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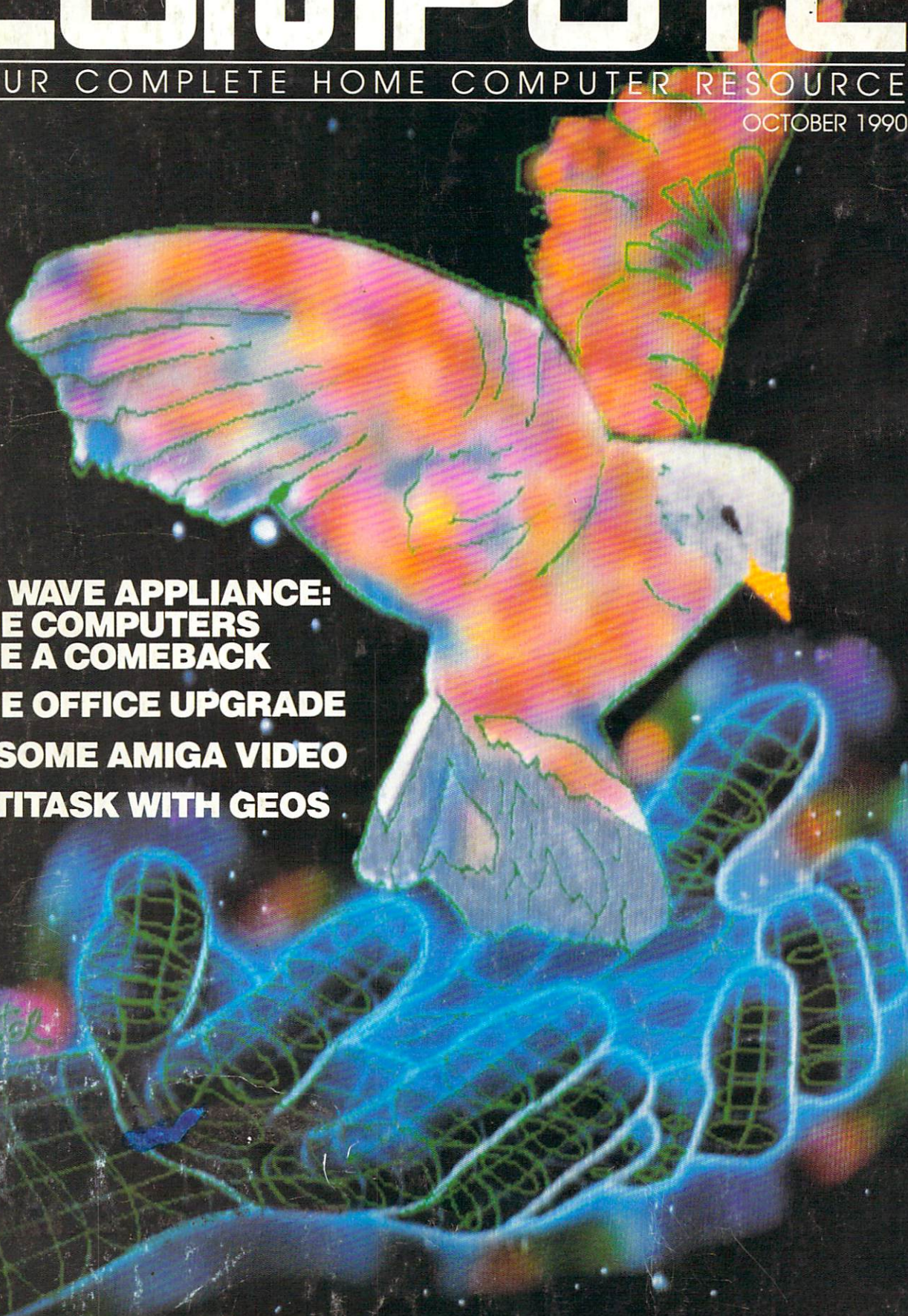
OCTOBER 1990

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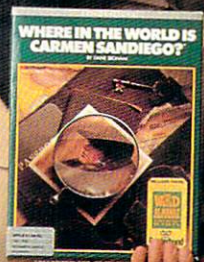


Wayne Bulette,  
Consulting Actuary &  
Master Detective

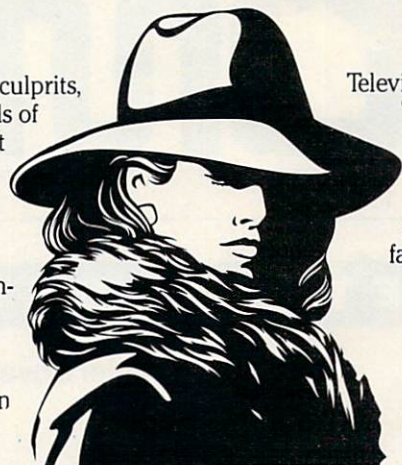
Josh Pedrol,  
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& Future  
Systems  
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12CSM

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"I've loved Carmen from the very beginning! My 16-year-old son and 13-year-old daughter, and even the neighbors, love to play, too. My kids are always trying to catch up with me! (But they never will!)" — Karen Drellich

"It's a great trivia game. I've always liked history and geography. But even

### Game Options Home Dossiers



Carmen USA™ IBM / Tandy VGA screen



Carmen Time™ IBM / Tandy VGA screen

Carmen and her crafty cohorts will lead you on a merry chase.

### Help!

The notorious Carmen Sandiego is on the loose. She and her gang are swiping precious landmarks and treasures all over the map. They're filching everything from the Mona Lisa's smile to the Statue of Liberty's torch.

Squads of ace detectives are already in hot pursuit: intrepid investigators like those pictured here. But Carmen's not easy to nab. She's a very furtive fugitive.

So there's plenty of challenging excitement waiting for you.

### So much fun it ought to be illegal

The Acme Detective Agency will quickly assign you to a case. Then get ready for a whirlwind chase.

Start at the scene of the crime, questioning witnesses. To help you decipher the clues you uncover, each game comes with a reference book packed with information about the cities and countries you'll need to visit.



so, I keep running into things I've forgotten—or never knew."

— Wayne Bulette

"It's a funner way to learn geography," reports 10-year-old Detective Christina Brassey. Eighth-grade sleuth Josh Pedrolini agrees. So do reviewers:

"Carmen is a smash hit," reports *Newsweek*.

"If kids get addicted to a game, it would be nice if it was one like *Where in the World is Carmen Sandiego?*," says Peggy Charren, President of Action

# COMPUTE

OCTOBER 1990

VOLUME 12 • NO. 7 • ISSUE 122

## GAZETTE SUBSCRIBER EDITION

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### FEATURES

#### Mail-Order Maze G-4

MICKEY McLEAN  
Learn your way through the mail-order maze. Shopping by mail can be convenient and economical, but check out these tips before you buy.

#### A Teacher's Game Machine G-8

DOROTHY HEMME  
While some may call what she does with her computer work, this school-teacher says it's fun to put her 64 to the test.

### DEPARTMENTS

#### 64/128 View G-1

TOM NETSEL  
A funny thing happened to *Gazette* on the way to the printer. Find out exactly what happened to the magazine and what's in store for future issues.

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EDITORS  
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FRED D'IGNAZIO  
Much of today's desktop electronic equipment is smaller than yesterday's portables. Machines are getting smaller, and they're working harder, too.



DIDIER CREMIEUX

#### Beginner Basic G-20

LARRY COTTON  
Learn how to create and control a musical sprite. Place it on a staff and use it to make music.

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RANDY THOMPSON  
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Get a free copy of *MLX*, *The Auto Proofreader*, and typing instructions.

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MARIUSZ JAKUBOWSKI  
Guide your space craft through eight levels of alien attacks. Shoot anything that moves or stands in your way if you expect to save mankind in this arcade game for the 64.

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R. B. COOK  
If you think you're good at playing solitaire, try your hand at this 64 version of the popular card game. You'll probably turn over some new twists.

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HUBERT CROSS  
Create and edit your own sound effects with this joystick-controlled sound editor for the 64.

#### Codebusters G-36

MICHAEL SEDLEZKY  
Use your robot to decode the locked vaults that contain the national defense system's stolen security numbers. Recover the numbers before time runs out, but watch out for the security guard.

# FACE IT. IT'S POSITIVELY ADDICTING.

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"To rotate Shakespeare's nose or not to rotate Shakespeare's nose, that is the question."

And picture this if you will—Joan of Arc's nose on Napoleon's mouth. What a combination!

play FACES in the head-to-head mode. When you create a perfect face, your opponent gets a stack of face pieces dumped onto his screen. It's funny, it's obsessive, and you'll keep coming back for more of this soon-to-be-unforgettable FACES from the Soviet Union!

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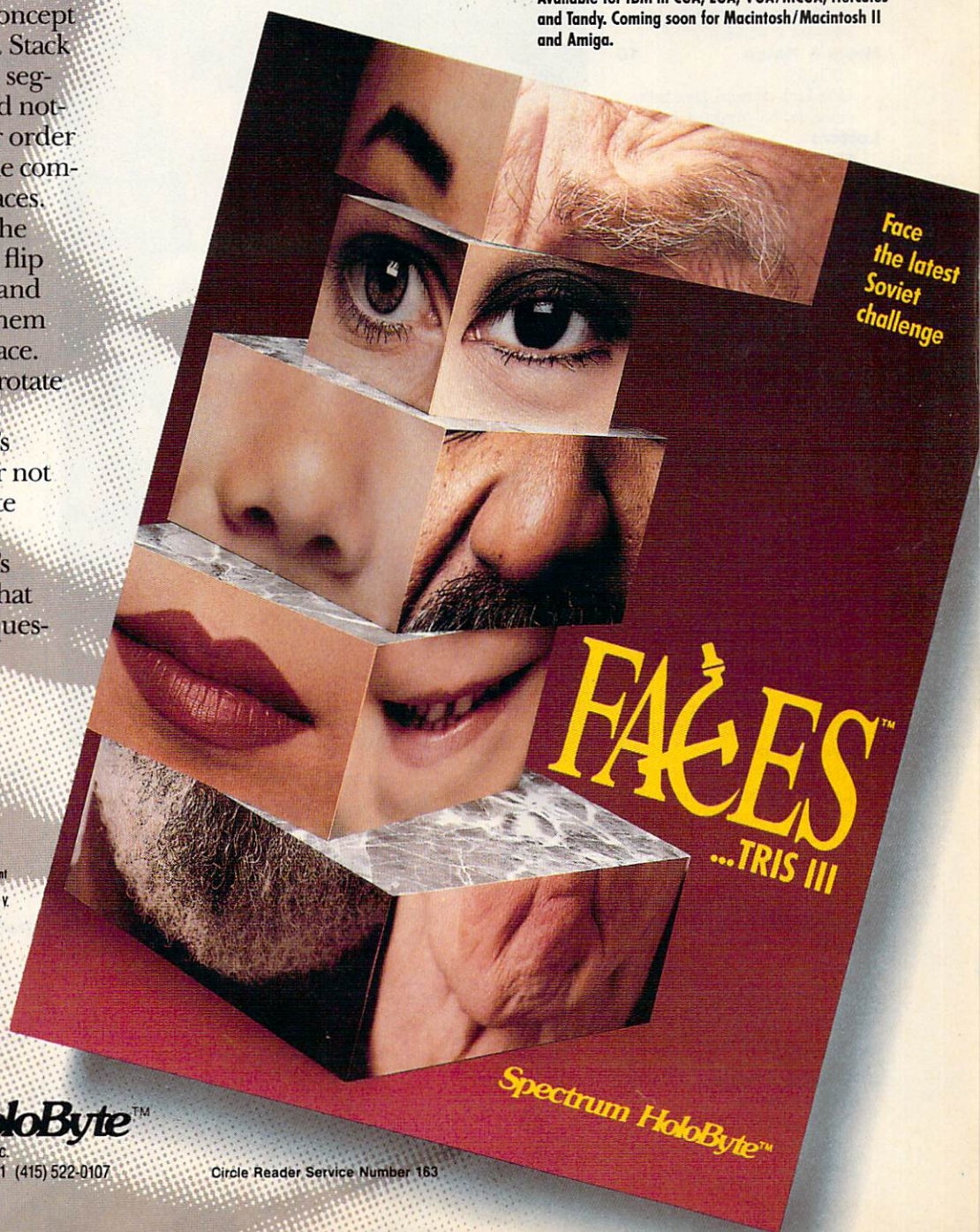
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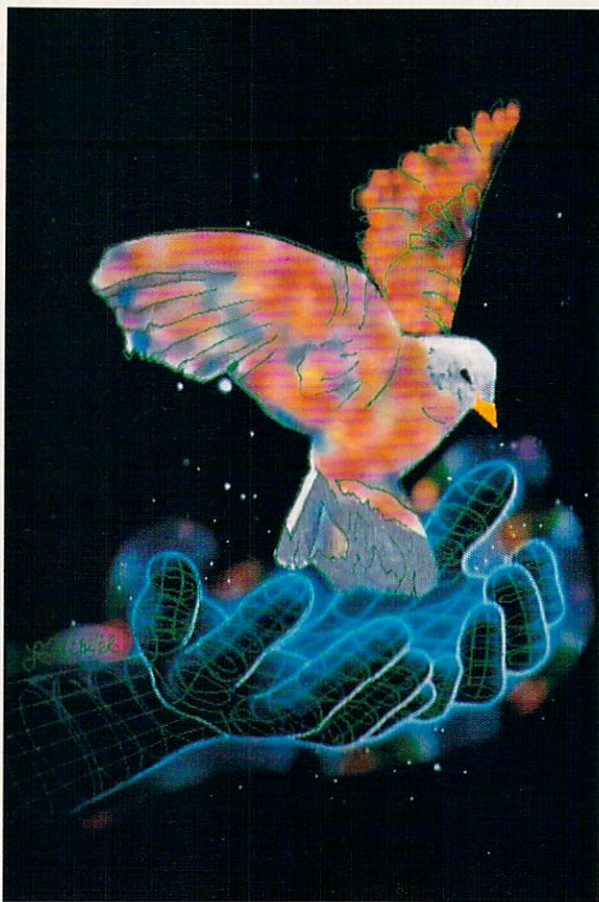
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MARVIN OSAKI Look like a professional with <i>Express Publisher</i> —without destroying your budget.	



## ON THE COVER

Laurence Gartel has been creating computer-generated images since 1980. His work has appeared in the *New York Times*, *Newsday*, and *Madison Avenue*; and one of his drawings hangs in the Museum of Modern Art.

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# Ultima VI

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# EDITORIAL LICENSE

P E T E R S C I S C O

**R**evolutions change, or they die. The last decade has brought many changes to the home computing revolution, some of them subtle, some dramatic. Once fueled by the early adopters of personal computer technology, the movement is now signaled by the increased power of home computers and a growing network of support services and electronic communication. The computer's potential is no longer limited to financial managers, propeller heads, game players, math prodigies, and electronic hobbyists but is open to as many as 40 million American households.

What makes 1990 different from 1980? Why are consumers more likely to buy a home computer now, rather than ten, or five, or even two years past? The answers lie in a multitude of circumstances.

At the start of the nineties, several trends suggest a new wave of computer buyers are poised to enter the home computer market. First, after a decade of exposure to computers in schools, at work, and at home in the form of other consumer electronics items (microwaves, VCRs, automobiles, ATMs), the public is more accepting of microchip technology. Computers no longer carry the asocial, or even antisocial, connotations that stereotyped users ten years ago. An entire generation of school kids has grown up with computer technology (at least in those schools that can afford it). Parents work with PCs every day. Videogames and media coverage make computing less foreign to our lives.

Second, personal computer technology, honed by a decade of

business use, is sophisticated enough to be accessible to the everyday consumer. The paradox of home computing lies here: Computers had to become powerful enough to run the sophisticated software that makes the machine simple enough for consumers to use.

Third, a wide range of support services has developed—most notably electronic information services and user groups—that gives consumers a compelling reason to buy a computer and a resource for handling problems. Services like Prodigy, CompuServe, GEnie, and America Online offer consumers what videotext never could: an easy way to shop, access information, and communicate with others who share similar interests.

IBM's PS/1, Laser Computer's P.A.L. 286, Tandy's 1000 RL, Commodore's Amiga 500C, and Apple's planned low-cost Macintosh all reflect these changes in the home computer

landscape. Software like GEOS, *Desk-Mate*, and *Windows*, and interfaces like the PS/1 quadrant, mirror the consumer's need for something beyond the cryptic commands that once guided computer use.

In the late 1980s, Nintendo proved that if you brought out a computer (the NES is a computer) that is inexpensive, is easy to operate, and has a well-defined purpose, you could sell millions. In relative terms, the new wave of home computers on store shelves today is a result of that influence. Although much more powerful and versatile than any videogame system, these new computers incorporate ease of use, value, and targeted functionality on a much larger scale than ever before.

Home computers have finally crossed the four thresholds necessary to becoming a mass consumer item. The technology is stable (remember the Beta/VHS wars?); applications are readily available (remember black-and-white TV broadcasts on your color set?); prices have declined (remember \$5,000 for an AT-compatible?); and the PC is available at mass-merchandise outlets (remember stereo specialty shops?). Everything is in place for huge growth in home computer use.

No revolution lasts without renewal. Even *COMPUTE*, though remaining the voice of home computing, is not immune to change—as you have no doubt noticed. The fire that ignited a small cadre of computer users ten years ago may now light the way toward a global community sharing the information and insight of generations. That would be a brave new world for all of us. □







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## Which Road to Sturgis?

I am a subscriber to your magazine and enjoyed your review of *Harley Davidson: The Road to Sturgis* in the May 1990 issue. I bought the program when it was introduced last November and have traveled the road to Sturgis quite frequently since.

This year we are celebrating the 50th anniversary of the Black Hills Motor Classic and expect an even bigger crowd than usual. We appreciate the mention of our event in your magazine. However, for the record, Sturgis is located in South Dakota, not North Dakota. Since you are based in North Carolina, I'm sure you can appreciate the difference.

BRUCE A. HUBBARD  
 PRESIDENT, BLACK HILLS MOTOR CLASSIC BOARD  
 STURGIS, SD

*Yes, we certainly can. You can be sure we'll be studying our PC Globe more closely from now on.*

## AUTOCON Update

Thank you for including my program *AUTOCON* on your June *SharePak* disk. On page 37, however, the *AUTOCON* and *Solve It* captions got switched.

The version of *AUTOCON* included on the disk (1.3) is not the latest version of the program. The new version (1.3a) has a couple of bug fixes and several enhancements involving the update and display configurations.

I have moved since version 1.3 was issued. The new address for registrations is P.O. Box 2639, Weaverville, California 96093-2639.

LARRY WEAVER  
 WEAVERVILLE, CA

## Food for Thought

I was shocked to find in your May 1990 issue photographs that show food and drink near a computer. I have tried to teach my students that food, drink, and computers do not go together, especially when the former is spilled upon the latter. Please be careful with the photographs. They can in-

advertently send the wrong message to your readers.

*COMPUTE* continues to supply me with information which helps me keep up with the latest trends in computing.

TERRY ROSS LACHMAN  
 BRONX, NY

*You're absolutely right. Even hackers, whose environment we attempted to depict in the photos, should suppress the epicurean urge to eat and drink while making merry with their favorite game, spreadsheet, or assembler. All it takes is one overturned cup of coffee or soft drink to ruin a keyboard and bring your computing to an abrupt halt.*

## Booting B:

I've been considering purchasing *Red Storm Rising*, the submarine simulator and the 1990 *COMPUTE!* Choice Award winner. Unfortunately, according to Microprose, the manufacturer, "Drive A must be a 5¼-inch drive." Drive A on my Tandy 1000 TX is a 3½-inch drive, and drive B is a 5¼-inch drive. I thought I might try the "PC Primer" suggestion in the December 1989 issue to swap drives, but Microprose uses key-disk copy protection on this game. What can be done?

CHRISTOPHER J. DUNN  
 GAINESVILLE, FL

*As an owner of a Tandy 1000 TX, you have an easy solution to your problem. Use the setup program that comes with your TX. Other PC or compatible owners who want to boot from the B drive can use a program called B:Boot! (\$19.90 + \$2.00 S&H) from YWSoft, P.O. Box 2231, Bloomington, Indiana 47402, (812) 857-4772.*

## Logo Recursion

I would like to respond to some of the comments in the February *COMPUTE!* Choice (p. 76) by Richard C. Leinecker. I was pleased to find such a positive review of *LogoWriter*.

*continued on page 56*

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STRATEGIC SIMULATIONS, INC.®

BINGHAM

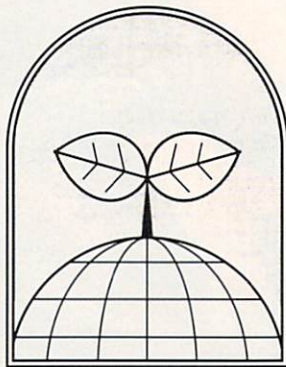


# NEWS & NOTES

## CLEAN IT UP

**W**ith Earth Day still in memory, the environment is on everybody's mind. "The increasing volume of landfill waste is becoming a major environmental issue worldwide," said Hideharu Takemoto, president of Canon U.S.A. The printer and copier maker hopes to combat that problem with its Clean Earth Campaign, designed to recycle used toner cartridges. Using a Canon-supplied kit, users return their cartridge at Canon's expense. Rather than refill the cartridge, Canon will recycle the materials to make new ones. The campaign begins in several Western states and will expand to other states by early 1991.

MIKE HUDNALL



Canon's cartridge recycling program is designed to conserve our environment.

## TWO—TWO— TWO COMPUTERS IN ONE

It's a PC! It's a Nintendo! It's both!

Taking the adage "If you can't beat 'em, join 'em" to its most extreme, Duo Computers announced in June a combination computer/Nintendo machine that can be plugged into a television set.

Scheduled for a fall release, the DUO FC and DUO FC Plus, currently awaiting FCC approval, contain standard MS-DOS hardware along with standard NES videogame systems. Users can switch back and forth between the machines at the touch of a switch. Since the NES contains its own processor, the two systems can even operate simultaneously.

The DUO FC (Family Computer), a PC compatible, is expected to sell for \$999 and be bundled with a variety of entertainment software, much of it from Capstone, Duo's sister company. The FC Plus, with a suggested retail price of \$1,899, is an AT compatible with a 20-megabyte hard card. It will include over \$400 worth of software.

Nintendo did not participate in the development of the FC. Duo Computers purchased its Nintendo systems on the open market and built them into the FC chassis.

KEITH FERRELL

## HUNT HERE FOR HINTS

It's 10 o'clock on a Sunday night, and you can't get the Babel Fish in Infocom's *Hitchhiker's Guide to the Galaxy*. The local software store is closed, so you can't go out and buy a hint book. It's a good thing you've got the Universal Hint System (UHS).

UHS is a set of shareware and public domain programs that lets you share adventure-game hints with other computer users. You search for the mystery currently puzzling you by using the UHS Reader program. Use an onscreen invisible pen to "uncover" a number of hints, ranging from vague allusions to dead giveaways. The UHS Writer lets you create your own hint files to share with others.

You can download UHS programs and hint files from the Gamer's Forum on CompuServe and Scorpia's Games Roundtable on GENie. UHS is available for the Amiga, Apple II, Atari 8-bit and ST, Color Computer 3, and IBM PC and compatibles. Versions are in the works for the Commodore 64 and Macintosh, as well as an online version for use with BBS software.

DENNY ATKIN

## PC SOS

How often have you been frustrated by software or hardware questions? Customer support is often elusive and, if you're running a home office, time can be crucial. Answers to your computer problems are now an 800 number away with PC HELPLINE, which offers advice for \$2 per minute, less if you buy advance time. Just call (800) 366-8125.

MIKE HUDNALL

 **PC Helpline**

*continued on page 12*

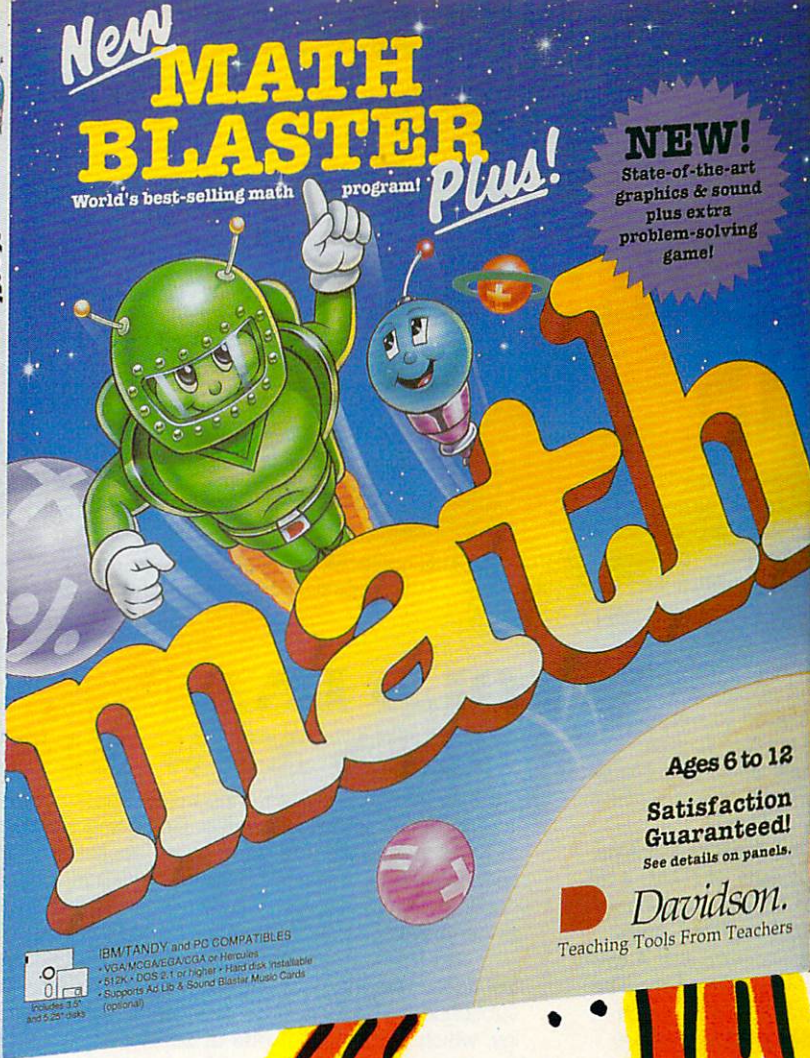
Order New Math Blaster Plus by December 15, 1990 and get \$20 off an AdLib sound card! AND Take \$5 off any other program mentioned in this ad!

New **MATH BLASTER** program! *Plus!*

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Countdown sequence initiated 10, 9, 8, 7 . . . New Math Blaster Plus is on the launch pad and ready to blast off with a payload of cosmic new activities, graphics and sound effects. The Blasternaut and his robot pal Spot are waiting for you to climb on board. Join them on a space odyssey to develop basic math and problem-solving skills. Strap yourself in for a journey through four galactic activities that will rocket your math scores out of the stratosphere!

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**Alge-Blaster Plus!**  
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  - Math Blaster Mystery \$49.95 (MS-DOS, Mac)
  - Alge-Blaster Plus! \$49.95 (MS-DOS) \$59.95 (Mac)
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# TAKE TO THE AIRIS

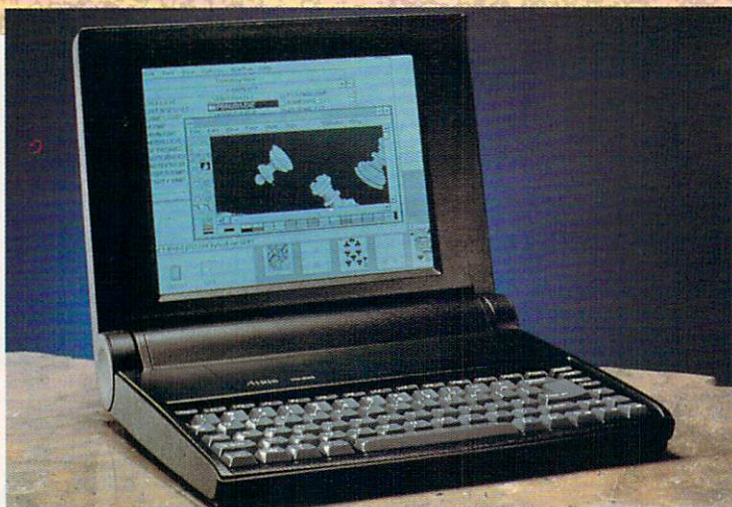
Some of the biggest crowds at this summer's PC Expo in New York were found gathered around one of the show's smallest—or at least newest—companies. Attracting all the attention was a notebook with a difference from Airis Computer.

The Airis VH-286 weighs in at 6½ pounds and boasts a 12.5-MHz speed. It's designed to run for 12 hours on ten standard C-size alkaline batteries; a rechargeable battery pack offering 6–8 hours of operation is also available.

Standard features of the Airis include 2 megabytes of RAM, a 20-megabyte hard disk, a 2400-baud Hayes-compatible modem, auto-resume after shutdown, and a two-year parts-and-labor warranty. The notebook's screen is an 11-inch (diagonal) backlit LCD with VGA support.

Airis plans to sell the notebook computer direct beginning this fall.

KEITH FERRELL



The Airis notebook computer, with a price tag below \$1,900, puts leading-edge portable power within reach of consumers.

## OLD LAMP GETS NEW SHINE

GE Information Services announced September 1 a new pricing policy for its GENie online service. Beginning October 1, 1990, a flat fee of \$4.95 per month will grant users access to a host of electronic services. Those services include the GENie Mall, Grolier's Encyclopedia, professional and leisure bulletin board areas, GENie mail, all single-player games, news, closing stock quotes, and others.

Neil Harris, manager of product marketing at GE Information Services, said the new pricing structure reflected the wishes of GENie subscribers. It also can be seen as a competitive move against Prodigy, which carries a flat rate of \$9.95 per month.

Also new is the \$6/hour fee for all modem speeds from 300 to 2400 baud during non-prime-time hours; the \$18/hour prime-time rate remains in effect. To attract new users, GENie will drop its \$29.95 sign-up fee beginning October 1.

PETER SCISCO

## PARLEZ VOUS FUNNY FUNNY?

Their lionization of Jerry Lewis notwithstanding, the French are making technological comic inroads with the Digital Cartoon Station. Designed to work with a 386-based PC, the system assists all aspects of cartoon animation, from initial sketches to final film or video output.

The Cartoon Station consists of a graphics tablet, a 16-million-color graphics card, a control board, and a special monitor. The system can create intermediate animated steps between drawings or work from a series of drawings to smooth out movements.

Pepe LePew may never look the same again.

PETER SCISCO  
*continued on page 57*



XCOM's Digital Cartoon Station gets down to funny business.

# You've Been Framed!

Agent Frank McBain is dead...but why did they pin it on you? You've just 96 hours to find out...crack an international spy ring...and prevent an **INTERNATIONAL DISASTER**.

You're American agent Mason Powers and you've just intercepted an ultra secret message about an international terrorist group. Just as you're about to brief CIA Section Chief, Frank McBain, everything goes black...and you wake up in a remote prison hospital in Turkey...with no memory of what happened and charged with the murder of Frank McBain!

Who set you up? Who is trying to kill you? And why do you feel such *intense urgency*? The *Countdown* has begun...and you'd better find the answers fast.

If you break out of the hospital you'll set out on an *interactive adventure* of intrigue and espionage taking you from *Istanbul to Paris*...with both agents and terrorists in hot pursuit. Interview different characters which converse, animate and respond (some actually talk!)...use your hand held computer to search for key evidence...gain valuable clues in realistic *Motion Graphics* flashbacks!

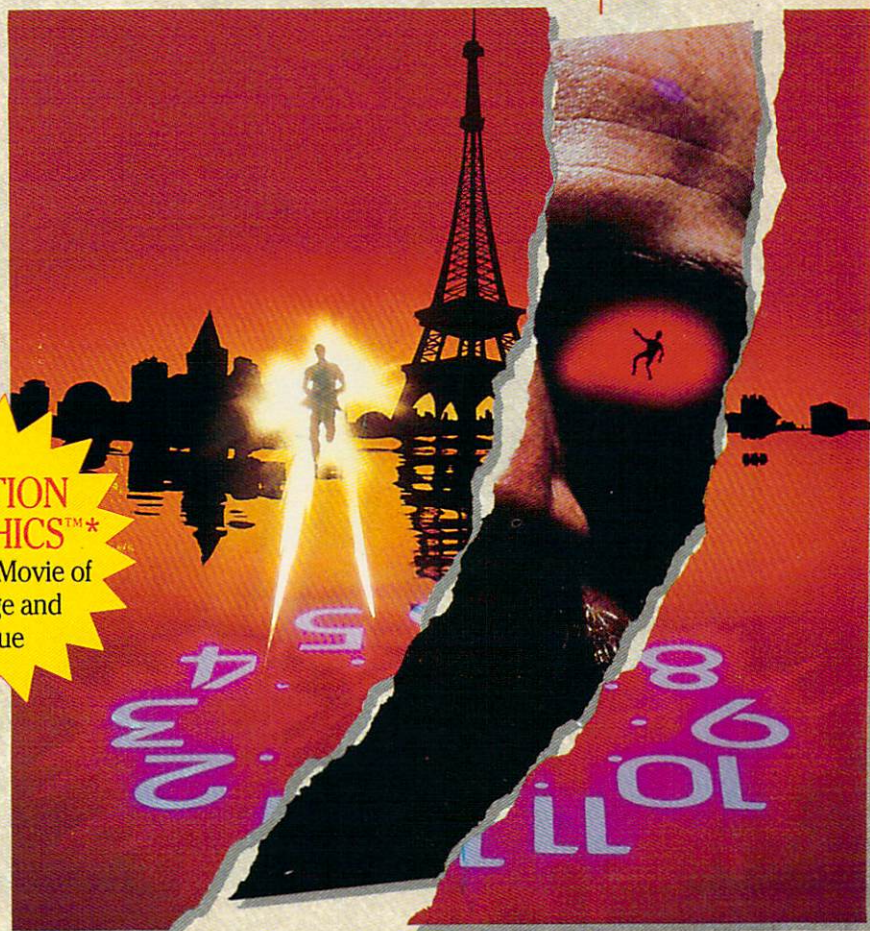
But can you complete your mission in time to avoid *global disaster*?

## Motion Graphics\*

*Countdown* is brought to you by *Access Software...the same madmen who brought you Mean Streets*. You'll experience *movie-quality Motion Graphics* action...with 256-color screens that bring new meaning to VGA. Add *RealSound™* high-quality digitized sound effects and you've got an interactive movie that will involve you totally...mind, body and soul.

Start the *Countdown*...and live the *ultimate* interactive movie.

# COUNTDOWN



**ACCESS**  
SOFTWARE INCORPORATED

## \*So Realistic, you'll think you're there

*Countdown* features breathtaking *Motion Graphics*...combining stunning 256-color movie-quality graphics with *RealSound™*, the revolutionary technology that gives you astonishing digitized sound effects, music and speech *without hardware*. *Countdown* also supports the major sound boards.



Actual 256-Color VGA Screens

To experience COUNTDOWN,  
visit your retailer or call



**1-800-824-2549**

TOLL FREE

(Credit Card orders only) or clip and return the order form

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801-298-9077 FAX 801-298-9160

Circle Reader Service Number 174

## ORDER FORM

**YES!** I want to *clear my name* and prevent a *Global Disaster* ... with the breathtaking reality of *Motion Graphics* 256-color graphics and digitized sound effects. Please rush me my copy of *Countdown*. *Satisfaction Guaranteed*.

5 1/4-inch Disk  3 1/2-inch Disk

I've enclosed \$59.95 as payment in full.

Charge this order to my:

VISA  MasterCard  American Express

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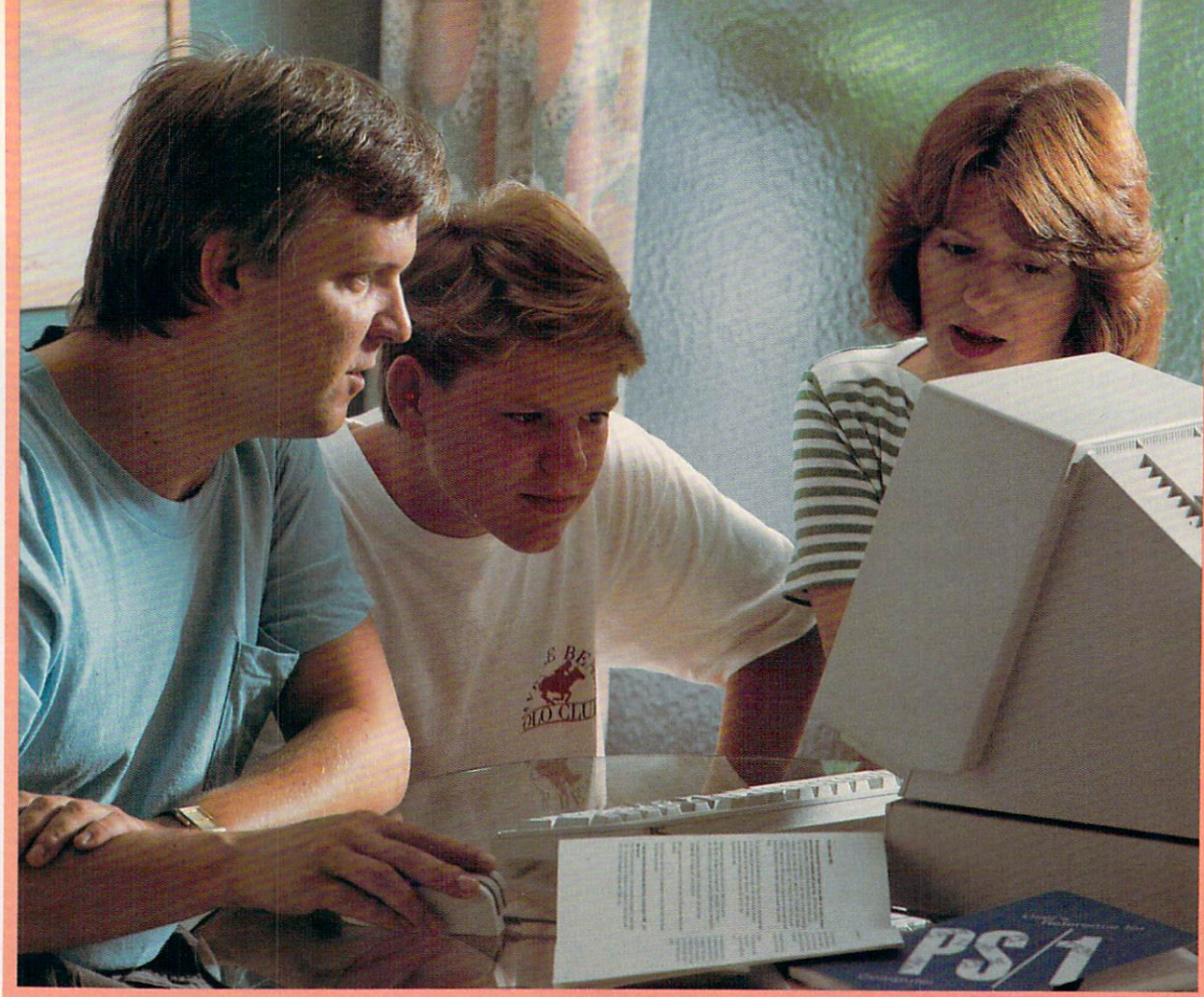
Address \_\_\_\_\_

City \_\_\_\_\_

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

Mail to: ACCESS SOFTWARE INCORPORATED  
545 West 500 South, Suite 130, Bountiful, UT 84010

(all orders must be signed)



MARK WAGONER © 1990

A  
FAMILY  
*Affairs*

K E I T H F E R R E L L



**T**he vacation house was called *Salubrious View*, and its vistas of tidal creeks and marshes certainly proved restful and restorative.

But during the course of a week's vacation at the North Carolina coast, one view that continually drew the attention of some members of the family was a bit more technical.

There was an IBM PS/1 in the house.

### Heating Up the Home Market

IBM's sleek new machine—its base measures less than 11 inches wide and 13.8 inches deep, and it's only 3.3 inches high—along with its powerful combination of hardware, software, and telecommunications, says a lot about Big Blue's renewed commitment to home computing. It also highlights the consumer's perception of the benefits and dilemmas of home computers.

Above all, IBM's homecoming returns home computing to the forefront of the industry's attention. While Tandy and Laser (see the sidebar on page 18), among others, have continued to address home needs with their machines, IBM and Apple have all but ignored the domestic side of computing since the early to mid-eighties.

But 1990 may be remembered as the year all that changed. Apple is expected to announce a home-aimed Macintosh this month. By now, the PS/1 should be available throughout the country from retailers such as Sears.

With more fanfare and excitement than at any other time in the past five years, the computer is coming home again. And there's every indication that, at last, consumers who have resisted computers will be opening their doors to a new generation of machines.

### Big Blue House Call

IBM last made a house call in 1984 with the ill-fated PCjr, universally criticized for being underpowered and insufficiently expandable. After canceling the PCjr in 1985, IBM focused its attention on the business and corporate fronts.

But there remained at IBM a sense of unfinished business.

About two years ago, a small development group set up shop in IBM's Lexington, Kentucky, plant. Its mission: Design the machine that would lead IBM back to the home market in triumph.

To hear members of this essentially entrepreneurial team talk, consumers themselves designed the computer.

The PS/1's specifications were derived from long hours of focus-group conversation with thousands of consumers. Again and again IBM asked what features were most wanted, which aspects of the computer were least important and which were most essential, what applications were most likely to be used. The answers—ease-of-use, power, expandability, value—played a large part in the PS/1's design.

Equally important, the PS/1 team set some specific market goals for the new machine. It organized the target market around a school metaphor by rating consumers' computer experience on levels from freshman to postgraduate. Freshmen, for example, possess little familiarity with

computers; sophomores might have some computer experience from work or school; seniors know a lot about computers; and so on. Freshmen and sophomores comprise the core of IBM's target group.

It's a large target. Depending on whose estimates you listen to, personal computers have reached somewhere between 15 and 25 percent of American homes. That leaves an enormous number of families as yet untapped by the computer industry.

Underlying all of IBM's research was a basic question: Why, considering the increases in performance relative to the decline in computer prices, has the PC failed to become a common home electronic appliance?

The answers—computers are too hard to use, the benefits of using a computer are too nebulous, it's too hard to buy a computer—also helped to shape the PS/1's design and marketing.

### Home at Heart

The heart of the PS/1 is a 10-MHz 80286 processor. There are faster and more powerful CPUs on the market, but the 286 offers certain advantages. For one, the chip is plentiful and inexpensive. For another, the 286 serves well as a home information, education, and entertainment machine. Even Microsoft CEO Bill Gates has expressed faith in the 286's viability as a consumer and multimedia platform.

If the 286 is a solid but unspectacular choice, IBM's including a 2400-baud Hayes-compatible modem with each PS/1 is a much more stiking decision. According to IBM's focus group conversations, telecommunications holds great interest for home consumers.

IBM INTRODUCES  
THE PS/1, AND  
COMPUTE INTRODUCES  
SOME NEWCOMERS  
TO IBM

### Home Without Walls

Telecommunications has for some time been computing's great unrealized promise. Even experienced computer users to some extent have avoided the wealth of services and products available through their modems because of the difficulties involved in using telecommunications software.

IBM hopes to remedy that situation. The PC can be a doorway to enhanced productivity, electronic education, interactive entertainment—a doorway to the world.

There are other reasons that IBM is providing a modem with the PS/1. Big Blue and Sears are partners in Prodigy, a consumer-oriented telecommunications service that offers information, shopping, and other activities in a graphics-oriented format. With 400,000 subscribers, Prodigy is hardly a failure. But it has taken some heat from industry media for its simple approach and slow response times.

On the other hand, Prodigy's friendly design encourages telecommunication novices to explore the world of electronic information. The free three-month subscription to Prodigy that comes with every PS/1 doesn't hurt, either. IBM and Sears are betting that after those first 90 days, consumers will renew their Prodigy memberships.

IBM is also gambling that telecommunications will prove easy enough for consumers that they will use the modem when technical support is required. A User's Club, with membership limited to PS/1 owners, offers online an-

swers to consumers' computing questions. Promenade, a service supported by Quantum Computer Services, providers of PC-Link, will offer computer classes, forums, games, and other on-line activities this fall.

### All in One Box

Hardware, software, telecommunications—while it looks from the outset that IBM has covered most of the marketing bases necessary to extending the number of computers in American homes, there remains the question of how the inhabitants of those homes will respond.

Fortunately, the PS/1 arrived at COMPUTE at the same time I was due to take some oceanside R & R with family, in-laws, and friends of all ages. The beach house would be filled with computer freshmen and sophomores and even a couple of seniors. No better place, I thought, than to answer that question of audience reaction.

The PS/1 we used was top-of-the-line, with a 30-megabyte hard disk and 256-color VGA monitor. It lists for \$1,999.

The fact that the PS/1 arrives in a single box, with monitor, CPU, keyboard, mouse, manuals, and software, proved a big hit with my informal focus group. Considering the amount of power it contains, the box isn't very big. And although you would never mistake the PS/1 as a portable computer, it's compact enough to make it worth taking along on an extended trip. We were able to fit it comfortably into the back of our station wagon amid the suitcases, cartons of linens, fishing rods, telescope, guitars, and other vacation gear. The compact size also makes the computer a good choice for college students: It will fit nicely on a dormitory desk.

### It's a Setup

Our first subjects, both attorneys, both in their 40s, had some computer experience. I'd rate them as sophomores. In fact, they have an old PC-compatible computer in their home, but it's seldom used and has prompted more than a little frustration.

Confronted with the PS/1's one-box packaging, they expressed a bit of initial skepticism that the machine was complete. Accustomed to the boat-anchor approach of big desktop machines, the size of the computer inspired some questions; *What's been left out?* was the most common.

One of the attorneys was particularly impressed with the machine's

easy setup. Little things count for a lot with consumers, and the fact that IBM included icons above each of the key connections—monitor, keyboard, mouse, printer—proved one of those valuable little extras. The computer was up and running barely ten minutes after we had opened the box.

Other computer novices to whom we showed the PS/1 likewise had little trouble in setting up the machine. It took the members in our group an average of 15 minutes to go from opening the box to turning on the computer.

During one setup, however, a member of our group plugged the keyboard and mouse into the wrong ports. The resulting error message was unintelligible even to our seniors and should be made clearer for new computer users.

### Screened for Consumers

The biggest surprise, though, arrives after the computer is turned on. Instead of the familiar and, to most freshmen, frightening DOS prompt, there's a bright, easy-to-understand screen divided into self-explanatory quadrants: Information (telecommunications services and tutorials), *Microsoft Works* (bundled with every PS/1), Your Software (where you can access programs you add to the machine's retinue), and IBM DOS (a menu-driven DOS shell built around DOS 4.01).

The screen icons are striking in VGA—clear and readable. The Your Software section in particular uses iconic metaphors to good effect. Each directory is presented as a file folder, and within each folder the names of executable files appear onscreen. Click on the program you wish to run, and off you go.

There's some distance to be covered, of course, between booting a computer and using a computer. IBM helps consumers bridge that distance with sophisticated system tutorials accessible by mouse.

The mouse, included with each PS/1, proved a source of some consumer confusion. One IBM executive admitted that his wife, upon her first close encounter of the mouse kind, picked up the device and pointed it at the screen, just as she would a remote control unit.

Our experience at the coast was not dissimilar. My mother-in-law was baffled when I told her to use the mouse to pick the onscreen activity she wanted to pursue. Assume nothing, I reminded myself; then I showed her what the mouse was and how to use it.

Ten minutes later, after exploring some of the system tutorials, her baffled look had disappeared and was replaced by something like delight. "I feel like I've learned something already," she said.

And she had.

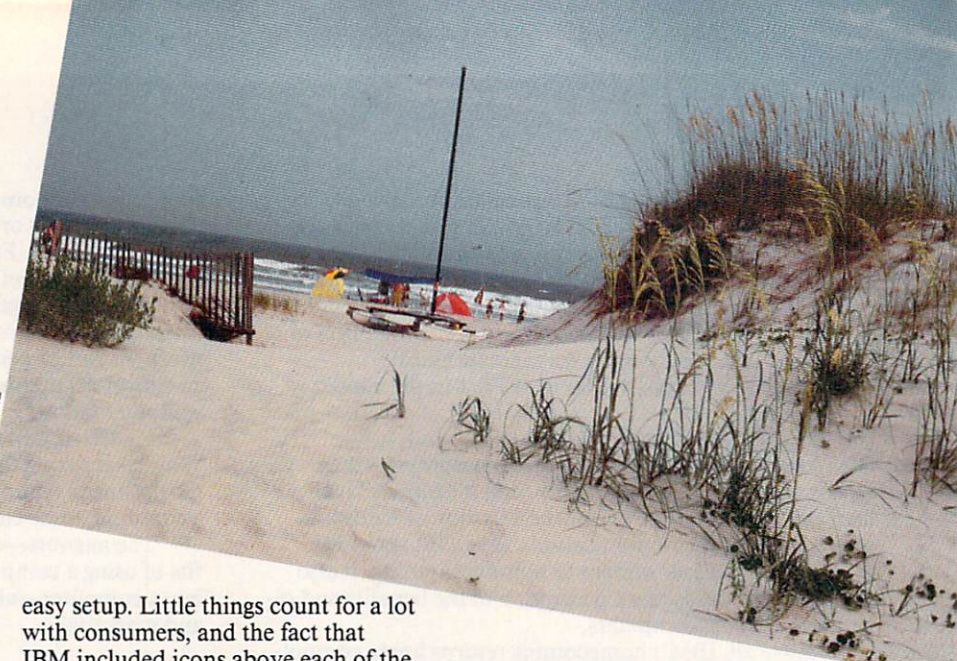
### Hardware, Hard Facts

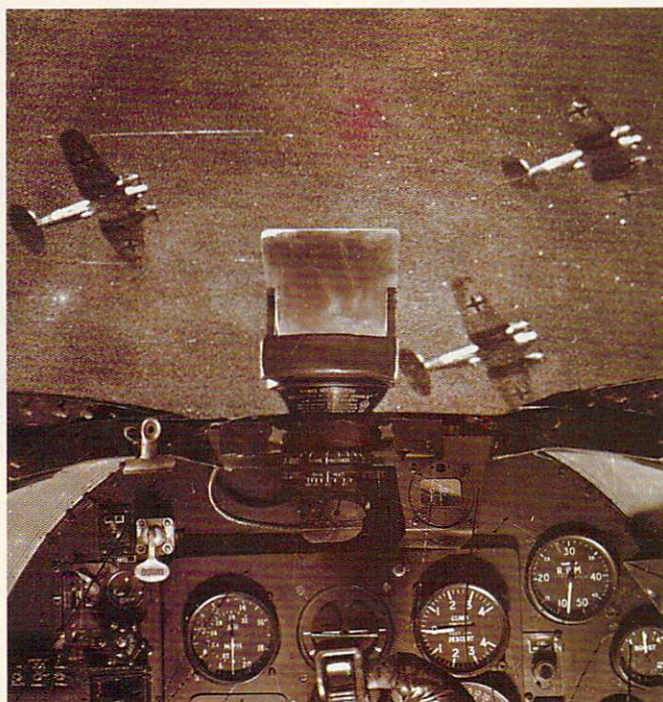
None of our freshmen seemed overly concerned about what many industry watchers consider IBM's most controversial configuration decision: The PS/1 has no standard internal slots.

That isn't to say that expanding the PS/1 wasn't on IBM's mind. Big Blue's focus groups indicated that adding internal boards didn't figure highly among consumers' desires; however, the ability to keep up with technological improvements did. A three-slot expansion unit that snaps onto the bottom of the PS/1 is available for under \$200. The same vertical expansion approach—like that used with rack stereo systems—is used with the PS/1's optional 5¼-inch drive.

Whereas opening most PCs is a consumer's nightmare, plunging into the PS/1 is a dream come true. The machine's front cover pops off, and the housing slides away at the touch of

KEITH FERRELL





# THE BATTLE OF BRITAIN. UP CLOSE AND PERSONAL.

One pilot described a World War II dogfight "like being on the inside of a beehive." And that's just what it feels like to

play *Their Finest Hour: The Battle of Britain*.™ The new air combat simulator from Lucasfilm Games that's keeping simulation buffs and action gamers alike on the edge of their seats.

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## The Realism Is Unreal.

From the moment you pull back on the throttle, *Their Finest Hour* grips you with near-photographic realism of aircraft, smoke, terrain, and flying debris.

To really get your adrenalin pumping, we've added a cacophony of roaring engines, chattering machine guns, and thundering explosions.



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Want to show your friends how you erased that



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schmitt 109. Pulverize ground installations from your Messerschmitt 110 fighter/bomber or your screaming Stuka. Or fly as pilot, bombardier or gunner in a Junkers 88, Dornier Flying Pencil, or Heinkel Spade.

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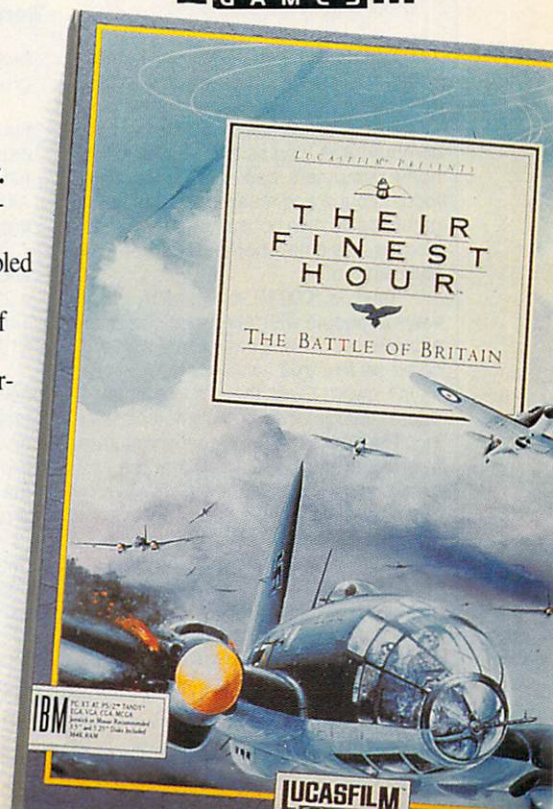
*Flying Pencil* with fancy deflection shooting? *Their Finest Hour* lets you save your proudest combat performances to disk. And relive them in real time, fast forward, or frame by frame.

## Look At Life From Both Sides Now.

Take on the Luftwaffe in a tough little RAF Hurricane or fabled Spitfire. Or test your skills at the controls of the Spitfire's nemesis, the formidable Messer-

breathe easier tomorrow. Who knows—you might even change history. And if you don't like the odds, *Their Finest Hour* lets you change sides.

**LUCASFILM™  
GAMES**



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a finger. Adding memory (the main unit will accommodate up to one megabyte) is as simple as sliding your bank card into an ATM. An optional sound card, with MIDI port, analog joystick port, three-voice sound chip, and digitizing chip, plugs in easily. You need no tools other than your fingers.

The PS/1 Selectric Touch keyboard got mixed reviews. Most of our beach party liked the responsiveness of the keys as well as their distinctive click. One among us, however, found the keyclick distracting. (My brother—an experienced computer user—thought the keys sounded like horseshoe crabs. As to whether that was from exposure to the PS/1 or to the ocean is a point of debate.)

The group universally appreciated IBM's decision to preload software on its hard disk-equipped PS/1 models. I was a bit concerned about the fact that no floppy disk masters of the software came with the machine, but our freshmen insisted they preferred to have the software already loaded and ready to run.

IBM makes it clear in its brief Getting Started manual that one of the first things you should do with your new PS/1 is make disk backups of the software, just as you would with any software you buy. And although there isn't an official policy, IBM representatives said that should a consumer somehow cripple the preloaded software, a replacement or fix could

KEITH FERRELL

be made, either by mail or by downloading software by means of the Promenade network.

The VGA monitor even impressed my father-in-law, an M.D. who has remained resistant to the computer age. Color VGA clarity may have spoiled him for monochrome terminals.

The PS/1's power supply resides in the monitor housing, contributing to the machine's quiet operation. It also contributes to the machine's small footprint, which was singled out by a couple of our freshmen as the PS/1's most attractive feature.

The 2400-baud modem makes even Prodigy run at an acceptable rate. Using the PS/1 in an office, we logged on to both Prodigy and the User's Club and were impressed with the responsiveness of the system's telecommunications. Consumers in IBM's test markets also find Prodigy

to be one of the system's biggest attractions.

The PS/1's documentation is as sleek as the machine itself. Gone are the huge DOS notebook manuals, replaced by a stripped-down paperback volume that only occasionally veers too far into computerspeak. Those members of the group who looked at the manuals didn't seem too intimidated.

It was clear after a few days that the group's consensus on the hardware was favorable. Some of our freshmen had even become, by virtue of tutorials and effort, sophomores. A couple even began to ask questions about buying a computer.

### To Market, to Market

IBM is making it as easy as it can for consumers to buy the PS/1 by selling it not only through Big Blue's tradi-

*continued on page 22*

## Tandy and Laser: Ready for IBM

Two companies that already sell home computers offer a wary welcome to IBM on its return to the consumer marketplace.

Tandy, which has been making home computers as long as there have been home computers, has been conducting focus groups and research sessions, gathering its own consumer information. The result is a new home computer with a style all its own.

Tandy's 1000 RL is aimed in some ways at people with little or no computer experience. "This is the closest we've come yet to a true appliance computer," says Howard Elias, Tandy's vice president in charge of computer merchandising. The goal of an appliance computer is to provide information tools that are as simple to use as a VCR or microwave oven.

An enhanced version of Tandy's DeskMate interface extends the RL's appliance-like feel. The opening screen includes larger icons, stylized representations of household budgeting tools, memo boards for family members, and kitchen/recipe information. The kitchen, in

fact, is the location many of Tandy's focus group subjects chose for their RL.

The enhanced DeskMate also benefits from the addition of new functions and databases, ranging from mathematical functions to airline and travel information. All of DeskMate's customary functions are also included.

Physically, the RL itself is slimmer and quieter than most desktop PCs. With a 20MB hard disk, 512K of RAM, and a Tandy color monitor, the RL sells for \$1,299.

While Tandy will be marketing its new computer through its Radio Shack stores, Laser Computer is meeting IBM on its own retail turf: Laser's machines are sold by many of the retailers carrying the PS/1. Laser is pleased with the proximity.

"IBM's name and reputation can only help make the public more aware of home computers," said Mike Wagner, Laser's director of marketing.

Wagner notes that Laser already markets a computer in a configuration that competes head-to-head with the

PS/1's features. Laser's P.A.L. 286 is an AT-class computer with a 40MB hard disk, 5¼- and 3½-inch floppy disk drives, a VGA monitor, a 2400-baud modem, software, an instructional videotape, and a mouse. The system sells for \$1,995. "Realistically, though," Wagner says, "the street price of the P.A.L. 286 is \$1,495."

Laser's experience in the home market is a bit different from anyone else's: The company made its name producing Apple II-compatible computers, a line that it continues to sell.

"There's still a good market for Apple-compatible machines," Wagner says. "Parents who are concerned about education still find Apple compatibility an important consideration. Besides, they can get our Apple compatible for \$400, including a monitor."

But the future belongs to MS-DOS, and Laser is ready for the future. "If IBM's presence helps the home computer industry grow, we're ready to grow with it," says Wagner. We all may be in for the ride of our lives.

Another Great Game From Japan

# 15 ADVENTURES IN ONE GREAT GAME



If you enjoy the action of arcade games and the challenge of role-playing games, you'll love **SORCERIAN**. Sierra and Nihon Falcom bring you Japan's Best-selling adventure game—with 15 thrilling scenarios, characters you create yourself, and over 100 magic spells to use against more than 600 enemies, **SORCERIAN** is the most exciting Japanese import yet.

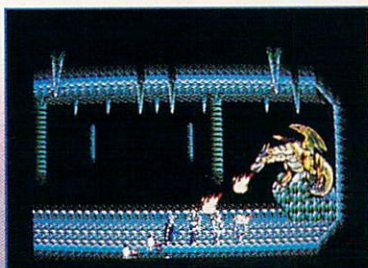


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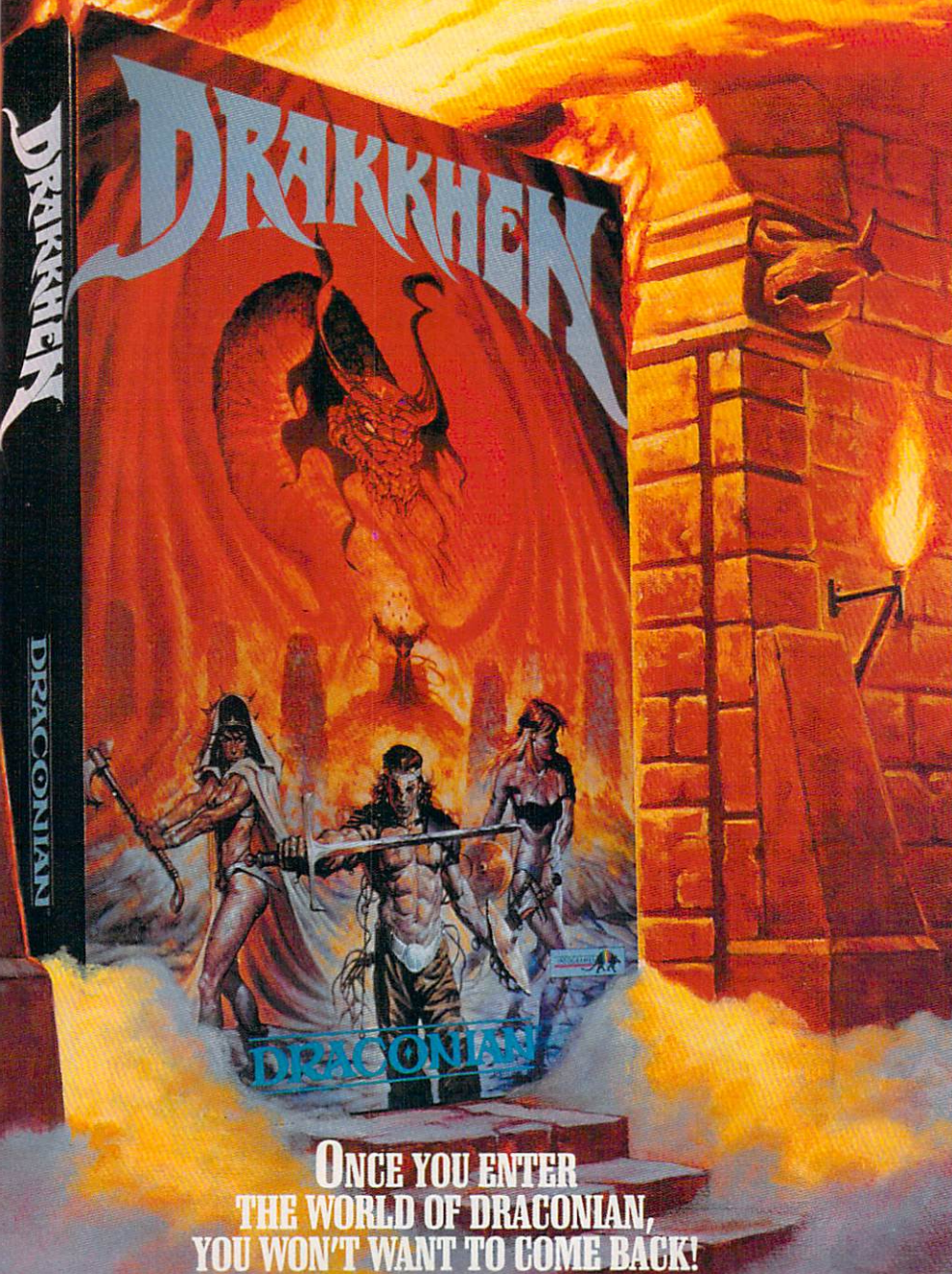
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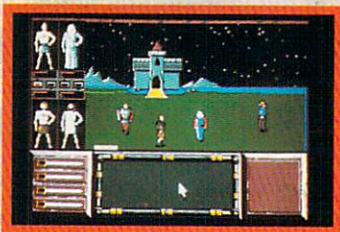
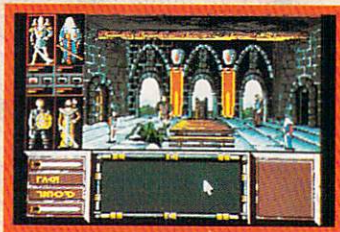
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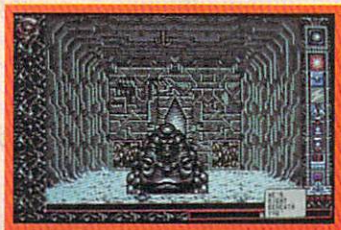
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**E**nter the *Chamber of the Sci-Mutant Priestess*—the second sensational title in the Draconian line—and explore a bizarre post-burn world caught in the throes of mutant treachery.

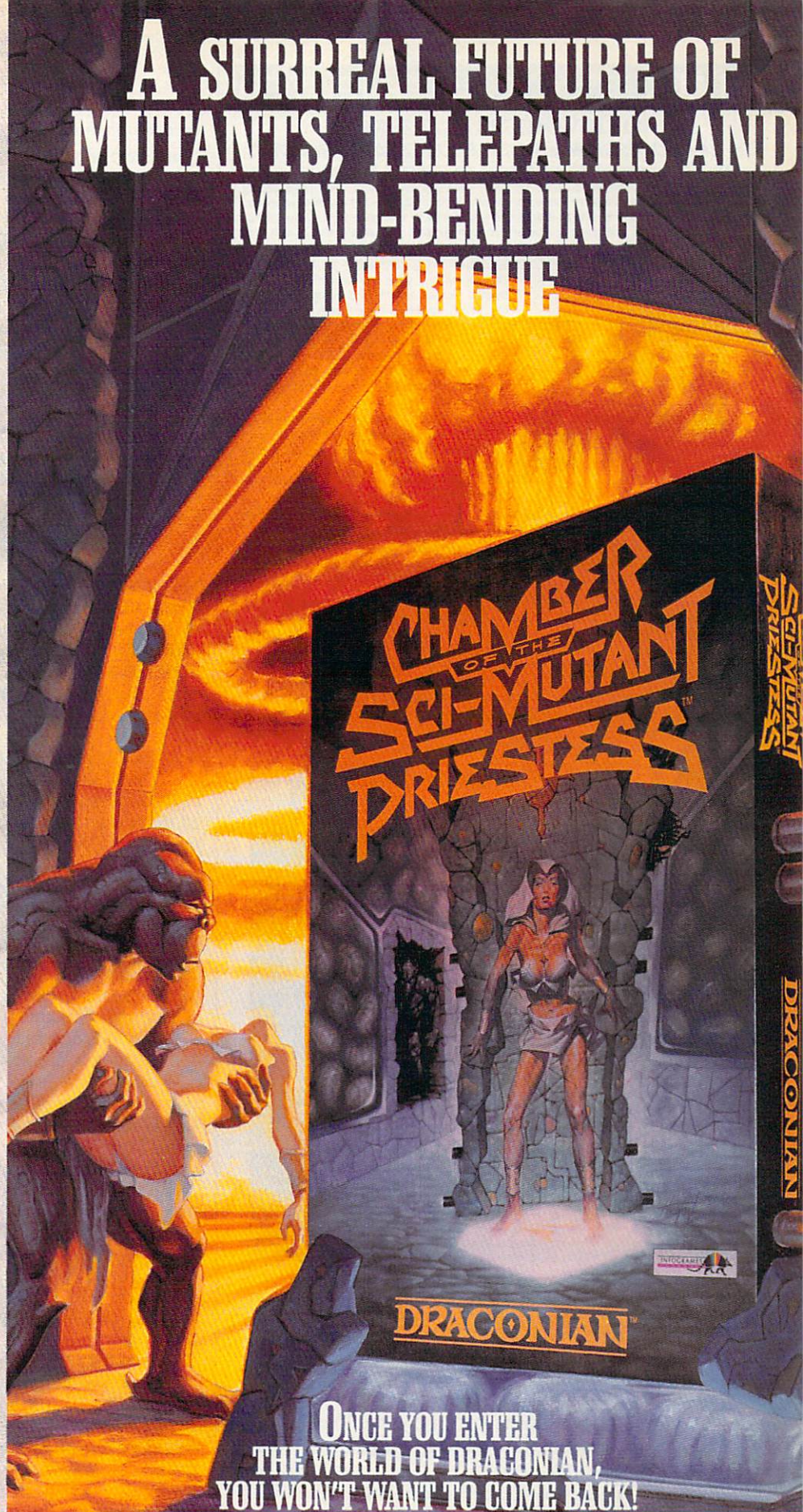
Set on a distant planet, the *Chamber of the Sci-Mutant Priestess* combines mystic drama and humor with a sophisticated icon interface, so players can easily maneuver through the game's captivating plot.

You play the role of Raven, a Tuner, whose telepathic abilities provide a unique advantage when fighting the enemy—a monstrous race of mutants called Protozorgs.

Command eight sci-powers with "iconomized" ease as you probe the chambers of the mutants temple, searching for your abducted girlfriend while engaging in a brain-draining test of five ordeals.

Animated and colorful, the *Chamber of the Sci-Mutant Priestess* promises hours of challenging intrigue for novice and expert fantasy game players alike. Don't miss out on the first psionic thriller of its kind—from Draconian!

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**“She had big brown eyes, the cutest laugh—and leukemia.”**

“Andrea was in preschool with my son.

“One day they rushed her to the hospital with leukemia. She needed blood urgently, so I went and gave... She’s in remission now, but every couple of months I go and give blood.

“Because I know someone else’s Andrea may need it.”

When was the last time you gave blood?

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National Heart, Lung, and Blood Institute, National Institutes of Health, Public Health Service, U.S. Department of Health and Human Services.

continued from page 18

tional network of computer dealers, but also through mass-merchandise retailers including Sears, Dillard’s, and Dayton-Hudson. This approach to marketing is the strongest suggestion yet that IBM perceives the computer to be a consumer electronics purchase rather than a product aimed at traditional computer purchasers.

The fact that the PS/1 will be available at Sears caught the entire beach party’s attention. (Dillard’s and Dayton-Hudson aren’t in our hometown.) Consumers who would never enter a computer store are familiar with Sears and even more familiar with the ubiquitous Sears charge card. I witnessed a couple of our freshmen mentally tabulating their current Sears balance. They want a computer and didn’t particularly flinch at the PS/1’s \$1,999 price tag.

That acceptance is one of the keys not only to the PS/1’s potential success, but also to the potential success of Tandy’s new home computer and to Laser’s P.A.L. 286 configuration. These three machines are just the start of a new generation of home computers.

### Walls Come Tumbling Down

We’ve all experienced the frustration of trying to teach—or even show—someone how to use a PC. These computers break down those barriers by eliminating the well-intentioned, but sometimes overzealous and impatient expert. Thanks to the mouse, graphical interface, preloaded software, and sophisticated tutorials, computer freshmen can explore, learn, and acquire computer skills all on their own—which is itself part of the home computer revolution.

That isn’t to say that there doesn’t remain a learning curve with the PS/1. It’s the same with any other sophisticated technology that arrives at home. (Remember when a common complaint was programming the VCR?) Computers are not yet as simple to use as other consumer electronics items, but neither are they as intimidating and complex as they once were. Novices can emerge from their first computing session feeling that they’ve accomplished something.

IBM’s reentry into the home market doesn’t automatically ensure the growth of that market, nor does IBM’s name alone ensure success. But it does signal that hardware and software manufacturers are finally delivering PCs that are built around consumer literacy, rather than insisting that consumers become computer literate.

IBM’s move home also promises a serious reexamination of home computing. The sheer size and marketing muscle of IBM and Sears should generate enough enthusiasm and curiosity to increase the number of consumers at least thinking about adding a home computer to their electronics arena.

If the PS/1 is a big hit, we can expect heated competition to bring us even more powerful home computers at even lower prices. Software developers will have a reason to develop programs that are increasingly easier to use and that yield ever more tangible benefits.

At the PS/1 introduction, IBM vice president Jim Canavino, attired in a very un-IBM ensemble of sweater, open-necked shirt, and casual slacks, declared the 1990s as “the decade of the home computer.”

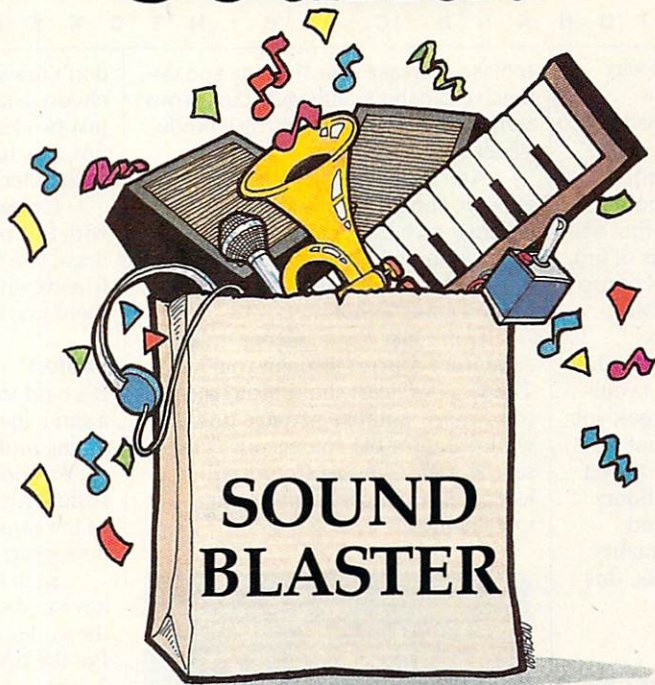
Certainly the hardware is in place and affordable, the software easier to use and more powerful than ever. It could be that we will see another 15 percent to 20 percent of North American homes adding computers over the next few years. Imagine—computers in almost 40 million homes, people reaching out to make electronic contact with each other, home businesses flourishing, home education expanding, interactive entertainment achieving new heights.

All of it made possible by home computers.

That’s a salubrious view indeed. □



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# SHAREPAK

R I C H A R D C. L E I N E C K E R

**F**un and games offer a great way to introduce families to the sometimes intimidating world of computing. Since this month's In Focus theme is family computing, we've filled this month's *SharePak* disk with programs that will provide your family with hours of fun.

We've screened hundreds of programs to bring you this fine collection. For every file on the disk, dozens were carefully evaluated. Had you downloaded the programs yourself and paid the connect charges, you would've paid many times what we charge for this disk. There's no need for you to spend hundreds of hours scouring the online services and mail-order catalogs for high-quality shareware. It's here on our disk, this month and every month.

### **Amado**

Challenge your mind, stimulate your brain, and exercise your intellect with this unique game. Colorful blocks in various patterns appear on the screen, and your job is to match the scrambled board with the computer-selected pattern in the fewest possible moves. You'll have to find one of an infinite number of solutions in order to make the match. Over 100 computer-generated patterns strengthen creativity and build intelligence.

Learning to play isn't hard. Just a few simple rules are involved, and easy-to-use keypresses control the action. But don't count on mastering the strategies quickly—this game is difficult to win despite its easy-to-learn rules and controls.

If you love a cognitive challenge or want to boost your brain power, *Amado* is the perfect game for you. It runs on any computer that has a color monitor.

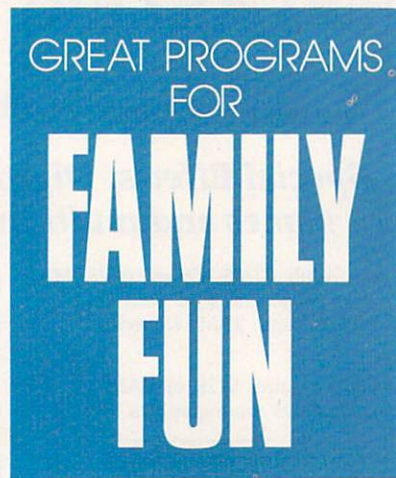
### **Captain Comic**

You are Captain Comic, galactic hero. Your mission is to recover from the planet Omsoc three treasures that were stolen away and hidden somewhere on the remote planet of Tambi. It won't be easy. You'll need to gather

tools to increase your fighting and defensive capability, navigate dangerous terrain, and avoid or destroy a horde of deadly creatures.

And if thrilling gameplay isn't enough, superb and exciting EGA graphics give this game the look of most commercial games. Easily understood instructions and rules will get you going right away.

Don't take the challenge unless adventure courses through your veins. The weak of heart should find something more suitable, perhaps tiddly-winks. But for the courageous, your search with *Captain Comic* will lead to experiences beyond your imagination.



### **Funny Face**

Do you remember sticking Mr. Potato Head pieces into a spud to create imaginative faces? The fun wore off, though, when the potato got old, soft, and smelly. *Funny Face* solves that problem with a computer version of the age-old favorite. Now you can use your computer to design and display your inventions instead of relying on some vagabond vegetable.

*Funny Face* is a creative form of entertainment. Children don't need strong artistic skills to make animation-style faces. It's as easy as picking a face part and placing it in the picture. There's no penalty for those who

don't draw well. Even very young children can create funny faces with just two keys, and adults can have fun, too, making hilarious faces for each other.

Unleash your artistic talent today with this program. Even if you can't draw, you'll dazzle your family and friends with the faces you create—and there's no mess!

### **Fusion**

It's hard to imagine getting hooked on a game in which all you do is catch falling multicolor blocks. After you see *Fusion*, you'll understand why it's so addictive. In it, you connect blocks of the same color to make them disappear.

Each level gets harder since you have to connect even more blocks of the same color to make them vanish. For the first level, you need to connect 3; on level 2, you need 4; and on level 3, you need 11. Strategy is important, and big piles are worth more points than several smaller ones.

There are lots of options. Connections may be horizontal, vertical, or diagonal. There's plenty of variety and interest to keep you going for hours and even days at a time.

Blocks are back in style and *Fusion* is the reason. Don't pass up this opportunity to play one of the most challenging and unique games to date.

### **Power Poker**

Poker is just as popular today as it was a century ago. Although it's largely a game of chance, poker requires careful thought and a knowledge of probability. The variations created by the cards dealt and how you arrange them make the game unpredictable. *Power Poker* adds another dimension. You play on a 5 x 5 grid and try to make the hands that gain the most points. Each card serves two hands, so you have to place the cards carefully.

If you enjoy poker or consider yourself a power player, *Power Poker* is a must-have. And if you don't know the game, now's your chance to learn it. □



# SHAREPAK

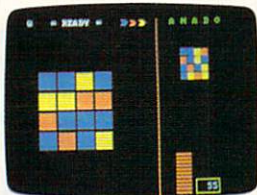
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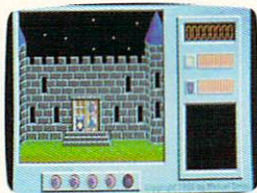
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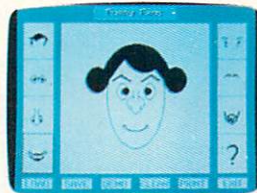
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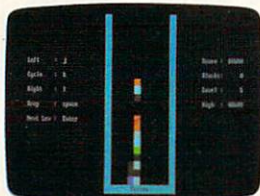
Amado



Captain Comic



Funny Face



Fusion



Power Poker

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# CONVERSATIONS

K E I T H F E R R E L L

**A**sk Emiel Petrone and he'll tell you—it's a question of standards. The international standards that allow audio CDs purchased in Japan to be used with CD players in the United States are essential to the development of an international industry. An international industry is essential for the creation and distribution of first-rate software. And Petrone, senior vice president for sales and distribution for American Interactive Media (AIM), wants to see an international industry grow around the medium of interactive compact discs.

Petrone knows all about standards. A few years ago, he helped establish the hardware standards that boosted Compact Disc Audio into the de facto standard for recorded music. Now, Petrone is involved with the establishment of CD-I, Compact Disc-Interactive, a technology that couples the enormous storage capacity of CDs with the power of the home computer.

"It's difficult to verbalize a technology that's complex on the inside but simple for the end user," Petrone says. "But our premise was to marry elements that already exist in various technologies, such as compact disc or laser disc, and enhance those further by making them multimedia technologies. What we have is a fully functional multimedia unit that we call a CD-I player."

The player, which exists now only as a prototype, gives consumers the opportunity to interact with high-quality images projected on their televisions. Because compact discs can store hundreds of megabytes of information, the quality of images and sounds is superior to that achieved in most computer software, and far superior to the experience delivered by videogame consoles like Nintendo. CD-I software goes beyond the standard fare found in most of today's computer games.

A CD-I golf game, for example, might consist of digitized photos of an actual course, with spoken commen-

tary about your play.

"Basically," Petrone says, "we're providing titles that are informative, entertaining, and educational." He anticipates AIM releasing as many as 50 CD-I software titles when the player hits the market. "Our programming will cover various genres that will allow people to interact with sophisticated programs without having to be computer knowledgeable."

In short, computer entertainment without the computer. The entire CD-I player design deliberately makes use of a familiar frame of reference. The unit connects to the family television and operates with an infrared remote control.



Emiel Petrone

"Our concept eliminates a lot of the computer lingo," Petrone says. "From a productivity level, that will still remain, of course, for people who wish to compute. But we want to reach the non-computer user, the person who would like the power of the computer, but on an easy-to-use basis."

What sounds like a dream product—several types of consumer electronics rolled into one—is Petrone's aim. "We've combined a compact disc player, a computer, and a laser disc player into one," he says. This is the sort of fusion product that has propelled the Japanese to worldwide

leadership in consumer electronics, and the list of companies participating in the development of CD-I hardware reads like a Who's Who of the Pacific Rim: Matsushita, Yamaha, Sony, Pioneer, Sharp, Sanyo, Fujitsu, and Ricoh. Another one of the key players is Dutch giant Philips, making CD-I a global undertaking.

"CD-I is a worldwide standard," Petrone says. "These are the consumer electronics companies that brought you compact disc audio and laser discs." And because CD-I players will be able to play CD audio discs, there's speculation of a CD-I player that will also play laser discs. This multiplicity of function may prove important as the new standard seeks to establish itself.

To become established, of course, CD-I must first get to market and then find buyers. How much can we expect to pay for our CD-I players?

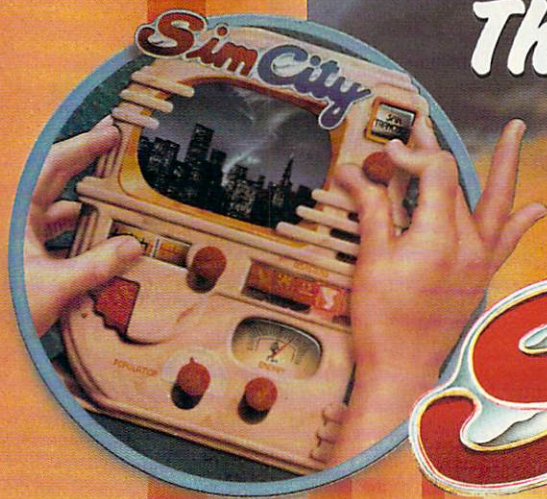
"The key price for any new piece of consumer electronics hardware is \$999.99," Petrone says. "That's where the VCR started, and that's where the CD [audio] player started."

Petrone stresses that introductory prices can be misleading. "When you have more than one manufacturer, their competition works to reduce prices based on amortization and volume of sales."

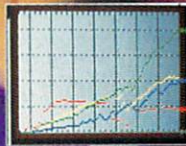
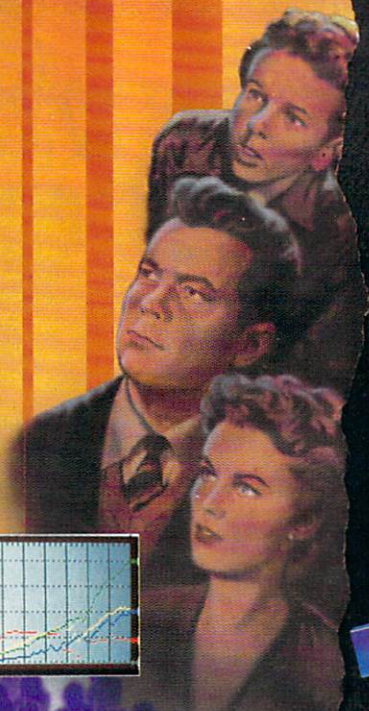
Assuming that CD-I achieves high-volume sales, should PC manufacturers be worried? Is CD-I an alternative to personal computers? Already CD-I is feeling the heat from consumer computer maker Commodore, which showcased its CD-TV interactive multimedia player in June at the Consumer Electronics Show in Chicago. Commodore claims it will have 100 applications for its product when it starts shipping to retailers this fall. But from mainstream computer products, Petrone sees little competition.

"CD-I is not intended to replace or eliminate the PC," Petrone says. "It's not an alternative to the PC. CD-I is a new, revolutionary consumer product." □

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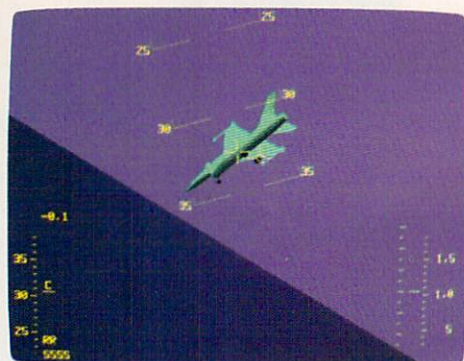
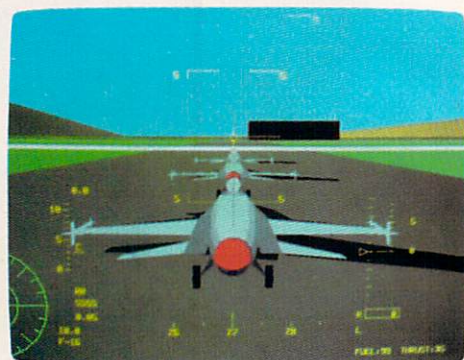
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# ARTFUL APPLIANCE

GEOS BRINGS PUSH-BUTTON COMPUTING TO THE MASSES—AND MULTITASKING TO THE PC



MARK WAGONER © 1990

The personal computer world went for a spin with Bill Gates this past summer when Microsoft finally took *Windows 3.0* off the test track and put it on the open road. The much-anticipated graphical user interface

(GUI), designed to make IBM PC and compatible computers easier to use, was enthusiastically received in most quarters. Microsoft claims that *Windows* will run on low-end PC compatibles—at least on a 286—but to

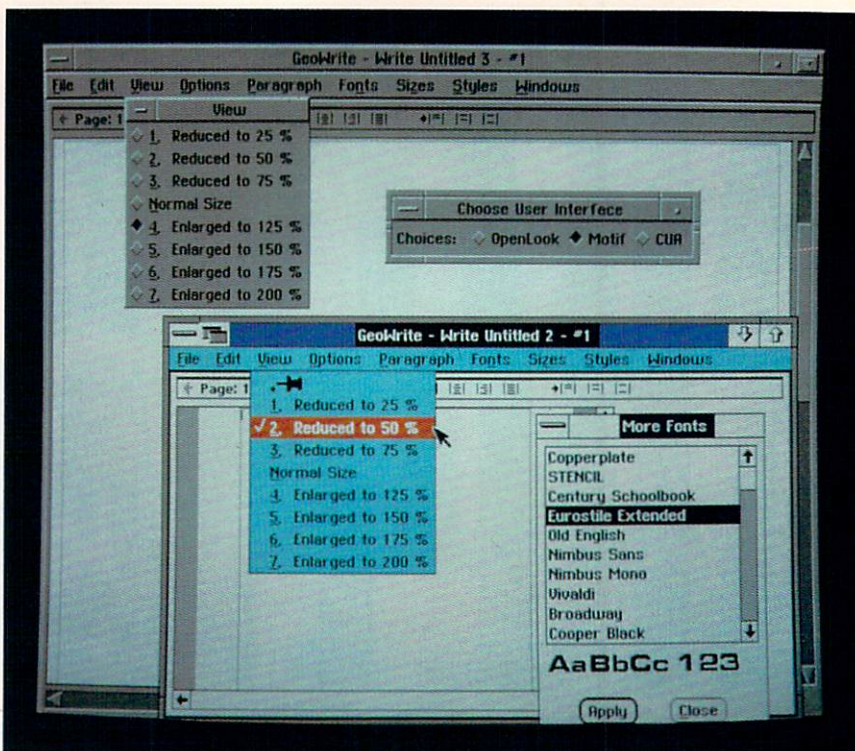
truly take advantage of that GUI's dramatically increased functionality, you'll need plenty of horsepower: at least two megabytes of memory and a 386 or 386SX processor—nowhere close to what most consumers own or can afford.

Enter GeoWorks (formerly Berkeley Softworks), a Berkeley, California, software company that for the past three years has been quietly tinkering in its garage with what could be the most functional and easy-to-use interface for home computers. GEOS provides a multitasking windowing environment in less than 100K of RAM, performs adequately on PC- and XT-class machines, runs even better on AT-class computers, supports dynamic memory management, and sits atop a powerful object-oriented programming environment.

If the name GEOS sounds familiar, you may remember its various incarnations as a graphical interface for the Apple II and Commodore 64—two computers that are limited by a slow processor and small amounts of memory.

### Small Packages

It's not easy getting graphical performance out of 8-bit machines with small amounts of RAM, but GeoWorks succeeded. The disciplined code that made those packages possible has served the company well in its latest venture. "Parts of the code have been written 10 or 12 times to optimize performance," says Brian Dou-



Use GEOS to customize the look of your personal computer by choosing from multiple user interfaces. Create a workstation look for your home PC.

gherty, GeoWorks' CEO.

"They are almost the only people left in this industry who can write tight code," says Jeffrey Tarter, editor of *SoftLetter*, a software-industry newsletter. In fact, the bulk of GEOS, which occupies a little over two megabytes of hard disk space, is comprised of font files. Company officials have

said that if you removed the font technology and made some minor modifications, the GUI would run on a double-floppy system.

"Highly compact, high-performance code is a lost art," agrees Dou- gherty. "A lot of these people came out of the videogame market," he says of the GEOS development team. Other team members learned their trade in the UNIX market, developing applications for workstations.

Videogame code must be extremely compact because of memory and processor limitations. But when GeoWorks examined the marketplace for state-of-the-art graphical interfaces, it quickly zeroed in on 32-bit workstations. The result illuminates a central paradox about GEOS and the state of current consumer computing: GeoWorks needed the high-level processing power of a workstation to create a workable, easy-to-use interface; but mass-market computers, those with the least amount of power, are exactly the systems most in need of such an interface.

### Window Shopping

GeoWorks' 8-bit history has also garnered GEOS support on the hardware side through Laser Computer of Zurich, Illinois. "Our familiarity grows out of our Apple II line," says Mike Wagner, Laser's director of marketing and product development. As the leading maker of Apple II clones, Laser had previous contact with Apple GEOS.



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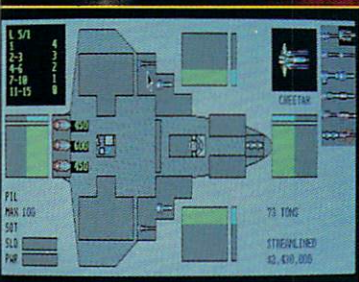
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In the fall of 1989, Laser was looking for the right software applications to bundle with a consumer-oriented, plug-and-play MS-DOS clone. The company studied several options, all of which presented particular problems: Either they were so basic in approach that they offered no room for growth, or they were too complex for novice computer buyers.

"By far, GEOS is the best [interface] product for the mass market," says Wagner.

That's exactly the flag Geoworks is driving for. The product was designed from the ground up for the mass market—home office, consumer, education, and small business.

## SOMETHING FOR EVERYONE

Right off the showroom floor, GEOS carries a full complement of standard features, including scalable outline fonts and a WYSIWYG display. GeoWorks put a lot of time under the hood, creating an attractive interface that rivals *Windows*, Presentation Manager, even the Mac's own Finder. Best of all, GEOS should be rolling onto store shelves by the time you finish this article.

The PC version of GEOS is entirely unrelated to its 8-bit cousins, except in name. It's not an upgrade or a port; its design is modeled on workstation technology.

Perhaps the most intriguing aspect of GEOS is what GeoWorks calls its *scalability*, which enables users of varying skill levels to take full advantage of the hardware and software. That capability transforms an MS-DOS *personal* computer into an MS-DOS *family* computer. The most basic level, called Appliances, is designed for those consumers who want to make use of a computer but who have little inclination to further their knowledge of computing.

For the computer literate, the Professional level offers increased functionality by delivering more choices. For example, a novice user who wanted to type a letter could click on the Appliances icon and move immediately to the Appliances screen. There, selecting the Notepad icon brings up an elegant, simple-to-use word processor, with Print, Cut, Copy, and Paste functions.

As users learn more about the system, they have access to increasingly more complex applications. A more advanced user, by clicking on the Professional icon, would gain access not just to the Notepad, but to GeoWrite, an advanced word processor with many desktop publishing attributes.

GEOS-specific applications will still take some time to come to market, but the program compensates for that lack with a DOS room from which you can run your favorite DOS programs. Creating a button, complete with icon, is simple and even fun. Both novice and advanced users should be able to enjoy the full measure of GEOS's performance.

GeoWorks' ambitious goal is to create a graphical solution that will work with any level of machine in those environments.

"With GEOS, we hope to expand the current mass market and create new markets," Dougherty says. He has good reason to be optimistic. Tens of millions of XT- and AT-class MS-DOS computers at home and in small business are waiting for a graphical interface, now that Apple and Microsoft have given validity to icons and mice.

"The world is largely convinced that a GUI is a good thing" Tarter says. "The potential [for GEOS] is enormous."

That potential isn't limited by the desktop. Dougherty has hinted that GEOS isn't just an interface for home computers, that instead it's an interface capable of supporting a spectrum of products, from laptops and handheld systems to CD-ROM readers.

## Make Mine a Cuisinart

The interface's capability to expand into more sophisticated areas was a key attraction for Laser. "You can start on the Appliances level and

admirably. And Laser isn't alone in appreciating what GEOS can do for its hardware.

"A lot of clone companies will see this as a real easy way to add value to their machines without spending a lot of money," says Tarter. That's great news for consumers, who will get the power and ease of a graphical interface as a complement to their home computer. GeoWorks will only say that it has a half-dozen hardware and software companies supporting the product at its release.

"We expect to have strong distribution and a significant impact in the marketplace," says Dougherty.

"The numbers are on their side," Tarter says. "At least two-thirds of the machines being sold are 'sub-*Windows*.'"

All of this translates to good news for users eager to explore the world of PC graphical interfaces and for consumers who have shied away from computers because of their complexity. GeoWorks has used that complexity to create a simple, effective, and efficient means for anyone who wants to use the power of a home computer.



The multitasking capabilities of GEOS make it a prime candidate for PC multimedia applications. Mixing video, text, and graphics are part of the new wave.

move to the Professional level when you're ready for it," says Wagner. That's important for a mass marketer like Laser, he says, because the sooner you can get a consumer up and running on a computer, the less chance you have of a frustrated customer bringing the machine back.

In getting users over that initial hurdle, Wagner says, GEOS succeeds

In the coming decade, millions of consumers will, for the first time, take to the home computing road to expand their horizons and creative opportunities. GeoWorks has crafted a great set of wheels for the trip, and GEOS makes for some great driving. □

Peter Scisco, editor in chief of *COMPUTE*, is a late convert to graphical interfaces.

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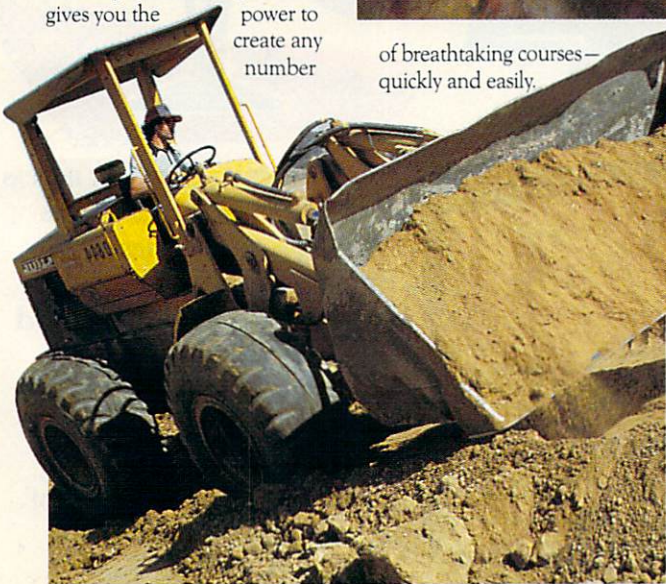


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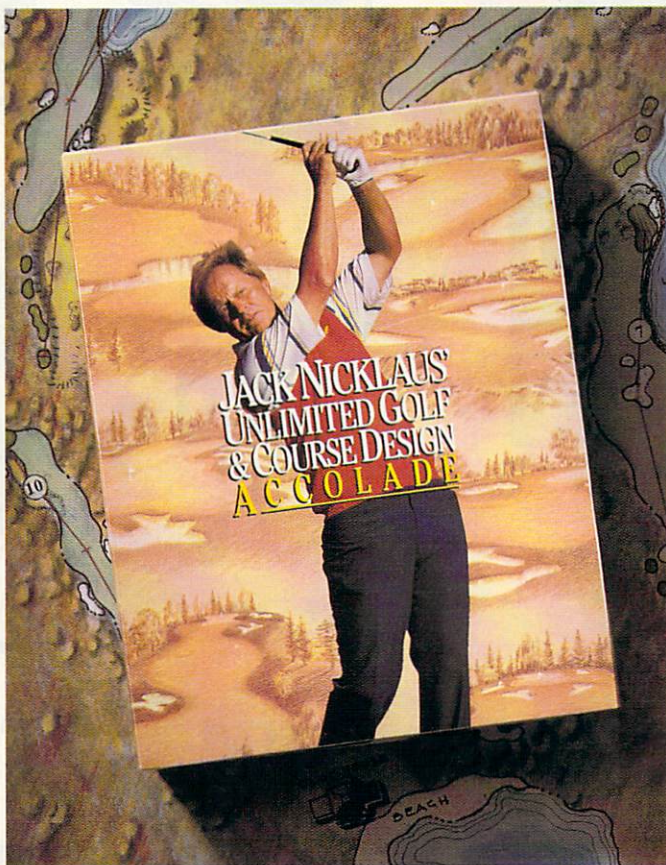


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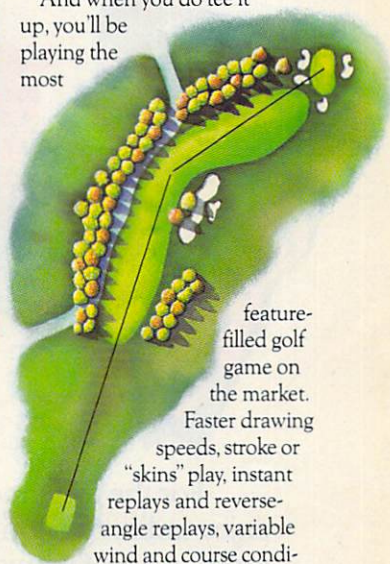
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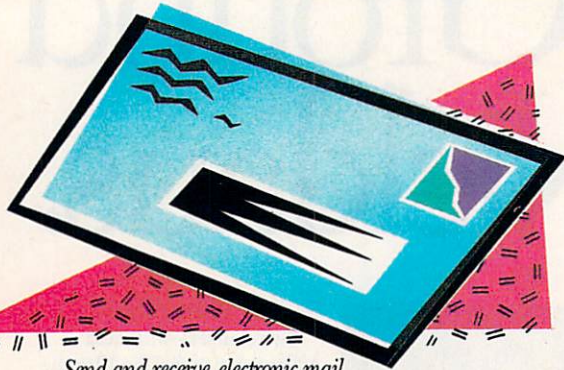
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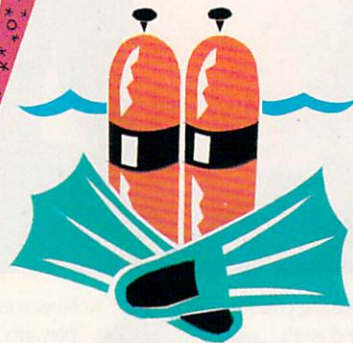


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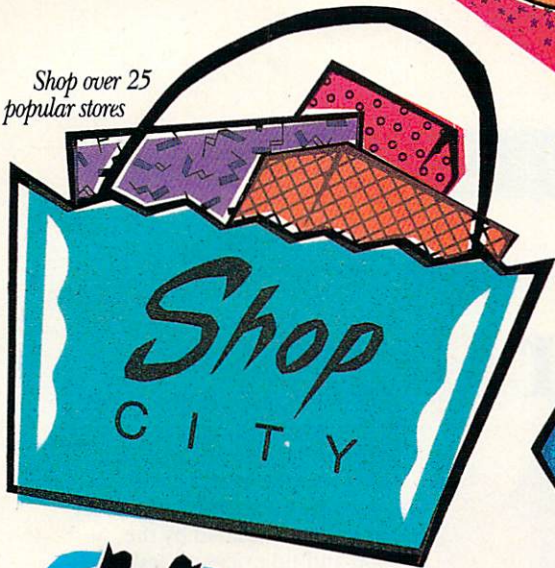


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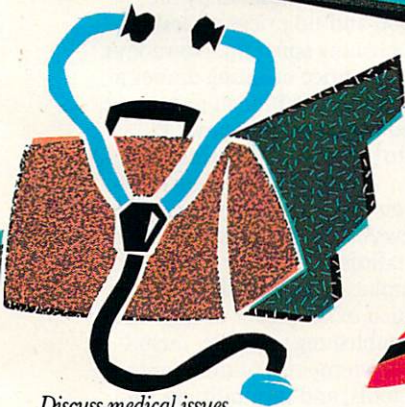
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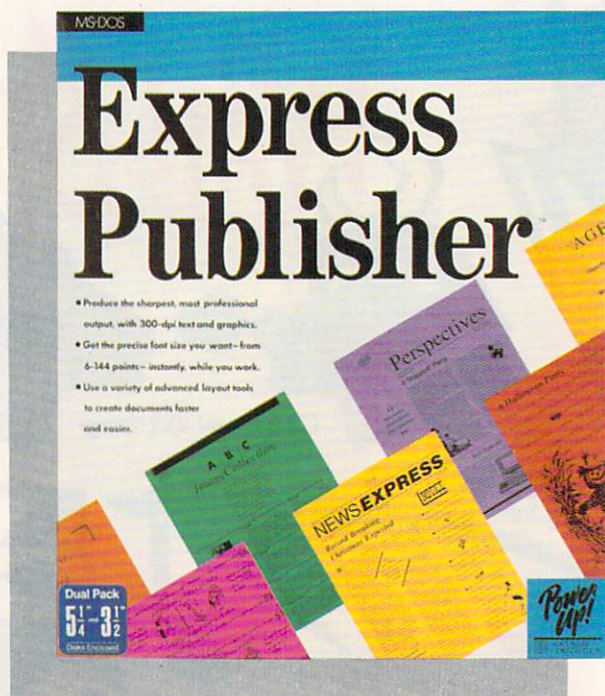


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Until recently, computerized typesetting and page layout cost big money. Budding Gutenbergs stuck with typewriters, scissors, and rubber cement, intimidated by the \$600-and-up prices of desktop publishing software. Nowadays, for the price of eating dinner at your favorite French restaurant, you can turn your trusty PC into a home office printshop.

Power Up! Software's *Express Publisher* lets you create newsletters, advertisements, invitations, and other text and graphic designs. This program

packs much of the power of high-end desktop publishing software, including pull-down menus, outline fonts, drawing tools, and the ability to import text and graphics from your favorite software. Compugraphic outline fonts make *Express Publisher's* output excellent, whether you're printing on your old dot-matrix, a laser printer, or even a PostScript typesetting system.

You shouldn't encounter any major hurdles getting *Express Publisher* up and running. An automated installation program puts everything in the right place on your hard drive. If you've ever used *Windows* or a Macintosh, the program's interface, consisting of a menu bar with a horizontal row of icons below it, will be instantly familiar. Your document is displayed in a window at the center of the screen. Scroll bars let you move

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around the page, and a handy ruler lets you keep track of where you're editing. Although *Express Publisher* requires a mouse, most of the program's options can also be accessed through keyboard equivalents.

I tested *Express Publisher* 1.1 on two systems. First I tried it on an XT-compatible with 640K, a 20-meg hard drive, CGA graphics, an Epson-compatible printer, and a Microsoft bus mouse. I then switched to a Compaq 286 with two megabytes of memory, a 40-meg hard drive, an EGA monitor, a Microsoft serial mouse, and an HP LaserJet printer.

If you have more than 640K of memory, *Express Publisher* will recognize and use it. If your system has only the minimum 640K, the program will use your hard drive for virtual memory storage. Accessing your hard drive to complete some opera-

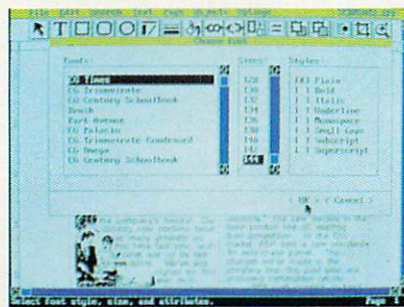
tions slows things down a bit, so extended or expanded memory makes your work a lot quicker. Although *Express Publisher* worked well on both systems, the combination of extra memory, processor speed, and screen resolution on the 286 machine amounted to quite a leap in productivity. I noticed this especially when waiting for page reformatting and other time-intensive functions.

Monitor resolution makes a big difference when working with *Express Publisher*. In CGA mode, the program uses 640 x 200 pixel resolution in two colors. This makes everything look skinny and tall, and you can only see a third of the page you're composing. The screen size doubled to over half a page when I switched to the 640 x 350 pixel EGA monitor.

Screen update is a little slow on some systems. Fortunately, the Display Settings options allow you to speed up operations on a slower computer or one with only 640K. You can substitute the computer's system font

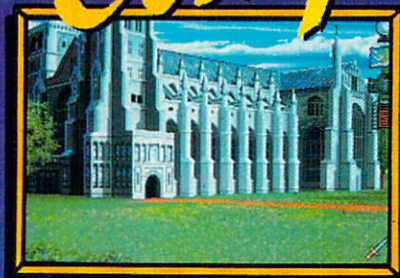
onscreen for the bitmapped font you're using and greatly speed things up. When you print out the final document, the smooth, bitmapped font still prints. You can change bitmapped pictures so that they display on the screen as labeled gray boxes, while the actual graphics appear when you print the document. The only problem I found with these options is that you can't see exactly what you're going to get before you print it. On slower systems, though, the increased speed, especially when typing in text, is worth the inconvenience of not working with a WYSIWYG display.

Digging into *Express Publisher's* tool box, I discovered several useful functions, each represented by an icon or a pull-down menu item. There are tools to make boxes, lines, and circles; to let you crop, magnify, and edit graphics; to align, link, and fill objects; and to layer objects and wrap them with text. Cut, paste, search, and replace commands, common to this type of program, have been imple-



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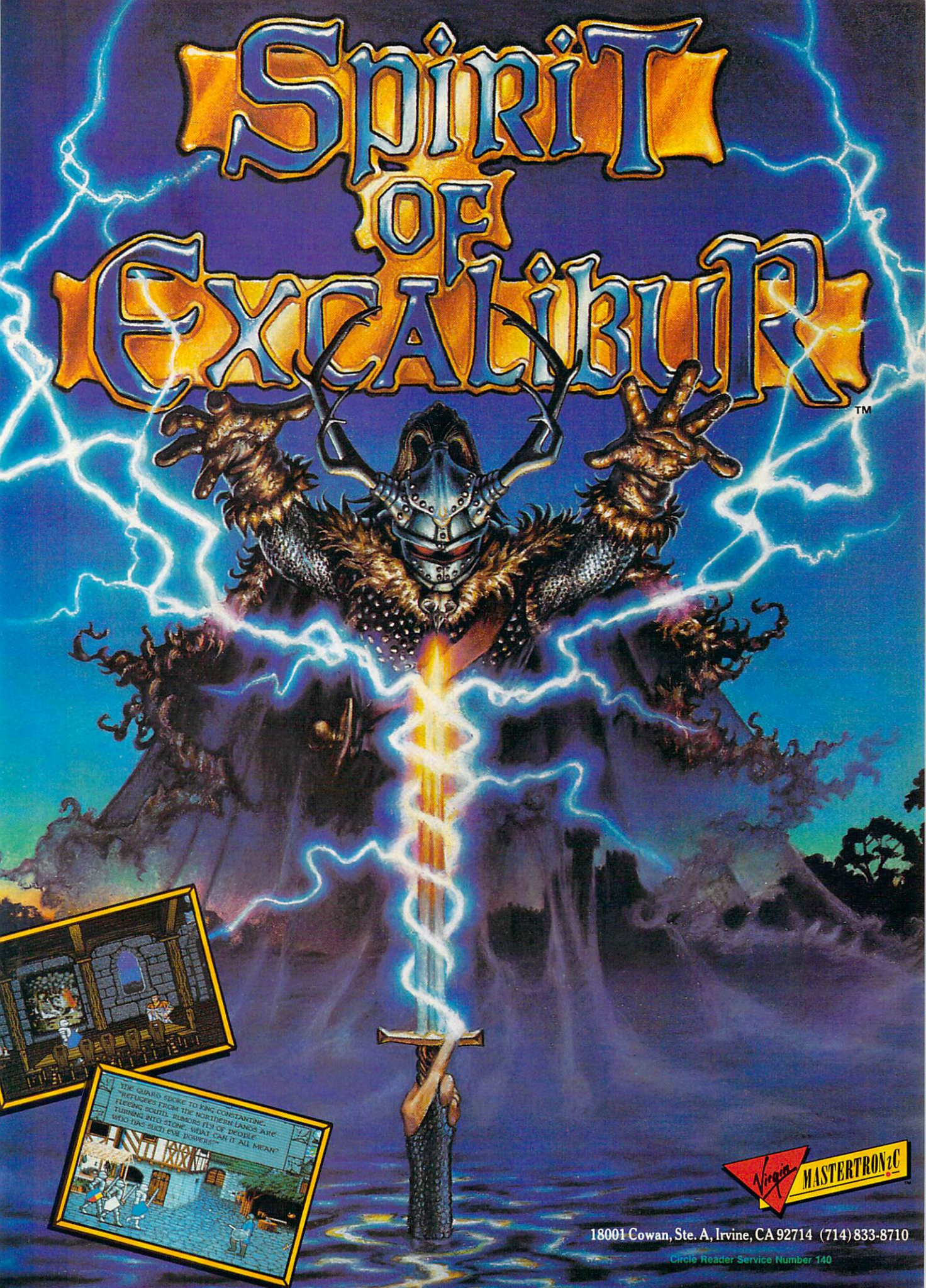
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mented in a very friendly, easy-to-use manner. To copy and paste text, for instance, you simply use the mouse to highlight the text you want to copy, select the Copy command from the Edit menu, place the cursor where you want the text to be copied to, and then select Paste. The text you've copied is instantly inserted after the cursor.

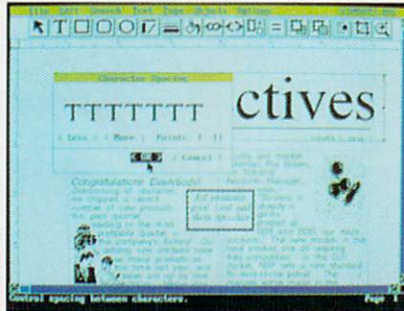
When creating a new document, you can choose from one-, two-, or three-column formats, or you can create your own. In addition, you can select page size from a list that includes letter, executive, legal, ledger, and A4 sizes. Once you've selected your basic format and page size, you can start filling pages with text and graphics. To enter text you must select the text window icon, size a text window, and place the window where you want it on the screen. You can type text into the window or import from your word processor. *Express Publisher* will directly import files from *Microsoft Word* or *Works*, *WordStar* and *WordStar 2000*, and *WordPerfect*, preserving bold, underlined, and italic text. You can also import unformatted ASCII, DCA, or IBM *DisplayWrite* 4.0 files.

*Express Publisher* includes two Compugraphic outline fonts, CG Times and CG Triumvirate (similar to Helvetica). These outline fonts can be scaled from 6 to 144 points and will print at your printer's highest resolution. On the printers I used, output of the smallest and largest characters looked very respectable. Even with 144-point type, there was very little roughness at the edges. You also have access to the fonts resident in your printer. *Express Publisher* supports the built-in draft and letter-quality fonts, font cartridges, and, as of the version 1.1 update, downloadable Bitstream and HP fonts. The fonts you choose can have many different attributes, including bold, italic, underline, subscript, and superscript. Both of the printers I tested produced sharp-looking documents using a mixture of Compugraphic and native printer fonts.

Often, certain characters may appear to have too much space between them when placed close together, such as the letters AT. High-end desktop publishing programs allow you to kern this space and move the characters closer together. While *Express Publisher* doesn't let you adjust the kerning of individual character pairs, you can choose to kern an entire text box. I achieved very subtle results when I applied kerning to blocks of

text containing small fonts, but I found it to be most useful for spacing larger headlines out in a manner more pleasing to the eye.

If you don't have enough room in a text box for an entire article, *Express Publisher* leaves a mark at the bottom right of the box. You can resize the box or link it with another box, possibly on another page, to accommodate the spill-over text. This feature is useful for making newsletter articles flow like a newspaper, with stories continued on various pages.



You can adjust the amount of space between characters within text boxes.

There are a multitude of options for laying out high-resolution graphics with *Express Publisher*. You can import files in virtually all common graphics formats. I successfully imported files from *PFS:First Publisher* (.MAC), *PC Paintbrush* (.PCX), *WordPerfect 5.0* (.WPG), and a scanner (.TIF). To help you get started, the *Express Publisher* disks include over 200 TIFF-format clip-art images in 300 and 150 dpi. Additional clip art and font packages are listed in the manual, or, if you prefer to do it yourself, you can use *Express Publisher*'s graphic tools to make lines, boxes, circles, or fills. If you want to tidy up your pictures, *Express Publisher* lets you crop pictures or zoom in to edit individual pixels.

*Express Publisher* treats everything you put in the document window as an object. These objects can be text windows or graphic images. Once you've created an object, you can resize, flip, rotate, and/or invert it. You can also cut, copy, and move it freely around the document window. By clicking the Send to Back or Bring to Front icons, you can layer graphic and text objects, placing them in the foreground or background relative to the other objects. Processor speed and memory directly affect how quickly you can move things around onscreen.

Several powerful tools are avail-

able for aligning and formatting each *Express Publisher* page or the document as a whole. To quickly get going on a newsletter, for example, you can load one of the many included templates. The newsletter sample has a headline and three columns of text. All you have to do is fill in the text, add a picture or two, and you have a great-looking newsletter. *Express Publisher*'s rulers and grid are helpful when you want to see where you are on a page or where your margins are. They can be toggled on and off with a menu item. Removing the ruler gives you a more complete view of the current document and, if you're using CGA, greatly expands the viewing area. You can work in inches, pixels, or picas, and you can snap objects to the nearest line on the grid or align them 15 different ways on a page. With all of these features, I had very little trouble creating a wide variety of documents with straight, neat-looking columns.

*Express Publisher* comes with a well-written manual bound in a large paperback book format, as well as a supplement to the manual listing corrections, tips, version 1.1 features, and additional troubleshooting ideas. The first half of the manual contains a tutorial clearly covering the basic essentials, while the rest contains appendices dealing with file compatibility, display settings, setup problems, printing, fonts, clip art, and technical support, which is provided free by writing or calling. Conveniently, all the included clip-art graphics are shown in the manual.

While *Express Publisher* is a low-end package, it has all the functions of professional desktop publishing programs that the casual user needs. *Power Up!* should be commended for releasing such a solid program at an affordable price and for providing good, free technical support. If your home office needs include page layout, you should book an *Express Publisher* tryout at your local software store.

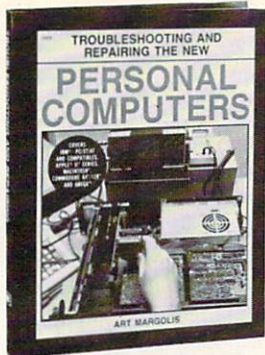
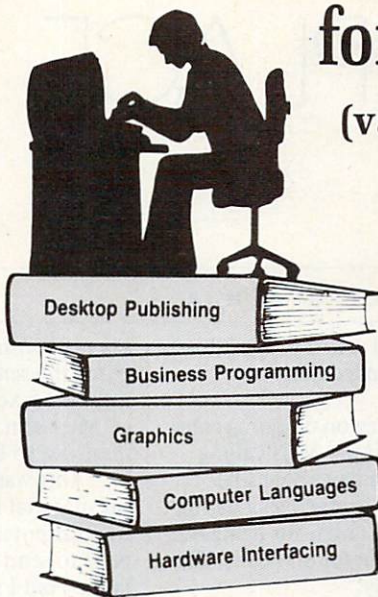
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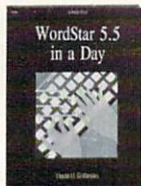
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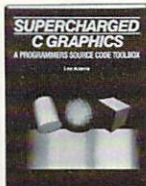
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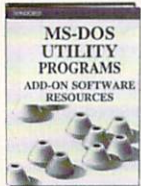
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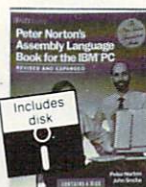
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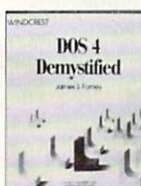
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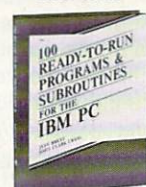
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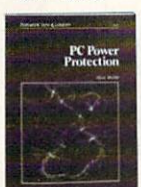
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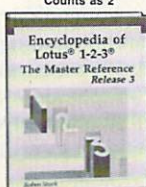
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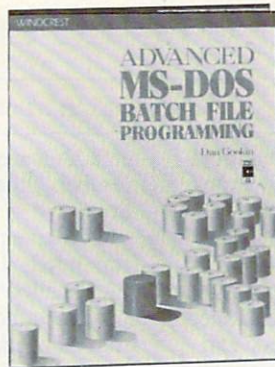
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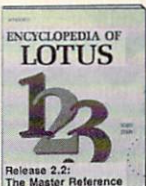
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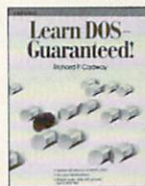
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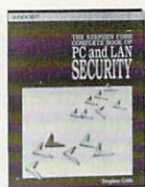
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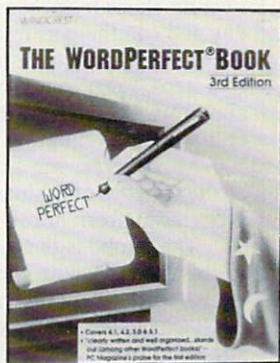
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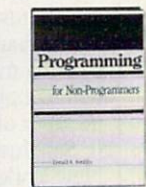
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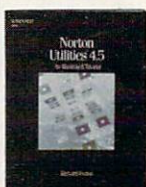
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# WORKPLACE

D A N I E L J A N A L

**F**or three weeks last month, I had to leave my home office to conduct business in California.

That's a long time and a long way from Fort Lee, N.J.

I needed to maintain a professional aura for my business and keep in touch with clients, reporters, and new business prospects for my public relations firm. Some careful planning led me to a strategy that would maintain client confidence and help me stay on top of my business.

First, I gave my clients a detailed itinerary of where I would be and how they could reach me. Then I told them I would check in for messages every day and call them as frequently as usual. With these two simple, effective steps, I preempted any concerns about my not paying attention to clients while traveling.

My itinerary set, I then took care of the logistics of maintaining a home office away from home.

The phone is the most direct way to stay in touch with clients and prospects—and potentially one of the most expensive. I devised several strategies to save time and money.

To avoid long-distance tolls, I wrote down the toll-free numbers for my clients and reporters.

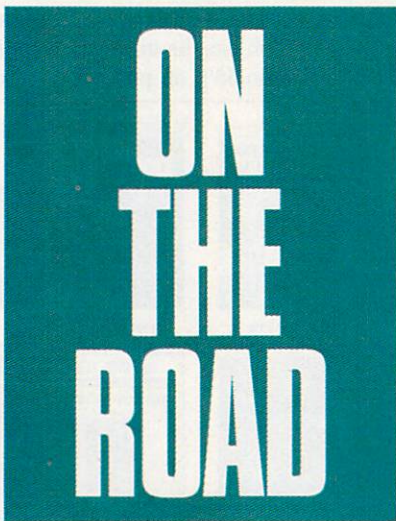
I changed the message on my answering machine to account for my whereabouts and to leave the phone number of a friend I would be visiting in San Jose. Because I live close to New York, I had to think of a clever message that did not imply, "I'm out of the office for three weeks. Feel free to rob me anytime before April 15."

Here's what I said: "You have reached Janal Communications. You may leave a message on this tape or call our Silicon Valley office." I gave the phone number of the friend's house where I planned to stay. At the end of my message, I asked callers to leave their phone number twice. I've found that people talk so fast that it's difficult to write the number if they say it only once. When I'm on the road, I can't rewind the tape.

Many people left messages. Some

left a message and called the San Jose number. Others called San Jose directly.

To save money on outgoing calls from hotels, I used my MCI calling card. I called from pay phones because most hotels charge fees ranging from 50 cents to a dollar for using the room phone—even for 800-calls. That can add up quickly!



I also got an 800 number for my home so I could call in without the additional expenses of the MCI card. An MCI representative told me the MCI card costs 75 cents a call to use, while an 800 number costs \$20 a month. The break-even point came at 27 phone calls—a small number when you consider I called the New Jersey number three times a day to check messages. Long distance charges, of course, were equal in both cases.

Besides my phone and answering machine, I live by the fax. In the four months I've had my new fax machine (my second), I've received 490 faxes and sent 1247. I needed a fax service on the road, and I found it through MCI mail. All I had to do was dial my regular account number (an 800 number, so it didn't cost anything). I merely typed the name and fax number of my client, transmitted the file to MCI

via my communications software, and typed the send command. My clients received faxes about two minutes later. MCI sent a receipt to my electronic mailbox, so I knew all had gone well.

This was a good solution to sending material that I had created with my computer. Fortunately, I didn't need to send hard copy or receive faxes. Had I needed to, I would have found a copy shop that offers fax services (every city seems to have several). Fees are steep—about \$3 to send each page and \$2 to receive. Most hotels will offer fax services for guests at a similarly outrageous fee.

My biggest fear was how I would conduct business without the piles of files I use to document my work. The best strategy was to copy all the important files to my laptop computer, a Zenith SupersPort with a 20MB hard disk. I have *WordPerfect 5.1*, *dBase III*, *Quattro Pro*, *Procomm* for online communications, and *Hotline*, an autodialer containing my entire address file—more than 1,000 names, including reporters, clients, and friends. I carried the most important parts of my office in a mere 12-pound machine.

The system worked perfectly. I called dozens of people instantly with the electronic address file, gathered tax information for my accountant with *Quattro*, and wrote dozens of memos (including this article) with *WordPerfect*. Also, *WordPerfect* converted files that I sent through the modem to CompuServe and MCI mail.

The biggest surprise came when a company called to order a directory I publish, *The Definitive PC User Group Directory*. I copied the database to a disk, wrote an invoice (printed with the help of a friend's laser printer), and sent the material via Federal Express. I can only hope they will pay just as fast!

Taking your home office on the road requires careful planning and a workable strategy. With effort and foresight, you can provide your clients with a great deal of personal service without burdening them with a great expense. □

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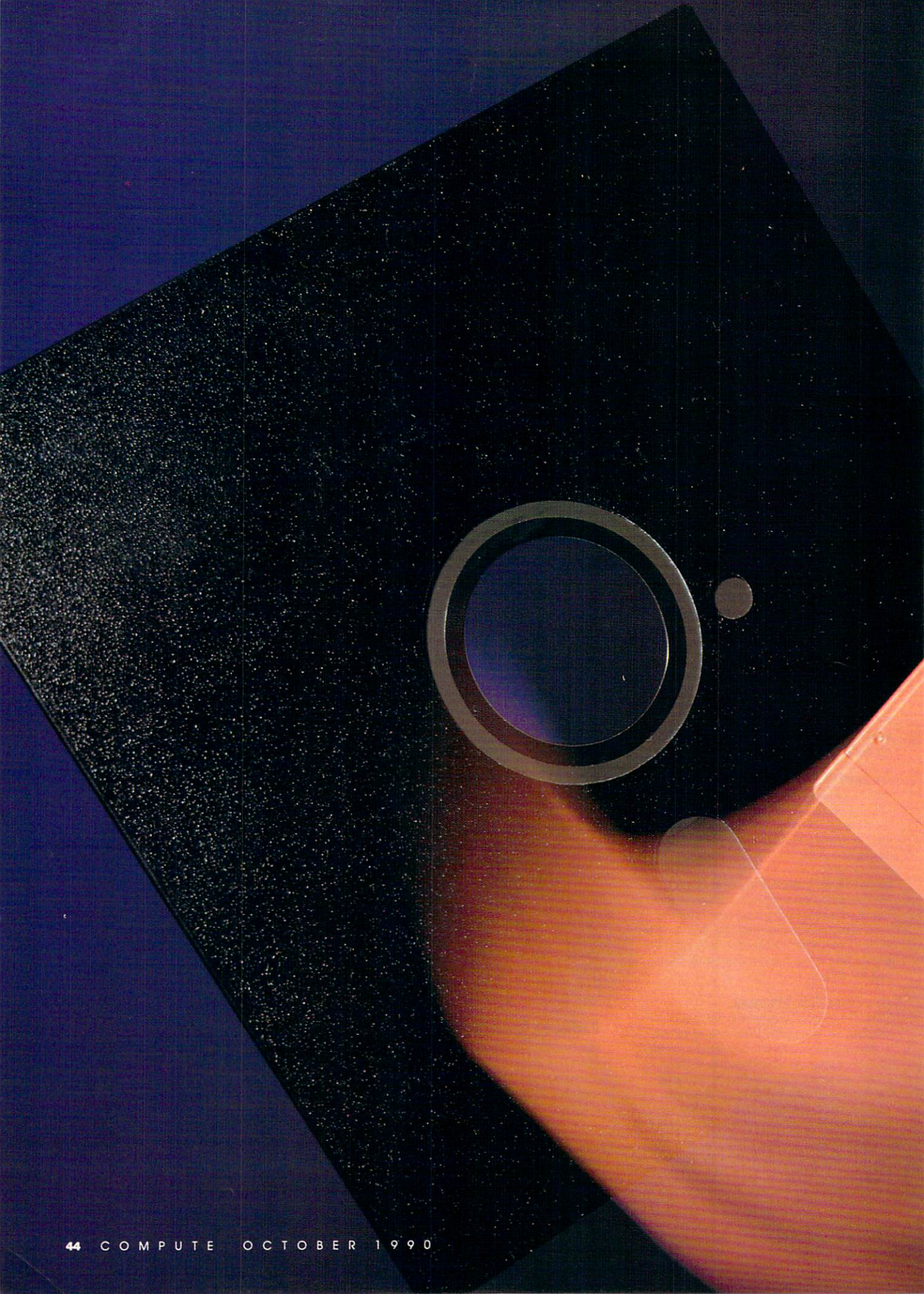
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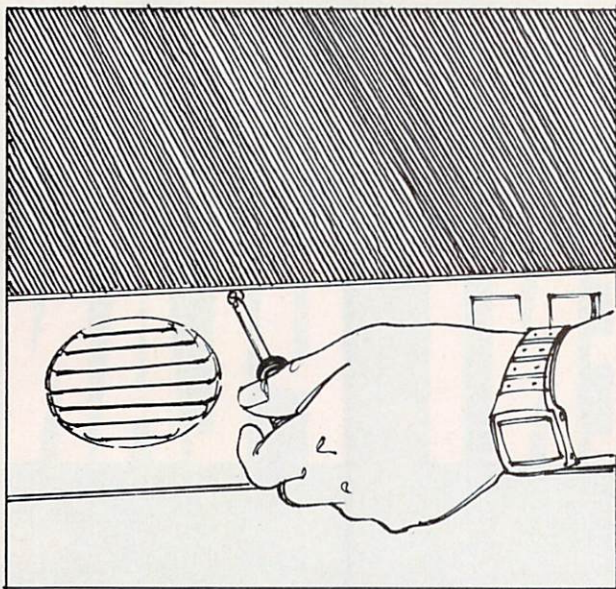
# INSTALLMENT PLAN

YOUR HOME BUSINESS  
CAN PROFIT FROM  
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UPGRADE YOUR COMPUTER  
WITH A 3½-INCH DRIVE  
AND REAP BIG BENEFITS.

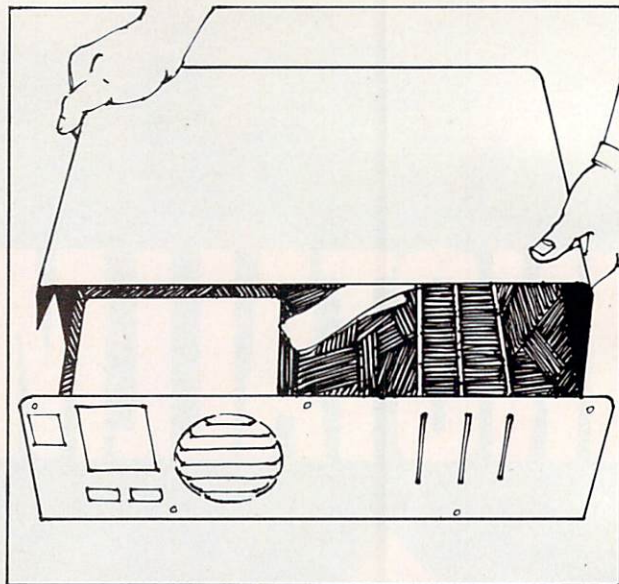


**P**ersonal computers designed for the home entrepreneur are shrinking in size as they grow in power. One example of that trend is the smaller, more damage-resistant 3½-inch floppy disk, which holds more data and is easier to handle than standard 5¼-inch floppies. These advantages are particularly pronounced around the home office, where storage space is at a premium and mishaps involving pets and children can be a factor. If you've been putting off adding a 3½-inch drive to your system, read on. It's really a simple operation. You only need to be able to use a screwdriver.

P H I L I P C H I E N



Most cases are held together by five screws, one in each corner and one in the top center of the back.



Pull the case cover forward gently but firmly. Most covers fit tightly to the case. Don't wrench or jerk the cover.

## Hardware Requirements

The most important computer requirement is an empty half-height drive bay in your computer. If your computer has two full-height floppy drives or any other unit that takes up all of your front panel drive locations, you won't have enough physical space to add another drive. You might be able to remove an extra drive or exchange a full-height for a half-height one to make enough room to add another drive.

While it's theoretically possible to use a 3½-inch drive with any version of MS-DOS, versions earlier than DOS 3.2 require special patch programs or drivers. If you're using an earlier version, it's highly recommended that you upgrade your version of DOS when you install your 3½-inch drive.

Most early disk controller cards were designed to support only 360K 5¼-inch drives. Current cards are designed to support virtually any floppy drive, including all 5¼-inch and 3½-inch permutations. The documentation that came with your disk controller card or computer should specify whether or not it supports 3½-inch drives. If your controller card doesn't support the new drives, you can upgrade your controller for about \$50.

Generally, 3½-inch drives aren't designed to fit into a PC or an XT drive bay. For the original IBM PC and similar cases, you should purchase a 3½-inch drive with a 5¼-inch adapter kit. The kit normally comes ready to install with the drive in the

adapter. Most adapters come with a frontplate that matches the computer's case. Finally, the adapter includes patch connectors that adapt the drive's power and data connectors to the connectors used by 5¼-inch drives.

## In Search of Power

If your power supply has only two disk drive power connectors or all your power connectors are in use, you need a simple power cord Y-adapter (about \$3). This adapter plugs into your power supply cable and converts one power plug into two identical plugs. You don't have to upgrade your computer's power supply when you add another floppy drive because only one floppy drive will be running at any given moment. Your computer doesn't care how many floppy drives are attached; it only supplies power to one at a time.

You must choose the capacity of your drive carefully, remembering that 3½-inch drives come in several models: 720K, 1.44MB, or 2MB. Most laptops, including the IBM portable, use 720K drives. The 1.44MB drive introduced with the IBM PS/2 is also available for other MS-DOS computers. It's quickly becoming the standard for 3½-inch drives because of its relatively low cost (typically only \$30-\$40 more than 720K drives) and full compatibility. The 2MB and other higher capacity drives are rare at this time. Some computers have built-in disk drive controllers, making it impossible to add a controller card to upgrade to 1.44MB drives or even

720K drives. Check your manual and call your computer manufacturer's technical support number to make sure your computer can be upgraded.

## Getting Down to Business

If this is your first venture inside your computer's case, you may want a technologically experienced friend to watch, just to make sure you don't make a mistake. But installing a drive is one of the simplest upgrades you can perform, and it's difficult to do it incorrectly.

The following directions and illustrations show how to install a 3½-inch drive with a 5¼-inch adapter in a generic PC clone that has an available drive bay. If you have an AT or need to remove an existing drive, there are minor differences.

You should always ground yourself before opening your computer to prevent damaging the computer by causing a static spark. Touch a bare metal part of the computer's case (such as the power supply) to eliminate any buildup of static in your body.

**Always shut off your computer and unplug it before opening the case.**

Many PCs have flip-top cases that open like the hood of a car. If yours has this type of case, press the two buttons on the sides of the case and flip open the top.

Most cases use five screws at the top and sides of the back panel to hold the cover on. There are several other screws that hold the power supply and



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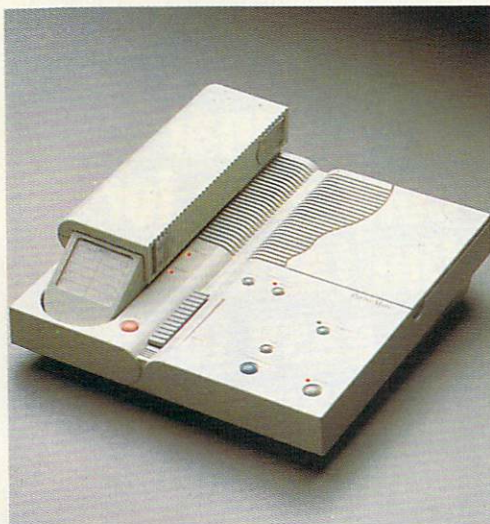
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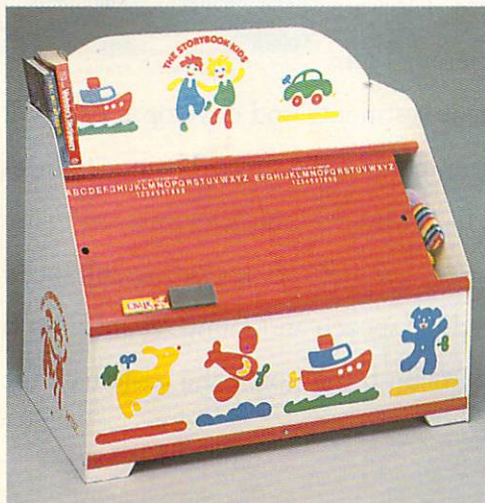
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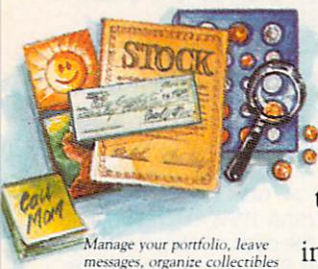
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your dinner, and generate a convenient shopping list. Manage your investments and develop a personal savings plan. Leave messages for your family—even leave important numbers for the sitter. The possibilities are endless—but whatever the task, the RL's DeskMate® Home Organizer software handles the details for you. There are other great features too, including enhanced CGA graphics and DAC technology



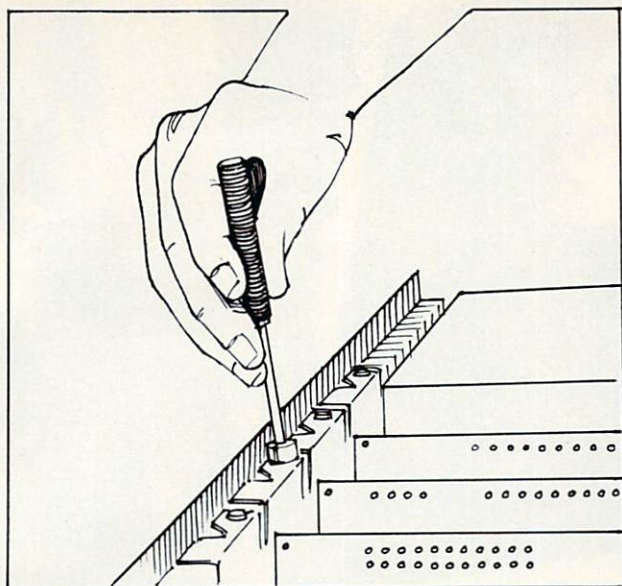
for incredible speech and sound recording and playback. And it's affordable—ready-to-run systems start under \$750\* So bring home the easiest-to-use personal computer ever . . . from America's leader in PC compatibles.

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\*Tandy 1000 RL (25-1450) with monochrome monitor. Complete color systems start at less than \$900. Price applies at participating Radio Shack stores and dealers.



**Change the drive controller if necessary. Always be sure to secure the cards in place with a screw.**

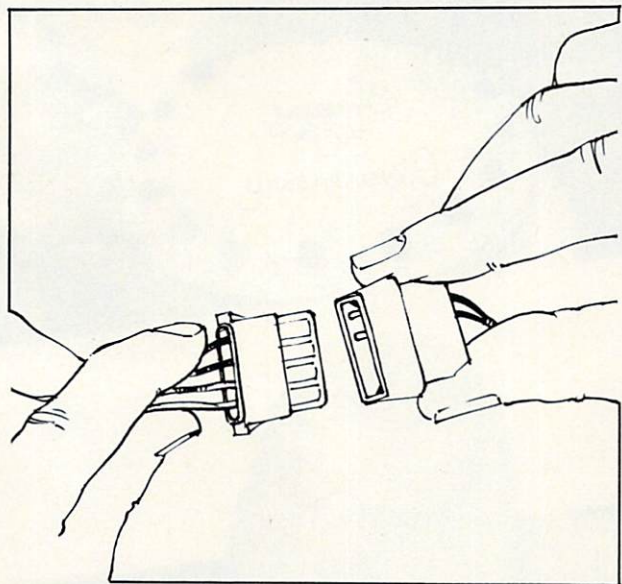
other internal components in place; you shouldn't unscrew those.

Unscrew the case screws and put them in a safe place. Slide the top of the case toward the front of the computer and take it off.

From the front of the case, remove the frontplate knockout panel corresponding to the location where you'll install your new drive. If you don't have an open drive location, you can replace an existing drive or substitute a half-height drive for an existing full-height one.

Remove the existing floppy controller card if you need to upgrade it. It's held in by one screw at the back of the computer's case. Unscrew it carefully to prevent it from falling into the case. Gently pull upward on the controller card with a rocking motion to remove it. The new disk controller's documentation should show you how to set up its jumpers, if necessary, to tell the computer what

*continued on page 154*



**Check all the connections twice. Power connections will only fit one way, but ribbon connections can be inverted easily.**

## What to Look for In a Home PC

If you're in the market for a home computer, here are some helpful guidelines to getting the most out of your investment.

### The Right Software

Look for software that is already set up and ready to use. After all, you don't want to have to learn how to use a database just to catalog your stamp collection or set up a spreadsheet to figure interest charges. Software should be easy to use and designed specifically for the home. So you can, for instance, keep an inventory of your possessions for insurance purposes. Or make a detailed schedule for a vacation or business trip, with a list of things to bring along. Or plan meals—selecting recipes, then making a grocery list based on the number of people you're serving.

And, of course, you'll want software to help you manage your finances. Like an automatic checkbook register to do all the math for you, and then itemize your expenses for easy budgeting. And a program to manage your stock portfolio. And when you're thinking about a new house or car, you'll want a loan scheduler to find out exactly what your payments will be. Essentially, you need easy-to-use software to help you manage your finances now, so you can plan ahead for your financial future.

Of course, your home computer should be PC compatible, so you can run programs from the office as well as tens of thousands of other personal, entertainment and home education programs.

### Getting Up and Running

The right computer should be so convenient that you'll use it all the time. And your system should be compact and quiet to fit well into any home environment. A definite plus is a feature that turns off the screen when not in use, keeping the computer both energy efficient and ready to use with the touch of a key.

Plus, you need to consider the keyboard. A top-of-the-line business system keyboard will make for easier, effective entry of information.

### Stretching Out

Finally, you need to be able to expand whenever you're ready. Look for built-in digital audio and joystick ports so you can take advantage of a wide range of game and home education software.

*Fortunately, there is a computer that meets all these requirements: the new Tandy® 1000 RL home computer. To learn more about home computing, plan to attend one of the special Open Houses being held every Friday at Radio Shack. Call any participating Radio Shack store, dealer or Computer Center for times, or to set up your own personal demonstration.*





Aging increases  
the risks of certain  
diseases.

Vitamins C, E and  
Beta Carotene may  
help reduce them.

By the time you reach your 30th Anniversary, you could be worrying about aging—and the chronic diseases that can go along with it.

Of course, a balanced diet has always been a key to good health. But now, scientific studies are focusing not only on diet, but on the potential health benefits of specific nutrients.

One area of promising research is the role that some nutrients may play in decreasing the risks of diseases which tend to develop with aging.

For example, in recent years, scientific institutions such as the USDA Research Center on Aging and the National Cancer Institute have been conducting research on Vitamins C, E and Beta Carotene—among other nutrients.

And the evidence so far indicates that assuring adequate Vitamins C, E and Beta Carotene in your diet may help reduce the risks of developing diseases such as cataracts, cancer and heart disease.

To make sure your diet has adequate Vitamin C and Beta Carotene, eat a variety of fruits and vegetables every day and add some seeds, seed oils, nuts and wheat germ for Vitamin E.

In addition to a good diet, continuing good health obviously depends on many other factors, some of which you can control, like not smoking, exercising, keeping your weight down and getting regular medical check-ups.

It's worth a little effort to reach your Golden Anniversary in good health.



A health message from Hoffmann-LaRoche Inc.

Circle Reader Service Number 106

size drives are attached.

If your new disk controller card uses the same data cable connector as the old one, you can use your existing cable. Just disconnect the cable from your old controller card and plug it into the new one. If you need to replace the existing cable, disconnect it from your drives and thread the new controller card's cable into place, following the same path as the old cable. In either case, plug the new disk controller card into a slot and carefully replace the screw that holds it in place.

The data cable that attaches your drives to the disk controller card has

three connectors: one at the end that attaches to the disk controller card and two on the other end for the drives. The cable has a twist between the drive connectors. This twist reverses the drive select lines permitting the computer to recognize the drives separately. Drive A is connected to the end of the cable; drive B, to the middle connector. The cable's connectors are 34-pin edge connectors that plug into your drive's data connectors. Most, although not all, cable connectors have a "key" inserted to prevent you from inserting the connector backward. Double-check the edge of

the ribbon cable. One edge should have a color different from the rest of the cable. This edge should always be next to pin 1 of the cable or connector where it's attached. You should attach your 3½-inch drive to the B drive connector (the one in the middle of the cable). You will probably want to keep your 5¼-inch drive as drive A since some programs require a 5¼-inch floppy in drive A to work properly.

Plug one of the power cables from your computer's power supply into the drive's power connector. The connectors are trapezoid shaped to prevent you from making an incorrect connection, so don't try to force the connectors together.

AT-style cases use rails rather than screws to hold the drives in place. The AT rails screw onto the 3½-inch drive's adapter chassis, and the drive assembly then slides into the drive housing in the computer case. XT drives screw directly into the drive mounts in the case.

### Putting It Back Together

Double-check all connections before you put the computer case back together. If you're installing your drive in an AT-compatible, you'll have to run the setup program to let the computer know that it has a new drive. When the computer boots, it asks if you want to run the setup program. Follow the menus and, when the setup program asks for the drives installed, change the setup to include your new 720K or 1.44MB drive as the B drive. Some computers run the setup program when you press Ctrl-Alt-Esc while the computer is running (save your work before doing this; there's no way to exit most setup programs without rebooting).

You can check out your setup by formatting a 3½-inch floppy in your new drive and verifying the disk with DOS CHKDSK. (Power users advise new users to run CHKDSK once a day on each disk that's been written to.) If you want to format a 720K single-density disk on a 1.44MB drive, you should use the command `FORMAT B: /N:9 /T:80` (assuming the 3½-inch drive is drive B).

The 3½-inch drives are quickly eclipsing 5¼-inch drives in popularity. Their compact size, higher density, and sturdier construction have made them more versatile and useful. Adding a 3½-inch drive yourself will save money and show you how simple it can be to upgrade your home office PC.

Philip Chien is a Titusville, Florida, computer writer with more than 12 years of experience with personal computers.

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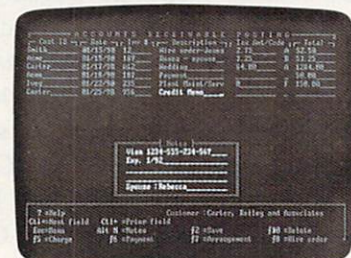
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Due to production changes instituted with the October issue of COMPUTE, all companion disks are now being mailed separately from the magazine. Although every effort is being made to have both your disk and magazine arrive on the same day, this may not occur. You should receive your disk under separate cover within five days of your magazine.

\* Subscribers to disks for COMPUTE's PC Magazine, Amiga Resource, and Gazette

## LETTERS *continued from page 8*

It is evident that Mr. Leinecker is an experienced programmer, but some of his concerns about Logo belie his Algol Family (BASIC, Pascal, and so on) preference. I strongly disagree with Mr. Leinecker's analysis that Logo doesn't have a set of structured control devices. Subprocedures and recursion are Logo's control devices. This is divergent thinking from structures such as WHILE DO and REPEAT UNTIL.

Recursion, although a programming technique and not a language-based control structure, is very powerful. Although Algol Family programmers generally think of recursion as a sophisticated technique for advanced programmers, recursion is quite natural in Logo.

On to variables. It is true that it seems difficult to know which punctuation to use with variables. In general, however, the double quote is used only with the primitive MAKE, and the colon is used most other times. Although colons and double quotes would seem unnecessarily complicated, variables in Logo are more powerful than in most other popular languages.

I find Logo's variables and reliance on recursion enabling and not prohibitive to my programming.

MICHAEL R. MUIR  
BURNHAM, ME

*Richard Leinecker responds:*

*All of your points are right on target. Recursion is a powerful control technique, as you point out. Your explanation of Logo's variables underscores their ease of use once you've mastered the conventions.*

*I don't think that children can fully grasp recursion owing to its somewhat esoteric nature. It's sort of like reading Lewis Carroll and jumping into another story. Or like an Escher print with the artist as a reflection on the art.*

*I use recursion on a regular basis in my programs; there's no easier way to generate a directory tree on an MS-DOS machine with its directories and embedded sub-directories. Recursion has some real dangers, though. You can run out of stack space before long and your program will crash. You can run out of available memory if you're trying*

*to allocate it as you go. Since I usually program in Assembly language, these considerations confront me on a cold, hard level and temper my free use of recursion techniques.*

*The structured constructs DO WHILE and REPEAT UNTIL are also very powerful tools. That's why most high-level languages (even the recent versions of BASIC) include them. These techniques are more straightforward and easier to understand. Even the GOTO statement has its place (in spite of the stigma it carries).*

*While I understand and agree with your points, I still think that these features should be added to Logo.*

*Do you have comments or questions? Send your letter—with your name, address, and daytime phone number—to COMPUTE Feedback, 324 West Wendover Avenue, Greensboro, North Carolina 27408. □*

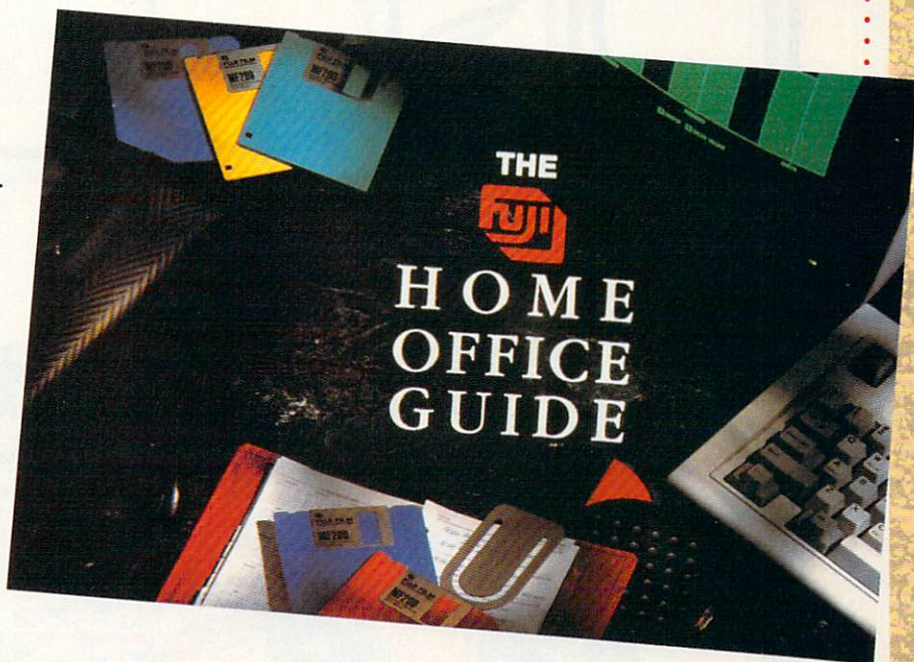
# Free Home Office Guidance

If you work at home, or if you're considering setting up a home office, *The Fuji Home Office Guide* can lend you tips and advice.

The 24-page guide covers topics such as naming your business, starting your day and sticking to business, home-office do's and don'ts, and where to get government help.

The guide is available from Fuji Film Floppy Disks free of charge by writing to *The Fuji Home Office Guide*, P.O. Box 1738, Ridgely, Maryland 21681.

LIZ CASEY



## New Age Software

A new trend in self-improvement software uses the computer as a mentor and self-development tool. Two companies on the forefront of this new age software are Winsight and Mindware.

Winsight's programs focus on supporting the decision-making process. You and the computer interact as you explore your knowledge and develop a plan of action. There are programs for personal growth, professional growth, and organizational effectiveness.

Mindware offers programs to help you brainstorm to shape ideas, hone your business skills, and explore your romantic compatibility with others. Mindware's programs foster personal well-being through self-awareness and creativity.

LIZ CASEY

## No Trade Trade-in

Electronic Arts' recently introduced "Software for Life" has been expanded to include consumers who purchase a Sega Genesis video entertainment system.

Here's how the program works: If you own the IBM version of one of Electronic Art's programs and you want to buy the Genesis version, submit the back cover of the manual from the original software and pay half price for the Genesis version.

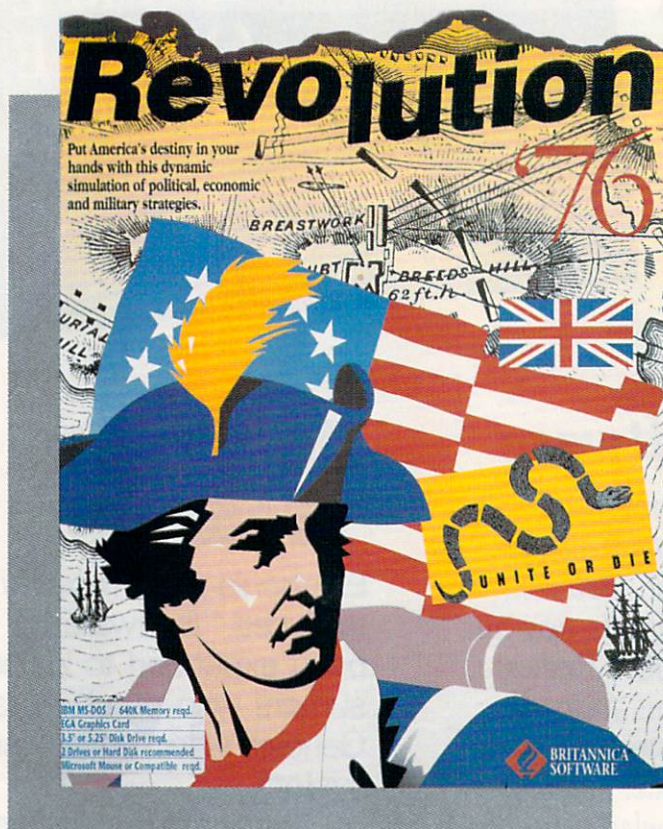
As Electronic Arts moves some of its games to videogame format, it wants to be sure that it brings loyal customers along.

LIZ CASEY





# DISCOVER



SHAPE COLONIAL DESTINY AS YOU PLOT STRATEGY FOR AMERICA'S PATRIOTS IN THIS EXCITING REVOLUTIONARY WAR SIMULATION

**T**he American Revolution typically evokes noble images of Washington crossing the Delaware or brave soldiers wintering at Valley Forge. The historical reality of this conflict is far more complex. And Britannica Software's *Revolution '76* is far more challenging and interesting than the usual war game because it acknowledges that reality as it presents you with the many problems of an emerging nation.

The scenario begins in 1775, with the colonies preparing for war with England. As manager of the American movement, you must set the stage for America's destiny, making a variety of appointments and decisions that are all part of the game's setup phase.

You'll appoint the chairmen of the Congressional committees for finance, war, navy and foreign affairs. You'll also appoint the leaders of your soldiers and the members of your

## COMPUTE CHOICE

CHARLES IDOL

Mark Waggoner

# ROY

MARK WAGONER © 1990



diplomatic corps. The rebel movement was divided by political factions and regional loyalties, so pay careful attention to the information the game supplies regarding each candidate's colony, faction (radical or moderate), and special talents.

Skills in administration, negotiation, or military leadership could play a significant role in your success, of course, but so could other factors. If your appointments slight a particular region or faction, you risk offending allies and losing financial and military support. If you accede to factional demands, you might have to appoint an inept individual, a decision with its own unpleasant consequences. To complicate matters further, qualities

of a candidate can change as the game progresses.

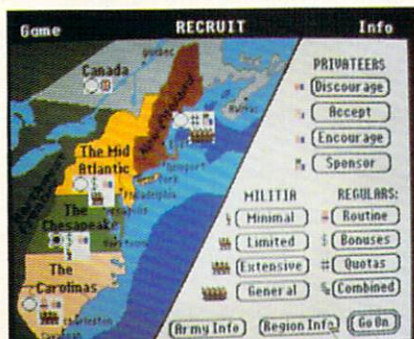
You also make decisions about how to treat Tories, set tax rates, recruit and support members of the military (privateers, militia, and regular army), and negotiate with the enemy. Here, too, your decisions can have profound implications. For example, adopting a harsh policy toward Tories in a region where Tory sentiment is strong could aggravate the movement against you and put Tory forces in the field. And as you set tax rates, remember that the colonists disliked all taxes, not just Crown taxes.

Fortunately, the game provides advisory screens about British and American activities to help you make decisions. One screen details British mobilization, another reports privateer activity, and still another allows you to click on any region or city to

find out the troop strength of that location (regular and militia for the Americans, and regular and Tory for the British) as well as the identity of the general in command, if there is one.

Once you've set your policies and made your appointments, you move into other phases of the game and learn the results of your actions. *Revolution '76* provides reports of troop movements and battles, the morale and the skill of commanding generals, the strength of the British Tory party, foreign attitudes toward American support, and the terms upon which the crown will negotiate peace.

Your options for peace negotiations are surrender, granting pardons, colonial autonomy, independence,

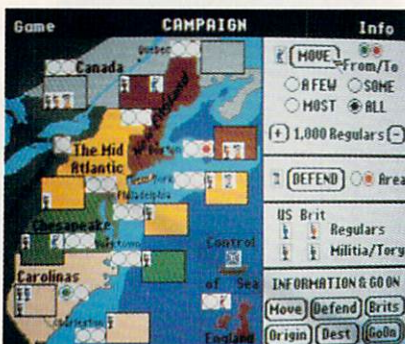


*Revolution '76* provides detailed information to help you lead the colonies in their ongoing struggle for independence.

and expansion. Keep in mind that at the start of the revolution, only the radicals advocated independence. Many of the colonials would've been quite happy if the Crown had granted autonomy, allowing America self-government as a political entity of the Empire.

Premature declaration of independence will lose a great deal of your support with the moderate faction. On the other hand, not much foreign support will be found until you do declare independence. Expansion is more ambitious than independence, since it means that the Crown will have to give up claims on land west of the Alleghenies.

Foreign governments respond to your requests for support, and the



Use game-supplied information and your own strategy to control the military.

Crown lets you know what it thinks of your peace terms. After you've progressed this far, you must pause to deal with the game's copy-protection scheme. (I thought we had gotten away from those.) Included with the game is a booklet called *Historical Perspective*, which presents an excellent summary of the revolution. Unfortunately, you must use it to answer a question, which will allow you to get back to the game. With that nuisance behind you, the game continues.

A sequence of screens repeats for each phase (year) as the revolution proceeds. The first shows a progress report for the phase just completed, comparing the conditions in January and December for military control of regions and cities, colonial political support of the revolution by region, your economic status, and British political support of the war. Economically, you're operating with a budget deficit, and the status screen reports the extent of inflation.

At this point you can declare independence, select executives to replace the weak Congressional com-

mittees, confederate to supplant the weak Continental Congress, and reform the economy. Economic reforms include, in order of unpopularity, punishing profiteers, price controls, reforming the currency, and repudiating the debt. You should consider the situation carefully before you act because your actions can cost you support.

Confederation offers you the most to gain and the most to lose. You face the issues of taxation, representation, western lands, and slaves. The taxation issue forces you to choose between federal taxation and state subsidy. Although federal taxation provides stability and control of income, the colonies uniformly oppose it.

Representation can be by colony, by colony population, or bicameral, a combination of the two. Small colonies favor representation by colony; big colonies, by population. The western lands issue is to decide whether those lands are under federal control or in colony ownership. The colonies are split on this question. The slavery issue is not whether there should be slaves but how they should be counted for levy and representation. Your choices are not to count them, to count them all, or to count them partially.

After you've chosen the terms of confederation, you receive the count on ratification. If you don't like that count, you can withdraw the proposal and try again a year later. Unless the terms are quite popular, they may have a drastic effect on the American cause.

Another screen informs you of the army losses through desertion, disease, and expiration of enlistments. These losses can be heavy and may cause you to change your military strategy. A consolation is that the British forces suffer similar losses. The losses on both sides change as the game progresses.

After all of this, the cycle moves back to the administrative screen, where you set the tax rate and Tory policy. After you've made your administrative decisions, you enter a new phase (year), and the sequence repeats until the game is won or lost.

Almost all of the screens contain attractive graphics, and all of your selections are by mouse. I did encounter some problems with the pull-down INFO menus. My system locked up when I clicked on some of the choices. [According to Britannica, the menus are memory resident and could cause

the game to lock up if you're making too many other demands on your computer's memory, such as using DOS 4.0 and a large AUTOEXEC.BAT file. —Eds.]

The game requires several hours to play, though you can save it for later resumption. If the British win, the screen states that the patriots, in Franklin's words, "having failed to hang together, hang separately."

If the Americans win, you're rated on your leadership with a grade of poor, fair, good, or excellent. I lost the first few games I played, probably because I wasn't paying enough attention to opposition to my actions. Then I got a grade of poor, and finally a grade of fair. I have yet to do better.

The game is challenging, interest-



You can choose from George Washington and other great patriots to lead the colonial government and military forces.

ing, educational, imaginative, and clever. It deserves better documentation than Britannica provides. The manual was written for the Apple IIGS and offers only an addendum for IBM owners.

In spite of falling short in a couple of areas, Britannica has created an enjoyable game. *Revolution '76* challenges your abilities as a political and military strategist as it gives you a more complete understanding of this chapter of American history and a fuller appreciation for the complexities of revolution and history in general.

#### Revolution '76

IBM PC and compatibles with 640K, EGA, mouse; two floppy drives or hard disk recommended—\$49.95

Package includes the manual, *Historical Perspective*, three 5¼-inch disks, and two 3½-inch disks.

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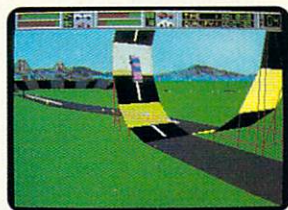
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# PATHWAYS

S T E V E N A N Z O V I N

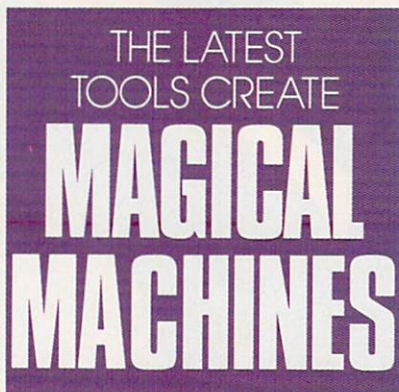
One day my son came home from school and told me he had used the class's brand-new computer to study math. "I wanted to like it, but it was dumb," he complained. "It tried to make all the problems look different, but they were all really the same underneath. I was so bored, I worked in my workbook instead."

Only eight years old, and already bored with computers. Look around, though, and you'd have to agree with the conventional wisdom that much of the computing we do is pretty boring stuff. At work, we rarely use computers for anything but writing form letters, keeping numbingly huge databases, and plugging monthly sales figures into spreadsheets. In school, our kids are exposed to a small number of approved educational programs that at best supplement the main work of learning and at worst are poor substitutes for Nintendo. At home, we play look-alike games that exercise our adrenal glands and trigger fingers but not much else. All these applications are absolutely crucial to the proper functioning of the modern world (including games, one could argue), but that doesn't make them any less boring.

What happened to the vision of computers as magical machines that would rescue us from drudgery and boredom, expand our mental and physical worlds, transform our lives? Or, to put it another way, what can you do with that box when your romance with *WordPerfect* has palled? Luckily, it's still possible to avoid boredom and find adventure in computing, if you know where to look and are willing to put some effort into the search. After all, going off-road is harder than cruising down the highway, but you get to see and do things that others miss, and you never fall asleep at the wheel. In this column, we'll look for the computing roads less traveled by, since that's where most of the fun is.

One cutting-edge application for your PC is animation. If you haven't been asleep for the past few months, you probably know what Leonardo, Michelangelo, Raphael, Donatello,

and Bart Simpson all have in common. They're *toons*—that is, animated cartoon characters. With the Ninja Turtles, Simpsons, and Jetsons pulling in big entertainment dollars across the land this past summer, animation looks ready to begin its second golden age (the first was defined by the still unsurpassed Disney and Warner Bros. cartoons of the 30s, 40s, and 50s). Computers are transforming modern animation, speeding the production of traditional cartoons and making possible new kinds of animation the old Disney Studios never dreamed possible. Now the new animation technology is trickling down to PCs..



The Amiga has long been the platform of choice for desktop animators, but two programs for PC compatibles have recently leveled the field. *Autodesk Animator* (Autodesk, 2320 Marinship Way, Sausalito, California 94965, 415-332-2344, \$295.00) and *Deluxe-Paint Animation* (Electronic Arts, 1820 Gateway Drive, San Mateo, California 94404, 415-571-7171, \$134.95) both offer complete color painting and animation environments. With these programs, you can draw an object or import a piece of clip art and then stamp the object down in various positions on a sequence of background frames. When the frames are played back, the object appears to move over the background. Or the computer can do the movement for you automatically, flying the object across the plane of the screen, making it appear to recede

or come forward, and flipping it around any axis of rotation. The possibilities range from handcrafted art animation in the Disney style, with detailed characters, shadows, and the works, to ultramodern flying-glass logos that can be created in a few moments for corporate presentations and home videos.

On the Macintosh, animation is taking a different path. For example, with *InterFACE* (Interactive Facial Animation Construction Environment, from Bright Star Technology, 14450 NE 29th Street, Suite 220, Bellevue, Washington 98007, 206-451-3697, \$499.95), you can create "talking agents"—customized, animated talking heads that synchronize to digitized or computer-generated speech—and put them in your own presentations to serve as narrators and guides. *HyperAnimator*, a less-expensive version (\$149.00) customized for use with *HyperCard*, is also available. Future agents will graft right onto the Mac's system software, so Albert Einstein or the Joker could pop up at opportune moments to alert you to incoming E-mail messages or remind you of your mother's birthday. (Having complete control over a set of little simulated slaves inside your computer does have its appeal, but wait until they revolt and take over the machine for themselves.)

The tools for making your own toons are available, affordable, and learnable. But why bother? Cartooning is a lot of work, even with the computer's help. One good answer: Cartoons are riveting in a way that other kinds of moving images are not, a fact that the animators of the classics knew well. If you have something important to say, an animated message will hit its mark with real impact. Animation also provides reality relief. In animation, anything can happen, with no plausibility strings attached. Probably the best part is that you need please only yourself. If you can't draw even as well as Matt Groening, so what? You can still make some seriomagic with your machine. □



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# CAN Software TEACH?

The screen flickers,  $1 + 1 = ?$  The child's eyes blink. The child hesitates, with finger poised over the computer keyboard in search of the right key. Ah, yes, 2. The child pushes the key, and the number 2 appears on the screen. Bells and whistles sound, fireworks appear on the screen, a dancing horse stands on its hind legs, and large letters flash across the screen *Good Work!* Next door, another child has entered a wrong answer, an alarm sounds, and a sad face appears on the screen. *Try Again*, it says.

These children are involved in the most common use of computers in elementary schools—drill and practice—which is little more than an electronic flashcard system. According to a study done by Johns Hopkins University, this system accounts for about 60 percent of the use of computers in our elementary schools. Many of the best-selling children's software programs represent some form of drill and practice in math, reading, spelling, and science. But is this approach really educational?

## Better Than Blackjack?

Some teachers and parents are skeptical of the value of such programs, especially considering the time and expense involved in using them. Catherine Staat, an

elementary school teacher in Pacific Grove, California, explains: "It's hard for me to justify spending \$49.95 on a program that's basically drill and practice and can only be used on one computer. Not only are many drill-and-practice programs expensive, but I find the students quickly become bored with the frills that reward them onscreen, such as a little man shooting out of a cannon or a rabbit dancing on a wire. I sometimes think I would be better off buying a deck of cards and letting the children play blackjack. In that case, not only would several students get to play at the same time, but math concepts would be reinforced—and only for about \$2."

Defending computer flashcards, however, is Davidson Software, producer of souped-up versions of drill and practice such as *Math Blaster Plus* and *Word Attack Plus*.

In an August 1989 press release, Davidson cited a survey of its customers and claimed that educational software had actually increased children's grade point averages, by as much as a whole point in some cases. The company president, Jan Davidson, refers to these survey results as "quite dramatic" and argues that they serve as "objective, independent verification" of the value of these programs.

Yet, in spite of this survey commissioned

CAN  
SOFTWARE  
HELP YOUR KIDS  
LEARN, OR IS IT JUST  
MORE FUN AND GAMES?

MICHAEL C. PERKINS AND KELLY RIVERS

by Davidson, how do we know that the same results couldn't be achieved with old-fashioned cardboard flashcards? Unfortunately, a comparison of computer-based learning and regular flashcards wasn't made by the Davidson study to see if there's any real difference between them.

Lynn Chan, former coordinator of California's Model Tech Project and now technology coordinator at the 550-student Skyline Elementary School in Daly City, California, agrees that drill and practice is largely a waste of time. But she does see potential in other uses of the computer. She says: "The best programs are those that involve children in some kind of genuine thinking process. I believe the best way for software publishers to develop programs like this, that can be effectively integrated into the instructional process, is to listen to teachers and use their input to produce the software that will truly supplement and enhance education rather than merely entertain or fill up time."

Attempting to address this concern, The Learning Company, a Fremont, California-based educational-software publisher that produces such programs as *Reader Rabbit* and *Math Rabbit*, defends its use of games by claiming they're more than just drill and practice. The Learning Company states that, in addition to reinforcing basic curriculum subjects, its material is designed to build thinking and problem-solving skills. The Learning Company has pursued a conscious educational strategy by producing school editions of its products with lesson sequences, skills matrix charts, and work sheets.



*Stickybear Townbuilder is a good example of a computer-aided design program for kids.*

### Road Not Taken

As an antidote, or at least as an alternative to drill and practice, many parents and teachers have shown a preference for word processing, database, drawing, desktop publishing, and even spreadsheet programs to show children how to write compositions, store and organize data, perform calculations, and generate newsletters.

Others have favored hard-core programming projects in BASIC, PASCAL, or the more experimental LOGO language, although all three languages have been criticized for their limitations.

Fortunately, in addition to word

processing and programming, there are imaginative alternatives that go beyond the dancing rabbits and exploding rockets often found in drill and practice.

Included in these alternatives for children's computing are computer-aided design (CAD) programs, simulation programs, learning games, and thinking-skills programs.

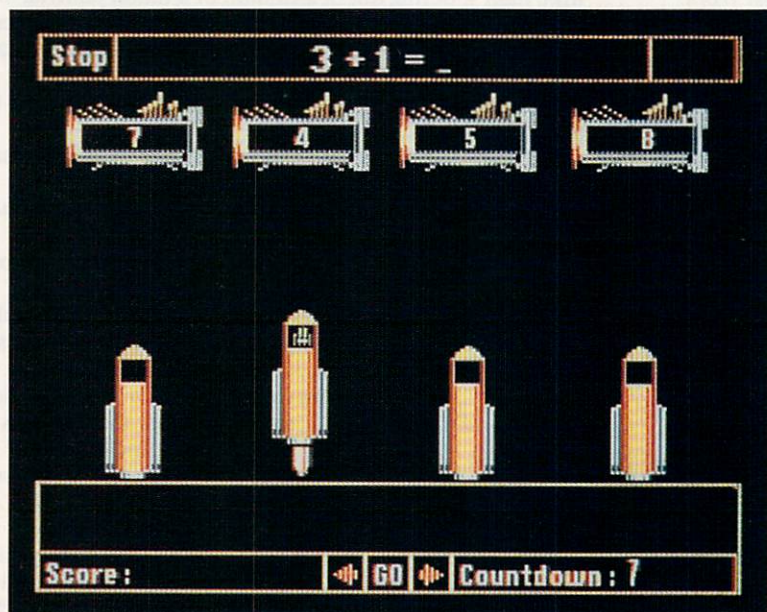
### Junior Designers

As CAD packages reach into more areas of industry—where they're used to create such things as airplanes, home interiors, landscapes, and clothing—the opportunity for children to experiment even on low-powered computers with CAD is that much more exciting and useful. These programs also help children develop good computing habits, including improved concentration, greater patience, and better thinking skills.

Some good examples of CAD programs for children include *Stickybear Townbuilder* (ages 5 to 7, from Weekly Reader Software), *Car Builder* (ages 9 and up, from Weekly Reader Software), *SimCity* (ages 12 and up, from Maxis Software), and *AutoCAD* (ages 12 and up, from Autodesk).

Candice Tasaki, a longtime user of *Car Builder* and *Stickybear Townbuilder* in her years as a computer coordinator and now as a classroom teacher in the San Jose Unified School District in California, says these programs are particularly well received by students. "Initially, the students are a bit thrown by the apparent complexity of the CAD process, but I've found it grows on them in a hurry," explains Tasaki. "I particularly like the fact

*continued on page 68*



*Math Blaster Plus combines a drill-and-practice tutorial with an arcadelike game.*

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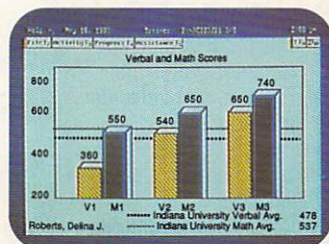
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continued from page 66

that the programs are teaching so many things, including the value of reading and following instructions, the value of trial-and-error experimentation, and the value of the computer as an instrument of design."

## **Tinker, Tailor, Soldier, Spy**

Another innovative alternative to the computer flashcard system is simulation. Computer simulation programs allow children to role-play, for example, as pioneers, business people, detectives, or space travelers. In doing this, children are challenged to plan ahead, solve problems, organize data, make deductions, and learn from their mistakes.

There are many excellent simulations available, including such well-known titles as *Seven Cities of Gold* (Electronic Arts), *The Ancient Art of War at Sea* (Brøderbund), *Balance of Power* (Mindscape), and *Zork II* (Infocom/Electronic Arts), as well as the classic flight simulator programs. Two other programs that quietly have survived the test of time to the point of becoming classics are *Oregon Trail* and *The Market Place*. Both are published by Minnesota Educational Computing Corporation (MECC).

In *Oregon Trail*, children pose as trailblazers who must cross rivers, fight diseases, hunt for game, and survive harsh weather as they travel the 2,000-mile Oregon Trail in the year 1848.

David Ellison, an English and history instructor at Barnard-White middle school (grades 5-8) in Union City, California, swears by the *Oregon Trail* program. In addition to the built-in interaction of the online material on *Oregon Trail*, Mr. Ellison also has his students keep a diary and write a paper about their experiences on the trail. "Before using programs such as *Oregon Trail*," he says, "I used to be very anticomputer, but I'm now very procomputer be-

cause of the way a simulation can make an otherwise remote subject, such as the pioneer experience in American history, come to life."

In *The Market Place*, children have the opportunity to run apple stands, plant shops, and lemonade booths as they learn the practical side of pricing, advertising, and business profits by working with bar graphs, spreadsheets, and sales reports.

Jim McCloud, a teacher at Addison School in Palo Alto, California, says, "In addition to using *The Market Place* to teach business concepts, I've also liked the fact that the program has served as an opportunity for applied math, where students are doing calculations that have some demonstrable practical result that goes beyond the usual word problems or busy-work drills found in the typical math textbook."

## **Play Till It Smarts**

Some educational programs such as the Carmen Sandiego series (from Brøderbund), though definitely not drill and practice, are harder to classify and can best be described as *learning games*. At the same time, given the notorious ignorance American students have of history and geography, the imaginative challenge presented by the Carmen series can only be welcomed by parents and teachers.

Kim Ford, computer coordinator for grades 4-8 at Carden El Encanto School in Santa Clara, California, has had a positive experience with the Carmen programs and has found them to be among the most popular programs with students. But she explains that they have their place: "The Carmen programs really cannot be said to teach geography or history in the way a textbook or lecture traditionally does, with the conveyance of certain facts, such as dates and places, and concepts, such as the causes of the American Civil War, that can be tested through multiple-choice or essay exams. Instead, I think Carmen serves as a fun stimulus to take an interest in geography and history, as well as to call into play the knowledge a student already has about these subjects."

Other programs focus on *thinking skills* even as they retain some game elements. A couple of good examples are *Think Quick!* (The Learning Company) and *The Factory* (Sunburst Communications). With these programs, children get involved in all kinds of mind-stretching activities, including taking part in trial-and-error processes, gathering and classifying information, and learning to visualize, observe, and solve problems.

Defending the value of these types of programs, Tom Sarnicola, computer coordinator at St. Emydius School in San Francisco, California, says: "While the results are not as clearly measurable as a straight simulation or as emotional as a game, I still like to watch my students go to work in solving the problems that confront them through these thinking-skills programs. I feel they are using a part of their brain that might not otherwise be called into play by traditional subjects."

## **Are We Learning Yet?**

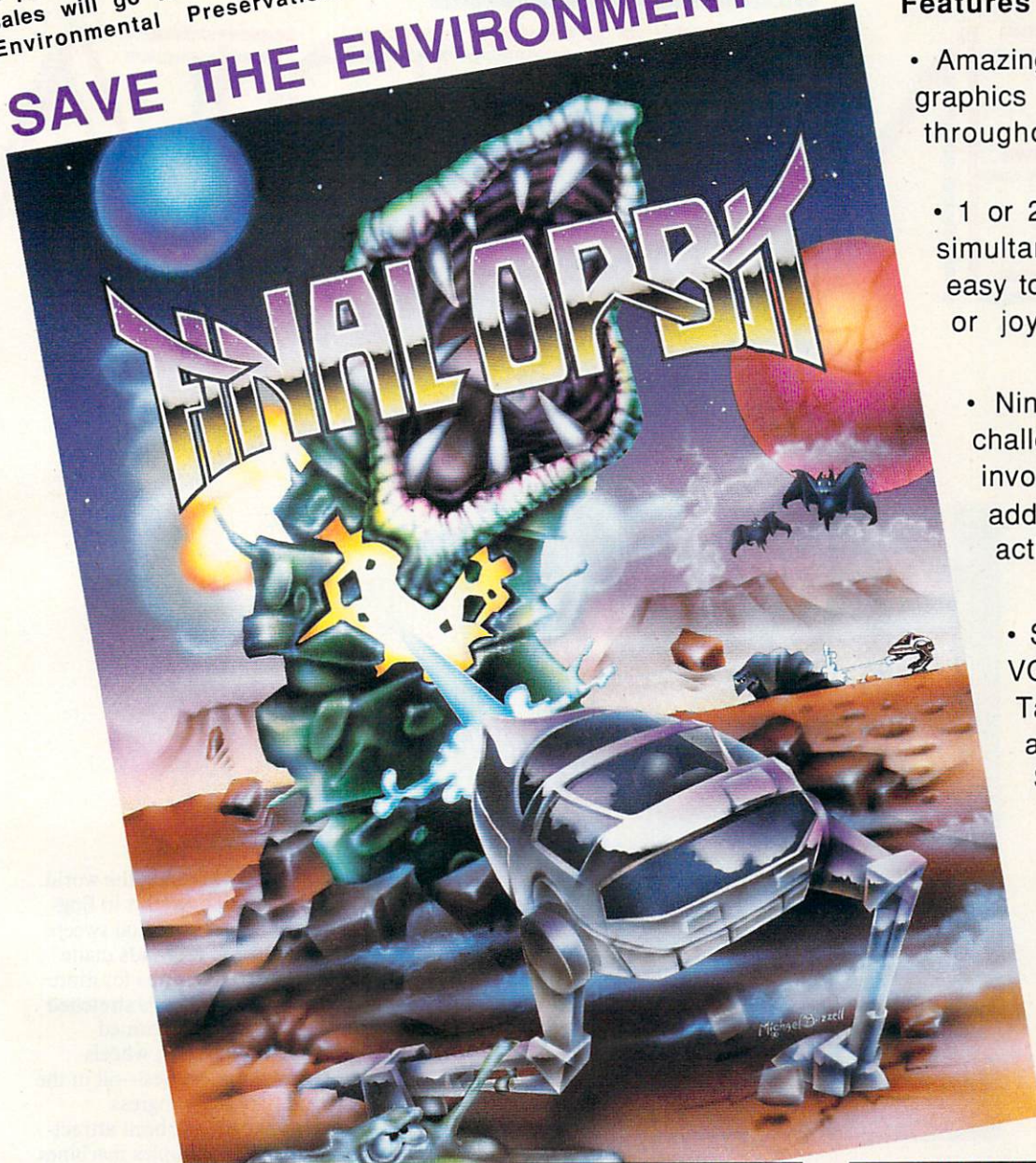
So is educational software truly educational? There's no question that educational programs can vary in their ability to teach our children. If a school or a parent is going to buy a computer or spend \$40 on a program just to do math problems or practice spelling, it would be better to buy a box of flashcards.

But if a child can use a computer in a way that takes advantage of its real capabilities—to write a school paper, design a product, or learn from a simulation—then the potential of this new technology is finally being tapped. □

Perkins and Rivers are independent computer-education consultants. They have written extensively about computer education for children.

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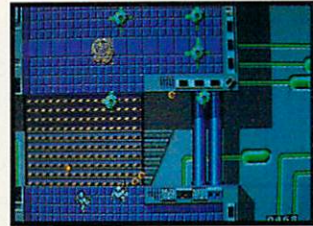
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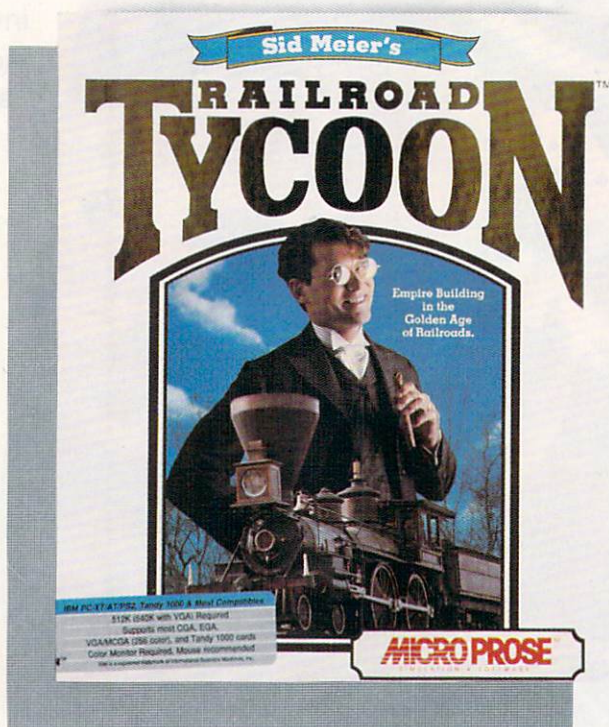
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Iron horses once ruled the world. From their jolting start in England to their continental sweeps over America, railroads made fortunes and forged nations for more than a hundred years. Rails stretched across prairies, smoke streamed through mountain passes, wheels groaned over countless ties—all in the name of industry and progress.

People have always been attracted to trains, as if the complex machines were alive. Maybe it's the breathing, huffing sounds a steam engine makes, or the way a whistle echoes in the distance on a summer night.

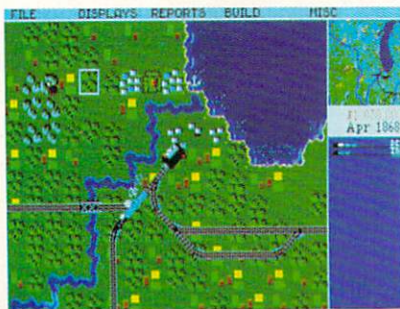
In a stunning departure from its standard fare, Microprose has exploited this fascination and come up with a compelling world-building simulation of railroads, trains, and empires. Not only is *Sid Meier's Railroad Tycoon* the company's only simulation sans combat, it is possibly its most detailed and realistic one. The worlds you make with *Railroad Tycoon* may exist only inside the computer, but they're as real as they can get without smoke in your eyes and sparks in your hair.

*Railroad Tycoon* is a capitalist's dream. Making money, a lot of it, is the idea. Your railroad prospers if you deliver goods and people from one



# MENTIT

place to another on time and to the right places. To get rich, you've got to take your tiny company—with no track, no trains, no passengers, and no freight—and turn it into a giant. An initial investment of a million dollars (or pounds, if you're playing on European turf) is the start of your budding empire. You grab for a piece of the American Dream by making almost every kind of decision imaginable, from surveying the grade for new track and bridging rivers to scheduling trains and getting the right goods to the right markets. If all this sounds too involved, don't worry; *Railroad Tycoon's* interface is among the best in the simulation business.



Keep the Chicago Zephyr running on time and you'll profit considerably.

Open *Railroad Tycoon's* box and you'll find three 5¼-inch disks, a 180-page manual, a much shorter technical supplement, and two laminated player's reference cards. Installing the simulation on your hard disk is fast and easy, unless your only 5¼-inch drive is B:. In that case, you'll have to forgo the automatic installation and copy the files manually. If you don't have a hard disk drive, make backup copies of the disks and get ready for some swapping during play. *Railroad Tycoon* requires a 512K IBM PC or compatible and works in CGA, EGA, MCGA, Tandy 16-color, and VGA modes. The game is virtually unplayable in CGA; it's impossible to tell where your trains are, and the types of goods and cars all look alike. A mouse isn't required, but I wouldn't want to play this game without one. The program supports the Ad Lib and Roland sound boards and the Tandy sound chip for enhanced sound effects. Traditional blips and beeps are there for the rest of us.

Nearly every aspect of building and running a railroad is packed into *Railroad Tycoon*, so read the manual before you start. Don't let the size of the manual spook you, though. Once you've played a session or two you'll be amazed at the game's elegant simplicity. Hats off to designers Sid Meier and Bruce Shelley for the snappy interface. Pull-down menus and full mouse support let you access detailed info about your trains and stations by pointing and clicking. In fact, productivity software designers could learn a thing or two from *Railroad Tycoon's* interface. My only complaint was that some choices are irreversible. I laid a lot of track I didn't want, and I built



more than one expensive station terminal when I meant to make a cheaper depot. This game needs an undo function.

You get to pick which territory you'll conquer: the eastern U.S. of 1830, the western U.S. of 1866, England of 1828, or Europe of 1900. I enjoyed the domestic scenarios the most—especially the western U.S., since the city names were familiar—but those less ethnocentric may find the crowded lands of Europe and England just as much fun. To keep you coming back, *Railroad Tycoon* changes the landscape each time you play. Though towns, cities, rivers, and mountains stay put, Chicago may be a broad-shouldered metropolis in one game and just a burg near a lake in another. Raw materials, industries, and competing railroads shift from place to place, too, so that no two worlds are exactly alike.

Your most important decision is where you'll lay your first stretch of track. It's best to start in a city near natural resources your trains can transport. Look for population centers in the largest scale display (there are three scales in all, from continental to local); search the surrounding countryside for coal mines, oil wells, ranches, grain elevators, and lumber mills; then survey the terrain. The flatter the ground and the fewer hills, mountains, and rivers in the area, the less money you'll spend laying track.

Connect two cities with a rail line; then start buying engines and cars. More decisions. You must have the right kind of cars for the goods you'll move. Passenger cars won't transport petroleum, and livestock won't get into coal hoppers. You choose engines from the actual machines of the period; faster, stronger locomotives cost dearly, while slower, punier engines may not pull their weight. It's easy to strike an economical balance between fast passenger and mail trains and slower freight trains at the start, since you own just one stretch of track and are moving just one or two types of goods. It gets much harder as your empire grows. Even so, *Railroad Tycoon* makes it as painless as possible to track the trains you own, their composition, scheduled stops, and whereabouts. A miniature display is always onscreen and a more detailed report is a keypress or mouse click away.

The initial million dollars slips through your fingers fast. You can raise more money by selling another bond, but then you'll be saddled with

interest payments. As in real business, it's best if you can expand your company with its profits. That's only possible if you've made the right moves and your trains carry lucrative cargoes. Hunt through the countryside for raw materials such as coal, oil, and lumber. Spot the industries that produce steel, food, paper, and manufactured goods. Lay rails to connect everything and then ship stuff to cities where demand is high. Quickly tote passengers and mail between towns. Do all this and your trains will rack up thousands of dollars each trip.



**Building an expensive iron bridge can prevent a more expensive collapse later.**

To really dive into *Railroad Tycoon*, you'll want to choose something called Complex Economy. Here, each city produces certain goods and only pays for what it needs. You've got to match markets to producers exactly. An interesting way to really turn a profit is to ship raw materials to one city, coal for instance, where it's turned into steel. That steel is then taken to another city where it's transformed into manufactured goods. Transport those goods to yet a third city and you've turned one car of coal into two more carloads, each one a revenue maker.

Want to play dispatcher and run your trains like an incredible model railroad? *Railroad Tycoon* lets you manually direct trains by overriding the simulation's automatic signaling. You can push two fast trains down the same stretch of track or pause a freight train to let a mail train make its schedule. Screw up and trains collide, a disaster for your line since accidents make shippers pull cargo from your trains. Even more insidious is the occasional bridge washout. If you don't react in time, trains hurtle off the edge, *Bridge on the River Kwai*-style. The animated scene, one of several, seems a sop to past Microprose simulations. Thankfully, you can turn off the animations and imagine train

wrecks and bridge building yourself.

You aren't building your empire in a vacuum. Three other companies compete in your world, run by the computer and headed by real railroad personalities from the period. They'll try to beat you to the best markets, box in your lines, and generally make your life miserable. You can counter by pushing track into a competitor's station to start a rate war. If you're not prepared to give that city topnotch service, however, you'll likely lose the war and your investment. A more direct way to your competitor's throat is to buy enough stock in his line so that you can take control. It works the other way, too, so start worrying when someone begins eyeing *your* stock. You're out of a job if a takeover is successful.

Documentation is extensive, though I found things unclear in places. I still don't know how to accurately read parts of a station's shipping report, for instance. And it took me several tries before I figured out how priority routing and manual switching work. Overall, however, the manual spells out the simulation in prose worth reading.

I've never owned a model train, but that didn't keep me from spending hours with this program. The simulation is so complete, so complex in its world building, that I can't begin to describe all its details or subtleties. At the same time, *Railroad Tycoon* is a lot of pure fun. Assembling trains and then watching them negotiate tracks, pull into stations, and huff and puff their way up grades is almost as much fun as running a model railroad in your basement. Only the smell of an overheated transformer is missing.

Working on several levels—miniature world of railroads, capitalism at its best (or worst), exploration (and exploitation) of uncharted lands—*Railroad Tycoon* is a welcome change from military simulations. After all, there's more than one way to ruthlessly destroy an enemy. *Sid Meier's Railroad Tycoon* is about more than just trains. It's about power, fame, and fortune.

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# GAMEPLAY

O R S O N S C O T T C A R D

In the halcyon days before IBM's big, blue eyes focused on micro-computing, anybody with a computer could learn to create good games. Even I, knowing nothing, could create stuff on my Atari and my 64. Self-taught home computer wizards could make those machines stand up and dance. And they could do it with only 48K.

When the PC came around, all of a sudden it seemed you had to be a corporation to make games. Even home hackers ended up with game designers overseeing projects, an art department doing graphics, programmers doing the scutwork, and marketing types making all the decisions that mattered.

In short, it looked like home hackers were either going to have to get serious about game design or get out of the business.

But a guy named Scott Miller in Garland, Texas, didn't know that home game design was dead. He got one of the original 1980 IBM PCs and, using whatever language came to hand (now he works with *Turbo Pascal 5.0*), he started creating a series of games called Kroz.

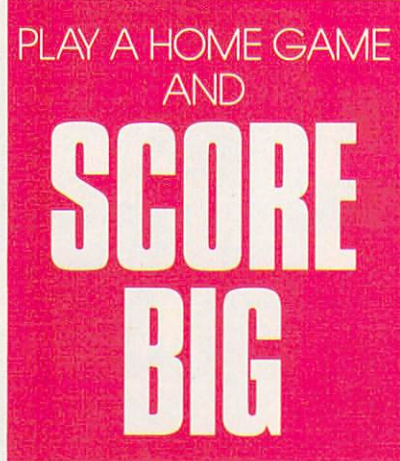
*Kroz*—*Zork* backward. But unlike the *Zork* games, Kroz games weren't text, they were graphics. You didn't read descriptions and then type words; you used the arrow keys to move a player-figure around the screen. Mazes, obstacle courses, tricks, traps, monsters, magic spells—it's hard to think of many ideas in the fantasy games that aren't present in the Kroz series.

Miller didn't eat up memory with vast graphics displays. His whole game uses the standard IBM character set. The player-figure is a little yellow happy face. Monsters are those weird Greek characters, or an *A* with an umlaut; different-shaded blocks represent different kinds of walls; diamonds, clubs, and hearts all have specific meanings.

You can play a whole game on a monochrome screen with a pathetic amount of memory—or on a 386

screamer with VGA—and it looks good and plays wonderfully. It takes every bit as much dexterity, both mental and manual, as, say, *Lode Runner*. True, you have to use your imagination a little more, but because Miller has been both clever and clear, you soon forget that you're looking at the standard character set.

The only way Miller could have an art department and a programming department and a game-design department would be through multiple personalities, because he does it all. His marketing department, on the other hand, is huge but costs him nothing: He puts out Kroz as shareware.



Here's how it works. He creates three games at once—a trilogy—and then chooses one of the games to distribute as shareware. There are dozens and dozens of shareware libraries; they all get Kroz for free and distribute it free to their membership.

The shareware game is complete. If you're content with just one Kroz game, you never have to pay.

But anybody who has played one Kroz game wants to play more. And to get the other two games in the trilogy, you have to go to Scott Miller. Even then, though, you're paying less than the most heavily discounted "professional" games. For each trilogy, including hint books, maps, and

information about secret easier-play modes, you pay \$20 (or, if you want, \$7.50 each for individual games). You can buy all six in the first two trilogies for \$35. If you want his huge new game, *Lost Adventures of Kroz*, you pay \$20. In short, you can get all the Kroz games for \$55.

And I assure you, it's worth many times that, compared with what you usually get for 50 bucks these days. Miller is clever (downright twisted sometimes), and you'll enjoy the contest as you try to outwit him, whipping your way through walls and monsters. Start with one or buy them all—you'll feel that you've gotten a great game for *less* than it was worth.

You make checks and send orders to Apogee Software, 4206 Mayflower, Garland, Texas 75043. Apogee Software sounds like a corporation until you realize that it consists entirely of Scott Miller. When you get your disks, it's because Miller sat there at his hot new PC running batch files to copy the programs onto the disks he sends you. *Every* disk is personally handled by the game designer.

In case you're getting inspired to go back and pick up where you left off in your own game programming, here's a piece of good news: It's profitable. Miller averages between 50 and 60 orders a week, with highs over 200. He makes a decent profit because he has *no* overhead—unless you count the fact that a few years ago he had to get an apartment of his own because his operation had taken over his parents' house.

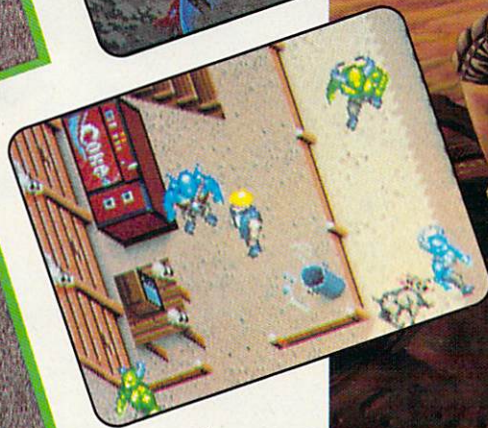
Miller is just beginning to get Kroz onto the online services—he only got his first modem a few weeks ago. And he's going international; a European disk magazine, *Otic International*, is translating Kroz's instructions into several languages and distributing it over there. He's even working on an EGA version.

So all you would-be home hackers, get back in front of that monitor where you belong and start writing. The world needs more cheap, but excellent, games. □

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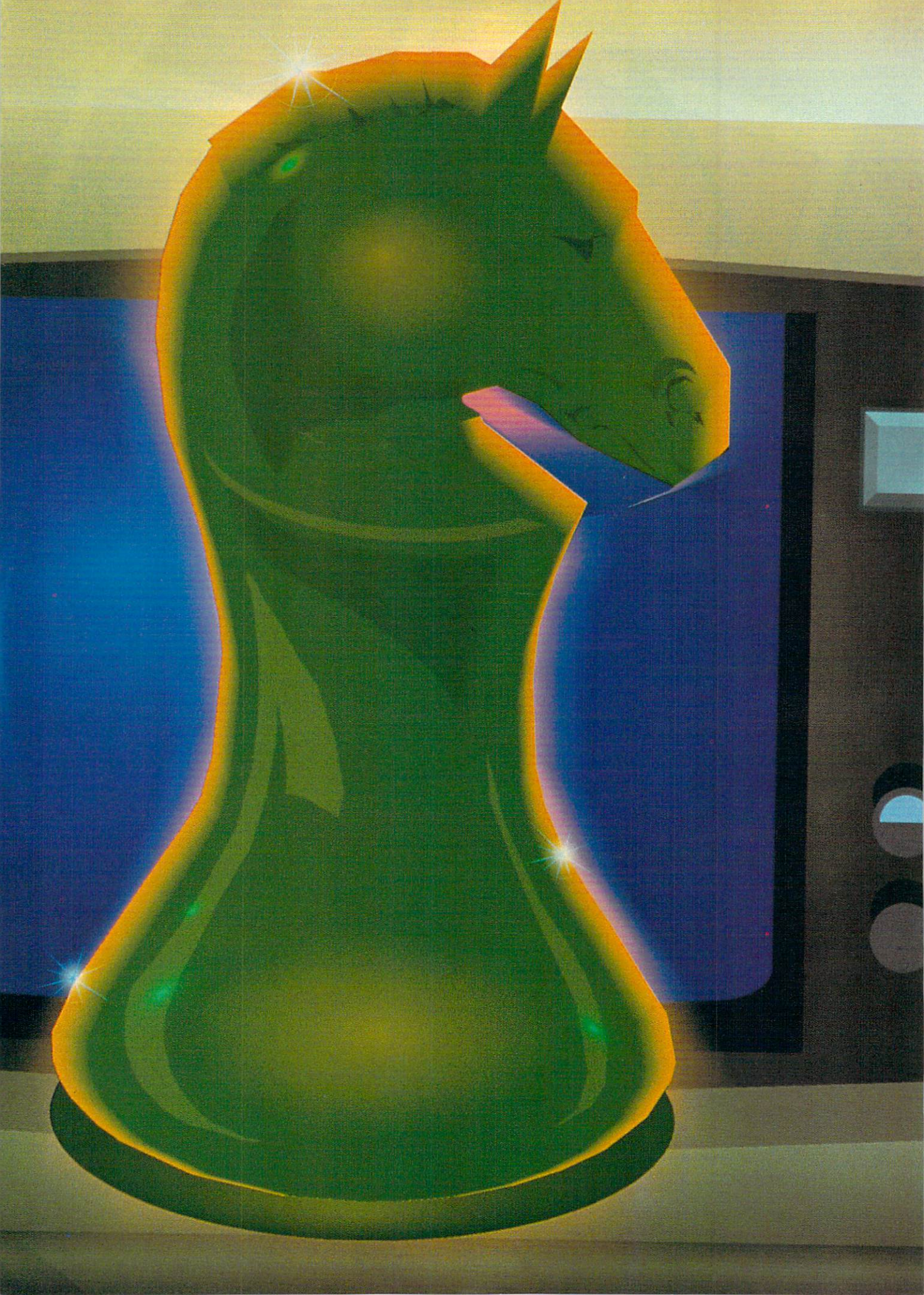
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# THE DESIGN GAME



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"The old-fashioned way of getting into the adventure market—a guy out in his garage, writing a game and sending it to a publishing house—just doesn't cut it anymore," says Chris Roberts, game designer at Origin Systems and author of *Times of Lore* and *Bad Blood*. In the past few years, game design has become a team effort.

Specialization is the buzzword in the adventure game industry now, and the game designer's role has changed. "Game designers today come up with the overall concept and feel of the game, and the direction they want it to take," the British-born Roberts says. "I go with an idea or a concept rather than a particular story line. I guide it but let the specialists take care of their sections."

Those specialists include writers, experienced in fantasy or science-fiction markets, who take Roberts' concept and create a story. Graphic artists, programmers, and musicians

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ONLY ONE PERSON TO  
WRITE AN ADVENTURE  
GAME. TWO TOP GAME  
DESIGNERS REVEAL WHAT  
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also contribute their talents to produce the kind of state-of-the-art product that's demanded by today's sophisticated game players.

### **Cheap Labor**

It wasn't too long ago that Roberts did all the work himself. "In the early days it was great," he says. "Back in England, I did my own graphics, my own programming, my own game design. It was very cheap, and so any royalties I got were like money in the bank."

Roberts created those first games to please himself, but he says game design now is market-driven. "In the old days, I used to ask myself, 'What do I think is fun?' Now it's, 'What do I think is fun, but what will everyone else think is fun so we can sell a lot of copies and pay everyone's salaries?'"

A typical project may require four or five artists, one or two programmers, and at least one writer. As a game nears completion, Roberts usually pulls in a musician who spends a month or two composing a musical score for the game. "There's a lot of specialization now," he says. "It makes the product a lot more professional, slick, and better, but obviously it costs a lot more." ▸

Richard Garriott, co-founder of Origin and designer of the popular Ultima series, has seen similar changes. "In the early days, in *Ultima I* through *III*, I did everything," he says. "I designed the game, I wrote the story, I programmed the code, I drew the graphics, I drew the maps of the worlds themselves, I generated the text for the conversations of every individual in the game. You really had to be a jack of all trades back then."

But with *Ultima IV*, the games became bigger—too big in fact. Garriott needed help, and some of the code was outside his range of expertise. He hired programmers for *Ultima IV* and *V*.

With *Ultima VI*, the design process has evolved even further. "In that program, I wrote not a single line of code, not a single word of text, and I drew no art," he says. "We're now in the era of specialization."

Garriott manages the Ultima product line. The story concept is his, as are the internal data structures and how the data is manipulated. But Garriott leaves much of the hands-on work to his staff. Programmers implement the code, artists draw the graphics, and writers create the conversations between the characters that Garriott creates.

Although Garriott no longer writes code, he says his programming background is vital to his game design. "I know what can be accomplished and how hard it is for my programmers to accomplish it. That lets me make intelligent choices about what a player should or could be able to do in the game."

### Role Reversal

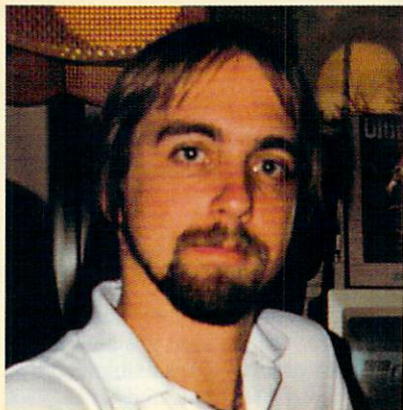
As the roles in game design have changed, so has the design process. Originally, a designer had a story idea

and then decided what to put in the story. The game grew and evolved as features were added. "Now, we do a top-down design" Roberts says, "We ask, 'What sort of game do we want? What sort of technical innovations is it going to have? What sort of story is it going to have?'"

From that point, the writer details the story and breaks down the plot elements. The programmers then decide what code they need to implement the story. Of course, the project evolves during the production, and there are always some surprises along the way, but the top-down approach helps a designer itemize his or her needs and define the tasks for the various specialists. "It helps us develop games more quickly and efficiently," Roberts says. "With the evolutionary development process, there's a lot of time wasted trying to think what you're going to do next."

*continued on page 80*

## How They Got Started



**Richard Garriott, a.k.a. Lord British, is a co-founder of Origin Systems and game designer of the popular Ultima series.**

### Richard Garriott

Garriott was introduced to computers in 1974 as a freshman in a Texas high school. BASIC programming was the only course. Since teachers at that time knew little about computers, Garriott and two other students proposed a computer class of individual study, without a teacher. "Oddly enough," Garriott says, "the administration agreed to our idea, and the project I chose was writing fantasy games on the computer."

All the games were dungeon adventures that involved fights with monsters, with letters representing monsters and asterisks representing walls and corridors. Garriott never named his games, he gave them numbers. By the time he graduated from high school, Garriott had written 28 versions of the game.

After high school, Garriott worked as a salesman in a computer store, and it was there he saw his first Apple II. He added graphics to game 28 to see how it would look on an Apple.

"That game was never meant to be published," Garriott says. "It was only meant as a personal development project." The computer store owner was so impressed with it, however, he suggested that Garriott try selling it. Garriott made a couple of hundred copies, packaged them with a sheet of instructions in plastic bags, and sold them in the store. The whole investment cost about \$200.

A few weeks later, Garriott got a telephone call. Someone at a software company called California Pacific had seen the program and wanted to publish it. "I flew to California, I signed a piece of paper, and they started mailing me money," Garriott says. "That is literally how I got into this business."

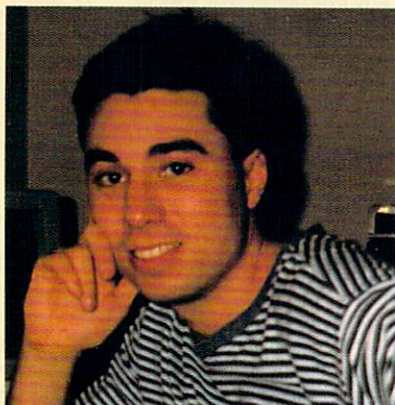
### Chris Roberts

The way graphics could be made to move on a screen was what first attracted Chris Roberts to videogames. "I've always been fascinated by moving graphics around on a screen," he says. "I guess that was my inspiration to start working on computer games."

In 1981, as a teenager in Manchester, England, Roberts got his hands on his first computer, a ZX 80, also known as the Sinclair Timex. He started by trying to make shapes move. Soon after that, he graduated to a BBC Micro, which was an Acorn computer with a 6502 microprocessor. It was on this machine that Roberts started working seriously on games by learning assembly language. "Back then you needed assembly language to write games because that was the only way to get the speed for the computer graphics," he says.

Roberts never took a course in computer science in high school, but after graduation, he took an extracurricular course in BASIC programming at the University of Manchester. His instructor was the editor of a magazine that dealt with the BBC Micro computer, and he asked Roberts to contribute BASIC programs for the magazine. "I wrote games for a couple of issues," Roberts says, "and that's how I got started."

From there, Roberts got a job as a designer with Ocean Software, one of Europe's largest publishing firms.



**Chris Roberts is a game designer at Origin Systems and the author of Times of Lore and Bad Blood.**

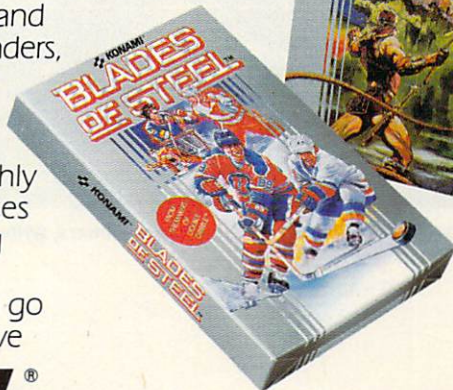




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Efficient game design has become a business necessity. People demand bigger games with more graphics and more disks, but the price has remained fairly constant, and sales have not increased that much. "It's getting more risky each time you do a game," Roberts says, "so we're trying to cut down on the inefficiency in software development."

Garriott favors a slightly different approach to game design but he also starts with one main concept. "I want to know the overall goal so I can decide what kinds of activities I'm going to support," he says. "But I don't nail down any specific activities because I don't have a technology that I know can pull it off yet."

Once his goal is clear, Garriott then starts building the data structure and technology that can support various activities, but without wasting code. For instance, suppose he has a rickety bridge that will collapse if you cross it with too much weight. "If you walked across the bridge without it collapsing, you'd never know I wrote that piece of code," Garriott says. "But if it collapsed and you died, that's a lot of code for a one-shot deal." Garriott avoids large pieces of code that get used only once.

He also strives to develop a diverse palette of activities to keep players entertained. "You spend the first few hours doing one kind of activity,"

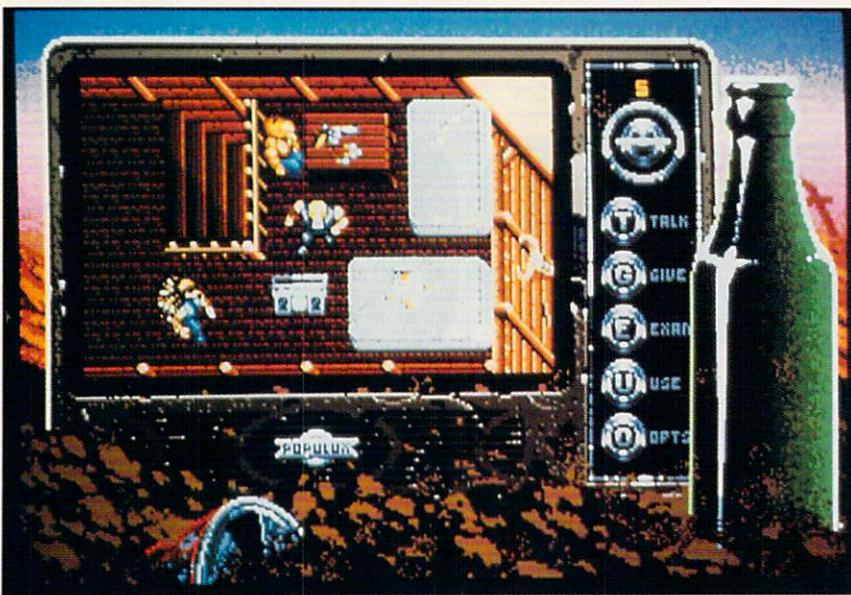


Garriott didn't write a single line of code for his latest game, Ultima VI.

he says. "Then, before you get bored, I introduce a new activity and function as vastly different from the previous one as I can."

One scenario might require you to interact with people and do some intellectual puzzle solving. "Then be-

cause you can play some of the game's musical instruments, that activity might be featured for a while before you go off to solve some mazes or dungeons," Garriott says. If play is repetitious, it's boring, and Garriott never wants that said about his games. □



Bad Blood's design team included programmers, writers, artists, and musicians.

### How You Can Get Started

Software companies rarely sign contracts with someone unknown. They're more likely to sign with development groups or houses rather than individuals. A talented programmer should try for a staff position with a development group or a major company, such as Electronic Arts, Brøderbund, or Origin.

But to get that first programming job, you have to be noticed. "In my experience, the best you can do is demonstrate talent and hope that a publishing house will hire you," Chris Roberts says. "It's tough, but one thing I definitely would say to anyone who wants to break in is to have a crack at it. Send the company a disk with something on it, something neat with five minutes of graphics."

He says a demonstration disk packs more impact than a letter that simply describes your talents. "Even if they're not going to publish it," he says, "a demo proves you have the ability to do it."

Roberts also recommends getting fired up and fighting for your goals and ideas. "First of all, have a vision. But then I think you need an incredibly large ego. Basically, you need this innate belief that your vision is right. And, by God, this is the way it's going to get done, even if you have to go through hell or high water to get it done."

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# GAMESCOPE

**H**ere are some tips for Activision's *MechWarrior*. I've played FA-SA's *Battletech* role-playing game for some years, and with *MechWarrior*, I've been able to put my strategies to the test.

Starting the game, a player can either keep the Jenner mech or sell it for a Locust. Selling the Jenner will give you more cash, which will be necessary later in the game. I choose the Locust for its speed, though it's the lightest and least powerful mechs. Repair the mech to full battle strength before starting the campaign.

Once you've chosen your mech, you should choose a defense contract from a ruling house. If one is not available, try again after visiting the saloon or checking the newsnet. House Davion or House Steiner offer the most money for any contract, and often the most salvage rights for disabled mechs. Negotiate for the highest money and salvage rights possible, but be alert for a halt in negotiations. Asking for too much can make you lose the contract.

The designers of the game apparently made the opposing forces oblivious to almost everything but the mission at hand. If an enemy mech is defending a fuel depot, the enemy mech will ignore you unless you confront it head on. You need only bypass the enemy (done fastest inside a Locust) by going wide around either side and attacking from the rear. The rear armor and leg armor of mechs are the weakest. You can defeat the largest mech (the BattleMaster) with the smallest (the Locust) by getting behind him. Then you need only stay close to the target and attack the legs of the larger mech. This results in large salvage profits. It's wisest to attack the farthest enemy mech first, then move to the next one and repeat the attack. Speed is necessary to defeat all the enemy mechs before they complete their mission, hence you should use the Locust. Using this attack, you can quickly increase your bank account and hire trained help.

When the Dark Wing is finally

found, it's best to have your crew equipped with the heaviest and most powerful mechs (BattleMasters). I've found, though, that you should have more long-range firepower than your crew. I have used a Warhammer to defeat enemies from long range, before massed firepower could be used against me. Defeating the Dark Wing is a challenge in itself, and saving the game before going into combat is wisest. A player should also have a large stock of spare ammunition stored aboard the spaceship before attacking the Dark Wing. With a little luck, and after finding the right mech for the task, you can save your family's reputation and return home a hero.

## MASTERING MECHS AND GUNSHIP GLORY

An important feature of the game is its open-endedness. Once you've won the game, you can continue to play until you're killed. Each mission is a test of skill and luck, so fight on.

*Tom Biggerstaff  
Leesville, LA*

### Winning at Gunship

When playing MicroProse's outstanding *Gunship* game, these tips may gain you promotion and decorations instead of an early flaming demise.

Don't take the direct route to your target because you're likely to overfly an enemy anti-aircraft site. Instead, set your map INS cursor on the nearest mountain in the desired directions, and fly to that mountain at an

altitude of 500 feet or below. Then slide around the base of the mountain to the next one. By hopping among the mountains, you can take advantage of their radar shadows to shield yourself from enemy observation. Another good technique is to skirt the very edge of the battle area (the edge of the screen). You can't be ambushed from that direction.

Keep your eyes glued to your Threat Display, too. When you see a threat displayed, it is usually best to attack and destroy it immediately, before it can react and begin shooting at you. The enemy is much more dangerous and harder to destroy once it has tracked you with its radar. If your flight path takes you too close to an enemy threat concentration, dive for the deck and fly away at high speed on a course that avoids the cluster—preferably placing mountains between you and the enemy. Do not attempt to fly over the enemy concentration, as you're likely to be shot down.

Also, as a precaution, you should practice autorotations using a dummy pilot who is expendable. This can save your military career and your life if you are hit and cannot continue in flight. You will be able to autorotate to a safe landing instead of crashing in flames. Finally, be sure to save your military records (roster.fil) to a blank disk after every successful game. This file can then be copied back to the *Gunship* play disk should you ever need to restore your records to an earlier point. Then, if you're killed or missing in action, you can resume life as a medalled, ribboned officer, instead of starting over as a rookie slick-chest sergeant.

*Don Harmon  
Merritt Isle, FL*

*If you have game tips and shortcuts of your own, we'd like to hear from you. Send your tip, no matter how brief, to COMPUTE Feedback—GameScope, 324 West Wendover Avenue, Greensboro, North Carolina 27408. If we publish your suggestion, we'll send you a gift.* □

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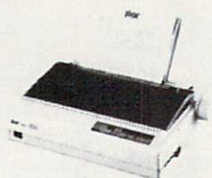
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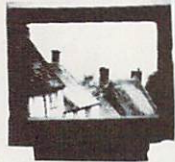


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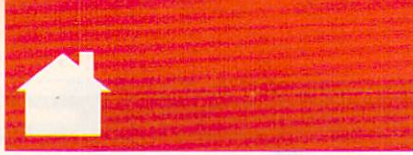
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ten antistatic wipes, and ten drying towelettes.



The cleaning and vacuum kit includes disk-head and mouse-roller cleaners.

The basic kit retails for \$19.99, and the cleaning and vacuum kit retails for \$29.99. Both come with a one-year warranty from Suncom. *Suncom Technologies, 6400 W. Gross Point Rd., Niles, IL 60648*  
Reader Service Number 352.

## Blackened Disk

Cajun Edge has just released *Disk Labeler Supreme*, a disk-labeling and management program for the IBM PC and compatibles.

This program uses pull-down menus and pop-up help screens so you can generate disk labels in your choice of two sizes and four styles. You can use the Quick Labels Menu to quickly make disk labels without using the more advanced features of the program. The Master Catalog stores a record of the disk and file information to help you keep your files organized.

*Disk Labeler Supreme* is available for the IBM PC, XT, AT, PS/2, and compatibles with DOS 2.1 or higher and 512K; it retails for \$79.95. Cajun Edge will mail 100 free disk labels on receipt of the completed registration card.

*Cajun Edge, P.O. Box 2457, Hammond, LA 70404*

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# NEW PRODUCTS

continued from page 84

## Space Math

*NUMBEROIDS* from deep space entertains as it teaches. This educational math package from The Gopher Gradeworks uses music and arcade-style graphics to keep your child's interest level high while he or she is learning to add, subtract, multiply, and divide.

The program features adjustable play speed and on-command math tables. The package also comes with the Space Traveler Lap Desk, which includes a scratch pad and pencil.



*NUMBEROIDS* from deep space uses arcade-style graphics to entertain your child while teaching math skills.

*NUMBEROIDS* from deep space is available for the IBM PC and compatibles for \$39.95.

*The Gopher Gradeworks, 8640 M Guilford Rd., Suite 204, Columbia, MD 21406*

Reader Service Number 358.

## Bright Banners

Brighten your banners, signs, and graphics with the BANNERBRITE collection of Day-Glo computer paper from Banner Band.

The 45-foot roll of continuous-feed paper is 9½ inches wide with ½-inch margins. BANNERBRITE comes in Day-Glo red, green, orange, and pink and retails for \$14.95 a roll.

*Banner Band, 533 N. Wolf Rd., Wheeling, IL 60090*

Reader Service Number 354.

## What's Cooking?

East Hampton Industries' updated version of *A>COOK, The Complete Computer Recipe System* (version 2.0) contains over 100 recipes and a built-

in word processor to assist you in adding or editing recipes. Recipes can be classified and recalled under four different categories. Also, a hard disk user can store over 14,000 recipes.

*A>COOK* runs on all IBM PCs and most compatibles with 256K and DOS 2.0 or higher. The package retails for \$39.95.

*East Hampton Industries, 81 Newtown Ln., Drawer EEEE, East Hampton, NY 11937*

Reader Service Number 360.

## My Money

MySoftware's *MyCheckbook* is a personal finance program that lets you print checks and organize your finances.

*MyCheckbook* helps you monitor your finances with features like categorized expenses, budgeting reports, payee reports, and a check register. The all-in-one screen approach lets you see your statement balance, current balance, projected balance, payee history, and category history as you write a check.

*MyCheckbook* requires 384K and DOS 2.0 or higher and is available for MS-DOS machines for \$19.95.

*MySoftware, 1259 El Camino Real, Suite 167, Menlo Park, CA 94025*

Reader Service Number 355.

## Makes Sense

MCE, a division of Lawrence Productions, has developed *LOOK, LISTEN & TOUCH* to help parents and teachers assess which of a child's senses—sight, sound, or feeling—contributes most to the learning process.

By knowing their keenest learning sense, students can study the sensory-specific study techniques provided and improve their study skills. The program features a printout option for teachers and parents that shows the learning style of each student.

The package includes a teacher's manual, which contains goals, objectives, prerequisite skills, and suggestions for integrating *LOOK, LISTEN & TOUCH* into an instructional unit. It sells for \$82.50.

*Lawrence Productions, 1800 S. 35th, Galesburg, MI 49053*

Reader Service Number 361.

## Animalistic Tendencies

Personalize your computer with Celsus Designs' Computer Critters, plush animal companions that attach to your computer monitor. The varmints come in four species: a toothy green dragon complete with tail, a carrot-carrying pink bunny rabbit, a brown bear cub, and a friendly bulldog.



Stare at your computer screen, and Computer Critters will stare back.

Designed to liven up drab computers, the Critters attach to your monitor with Velcro. The rabbit and bear each retail for \$29.95; the bulldog and dragon, for \$34.95. Celsus plans to release more creatures from the animal kingdom in the near future.

*Celsus Designs, P.O. Box 5401, Hacienda Heights, CA 91745*

Reader Service Number 357.

## Words in the Bank

Scholastic Software has announced the release of *The Bank Street Prewriter* to help students in grades 5–12 create and manage ideas for writing.

The program offers three modules: Brainstorming, Prompted Writing Activities, and Outlining. Brainstorming helps students get started with activities including free writing, invisible writing, and goal setting. Prompted Writing Activities encourages students to develop ideas for over 20 specific styles and forms of writing. The Outlining tool is also included to help students organize their ideas.

*The Bank Street Prewriter* is available for Apple II computers with 128K and MS-DOS computers with 256K for \$32.95.

*Scholastic Software, P.O. Box 7502, 2931 E. McCarthy St., Jefferson City, MO 65102*

Reader Service Number 362.



# 64/128 VIEW

T O M N E T S E L

A funny thing happened to *Gazette* on the way to the printer this month. Actually, it began several months ago, when COMPUTE! Publications' parent company, Capital Cities/ABC, decided to divest itself of its consumer magazine division. *COMPUTE!*, *COMPUTE!'s Gazette*, *COMPUTE!'s Amiga Resource*, and *COMPUTE!'s PC Magazine* were up for sale.

That's when General Media came to the rescue. COMPUTE Publications (without the exclamation point) now joins the firm that publishes *Omni*, *Penthouse*, *Longevity*, and *Four Wheeler* magazines. With the buyout, however, came a major restructuring.

We no longer produce four separate products. Instead, we publish one basic magazine, *COMPUTE*, with separate machine-specific editions for owners of Amigas, PCs, and 64/128s.

In this way, subscribers get the computer-specific information they've come to expect plus entertaining and informative *COMPUTE* features, articles, and reviews dealing with the personal computer world at large.

While the name on the cover is different, I think 64 and 128 owners will find that *Gazette* has retained its identity. Look through this issue and you'll see many of your favorite columns and features—and yes, we still have the type-in programs for *Gazette* subscribers and newsstand buyers.

There have been changes, however. For many years Lance Elko edited *Gazette* magazine, and, although he did an outstanding job, Lance felt the time had come for him to pursue other interests. We wish

him the best. This issue marks my debut as editor, and I'll do my best to continue with the tradition of excellence that Lance fostered and maintained.

As for the contents, they have changed little. "Feedback" and "Letters to the Editor" have been combined into one column, now called "Feedback." This is where we'll try to answer your questions and publish your suggestions, comments, tips, quips, and gripes.

To find out what's new in the 8-bit world of Commodore, check out "News & Notes." Formerly called "Commodore Clips," this is where we'll announce new software and hardware, the latest facts and rumors from Commodore, and other items of interest to 64 and 128 owners.

Returning are many of your favorite columnists. Larry Cotton's tutorial on BASIC programming and Jim Butterfield's machine language

series are both here. Also continuing are Randy Thompson's "Programmer's Page" and "D'Iversions," Fred D'Ignazio's look at technology.

"The GEOS Column" has been a semiregular feature, but since many of its articles are submitted by readers, we'll need your help if it is to remain. We do have a few surprises coming up for GEOS fans, but we still need to hear from you.

We also want to hear from BASIC and machine language programmers. Just as in the past, if you write original 64 or 128 games, utilities, or productivity programs, keep those submissions coming. The type-in programs have always been an integral part of the *Gazette* concept, and we want to continue bringing you the best in original programs. Of course, those programs are also available on the *Gazette Disk*.

We're also looking for authors to write articles, features, and reviews. If

you have expertise in a certain field and can communicate that knowledge, we'd like to hear from you. We also need computer artists (see "News & Notes" in this section).

We want the *Gazette* pages to remain a major resource for 64 and 128 users, but we need your help. Whether you're into telecommunications, desktop publishing, graphics, music, programming, or game playing, all of you dedicated 64 and 128 users constitute a vast wellspring of information. We want to tap this wealth of knowledge and share it with all our readers. With your help and support, we at *Gazette* will do our best to meet your computing needs into the next decade. □





# NEWS & NOTES

## CALLING ALL ARTISTS!

Is there a Rembrandt or van Gogh inside you, trying to get out? If so, we want to see your 64/128 masterpieces. Starting with the November issue of *Gazette Disk*, we'll publish the best examples of original 64/128 art submitted by our readers. Five top entries will appear each month in the "Gazette Gallery," a new feature found only on the *Gazette Disk*.

Send your *Doodle*, *Koala*, or other popular 64/128 paint-program

pictures to the address below. (No more than five submissions per disk per month, please.) We pay \$50 for each piece of art we accept and \$100 for the one we judge Picture of the Month. Enclose a self-addressed, stamped disk envelope if you want your disk returned.

Gazette Gallery  
COMPUTE Publications  
324 W. Wendover Ave.  
Greensboro, NC 27408

## War Strategy

Strategic Simulations (675 Almanor Avenue, Sunnyvale, California 94086) has released *War of the Lance* (\$39.95), the first Advanced Dungeons & Dragons strategic war game for the Commodore 64. Set in the Dragonlance game world, this one- or two-player game requires you to make alliances, conquer nations, and destroy enemy troops.

You command the Whitestone forces of good against the evil Highlord Dragonarmies. The full campaign lasts for six game years, which takes 30 turns. You may engage in battles to conquer enemy countries or try to gain alliances by sending diplomats. Representatives of your armies can also be sent on quests for magic that will make your forces even more powerful.

A strategic map allows you to track the movements of the different armies. The zoom function permits you to direct the war on a tighter scale. You can watch the details of battle by selecting the tactical view.

—MICKEY McLEAN

## Own Your Own Stables

Owners of *Omni-Play Horse Racing* from SportTime Computer Software (3187-G Airway Avenue, Costa Mesa, California 92626) can now expand the playing style and graphics of their game with the *Stable Owners* option module (\$19.95). It's one of several modules scheduled for release. The modules allow you to customize your game, making it as basic or as complex as you desire.

With *Stable Owners*, you add a new perspective to the game by joining the elite class of thoroughbred owners, giving you control over the destiny of your own horses. Put together your own personal stable of Claiming, Allowance, and Stakes horses. Hire jockeys and match their skills against the competition as you enter them into the races of your choice. Up to four players can participate.

—MICKEY McLEAN

## Dinosaurs, Business, and Tennis

DigiTek Software (8910 North Dale Mabry, Executive Center, Suite 37, Tampa, Florida 33614) has announced three new products for the 64/128: *Dinowars*, *Big Business*, and *Tie Break Tennis*.

*Dinowars* (\$29.95) is a combination of a strategy-board game and an arcade-action adventure. Also included is an animated encyclopedia and an action-only mode. Players control any of eight different dinosaurs, each with its own strengths and weaknesses, in combat over a kidnapped dinosaur egg. The game features massive dinosaurs that stand as tall as two-thirds of the screen.

For competition with a more current flavor, try *Big Business* (\$29.95), a humorous simulation of a large manufacturing company. Three players each start with equal assets and market the same product, competing to acquire the greatest net worth by game's end. While some aspects of the game are strictly entertaining, the core of the program is an accurate economic model. Factors such as interest rates, inflation, market climate, prices, and availability of raw materials are calculated.

When you're ready for a little exercise, step onto the court for *Tie Break Tennis* (\$29.95). This realistic tennis simulation puts more than a dozen techniques at your disposal: crushing serves, forehand, backhand, topspin, slice, lob, overhead play, slam, volley, passing shots, drop shots, and soft balls. The game features speech and sound effects and a TV-style presentation. Play singles, doubles, or tournaments on clay, grass, or asphalt, and even select your choice of racquets. Compete against a computer or human opponent.

—TOM NETSEL

FOR ORDERS AND INFORMATION IN USA & CANADA CALL

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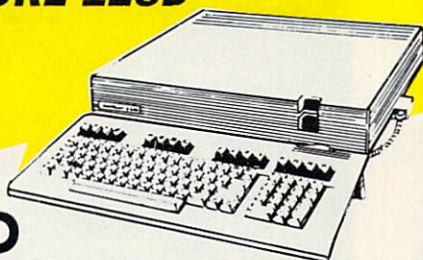
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## COMMODORE 128D

C-128D w/Built-in Disk Drive

**\$449**



**C-128-D**

**128D COMPLETE PACKAGE**

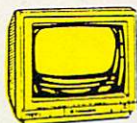
- Commodore 128-D Computer with Built-in Disk Drive
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- 12" Monitor

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- Commodore 128D Computer with Built-in Disk Drive
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**\$699**



COMMODORE 1571 DISK DRIVE

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NX-1000C Rainbow.....	\$227.95	GSX-200.....	\$199.95
COLOR OPTION KIT FOR GSX PRINTER.....CALL			
EPSON		PANASONIC	
LX-810.....	\$199.95	KXP-1180.....	\$159.95
LQ-510.....	\$319.95	KXP-1191.....	\$229.95
FX-850.....	\$349.95	KXP-1124.....	\$289.95
BROTHER			
HR-5 80 COLUMN THERMAL PRINTER.....	\$59.95		

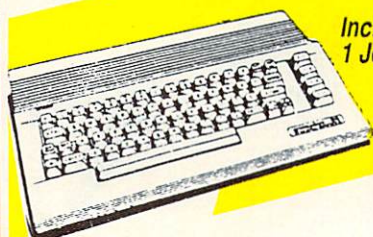
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Includes: 1 Joystick

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- Commodore C-64/C Computer
- Commodore 1541-II Disk Drive
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**\$279**

### COMMODORE 64C COMPLETE PACKAGE

- Commodore C-64/C Computer
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- Commodore Color Printer
- 12" Monitor
- 10 Diskettes

**\$289**

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- Commodore C-64/C Computer
- Commodore 1541 Disk Drive
- Commodore Color Printer
- Color Monitor
- 10 Diskettes

**\$339**

## PERIPHERALS FOR COMMODORE

1700 RAM Expansion.....	\$119.95	XETEC S. Graphix Jr. Interface.....	\$29.95
1764 Expansion Module.....	\$129.95	XETEC S. Graphix Sr. Interface.....	\$49.95
CARDCO G-WIZ Interface.....	\$49.95	XETEC Supergraphix Gold.....	\$74.95
C-64/C-64C Power Supply.....	\$29.95	XETEC Lt. Kernal 20MB Hard Drives for:	
C-1670 Modem.....	\$79.95	C-64C.....	\$729
COMMODORE 1350 Mouse (128, 128D only).....	\$16.95	C-128 & 128D.....	\$849
COMMODORE 1351 Mouse.....	\$49.95	Excellerator Plus Power Supply.....	\$39.95
		C-128 Power Supply.....	\$79.95

SEE OUR AD IN THIS MONTH'S AMIGA SECTION OF THIS MAGAZINE FOR GREAT AMIGA SPECIAL VALUES



DIDIER CREMIEUX

# MAIL-ORDER MAZE

BUYING SOFTWARE AND HARDWARE BY MAIL IS EASY, IS CONVENIENT, AND CAN SAVE YOU MONEY. BUT THERE ARE SOME TIPS YOU SHOULD KNOW BEFORE YOU PLACE AN ORDER.

## M I C K E Y M C L E A N

**B**ecause of our busy lifestyles, mail order's convenience makes it an attractive alternative to driving out to the shopping mall and fighting for a parking place. Computer users were taking advantage of mail order long before it was chic to have Lands' End and L. L. Bean catalogs stacked on your coffee table. It's also a good way to save money and locate hard-to-find items.

If you glance at computer magazines from the past ten years or so, you'll notice a multitude of companies selling products with an 800 order number—but much has changed

over the past decade. Mail order had a bad name years ago, mainly because of a number of unscrupulous dealers who deceived consumers. The U.S. Postal Service responded by cracking down on this type of activity, forcing many unscrupulous dealers out of business. As a result, the mail-order business has gained a new respectability in recent years.

This doesn't mean you should throw caution to the wind, but now you can order products with confidence and usually receive a guarantee that you'll be completely satisfied or get your money refunded.

## Reputation

Before shopping for the software or hardware you need, seek out a dealer who best meets your needs.

"Check out the reputation of a company," says Les Lawrence, president of Software Support International. "Watch the company's advertisements, and find out how long they've been in business."

Mark Lane, manager of Software Discounters of America, agrees, "The bigger the company, the bigger the ad, and the longer they've been in business, the more you know what kind of commitment they have."

Other factors to consider are the type of guarantee offered, the return policy, how fast products can be delivered, and the knowledgeability of the staff. Whether or not a company accepts your credit card, ships C.O.D., offers rush service, or ships to military or international destinations could also be important to you.

Friends, co-workers, or fellow user-group members can be a good source of information. Ask around and find out which companies they've had success with.

"Not all companies are alike," says Janet Brito, president of Briwall. "And there are not many left to choose from in the Commodore market."

Lane says that since the 64/128 market's days are numbered, consumers should look to a company that already carries multiple formats.

"I carry all formats, therefore I don't have to run away from the Commodore market," he says. "I'll stick with it. I'm not sure others will stick around, but I'll try hard to get all the new titles I can."

## Price vs. Service

The first thing most consumers look for in a mail-order ad is the price of the product and how it compares with what other mail-order firms or the local computer store is offering.

When dealing with mail-order companies, comparing prices has added importance. For example, several companies will match any current nationally advertised price on the exact same item less shipping and sales tax. The only stipulations are that the product has to have been advertised recently and you must be able to verify its price.

Briwall's Janet Brito believes that low prices are important but should not be the most important factor when you're choosing between mail-order companies.

"There are some mail-order companies out there that advertise products at the cheapest price, and that's all they'll give you," she says. "I get

## FRIENDLY TIPS

This list of tips from representatives of major mail-order houses should help you get through the ordering process with few or no problems.

1. If you have detailed questions about a product or the company, call the customer-service or technical-support telephone number, not the order number.
2. Place your order during normal business hours, when the company is better staffed and able to answer your questions.
3. To receive prompt service, it's best to call in midweek (Monday and Friday are the busiest days for orders).
4. When comparing prices between companies, be sure to add in all shipping costs and credit card surcharges.

5. Be prepared to pay sales tax should you reside in the same state as the mail-order company.

6. Look for a company that has a computerized inventory so you can find out immediately if a product is in stock.

7. Determine whether a company charges your credit card before shipping the product.

8. Make a note of the name of the company you ordered from, the date you placed the order, the total price of the order, and the name of the person who handled your order.

9. Value good service and after-sale support more than unit price.

10. If a company has served you well in the past, stay loyal.

very irritated when people call just to compare prices. They don't consider other factors such as service and support. They need to be a little less concerned about pricing and think about how they're being treated after they've ordered."

On the other hand, Les Lawrence believes low prices are the main reason why consumers use mail order and that they should not expect much beyond that.

"Customers have to realize we have cut prices to rock bottom," he says. "They shouldn't always expect free customer support and 100-percent satisfaction. It's difficult at the

prices we charge. Somebody has to pay the bill."

Lawrence also believes that customers have a responsibility to research the market well and know what they want before ordering.

"Customers should go into a purchase with eyes wide open and know what they're buying before they buy—they shouldn't play games with mail order."

## Piracy Problems

Software piracy has hurt the computer industry in more ways than one, and publishers are not the only ones who have suffered. The practice of illegally copying games has put a large dent in the mail-order trade and has changed the way some are doing business.

Janet Brito says that she started noticing people purchasing four or five games at a time from her company and then returning them a few weeks later. After repeated instances of this suspicious behavior, the company decided to change its return policy.

"We've stopped taking back entertainment titles because of the copying," she says.

Brito adds that despite this change in policy, the company will consider issuing a refund on an entertainment title if a customer has a legitimate beef.

## Operators Standing By

After digesting the information in this article and the reference guide on page 6, you should be able to go to the mail-order ads in this magazine, make comparisons, and place an order with confidence. Who knows? You may find it so easy that you'll never set foot in a shopping mall again. ▸

## BE PREPARED

Before placing an order with a mail-order company, be ready. You can save yourself and the company a lot of time.

1. Read the company's ad carefully and take note of its ordering, payment, shipping, and return policies. If you have any questions about its policies, ask before you order.
2. Know which products you want to order, including any specifications.
3. Write down any questions you have about your order.
4. If you're paying by credit card, have your card number, expiration date, and the name of the cardholder in front of you.
5. Have the proper shipping address ready. If a company ships primarily by UPS, you'll need to provide a street address (a post office box number is unacceptable).

# MAIL-ORDER REFERENCE GUIDE

The following grid lists the services and policies of six of the major mail-order houses in the 64/128 market.

This chart contains information obtained from advertisements and company representatives. It should be used strictly as a reference. Company policies are subject to change, and there may also be some exceptions to stated rules and regulations. It is recommended that you contact each company to make direct inquiries concerning policies that interest you and will apply to your order.

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# A TEACHER'S GAME MACHINE

D O R O T H Y H E M M E

**C**ommodore is a game machine, right? Well, I don't play many games, at least not the joystick, shoot-'em-up variety. I leave those to my 14-year-old son. When I play "computer," I like to find and run useful programs that will expand my creativity and lighten my work load. That's a game to me—and it's fun.

So what can I do with my game machine? To borrow a cliché from literature: "How do I love thee? Let me count the ways." If you're an educator or a parent, you might count the ways, too. As a high school English teacher, I must grade volumes of paperwork and record those grades. Of course, I first have to generate the assignments so students can submit their papers to be graded in the first place. From generating assignments to helping me with dozens of other classroom tasks, the 128 makes my work a snap. In fact, handling chores such as these have become my favorite computer games.

Although I started my computer system with a 64, a 1541 disk drive, and a composite monitor, I upgraded several years ago to a 128, a 1571, and an RGB 80-column

monitor. I'll have to admit that the disk drives are slower than I like, so I also bought a Mach 128 cartridge for greater speed and two-key loading. That made a big difference.

First, the 80-column mode is ideal for word processing. Its higher resolution makes it much easier on my tired old eyes. Also, many word processors have a preview mode for 80 columns that doesn't require scrolling from side to side or shrinking the text onscreen. My handouts and tests have to be precise, and I don't have the time to print several versions to see exactly what any change or modification will look like. I like the convenience of the 80-column screen.

I have several word processing packages, including COMPUTE's *SpeedScript 128*, GEOS, and Professional Software's *Fleet System*. I use this last program most often because of its built-in spelling checker. I also like its flexible page

length, from three-line mailing labels to legal-size documents. Of course, I have all my tests, handouts, and notes on disk, and this makes inserting, cutting, and pasting information for new tests and assignments very easy.▷

COMMODORE—GAMES—FUN.  
THESE THREE WORDS ARE LINKED  
IN MANY PEOPLE'S MINDS, BUT  
THIS TEXAS TEACHER FINDS HER  
128 IS FUN EVEN IF THE GAMES  
SHE PLAYS ARE DIFFERENT.

Next is the printer. The right printer is a must, but with all the printing chores teachers face, one printer is not always enough. I have a great Star SG10 dot-matrix printer that does a superb job on most anything from near-letter-quality printouts to graphics, and its ribbon is cheap. It prints through carbons, ditto masters, and NCR paper. In addition, I also have an old daisywheel Smith-Corona TP1 for times when I need true letter-quality printouts. Finally, I own an Okimate 10 for printing in color. In bold or enhanced mode, the Okimate will also print on clear transparencies for overhead projectors when the need arises.

### Power User

Now, how about software? That's the heart of computing, isn't it? I don't do much programming, but I'm a power user of what others more gifted than I can create. After I've made an assignment with a good 80-column word processor or test generator and the students have turned them in, it's time to record their grades with a spreadsheet.

I have downloaded dozens of public domain programs from Q-Link, including gradebooks. All of these programs have features I use each six weeks when I'm creating new roll sheets for temporary grade listings, for progress reports I send to students' homes, and for seating charts. However, the spreadsheet I particularly like is the Epyx version of *Multi-Plan* in both 40 and 80 columns.

I'm required to average grades every three weeks for all of the students I teach, including those governed by the University Interscholastic League for extracurricular activities. *Multi-Plan* does the averaging and helps me spot potential problems. If grades suddenly drop, deficiency reports go out. These reports help parents and other teachers become aware of any learning difficulty a student may have before it gets out of hand.

I also need averages at the end of the six-week grading period for report cards. I can't see spending time averaging grades for 150 students from scratch every three weeks on a calculator—not when my computer averages and saves it all. It all boils down to saving time.

There are always students who forget to do assignments or fail to make up work when absent. *Multi-Plan* allows me to create a spreadsheet with headings that literally spell out what the assignment was, what the grade was, and if it was a daily or a major grade. I post these grades on the bulletin board by student ID number—no names, please! This usually

gets them to make up the missing work. It's amazing how quickly students want to get something done when they see how zeros affect their grade averages.

Also, this method keeps me accurate. If I've goofed on entering a grade or forgotten to update make-up work, students are quick to point out my mistakes. Often, spreadsheet columns are too wide for the page, so *Sideways* from TimeWorks is a great program for turning the figures 90 degrees so they'll print on one long sheet of paper.



**Most teachers regard the paperwork associated with the teaching profession as a chore. But Dorothy Hemme actually enjoys making assignments, averaging grades, and writing reports—as long as she can do them on her 128.**

### Notice This

In addition to helping with my administrative chores, the computer helps me grab the kids' attention. We use Brøderbund's *Print Shop* and Unison World's *Printmaster* for signs around the room dealing with novels and characters. I also print individual signs and have them laminated for each passing student who is engaged in an extracurricular activity such as football, choir, or drill team. These signs are posted on a wall in a special area of my classroom.

Banners grab students' eyes and draw attention to coming attractions at school. The Okimate helps with the artwork. I quit oil painting years ago when I ran out of room at home and my small kids were into everything, but now I create pictures with a light pen and print them with the Okimate.

And how do I reward my students for a job well done? I print blank certificates with Spinnaker's *Certificate Maker* and then run them off on the school's photocopy machine on blue paper—our school color. I buy the paper by the ream at an office supply store with my own money. I fill in the students' names and then hand out certificates for every excellent essay, for those who make the honor roll, for improve-

ment, and for students who worked hard on certain projects.

### For Excellence

In addition, I send my own newsletter to the students' homes. Yes, I am also into desktop publishing. At appropriate times during the year, I publish a newsletter for students and their parents to let them see what we've accomplished in class. After experimenting with *Newsroom* and *Personal Newsletter*, I switched to *Paperclip Publisher* from Electronic Arts shortly after it arrived on the scene. I include graphics and as many names of students achieving excellence as I can muster. Students and parents tell me that these newsletters and certificates wind up on refrigerator doors and are great for brownie points with parents.

Being the computerphile that I am, I recently invested in Berkeley Software's *geoPublish*, but only after buying the 512K *geoRam*. Again, for me the irritation of the Commodore is its lack of speed, not its capabilities. After experimenting with *geoRam*, I know that the cartridge will save me considerable time, since I won't have to wait for text and clip art to load from disk every few seconds.

### IBM? Who Needs It!

A word to IBM PC clone and Mac users: Sure, more than likely you have greater memory and greater speed—I envy those features. Talk of 286s and 386s and what they can do is heady stuff, and I love Mac graphics, but you paid more for your system. As an underpaid educator, however, I cannot afford such things—but I've found I don't need them.

Commodore garnered the low end of the computer market early because most home computer users could not afford expensive office machines. Over the years, I've spent quite a few hard-earned dollars for my machines and peripherals, but it has always been to upgrade the same machine. I've never felt the need to buy a new brand.

By now, if you still think the Commodore is a game machine, perhaps you're right. I'll admit I play with my 128 every night, and I have a lot of fun with it. While I might not blast aliens or search for treasure in monster-infested dungeons, I do get a kick out of the "games" I play with my computer. It's not my fault if some people insist on calling it work. ☐

Dorothy Hemme teaches 11th grade English at Clements High School in the Fort Bend School District in Sugar Land, Texas. In 1984, Hemme hooked a 64 to a black-and-white television and booted her first word processor. She hasn't touched a typewriter since.



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# FEEDBACK

## QUESTIONS FROM OUR READERS

### Muddled Math

The June table of contents lists *Mudfrog Math* as a program for the 64, but the lead-in for the article says it's for the 128. The article itself says nothing about which machine the program is for. When I run the menu from the *Gazette Disk* with my 64, the program isn't listed, but the program appears when I list the directory. When I try to load it using the program name, I get an error message. What's the problem? Is the table of contents or the lead-in wrong? Is the disk screwed up?

IVAN BORTNER  
BOILING SPRINGS, PA

*Sorry, Ivan, we goofed when we compiled the table of contents. Mudfrog Math is for the 128 as stated in the lead-in, and since the program is written in BASIC 7.0, it will not run on the 64. I guess our name is mud!*

### Ham Aid

Here's an idea for a new column. It's a cross between *This Old House* and *On the Road*. It could be called *This Old Computer*. People would come up with ideas and you'd send an expert to give them a hand.

To start it off, I'd like to see some programs that help amateur radio hobbists—perhaps a calculator that gives you the number of turns and wire gauge needed for a radio-frequency coil. Maybe your expert could whip up a program that would help me receive teletype or ASCII signals over my shortwave radio.

TERRY M. SUTLIFF  
ORANGEVILLE, PA

*We have experts like you mentioned, Terry. They're called our readers. We'll be glad to pass on any tips they can provide.*

### Secret Color Memory on the 128

I have written a short and simple sketch program for my Commodore 128 running in graphic mode 4 (multicolor bitmap mode). I am having

trouble saving the picture after I draw it. When I BSAVE locations 7168–16384, it stores the picture and colors 0, 1, and 2, but not color 3. I know there must be a place where it is stored, because several colors for color 3 show up on the monitor. Can you help?

MATTHEW BOARDMAN  
CHESTER BASIN, N.S., CANADA

*In multicolor bitmap graphics, the information for color 3 is stored in color memory at 55296. On a 64, that's the end of the story. However, the 128 has two separate banks of color memory—one for the hi-res multicolor bitmap color 3 and the other for normal screen memory. In the simple sketch program that follows, locations 216 and 1 are manipulated to get at the bitmap color memory. The command POKE 216,255 turns off the screen interrupt that generates the split-screen display, while POKE 216,0 turns it back on. Memory location 1 contains a data direction bit that indicates read or write.*

*The program that follows is for the Commodore 128 and requires a joystick plugged into port 2. Use the number keys 0–3 to select a pen. Move the joystick to draw. Press + or – to change the pen color. Press C to clear the screen. Select color 0 or hold down the fire button to erase. Press L for load and S for save.*

*The program creates two files, distinguishable by their filename extension, for each picture saved. The 37-block file with the extension .BIT contains the bitmap and colors 0, 1, and 2. The 5-block file with the extension .COL contains the color 3 information.*

```
EX 100 REM SIMPLE 128 SKETCH P
      ROGRAM{2 SPACES}1/89 FE
      EDBACK
DC 110 GRAPHIC 4,1
JG 120 DIM C(3),DX(8),DY(8):C(
      0)=12:C(1)=7:C(2)=2:C(3
      )=15
HQ 130 DY(1)=-1:DY(2)=-1:DY(8)
      =-1
```

```
CP 140 DX(6)=-1:DX(7)=-1:DX(8)
      =-1
HJ 150 DY(4)=1:DY(5)=1:DY(6)=1
JB 160 DX(2)=1:DX(3)=1:DX(4)=1
QG 170 REM S = SPEED OF THE PE
      N
HE 180 S=3:FOR I=0 TO 8:DX(I)=
      DX(I)*S:DY(I)=DY(I)*S:N
      EXT
CS 190 MX=160:MY=160:CN=1
AP 200 X=MX/2:Y=MY/2:FOR I=0 T
      O 3:COLOR I,C(I):NEXT
AK 210 GRAPHIC 4,0:PRINT"{CLR}
      ":FOR I=1 TO 20:PRINT:N
      EXT
SH 220 PRINT"0,1,2,3 TO SELECT
      PEN"
RA 230 PRINT"+ -{5 SPACES}CHAN
      GE PEN COLOR"
FQ 240 PRINT"L LOAD{2 SPACES}C
      CLEAR"
QP 250 PRINT"S SAVE{2 SPACES}E
      EXIT;"
DM 260 REM MAIN LOOP
AF 270 T=JOY(2):IF T>0 THEN 31
      0
GC 280 REM GET KEY PRESS WHEN
      {SPACE}JOYSTICK IS STIL
      L
GX 290 GETA$:IF A$<>" " THEN 38
      0
JH 300 GOTO 270
RC 310 X2=X:Y2=Y
KB 320 F=T>127:T=T+F*128:F=1+F
RA 330 X=X+DX(T):Y=Y+DY(T)
HH 340 IF X>MX OR X<0 THEN X=
      X2
EQ 350 IF Y>MY OR Y<0 THEN Y=
      Y2
RH 360 DRAW CN*F,X,Y TO X2,Y2
EQ 370 GOTO270
DA 380 A=VAL(A$):IF A$="0" OR
      {SPACE}>A THEN CN=A:GO
      TO 270
HG 390 IF A$<>"+" THEN 430
CB 400 REM INCREASE PEN COLOR
DG 410 C(CN)=C(CN)+1:IF C(CN)>
      16 THEN C(CN)=1
JS 420 COLOR CN,C(CN):GOTO270
MS 430 IF A$<>"-" THEN 470
FF 440 REM DECREASE PEN COLOR
XQ 450 C(CN)=C(CN)-1:IF C(CN)<
      1 THEN C(CN)=16
JK 460 COLOR CN,C(CN):GOTO270
XA 470 IF A$="E" THEN GRAPHIC
      {SPACE}CLR:PRINT"{CLR}"
      :END
MD 480 IF A$="C" THEN GRAPHIC
      {SPACE}4,1:GOTO 210
MH 490 IF A$<>"S" THEN 600
CJ 500 REM SAVE FILE
HJ 510 GRAPHIC 0,0
EG 520 F$="":PRINT"{CLR}":INPU
      T"SAVE NAME";F$
JK 530 IF F$="" THEN 210
DS 540 F1$=F$+".BIT"
```

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# FEEDBACK

continued from page G-12

```

HH 550 F2$=F$+" .COL":GRAPHIC 4
,0
RS 560 BSAVE (F1$),B0,P7168 TO
P16384
BF 570 BANK 0:POKE 216,255:POK
E 1,PEEK(1) AND 254:BAN
K15
HR 580 BSAVE (F2$),B15,P55296
{SPACE}TO P56320
AG 590 POKE 216,0:POKE 1,PEEK (
1) OR 1:GOTO210
BP 600 IF A$<"L" THEN 270
KK 610 REM LOAD FILE
KB 620 GRAPHIC 0,0
QA 630 F$="":PRINT"{CLR}":INPU
T"FILENAME FOR LOAD ($
{SPACE}FOR DIR)":F$
JA 640 IF F$="" THEN 210
CB 650 IF F$="$" THEN GRAPHIC
{SPACE}0,0:DIRECTORY:GE
TKEYF$:GOTO630
FE 660 GRAPHIC 4,0
KP 670 BANK0:POKE 216,255:POKE
1,PEEK(1) AND 254
RJ 680 F1$=F$+" .BIT"
DK 690 F2$=F$+" .COL"
QE 700 BANK15:BLOAD (F2$),D0,P
55296
GH 710 BLOAD (F1$),D0,P7168
DS 720 GOTO210

```

## Plus/4 Software Sources

For readers who want sources of Plus/4 software, send me a self-addressed, stamped envelope. I will send them a list of suppliers plus information about a newly formed user group called the Plus/4 Forum. I just joined, and Forum will send new members a disk of public domain programs.

RONALD J. HARDCASTLE  
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JOHN H. COLVIN  
LOUISVILLE, KY

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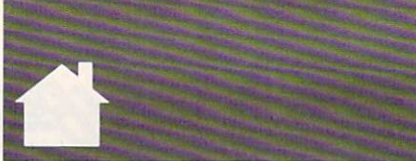
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# MACHINE LANGUAGE

J I M B U T T E R F I E L D

**T**he BIT command doesn't seem to fit in with the other 6502-based commands. It does a test that seems both complex and puzzling, and it has only two addressing modes: absolute and zero page.

BIT was designed to allow a program to quickly examine input/output (I/O) registers. Load a mask into the A register, matching the bit you want to test; execute the BIT instruction, addressing the I/O register you want to look at; then use the Z bit to tell you if you have a match.

No special addressing modes were added because designers felt that there'd be only a few I/O chips, each of which could be tested directly.

The BIT command automatically tests the two highest order bits of the selected address. No mask is necessary. The highest bit (bit 7) is copied to the N flag; a subsequent BMI will branch if this bit is set. And the second-highest bit (bit 6) is copied to the V (oVerflow) flag; a BVS will take the branch if this bit is set.

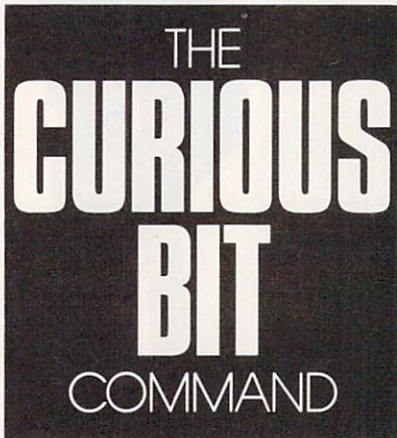
Bit 7 is tested because it's often used as the most important signal bit in a group. Interrupt registers often give it special status. Bit 7 is also used as a sign bit; turning on when the byte drops below 0.

Computer designers often put important connections at the two high bits so that they'll be easy to test with BIT. For example, the two most important input lines of the serial bus (serial in and clock in) are positioned in the two highest bits of the 6526 CIA #2 chip at address 56576 (\$DD00). We could monitor these with the BIT command without having to alter any data register—including the A register.

The formal description of the BIT command goes like this: The BIT instruction sets the N flag to the value of bit 7 of the memory being tested, the V flag to the value of bit 6 of the memory being tested, and the Z flag to the result of an AND operation between the A register and memory. (Z is set if the result is 0; otherwise it's

cleared.) We've looked at the N and V flags, but what's this AND situation?

Suppose we want to test the lowest bit (bit 0). We'd write LDA #\$01 followed by a BIT instruction with an address. The contents of the address will be ANDed with the value \$01; if its lowest bit is set, the result of the AND will be \$01 and the Z flag will be clear. Otherwise, if the lowest bit of the address is clear, the result of the AND will be \$00 and the Z flag will be set. Neither the contents of the A register nor the memory address will be changed; the AND operation is there solely for generating the right result in the Z flag. If the bit is set, the Z flag will be clear, and vice versa.



That was an example using one bit, but testing multiple bits is nearly as simple. Remember that *all* the matching bits in the memory address must be 0 in order for the Z flag to be set. If *any* of these bits are set, the Z flag will be cleared.

This example monitors register 653 (\$028D), which on the 64 signals whether any or all of three keys are being held down: SHIFT (value 1), Commodore (2), and CTRL (4). If more than one of these keys is being pressed, this location will contain the total of the numbers shown.

Here is a program that waits until *only* the Commodore key is pressed.

```
033C LDA #02
033E BIT $028D
0340 BEQ $033E
0342 RTS
```

Now, suppose I need to print an asterisk and a space character. The BIT instruction can be used to combine these into a single routine:

```
200E: A9 2A 2C A9 20 4C D2 FF
```

A subroutine at address \$2011, which is within the above memory range, might be seen as

```
2011 A9 20 LDA #20 ;space
character
2013 4C D2 FF JMP $FFD2 ;CHROUT
routine
```

It prints a space. The JMP instruction goes to a subroutine that will return directly to the routine that called \$2011. Let's look again as a program calls the routine at \$200E.

```
200E A9 2A LDA #2A ;asterisk
character
2010 2C A9 20 BIT $20A9 ;no
character
2013 4C D2 FF JMP $FFD2 ;CHROUT
routine
```

The BIT instruction does nothing; it changes no registers, and the status bits will not be used. Address \$20A9 is meaningless; there's really nothing of interest there. But note how that BIT opcode, \$2C, has managed to hide the instruction A9 20, which is located at address \$2011. This trick is used quite often in Commodore ROM code.

Let's put the above code into a BASIC driver and see it in action.

```
100 DATA162,0,32,14,32,32,17,32,232,224,
10,208
110 DATA245,96,169,42,44,169,32,76,210,255
120 FOR J=8192 TO 8213
130 READ X:T=T+X
140 POKE J,X:NEXT
150 IF T < >2333 THEN STOP
160 SYS 8192
```

The program prints a line of spaces and asterisks. Disassemble it and see how BIT works. □

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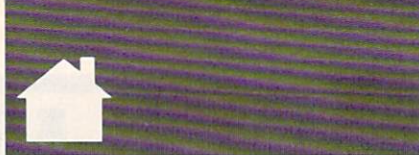
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# D'IVERSIONS

F R E D D ' I G N A Z I O

**H**ave you ever noticed how computers, keyboards, cameras, car phones, and CDs keep getting smaller? And how different devices are coming together—VCRs and cameras, CD players and boom boxes, computers and fax machines? Welcome to desktop fusion!

We are in an age of rampant miniaturization of everything electronic. For example, IBM scientists recently published a photo showing how they had lined up xenon atoms on a nickel surface to spell the company's name. Scientists hope that one day they'll be able to build ultrasmall computers that are just a few atoms wide.

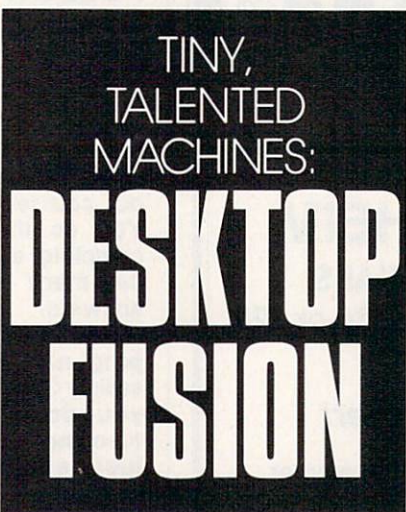
The process of miniaturization extends into the world of mechanical engineering as well. A new generation of *nanotechnologists* are attempting to shrink gears, electric motors, and pumps to microscopic size. They've achieved some remarkable successes.

Since more components can be squeezed into a smaller space, engineers could have let old machines continue to get smaller. Instead, they've begun combining older machines into new multifunction fusion machines that use the same space as older, single-purpose machines. But the fusion machines can do many more things and cost less than the combined price of the older machines. In fact, these new machines may be an entirely new species!

Take a look at computers. I bought one of the first Compaq portable computers years ago because I had to go to England to teach a summer-long course on robotics. Compaq called its machine a portable, but it was more like an old-fashioned, cast-iron sewing machine. By the time I had packed the portable into its case and strapped it around one shoulder and the portable Epson printer around the other shoulder, I resembled a guide on an expedition to climb Mount Everest. I had to walk slowly and stand perfectly straight. I didn't dare lean to one side for fear that I'd topple over and risk getting crushed by one of my "portable" machines.

Now companies are making computers many times more powerful than my old Compaq, and these machines weigh only a sixth as much. Some even fit into your pocket.

Take video cameras. Back in the 1970s along came the porta-pack—a camera and a VCR all in two boxes that you could carry on your shoulders. This was supposedly the dawn of the portable-video era. But the problem was that the porta-pack cameras were even heavier than my Compaq. Only big, husky people could become video whizzes in the early years.



Then the Japanese got into the act. Now the new Sony and JVC cameras combine the quality and functionality of a broadcast studio in a package the size of a kitten.

I once dreamed of my computer being like the sun, and I saw a constellation of other devices—video cameras, keyboards, CDs, VCRs, TVs, fax machines, telephones—swirling around the computer. In my dream, the devices came closer and closer until there was a blinding explosion.

The computer had swallowed all the other machines. It could now do what all the other machines did. It could take pictures and make phone calls. It could make copies and send faxes. It could record TV programs

and play stereo music.

But if it could do all these things, maybe it was no longer a computer. Maybe it was something more. If so, what was it? A Smart TV? A Teleputer? A MusiCopiCalcutron?

We've all seen those computer screens that supposedly represent the ideal graphic environment of the future. You know, the ones with little pictures of file folders, stacks of electronic paper, and cute little trash cans.

The metaphor for computers of the future is supposed to be the desktop. We are told this makes computers user-friendly. Noncomputer types are more comfortable and less anxious. Their computer screen looks like a tiny copy of the office with its filing cabinets, folders, and trash cans.

This is all very cute. And it does make computers more understandable. But it may also be inaccurate. It may be preparing us for a world of the past, not the future. The new fusion machines do not have to sit on a desktop. They are so portable they can be carried anywhere.

Already, the computer is not necessarily the machine that sits on a desktop. Camcorders are really highly sophisticated video computers. Musical keyboards are incredibly complicated audio computers. Portable scanners, modems, cellular telephones, CD players, and TVs are all computers, too.

As fusion machines get smaller, they blast off from the desktop and soar like tiny spacecraft into the rest of our lives. We're carrying them in our pockets, briefcases, and purses. We wear them in our ears, hang them on our shoulders. They're merging with cosmetic jewelry and becoming part of people's lifestyles. They are colored in pastels and stripes and are enveloped in fabrics such as denim and corduroy—like designer clothes.

In a world of tiny fusion machines, office furniture seems to be a clunky metaphor. Maybe it's time to turn to architects, biologists, dancers, and fashion designers for metaphors more timely, creative, and humane. □

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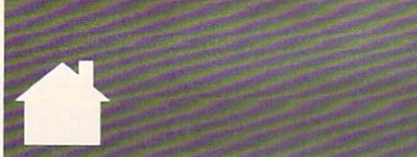
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# BEGINNER BASIC

L A R R Y C O T T O N

**S**prites are colorful shapes that are easily defined and controlled from BASIC on the 64 and 128. They can pop up anywhere on the screen and often manifest themselves in games as spaceships, aliens, or the like.

Sprites can be set up and manipulated independently of other items on the screen, such as text or character graphics (the figures on the front of the computer keys). In fact, they work very nicely with these, as illustrated by this month's exercise.

This month, I'll show you how straightforward programming sprites can be. We'll begin writing a short program which uses only one sprite, bearing in mind that the same techniques can be applied to display as many as eight sprites on the screen at once. Although this program isn't a game per se, you'll immediately see how to expand on your ability to program sprites in games or in other programs by using the simple BASIC commands that we've learned over the last few months. So, let's begin.

In addition to sprites, our program uses the 64's musical capabilities. We covered music in the July and August 1989 issues (also in the November and December issues), so you may want to refresh your memory by reviewing these columns.

We begin the program by clearing the sound (SID) chip's internal memory registers.

```
10 S=54272:FOR T=S TO S+24:POKE T,0:NEXT
```

Next, we'll set up the SID chip's

square wave and musical envelope (attack, decay, sustain, and release) for voice 1, and turn up the volume to the maximum setting.

```
20 POKE S+3,8:POKE S+5,12:POKE S+6,29:POKE S+24,15
```

Now, we'll clear the screen, color it and the border white, and draw a black musical treble-clef staff.

```
30 PRINT CHR$(147)CHR$(144):POKE 53280,1:POKE 53281,1
40 FOR T=1 TO 8:PRINT "{18 SPACES}{3 @}":NEXT
```

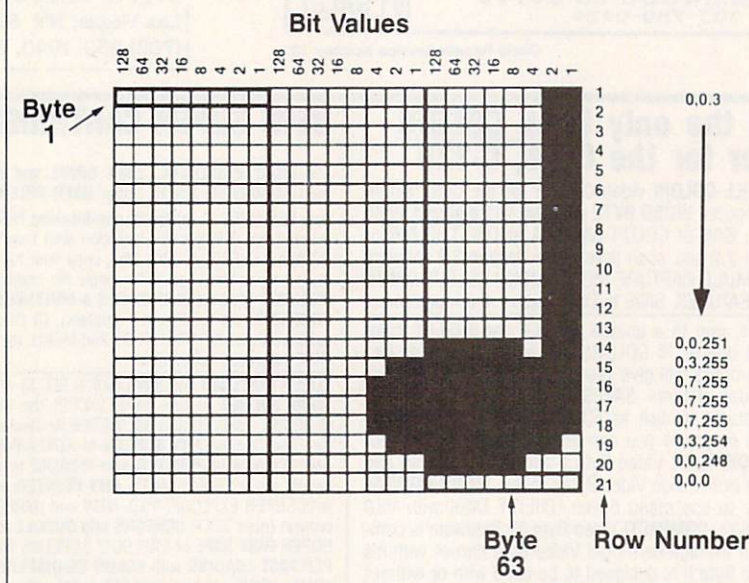
a group of 39 or so that begin at location 53248. When you program sprites, always start by defining that first memory register. The *Programmer's Reference Guide* calls it variable V, so we'll stick with that.

```
100 V=53248
```

Next, we'll define another variable, N, which will ultimately represent the vertical position of the sprite on the screen.

```
110 N=125
```

MUSICAL NOTE ON A SPRITE GRID



As you may recall, the 64's screen is composed of 64,000 individually addressable dots—called *pixels*—in a 320 × 200 (horizontal × vertical) matrix. The sprite can be located anywhere on the screen, although those near the borders may make the sprite invisible. The value 125 is the number of pixels the sprite will be offset from the top of the screen. We'll locate it horizontally in a moment.

Now comes the only tricky part, so pay close attention. We must define the

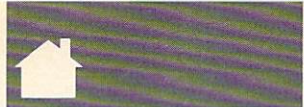
shape of the sprite, which in this program will be the symbol for a musical quarter note, which you can move up and down on the musical staff with the joystick. Naturally, appropriate sounds will emanate from your computer, corresponding to the position of the note on the staff. In other words, you'll be able to play a tune with the joystick.

Our ultimate goal is to generate 63 pieces of data that represent the sprite's shape, which we can POKE into certain memory registers in the computer. To create this data, it's

```
50 PRINT "{2 @}UI{35 @}"
60 PRINT "{2 @}BB{35 @}"
70 PRINT "{@}U+K{35 @}"
80 PRINT "{@}B+I{35 @}"
90 PRINT "{@}J+K{35 @}"
92 PRINT " JK{15 SPACES}{3 @}"
94 FOR T=1 TO 7:PRINT "{18 SPACES}{3 @}":NEXT
```

The program may be run at this point, so try it. The staff, which is composed of some graphics characters, will form the background for our sprite, which we'll create next.

Sprites are controlled by 12 non-consecutive memory registers, within



# BEGINNER BASIC

helpful to draw a grid such as the one shown in the accompanying figure. Then you must fill in the blocks according to the shape you want displayed on the screen. Last, add up the numbers above the blocks in the grid. Sound difficult? It's not.

Think of the grid as 21 rows of 24 tiny squares. Each row is divided into three groups of eight squares. Each group of eight squares represents one POKEable value (a byte). The first row, then, contains the first three bytes of the 63 pieces of data we need. The bytes in the grid are numbered as follows:

1	2	3
4	5	6

and so on, for 21 rows (21 rows times 3 bytes per row equals 63 bytes).

Note that the top of the grid is numbered, representing the corresponding bit value within each respective byte. Wherever a black square appears, the number above it—or bit value—should be added within that byte. For instance, bytes 1 and 2 are 0; no squares are blackened. Byte 3 contains only two blackened squares, under the numbers 1 and 2. Adding 1 and 2 yields 3, which, coincidentally, is the third piece of data for the sprite. In fact, for this sprite, the first 13 rows of the grid contain the numbers 0, 0, and 3. The maximum value a byte can hold, remember, is 255—the sum of 128, 64, 32, 16, 8, 4, 2, and 1. So, we READ and POKE the byte values in the sprite grid, as shown below.

```
120 FOR J=12288 TO 12350:READ
D:POKE J,D:NEXT
```

```
130 DATA0,0,3,0,0,3,0,0,3,0,0,3,0,0,3,
0,0,3,0,0,3,0,0,3,0,0,3,0,0,3
```

```
140 DATA0,0,3,0,0,251,0,3,255,0,7,255,0,7,
255,0,7,255,0,3,254,0,0,248,0,0,0
```

It has become customary to put the data for sprite 1 in memory locations 12288–12350, so we'll use them. If you're using less than four sprites, you might want to use locations 832–894 for sprite 1. Later, we'll tell the computer where to find the data.

We'll program the various sprite memory registers in a slightly different order from that used in the *Programmer's Reference Guide*. While the order isn't critical, it's more logical to assign the color and other parame-

ters before turning on the sprite.

First, we'll select the color for the sprite. Any color will do, so let's make it green. The color value for green is POKEd into register 53287 (use V+39 since we defined register 53248 as V in line 100).

## 150 POKE V+39,5

Next, we'll tell the computer where to look for the sprite data.

## 160 POKE 2040,192

If you put the data at 832–894, you'd POKE 2040,13 instead. The *Programmer's Reference Guide* goes into some detail about how to calculate this pointer value (13); we'll discuss it some more in a forthcoming column.

Memory register 53248 (V) happens to control the horizontal position of the sprite on the screen. We want it precisely 160 pixels from the left edge.

## 170 POKE V,160

Then we locate it vertically, using register 53249 and N, which was defined in line 110.

## 180 POKE V+1,N

Last but not least, we turn on the sprite using V+21. POKeing a 1 into this location turns on sprite 1.

## 190 POKE V+21,1

If you've been entering the program line by line, you're about to be rewarded. Run the program. If you haven't made any typing errors, the sprite, in the shape of a green quarter note, should now pop onto the screen, superimposed on a musical staff. Its position on the staff, the second space from the top, corresponds to a piano's C above middle C. At this point, be sure to save what you've typed in. In the next issue, we'll continue with this program and add some more features.

Next month, we'll move the note around with the joystick and play the notes which correspond to the sprite's position on the staff as we move it. We'll also go into more depth on positioning sprites, creating multiple sprites, and moving sprites at various speeds. □

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# PROGRAMMER'S PAGE

R A N D Y T H O M P S O N

**T**his month you'll find some special effects, a joystick routine, and corrections for two previous programs.

## Screen Fader

The following program fades out all of the text on the screen. Because the program relies on the computer's operating system to fill color memory, this routine will not work on some older 64s.

```
XS 10 POKE 53280,0:POKE 53281,
      0:POKE 646,1:POKE 648,24
      0
HX 20 FOR A=1 TO 6:READ C:POKE
      646,C:PRINT CHR$(147):N
      EXT
KM 30 POKE 648,4:POKE 646,1:PR
      INT CHR$(147)
CR 40 DATA 1,7,15,12,11,0
```

The color sequence used to fade the characters can be changed by altering the data in line 40. Each value (0-15) corresponds to one of the standard Commodore colors.

You may also change line 20 so that it reads the color values from memory instead of from DATA statements. For example, replace line 20's READ C:POKE 646,C instructions with POKE 646,PEEK(828+A), and the fade colors will be obtained from memory starting at location 828. This way, you don't have to use RESTORE before calling this routine for the second or third time.

CLINT KAWASAKI  
ALTUS, OK

## Earthquake

This short routine makes all of the characters on the screen shake back and forth.

```
ED 10 PRINT CHR$(147)TAB(14)"
      {DOWN}S H A K E!"
PH 20 FOR X=1 TO 10:FOR I=0 TO
      5:POKE 53270,(PEEK(5327
      0)AND248)+I:NEXT
QJ 30 POKE 53270,200:NEXT
```

You can use this code to produce explosion or earthquake effects.

JOHN SVOBODA  
SWARTZ CREEK, MI

## Improved 64 Joystick Handling

When I first started programming on the 64, I was irritated by the fact that using a joystick could scramble the keyboard and vice versa. So, I've devised a way to get around this problem.

The following BASIC program creates a short machine language subroutine that returns the value of a joystick in either port while filtering out

## READERS' TIPS ON QUAKES, FADERS, SPOOLERS AND MORE

any interference with the keyboard.

After running this program, you can read a joystick by issuing the command *joy=USR(port)*, where *port* is the desired joystick port (1 or 2) and the current value of that port is returned in the *joy* variable. This subroutine automatically inverts port bits 0-3 so that it returns the values recommended on page 344 of the *Commodore 64 Programmer's Reference Guide*. That is, the value of *joy* AND 15 equals 0 if there's no joystick movement, 1 for up, 2 for down, 4 for left, 5 for up and left, 6 for down and left, 8 for right, 9 for up and right, and 10 for down and right. If *joy* AND 16 equals 0, the fire button is being pressed.

```
MX 100 JJ=49152:JH=INT(JJ/256)
      :JL=JJ-JH*256:POKE 785,
      JL:POKE 786,JH
MQ 110 FOR K=JJ TO JJ+67:READ
      {SPACE}Y:POKE K,Y:NEXT
SR 120 DATA 120,70,97,176,21,1
      69,127,141
AX 130 DATA 0,220,173,1,220,20
      1,255,240
BH 140 DATA 4,169,31,208,13,17
      3,0,220
EC 150 DATA 16,8,169,255,141,0
      ,220,173
MD 160 DATA 1,220,41,31,73,15,
      208,4
MK 170 DATA 133,97,240,23,133,
      98,169,136
QB 180 DATA 133,97,169,0,133,9
      9,133,100
XA 190 DATA 133,101,133,102,19
      8,97,6,98
SH 200 DATA 16,250,88,96
```

This program stores the joystick routine's machine language in memory at 49152. If this address is inconvenient, change the value assigned to JJ in line 100.

TIM MACINTA  
FLINTSTONE, MD

## Printer Spooler

Ted Grondski wrote to point out an error in his printer spooler program that was published in June's column. Line 180 should be changed to read

```
180 POKE A+219,H:POKE
      A+78,H+1
```

This correction is necessary if you wish to change the program's starting address.

## Alpha Lock

Rev. Kenneth Cherry of Spring Grove, Pennsylvania, found an error in my May *Alpha Lock* program. The first value in line 300 should be a 20, not a 13. Without this change, the DEL key thinks it's a RETURN key whenever the alpha lock is activated.

*"The Programmer's Page" is interested in your programming tips and tricks. Send all submissions to The Programmer's Page, COMPUTE's Gazette, P.O. Box 5406, Greensboro, North Carolina 27403. We'll pay \$25-\$50 for each tip we publish.* □



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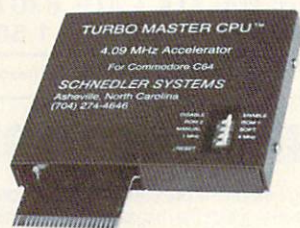
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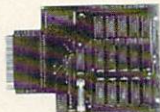
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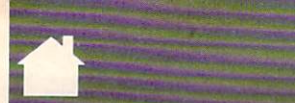
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Type in the *Proofreader* exactly as listed. Because the program can't check itself, type carefully to avoid mistakes. Don't omit any lines, even if they contain unusual commands. After you've finished, save a copy before running it.

Next, type RUN and press Return. When the program displays the message *Proofreader Active*, you're ready to type in a BASIC program.

Every time you finish typing a line and press Return, the *Proofreader* displays a two-letter checksum in the upper left corner of the screen. Compare this result with the two-letter checksum printed to the left of the line in the program listing. If the let-

ters match, it's almost certain the line was typed correctly. If not, check for your mistake and correct the line.

The *Proofreader* ignores spaces not enclosed in quotation marks, so you can omit or add spaces between keywords and still see a matching checksum. However, spaces inside quotes are significant, so the program pays attention to them.

The *Proofreader* does not accept keyword abbreviations (for example, ? instead of PRINT). If you use abbreviations, you can check the line later by LISTing it, moving the cursor back to the line, and pressing Return.

If you're using the *Proofreader* on the 128, do not perform any GRAPHIC commands while the *Proofreader* is active. When you perform a command like GRAPHIC 1, the computer moves everything at the start of

BASIC program space—including the *Proofreader*—to another memory area, causing it to crash. The same thing happens if you run any program with a GRAPHIC command while the *Proofreader* is in memory.

Though the *Proofreader* doesn't interfere with other BASIC operations, it's a good idea to disable it before running another program. The simplest way to disable it is to turn the computer off then on. A gentler method is to SYS to the computer's built-in reset routine (65341 for the 128, 64738 for the 64). These reset routines erase any program in memory, so be sure to save the program you're typing in before entering the SYS command.

When using the *Proofreader* with another utility, disable both programs before running a BASIC program.  see program listing on page 39

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# PROGRAMS

M A R I U S Z J A K U B O W S K I

The year is 2141 A.D. Ravaged by pollution, the planet Earth is now all but uninhabitable. For the past 50 years, scientists have desperately scoured the heavens for another planet to colonize. So far, they've had little success—until now. In a miraculous turn of events, a suitable planet has just been located in Section Pi. This oasis in the cosmic void is seen as man's last hope for survival.

After a careful survey of this planet, vestiges of a supreme alien culture are uncovered. Though the aliens were long ago destroyed by their own weapons, their robotic defense system remains intact and active. To make matters worse, this system is enclosed in eight tunnels below the surface of the planet. If our species is to survive, you must pilot a specially equipped fighter to the planet and destroy the robotic defense system.

## Getting Started

*Section Pi* is written entirely in machine language. To type it in, you'll need *MLX*, a machine language entry program. See "Typing Aids" elsewhere in this section. The *MLX* prompts, and the values you should enter, are as follows:

Starting address: \$1D4D

Ending address: \$3284

When you've finished typing, be sure to save the program to disk.

To play a game, plug a joystick into port 2 and type `LOAD "filename".8,1`, where *filename* is the name you used when you saved the program. After the program has loaded, enter the command `SYS 7501`. When the title screen appears, press the fire button to begin play.

## Playing the Game

The object of *Section Pi* is to blast your way through eight levels, or *stages*, of robotic attack. You begin the mission with four fighter craft. You must avoid or destroy the alien robot ships that you encounter, as well

as any debris that obstructs your path. Contact with either results in the loss of a ship. The game ends when you've lost all your fighters or you've completed the eighth stage.

The stage number, high score, and current score are displayed at the top of the screen. The number of ships remaining is shown below the stage number. For every 10,000 points you score, you're awarded an extra fighter. On the first stage, you receive 100 points for each robotic craft you de-

# SECTION PI

GET OUT YOUR  
PLASMA GUN AND  
START BLASTING IN  
THIS FAST-ACTION  
ARCADE-STYLE  
GAME FOR THE 64.  
JOYSTICK REQUIRED.

stroy. With each successive stage, you earn 50 additional points per robot. Each piece of the tunnel you vaporize is worth 10 points. The *level guardians*, or oversized alien robots, that appear at the end of each stage are worth three times the current point value of the smaller robots.

The robots that are found deep in the tunnels are built to withstand greater pressure and more severe temperatures. As a result, these robots require more shots before they're destroyed. You'll notice that these deep-level robots move more quickly, too.

## Words to Live By

There are several playing strategies you might like to try. When you come upon the level guardians, don't be discouraged. They'll attack your fighter in a chainlike formation that spans the entire width of a tunnel. To fly through them, destroy the robot on the outside of the formation first; then you can maneuver your craft through the remaining guardians.

At the higher stages, the robots require more hits to be destroyed. Again, to survive an attack, you must single out and destroy one robot in the formation and then fly through the vacated space.

When one of your ships has been destroyed, a new one will appear. For a brief moment, this ship is invincible. Be sure to use this time to take out as many robots as possible.

## Section Pi

```
1D4D:A2 00 0E 0E DC 86 FB 86 0B
1D55:FD A9 D0 85 FC A9 38 85 EF
1D5D:FE A9 33 85 01 A2 08 A0 83
1D65:00 B1 FB 91 FD C8 D0 F9 53
1D6D:E6 FC E6 FE CA D0 F2 A9 50
1D75:37 85 01 A9 1E 8D 18 D0 8F
1D7D:4C 37 1E A9 FB CD 12 D0 16
1D85:10 FB A6 02 CA 10 02 A2 F8
1D8D:07 86 02 AD 16 D0 29 F7 46
1D95:09 10 05 02 8D BC 2F E0 B7
1D9D:07 F0 03 4C E5 1D A2 0D B2
1DA5:A9 04 8D BB 1D 8D BE 1D DC
1DAD:A9 51 8D BA 1D A9 50 8D 2C
1DB5:BD 1D A0 00 B9 51 04 99 DE
1DBD:50 04 C8 C0 27 90 F5 18 C5
1DC5:AD BA 1D 7D 4F 2D 8D BA 06
1DCD:1D 8D BD 1D AD BB 1D 69 83
1DD5:00 8D BB 1D 8D BE 1D CE 2D
1DDD:BD 1D CA 10 D5 20 D3 2C 9B
1DE5:A9 FB CD 12 D0 30 FB 60 6E
1DED:AD 12 D0 C9 FB D0 F9 60 B1
1DF5:A9 01 8D 19 D0 A2 FB AC 3E
1DFD:BC 2F AD 12 D0 C9 FB 90 6F
1E05:15 A2 07 20 65 2B CA 10 D4
1E0D:FA AD 1F D0 8D E5 2F 20 A5
1E15:5D 2D A2 42 A0 C8 8E 12 1B
1E1D:D0 8C 16 D0 20 6A 2C 20 D7
1E25:5C 2B AD 0D DC 29 01 F0 5F
1E2D:06 20 47 2A 20 6B 25 4C 45
1E35:BC FE 20 45 20 20 EF 22 6B
1E3D:A2 2E BD DC 2D 9D 00 D0 8C
1E45:CA 10 F7 A9 0B 8D 86 02 22
1E4D:A9 93 20 D2 FF A2 18 BD EC
1E55:13 2E 9D 00 D4 CA 10 F7 44
1E5D:E8 86 02 A9 7F 8D 0D DC B3
1E65:A9 F5 8D 14 03 A9 1D 8D 6D
1E6D:15 03 A2 5F BD 7C 2D 9D 17
1E75:F8 38 CA 10 F7 A9 28 20 6D
```







# PROGRAMS

```

2CBD:C9 46 90 03 CE 01 D0 C0 AB
2CC5:01 D0 0A AD 01 D0 C9 E6 B4
2CCD:B0 03 EE 01 D0 60 CE F7 CA
2CD5:2F D0 2C AD BE 2F CD C0 69
2CDD:2F F0 19 AD 1B D4 C9 A0 68
2CE5:B0 12 AD C0 2F 8D BE 2F 39
2CED:AD 1B D4 4A 4A 69 28 8D F8
2CF5:F7 2F D0 0B AD BF 2F 8D 39
2CFD:BE 2F A9 78 8D F7 2F A9 92
2D05:04 8D 32 2D A9 77 8D 31 55
2D0D:2D A0 0D 18 B9 4F 2D 6D 1C
2D15:31 2D 8D 31 2D A9 00 6D 95
2D1D:32 2D 8D 32 2D AE C0 2F 85
2D25:AD 1B D4 D9 41 2D B0 03 78
2D2D:AE BE 2F 8E 77 04 18 88 E1
2D35:10 D9 A2 22 8E 77 04 E8 C7
2D3D:8E E7 07 60 FA FA C8 64 79
2D45:32 14 14 14 14 1E 3C 6E 81
2D4D:D2 FA 28 28 28 28 28 B1
2D55:A0 78 C8 28 28 28 28 14
2D5D:CE BD 2F D0 19 A9 04 8D 86
2D65:BD 2F AD 07 18 BD 40 39 A0
2D6D:4A 08 4A 28 90 02 09 40 99
2D75:9D 40 39 CA 10 EE 60 7E FD
2D7D:03 18 7E 18 30 7E 00 C0 C2
2D85:00 00 00 00 00 00 00 EB
2D8D:18 18 30 30 00 60 00 84
2D95:00 00 55 AA FF AA 55 55 EF
2D9D:AA FF AA 55 00 00 14 0C
2DA5:69 69 7D 7D 69 69 14 10 BF
2DAD:64 B9 64 14 19 6E 19 16 41
2DB5:5A 6B BF FE E9 A5 94 14 23
2DBD:69 BE BE BE BE 69 14 00 04
2DC5:00 50 50 00 00 00 00 3E
2DCD:50 00 00 00 00 05 00 64
2DD5:00 40 10 04 01 00 00 28 B2
2DDD:96 00 00 00 00 00 00 83
2DE5:00 00 00 00 00 00 00 40
2DED:1B 00 00 00 01 D8 00 1E 5F
2DF5:00 00 00 FF 00 00 00 50
2DFD:00 06 0E 03 03 06 0E 26
2E05:0E 0E 0E 0E 0E C2 C0 7D
2E0D:C0 C3 C3 C3 C3 0A 0A BA
2E15:05 05 10 33 CA 0A 0A 05 02
2E1D:05 80 00 F8 0A FF 05 05 0B
2E25:80 00 00 00 00 8F 00 E0
2E2D:00 00 00 00 01 01 01 97
2E35:FF FF FF 00 00 00 00 91
2E3D:00 00 00 00 01 FF 00 00 A1
2E45:01 FF 00 00 01 FF 00 13 3D
2E4D:92 9A 20 53 54 41 47 45 4E
2E55:20 9F 31 20 20 20 20 B3
2E5D:20 20 9A 48 49 9F 20 D2
2E65:20 20 20 20 20 20 20 C1
2E6D:20 20 9A 31 55 50 9F 20 93
2E75:20 20 20 20 20 20 20 D1
2E7D:9B 5F 5F 5F 20 20 20 43
2E85:20 20 20 20 20 12 9A 40
2E8D:20 53 45 43 54 49 4E 60
2E95:20 50 49 20 92 FF 02 02 DB
2E9D:03 02 01 02 02 02 01 59
2EA5:03 02 01 00 02 02 01 41
2EAD:02 02 02 02 02 01 03 09
2EB5:01 01 04 05 01 01 02 02 B5
2EBD:02 02 02 03 02 00 02 1E
2EC5:01 03 01 02 01 01 03 01 B6
2ECD:01 02 02 02 03 03 01 04 B5
2ED5:02 05 03 01 03 01 01 03 06
2EDD:03 01 00 01 03 02 02 02 32
2EE5:02 02 01 03 02 02 02 32
2EED:02 01 01 04 02 02 05 EC
2EF5:02 02 02 03 00 02 02 52
2EFD:03 03 01 01 02 02 01 03 E9
2F05:01 01 02 02 02 02 01 A1
2F0D:03 01 01 01 02 02 01 78
2F15:04 05 00 02 00 01 03 03 E3

```

```

2F1D:02 02 02 02 02 02 03 7C
2F25:01 02 02 03 00 01 02 03 FF
2F2D:03 01 01 01 04 02 05 02 B1
2F35:02 00 00 01 00 01 01 02 AC
2F3D:02 02 02 03 01 00 00 02 97
2F45:02 02 03 00 00 01 01 04 8F
2F4D:05 00 01 02 01 04 02 02 8C
2F55:02 02 02 04 05 00 02 00 E1
2F5D:01 02 02 02 02 02 00 04 39
2F65:05 01 C3 07 00 B4 03 0A 52
2F6D:02 D8 03 24 24 28 02 01 6C
2F75:0E 00 01 01 09 08 0F 0C 9D
2F7D:29 48 25 C4 06 0C 0B 0E F7
2F85:24 50 24 C1 0B 0E 0B 04 58
2F8D:28 40 22 C5 09 08 0F 0C 43
2F95:29 48 23 C3 06 0E 0B 0E C7
2F9D:20 50 24 C4 09 0A 0F 05 84
2FA5:29 48 24 C5 09 08 0F 0C 1E
2FAD:2A 50 25 C2 01 74 50 01 81
2FB5:C3 07 00 B4 03 0A 02 D8 20
2FBD:03 24 24 28 02 01 0E 00 DD
2FC5:01 01 00 00 00 00 00 3E 23
2FCD:00 00 00 00 00 00 00 2C
2FD5:00 00 00 00 00 00 00 34
2FDD:00 00 00 00 00 00 00 3C
2FE5:00 00 00 00 00 00 00 44
2FED:00 00 00 00 00 00 00 4C
2FF5:00 00 00 00 00 00 00 63
2FFD:20 20 20 00 00 00 00 78
3005:00 3B 00 00 E6 C0 00 3B A9
300D:00 00 00 00 00 00 00 6D
3015:00 00 00 00 00 00 0E C0 52
301D:00 39 B0 00 0E C0 00 00 55
3025:00 00 00 00 00 00 00 85
302D:00 00 00 3B 00 00 E6 C0 CF
3035:00 3B 00 00 00 00 00 64
303D:00 00 63 E6 F9 B0 E6 F9 D2
3045:B0 39 BE 6C 39 BE 6C 0E 96
304D:6F 9B 0E 6F 9B 39 BE 6C B0
3055:39 BE 6C E6 F9 B0 E6 F9 58
305D:B0 E6 F9 B0 E6 F9 B0 E6 81
3065:F9 B0 39 BE 6C 39 BE 6C 34
306D:0E 6F 9B 0E 6F 9B 39 BE 20
3075:6C 39 BE 6C E6 F9 B0 E6 60
307D:F9 B0 63 0F FF 00 15 55 E3
3085:50 2A AA A8 0F FF FF 00 F0
308D:E6 00 00 98 00 03 6E C0 94
3095:0E 79 B0 35 A0 EC EE C9 25
309D:3B A9 85 26 EE C9 3B 35 63
30A5:A0 EC 0E 79 B0 03 6E C0 1A
30AD:00 98 00 00 E6 00 0F FF 89
30B5:FF 2A AA A8 15 55 50 0F 2E
30BD:FF 00 63 00 00 00 00 8A
30C5:00 03 FF C0 0E AA B0 39 A8
30CD:55 6C 39 AA 6C E6 FF 9B 60
30D5:E6 C3 9B E6 3C 9B E6 EB 86
30DD:9B E6 D7 9B E6 EB 9B E6 7F
30E5:3C 9B E6 C3 9B E6 0F 9B 78
30ED:39 AA 6C 39 55 6C 0E AA D9
30F5:B0 03 FF C0 00 00 00 00 7B
30FD:00 00 63 00 00 00 00 4C
3105:03 B0 00 0E BC 00 3E 6F C7
310D:C3 F9 9E BE B6 ED 69 7B 4B
3115:3E 96 BC F3 EB CF BC 3C 67
311D:3E 7F C3 ED BC 3C 3E F3 1C
3125:EB CF 9E 96 BC ED 69 7B 8E
312D:9E BE B6 6F C3 F9 BC 00 DB
3135:3E B0 00 0E C0 00 03 00 CF
313D:00 00 63 30 03 00 EF 0E 15
3145:F0 BF CF BC EB BE 6C FB EB
314D:BB BF 3E EF BB 0F 9B FC 92
3155:03 EE B0 03 FF EC 0E EB F6
315D:BF 2F BE 6F 3E 6F BF 0F 78
3165:BF BF 0E FB BC 09 BE 6C 1C
316D:3E EF BC 3B FE F0 E6 F9 B9
3175:B0 EF FE EC 30 EF F0 00 FD

```

```

317D:FE C0 63 00 00 00 00 00 FB
3185:00 00 00 B0 00 00 C0 00 74
318D:80 00 02 B0 03 00 C0 38 4D
3195:00 00 20 20 0F 30 38 24 CB
319D:00 30 08 00 00 30 00 03 D0
31A5:00 00 00 00 38 30 00 20 AA
31AD:00 00 00 00 0C 00 0C 28 B0
31B5:00 00 1B 00 00 0C 00 00 AB
31BD:00 00 63 00 00 00 0C 03 A7
31C5:00 30 0D 80 03 C3 C0 00 86
31CD:F0 00 03 BC 30 00 F0 2C 64
31D5:30 00 D8 2C 38 EC D8 2E
31DD:30 AC E7 00 30 2F 30 0C 2B
31E5:3C 2C C0 00 18 00 00 EC 37
31ED:00 0C 00 30 3B 00 0C F7 40
31F5:00 00 E6 80 00 3B 00 00 2A
31FD:00 00 63 C0 0C 0C 00 3B A4
3205:00 03 07 C0 00 F2 00 00 E2
320D:B0 F0 03 EC EC 30 DF 6B 88
3215:EC E3 9C E7 0C F8 9A 6C E0
321D:0F E8 DB 00 3F 9B 2C 0C 8B
3225:EC EB 30 00 DC 00 03 2C 1A
322D:00 3B F0 00 EA C0 30 3A 73
3235:C0 0C E5 C0 00 36 00 00 9E
323D:00 00 63 00 0C 03 30 3B 1C
3245:0C 30 DB C3 0C EE F0 C3 35
324D:C3 E0 33 60 A8 3E 5B 9F CC
3255:ED 60 5E EB A3 9B A6 D7 04
325D:BF F8 E6 CC 3F 26 EF C3 BF
3265:A7 9B 00 EC EC 33 BC 3C 3D
326D:00 C9 FC CF E5 F0 3B E6 31
3275:AC 26 EA F0 FB 3E C0 0C 8C
327D:03 00 63 55 00 00 00 25

```

## TYPING AIDS

MLX, the machine language entry program for the 64 and 128, and *The Automatic Proofreader* are utilities that help you type in Gazette programs without making mistakes. These labor-saving utilities are on each Gazette Disk and printed in issues of Gazette through June 1990.

If you don't have access to a back issue or to one of our disks, write and we'll send you free copies of both of these handy utilities. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope.

Write to Typing Aids, COMPUTE!'s Gazette, 324 West Wendover Avenue, Greensboro, North Carolina 27408.



# PROGRAMS

## R. B. COOK

If you enjoy a good game of solitaire from time to time, then try your hand at *Line-Up*. This intriguing game of numbers will keep you entertained for hours.

In *Line-Up*, a deck consisting of 50 cards (five colored sets numbered 0-9) is randomly laid out in five rows. The object is to rearrange the cards so that they're in ascending numerical order in rows of the same color.

### Getting Started

*Line-Up* is written entirely in BASIC. To prevent typing errors, use *The Automatic Proofreader* to type it in. See "Typing Aids" elsewhere in this section. When you've finished typing, be sure to save a copy of the program.

To play a round, simply load and run the program. After a brief pause, the cards are shuffled and dealt for the first game.

### Playing the Game

*Line-Up*'s numbered cards are grouped into five different colors—red, blue, green, purple, and cyan. There are also 5 blank yellow cards. At the start of a game, the cards are dealt in five rows of 11 cards each. Your goal is to arrange the cards in each row by color while at the same time placing them in ascending numeric order, beginning with 0. You do this by repeatedly swapping a blank card with a numeric card.

Your current position is marked by a large, target-shaped cursor that appears on one of the blank cards. To move the cursor to the next available blank card, press the space bar. You can move to any one of the five blank cards unless it follows a 9 card or another blank card.

When you're ready to move a card, press Return. The blank card will change positions with the numeric card that's the same color as and one number higher than the card just to the left of the blank. For example, if the card to the left of the blank card is a red 4, then the blank card will be exchanged with the red 5. Using this process, you can eventually move the

cards into the correct order.

If you attempt to swap a card at the beginning of a row, you'll be asked to select a color with which to start the row. Press R (red), G (green), B (blue), P (purple), or C (cyan). After you've chosen the color, the 0 card in that color is exchanged with the blank card.

# LINE-UP

LOOKING FOR A  
NICE, QUIET GAME  
OF SOLITAIRE? LINE-UP  
FOR THE 64 MAY BE  
JUST WHAT THE  
DOCTOR ORDERED.

When no more swaps are possible, the program reshuffles the remaining cards. You have five deals to place the cards in order before the game ends.

### Line-Up

```
HQ 10 REM COPYRIGHT 1990 COMPU
TE! PUBLICATIONS, INC. -
ALL RIGHTS RESERVED
AE 20 GOSUB 680:GOSUB 620:GOSUB 4
70
DQ 30 PL=0:FORL=RWTO4:FORK=CLT
O10
KJ 40 IFLO (L,K) <50 THEN 110
DG 50 IFK>0 THEN IFRIGHT$(STR$(L
O(L,K-1)),1) = "9" OR LO(L,K
-1) > 49 THEN 110
QA 60 PL=1:T=K*24+27:IFT>255TH
ENT=T-256
EQ 70 POKESX,T:POKESM,-(K>9):P
OKESY,L*24+116:POKEVL,0:
POKEVL,15:POKESP,1
AH 80 POKE198,0:WAIT198,1:GETG
$
FG 90 IFG$=CHR$(13) THEN GOSUB 29
0:MV=MV+1
ED 100 POKESP,0
EA 110 NEXT:NEXT:IFPL THEN 30
PQ 120 NC=0:LC=0:FORL=0TO4:FOR
K=0TO10
```

```
MD 130 IFK>0 THEN IFLO (L,K-1) +1 <
>LO (L,K) THEN 150
PK 140 IFVAL (RIGHT$(STR$(LO (L,
K)),1)) = K AND LO (L,K) < 50 T
HEN 160
MD 150 TB (L) = K:FORJ=KTO10:DK (N
C) = LO (L,J):NC=NC+1:NEXT
:K=10
QE 160 NEXT:NEXT:IFNC=50 OR DL=5T
HEN 180
XA 170 GOSUB 470:GOTO 30
BK 180 SC=0:FORL=0TO4
BF 190 IFLO (L,0)/10>INT (LO (L,0
)/10) THEN 220
HC 200 T=5-VAL (LEFT$(STR$(LO (L
,0)),2))
QS 210 SC=SC+TB (L)*T*10-(TB (L)
=10)*100
HS 220 NEXT
BS 230 SC=SC-MV*5-DL*100:IFSC<
0 THEN SC=0
KC 240 IFSC>HSTHENHS=SC
FQ 250 PRINT "{HOME}{4 DOWN}" CL
$:PRINTTAB (8) "{UP}{YEL}
SCORE {WHT}" SCTAB (22-(HS
<1000)) "{YEL}HIGH{WHT}"
HS
KM 260 FORL=0TO5:GOSUB 440:GOSU
B 450:NEXT
PB 270 PRINTTAB (8) "{DOWN}PRESS
ANY KEY TO REPLAY"
DD 280 POKE198,0:WAIT198,1:SH=
0:DL=0:MV=0:GOSUB 620:GO
SUB 470:GOTO 30
ER 290 IFK>0 THEN T=LO (L,K-1) +1:
GOTO 340
MS 300 PRINT "{HOME}{6 DOWN}" CL
$:PRINTTAB (14) "{UP}
{YEL}WHICH COLOR?{UP}":
GOSUB 450
QR 310 POKE198,0:WAIT198,1:GET
G$
JM 320 FORJ=1TO5:IFG$<>MID$( "R
BGPC",J,1) THEN NEXT:GOSU
B 420:GOTO 310
EX 330 T=J*10-10:PRINTCL$
JC 340 POKESP,0:FORJ=0TO4:FORH
=0TO10
EH 350 IFLO (J,H) <>T THEN NEXT:NE
XT
PK 360 PRINTLEFT$(CD$(9+L*3)TA
B(K*3+3)CC$(LO (J,H))TH$
CD$(LO (J,H))BH$
BF 370 PRINTLEFT$(CD$(9+J*3)TA
B(H*3+3) "{YEL}" TH$CD$(5
0)BH$:GOSUB 400
PD 380 T=LO (L,K):LO (L,K) = LO (J,
H):LO (J,H) = T
PX 390 RETURN
PR 400 POKEAT,10:POKESR,73:POK
EWV,17:POKEHF,50:POKELF
,0
EA 410 FORI=1TO333:NEXT:POKEWV
,16:RETURN
PX 420 POKEHF,5:POKEAT,0:POKES
```







# PROGRAMS

H U B E R T C R O S S

**Y**our 64's Sound Interface Device (SID) chip is a very capable instrument. It can play up to three sounds at once, each with its own envelope. It can also filter the voices and combine them synthetically for enhanced effects.

Now, *Sound Master* offers you even greater control over the SID chip. With this sound-effects editor, you can completely program the first 160 jiffies of each sound. (A jiffy is 1/60 second.) For instance, you can start a sound with a sawtooth waveform on voice 1, change it to a noise waveform 10 jiffies later, turn on the filter 5 jiffies later, and finally turn on voice 2. While all this is going on, you can also continuously change each voice's frequency and pulse width or the filter frequency and resonance.

When you've finished designing, *Sound Master* saves your sounds to disk or creates an interrupt-driven sound routine you can add to your own programs. For greater flexibility, *Sound Master* lets you place this routine anywhere in memory and include up to 32 separate sounds with it.

## Getting Started

This article assumes that you have some familiarity with the SID chip. If you need further information on programming sound on the 64, *Mapping the 64* (by Sheldon Leemon) and *All About the Commodore 64, Volume 2* (by Craig Chamberlain), from COMPUTE Books, and *The Commodore 64 Programmer's Reference Guide* are excellent places to start. If you don't have any experience with the SID chip, you may also want to read Larry Cotton's "BASIC for Beginners" column in the July and August 1989 issues of *Gazette*.

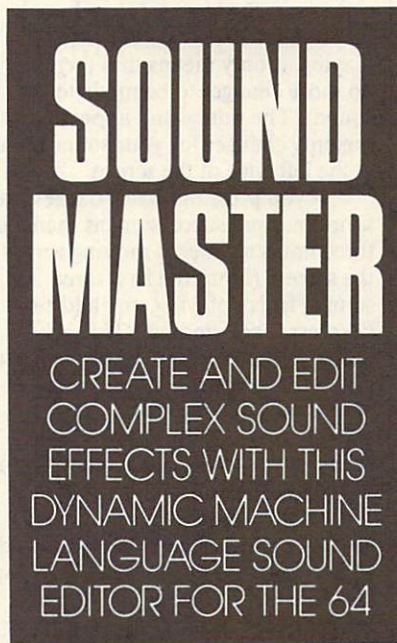
To use *Sound Master*, first type it in using *MLX*, a machine language entry program. See "Typing Aids" elsewhere in this section. Load and run *MLX*. When *MLX* prompts you, respond with the values given below.

Starting address: 0801  
Ending address: 1F38

When you've finished typing in the program, be sure to save a copy to disk.

To get started, plug a joystick into port 2 and then type LOAD "*filename*",8, where *filename* is the name that you used when you saved the program. To activate *Sound Master*, type RUN and press Return. The program's main screen will appear with the following menu options.

(L)oad File  
(S)ave File  
(E)dit File  
(C)lear Sound  
(Q)uit to BASIC  
(M)L Routine



The first two options, Load and Save, allow you to store and recall the sound files that you've created. When you press L or S, *Sound Master* prompts you for a filename. Enter the name of the sound file you wish to load or save. If you're loading a file, *Sound Master* searches the disk in drive 8 for the file you've requested. If you're saving, it stores the file on the disk in drive 8. In either case, a disk error will cause the program to

prompt you with the message *Disk Error: Try again? (Y/N)*. If you respond by pressing Y, *Sound Master* tries the load or save again; otherwise, it returns you to the menu.

## Editing Sounds

Pressing E from the main menu places you in the sound editor. The editor's main screen contains a list of the available edit screens and the number keys used to access them (see the following table).

### Available Edit Screens

- 1 Voice 1 Frequency
- 2 Voice 2 Frequency
- 3 Voice 3 Frequency
- 4 Voice 1 Pulse Width
- 5 Voice 2 Pulse Width
- 6 Voice 3 Pulse Width
- 7 Filter Frequency
- 8 Filter Resonance
- 9 Sound Points

To begin editing, press 1, 2, or 3 to set the frequency for a specific voice. If you've already loaded a sound file, you'll see a line drawn across the bottom of the screen, indicating how the sound changes over the 160-jiffy time interval. If you're programming a new sound, the frequency will be undefined. The first point at the left side of the screen represents the first jiffy of your sound; the point on the far right represents the 160th jiffy.

In addition to the frequency line, you'll also see a pointer on the screen. Press the joystick left or right to move the pointer over the range of the sound interval. To raise or lower the frequency, press the joystick up or down, respectively.

The frequency line always follows the pointer as you move it about the screen. You can anchor it at a particular point by pressing the fire button. After you've defined a few points, press the space bar to hear the new sound. (If you haven't loaded another sound or haven't set some of the other parameters, you may not hear anything.)



# PROGRAMS

If you change your mind about a point you've set, press the S key until the pointer is on the point that you want to change. Then press M to move it using the joystick, or press the Del key to remove it entirely.

## Editor Commands

### Screens 1-8

Keypress	Function
S	Select point
M	Move point
Del	Delete point
Run/Stop	Exit to main menu
Space bar	Play sound
1-9	Display screens 1-9
Fire	Add point to line

### Screen 9

Keypress	Function
Crsr keys	Move around windows
+/-	Increment/decrement parameter
I	Copy to buffer
O	Restore from buffer
S	Select sound point
Space bar	Play sound
Run/Stop	Exit to main menu
1-8	Display screens 1-8
Shift-	
Clr/Home	Clear parameter windows
Fire	Pick up/place points

You don't have to define a voice's frequency for every jiffy of the time interval; it can begin and end at any time. You can even leave the frequency undefined for the entire interval.

The other edit screens, selected with keys 4-8, allow you to set a voice's pulse width or the filter frequency and resonance for all three voices. Each of these edit screens is similar to the one just described, and each has a joystick and keyboard interface for setting the parameters.

## Creating Your Own Sounds

Edit screen 9, Sound Points, lets you define the remaining sound parameters for each voice. Again, the joystick and keyboard are your interface for entering points, only this time, there are four parameter windows associated with each point and additional keystrokes for fine-tuning each voice.

To set a sound point, use the cursor keys to move around the parameter windows; then use the + and - keys to change the parameter values. When the parameters are set to your

liking, press the joystick left or right to position the point along the time interval and press the fire button to set it.

If you want to see the contents of an existing point, select it with the S key and then press the fire button. This deletes or picks up the point and copies its contents to the parameter windows. You can restore the point by pressing the fire button again without moving the joystick.

To save the contents of the parameter windows to a temporary buffer—the Into buffer—press I. Press O to restore the values to the windows or press Shift-Clr/Home to clear them.

To test your sound at any time, press the space bar. A sound note appears at the left edge of the screen (time = 0 jiffies) and moves toward the right border (time = 159 jiffies). The note may disappear before it reaches the right border if the program determines that there are no more changes in the sound. (This doesn't mean that the sound has finished playing, it only means that there are no more changes to be made to the sound.) The note won't appear at all if the only changes for your sound occur at the left edge of the screen.

If you press the space bar several times in rapid succession, as many as three notes will begin moving across the screen. (Until the first three sounds finish playing, any additional keypresses are ignored.) This is because *Sound Master* can handle up to three different sounds at once. If you're careful while creating your sounds, you'll be able to activate all three voices at the same time without conflicts.

When you set a parameter for a sound point and then play the sound, that parameter is sent to the SID chip even if it's the same value sent by a previous point. To pass a parameter through a point without changing it, set it to the blank or no-change position. For most sound points, you'll probably leave most of the parameters blank. For example, say you'd set the voice 1 gate, wave, attack, decay, sustain, and release values at the beginning of a sound and later turn off the gate to start the release cycle of the sound. The best way to accomplish this is to set only the gate parameter in the second sound point. The remaining parameters don't need to be

changed and should be left blank. If you follow this advice you'll also save a lot of memory when you create a sound routine.

When you're ready to exit the sound editor, press Run/Stop. Pressing this key at any time during the editing process will return you to the main menu.

## More Menu Options

The next two menu options, Clear Sound and Quit to BASIC, allow you to clear the current sound from memory and exit the program, respectively. Be careful with these commands because a single keystroke could wipe out hours of hard work.

The last menu option, ML Routine, allows you to combine several sounds into a stand-alone sound routine. Before you begin, be sure that you have saved on disk all of the sounds that you want to use and know what their filenames are. Once you've done that, press M at the main menu.

*Sound Master* prints the number of the sound that you're loading (you can place up to 32 in one sound-routine file) and asks for the first filename. Enter the name of the sound file and press Return. After the file loads, the program asks ADD MORE SOUNDS?. Press Y to add more sounds to the file or N to continue.

When you've finished selecting sound files, *Sound Master* prompts you for the starting address of the sound routine. Enter a value in the range 512-53248. Next, type the filename for the sound-routine file and press Return. The program will save the file and return you to the main menu.

To play the sounds from a sound-routine file, load it from disk with a command similar to LOAD "filename",8,1. Next, activate the sound routine with SYS start, where start is the starting address of the sound routine. To begin playing a sound, POKE 2,n, where n is the sound number (1-32). As we mentioned earlier, you can have up to three sounds active at the same time; any sounds activated after the first three are ignored.

The sound routine is short and should work with most other programs. However, it won't work with programs that use locations 2 and 3 or locations 886-1023. Also, programs



# PROGRAMS

that redirect the IRQ interrupt vector  
may not work with *Sound Master*.

## Sound Master

```

0801:0A 08 00 00 9E 32 30 36 6C
0809:31 00 00 00 A9 22 8D FE A1
0811:FF A9 08 8D FF FF D0 22 29
0819:68 85 01 68 A8 68 AA 68 0A
0821:40 48 8A 48 98 48 A5 01 6B
0829:48 A9 08 48 A9 19 48 08 97
0831:48 48 48 A9 37 85 01 4C 39
0839:23 0A 78 A9 23 8D 14 03 81
0841:A9 0A 8D 15 03 58 20 74 D9
0849:10 20 96 12 20 4E 10 20 D7
0851:B8 14 20 E2 1D A9 87 20 B3
0859:17 11 A9 C7 20 17 11 A2 0D
0861:04 BD F7 08 9D F8 8B 9D E7
0869:F8 CB A9 01 9D 27 D0 A9 03
0871:55 95 5C CA 10 EB A9 FC 4A
0879:A0 08 20 1E AB A9 45 CD 1E
0881:36 1F F0 06 8D 36 1F 20 96
0889:4C 19 20 E4 FF C9 4C D0 E8
0891:06 20 E3 18 4C 77 08 C9 C4
0899:4D D0 09 20 DD 19 20 4C 87
08A1:19 4C 77 08 C9 53 D0 06 04
08A9:20 27 19 4C 77 08 C9 45 30
08B1:D0 12 20 68 18 20 55 09 2E
08B9:20 ED 17 20 75 12 20 81 EF
08C1:FF 4C 60 08 C9 43 D0 24 92
08C9:A9 D8 A0 08 20 4B 1B D0 AE
08D1:A5 20 4C 19 4C 77 08 D0 35
08D9:41 52 45 20 59 4F 55 20 9C
08E1:53 55 52 45 3F 20 28 59 B3
08E9:2F 4E 29 00 C9 51 D0 9A 1A
08F1:20 DF 17 4C 44 E5 1C 1D C0
08F9:1E 1E 1E 93 11 20 12 4C 17
0901:92 4F 41 44 20 46 49 4C 95
0909:45 D0 20 12 53 92 41 56 E3
0911:45 20 46 49 4C 45 D0 20 DC
0919:12 45 92 44 49 54 20 53 4B
0921:4F 55 4E 44 D0 20 12 43 8E
0929:92 4C 45 41 52 20 53 4F 5D
0931:55 4E 44 D0 20 12 51 92 59
0939:55 49 54 20 54 4F 20 42 37
0941:41 53 49 43 D0 20 12 4D 80
0949:92 4C 20 52 4F 55 54 49 A2
0951:4E 45 D0 00 20 01 14 20 CA
0959:41 12 20 A2 1D A9 07 8D E9
0961:20 D0 A9 00 8D 21 D0 20 9F
0969:B4 0A A9 00 A0 3D 99 D0 98
0971:9D 88 10 FA 85 72 20 68 C4
0979:18 38 66 6F 4C 86 09 8A 82
0981:60 C9 03 F0 FB 20 8C 09 28
0989:4C 82 09 20 E4 FF AA C9 CB
0991:3A B0 EC C9 31 90 E8 E9 AE
0999:30 C5 72 F0 E2 85 71 68 0B
09A1:68 20 86 D0 A9 00 8D 15 0F
09A9:D0 A6 72 E0 09 F0 06 20 62
09B1:09 0B 4C BF 09 20 B4 0A CC
09B9:20 41 12 20 89 14 20 C3 11
09C1:13 A6 71 86 72 E0 09 F0 B7
09C9:03 20 40 0B 20 41 12 A6 EE
09D1:71 20 E4 09 20 89 14 A5 C6
09D9:71 C9 09 F0 03 4C BF 0E 1E
09E1:4C 5C 0B 48 8D 10 0A 8D E6
09E9:7B 13 8E 00 0A A2 0C 86 C9
09F1:63 A0 27 A9 20 20 6C 13 CA
09F9:20 24 13 88 10 F7 A2 00 B5
0A01:BD 19 0A 85 62 BD 26 1C 46
0A09:BC 34 1C 20 AF 13 68 60 09
0A11:22 55 66 22 55 66 44 44 8B
0A19:77 0C 0C 0C 0B 0B 0C D4
0A21:0C 0E A2 02 BD 7B 03 95 AA
0A29:57 20 8F 0A E8 E0 05 D0 29
0A31:F3 BE 27 D0 EE 28 D0 AD 54

```

```

0A39:00 DC 85 03 46 03 B0 03 08
0A41:20 7B 0A 46 03 B0 03 20 EA
0A49:78 0A 46 03 B0 03 20 6A 51
0A51:04 46 03 B0 03 20 67 0A D8
0A59:46 03 66 8E A5 28 30 50 85
0A61:20 8D 0A 4C B1 0A A9 01 F8
0A69:2C A9 FF 18 65 57 C9 A0 3C
0A71:B0 04 85 57 46 28 60 A9 42
0A79:01 2C A9 FF 18 65 5C C9 27
0A81:68 90 08 C9 C8 B0 04 85 22
0A89:5C 46 28 60 A2 00 8A 0A 9C
0A91:A8 B5 57 69 0B 0A 99 00 9C
0A99:D0 AD 10 D0 3D 01 1C 90 47
0AA1:03 1D F9 1B 8D 10 D0 B5 73
0AA9:5C 18 69 32 99 01 D0 60 15
0AB1:4C FC 1D A2 00 8E EE 0A 1B
0AB9:BD BA 0E 8D 7B 13 BD A6 40
0AC1:0E 8D DC 0A BD AB 0E 8D C2
0AC9:DA 0A BD B0 0E 8D E5 0A 0D
0AD1:BD B5 0E 8D EA 0A A9 20 BF
0AD9:A2 01 A0 09 20 6C 13 20 1D
0AE1:24 13 C8 C0 1F D0 F5 E8 03
0AE9:E0 0B D0 EE A2 00 BD A6 71
0AF1:0E 85 62 8D A1 13 BD AB 14
0AF9:0E 85 63 BD 22 1C BC 30 E9
0B01:1C 20 8F 13 AE EE 0A 60 F5
0B09:A6 72 F0 FB E0 09 F0 F7 F1
0B11:AD 27 7B 48 24 6F 30 08 03
0B19:CE 27 7B 20 08 10 A6 72 12
0B21:AD 27 7B 9D 27 7B 8A 18 75
0B29:69 7B 8D 35 0B A0 00 B9 6C
0B31:31 7B 99 30 7B C8 D0 F7 0D
0B39:68 8D 27 7B 4C 08 10 BD E3
0B41:27 7B 8D 27 7B 8A 18 69 8D
0B49:7B 8D 51 0B 0A 00 B9 30 04
0B51:7B 99 30 7B C8 D0 F7 38 FA
0B59:66 6F 60 A9 5B 85 5C 78 47
0B61:20 8D 0A 58 A2 01 20 B6 C1
0B69:A0 E8 E0 05 D0 F8 A9 1F 08
0B71:8D 15 D0 A9 80 8D 8A 02 99
0B79:20 C1 D0 A2 0E A0 09 A9 8A
0B81:33 20 24 13 A0 16 A9 34 D3
0B89:20 24 13 A0 23 A9 35 20 6F
0B91:24 13 A9 04 85 A3 A9 00 02
0B99:85 FE 20 A4 80 24 8E 30 C6
0BA1:05 78 20 F1 0C 58 20 8C 0A
0BA9:09 F0 F2 C9 03 F0 24 C9 69
0BB1:20 D0 21 20 BA 0B 4C 9E 6B
0BB9:0B A9 77 8D C1 17 8D 37 44
0BC1:1F A9 1F 8D C2 17 8D 57 73
0BC9:1F 20 F7 14 A9 01 8D 9B BF
0BD1:1E 85 02 60 A4 FE A6 A3 B0
0BD9:09 91 D0 05 CA E0 0D 90 28
0BE1:1B C9 11 D0 05 E8 E0 D0 C1
0BE9:90 12 C9 1D D0 05 C8 C0 C4
0BF1:03 90 09 C9 9D D0 0F 88 42
0BF9:C0 03 B0 A1 84 FE 86 A3 32
0C01:20 A4 0D 4C 9E 0B C9 2D 9A
0C09:D0 1F 20 F6 D0 A4 A3 BD C4
0C11:DD 9D 10 0C 38 E9 01 D9 87
0C19:29 16 B0 2A A9 00 F0 26 59
0C21:B9 99 0E 38 E9 01 4C 47 F4
0C29:0C C9 2B D0 24 20 F6 D0 C8
0C31:A4 A3 BD DD 9D 10 0C 18 77
0C39:69 01 D9 99 0E 90 07 A9 85
0C41:00 F0 03 B9 29 16 9D DD 4C
0C49:9D 29 7F 20 2A 0E 4C 9E 2D
0C51:0B C9 49 D0 0E A2 1E BD 8C
0C59:DD 9D 9D FC 9D CA 10 F7 7B
0C61:4C 9E 0B C9 4F D0 0E A2 C1
0C69:1E BD FC 9D DD 9D CA E3
0C71:10 F7 20 C1 0D C9 93 D0 37
0C79:10 A2 1E A9 00 9D DD 9D 70
0C81:CA 10 FA 20 C1 0D 4C 9E DD
0C89:0B C9 53 D0 1A A5 06 F0 75
0C91:16 E6 FD A6 FD E4 06 90 B8

```

```

0C99:04 A2 00 86 FD 20 6A 0D 17
0CA1:85 57 78 20 8D 0A 58 4C F4
0CA9:9E 0B E4 06 F0 2C A5 F7 4C
0CB1:85 F9 A5 F8 85 FA A5 F9 AC
0CB9:18 69 20 85 F9 90 02 E6 91
0CC1:FA A0 1F B1 F9 91 F7 88 0D
0CC9:10 F9 A5 F7 18 69 20 85 C8
0CD1:F7 90 02 E6 F8 E8 E4 06 F3
0CD9:D0 DC C6 06 60 A0 1F B1 40
0CE1:F7 99 DC 9D 88 D0 F8 20 6B
0CE9:AB 0C 20 C1 0D 4C 0F 0D BF
0CF1:20 42 0D B0 E8 A6 06 E0 26
0CF9:40 B0 32 A0 1F B9 DC 9D E5
0D01:91 F7 88 D0 F8 A5 57 91 9E
0D09:F7 E6 06 A9 02 2C A9 00 48
0D11:85 8F A5 61 48 A9 A0 20 E6
0D19:2F 0D A9 E0 20 2F 0D 68 91
0D21:85 61 AD 00 DC 29 10 F0 A8
0D29:F9 A9 80 85 8E 60 85 61 75
0D31:A5 57 85 22 85 24 A9 58 2F
0D39:85 23 85 25 E6 25 4C 57 9D
0D41:11 A9 27 85 F7 A9 73 85 5E
0D49:F8 A5 06 F0 1A A2 00 A0 15
0D51:00 B1 F7 C5 57 F0 11 A5 79
0D59:F7 18 69 20 85 F7 90 02 D3
0D61:E6 F8 E8 E4 06 D0 E8 18 F5
0D69:60 A9 00 85 F8 8A A0 05 AE
0D71:0A 26 F8 88 D0 6A 69 27 2E
0D79:85 F7 A5 F8 69 73 85 F8 B5
0D81:A0 00 B1 F7 60 78 A5 57 29
0D89:48 A6 06 CA 30 10 8E 9B 59
0D91:0D 20 6A D0 85 57 20 0C 2E
0D99:0D A2 00 4C 8C D0 68 85 96
0DA1:57 58 60 20 F6 0D 20 2A E1
0DA9:0E A5 B4 0A 0A 69 0F 85 05
0DB1:58 A5 B5 0A 0A 85 5D 99
0DB9:A2 01 78 20 8F 0A 58 60 2C
0DC1:A5 FE 48 A5 A3 48 A2 0C 61
0DC9:86 A3 A0 02 84 FE 20 F6 9B
0DD1:0D 20 2A 0E C6 FE 10 F6 E9
0DD9:C6 A3 A5 A3 C9 04 B0 EA D9
0DE1:A0 00 84 FE 20 F6 D0 20 E3
0DE9:2A 0E C6 A3 10 F6 68 85 62
0DF1:A3 68 05 FE 60 A5 A3 C9 43
0DF9:04 B0 0D A9 14 85 B4 A5 44
0E01:A3 AA 18 69 04 85 B5 60 35
0E09:A5 FE 0A 65 FE 8D 1D 0E C5
0E11:0A 8D 1F 0E 0A 65 FE 69 A7
0E19:09 85 B4 A9 00 69 00 65 57
0E21:A3 AA A5 A3 69 0B 85 B5 60
0E29:60 A5 B4 85 62 A5 B5 85 68
0E31:63 BD DD 9D 30 02 A9 18 F8
0E39:29 7F A8 B9 4E 0E 20 02 67
0E41:13 B9 67 0E 20 02 13 B9 0C
0E49:80 0E 4C 02 13 32 32 32 CA
0E51:32 32 32 32 32 32 32 32 6D
0E59:32 32 32 32 32 32 32 2D 70
0E61:37 2A 29 29 31 20 32 32 FB
0E69:32 32 32 32 32 32 32 32 85
0E71:33 33 33 33 33 33 33 29 65
0E79:2C 21 2E 37 32 23 20 32 BD
0E81:33 34 35 36 37 38 39 3A 95
0E89:3B 32 33 34 35 36 37 34 8E
0E91:20 26 30 28 23 20 37 20 F7
0E99:92 92 92 98 92 96 90 90 20
0EA1:90 90 92 92 92 90 01 01 61
0EA9:0E 1B 00 04 0E 0E 0E 1F B7
0EB1:18 0D 1A 27 0A 08 18 18 8B
0EB9:18 33 44 22 55 66 A9 50 41
0EC1:A2 98 AC 27 7B F0 06 B9 C2
0EC9:30 7B BE 85 7B 85 57 86 34
0ED1:5C 20 42 10 20 65 0F A9 CB
0ED9:1D 8D 15 D0 20 8C 09 C9 A6
0EE1:03 D0 03 4C 09 0B C9 20 01
0EE9:D0 09 20 09 0B 20 BA 90 9E
0EF1:4C DD 20 09 4D D0 06 20 E3

```







# PROGRAMS

1D39:32	26	22	23	20	35	3D	3D	1A	1E39:AD	B5	03	8D	96	03	A2	18	11
1D41:3D	3D	3D	3D	3D	BD	00	20	E5	1E41:BD	80	03	9D	00	D4	CA	10	AF
1D49:20	2F	32	26	22	23	0D	3E	FD	1E49:F7	A2	0E	BD	80	03	18	7D	85
1D51:21	2D	23	3D	3D	3D	BD	0D	07	1E51:99	03	9D	80	03	BD	81	03	EB
1D59:30	21	2F	23	3D	3D	3D	BD	23	1E59:7D	9A	03	9D	81	03	BD	9D	66
1D61:0D	21	2D	2D	21	22	27	3D	FF	1E61:03	18	7D	9B	03	9D	9D	03	5B
1D69:BD	0D	32	23	22	21	31	3D	73	1E69:BD	9E	03	7D	9C	03	9D	9E	2F
1D71:3D	BD	0D	37	2E	37	2D	21	98	1E71:03	8A	38	E9	07	AA	10	D3	4E
1D79:26	29	BD	0D	2C	23	28	23	FA	1E79:AD	B4	03	18	6D	AE	03	8D	55
1D81:21	37	23	BD	0D	2C	26	29	E8	1E81:B4	03	AD	B5	03	6D	AF	03	1A
1D89:3E	3D	3D	3D	BD	0D	37	31	6F	1E89:8D	B5	03	AD	B3	03	18	6D	7C
1D91:29	22	3D	3D	3D	BD	0D	24	83	1E91:B1	03	8D	B3	03	A6	02	F0	FB
1D99:26	28	2D	23	2C	3D	BD	0D	A7	1E99:25	E0	00	F0	02	B0	1F	A0	61
1DA1:00	A2	D6	A0	1D	8A	18	69	16	1EA1:02	B9	7D	03	C9	FC	F0	05	56
1DA9:26	8D	08	1D	98	69	00	8D	3F	1EA9:88	10	F6	30	11	BD	36	1F	1B
1DB1:DD	1D	8A	18	69	60	8D	AF	8C	1EB1:99	77	03	BD	56	1F	99	7A	B1
1DB9:1E	98	69	01	8D	B0	1E	8A	5C	1EB9:03	A9	00	99	7D	03	A2	02	BA
1DC1:18	69	80	8D	B5	1E	98	69	0C	1EC1:8E	76	03	AE	76	03	BD	7D	E6
1DC9:01	8D	B6	1E	8E	D4	1D	8C	2F	1EC9:03	C9	FC	F0	5C	BD	77	03	74
1DD1:D5	1D	60	D6	1D	78	A9	FC	D2	1ED1:85	02	BD	7A	03	85	03	AE	93
1DD9:8D	14	03	A9	1D	8D	15	03	27	1ED9:76	03	A0	00	B1	02	C9	FC	4C
1DE1:58	A2	7F	A9	00	9D	80	03	F5	1EE1:F0	3A	DD	7D	03	D0	2F	C8	3B
1DE9:CA	10	FA	A9	0F	8D	98	03	6A	1EE9:B1	02	08	29	7F	AA	C8	B1	FC
1DF1:A2	02	A9	FC	9D	7D	03	CA	B6	1EF1:02	28	10	0C	9D	80	03	C8	B9
1DF9:10	FA	60	A2	0E	BD	9D	03	D6	1EF9:B1	02	9D	81	03	18	90	09	FD
1E01:85	03	BD	9E	03	A0	04	4A	4F	1F01:3D	80	03	C8	11	02	9D	80	37
1E09:66	03	88	D0	FA	9D	83	03	AF	1F09:03	A5	02	18	69	04	85	02	5C
1E11:A5	03	9D	82	03	8A	38	E9	59	1F11:90	C5	E6	03	B0	C1	BD	7D	9B
1E19:07	AA	10	E1	AD	97	03	29	9E	1F19:03	18	69	01	9D	7D	03	A5	AA
1E21:0F	85	03	AD	B3	03	29	F0	6E	1F21:02	9D	77	03	A5	03	9D	7A	D5
1E29:05	03	8D	97	03	AD	B4	03	0F	1F29:03	CE	76	03	10	95	A9	00	C5
1E31:4A	4A	4A	4A	4A	8D	95	03	C9	1F31:85	02	4C	31	EA	00	00	00	A6

## TYPING AIDS

*MLX*, the machine language entry program for the 64 and 128, and *The Automatic Proofreader* are utilities that help you type in Gazette programs without making mistakes. These labor-saving utilities are on each *Gazette Disk* and printed in issues of *Gazette* through June 1990.

If you don't have access to a back issue or to one of our disks, write and we'll send you free copies of both of these handy utilities. We'll also include instructions on how to type in Gazette programs. Please enclose a self-addressed, stamped envelope.

Write to Typing Aids, COMPUTE's Gazette, 324 West Wendover Avenue, Greensboro, North Carolina 27408.

M I C H A E L S E D L E Z K Y

**A**n evil syndicate has stolen the security numbers for the national defense system and stashed them in their underground vaults. Your job, if you choose to accept it, is to unlock the vaults and recover the stolen numbers. Since the air surrounding the vaults is laced with cyanide gas, you'll need the assistance of a Mobile Datalink Robot—special model MDR007—for the job.

*Codebusters* is a one-player guessing game that requires deductive reasoning skills and a good memory. In this game, you must use your robot to decode the four security panels that control the lock for each vault. A destruct-timer and a pesty security robot add to the suspense.

### Getting Started

*Codebusters* is written entirely in machine language. To type it in, you'll need *MLX*, a machine language entry program. See "Typing Aids" elsewhere in this section. When *MLX* prompts you, respond with the values given below.

Starting address: 0801  
Ending address: 17D0

After you have finished typing in the program, be sure to save a copy of it

# CODE-BUSTERS

HERE'S A  
CHALLENGING  
MEMORY GAME FOR  
THE 64 THAT  
YOUNGSTERS WILL  
REALLY ENJOY.  
JOYSTICK REQUIRED.

before exiting *MLX*.

Although written in machine language, *Codebusters* loads and runs like a BASIC program. When you're ready to play, plug your joystick into port 2; then load the program and type RUN.

A title screen will appear. To proceed, press the fire button.

### Open the Vault

As the game begins, you find yourself in front of a vault where the missing security numbers are located. Before you are the four separate security panels which must be decoded before the vault doors will open. To decode each panel, you must determine its five-digit access code. To assist you in decoding the panels is a Mobile Datalink Robot, initially located offscreen to the left.

To control the robot, as well as to issue any other commands, use the command line window at the bottom of the screen. To scan through the command line selections, move the joystick up or down. Press the fire button to execute the command shown.

To activate your robot, select the Robot Movement Control command. When you press the fire button, the message *Motor Controls Engaged* will appear on the command line; you can now move the robot. To position the robot in front of one of the four panels' connectors (the connectors are at your robot's eye level, just to the left of each panel), move the joystick left or right. Once the robot is aligned



# PROGRAMS

with a connector, disengage the motor-controls command by pressing the fire button. Then, select the Analyzer Hook Up command to connect the robot to the panel.

You're now ready to attempt to decipher the panel's access code. Choose the Enter Code Selection command to select a number using your joystick. A hyphen will appear under the rightmost digit in the access code. To increase or decrease the value of this digit, move the joystick up or down, respectively. To locate the hyphen under another digit, move the joystick left or right. When you've finished entering the five-digit number, press the fire button to activate the command line. Then select the Transmit Data to Panel command to relay your guess to the panel.

The Decode Analyzer evaluates your response and reports back to you with a color code for each digit. If the color is green, then the digit is correct. If it's red, then the correct number is higher. Yellow indicates that the correct digit is lower. When you've correctly identified all five digits, you'll receive 500 points. Toggle the Analyzer Hook Up command to unplug the MDR007 and then move on to the next panel. When you've activated all four panels, the vault doors will open, revealing the stolen security numbers. The value of the security numbers are then added to your score. To advance to the next vault and begin the entire process anew, press the fire button.

## Security Alert!

Failing to identify the access codes for the four panels within 50 guesses or within nine minutes ends the game. If, however, you're successful, you can continue on to the next vault. Each time you open a vault, you'll receive 10 bonus guesses. Your current score (middle of the screen), the nine-minute timer (lower left), your high score (upper left), your best time to open a vault (upper right), and the number of guesses remaining (lower right) are all displayed.

Figuring out the access codes is not the only problem you'll encounter in *Codebusters*. Periodically, a security robot will appear and try to unplug the MDR007 from a panel. A red warning light will flash on your on-screen control panel for four seconds before the guard appears. If the guard

is successful in disconnecting your robot, you'll lose five decoding attempts. To prevent this from happening, unplug the MDR007 from the panel yourself. This keeps you from losing any attempts, but it also causes the five-digit number that's currently showing on the decoder to be erased. Therefore, be sure to memorize the code before you disconnect your robot.

If you find that the guard robot comes around too often, you can decrease the frequency of its appearance by POKEing a number between 140 and 255 in location 3319 (the current value is 140). To do this, just load the program, POKE the given value, and then run the program. You can also change the color of your robot in a similar manner; just POKE a given color value (0-15) into location 3378.

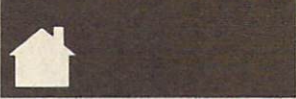
## Codebusters

```
0801:0C 08 01 00 9E 20 32 38 4B
0809:31 38 00 00 00 21 21 2B B1
0811:2B 2B 2B 25 00 00 00 00 39
0819:00 00 00 00 20 20 20 03 ED
0821:0F 04 05 02 15 13 14 05 9C
0829:12 13 20 20 20 28 03 29 DD
0831:20 31 39 39 30 20 03 0F 6F
0839:0D 10 15 14 05 21 15 01 8F
0841:54 00 07 15 00 07 6A 80 1F
0849:07 9F C0 07 EA A0 07 EA 20
0851:A4 05 E6 A4 07 D6 97 01 DF
0859:6F 57 07 EE 97 03 EE A4 12
0861:03 AA A4 00 AA 80 00 FF 89
0869:C0 02 66 60 00 FF C0 02 B0
0871:66 60 00 FF C0 00 FF C0 93
0879:00 3F C0 00 08 00 47 00 28
0881:05 50 00 15 34 00 AA 74 E4
0889:00 FD B4 02 AA F4 06 AA AF
0891:F4 06 A6 D4 35 A5 F4 35 1F
0899:7E 50 35 AE F4 06 AE F0 9C
08A1:06 AA B0 00 AA 80 00 FF CC
08A9:C0 02 66 60 00 FF C0 02 F0
08B1:66 60 00 FF C0 00 FF C0 D3
08B9:00 3F C0 00 08 00 47 00 68
08C1:04 00 00 37 00 00 77 40 76
08C9:00 B7 80 02 B7 A0 02 F7 34
08D1:E0 06 D5 E4 05 F7 D4 0E 9C
08D9:5D 6C 0E F7 EC 0E FF EC 81
08E1:02 BF A0 00 AE 80 00 FF 6E
08E9:C0 02 66 60 00 FF C0 02 31
08F1:66 60 00 FF C0 00 FF C0 14
08F9:00 3F C0 00 08 00 47 00 A8
0901:04 00 00 37 00 00 77 40 B7
0909:00 B7 80 02 B7 A0 02 F7 75
0911:E0 06 D5 E4 05 F7 D4 0E DD
0919:59 6C 0E F7 EC 0E FF EC C0
0921:02 BF A0 00 AE 80 00 FF AF
0929:C0 01 99 90 00 FF C0 01 9A
0931:99 90 00 FF C0 00 FF C0 FA
0939:00 3F C0 00 04 00 47 FF C9
0941:FF FF FF FF FF D5 55 7 AC
0949:D5 7D 57 D5 7D 57 D5 AA 8D
0951:57 D5 69 57 D6 AA 97 DA 92
0959:7D A7 D6 AA 97 D5 69 57 D7
```

```
0961:D5 AA 57 D5 7D 57 D5 7D C3
0969:57 D5 7D 57 D5 7D 57 D5 EA
0971:7D 57 D5 55 57 FF FF FF E2
0979:FF FF FF FF FF FF F3 FF 73
0981:FF FF FF FF FF D5 41 57 C4
0989:D5 C3 57 D5 C3 57 D6 82 6B
0991:97 D5 82 57 DA 82 A7 E9 C4
0999:C3 6B DA 82 A7 D5 82 57 DC
09A1:D6 82 97 D5 C3 57 D5 C3 FA
09A9:57 D5 C3 57 D5 C3 57 D5 0D
09B1:C3 57 D5 41 57 FF FF FF 05
09B9:FF FF FF FF FF FF F3 FF B3
09C1:FF FF FF FF FF D5 00 57 82
09C9:D7 00 D7 D7 00 D7 DA 00 55
09D1:A7 D6 00 97 EA 00 AB E7 7D
09D9:00 DB EA 00 AB D6 00 97 90
09E1:DA 00 A7 D7 00 D7 D7 00 E2
09E9:D7 D7 00 D7 D7 00 D7 D7 A1
09F1:00 D7 D5 00 57 FF FF FF 6F
09F9:FF FF FF FF FF FF F3 FF F3
0A01:FF FF FF FF FF FF D4 00 17 7F
0A09:DC 00 37 DC 00 37 E8 00 EE
0A11:2B D8 00 27 E8 00 2B DC DD
0A19:00 37 E8 00 2B D8 00 27 FB
0A21:E8 00 2B DC 00 37 DC 00 73
0A29:37 DC 00 37 DC 00 37 DC B5
0A31:00 37 D4 00 17 FF FF FF 66
0A39:FF FF FF FF FF FF F3 FF 35
0A41:FF FF FF FF FF FF C0 03 5B
0A49:C0 00 03 C0 00 03 C0 00 B7
0A51:03 C0 00 03 C0 00 03 C0 14
0A59:00 03 C0 00 03 C0 00 03 C0 CF
0A61:C0 00 03 C0 00 03 C0 00 CF
0A69:03 C0 00 03 C0 00 03 C0 2C
0A71:00 03 C0 00 03 FF FF FF 76
0A79:FF FF FF FF FF FF F3 00 75
0A81:00 00 00 00 00 00 00 00 95
0A89:02 22 00 20 20 20 00 88 33
0A91:00 08 20 80 80 80 00 6A
0A99:A8 00 22 AA 20 02 AA 00 4F
0AA1:03 AB 00 00 EC 00 00 FC 86
0AA9:00 00 30 00 00 30 00 84
0AB1:10 00 01 55 00 01 55 00 F1
0AB9:00 00 00 00 00 00 5D FF 68
0AC1:FF FF FF FF FF FF F5 5F B7
0AC9:F5 55 5F F5 55 5F F5 5E E2
0AD1:5F F6 AA 9F F6 AA 9F F6 3B
0AD9:AA 9F F6 AA 9F F6 AA 9F 82
0AE1:F6 AA 9F F6 AA 9F F6 AA EB
0AE9:9F F5 55 5F F5 55 5F F5 A5
0AF1:55 5F F5 55 5F FF FF FF 97
0AF9:FF FF FF FF FF FF 00 0E
0B01:00 A9 93 20 D2 FF A9 0A E9
0B09:8D 20 8D A9 00 8D 21 D0 EB
0B11:A2 18 A9 00 9D 00 D4 CA 15
0B19:10 F8 A9 0A 8D 18 D4 A9 6B
0B21:C8 8D 05 D4 8D 06 D4 A9 C4
0B29:21 8D 05 D4 A2 10 BD 2E FF
0B31:08 9D 13 06 BD 1D 08 9D 85
0B39:C3 05 AD FF CF 9D C3 D9 7E
0B41:9D 13 DA CA 10 E8 EE FF F4
0B49:CF AD FF CF 8D 00 D4 49 0F
0B51:FF 29 0F 8D 01 D4 CE EF 55
0B59:CF D0 08 AD 20 D0 A9 08 46
0B61:8D 20 D0 AD 00 DA 29 10 11
0B69:D0 C2 AD 10 BD 1C 0D 9D FB
0B71:00 D0 BD 2B 0D 9D 20 D0 16
0B79:CA 10 F1 A2 07 BD 0E 08 B4
0B81:9D F8 07 CA 10 F7 A9 04 26
0B89:8D 17 D0 8D 1D D0 A9 FF 9E
0B91:8D 15 D0 8D 1C D0 A9 FF 1E
0B99:8D 0E D4 8D 0F D4 A9 80 0D
0BA1:8D 12 D4 A0 27 A9 00 99 62
0BA9:00 04 99 28 04 99 00 05 23
0BB1:99 B8 05 99 E0 05 99 08 53
0BB9:06 99 30 06 99 58 06 99 73
```







# PROGRAMS

```

12E1:CF 8D BD CF 09 30 8D 12 3C
12E9:05 AD AB CD 8D BE CF 09 5E
12F1:30 8D 13 05 8D B0 CF A2 B5
12F9:06 BD 86 10 9D 00 D4 CA C3
1301:10 F7 A9 03 8D 18 D4 A2 AB
1309:03 EE AE CF AD AE CF 8D 94
1311:00 D4 A9 21 8D 04 D4 AD 87
1319:B1 CF 8D 01 D4 CE B1 CF E2
1321:D0 E7 A9 20 8D 04 D4 A9 B0
1329:01 8D E8 CF CE B0 CF D0 F6
1331:D8 A9 96 8D B0 CF EE FE 7B
1339:07 CA 10 CD A9 80 8D 04 E2
1341:D4 EE AA CD 60 A9 00 8D F6
1349:F0 CF 8D F1 CF 8D F2 CF 17
1351:8D F3 CF 8D CD CF A9 BA C9
1359:8D D4 06 20 BF 13 60 AD F6
1361:F3 CF CD A3 CE 90 17 F0 41
1369:01 60 AD F2 CF CD A2 CE D6
1371:90 0C F0 01 60 AD F1 CF 7E
1379:CD A1 CE 90 01 60 AD F1 A8
1381:CF 8D A1 CE AD F2 CF 8D 7A
1389:A4 CE AA CD F3 CF 8D A3 CE 74
1391:A2 09 BD 2E 15 09 80 9D 51
1399:44 04 CA 10 F5 60 42 00 B3
13A1:A0 05 BD A4 CE DD 3C 03 C4
13A9:F0 03 90 06 60 E8 88 10 43
13B1:F1 60 CE A2 05 BD 3C 03 9D 10
13B9:A4 CE CA 10 F7 60 AD E8 C5
13C1:CF F0 01 60 EE F1 CF AD BE
13C9:F1 CF C9 0A D0 31 A9 00 55
13D1:8D F1 CF EE F2 CF CE 0D A5
13D9:CF AD F2 CF C9 06 D0 1F D5
13E1:A9 00 8D F2 CF EE F3 CF AF
13E9:CE 0C CF AD F3 CF C9 09 CA
13F1:D0 0D A9 00 8D F1 CF 8D 5A
13F9:F2 CF A9 01 8D E6 CF AD 28
1401:F1 CF 09 B0 8D D6 06 AD C3
1409:F2 CF 09 B0 8D D5 06 AD 48
1411:F3 CF 09 B0 8D D3 06 60 7B
1419:A9 06 8D 2D DB 8D 30 DB 6D
1421:8D 33 DB 8D 36 DB 8D 39 A6
1429:DB 4C 3E 14 A9 0E 8D 2D 29
1431:DB 8D 30 DB 8D 33 DB 8D EC
1439:36 DB 8D 39 DB A2 04 A9 D3
1441:00 9D F4 CF A9 B0 9D F0 A8
1449:06 CA 10 F3 60 4C 2A 0E FE
1451:A0 19 B9 38 15 09 80 99 32
1459:C7 07 88 10 F5 60 20 20 CA
1461:12 0F 02 0F 14 20 0D 0F D1
1469:16 05 0D 05 0E 14 20 03 D3
1471:0F 0E 14 12 0F 0C 20 20 51
1479:00 20 20 20 20 20 01 0E 41
1481:01 0C 19 1A 05 12 20 08 AA
1489:0F 0F 0B 20 15 10 20 20 A9
1491:20 20 20 00 20 20 05 9C
1499:0E 14 05 12 20 03 0F 04 BE
14A1:05 20 13 05 0C 05 03 14 95
14A9:09 0F 0E 20 20 20 07 F
14B1:20 14 12 01 0E 13 0D 09 21
14B9:14 20 04 01 14 01 20 14 7D
14C1:0F 20 10 01 0E 05 0C 20 48
14C9:20 00 10 12 05 13 20 DF
14D1:02 15 14 14 0F 0E 20 20 15
14D9:14 0F 20 03 0F 0E 14 09 E5
14E1:0E 15 05 20 20 20 20 DA
14E9:20 20 20 20 20 07 01 C0
14F1:0D 05 20 0F 16 05 12 20 DF
14F9:20 20 20 20 20 20 20 22
1501:20 20 20 20 0B 36 51 73
1509:6C 87 8C A2 35 70 AA E7 AF
1511:1E 1F 20 56 57 58 8E 8F 44
1519:90 CE CF D0 00 00 00 01 47
1521:01 01 02 02 02 03 03 03 91
1529:00 03 06 09 0C 0E 05 17 1F
1531:20 12 05 03 0F 12 04 20 A9
1539:20 0D 0F 14 0F 12 20 03 DD

```

```

1541:0F 0E 14 12 0F 0C 13 20 09
1549:05 0E 07 01 07 05 04 20 DE
1551:20 04 09 0E 13 AD FA CF A3
1559:F0 01 60 20 51 14 A9 07 7F
1561:8D 18 D4 A2 06 BD 9F 15 98
1569:9D 00 D4 CA 10 F7 A9 11 6E
1571:8D 04 D4 20 2A 0E AD E6 CB
1579:CF F0 01 60 A9 03 8D 01 63
1581:D4 20 98 15 20 A6 15 AD F5
1589:00 DC 29 10 D0 E8 20 2A A5
1591:0E A9 10 8D 04 D4 60 AD E9
1599:00 DC 8D 18 16 60 FF 03 63
15A1:FF 01 40 73 F9 CE 19 16 9E
15A9:F0 01 60 AD 18 16 29 7F 5E
15B1:49 7F D0 0B CE 1A 16 D0 07
15B9:05 A9 23 8D F8 07 60 AD 60
15C1:00 D0 8D 17 16 AD 18 16 F0
15C9:29 04 D0 24 A9 22 8D F8 CF
15D1:07 A9 07 8D 01 D4 A9 0A 5C
15D9:8D 1A 16 CE 17 16 EE 17 07
15E1:16 D0 03 EE 17 16 CE 17 60
15E9:16 AD 17 16 8D 00 D0 60 3D
15F1:AD 18 16 29 08 F0 01 60 B4
15F9:A9 21 8D F8 07 A9 07 8D FC
1601:01 D4 A9 0A 8D 1A 16 EE A8
1609:17 16 D0 03 CE 17 16 AD 3D
1611:17 16 8D 00 D0 60 00 08
1619:00 00 01 01 78 AD 14 03 1B
1621:8D 00 CD AD 15 03 8D 01 79
1629:CD A9 D9 8D 14 03 A9 16 D0
1631:8D 15 03 A9 03 8D 0C D4 9F
1639:A9 17 8D 0D D4 A9 41 8D DF
1641:0B D4 A9 0F 8D 18 D4 58 1D
1649:60 AD 07 CF D0 01 60 AD E7
1651:10 CF F0 0B CE 11 CF D0 73
1659:05 A9 00 8D 10 CF 60 CE 9A
1661:03 CF AD 03 CF 29 01 F0 FE
1669:01 60 AD 28 D0 49 0B 8D B5
1671:28 D0 AD 01 CF 29 01 D0 A1
1679:0D EE 02 D0 AD 02 D0 C9 16
1681:FF F0 0B 4C B0 16 CE 02 8D
1689:D0 F0 03 4C B0 16 AD F9 B2
1691:07 49 03 8D F9 07 AD 01 15
1699:CF 49 01 8D 01 CF CE 07 E4
16A1:CF D0 0B AD 08 CF 8D 00 C0
16A9:CF A9 05 8D 0F CF 60 AD C7
16B1:CF CF D0 01 60 AD 02 D0 09
16B9:CD 00 D0 F0 01 60 A9 01 D3
16C1:8D 04 CF 60 78 AD 00 CD FD
16C9:8D 14 03 AD 01 CD 8D 15 6C
16D1:03 58 A9 00 8D 0B D4 60 6D
16D9:AD 0A CF F0 19 A9 05 8D 6F
16E1:27 D0 CE 0B CF D0 0F A9 E9
16E9:00 8D 0A CF A9 01 8D 27 4B
16F1:D0 A9 10 8D 04 D4 20 4A C9
16F9:16 AD 04 DC 6D FF CE 29 1D
1701:0F 8D FF CE A2 03 BD E9 8D
1709:CF F0 08 BD 29 D0 49 05 5C
1711:9D 29 D0 CA 10 F0 AD E6 A5
1719:CF F0 03 4C 31 EA CE AD 11
1721:CE D0 15 A0 05 AD 0F CF 64
1729:49 08 8D 0F CF 99 4A DB F5
1731:88 10 FA A9 1E 8D AD CE F2
1739:AD E7 CF 8D 07 D4 49 FF 29
1741:29 07 8D 0B D4 8D 09 D4 BB
1749:09 03 8D 0A D4 CE E7 CF 90
1751:F0 1A AD FC CF F0 12 CE 39
1759:CA CF D0 0D A9 14 8D C4 46
1761:CF AD F8 07 49 07 8D F8 EC
1769:07 4C 31 EA A9 3C 8D E7 44
1771:CF CE 00 CF D0 0B A9 02 40
1779:8D 0F CF 8D 07 CF 8D 10 A7
1781:CF 20 BF 13 20 8B 17 4C 72
1789:31 EA A2 10 BD DC 0D 9D 79
1791:1A 04 09 80 CA 10 F5 AD 27
1799:A3 CE 09 B0 8D 24 04 AD 2C

```

```

17A1:A2 CE 09 B0 8D 26 04 AD BB
17A9:A1 CE 09 B0 8D 27 04 A9 43
17B1:BA 8D 25 04 20 9F 13 A2 CD
17B9:11 BD ED 0D 9D 00 04 CA 2E
17C1:10 F7 A2 05 BD A4 CE 09 C1
17C9:B0 9D 0B 04 CA 10 F5 60 3C

```

## The Automatic Proofreader

See article on page 24.

```

10 VE=PEEK(772)+256*PEEK(773):
LO=43:HI=44:PRINT"{CLR}
{WHT}AUTOMATIC PROOFREADER
{SPACE}FOR ";
20 IF VE=42364 THEN PRINT "64"
30 IF VE=17165 THEN LO=45:HI=4
6:GRAPHIC CLR:PRINT"128"
40 SA=(PEEK(LO)+256*PEEK(HI))+
6:FOR J=SA TO SA+166:READ B
:POKE J,B:CH=CH+B:NEXT
50 IF CH<>20570 THEN PRINT "*E
RROR* CHECK TYPING IN DATA
{SPACE}STATEMENTS":END
60 FOR J=1 TO 5:READ RF,LF,HF:
RS=SA+RF:HB=INT(RS/256):LB=
RS-(256*HB)
70 CH=CH+RF+LF+HF:POKE SA+LF,L
B:POKE SA+HF,HB:NEXT
80 IF CH<>22054 THEN PRINT "*E
RROR* RELOAD PROGRAM AND CH
ECK FINAL LINE":END
90 IF VE=17165 THEN POKE SA+14
,22:POKE SA+18,23:POKESA+29
,224:POKESA+139,224
100 POKE SA+149,PEEK(772):POKE
SA+150,PEEK(773):PRINT"
{CLR}PROOFREADER ACTIVE"
110 SYS SA:POKE HI,PEEK(HI)+1:
POKE (PEEK(LO)+256*PEEK(HI)
)-1,0:NEW
120 DATA120,169,73,141,4,3,169
,3,141,5,3,88,96,165,20,133
,167
130 DATA165,21,133,168,169,0,1
41,0,255,162,31,181,199,157
,227
140 DATA3,202,16,248,169,19,32
,210,255,169,18,32,210,255,
160
150 DATA0,132,180,132,176,136,
230,180,200,185,0,2,240,46,
201
160 DATA34,208,8,72,165,176,73
,255,133,176,104,72,201,32,
208
170 DATA7,165,176,208,3,104,20
8,226,104,166,180,24,165,16
7
180 DATA121,0,2,133,167,165,16
8,105,0,133,168,202,208,239
,240
190 DATA202,165,167,69,168,72,
41,15,168,185,211,3,32,210,
255
200 DATA104,74,74,74,74,168,18
5,211,3,32,210,255,162,31,1
89
210 DATA227,3,149,199,202,16,2
48,169,146,32,210,255,76,86
,137
220 DATA65,66,67,68,69,70,71,7
2,74,75,77,80,81,82,83,88
230 DATA 13,2,7,167,31,32,151,
116,117,151,128,129,167,136
,137

```



# HOW TO TYPE IN

Each month, Gazette publishes programs for the Commodore 128 and 64. Each program is clearly marked by title and version. Be sure to type in the correct version for your machine. All 64 programs run on the 128 in 64 mode. Be sure to read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

We regularly publish two programs designed to make typing easier: *The Automatic Proofreader*, for BASIC programs, and *MLX*, for entering machine language programs.

When entering a BASIC program, be especially careful with DATA statements, as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the computer). If this happens, the only recourse is to turn your computer off and then on, erasing what was in memory. This could cause you to lose valuable data, so be sure to *save a program before you run it*. If your computer crashes, you can always reload the program and look for the error.

## Special Characters

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from Gazette, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor-down key; {5 Spaces} means to press the space bar five times.

To indicate that a key should be shifted (hold down the Shift key while pressing another key), the character is underlined. For example, A means hold down the Shift key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example, enter eight shifted A's).

If a key is enclosed in special brackets, [ ] , hold down the Commodore key (at the lower left corner of the keyboard) and press the indicated character.

Rarely, you'll see a single letter of the alphabet enclosed in braces. This

can be entered on the Commodore 64 by pressing the Ctrl key while typing the letter in braces. For example, {A} means to press Ctrl-A.

## The Quote Mode

Although you can move the cursor around the screen with the Crsr keys, often a programmer will want to move the cursor under program control. This is seen in examples such as {LEFT} and {HOME} in the program listings. The only way the computer can tell the difference between direct and programmed cursor control is the *quote mode*.

Once you press the quote key, you're in quote mode. This mode can be confusing if you mistype a character and cursor left to change it. You'll see a graphics symbol for cursor left. In this case, you can use the Del key to back up and edit the line. Type another quotation mark and you're out of quote mode. If things really get confusing, you can exit quote mode simply by pressing Return. Then cursor up to the mistyped line and fix it. If the mistake involves cursor movement, however, you must press the quote key to reenter quote mode. □

When You Read:	Press:	See:
{CLR}	SHIFT CLR/HOME	
{HOME}	CLR/HOME	
{UP}	SHIFT ↑ CRSR ↓	
{DOWN}	↑ CRSR ↓	
{LEFT}	SHIFT ← CRSR →	
{RIGHT}	← CRSR →	
{RVS}	CTRL 9	
{OFF}	CTRL 0	
{BLK}	CTRL 1	
{WHT}	CTRL 2	
{RED}	CTRL 3	
{CYN}	CTRL 4	

When You Read:	Press:	See:
{PUR}	CTRL 5	
{GRN}	CTRL 6	
{BLU}	CTRL 7	
{YEL}	CTRL 8	
{F1}	f1	
{F2}	SHIFT f1	
{F3}	f3	
{F4}	SHIFT f3	
{F5}	f5	
{F6}	SHIFT f5	
{F7}	f7	
{F8}	SHIFT f7	

When You Read:	Press:	See:
←		
↑	SHIFT	

## For Commodore 64 Only

[ 1 ]	COMMODORE 1	
[ 2 ]	COMMODORE 2	
[ 3 ]	COMMODORE 3	
[ 4 ]	COMMODORE 4	
[ 5 ]	COMMODORE 5	
[ 6 ]	COMMODORE 6	
[ 7 ]	COMMODORE 7	
[ 8 ]	COMMODORE 8	



# REVIEWS

## SWITCH BETWEEN PROGRAMS • AUTOMATE APPLICATIONS ZAP GRAMMAR ERRORS • CHALLENGE FIGHTER BOMBERS

### TAKE CHARGE!

**H**ow many of us run our computers, and how many are run by them? If you're tired of trying to make the computer do what you want it to do, or if you've finally given in and started doing things its way, *Take Charge!* from Departmental Technologies could be the utility package that puts you back in the driver's seat.

*Take Charge!* offers a broad array of disk and file utilities that you can use from the command line or from the program's menu system. It also provides a collection of small applications. You can have it use your modem to dial any number you type onscreen at the DOS prompt. It can switch in seconds between applications of any size and provide instant access to other utilities.

The big news is that *Take Charge!* uses only 20K of RAM. Since it's so small and it task-switches so effectively, you don't have to consider your word processor, desktop publisher, database, spreadsheet, and telecommunications programs as separate entities anymore. Simply assign them hot keys and treat them as if they were components of the world's greatest integrated system. This high efficiency deserves to be applauded, particularly in the face of the ever more gargantuan programs developers are foisting on the public, programs that soak up RAM like mad sponge monsters.

Access *Take Charge!*'s broad array of disk and file utilities from the command line or from the program's menu system. The program provides a collection of small applications. Use the online calendar feature to make appointments through the end of 2099. You can write or edit straight-ASCII text files with its friendly text editor. You can also access powerful disk and file utilities that even let you do such things as edit file attributes or

optimize disks. (These commands might be better placed in your DOS directory. You'll find yourself using them often.)

You can lock your keyboard for while you're away, dial a number from the command line or a database, or cut and paste unlimited amounts of text between applications. I'd go on, but I'm out of breath.

Most of us have to make appointments, get to meetings, or (for those among us who program computers) be reminded to eat at the proper times. The alarm provided with *Take Charge!* is the answer for people who want to be punctual but never seem to get away from their desks on time. When the alarm goes off, it announces the appointed time with a chirp and displays a message on the top line of the screen. The chirp and message repeat every few seconds.



Switch among applications with ease.

I discovered one possible bug: You can set the alarm to ring at 00:00, but it won't ring at midnight. So if your carriage is going to turn into a pumpkin, you'd better set the alarm for 23:59 or 00:01. Otherwise, *Take Charge!* is very intelligent about rejecting inappropriate input, such as impossible times and dates.

The manual is old, and you may discover some out-of-date information. The menu program, for instance, is called TCMENU rather than MENU, as the book says. An ad-

dendum clarifies most of the confusing references. If you still run into problems, you'll find technical support knowledgeable and fairly patient. The text editor doesn't automatically wrap text, which can present a problem. If you type a single line of several hundred characters, the cursor will follow you across the screen and miles out to the right, clear past Jesse Helms. You can turn on word wrap, but it still acts peculiarly. You wouldn't want to write the great American novel on it, but as a text editor and batch-file writer, it's highly functional.

All hard disk optimizers seem extremely slow to me, but *Take Charge!*'s seems even slower. It doesn't provide all of the options and detailed information about the disk that you'd receive from *PC Tools Deluxe*.

Another module allows you to edit your directory. With it, you can simply type in a new volume name, for example, or change a file's attributes. This is almost too much power for the casual user. Don't enter this module (its name is DE) unless you know what you're doing. A Departmental Technologies spokesman said that most companies purchasing *Take Charge!* in bulk for their employees insist that this feature be removed.

*Take Charge!* also features a telecommunications package. The module doesn't allow scripting, though you can write ten 70-character macros and save them as a file. Since you can load other macro files very easily, you could access a virtual infinity of macros. A 70-character macro could probably do as much work as most scripts. You can also send all interaction to a log file or save a screen shot.

Departmental Technologies is proudest of *Take Charge!*'s ability to switch among programs. Even if you don't like any of the programs that come with it (and I feel certain several will endear themselves to you), the



# REVIEWS

ability to switch among programs so rapidly—and with so little overhead—makes *Take Charge!* a program to be reckoned with. It's worth looking for.

ROBERT BIXBY

IBM PC and compatibles; 320K; DOS 2.0 or higher; hard disk—\$99.95

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## CRIME WAVE

Though the design and concept of the packaging are almost identical, *Crime Wave* by Access is not a sequel to last year's major Access release, *Mean Streets*. *Crime Wave* is pure arcade-style action.

The *Crime Wave* world of 1995 is not a pretty place. Crime syndicates have taken over the inner cities and turned them into crumbling wastelands. Onto this landscape you strut



Rescue the president's daughter.

as Lucas McCabe, a one-man sea wall to face the cresting wave of crime. Archvillain King Pin has snatched the President's daughter and is holding her, and the country, hostage. Only McCabe has the high-tech weapons and savvy to attempt a rescue in the heart of the city.

A comic book-style storyboard introduces the plot and characters before the action starts. Real actors and actresses were used to create the excellent digitized sequences. Titillating scenes of Brittany, resplendent in her red miniskirt, offer boys plenty of incentive to fight their way to the next sequence. The fact that most arcade games are played by teenage males

was not lost on designer Bryan Brandenburg.

The onscreen graphics in *Crime Wave* are really outstanding. In VGA mode the foregrounds and backgrounds are almost TV quality. When played in VGA, *Crime Wave* not only makes Nintendo graphics look substandard, it even outshines the new 16-bit home videogame systems and most stand-up arcade games. The graphics are still very good in EGA, but I found that the dull-red, slow-moving shots from the bad guys tended to get lost in the background and were hard to spot out of the corner of my eye.

Several levels of difficulty are included, so even if you're a novice, you'll be able to play for an hour or so the first time out before losing all your lives. It will take significantly longer than that to get all the way through this large game. Including the story segments, it takes up almost 3MB on your hard disk. You can use a special version (including only the arcade sequences) that will only take up 1.2MB.

Access's Real Sound technology makes realistic sound possible in *Crime Wave* without the need for additional hardware. While Real Sound has impressed me in the past, I thought it could have been put to better use in this game.

Those who shun onscreen violence will find *Crime Wave* particularly offensive. Burning body parts of blasted bad guys literally rain down in some segments. And joystick junkies will have to learn to drive the keyboard because a joystick option was not included. The game's copy protection involves looking up information in the manual.

*Crime Wave* is another example of a game that probably couldn't be played on today's videogame systems. It's big, it's action-packed, and it's graphically sophisticated. It will wash you away.

RICHARD SHEFFIELD

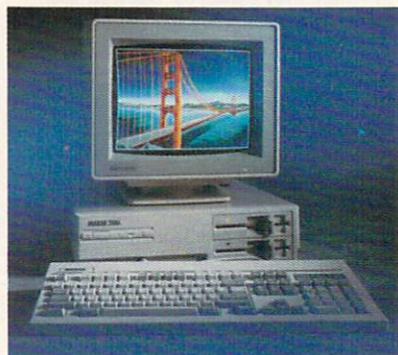
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## MAXAR 286L

A powerhouse doesn't have to look like one. Take the Maxar 286L computer. It provides the power of a state-of-the-art 80286 system, but it's packaged in a compact, aesthetic design that doesn't overwhelm your desk.

The 286L case is a trim 16-inch square standing less than 4 inches tall. Capable of running at either 8 or 12 MHz, the machine boasts 1MB of zero-wait-state RAM on the motherboard. Other standard features include an Award Software ROM BIOS; a 1.2MB, 5¼-inch floppy disk drive and controller; and three AT- and three XT-compatible expansion slots (mounted horizontally to save space).



Good things come in a small package.

Also standard are one parallel port, two serial ports, an 80287 math coprocessor socket, a battery-backed clock/calendar, a 101-key keyboard, GW-BASIC, and MS-DOS. The basic system retails for \$1,375. (The system I tested was customized with two half-height 1.2MB floppy drives, a 40MB hard drive, and a 12-inch monochrome monitor.)

While many companies hide power switches in hard-to-reach locations, the Maxar sports a push-button power switch on the front panel so you don't have to stand on your ear to turn it off and on. This switch also controls a power receptacle on the back of the unit (perfect for powering a monitor). A recessed design for this switch prevents accidental power outages from wayward fingers, coffee cups, software boxes, books, or other jungle hazards of the cluttered desk. Other items of interest on the front

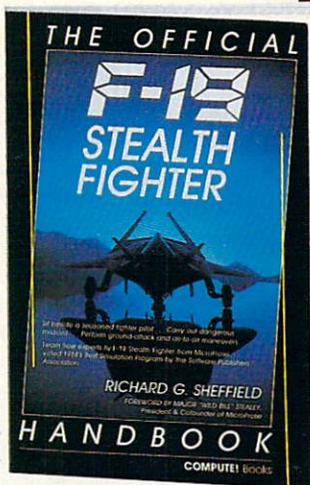
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**The Official F-19 Stealth Fighter Handbook**  
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Foreword by Major "Wild Bill" Stealey,  
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Learn the ins and outs of flying MicroProse's new *F-19 Stealth Fighter* flight simulator. Study the practical hints and tips for flying the simulator and performing ground-attack and air-to-air tactics. Then read all the background information in the book to learn to fly the real F-19. In the final section of the book, you'll find yourself looking over the shoulder of an expert *F-19 Stealth Fighter* game player as he carries out several dangerous missions.

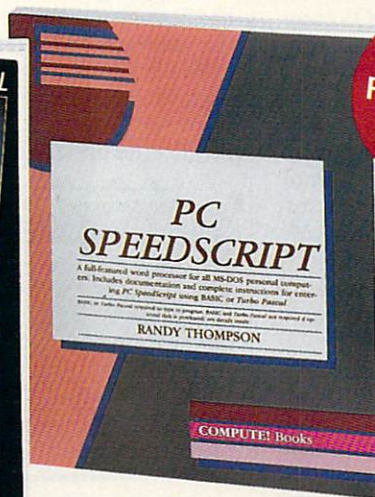
**Easy 1-2-3 for Small Business**  
by Sandra Cook Jerome, C.P.A.  
**\$18.95** 320pp

This hands-on guide is perfect for small-business owners who need financial reports and information quickly. It is more than just another tutorial on *Lotus 1-2-3*; it's a guide to building practical spreadsheets. You get complete instructions for creating more than a dozen spreadsheets, including income statements, job costing, tax planning, balance sheets, and accounts-receivable aging. You'll even learn to write a business plan. Although written specifically for *Lotus 1-2-3* releases 2.2 and 3, the spreadsheets in *Easy 1-2-3 for Small Business* are also compatible with release 2.01.



**COMPUTE!'s Guide to Nintendo Games**  
by Steven A. Schwartz  
**\$9.95** 272pp

A valuable buyer's guide, this book is packed with tips for better play and reviews of available game cartridges for the Nintendo Entertainment System. Each game description includes a screen shot; basic information such as type of game, number of players, and controller type; and ratings for the essential elements such as sound and graphics quality, violence, difficulty, and overall play value.



**PC SpeedScript**  
by Randy Thompson, associate editor  
at COMPUTE! Publications  
**\$24.95** 224pp

*SpeedScript*, a full-featured word processor and the most popular program ever published by COMPUTE!, is now available for IBM, Tandy, and compatible personal computers. From letters and reports to novels and term papers, *PC SpeedScript* handles all your word processing needs. This 5¼-inch disk contains the ready-to-run *PC SpeedScript* program and the *Turbo Pascal* source code. You do not need BASIC or *Turbo Pascal* to run the programs. The package includes a 224-page book with complete documentation and source code listings.

**Quick & Easy Guide to Using MS-DOS, Second Edition**  
by Bonnie Derman and  
Strawberry Software  
**\$14.95** 224pp

The second edition of this easy-to-use guidebook covers all versions of MS-DOS through version 4. Commands and directions are logically arranged for quick reference. Topics include directories, files, disk commands, screen and printer output, and more. It's the only MS-DOS book that employs a truly task-oriented approach.

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**\$18.95** 256pp

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panel are a reset button (recessed and just below the power switch) and indicator lights for power and turbo processor speed.

Maxar's clear and informative manual provides numerous drawings to simplify system setup. A section also demonstrates how to install extra floppy drives, hard drives, and expansion boards. MS-DOS installation and several of the more useful DOS commands are clearly explained, all without overwhelming you with extraneous details.

*QAPLUS*, a quality-assurance diagnostic program, comes bundled with the Maxar. It checks everything from CPU, disk, and video speeds to interrupt controllers. It also checks RAM, the keyboard, the printer, communication ports, and floppy and hard disk drives.

In a world crowded with PC clones, the Maxar 286L is a solid performer that incorporates features usually found in higher-priced systems. If you're looking for a powerful 80286-based computer in a small, attractive package, consider the Maxar 286L.

TOM NETSEL

Maxar 286L standard configuration with 1MB of RAM, 1.2MB floppy disk drive, 80287 math coprocessor socket—\$895

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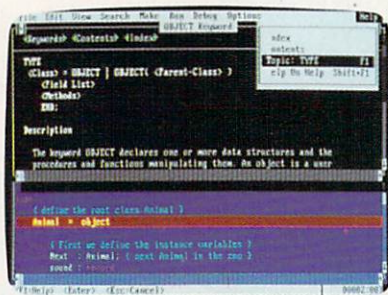
## QUICKPASCAL

You might call *QuickPascal* an extended subset of Borland's *Turbo Pascal* 5.0. The language itself is quite similar, with the following exceptions: Borland-style graphics calls are not officially supported, there are no overlays, and *QuickPascal* contains a set of object-oriented extensions that have no analog in *Turbo* 5.0.

*QuickPascal* also has a goodly number of features that *Turbo* ought to have, such as support for C-style strings and some new text-mode functions that ease the creation of snappy text screens. Its unit-level recreation even includes a totally undocumented

GRAPH unit for quite a few of *Turbo Pascal*'s graphic calls, but not for font or BGI calls.

The Quick environment has evolved from its brethren *QuickC* and *QuickBASIC* products. The incredible online help system Microsoft pioneered with *QuickBASIC* 4.0 is even better in *QuickPascal*, the tutorials are better than *QuickC*'s, and the editor has been given multiple windows with the usual great mouse support. However, the reference material is unacceptable. In fact, there is almost no reference material. You can't even buy it as an option.



**QuickPascal's online help is unbeatable.**

The online help contains an ample supply of sample programs, and the code from the samples can be dropped into your own programs fairly easily.

Error handling is built into the environment. The good news is that when the compiler encounters an error, it puts up a dialog box you can use to obtain an explanation of the error message and advice on what to do about it. This is exactly the way online error handling should work.

The bad news is one serious omission: If you run the command line version of the compiler, you can't get error-message documentation. Neither runtime errors nor compile-time errors are covered in the printed manual. Nor is there a good listing of the units and library routines, documentation of an assembly language interface, or full reference material anywhere. Want to know whether text-mode screen-handling coordinates use a screen origin of (0,0) or (1,1)? You'll have to figure it out for yourself. You won't find it written anywhere in any of the documentation, online or otherwise.

*QuickPascal* is not compatible with ISO-standard Pascal, nor is it

compatible with Microsoft's older Pascal compilers or *CodeView*. For the time being, you must use its integrated debugger (which is quite good). The generated code and compile speed are very close to those of *Turbo Pascal*.

Is *QuickPascal* worth the money? If you want the brilliant Microsoft graphics library, Windows-style fonts, unbeatable online help, and high text-mode compatibility with Borland's *Turbo Pascal*, look no further. Bear in mind that *QuickPascal* isn't compatible with *CodeView*, the MS LINK format, Windows, OS/2, or *Microsoft Pascal*.

If, however, you need overlays, adequate reference documentation, advanced debugger support, better fonts, an open architecture, and graphics or unit compatibility with the Borland interface, you might want to consider your alternatives.

TOM CAMPBELL

IBM PC and compatibles; 512K; DOS 2.1 or higher; two floppy disk drives or one floppy disk drive and a hard disk; mouse optional—\$99

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## AVAGIO

Outstanding desktop publishing results with average output devices? *Avagio* can do it, and at a great price, too. Even on your nine-pin printer, you can produce remarkably high-quality brochures, newsletters, business cards—the list goes on.

*Avagio* gives you extraordinary control of graphics and a very sharp and accurate onscreen display, closing the gap between what you see and what you get. Finally, the program simply prints better on dot-matrix printers than any other program I've ever seen.

Besides this powerful display and print technology, *Avagio* offers a complete list of editing features, the ability to import text files in several popular word processing formats or ASCII, support for several graphics formats, and 150 of its own high-quality clip-art images.

*Avagio's* menus have even more interesting dishes to serve up. Kerning lets you easily adjust the space between characters, such as the gap between a lowercase *l* and a lowercase *y*. Using text frames, you can flow text around graphics. While there's no option for wrapping text around uneven graphic edges, you can create text frames that allow graphics to overlap columns. Because you can sequentially link one frame (a box that contains text or graphics) to the next, you can work some pretty fancy dance steps around the edges of most graphics. But they're as complex to perform as they are impressive to see.



Say good-bye to printout jaggies.

Scale characters to 500 points (that's seven inches to you and me), and *Avagio* won't hesitate. Not even high-end programs like *PageMaker* let you change the fill of a character, but *Avagio* lets you treat any letter or group of letters as graphic elements.

When it comes to traditional graphics, you have the same kind of tools for editing fill patterns, line styles, and line widths. You'll think you're working with a full-fledged graphics program instead of a page-layout program.

The Mingle options, probably the flashiest of *Avagio's* graphics tools, let you control how one element affects the appearance of another when they intersect on the page. You can make some shapes opaque and others translucent like tissue paper. Still others turn images into negatives.

As long as your ribbon is new, you'll get sharp output that very closely resembles what you see on your screen. This is especially important when you work with very detailed graphics, when you want to line up page elements precisely, and when you want to kern text.

If you do much printing on dot-

matrix printers, you'll also notice something else missing: jaggies. *Avagio's* features translate smoothly to the page, even in draft mode. Of course, the program also supports laser and ink-jet printers, and the quality just gets better.

You pay for quality in speed, though. Printing at draft quality is slow, but you shouldn't expect lightning-fast output from a nine-pin dot-matrix printer anyway. At standard and high-quality printing, the slowness is even more exaggerated.

Packed with features, *Avagio* still isn't any harder to learn than most other desktop publishing packages. If you've used *PageMaker*, you'll be amazed at the similarities, which should lower the learning curve considerably. Greenhorns shouldn't find this program any harder to learn than any other electronic page-layout program. A better tutorial would improve this package, though. So would an index for the manual.

While it doesn't demand much from your printer, the program does eat up a lot of disk space—nearly seven megabytes. Manual and tutorial aside, *Avagio* is the best page-layout package for the PC right now. You can have your dot-matrix printer and desktop publish, too.

HEIDI E. H. AYCOCK

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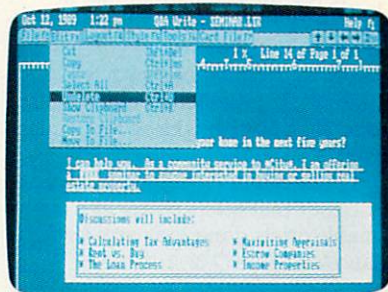
## DESKMATE Q & A WRITE

For some people, using a sophisticated \$500 word processor for day-to-day writing is like using a sledgehammer to drive a nail into the wall—it gets the job done, but the extra power can make the job more complicated.

If that description fits you, check out *DeskMate Q & A Write*, an inexpensive word processor that doesn't sacrifice power for ease of use.

The *DeskMate* graphical user interface (GUI) makes *D/Q & A*, already known as one of the easiest-to-use word processors, even better.

Although it runs under a GUI, *D/Q & A* isn't a WYSIWYG (What You See Is What You Get) word processor. It displays boldface and underlining onscreen, but it doesn't show graphics or multiple fonts while you edit. There is a page-preview mode, however, so you can see exactly how your document will appear before you print it.



The friendly *DeskMate* interface and *Q & A Write's* power make word processing easier and much more enjoyable.

Almost all the commands in *D/Q & A* are available from six menus at the top of the screen, and there are keyboard equivalents for most functions.

The program has some surprisingly advanced page-layout capabilities for an entry-level word processor: lines, boxes, multiple fonts, headers and footers, and more.

You can import graphics in *DeskMate Draw*, *Lotus 1-2-3*, *Symphony*, *PFS:Graph*, and BASIC BSAVE formats. You can also use the command \*SPREADSHEET\* to directly import all or part of a *Lotus*-compatible spreadsheet file.

*D/Q & A* has a spelling checker, but unless you already own *DeskMate's* dictionary, you'll need to order it with the manual's coupon. *D/Q & A* also lets you access Tandy's add-on *DeskMate Thesaurus* from its Tools menu.

Not only is *D/Q & A* a very capable word processor, it's also a handy minidatabase. *Card File*, the built-in database, can handle up to 180 fields and 1000 records in each file. Use it to look up an address or phone number or to maintain a mailing list. >



# REVIEWS

Of course, it's the printed output that matters the most, and here *D/Q & A* won't let you down. You can print up to eight columns on a page, continuous or single-sheet forms, justified or ragged text, and mailing labels. The program will even automatically find the addresses at the top of a business-format letter and print them on an envelope.

The manual is complete and easy to understand, explaining all of the program's operations in a procedural manner.

If you don't have a mouse already, this program makes getting one worthwhile. While you can access any of *D/Q & A*'s functions with the keyboard, the mouse makes many operations, such as highlighting text, much easier.

For a fast, easy-to-use PC word processor that offers power at a reasonable price, don't look any farther than *DeskMate Q & A Write*.

DENNY ATKIN

IBM PC and compatibles with 512K and graphics adapter—\$199

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## BRUCE LEE LIVES

The computer game industry has paid homage to the memory of Bruce Lee by creating martial arts contests focusing on classic competition, fight-to-the-death scenarios, and action/adventure games. Not until *Bruce Lee Lives: The Fall of Hong Kong Palace*, however, has a program successfully incorporated all three of these elements.

Before setting forth on your quest to defeat Master Po and his narcotics empire, you must win at least two of three qualifying rounds. You'll face one of the local martial arts school's top students in a beautifully rendered courtyard scene.

Since the student is no pushover, you should consider a few practice sessions before taking him on. The bottom of this screen displays two diagrams of the keypad and joystick, showing all of the possible moves you can make. Keyboard control is intu-

itive and responsive. Most players will find the joystick a poor choice, since it's virtually impossible to consistently position the shaft in the diagonal locations. At a critical moment, you might find yourself unintentionally dodging a blow when one more punch might have finished off a culprit or, worse yet, running toward a killer that you should be avoiding.



Defeat Master Po's narcotics empire.

Be sure to take advantage of the game's macros, which let you record up to three sequential martial arts moves and map them to a single key-press or joystick movement. So once you've perfected a *kick-duck-punch* sequence, you can execute the entire sequence with one action.

After you've completed the training and qualifying sequences, you're ready to pursue the evil Master Po. You must complete four missions before the climactic confrontation with your archenemy in his Hong Kong Palace headquarters.

In the first mission, the Trap, Po distracts you with a telephone call, while a pair of his thugs break down your apartment door with more on their minds than walking off with your PC clone. One at a time, you have to outfight both attackers in order to finish the screen.

To combat these and other opponents, a host of moves are available to you. You can punch or jab; employ a variety of kicks; dodge blows by jumping, ducking, or moving backward; or run away to a safe corner.

In the second sequence, the Brawl, you must knock out the huge bouncer at the seedy bar that operates as a front for Po's money-laundering operation. The next scenario, the Cargo Ship, requires you to board the ship on which Po stores his cache of opium. Find the ship's fuel tanks and

attach a bomb to them by pressing the B key (this command is undocumented, by the way). Dispatch or avoid any guards you encounter, locate an alternate exit, and get clear of the ship within 30 seconds after the explosive is set.

*Bruce Lee Lives* will take even advanced arcaders hours to complete. Software Toolworks' Troy Heere offers some hints not found in the manual to help you get through the game a little faster.

First, you don't have to overwhelm all of the guards. Some you merely have to elude. If you must engage in combat, Heere recommends use of the jumping kick. "With a little practice, you can execute multiple jumping kicks consecutively, inflicting staggering blows on the opponent," he explains.

Another helpful tip is to get your hits in from as far away from your adversary as possible. "The opponent's strategy under this condition is generally to keep punching as long as you're too close to try anything else," Heere says.

The game's artificial intelligence adds to its challenge and excitement. "*Bruce Lee Lives* employs what I call a *learning engine*," Heere says. "It keeps track of the moves of both the computer and the human player and the effectiveness of one move versus another. It doesn't care who made what move, only whether it was effective in relation to the countermove. Because of this, the computer learns not only from its own successes and failures, but from the human's as well."

By blending elements from earlier martial arts contests and by adding sophisticated artificial intelligence, the creators of *Bruce Lee Lives* have freshened up what was becoming a very stale format. This is a game worthy of bearing the Dragon's name.

LEN POGGIALI

IBM PC and compatibles, 512K, CGA, EGA, VGA, or Tandy 16-color (requires 640K)—\$39.95

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## IBM CURRENT

**P**ersonal Information Managers (PIMs) are supposed to manage all kinds of information in a manner that complements, rather than conflicts with, your way of doing things. The problem here is that everyone's method of managing information is different. To excel, therefore, a PIM must attempt to be all things to all people. While no program can totally achieve this lofty goal, IBM's *Current*, a new addition to the PIM lineup, comes close.



**Current can assign items to appropriate categories based on key phrases.**

*Current* runs under *Windows*, a graphical user interface that allows the program's screens to resemble familiar real-life objects. *Current*'s appointment calendar, for example, resembles the standard daily calendar found on most desktops. Its address/phone book has alphabetical tabs down the side. Consequently, *Current* is extremely intuitive to learn and use.

Unfortunately, *Current* makes significant hardware demands—a full 640K complement of RAM and, installed with its runtime version of *Windows*, over 3.5 megabytes of disk space just for its own files.

Although it's possible to run *Current* without a mouse, you wouldn't want to. Keyboard alternatives to mouse operations, though functional, are unavoidably complex.

The first display you see when you install and run *Current* is the appointment calendar. Recording information on this calendar is simply a matter of entering an appointment at the appropriate date. You can adjust *Current*'s default half-hour time intervals all the way down to five-minute increments. Once an appointment has been recorded, the program's true

power comes into play.

Each appointment you record is called an *item*. You can group items into categories and assign an individual item to as many categories as you like. You could, for example, create a category consisting of all items that mention the person with whom your appointment is scheduled, a second category with items referring to whatever project that appointment involves, and a third category based on the city where this appointment will take place.

A few mouse clicks allow you to organize and review all the items stored in any given category. Consequently, you can quickly check on whatever information you've recorded about the person, the project, or the place, depending on which category you choose. But there's a catch.

In order to reliably manage all your information in all its possible permutations, *Current* sacrifices adaptability. Although *Current* can display records in any one of six preformatted views, the output options for each view are limited. The report view, for example, is limited to first-level mathematical operations. Even though you can include a calculated field in a report—you could, for instance, total individual purchases to track a project budget—you can't perform calculations using the results of the first operations. Your budget report couldn't include a final calculation showing cost overruns or how much of the original budget remains unspent. This is hardly a major shortcoming, but you should check to make sure *Current* can satisfy your personal needs before adopting it as your PIM.

If you choose *Current* as your PIM, you'll be pleasantly surprised by some of its nifty extras: its alarm and its ability to dial any number in a current document with your modem, for example. *Current* is smart enough to assign the correct date to an appointment you schedule—for example, to *next Tuesday*. You can apply complex filters to any *Current* reports, extracting only selected items from even large categories. After a short while, you'll even figure out how to take advantage of one of the program's most useful features: its ability to automatically assign an item to the appropriate categories, based on certain key

phrases the item contains.

*Current* is, in short, one impressive program. And while it might not be all things to all people, it could be the perfect PIM for you. It's certainly worth investigating.

JACK NIMERSHEIM

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## HYUNDAI SUPER-386C HYUNDAI SUPER-286N

**J**apan isn't the only Asian country hard at work in the electronics industry. Korea's Hyundai is offering its own versions of power, speed, and expandability in the Super-286N and the Super-386C. I had the opportunity to work with both of these machines, and each performed exceptionally well.



**The Super-286N offers value and quality.**

Each computer comes equipped with a 101-key keyboard, six expansion slots, one serial and one parallel port, a 200-watt power supply, MS-DOS version 3.3, and GW-BASIC, ready to be installed. The 386c is OS/2-compatible and can function as a UNIX workstation. With its VGA capabilities, it can also function as a graphics workstation for CAD/CAM and desktop publishing purposes.

Each of my review units came equipped with a 40MB hard drive and one 1.2MB 5¼-inch floppy drive. The 286 had a Hyundai HCM-1420 EGA color monitor, while the 386 unit came equipped with Hyundai's HCM-40 VGA color monitor. Colors seemed somewhat more vivid on the VGA unit when I placed the monitors side by side, but unless you own or plan to buy software that's designed specifically for VGA, I don't see the advantage of owning the more expensive VGA monitor and card.



Power, speed, and expandability are yours with Hyundai's Super-386c.

Setup and software installation on the two computers were simple, as was opening up the units to add a modem card. I also experienced no compatibility problems. My word processor, spreadsheet, database, and favorite games worked fine on both units. The 386 crunched spreadsheet numbers noticeably faster than the 286 and searched for strings in my word processor and database in the blink of an eye; but the 286 wasn't that much slower.

I would recommend both units for everyday home or small-business use, but if you're thinking of moving up to OS/2 or are in need of a UNIX or CAD/CAM workstation in the near future, then the 386c becomes a necessity. It's also the less likely of the two to become obsolete anytime soon. Both computers are excellent buys, but since the Super-386c has a full-fledged 386 processor, it's priced considerably higher than the 386SX-chip models currently on the market that perform many of the same tasks without putting a hole in your wallet.

If you're content with less power and the slower speed of a 286 computer, then the Hyundai Super-286N will provide you with the reliable PC you've been looking for. And besides,

if this is all you need, you'll save a great deal of money. With either of these computers, you can have power and performance to meet your future needs.

MICKY McLEAN

Super-286N with one 1.2MB floppy disk drive—\$1,145; with one floppy drive and a 40MB hard drive—\$1,745

Super-386c with one 1.2MB floppy disk drive—\$2,195; with one floppy drive and a 40MB hard drive—\$2,795; with one floppy drive and a 100MB hard drive—\$3,695

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## Amiga

### REJUVENATOR

**W**ith the impending release of Kickstart/Workbench 2.0 and the Enhanced Chip Set (ECS), Amiga 1000 owners may worry about being left behind. Their fears are unfounded, however, as a number of third-party projects in the works will let the original Amiga take advantage of OS 2.0 and the ECS.

The first of these products to hit the market is Greg Tibbs' Rejuvenator board, marketed by Expert Services. After installing the Rejuvenator in my Amiga 1000, I felt as if I were using a new computer. The Rejuvenator adds the SuperAgnus chip, a full megabyte of chip RAM, support for the ECS Denise chip (which will add a number of new graphics modes under OS 2.0), a battery-backed clock, and a flickerFixer-compatible video slot. The 1000's internal RAM is converted into 512K of true fast memory, giving you a total of 1.5 megs.

If one meg of chip RAM isn't enough, you can replace the SuperAgnus chip with an Amiga 3000 Agnus and expand to two megs of chip RAM.

The Rejuvenator has a socket that will accept a 500/2000-style Kickstart ROM chip. Kickstart 2.0 has grown to 512K, so it won't fit into the

Amiga 1000's 256K of Kickstart RAM. Unlike competing boards, the Rejuvenator has a switch that will let you load older Kickstart versions from disk.

The Rejuvenator replaces the Kickstart RAM board inside your Amiga 1000 and requires no motherboard surgery. Just plug in the board, connect three jumper clips, and you're ready to go. You do have to line up about 150 pins with the proper sockets, though, so unless you're very experienced with hardware installation, I'd recommend you let the manufacturer install the board.

I've been using the Rejuvenator with both ECS chips for over a month and have encountered no compatibility problems. Although I've been running with Kickstart 1.3 in ROM, beta versions of 2.0 worked fine. My 1000 with two expansion cards is actually *less* crash-prone than before I installed the Rejuvenator. If you do encounter problems, Expert Services' technical support is excellent.

With the addition of a MicroWay flickerFixer board, which works flawlessly in the Rejuvenator, the Amiga 1000 acts just like a slower Amiga 3000. You don't get the 3000's faster speed, but you get to keep your keyboard garage.

DENNY ATKIN

Amiga 1000—\$499.95

EXPERT SERVICES  
5912 Centennial Cir.  
Florence, KY 41042  
(606) 371-9690

### TYPHOON THOMPSON

**G**ames like *Typhoon Thompson* don't come along often enough. It's one of those rare instances where the sum is far more than the individual parts. Although it comes a little closer to cute than I like, there's more than enough charm to offset any hint of saccharine. From the animation to the superlative gameplay, everything about it is exemplary.

The most immediately striking thing about *Typhoon Thompson* is the animation. It uses very small charac-

ters, no more than an inch high, but imbues them with such personality that they make other games look flat and soulless. The opening sequence has Typhoon, the intrepid hero, dropping from a flying saucer into the skimmer in which he glides around the open sea. Actually, he doesn't so much drop as get shoved out of the



Skim the waves to rescue the sea child in Broderbund's *Typhoon Thompson*.

spacecraft to reluctantly start his quest for a kidnapped sea child. To recover the child, he has to capture the water sprites who committed the dastardly deed. These sprites possess several types of flyers, vehicles that can cause harm in a number of ways. If you can destroy a flyer, you can then capture the sprite within.

Maneuvering the jet-sled around the ocean is one of the most exhilarating experiences I've ever had in a game. Response to the mouse is instantaneous, sending you flying just above the surface of the water, and even under it. This submarine capability is one of the details that makes the game so special. You see a water-distorted image of your craft when you dive, and the illusion is so convincing you'll find yourself holding your breath.

If you like fast-action arcade games with excellent graphics and dynamic sound, this is the game for you. But even people who aren't fans of arcade games will find *Typhoon Thompson* a delight. Don't miss it.

TOM MALCOM

Amiga—\$34.95

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(800) 521-6263

## BARNEY BEAR GOES TO SCHOOL

Commodore has had some recent success in the education market with the Amiga, but it still has a long way to go before it can compete with Apple and MS-DOS machines in the classroom. One of the obvious problems for the classroom Amiga—ever since the machine's debut—is the lack of software, especially at the preschool and elementary-school levels.

To help fill this void, Free Spirit, a committed 64/128 and Amiga software publisher, has debuted *Barney Bear Goes to School*. According to Free Spirit, this package is the first in a series built around the Barney Bear character. In exploring new territory



Your kids will learn counting, spelling, the alphabet, and more as they guide Barney Bear through his day.

(educational software), Free Spirit has done a laudable job: *Barney* is a delightful program with nice graphics and good use of color. It has solid educational value, although I question the package's target age range of 3-8 years. It seems that ages 3-5, maybe age 6, would be a more appropriate range.

The premise of *Barney* is simple: Guide Barney through his day by following the narrator's prompts. You first find him in bed in the morning. The narrator's voice tells you to touch his shoulder, wake him, and help him get dressed for school. You get to decide whether Barney eats breakfast, and then you're off to school.

At school, you point and click on various objects in the classroom. Pick an object and you branch into count-

ing, the alphabet, spelling, painting, or just listening to sounds. (If the program were truly intended for children ages 6-8, it should have been deeper here. Surely, most kids age 6-8 can count to 10 and spell *cat*.) Kids will probably have the most fun by selecting the easel. Here they can paint a variety of pictures with a nice palette of colors.

*Barney* is an excellent effort with a lot to recommend it, especially for preschoolers and kindergartners. Here's hoping that Free Spirit can deliver a bit more educational depth in the series' future titles.

LANCE ELKO

Amiga, 1MB—\$34.95

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## THE HOUND OF SHADOW

Instead of the Sherlock Holmes mystery I was expecting when I opened *The Hound of Shadow's* package, I found a role-playing game based on H. P. Lovecraft's Cthulu horror-fiction works. Set in London in 1925, this isn't an adventure game in the traditional sense. It's much more of an atmospheric piece of interactive fiction, with puzzle-solving virtually eliminated in favor of character and event interaction. The approach is a good one, but in choosing to have certain events occur at certain times, the player is given no real control over them.

Too much time in *The Hound of Shadow* is spent waiting around for things to happen or being forced into arbitrary situations. Having missed an appointment with another character, I was snatched without warning from a location I was exploring and dumped into another scene. It's disconcerting and unfair to the player. Character and plot manipulation in a game of this type need to be much more subtle; I would much rather be guided than pushed.

The game's illustrations are ex-

traordinary, rendered in sepia shades and importing a wonderful feel for the period. The parser is among the better I've used, though I am absolutely appalled that the player isn't provided with any cursor movement or line-editing tools. If you make a typo, your only choice is to delete back to it.



Enter the strange world of H. P. Lovecraft's Cthulu mythos—if you dare.

Fans of Lovecraft and the horrors that sprang from his imagination will undoubtedly be enthralled with *The Hound of Shadow*, but if you're just expecting an enjoyable adventure, you'll be disappointed.

TOM MALCOM

Amiga—\$39.95

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## CANDO

When *HyperCard* took the Macintosh world by surprise three years ago, Amiga owners wished for a similar program to energize their machines. They looked for a powerful but simple "software erector set" that nonprogrammers could use to create custom applications with text, sound, graphics, animation, and interactivity.

*CanDo* from Inovatronics is the most ambitious attempt to date to fashion a *HyperCard*-style interactive authoring system for the Amiga, and it succeeds quite well on those terms. While in need of some polishing, it offers impressive programming power for the price.

*CanDo* documents or applica-

tions are called *decks*. Decks can be run under *CanDo* or, using a utility called the *Binder*, be made into independent programs that are freely distributable. If you plan to pass around your *CanDo* creation, you must include any graphics or sound files in the same directory that contains the deck.

Decks contain one or more *cards*, or screens of *CanDo* information. When you open a deck, you see the first card and the main control panel, which contains the most important tools for browsing through the deck. The main control panel has buttons for navigating from card to card, and it also gives you access to *CanDo*'s many layers of object-editing requesters. (All elements of a *CanDo* deck are called *objects*, from buttons and animations to the deck itself.)

These requesters contain a dazzling array of tools for customizing your decks. No other Amiga program offers anything like *CanDo*'s degree of control. You can create custom windows, file requesters, menus, embedded and editable text documents, buttons in several varieties, data fields, bitmapped graphics, brush animations, and sounds.

Most objects can be modified in several ways. For example, buttons (objects that you click on to initiate a specific action) can be practically any *CanDo* object, including IFF brushes and text in fields. The program offers a multitude of button styles with highlighting, outlining, shadows, and other special effects. Buttons also can be set to react to various mouse messages, such as clicking, double-clicking, dragging, and mouse button release—and each message can trigger a different button action. This opens up a can of worms for novice users who might not be sure how to trigger a button, so *CanDo* authors should be cautious about designing nonstandard buttons.

Behind the actions of any object is its script, or list of commands. By learning and using *CanDo*'s scripting language, you can gain even more control over the program and make your decks do some rather sophisticated tricks. Scripts can be attached to any object and trigger any action that can be accomplished through requester boxes and many actions that can't be.

*CanDo*'s command language gives you control over some aspects of

AmigaDOS, like file input and output, buffers, icons, and tooltypes. You can also use scripts to specify the properties of windows and other Intuition objects. With all the scripting tools provided, *CanDo* also makes a useful prototyping tool for programmers who want to design and test an application interface before doing actual programming in C or Assembler.

*CanDo* fully supports the *ARexx* language, with both incoming and outgoing messages. Your *CanDo* deck can communicate with other *ARexx*-compatible programs such as *Deluxe Video III*, *Digi-Paint 3*, *MicroFiche Filer*, and so on.



*CanDo* decks can include buttons, scrolling lists, and sampled sounds.

Documentation for a program as complex as *CanDo* is crucial; however, its manual earns a mixed review. It thoroughly discusses all aspects of the program (albeit in very tiny, hard-to-read type), but the two rather skimpy and poorly designed tutorials won't take you far; you'll learn more by examining the sample decks provided. An introductory section describing the nature of hypermedia, the uses for interactive programming, the structure of *CanDo*, and what the program is capable of doing is sorely needed.

Surprisingly, this generally well-thought-out program sports a few obvious shortcomings. There are no hooks for calling external commands and functions written in another programming language, an ability included in both *HyperCard* and Intuitive Technologies' *UltraCard*, an Amiga program very similar to *HyperCard*. *CanDo* doesn't support the standard ANIM format for animation, but only the animbrush format used in *Deluxe Paint III*. To import an ANIM, you'll have to first turn it into an animbrush outside *CanDo*. While text handling

in fields is good, there's no support for ColorFonts; that means no slick Kara Fonts in your decks unless you import them as brushes.

Memory management is a problem, too. I was able to crash *CanDo* on a one-meg machine by trying to import and play a 340K *DeluxePaint III* animation. Given the tight memory constraints for one-meg users, serious *CanDo* authors will want to spring for additional RAM. (You can, however, discard parts of the program you don't need, such as help files and *ARexx* objects, making for a leaner application that takes up less RAM and disk space.) And since *CanDo* doesn't have the sophisticated data-compression scheme that gives the Mac's *HyperCard* its speed, disk access for each new card makes the program crawl on a floppy-only system. Run *CanDo* from a hard disk to save your sanity.

Then there are the bugs and the interface's rough edges. Granted, many first-generation programs need some time to mature, but I was surprised at how many problems I had with *CanDo*'s own demo deck.

One card loaded a brush animation and sound, played them, and promptly froze the program, which then had to be rebooted. This and other problems indicate that creating a bug-free, well-designed, easy-to-use *CanDo* application is no piece of cake, even for programmers who supposedly know how.

*CanDo* isn't easy to learn or use—but few power programs are. Its heavy-duty arsenal of tools would be overkill for many applications. But if you're looking for a full-featured hypermedia tool or an authoring/prototyping system that gives you control over the Amiga OS but doesn't require expertise in C or Assembler—and you've got the hardware to run it properly and the patience to deal with the program's peculiarities—then *CanDo* is your best choice.

STEVEN ANZOVIN

Amiga; 1MB; 2 disk drives; additional RAM and hard disk highly recommended—\$149.95

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64/128

## STRIKE ACES

Each year, the quiet of the South Dakota Badlands is suddenly shattered by the scream of jet engines as the Strategic Air Command begins its annual bombing and navigation competition. In this contest, the best fighter/bomber crews from around the world attempt to outscore each other in such areas as accuracy, time control, evasiveness, and terrain following.

In Accolade's *Strike Aces*, you become a participating pilot in the competition. Whereas the actual winners receive the coveted Curtis E. LeMay trophy, you experience the action and make the split-second decisions of a modern combat pilot. And if you are successful, you gain the satisfaction of a difficult job well done.

While the manual describes *Strike Aces* as "first and foremost a game," there is sufficient detail to keep us nonpilots challenged for a good while. After you enter your name (and thus enter the contest), your first decision is the type of aircraft you will fly. Choose from four modern fighter/bombers: the McDonnell Douglas F-4E Phantom, the General Dynamics F-111F Aardvark, the Panavia Tornado IDS, and the MiG-27 Flogger-D. Each plane has its own capabilities and flight characteristics.

To aid you in your choice, you have both online specifications and a detailed picture of each aircraft. In addition, you can view the aircraft in 3-D as seen from the perspective of a chase plane. Your choice will be reflected in an aircraft-specific cockpit display.

You next decide the type of aircraft you wish the enemy to fly: an F-14 Tomcat, F5E Tiger II, or MiG-29 Fulcrum. Each of these has its own idiosyncrasies, and you need to learn them if you are to evade these planes successfully.

If you are like most hard-core computer users who want to fly the thing and forget about reading the manual, *Strike Aces* has you covered. You can jump into the competition

and fly a mission, or go to free flight, where you can practice maneuvers, including bombing and landing. It is here that you discover the 3-D scrolling landscapes and the multiple views available from your cockpit. Furthermore, there are multiple views of your aircraft. See your plane from an observer plane, a track view (from behind your aircraft), a satellite view, a control tower view, and an enemy view (from a chase plane behind your enemy). You even have a view from a missile you just launched at a SAM site. All proceed in real time, and you can watch yourself from outside the aircraft should you fly into the ground at 600 knots.



*Strike Aces* tests your bombing skills in friendly competition, not warfare.

If, however, you do take the time to read the manual, you will find plenty of information on flight controls, munitions, mission strategy, and maneuvers. A military pilot will have years of training before he flies complex aircraft and missions, but an hour or so with *Strike Aces* should get your gear up and you on your way toward a successful mission.

The key to success is planning. So before you actually take to the air, familiarize yourself with your mission objectives. The briefing is in three parts: a text summary, a map showing your planned course, and information about the target. You cannot return to this screen once a mission is underway, so it is well worth the time you spend memorizing the pertinent details.

The missions progress from relatively easy (take off, fly to target, destroy it, fly back and land) to complex (evade enemy radar, planes, and missiles; attack multiple targets; and engage in midair refueling). You cannot

attempt more difficult missions until you have successfully completed the easier ones. There are four difficulty levels with two missions each. If you "Top Guns" make it through all four levels, go back and do it again in a different plane to prove it wasn't a fluke!

You have at your disposal 13 different types of munitions, from "smart" guided bombs to cannon and cluster bombs. Smart bombs are good for destroying bridges, and cluster bombs are handy for punching holes in runways. When you arm your aircraft, there are online specs for the weapons to assist in your choice. Only those weapons available to a given aircraft will be displayed. After you choose your munitions, use the joystick to position the weapon on the aircraft. It is updated on both bottom and head-on views of your plane.

After you complete a mission, you are debriefed. Here you compare the planned mission course with the actual course you flew. Additionally, you relieve a report that describes your performance on that mission. If you were unsuccessful, (crashed, shot down, took out some friendlies), you can refly the mission. Alternatively, you can choose a new mission or select another pilot.

As a game, *Strike Aces* is sweaty-palm entertainment. As a flight simulator, it is a sweaty-palm education. The detailed pictures and multiple views of aircraft are magnificent. Sound effects, while limited, are well done. The roar of your engines even continues when the game/simulation pauses. You cannot save a mission in progress, presumably because you can't in real life either.

The decisions you make while playing *Strike Aces* mimic those of a combat pilot. There is just the right amount of complexity to keep you challenged while not miring you in details. It is not easy to offer a program that is both a game and a simulation of real world events, but *Accolade's Strike Aces* does a masterful job of being both.

DAVID MINNICK

Commodore 64 or 128, joystick—\$39.95

ACCOLADE  
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San Jose, CA 95128  
(408) 296-8400

## TURBO MASTER CPU

How many of us have become frustrated at the relatively slow operating speed of the 64? One-megahertz (MHz) computer operation sounded like something out of science fiction when the 64 was first released, but it was soon surpassed by virtually every other machine on the market.

Some of these increases in speed were illusory: A 4.77-MHz PC, for example, is actually grinding through code at only about twice the rate as a 1-MHz 64. The reason for this is that the PC takes more cycles to interpret and execute an instruction. This and a number of other drawbacks of the 8088 CPU led experts to pronounce it brain damaged when it first began to appear in computers.

Since processing in the 6502 family of microprocessors (including the 6510 and 65C02) is so efficient, not much has to be done for it to keep pace with the 8088. In order to make it as good as a 4.77-MHz 8088, simply double the 6502's speed. To make it as good as an 8-MHz 8088, quadruple its speed. And that's just what Steven Schnedler did. The Turbo Master CPU from Schnedler Systems is an accelerator for the 64 or 128 in 64 mode that speeds up the central processing unit (CPU) from 1.0225 MHz to 4.09 MHz.

Faster cousins of the 6502 have been around for a long time. The 4-MHz Apple IIC was released a couple of years ago. Other speed-up chips for the 64 have been available, too, but speeding up the 64 proved to be more of a challenge than simply speeding up the 6510. The problem is that while most computers are cooperative enterprises, willingly waiting an extra cycle or two for information to return from memory or slowing down for bus access, the 64 is a very tightly timed and integrated package. Signals not arriving at the exact moment they're expected can cause the entire operation to go awry. Doubling or quadrupling the speeds of these signals makes timing a nightmare.

The solution is to create a new 64 on a card, with new ROMs, new

RAM—new everything, in fact, except the timer chips, the keyboard, the SID, and a few other components. This raises the price to about the cost of a new 64. If you already have a 64, however, you can boost its capabilities simply by plugging in this card. Unlike other accelerator cards that have been sold, the Turbo Master CPU can work with the 128 (in 64 mode) without causing screen disturbances.

Not only can you improve CPU operation with the Turbo Master, you can also improve disk access (1541 or 1571 in 1541 mode only)—both saving and loading. (The unit doesn't



Boost your 64's speed to 4 MHz with the Turbo Master CPU accelerator.

work with tape drives.) In addition, Jiffy DOS has a chip that supports the Turbo Master CPU. It works with GEOS, but you have to install some special features to make it work, including a new mouse driver. It significantly speeds up GEOS operations, and *geoWrite* had no trouble keeping up with me. The drawing pad moves fluidly underneath the drawing window, with the disk drive chattering away as new parts of the VLIR file are opened and displayed. Until I tried Turbo Master, I hadn't realized how badly GEOS was hampered by the CPU.

Although it could not be tested for this review, a patch that Schnedler says he has developed will let GEORAM and Turbo Master work together, provided you have a cartridge slot extender that allows two cartridges to be turned on at the same time. It will also work with the 1764 RAM expansion unit (REU). Using either of these REUs requires a beefed-up power supply because you'll be operating what amounts to two computers and a ton of RAM.

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One of the settings on the Turbo Master CPU provides you with an alternative ROM in which the DOS wedge is a permanent resident.

An additional advantage of buying the Turbo Master is that it provides the 65C02 opcodes. These include the useful codes BRA, for branch always; PHX, PHY, PLX, and PLY, for pushing and pulling values between the X and Y registers and the stack; and STZ, which can be used to store 0 in a memory location in a single operation. Schnedler also makes an assembler that can take full advantage of these new opcodes.

Quietly, with little fanfare, dedicated admirers of the unassuming little 64 are updating and upgrading its capabilities. Steven Schnedler is one of these admirers, and his company deserves your support.

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## CURSE OF BABYLON

**M**ost games imported from other countries prove themselves worthy of being shipped to America. *Curse of Babylon* is no exception.

This arcade adventure game puts you up against a bevy of monsters, from bats and dragons to demon cats and Medusalike creatures. *Curse of Babylon* was originally released for the NEC computer in Japan and is brought to America by Kyodai. In Japan, the game was simply called *Babylon* and was a big hit with computer gamers there.

In *Curse of Babylon*, you must rid the title city of monsters and release the wizards who have been captured by an evil man. You do this by jumping and fighting your way through more than 150 screens of action both above and below ground. Along the way, you'll find many weapons and magical items. You must determine

the best time to use these items, but look for better weapons as you move through the game.

You start out with a shield and knife, but you'll need more than these to succeed. To help you keep track of the objects you find, as well as other necessary information in the game, there is an options screen you can access by pressing RETURN. From this screen, you can select a magic article to be your current item, select one of seven bits of music the game offers, save a game, load a game, and examine statistics. Statistics include hit points (how much damage you can take), magic points (how much magic you can perform), strength, defensive power, weapon strength, and shield defensive power.



In *Curse of Babylon*, you face a bevy of monsters in waves of arcade action.

At the bottom of every screen is a strip of counters or indicators to help you. These include a crest counter (any crests that you locate help the wizards), a key counter, a healing-potion counter, a magic-item selector, a shield- and a weapon-status indicator, a current-hit-points indicator, and a current-magic-points indicator.

As you move through the screens, kill monsters and collect any objects that you discover. Occasionally, when you kill a monster, you'll find a potion or some other useful object. Red potions increase magic power. Blue potions are very important, as they restore hit points and magic points to their respective maximums—but only when your current life runs out of hit points.

There are seven magic items and six magic spells in the game. You'll know when to use them only through experimentation. By collecting keys to get into rooms and finding special

items and potions in rooms, you progress through the game. It's very easy to lose lives, however, if you don't remain alert.

Once a monster is removed from a screen, it will not return. You can use this feature or the pause key to catch your breath. I recommend that you save the game frequently in order to finish it. Potions and objects are in the same place every game, so you may want to remember where they're located.

The graphics in the introductory screens show off the 64 at its best. The game graphics, however, are a little on the dark side but are still fairly good. The impressive elements of *Curse of Babylon* are its ease of play and the tremendous amount of music. The manual is put together well, with easy-to-read language that describes the screens and your goal. Pictures of monsters from the game are printed throughout the manual.

Ultimately, *Curse of Babylon* is fun and takes several hours to finish, giving you more than your money's worth. And that's what's important.

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## HEAT WAVE

**A**ccolade has a good reputation in the area of speed simulations. Leafing through its product catalog, you can choose to race a sleek supercar like a Ferrari F-40 through the California countryside or a Porsche on the Autobahn. You can drive a 1963 Corvette Sting Ray or another so-called muscle car, pilot a Blue Angel F/A-18 through the azure sky, straddle a cycle through the International Grand Prix motorcycle racing circuit, or hit the Grand Prix circuit for Formula One racing. Not wanting to exclude water vehicles from all this high-speed action, Accolade now offers *Heat Wave*, an off-shore superboat racing program.

*Heat Wave* is fun and provides some diverting entertainment, but it's







# REVIEWS

not up to the standard set by Accolade's previous titles. It's not detailed enough to be a simulation, nor is it challenging enough to be an arcade game.



You can burn up the water from San Francisco to Miami in *Heat Wave*.

You choose from six course offerings: four offshore near Miami, one in the San Francisco Bay, and one on the Mississippi River. Next, select your boat from three deep-V-hulled boats and a catamaran. Each of these boats has unique characteristics that offer certain advantages depending on water conditions. Before you take off, you can add gasoline and up to three spare parts. Then it's on to practice, qualification time trials, and the race itself.

The joystick controls the boat's speed, direction, and trim. The space bar pauses the action. Status Key Indicators flash whenever something important happens. Press a corresponding key to see what's up. Navigation displays the current course map, and Time Sheet tells you how you're doing. Your time is recorded whenever you pass a marker buoy, as are any penalties you incur for such things as missing a marker, making repairs, or jumping the starting flag. Damage spells out what's gone wrong and provides a menu to allow you either to fix things or exit the race.

Your control panel bears the usual instruments and gauges: starter, fuel gauge, compass, clock, engine temperature, speedometer, and tachometer. The panel also informs you when your trim needs adjusting, and it allows you to activate the bilge pump.

All this has the potential for an exciting race program, something like *The Duel* on water. There's even a neat bobbing effect before the race starts. Good music and nice-looking

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background graphics foreshadow a good race, and a run in the boat is fun enough—but the anticipated excitement never materializes.

While there are some indications that one type of boat handles better than another (the rate of gas consumption, for instance), there's no appreciable difference among the boats. Their cockpit dashboards are identical; the design is the same for all four boats. There's no real difference between Rookie and Experienced Racer, either. While the various course maps indicate that you pass under bridges, we've yet to actually do so. Bridges appear only in the distance. The courses even seem similar—possibly because there are no changes in the water conditions. Basically, there is little challenge once you've accustomed yourself to the program.

The manual refers to two keys not present on the 64: the Escape and Tab keys. While pressing any key works in place of the Escape key, we couldn't find any key to instantly kill the engines, the Tab key's function.

The *Heat Wave* package refers to designing a custom course, a feature that could attract many buyers. Note that this option is *not* supported in the 64 version. You can probably make your own course on other computers—there are *Heat Wave* versions for the IBM, Amiga, Atari ST, and Apple IIGS—but you can't do it on the 64. I wish package designers would keep the different versions of the product in mind when they start listing a game's features on the box.

*Heat Wave* has potential, and if you want to polish your basic boat-racing skills, it offers good practice. However, to live up to the hype of the packaging and to Accolade's reputation, these problems need to be addressed: correct the manual, vary the course conditions and play levels, put back the bridges, and let us design those custom courses. In other words, make the product do what it says it will. Then you'll have a terrific game.

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## MICRO LEAGUE WRESTLING

If you've seen World Wrestling Federation (WWF) wrestling at your local arena or on television, you know there are certain rules the wrestlers must follow: Always talk in gruff tones at no less than 90 decibels, and animate gestures as much as possible when an audience or TV camera is in view. And they are required to end each and every interview with a growl and a display of their muscle development.

Other than these few, modest guidelines, it appears that each punch, hold, and elbow swing that wrestlers execute—both in and out of the ring—are allowed and considered legal. These antics and more are now available for the 64. They are duplicated with incredible accuracy in *Micro League Wrestling* by Micro League Sports.

The Superstar of the WWF, Hulk Hogan, is featured in this game of rough-and-tumble action. His mission is to staunchly defend his title against such ruffians as Randy "The Macho King" Savage and Paul "Mr. Wonderful" Orndorff.

*Micro League Wrestling* features digitized video of actual wrestling action. Digitized pictures flash in rapid succession as the flamboyant world of the WWF unfolds on the computer screen. The effect accomplished by the changing pictures, combined with a little imagination from the user, creates the environment that is very close to watching a televised match.

As they do on television, the wrestlers strut, posture, and expound their virtues in prematch interviews with "Mean Gene" Okerlund. The printed dialogue of their remarks appears beneath their pictures as they gesture wildly and contort their faces in anger. When the match begins, announcers Vince McMahon and Jesse "The Body" Ventura offer their opposing commentary on the wrestlers' abilities and physical status.

The player who assumes the role of the Hulkster chooses from a menu of specialized moves and then enters a selection. The computer, in one-player mode, or a second player, acting as

Macho Man or Mr. Wonderful, also chooses and enters a move. The program determines which of the two has succeeded in making the best choice. It then promptly displays the digitized video, in graphic detail, of the selected Elbow Drop, Body Slam, Suplex, Eye Rake, Atomic Drop, and so on as it is being delivered to the recipient. Ouch!

Just as if it were a live match, the players have to contend with distractions. The Hulk's manager, the Lovely Miss Elizabeth, captures his attention for a brief moment, and he is clubbed from behind with a stool. Manager Bobby "The Brain" Heenan enters the ring when the referee isn't looking and delivers a blow with a lead pipe. To rally his dwindling power, the Hulkster calls to the audience for support and absorbs their cheers. Inspired by their enthusiasm, he rises to the occasion, and often to victory.

A Power Level Bar of each wrestler, as well as his Damage Points tally, are shown at the bottom of the screen. The wrestler who can pound his opponent into submission within the allotted time of the match is declared the World Champion and is given the massive championship belt to hold before the cheering crowd.

According to the documentation, there are supplemental disks, sold separately, containing other WWF Wrestling Stars to challenge the Hulk and the title. My kids, who are avid wrestling fans and who have played this game extensively, can't wait to find the additional disks.

For their sake, and for the sake of other youngsters, I was pleased to see a message on the opening screen that explains that the moves and actions of the wrestlers are performed by professional athletes and should not be attempted by others, except on the computer. This message has served its purpose successfully, at least in my household. Now if I can only get the kids to stop wearing those silly headbands and posing in front of the mirror in their underwear.

STEVE HEDRICK

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### GRAMMATIK MAC

Good writing doesn't come easy. It takes practice—a lot of it—to write effectively. Unfortunately, most of us don't have the time or the training to write well. We know our writing is merely adequate, but we don't know how to make it better.

*Grammatik Mac* helps you improve your writing. This full-featured program evaluates your prose for grammar, style, usage, and punctuation problems and then lets you edit and make corrections. It does nearly everything but put red marks on your paper.

The program checks for an array of grammatical and stylistic errors, displays each problem in context, and then lets you make immediate changes. You can accept *Grammatik Mac's* advice (usually good), substitute your own correction, ignore the problem, or mark it for later review.

Grammar may be its namesake, but *Grammatik Mac* flags everything from overly long sentences to transposed letters and archaic terminology. I thought its constant nagging about passive voice was particularly valuable, and I was thankful for its careful attention to subject-verb agreement. *Grammatik Mac* can check spelling as well, but your word processor's spelling checker is probably faster and its dictionary larger.

Once you've cleaned up the document, *Grammatik Mac* provides a blizzard of statistical facts about your writing. You'll see grade-level readability scores, sentence-length averages, passive-voice percentages, and more. The

statistics are really only useful in spotting general problems. Unfortunately, the program refuses to recognize carriage returns in both *Word 3.0* and *WriteNow* files, so it reported that my files contained only one paragraph!

You can customize *Grammatik Mac* to some extent by changing its writing style and adding to or dropping the grammatical rules it checks. Try out each style—general, business, technical, fiction, and informal—before deciding which one is best for you. I use general for most of my writing, though I change to fiction when I don't want my sentence fragments questioned. *Grammatik Mac* isn't as easily customized as the program's PC version, which includes an editor you can use to create new rules and modify existing ones. Look for a planned upgrade to *Grammatik Mac* that will closely follow the features and improvements in *Grammatik Windows*.

*Grammatik Mac's* interface is sometimes confusing, making the program more difficult to use. To change rule classes, for example, you use a strange Command-click combination instead of a standard click or double-click. If you don't click on the Save button at the opening screen, you can't save a modified file under a different name. And switching between *Grammatik Mac* and a word processor takes time, even with MultiFinder, for you still have to save the document in one program before using it in the other.

I find *Grammatik Mac* a useful writer's tool, but I don't take all of its advice. If I did, my writing would sound too formal and too dull. The hallmark of a good editor and proofreader is the ability to pinpoint problems and recommend changes. The hallmark of a good writer is to know when the recommendations work. *Grammatik Mac* looks over your shoulder and reminds you of the rules. You still get to decide which rules to break and which to bend.

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### MISSION STARLIGHT

The doctor says I have to take a break from playing *Mission Starlight*. Just until the swelling in my finger goes down. It's nothing serious; I just pushed the fire button one time too many. But who could blame me? Casady and Greene has released a very addictive arcade game.

The game has two phases. First, you fly to a planet, killing enemy ships as you spiral down to the surface. Along the way, you dodge asteroids and pick up bonus orbs to earn extra ships and extra missiles. You can always use extra ships and extra missiles because it's so easy to lose them.

Once you get through the space gauntlet, you enter the second phase—a tougher battery of foes on the

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planet's surface. You fly toward an enemy base, firing missiles at the main building. It wouldn't be so hard to hit the building if it weren't for the enemy fliers that pursue you so relentlessly. And it would be easier to destroy the base if you only had more missiles.

*Mission Starlight* is a difficult challenge. It takes a long time to master the controls, and you have to figure out when your enemies are close enough to hit you. Then you have to nail down the evasive tactics that will save your life on the planet's surface.



**Knock out the alien power plants with *Mission Starlight*.**

On the surface and in space, the graphics are excellent. Each type of ship has a special shape, and that shape plays a role in how hard the ship is to destroy. For example, when you fly to the first planet, there's a diamond-shaped ship that rotates. In one stage of the rotation, the ship will hit you unless you dodge it. In another, you can fly right over it and zap it to astral smithereens. The trick is knowing when to dodge and when to zap.

And you don't just see the zaps—you hear them. As with other Casady and Greene games, *Mission Starlight* is a symphony of great Macintosh sounds. From the first ditty at the introductory screen to the eerie electronic hum as you choose the next planet to conquer, the game puts the Mac through its audible paces.

The game runs fine on most home computers, but watch out if you have any INITs or special video requirements. The company includes a special INIT that takes care of most of these problems, but some INITs can still cause trouble.

Probably the biggest shortcoming of the game is the way it uses the mouse. The mouse isn't a precise enough controller for this game. I had

to use the keyboard instead. It's easy to map the keys just as you like them, and I appreciated that feature. But I'd like to see the mouse play a bigger role in the game.

Mouse or no mouse, I'd like to play more *Mission Starlight*. It's proof that the Macintosh is a fine platform for pure fun.

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## ULTRAPAIN

This program has almost everything a Mac artist needs in a graphics package—at a very reasonable price. It does the work of four different programs: a basic black-and-white paintbox in the *MacPaint* mold, a low-level structured drawing program such as *MacDraw*, a gray-scale/8-bit color image processor for editing scanned art, and an 8-bit color paint program.

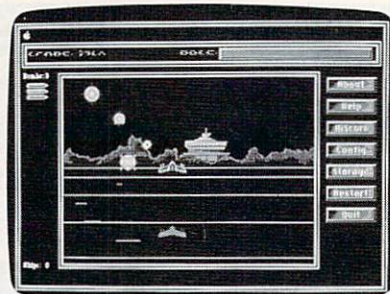
Not only does it offer all the standard graphics tools you've come to expect, but it has a remarkable amount of advanced functionality. Up to eight layers can be combined in one picture; layers can be paint, draw, or a combination; and any layer can be hidden or grayed. You can edit objects at up to 600 dpi, kern text to fractional widths, and do Boolean operations on draw objects (OR, XOR, BIC, and so on) in order to combine them in different ways.

Image-processing effects for gray-scale and 8-bit images include adjustments to luminance, sharpness, contrast, blur, and pixelization. Bezier curve editing is available for high-resolution drawing, and an adjustable autotrace tool—one of the best I've used—converts paint images to draw images with good fidelity. *UltraPaint* imports and exports all the standard graphics file formats except EPS (Encapsulated PostScript).

The program's most innovative feature is its modular open architecture. *UltraPaint* is designed to accept

external tools, letting you easily add innovative paint and draw effects and create new kinds of objects. These options can be added to the program by simply dragging them into a special folder; the external tools then become available in their own tool palette. Among the more useful external tools included in the package are a chalk tool, for charcoal and pastel effects, and a water droplet tool, for blending the edges of paint objects.

*UltraPaint* is compact and useful, but no program is perfect. I missed small but significant features, such as autoscrolling on demand, resizing paint objects by percentages, and the ability to automatically set the opening size of a new painting to the size of the monitor you're using (pictures always open in the default 512 × 342 standard Mac screen size).



***UltraPaint* is four different kinds of graphics programs rolled into one application.**

Many of the more specialized tools contained in dedicated color paint and gray-scale-editing packages aren't in *UltraPaint*, but the program's open architecture means that these tools can be added later.

Most serious Mac artists will already have invested in higher-priced software that does everything *UltraPaint* can do. But for the Mac artist looking for one package that does it all, *UltraPaint* is the best and most cost-effective choice. It could be all you ever need in a graphics program.

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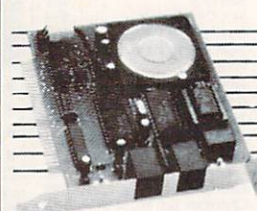
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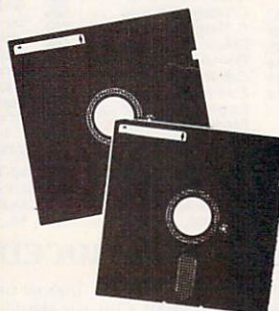
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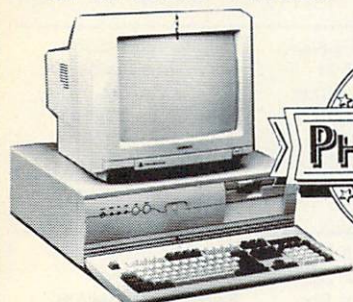
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<p><b>Jet-Boys</b></p> <p><b>64/128</b></p>	<p>Strap on your jet pack and scroll horizontally through hordes of galactic terrorists. Learn the pattern of your attacking foes and try to grab more powerful weapons as they fly by. <i>Jet-Boys</i> is one of those fast-paced arcade-style games that make you thankful you aren't paying 25 cents each time you play it. You could go broke trying to master it. Colorful, smooth-scrolling, but frustrating.</p> <p><i>Tom Netsel</i></p>	<p>Commodore 64 and 128, joystick required</p>	<p>Avantage 550 S. Winchester Blvd. Suite 200 San Jose, CA 95128 (408) 985-1700 \$34.95</p>
<p><b>WritePro</b></p> <p><b>PC</b></p>	<p>This program claims to teach creative writing. <i>WritePro</i> requires you to begin with a character and an antagonist, from whom the plot will flow. By drawing on solid rules for fiction and using repetitive reinforcement, it should help any beginner. <i>WritePro</i> is available in two packages, one containing Lessons 1 and 2 and the other with Lessons 3 and 4. A built-in word processor is included.</p> <p><i>Ervin Bobo</i></p>	<p>IBM, Tandy, or compatible PC; 512K; DOS 2.0 or higher; one floppy drive</p>	<p>WritePro 43 Linden Cir. Scarborough, NY 10510 \$89.95 (all four lessons)</p>
<p><b>Shinobi</b></p> <p><b>64/128</b></p>	<p>This is one of the better arcade-style ninja games. The pace is nonstop, the joystick maneuvers easy to master. Your ninja scrolls horizontally on two levels, trying to take out thugs, gunmen, and frogmen before they eliminate him. Fling lethal shurikens or use your deadly fists to take out foes. When all else fails, rely on your ninja magic. But use it sparingly as you battle the evil Ring of Five.</p> <p><i>Tom Netsel</i></p>	<p>Commodore 64 and 128, joystick required.</p>	<p>Sega of America Distributed by Electronic Arts 1820 Gateway Dr. San Mateo, CA 94404 (415) 571-7171 \$34.95</p>
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<p><b>Island of Lost Hope</b></p> <p><b>AMIGA</b></p>	<p>A graphic adventure with crisp, overscan artwork, this game is simplistic and arbitrary. It has onscreen mapping, programmable function keys, and three methods of movement, but it lacks depth. <i>ILOH</i> is linear; there's generally only one method for solving the rather unimaginative puzzles. It's also short—I finished it in a matter of hours. A good starter game for beginning adventurers, it will disappoint experienced players.</p> <p><i>Tom Malcom</i></p>	<p>Amiga</p>	<p>Digital Concepts 43035 Hayes Sterling Heights, MI 48078 (313) 772-1416 \$39.95</p>



PC	<b>Menu! version 2.1</b>	<p><i>Menu!</i> is an operating-system shell that lets you assign 25 programs to a menu called from your AUTOEXEC batch file at boot time. Pressing a letter key A-Y will call up the program associated with that letter on the menu. <i>Menu!</i> also offers a short list of DOS commands on a submenu called up by pressing Z. <i>Menu!</i> can provide prompts that precede and follow program operation and keypresses within the program.</p> <p style="text-align: right;"><i>Robert Bixby</i></p>	<p>IBM, Tandy, or compatible PC; 68K; DOS 2.0 or higher; hard disk recommended</p>	<p>POP Computer Products P.O. Box 1833 Evergreen, CO 80439 \$29.95</p>
PC	<b>Cactus Calendar</b>	<p>This is a comprehensive calendar program that caters to the needs of salespeople or other professionals requiring minute time management of multiple tasks. <i>Cactus Calendar</i> can produce several types of calendars in addition to daily calendars for task and appointment lists that utilize 5½ × 8½ inch 3-ring binders. The program's strong suit is calculating repetitive events. Unfortunately, no onscreen calendar display is possible.</p> <p style="text-align: right;"><i>James W. Maki.</i></p>	<p>IBM, Tandy, or compatible PC; 640K; DOS 2.0 or higher; Epson (9- or 24-pin) or HP LaserJet II or compatible printer</p>	<p>Cactus Software P.O. Box 880 Peoria, AZ 85380-0880 \$49.95</p>
PC	<b>ColorIX VGA Paint</b>	<p>This is the most powerful PC paint program I've seen. It supports 360 × 480 with 256 colors on most VGA cards—that's nearly three times the usual VGA resolution for 256 colors! With SuperVGA graphics adapters, you can go all the way up to 800 × 600 with 256 colors or 1024 × 768 with 16 colors. <i>ColorIX VGA Paint</i> uses pop-up menus so you can see the whole picture, but it takes awhile to learn the sequence of menus.</p> <p style="text-align: right;"><i>David English</i></p>	<p>IBM, Tandy, or compatible PC; 384K; DOS 2.0 or higher; VGA graphics adapter; mouse recommended</p>	<p>RIX Software 18552 MacArthur Blvd. Suite 375 Irvine, CA 92715 \$199.00</p>
PC	<b>GraphMaster</b>	<p>With <i>GraphMaster</i>, you can create bar, line, pie, area, and scatter graphs from data typed at the keyboard or sequential data read from a disk. The program includes a handy pixel-level graph editor which you can use to transform your graphs into complex pictures. The program is easy to use and inexpensive, but it can only display in CGA (640 × 200) and Hercules (720 × 348) and only print in CGA to IBM- or Epson-compatible printers.</p> <p style="text-align: right;"><i>David English</i></p>	<p>IBM, Tandy, or compatible PC; 256K; DOS 2.1 or higher; graphics adapter; printer optional</p>	<p>Zephyr Services 1900 Murray Ave. Pittsburgh, PA 15217 \$39.95</p>
PC	<b>Microace Blackjack</b>	<p>While <i>Microace Blackjack</i> probably should be played only for fun, this program also purports to hone your skills and increase your winnings at blackjack. Four built-in strategies may be used to beat the house, or you can design your own and let the computer analyze it. Practice in card counting is supported, though this is a chancy skill in multiple-deck games. Have fun with it, but don't bet the rent.</p> <p style="text-align: right;"><i>Ervin Bobo</i></p>	<p>IBM, Tandy, and compatible PCs; 512K; DOS 2.0 or higher; MDA, CGA, EGA, or VGA</p>	<p>Microace Box 5223 Englewood, CO 80155 \$49.95</p>
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PC	<b>Qix</b>	<p>Qix is an excruciatingly simple game with an itchy fascination much like <i>Tetris</i>. The object is to capture territory while avoiding contact with randomly moving shapes. When you conquer more than a set percentage of the screen, you receive points based on how far you exceeded the threshold. You will never sit down with the intention of wasting hours on <i>Qix</i>, but something prevents you from putting it away.</p> <p style="text-align: right;"><i>Robert Bixby</i></p>	<p>IBM, Tandy, or compatible PC; 512K; DOS 2.1 or higher; CGA, MCGA, Tandy 16-color graphics adapter; supports Ad Lib sound board; joystick recommended</p>	<p>Taito 267 W. Esplanade Suite 206 North Vancouver, B.C. Canada V7M 1A5 \$34.95</p>
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