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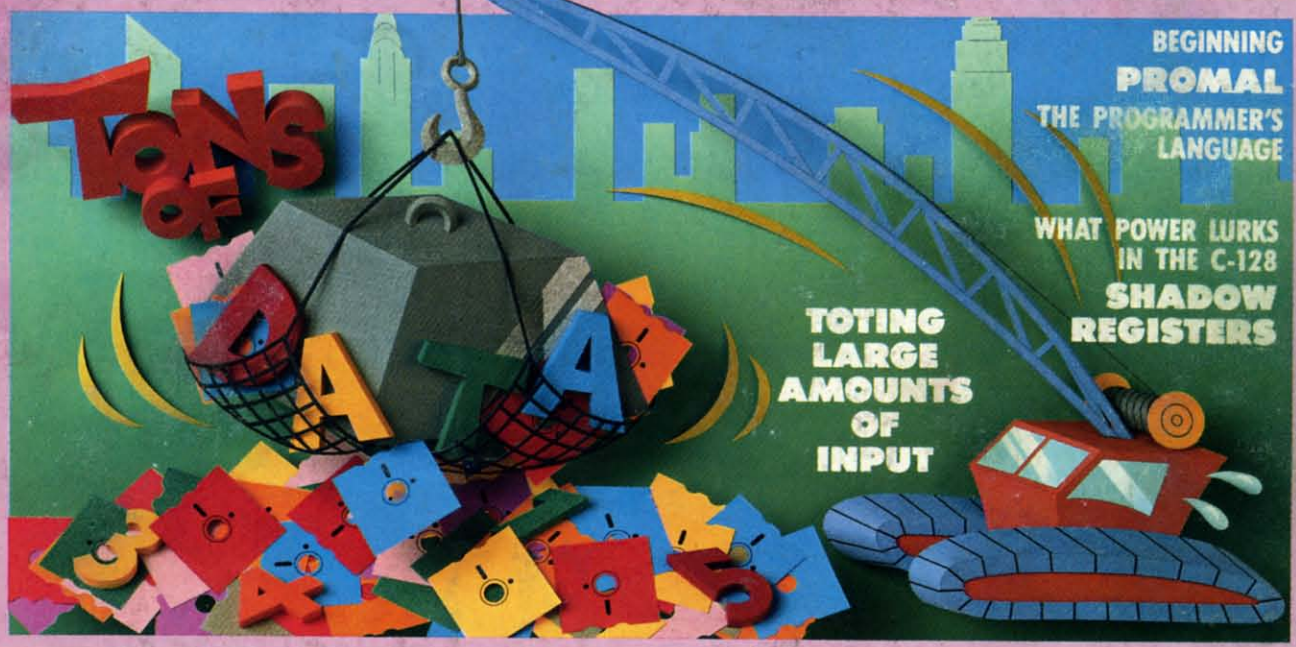

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THE COMMODORE USERS

Ahoy Access

Clipper

NOVEMBER, 1986

Ahoy! *Access Club Members,*

Hello, again! Greetings from the publishers of Ahoy! *This* Clipper *is a FREE SERVICE to you as a subscriber to* Ahoy! *and a member of the Access Club.*

This Clipper *features some smashing offers...up to 30% off on some items. We have even included an offer from Abby's Discount Software that pays for itself! And, don't miss the offers from Hi Tech Expressions, Batteries Included, and Solutions Unlimited. These great software manufacturers have gone out of their way to create opportunities too good to pass up.*

Please keep me informed about Commodore events in your area. We'll print them in our Commodore Calendar (see page 2 of this Clipper*). The deadline for the next issue is October 10th, so please mail your information to me as soon as possible.*

Stay well and happy!

Admirally yours,

Joe Fergeson

Joe Fergeson
Director
Ahoy! *Access Club*

Super Savings

ONCE MORE WITH FEELING!

For the last two issues of the *Clipper,* we've carried an excellent offer from **Batteries Included**! If you purchased either *PaperClip II* or *The Consultant* during the qualifying months, for only $5, to cover shipping and handling, **Batteries Included** would send you a copy of *Cal-Kit* FREE! (*Cal-Kit* is a top-notch productivity package with over 30 ready-to-use application templates.) Well, once again **B.I.** is experiencing distribution problems, so they're going to continue this fine offer for yet another month. But this month it gets even better, because by way of apology, **B.I.** is adding a **B.I.** C-128 adaptor, a $14.95 value. This helpful hardware will allow you to use a monochrome monitor with the **B.I.** programs. For more information on the programs, see **Batteries Included**'s ad on page 67 of this month's issue of *Ahoy!* To get your copy of *Cal-Kit* and your **B.I.** C-128 adaptor, all you have to do is clip the **Batteries Included** coupon on this page and send it along with your registration card and store receipt to **Batteries Included**, 30 Mural Street, Richmond Hill, Ontario L4B 1B5, Canada. This offer expires December 1, 1986, so we recommend you call or visit your local computer store TODAY!

FREE BACKUP DISK...

If you're like me, you've experienced the frustration of enlarging graphics and discovering rough edges. **Solutions Unlimited** has the solution. It's called *The Optimizer,* and it's a very handy feature on all of **Solutions'** programs. It smooths out those rough spots and leaves you with a "photolike" printer reproduction. *The Optimizer* is a feature of *Billboard Maker, Icon Factory,* and *Photo Finish.*

At $34.95, *Billboard Maker* takes pictures created by other programs and enlarges them to billboard size. *Icon Factory* at $39.95 allows you to extract graphics from *Print Shop, Print Master,* and *Newsroom* and move them into Koala DOODLE! and other popular drawing programs, where you may add color, as you wish. For only $29.95, *Photo Finish* allows you to dump the screen to various printers, and view and adjust the gray scale of your color pictures prior to printing. See **Solutions Unlimited**'s ad on page 117 of this issue of *Ahoy!* for more information on these effective programs. And **Solutions** wants you to serious consider the purchase of these programs, so for a limited time, with the purchase of any or all of these programs, you'll receive a backup disk, FREE! That's a $10 value! SPECIAL: When you buy all three programs, you may reduce the price of *Billboard Maker* to only $19.95. No phone orders will be accepted. Simply clip the coupon on page 3 of this *Clipper* for easy ordering, but do it soon, for this offer dematerializes on December 1, 1986.

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ALMOST 30% OFF BLITZ...

One of the better BASIC compilers available for the 64 was created by **Skyles Electric Works.** It's called *Blitz,* and the 64 version can speed up the running of your BASIC programs between 5 and 20 times. The 128 version is even faster. *Blitz* will also allow you to pass information from one program to another, as well as reduce the size of large programs so that they load faster. Plus, once you've *Blitz*ed a program, it's yours. You'll find more information about *Blitz* in the **Skyles Electric Works** ad on page 9 of this month's issue of *Ahoy!* For a limited time, **Skyles** is making their Winter Sale on *Blitz* even better for you, as a member of the Club. The **Skyles** coupon on page 3 of this *Clipper* is worth $20 OFF the price of the C-128 *Blitz* disk. That's almost a 30% SAVINGS! You must add $4.50 for shipping and handling, and California residents must be sure to add appropriate sales tax. You may place your order on the phone by calling (800) 227-9998, or in California by calling (415) 965-1735. (Don't forget to mention the Club when you call.) But this offer is too good to pass up and it does expire on December 1, 1986, so don't wait...mail or phone your order TODAY!

AN OFFER THAT PAYS FOR ITSELF...

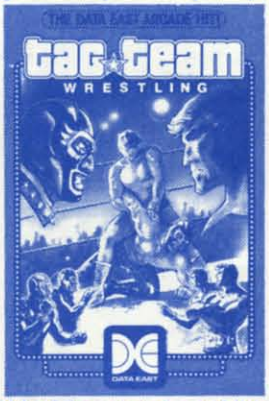
On page 81 of this month's issue of *Ahoy!* you'll find an ad for **Abby's Discount Software. Abby's** sells Commodore and Commodore-compatible hardware and software. Prominently featured in their ad, you'll see an irresistible offer for the Suncom *P.Q. Party Quiz,* priced at only $14.95. Considering that the regular price of this wonderful trivia party game is $49.95, the price alone should entice you. But for you as a member of the *Ahoy!* Access Club, it gets even better. When you buy the Suncom *P.Q. Party Quiz* at the discounted price, **Abby's** will generously add Commodore's *Easy Lesson* or *Star Ranger,* a $9.95 value, ABSOLUTELY FREE! But wait, there's more...when you add at least $20 of other software from **Abby's** to your order, you'll also receive FREE your choice of one of three Timeworks programs *(Data Manager, Electronic Checkbook,* or *Money Manager),* a $24.95 value. To take advantage of these great offers, simply clip the coupon on page 3 or this *Clipper,* indicate your choice of FREE PROGRAMS, and send it along with your payment to **Abby's** at 37 South Broad Street, Fairborn, OH 45324. Or, you may call in your order to (800) 282-0333, in Ohio (513) 879-9699, and mention your membership in the Club. Ohio residents will need to add appropriate sales tax. This offer expires on December 1, 1986, so don't be left out. Mail your order TODAY!

COMMODORE CALENDAR OF EVENTS

November 10-14 (Trade Only)	**COMDEX** Las Vegas Convention Center	The Interface Group Needham, MA	David Thurmna (617) 449-6600
January 8-11 (Trade Only)	**The Consumer Electronics Show** Las Vegas Convention Center	EIA/Consumer Electronic Group Washington, D.C.	Dennis Corcoran (202) 457-4919

GET ON "THE LIST"...

We've all enjoyed playing arcade games. But did you know that according to *Billboard,* recently three arcade games set an industry record by remaining the top hits for three months in a row? Now for the good part. Those very record-setting games are available to you for your Commodore 64 from **Data East Software.** The games are *Karate Champ, Kung Fu Master,* and *Commando.* If you enjoyed the arcade versions, just imagine the fun you'll have playing the same games at home. In October, **Data East** expects to introduce a new game, *Tag Team Wrestling.* Then by January, they'll debut three more hits: *Ikari Warriors, Breakthru,* and *Ring King.* If you want to be one of the first to learn all about these new hits, then simply complete the coupon on page 3 of this *Clipper* and send it to **Data East,** 470 Needles Drive, San Jose, CA 95112. **Data East** will put you on their exclusive mailing list. But don't wait too long, because this offer runs out of steam on December 1, 1986.



$20 OFF COMPACT DISC PLAYER...

Pro-Tech-Tronics wants to make sure that when you're in the market for hardware, you'll call them first. So this issue, they're offering you, as a member of the Club, $20 OFF the already discounted price of $169 for the Symphonic Compact Disc Player. With a retail value of $249, this front-loading product has a 3-beam laser pickup, 16-track random memory select, and index/track/time display... and it's all yours for a mere $149. **Pro-Tech-Tronics** also has a 15-day home trial period, so there's never any risk. To order your Compact Disc Player, just clip the coupon on page 3 of this *Clipper* and send it along with your payment of $159. This total cost includes $10 for shipping and handling anywhere within the continental United States. Or if you wish, you may place your order by phone at (800) 345-5080—in Minnesota, call (612) 560-6603—using your VISA, MasterCard, or American Express. But be sure to mention your membership in the *Ahoy!* Access Club, so that you qualify for $20 OFF! Since this offer does expire December 1, 1986 and the supply is limited, you'd best call in or send your order RIGHT AWAY!

5 FREE DISKS WITH PURCHASE...

American International Computer Products (AICP) sells hardware and software at good prices, prices worth looking at when you're in the market for Commodore and Commodore-compatible products. We have all been spoiled by the wonderful offers that **AICP** provides to us *Clipper* after *Clipper,* and this issue is no exception. This issue, **AICP** is offering 5 FREE DISKS with the purchase of two 10 packs. The disks are all guaranteed, first quality, single-sided, double-density, and regularly sell for $7.95/10-pack. That's a 20% SAVINGS—not to be missed! You will need to add $3.50 to cover shipping and handling. To take advantage of this wonderful offer, simply clip the coupon on page 3 of this *Clipper,* and send it along with $19.30 to **AICP.** (New York residents will need to add appropriate sales tax.) Or, you may call **AICP** at (800) 634-AICP, or in New York State at (718) 351-1864, mention your membership in the *Ahoy!* Access Club, and order with your credit card. (Credit card orders are subject to a 4% surcharge.) But don't delay—'cause this offer disappears from sight on December 1, 1986.

The Ahoy! Access Clipper *is published bimonthly by* Ahoy! *magazine and sent free to selected subscribers of* Ahoy! Ahoy! *is a monthly publication of Ion International Inc. The cost of a one-year subscription is $21.95; two years are $41.75. Inquiries regarding sub scriptions to the magazine should be addressed to Ion International Inc., 45 West 34th Street, Suite 407, New York, New York 10001.*

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SAVE $10 AND WIN BIG... Have you ever wondered how some people people consistently win at the track? A fellow I know cleared $10,000 (after taxes) from his winnings last year. While some rely on their innate knowledge and intuition, others have found the **Alsoft** *Race Analysis System* very valuable. This unique handicapping system will replace hours of hand calculations with five minutes of typing. To give you the most unbiased ratings and increase the likelihood of picking longshot winners, *Morning Line* odds are not considered. With the ability to input cross references from up to 20 races, the program predicts winners including best win, quinella, perfecta, exacta, trifecta, and trifecta box. Ratings may be viewed onscreen, printed by the printer, or saved on diskette for future evaluation. BONUS: The **Alsoft** *Race Analysis System* now includes the *Master Analysis Development Package*, easily enabling you to build, develop, and fine tune computerized handicapping systems for all kinds of sporting events. PLUS, you'll receive a FREE Pro Football Handicapping Module. The regular price of the *Race Analysis System* with the additional program and module is only $39.95, but until December 1, 1986, you may buy **Alsoft**'s winning program for $10 OFF, or $29.95, which, incredibly enough, includes shipping and handling. That's a 25% SAVINGS! All **Alsoft** programs come with a 30-DAY MONEY-BACK GUARANTEE. Pennsylvania residents will need to add 6% sales tax. You may order your *Race Analysis System* by clipping the **Alsoft** coupon on this page, or by calling them at (412) 233-4659. They do take MasterCard and VISA. But don't delay, this offer crosses the finish line on December 1, 1986.

25% OFF VOICE SYNTHESIZER...

Protecto Enterprizes of Barrington, Illinois sells some of its products at truly exceptional prices. One of those products to be found in this month's issue of *Ahoy!* is the Easy Speech Voice Synthesizer. All you have to do is plug it in, and you can immediately program words and sentences, as well as create talking adventure games and add sound to action games. Also, you may adjust volume and pitch. As if that weren't enough, **Protecto** will include a text-to-speech program, a $9.95 value, FREE. With this nifty program, you type in a word and the computer recites it back to you. Having sold for $89, you'd expect that **Protecto**'s price of $39.95 would be unbeatable. But **Protecto** themselves are offering you, as a member of the Club, an extra $10 OFF. That's a 25% SAVINGS! In order to control the response, you will need to mail the *Clipper* coupon from page 3. But don't wait, 'cause this offer expires on December 1, 1986.

BATTERIES INCLUDED *CAL-KIT!* ADAPTOR OFFER

Mail to: Batteries Included
30 Mural Street
Richmond Hill, Ontario L4B 1B5 Canada

Yes, Batteries Included, I'd like a copy of *Cal-Kit*, along with your B.I. C-128 Adaptor. Enclosed is my store receipt from my purchase of *PaperClip II* or *The Consultant*, along with the registration card and $5 to cover shipping and handling. Thanks so much!

FREE BACKUP FROM SOLUTIONS UNLIMITED

Mail to: Solutions Unlimited
P.O. Box 177 / Dobbs Ferry, NY 10522
No Phone Orders!

Yes, Solutions, I'd love to have a FREE BACKUP disk with my order. I understand this offer has a $10 value. My order for *Billboard Maker, Icon Factory,* and/or *Photo Finish* is enclosed. I understand that if I order all three I'll get *Billboard Maker* for $19.95. New York residents: Please add sales tax.

$20 OFF DISC PLAYER FROM PRO-TECH-TRONICS

Mail to: Pro-Tech-Tronics
6870 Shingle Creek Parkway, No. 103
Minneapolis, MN 55430
For faster service, call (800) 345-5080; in Minnesota, (612) 560-6603.

Yes, Pro-Tech-Tronics, I want your Symphonic Compact Disc Player at $20 OFF your already-discounted price of $169. My payment of $159 ($10 to cover shipping and handling) is enclosed. Thanks!

5 FREE DISKS FROM AICP

Mail to:
American International Computer Prods.
P.O. Box 1758
Staten Island, NY 10314
For faster service, call (800) 634-AICP; in New York, call (718) 351-1864.

Yes, AICP, I want my 5 FREE DISKS. My order for two 10 packs of your disks is enclosed, as is my payment of $19.30 ($15.80 for the disks and $3.50 for shipping and handling). New York residents: Please add appropriate sales tax.

ALMOST 30% OFF FROM SKYLES

Mail to:
Skyles Electric Works / 231E S. Whisman Rd.
Mountain View, CA 94041
For faster service, call (800) 227-9998, or in California, (415) 965-1735.

Yes, Skyles, I want to SAVE ALMOST 30% on the 128 version of *Blitz*. My payment of $49.95 plus $4.50 for shipping and handling is enclosed. California residents: Please add sales tax.

PROTECTO 25% OFF VOICE SYNTHESIZER

Mail to: Protecto Enterprizes
22292 North Pepper Road
Barrington, IL 60010
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Yes, Protecto, I want to SAVE $20 on the Easy Speech Voice Synthesizer. My payment of $29.95 plus $3 for shipping and handling is enclosed. Illinois residents: Please add 6½% sales tax.

GREAT OFFERS FROM ABBY'S

Mail to: Abby's Discount Software
37 South Broad Street
Fairborn, OH 45324
For faster service, call (800) 282-0333; in Ohio, call (513) 879-9699.

Yes, Abby's, I want to take you up on your great offer(s). My order for the Suncom *P.Q. Party Quiz* is enclosed. I understand you'll send me FREE my choice of Commodore's ☐ *Easy Lesson* or ☐ *Star Ranger*. Also, if in addition, I order $20 of software, you'll send my choice of the following Timeworks programs: ☐ *Data Manager*, ☐ *Electronic Checkbook*, or ☐ *Money Manager*. Thanks!

FREE GRAPHICS ENHANCER FROM HI TECH

Mail to: Hi Tech Expressions, Inc.
2699 S. Bayshore Drive, Ste. 1000A
Coconut Grove, FL 33133
No Phone Orders!

Yes, Hi Tech, I want to expand my use of your fabulous program *PartyWare* with your FREE GRAPHICS ENHANCER. I have enclosed my registration card and register receipt (with the amount circled). Also, I have indicated my choice of graphics disks below. Thanks!

☐ Holiday Graphics Disk
☐ General Graphics Disk

DATA EAST MAILING LIST

Mail to: Data East USA, Inc.
470 Needles Drive
San Jose, CA 95112

Yes, Data East, I want to be the first of my friends to learn about your new releases. Please add my name to your exclusive mailing list. Thanks!

SAVE $10 FROM ALSOFT

Mail to: Alsoft / 305 Large Avenue
Clairton, PA 15025
For faster service, call (412) 233-4659.

Yes, Alsoft, I want to SAVE 25% on your excellent *Race Analysis System*. My payment of $29.95, which includes shipping and handling, is enclosed. Thanks very much!

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CELEBRATE WITH FREE GRAPHICS ENHANCER...

In this month's issue of *Ahoy!* on page 45, you'll find a full review of the **Hi Tech Expressions** line of creative software, including musical animation, paper printouts, and computer greetings. Not surprisingly, we loved their product line. One of the **Hi Tech** products we reviewed is *PartyWare,* a dynamite card and party accessory design kit. With

PartyWare, not only can you print invitations for many occasions, but you can create place mats, place cards, banners, party hats, and prize ribbons as well. You'll even get a party checklist and a database in which you may store a guest list of up to 60 names, plus ideas for party games. We suggest you also seriously consider buying a product called *WareWithAll* which includes everything you need to create the goodies in *PartyWare:* four kinds of designer printer paper (20 sheets of each), greeting card envelopes, magic markers, a special gift disk, and coordinating stickers. We think you'll like *PartyWare* and *WareWithAll* as much as we did, AND for a limited time, when you buy *PartyWare,* you may send for a FREE GRAPHICS ENHANCER, a $9.95 value, yours free when you clip the **Hi Tech** coupon on page 3 of this *Clipper* and send it along with the registration card and your register receipt (with the amount circled) to **Hi Tech Expressions.** Also, you may choose from one of two FREE GRAPHICS ENHANCERS. One is the Holiday Graphics Disk with Christmas and Hanukkah symbols and the other is a General Graphics Disk for all sorts of additional party opportunities. Be sure to indicate your choice on the **Hi Tech** coupon. You'll have fun celebrating with *PartyWare* and enjoying the FREE GRAPHICS ENHANCER, but visit your favorite software store soon, 'cause this offer expires January 1, 1987.

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Ahoy!

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ISSUE NO. 35 NOVEMBER 1986

Ahoy! (ISSN #8750-4383) is published monthly by Ion International Inc., 45 W. 34th St., Suite 407, New York, NY, 10001. Subscription rate: 12 issues for $21.95, 24 issues for $41.75 (Canada $29.25 and $54.25 respectively). Second class postage paid at New York, NY 10001 and additional mailing offices.

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Postmaster, send address changes to *Ahoy!*, 45 W. 34th Street, Suite 407, New York, NY 10001. Direct all address changes or matters concerning your subscription to *Ahoy!*, P.O. Box #341, Mt. Morris, IL 61054. All editorial inquiries and software and hardware to be reviewed should be sent to *Ahoy!*, 45 W. 34th St., Suite 407, New York, NY 10001.

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21st CENTURY WARRIOR:

"In a wide variety of locations around the world, the American soldier will now have a powerful new ally whose speed, maneuverability and firepower will serve as an added deterrent to opposing forces."

—Commander-in-Chief Ronald Reagan Speaking about the AH-64 APACHE, as quoted in the Journal Of Defense & Diplomacy

The APACHE—as fierce and elusive as its warrior namesake. Equipped with an arsenal of today's most advanced weaponry, it can attack from nowhere against overwhelming odds, then slip away to strike again without warning. It is capable of defeating the enemy's armored columns, infantry and, if necessary, hostile aircraft on the modern electronic battlefield.

The attack helicopter—the gunship—came of age during the Vietnam War. Starting as a primitive patchwork of machine guns and rocket pods straped to the side of a utility helicopter, it evolved into such sophisticated weapon systems as the armed Huey and AH-1G Cobra. However, the deadly armored arsenal of today's Warsaw Pact demands an even stronger front line.

The AH-64 Apache is here to give America all the muscle it needs for the defense of freedom. This war machine is a fully integrated acquisition/firepower system designed to let the pilot find, lock onto and destroy the enemy with the greatest possible accuracy and effectiveness. Now actively in production at Hughes Helicopters, the first 675 choppers should be delivered to the U.S. Army by early 1990.

But you don't have to wait. As the latest addition to the ever growing line of MicroProse Simulation Software, GUNSHIP now brings all of the danger and excitement of attack helicopter action home to your computer in this true-to-life simulation.

With GUNSHIP, you, the pilot, will fly confidently into the world's hottest trouble spots... Central America, the Middle East, Southeast Asia and Central Europe. You'll use an unbelievable array of

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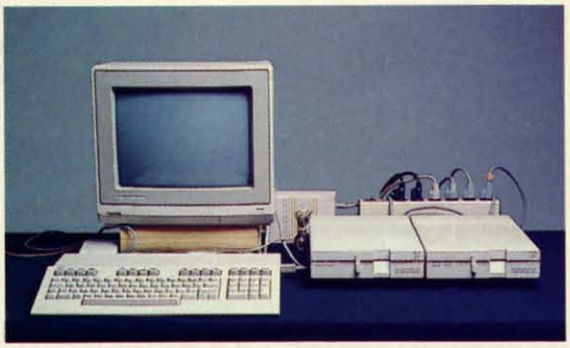

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VIEW FROM THE BRIDGE

At no time of the year do we relish writing this column—our description of the contents of the current issue of *Ahoy!*—as much as in the fall, when our page count swells to its largest total. We can't wait to tell you about the special features in this 140-plus page issue—and, come to think of it: why *should* we?

- If you've ever felt buried under *Tons of Data,* Dale Rupert will lighten your load with his *Rupert Report* on sequential file storage. Included are *Datawriter* and *Datareader* routines for the C-64 and C-128 that can serve as models for your own file access programs. (Turn to page 20.)
- For the second month running, Cleveland M. Blakemore has dominated our games lineup with two high-quality contributions. *Guardian* recalls arcade classics like *Buck Rogers* and *Star Wars* as you race a shuttlecraft down a scrolling 3-D trench, blasting at an assortment of adversaries. (Turn to page 74.) Certain to win acclaim as our most offbeat program ever, *Teleporter* requires a keen eye and a steady disintegrator finger to survive in the employ of Captain Finch "Hardnose" Legree. (Turn to page 35.)
- Tony Brantner's tight graphics have elicited their share of oohs and ahs in the past *(Swoop, Meteor Run, Knockout)*—but he'll really bowl you over with this month's *Tenpins!*
- Comprised of five different scenarios that can cycle through to over fifty screens of nonstop action, *Discs of Daedalus* will throw even the most experienced space adventurer. (Turn to page 55.)
- Proving that we needn't leave earth to find suitable computer game villains, *Detonation* requires you, an explosives expert, to defuse the bombs Koloccan terrorists have placed throughout the sacred temple of Remkcalb. (Spell that backwards and you'll have the name of the programmer—or else, turn to page 56.)
- Of course, placing two programs in a single *Ahoy!* is commonplace for Buck Childress. This month's *Syntax Patrol* finds errors in your program lines immediately upon entry. (Turn to page 52.) And *128 RAM Check,* an adaptation of Buck's *Free RAM Check* for the 64 (May '86 *Ahoy!*), promotes error-free operation by testing the BASIC RAM in banks 0 and 1. (Turn to page 39.)
- Depending on where your programming priorities lie, one of two programs in this issue may meet your needs. *Long Lines* doubles the C-64 line editor's capacity to 160 characters, making it possible to write faster-running programs with less memory overhead. (Turn to page 73.) *Deluxe List* follows behind space-stingy programmers and reroutes their work into an easily readable format. (Turn to page 36.)
- Mark Andrews breaks new ground in this month's *Commodore Roots* column on the C-128's "shadow registers"—undocumented areas of memory useful in sprite programming. You'll be a better machine language programmer when you know what *The Shadow Knows!* (Turn to page 27.)
- In the last of three *Cadet's Columns* devoted to alternative programming languages, Cheryl Peterson introduces beginners and experts alike to PROMAL. (Turn to page 95.)
- Seldom is a single game accorded feature coverage in our *Entertainment Software Section,* but we deemed QuantumLink's *Habitat* unusual enough to merit such treatment. Arnie Katz and his gang of game experts also provide reviews of *Frankie Goes to Hollywood, Super Cycle, Mind Mirror, Spitfire 40, Psi 5 Trading Co.,* and the entire Hi Tech Expressions line of creative software. (Turn to page 41.)
- In our *Reviews* section, Morton Kevelson goes to his usual elaborate lengths in profiling two products useful in accelerating computer-to-printer communications: R.J. Brachman's *Serial Box* and Xetec's *Printer Enhancer.* Additionally, Ted Salamone presents the results of his thorough testing of Timeworks' *Partner 128* cartridge. (Turn to page 58.)
- We hate to imagine the outcry that would result if this issue didn't also include *Commodares,* where intermediate and advanced programmers either meet the challenge—or their match; an extra-long installment of *Tips Ahoy!,* the best programming and hardware hints we can cull from our readership; *Scuttlebutt,* detailing upcoming releases for your holiday shopping convenience; and *S.O.S.,* where we provide answers to even the most unanswerable questions—even if we have to make them up.

This month's *Ahoy! Disk* features another of the bonuses it's becoming famous for—a demo of Firebird's *The Pawn* graphic adventure. For ordering information, see page 93; or try page 68 for an even better deal—the *Ahoy! Disk Magazine.*

And speaking of deals—if you procrastinated too long the last time we offered you a free modem (May), turn to page 88 before we pull the rug out again!

—*David Allikas*

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BLACK IS BLACK

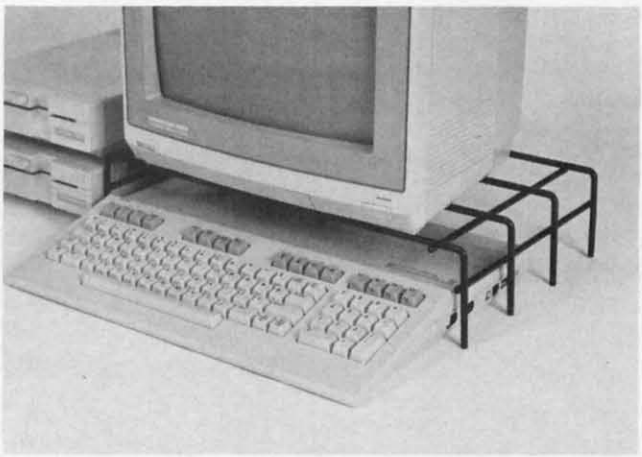
As you know by now if you check the financial pages daily to see if your 64, 128, or Amiga is an orphan, Commodore International reported a $1.2 million profit for the quarter ended June 30, 1986. That may not sound like much for a company Commodore's size, but it's reason for popping corks in West Chester, PA when compared to the $124 million loss for the same period in 1985. Commodore, in fact, was so excited about completing their first profitable quarter in over 18 months that they sent us a press release the very same day—despite the fact that they were thus obliged to publicize their $128 million loss for the fiscal *year* ended June 30, compared to a $114 million loss for the prior fiscal year.

But let's be as positive as Commodore. As life-threatening as their recent financial woes were, and despite the fact that its bank debt of over $138 million remains unresolved, the company managed to return to profitability despite overwhelming odds, partially due to such bold measures as laying off one third of its employees and closing down a number of its non-computer manufacturing operations. Commodore computer owners hoping for many more years of strong software and hardware support can take heart from the fact that the company has survived the darkest chapter in its history, and that more substantial gains are likely to be reported for the third and fourth (Christmas) quarters of 1986.

Commodore International, 215-431-9100 (see address list, page 14).

EQUIPMENT STAND

Designed for placement above a C-64 or C-128, the Problem Solver Equipment Stand is especially useful for holding a monitor and freeing up desk space beneath, or supporting a printer with fanfold paper lying underneath. Crafted of vinyl-coated steel, the stand measures 18" wide by 4" high by 11" deep.



The Problem Solver Printer Stand helps you make more efficient use of your workspace, while placing your monitor at a more comfortable height for viewing the screen. READER SERVICE NO. 194

Cheatsheet Products Inc., 412-781-1551 (see address list, page 14).

MOSTLY MOZART

Volume III in Free Spirit's *Music of the Masters* series is devoted almost entirely to the works of Mozart, totaling one hour of music and including the Overture from The Marriage of Figaro, Sonata Facile, Minuet from Don Giovanni, and several shorter works. Screen commentary on Mozart's life and music is provided as the music plays. Price of the C-64 disk is $9.95; all three volumes are available for $24.95.

Free Spirit Software, Inc., 312-352-7323 (see address list, page 14).

IS OUR INTERFACE RED

In our mention of the *PPD* printer driver program in August's *Scuttlebutt* (page 12), we quoted a price of $10 for an unassembled cable kit. The correct price is $20. Drude Micro Services also informs us that the C-128 version is ready for shipping, and will be included on the same disk as the C-64 version.

Drude Micro Services, 319-277-5106 (see address list, page 14).

HOLIDAY GRAPHICS

The *Holiday Edition* of *The Print Shop Graphics Library* provides graphics, fonts, and borders to be used with Broderbund's already legendary program to create cards, banners, signs, and letterhead. Included are images and symbols for 15 holidays. For the C-64; $24.95.

Broderbund Software, 415-479-1170 (see address list, page 14).

NEW JOYSTICK

A study in ergonomic joystick design, the Epyx 500XJ joystick ($16.99) is curved on both sides to fit snugly in the user's left palm and provide a fingerhold (sorry, southpaws—you'll have to swivel the stick with your right hand). The stick clicks when moved in any of its eight directions. The internal switches are lo-

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cated near the top of the base unit, closer to the stick itself than in many other brands, supposedly providing quicker response. The fire button is activated by the trigger finger rather than the thumb – also, we're told, promoting higher scores. Epyx is so sure it will that they sent us samples for all our game reviewers. We'll report on their findings in an upcoming *Entertainment Software Section.*

Epyx, Inc., 408-745-0700 (see address list, page 14).

GRAPHICS INTERFACE

The Device One parallel printer interface for the C-64 ($119.95) includes among its many features the ability to download fonts, pictures, and disk directories directly from disk, print hi-res pictures and text together in two sizes and half-tone mode, and combine up to four different font sizes and thirteen different font styles (four of which are in ROM) in a single sentence. A banner mode provides for letters up to 8" high, and a letterhead mode allows a message or picture to be printed in the same spot on every page. Near letter quality characters can be integrated with text, pictures, fonts, and banners.

(Deep breath.) Screen dump mode for lo- and hi-res screens; hex and decimal dump modes; Pet ASCII conversion mode; device number selection; built-in 16K buffer; definition of all four margins; transparent and semi-transparent modes. The included utility disk can be used for creating fonts, drawing pictures, and converting pictures from most graphic packages to work with built-in picture dump.

Progressive Peripherals & Software, 303-825-4144 (see address list, page 14).

GAME RELEASES

Tass Times in Tonetown requires players to find Gramps, missing in a village in another dimension where "all rules change." The player must also become "tass" to avoid being marked as a tourist and booted out of Tonetown. Onscreen icons allow the game to be played with a minimum of typing. $34.95 for the 64; $39.95 for the Amiga.

Activision has also released the first two in a series of Designer's Libraries for use with *Garry Kitchen's GameMaker: The Computer Game Design Kit,* each providing predesigned game elements to facilitate game creation. The *Sports* library includes a race track, football field, skier, and hockey player, and such sound effects as crowd noises, buzzers, a referee's whistle, and the crack of a bat. The *Science Fiction* disk provides space ships, energy fields, planet surfaces, and monsters. Selections can be used as they are or customized using *GameMaker.* Each C-64 disk is $19.95.

And finally, Activision has formed another new division: Electric Dreams, which will distribute foreign entertainment software in America. Three initial releases have been announced, all for the C-64, each $29.95:

The Rocky Horror Show incorporates the main elements and characters from the movie, requiring you as Brad to find the abducted Janet and assemble the De-Medusa machine.

Spindizzy compels you to guide a gyroscopic device across 386 multilevel screens that must be assembled into a single world.

Based on the Tomy toys, *Zoids* requires you, an earthling, to intervene in the war between the Red and Blue Zoids by building a robot to defeat the Red Zoid Imperial Leader.

Activision, 415-960-0410 (see address list, page 14).

In order to foil the intergalactic smuggling ring called the *Breakers* ($39.95) and free the enslaved Lau people, text adventurers must outwit the criminals and dodge mutant space cops while combining the sacred elements that can restore order to the planet. The game's parser understands 1500 words, making dialogue puzzles with several characters possible. A reference card and book are included.

Broderbund Software, 415-479-1700 (see address list, page 14).

Software Toolworks' *Chessmaster 2000* offers 20 levels of play from Newcomer to Grandmaster, an open-

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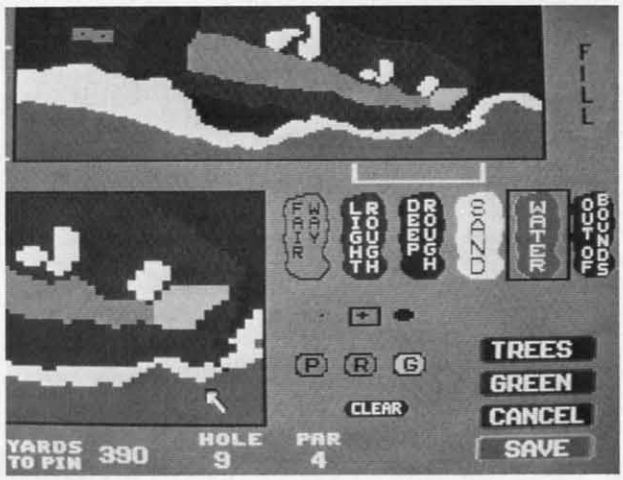
Mean 18's ***course architect makes it possible to design or modify an entire course, including trees, bushes, skyline, background, terrain, course name, and any or all of the 18 holes and par values.*** ***READER SERVICE NO. 195***



ing library of 71,000 moves, and a "teach" mode allowing the program to demonstrate all possible moves. Also featured are onscreen clocks, "coffeehouse" mode (in which the computer plays a slightly addled game to encourage the beginner), and analysis of games in progress or games already played. $39.95 for the 64; $44.95 for the Amiga.

Planned releases from Software Toolworks include *The New Technology Coloring Book,* utilizing the Amiga's graphics capabilities to take the user on a "journey through the mysteries of science and the universe;" and *Life and Death,* simulating the experience of practicing medicine in the emergency room of a big city hospital.

The Software Toolworks, 213-278-8450 (see address list, page 14).

Effective immediately, Datasoft games will be packaged with Frequent Buyer Coupons that can be collected and cashed in for free gifts. Seven coupons will entitle the customer to choose a gift worth up to $20 from a 100-item catalog; ten coupons, a gift worth up to $25; fourteen coupons, up to $50.

Datasoft, IntelliCreations, Inc., 818-886-5922 (see address list, page 14).

Space, the Ultimate Frontier ($8.99) places the user on the bridge of a starship with the task of defending the sector against the invading Klyron Empire.

Ufland Software, Inc., 519-538-1758 (see address list, page 14).

The Amiga version of Accolade's *Mean 18* golf simulation ($44.95) features enhanced graphics, resolution, color, and sound, four courses including St. Andrews, Augusta National, and Pebble Beach, a golf course architect, and numerous strategy and play options. Also included are a driving range and putting green, plus such landscape features as sand traps, bunkers, water, and roughs.

Accolade, 408-446-5757 (see address list, page 14).

A Christmas Adventure has been available for the 64 for the past three holiday seasons, but this year BitCards will send a free sampler/demo disk containing over half of the actual program to anyone who sends $1 in cash or stamps to cover shipping costs. Price of the full program, to which it is possible to add personalized holiday greetings, is $24.95 plus $3 shipping.

BitCards Inc., 800-821-5226/ext. 432 or 514-274-1103 (see address list, page 14).

Newly adapted for the Amiga from Electronic Arts:

EA's first adaptation of an arcade game, *Marble Madness* ($49.95) duplicates the phenomenal arcade original faithfully in terms of 3-D graphics, sound, and gameplay. The goal of one or two players is to race a marble down treacherous paths in an attempt to beat the clock to the goal line. Adversaries along the way include the Hoovers, who seek to inhale you, Marble Munchers, and the Steelie, who attempts to knock you marble into a fatal tumble. Each of the six different raceways has its own stereo soundtrack.

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Featuring enhanced graphics and sound, the *Skyfox* combat flight simulation, *Adventure Construction Set*, and the action-magic adventure *Archon II: ADEPT* will retail for $39.95 each.

Electronic Arts, 415-571-7171 (see address list, page 14).

Casino Blackjack ($19.95) provides full player and dealer statistics and a wide range of casino options including split pair, insurance, and double down.

Dragon Magic Software (see address list, page 14).

Polarware/Penguin Software's illustrated adventures, *Transylvania* and its sequel *Crimson Crown,* have been enhanced for the Amiga. The games, each $29.95, chronicle the struggle between the royal family of Wallachia and the evil Vampyr.

Polarware/Penguin Software, 312-232-1984 (see address list, page 14).

Six releases for the C-64 and/or Amiga from Artworx:

Beach Blanket Volleyball ($14.95), playable against another human or against the C-64 on nine levels, provides the usual opportunities to return impossible shots, spike the ball close to the net, etc. All that's missing is the sand in your hot dog.

Police Cadet for the C-64 ($14.95) requires the recruit to keep the peace on a beat, a stakeout, in a deserted park, and in a supermarket, capturing armed suspects or shooting them when necessary. But don't shoot an innocent bystander, or your career will be over.

Hole In One Golf, which includes club and swing selection and a course design option, has been adapted for the Amiga ($29.95), while *Hole In One Golf +6* ($19.95) for the 64 adds a sextet of courses to Artworx's original program.

Equestrian Showjumper for the 64 ($14.95) lets one to six players compete with horses from nations around the world, jumping fences of varying height and difficulty on twelve provided courses.

Strip Poker, adapted for the Amiga ($39.95) after release in several other formats, makes use of a variety of computer opponents, each with his or her own style of play, personality, and comments—and, of course, detailed graphics. Two female opponents are included; data disks containing additional opponents of both sexes will be made available.

Bridge 4.0, also adapted for the Amiga ($29.95), utilizes speech synthesis and lets the player make all bird and card selections via the mouse.

Artworx Software, 716-425-2833

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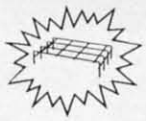

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(see address list, page 14).

MicroProse's *Top Gunner Collection* ($24.95) combines three previous releases on one double-sided disk for the C-64: *HellCat Ace* (re-creation of 14 significant US-Japan battles), *MiG Alley Ace* (dogfighting between the F-86 Sabre Jet and the Red Chinese MiG 15), and *Air Rescue* (piloting a copter through an underground labyrinth).

MicroProse won't reveal the name or any other details about the flight simulator they plan to release in the first quarter of '87, except that it will have "the best of everything all the other simulators have."

MicroProse, 301-667-1151 (see address list, page 14).

BOOKS

A revised and expanded edition of Jim Butterfield's previous volume covering only the 64, *Machine Language for the Commodore 64, 128 and Other Commodore Computers* ($14.95) offers step by step instructions, examples, and exercises for programmers at all levels, including beginners with knowledge of fundamentals. The book covers machine architecture (where a program can be placed in memory, how to print to the screen, how to input from keyboard), tools (using a monitor to read and change memory, using a simple assembler, and debugging), and machine language itself.

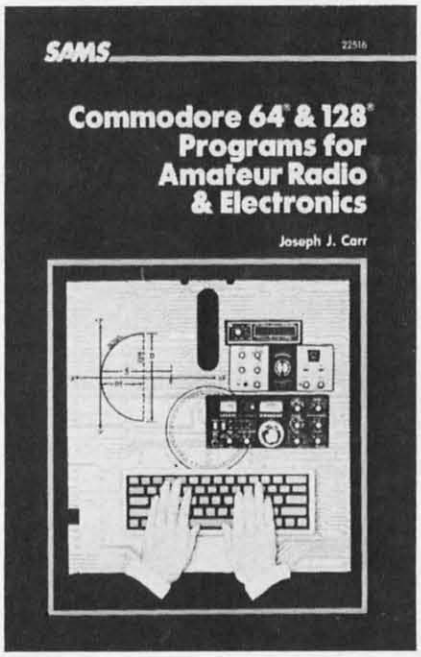
Prentice Hall Press, 212-333-2916 (see address list, page 14).

A booklength tutorial devoted to SubLOGIC's *Flight Simulator II, The Flight Simulator Book* ($19.95) uses dozens of actual government aviation charts to teach the student to do everything an airline captain does, from aviation basics through maneuvers, flight planning, cross-country procedures, radio navigation, instrument landings, and more.

En Route Books, 602-846-6737 (see address list, page 14).

These from Howard W. Sams:

Commodore 64 & 128 Programs for Amateur Radio & Electronics ($14.95), a task-oriented guide for the electronics hobbyist, programmer, engineer, and technician, includes 42 programs (available on disk) to save time and simplify tasks.



Task-oriented guide for the hobbyist.
READER SERVICE NO. 197

John D. Lenk's Troubleshooting & Repair of Microprocessor-Based Equipment ($21.95) details numerous procedures and tricks for diagnosing, isolating, and locating faults in microprocessor circuits.

Howard W. Sams & Co., 1-800-428-SAMS (see address list, page 14).

EDUCATIONAL RELEASES

Gessler has released Spanish and French Hangman games for the 64: *La Corrida de Toros,* set in a bull ring, and *La Guilotine,* depicting events at the Bastille. Each $29.95 program includes hundreds of words in numerous categories, a vocabulary review, and a matching exercise.

Also from Gessler comes CLEF, a 30-disk series of Computer-assisted Learning Exercises for French for use in beginning and intermediate French classes. Each C-64 disk focuses on a particular point of grammar or group of vocabulary words, including a series of individually graded exercises and analysis of errors. Price is $19.95 for one disk, $85 for five, or $499 for all thirty.

Gessler Educational Software, 212-673-3113 (see address list, page 14).

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BASICally SIMPLE 128 - How to use all C128* Basic 7.0 commands, functions and operators in Basic programs. C128* disk only - $19.95
BASICally SIMPLE 64 - How to use all C64* Basic 2.0 commands, functions and operators in Basic programs. Disk - $14.95

Datafiler 128 - Database program for the C128* in 128 mode. Disk - $24.95

FREE SHIPPING & HANDLING. Illinois residents add 7% sales tax. Send check or money order to:

Free Spirit Software, Inc.
538 S. Edgewood
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Educational Activities will send its catalog of over 100 programs (not all of them available for Commodore) free to educators who request it.

Educational Activities, 516-223-4666 (see address list below).

BASIC EXTENSION

The Boss ($35) provides C-64 users with over 40 new BASIC commands and functions, mostly useful for writing data communications-type programs. Included are commands for performing I/O operations with the modem, turning the modem on and off, getting user inputs of specified lengths from the other end, checking for carrier, and more. The program handles all ASCII translation and utilizes system timers.

SoftTools, 514-739-3046 (see address list below).

For more information on products accompanied by a Reader Service Number, fill out and return the card bound between pages 66 and 67.

MIDI SOUNDS

MIDImouse has added Volumes 3 and 4 to its CZ Sound Collection series of acoustic and electronic sounds for the MIDI-equipped C-64. Each disk-based volume is $14.95, or $21.95 for two, $28.95 for three, or $35.95 for four. The collection is also available on two 64-voice RAM cartridges priced at $69.95 each, or both for $124.95. Demo cassette is $4.

Also new is a Digital Sound Cassette of 125 sounds for $17.95. (A disk

Continued on page 146

Companies Mentioned in Scuttlebutt

AC3L Software
P.O. Box 7
New Derry, PA 15671

Accolade
20833 Stevens Creek Blvd.
Cupertino, CA 95014
Phone: 408-446-5757

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

Artworx Software Company
150 North Main Street
Fairport, NY 14450
Phone: 716-425-2833

BitCards Inc.
P.O. Box 1289
Champlain, NY 12919
Phone: 800-821-5226/ext. 432 or 514-274-1103

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

CTL Software
115 Bixby Drive
Milpitas, CA 95035
Phone: 408-263-1623

Cheatsheet Products Inc.
P.O. Box 111368
Pittsburgh, PA 15238
Phone: 412-781-1551

Commodore International
1200 Wilson Drive
West Chester, PA 19380
Phone: 215-431-9100

Datasoft
IntelliCreations Inc.
19808 Nordhoff Place
Chatsworth, CA 91311
Phone: 818-886-5922

Dragon Magic Software
P.O. Box 490
Dublin, OH 43017

Drude Micro Services
P.O. Box 533
Cedar Falls, IA 50613
Phone: 319-277-5106

Educational Activities, Inc.
1937 Grand Avenue
Baldwin, NY 11510
Phone: 516-223-4666

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

En Route Books
6408 West College Drive
Phoenix, AZ 85033
Phone: 602-846-6737

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Sunnyvale, CA 94089
Phone: 408-745-0700

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LaGrange, IL 60525
Phone: 312-352-7323

Gessler Software
900 Broadway
New York, NY 10003
Phone: 212-673-3113

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Indianapolis, IN 46268
Phone: 1-800-428-SAMS

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120 Lakefront Drive
Hunt Valley, MD 21030
Phone: 301-667-1151

MIDImouse Music
Box 272-MS
Rhododendron, OR 97049
Phone: 503-622-5451

Polarware/Penguin Software
521 Hamilton
P.O. Box 311
Geneva, IL 60134
Phone: 312-232-1984

Prentice Hall Press
Gulf+Western Building
One Gulf+Western Plaza
New York, NY 10023
Phone: 212-333-2916

Progressive Peripherals & Software, Inc.
464 Kalamath Street
Denver, CO 80204
Phone: 303-825-4144

QuantumLink
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Vienna, VA 22180
Phone: 800-392-8200 or 703-448-8700

SoftTools
Snowdon P.O. Box 1205
Montreal, Quebec
Canada H3X 3Y3
Phone: 514-739-3046

The Software Toolworks
9713 Santa Monica Blvd.
Beverly Hills, CA 90210
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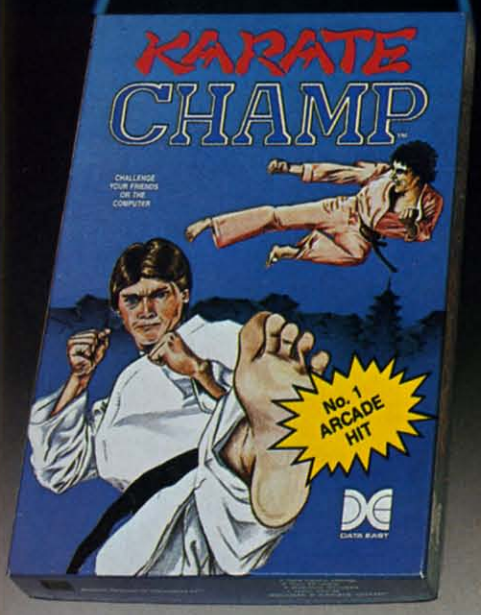
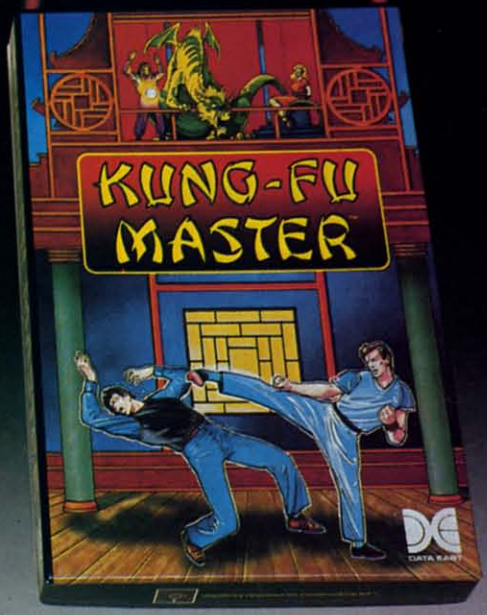


Put on your black belt and challenge your friends or the computer through nine picturesque settings in this leading Martial Arts Game to become the **KARATE CHAMP**. For the Commodore 64™/128 and the 48K Apple II® Series.

As the crack shot **COMMANDO**,* battle overwhelming odds to defeat advancing rebel forces. Armed with only a machine gun and hand grenades, you must break through the enemy lines to reach the fortress. For the Commodore 64™/128.



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DATA EAST

DATA EAST USA, INC.
470 Needles Drive, San Jose, California 95112
(408) 286-7074

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SCIENTISTS A
DISCOVER NE

When we started our company on the west coast, people thought we were a little spaced out. So you can imagine their reactions when we announced we'd discovered a new universe.

People laughed. People scoffed. And they really freaked out when we told them where we'd found it:

Inside a Commodore 64.

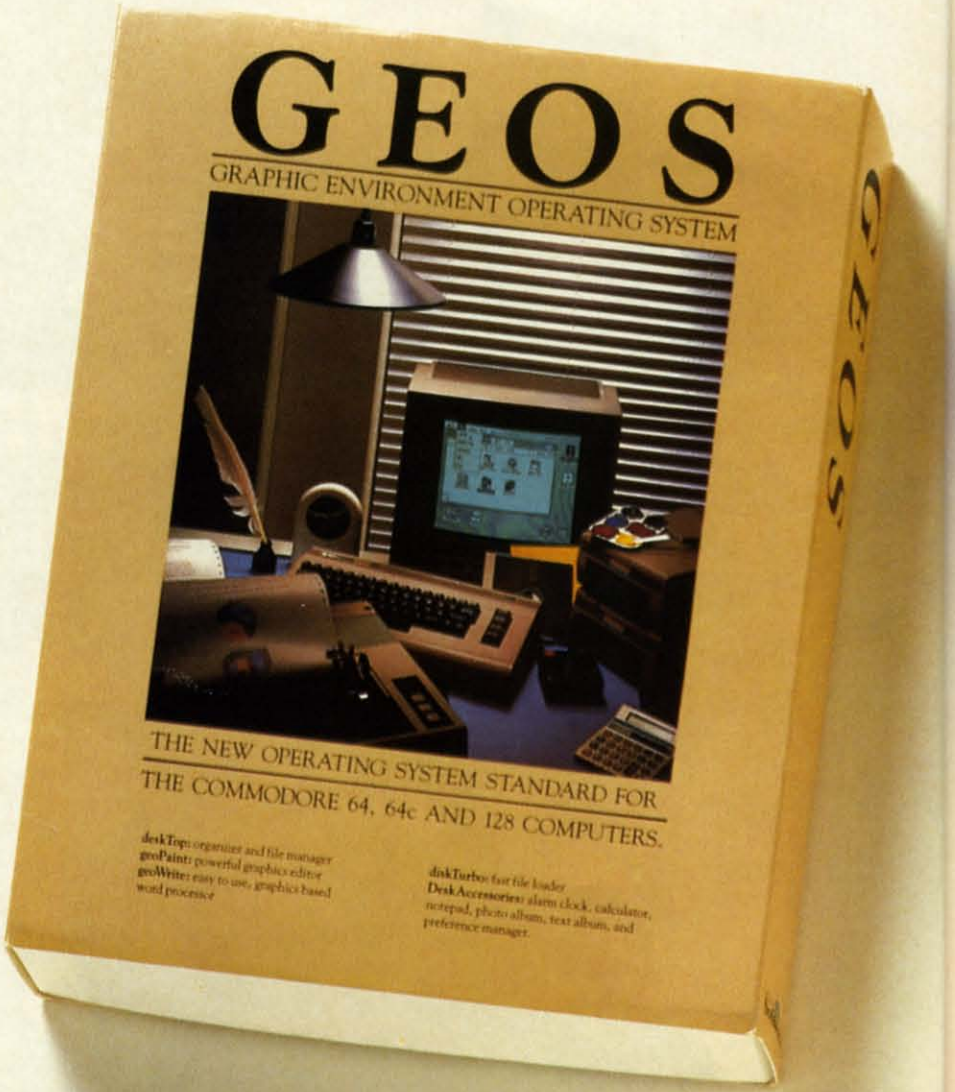
It's called GEOS. And it turns any Commodore into a powerful PC that holds its own against any computer, no matter what kind of fruit it was named after.

GEOS: The superior intelligence. Of course, we always knew Commodores possessed superior brains. It just took GEOS to discover them.

You see, GEOS opens your Commodore to a huge universe that can hold an infinite number of applications. Which means that GEOS can do just about anything the expensive PC's can do, including one thing they can't:

Add even more GEOS applications that are being developed even as you read this.

Increase your speed to warp factor 7. The first thing you notice with GEOS is how its diskTurbo speeds up your Commodore's disk loading and storing time.



Not twice or three times as fast. But five to seven times faster than normal. Which lets you streak through files and documents at what seems like warp speed.

And that saves you endless time.

Every universe comes complete with a desk. The way to keep order in our universe is with the GEOS Desktop. It's just like your desk at home, only without the coffee stains.

The Desktop keeps your art and documents filed, and comes

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AT BERKELEY
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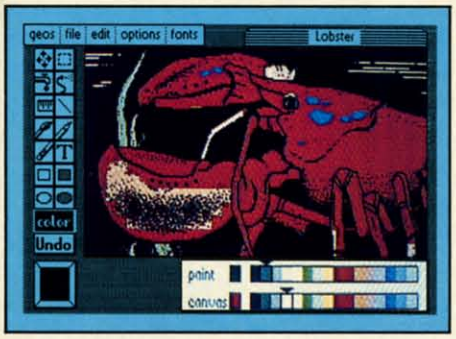
with all the accessories you need to keep you organized:

An alarm clock keeps you punctual. A notepad keeps your memos. And a calculator keeps your accountant honest.

How to communicate with a new universe. With geoWrite, you can rearrange your written words. Move blocks of copy. Cut and paste. And even display your text in fonts of different styles and sizes, right on the screen.

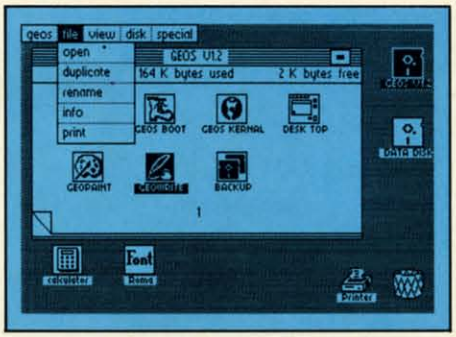
With geoPaint, you become a Michelangelo with a mouse.



Sketching and painting with all kinds of colors, textures and patterns.

You can invert, mirror and rotate images. Insert them into your geoWrite documents. And save them in your GEOS Photo Album for use later.

Finding your way through the universe. The most difficult



thing about a new universe is finding your way around. But with GEOS, you only need to remember two things:

Point and click.

When GEOS offers you options, you just point to your answers and click your mouse or joystick.

You want to draw? Point and click.

You want to write? Point and click.

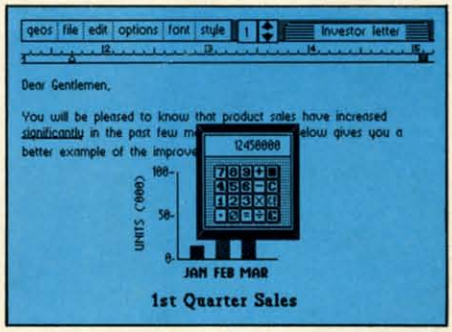
You want to fill in that obtuse rhomboid with an air-brushed geometric pattern in a lighter shade of pink? Point and click.

Easy, huh? And in case you ever do make a mistake, GEOS backs you up with an "Undo" feature that undoes the very last command you entered.

Running out of space. With GEOS, that's hardly likely. Because there's endless space in the universe for new applications.

Unfortunately, there's only so much space in this ad.

So zip down to your nearest software dealer. Tell him you want to explore the new universe in your Commodore.



And if he looks at you like you're some kind of alien, well, just tell him Berkeley Softworks sent you.

The name is universally known.

To order, call 1-800-443-0100 ext. 234

GEOS is just $59.95

(California residents add 6.5% sales tax.) $2.50 US/$5.50 Foreign for shipping and handling. Allow six weeks for delivery.

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THE UNIVERSE

Well, we told you it wouldn't be long until the first GEOS applications were ready. And these are just the first. The number of satellites in the GEOS universe is infinite.

Judge Font Pack on looks alone. Let's face it. People judge your work not only by what it says, but how it looks.

That's why we developed Font Pack. A collection of 20 different type styles that not only say what you mean, but really look like they mean it.

Charming is charming. **Boalt** is all business. FontKnox is financial. And **Telegraph** is ... hmmm, well, you get the point.

When you combine these 20 fonts with the five you get with geoWrite, your work not only reads

Boalt STADIUM
Bubble Telegraph
Durant Mykonos
Harmon **Superb**
Ormond Tilden
LeConte Bowditch
Putnam

better, it practically speaks for itself.

Look what we found in your desk. You know how there's always one drawer in your desk that's filled with really neat stuff? Well, GEOS has one of those, too.

It's called Desk Pack.

The ingenious Desk Pack Graphics Grabber copies graphics from clip art galleries like Print Shop, Print Master and Newsroom for use in geoWrite and geoPaint.

The Desk Pack Calendar pops up whenever you need to plan your schedule. And since it's valid until the year 9999, you'll never have to miss one of those swell family

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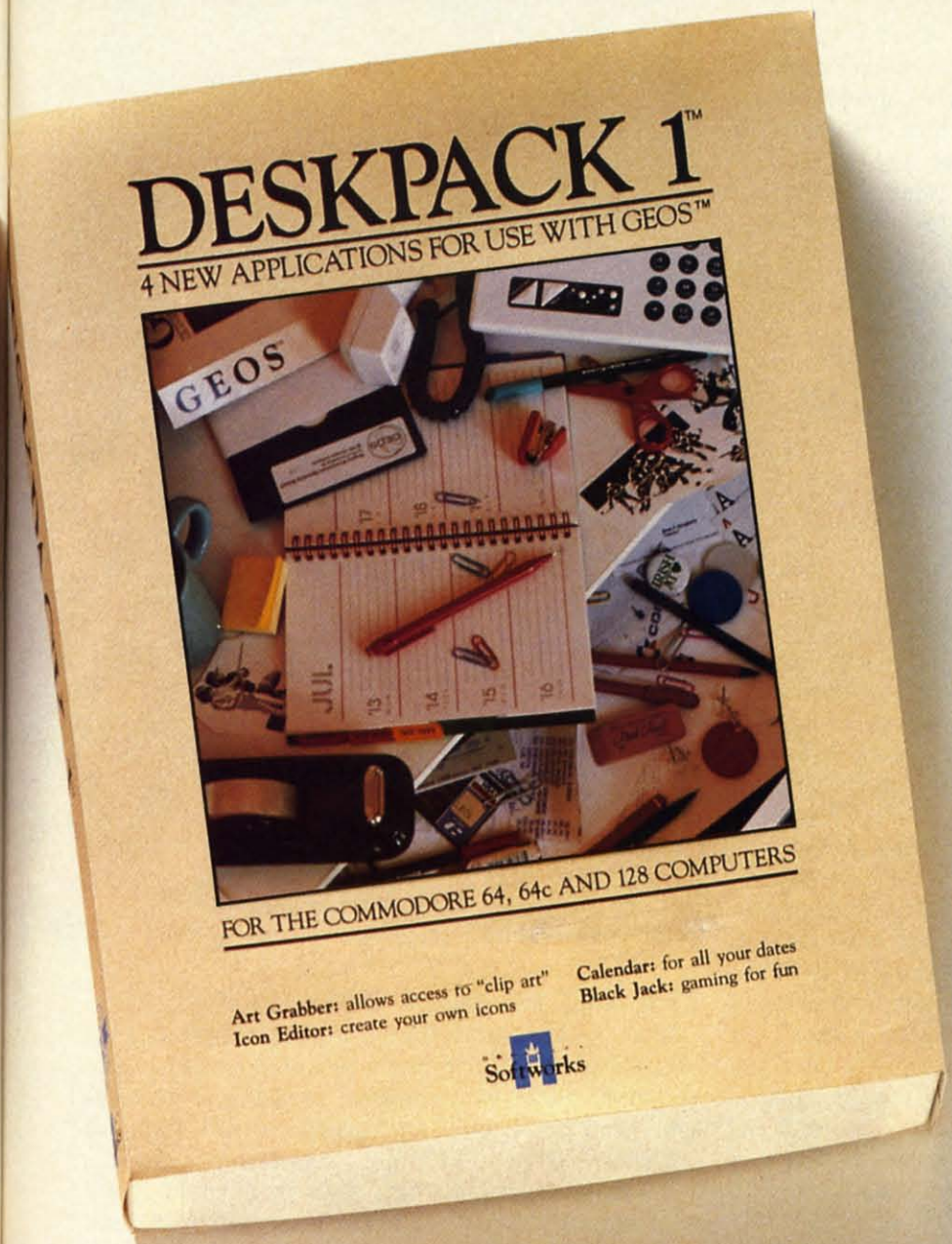
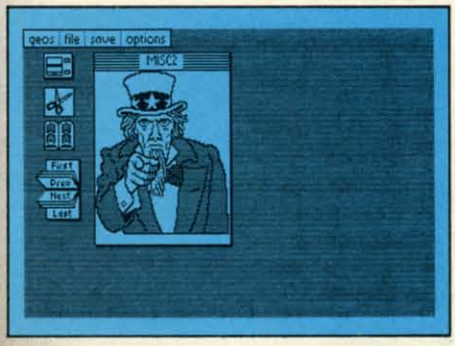
ES EXPANDING.



New discoveries reported. The GEOS universe is expanding. And we'll report each new discovery to you as it occurs.



In the meantime, add Desk Pack and Font Pack to your GEOS system. And see how much you can explore.

reunions ever again.

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And when you can't deal with work, Desk Pack deals the sharpest Black Jack game this side of Vegas, complete with graphics and sound effects.

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GETTING AND TAMING LARGE AMOUNTS OF INPUT

BY DALE RUPERT

Data file handling is one aspect of computer programming which many people avoid for one reason or another. The concept of "files" is often deemed mysterious or difficult. In fact it is neither, and this month we will prove it.

In the October *Rupert Report* we converted our computers into digital oscilloscopes. We looked at the inputs to the computer's analog-to-digital circuitry on a real-time basis. That is, the display on the screen was the actual value of the input at that instant. One significant advantage of digital oscilloscopes over their analog counterparts is the ability of digital scopes to record the incoming signal values for future reference and for further "not in real time" processing. This month, we will investigate the use of sequential disk files for storing and recovering numerical data. That way we can accumulate information and process it at our convenience.

Files are simply collections of data. Program files are familiar to everyone who has ever saved or loaded a program. Sequential files are slightly different in format from program files, but we need not be concerned about the file structure. BASIC provides commands to let us easily write data into a sequential file and read it back.

The name "sequential" comes from the fact that any data item is accessible only after reading through all items written before that one. Cassette files are naturally sequential in structure. The third program on a tape is reachable only after the recorder reads through the first two programs.

An alternative to sequential files is relative or random access files. The disk drive is capable of picking out various portions of the diskette in any order. With relative files, a program can call up the fortieth data item in the file without looking at any other items. On the other hand, a program can read the fortieth data item of a sequential file only by first reading the preceding thirty-nine.

For real-time data collection, the use of sequential files is not a disadvantage. If the data items must be randomly accessed in order to process them, we can read the data from the disk into arrays in memory which will allow random access.

THE ART OF DATA COLLECTION

If you wished to monitor the amount of light reaching one side of your house over a period of several weeks, you might set up your computer as a data logger. You could adapt the photocell arrangement we used last month and write a program to read a light intensity value into the computer once every half hour, for example. If you were interested in more rapid fluctuations in brightness, you could program the computer to read the photocell as quickly as possible.

This incoming data must be stored somewhere. The two most common storage areas are random access memory (RAM) and diskettes. If the quantity of data is not too large, and if the computer will not be shut off before the data can be interpreted or processed, a numerical array in RAM would work fine. Variable storage RAM in the C-128 is limited to an array of roughly 32,000 integer numbers, and it is much less than that on the C-64. Integers in an array use two bytes apiece, and the C-128 has on the order of 64,000 bytes of variable storage.

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CONSTRUCTION: AJIN

If a BASIC program brings in ten photocell readings per second, C-128 RAM could store approximately one hour's worth of integer data in an array. If more readings are needed, the present readings must be processed first or written to disk to make room.

The 1541 format, single-sided disk stores roughly 170,000 bytes. At first glance, this seems like nearly three times the storage capacity of variable RAM. In actuality, looks are deceiving. Unfortunately integers are not stored on disk as efficiently as in RAM arrays. Numeric data is stored in ASCII format on disk. For example, the integer "125" takes up six bytes in a disk sequential file. It looks like this:

disk data	>	32	49	50	53	32	13
meaning	>	sp	1	2	5	sp	cr

There is a space (CHR$(32)) stored ahead of the 1, then the three digits, followed by another space, and a carriage return (CHR$(13)) which separates this integer from the next one.

An integer such as 12,345 uses only two bytes of a RAM integer array, but it fills eight bytes of a sequential file. The array stores integers ranging from −32768 to +32767 in hexadecimal format; for example, 12,345 in hex is stored as the two bytes 30 39, since $3039 equals 12345. (The leading dollar sign indicates a hexadecimal or base-16 number.) Adding the two spaces and the carriage return to the 5 digits brings the ASCII character total to eight needed to store 12,345 in a disk file.

So why use the disk for data storage? The main reason is that the disk is non-volatile. That means the data is still around even after the power to the computer is shut off. Also, several disks may be used to accumulate several days' worth of data. The program to analyze the data would read from one disk, perform the analysis, and request the next disk to be inserted.

Disk storage is not foolproof however. If the power goes off before a disk file has been properly closed, some or all of the data may be inaccessible. The only way to avoid

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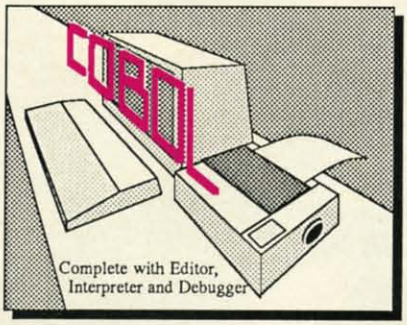

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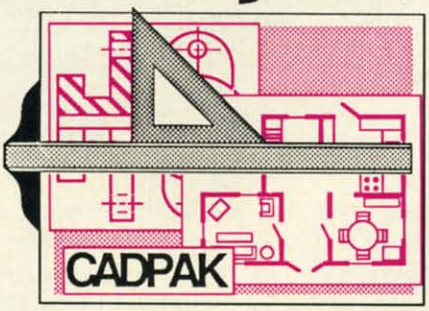

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power failure related data losses is to use a battery backed up, uninterruptible power supply (and, yes, even they have been known to fail).

With the 1571 disk drive using double-sided disks, the data storage capacity is essentially twice as great as the single-sided drive. Keep in mind that with a single disk drive system it is best to fill only part of a diskette with raw data if the data is to be processed (sorted, filtered, and so forth) and saved. That way there is room for the computer to store the processed data on the same disk. Swapping diskettes during processing is possible but cumbersome.

When time is no object, a cassette tape file might be considered for storing large amounts of raw data. The procedures for using tape are essentially the same as those we will discuss below for disk storage. For the details, you are on your own. (Once a person has used a disk drive, he generally wants to have as little as possible to do with standard tape storage, and rightfully so. Cassette storage is to computers as first gear is to cars. They are fine for starting out, but to cover a significant distance in a reasonable time, you need something else.) Generally disk storage, even with multiple disks, is a better approach than using cassettes.

READING, WRITING, AND FILES

All it takes to create a sequential disk file are three steps:

1. Open the file
2. Write to the file
3. Close the file

The BASIC 7.0 implementation to these steps is not much more difficult than their statement. The corresponding commands to put the numbers 1 through 100 into a sequential file called "NUMBERS" are simply:

```
1 DOPEN#8,"NUMBERS",W
2 FOR N=1 TO 100 : PRINT#8,N : NEXT N
3 DCLOSE
```

On the C-64, BASIC 2.0 requires a few more "things" and has a slightly different syntax, so the three steps are thus:

```
1 OPEN 8,8,8,"NUMBERS,S,W"
2 FOR N=1 TO 100 : PRINT#8,N : NEXT N
3 CLOSE 8
```

Line 1 in each case needs a little explanation. Opening a file allows the computer to get prepared for the data which will be stored in the file. The 8's following each type of OPEN statement in the two examples are labels called "logical file numbers." The computer prefers numbers to names. When you tell the computer to PRINT a value into the file in line 2, you refer to the file by its number, not by the filename "NUMBERS".

Any number from 1 to 127 may be used for the logical file number. I used 8 for the C-128 from habit since the C-64 requires two other numbers after the OPEN statement. The middle number in the C-64 version must be an 8 to

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refer to the first disk drive. Rather than remember which number is which, I simply use all 8's since that works. If we were writing data to several files at a time, we would open each one separately with its own filename and its own logical file number. The third number in the C-64 version OPEN statement must be between 2 and 14, and it must be different for two files at the same time.

The "S" stands for "sequential" and is implied in BASIC 7.0. The "W" is required in both versions of BASIC to indicate that we will write to the file. Notice that one W is inside the quotation marks, and the other one is outside.

The PRINT# statement does the writing. *Do not* put a space between the T and the #, and do not use the question mark abbreviation for this statement. "?#" and PRINT #" do not generate the same token as "PRINT#". The PRINT# (read "print number" or "print pound") statement writes to disk files in about the same way that PRINT writes to the screen. If we put a semicolon at the end of line 2, each number would be written without a carriage return after it. Unfortunately that makes it harder to read the individual numbers back.

Reading the numbers we have just written is also a three step process:

4 Open the file
5 Read from the file
6 Close the file

Once again, there is nothing very difficult or involved. The BASIC 7.0 (C-128) implementation looks like this:

```
4 DOPEN#8,"NUMBERS"
5 DO : INPUT#8,X : PRINT X : LOOP UNTIL
ST=64
6 DCLOSE
```

and here is the BASIC 2.0 version:

```
4 OPEN 8,8,8,"NUMBERS,S"
5 INPUT#8,X : PRINT X : IF ST<>64 THEN G
OTO 5
6 CLOSE 8
```

The "S" in the OPEN statement is optional and may be used in the BASIC 7.0 version if desired. The INPUT# statement works the same way as the more familiar INPUT statement. Line 5 causes the computer to read up to the first carriage return from the file associated with logical file number 8, the "NUMBERS" file. In general, to read data from a file, the format of the INPUT# statement should be the same as the PRINT# statement which wrote it. The PRINT statement merely puts this data onto the screen so that we know the program is working. Instead of the PRINT statement we could put additional computational statements here, if desired.

CHECKING STATUS

After the last value was written and the file was closed in lines 1 through 3, the computer added a special character to identify the end of the file. BASIC uses a special status variable ST to identify the outcome of input and output (I/O) operations such as to the printer and the disk. As long as everything is normal, the value of ST is 0.

Once the computer reads the last value in the file, it sets the value of ST to 64. Line 5 in both programs checks the value of ST to decide whether to go back for more data.

There is one special consideration about the ST variable. It can be read only once to indicate the status of each I/O operation. Once it is read, it is reset to zero. Therefore if several parts of a program need to know the value of ST for a given I/O operation, its value must be read once and stored in a separate variable. We'll see an example of this later.

One further caution. If for some reason the program to write or read disk files is interrupted and the "disk drive active" light is left on, you should close any files which were opened. On the C-128 simply type DCLOSE to close all open files. On the C-64 you must type CLOSE n for each logical file number n which is open. The drive light should then go off.

TAKING CARE OF ERRORS

The programs *Datawriter* and *Datareader* are meant to be models for creating your own file access programs. There are versions for the C-128 and for the C-64 beginning on page 127). If you understand the simple examples above, these programs should not be difficult to interpret. The line numbers for the two versions are the same, so our discussion will apply to both versions, except as noted.

The filename may be stored in a variable rather than being given directly. Notice the syntax in line 30 for using

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the variable filename F$. In addition to the I/O status variable ST, the C-128 has another set of special variables, DS and DS$, which store information about the disk drive status. If our attempt to open a file for writing fails, DS will have a code number identifying the problem. DS$ includes the code number as well as an error message and the faulty track and sector if relevant.

The corresponding drive status function on the C-64 involves opening a special file for the disk drive command channel. The drive sends its status to the computer through this channel which is number 15. The first two quantities it transmits are the error number and the error message. These are identical to DS and DS$. Line 40 in the C-64 version shows how to access these values. In essence our program must put the values into DS and DS$. The C-64 computer doesn't do that for us.

Notice that lines 40 and 220 read the drive status error number DS and store it in another variable DD. That way, the error handling routines in lines 1000 and 2000 can also reference the value. Recall that the values are reset each time they are read.

What could cause a disk drive error when line 30 in *Datawriter* opens the output file? The most common causes are that a file with the given filename already exists on the disk, or that the disk hasn't been formatted (use the NEW or HEADER commands), or that the disk drive door is open.

If an error has occurred in opening the file to be written, the program branches to the error handler routine in line 1000. The first thing it does is to close the open file(s). If the error resulted from the file already existing on the disk, DS and DD have a value of 63, and the program branches to line 1030. If the value of DD is not 63, the status variable and the error message are displayed to help the operator figure out the problem, and the program ends.

If the file to be written already exists, the program allows the user to write over (scratch) the old file and to replace it with the new one, or else he may specify a new filename.

If in *Datareader* a drive status error occurs, the most likely reason is that the specified file does not exist on the disk. The user is allowed to specify a different filename or simply to press the RETURN key to exit the program. On the C-128 version, the user may request that the disk directory be displayed so he can see which files exist.

In both programs, the status is checked after each INPUT# or PRINT# statement. If ST is not zero, then something went wrong during the I/O operation, such as the disk door being opened or the drive being unplugged. A status value of −128 means the drive is not present or not ready.

The main loop beginning in line 90 of *Datawriter* simply reads the jiffy timer and writes the square of that value to the file "TIME1." This operation is performed 100 times as controlled by the variable N. You could easily replace line 100 with T2=POT(1) to read the light intensity on a photocell plugged into the C-128's paddle port as described last month. The main loop might be timer-controlled so that the keyboard or an input port is read once every hour for example. A statement comparable to that in line 110 is all that is needed to store data onto the disk.

Datareader retrieves the squared jiffy clock values one by one from the disk file if you specify the filename "TIME1." Each value is sequentially numbered and displayed on the screen. Also the difference between the present value in D and the previous value (saved at line 280 in D0) is calculated and displayed. This is merely to show how the incoming data may be processed. Notice that the sequential numbers are displayed as the data is read from the disk. There is no need to store these numbers in the disk file.

You may change the default filenames in lines 20 and 200. The "XX" in line 200 causes the program to automatically branch to the error handler so the actual filename can be entered (assuming your disk does not contain a file called "XX".) You can add additional error handling if necessary, although nothing more is needed to take care of most problems. (Try opening the disk drive door during the file access just to see what happens.)

What you put into the main loops is up to you. Our simple model did not require the use of arrays since only two data values were referenced at a time (the current reading and one previous reading). In future columns we will discuss the use of RAM arrays for processing the data, and we will see some more advanced file reading and writing capabilities. The *Datawriter* and *Datareader* models should help you to implement most data logging applications.

Hopefully by now you are convinced that sequential file operations are not really very difficult. If not, reread this article, study the examples, try them, and then modify them. Very soon you will agree that disk data files are as easy as 1, 2, 3. ☐*SEE PROGRAM LISTINGS ON PAGE 127*

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THE SHADOW KNOWS

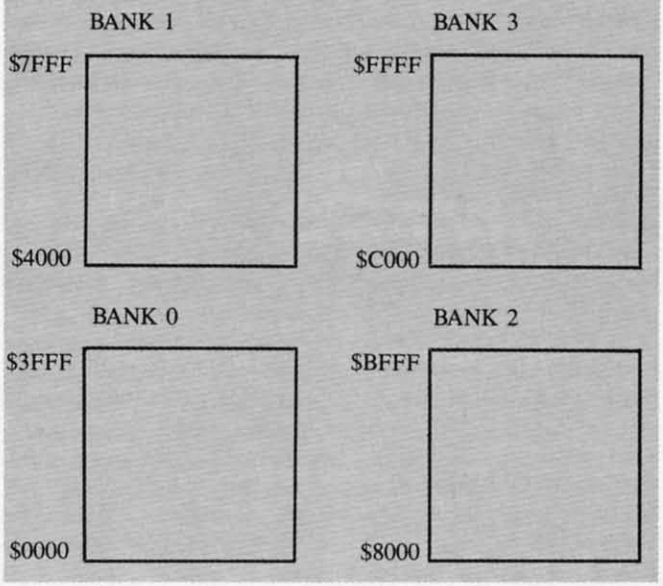
Exposed: Secrets of Programming Sprites Using the Commodore 128's Shadow Registers

By Mark Andrews

There's a secret to programming sprites on the Commodore 128—and it isn't revealed in the official *C-128 Programmer's Reference Guide.* In fact, to my knowledge, it hasn't been revealed anywhere. But it soon will be—in this series of two columns.

The secret, in a nutshell, is this: Deep in the Commodore 128's memory banks, in an undisclosed and totally undocumented location, is a set of "shadow registers" that determine where sprites will appear on the screen in assembly language programs.

FIGURE 1
The Four Video Banks in Each Memory Bank



In order to write a sprite program in C-128 assembly language, it is essential to know the addresses and functions of these shadow registers. Without them, you cannot program a sprite in C-128 assembly language. Yet, strangely enough, these registers are not mentioned in the *C-128 Programmer's Reference Guide,* a 744-page technical manual commissioned by Commodore and published by Bantam. And, to date, I have not found them listed in any other book on C-128 assembly language.

EXPLORING THE SHADOWS

But in this month's and next month's column, we'll actually use the C-128's secret sprite registers to create a sprite and animate it on the screen. We'll do this in an assembly language program that has been divided into two parts, called SPRITE1 (on page 122) and SPRITE2 (next month).

The SPRITE1 and SPRITE2 programs look and work much like a C-64 program that appeared in this column several months ago. Like their predecessor, they display part of a message on the screen in headline-sized characters, and then use a sprite to complete and animate the message. But don't let these similarities fool you. SPRITE1 and SPRITE2 were written strictly for the Commodore 128; because they make use of shadow registers and other special features of the C-128, they will not work on the 64.

Before we start typing and assembling SPRITE 1, it would probably be a good idea to take a look at some of the graphics features of the C-128. So here goes:

THE C-128'S BANKED ARCHITECTURE

As we have seen in previous columns, the Commodore 128 has two 64K blocks of RAM—sometimes labeled RAM block 0 and RAM block 1—and one 48K block of ROM. But the C-128's VIC-II video chip, which controls sprites as well as screen graphics, can access only 16K of memory at a time. So each of the C-128's 64K RAM blocks has been divided into four video banks, each containing 16K of memory. And a simple method has been provided for telling the VIC-II which video bank it must access to get the data it needs to generate a screen display.

To direct the VIC-II chip to the proper video bank, all a programmer has to do is set two bits in a certain C-128 register: specifically, bits 0 and 1 of memory register $DD00, sometimes referred to as Complex Interface Adapter Register No. 2, or CI2PRA. Figure 1 shows how each of the C-128's two blocks of RAM can be divided into four 16K video banks. And Figure 2 shows how bits 0 and 1 of the CI2PRA register can direct the VIC-II chip to any desired video bank within either of the C-128's

FIGURE 2
Selecting a Video Bank Using Register $DD00

Video Bank	Address Range	$DD00 Setting	Hexadecimal Equivalent
0	$0000-$3FFF	XXXXXX11	$03
1	$4000-$7FFF	XXXXXX10	$02
2	$8000-$BFFF	XXXXXX01	$01
3	$C000-$FFFF	XXXXXX00	$00

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64K blocks of RAM.

HOW TO USE THE C12PRA REGISTER

The C12PRA is an important register in C-128 graphics programs, because it is often necessary to move the block of memory that is accessed by the VIC-II. For example, in the SPRITE1 program, there are three large blocks of graphics-related data: a high-resolution screen, a character set that has been copied from ROM into RAM, and a sprite. Since data from all three of these memory blocks must appear on the screen at the same time, the C-128's VIC-II chip has to have access to all three simultaneously. And that means that all three blocks of data have to be situated in the same 16K video bank in the same 64K block of memory.

FIGURE 3
Altering Register $DD00 by a Masking Operation

```
LDA C12PRA
AND #$FC ;CLEAR BITS 0 AND 1
ORA #$02 ;USE VIDEO BANK 1
STA C12PRA
```

This condition would not be difficult to fulfill if the VIC-II chip were set to access an empty 16K block of RAM at power-up time. Unfortunately, this is not the case. When the C-128 is turned on, the VIC-II chip is set to access video bank 0 in RAM block 0—and, as it turns out, this is a very crowded block of RAM. It contains Page Zero, the 8502 stack, some RAM used by BASIC, and a big chunk of the C-128's operating system RAM—in all, over 7K of RAM that would be difficult, if not impossible, to use for storage of graphics data.

Fortunately, it is not difficult to rearrange things so that the VIC-II can access a less crowded segment of RAM. In SPRITE1, for example, the C12PRA chip is used to redirect the VIC-II chip to video bank 1 (memory addresses $4000-$7FFF) in RAM block 0.

In lines 412 through 418 of SPRITE1, the 8502 is instructed to access memory bank 15, where the C12PRA register ($DD00) resides. Then bits 0 and 1 of the C12PRA register are set to access video bank 1. A masking operation is used for this procedure, as illustrated in Figure 3.

THE VMCSB REGISTER

Before the VIC-II chip can produce a screen display, it must also be told exactly where to go in memory to get the screen data and character data which it needs to produce a screen display. In a C-128 program, screen and character data may be placed anywhere the programmer desires—within these limitations:

- A high-resolution screen map must start on a 1K boundary—that is, at a memory address divisible by $0400, or 1024 in decimal notation.
- When a full or partial character set is copied from ROM into RAM, its starting address in RAM must be situated on a 2K boundary—that is, at a memory address divisible by $0800 (or 2048 in decimal).
- If a RAM-based character set is used in a program, both the screen map and the relocated character set must reside in the same 16K video bank in the same 64K block of RAM.

THE C-128'S SHADOW REGISTERS

If you have written programs for the C-64, you may know that it has one memory register—often called the VMCSB register—that serves as a double function in high-resolution programs. VMCSB, situated at memory address $D018, is an eight-bit register that is used as two four-bit registers. The high byte of $D018 tells the VIC-II chip where it can find data that it needs to generate a screen map. And the low byte directs the VIC-II chip to the segment of memory that contains character data.

In the Commodore 64, setting the MVCSB register is a very straightforward operation. But in the C-128, VMCSB cannot be accessed directly from a user-written program. Instead, it must be addressed through two "shadow registers"—one used when the C-128 is in its 40-column text mode, and one used when the computer is generating high-resolution graphics. In the C-128's 40-column text mode, memory register $A2C is the VMCSB shadow register. In high-resolution graphics mode, the VMCSB's shadow register is memory address $A2D. These two registers are not the secret sprite registers that were mentioned at the beginning of this column. But they work in a similar way: they provide the programmer with access to other registers that are not directly addressable from user-written programs.

FIGURE 4
Text and Low-Resolution Screen-Map Addresses (store starting address code in $A2C as follows:)

		Starting Addresses			
Bits to Set	Hex No.	Video Bank 0	Video Bank 1	Video Bank 2	Video Bank 3
1111XXXX	$F0	$3C00	$7C00	$BC00	$FC00
1110XXXX	$E0	$3800	$7800	$B800	$F800
1101XXXX	$D0	$3400	$7400	$B400	$F400
1100XXXX	$C0	$3000	$7000	$B000	$F000
1011XXXX	$B0	$2C00	$6C00	$AC00	$EC00
1010XXXX	$A0	$2800	$6800	$A800	$E800
1001XXXX	$90	$2400	$6400	$A400	$E400
1000XXXX	$80	$2000	$6000	$A000	$E000
0111XXXX	$70	$1C00	$5C00	$9C00	$DC00
0110XXXX	$60	$1800	$5800	$9800	$D800
0101XXXX	$50	$1400	$5400	$9400	$D400
0100XXXX	$40	$1000	$5000	$9000	$D000
0011XXXX	$30	$0C00	$4C00	$8C00	$CC00
0010XXXX	$20	$0800	$4800	$8800	$C800
0001XXXX	$10	$0400	$4400	$8400	$C400
0000XXXX	$00	$0000	$4000	$8000	$C000

USING MEMORY REGISTER $A2C

With text and low-resolution programs written for the C-128, the default screen map—the block of memory that is used as a screen map when the computer is turned on—extends from $0400 to $07FF in memory bank 0. And the ROM block that holds character data at power-up time

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FIGURE 5
RAM Character Set Starting Addresses in Text Mode
(store starting address code in $A2C as follows:)

Bits to Set	Hex No.	Starting Addresses Video Bank 0	Video Bank 1	Video Bank 2	Video Bank 3
XXXX111X	$0E	$3800	$7800	$B800	$F800
XXXX110X	$0C	$3000	$7000	$B000	$F000
XXXX101X	$0A	$2800	$6800	$A800	$E800
XXXX100X	$08	$2000	$6000	$A000	$E000
XXXX011X	$06	$1800	$5800	$9800	$D800
XXXX010X	$04	$1000	$5000	$9000	$D000
XXXX001X	$02	$0800	$4800	$8800	$C800
XXXX000X	$00	$0000	$4000	$8000	$C000

extends from $D000 to $DFFF in bank 14. In addition, the C-128 has a color map that is always in the same place when the 128 is in 40-column text mode. This map extends from $D800 to $DBFF in bank 15.

When the C-128 is in its 40-column text mode, memory register $A2C can be used to relocate screen data, character data, or both. The high nibble of $A2C tells the VIC-II where it can find a screen map, and the low nibble points the VIC-II to the segment of memory in which character data is stored.

In order for memory register $A2C to work properly, of course, the C12PRA register ($DD00) must be set to access the video bank in which screen and character data are stored. Figures 4 and 5 show how the VIC-II, C12PRA, and $A2C registers can be used together to generate a text or low-resolution screen display.

USING MEMORY REGISTER $A2D

When the Commodore 128 is placed in its high-resolution mode, the block of RAM used as screen memory starts by default at memory address $1C00 in memory bank 0. The first 1024 bytes of this memory block—the portion that extends from $1C00 to $1FFF—are used as a color map. The data used to bit-map the screen extends from $2000 to $3FFF.

When a hi-res screen is to be displayed, memory register $A2D can be used to relocate both the RAM block used as a color map and the RAM block that is used as a bit map. The high nibble of $A2D tells the VIC-II chip where it can find the color map that it needs to generate a bit-mapped screen. And the low nibble directs the VIC-II to the starting address of the high-resolution screen map. Since it takes 8000 bytes of memory to produce bit-mapped display, however, only one bit in the $A2D register—bit 3—is used to direct the VIC-II chip to the starting address of a high-resolution screen map.

Memory register $A2D, like memory register $A2C, works hand in hand with the C12PRA register ($DD00).

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For $A2D to work properly, the C12PRA register must be set to access the video bank in which both a color map and a high-resolution screen data are stored. Figures 6 and 7 show how the VIC-II, C12PRA, and $A2D registers can be used together to generate a bit-mapped high-resolution display.

FIGURE 6
High-Resolution Color-Map Addresses
(store starting address code in $A2C as follows:)

Bits to Set	Hex No.	Starting Addresses: Video Bank 0	Video Bank 1	Video Bank 2	Video Bank 3
1111XXXX	$F0	$3C00	$7C00	$BC00	$FC00
1110XXXX	$E0	$3800	$7800	$B800	$F800
1101XXXX	$D0	$3400	$7400	$B400	$F400
1100XXXX	$C0	$3000	$7000	$B000	$F000
1011XXXX	$B0	$2C00	$6C00	$AC00	$EC00
1010XXXX	$A0	$2800	$6800	$A800	$E800
1001XXXX	$90	$2400	$6400	$A400	$E400
1000XXXX	$80	$2000	$6000	$A000	$E000
0111XXXX	$70	$1C00	$5C00	$9C00	$DC00
0110XXXX	$60	$1800	$5800	$9800	$D800
0101XXXX	$50	$1400	$5400	$9400	$D400
0100XXXX	$40	$1000	$5000	$9000	$DC00
0011XXXX	$30	$0C00	$4C00	$8C00	$CC00
0010XXXX	$20	$0800	$4800	$8800	$C800
0001XXXX	$10	$0400	$4400	$8400	$C400
0000XXXX	$00	$0000	$4000	$8000	$C000

FIGURE 7
High-Resolution Screen-Map Addresses
(set bit 3 of $A2D as follows:)

Setting of Bit 3	Hex No.	Starting Addresses: Video Bank 0	Video Bank 1	Video Bank 2	Video Bank 3
XXXX1XXX	$08	$2000	$6000	$A000	$E000
XXXX0XXX	$00	$0000	$4000	$8000	$C000

In the SPRITE1 program, the block of memory used as a color map starts at $5C00, and the block used as a screen map starts at $6000. It takes only two lines of code—lines 423 and 424—to point the VIC-II chip to the two banks of memory that will be used to color-map and bit-map the program's high-resolution screen. Register $A2D is labeled SVMCSB (for "shadow MVCSB") in SPRITE1, and the two lines that point the VIC-II chip to the program's color map and bit map are reproduced in Figure 8.

FIGURE 8
Setting the SVMCSB Register

```
LDA #$78
STA SVMCSB
```

CREATING GIANT CHARACTERS

The SPRITE1 program paves the way for the SPRITE2 program by printing a giant-sized message on the C-128 screen. And it accomplishes this feat without requiring the programmer to create, purchase, or otherwise acquire a special character set; it simply copies the C-128's character set into RAM, and then blows each character up to four times its normal size. And, since each character is stored in RAM in its original size, the giant characters produced by SPRITE1 do not require a giant-sized chunk of memory.

Another noteworthy feature of SPRITE1's character-generating module is its simplicity. To copy the C-128's character set into RAM, the program uses an algorithm much like one presented in this column a few months ago. As each character is called up to be displayed on the screen, each dot is copied into screen memory twice, doubling the character's width. And each scan line in each character is also placed in screen memory twice, doubling the character's height. Result: quadruple-size screen characters, all produced in lines 267 through 317 of the SPRITE1 program.

SPRITE1 was written on a Commodore 64 using a *Merlin 64* assembler. With minor modifications, though, it can be typed, assembled, and run using any C-64 or C-128 assembler. Type it, assemble it, and execute it, and you'll see it display part of a headline-size message on your C-128 screen. And be sure to save the program on a disk; next month, we'll add a sprite that will complete and animate the display. □

SEE PROGRAM LISTING ON PAGE 122

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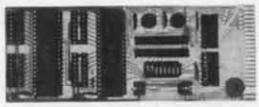

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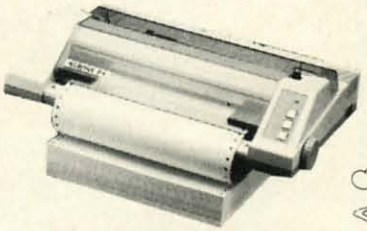

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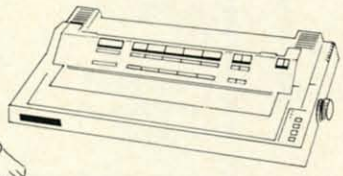

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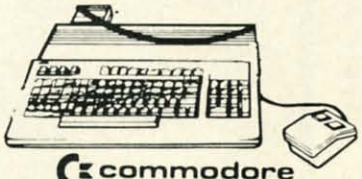

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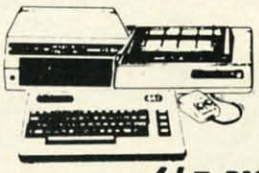

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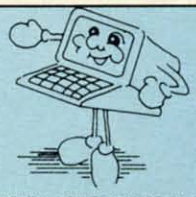

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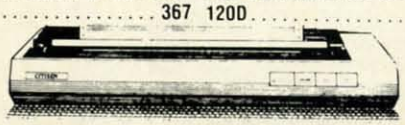

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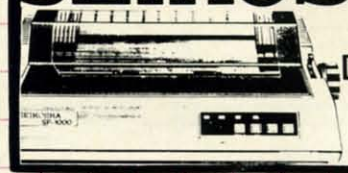

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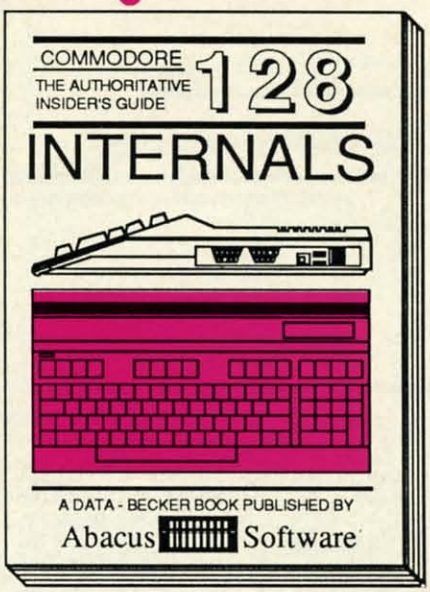

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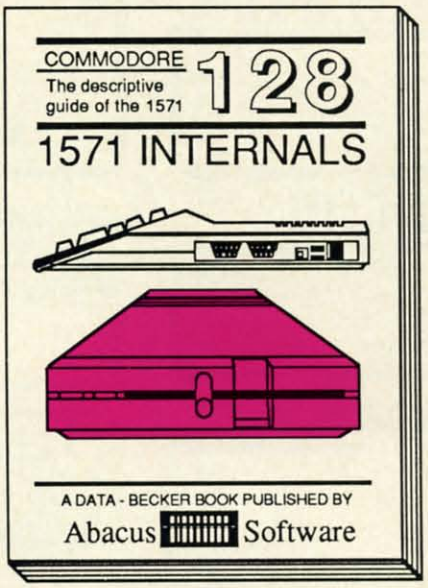

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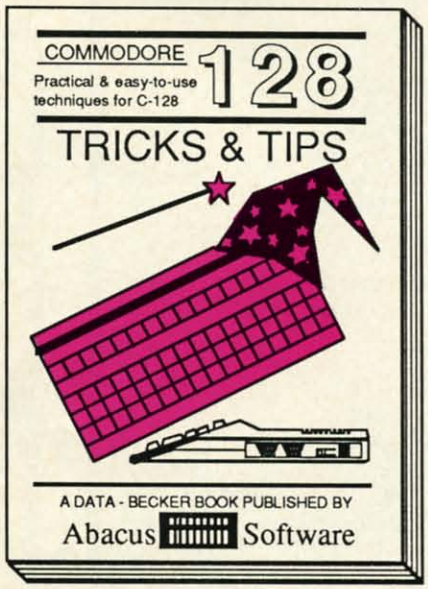

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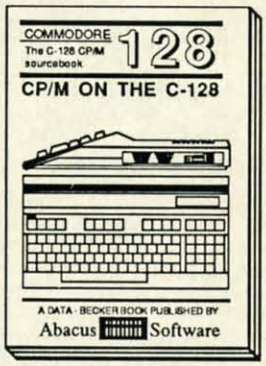

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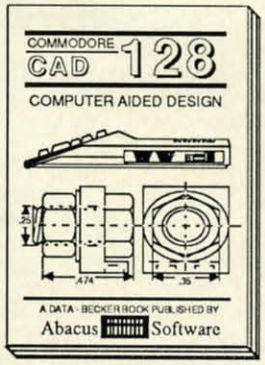

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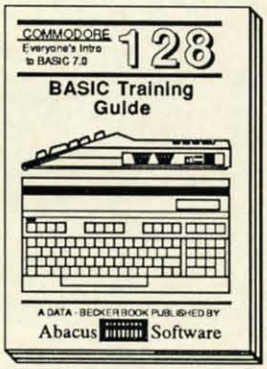

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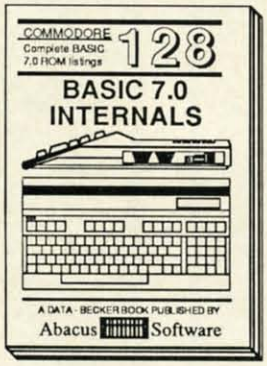

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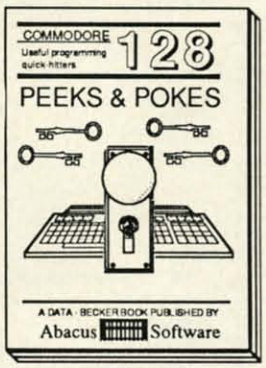

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TELEPORTER

For the C-64

By

Cleveland M. Blakemore

You walked up the boarding ramp with the ad clutched in your hand, crisp in your new cadet pressure suit. As you passed through the ship entrance, a gibbering lunatic was escorted out of the ship by two spaceport MPs. He glanced at you wildly from his straitjacket, restrained by the two large officers on either side.

"Fry them all. It's the only way to be sure you'll keep the freeloaders off!" he said, giggling.

Once inside the ship, the wrinkled, prunefaced captain, Finch Legree, explained your responsibilities while he eyeballed your uniform for starch creases.

"Your job is simple, young man. Watch the instruments. Monitor the arrivals on the teleporter ramp. If you think we're being boarded by some hitchhiker, charge the teleporter grid and fry him into charcoal!"

You understood the captain's problem, of course. Aliens were notorious for sneaking on starships on the teleport beams just to avoid the price of a flight ticket. They even went to the trouble of sending a fake transmission announcing their arrival, complete with bioscan readings and images. But a good teleport specialist, one like you, could spot the inconsistencies between received and apparent readings and ferret out the imposters.

In the game of *Teleporter*, you stand before a 3-D picture of a control panel and a teleporter pedestal. Personnel from all walks of life materialize slowly in front of you. Before they arrive, you will get a prior transmission that will display a bioscan reading (B), a body temperature reading (T), and a waveform for that alien's correct brainwaves (R). You will also see a transmitted image of the alien that is supposed to arrive on your IMAGE screen. If at any time during his materialization, his bioscan or temperature reading fluctuates more than (.5) from normal, or his received waveform (R) seems to fluctuate from his normal one (W), press the space bar or joystick button on Port 1. The grid will electrify and the alien will be disintegrated.

Legree is also watching on his monitor while the alien beams onboard. If he seems to frown more than usual, it could indicate something is fishy. You have to get used to his personality to be able to judge.

You will monitor 20 arrivals, after which you will receive a rating from Captain Legree. If you have made more than six mistakes, Captain Legree will fire you from your post.

The first six or seven levels are pretty easy. Usually the alien will be the wrong type, or will have different colors on his uniform. After that it gets a bit more difficult. The game is a good test of intuition—the feeling of knowing something without understanding how you know it. Watch the readings and waveforms for too much variation. Keep an eye on Legree—if he frowns a lot, that's a good tip the alien is a fake.

Later on, the game gets very tricky. The ship's computer malfunctions. Screens flicker and shut off. Transmissions are garbled. Captain Legree goes to lunch. The image on your monitor may not be the right one for the alien that is boarding. The ship itself passes through meteor belts and radiation storms, causing the teleporter room to shake and buckle, making it harder to watch the screens. Captain Legree is a real miser, and he may even shut off some of your equipment himself to save energy.

At the end of 20 arrivals, you may be glad to resign your post. But I hope you will like the game—if you attain a perfect score, Legree will knight you a "Regular Ricky Rocket!"

The game is written entirely in BASIC, with a little ML to copy character data down. It uses several neat graphic tricks with sprites and sprite priorities to create the "Beam-on" effect, and has some gimmicks in it to make the ship shake. My favorite is switching to an undefined character set to create the effect of "electrifying" the teleporter grid. The undefined set consists of totally random bytes in character memory, making the screen "sizzle."

You should be able to type the game in one short sitting, and I hope you'll find it a very interesting piece both in programming technique and playability. □

SEE PROGRAM LISTING ON PAGE 130

www.commodore.ca

DELUXE LIST

C-64 Program Prettification

By Mark Bersalona

BASIC programmers usually put several commands on each program line. This practice saves a few bytes of memory per program line and lets the program run slightly faster. However, it also makes the program listing difficult to read. How can we have the compactness of multiple statements on each line with the legibility of lines with single statements? *Deluxe List* solves this problem.

Deluxe List is a machine language routine stored as a BASIC loader. When the loader is run, the ML is wedged into the LIST routine. When a program is listed, *Deluxe List* looks for colons that are not within strings. All strings are assumed to begin and end with quotation marks, i.e., strings at the end of program lines must have close quotes. If it finds such colons, *Deluxe List* jumps to the next line, prints two spaces, and prints the next statement. If there are several statements in a line, *Deluxe List* prints each on a separate line.

As a bonus, the SHIFT key will freeze a listing. Unlike many other LIST-freezing utilities, the SHIFT key only pauses a LIST. It will not interfere with a running program.

HOW *DELUXE LIST* WORKS

The BASIC in the 64 has six main vectors starting at $300. The IQPLOP vector, ($306), is used by LIST to untokenize keywords. By changing the vector ($306) to point to *Deluxe List* or any other new routine, we can easily improve LIST. The end of *Deluxe List* jumps to $A71A, the address to which ($306) normally points.

HOW TO USE *DELUXE LIST*

The first listing on page 142, DELUXE LIST49152, puts *Deluxe List* in memory starting at location 49152 and activates it. When *Deluxe List* is activated it is important not to edit program lines with the screen editor. To see why, type in a program line with at least two commands (10 PRINT:PRINT for example). LIST the line with *Deluxe List* activated, edit the line with the screen editor, and hit RETURN. LIST the line again. The new program line is probably not what you expected. You can edit lines with single statements, or you can retype entire lines, but it is easier and safer to disable *Deluxe List*. SYS49152 will toggle *Deluxe List*, activating or disabling it.

Many machine language utilities also load into memory starting at 49152. The second listing on page 142, DELUXE LIST828, puts *Deluxe List* in the cassette buffer starting at location 828. SYS828 will toggle *Deluxe List* at this location. Note that tape use will overwrite *Deluxe List*.

Deluxe List is ideal for printing listings on paper. Be sure *Deluxe List* is activated before listing to a printer. □

SEE PROGRAM LISTINGS ON PAGE 142

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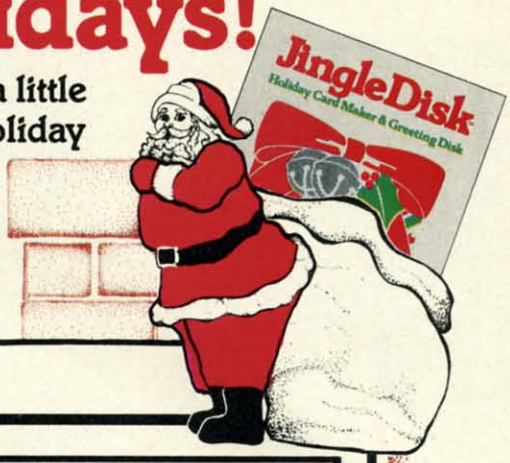

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128 RAM CHECK

By Buck Childress

I'll bet you're having a blast with your C-128. What an incredible amount of memory for those Paul Bunyan sized programs! Because it never seems to get full, chances are you'll never use all that RAM. If you're looking for something that will finally exercise those dormant bytes and at the same time make sure they're in working order, give *128 RAM Check* a whirl.

128 RAM Check will test the BASIC RAM in banks zero and one, which stretch from 7168-65279 and 1024-65279 respectively. These two memory banks comprise the RAM that gives you 122365 BASIC bytes free.

It also tests four additional areas of RAM in bank zero. They include the buffer for the cassette and disk autoboot (2816-3071), the RS232 input and output buffers (3072-3583), the sprite definition area (3584-4095), and the free RAM area (4864-7167). In addition to being used for sprite data and input/output, many machine language programs and subroutines reside in these areas. In case you're wondering, *128 RAM Check* initially loads into free RAM. After checking the sprite definition area, it relocates itself there in order to check the free area.

128 RAM Check works by attempting to store all values from 0 through 255 in each memory location. If successful, it moves to the next location. The area of RAM under scrutiny is displayed and a counter keeps you abreast of the current byte being tested. If all bytes in an area check out fine, you'll see "OK". Should a bad byte be encountered, "ERROR" is printed, along with the location of the byte. *128 RAM Check* then moves to the next area of RAM. When the various RAM areas in both banks have been checked, the test is over.

After saving a copy of *128 RAM Check*, run it. The loader will POKE the data into memory and check for errors. Now type SYS 4864 and press RETURN to check your RAM. Because the loader is erased during the test, be certain you have a good copy saved.

While *128 RAM Check* is running, you'll see a moving object at the top of your screen. This is a video display of the values being stored in each memory location. It appears to be moving because of the great speed of machine language.

128 RAM Check takes approximately 25 minutes to check bank zero and 60 minutes to check bank 1. (The bank 1 check requires extra manipulation, making it slower than the bank 0 check.) Because there are more than 125,900 locations to test, *128 RAM Check* must perform in excess of 32,200,000 PEEKs, POKEs, comparisons, and resulting subroutines in order to complete its task. If you don't want to watch it in action, you can let it zip along while you eat dinner or watch TV. Should you want to stop *128 RAM Check* before it's finished, RUN STOP/RESTORE will do the job.

When the test is complete, press the reset button, or turn the computer off then back on to reset it.

The 128 is a fabulous machine with a tremendous amount of RAM. Won't it be nice to know it's all working? □

SEE PROGRAM LISTING ON PAGE 136

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VIZASTAR for the C128

Vizastar, the integrated spreadsheet, database and graphics program that has the Commodore 64 world raving, is now available for the C128. It boasts 80 columns, and has over 40K of free memory in the spreadsheet. Those who already own Vizastar 64 will be pleased to know that your existing files can be read by Vizastar 128. Also, you can upgrade to the 128 version. Call us for details and pricing.

"The only other comparable product would be Lotus 1-2-3 for the IBM PC; nothing in the C64 world comes even close to the features of Vizastar."
AHOY July 85

"I found Vizastar would do anything Lotus 1-2-3 could, and then some. It's my Commodore choice to become the standard against which the others will be judged."
INFO 64 Magazine, Issue #7

"Vizastar is an exceptional package that rivals the features of programs such as Lotus 1-2-3 and offers C64 owners the kind of integrated software previously only available for higher-priced systems."
RUN Magazine, June 1985

"I scrutinized, tested and experimented with Vizastar extensively, but could find no weaknesses whatsoever. It is the most comprehensive, most flexible, most powerful and easiest to use integrated software package I've worked with."
Commodore Microcomputer, Sept/Oct 1985

"I use an IBM PC at work with Lotus 123. I feel Vizastar is just as good and in someways better than 1-2-3."
Steven Roberson, NC. End User

"I have used Multiplan and Superbase; both are good pieces of software, but are inadequate when compared to Vizastar."
Jim Mathews, WA. End User

"So good, I bought a second C64 and Vizastar for my office. A wild bargain! You've saved me from having to buy IBM and Lotus."
Philip Ressler, MA. End User

VIZAWRITE CLASSIC for C128

This is the new word processor from Vizastar's author, Kelvin Lacy and is the successor to Omniwriter, which he also wrote. All the features of Omniwriter are there, plus many significant enhancements, like auto pagination, on-line help, pull-down menus, full-function calculator and more. Up to 8 'newspaper-style' variable-width columns can help with newsletters.

Three different proportionally-spaced "near letter quality" fonts are also built-in for use with Commodore or Epson compatible printers. You can merge almost any other word processor file directly into Vizawrite, including Paper Clip and Omniwriter. Naturally, it is also compatible with Vizastar. At all times, what you see on the screen is exactly the way it will be printed out. Vizawrite can do mail-merges and has an integrated 30,000 word spelling checker that you can expand yourself.

PROGRAM SPECIFICATIONS

Both Vizawrite and Vizastar are written in 100% machine language and run in the 128's FAST mode, making it lightning fast. They require a C128 with 80 column color or monochrome monitor. Both come with a cartridge, a diskette, and a reference manual. Vizastar also includes a 50 page tutorial book. Both work with 1541 or 1571 disk drives.

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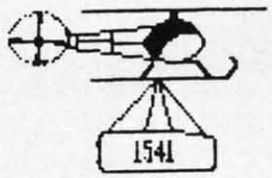

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WELCOME TO HABITAT

An Introduction to the Ground-Breaking Telecommunications Game

By Arnie Katz

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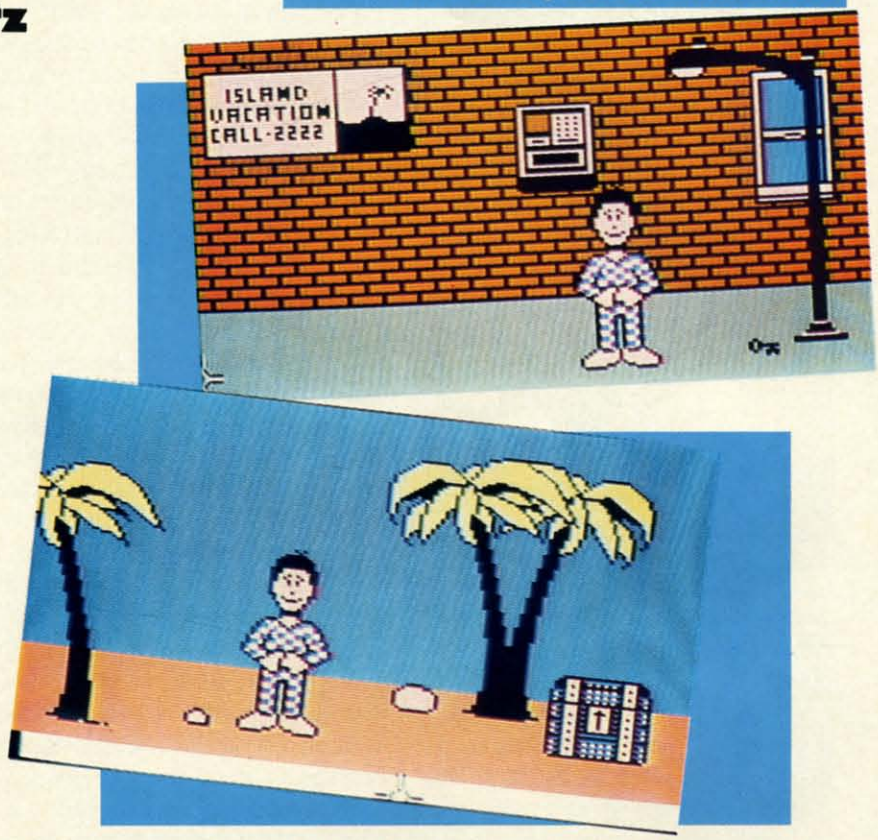

Each human participant in Lucasfilm/QuantumLink's **Habitat** *role-plays via an onscreen "avatar."* *READER SERVICE NO. 133*

The man who invented *Pong*, Sanders Associates' Ralph Baer, once said that the only three things worth doing with a home computer are entertainment, word processing, and telecommunications. This is probably a bit of an exaggeration, but there's no denying that these activities fill the majority of hours Americans spend with microcomputers in the home.

Combining gaming and telecommunications in one powerhouse package is a cherished dream that has been a long time turning into a reality. Computer gaming via modem is not a new concept, but technology has only reached the level needed to support a broad spectrum of games within the last year.

Online entertainment programs have existed almost as long as micros. Unfortunately, the quality of the games, especially the visuals, has been clearly inferior to the average piece of home computer leisureware.

The Source and CompuServe both offer a selection of online games, but entertainment is little more than a side-issue to these business-oriented operations. Most of their subscribers view the Source and CompuServe as productivity boosters and an economically attractive alternative to other modes of communication.

Though QuantumLink, which serves owners of the C-64 and C-128, is not the only entertainment-oriented network—PlayNET also emphasizes games—it is a striking contrast to rival networks. Parent company Control Video Corporation has targetted it squarely at the home market with a consequent emphasis on gaming, online chat, and hobby groups.

The Virginia-based service is introducing a brand new online game which represents the next great leap forward in entertainment telecommunications programs. *Habitat*, created by the fertile minds at Lucasfilm, is an authentic breakthrough which heralds the arrival of online gaming as a major part of the computer entertainment scene.

Although *Habitat* is still in the beta test phase at this writing, QuantumLink officials gave *Ahoy!'s* editors a hands-on demonstration of this remarkable game.

Habitat is a role-playing campaign in which each human participant controls an onscreen character known as an "avatar." As a device to heighten player-involvement, the gamer has some latitude in determining the appearance of his or her avatar. The user chooses a head and face from a databank which contains hundreds of possibilities and decides how the avatar should be dressed.

Each avatar owns a personal fiefdom called a "turf," which serves as a home base. The player can customize this turf in many different ways, including choosing the texture and color of every object within it. Stores in *Habitat* sell a selection of furniture to help do-it-yourself decorators. A well-heeled character can acquire such luxuries as a telephone which

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The* Habitat *player selects the head, face, and clothing of his/her avatar.

pinpoints the locations of other avatars in the program's vast domain.

QuantumLink plans to set up a trust fund for each avatar so that no one has to spend his time in *Habitat* trying to earn a living. The avatar can draw the interest, but not the principal, to buy things. Treasure-hunters may increase their net worth by finding hidden bags of gold, and wheeler-

For customizing one's "turf," or home base, stores sell assorted furniture.

dealers may be able to work out financially advantageous trades with other avatars.

A citizen can stay home and putter, spend the day at the beach, go to city hall to collect information, visit other characters in their turfs, hunt for magic items and treasures, or just go exploring in search of experiences. Regions in *Habitat* include cities, suburbs, and even a fairyland with mushrooms as big as avatars. A projected add-on disk will make it possible to travel to alien planets and other dimensions.

There is no predetermined plot to restrict the scope of *Habitat*. Lucasfilm and QuantumLink have seeded

Most of the game's excitement results from interaction among the avatars.

this electronic universe with mini-adventures, but most of the excitement arises due to interaction among the avatars.

A major quest involves the search for a magic lamp. The genie inside will grant his liberator one wish. "Of course, it may not come true exactly as the player might wish," warns Janet Hunter, the Control Video executive in charge of the game.

The player moves an avatar with the joystick. Holding down the action button activates a four-choice menu that lets the avatar move around the screen, pick up or drop items, and perform specialized actions.

Several forms of communication are possible between avatars. Simply typing a comment puts it into an onscreen word-balloon which is visible by every other character in the region. By positioning the onscreen cursor directly over another character, a participant can send a private message to that particular avatar which others currently in the region cannot see.

The most controversial aspect of *Habitat* may be the inclusion of a deity known as the Oracle. The god of *Habitat* can wipe out an avatar's fortune, grant wishes, or curse the unworthy with the head of a donkey. Though QuantumLink's Hunter assures that such striking divine intervention will happen only rarely and after incredible provocation, the network expects some protests about the Oracle from the Petra Fellowship and other fundamentalist Christian groups. "We realize there is a potential for some problems," she admits.

The network will defend against criticism by pointing out that *Habitat*, for all its pseudo-realism, is just a game. Other role-playing systems, such as *Dungeons & Dragons*, have used deities, and CVC will assert *Habitat's* right to the same freedom of expression.

Habitat is the next generation of telecommunications gaming. Seldom has pioneering been so enjoyable.

Quantum Computer Services, Inc., 8620 Westwood Center Drive, Vienna, VA 22180 (phone: 703-448-8700 or 800-392-8200).

SUPER CYCLE

Epyx
Commodore 64
Disk; $39.95

Super Cycle is not just a motorcycle racing contest, it's a time machine. Designer Stephen Landrum whisks computerists back to those thrilling days of yesteryear, when arcade-style games ruled the roost and the joystick jockey was king.

Those who lament the recent scarcity of action-oriented software can cure those entertainment software blahs by strapping on a helmet and gripping the handlebars of this 750-cc speed machine. *Super Cycle* provides relentless action with a dollop of strategy to keep players on their toes.

Although the nonstop pace of *Super Cycle* may remind veteran gamers of the classic videogames, the graphics of this solitaire contest are strictly contemporary. The player's bike, always in the foreground of the display, is marvelously detailed and, therefore, easily distinguished from competing cycles. The scenery is a little sparse, but the overall visual effect is pleasing to the eye without distracting the gamer's attention from the road during competition.

A much-appreciated frill is the on-track official, who drops the flag to start a new race. The control panel at the bottom of the screen also signals the cyclist that it's time to ride, but the visual cue makes the situation seem much more dramatic. Prior to hitting the track, the user picks one of eight colors for the bike and chooses the style and hue of the cyclist's outfit. The same utility screen offers a choice of three different levels of difficulty. Starting with any but the easiest is a good way to see the excellent crash explosions.

The computerist employs a joystick to steer the cycle. By pushing the stick forward and simultaneously hitting the action button, the rider shifts to a higher gear. If the button is pressed while the stick is in the neutral position, the cycle downshifts one gear. Three lights arrayed vertically on the instrument panel represent the chopper's gears. A yellow light indicates the one which is currently in force.

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Super Cycle: ***a race against time.***
READER SERVICE NO. 134

The most enjoyable aspect of *Super Cycle* is the way author Landrum has captured the feel of riding a competition bike. The tiniest movement of the control stick can send the powerful racer skidding from one edge of the track to the other, while the onscreen rider leans way over to the side in an effort to prevent a complete crackup.

The gearing isn't just for show, either. The computerist must carefully watch the speedometer and make the changes at just the right point. Otherwise, the cycle slows to a crawl. Proper shifting is especially important at the start of a race or just after the crash, since seconds lost then can make the difference between a successful race and a nice try.

The gamer races against time. The other cycles on the track are obstacles, not true rivals for the checkered flag. The program presents six courses to challenge the electronic athlete's prowess. The cyclist must complete a course before time (about 1.5 minutes) expires to advance to the next-hardest track. Every third course is a bonus run in which the rider can earn extra points and time by knocking down the flags on the road.

The first course has few twists and turns, but the routes of the subsequent tracks are much trickier. The harder ones add pylons, puddles, ice slicks, and even wooden barriers. These force the rider away from the safe center portion of the road and necessitate frequent, dangerous lane-switches.

Super Cycle provides more exercise for the fingers than the brain, so it may not be every computerist's delight. Those willing to give this engaging action program a chance, however, will discover an exciting change-of-pace from a steady diet of brain-teasing adventures and intricate simulations.

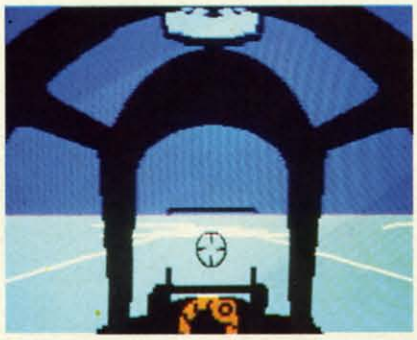
Epyx, 1043 Kiel Court, Sunnyvale, CA 90489 (phone: 408-745-0700).

–Arnie Katz

SPITFIRE 40

Avalon Hill
Commodore 64
Disk; $35.00

Amateur pilots not wanted! Only World War II aces need apply. *Spitfire 40* not only tests flying and fighting skills, but the gamer's patience as well. Battling enemy aircraft is enough of a challenge without also having to fight the program itself, which seems bent upon keeping the computerist from doing whatever he or she is trying to do.



Spitfire 40: ***a wealth of detail.***
READER SERVICE NO. 135

Few computer games have successfully combined the complexity of a flight simulator with the excitement of air combat. This disk doesn't really turn the trick, either, but it is an honorable try.

The Spitfire first rolled off the assembly line and took to the air on May 14, 1938. It was one of the mainstays during the Battle of Britain. If the controls for the real Spitfire were as difficult as presented here, Germany's planned air annihilation of Britain might have worked.

After the user decides whether to try the simulator or the dogfight scenario, the main display screen appears with a view from the cockpit. The player can look at the panel or out the windscreen, but not both at the same time. The space bar toggles between views. In most instances, it is better to fly "blind" so that all the instruments are visible. The view outside is neither very impressive nor functional.

Spitfire 40's ***instrument panel is realistic but difficult to decipher.***

The most enjoyable aspect of this program is the incredible wealth of detail. It's an absorbing play-experience just to take off, turn right around, and land.

To launch the metal bird into the unfriendly skies, the computerist first engages the engine and raises the RPM to 1800. When the pilot disengages the brakes, the plane begins to roll and pick up speed. Then, the sound of the propwash fills the room. It is crucial to take off quickly at this point to avoid overheating, and to keep the plane from being damaged by the debris that's kicked up from the propwash.

The computer flier raises the RPMs to about 3000, waits for the air speed to reach 90, and then eases the joystick back. When the sound of the propwash fades, the plane is airborne and the user can tuck away the landing gear. Once the aircraft achieves a climb rate of 1000 to 2000 feet per minute, the stick can be returned to a neutral position.

All these moves would be even easier if the onscreen instrument panel were easier to decipher. A brief, yet informative pilot's notes and player's aid card makes the process of hunting up a gauge a lot easier. In an attempt at realism, the dials contain very few numbers. Therefore, the pilot must do a lot of guessing when the arrow lies between two marked points.

Controlling the pitch of the aircraft

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Take the evaluation of Senior Editor David Martin, in *Private Pilot* magazine's August 1986 issue. Martin, a former Navy aviator who has flown almost everything with wings, reviewed five MicroProse programs, including the bestselling SOLO FLIGHT primary flight simulator. "I'd not have believed it possible . . ." he wrote, "Pilots of all sorts will be fascinated by these aviation games."

Mr. Martin isn't the only pilot who's spent many of his recent leisure hours with MicroProse simulations. Comparing his experience in training real flyers with the instrument layout found in SOLO FLIGHT, Cessna Flight Instructor Mark Rice told us "the instrument flying segments are very similar to the real thing – you're up in the clouds and using your readings to guide the aircraft."

Concorde pilot and former RAF jet flyer John Hutchinson reviewed Micro Prose' sport flight ACROJET for the British press. His conclusion: "this simulation is one that really does live up to its real-life counterpart . . . I find ACROJET completely absorbing and very exciting." High praise, from the man who flies the world's fastest airliner . . .

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is particularly challenging. No matter what the plane's altitude and speed, it is very tough to keep the nose level. This reviewer tried several joysticks to make sure it was not a mechanical problem, but the plane responded cantankerously to all control devices. Failure to watch the vertical speed indicator closely could have "grave" consequences.

The second problem involves navigation. The entire patrol area map appears at the touch of a key. Unfortunately, the map doesn't provide much information. The chart offers three scale-settings, but none is very illuminating.

In actual play, most pilots will want to watch the instruments while they adjust the flight path, and then return to the map to see the effect of such changes. It's not a good idea to make changes while the map is displayed, because the program doesn't continuously update the view. The chart doesn't scroll and lacks a compass rosette, so it's nearly impossible to get back to a specific area if the plane flies off the beaten path.

Another drawback becomes obvious when playing the battle portion. The indicators don't show information about the altitude of enemies relative to the computerist's ship.

One nice feature is the flight log. Difficulty is calculated for each individual user. Prior to play, the computerist formats a blank disk on which the program records that player's flight hours and success. The more flight time and the more kills in battle, the more difficult the game and the more skilled the enemy pilots become. Avalon Hill provides a certificate of merit for anyone who logs 60 hours in the air.

Spitfire 40 offers C-64 owners two games in a single package. Although neither the simulator nor the battle scenario is the best available, the program as a whole provides a pleasing variety of action for those who want their flying and their fighting on the same disk.

Avalon Hill Microcomputer Games, 4517 Harford Road, Baltimore, MD 21214 (phone: 301-254-5300).

—Rick Teverbaugh

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Hi Tech Expressions
Commodore 64; Disk

The holiday season is almost here, bringing with it a universal need for attractive greeting cards. There is something special about a homemade card, and these programs can help even those who can't draw a Christmas tree design customized greetings packed with the holiday spirit.

ThoughtWare started this branch of computer design almost by accident. The company created *JingleDisk* as an electronic card to send to clients. Recipients praised it so enthusiastically that ThoughtWare launched a new division, Hi Tech Expressions, to create similar products for home use. The original program, now updated with new graphics, has become the flagship of an entire line of programs for making cards and associated party supplies.

It's not surprising that *JingleDisk* sparked so much excitement. It's stuffed full of seasonal paintings that make the Commodore burst with Christmas cheer. A six-minute illustrated story unfolds onscreen, detailing the adventures of a mouse, a cat, and a tin soldier. The trio's hijinks in front of the fireplace and decorated tree, accompanied by seasonal carols, would bring yuletide smiles to Scrooge.

JingleDisk contains a simple cardmaking option along with the animated holiday tale. It prepares an illustrated, folded card, with a clever graphic of the mouse hiding in a stocking hanging on the tree. The computerist can type in the names of sender and recipient.

HeartWare provides a three-minute animated friendship demo-message, music, and a card-printing function to prepare folded or full-page greetings. Users can also make a self-booting disk with a personalized greeting to send to friends and lovers.

The graphics available are sentimental in tone. Folded cards can be illustrated with nesting lovebirds, snails, fish, or a sun-drenched tree. Full-pagers include a picture of a forest pond with rainbow, a heart pierced by Cupid's arrow, and an underwater scene.

Do-it-yourself cards, party goods, etc.
READER SERVICE NO. 149

CardWare makes everyone's birthday a more special occasion. A three-minute animated story details a shopping spree. The disk maker function creates animated self-booting greetings to send to computing friends. The cardmaking options have five child-pleasing graphics for folded cards, including teddy bear, rag doll, roses, birthday cake, and toy train. Full-page scenes include a pretty village, birthday candles with the recipient's name, and a baker holding a birthday cake.

PartyWare, a two-disk set, is a complete party design and greeting card kit. The built-in disk maker function creates personalized messag-

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es framed by animated graphics. Printing functions create cards, note paper, place mats, banners, invitations, place cards, party hats, prize ribbons, and a party check list. The package even includes ideas for games and a database to store a guest list of up to 60 names. There's room to save nicknames, addresses, phone numbers, and the dates of two special events, such as anniversaries and birthdays.

To accompany these special programs, Hi Tech created *WareWithAll* and *Holiday Printerpaper.* These two packages have everything the computerist needs to make the greeting cards look more professional.

WareWithAll contains four kinds of designer printing paper: 20 sheets each of polka-dotted, star-spangled confetti-bordered, and heart-trimmed paper. Also included are greeting card envelopes, magic markers for addressing letters, a special gift disk, and some decorative stickers.

Holiday Printerpaper has three styles of paper that work with any print utility product. There are 50 sheets each of Christmas trees, snowflakes, and holly. *Holiday Printerpaper* also comes with a special graphics disk that contains more art for use with *PartyWare.*

The programs all operate smoothly, and their low price is no reflection on their solid quality. The resulting greetings, whether on disk or paper, are bound to make the holidays more cheerful.

Hi Tech Expressions, ThoughtWare, 2699 S. Bayshore Dr., Suite 1000A, Coconut Grove, FL 33133 (phone: 305-854-2318).

—Joyce Worley

PSI 5 TRADING CO.

Accolade Entertainment Software
Commodore 64
Disk; $29.95

Travel lanes crisscross space in the 35th century. Ships transporting cargo and passengers fill the skyways of the galaxy. Brisk commerce between the intelligent races of the known planets keeps freighters zipping through the shipping lanes. A captain with a good crew has a chance to amass a fortune shepherding goods from one port of call to another.

Alas, there's more in space than friendly transports and passenger ferries. Along the Parvin Frontier, a mining quadrant populated by settlers, entrepreneurs, and social misfits, cargo pirates prey on legitimate travelers. These space thieves will clear a hold of its wares before the captain can say, "Who goes there?"

Wise leadership might crew the ship, choose a mission, and win through to the destination with cargo and freighter intact. Odds are that something will go amiss. Equipment failure, delays, and personnel problems are bad enough, but just when the captain's hands are full coping with these workaday emergencies, the pirates add the final straw to his back-breaking load. It's not easy to get rich, even in the future!

Psi 5 Trading Co. casts the computerist as commander of a cargo freighter, trying to earn an honest buck by delivering goods to Parvin planets. Designer Mike Lorenzo, best known for his videogame hits *(Oink, Circus, Golf),* has created a complex spaceship and an exciting roster of characters to act as crew. The resulting simulation calls for good judgment and steady nerves, but even these attributes may not be enough to overcome the problems that confront the *Psi 5* player.

The captain first chooses the course from a menu of several possible assignments. The roster lists the distance, cargo, and projected payment for completing the mission. Since the rewards are proportionate to the risks, it's best for novice pilots to start with a simple destination until management of the ship and its personnel becomes automatic. The experienced space skipper can then tackle one of the higher-paying long hauls.

The specialists of the crew run five key positions which go far to determine the success or failure of the enterprise. Choosing the right human, alien, or vaccdroid worker for each spot is an important part of the game.

There are six candidates for each department position, shown on the screen as a rogue's gallery of photographs. The candidates' resumes list name, nickname, age, marital status, qualifications, educational background, experience, strengths, and weaknesses.

The player must evaluate these spacedogs' histories and hire officers for the Weapons, Scanning, Navigation, Engineering, and Repair Departments. It isn't always easy to assemble a crew that works well together. As in the real world, expert skills in one area often go with deficiencies in others. Sometimes a strong candidate has grave personality flaws which make it difficult for him or her to fit into shipboard life.

The captain's communications console, which fills the display screen, provides all the data needed to run the mission and maintain contact with the ship's personnel. Graphic artist Mimi Doggett did an exemplary job producing this attractive and easy-to-use screen.

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The upper left half of the screen looks out on space, and the scene changes from forward to aft to monitor traffic coming and going. The communications screen is on the right half of the display. This displays a picture of the department head to whom the captain is talking.

A band of indicators across the middle of the screen monitors the ship's functions, including shield and battery indicators, temperature, weapons and supply information, and speed and compass readouts. Unfortunately this band of dials and gauges is so densely packed that they are difficult to interpret. The savvy computerist will memorize what each symbol means.

Below this tightly packed data strip, a second band lists the departments. Selecting one initiates communication with that section's manager.

The information window in the lower half of the screen reveals data and a steady battery of incoming messages from the onboard specialists. Shifting among the sectors, the captain examines the status of activities in each department via his telecommunications screen, and assigns work.

It takes constant monitoring of all the ship's departments to properly prioritize work assignments and insure top efficiency. The Scanning Department keeps track of other space vehicles and identifies their positions, class of people, and whether they are friends or foes. The Weapons Department displays the type of munitions available and executes attack commands. The Navigation Department shows the possible courses, estimated time of arrival at the destination, risk factors, and speed. Engineering allocates power to the parts of the ship where it's most urgently needed. Finally, the Repair Department, with its crew of robodroid assistants, fixes all damage sustained.

The graphics are the best part of the program. The viewport creates a satisfactory illusion of interplanetary travel, and the communications console is sparked by clever bits of animation. The crew members are depicted as a satisfying mixture of human, alien, and robotic lifeforms. The keyboard or joystick controls all gaming options, and it is easy to move between departments with the communications device.

It is not easy to master the ship's controls, nor to determine the perfect allocation of power to keep the freighter alive, defended from enemies, and on time. Unfortunately, most gamers will fail again and again before they are able to complete even one expedition. The training mission guide included with the documentation lacks the detail necessary to adequately teach new pilots. Many players will give up before they get the hang of it.

Once the gamer does gain control of the ship, *Psi 5 Trading Co.* is not quite as exciting to play as its appearance might suggest. Beneath the fancy visuals, *Psi 5* is a complex simulation which requires the user to juggle a lot of factors during the course of a mission. Gamers who don't favor this sort of mental acrobatics might prefer a more action-oriented program. Those who do like complex strategy contests, however, will enjoy many problem-filled missions as they explore the frontiers of space.

Psi 5: ***mental acrobatics required.***
READER SERVICE NO. 136

Information window displays data, incoming messages from specialists.

Accolade, 20863 Stevens Creek Blvd., B-5/E, Cupertino, CA 95014 (phone: 408-446-5757).

—Joyce Worley

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Mind Mirror: ***substance beneath hype.***
READER SERVICE NO. 138

MIND MIRROR

Electronic Arts
Commodore 64
Two disks; $32.95

Timothy Leary's *Mind Mirror* represents the ultimate computer expression of pop psychology. The man who led a generation of pharmaceutical experimenters in the 1960s has turned to software for mental expression in the 1980s.

The front cover shows a hand bearing a crystal ball against a post-rainstorm sky. Within the crystal stands Dr. Tim. His face is distorted slightly by the globe's fish-eye effect, but remains instantly recognizable. He is depicted in Yuppie Heaven: a modernistic habitat of white walls, clean lines, and "raw-look" wood. A caveat tacked to the shrinkwrap promises that this software "can be hazardous to your stereotypes." The copy on the back cover actually invites consumers to "Tune in, turn on, boot up."

If all this strikes software cynics as a terminal case of computer hubris, the impression is erroneous. As is so often the case with Dr. Leary, there is a surprising amount of substance beneath the outrageous hype.

Mind Mirror is a fine example of a genre now attaining popularity among computerists: the life simulation. Like Dr. Peter Favaro's *Alter Ego* (Activision), this program explores the entertainment possibilities of vicariously experiencing life through another's eyes.

Mind Mirror offers three types of activities. First, the user learns to create the "mind maps" which serve as the basis for the program. The second segment of *Mind Mirror* applies the concept to "real" life. The computerist creates mind maps of movie stars, athletes, politicians, and the like and then runs these simulacra through a series of exercises on subjects like "Religious Tolerance." Finally, the user actually steps inside the construct for a walk through an actual life experience. To sample the full ramifications, create a mind map of Ronald Reagan, and then check out a punk rock club. Or how about going on a job interview as Boy George?

Events are described in prose. There's some visual stimulation, however, in the form of beautiful neo-psychedelic transition sequences. They're guaranteed to remind older Commodore owners of a 1960s rock concert light show.

The package includes a booklet that is almost worth the price of admission. Dr. Tim convincingly demonstrates that there's still lots of spring in his synapses with a brief history of human thought that says more in a couple of pages than many philosophers speak in volumes. *Mind Mirror* reflects Dr. Leary's view that mankind has passed beyond the "mechanical thought" patterns of the post-Gutenberg era, into the age of "electronic thought." "Just as the industrial age replaced the one-tool-at-a-time hand craftsmanship with toolmaking machines, now the mechanical thinker—the PhD "man of letters" (who laboriously wrestles heavy Macro thoughts in and out of wood-pulp paper)—is being replaced by the electronically literate person who has access to a thoughtmaking program," explains the Doctor, who elsewhere refers to his program as a "thought processor, headware for the computer generation."

Mind Mirror is a piece of software that does something genuinely rare: It enlightens while it entertains.

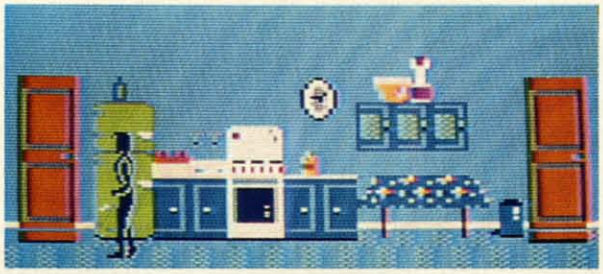
Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404 (Phone: 415-571-7171). ***—Bill Kunkel***

FRANKIE GOES TO HOLLYWOOD

Firebird
Commodore 64
Disk; $34.95

"Relax," urged the British pop group, Frankie Goes To Hollywood, in their biggest hit song. Unfortunately, no one told the design team that too much relaxation might be injurious to the finished program. After bopping to a peppy computerized version of the title song, the computerist can play this contest for hours without experiencing even the slightest resistance from the characters or

Frankie Goes to Hollywood ***requires the player to advance from Mundanesville to the Pleasure Dome by collecting four pills which, when consumed, either double pleasure or halve pain.***
READER SERVICE NO. 139



The rooms the player passes through contain clues which must be interfaced with devices found elsewhere.

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situations.

Frankie Goes To Hollywood is yet another in an endless string of British-produced action games which shamelessly ape Epyx's classic *Impossible Mission.* Once again, Anglo designers have concocted a scenario in which a player-surrogate moves through a seemingly infinite series of corridors and rooms.

As usual, the rooms contain clues—sometimes out in the open, sometimes hidden—which the player must collect. Some of these objects must be interfaced with other devices located elsewhere within the game. For instance, a videocassette can only be played on a VCR, and a computer disk must be booted on a compatible micro system.

Frankie Goes To Hollywood pulls out all the stops in terms of game gimmicks. It adheres faithfully to the philosophy that "more is better." Many British computerists believe that the more rooms, puzzles, and required tasks a game contains, the better value it is.

In a sense, this is true. Unfortunately, it doesn't say much about the quality of the games which this quantity-oriented approach generally produces. Those who want a really sprawling action-adventure, even at the cost of inventiveness and originality, should enjoy this.

A fair example of the "kitchen sink" approach used to design *Frankie Goes To Hollywood* is the murder. Near the start of the game, the player stumbles upon a dead body. Thereafter, clues appear as the character continues to move through the corridors. These clues contain information about the suspects and the murderer.

Clues concerning possible suspects might inform the player that "Miss Blofu is a vegetarian," or that "Capt. Klack is illiterate." Elsewhere, the game provides information about the killer like "The murderer left behind a cookbook: '50 Ways To Prepare Penguin.' " The player must correlate the various pieces of information to pinpoint the criminal.

Despite the nagging sensation that most of this program's "original" elements are cleverly disguised borrowing from *Impossible Mission,* Frankie does demonstrate some inventiveness. The player must try to make the leap from "Mundanesville," an appropriately ordinary suburb, to the arcadelike Pleasure Dome. The computerist can't go to the Dome without first becoming a complete person by collecting four types of pills which, when consumed, either double pleasure to halve pain. These pharmaceuticals, combined with actual experiences, increase the player's status as a "real person." Frankie Goes To Hollywood (the group), which acts collectively as the game's deity, periodically grants "pleasure units" and announces the player's new status (i.e.: "The player is now 20% a real person.")

The idea that pills, represented by icons which resemble a ribbon, a hypodermic needle, a heart, and a cross, make people more "real" is fairly remarkable. *Frankie Goes To Hollywood* is supposed to be controversial, but its seeming advocacy of wide-spectrum drug-taking may be going a little far. Parents may well want to use discretion or, at the least, discuss the theme of the program with young computerists.

Another problem is that it takes an eternity to reach the Pleasure Dome. Adding salt to the wound is the fact that *Frankie* can't be saved, which means the player must retrace the same tortuous route each session.

A much worse drawback is that the gamer doesn't face a single serious challenge during the entire tour of Mundanesville. The player simply moves from room to room, searches for objects, and takes them. The only decision for the computerist is which item to discard when the character can't carry any more. There's no time limit or hostile force which impels the player to keep moving and work fast, yet this scavenger hunt is too simple to require the gamer to ponder each move for more than a few seconds. Where are those killer robots from *Impossible Mission* now that we need them so badly?

The graphics delineate every on-screen object in marvelous detail. The icons, which are virtually ignored in the documentation, are well-drawn, but the symbolism is a little murky. The cross obviously represents religion, but what does the hypo symbolize? If the needle is supposed to stand for health or medicine, some less flagrant image might have been a better choice.

Frankie Goes To Hollywood is a game with a lot of promise, all of it sabotaged by the lack of any genuine conflict in the long introductory sequence. There's plenty to do and see, but after a few hours of seeing and doing it, the thrill is gone.

Firebird Licensees, P.O. Box 49, Ramsey, NJ 07446 (phone: 201-934-7373). *—Bill Kunkel*

Reviewed Next Month:

- **Ultimate Wizard**
- **Financial Time Machine**
- **Macbeth**
- **The Arc of Yesod/The Nodes of Yesod**
- **Battlefront**

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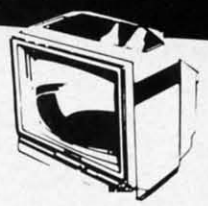

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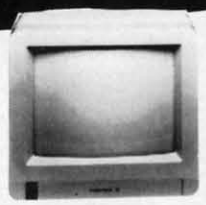

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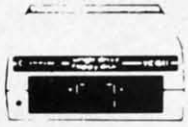

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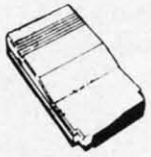

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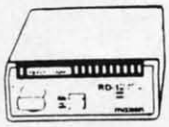

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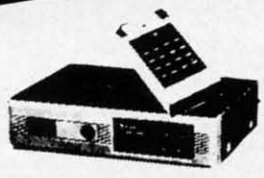

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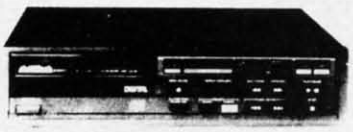

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SYNTAX PATROL

Instant Error Detection for the C-64

By Buck Childress

Snap! Crackle! Pop! No, that's not your cereal bowl talking to you. It's *Syntax Patrol* zapping the bugs out of your programs. *Syntax Patrol* knocks those bugs out before they get in. It keeps an eye on the syntax of each line as you enter it and stops those errors cold. No more marathon debugging sessions. No more unusual verbiage emanating from the mouth. Will computing ever be the same?

Use *Flankspeed* (page 121) to enter *Syntax Patrol*. After saving the program to disk, reset the computer and LOAD"SYNTAX PATROL",8,1. When it's through loading, type NEW and press RETURN. Then type SYS 51000 and press RETURN. That's all there is to it. *Syntax Patrol* is on patrol. Now whenever you enter a program line and press RETURN, *Syntax Patrol* checks for errors and lets you know immediately if any exist. The line won't be added to your program until it's error free. It's as simple as that.

Syntax Patrol is really handy for digging out those no-nos in an existing program, too. If one of your programs has the Syntax Blues, just load it up and list it, place the cursor on the first line, and start pressing RETURN. Zip, bam, pow...you'll find those typos, bleeps, and blunders in no time flat.

As an added feature, *Syntax Patrol* is fully compatible with the *Failsafe* automatic program saver (May '86 *Ahoy!*). You can keep the bugs out as you go and have those spiffy program lines saved automatically. To use them together, just load and run *Failsafe.* Now load and activate *Syntax Patrol.* By the way, whenever you activate *Syntax Patrol,* you're asked if you want to use *Failsafe,* too. Press the N (no) key if you don't or the Y (yes) key if you do.

If you choose yes, *Syntax Patrol* first checks to see if *Failsafe* has been loaded, and lets you know. Then it makes the necessary adjustments in *Failsafe* so they'll work together automatically. Now you can just program to your heart's content. After 15 minutes, *Failsafe* waits for you to press RETURN on an error-free line. Because a save won't take place on a messy line, your gem stays nice, neat, and pest free.

To deactivate the utilities, type SYS 51000 and press RETURN. SYS 51000 turns *Syntax Patrol* on and off. And, because *Syntax Patrol* controls *Failsafe*, it also deactivates *Failsafe. Syntax Patrol* returns *Failsafe* to its original state so, if you want, you can use it alone.

Here are a few things to remember. *Syntax Patrol* checks the syntax of your program. It'll find the typos (e.g., PKOE instead of POKE), improper punctuation, missing parentheses...just about everything you're likely to come across as a BASIC programmer. It's up to you, though, to make sure that your program is sound. For example, if you have a NEXT command in your program, you must have a FOR command somewhere in there, too. *Syntax Patrol* accepts NEXT as a proper command, but a missing FOR won't show until the program is run, and vice versa. The same holds true for other types of commands such as FNA(X), PRINTB$(20), READA, etc. They're all syntactically correct. But, if somewhere in your program you haven't defined the function or dimensioned the array, or you don't have enough data, you'll get an error when your program is run. Unfortunately, there's no way that *Syntax Patrol* can anticipate what you will have in your program. If you watch this part, *Syntax Patrol* will do the rest.

Syntax Patrol is a machine language program that uses an area of RAM totally separate from BASIC. Although, in most cases, you can load, save, and run programs on a non-interference basis, it's a good idea to deactivate *Syntax Patrol* first, just to be on the safe side. Remember, SYS 51000 alternately switches it on and off.

Put *Syntax Patrol* on the job. Your programs will be so clean they'll squeak.

SEE PROGRAM LISTING ON PAGE 128

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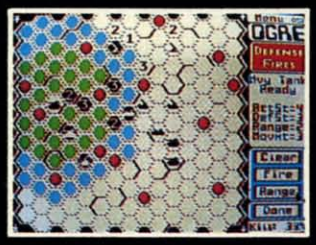

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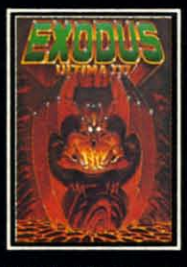

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DISCS OF DAEDALUS

For the C-64

By George Decker

Years of experimentation paid off for the research team made up of earth's greatest biophysicists. After repeated failures, they perfected a bio-interfaceable anti-gravity compound—a synthetic metal which, when brought into contact with living cells such as in a human hand, would float like a helium balloon.

But the team's triumph was short-lived. For warmongering Jershans, who monitored the broadcast of the scientists' press conference, kidnapped the entire team and enslaved them to work in laboratories on various planets throughout the Jershan space system, planning to exploit their genius for the purpose of weapon design. An early warning system protecting all the planets prevents any spacecraft from landing and staging a rescue attempt.

The Jershans did not count on earth's elite rescue corps using the scientists' own invention to save them. For by dropping pieces of the anti-gravity substance to the planet's surface from a safe distance above, the scientists could be enabled to float to the rescue ships—and freedom. The fragments to be used, cast by the scientists in the shape of weightlifting plates, have been codenamed the Discs of Daedalus, after the character in Greek myth who escaped imprisonment on wings of his own invention.

HOW TO PLAY

There are five different screens to go through. Upon completing the last screen, you start over at the first.

Screens one, three, and five get larger each time you go through them. That is, starting with the second time through these screens, you will repeat them. The third time you will go through them three times, the fourth time four, etc.

Screen four is timed for how long you stay there. Each time through this screen will increase the amount of time you will stay the following time.

All screens get a little faster each time through, and completing the last screen will award you an extra ship, up to a maximum of three.

The number of ships in reserve is displayed in the upper left of the screen. The number of scientists rescued is displayed in the upper right.

Screen One, landing sequence: Your ship will appear at the top of the screen and can be moved right or left for positioning. Below your ship are mines you want to avoid. When you push your joystick button your ship will descend. You have no control over the descent, but can move right or left to avoid the mines.

Hitting a mine results in the loss of one ship.

Screen Two, rescue sequence: An enemy ship will be on the right side of the screen and move up and down firing missiles at you. At the bottom of the screen is the scientist who will be moving back and forth. Your ship will stay in the upper half of the screen and can be moved up, down, right, or left. To rescue the scientist, push your joystick button. This will release a disc that he will need to catch to fly up to your ship. You have an unlimited amount of discs, so if you miss you can try again.

To complete this sequence, catch the scientist by touching him with your ship when he is flying up in the air.

You are responsible for all your equipment and the scientist's life. This means that if your ship, disc, or the scientist is hit by a missile, you lose a ship. You will also lose a ship if the scientist reaches the top of the screen before you catch him.

Screen Three, takeoff sequence: Remember when you descended through the mines? Now you have to go back up through them. This is just like screen one, except you are going up instead of down.

Screen Four, missiles in the space storm sequence: Missiles will fill the air and move right, toward your ship. Your ship will be on the right hand side of the screen and can move up or down to avoid the missiles. Because of the space storm, you will not always be able to see the missiles. Watch for the brief periods of light that will let you see them so you can avoid being hit. Also listen for the sounds they make, so you can judge how far they have advanced when they can't be seen.

Being hit by a missile results in the loss of one ship.

Screen Five, force field sequence: Your ship will be positioned on the right of the screen. The force field will be on the left, running top to bottom. In the force field is an opening that will constantly move up.

When you are ready to start, push the joystick button. Your ship will move to the left and won't stop until you reach the other end of the screen or hit the force field. You can control your ship by moving it up or down.

To complete this sequence, guide your ship through the force field opening. Hitting the force field results in the loss of one ship.

LOADING AND RUNNING

Type in LOAD "RESCUE",8,1 and hit RETURN. When the program is loaded type in SYS 49152 and hit RETURN to start. □

SEE PROGRAM LISTING ON PAGE 133

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DETONATION

For the C-64

By Bob Blackmer

Evil Koloccan terrorists have planted numerous bombs throughout the sacred temple of Remkcalb. They have also impregnated the temple walls with a substance connected to the detonating device, and placed vaporous swirls of energy protecting each room in the temple in which a bomb is placed. You have been selected to try to save the temple from destruction because of your knowledge of explosive devices and your athletic prowess. Time is of the essence, as the temple will be destroyed in less than eight minutes after the fuse is lit.

Your mission is to enter each room of the temple, retrieve the bombs, and take them to your containment room, where you will defuse them. This will clear one level of the temple. Do this 11 times and you will have saved the temple.

Detonation is an explosive, colorful arcade game for the C-64. When the title screen appears you will see the temple rooms at the top, left, and right portions of the screen, and the three vaporous swirls which will be your nemeses. The bottom of the screen is your base, the containment room where you will defuse the bombs and go to enter the next level. The fuse that will serve to make you nervous runs around the screen border. In the background you will hear the haunting rhythm which will accompany you throughout the game.

You begin the game by pressing the fire button of a joystick plugged in Port 2. You will see the fuse light and begin to burn. You are at your base at the bottom of the screen. Any contact with the walls of the rooms, the walls of your base, or the vaporous swirls will result in the burning of the fuse at a frenetic pace. You must enter each room as you avoid the swirls and retrieve the bomb. After obtaining all three bombs you must go to your containment room, where they will be defused. This will complete one level, signified by a bomb appearing at the bottom of the screen and the increased speed of the swirls. The pulsating rhythm will also speed up, providing a musical pace for your mission. Upon completion of the tenth level, the pace of the swirls and music will be sheer madness, and I wish you luck. If you are successful at this level, your score will be determined by the amount of fuse left. Needless to say, if the fuse burns out during your mission there will be a monumental explosion signifying your failure.

Your character on the screen possesses great speed and mobility, enabling you to complete your task if you are diligent in avoiding contact with the swirls. If you like to shoot for a high score, my best is 87,000. If anyone (I mean you) can top this, write me care of *Ahoy!*

Detonation is written in machine language and must be entered using *Flankspeed* (see page 121). After typing *Detonation* in and saving it, reset the computer and LOAD "DETONATION",8,1. Type SYS 49152 to start. □

SEE PROGRAM LISTING ON PAGE 143

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BUFFER-IN, BUFFER-OUT:
Speeding Up Your Computer Throughput

Text and Photos by Morton Kevelson

Speed! That's what computers are all about! The entire life of a computer centers around its ability to perform hundreds of thousands of rudimentary mathematical calculations per second. Even the most modest of these machines have hearts which beat a million times per second. Each beat represents another computerish thought brought to fruition.

The full speed of the computer is unleashed only when it is communing with itself. When interaction with the outside world is required, it more often than not winds up twiddling its thumbs. We humans are probably the worst offenders in this regard. We require our machines to patiently await each and every one of our keystrokes. The failure to heed just one results in the immediate censure of the hapless machine.

When it comes to sending information to the outside world, the tables are turned. In most cases we want all the speed the computer can give us. For some things, the display screen for example, the computer is more than adequate for the task. Very few humans can read text as fast as the machine can put it on the screen. However, we are dissatisfied with the time the majority of output operations take. The 1541 disk drive has received much criticism in this regard. But even more aggravating, perhaps, are printers. Even the fastest dot matrix printers barely put text on paper at a rate which makes for comfortable reading. Most of us have experienced the everlasting tedium of printing a large document or a lengthy program listing.

Fortunately, there is a purely electronic solution. Low cost computer memory chips have made it possible to assemble large blocks of computer memory at very little expense. When properly combined with a microprocessor, a suitable control program in ROM, and several support chips, a block of RAM can be set to behave like a very fast printer connected to the computer's output port. We now present two such devices which perform the desired task in fundamentally different fashions.

SERIAL BOX

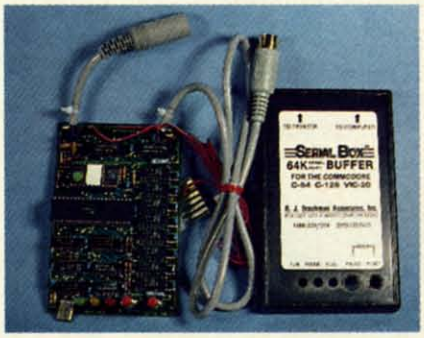
R.J. Brachman Associates, Inc.
Commodore 64
Price: $79.95

To our knowledge *Serial Box* is unique in the Commodore world. It is the only 64 kilobyte buffer which interfaces directly with the proprietary Commodore serial port. As such it may be used with any of the Commodore printers (1515, 1525, 1526, MPS series) which were designed for the VIC 20, C-64, and C-128.

However, slapping a big buffer on the Commodore serial port is not as simple as it sounds. Some thought has to be given to just how this device will be controlled. After all, Commodore serial port peripherals are expected to be "intelligent." That is, they all have microprocessing power of their own, with the ability to process instructions and take appropriate action.

R. J. Brachman has given the proper thought to the design of their product. *Serial Box* appears to the serial port as a hardware device number 6 acting as a buffer for hardware device number 4. This means that commands to *Serial Box* are issued to device number 6. In turn, *Serial Box* will automatically pass on all data and commands intended for device number 4. This arrangement will work fine with the majority of installations. However, for those rare cases, both the *Serial Box* device number and its associated buffered device number may be changed under software control to any value from 4 to 7. Of course you must make sure that *Serial Box* and its buffered device do not have the same number, or terminal confusion will result. The accompanying user manual makes these facts, among many others, perfectly clear.

Note that *Serial Box* does not take the place of a printer interface. If you are using a non-Commodore printer you will still require the services of a serial port printer interface in conjunction with *Serial Box*. Of course,



Serial Box *sports 6502 microprocessor, 4K of operating system in ROM, and 64K of dynamic RAM. Note that an unusual software refresh of the dynamic RAM is made use of.*
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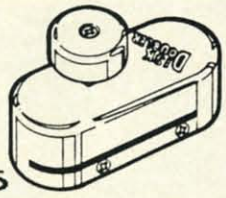

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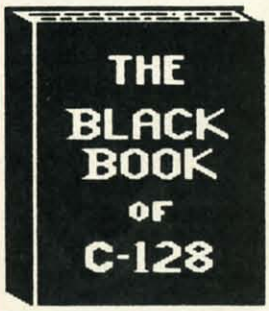

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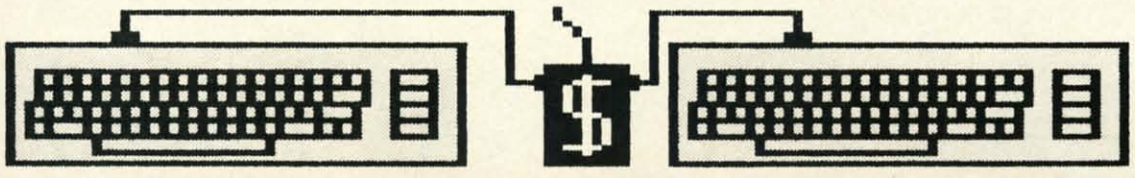

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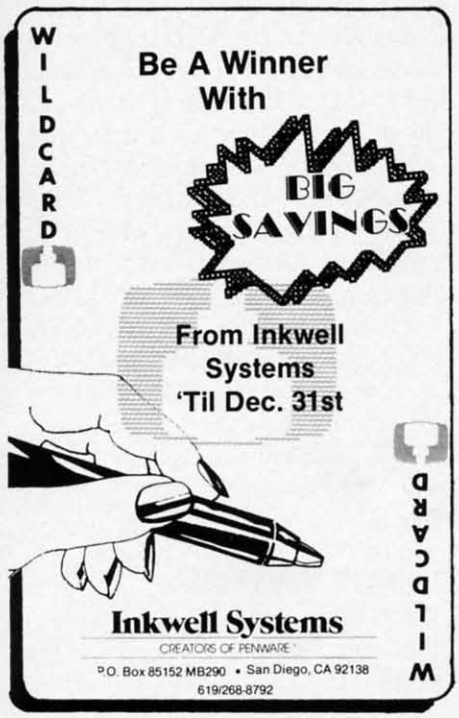

the connection order requires that *Serial Box* goes between the computer and the printer interface.

The *Serial Box* hardware is contained in an unimposing 3-1/2 by 5-3/5" black box not much different in external appearance from most printer interfaces. Communication with *Serial Box* is via a pair of unshielded cables which are terminated in male and female six-pin DIN connectors compatible with the Commodore serial bus. Thus *Serial Box* becomes another link in the serial port daisy chain. Of course it should be the last link right ahead of the printer or its associated interface.

Power for *Serial Box* is supplied over a single red wire terminated in a cassette port connector. This may be fine for use with the VIC 20 or the C-64, but it will cause problems for SX-64 and Plus/4 users. (See next month's *Ahoy!* for information on building a 5v power supply.)

The front panel of the serial box also sports a trio of colored light emitting diodes (LEDs) in red, yellow, and green, along with a pair of red push-buttons. The green light signifies that all is well with *Serial Box*. The yellow light indicates that pause mode is in effect. The red light signals that the buffer is full, sort of a case of *Serial Box* indigestion. One of the push-buttons serves to place *Serial Box* into pause mode while the other serves to reset the built-in line counter. Simultaneously pressing both buttons will clear all data stored in the buffer.

The LEDs will also light in various combinations to indicate the possible operating conditions. For example, all three lights lit at once indicates that the buffer has filled while the printer is off-line. This may be considered as a case of terminal indigestion with no place to go.

Operating *Serial Box* is simplicity itself. Just plug it in, turn everything on, and away you go. There are several other features of which you will most likely wish to avail yourself. The pause button takes primary consideration. This stops output to the printer while still accepting data from the computer. The primary advantage of this mode is a slight increase in speed. During normal operation the buffer sends one character to the printer for every eight received from the computer. When in pause mode *Serial Box* turns its full attention to the computer, resulting in a slight increase in speed. Note that pausing *Serial Box* does not suspend the printing of any data which may already be in the printer or interface buffers.

The actual operating speed of *Serial Box* is dependent to a great extent on the capabilities of the software running on the computer. In general, word processors will be able to make the most of *Serial Box*, as these programs can generally transmit text as fast as the printer can take. Graphic dumps will give variable results, as they are usually calculation-intensive. The actual benefit you will perceive will of course depend on the speed of your printer. The slower your printer, the more you will gain.

R. J. Brachman claims a top speed for *Serial Box* of 677 characters per second (cps). We clocked the device at about 450 cps while dumping an 18K text file from *Easy Script* with *Serial Box* in pause mode. The speed of normal operation will also depend to some extent on the printer or printer interface used in conjunction with *Serial Box*. Throughput while driving a Cardco Super-G and a Gemini 10X was about 250 cps. A large buffer in the associated interface does not guarantee additional speed. Running with a Xetec *Super Graphix*, with an 8K built-in buffer, resulted in only a 6% speed increase. However, an MW-350 with a 10K buffer generated nearly a 40% speed improvement over the Cardco combination. Note that the printer interface will have no effect on speed when *Serial Box* is

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in pause mode. In this case *Serial Box* always runs at its maximum possible speed.

Do not confuse the *Serial Box* throughput speed we have just discussed with the operating speed of the printer interface while emulating a Commodore 1525 printer. These speeds are entirely independent of each other. The former refers to the rate at which data is taken from the computer. The latter indicates the rate at which the interface drives the printer graphics mode. Refer to the various printer interface reports which have appeared in *Ahoy!* for additional details.

Most Commodore printers and printer interfaces will work just fine with *Serial Box*. However, the manual does list several products which use "non-standard" serial port timing. Interestingly enough, one of these products is the Commodore DPS-1101 printer. The problem lies in the incomplete specification of the serial bus timing which has been published by Commodore. To avoid these problems, *Serial Box* has a built-in mode that slows it down slightly for use with particular peripherals. However, this operating mode has no effect on *Serial Box's* speed when it is in pause mode.

Serial Box will not solve all printer speed problems. In some cases the printing speed is totally dependent on the driving software. The best example that comes to mind is the highly popular *Print Shop* from Broderbund. This program spends an inordinate amount of time "thinking" about what it's going to print. As a result there is virtually no benefit to be obtained from *Serial Box* for this application.

To make life easier for the Commodore user, *Serial Box* recognizes several software operating commands. Among these is the ability to keep count of the number of lines printed and to skip the paper perforatioins at appropriate intervals. The remainder of the commands allow you to duplicate the *Serial Box* hardware functions under software control, change its associated device numbers, and adjust the line counter and perforation skip parameters.

Serial Box is an ideal supplement to the standard Commodore printers (1515, 1525, 1526, and MPS series). These printers are relatively slow with little or no built-in buffering. Actually, to our knowledge, *Serial Box* is the only product which will offer some relief with these Commodore printers. Of course, *Serial Box* will benefit all letter quality or NLQ dot matrix printer operations. Price-wise, at $1.25 per kilobyte, *Serial Box* is certainly hard to beat.

R.J. Brachman Associates, Inc., P.O. Box 1077, Havertown, PA 19083 (phone: 215-622-5495).

PRINTER ENHANCER

Xetec, Inc.
Commodore 64
Price: $249.95

Strictly speaking, the *Printer Enhancer* is not a Commodore-specific peripheral. However, Xetec has been a supplier of Commodore printer interfaces for some time now. In fact, if you have been using their *Super Graphix* printer interface, you will recognize the fonts which the *Printer Enhancer* generates.

The *Printer Enhancer* is designed to work directly with the Centronics type of parallel printer hookup. It is equipped with a single Centronics input port and a pair of shielded output cables, terminated with Centronics connectors which are suitable for most popular printers.

In addition to 64K of built-in buffering, the *Printer Enhancer* also has eight near-letter quality (NLQ) built-in fonts when used with a compatible dot matrix printer. The font samples presented here were produced with the *Printer Enhancer* and a Star Micronics Gemini 10X printer.

Typewriter Font
Italic Font
Script Font
News Font
Manhattan Font
Shadow Font
Block Font
Tech Font

Setup of the *Printer Enhancer* is simple. Just plug the "A" cable from

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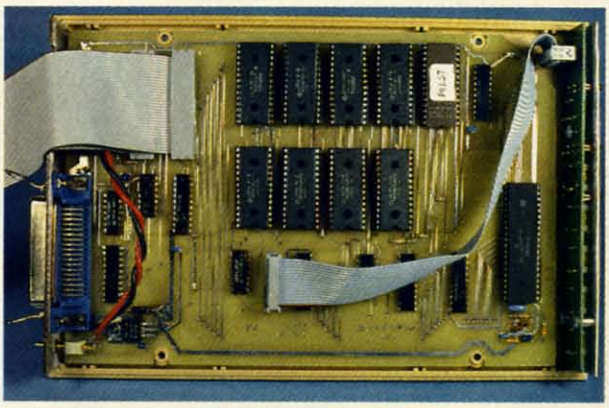
the *Enhancer* into your Centronics printer. The Centronics cable from your existing interface connects directly to the *Enhancer.* If you are using a second Centronics printer, just hook it up to the *Enhancer's* "B" cable. Power for the *Enhancer* is obtained from a self-contained "battery eliminator" style plug-in wall transformer. Thus it will place no additional burden on your Commodore's power supply.

Note that a second Commodore style printer interface, or any type of printer switch, is not required for the second printer. All printer switching is handled electronically by the *Printer Enhancer.* If both printers are of the same or compatible types, the emulation features of your Commodore interface will be available with each one.

The *Printer Enhancer* setup is completed by setting the eight DIP switches located on its back panel (four for each printer). A built-in power up self-test feature lets you verify the settings of the DIP switches, as well as checking the *Printer Enhancer's* operation and RAM. Operation of the five front panel push-buttons may also be verified at this time. Pushing each one should generate a confirming message on your printer. Finally, all 10 of the front panel's LEDs light in a sequential "sweep" pattern to verify their operation.

The five front panel push-buttons give direct access to all of the *Printer Enhancer's* features. Two of these are the mandatory buttons for pausing operation and clearing the buffer. A third button lets you set the number of copies of the buffer contents to be printed. Up to 255 copies are possible. Note that the entire document will have to fit in the 64K buffer for this feature to work. A fourth button lets you select either or both printers. Judicious use of these buttons allows for several documents to be sent to the buffer and selectively routed to either printer. Of course, the total length of all documents must not exceed 64K.

The fifth button cycles the *Enhancer* through its eight built-in NLQ fonts. These fonts are generated using your dot matrix printer's high density dot graphics capabilities. They will not be available on printers which lack the requisite dot density. Supported printers are Epson, Star Micronics, Prowriter, C Itoh, and Blue Chip. All printers have settings for both narrow and wide carriage versions. Other ASCII printers may also be used without the benefit of the built-in fonts.



Inside the* Printer Enhancer *we find a 6805 8-bit microprocessor, 64K of static RAM, and 32K of ROM. This prototype lacks twin shielded cables.
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Printer Enhancer's *front panel displays no lack of buttons and lights.*

Since the fonts are generated internal to the *Enhancer,* the printer's built-in text features are not directly available. Several of these features have been incorporated into the *Printer Enhancer's* fonts. These include

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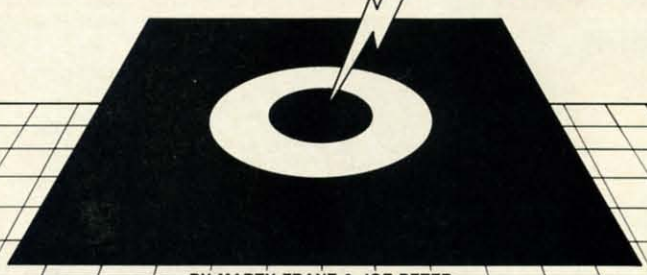

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expanded and compressed print, boldface, and underlining. The exact features will vary with the specific printer. To maintain compatibility with your existing driver software, the *Printer Enhancer's* control codes which select these features are identical to the codes on your printer.

Some of the printer features are also available from the *Printer Enhancer's* front panel by pressing the push-buttons in predefined combinations. The array of 10 LEDs function as indicators of the selected features by blinking in a prearranged pattern. In this case, it is the timing of the various flashes which conveys the information. Overall the scheme worked, although it was difficult to follow the blinking patterns. On the other hand, an easier to use arrangement would have more than doubled the total number of indicating lights and front panel switches.

The front panel feature selection was not designed to implement changes within the body of the text. These switches should be used for global settings for an entire document. Fine control of the text should be done using the traditional ESCape code sequences.

Operating speed of the *Printer Enhancer* is dependent on your installation. If the *Printer Enhancer* is installed after a Commodore-type printer interface, speed will be determined entirely by the characteristics of the interface. This will be on the order of 300 to 600 cps. Additional speed limitations may be imposed by your driving software, as was pointed out in the review of *Serial Box* above.

The greatest data transfer speed to the *Printer Enhancer* will be obtained with a direct parallel connection between the computer's user port and the *Printer Enhancer.* We achieved a data transmission rate greater than 1400 cps when using *Superscript 128* with the *Printer Enhancer* connected to the user port. The disadvantage of the user port connection is that the computer's operating system does not recognize this as a valid eight bit parallel port. This means that BASIC program listings or output cannot readily be sent to your printer. Soft-

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USER PORT-TO-CENTRONICS CABLE

PARTS LIST

Item	Stock #	Price
36 Pin Centronics connector (solder type)	276-1534	$4.99
5' ribbon cable	278-772	$3.59

A 24-pin edge card connector (.156" x .200" spacing) is available for $2.90 (Part No. C1-12) from Digi-Key, 701 Brooks Ave. South, Thief River Falls, MN 56701 (phone: 1-800-344-4539).

CONNECTION TABLE

User Port			Centronics	
Pin	Type		Pin	Type
A	Ground	⇔	33	Ground
B	Flag2	⇔	10	Acknowledge
C	PB0	⇔	2	Data 1
D	PB1	⇔	3	Data 2
E	PB2	⇔	4	Data 3
F	PB3	⇔	5	Data 4
H	PB4	⇔	6	Data 5
J	PB5	⇔	7	Data 6
K	PB6	⇔	8	Data 7
L	PB7	⇔	9	Data 8
M	PA2	⇔	1	Data Strobe
N	Ground	⇔	16	Ground

ware drivers are available which will do the job. Of course these must be LOADed up and initialized before running your application. This is generally not possible with most commercial software.

Fortunately, many commercial programs contain the necessary routines to redirect output to a Centronics printer on the user port. Word processors in particular support this operating mode. *Vizawrite Classic* for the C-128 (Solid State Software) even offers an optional cable for this very purpose. Suitable cables may also be available from your Commodore dealer.

If you have the technical ability, a cable may be easily constructed from readily available parts. The table gives the Radio Shack parts list and the necessary connections for building your own user port-to-Centronics cable for the C-64 and C-128.

User port connections are as per the *Commodore 64 User's Guide* (page 143), or the *C-128 System Guide* (page 352). Note that the view shown in these books is looking at the computer from the back. If you do opt for the user port connection you should arrange for an easy means of reconnecting your printer to the serial port. This will allow the printer to be used with those programs that do not support the user port. It will also permit printer operation along with the modem.

At first glance the *Printer Enhancer* may seem like an expensive proposition for just a 64K buffer. However, if you are running two printers with your computer, the cost does not seem that extreme. In this case the overall price must include the cost of two printer interfaces and a serial port switch, or one printer interface and a Centronics A-B switch. The latter are typically $70. When you're done you will still lack the custom fonts and the built-in software selection of the printer as provided by the *Printer Enhancer*. Also keep in mind that nothing is as fast as a Centronics buffer connected directly to the user port.

Xetec, Inc., 3010 Arnold Road, Salina, KS 67401 (phone: 913-827-0685).

PARTNER 128

Timeworks, Inc.
Commodore 128
Cartridge; $69.95

The Commodore equivalent of IBM PC RAM-resident programs like Borland's *Sidekick, Partner 128* enhances the 128's overall capabilities, making it an even better small business machine. Like its forebears, this application provides a number of useful (though unrelated) tools designed to increase personal productivity.

8, 7, 6, 5...

With the appointment calendar you can keep reminders, lists of things to do, people to see, and places to be. There's only one drawback: space for these categories is limited to five entries per day. Even bag ladies have more than five things to do in a day!

The memo pad is a mini-word processor with decent edit capabilities, flexible cursor control, and word wrap. Two nice touches are a BASIC search function (case insensitive) and typewriter emulation. The latter al-

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The publisher cannot assume responsibility for errors in the above listing.

REVIEWS

lows direct line-by-line output to a printer for labels, envelopes, forms, and other items which are traditionally difficult to do by computer. (Timeworks suggests the memo pad be used to write online help text. A great idea, if you're in the market.)

Unlike the free form nature of the 60-column memo pad, the address list locks users into a format of name, address, city, state, zip, and phone number. You must live not only with these field sizes, but also with the inadequacy of one address line.

Somewhat offsetting this rigid approach is the routine's sort feature, an intuitive, alphanumeric function which takes its cue from the field where the cursor is positioned. Now that's convenience. An auto dialer, supported by the database, is included for modem madness. Other peripheral, but more generally useful resources include the five function calculator with hardcopy capability and an

128 answer to* Sidekick *for IBM PC. READER SERVICE NO. 193

interface to DOS. Though restricted to commands such as new, verify, initialize, rename, and scratch, such easy access is a boon under certain circumstances.

The ability to dump screen imag-

BUT HOW GOOD A PARTNER IS IT?

By now you are wondering if *Partner 128* works with your favorite (or eagerly anticipated) software. Since we don't want you to risk hard earned cash finding out, here's the compatibility lowdown.

Programs in which *P 128* ran with no problems whatsoever:

Fasthack'em (Basement Boys)
Jane (Commodore)
Brainstorm (Country Road Software)
dfile & wordfile 128 (michaelsoft)
Superbase (Precision)
Personal Accountant (Softsync)
Data Manager 128 (Timeworks)
Sylvia Porter's Personal Finance (Timeworks)
Word Writer 128 (Timeworks)

Programs which did not allow disk access until after <Commodore O>, the override command, was issued (beware—this command may damage data files):

Superscript (Precision)
Pocket Writer (<Commodore G> to make menus legible). (Digital)
Pocket Planner (<Commodore G> to make menus legible. Also, *P 128* does not work when displaying graphs). (Digital)

Programs which refused to access the disk drive, even after <Commodore O> was issued:

Fleet System 3 (Professional)
Swiftsheet (Cosmi)
Swiftcalc with *Sideways* (N.G. in graphics mode too). (Timeworks)

Not easily classified:

Multiplan (Epyx): SwiftLoad function of *P 128* interfered with loading. After <Commodore D> disabled SwiftLoad, *Multiplan* worked fine.

PaperClip (Batteries Included): *Partner 128* goes in Port 1, security key in 2, <Commodore O> corrects "No Disk Access" problem.

New Consultant (Batteries Included): *P 128* in Port 1, security key in 2, no problems after that.

Bobs Term 128 (Precision): *P 128* in joyport 1, security key in 2, <Commodore G> to make menus legible. All *P 128* functions worked fine.

Note: <CTRL (P128 BUTTON)> is correct procedure to call *P-128* in Port 1.

While this is not a complete list of 128 applications, it is representative of titles from some of the best-known software houses. (*Vizawrite* is not a *P 128* partner, since they both occupy the cartridge port. Slot extenders may help here, though there are no guarantees.)

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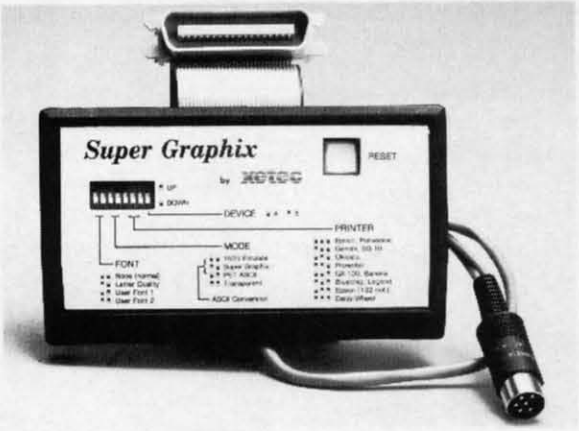

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es to a printer is good for programming and manual preparation. Unfortunately, it can only handle text; graphics are out of the question.

A security option entitled Swift-Lock makes it easy to leave an unattended 128 while preventing unauthorized tampering with files. As this can be circumvented by a warm reboot, it doesn't provide much protection against determined snoopers. Of course, it will deter the uninitiated or those without sufficient time to reboot and reload the coveted files.

The Fine Print

The manual goes to great lengths stating the need to use a data disk formatted just for *Partner 128*. The guide makes it seem as if regularly formatted floppies won't work. This is not the case. One word of warning is accurate, however; 128 virtuosos should not activate the cartridge during disk reads or writes. After all, "diskus interruptus" rarely does anyone any good.

Several 128 programs use a security key or dongle in Port 2, one of the places where *Partner* connects. For the most part these applications can still be used; merely plug *Partner* into Port 1 and the key into Port 2. Then call *P 128* with the following action: <CTRL (PARTNER 128 button)>. (Timeworks sells a Y cable adapter for these situations, though it is not necessary.)

Advanced (machine language) programmers can load other utilities into *Partner*, though this severely restricts file capacities. OUT OF MEMORY messages could become a painful way of life.

Do You Need a Partner?

Of course, you are the only one who can really tell. *Partner 128*, as noted in the sidebar, is highly compatible with most applications. Furthermore, it provides features not found anywhere else at any price.

However, a monopoly is no reason to buy a product. The real reasons for purchasing *Partner 128* include enhanced productivity, and unbeatable convenience.

Timeworks, Inc., 444 Lake Cook Road, Deerfield, IL 60015 (phone: 312-948-9200). ***—Ted Salamone***

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S.O.S.

No problem is too tough for *Ahoy!'s* crack technical crew. Just send your programming or hardware questions to: *S.O.S., c/o Ahoy!* Magazine, 45 West 34th Street—Suite 407, New York, NY 10001.

By Tim Little

I am using a Commodore 64 computer, two 1541 disk drives, and a 1660 modem with the Higgyterm terminal software (the program supplied by Commodore with the 1660). When I logged on to *Ahoy!'s* bulletin board, I was advised not to attempt to download programs unless I was using an 8-bit Punter terminal program.

What is the Punter protocol? What terminal software uses it?

—Robert H. Croswell
Trappe, MD

The Punter Protocol is a method of sending a data file from one computer to another computer. It sends the data in groups of bytes with a checksum byte transmitted after the receiving system declares that it is ready for another "packet" of data. After the checksum byte is verified with the computed checksum, it will either agree, in which case the next packet is transmitted; or a discrepency will have occurred, and the receiving system will ask the other system to transmit the data again until the checksums match. This insures an error-free file transfer, or at least reduces the probability of erroneous data being transmitted.

There are many terminal programs on the market as well as in the public domain. A few are Bob's Term Pro, Blitz Term, Eagle Term, First Term, Hal Term, Super Punter *and* Versa Term. *Check the package before you buy.*

Some of the programs I use will not allow me to print out parts of a report that can be displayed on the screen. Furthermore, these programs are protected so I can't modify them. The *Screen Dump* program (Aug. '85) could be of some use to me if I could use a function key that I could push any time I wanted to print out a screen display. Can you help?

—John Mackey
Creswell, OR

Unfortunately, unless you become quite proficient at machine language program deprotection and modification, the program Screen Dump *will be of no use in this respect. Most commercial programs incorporate protection schemes that will disable any utilities that are in the machine in order to boot, thus few commercial programs will allow any software screen dump programs to function.*

My suggestion is dependent upon your need to print

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out the information as well as the program you are using. Almost any cartridge-based screen dump will perform the task, and many are available at local software distributors. This is just a sampling:

Freeze Frame *(Cardco)*
Screen Dump Etc. *(IRQ, Inc.)*
HardCopy *(FS! Software)*

Be sure that the above programs will work with your specific printer as well as your specific program.

Many readers have complained that while writing their own programs, they have found serious bugs in the C-64's BASIC interpreter. One such bug is called the input-prompt bug and the only solution appears to be to avoid it altogether. The following reader offers a solution as well as the cause:

If an INPUT line contains a prompt (such as INPUT "Would you like a few more problems (Y/N)";A$) which contains 39 characters or more, or if the INPUT statement is preceded by a PRINT statement which contains a string of 39 or more characters and is followed by a semicolon, then the prompt in the INPUT or the string which follows the PRINT may become concatenated with the actual input variable. If the variable was a numeric variable, then the attempted combination with a string produces a REDO FROM START message on the screen. If the variable was a string (INPUT A$) then the combined input will be stored in the variable. This is obvious when you print out the new variable, but can wreak havoc when used in IF...THEN statements. —Jack Ryan
El Dorado, AR

His solution is to keep prompts to a 38 or less character minimum, and I do agree since this is not a real inconvenience.

After reading several books on bit mapped graphics on the C-64's high resolution screen, I noticed that all of them failed to mention how to turn off a pixel after turning it on. I would appreciate the formula in BASIC.
—Robert Cario
Merrick, NY

I will assume that you are familiar with the first five of the following six formulas. These formulas will let you turn off any pixel at location (X,Y) where X can range from 0 to 319 and Y can range from 0 to 199. BASE is the address of the hi-res screen.

```
ROW = INT(Y/8)
COL = INT(X/8)
LINE= Y AND 7
BYTE= ROW*320 + COL*8 + LINE + BASE
BIT = 7 - (X AND 7)
POKE BYTE,PEEK(BYTE) AND (255 - 2^BIT)
```

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LONG LINES

Code Consolidation for the 64

By Rick Nash

Long Lines is a short utility program that will improve the Commodore 64's line editor. As you probably know, the standard line length is 80 characters, or two screen lines. This utility will double the editor's capability to 160 characters (four screen lines).

The reason for longer BASIC lines is twofold. Programs will run slightly faster, and fewer lines means less memory overhead. Each BASIC program line requires a minimum of five bytes. For very large programs, combining many small lines into fewer long lines can result in substantial memory savings.

ENTERING *LONG LINES*

Enter and save a copy of the listing on page 132. This is a program generator which, when run, will produce a machine language program directly to tape or disk with the filename "LONG LINES". To use, simply LOAD "LONG LINES", dv,1 where dv is 8 for disk, or 1 for tape. Next, execute *Long Lines* with SYS 49152, and enter NEW. At this point, you can write or edit up to four screen lines for each BASIC line.

Programs written with long lines can be loaded, saved, or run without the utility, but do not edit any long lines, as they will be truncated to the normal 80 character length.

Both BASIC and the Kernal are moved to RAM, and heavily patched. You must reexecute *Long Lines* (SYS 49152) after a RUN STOP/RESTORE or a RESET. □

SEE PROGRAM LISTING ON PAGE 132

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GUARDIAN

For the C-64

By Cleveland M. Blakemore

In the year 4025, the star Sol far on the rim of the Milky Way spiral began to pass through a massive gas cloud, dragging the earth and surrounding planets with it. The gas cloud was no natural phenomenon left over from the Big Bang, but the debris and residue of one of the largest intergalactic wars ever fought.

The motives and identities of the long-dead civilizations that were involved are forever lost in the miasma of time, but unfortunately the machines they built to wage war for them are still functioning.

The other major planets have already been destroyed, and the earth is calculated to be next in line, although earth's scientists are not quite sure what is in store for us.

Reconaissance has revealed several synthetic moons with trenches running the circumference, ending in colossal pyramids topped with strange power crystals. The scientists know that the moons are in orbit with an artificial gravity well, a "black hole" which somehow draws its energy from the power crystal on top of the pyramid.

When the crystal lines up with the black hole, anything intersecting the conjunction will be annihilated. Earth's terrified masses have taken to calling the crystals "the eyes of doom."

Earth's greatest pilots have been scraped together amidst the hysteria to fly a suicide mission across the surface of the moon, through the trench towards the pyramid. Your mission is to destroy the pyramid before the black hole aligns with "the eye of doom." Just before the pyramid releases its deadly blast of energy, our scientists believe a second crystal opens at the base of the pyramid. If you can fire a laser torpedo down this opening, they believe the pyramid's power source will be knocked out of commission, and the earth will be saved!

In the 3-D game *Guardian*, you fly a shuttlecraft down a constantly scrolling trench, avoiding or blasting the weird machines that attack you in endless ranks, launched from the pyramid far away on the horizon.

The pyramid grows larger as you approach it, while the earth moves across the sky in the background. If you look closely, you may see the "black hole" as it approaches from the other side of the screen.

There are two types of flying machines that attack you: white alien fighter ships (500 points) and cyan fighter ships (1000 points). There are two types of ground rolling robots: light green (1500 points) and dark brown (2000 points).

Since the game is in 3-D, your altitude directly controls the height of your laser fire, so you must be at the same altitude to destroy an alien fighter craft. You can judge the height by looking at the distance between the fighter ship and its shadow. To dive, push up on the joystick. To fly higher, pull back. Your shadow shows you the approximate distance from the moon's surface. When you are lined up with a ship in flight coming at you, your shadow should appear to be approximately the same distance from your ship as his.

The robots are a different menace altogether. They have slits in the front of their chassis, the only weak spot in their armor. Fire a shot through this slit and the robot will be nuts and bolts. The robot has a very high reach with his electronic arms, so you will have to get some altitude to fly over him! Once you get the height correct, you can sit in place and plink at robots all day long and rack up points.

Avoid the plasma balls the aliens fire at you as they approach.

The best shot at an alien comes as they appear on the horizon. As they get closer, you have to be more accurate with the altitude.

The power crystal appears as a flashing eye at the base of the pyramid. You have only seconds to hit it before the earth explodes. If you successfully knock a pyramid out, the screen colors change, and you are on the surface of another guardian moon. The aliens get progressively faster each time you wipe out a pyramid, so you will have to be more tricky in avoiding them and more selective with your shots.

You only have three ships in the game, displayed at upper right. The current score is at upper left in yellow.

This game uses extended background mode for the scrolling color bars, rotating the three colors to give the illusion of motion. This is an ancient trick on the Commodore, and highly effective, even in BASIC programs. (Although the idea is simple enough and very snazzy, I think we have yet to see some of the incredible games that could be created with EBC mode.) The pyramid itself is constructed with redefined character graphics.

My high score so far is 54500. It is theoretically possible to flip the game over past 650,000, but even I would do a double take on that one. If you should flip this game over, please let me know via a letter to *Ahoy!*, and I will incorporate a three byte scoring system in my next game to keep you joystick superjockeys happy!

Enjoy *Guardian*.

Now save the earth! □

SEE PROGRAM LISTING ON PAGE 137

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Back Issues

SPECIAL ANNOUNCEMENT!
A small cache of *Ahoy!* #2 (Feb. '84) has been uncovered, and is available at $10 per copy while limited supplies last.

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