS)	6/18	3:48
Tim Reddy (Catlin, IL)	6/18	0:04
M. Stamps (Louisville, KY)	6/22	3:24
Teresa Hawkey (Lawrence, KS)	6/22	3:44
Robert Cook (Braintree, MA)	6/22	2:48
Mark Johnson (Davenport, IA)	6/23	2:24
Shawn Miller (Kekaha, HI)	6/23	0:21

Victimized by Compulsive Gambling?

Today, over 5 million Americans suffer with the addiction of compulsive gambling. Spending house payments in trying to win back losses... borrowing from friends, relatives and employers, even stealing. This disease destroys marriages, careers...entire lives.

Now there's help, hope and a tomorrow for these millions. And, helpful suggestions for those friends and family members close to the gambler who are also suffering, personally or business-wise. A growing dilemma? Yes! Is HELP AVAILABLE? Yes!

***Recovery!* is published monthly in magazine and newsletter form.**

This publication is tailored to help spouses, relatives and employers of known or suspected compulsive gamblers...and the recovering gambler, him or herself.

The information and articles in *Recovery!* can help you understand and help cope with this growing addiction and will be most beneficial to other *related addictions*. Monthly issues offer expert advice on:

- How to help the compulsive gambler stop
- Spotting danger signs in a loved one
- Self-help for the spouse in coping
- How to successfully support and deal with the emotional needs of children in the gambler's family
- True life stories and how the recovery was affected
- Gambling's effect on corporations and businesses
- Financial guidance and investment tips
- Health and fitness for full recovery and relief of stress
- Meeting places, seminars through the U.S. and abroad for both the gambler and spouse
- Current treatment centers
- Correspondence section to exchange ideas across the country
- Toll-Free Hotline Number
- Ideas for constructive substitutions....and much, much more!

Special Corporate Seminars Available Upon Request

YES! Please send FREE
information on helping a
compulsive gambler.

Recovery!
P.O. Box 280
Throggs Neck Station
Bronx, NY 10465-9998

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

If Applicable: Co. Name _____

Address _____

Employees _____ Company Contact _____

CHAINMAIL!

For the C-128

By Cleveland M. Blakemore

CRASH!
...SWISH!
...UUMMPPHH!
...AARRGGH!

The Crimson Knight staggers you with a blow that knocks you nearly senseless, then batters you toward the edge of the pit. You cartwheel helplessly, almost losing your balance, then regain your equilibrium just in time to leap forward beneath another well-timed swing that would've plunged you to your death. Your green armor is dented in several places where you've been struck before, and you are weak from injury.

If you can only make it to the mystic flame! You dodge around the opposite side of the pit, avoiding the thrusts of your opponent, finally reaching the flickering sacred fire in the corner of the dungeon, and you plunge your enchanted sword into its heart.

In seconds your body is flooded with newfound strength, nourished by the magic blaze, and you turn in the firelight to face your enemy, who squares off for another round of blows....

You must be playing *Chainmail!*

This is a two-player game for the C-128, written in a hybrid program of machine language and BASIC Seven-point-oh.

The graphics are excellent, but the complexity of the game may seem deceptively simple at first. *Chainmail!* is a game of strategy and dexterity, with infinite variations.

The game takes a moment at the beginning while it loads the ML data, POKes the sprite shapes, and draws the dungeon. Then an original little tune I composed for the game begins playing in three part harmony until both players press their joystick buttons.

The graphics represent a view of a dungeon deep in the earth, as seen from above. The two player's figures are knights, as seen looking down into the room.

The Crimson Knight is player one, and the Green Knight is player two. Each player has a complementing "strength" bar offscreen.

There are two ways to be killed in *Chainmail!*

The first is to let your strength bar drop below zero. The second way to is fall (or be pushed) into either of the two three-dimensional vertical shafts in the room. When a player is killed, a skull and crossbones will appear in his location. The contest of knights is over, and you will be returned to the main title screen.

To rotate your onscreen alter ego, simply move the corresponding joystick left to rotate clockwise, right to rotate counterclockwise.



To move him around the screen, depress the fire button and push the knight in the direction you want to move, limited only by the walls of the dungeon. The motion is very smooth and quick, because it is serviced by an interrupt routine.

To swing your sword, depress the joystick button by itself. You'll hear a swish, and your sword will flick out directly in front of you.

This is strictly a duel of noble knights. Hitting your opponent from behind is not permitted. You must be facing your opponent to strike him with the sword. To injure him, you must catch him off guard with his sword in the raised position. To block an opponent's blow, your sword must be out.

After a few good hits from your enemy, you may find yourself getting pretty weak. Have no fear! Merely touching one of the sacred fires in either corner of the room will restore you to full strength in a matter of seconds. Only one knight at a time can refresh his strength, however. If both knights try to touch the healing fire at the same time, they will be pushed back.

A much quicker way to kill the other knight is to shove him into one of the pits, where his armored figure will whittle down to the bottom and land in a crumpled heap, dead.

Whenever one knight shoves another, he is pushed in the direction his opponent is pointing. For instance, to push you opponent into the shaft on the left, rotate until you are pointing in that direction, then situate yourself behind his left shoulder and begin shoving. Unless he maneuvers out of the way in time, he will topple into the shaft with a

Continued on page 97

NEW BULL'S-EYE

SO GOOD,
EVEN WE CAN'T BELIEVE IT.

Think of the best disks in your library; the very best ones, the cream of the crop. Chances are, those are the same disks that you haven't been able to back up. Until now.

BULL'S-EYE was created for only one reason: to back up the impossible. To archive the programs that are protected with the newest, toughest routines on the market.

We'd like to go into more detail, but we can't—these titles are so hot, we can't mention their names in this ad. But you know the ones we mean. Just think of the biggest names in software. Think of the most complex and effective protection schemes you've ever run up against. Now think of the very best archival software on the market today...

BULL'S-EYE—from **Kracker Jax**.

ONLY \$19.95

KRACKER JAX®

A REVOLUTION IN ARCHIVAL SOFTWARE!

Kracker Jax is the powerful parameter copy system that is taking the country by storm! What IS a parameter? It's a custom program that allows your 1541 or 1571 disk drive to strip all copy protection from your expensive software, leaving you with UNPROTECTED, TOTALLY BROKEN back-ups that can even be copied with a simple fast copier.

- **Kracker Jax** is the BEST program of its kind!
- **Kracker Jax** will back up titles that the nibblers CAN'T!
- **Kracker Jax** requires NO special knowledge to operate!
- **Kracker Jax** strips protection in a matter of SECONDS!
- **Kracker Jax** is priced RIGHT—just \$19.95 per Volume.
- **Kracker Jax** is UNPROTECTED—easy to back up!
- **Kracker Jax** updates are available QUARTERLY!

VOLUME FIVE INCLUDES A POWERFUL
NEW C64/C128 FAST COPIER!

ALL NEW VOLUME FIVE

VOL. 1-4 STILL AVAILABLE.
ONLY \$19.95 EACH!

NEW HACKER'S UTILITY KIT

Are you ready to take control of your software? Let us help! Our **Hacker's Utility Kit** contains the most impressive array of tools ever assembled in a single package! You get:

- **WHOLE DISK USAGE/ERROR/DENSITY SCANNER**—get needed info fast!
- **GCR EDITOR**—view raw data the way your computer reads it!
- **FAST DATA COPIER**—won't write errors!
- **1 OR 2 DRIVE NIBBLER**—state of the art!
- **FILE TRACK AND SECTOR TRACER**—find any sector link in a file fast!
- **BYTE PATTERN FINDER**—scan the disk for any pattern you choose!
- **CUSTOM COPIER CREATOR**—the only one of its kind!
- **RELOCATABLE M/L MONITORS**—including drive monitor!
- **FAST FORMATTER**—programmable tracks or whole disk!
- **DISK FILE LOG**—quickly find file start and end addresses!

So how good is this package? Just remember that it's put out by **Kracker Jax**, the people who live at the cutting edge of archival technology. That's how good it is!

ONLY \$19.95

KRACKER JAX® REVEALED! THE BOOK

At last—**Kracker Jax** takes you beyond the protection barrier. The secrets of unprotecting software are yours with **Kracker Jax** revealed!

We'll show you exactly how to defeat five different protection schemes encompassing scores of current programs. Our tutorial has twenty specific examples to lead you step by step, to a new level of knowledge. Here's what you get:

- **Kracker Jax** revealed.
- A reset switch.
- A utility disk.
- 20 parameters on disk.

ONLY \$23.50 COMPLETE!

Please allow two weeks for delivery.

THE SHOTGUN

Those of you who have used our **Kracker Jax** parameters know just how good they are. Can you imagine the kind of nibbler we could put out? Well, you don't have to imagine it because it's HERE! **THE SHOTGUN**, our new premium nibbler utility, is available two ways:

- **THE SHOTGUN** by itself—offered to you at the unheard of introductory price of only \$14.95!
- **THE LOADED SHOTGUN**—Packaged WITH 32 of the most popular **Kracker Jax** parameters ever created—only \$19.95!

Whichever version you order, you'll find **THE SHOTGUN** to be loyal to the **Kracker Jax** tradition of more quality for less money.

THE C-128 CANNON

Here's the package you C-128 owners have been waiting for! The **C-128 CANNON** gives you more power than you ever hoped for! Just look at some of these capabilities:

- **NIBBLER**—Works with single or dual 1571/1541 drives!
- **FAST COPIER**—Great for data disks or use with **Kracker Jax**!
- **FILE COPIER**—Makes file maintenance and manipulation easy!
- **1581 FAST COPIER**—For use with the new high speed 3.5" drive!
- **1581 FILE COPIER**—For high speed file manipulation!
- **MMF COPIER**—Copies unprotected IBM and CP/M disks!
- **T/S EDITOR**—Works with 1541, 1571, and the new 1581 drives!
- **ERROR SCANNER**—Complete with on-screen display!
- **DENSITY SCANNER**—Check for altered densities track by track!
- **DIRECTORY EDITOR**—Alter & organize your disk directories!
- **KRACKER JAX**—You also get 100 of our most popular parameters!

You've seen nibblers alone that sold for thirty-five or forty dollars. And the 100 **Kracker Jax** parameters are a twenty dollar value. Yet the ENTIRE **C-128 CANNON** utility package sells for just \$34.95. Never before has this much power and control been integrated into a single, affordable product. If you own a C-128, you deserve the **C-128 CANNON**!

C-128 owners, this is the package
of your dreams—only \$34.95

NEW THE GRAPHIC LABEL WIZARD

No, we don't have the first graphic label utility on the market—but we have the best one! Without doubt, the Wizard is the hottest graphic label program around! Check out some of these features:

- Use Print Shop, Print Master, or your own custom graphics!
- Print a graphic & up to 8 lines of text on a standard label!
- Uses pop-up menus/includes extra graphics/saves labels onto disk!
- Works with both Epson & Commodore compatible dot-matrix printers!
- Will print different text styles & sizes on appropriate printers!
- Hi-res preview of up to 4 different graphics on screen at one time!
- Machine language programming for ultra-fast speed and flexibility!
- Special CATALOG feature lets you print titled display sheets of your Print Shop, Printmaster, and custom graphics—with up to 28 high-res graphics per page!

And these are just some of the things that the **Graphics Label Wizard** can do! So the next time your custom labels need a special touch, just summon up a little magic—from the Wizard.

ONLY \$24.95

THE MSD DUAL CANNON

MSD owners aren't left out in the cold anymore! The all new **MSD DUAL CANNON** gives you state of the art control over your advanced equipment! You get:

- **A NIBBLER**—for backing up your protected programs!
- **A FILE COPIER**—for easy file maintenance and manipulation!
- **A SECTOR EDITOR**—developed just for the MSD dual drive!
- **FAST COPIER**—that WON'T transfer errors—perfect for use with data disk or **Kracker Jax** parameters!
- **AUTO MODE**—drive can copy without computer connected!
- **SPECIAL BONUS**—you get 32 free **Kracker Jax** parameters!

Start getting the full performance that your MSD drives are capable of delivering. You already know you own the finest drives available—so why settle for anything less than the best utilities made for them?

Get the most out of your special equipment—only \$34.95!

SUPER CAT

If you had the time and skill to create your own custom disk catalog system, the paramount system of your wildest dreams, it probably STILL wouldn't have all the features of **SUPER CAT**! For example: • Catalog up to 640 disk directories—1280 with 2 drives! • Index & alphabetize over 5000 titles—10000 with 2 drives! • Unique ID's are NOT necessary! A printer is NOT required! • Find ANY title in 10 seconds—sort 1000 titles in 8 seconds! • Automatic entry with Selection, Edit, and Cross Ref. options!

SUPER CAT has literally too many features to fit in here. From the easy, menu driven work screens to the comprehensive output options, **SUPER CAT** is the most powerful and complete disk catalog system available today!

The ultimate software library index system—only \$24.99

BASIC PROGRAMMERS—CONTACT US ABOUT "ON-LINE HELP!"

COMPUTER MART

Need more info? Call or
write for our free catalog

Program submissions wanted!
Good Commissions—
National Marketing.

CHECKS, MONEY ORDERS OR VISA/MASTERCARD.

Mail your order to: Computer Mart, Dept. I

2700 NE Andresen Road/Vancouver, WA 98661

Phone orders welcome: 206-695-1393

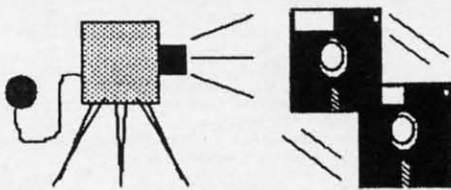
Same day shipping/No C.O.D. orders outside U.S.



PLEASE NOTE: Free shipping & handling on all orders • C.O.D. add \$3.00 to total order • All orders must be paid in U.S. funds.

DEALERS—WE HAVE THE SUPPORT YOU'RE LOOKING FOR!

THEY'VE DONE IT AGAIN!



The programmers who created Snapshot 64, the hottest "memory capture" utility on the market, have done it again! Introducing SUPER SNAPSHOT, the ultimate cartridge for the C64/C128.

SUPER SNAPSHOT combines several different functions into one revolutionary new cartridge. First and foremost, SUPER SNAPSHOT is a state-of-the-art memory capture device. This means that you can load a program into your computer's RAM and, at the touch of a button, capture an exact image of your computer's memory. That image can then be saved to disk, allowing you to make working, UNPROTECTED backups of your software!

And that's just the beginning—here're some of the highlights of this incredible cartridge:

- SUPER SNAPSHOT works on the C64 or the C128 in the 64 mode!
- Will copy 99.9% of all memory resident software on the market today!
- SUPER SNAPSHOT files will run without the cartridge being plugged in!
- No experience required thanks to our window driven user menus!
- Allows you to combine several different programs onto a single disk!
- 24K on board—easily expandable to 40K with plug in EPROM's!
- Our TurboDOS is the most compatible fast loader we've ever tested!
- The special built in DOS wedge commands will support devices 8, 9, 10 and 11.
- Our ROM-based machine language monitor will NOT corrupt memory!
- Unique RESUME feature lets you flip in and out of running programs!
- Hi-res screen dump works with 1525, 1526, & compatibles like Epson & Gemini!
- SUPER SNAPSHOT also works with all aftermarket disk drives tested to date, such as the MSD, FSD, Enhancer, and more.
- Special Bonus: 40 FREE custom designed Kracker Jax parameters complete with fast copier.

Why buy a separate cartridge for each major function? A fast loader cartridge. A machine language monitor. A screen dump. DOS wedge commands. A memory capture utility. What would it cost for four or five cartridges, not to mention an expansion board to hold them all? Thanks to SUPER SNAPSHOT, you'll never have to find out! SPECIAL OFFER FOR SNAPSHOT 64 OWNERS: Send us your working Snapshot 64 cartridge (with the original owner's manual AND the function key overlay card) in good, working condition with your order for a \$10.00 discount off the price of the new SUPER SNAPSHOT! This offer applies only to direct orders.

SUPER SNAPSHOT 64/ONLY \$49.95

COMPUTER MART

Need more info? Call or write for our free catalog

DEALERS—Don't miss out on this one—CALL!

CHECKS, MONEY ORDERS OR VISA/MASTERCARD.

Mail your order to: Computer Mart
2700 NE Andresen Road/Vancouver, WA 98661
Phone orders welcome: 206-695-1393
Same day shipping



PLEASE NOTE: Free shipping & handling on all orders. • COD orders must add \$3.00 to total order. WA residents must add 7.3% sales tax. Sorry, no COD orders accepted from outside the U.S. • All orders must be paid in U.S. funds. • Overseas orders please add \$5.00 per unit. Canadians may order from: Marshview Software, P.O. Box 1212, Sackville, N.B. E0A 3C0

Reader Service No. 187

SPRITESHELL 128

Continued from page 50

GRAPHIC0, the text screen. Merely setting aside memory for the GRAPHICS area will not direct the commands to the screen.

The demo program SHELL DEMO loads in the interrupt object code and a small sprite file in order to demonstrate the proper method to initialize the interrupt. Two players wander around inside a cave filled with flapping bats. Both the bats and the players cannot move beyond the borders until you change them. You can imagine how easy it would be to add a few dollar signs to the cave, and a collision check between the bats and players—and you would have a simple game where two players could race against the clock to gather gold inside the cave.

You should be able to come up with a nearly limitless supply of ideas for games now that you have the means to control sprites efficiently. Since the interrupt saves a lot of time that would normally be wasted in added BASIC processing, your main loop will basically only need to change sprite directions and check for collisions, keep track of score, or monitor game logic. If you are creative and resourceful, your C-128 should now begin producing that harvest of arcade-quality games promised in Commodore's sales literature, with the convenience of programming in simple, easily debugged Commodore BASIC.

A few mind-stimulators to get you started...

"Space Invaders" with sprites moving in preset patterns back and forth while you fire at them using sprite two as a missile.

Two-player tank games where you move around inside a compound firing missiles at one another. The missiles could be shimmering fireballs!

Adventure games where you slide around inside a castle avoiding flailing creatures and collecting treasures, all the while flinging daggers at your enemies.

This program comprises three files: *Spriteshell 128*, *DEMO.SPRITES*, and *SHELL DEMO*.

The program SHELL DEMO is a BASIC listing you can enter in 128 mode, but the other two files are in machine language. They will have to be entered in 64 mode.

Spriteshell 128 is the object code for the actual machine language interrupt. After you've goofed around with the demo, you will be able to use this file independently in your own programs by BLOADing it in at the beginning of your BASIC listing. Make sure you understand how it works before doing this. Study the simple demo to get a feel for it.

DEMO.SPRITES is merely a small file of three sprite shapes that are used by the demonstration program.

Flankspeed (see page 79) is used to enter two programs in 64 mode. Type "POKE44,64:POKE16384,0:NEW" before loading in *Flankspeed* in order to set BASIC memory above the area where you will be entering the two *Flankspeed* listings. Save at least two copies of each when you are finished, then go back to 128 mode to BLOAD these object files back into memory. Remember, you will only use *Flankspeed* to enter the 128 object code! *Spriteshell 128* will crash in 64 mode if you SYS to the starting location of the interrupt. The game utility is only intended for use with sprites on the C-128's operating system. □

SEE PROGRAM LISTINGS ON PAGE 80

COMMODORES

PROGRAMMING CHALLENGES

By Dale Rupert

Each month, we'll present several challenges designed to stimulate your synapses and toggle the bits in your cerebral random access memory. We invite you to send your solutions to:

Commodares, c/o Ahoy!
P.O. Box 723
Bethel, CT 06801

We will print and discuss the cleverest, simplest, shortest, most interesting and/or most unusual solutions. Be sure to identify the *name* and *number* of the problems you are solving. Put *your* name and address on the listings as well. Show sample runs if possible. Briefly describe your solutions and tell what makes them unique or interesting, if they are. You must enclose a stamped, self-addressed envelope if you want any of your materials returned. Solutions received by the middle of the month shown on the magazine cover are most likely to be discussed, but you may send solutions and comments any time. Your original programming problems, suggestions, and ideas are equally welcome. The best ones will become *Commodares*!

PROBLEM #45-1: IDEAL INPUT

This problem was suggested by Bret Ekstrand (Signal Hill, CA). Write a subroutine which allows the user to input commas, quotation marks, and colons as well as text without the "Extra Ignored" error or any other problems. Bret mentioned that you can stuff a quotation mark into the keyboard buffer, but unfortunately it would be displayed on the screen and that is undesirable. It may also mess up actual quotation marks entered by the user.

Your subroutine should take exactly what the user types and store it in the variable US\$. Oh yeah, the INST/DEL key must work properly, too. Let's see solutions for the C-64 and for the C-128.

PROBLEM #45-2: FADE AWAY

John Yergaw (London, ONT) sent a long list of programs he would like to see. I'm afraid that "a rotating earth with continents on it spinning in a circle" is somewhat out of *Commodares*' league. But here's an interesting one you should enjoy. Make a word fade away. That's it. Display a word on the screen then make it fade away. How? That part is up to you.

PROBLEM #45-3: SUPER BOWL

Oren Dalton (El Paso, TX) suggested this challenge. Write

a program to calculate the minimum and maximum bowling scores that can result from exactly five strikes and five spares. To simplify things, assume the player knocked down only five pins after the tenth frame. Show all solutions. Oren's program shows the ten frames in this form: X X X / / / / X X where X represents a strike, and / represents a spare.

PROBLEM #45-4: FAST FACTORIAL

Use an assembler/monitor for the C-64 or the C-128 monitor to solve this one from Thomson Fung (San Diego, CA). Write assembly code to compute 5! (5 factorial) exactly, leaving the result in the X Register. Thomson's solution is 36 bytes long. Commented listings are essential if your solution is to be considered. By the way, 5! is $5 * 4 * 3 * 2 * 1$. Your routine should perform the integer multiplications.

Before we begin our discussion of solutions to *Commodares* from the May issue of *Ahoy!*, here are two short sort routines send by Scott Duncan (Superior, NE) for the C-128:

```
1 REM =====
2 REM      COMMODORES PROBLEM #45-2 :
3 REM      SHORT SORT
4 REM      SOLUTION BY
5 REM      SCOTT DUNCAN
6 REM =====
7 N=8 :REM # OF ITEMS TO SORT
8 REM SELECT RANDOM NUMBERS TO BE SORTED
9 FOR I=1 TO N : J(I)=INT(RND(1)*1000)-3
10 S(I)=J(I):PRINT J(I);:NEXT:PRINT
11 REM -- INSERTION SORT --
12 FOR I=2 TO N:T=J(I):K=I:DO WHILE J(K-1)>T:J(K)=J(K-1):K=K-1:LOOP UNTIL K=1:J(K)=T:NEXT
13 FOR I2=1 TO N:PRINT J(I2);:NEXT:PRINT
14 "INSERTION SORT"
15 REM -- SHELLSORT --
16 REM (REPLACE 1 AND 2 IN INSERTION SORT WITH H AND H+1)
17 H=2*INT(LOG(N)/LOG(2))-1:DO:FOR I=H+1 TO N:T=S(I):K=I:DO WHILE S(K-H)>T:S(K)=S(K-H):K=K-H:LOOP UNTIL K<=H:S(K)=T:NEXT:H=INT(H/2):LOOP UNTIL H=0
18 FOR I2=1 TO N:PRINT S(I2);:NEXT:PRINT
19 "SHELLSORT"
```

Scott clearly took advantage of the sophisticated loop con-

trol structures available in BASIC 7.0. In particular, the use of different conditional tests for the WHILE and the UNTIL statements is a very powerful feature.

Scott adapted sort routines described in *Algorithms* by Robert Sedgewick (Addison-Wesley, 1983). That book explains the workings of these sort routines and many others. You might enjoy comparing the times of these two routines. You specify the number of items to be sorted with the value of N in line 10. For values of N greater than 10, you must add a dimension statement such as

```
15 DIM J(N),S(N)
```

Now on to *Problem #41-1: Real Thing* submitted by J.H. Smalley (Boulder, CO). The problem was to write a short program to display the *exact* value of $2 \uparrow 127 - 1$, which is the largest floating point number the Commodore computers can use.

I must learn to be more careful in my wording of the problems. A few readers sent this one-liner which does fulfill the requirement, if not the intent, of the problem:

```
1 PRINT "170,141,183,460,469,231,731,687,303,715,884,105,727"
```

Admittedly there was no mention of the number base in which the result was to be printed, so this solution suggested by Daniel Souza (N. Dartmouth, MA) also fills the bill:

```
10 FOR X=1 TO 127 : A$=A$+"1" : NEXT
20 PRINT "IN BASE 2, 2^127-1 IS ";A$
```

Yes, in the binary number system, the answer is a string of 127 1's.

But now on to the intended solutions. The shortest solution came from Clifford Dedmore Jr. (Coos Bay, OR).

```
1 REM =====
2 REM   COMMODARES PROBLEM #41-1 :
3 REM   REAL THING
4 REM   SOLUTION BY
5 REM   CLIFFORD DEDMORE JR.
6 REM =====
10 N(1)=1:FOR K=1TO127:FORJ=1TO5:N(J)=N(
J)*2+C%:C%=N(J)/1E8:N(J)=N(J)-C%*1E8
20 NEXTJ,K:N(1)=N(1)-1:FORK=1TO5:N$=STR$
(N(6-K)):PRINTMID$(N$,2,LEN(N$)-1):NEXT
```

His program stores the result in five 8-digit elements of the N() array. Each element is repeatedly multiplied by two, 127 times. Each element can become as large as 1E8. The Commodore performs exact mathematical operations on numbers as large as 1E8. When an element becomes larger than that, it is reduced by multiples of 1E8, and the excess is carried in C% to the next larger array element.

To watch this program operate, you may modify line 20 to print intermediate results. Replace the NEXTJ,K statement with these statements:

```
NEXT J : FOR L=5 TO 1 STEP -1 : PRINT
```

74 AHoy!

```
N(L); : NEXT L : PRINT : NEXT K
```

Commodore 64 users must break line 20 into two lines with this modification.

You can use this program to calculate other powers of two. Change the 127 in line 10 to the desired power. For larger results, you may need to use more elements of the N() array. Change the 5's as necessary. Remember that $N(1)=N(1)-1$ in line 20 subtracts one from the result before printing the answer. Remove it if desired. For powers of numbers other than two, change the 2 in line 10.

Problem #41-2: New Name from Lon Olson (Mesa, AZ) was a good exercise in string permutations. The computer is to generate all possible 5-letter names for a new company according to these rules:

- 1) The first letter is the initial of your first name.
- 2) The fifth letter is the initial of your last name.
- 3) Of the three middle letters, at least one is a vowel (a, e, i, o, or u).
- 4) All five letters must be different (except the first and fifth may be the same).

This program from Jim Speers (Niles, MI) is the most compact of the solutions meeting all the requirements above:

```
1 REM =====
2 REM   COMMODARES PROBLEM #41-2 :
3 REM   NEW NAME
4 REM   SOLUTION BY
5 REM   JIM SPEERS
6 REM =====
200 X$="AEIOUBCDFGHKLMNPQRTVWXYZ":F$="J"
:L$="S":NV=5:NL=24
210 FORV=1TONV:FORA=1TONL-1:IFA=VTHEN260
220 FORB=A+1TONL:IFB=VTHEN250
230 A$=MID$(X$,A,1):B$=MID$(X$,B,1):V$=M
ID$(X$,V,1)
240 PRINT F$V$A$B$L$ "F$V$B$A$L$" "F$A$
B$V$L$" "F$A$V$B$L$" "F$B$V$A$L$" "F$B$A
$V$L$:N=N+6
250 NEXTB
260 NEXTA
270 NEXTV
280 PRINTN;"NAMES PRINTED"
```

You should change the value of X\$, F\$, and L\$ as appropriate for your initials. Jim and several others also sent routines which allow the user to enter his initials. You may enjoy modifying this program to do that.

Among the more interesting names mentioned by readers were NMALS or NPETS (pet store), NRIBS (barbeque restaurant), and NEWTS (lizard farm) from Neil Spokes (Briarcliff Manor, NY); Mario Segal (Mexico City, Mexico) came up with MEATS for a steakhouse and MALES for a men's club; Jim Speers can be himself (JAMES), someone else (JONES), or "just another fat man" (JOWLS); Jim is also considering JADES, JEANS, or JOKES for his next business. Mike Suetkamp (Marion, IN) will open up a classy place; he will call it MIKES.

Necah Buyukdura (Ankara, Turkey) sent a good solution as well as some statistics. He said that the number of New

Names that can be generated is:

4554 when the first and last initials are two different vowels;

6072 when only one initial is a vowel;

6624 when both initials are the same vowel;

7590 when the two initials are different consonants;

8280 when both initials are the same consonant.

You statisticians may enjoy verifying these numbers.

Problem #41-3: *Word Slider* is an enjoyable animation challenge from Scott McClare (Espanola, ONT). The idea is to slide two words through each other on one line of the screen, one coming from the right and the other from the left. The word from the right has priority and is visible when the two overlap.

Among the short but sophisticated solutions is this one from Bob Renaud (Pittsfield, MA).

```
1 REM =====
2 REM   COMMODARES PROBLEM #41-3 :
3 REM   WORD SLIDER
4 REM   SOLUTION BY
5 REM   BOB RENAUD
6 REM ===== FOR C-128 ONLY =====
10 AT=65520:WINDOW0,12,39,13:DO:FORJ=0TO
34:SYSAT,,0,J:PRINT"STRING":SYSAT,,0,34-
J:PRINT"SLIDER":SLEEP1:PRINT:NEXT:LOOP
```

It is for the C-128 only. According to Bob, the program uses the JPL0T Kernal routine. It uses the WINDOW function to center the printout and avoids leftover letters by scrolling the previous line out of the window. The DO loop runs continuously until you press RUN STOP.

To restore the screen to full size, press the HOME key twice. ReLIST the program before making changes to it, since the line links for text on the screen were lost when the new window was created. You may adjust the speed of motion with the value in the SLEEP statement, or replace SLEEP with a FOR/NEXT loop for finer control. (SLEEP doesn't handle fractions of a second properly.)

A more straightforward approach is shown in the following program submitted independently by Robert Marcus (Agincourt, ONT), J.V. Henry (North Fork, CA), and by Casey Gorsuch (Wilson Creek, WA).

```
1 REM =====
2 REM   COMMODARES PROBLEM #41-3 :
3 REM   WORD SLIDER
4 REM   SOLUTION BY
5 REM   CASEY GORSUCH
6 REM   ROBERT MARCUS
7 REM   J.V. HENRY
8 REM =====
10 FORI=0TO37:PRINT"+TAB(I)"CATS"TAB(37-
I)"DOG":FORX=0TO40:NEXT:NEXT
```

Change the value 40 to adjust the speed at which the words move.

Many readers successfully handled the difficulties of using two words of different lengths. Instead of using TABs to position the words each time, some readers repeatedly

constructed mostly-blank strings 40 characters long with the positions of the moving words within the strings continuously updated. Other readers simply POKEd the word characters directly to the correct screen locations.

Still others positioned the cursor with POKEs before printing each word. On the C-64, these statements move the cursor to horizontal position X on screen line Y then print A\$:

```
POKE 214,Y : PRINT : POKE 211,X : PRINT
A$
```

On the C-128, the statement CHAR,X,Y,A\$ does the same thing. Thanks to Judy Groth (Brooklyn, NY), Edward Shaw (Lexington, KY), Danny Potts (Birmingham, AL), and Skot Hannon for describing the POKEs for the C-64.

The following solution from Dominique Vachon shows how the problem can be solved in Pascal.

```
1 REM =====
2 REM   COMMODARES PROBLEM #41-3 :
3 REM   WORD SLIDER
4 REM   PASCAL SOLUTION BY
5 REM   DOMINIQUE VACHON
6 REM =====
10 :PROGRAM WORD-SLIDER (OUTPUT);
11 : CONST FIRST = "DOG";
12 :          SECOND = "CAT";
```

Merlin 128™

Easy to use for the beginner or professional, Merlin 128 is the complete macro assembler system designed specifically for the Commodore 128. Just a few of its features include:

- **Full Screen Editor** for quick and easy 80 column editing.
- **Macro Libraries** for frequently used subroutines.
- **Sourceror** to disassemble binary programs into source files.
- **Relocating Linker** to generate relocatable object code.
- **Local and Global Label** support.
- **Entry and External Label** definitions.
- **Printfiler** to save assembled listings as ASCII Text files.
- **Altkeys** to create your own keyboard command macros.
- **Keydefs** to define and edit the Function Key definitions.

Merlin 128 comes with many **Sample Programs** you can list and modify yourself, including 1571 Disk Copy, 1571 Disk Zap, HiRes, Swish, RAM Test and more!

\$69.95* *Plus \$3.00 Shipping. CA Res. add 6% Sales Tax.

See why Merlin 128 is the best macro assembler for the Commodore 128. Ask your local dealer or order today by calling our Toll Free Order Line:

800-421-6526 or 619-442-0522 in CA

Roger Wagner™
PUBLISHING, INC.

1050 Pioneer Way • Suite P • El Cajon, CA 92020

Merlin 128 requires a Commodore 128 and at least one 1571 drive or equivalent. Merlin 128 is compatible with Merlin 64 source files.


```

13 : VAR A,D : INTEGER:
14 : BEGIN
15 :   FOR D := 0 TO 37 DO
16 :     BEGIN
17 :       CLEARSCREEN;
18 :       POSCURSOR(0,D);WRITELN (SECOND);
19 :       POSCURSOR(0,37-D);WRITELN(FIRST)
20 :     ;
21 :   FOR A := 1 TO 20 DO
22 :     BEGIN END;
23 :   END;
24 : END.

```

The line numbers and leading colons are not needed. The POSCURSOR command is similar to the CHAR command described above.

The toughest challenge this month was *Problem #41-4: Smith Numbers* by Sol Katz (Lakewood, CO). A Smith number is an integer with the sum of its digits equal to the sum of the digits of its prime factors (whew!). The problem was to find and print Smith numbers.

To solve the problem, you must find the prime factors of a number, the sum of the digits of the number, and the sum of the digits of the prime factors. Each positive integer has a unique set of prime number factors. Multiplying the factors together gives the number.

This solution from Barry Warren (Coboconk, ONT) efficiently solves the problem.

```

1 REM =====
2 REM   COMMODARES PROBLEM #41-4 :
3 REM   SMITH NUMBERS
4 REM   SOLUTION BY
5 REM   BARRY WARREN
6 REM =====
10 DIM X(29):Z=4
20 P=Z:I=1:Y=1:PRINT Z,
30 Y=Y+1:IF Y*Y>P THEN X(I)=P:GOTO 60
40 Q=P/Y:IF INT(Q)<Q GOTO 30
50 P=Q:X(I)=Y:I=I+1:Y=Y-1:GOTO 30
60 ON I GOTO 110:S=0:FOR J=1 TO I:X=X(J)
:PRINT X;:GOSUB 90:NEXT: SX=S
70 S=0:X=Z:GOSUB 90:IF S=SX THEN PRINT :
PRINT Z "IS A SMITH NUMBER";
80 Z=Z+1:PRINT:GOTO 20
90 Y=INT(X/10):S=S+INT((X/10-Y+.05)*10):
X=X-Y:IF X>0 GOTO 90
100 RETURN
110 Z=Z+1:PRINT "PRIME":GOTO 20

```

Z stores the number to be tested. The prime factors of Z are stored in the X() array. Lines 30 through 50 calculate the prime factors of Z. Line 40 repeatedly divides P (initially set to Z) by every integer divisor Y. If Y does not divide evenly into P, the program branches back to line 30 for the next divisor.

Once an exact divisor is found, P is replaced by the quotient, and the divisor (which is a prime factor) is stored in X() in line 50. The Y=Y-1 statement causes each Y value to be reused as many times as possible.

76 AHoy!

After the value of P is less than the square of the next divisor, all prime factors of Z have been found, and line 30 branches to line 60. The variable I keeps track of the number of factors found. If I is still 1 in line 60, then the number Z must be prime, and the program branches to line 110 to print that fact. If I is greater than 1, then line 60 prints each prime factor. I added the PRINT statements to Barry's program in lines 60 and 110 to show intermediate results.

Lines 60 and 70 call the subroutine at line 90 to add up the digits of the prime factors and of the original number in SX and S respectively. If the two digit sums are equal, the final statement in line 70 prints the Smith numbers. Line 80 increments the test number Z, and the process is repeated.

You may set Z to whatever starting value you desire in line 10. To look for Smith numbers larger than one million, simply use Z=1000000 in line 10, or press RUN STOP to stop the program and enter

```
Z=1E6 : GOTO 20
```

Congratulations to Necah Buyukdura (Ankara, Turkey), Bret Ekstrand (Signal Hill, CA), Gary Bond (Topeka, KS), and Jim Speers (Niles, MI) for good solutions to this masters-level challenge. Leo Brennenman (Erie, PA) disqualified himself from this problem since he personally knew Smith. Leo wondered how I got Smith's unlisted phone number. (Sorry, but I am not allowed to divulge that information.) By the way, I wonder what the largest Smith number and prime number are that this program is capable of finding. Anyone know?

Keep those suggestions and solutions coming. If you find the problems too easy, send harder ones. If these problems are always over your head, send easy ones. We aim to please (or at least to entice) everyone. See you next month.

Congratulations to the following people not already mentioned this month for sending valid *Commodares* solutions. Please be sure to include your address with your listing. The envelopes (and some return addresses) are discarded. □

Carmen Artino (Guilderland, NY)
Ernest Barkman (Orlando, FL)
Steven Blucher (Baltimore, MD)
Billy Brown Jr.
Dave Budgett (Graceville, MN)
Michael Cole
Curt Donofrio (Shelton, CT)
B. Donovan (Quebec City, QUE)
Craig Ewert (Crystal Lake, IL)
Jim Fidelholtz (Puebla, MEX)
R.E. Frazier (San Diego, CA)
Thomson Fung (San Diego, CA)
Ron Gow (Sacramento, CA)
Robert Groysman

Alan Gutierrez
David Hoffner (Brooklyn, NY)
Shaun Jones (Thackerville, OK)
Anibal Lopez (Rio Piedras, PR)
Jeff McCreary
Edward Nichols (Lawton, OK)
Dave Nowka
Lon Olson (Mesa, AZ)
Edward Shaw (Lexington, KY)
David Shiloh (Eugene, OR)
J.H. Smalley (Boulder, CO)
Mark Stevens
John Yarbrough (Glen Rock, PA)
Perry Yates (Galveston, TX)

PROGRAMS NEEDED

...and paid for—at the highest rates offered by any Commodore-specific publication. We need the best utility, game, and productivity programs being written today. If you have a program that falls into that category, send it on disk with a printout, documentation, and SASE to *Ahoy!* Program Submissions, Ion International Inc., 45 West 34th Street—Suite 500, New York, NY 10001.

PROGRAM LISTINGS

Attention new Ahoy! readers! You must read the following information very carefully prior to typing in programs listed in Ahoy! Certain Commodore characters, commands, and strings of characters and commands will appear in a special format. Follow the instructions and listings guide on this page.



In the following pages you'll find several programs that you can enter on your Commodore computer. But before doing so, read this entire page carefully.

To insure clear reproductions, Ahoy!'s program listings are generated on a daisy wheel printer, incapable of printing the commands and graphic characters used in Commodore programs. These are therefore represented by various codes enclosed in brackets []. For example: the SHIFT CLR/HOME command is represented onscreen by a heart

☛. The code we use in our listings is [CLEAR]. The chart below lists all such codes which you'll encounter in our listings, except for one other special case.

The other special case is the COMMODORE and SHIFT characters. On the front of most keys are two symbols. The symbol on the left is obtained by pressing that key while holding down the COMMODORE key; the symbol on the right, by pressing that key while holding down the SHIFT key. COMMODORE and SHIFT characters are represented in our listings by a lower-case "s" or "c" followed by the symbol of the key you must hit. COMMODORE J, for example, is represented by [c J], and SHIFT J by [s J].

Additionally, any character that occurs more than two times in a row will be displayed by a coded listing. For example, [3 "[LEFT]"] would be 3 CuRSor left commands in a row, [5 "[s EP]"] would be 5 SHIFTed English Pounds, and so on. Multiple blank spaces will be noted in similar fashion: e.g., 22 spaces as [22 " "].

Sometimes you'll find a program line that's too long for the computer to accept (C-64 lines are a maximum of 80 characters, or 2 screen lines long; C-128 lines, a maximum of 160 characters, 2 or 4 screen lines in 40 or 80 columns respectively). To enter these lines, refer to the *BASIC Command Abbreviations Appendix* in your User Manual.

On the next page you'll find our *Bug Repellent* programs for the C-128 and C-64. The version for your machine will help you proofread programs after typing them. (Please note: the *Bug Repellent* line codes that follow each program line, in the whited-out area, should *not* be typed in. See instructions preceding each program.)

On the second page following you will find *Flankspeed*, our ML entry program, and instructions on its use.

Call Ahoy! at 212-239-6089 with any problems (if busy or no answer after three rings, call 212-239-0855).

WHEN YOU SEE	IT MEANS	YOU TYPE	YOU WILL SEE	WHEN YOU SEE	IT MEANS	YOU TYPE	YOU WILL SEE
[CLEAR]	Screen Clear	SHIFT CLR/HOME	☛	[BLACK]	Black	CNTRL 1	■
[HOME]	Home	CLR/HOME	S	[WHITE]	White	CNTRL 2	□
[UP]	Cursor Up	SHIFT ↑ CRSR ↓	⬆	[RED]	Red	CNTRL 3	■
[DOWN]	Cursor Down	↑ CRSR ↓	⬇	[CYAN]	Cyan	CNTRL 4	■
[LEFT]	Cursor Left	SHIFT ← CRSR →	⬅	[PURPLE]	Purple	CNTRL 5	■
[RIGHT]	Cursor Right	← CRSR →	➡	[GREEN]	Green	CNTRL 6	⬆
[SS]	Shifted Space	SHIFT Space	■	[BLUE]	Blue	CNTRL 7	⬆
[INSERT]	Insert	SHIFT INST/DEL	■	[YELLOW]	Yellow	CNTRL 8	⬆
[DEL]	Delete	INST/DEL	■	[F1]	Function 1	F1	■
[RVSON]	Reverse On	CNTRL 9	R	[F2]	Function 2	SHIFT F1	■
[RVSOFF]	Reverse Off	CNTRL 0	■	[F3]	Function 3	F3	■
[UPARROW]	Up Arrow	↑	⬆	[F4]	Function 4	SHIFT F3	■
[BACKARROW]	Back Arrow	←	⬅	[F5]	Function 5	F5	■
[PI]	PI	π	π	[F6]	Function 6	SHIFT F5	■
[EP]	English Pound	£	£	[F7]	Function 7	F7	■
				[F8]	Function 8	SHIFT F7	■

BUG REPELLENT FOR THE 64 & 128 By BUCK CHILDRESS

Please note: the *Bug Repellent* programs listed here are for *Ahoy!* programs published from the May 1987 issue onward! For older programs, use the older version.

Type in, save, and run *Bug Repellent*. You'll be asked if you want automatic saves to take place. If so, you're prompted for the device, DISK (D) or TAPE (T). You then pick a starting file number, 0 through 99. Next, you enter a name, up to 14 characters long. At this point, *Bug Repellent* verifies your entries and gives you a chance to change them if you want. If no changes are needed, *Bug Repellent* activates itself. (Pressing RETURN without answering the prompts defaults to disk drive and begins your files with "00BACKUP".)

Type NEW and begin entering an *Ahoy!* program. As you enter program lines and press RETURN, a *Bug Repellent* code appears at the top of your screen. If it doesn't match the code in the program listing, an error exists. Correct the line and the codes will match.

If used, automatic saves take place every 15 minutes. When the RETURN key is pressed on a program line, the screen changes color to let you know that a save will begin in about three seconds. You may cancel the save by pressing the RUN STOP key. The file number increments after each save. It resets to 00 if 99 is surpassed. After saving, or cancelling, the screen returns to its original color and the timer resets for 15 minutes.

When you've finished using *Bug Repellent*, deactivate it by typing SYS 49152 [RETURN] for the Commodore 64 or SYS 4864 [RETURN] for the Commodore 128.

C-64 BUG REPELLENT

```

•10 PRINTCHR$(147)"LOADING AND CHECKING THE DATA[3].":J
=49152
•20 FORB=0TO11:READA:IFA<0ORA>255THEN40
•30 POKEJ+B,A:X=X+A:NEXTB:READA:IFA=XTHEN50
•40 PRINT:PRINT"ERROR IN DATA LINE:"PEEK(64)*256+PEEK(63)
:END
•50 X=0:J=J+12:IFJ<49456THEN20
•60 POKE198,0:POKE49456,0:A$="Y":B$=A$:C$="D":D$="DISK":D
=8:PRINTCHR$(147)
•70 INPUT"DO YOU WANT AUTOMATIC SAVES (Y/N)":A$:PRINT:IFA
$="Y"THEN90
•80 PRINT"NO AUTOMATIC SAVES[3].":GOTO150
•90 POKE49456,1:INPUT"DISK OR TAPE (D/T)":C$:IFC$<>"D"THEN
ND=1:D$="TAPE"
•100 POKE49457,D:D$=D$+" DRIVE":PRINT:INPUT"FILE NUMBER (
0-99)":N
•110 N$=RIGHT$(STR$(N),2):IFN<10THENN$=CHR$(48)+CHR$(N+48
)
•120 F$="BACKUP":PRINT:INPUT"FILENAME":F$:F$=N$+LEFT$(F$,
14):L=LEN(F$)
•130 POKE49458,L:FORJ=1TOL:POKE49458+J,ASC(MID$(F$,J,1)):NE
XTJ:PRINT
•140 PRINT"SAVING DEVICE ** "D$:PRINT"STARTING WITH ** "F
$
•150 PRINT:INPUT"IS THIS CORRECT (Y/N)":B$:IFB$<>"Y"THEN6
0
•160 POKE770,131:POKE771,164:SYS49152:END
•170 DATA169,79,32,210,255,162,38,160,192,204,3,3,1507
•180 DATA208,10,162,131,160,164,169,70,32,210,255,44,1615
•190 DATA169,78,32,210,255,142,2,3,140,3,3,76,1113
•200 DATA36,193,32,96,165,134,122,132,123,32,115,0,1180
•210 DATA170,240,243,162,255,134,58,144,3,76,150,164,1799
•220 DATA32,107,169,32,121,165,173,0,2,240,5,169,1215
•230 DATA79,141,2,3,76,162,164,169,0,133,2,133,1064
•240 DATA251,133,252,133,254,24,101,20,69,254,230,254,197
5
•250 DATA24,101,21,69,254,170,230,254,164,252,185,0,1724
•260 DATA2,133,253,201,34,208,6,165,2,73,255,133,1465
•270 DATA2,201,32,208,4,165,2,240,8,138,24,101,1125
•280 DATA253,69,254,170,44,198,254,230,252,164,253,208,23
49
•290 DATA213,138,41,240,74,74,74,24,105,129,141,1327
•300 DATA44,193,138,41,15,24,105,129,141,45,193,162,1230
•310 DATA0,189,43,193,240,12,157,0,4,173,134,2,1147
•320 DATA157,0,216,232,208,239,169,38,141,2,3,173,1578
•330 DATA48,193,240,23,165,161,201,212,176,4,165,160,1748
•340 DATA240,13,238,32,208,160,0,32,225,255,208,6,1617
•350 DATA32,33,193,76,38,192,232,208,242,200,208,239,1893
•360 DATA32,68,229,169,0,168,174,49,193,32,186,255,1555
•370 DATA173,50,193,162,51,160,193,32,189,255,169,43,1670
•380 DATA166,45,164,46,32,216,255,162,1,189,51,193,1520
•390 DATA168,200,152,201,58,144,2,169,48,157,51,193,1543
•400 DATA201,48,208,3,202,16,234,32,33,193,76,116,1362
•410 DATA164,206,32,208,169,0,170,168,76,219,255,160,1827
•420 DATA1,1,160,0,0,65,72,79,89,33,0,0,500

```

C-128 BUG REPELLENT

```

•10 PRINTCHR$(147)"LOADING AND CHECKING THE DATA[3].":J
=4864
•20 FORB=0TO11:READA:IFA<0ORA>255THEN40
•30 POKEJ+B,A:X=X+A:NEXTB:READA:IFA=XTHEN50
•40 PRINT:PRINT"ERROR IN DATA LINE:"PEEK(66)*256+PEEK(65)
:END
•50 X=0:J=J+12:IFJ<5213THEN20
•60 POKE208,0:POKE5213,0:A$="Y":B$=A$:C$="D":D$="DISK":D
=8:PRINTCHR$(147)
•70 INPUT"DO YOU WANT AUTOMATIC SAVES (Y/N)":A$:PRINT:IFA
$="Y"THEN90
•80 PRINT"NO AUTOMATIC SAVES[3].":GOTO150
•90 POKE5213,1:INPUT"DISK OR TAPE (D/T)":C$:IFC$<>"D"THEN
D=1:D$="TAPE"
•100 POKE5214,D:D$=D$+" DRIVE":PRINT:INPUT"FILE NUMBER (0
-99)":N
•110 N$=RIGHT$(STR$(N),2):IFN<10THENN$=CHR$(48)+CHR$(N+48
)
•120 F$="BACKUP":PRINT:INPUT"FILENAME":F$:F$=N$+LEFT$(F$,
14):L=LEN(F$)
•130 POKE5215,L:FORJ=1TOL:POKE5215+J,ASC(MID$(F$,J,1)):NE
XTJ:PRINT
•140 PRINT"SAVING DEVICE ** "D$:PRINT"STARTING WITH ** "F
$
•150 PRINT:INPUT"IS THIS CORRECT (Y/N)":B$:IFB$<>"Y"THEN6
0
•160 POKE770,198:POKE771,77:SYS4864:END
•170 DATA32,58,20,169,41,162,19,236,3,3,208,4,955
•180 DATA169,198,162,77,141,2,3,142,3,3,224,19,1143
•190 DATA208,7,32,125,255,79,78,0,96,32,125,255,1292
•200 DATA79,70,70,0,96,162,0,134,251,189,0,2,1053
•210 DATA240,19,201,48,144,9,201,58,176,5,133,251,1485
•220 DATA232,208,238,134,252,165,251,208,3,76,198,77,2042
•230 DATA169,0,166,235,164,236,133,253,133,254,142,47,193
2
•240 DATA20,140,48,20,24,101,22,69,254,230,254,24,1206
•250 DATA101,23,69,254,170,230,254,164,252,185,0,2,1704
•260 DATA133,251,201,34,208,6,165,253,73,255,133,253,1965
•270 DATA201,32,208,4,165,253,240,8,138,24,101,251,1625
•280 DATA69,254,170,44,198,254,230,252,164,251,208,213,23
07
•290 DATA138,41,240,74,74,74,24,105,65,141,88,1138
•300 DATA20,138,41,15,24,105,65,141,89,20,32,79,769
•310 DATA20,189,85,20,240,6,32,210,255,232,208,245,1742
•320 DATA174,47,20,172,48,20,24,32,240,255,173,93,1298
•330 DATA20,240,27,165,161,201,212,176,4,165,160,240,1771
•340 DATA17,32,65,20,238,32,186,255,169,45,174,16,18,1351
•350 DATA255,208,6,32,49,20,76,198,77,232,208,242,1603
•360 DATA200,208,239,32,66,193,173,95,20,162,96,160,1644
•370 DATA20,32,189,255,169,0,170,32,104,255,169,0,1395
•380 DATA174,94,20,168,32,186,255,169,45,174,16,18,1351
•390 DATA172,17,18,32,216,255,162,1,189,96,20,168,1346
•400 DATA200,152,201,58,144,2,169,48,157,96,20,201,1448
•410 DATA48,208,3,202,16,234,32,49,20,141,0,2,955
•420 DATA76,183,77,58,59,32,65,20,206,32,208,206,1222
•430 DATA1,214,169,0,170,168,76,219,255,32,79,20,1403
•440 DATA169,26,141,0,214,173,0,214,16,251,96,162,1462
•450 DATA0,142,0,255,96,19,18,32,32,32,32,146,804
•460 DATA0,1,0,0,65,72,79,89,33,0,0,0,339

```


FLANKSPEED FOR THE C-64 By GORDON F. WHEAT

Flankspeed will allow you to enter machine language *Ahoy!* programs without any mistakes. Once you have typed the program in, save it for future use. While entering an ML program with *Flankspeed* there is no need to enter spaces or hit the carriage return. This is all done automatically. If you make an error in a line a bell will ring and you will be asked to enter it again. To LOAD in a program Saved with *Flankspeed* use LOAD "name",1,1 for tape, or LOAD "name",8,1 for disk. The function keys may be used after the starting and ending addresses have been entered.

f1—SAVEs what you have entered so far.

f3—LOADs in a program worked on previously.

f5—To continue on a line you stopped on after LOADING in the previous saved work.

f7—Scans through the program to locate a particular line, or to find out where you stopped the last time you entered the program. It temporarily freezes the output as well.

•100 POKE53280,12:POKE53281,11	OP	5	IK
•105 PRINT"[CLEAR][c 8][RVSON][15" "]FLANKSPEED[15" "];	FP	•390 PRINT:PRINT"ADDRESS NOT WITHIN SPECIFIED RANGE!":B=fj:	HK
•110 PRINT"[RVSON][5" "]MISTAKEPROOF ML ENTRY PROGRAM[6" "	JP	GOTO415	DM
•115 PRINT"[RVSON][9" "]CREATED BY G. F. WHEAT[9" "];	FA	•395 PRINT:PRINT"NOT ZERO PAGE OR ROM!":B=fj:GOTO415	JK
•120 PRINT"[RVSON][3" "]COPR. 1987, ION INTERNATIONAL INC.	AJ	•400 PRINT"?ERROR IN SAVE":GOTO415	IO
[3" "];	ND	•405 PRINT"?ERROR IN LOAD":GOTO415	JO
•125 FORA=54272TO54296:POKEA,0:NEXT	NP	•410 PRINT:PRINT:PRINT"END OF ML AREA":PRINT	BF
•130 POKE54272,4:POKE54273,48:POKE54277,0:POKE54278,249:PO	FL	•415 POKE54276,17:POKE54276,16:RETURN	DH
KE54296,15	FF	•420 OPEN15,8,15:INPUT#15,A,AS:CLOSE15:PRINTA\$:RETURN	IM
•135 FORA=680TO699:READB:POKEA,B:NEXT	EK	•425 REM GET FOUR DIGIT HEX	OL
•140 DATA169,251,166,253,164,254,32,216,255,96	KP	•430 PRINT:PRINTB\$;:INPUTT\$	JD
•145 DATA169,0,166,251,164,252,32,213,255,96	OE	•435 IFLEN(T\$)<>4THENGOSUB380:GOTO430	AK
•150 B\$="STARTING ADDRESS IN HEX":GOSUB430:AD=B:SR=B	AM	•440 FORA=1TO4:A\$=MID\$(T\$,A,1):GOSUB450:IFT(A)=16THENGOSUB	KB
•155 GOSUB480:IFB=0THEN150	PE	380:GOTO430	GM
•160 POKE251,T(4)+T(3)*16:POKE252,T(2)+T(1)*16	PG	•445 NEXT:B=(T(1)*4096)+(T(2)*256)+(T(3)*16)+T(4):RETURN	NJ
•165 B\$="ENDING ADDRESS IN HEX":GOSUB430:EN=B	GM	•450 IFA\$>"@ANDAS<"G"THENT(A)=ASC(A\$)-55:RETURN	IC
•170 GOSUB470:IFB=0THEN150	HG	•455 IFA\$>"/ANDAS<:"THENT(A)=ASC(A\$)-48:RETURN	OL
•175 POKE254,T(2)+T(1)*16:B=T(4)+1+T(3)*16	EC	•460 T(A)=16:RETURN	HO
•180 IFB>255THENB=B-255:POKE254,PEEK(254)+1	ED	•465 REM ADDRESS CHECK	LE
•185 POKE253,B:PRINT	KD	•470 IFAD>ENTHEN385	OB
•190 REM GET HEX LINE	IH	•475 IFB<SRORB>ENTHEN390	HE
•195 GOSUB495:PRINT":[c P][LEFT]";:FORA=0TO8	IJ	•480 IFB<256OR(B>4096)ANDB<49152)ORB>53247THEN395	PM
•200 FORB=0TO1:GOTO250	FA	•485 RETURN	AP
•205 NEXTB	EG	•490 REM ADDRESS TO HEX	NF
•210 A\$(A)=T(1)+T(0)*16:IFAD+A-1=ENTHEN340	II	•495 AC=AD:A=4096:GOSUB520	LG
•215 PRINT"[c P][LEFT]";	GL	•500 A=256:GOSUB520	HE
•220 NEXTA:T=AD-(INT(AD/256)*256):PRINT"	GI	•505 A=16:GOSUB520	JD
•225 FORA=0TO7:T=T+A\$(A):IFT>255THENT=T-255	IL	•510 A=1:GOSUB520	OC
•230 NEXT	FM	•515 RETURN	JI
•235 IFA\$(8)<>TTHENGOSUB375:GOTO195	PA	•520 T=INT(AC/A):IFT>9THENA\$=CHR\$(T+55):GOTO530	AA
•240 FORA=0TO7:POKEAD+A,A\$(A):NEXT:AD=AD+8:GOTO195	GA	•525 A\$=CHR\$(T+48)	IC
•245 REM GET HEX INPUT	GO	•530 PRINTA\$;:AC=AC-A*T:RETURN	AB
•250 GETA\$:IFA\$=""THEN250	LM	•535 A\$="**SAVE**":GOSUB585	FB
•255 IFA\$=CHR\$(20)THEN305	IG	•540 OPEN1,T,1,A\$:SYS680:CLOSE1	PM
•260 IFA\$=CHR\$(133)THEN535	HO	•545 IFST=0THENEND	FI
•265 IFA\$=CHR\$(134)THEN560	HE	•550 GOSUB400:IFT=8THENGOSUB420	PE
•270 IFA\$=CHR\$(135)THENPRINT" ":GOTO620	MI	•555 GOTO535	PO
•275 IFA\$=CHR\$(136)THENPRINT" ":GOTO635	DJ	•560 A\$="**LOAD**":GOSUB585	OI
•280 IFA\$>"@ANDAS<"G"THENT(B)=ASC(A\$)-55:GOTO295	JA	•565 OPEN1,T,0,A\$:SYS690:CLOSE1	CO
•285 IFA\$>"/ANDAS<:"THENT(B)=ASC(A\$)-48:GOTO295	PK	•570 IFST=64THEN195	GN
•290 GOSUB415:GOTO250	FA	•575 GOSUB405:IFT=8THENGOSUB420	KA
•295 PRINTA\$"[c P][LEFT]";	BI	•580 GOTO560	IO
•300 GOTO205	BB	•585 PRINT" ":PRINTTAB(14)A\$	HK
•305 IFA>0THEN320	FA	•590 PRINT:A\$=""INPUT"FILENAME":A\$	HL
•310 A=-1:IFB=1THEN330	BF	•595 IFA\$=""THEN590	NP
•315 GOTO220	FK	•600 PRINT:PRINT"TAPE OR DISK?":PRINT	KO
•320 IFB=0THENPRINTCHR\$(20):CHR\$(20):A=A-1	PH	•605 GETB\$:T=1:IFB\$="D"THENT=8:A\$="@j":"+A\$:RETURN	PH
•325 A=A-1	CP	•610 IFB\$<>"T"THEN605	DD
•330 PRINTCHR\$(20):GOTO220	KH	•615 RETURN	NK
•335 REM LAST LINE	OD	•620 B\$="CONTINUE FROM ADDRESS":GOSUB430:AD=B	HN
•340 PRINT" ":T=AD-(INT(AD/256)*256)	OB	•625 GOSUB475:IFB=0THEN620	FK
•345 FORB=0TOA-1:T=T+A\$(B):IFT>255THENT=T-255	LH	•630 PRINT:GOTO195	LN
•350 NEXT	BO	•635 B\$="BEGIN SCAN AT ADDRESS":GOSUB430:AD=B	HI
•355 IFA\$(A)<>TTHENGOSUB375:GOTO195	MB	•640 GOSUB475:IFB=0THEN635	LM
•360 FORB=0TOA-1:POKEAD+B,A\$(B):NEXT	LM	•645 PRINT:GOTO670	LE
•365 PRINT:PRINT"YOU ARE FINISHED!":GOTO535	JK	•650 FORB=0TO7:AC=PEEK(AD+B):GOSUB505:IFAD+B=ENTHENAD=SR:G	CD
•370 REM BELL AND ERROR MESSAGES	PG	OSUB410:GOTO195	JD
•375 PRINT:PRINT"LINE ENTERED INCORRECTLY":PRINT:GOTO415		•655 PRINT" ":NEXTB	KE
•380 PRINT:PRINT"INPUT A 4 DIGIT HEX VALUE!":GOTO415		•660 PRINT:AD=AD+8	
•385 PRINT:PRINT"ENDING IS LESS THAN STARTING!":B=fj:GOTO41		•665 GETB\$:IFB\$=CHR\$(136)THEN195	
		•670 GOSUB495:PRINT" ":GOTO650	

SPRITESHELL 128

FROM PAGE 48

Warning! Read documentation carefully before entering these programs!

Starting address in hex: 1300

Ending address in hex: 1517

Flankspeed required for entry! See page 79.

SPRITESHELL 128

```

1300: 78 A9 19 8D 14 03 A9 13 9C
1308: 8D 15 03 AD F8 11 85 FB E6
1310: A9 01 85 FC 8D FD 11 58 32
1318: 60 C6 FB D0 2A AD F8 11 ED
1320: 85 FB AD F6 11 F0 20 A5 0E
1328: FC 18 6D F3 11 AE F9 11 69
1330: A4 D8 F0 06 9D F9 1F 4C A7
1338: 3D 13 9D F9 07 CA D0 F0 B3
1340: A9 01 38 E5 FC 85 FC AD 36
1348: F2 11 D0 03 4C 31 14 A2 54
1350: 00 AD FA 11 F0 0A A9 01 AF
1358: 38 ED FD 11 8D FD 11 AA D4
1360: BD 00 DC 29 0F 85 FD A9 60
1368: 0F 38 E5 FD 48 8A 0A AA 1B
1370: 68 C9 04 D0 16 DE D6 11 54
1378: D0 0E 8A 4A A8 C8 98 4D 83
1380: E6 11 8D E6 11 DE D6 11 C4
1388: 4C 31 14 C9 08 D0 16 FE D1
1390: D6 11 D0 0E 8A 4A A8 C8 9D
1398: 98 4D E6 11 8D E6 11 FE FA
13A0: D6 11 4C 31 14 C9 01 D0 B5
13A8: 07 E8 DE D6 11 4C 31 14 F0
13B0: C9 02 D0 07 E8 FE D6 11 24
13B8: 4C 31 14 C9 05 D0 1A DE E2
13C0: D6 11 D0 0E 8A 4A A8 C8 CD
13C8: 98 4D E6 11 8D E6 11 DE 0B
13D0: D6 11 E8 DE D6 11 4C 31 E5
13D8: 14 C9 06 D0 1A DE D6 11 6E
13E0: D0 0E 8A 4A A8 C8 98 4D EB
13E8: E6 11 8D E6 11 DE D6 11 2D
13F0: E8 FE D6 11 4C 31 14 C9 1C
13F8: 09 D0 1A FE D6 11 D0 0E B2
1400: 8A 4A A8 C8 98 4D E6 11 24
1408: 8D E6 11 FE D6 11 E8 DE 3C
1410: D6 11 4C 31 14 C9 0A D0 2E
1418: 18 FE D6 11 D0 0F 8A 8A 0C
1420: 4A A8 C8 98 4D E6 11 8D 47
1428: E6 11 FE D6 11 E8 FE D6 C5
1430: 11 AE FB 11 8E F4 11 AD 3F
1438: F4 11 0A AA 4A A8 B9 0E AD
1440: 15 2D E6 11 D0 14 BD D6 F3
1448: 11 38 CD EE 11 B0 0B AC C7
1450: EE 11 C8 98 9D D6 11 4C 83
1458: B3 14 8A 4A A8 B9 0E 15 7A

```

```

1460: 2D E6 11 F0 28 BD D6 11 44
1468: 38 CD EF 11 90 1F AC EF BB
1470: 11 88 98 9D D6 11 AD F4 CA
1478: 11 CD F7 11 D0 0F A9 FF E9
1480: AE F4 11 38 FD 0E 15 2D BB
1488: 15 D0 8D 15 D0 E8 BD D6 5F
1490: 11 38 CD F0 11 B0 0B AC 12
1498: F0 11 C8 98 9D D6 11 4C CD
14A0: B3 14 BD D6 11 38 CD F1 06
14A8: 11 90 1F AC F1 11 88 98 3A
14B0: 9D D6 11 AD F4 11 CD F7 AF
14B8: 11 D0 0F A9 FF AE F4 11 08
14C0: 38 FD 0E 15 2D 15 D0 8D BA
14C8: 15 D0 CE F4 11 30 03 4C 03
14D0: 37 14 4C 65 FA 8D EE 11 56
14D8: 8E EF 11 60 8D F0 11 8E E6
14E0: F1 11 60 8D F8 11 8A 38 9E
14E8: C9 06 90 02 A9 06 8D F9 82
14F0: 11 8C F3 11 60 8D F2 11 85
14F8: 8E F6 11 8C FA 11 60 8D 16
1500: F7 11 8A 38 C9 07 90 02 2F
1508: A9 07 8D FB 11 60 01 02 B6
1510: 04 08 10 20 40 80 00 00 0D

```

SHELL DEMO

```

•10 REM SPRITESHELL 128 DEMO
•20 REM CLEVE BLAKEMORE
•30 REM 5765 TIVOLI CIRCLE APT. #103
•40 REM RICHMOND,VA. 23227
•50 :
•60 REM MAKE SURE THESE FILES BELOW EXIST
    ON DISK BEFORE RUNNING THIS PROGRAM
•70 :
•80 BLOAD"SPRITESHELL 128
•90 BLOAD"DEMO.SPRITES
•100 :
•110 XB=5333:YB=5340
•120 SPRTG=5347
•130 FLAGS=5365:CFLAGS=5375:SHELL=4864
•140 :
•150 SYS XB,24,60
•160 SYS YB,50,220
•170 SYS SPRTG,5,6,58
•180 SYS FLAGS,1,1,1
•190 SYS CFLAGS,8,7
•200 COLOR0,1:COLOR1,3:COLOR4,1:GRAPHIC1,
    1
•210 BOX1,0,0,310,190:SPRSV3,A$:SPRSVA$
    ,4:SPRSV2,A$:SPRSVA$,3:SPRSV1,A$:SPRS
    AVA$,2
•220 FORX=3TO8:MOVSPRX,173,140:MOVSPRX,60
    ,(X-1)*45:SPRITEX,1,X:NEXT
•230 FORX=1TO2:MOVSPRX,173,140:SPRITEX,1,
    2:NEXT

```

LH
KJ
CN
DC
GM

JB
IA
IJ
BL
JO

AO
IP
EK
MG
NC
BC
BM
KH
LM

DK

BA

EO

NH


```

•240 SYS SHELL
•250 MOVSPR((RND(1)*6)+3),(RND(1)*8)*45#1
:GOTO250

```

AI
AF

DEMO.SPRITES

Starting address in hex: 0E00
Ending address in hex: 0EC0

```

0E00: 00 00 00 00 00 00 00 00 00 00
0E08: 00 00 18 00 00 3C 00 00 5C
0E10: 3C 00 00 3C 00 00 18 00 A0
0E18: 00 7E 00 00 FF 00 01 BD 55
0E20: 80 03 BC C0 03 3C C0 03 24
0E28: 18 C0 02 3C 40 00 7E 00 FD
0E30: 00 C3 00 01 81 80 01 81 79
0E38: 80 01 81 80 03 81 C0 00 01
0E40: 00 00 00 00 00 00 00 00 40
0E48: 00 00 00 00 00 00 00 10 58
0E50: 00 10 38 00 38 7C 00 7C C9
0E58: 4E 6C E4 07 39 C0 03 FF FB
0E60: 80 01 FF 00 00 38 00 00 1A
0E68: 00 00 00 00 00 00 00 00 68
0E70: 00 00 00 00 00 00 00 00 70
0E78: 00 00 00 00 00 00 00 10 88
0E80: 00 00 00 00 00 00 00 00 80
0E88: 00 00 00 00 00 00 00 00 88
0E90: 00 00 00 00 00 00 00 00 90
0E98: 1E 6C F0 3F 39 F8 73 FF F8
0EA0: 9C 41 FF 04 00 38 00 00 BA
0EA8: 00 00 00 00 00 00 00 00 A8
0EB0: 00 00 00 00 00 00 00 00 B0
0EB8: 00 00 00 00 00 00 00 10 C8
0EC0: 01 C1

```

```

•120 RETURN
•200 REM #2 - FLOATING POINT MATH
•210 FOR N=1 TO 1000
•220 K=K+(K-.6)*K/(K+.03)
•230 NEXT : RETURN
•300 REM #3 - STRING MANIPULATIONS
•310 FOR N=1 TO 1000
•320 N$=MID$(LEFT$(N$+"AHOY",3),2,1)
•330 NEXT : RETURN
•400 REM #4 - DISK WRITE
•410 DOPEN #1,"@TEST,S",W
•420 FOR N=1 TO 1000
•430 PRINT#1,N
•440 NEXT : DCLOSE : RETURN
•500 REM #5 - DISK READ
•510 DOPEN #1,"TEST,S"
•520 FOR N=1 TO 1000
•530 INPUT#1,K
•540 NEXT : DCLOSE : RETURN
•600 REM #6 - VERTICAL PRINTING
•610 FOR N=1 TO 1000
•620 PRINT N
•630 NEXT : RETURN
•700 REM #7 - HORIZONTAL PRINTING
•710 FOR N=1 TO 1000
•720 PRINT N;
•730 NEXT : RETURN
•800 REM #8 - RANDOM NUMBERS
•810 FOR N=1 TO 1000
•820 K=RND(0)*320 : K=RND(0)*200
•830 NEXT : RETURN
•900 REM #9 - RANDOM POINTS
•910 GRAPHIC 0 : GRAPHIC 1,1
•920 FOR N=1 TO 1000
•930 DRAW,RND(0)*320,RND(0)*200
•940 NEXT
•950 GRAPHIC 0 : GRAPHIC 5 : RETURN
•1000 REM #10 - RANDOM LINES
•1010 GRAPHIC 0 : GRAPHIC 1,1
•1020 FOR N=1 TO 100
•1030 DRAW,RND(0)*320,RND(0)*200 TO RND(0)*320,RND(0)*200
•1040 NEXT
•1050 GRAPHIC 0 : GRAPHIC 5 : RETURN
•1100 REM #11 - RANDOM CIRCLES
•1110 GRAPHIC 0 : GRAPHIC 1,1
•1120 FOR N=1 TO 50
•1130 CIRCLE,RND(0)*320,RND(0)*200,RND(0)*50
•1140 NEXT
•1150 GRAPHIC 0 : GRAPHIC 5 : RETURN

```

AG
ND
ON
GD
DF
EF
EG
NH
JI
GI
OL
LM
PH
EC
DL
JN
CF
EJ
KH
AL
IP
FP
LP
OP
ND
PL
CD
CJ
EE
BC
IG
DG
EC
KK
JM
DB
NP
GG
KG
NF
FN
JG
DO
FB
BJ
CK
BD
PK
KC

THE 128 VERSUS THE CLONES FROM PAGE 32

BENCHMARKS GALORE

```

•1 REM
•2 REM BENCHMARKS GALORE
•3 REM RUPERT REPORT #45
•4 REM C-128
•5 REM
•6 OPEN#4,4
•10 FOR B=1 TO 11
•20 FAST : T0=TI
•30 ON B GOSUB 100,200,300,400,500,600,700,800,900,1000,1100
•40 PRINT#4,"BENCHMARK #";B
•50 PRINT#4,(TI-T0)/60;"SECONDS"
•60 NEXT B
•70 PRINT#4 : CLOSE 4 : END
•100 REM #1 - SIMPLE FOR/NEXT LOOP
•110 FOR N=1 TO 10000 : NEXT N

```

IO
FH
MH
JC
JC
DE
LL
CN
OH
OH
OF
PI
OH
HL
NL

**Many of the products advertised
in Ahoy! are available at
discount prices to members of the
Ahoy! Access Club. See page 49.**

HOOPS

FROM PAGE 18

Starting address in hex: C000

Ending address in hex: C7E7

SYS to start: 49152

Flankspeed required for entry! See page 79.

```
C000: A9 8E 20 D2 FF A9 08 20 FC
C008: D2 FF A0 00 B9 E2 C6 99 78
C010: 00 3F C8 D0 F7 A0 18 B9 53
C018: FA C4 99 00 D4 88 10 F7 D6
C020: A9 00 8D 17 D0 8D 1B D0 B8
C028: A9 03 8D 1C D0 8D 1D D0 CA
C030: A2 05 BD 87 C4 9D 27 D0 77
C038: BD 8D C4 9D F8 07 CA 10 C0
C040: F1 A9 02 8D 25 D0 A9 0C 17
C048: 8D 26 D0 A9 00 8D 20 D0 F4
C050: 8D 21 D0 A0 07 99 7F C4 55
C058: 88 10 FA A9 8D A0 C5 20 A9
C060: D0 C3 A2 09 A0 01 18 20 7A
C068: F0 FF A9 13 A0 C5 20 D0 6D
C070: C3 A2 09 A0 26 18 20 F0 CF
C078: FF A9 2D A0 C5 20 D0 C3 6A
C080: 20 E6 C3 20 6E C3 A9 AB F2
C088: 8D 73 C4 A9 78 8D 6D C4 30
C090: A9 61 8D 75 C4 A9 F8 8D 93
C098: 76 C4 A9 00 8D 79 C4 8D D6
C0A0: 7B C4 8D 7C C4 20 2E C4 C2
C0A8: A9 33 8D 15 D0 A9 04 8D 34
C0B0: 82 C4 A5 A2 29 01 09 04 77
C0B8: 8D 83 C4 A2 0C A0 0C 18 02
C0C0: 20 F0 FF A9 4D A0 C5 A2 D1
C0C8: 33 20 2D C3 38 E9 31 8D ED
C0D0: 7D C4 A8 D0 29 A2 0C A0 05
C0D8: 0D 18 20 F0 FF A9 5F A0 B8
C0E0: C5 A2 37 20 2D C3 8D 78 97
C0E8: C5 38 E9 2A 8D 7E C4 A2 6E
C0F0: 06 A0 10 18 20 F0 FF A9 7A
C0F8: 6F A0 C5 20 D0 C3 A9 3F 6C
C100: 8D 15 D0 E6 04 A5 04 29 31
C108: 07 D0 18 AD 00 DC A2 00 25
C110: 20 2F C1 AD 01 DC AE 7D D8
C118: C4 D0 03 20 6A C1 A2 01 A0
C120: 20 2F C1 20 8D C1 20 88 49
C128: C2 20 2E C4 4C 03 C1 29 38
C130: 0C 4A 4A A8 18 BD 75 C4 89
C138: 79 9B C4 85 02 BD 7B C4 97
C140: 79 9F C4 85 03 38 A5 02 86
C148: FD 93 C4 A5 03 FD 95 C4 9F
C150: 90 17 38 A5 02 FD 97 C4 32
C158: A5 03 FD 99 C4 B0 0A A5 BD
C160: 02 9D 75 C4 A5 03 9D 7B FB
C168: C4 60 18 AD 73 C4 6D 7E 77
C170: C4 85 02 AD 79 C4 69 00 12
C178: 85 03 A0 07 38 AD 76 C4 C9
C180: E5 02 AD 7C C4 E5 03 90 D0
C188: 02 A0 0B 98 60 18 AD 81 76
```

```
C190: C4 69 02 A8 AD 82 C4 69 C7
C198: 00 C9 0A B0 06 8C 81 C4 F5
C1A0: 8D 82 C4 AC 82 C4 A5 04 13
C1A8: 39 A3 C4 D0 5F 18 AD 6D AD
C1B0: C4 79 AD C4 A8 AE 73 C4 F0
C1B8: AD 79 C4 20 4A C2 C9 20 BB
C1C0: F0 2C C9 02 B0 33 CD 84 DF
C1C8: C4 F0 26 AC 82 C4 C0 05 5E
C1D0: 90 1C 48 AA FE 7F C4 20 D3
C1D8: 6E C3 A9 00 8D 81 C4 A9 32
C1E0: 05 8D 82 C4 A0 80 8C 0B 73
C1E8: D4 C8 8C 0B D4 68 8D 84 6D
C1F0: C4 A5 FB 8D 6D C4 4C 0C 6F
C1F8: C2 A5 A2 29 0F 8D 81 C4 10
C200: AC 82 C4 B9 C1 C4 8D 82 44
C208: C4 20 1A C3 AC 83 C4 A5 65
C210: 04 39 A3 C4 D0 33 18 AD 7F
C218: 73 C4 79 AD C4 AA AD 79 0E
C220: C4 79 B7 C4 AC 6D C4 20 D9
C228: 4A C2 C9 02 90 1B C9 20 96
C230: D0 0B A5 FC 8D 73 C4 A5 1A
C238: FD 8D 79 C4 60 AC 83 C4 57
C240: B9 C1 C4 8D 83 C4 20 1A 90
C248: C3 60 84 FB 86 FC 85 FD F3
C250: A9 00 85 3B A9 04 85 3C 2A
C258: 38 98 E9 21 4A 4A 4A A8 BB
C260: F0 10 18 A5 3B 69 28 85 71
C268: 3B A5 3C 69 00 85 3C 88 39
C270: D0 F0 38 8A E9 0C 85 FE 6F
C278: A5 FD E9 00 4A 66 FE 46 FB
C280: FE 46 FE A4 FE B1 3B 60 B5
C288: AD 6D C4 C9 DC 90 5D AD AA
C290: 7F C4 C9 15 B0 07 AD 80 99
C298: C4 C9 15 90 05 68 68 4C EE
C2A0: ED C2 A2 01 AD 79 C4 D0 B1
C2A8: 08 AD 73 C4 C9 AB B0 01 BD
C2B0: CA 18 BD 75 C4 69 12 85 8C
C2B8: 02 BD 7B C4 69 00 85 03 AA
C2C0: 38 A5 02 ED 73 C4 85 02 4E
C2C8: A5 03 ED 79 C4 D0 1D 38 C3
C2D0: A9 24 E5 02 C9 25 B0 14 3A
C2D8: 4A 4A 8D 83 C4 A5 A2 29 B4
C2E0: 3F 8D 81 C4 A9 00 8D 82 AD
C2E8: C4 20 1A C3 60 A2 0C A0 5B
C2F0: 0C 18 20 F0 FF EE 86 02 9D
C2F8: A0 00 B9 7B C5 F0 EE 20 94
C300: D2 FF A5 A2 C5 A2 F0 FC 71
C308: C8 AD 00 DC 29 10 F0 07 8C
C310: AD 01 DC 29 10 D0 E3 4C D5
C318: 4B C0 A2 40 A0 80 8E 04 BA
C320: D4 8C 12 D4 E8 C8 8E 04 AC
C328: D4 8C 12 D4 60 86 05 20 7C
C330: D0 C3 A9 00 85 C6 A5 A2 03
C338: 29 10 85 C7 A9 20 20 D2 7B
C340: FF A9 9D 20 D2 FF A9 00 24
C348: 85 C7 20 E4 FF C9 31 90 26
C350: E5 C5 05 B0 E1 48 20 D2 CE
C358: FF 18 A5 A2 69 28 C5 A2 B2
```


C360:	D0	FC	A2	0F	A9	20	9D	EC	34	C530:	9D	A1	11	9D	A1	11	9D	A1	10
C368:	05	CA	10	FA	68	60	AD	7F	39	C538:	11	9D	9D	9D	9D	9D	9D	9D	98
C370:	C4	20	C3	C3	48	A0	2A	A9	99	C540:	9D	90	5A	40	40	40	40	40	0A
C378:	04	20	99	C3	68	AA	A0	2E	DB	C548:	1C	D0	05	A1	00	9F	50	4C	18
C380:	A9	04	20	99	C3	AD	80	C4	9E	C550:	41	59	45	52	53	20	28	31	4F
C388:	20	C3	C3	48	A0	47	A9	04	0E	C558:	2F	32	29	20	20	05	00	96	BE
C390:	20	99	C3	68	AA	A0	4B	A9	B6	C560:	4C	45	56	45	4C	20	28	31	53
C398:	04	84	3B	85	3C	8A	0A	AA	5D	C568:	2D	36	29	20	20	05	00	1F	59
C3A0:	BD	E6	C4	8D	85	C4	BD	E7	87	C570:	12	4C	45	56	45	4C	20	20	3C
C3A8:	C4	8D	86	C4	A2	0E	A9	20	C0	C578:	20	92	00	50	52	45	53	53	B9
C3B0:	4E	86	C4	6E	85	C4	90	02	95	C580:	20	46	49	52	45	20	42	55	7F
C3B8:	A9	51	BC	D7	C4	91	3B	CA	A4	C588:	54	54	4F	4E	00	93	12	1F	93
C3C0:	10	EC	60	A2	00	C9	0A	90	25	C590:	20	AC	A2	A2	A2	A2	A2	A2	2D
C3C8:	06	E9	0A	E8	4C	C5	C3	60	E1	C598:	A2	BB	A7	B8	B8	B8	B8	B8	3A
C3D0:	85	39	84	3A	A0	00	B1	39	D9	C5A0:	B8	B8	B8	B8	B8	B8	B8	B8	66
C3D8:	F0	0B	20	D2	FF	C8	D0	F6	58	C5A8:	B8	B8	B8	B8	B8	A5	AC	A2	39
C3E0:	E6	3A	4C	D6	C3	60	A9	18	0B	C5B0:	A2	A2	A2	A2	A2	A2	BB	20	5C
C3E8:	85	3B	85	A7	A9	05	85	3C	47	C5B8:	12	20	92	A1	05	20	20	20	84
C3F0:	A9	D9	85	A8	A2	11	A9	74	74	C5C0:	20	20	20	20	12	1F	A1	A7	BB
C3F8:	A0	00	91	3B	A9	0C	91	A7	55	C5C8:	20	20	B0	C3	C3	C3	C3	C3	8C
C400:	A0	27	91	A7	A9	6A	91	3B	E1	C5D0:	C3	C3	C3	C3	C3	C3	C3	AE	D9
C408:	18	A5	3B	69	28	85	3B	85	D8	C5D8:	20	20	A5	92	A1	05	20	20	38
C410:	A7	A5	3C	69	00	85	3C	29	ED	C5E0:	20	20	20	20	20	12	1F	A1	54
C418:	03	09	D8	85	A8	CA	D0	D6	9D	C5E8:	20	20	92	A1	05	20	20	20	C2
C420:	A9	A0	99	C0	07	A9	0C	99	1B	C5F0:	20	20	20	20	12	1F	A1	A7	EB
C428:	C0	DB	88	10	F3	60	AD	6D	CC	C5F8:	20	20	C2	92	99	20	AE	B0	A7
C430:	C4	8D	6E	C4	AD	73	C4	8D	29	C600:	D5	C9	D5	C9	B2	C9	D5	C9	5B
C438:	74	C4	AD	79	C4	8D	7A	C4	2A	C608:	20	1F	12	C2	20	20	A5	92	94
C440:	A2	05	8A	0A	A8	BD	6B	C4	13	C610:	A1	05	20	20	20	20	20	20	77
C448:	99	01	D0	BD	71	C4	99	00	41	C618:	20	12	1F	A1	20	20	92	A1	7F
C450:	D0	AD	10	D0	3D	D1	C4	A8	2C	C620:	05	20	20	20	20	20	20	20	06
C458:	BD	77	C4	29	01	F0	05	98	0B	C628:	12	1F	A1	A7	20	20	C2	92	38
C460:	1D	CB	C4	A8	8C	10	D0	CA	EE	C630:	99	20	AB	B3	C2	C2	C2	C2	54
C468:	10	D8	60	99	99	00	00	DC	C1	C638:	AB	CB	CA	C9	20	1F	12	C2	58
C470:	DC	2E	16	00	00	00	00	00	91	C640:	20	20	A5	92	A1	05	20	20	9F
C478:	01	00	00	00	00	00	00	00	79	C648:	20	20	20	20	20	12	1F	A1	BB
C480:	00	00	00	00	00	00	00	01	81	C650:	20	20	92	A1	05	20	20	20	2A
C488:	01	09	08	02	07	FC	FC	FE	9C	C658:	20	20	20	20	12	1F	A1	A7	53
C490:	FD	FF	FF	1B	B9	00	00	A0	04	C660:	20	20	C2	92	99	20	BD	AD	1B
C498:	3E	00	01	00	01	FF	00	00	D8	C668:	CA	CB	CA	CB	B1	20	CA	CB	FD
C4A0:	00	FF	00	01	03	07	0F	1F	D9	C670:	20	1F	12	C2	20	20	A5	92	FC
C4A8:	1F	0F	07	03	01	FF	FF	FF	E1	C678:	A1	05	20	20	20	20	20	20	DF
C4B0:	FF	FF	01	01	01	01	01	FF	B5	C680:	20	12	1F	A1	20	20	92	A1	E7
C4B8:	FF	FF	FF	FF	00	00	00	00	B8	C688:	05	20	20	20	20	20	20	20	6E
C4C0:	00	08	07	06	05	05	04	04	E7	C690:	12	1F	A1	A7	20	20	AD	C3	BC
C4C8:	03	02	01	01	02	04	08	10	ED	C698:	C3	C3	C3	C3	C3	C3	C3	C3	B6
C4D0:	20	FE	FD	FB	F7	EF	DF	00	B1	C6A0:	C3	C3	C3	BD	20	20	A5	92	22
C4D8:	01	02	28	29	2A	50	51	52	4B	C6A8:	A1	05	20	20	20	20	20	20	10
C4E0:	78	79	7A	A0	A1	A2	6F	7B	1D	C6B0:	20	12	1F	A1	20	20	BC	92	33
C4E8:	97	2C	E7	73	CF	73	C9	5B	70	C6B8:	A2	A2	A2	A2	A2	A2	A2	12	3D
C4F0:	CF	79	EF	79	92	72	EF	7B	14	C6C0:	BE	A7	20	20	20	20	20	20	E7
C4F8:	CF	7B	00	08	00	0C	00	08	60	C6C8:	20	20	20	20	20	20	20	20	C9
C500:	00	C8	F3	00	00	00	68	00	25	C6D0:	20	20	20	20	A5	BC	92	A2	E8
C508:	00	06	00	00	00	17	00	00	25	C6D8:	A2	A2	A2	A2	A2	A2	12	BE	79
C510:	2D	F5	2F	05	12	A1	11	9D	C9	C6E0:	20	00	00	00	00	55	55	54	FF
C518:	A1	11	9D	A1	11	9D	A1	11	6B	C6E8:	55	55	54	CC	CC	CC	88	88	5F
C520:	9D	A1	92	1C	CF	90	41	41	F0	C6F0:	88	8B	8B	88	B8	B8	B8	88	CB
C528:	41	41	41	5A	00	05	A1	11	FD	C6F8:	88	88	CC	CC	CC	22	22	20	D4

C700:	2E	2E	20	22	E2	E0	22	22	A6	141,50,193,1556	FD
C708:	20	33	33	30	08	88	80	08	D7	•150 DATA236,50,193,240,10,201,5,208,9,14	CO
C710:	B8	80	0B	8B	80	0C	CC	C0	F9	1,49,193,1535	
C718:	02	22	00	02	EE	00	03	23	53	•160 DATA32,67,192,76,72,235,201,6,208,24	II
C720:	00	26	00	00	00	00	00	00	46	9,141,49,1528	
C728:	00	00	00	00	00	00	00	00	28	•170 DATA193,32,94,192,76,72,235,173,32,2	BK
C730:	00	00	00	00	00	00	00	00	30	08,141,51,1499	
C738:	00	00	00	00	00	00	00	00	38	•180 DATA193,24,105,8,141,32,208,32,242,1	CG
C740:	00	7F	00	01	FF	C0	03	FF	84	92,173,51,1401	
C748:	E0	07	FF	F0	07	FF	F0	07	20	•190 DATA193,141,32,208,169,0,141,49,193,	FO
C750:	FF	F0	07	FF	F0	07	FF	F0	31	96,169,0,1391	
C758:	03	FF	E0	01	FF	C0	00	7F	7D	•200 DATA166,214,164,211,141,52,193,142,5	PJ
C760:	00	26	00	00	00	00	00	00	86	3,193,140,54,1723	
C768:	00	00	00	00	00	00	00	00	68	•210 DATA193,32,68,229,32,11,193,140,60,1	CC
C770:	00	00	00	00	00	00	00	00	70	93,173,52,1376	
C778:	00	00	00	00	00	00	00	00	78	•220 DATA193,141,55,193,172,55,193,177,10	OD
C780:	00	7F	00	01	88	C0	02	88	D4	7,141,56,193,1676	
C788:	A0	04	49	10	04	49	10	07	EA	•230 DATA177,111,141,58,193,169,39,56,237	PA
C790:	FF	F0	04	49	10	04	49	10	3C	,55,193,168,1597	
C798:	02	88	A0	01	88	C0	00	7F	8D	•240 DATA177,107,141,57,193,177,111,141,5	KM
C7A0:	00	26	00	00	00	00	00	00	C6	9,193,169,19,1544	
C7A8:	00	00	00	00	00	00	00	00	A8	•250 DATA56,237,52,193,24,109,55,193,168,	MF
C7B0:	00	00	00	00	00	00	00	00	B0	173,56,193,1509	
C7B8:	00	00	00	00	00	00	00	00	B8	•260 DATA145,105,173,58,193,145,109,169,2	FE
C7C0:	00	00	00	00	00	00	00	00	C0	0,24,109,52,1302	
C7C8:	00	00	00	00	01	FF	80	0F	59	•270 DATA193,56,237,55,193,168,173,57,193	DN
C7D0:	FF	F0	3F	FF	FC	7F	FF	FE	7C	,145,105,173,1748	
C7D8:	FF	FF	FF	FF	FF	FF	FF	FF	D8	•280 DATA59,193,145,109,206,55,193,16,179	NK
C7E0:	FF	00	00	00	00	00	00	00	E0	,165,105,24,1449	
										•290 DATA105,40,32,31,193,144,3,32,40,193	GN
										,206,60,1079	
										•300 DATA193,208,155,238,52,193,173,52,19	NI
										3,201,20,208,1886	
										•310 DATA139,174,53,193,172,54,193,24,32,	LP
										240,255,76,1605	
										•320 DATA88,192,32,11,193,168,177,105,145	LJ
										,107,177,109,1504	
										•330 DATA145,111,200,208,245,32,40,193,16	LI
										5,106,201,8,1654	
										•340 DATA144,236,96,169,4,162,194,133,106	KO
										,134,108,169,1655	
										•350 DATA216,162,198,160,25,133,110,134,1	OL
										12,169,0,133,1552	
										•360 DATA105,133,107,133,109,133,111,96,2	MK
										30,106,230,108,1601	
										•370 DATA230,110,230,112,96,0,0,0,0,0,0	EL
										,778	

CENTERFOLD FROM PAGE 22

```

•10 REM *** CENTERFOLD *** BUCK CHILDRESS
***
•20 REM *** P.O. BOX 13575 SALEM, OR 9730
9 ***
•30 PRINTCHR$(147)"LOADING AND CHECKING D
ATA LINE:"D=49152
•40 FORA=0TO11:READB
•50 IFA=0THENF=PEEK(64)*256+PEEK(63):PRIN
TCHR$(19)TAB(31)F:PRINT
•60 IFB<0ORB>255THEN80
•70 POKED+A,B:E=E+B:C=C+1:NEXTA:READB:IFB
=ETHEN90
•80 PRINT"ERROR IN DATA LINE:"F:END
•90 E=0:D=D+12:IFC<312THEN40
•100 PRINT"THE DATA IS OK[3"."]":PRINT
•110 PRINT"SYS 49152 TO ACTIVATE[3"."]":E
ND
•120 DATA169,18,162,192,160,0,120,141,143
,2,142,144,1393
•130 DATA2,140,49,193,88,96,173,49,193,20
8,28,165,1384
•140 DATA207,208,24,173,141,2,174,50,193,

```

FH
OA
PA
PN
AM
FI
CI
PA
CL
FB
OB
NC
MG

PROBLEMS ENTERING A PROGRAM?

Help is available from the **Ahoy!** Programming Department at 212-239-6089 (if busy or no answer after three rings call 212-239-0855).

CRYSTALLUS

FROM PAGE 16

Starting address in hex: C000

Ending address in hex: CA48

SYS to start: 49152

Flankspeed required for entry! See page 79.

C000: 20 7D C5 20 5B C3 20 D5 98
 C008: C6 20 0C C2 AD 49 C1 F0 67
 C010: 0A A9 00 8D 49 C1 A9 20 26
 C018: 20 ED C1 AD 4A C1 C9 24 8F
 C020: D0 03 20 10 C3 AD 1D C1 74
 C028: F0 03 4C D7 C0 20 9C C1 7F
 C030: 20 39 C0 20 C1 C0 4C 09 42
 C038: C0 EE 1B C1 AD 1B C1 D0 20
 C040: F8 EE 1C C1 AD 1C C1 C9 5B
 C048: 18 D0 EE A9 00 8D 1C C1 35
 C050: AD 1A C1 F0 11 CE 1A C1 86
 C058: A2 00 BD 77 C0 9D C1 34 84
 C060: E8 E0 06 D0 F5 60 A2 00 F9
 C068: BD 7D C0 9D C1 34 E8 E0 C1
 C070: 06 D0 F5 EE 1A C1 60 08 70
 C078: 80 3E BC 02 20 20 02 BC F4
 C080: 3E 80 08 10 12 05 13 13 94
 C088: 20 06 09 12 05 20 20 14 23
 C090: 0F 20 10 0C 01 19 20 19 2F
 C098: 0F 15 20 08 01 16 05 20 21
 C0A0: 05 13 03 01 10 05 04 21 F6
 C0A8: 20 20 03 12 19 13 14 01 3F
 C0B0: 0C 0C 15 13 20 02 0F 02 24
 C0B8: 20 02 0C 01 03 0B 0D 05 08
 C0C0: 12 AD 09 C2 C9 3D D0 04 28
 C0C8: EE 1D C1 60 AD 09 C2 C9 3A
 C0D0: 03 D0 03 EE 1D C1 60 A2 78
 C0D8: 00 BD 83 C0 9D DA 06 BD 17
 C0E0: 96 C0 9D AA 04 E8 E0 13 61
 C0E8: D0 EF 20 8D C2 20 10 C3 0E
 C0F0: 20 39 C0 20 9C C1 EE 22 9A
 C0F8: D0 AD 00 DC C9 6F D0 EA 49
 C100: A9 01 8D 0F C3 20 10 C3 FE
 C108: A2 00 A9 A0 9D DA 06 9D 11
 C110: AA 04 E8 E0 13 D0 F5 4C AE
 C118: 03 C0 00 00 00 00 A2 00 7E
 C120: AD D6 6B DD 43 C1 F0 0B EE
 C128: E8 E0 04 D0 F3 A9 01 8D F2
 C130: 47 C1 60 BD 43 C1 C9 98 BE
 C138: D0 03 EE 49 C1 A9 00 8D 3D
 C140: 47 C1 60 20 9A 8E 98 00 8B
 C148: 00 00 00 AD EE C1 8D 21 55
 C150: C1 AD EF C1 8D 22 C1 AD 90
 C158: 21 C1 18 6D 48 C1 8D 21 79
 C160: C1 B0 03 4C 69 C1 EE 22 5E
 C168: C1 20 1E C1 60 AD EE C1 E8
 C170: 8D 21 C1 AD EF C1 8D 22 EF
 C178: C1 AD 21 C1 38 ED 48 C1 FA

C180: 8D 21 C1 90 03 4C 8B C1 1E
 C188: CE 22 C1 20 1E C1 60 AD 49
 C190: 21 C1 8D EE C1 AD 22 C1 43
 C198: 8D EF C1 60 AD 08 C2 85 36
 C1A0: FB A9 60 85 FC AE 09 C2 A3
 C1A8: E0 00 F0 10 A5 FB 18 69 AD
 C1B0: 58 85 FB A5 FC 69 00 85 1C
 C1B8: FC CA D0 F0 A9 D1 85 02 45
 C1C0: A9 04 85 03 A2 0C A0 14 5A
 C1C8: B1 FB 91 02 88 10 F9 18 B4
 C1D0: A5 02 69 28 85 02 A5 03 3A
 C1D8: 69 00 85 03 18 A5 FB 69 ED
 C1E0: 58 85 FB A5 FC 69 00 85 4C
 C1E8: FC CA 10 DA 60 8D 2F 6C 25
 C1F0: EE 4A C1 A0 00 20 10 C3 80
 C1F8: C8 C0 02 D0 F8 AD 4A C1 08
 C200: C9 24 D0 03 20 B3 C2 60 B8
 C208: FF FF 00 60 AD 00 DC C9 BC
 C210: 7F F0 F8 8D 0A C2 C9 7E 1C
 C218: D0 16 20 8D C2 A9 58 8D FE
 C220: 48 C1 20 6D C1 AD 47 C1 30
 C228: D0 E1 20 8F C1 CE 09 C2 E6
 C230: AD 0A C2 C9 7D D0 16 20 F8
 C238: 8D C2 A9 58 8D 48 C1 20 42
 C240: 4B C1 AD 47 C1 D0 C4 20 B9
 C248: 8F C1 EE 09 C2 AD 0A C2 CE
 C250: C9 7B D0 16 20 A0 C2 A9 A9
 C258: 01 8D 48 C1 20 6D C1 AD ED
 C260: 47 C1 D0 23 20 8F C1 CE 9D
 C268: 08 C2 AD 0A C2 C9 77 D0 BF
 C270: 16 20 A0 C2 A9 01 8D 48 8A
 C278: C1 20 4B C1 AD 47 C1 D0 EE
 C280: 06 20 8F C1 EE 08 C2 A9 5B
 C288: 00 8D 0A C2 60 AD F8 07 F0
 C290: C9 E2 D0 06 A9 E3 8D F8 28
 C298: 07 60 A9 E2 8D F8 07 60 7A
 C2A0: AD F8 07 C9 E0 D0 06 A9 79
 C2A8: E1 8D F8 07 60 A9 E0 8D 90
 C2B0: F8 07 60 20 39 C0 AD 1B F3
 C2B8: D4 C9 C0 90 05 A2 03 4C 9F
 C2C0: D6 C2 C9 80 90 05 A2 02 DE
 C2C8: 4C D6 C2 C9 40 90 05 A2 F0
 C2D0: 01 4C D6 C2 A2 00 BD FE 17
 C2D8: C2 8D F3 C2 BD 06 C3 8D F4
 C2E0: F4 C2 BD 02 C3 8D F6 C2 63
 C2E8: BD 0A C3 8D F7 C2 A2 00 5F
 C2F0: A9 20 9D 00 60 9D 00 60 B6
 C2F8: E8 E0 02 D0 F5 60 3A 6C 92
 C300: BA EC 3F 28 A3 90 65 65 0E
 C308: 75 75 77 77 63 63 00 00 A8
 C310: AD 0F C3 D0 29 EE 0F C3 4C
 C318: AE 0E C3 BD 7D C4 8D 00 26
 C320: D4 BD BD C4 8D 01 D4 BD 56
 C328: FD C4 8D 07 D4 BD 3D C5 15
 C330: 8D 08 D4 A9 41 8D 04 D4 EB
 C338: A9 21 8D 0B D4 60 CE 0F AE
 C340: C3 A9 40 8D 04 D4 A9 20 1E
 C348: 8D 0B D4 EE 0E C3 AD 0E 32

C350:	C3	C9	40	D0	05	A9	00	8D	2B	C520:	47	68	68	68	68	47	47	47	DE
C358:	0E	C3	60	A2	00	8A	9D	00	55	C528:	47	68	68	68	68	47	47	47	E6
C360:	38	E8	E0	00	D0	F8	A2	00	CE	C530:	47	61	61	0C	0C	47	47	68	49
C368:	BD	09	C4	9D	00	38	BD	26	AD	C538:	68	47	47	47	47	06	06	09	D2
C370:	C4	9D	40	38	BD	43	C4	9D	AE	C540:	09	06	06	09	09	06	06	06	79
C378:	80	38	BD	60	C4	9D	C0	38	AA	C548:	06	07	07	09	09	06	06	09	83
C380:	E8	E0	1D	D0	E3	A2	00	BD	7C	C550:	09	06	06	07	07	05	05	07	84
C388:	DE	C3	9D	00	D0	E8	E0	2B	8E	C558:	07	09	09	09	09	06	06	06	95
C390:	D0	F5	A9	1D	8D	09	C2	8D	05	C560:	06	09	09	09	09	06	06	05	9B
C398:	08	C2	A9	E0	8D	F8	07	A9	25	C568:	05	09	09	09	09	06	06	06	A3
C3A0:	00	8D	4A	C1	8D	1D	C1	8D	34	C570:	06	08	08	07	07	06	06	09	A9
C3A8:	47	C1	8D	49	C1	A9	2F	8D	B0	C578:	09	06	06	06	06	AD	0E	DC	32
C3B0:	EE	C1	A9	6C	8D	EF	C1	A2	59	C580:	29	FE	8D	0E	DC	A5	01	29	F0
C3B8:	00	BD	C5	C3	9D	00	D4	E8	5B	C588:	FB	85	01	A2	00	BD	00	D0	3C
C3C0:	E0	19	D0	F5	60	00	00	00	E1	C590:	9D	00	30	E8	E0	00	D0	F5	EE
C3C8:	08	40	09	09	00	00	00	00	23	C598:	EE	8F	C5	EE	92	C5	AD	92	64
C3D0:	20	09	59	80	80	00	00	80	D4	C5A0:	C5	C9	37	D0	E6	A9	30	8D	86
C3D8:	80	00	00	00	00	8F	AF	89	22	C5A8:	92	C5	A9	D0	8D	8F	C5	A5	04
C3E0:	00	00	00	00	00	00	00	00	E0	C5B0:	01	09	04	85	01	AD	0E	DC	DD
C3E8:	00	00	00	00	00	00	00	1B	04	C5B8:	09	01	8D	0E	DC	A2	00	BD	9B
C3F0:	00	00	00	01	D8	00	1D	00	E7	C5C0:	CB	C5	9D	00	34	E8	E0	D8	C6
C3F8:	00	01	01	00	00	00	00	09	04	C5C8:	D0	F5	60	AA	AA	AA	AA	AA	45
C400:	00	07	01	05	00	07	00	07	1B	C5D0:	AA	AA	AA	69	99	A5	A5	9D	BC
C408:	07	00	00	00	08	00	00	08	1F	C5D8:	9D	7D	7D	01	01	06	06	1A	99
C410:	00	00	00	00	00	04	00	00	14	C5E0:	1A	66	69	FD	FD	FD	FD	FD	C0
C418:	37	00	00	04	00	00	11	00	64	C5E8:	FD	FD	FD	FD	FD	F4	F4	D0	99
C420:	00	40	40	00	C0	C0	08	00	2A	C5F0:	D0	40	40	40	40	90	90	A4	88
C428:	00	08	00	00	00	00	00	34	64	C5F8:	A4	99	69	69	66	5A	5A	76	9B
C430:	00	00	04	00	00	04	00	00	38	C600:	76	7D	7D	7F	7F	7F	7F	7F	EE
C438:	04	00	00	14	00	00	3C	00	8C	C608:	7F	7F	7F	7D	7D	1D	1D	05	C0
C440:	00	00	00	00	00	00	08	00	48	C610:	05	01	01	FF	FF	FF	FF	FF	17
C448:	00	08	00	00	00	00	00	04	54	C618:	FF	FF	FF	55	6A	6A	6A	6A	17
C450:	00	00	37	00	00	05	00	00	8C	C620:	6A	6A	6A	55	A9	A9	A9	A9	5B
C458:	11	00	00	13	00	00	30	00	AC	C628:	A9	A9	A9	FD	FD	F6	F6	DA	E9
C460:	00	00	00	08	00	00	08	00	70	C630:	DA	66	69	55	AA	AA	AA	AA	DA
C468:	00	00	00	00	04	00	00	37	A3	C638:	AA	AA	AA	55	AA	AA	AA	AA	38
C470:	00	00	04	00	00	11	00	00	85	C640:	AA	AA	55	AA	AA	AA	AA	A9	3F
C478:	31	00	00	03	00	1E	1E	60	49	C648:	A6	9A	6A	69	66	DA	DA	F6	70
C480:	D1	1E	1E	60	D1	8F	18	D2	3B	C650:	F6	FD	FD	69	99	A7	A7	9F	35
C488:	D1	C3	D2	18	D1	8F	8F	DA	D4	C658:	9F	7F	7F	FD	FD	F6	F6	DA	BB
C490:	68	8F	D2	18	DA	8F	8F	18	85	C660:	DA	6A	6A	7F	7F	9F	9F	A7	F5
C498:	C3	D1	18	68	68	D1	68	D2	24	C668:	A7	A9	A9	6A	6A	9A	9A	A6	14
C4A0:	D1	C3	68	18	C3	D2	68	8F	45	C670:	A6	A9	A9	FD	FD	3D	3D	0D	ED
C4A8:	D2	18	60	D1	C3	D2	D1	1E	4C	C678:	0D	01	01	FF	FF	55	F7	F7	CC
C4B0:	D2	C3	1F	18	C3	D2	D1	68	4F	C680:	F7	55	FF	DF	DF	55	FF	FF	E2
C4B8:	DA	8F	D2	8F	8F	19	19	16	5D	C688:	FF	55	DF	00	08	80	3E	BC	41
C4C0:	12	19	19	16	12	0C	0E	0F	56	C690:	02	20	00	00	20	02	BC	3E	CF
C4C8:	12	10	0F	0E	12	0C	0C	0B	3D	C698:	80	08	00	00	00	00	00	00	21
C4D0:	09	0C	0F	0E	0B	0A	0C	0E	32	C6A0:	00	00	00	A9	9E	20	D2	FF	DB
C4D8:	11	12	0E	09	09	12	09	0F	46	C6A8:	A9	93	20	D2	FF	A2	00	BD	39
C4E0:	12	10	09	0E	10	0F	09	0C	4E	C6B0:	A9	C0	9D	C5	05	BD	B5	C0	B7
C4E8:	0F	0E	16	12	10	0F	12	19	78	C6B8:	9D	65	06	E8	E0	0C	D0	EF	58
C4F0:	0F	10	15	0E	10	0F	12	09	6D	C6C0:	A9	02	8D	1A	06	A9	19	8D	6A
C4F8:	0B	0C	0F	0C	0C	47	47	68	2E	C6C8:	1B	06	A0	00	20	39	C0	C8	6D
C500:	68	47	47	68	68	47	47	47	9D	C6D0:	C0	19	D0	F8	60	20	A3	C6	5F
C508:	47	0C	0C	68	68	47	47	68	2F	C6D8:	A9	81	20	D2	FF	A9	93	20	54
C510:	68	47	47	E9	E9	47	47	0C	75	C6E0:	D2	FF	A2	00	A9	A0	9D	00	3E
C518:	0C	68	68	68	68	47	47	47	9B	C6E8:	04	9D	00	05	9D	00	06	9D	D0

C6F0:	E8	06	E8	E0	00	D0	EF	A2	0D	C8C0:	E0	04	D0	F5	EE	8E	C9	AD	61
C6F8:	00	A9	03	9D	A8	D8	9D	D8	3B	C8C8:	8E	C9	C9	0F	D0	DA	8D	8E	C1
C700:	DA	E8	E0	17	D0	F5	A2	00	25	C8D0:	C9	AE	8E	C9	BD	44	C9	8D	FA
C708:	A9	03	9D	D0	D8	9D	E6	D8	59	C8D8:	E5	C8	BD	67	C9	8D	E6	C8	B3
C710:	9D	98	D9	9D	AE	D9	9D	10	F3	C8E0:	A2	00	A9	9A	9D	00	60	E8	AE
C718:	DA	9D	26	DA	18	8A	69	28	C5	C8E8:	E0	02	D0	F8	EE	8E	C9	AD	8A
C720:	AA	E0	C8	D0	E3	A2	00	A9	75	C8F0:	8E	C9	C9	23	D0	DB	A9	00	8C
C728:	0E	9D	D1	D8	9D	F9	D8	9D	8C	C8F8:	8D	8E	C9	8D	8F	C9	AE	8E	03
C730:	21	D9	9D	49	D9	9D	71	D9	D4	C900:	C9	BD	3E	C9	8D	17	C9	18	16
C738:	9D	99	D9	9D	C1	D9	9D	E9	0A	C908:	BD	38	C9	6D	8F	C9	8D	16	32
C740:	D9	9D	11	DA	9D	39	DA	9D	F2	C910:	C9	A2	00	A9	98	8D	00	60	AC
C748:	61	DA	9D	89	DA	9D	B1	DA	B0	C918:	18	AD	8F	C9	69	0A	8D	8F	C7
C750:	E8	E0	15	D0	D4	A2	00	A9	21	C920:	C9	AD	8F	C9	C9	3C	D0	D6	9E
C758:	20	9D	00	60	E8	E0	00	D0	11	C928:	A9	00	8D	8F	C9	EE	8E	C9	FF
C760:	F6	EE	5B	C7	AD	5B	C7	C9	04	C930:	AD	8E	C9	C9	06	D0	C7	60	FE
C768:	80	D0	EA	A9	60	8D	5B	C7	5F	C938:	42	02	C2	82	42	02	66	69	D5
C770:	A2	00	A0	96	98	9D	7A	63	5E	C940:	6B	6E	71	74	46	50	64	6E	69
C778:	9D	12	77	C8	C0	98	D0	02	94	C948:	10	1A	C6	EE	90	AE	46	50	FD
C780:	A0	96	E8	E0	44	D0	ED	A9	2E	C950:	64	06	24	FA	18	22	2C	BA	FA
C788:	00	8D	8E	C9	A0	96	98	8D	CB	C958:	C4	CE	D8	E2	7A	98	3A	4E	43
C790:	7A	63	8D	BD	63	C8	C0	98	3F	C960:	58	62	6C	04	0E	22	2C	66	4E
C798:	D0	02	A0	96	18	AD	90	C7	C0	C968:	66	66	66	69	69	6B	6B	6E	B3
C7A0:	69	58	8D	90	C7	B0	03	4C	48	C970:	6E	71	71	71	74	74	67	68	EB
C7A8:	AD	C7	EE	91	C7	18	AD	93	BF	C978:	68	68	6A	6A	6A	6A	6A	6D	CA
C7B0:	C7	69	58	8D	93	C7	B0	03	D6	C980:	6D	70	70	70	70	70	73	73	07
C7B8:	4C	BE	C7	EE	94	C7	EE	8E	54	C988:	73	73	9A	8E	8E	9A	00	00	C1
C7C0:	C9	AD	8E	C9	C9	39	D0	C6	2B	C990:	00	00	DE	E8	F2	FC	06	10	5E
C7C8:	A9	63	8D	91	C7	8D	94	C7	A6	C998:	9E	A8	B2	BC	C6	D0	5E	68	AD
C7D0:	A9	7A	8D	90	C7	A9	BD	8D	CF	C9A0:	72	7C	86	90	1E	28	32	3C	5B
C7D8:	93	C7	A9	00	8D	8E	C9	8D	51	C9A8:	46	50	DE	E8	F2	FC	06	10	0D
C7E0:	8F	C9	8D	90	C9	8D	91	C9	0B	C9B0:	9E	A8	B2	BC	C6	D0	64	64	C7
C7E8:	AE	8E	C9	BD	B6	C9	8D	0B	C6	C9B8:	64	64	65	65	67	67	67	67	E9
C7F0:	C8	18	BD	92	C9	6D	8F	C9	B2	C9C0:	67	67	6A	6A	6A	6A	6A	6A	0E
C7F8:	8D	0A	C8	B0	03	4C	03	C8	25	C9C8:	6D	6D	6D	6D	6D	6D	6F	6F	38
C800:	EE	0B	C8	AE	90	C9	BD	DA	64	C9D0:	6F	6F	70	70	72	72	72	72	5A
C808:	C9	8D	00	60	18	AD	0A	C8	58	C9D8:	72	72	20	20	82	8D	8D	8D	29
C810:	69	58	8D	0A	C8	B0	03	4C	32	C9E0:	86	88	88	82	80	81	84	85	07
C818:	1D	C8	EE	0B	C8	EE	90	C9	0A	C9E8:	80	86	8E	80	81	84	20	20	45
C820:	EE	91	C9	AD	91	C9	C9	08	45	C9F0:	85	80	8D	81	84	20	20	20	EA
C828:	D0	D9	A9	00	8D	91	C9	EE	54	C9F8:	20	85	8E	83	20	20	20	20	31
C830:	8F	C9	AD	8F	C9	C9	0A	D0	35	CA00:	20	20	8E	83	20	20	20	20	D2
C838:	AF	A9	00	8D	8F	C9	8D	90	96	CA08:	20	20	8D	86	88	20	20	20	45
C840:	C9	8D	91	C9	EE	8E	C9	AD	E7	CA10:	20	82	8E	80	86	88	20	20	11
C848:	8E	C9	C9	24	D0	9A	A9	00	A3	CA18:	82	80	84	85	80	86	88	82	37
C850:	8D	8E	C9	AE	8E	C9	BD	92	8D	CA20:	80	81	20	20	85	8D	8D	8D	90
C858:	C9	8D	68	C8	BD	B6	C9	8D	AC	CA28:	81	84	20	20	82	8D	8E	8E	9B
C860:	69	C8	A2	00	BD	2A	CA	9D	85	CA30:	8D	85	20	20	20	88	86	8D	40
C868:	00	60	E8	E0	0A	D0	F5	EE	52	CA38:	8E	8E	8D	81	84	20	20	20	49
C870:	8E	C9	AD	8E	C9	C9	06	D0	6F	CA40:	88	83	83	83	83	84	20	20	9B
C878:	DA	A9	00	8D	8E	C9	A2	00	85	CA48:	FF	48							
C880:	AC	8E	C9	B9	34	CA	9D	5E	3A										
C888:	75	B9	3E	CA	9D	B6	75	EE	79										
C890:	8E	C9	AD	8E	C9	C9	0A	D0	93										
C898:	05	A9	00	8D	8E	C9	E8	E0	F6										
C8A0:	3C	D0	DD	A9	00	8D	8E	C9	1B										
C8A8:	AE	8E	C9	BD	44	C9	8D	BD	C6										
C8B0:	C8	BD	67	C9	8D	BE	C8	A2	20										
C8B8:	00	BD	8A	C9	9D	00	60	E8	B1										

All the programs in this issue are available on disk. See page 37 for ordering information.

NO NEWS FROM PAGE 30

C-64 VERSION

```

•10 REM *** NO NEWS (64) *** BUCK CHILDRE
SS ***
•20 REM *** P.O. BOX 13575 SALEM, OR 9730
9 ***
•30 PRINTCHR$(147)"LOADING AND CHECKING D
ATA LINE:";J=53000
•40 FORB=0TO11:READA
•50 IFB=0THENL=PEEK(64)*256+PEEK(63):PRIN
TCHR$(19)TAB(31)L:PRINT
•60 IFA<0ORA>255THEN80
•70 POKEJ+B,A:X=X+A:D=D+1:NEXTB:READA:IFA
=XTHEN90
•80 PRINT"ERROR IN DATA LINE:"L:END
•90 X=0:J=J+12:IFD<240THEN40
•100 PRINT"THE DATA IS OK[3"."]":PRINT
•110 PRINT"SYS 53[3"0"] TOGGLES ON AND OF
F[3"."]":END
•120 DATA169,79,32,210,255,160,207,204,3,
3,240,19,1581
•130 DATA173,2,3,174,3,3,141,251,207,142,
252,207,1558
•140 DATA169,78,162,59,76,50,207,169,70,3
2,210,255,1537
•150 DATA174,251,207,172,252,207,142,2,3,
140,3,3,1556
•160 DATA76,210,255,32,96,165,134,122,132
,123,32,115,1492
•170 DATA0,170,240,243,162,255,134,58,176
,3,76,156,1673
•180 DATA164,32,121,165,169,1,141,249,207
,169,0,160,1578
•190 DATA255,141,248,207,141,250,207,141,
246,207,200,185,2428
•200 DATA0,2,240,107,201,34,208,6,77,246,
207,76,1404
•210 DATA99,207,174,246,207,208,235,201,1
38,240,8,201,2164
•220 DATA147,240,4,201,162,208,223,165,21
4,141,247,207,2159
•230 DATA174,247,207,160,0,24,32,240,255,
169,224,160,1892
•240 DATA207,32,30,171,238,248,207,208,28
,206,249,207,2031
•250 DATA208,23,169,20,141,249,207,169,12
8,77,250,207,1848
•260 DATA141,250,207,240,215,169,18,32,21
0,255,76,140,1953
•270 DATA207,32,228,255,201,78,240,4,201,
89,208,212,1955
•280 DATA32,210,255,201,78,208,3,76,116,1
64,169,13,1525

```

CA
OA
BN
MB
PF
FK
PL
MG
HP
FB
OD
BA
JA
DG
LA
NK
IO
LN
PJ
LP
NC
NJ
PO
LF
HO
EJ
JO
JL

```

•290 DATA32,210,255,76,225,167,65,46,72,4
6,83,46,1323
•300 DATA65,82,69,32,89,79,85,32,83,85,82
,69,852
•310 DATA63,32,40,89,47,78,41,146,32,0,0,
0,568

```

ME
CD
ED

C-128 VERSION

```

•10 REM *** NO NEWS (128) *** BUCK CHILDR
ESS ***
•20 REM *** P.O. BOX 13575 SALEM, OR 9730
9 ***
•30 PRINTCHR$(147)"LOADING AND CHECKING D
ATA LINE:";J=3072
•40 FORB=0TO11:READA
•50 IFB=0THENL=PEEK(66)*256+PEEK(65):PRIN
TCHR$(19)TAB(31)L:PRINT
•60 IFA<0ORA>255THEN80
•70 POKEJ+B,A:X=X+A:D=D+1:NEXTB:READA:IFA
=XTHEN90
•80 PRINT"ERROR IN DATA LINE:"L:END
•90 X=0:J=J+12:IFD<264THEN40
•100 PRINT"THE DATA IS OK[3"."]":PRINT
•110 PRINT"SYS 3072 TOGGLES ON AND OFF[3"
"."]":END
•120 DATA169,0,141,0,255,169,79,32,210,25
5,160,12,1482
•130 DATA204,3,3,240,19,173,2,3,174,3,3,1
41,968
•140 DATA12,13,142,13,13,169,78,162,56,76
,47,12,793
•150 DATA169,70,32,210,255,174,12,13,172,
13,13,142,1275
•160 DATA2,3,140,3,3,76,210,255,162,255,1
34,60,1303
•170 DATA32,147,79,134,61,132,62,32,128,3
,170,240,1220
•180 DATA239,176,3,76,226,77,32,10,67,169
,1,141,1217
•190 DATA10,13,169,0,160,255,141,9,13,141
,11,13,935
•200 DATA141,6,13,141,7,13,200,185,0,2,20
8,3,919
•210 DATA76,220,77,201,34,208,6,77,6,13,7
6,96,1090
•220 DATA12,174,6,13,208,232,201,138,240,
31,201,147,1603
•230 DATA240,27,201,162,240,23,201,240,24
0,19,201,254,2048
•240 DATA240,209,201,17,240,4,201,27,208,
201,173,7,1728
•250 DATA13,201,254,208,197,165,235,141,8
,13,174,8,1617
•260 DATA13,160,0,24,32,240,255,32,129,14
6,65,82,1178

```

HJ
OA
BP
MB
LB
FK
PL
MG
MB
FB
HN
HI
GJ
BD
GM
AG
AN
HB
HO
NJ
OI
BM
NM
DL
HE
KE

codes
rams!
ME
CD
ED
SION
HJ
OA
BP
MB
LB
FK
PL
MG
MB
FB
HN
HI
GJ
BD
GM
AG
AN
HB
HO
NJ
OI
BM
NM
DL
HE
KE

- 270 DATA69,32,89,79,85,32,83,85,82,69,63,32,800
- 280 DATA40,89,47,78,41,146,32,0,238,9,13,208,941
- 290 DATA28,206,10,13,208,23,169,20,141,10,13,169,1010
- 300 DATA128,77,11,13,141,11,13,240,197,169,18,32,1050
- 310 DATA210,255,76,166,12,32,228,255,201,78,240,4,1757
- 320 DATA201,89,208,212,32,210,255,201,78,208,3,76,1773
- 330 DATA55,77,169,13,32,210,255,76,220,7,0,0,1184

MJ
GO
KN
EM
EG
NI
NO

RED ALERT FROM PAGE 60

Starting address in hex: C000

Ending address in hex: C865

SYS to start: 49152

Flankspeed required for entry! See page 79.

C000: A9 08 20 D2 FF 20 1E C5 A8
C008: A9 93 20 D2 FF A0 00 98 71
C010: 99 40 71 C8 C0 C0 90 F8 2F
C018: A9 08 8D 5C 71 8D 62 71 86
C020: A9 22 8D 5F 71 A9 18 8D 99
C028: 9F 71 A9 3C 8D DF 71 A0 9E
C030: 00 B9 66 C7 99 00 72 C8 EC
C038: D0 F7 A0 18 B9 2C C6 99 FF
C040: 00 D4 88 10 F7 A9 00 8D DC
C048: 20 D0 8D 21 D0 8D 15 D0 2C
C050: 8D 1C D0 A9 C5 8D F8 77 38
C058: A9 FF 8D 17 D0 8D 1B D0 F0
C060: 8D 1D D0 A9 F7 8D 48 77 CA
C068: 8D 49 77 8D 6E 77 8D 6F 27
C070: 77 A9 08 8D 48 DB 8D 49 22
C078: DB 8D 6E DB 8D 6F DB A0 A5
C080: 27 A9 A0 99 70 77 A9 EF 0D
C088: 99 98 77 A9 08 99 70 DB C9
C090: 99 98 DB 88 10 EB A2 14 D9
C098: A0 13 18 20 F0 FF A9 F6 16
C0A0: A0 C6 20 1E AB A2 18 A0 4D
C0A8: 02 18 20 F0 FF A9 0B A0 29
C0B0: C7 20 1E AB 20 68 C4 A9 59
C0B8: 01 8D 83 C5 20 3B C4 A2 53
C0C0: 05 A9 00 9D 87 C5 CA 10 35
C0C8: FA 8D 86 C5 20 B8 C4 A9 E4
C0D0: 9F 8D 81 C5 A9 8C 8D 80 89
C0D8: C5 A9 00 8D 82 C5 85 05 A8
C0E0: A0 5A 99 8D C5 88 10 FA 5C
C0E8: 20 E3 C3 A2 30 AD 83 C5 7A
C0F0: C9 0A 90 06 E9 0A E8 4C 84
C0F8: F0 C0 8E D6 77 09 30 8D 4E
C100: D7 77 AD C9 77 8D 85 C5 17
C108: AD 1B D4 29 07 09 10 8D 7C
C110: 84 C5 A0 43 8C 33 77 C8 3E

C118: 8C 34 77 A9 FF 8D 15 D0 6D
C120: A0 04 A2 10 8E 04 D4 E8 C7
C128: 8E 04 D4 A2 0F 8A 09 20 F4
C130: 8D 01 D4 A9 02 20 89 C4 AD
C138: EE 27 D0 CA 10 EF 88 D0 43
C140: E1 8C 00 D4 A9 05 8D 01 C0
C148: D4 AD 8D 02 D0 FB E6 04 12
C150: A5 04 29 3F D0 03 EE 27 4C
C158: D0 29 0F D0 03 20 EA C1 02
C160: 20 2B C2 20 91 C4 A5 05 8F
C168: F0 05 C6 05 4C 7B C1 38 EB
C170: A9 18 ED 83 C5 0A 85 05 FD
C178: 20 F3 C2 20 E3 C3 AD 84 49
C180: C5 D0 C6 A2 06 BD B0 C5 BA
C188: D0 BF CA 10 F8 A9 28 20 DE
C190: 89 C4 AC 83 C5 C8 C0 15 73
C198: B0 03 8C 83 C5 A2 00 8E 53
C1A0: 15 D0 86 02 BD 87 C5 D0 EA
C1A8: 24 BC F0 C5 A9 45 99 48 11
C1B0: 77 99 49 77 8A 48 A2 0A 02
C1B8: 20 23 C4 A2 80 8E 0B D4 52
C1C0: E8 8E 0B D4 A9 14 20 89 7F
C1C8: C4 68 AA E6 02 E8 E0 06 59
C1D0: 90 D2 AD C9 77 CD 85 C5 3C
C1D8: F0 03 EE 86 C5 A5 02 0D BC
C1E0: 86 C5 F0 03 4C CC C0 4C 47
C1E8: B4 C0 AD 00 DC AA 29 03 BF
C1F0: A8 18 AD 80 C5 79 E8 C5 CD
C1F8: C9 32 90 07 C9 B4 B0 03 BE
C200: 8D 80 C5 8A 29 0C 4A 4A 28
C208: A8 18 AD 81 C5 79 E8 C5 E5
C210: AA AD 82 C5 79 EC C5 D0 AD
C218: 07 E0 18 90 0D 4C 24 C2 E8
C220: E0 29 B0 06 8E 81 C5 8D 44
C228: 82 C5 60 AD DA C5 D0 47 37
C230: AD 8D C5 D0 58 AD 33 77 B2
C238: C9 20 F0 07 AD 00 DC 29 CD
C240: 10 F0 01 60 A9 A0 8D 9B 16
C248: C5 A9 C4 8D B0 C5 A9 C6 F0
C250: 8D F9 77 A9 00 8D A2 C5 EE
C258: 8D 94 C5 8D A9 C5 A9 01 E7
C260: 8D 28 D0 AD 80 C5 85 FB 5C
C268: AD 81 C5 85 FC AD 82 C5 D5
C270: 85 FD A2 00 20 8E C3 A2 AB
C278: 00 20 B3 C3 EE DA C5 D0 70
C280: 71 EE 8D C5 A2 80 8E 04 E9
C288: D4 E8 8E 04 D4 A2 06 BD 14
C290: 8D C5 D0 5B 38 AD B0 C5 6C
C298: E9 09 DD B0 C5 B0 50 18 F8
C2A0: 69 13 DD B0 C5 90 48 38 82
C2A8: AD 9B C5 E9 09 85 02 AD DF
C2B0: A2 C5 E9 00 85 03 38 A5 69
C2B8: 02 FD 9B C5 A5 03 FD A2 63
C2C0: C5 B0 2C 18 A5 02 69 13 9F
C2C8: 85 02 A5 03 69 00 85 03 EA
C2D0: 38 A5 02 FD 9B C5 A5 03 B8
C2D8: FD A2 C5 90 12 FE 8D C5 34
C2E0: A9 00 9D DA C5 8A 48 AE 4A

AHOY! 89

C2E8:	83	C5	20	23	C4	68	AA	CA	18	C4B8:	A2	05	86	02	BD	87	C5	F0	E4
C2F0:	D0	9D	60	A2	06	BD	DA	C5	C6	C4C0:	0F	AD	86	C5	F0	1F	CE	86	2F
C2F8:	D0	56	BD	8D	C5	D0	05	AD	B4	C4C8:	C5	A9	00	85	02	9D	87	C5	AA
C300:	84	C5	D0	03	4C	87	C3	CE	84	C4D0:	BC	F0	C5	A9	41	99	48	77	88
C308:	84	C5	AD	1B	D4	29	1F	09	41	C4D8:	A9	42	99	49	77	A9	06	99	68
C310:	08	9D	B0	C5	9D	28	D0	A0	63	C4E0:	48	DB	99	49	DB	CA	10	D4	73
C318:	00	AD	1B	D4	C9	20	B0	01	51	C4E8:	A5	02	D0	31	8D	04	D4	A5	9E
C320:	C8	9D	9B	C5	98	9D	A2	C5	86	C4F0:	02	0A	18	65	02	A8	B9	45	24
C328:	A9	C7	9D	F9	77	A9	00	9D	EF	C4F8:	C6	F0	22	A2	10	8E	04	D4	EC
C330:	94	C5	9D	A9	C5	AD	1B	D4	35	C500:	B9	46	C6	F0	0D	8D	01	D4	28
C338:	29	07	9D	E1	C5	A8	B9	04	14	C508:	B9	47	C6	8D	00	D4	E8	8E	A9
C340:	C6	85	FC	B9	0C	C6	85	FD	99	C510:	04	D4	B9	45	C6	20	89	C4	1D
C348:	B9	14	C6	85	FB	20	8E	C3	D0	C518:	E6	02	4C	EF	C4	60	AD	0E	1E
C350:	20	B3	C3	FE	DA	C5	D0	2F	87	C520:	DC	29	FE	8D	0E	DC	A5	01	44
C358:	FE	8D	C5	A0	80	8C	04	D4	31	C528:	29	FB	85	01	A9	D0	85	3A	0E
C360:	C8	8C	04	D4	BC	E1	C5	C0	B3	C530:	A9	78	85	3C	A0	00	84	39	72
C368:	06	90	0B	A9	20	8D	33	77	0C	C538:	84	3B	A2	08	B1	39	91	3B	5A
C370:	8D	34	77	4C	87	C3	A9	01	EB	C540:	C8	D0	F9	E6	3A	E6	3C	CA	E2
C378:	99	87	C5	B9	F0	C5	A8	A9	22	C548:	D0	F2	A5	01	09	04	85	01	46
C380:	45	99	48	77	99	49	77	CA	44	C550:	AD	0E	DC	09	01	8D	0E	DC	6B
C388:	F0	03	4C	F5	C2	60	38	A5	BF	C558:	A0	2F	B9	36	C7	99	08	7A	FB
C390:	FC	FD	9B	C5	9D	B7	C5	A5	AD	C560:	88	10	F7	AD	02	DD	09	03	8A
C398:	FD	FD	A2	C5	9D	BE	C5	9D	BC	C568:	8D	02	DD	AD	00	DD	29	FC	87
C3A0:	C5	C5	38	A5	FB	FD	B0	C5	7A	C570:	09	02	8D	00	DD	A9	DE	8D	FC
C3A8:	9D	CC	C5	A9	00	E9	00	9D	0A	C578:	18	D0	A9	74	8D	88	02	60	F7
C3B0:	D3	C5	60	18	BD	94	C5	7D	58	C580:	00	00	00	00	00	00	00	00	80
C3B8:	B7	C5	9D	94	C5	BD	9B	C5	4D	C588:	00	00	00	00	00	00	00	00	88
C3C0:	7D	BE	C5	9D	9B	C5	BD	A2	22	C590:	00	00	00	00	00	00	00	00	90
C3C8:	C5	7D	C5	C5	9D	A2	C5	18	B5	C598:	00	00	00	00	00	00	00	00	98
C3D0:	BD	A9	C5	7D	CC	C5	9D	A9	55	C5A0:	00	00	00	00	00	00	00	00	A0
C3D8:	C5	BD	B0	C5	7D	D3	C5	9D	87	C5A8:	00	00	00	00	00	00	00	00	A8
C3E0:	B0	C5	60	A2	06	8A	0A	A8	9D	C5B0:	00	00	00	00	00	00	00	00	B0
C3E8:	BD	B0	C5	99	03	D0	BD	9B	E3	C5B8:	00	00	00	00	00	00	00	00	B8
C3F0:	C5	99	02	D0	AD	10	D0	3D	EE	C5C0:	00	00	00	00	00	00	00	00	C0
C3F8:	FD	C5	A8	BD	A2	C5	F0	05	81	C5C8:	00	00	00	00	00	00	00	00	C8
C400:	98	1D	F6	C5	A8	8C	10	D0	88	C5D0:	00	00	00	00	00	00	00	00	D0
C408:	CA	10	DA	AD	80	C5	8D	01	40	C5D8:	00	00	00	00	00	00	00	00	D8
C410:	D0	AD	81	C5	8D	00	D0	AD	E1	C5E0:	00	00	00	00	00	00	00	00	E0
C418:	10	D0	29	FE	0D	82	C5	8D	04	C5E8:	00	01	FF	00	00	00	FF	00	E9
C420:	10	D0	60	A0	04	38	B9	C8	C0	C5F0:	04	08	0C	1A	1E	22	02	04	69
C428:	77	69	00	C9	3A	90	02	A9	49	C5F8:	08	10	20	40	80	FD	FB	F7	E3
C430:	30	99	C8	77	88	10	EF	CA	8D	C600:	EF	DF	BF	7F	28	48	68	D8	C0
C438:	D0	E9	60	A0	00	B9	C8	77	ED	C608:	F8	18	A0	A0	00	00	00	00	5A
C440:	D9	E0	77	F0	05	B0	0B	4C	70	C610:	00	01	00	00	CA	CA	CA	CA	3C
C448:	5D	C4	C8	C0	06	90	EE	4C	C5	C618:	CA	CA	C3	C3	04	06	05	07	4B
C450:	5D	C4	A0	05	B9	C8	77	99	AB	C620:	02	08	0A	09	C8	C9	CA	CB	66
C458:	E0	77	88	10	F7	A0	05	A9	90	C628:	CA	C9	C8	C7	00	00	00	00	4D
C460:	30	99	C8	77	88	10	FA	60	5E	C630:	00	1A	09	3E	1E	00	00	00	AF
C468:	EE	86	02	A9	64	A0	C6	20	75	C638:	10	08	FF	FF	00	00	80	00	D0
C470:	1E	AB	A9	04	20	89	C4	AD	04	C640:	00	00	5A	F1	AF	0A	28	B6	25
C478:	00	DC	29	10	D0	EA	A0	BD	A8	C648:	09	24	59	09	24	59	09	24	82
C480:	A9	20	99	2B	74	88	D0	FA	D7	C650:	59	0A	28	B6	09	24	59	09	22
C488:	60	18	65	A2	C5	A2	D0	FC	3F	C658:	24	59	09	24	59	0C	28	B6	47
C490:	60	A2	06	BD	8D	C5	F0	1C	B7	C660:	20	00	00	00	13	11	20	20	E4
C498:	4A	4A	4A	4A	4A	A8	B9	1C	8A	C668:	20	20	B2	C0	C9	20	B2	C0	79
C4A0:	C6	9D	28	D0	B9	24	C6	9D	40	C670:	AE	20	B2	C0	C9	20	20	D5	92
C4A8:	F9	77	FE	8D	C5	D0	05	A9	EB	C678:	C0	C9	20	B2	20	20	20	B2	E8
C4B0:	00	9D	B0	C5	CA	10	DC	60	DC	C680:	C0	AE	20	B2	C0	C9	20	B0	1E


```

C688: B2 AE 0D 20 20 20 20 AB 23
C690: C0 C6 20 AB B3 20 20 DD B5
C698: 20 DD 20 20 AB C0 B3 20 17
C6A0: DD 20 20 20 AB B3 20 20 7E
C6A8: AB C0 C6 20 20 DD 0D 20 27
C6B0: 20 20 20 B1 20 B1 20 B1 66
C6B8: C0 BD 20 B1 C0 CB 20 20 D5
C6C0: B1 20 B1 20 B1 C0 BD 20 B4
C6C8: B1 C0 BD 20 B1 20 B1 20 BC
C6D0: 20 B1 0D 0D 20 20 20 20 3D
C6D8: 20 20 20 50 52 45 53 53 C7
C6E0: 20 46 49 52 45 20 42 55 DF
C6E8: 54 54 4F 4E 20 54 4F 20 13
C6F0: 53 54 41 52 54 00 9E C3 E2
C6F8: C4 11 9D 9D 9D 9D 9D 81 64
C700: AF A2 12 B7 20 20 B7 92 A6
C708: A2 AF 00 9A 53 43 4F 52 2D
C710: 45 20 05 30 30 30 30 30 6B
C718: 30 20 20 20 9C 57 41 56 34
C720: 45 20 05 30 31 20 20 20 4C
C728: 1E 48 49 47 48 20 05 30 BC
C730: 30 30 30 30 30 00 01 13 35
C738: 37 37 7F 7F FF 00 00 00 A5
C740: 30 F8 FE FE FF 00 00 00 67
C748: 00 00 00 03 03 00 00 00 4E
C750: 00 00 00 C0 C0 00 00 00 D1
C758: 00 00 00 00 FF 00 18 18 88
C760: 30 E0 E0 30 18 18 00 00 B2
C768: 00 00 00 00 00 00 00 00 68
C770: 00 00 00 00 00 00 00 00 70
C778: 00 08 00 00 00 00 00 A1 22
C780: 00 00 08 00 01 3C 80 00 46
C788: 10 00 00 85 00 00 10 00 2E
C790: 00 00 00 00 00 00 00 00 90
C798: 00 00 00 00 00 00 00 00 98
C7A0: 00 00 00 00 00 00 00 00 A0
C7A8: 00 00 00 00 00 00 00 00 A8
C7B0: 00 00 00 04 00 00 00 00 B4
C7B8: 01 00 40 00 32 00 02 10 3E
C7C0: 20 00 2E 00 08 75 08 02 96
C7C8: 8C 20 00 63 00 01 10 40 2A
C7D0: 00 00 00 00 04 00 00 00 D4
C7D8: 00 00 00 00 00 00 00 00 D8
C7E0: 00 00 00 00 00 00 00 00 E0
C7E8: 00 00 00 00 00 00 00 00 E8
C7F0: 04 00 00 00 00 02 00 20 17
C7F8: 00 63 00 04 32 10 00 4F F1
C800: 00 10 D6 84 01 7F 60 00 4C
C808: 5D 00 05 1A 10 00 C1 80 D6
C810: 02 00 20 00 00 00 00 04 36
C818: 00 00 00 00 00 00 00 00 18
C820: 00 00 00 00 00 00 00 00 20
C828: 00 00 00 00 00 42 00 00 6A
C830: 08 00 08 00 10 01 91 80 63
C838: 10 A6 08 01 52 80 43 35 43

```

```

C840: C2 0C DE A4 83 3F 00 04 59
C848: FD B0 4B 6E 02 01 5A A0 AE
C850: 10 21 08 01 00 80 08 08 1B
C858: 10 00 00 00 00 42 00 00 AA
C860: 00 00 00 00 00 00 00 60

```

CHAINMAIL! FROM PAGE 70

```

•10 FAST:COLOR.,1:COLOR4,12:COLOR1,12:GRA
PHIC2,1,..:SLOW:PRINTCHR$(11)CHR$(142); ON
•20 PRINT"[CLEAR][DOWN][BLUE][c A][3"[s C
]"[c S][c A][c S] [c A][c S][c A][s C][
s C][c S][c A][c S][c A][c S][3" "[c A]
[c S][c A][c S][c A][c S][c A][s C][s C]
[c S][c A][c S][c A][c S] [c A][c S]" HD
•30 PRINT"[s B][c A][s C][s C][c X][s B][
s B] [3"[s B]"[c A][c S][4"[s B]"[c Z]
[s C][s C][c S][s B][c Z][c X][c Z][c X]
[s B][s B][c A][c S][5"[s B]" [s B][s
B]" EN
•40 PRINT"[s B][s B][3" "[s B][c Z][s C]
[c X][s B][s B][c Z][c X][4"[s B]"[c A]
[s C][c S][s B][s B][c A][c S][c A][c S]
[s B][s B][c Z][c X][5"[s B]" [s B][s
B]" JN
•50 PRINT"[s B][s B][3" "[s B][c A][s C]
[c S][s B][s B][c A][c S][5"[s B]" [4"[
s B]"[c Z][c X][3"[s B]"[c A][c S][5"[
s B]" [s B][s B]" HM
•60 PRINT"[s B][s B][3" "[s B][s B] [10"
[s B]" [4"[s B]" [10"[s B]" [c Z][c
X]" GH
•70 PRINT"[s B][c Z][s C][s C][c S][s B][
s B] [10"[s B]" [4"[s B]" [9"[s B]"[
c Z][s C][c S][c A][c S]" IO
•80 PRINT"[c Z][3"[s C]"[c X][c Z][c X]
[c Z][c X][c Z][c X][c Z][c X][c Z][c X]
[c Z][c X] [c Z][c X][c Z][c X] [c Z][c
X][c Z][c X][c Z][c X][c Z][c X][s
C][s C][c X][c Z][c X]" OA
•90 PRINT" [c 8][RVSON][sEP][c *][RVSOFF
]"SPC(31)"[RVSON][sEP][c *]" AO
•100 PRINT" [RVSON][c M] [RVSOFF][3" "[
YELLOW]BY CLEVELAND M. BLAKEMORE[3" "[c
8][RVSON][c M]" EA
•110 PRINT" [RVSON][c M][SS][RVSOFF]"SPC
(31)"[RVSON][c M]" NI
•120 PRINT" [RVSON][c M][SS][RVSOFF]"SPC
(11)"[RED][3" "[1987"SPC(13)"[c 8][RVSON
][c M]" AK
•130 PRINT" [RVSON][c M][SS][RVSOFF] [Y
ELLOW][s U][25"[s C]"[s I] [c 8][RVSON
][c M]" IL

```


•140 PRINT" [RVSON][c M][SS][RVSOFF] [Y ELLOW][s B][RED][s U][23][s C]"[s I][YE LLOW][s B] [c 8][RVSON][c M] "	NC	HAPEA\$,C,168,1:NEXT:COLOR1,3:CHAR1,7,24, "[6" "]",1:COLOR1,6	LD
•150 PRINT" [RVSON][c M][SS][RVSOFF] [Y ELLOW][s B][RED][s B][c 3][RVSON] A TWO PLAYER GAME FOR [RED][RVSOFF][s B][YELLO W][s B] [c 8][RVSON][c M] "	KM	•310 CHAR1,27,24,"[6" "]",1:GRAPHIC.	BK
•160 PRINT" [RVSON][c M][SS][RVSOFF] [Y ELLOW][s B][RED][s B][c 3][RVSON][6" "T HE C-128[8" "][RED][RVSOFF][s B][YELLOW] [s B] [c 8][RVSON][c M] "	NB	•320 CLR:DIM J,A,R(2),S(2),H(2),P,Z,X,D,Y ,B,F,O,T,H,V,LP,RP:P=8183:Y=15:O=1:T=2:H =3:Z=1:X=8:D=45:B=75:F=5:SC=.:LP=64:RP=1 28:V=4	GG
•170 PRINT" [RVSON][c M][RVSOFF] [YELL OW][s B][RED][s B]"SPC(23)"[s B][YELLOW] [s B] [c 8][RVSON][c M] "	OG	•330 DEFFNA(X)=JANDY:DEFFNR(J)=R(Z)+(A<F) *-O+(A>F)*O+(R(Z)=XAND<F)*X+(R(Z)=OAND(A>F))*-X:DEFFNS(J)=B+R(Z)+S(Z)*X:DEFFNC(X)=(JANDH)	EE
•180 PRINT" [RVSON][c M][RVSOFF] [YELL OW][s B][RED][s B] [c 3]LEFT=ROTATE CW (1-8) [RED][s B][YELLOW][s B] [c 8][RVS ON][c M] "	JC	•340 DEFFNU(P)=H(P)+(H(P)<D+T)*-T:DEFFNI(A)=80+(A-O)*160+H(A):DEFFNP(J)=J+V+(J+V> X)*X:DEFFND(J)=(R(J)-O)*D	EC
•190 PRINT" [c 5][s U][s C][s C][s I] [YE LLOW][s B][RED][s B][c 3]RIGHT=ROTATE CC W (1-8) [RED][s B][YELLOW][s B] [c 5][s U][s C][s C][s I]"	JI	•350 TEMPO 18:ENVELOPE 0,0,9,2,1,2,1536:P LAY"X0U9":PLAY"V1T0V2T0V3T0":VOL15	AJ
•200 PRINT" [c 4][RVSON][c F][c D][RVSO F] [YELLOW][s B][RED][s B] [c 3]FIRE=SW ING SWORD[6" "][RED][s B][YELLOW][s B] [c 4][RVSON][c F][c D]"	OH	•360 A\$(1)="V303SEV204IGV1IBIRV303SBSRO4S FV2QDV1QAV3SRO3SBSRO2SAV104IEIRV303SFSRS BV104QDV3SRO3SFSRV105HCV2HCV304HEV2HBV10 5HEV304QE	JD
•210 PRINT" [RVSON][c V][c C][RVSOFF] [Y ELLOW][s B][RED][s B][c 3]F/DIR=MOVE IN CUR DIR [RED][s B][YELLOW][s B] [c 4] [RVSON][c V][c C]"	FM	•370 A\$(2)="V303SEV104IEIRV303SBSRO4SFV1Q DV3SRO3SBSRO2SAV204IGV1IBIRV303SFSRSBV20 4QDV1QAV3SRO3SFSR	FE
•220 PRINT" [c 2][RVSON][c EP][c EP][RVSO F] [YELLOW][s B][RED][s B][RED][RVSON] RED [RVSOFF][BACKARROW]PORT1 [GREEN][RVS ON]GREEN[RVSOFF][BACKARROW]PORT2[RED][s B][YELLOW][s B] [c 2][RVSON][c EP][c EP]"	BL	•380 A\$(3)="V303SEV104IEIRV303SBSRO4SFV1Q DV3SRO3SBSRO2SAV104HEV3SRO3SFSRSBSR.IFV2 IR	FD
•230 PRINT" [RVSON][c EP][c EP][RVSOFF] [Y ELLOW][s B][RED][s J][23][s C]"[s K][Y ELLOW][s B] [c 2][RVSON][c EP][c EP]"	FH	•390 SPRITE1,..,3,..,1,1,..:R(1)=5:MOVSPR1,.. #:MOVSPR1,163,70:POKE8184,80:SPRITE2,.. 6,..,1,1:MOVSPR2,163,180:POKE8185,76:R(2) =1	IO
•240 PRINT" [RVSON][c P][c P][RVSOFF] [Y ELLOW][s J][25][s C]"[s K] [c 2][RVSO N][c P][c P]"	GM	•400 SPRCOLOR9,8:POKE8186,93:POKE8187,93: SPRITE3,..,3,..,1:SPRITE4,..,3,..,1: MOVSPR3,48,200:MOVSPR4,295,70	HI
•250 PRINTTAB(10)"[BLUE]LOADING SPRITE DA TA":A=4864:B=6079:FORC=ATOB:READD:POKEC ,D:NEXT:A=3584:B=3711:FORC=ATOB:READD:PO KEC,D:NEXT	MD	•410 POKE8188,58:POKE8189,58:SPRITE5,..,1, ..,1,..:SPRITE6,..,1,..,1,..:MOVSPR5,80+48,23 4:MOVSPR6,240+48,234	AI
•260 A=3712:B=3712+63:FORC=ATOB:POKEC,..:N EXT:A=3712+8*3:B=3712+8*3*2:FORC=ATOB-1: POKEC,255:NEXT	BJ	•420 POKE8190,57:POKE8191,57:SPRITE7,..,12 ,..,1,1:SPRITE8,..,12,..,1,1:MOVSPR7,100,12 0:MOVSPR8,217,120	JO
•270 PRINTCHR\$(145)CHR\$(13)CHR\$(27)"Q"TAB (9)"LOADING INTERRUPT DATA":A=3072:B=34 56:FORC=ATOB:READD:POKEC,D:NEXT	IJ	•430 FORA=.TO10:J=BUMP(1):NEXT:SYS3072:PO KE4594,..:H(1)=48:H(2)=48	NE
•280 POKE4590,30:POKE4591,30:POKE4592,60: POKE4593,190	EA	•440 PRINTCHR\$(145)CHR\$(13)CHR\$(27)"Q"TAB (6)"[c 7]PRESS FIRE BUTTONS TO BEGIN!";	NF
•290 PRINTCHR\$(145)CHR\$(13)CHR\$(27)"Q"TAB (9)"CREATING DUNGEON ARENA":SPRSAV1,A\$: FORC=.TO320STEP24:GSHAPEA\$,C,..,1:NEXT	NF	•450 A=1:DO:PLAYA\$(A):A=A+O+(A=H)*H:LOO PUNTILJOY(1)=RPANDJOY(2)=RP:GRAPHIC1,..:POK E53248+21,255	LK
•300 FORC=21TO158STEP21:GSHAPEA\$,..,C,1:GS HAPEA\$,296,C,1:NEXT:FORC=.TO320STEP24:GS		•460 REM MAIN LOOP	LP
		•470 DO:Z=H-Z:J=JOY(Z):A=FNA(.):IFAANDA=J THENR(Z)=FNR(.):SOUNDZ,P,O:ELSEIFA=.ANDA <>JANDS(Z)=.THENS(Z)=O:SOUNDZ,P,H,..,H:E LSES(Z)=.	FM
		•480 POKEP+Z,FNS(.):J=BUMP(O):LOOPUNTILH(Z)<=.ORFNC(.):ONFNC(.):GOTO530,540,490:GO TO600	OB
		•490 IFR(T)<>FNP(R(O))THEN520	EC
		•500 IFS(O)ANDS(T)=.THENH(T)=H(T)-T:MOVSP RF,FNI(T),+.	AH
		•510 IFS(T)ANDS(O)=.THENH(O)=H(O)-T:MOVSP	

LD RF+O,FNI(O),+.
BK *520 SOUNDZ,B*B,F,T,B,B*H,H:MOVSPRO,F;FND
Y (T):MOVSPRT,F;FND(O):J=BUMP(O):J=BUMP(O)
H :GOTO470
GG *530 A=:IFJAND(Y-H)THENH(O)=FNU(O):MOVSP
EE RF+O,FNI(O),+.:GOTO570
EC *540 IFJAND(Y-H)THENH(T)=FNU(T):MOVSPRF,F
AJ NI(T),+.:GOTO570
JD *550 IFJANDLPTHENA=F+T:GOTO580
FE *560 IFJANDRPTHENA=X:GOTO580
FD *570 J=BUMP(O):J=BUMP(O):GOTO470
IO *580 POKE4594,0:IFATHENMOVSPRFNC(.),RSPPO
HI S(A,.)+12,RSPPOS(A,0)+12:SPRITEFNC(.),,
AI ,,,,
JO *590 Z=FNC(.)
NE *600 POKE4594,0:SOUND0,20000,150,1,300,10
NF 0,2:FORD=.TOF:FORA=OTOX:POKEP+Z,B+A:FORJ
LK =.TOY:NEXTJ,A,D:POKEP+Z,92:FORJ=OTOF:SOU
LP NDO,J*2000,F,,J*B,J*P,H:NEXT
FM *610 SLEEP5:POKE53248+21,,:GRAPHIC.:RUN32
OB 0
EC *620 DATA0,,128,,1,,,2
AH *630 DATA0,,4,,,8,,,
*640 DATA236,,1,199,,2,146,128
*650 DATA005,41,64,5,69,64,5,125
*660 DATA064,3,69,128,22,170,208,41
*670 DATA125,40,32,254,8,39,131,200
*680 DATA024,,48,,,,,
*690 DATA0,,,,,
*700 DATA0,,,,,
*710 DATA0,,,,,252,,25
*720 DATA062,,42,64,127,78,252,128
*730 DATA066,196,192,58,165,64,6,149
*740 DATA064,3,253,64,,98,64,,
*750 DATA092,128,,63,128,,34,,
*760 DATA0,19,128,,8,128,,8
*770 DATA128,,15,,,,,
*780 DATA0,,,,,224,,1,16
*790 DATA0,1,32,,151,,
*800 DATA152,128,,175,64,,208,224
*810 DATA0,110,96,,117,32,,100
*820 DATA128,,117,48,,110,104,,
*830 DATA208,196,,175,66,,152,129
*840 DATA0,151,,1,32,,1,16
*850 DATA0,,224,,,,,
*860 DATA0,15,,8,128,,8
*870 DATA128,,19,128,,34,,
*880 DATA063,128,,92,128,,98,64
*890 DATA003,253,64,6,149,64,58,165
*900 DATA064,66,196,192,78,252,128,42
*910 DATA064,,25,62,,253,,
*920 DATA0,1,,,1,,,1
*930 DATA0,,1,,,1,,255
*940 DATA0,,,,,
*950 DATA0,,24,,48,39
*960 DATA131,200,32,254,8,41,125,40
*970 DATA022,170,208,3,69,128,5,125
*980 DATA064,5,69,64,5,41,64,2

DG *990 DATA146,128,1,199,,,236,,
GL *1000 DATA0,32,,,64,,,128
IO *1010 DATA0,1,,,2,,,
OE *1020 DATA0,240,,1,16,,1,16
HJ *1030 DATA0,1,200,,,68,,1
JO *1040 DATA252,,1,58,,2,70,,
HL *1050 DATA002,191,192,2,169,96,2,165
IM *1060 DATA092,3,35,66,1,63,114,254
LK *1070 DATA002,84,,124,152,,63,,
OI *1080 DATA0,,,,,
DA *1090 DATA0,,,,,255
FB *1100 DATA0,1,192,,2,32,,1
AM *1110 DATA032,,58,64,32,70,64,16
PC *1120 DATA189,64,8,194,192,5,157,128
PF *1130 DATA003,43,128,,73,128,1,43
NG *1140 DATA128,1,157,128,1,194,192,,
KN *1150 DATA189,64,,70,64,,58,64
IP *1160 DATA0,1,32,,2,32,,1
LD *1170 DATA192,,,,,255
MN *1180 DATA0,128,,128,,128
KJ *1190 DATA0,,128,,128,,
HG *1200 DATA191,,124,152,,2,84
GF *1210 DATA001,63,114,3,35,66,2,165
KL *1220 DATA092,2,169,96,2,191,192,2
AI *1230 DATA070,,1,58,,1,252,,
OC *1240 DATA0,68,,1,200,,1,16
BL *1250 DATA0,1,16,,240,,255
AD *1260 DATA0,16,,16,,16
DO *1270 DATA0,,16,,16,,
GO *1280 DATA016,,16,,124,,
FE *1290 DATA001,199,,2,146,128,5,41
IM *1300 DATA064,5,69,64,5,125,64,3
LD *1310 DATA069,128,22,170,208,41,125,40
LB *1320 DATA032,254,8,39,131,200,24,,
BM *1330 DATA048,,,,,
MA *1340 DATA0,,4,,,8,,,
OO *1350 DATA016,,32,,252,64,25
NM *1360 DATA062,128,42,65,,78,252,128
EP *1370 DATA066,196,192,58,165,64,6,149
LH *1380 DATA064,3,253,64,,98,64,,
HE *1390 DATA092,128,,63,128,,34,,
BE *1400 DATA0,19,128,,8,128,,8
JA *1410 DATA128,,15,,,,,
LK *1420 DATA0,,3,128,,4,64
MH *1430 DATA0,4,128,,2,92,,2
MJ *1440 DATA098,,2,189,,3,67,,
GD *1450 DATA001,185,128,1,212,128,1,146
GO *1460 DATA255,1,212,128,1,185,128,3
*1470 DATA067,,2,189,,2,98,,
*1480 DATA002,92,,4,128,,4,64
*1490 DATA0,3,128,,,,,36
*1500 DATA0,15,,8,128,,8
*1510 DATA128,,19,128,,34,,
*1520 DATA063,128,,92,128,,98,64
*1530 DATA003,253,64,6,149,64,58,165
*1540 DATA064,66,196,192,78,252,128,42
*1550 DATA064,128,25,63,128,,252,64
*1560 DATA0,,32,,,16,,

PD
PL
FE
JC
IC
CF
GO
HC
FP
EL
MA
AA
HJ
EN
GC
OK
DF
AC
JJ
DM
PC
LG
OM
AO
OB
MA
GH
BL
ML
JL
CF
NJ
DL
GN
MJ
KP
JD
AN
EK
BG
LP
IH
HF
LH
GG
MG
PK
CG
HF
CN
BC
FO
AI
NO
CJ
EO
CG
ON

•1570 DATA008,,,4,,,2,255
 •1580 DATA0,,,,,24,,
 •1590 DATA048,39,131,200,32,254,8,41
 •1600 DATA125,40,22,170,208,3,69,128
 •1610 DATA005,125,64,5,69,64,5,41
 •1620 DATA064,2,146,128,1,199,,
 •1630 DATA124,,,16,,,16,,
 •1640 DATA0,16,,,16,,,16
 •1650 DATA0,,,16,,,16,,,
 •1660 DATA0,120,,,136,,,136
 •1670 DATA0,,,228,,,34,,,
 •1680 DATA254,,,157,,1,35,,
 •1690 DATA001,95,224,1,84,176,1,82
 •1700 DATA174,1,145,161,,159,185,,
 •1710 DATA129,42,,254,76,1,31,128
 •1720 DATA002,,,4,,,8,,
 •1730 DATA0,16,,,32,,,
 •1740 DATA0,,,1,192,,2
 •1750 DATA032,,1,32,,58,64,,
 •1760 DATA070,64,,189,64,,194,192
 •1770 DATA001,157,128,1,43,128,255,73
 •1780 DATA128,1,43,128,1,157,128,,
 •1790 DATA194,192,,189,64,,70,64
 •1800 DATA0,58,64,,1,32,,2
 •1810 DATA032,,1,192,,,,
 •1820 DATA064,,,32,,,16,,
 •1830 DATA0,8,,,4,,,2
 •1840 DATA063,,1,252,152,1,2,84
 •1850 DATA001,63,114,3,35,66,2,165
 •1860 DATA092,2,169,96,2,191,192,2
 •1870 DATA070,,1,58,,1,252,,
 •1880 DATA0,68,,1,200,,1,16
 •1890 DATA0,1,16,,,240,,255
 •1900 DATA028,,56,20,,40,116,,
 •1910 DATA046,66,,66,121,126,158,4
 •1920 DATA129,32,3,,192,2,,64
 •1930 DATA002,129,64,2,231,64,3,,
 •1940 DATA064,5,148,224,9,65,80,242
 •1950 DATA162,207,132,128,161,244,156,175
 •1960 DATA020,65,40,28,62,56,,
 •1970 DATA0,,,,,
 •1980 DATA0,,,,,
 •1990 DATA0,,4,,,4,,1
 •2000 DATA016,64,,65,,1,81,,
 •2010 DATA004,81,64,4,101,64,1,238
 •2020 DATA064,5,171,80,6,255,144,6
 •2030 DATA125,144,1,150,64,,85,,
 •2040 DATA0,,,,,
 •2050 DATA0,,,,,
 •2060 DATA0,,,2,,,64
 •2070 DATA128,,18,64,,17,128,,
 •2080 DATA017,64,,71,64,,213,64
 •2090 DATA0,87,80,,117,80,1,254
 •2100 DATA208,1,191,144,2,251,208,2
 •2110 DATA125,144,1,150,64,,85,,
 •2120 DATA0,,,,,
 •2130 DATA0,,,,,
 •2140 DATA127,60,254,144,195,33,162,203

HM
 NI
 PG
 EB
 EB
 AE
 LL
 HJ
 FB
 BO
 LL
 EA
 FG
 KD
 LM
 KH
 MF
 PO
 LI
 IL
 JC
 DM
 BH
 MJ
 IF
 IF
 JP
 JO
 FP
 KN
 HO
 OD
 AC
 BJ
 FD
 FP
 HI
 PC
 FD
 NO
 LE
 PG
 HE
 JF
 DL
 KH
 MI
 AK
 CB
 IO
 MA
 DJ
 PH
 PI
 AH
 IH
 HB
 GM
 •2150 DATA005,128,195,65,127,60,254,231
 •2160 DATA231,231,154,25,24,24,152,89
 •2170 DATA088,58,24,231,231,231,126,255
 •2180 DATA126,131,64,197,163,4,129,139
 •2190 DATA032,145,131,,129,126,255,126
 •2200 DATA231,231,231,90,26,88,24,24
 •2210 DATA026,25,24,152,231,231,231,,
 •2220 DATA255,255,255,128,,1,183,255
 •2230 DATA237,187,255,221,189,255,189,190
 •2240 DATA255,125,191,126,253,191,129,253
 •2250 DATA191,129,253,191,129,253,191,129
 •2260 DATA253,191,129,253,191,129,253,191
 •2270 DATA129,253,191,126,253,190,255,125
 •2280 DATA189,255,189,187,255,221,183,255
 •2290 DATA237,128,,1,255,255,255,255
 •2300 REM INTERRUPT DATA
 •2310 DATA120,169,21,141,20,3
 •2320 DATA169,12,141,21,3,169
 •2330 DATA2,133,251,169,1,133
 •2340 DATA252,88,96,173,242,17
 •2350 DATA240,2,76,101,250,198
 •2360 DATA251,208,24,169,3,133
 •2370 DATA251,165,252,24,105,93
 •2380 DATA162,2,157,249,31,202
 •2390 DATA208,250,169,1,56,229
 •2400 DATA252,133,252,169,1,56
 •2410 DATA229,252,170,189,0,220
 •2420 DATA170,41,16,240,7,165
 •2430 DATA252,10,72,76,30,13
 •2440 DATA138,41,15,133,253,169
 •2450 DATA15,56,229,253,168,165
 •2460 DATA252,10,72,170,152,201
 •2470 DATA4,208,22,222,214,17
 •2480 DATA208,14,138,74,168,200
 •2490 DATA152,77,230,17,141,230
 •2500 DATA17,222,214,17,76,30
 •2510 DATA13,201,8,208,22,254
 •2520 DATA214,17,208,14,138,74
 •2530 DATA168,200,152,77,230,17
 •2540 DATA141,230,17,254,214,17
 •2550 DATA76,30,13,201,1,208
 •2560 DATA7,232,222,214,17,76
 •2570 DATA30,13,201,2,208,7
 •2580 DATA232,254,214,17,76,30
 •2590 DATA13,201,5,208,26,222
 •2600 DATA214,17,208,14,138,74
 •2610 DATA168,200,152,77,230,17
 •2620 DATA141,230,17,222,214,17
 •2630 DATA232,222,214,17,76,30
 •2640 DATA13,201,6,208,26,222
 •2650 DATA214,17,208,14,138,74
 •2660 DATA168,200,152,77,230,17
 •2670 DATA141,230,17,222,214,17
 •2680 DATA232,254,214,17,76,30
 •2690 DATA13,201,9,208,26,254
 •2700 DATA214,17,208,14,138,74
 •2710 DATA168,200,152,77,230,17
 •2720 DATA141,230,17,254,214,17

PC
 KK
 DL
 LP
 FB
 IL
 KJ
 KK
 NN
 CF
 BD
 OF
 FI
 EB
 NE
 HO
 OI
 AM
 JK
 MJ
 JO
 FC
 HF
 CP
 OI
 EF
 CI
 GK
 EA
 NG
 AH
 EG
 AE
 FF
 ME
 CA
 FB
 OB
 ME
 EL
 LP
 IM
 JI
 MI
 GG
 KO
 OF
 FB
 JB
 EF
 MI
 NH
 GD
 NM
 NJ
 PC
 DJ
 FI

PC
KK
DL
LP
FB
IL
KJ
KK
NN
CF
BD
OF
FI
EB
NE
HO
OI
AM
JK
MJ
JO
FC
HF
CP
OI
EF
CI
GK
EA
NG
AH
EG
AE
FF
ME
CA
FB
OB
ME
EL
LP
IM
JI
MI
GG
KO
OF
FB
JB
EF
MI
NH
GD
NM
NJ
PC
DJ
FI

- 2730 DATA232,222,214,17,76,30
- 2740 DATA13,201,10,208,23,254
- 2750 DATA214,17,208,14,138,74
- 2760 DATA168,200,152,77,230,17
- 2770 DATA141,230,17,254,214,17
- 2780 DATA232,254,214,17,104,170
- 2790 DATA74,168,200,152,45,230
- 2800 DATA17,208,20,189,214,17
- 2810 DATA56,205,238,17,176,11
- 2820 DATA172,238,17,200,152,157
- 2830 DATA214,17,76,126,13,138
- 2840 DATA74,168,200,152,45,230
- 2850 DATA17,240,17,189,214,17
- 2860 DATA56,205,239,17,144,8
- 2870 DATA172,239,17,136,152,157
- 2880 DATA214,17,232,189,214,17
- 2890 DATA56,205,240,17,176,11
- 2900 DATA172,240,17,200,152,157
- 2910 DATA214,17,76,126,13,189
- 2920 DATA214,17,56,205,241,17
- 2930 DATA144,8,172,241,17,136
- 2940 DATA152,157,214,17,76,101,250

AF
GH
DM
KL
CC
FA
OH
NA
IA
ED
EN
AC
PN
IO
KA
HD
MM
CK
BN
OG
HG
NO

C0D0: 74 68 20 50 53 20 54 6F 55
C0D8: 20 47 45 4F 53 20 2E 20 96
C0E0: 2E 20 2E 20 2E 00 00 00 AB
C0E8: 00 00 00 00 00 00 00 00 E8
C0F0: 00 00 00 00 00 00 00 00 F0
C0F8: 00 00 00 FF 20 9F C1 00 7A
C100: C7 00 00 3F 01 A9 BE 85 F5
C108: 18 A9 00 85 19 A0 6E 38 AF
C110: 20 4E C1 A2 00 20 32 52 87
C118: 20 3E 53 E0 02 F0 0C 8A 34
C120: D0 DA 20 D2 54 20 94 54 1C
C128: 20 52 55 4C 2C C2 8A 0A BF
C130: AA BD 53 52 85 74 BD 54 4A
C138: 52 85 75 A9 4A 85 02 A9 AA
C140: 52 85 03 4C 56 C2 81 0C 0E
C148: 08 1E 74 01 11 48 00 61 9E
C150: 52 81 52 9E 52 AF 52 C4 2E
C158: 52 D9 52 F8 52 18 49 4E D1
C160: 53 45 52 54 20 50 52 49 AB
C168: 4E 54 20 53 48 4F 50 20 86
C170: 47 52 41 50 48 49 43 20 90
C178: 44 49 53 4B 00 18 49 4E 54
C180: 53 45 52 54 20 47 45 4F BB
C188: 53 20 57 4F 52 4B 20 44 A4
C190: 49 53 4B 20 2E 20 2E 20 35
C198: 2E 00 18 46 49 4C 45 20 20
C1A0: 4E 4F 54 20 46 4F 55 4E EB
C1A8: 44 21 00 18 45 52 52 4F 5F
C1B0: 52 20 52 45 41 44 49 4E D7
C1B8: 47 20 46 49 4C 45 21 00 62
C1C0: 18 45 52 52 4F 52 20 57 DB
C1C8: 52 49 54 49 4E 47 20 46 FD
C1D0: 49 4C 45 21 00 18 54 48 81
C1D8: 49 53 20 49 53 20 4E 4F EF
C1E0: 54 20 41 20 47 45 4F 53 E5
C1E8: 20 57 4F 52 4B 20 44 49 FA
C1F0: 53 4B 21 00 18 53 55 43 B4
C1F8: 43 45 53 53 46 55 4C 20 30
C200: 43 4F 4E 56 45 52 53 49 6B
C208: 4F 4E 21 00 18 45 4E 54 C6
C210: 45 52 20 4E 41 4D 45 20 0A
C218: 4F 46 20 46 49 4C 45 20 0F
C220: 4F 52 00 18 50 52 45 53 15
C228: 53 20 52 45 54 55 52 4E 7D
C230: 20 46 4F 52 20 4C 49 53 41
C238: 54 00 20 A1 C2 A9 00 8D 48
C240: 3D 54 A9 3D 85 0C A9 54 48
C248: 85 0D A9 A2 85 02 A9 53 AB
C250: 85 03 20 56 C2 A5 02 C9 83
C258: 02 D0 03 A2 02 60 C9 06 03
C260: F0 D8 AD 3D 54 D0 05 20 5F
C268: B9 53 D0 CE A9 3D 85 0E 8F
C270: A9 54 85 0F 20 8D 53 20 24
C278: 0B C2 8A F0 08 A2 02 20 8E
C280: 32 52 4C 3E 53 20 5E 54 B5
C288: 60 A0 0F B1 0E C9 61 90 14
C290: 09 C9 7B B0 05 38 E9 20 D6
C298: 91 0E 88 10 EE 60 81 0B AC

PS TO GEOS FROM PAGE 51

PS TO GEOS.ML

Starting address in hex: C000

Ending address in hex: C570

Flankspeed required for entry of PS TO GEOS.ML! See page 79.

C000: BF FF FF FF BB BA B9 BA AA
C008: 93 91 A3 13 91 A2 BA 91 64
C010: 80 00 01 B9 27 9F A1 24 D7
C018: 93 B9 E4 9F 89 24 91 B9 E2
C020: 27 91 80 0C 01 9F FC 01 04
C028: BF FC 01 BC 00 01 9E 7B BD
C030: DD 90 42 51 96 72 5D 92 2B
C038: 42 45 9E 7B DD FF FF FF B7
C040: 83 06 00 00 52 73 56 00 E5
C048: 52 50 53 20 54 4F 20 47 69
C050: 45 4F 53 20 20 56 31 2E 2E
C058: 30 00 00 00 00 53 68 61 A5
C060: 77 6E 20 4B 2E 20 53 6D C0
C068: 69 74 68 00 00 00 00 00 AE
C070: 00 00 00 00 00 00 00 00 70
C078: 00 00 00 00 00 00 00 00 78
C080: 00 00 00 00 00 00 00 00 80
C088: 00 00 00 00 00 00 00 00 88
C090: 00 00 00 00 00 00 00 00 90
C098: 00 00 00 00 43 6F 6E 76 30
C0A0: 65 72 74 20 79 6F 75 72 DD
C0A8: 20 50 72 69 6E 74 20 53 4B
C0B0: 68 6F 70 20 67 72 61 70 C4
C0B8: 68 69 63 73 20 69 6E 74 CD
C0C0: 6F 20 47 45 4F 53 20 66 06
C0C8: 6F 72 6D 61 74 20 77 69 EE

IMPORTANT! Letters on white background are **Bug Repellent** line codes. **Do not enter them!** Pages 77 and 78 explain these codes and provide other essential information on entering **Aho!** programs. Refer to these pages **before** entering any programs!

```

C2A0: 10 20 10 53 0B 10 30 27 A6
C2A8: 53 0D 10 3A 0C 10 02 01 72
C2B0: 48 06 11 48 00 A9 12 A2 B6
C2B8: 01 85 04 85 70 86 05 86 4B
C2C0: 71 A9 00 85 FB 85 0A A9 96
C2C8: 80 85 FC 85 0B 20 E4 C1 23
C2D0: A0 02 B1 FB F0 26 C8 B1 B2
C2D8: FB F0 21 A0 1F B1 FB D0 25
C2E0: 1B 88 B1 FB C9 03 B0 14 C3
C2E8: A0 05 B1 FB 99 38 54 C8 2B
C2F0: C0 15 D0 F6 20 14 54 F0 08
C2F8: 03 A2 00 60 18 A5 FB 69 22
C300: 20 85 FB 90 CB AE 01 80 2E
C308: AD 00 80 D0 AC A2 FF 60 B6
C310: A9 24 85 02 A9 54 85 03 EB
C318: 20 56 C2 A5 02 C9 04 60 27
C320: 81 0B 0A 1E 36 54 03 01 63
C328: 48 04 11 48 0B 0A 3C 4E 6D
C330: 54 00 18 46 69 6C 65 3A 58
C338: 20 40 40 40 40 40 40 40 1A
C340: 40 40 40 40 40 40 40 40 42
C348: 40 00 18 55 73 65 20 74 63
C350: 68 69 73 20 66 69 6C 65 57
C358: 3F 00 A9 00 85 10 A9 40 C0
C360: 85 11 A0 1C B1 0C 38 E9 93
C368: 02 29 01 85 72 A0 01 B1 DF
C370: 0C 85 04 C8 B1 0C 85 05 17
C378: A9 00 85 06 A9 03 85 07 E6
C380: 20 FF C1 60 50 68 6F 74 5F
C388: 6F 20 53 63 72 61 70 00 13
C390: 20 A2 54 A9 88 85 02 A9 0B
C398: 54 85 03 4C 38 C2 A2 01 60
C3A0: 20 32 52 20 A1 C2 AD 8B 03
C3A8: 84 F0 01 60 A2 05 20 32 79
C3B0: 52 4C A2 54 06 30 00 0C 88
C3B8: 00 0B 38 00 16 00 06 00 18
C3C0: 24 BF 00 16 00 4D BF 00 C7
C3C8: 00 05 06 0B 2D 34 A4 72 57
C3D0: B9 CE 54 85 7B B9 D0 54 8D
C3D8: 85 7C B9 CC 54 85 7D A9 62
C3E0: 00 8D BB 55 85 76 A9 45 6A
C3E8: 8D BC 55 85 77 A9 02 85 B6
C3F0: 78 A9 40 85 79 A4 7D A2 17
C3F8: 04 B9 B8 54 20 43 55 C8 45
C400: CA 10 F6 A6 7C A5 7B 18 2E
C408: 69 80 20 43 55 A4 7B 84 4F
C410: 7A A0 00 B1 78 20 43 55 0E
C418: E6 78 D0 02 E6 79 A4 7A C9
C420: 88 D0 EC CA D0 DF A4 7D 04
C428: A2 04 B9 C2 54 20 43 55 58
C430: C8 CA 10 F6 A5 76 8D BD 32
C438: 55 A5 77 8D BE 55 60 84 31
C440: 73 A0 00 91 76 E6 76 D0 8A
C448: 02 E6 77 A4 73 60 A9 74 3F
C450: 85 14 A9 55 85 15 A9 00 2D
C458: 85 16 20 ED C1 8A D0 06 25
C460: A2 06 4C 32 52 60 A2 04 E0
C468: 20 32 52 68 68 4C 00 52 7C
C470: 88 54 03 15 BF FF FF FF 25
C478: 80 40 01 80 60 01 80 60 FC
C480: 01 80 60 0D 80 50 35 80 F5
C488: 50 D9 80 53 21 80 5C C1 46
C490: 80 59 01 87 CE 01 9F C8 2B
C498: 01 B8 F8 01 B1 FC 01 BF BB
C4A0: 6E 01 9C 66 01 80 66 01 FB
C4A8: 80 6C 01 80 38 01 80 00 D0
C4B0: 01 FF FF FF 83 04 00 00 39
C4B8: 70 00 53 00 00 50 68 6F A4
C4C0: 74 6F 20 53 63 72 61 70 BF
C4C8: 20 56 31 2E 31 00 00 00 CF
C4D0: 00 50 68 6F 74 6F 20 53 50
C4D8: 63 72 61 70 00 00 00 00 80
C4E0: 00 00 00 00 00 00 00 00 E0
C4E8: 00 00 00 00 00 00 00 00 E8
C4F0: 00 00 00 00 00 00 00 00 F0
C4F8: 00 00 00 00 00 00 00 00 F8
C500: 00 00 00 00 00 00 00 00 00
C508: 00 00 00 00 00 00 00 00 08
C510: 00 00 00 00 00 00 00 00 10
C518: 00 00 00 00 00 00 00 00 18
C520: 00 00 00 00 00 00 00 00 20
C528: 00 00 00 00 00 00 00 00 28
C530: 00 00 00 00 00 00 00 00 30
C538: 00 00 00 00 00 00 00 00 38
C540: 00 00 00 00 00 00 00 00 40
C548: 00 00 00 00 00 00 00 00 48
C550: 00 00 00 00 00 00 00 00 50
C558: 20 53 48 41 57 4E 20 4B 66
C560: 2E 20 53 4D 49 54 48 20 55
C568: 2D 20 41 48 4F 59 21 20 29
C570: 00 70

```

BINARY TO GEOS

```

•100 REM* BINARY TO GEOS V1.0 FROM AHOY!! JO
•110 REM* (E)NGENDERED BY SHAWN K. SMITH JO
•120 PN$="PS TO GEOS":DATA 000,006,087,00
    3,008,004,030
•130 FORD=1TO16:P$=P$+CHR$(160):NEXT
•140 PN$=MID$(PN$+P$,1,16):Z$=CHR$(0)
•150 FORD=1TO7:READ DI(D):NEXT
•160 PRINTCHR$(147):PRINT:PRINT
•170 INPUT"ENTER NAME OF BINARY FILE";B$
•180 OPEN1,8,15,"I0":OPEN8,8,8,B$+"P,R"
•190 GOSUB220:GOSUB250:GOSUB390
•200 PRINT:PRINTCHR$(18)PN$" CONVERTED!"
•210 CLOSE8:CLOSE1:END
•220 INPUT#1,E,E$,A$,A$:IFE=0THENRETURN
•230 PRINT:PRINT"[3*"]";E;E$;"[3*"]"
•240 CLOSE8:CLOSE1:END
•250 PRINT:PRINT"WORKING . . .":PRINT
•260 T=18:S=1:CLOSE8:OPEN8,8,8,"#"

```

HA
FE
FH
HF
IC
HE
PE
IO
OD
GM
CH
GK
IK
FP
HP


```

270 PRINT#1,"U1"8;0;T;S:GOSUB220
280 PRINT#1,"B-P"8;0;GET#8,NT$,NS$
290 FORTB=2TO228STEP32:DN$=""
300 PRINT#1,"B-P"8;TB:GET#8,FT$,TD$,SD$
310 IFASC(FT$+Z$)<>130THEN350
320 FORD=1TO16:GET#8,N$:DN$=DN$+N$:NEXT
330 PRINTDN$,
340 IF DN$=MID$(B$+P$,1,16)THEN RETURN
350 NEXT:T=ASC(NT$+Z$):S=ASC(NS$+Z$)
360 IF T THEN270
370 PRINT"[3?"] FILE NOT FOUND!"
380 CLOSE8:CLOSE1:END
390 PRINT#1,"U1"8;0;ASC(TD$)ASC(SD$)
400 PRINT#1,"B-P"8;0;GET#8,T2$,S2$
410 PRINT#1,"B-P"8;0;PRINT#8,CHR$(0)CHR$
(255)CHR$(3)CHR$(21);
420 PRINT#1,"U2"8;0;ASC(TD$)ASC(SD$)
430 PRINT#1,"U1"8;0;T;S:PRINT#1,"B-P"8;T
B:PRINT#8,CHR$(131);T2$S2$PN$TD$SD$;
440 FORD=1TO7:PRINT#8,CHR$(DI(D));:NEXT
450 PRINT#1,"U2"8;0;T;S
460 RETURN

```

LA
LI
DL
LI
GP
DN
LM
GB
JB
IM
MB
BF
MG
BA
CG
AF
IK
JB
EF
FL

TIPS AH-OY!

Continued from page 47

```

5050 PRINT"[CLEAR]PRESS <SHIFT> TO PAUSE
<[BACKARROW]> TO EXIT":GET#2,B$,C$
5060 IFPEEK(197)=57THEN5170
5070 IFPEEK(653)=1THEN5070
5080 GET#2,Z$,B$,C$,D$:IFZ$=""ANDB$=""TH
EN5170
5090 V$=STR$(ASC(C$+O$)+ASC(D$+O$)*256)+
" ":V$=MID$(V$,2):PRINT:PRINTV$;:Q=0
5100 GET#2,C$:C=ASC(C$+O$):IFC=0THEN5060
5110 IFC>127ANDC<204ANDQ=0THENPRINTT$(C-
127);:GOTO5100
5120 IFC=34THENQ=1-Q
5130 PRINTCHR$(C);:GOTO5100
5140 GET#15,N:IFN=0THENRETURN
5150 IFN=6THENPRINT"[DOWN][DOWN]PROGRAM
NOT ON THIS DISK":FORK=1TO200:NEXT:RUN
5160 PRINT"[DOWN][DOWN]DISK ERROR. PROGR
AM ABORTED
5170 CLOSE15:POKE198,0

```

CHAINMAIL

Continued from page 70

scream.

As long as the other player is still in contact with you, he will not lose his balance and fall into the shaft. This makes it easy to push your enemy razor-close to the shaft, then pull free and watch him tumble in. Just make sure it is not he who pulls free and watches you tumble in!

Swordplay has many variations. You can lock your sword into place and execute the forward charge. When we were debugging the game, my friend developed an interesting technique of locking his sword out and spinning in place. Whenever I tried to approach him, I was struck with several blows. You can also try striking, rotating to cause a blow to glance off, and rotating back and striking your enemy again. Another method is to strike, pull back out of range, wait for your opponent's sword to swish by harmlessly, and plunge forward with a blow again. It takes a great deal of practice to execute any of these techniques.

Once you get the other knight at a disadvantage, he'll probably lose his nerve and break for one of the healing fires. Don't let him reach it. If possible, interpose yourself between him and the nearest escape route. If he rotates away to protect himself from your blows, begin shoving him towards one of the shafts.

Chainmail! is a simple yet fiercely competitive game with superb graphics. I consider it my finest offering yet in the way of arcade games for the C-128. Please enjoy it, and feel free to write me with any complaints, requests, etc., c/o Ahoy!

Since there are a lot of data statements, make sure you save one or two copies to disk before running the program, in case a typing error crashes it. It's a lot easier to look through the listing and find a single error than to type the whole thing over again. □

SEE PROGRAM LISTING ON PAGE 91

EXPLODED CHARACTERS

When designing programmable characters (such as some German, French, Spanish, or Turkish letters), the task at hand is usually just a slight modification of an English character which is already available from the keyboard. Therefore the exploded view of a keyboard letter may give good guidance as to how the modified version of that letter should be designed as a programmable character.

The user responds to the INPUT prompt by typing a character and pressing RETURN. The program gives an exploded (64 times larger) view of that character. For lower case characters replace the value 53248 in line 35 with 55296.

—Necah Buyukdura
Ankara, Turkey

```

10 POKE 52,48: POKE 56,48: CLR
15 B$="[8" "]"
16 M$=CHR$(147):H$=CHR$(19):R$=CHR$(18):
O$=CHR$(146):D$=CHR$(17)
20 PRINT M$D$D$D$D$ "R$B$ "
25 FOR J=1 TO 8: PRINT "R$ " "O$B$R$ " :
NEXTJ: PRINT "R$B$ "
30 PRINT H$D$B$B$: PRINT B$B$
35 PRINT H$D$;: INPUT " CHARACTER ";C$:C
H=PEEK(1077)*8+53248
40 POKE 56334,PEEK(56334)AND254:POKE1,PE
EK(1)AND251
45 FOR I=0 TO 7:A(I)=PEEK(CH+I):NEXTI
50 POKE 1,PEEK(1)OR4
55 POKE56334,PEEK(56334)OR1
60 PRINT H$D$D$D$D$: FOR X=0 TO 7: X$=""
65 FOR Y=7 TO 0 STEP -1
70 IF A(X)>=2[UPARROW]Y THEN X$=X$+CHR$(
113): A(X)=A(X)-2[UPARROW]Y:GOTO 80
75 X$=X$+" "

```



```

•80 NEXT Y: PRINT CHR$(158)TAB(2)X$: NEXT
X: GOTO 30

```

QUICKER TRIG FUNCTIONS

One of the problems with standard Commodore BASIC is its slow speed—especially when trigonometric functions are involved. It takes about 0.26 milliseconds for a sine or cosine value to be calculated. This may not seem like a lot of time, but when the functions are used repeatedly, it can slow down a program's execution considerably. (Also, the values must be calculated in radian measure, not degrees—an annoying quirk.)

The following program demonstrates the slow speed of BASIC 2.0 using trig functions, by animating an orbiting sprite:

```

•100 REM DEFINE SPRITE
•101 V=53248
•102 FORI=832TO832+63:POKEI,255:NEXT
•103 POKE2040,13:POKEV+21,1:POKEV+39,1
•120 REM PUT SPRITE IN ORBIT
•140 FORX=0TO2*PI]STEPPI]/180
•141 POKEV,165+90*COS(X):POKE V+1,140+90*SIN(X)
•142 NEXT:GOTO 140

```

The trig functions, sine and cosine, were bogging down the animation speed because the functions' values must be calculated each time. If, however, the trig functions were precalculated and stored in an array, then run time would be much quicker, and degrees could be used instead of radians as an argument. Just add these lines to increase program speed:

```

•110 REM PRECALCULATE SINE, COSINE
•112 DIM SN(360),CS(360):FOR D=0TO360:SN(D)
)=SIN(D*PI]/180):CS(D)=COS(D*PI]/180):
NEXT
•140 FORX=0TO360
•141 POKEV,165+90*CS(X):POKE V+1,140+90*SN(X)

```

Note that we have changed the functions, sin() and cos(), to the variables sn() and cs().

After a 30 second pause for sine and cosine precalculation, you will see a 300% improvement in speed! This simple precalculation trick can be applied to other functions

as well, and will make your programs run much more speed-efficiently—without complicated machine language!

—Andrew Vajoczki
Brantford, ONT

SENSORS ON

Disk Notch Sensor is a short C-64/128 BASIC program that will inform you whether a disk's notch (the small rectangular hole on the disk) is covered by a write-protect tab or uncovered. This program works with a C-64/128 and a 1541 or 1571 disk drive.

To use the program, just turn on your disk drive and computer. Then run this program and insert a disk in the drive. It will quickly and safely tell you if your disk is physically write-protected.

You can easily modify this program to your own needs. Let's say you have a program that saves information on the disk. Just slightly modify *Disk Notch Sensor* and add it as a routine to the program. Then the program can check to see if the disk is not physically write-protected before it saves something on the disk.

You should be able to find many other uses for *Disk Notch Sensor*.

—Nghia Tran
Petaluma, CA

```

•10 REM *** DISK NOTCH SENSOR ****
•20 REM *** AUTHOR: NGHIA TRAN ***
•21 PRINT"[CLEAR]PRESS ANY KEY TO CHECK D
ISK"
•22 GET A$
•23 IF A$="" THEN 22
•30 OPEN15,8,15:PRINT"[CLEAR][WHITE]"
•40 PRINT#15,"M-R"CHR$(30)CHR$(0)
•50 GET#15,K$
•60 N=ASC(K$+CHR$(0))
•70 IF N=16 THEN 100
•90 PRINT"[CLEAR][RVSON]DISK'S NOTCH IS[G
REEN] WRITE-PROTECTED[RVSOFF]":GOTO110
•100 PRINT"[CLEAR][RVSON]DISK'S NOTCH IS[
c 1] NOT PROTECTED[RVSOFF]"
•110 PRINT"[3"[DOWN]]"[WHITE]PRESS [RVSON
]R[RVSOFF] TO RE-CHECK OR [RVSON]Q[RVSO
F] TO QUIT."
•120 GET I$
•130 IF I$="" THEN 120
•140 IF I$="R" THEN 40
•150 CLOSE15:END

```

...COMING IN THE OCTOBER ISSUE OF AHoy! (ON SALE SEPTEMBER 1)...

**A RAINBOW
OF DATA
STRUCTURES**

ARRAYS, LISTS,
AND LINKED
LISTS

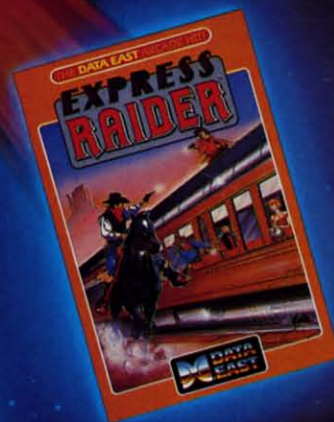
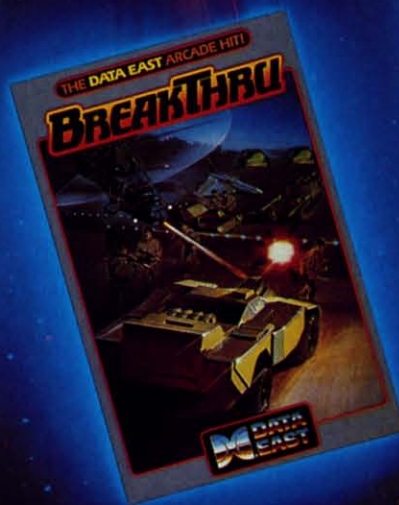
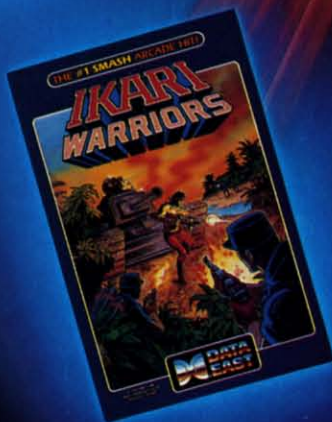
**A LOOK AT
BASIC 8.0**

80-COLUMN
HI-RES
GRAPHICS

SPRAY-CAM

NOT A TYPO...
AN INDUSTRIAL
SIMULATION!

DATA EAST BRINGS ARCADE REALISM HOME!



ENTER THE DATA EAST SWEEPSTAKES

OVER 100 PRIZES - Win free Data East Computer Games, a real Data East Arcade Game, and a trip for two to the National Arcade Expo!

No purchase necessary.
See participating dealers for details.
Void where prohibited.

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. For Commodore 64 128[™] and Apple II[®] series.

COMMANDO® - As the crack shot Commando, battle overwhelming odds to defeat advancing rebel forces! Armed with only a machine gun and hand grenades, you must reach the fortress. For Commodore 64 128[™], Apple II[®] series, and IBM.

IKARI WARRIORS® - Behind enemy lines, guerilla warfare are your tactics as you and your partner battle through the jungles, rivers, ruins, and opposing entrenchments in this interactive 2-player arcade hit. For Commodore 64 128[™].

BREAKTHRU® - Your mission is to retrieve the secret fighter plane stolen by hostile renegades. Use your sophisticated assault vehicle to Break Thru each of the five enemy strongholds. For Commodore 64 128[™].

EXPRESS RAIDER® - Bandits have seized the Gold City Express. Rescue the passengers, save the train, and recapture the loot! For Commodore 64 128[™].

TAG TEAM WRESTLING® - Teamwork and stamina are the keys, as you and your partner battle your way through the Title Matches on your quest for the belt. For Commodore 64 128[™], Apple II[®] series, and IBM.

KUNG-FU MASTER® - Battle the evil forces through the five dangerous floors in the wizard's castle to rescue the captive fair maiden. For Commodore 64 128[™] and Apple II[®] series.



DATA EAST USA, INC. 470 NEEDLES DRIVE, SAN JOSE, CALIFORNIA 95112. (408) 286-7074.

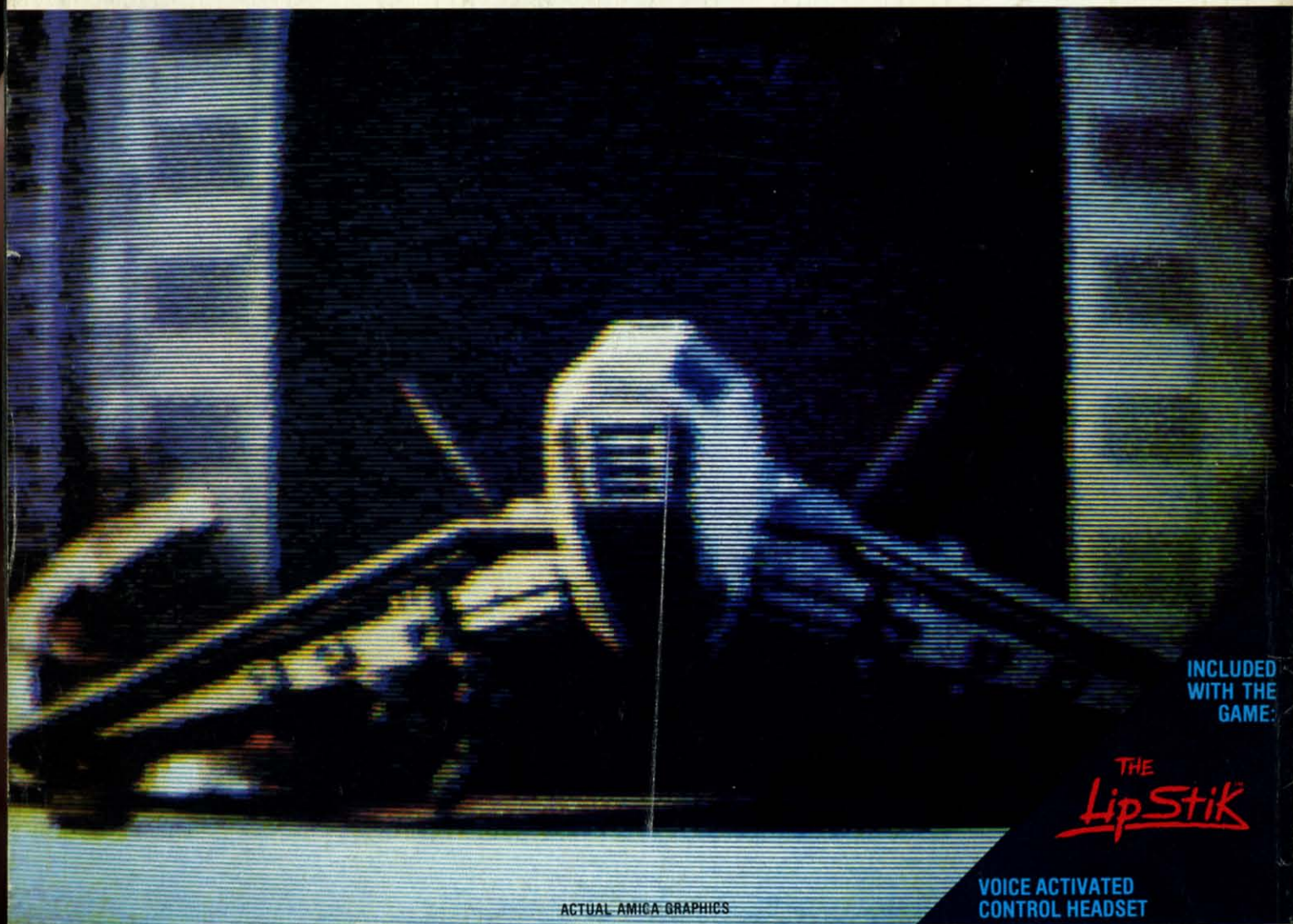
© 1986 DATA EAST USA, INC. *COMMANDO, IKARI WARRIORS, AND KUNG-FU MASTER MFD. UNDER LICENSE FROM CAPCOM USA, SNK CORP., AND IREM CORP. RESPECTIVELY. COMMODORE, APPLE, AND IBM ARE REGISTERED TRADEMARKS OF COMMODORE ELECTRONICS LTD., APPLE COMPUTERS, INC. AND IBM, RESPECTIVELY.

*DATA EAST SWEEPSTAKES - OHIO RESIDENTS MAY ONLY ENTER BY MAILING A 3" X 5" POSTCARD TO: DATA EAST, P.O. BOX 519, SAYREVILLE, NEW JERSEY 08872.

Reader Service No. 200

www.commodore.ca

ECHELON™



INCLUDED
WITH THE
GAME:

THE
LipStik

VOICE ACTIVATED
CONTROL HEADSET

ACTUAL AMIGA GRAPHICS

3-D SPACE FLIGHT SIMULATOR

ECHELON . . . A top secret military facility where a few highly skilled pilots will be trained to operate the 21st Century's most awesome combat and exploration vehicle, the Lockheed C-104 Tomahawk. The C-104 spacecraft has the latest in advanced instrumentation, weaponry, and control systems.

ACTUAL C-64 SCREENS



Available Now For C-64/128.

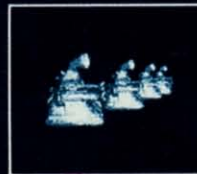
Enhanced versions coming soon for APPLE, IBM, AMIGA, ATARI ST, and COMMODORE 128.



ITS IMPRESSIVE ATTRIBUTES INCLUDE

- 4 Different "State-of-the-Art" Weapons Systems
- Bi-Directional Transporter Unit
- Unmanned RPV (Remote Piloted Vehicle) Control
- Anti-Gravity Braking and Hovering
- Forward and Reverse Thrusters
- Twin 3-D Screens
- Real-Time Infrared Vector Graphics
- Non Real-Time Computer Enhanced Graphics
- Computer Assisted Control Systems
- Computer Information Data Link
- On Board Sub-Atomic Analyzer/Decoder
- Voice Activated Control Button

ECHELON is a true 3-D space flight simulator that puts you at the controls of the C-104 Tomahawk and in the heart of the action. You'll experience the excitement and thrill of real spaceflight through superb three dimensional graphics. But, before you go exploring on your own, it would be wise to go through the carefully designed training simulators. These rigorous courses will develop your skills in maneuvering the spacecraft, accurate selection and use of weapons, control of RPV's, object retrieval and refuel and docking procedures. Developing these skills are essential to your survival when encountering hostile enemy spacecraft or exploring unknown terrain. **ECHELON** is available now and offers you the Simulation Adventure of a Lifetime for only \$44.95.



If you can't find our products at your local dealer, you can order direct. For mail orders, enclose check or money order, plus \$1.00 shipping and handling, and specify machine version desired. Order by phone on VISA, MasterCard or C.O.D. by calling TOLL FREE (800) 824-2549. ACCESS SOFTWARE, INC. 2561 So. 1560 W. Woods Cross, UT 84087



ACCESS™
Software Incorporated

Reader Service No. 213

www.commodore.ca

SUBSCRIBE TO AHOY!

☐ Send me twelve issues of *AHOY!* for \$23.00 (\$30.00 Canada & elsewhere).

☐ Send me twenty-four issues of *AHOY!* for \$44.00 (\$55.00 Canada & elsewhere).

☐ Payment enclosed: \$_____ ☐ Please bill me.

☐ Please charge to Credit Card checked:

☐ MasterCard ☐ VISA Card #_____ Exp. Date_____

Signature_____

NAME_____

ADDRESS_____

CITY_____

STATE_____ ZIP_____

SUBSCRIBE TO THE AHOY! DISK MAGAZINE

☐ Send me twelve issues of the *AHOY! Disk Magazine* for \$97.00 (\$135.00 Canada & elsewhere).

☐ Send me twenty-four issues of the *AHOY! Disk Magazine* for \$180.00 (\$250.00 Canada & elsewhere).

☐ Payment enclosed: \$_____ ☐ Please bill me.

☐ Please charge to Credit Card checked:

☐ MasterCard ☐ VISA Card #_____ Exp. Date_____

Signature_____

NAME_____

ADDRESS_____

CITY_____

STATE_____ ZIP_____

September 1987 *Ahoy!* Void after January 3, 1988

READER SERVICE CARD

To request additional information on any product advertised or otherwise pictured in this issue of *Ahoy!* that is accompanied by a reader service number, circle the corresponding number below and mail this card. We will promptly forward your request to the designated companies.

101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130
131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160
161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190
191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220
221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270
271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300

A. Please check whether you are...

1. ☐ male 2. ☐ female

B. What is your age?

1. ☐ under 18 2. ☐ 18-24 3. ☐ 25-34
4. ☐ 35-44 5. ☐ 45-54 6. ☐ 55-64 7. ☐ 65+

C. Education level completed

1. ☐ elementary 2. ☐ high school
3. ☐ junior college 4. ☐ college graduate
5. ☐ master's degree 6. ☐ PhD

D. From which of the following sources did you obtain your copy of *Ahoy!*?

1. ☐ newsstand 2. ☐ subscription (mail)
3. ☐ from a friend or family member
4. ☐ other_____

If not currently a subscriber, do you plan to become one?

1. ☐ yes 2. ☐ no

Name_____

Street_____

City_____ State_____ Zip_____



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 65 MT. MORRIS, ILL.

POSTAGE WILL BE PAID BY ADDRESSEE

Ahoy!

**P.O. BOX 341
MT. MORRIS, IL 61054-9925**



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 65 MT. MORRIS, ILL.

POSTAGE WILL BE PAID BY ADDRESSEE

Ahoy!

**P.O. BOX 341
MT. MORRIS, IL 61054-9925**



PLACE
STAMP
HERE

AHOY! MAGAZINE
P.O. Box 2501
Clinton, Iowa 52735

AwardWin
assorted

kets, coup
tionery. A
create pri
seals to de

Creating
snap. The
step by st
cate, but i
cess that m
for thems
menus.

First the
mat of the
plates, bo
styles, and
signs for
the numb
screen pic
terist curs
of the tem

There a
special op
up text bo
of text and
dards for
jority of t
downright
cent moon
are some
ligingly a
awardmak

After se
puterist ch
creation.
award can
ed are par
book, but
doghouse.
ation, han
ey bag, m
and team

Next th
font from